Township of Lanark Highlands - Waste Management Plan

January 18, 2022

Prepared for:
Township of Lanark Highlands

Cambium Reference: 13711-001

CAMBIUM INC.

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Executive Summary

The waste management industry is currently undergoing significant changes that will present opportunities and challenges and will likely change how the Township will operate its waste related activities in the future. The Township of Lanark Highlands (Township) contracted Cambium Inc. (Cambium) to prepare a Waste Management Master Plan (the Plan) in anticipation of these changes.

The goals of the Plan, as identified by the Township, are to

GOALS

1. Optimize service delivery to reduce costs of waste management operations
2. Increase capacity/reduce waste volumes at the landfill
3. Increase waste diversion

In developing the Plan, Cambium utilized research and its expertise in municipal "best practices" for waste reduction programs and planning. The project team also applied awareness of trends and anticipated future regulatory policy changes to support its recommendations.

Through development of the Plan the following objectives were identified:

OBJECTIVES

1. Implement 3 initiatives to reduce net operating costs by 2030
2. Reduce the annual volume of waste and cover to landfill by 25% through implementation of diversion programs and improved operational practices
3. Increase overall landfill diversion rates to 50% by 2030

Methodology

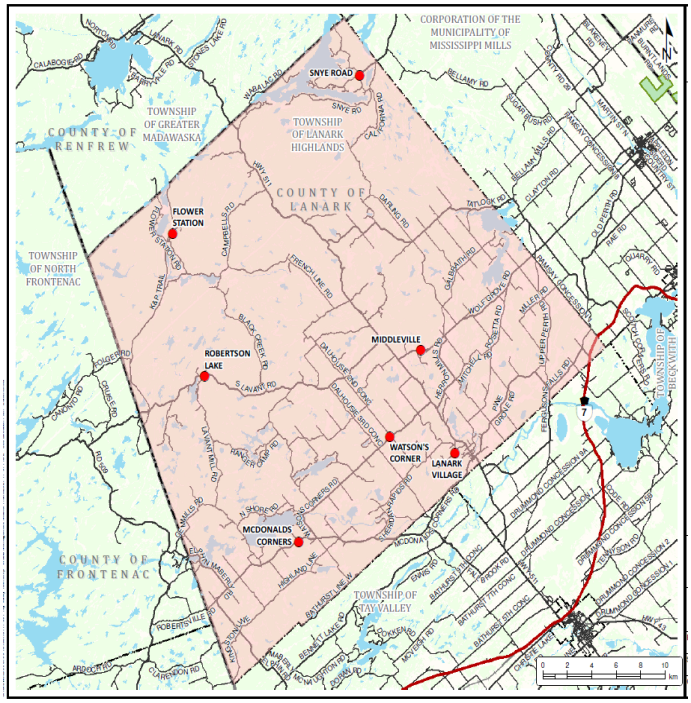
Cambium worked closely with the Township to outline a roadmap/methodology for the successful development of the Plan. The methodology included:

- Meetings with Township staff
- Visits to the Townships operating Waste Disposal Sites (WDS)s

- Review of relevant waste policy and legislation
- Review of Township programs, performance, and financial statements
- Community engagement
- Development and assessment of options to achieve the desired goals and objectives
- Development of the Plan

Current Waste Management System

Permanent and seasonal residents in the Township are currently provided depot drop-off services at seven Waste Disposal Sites (WDS)s. In addition, households within Lanark Village receive curbside pick-up of both garbage and Blue Box recyclable items. All services are operated by a 3rd party contractor. Curbside collection services are currently provided by Emterra and day-to-day operations at each WDS location are provided by Robert Alexander.



Landfill Capacity

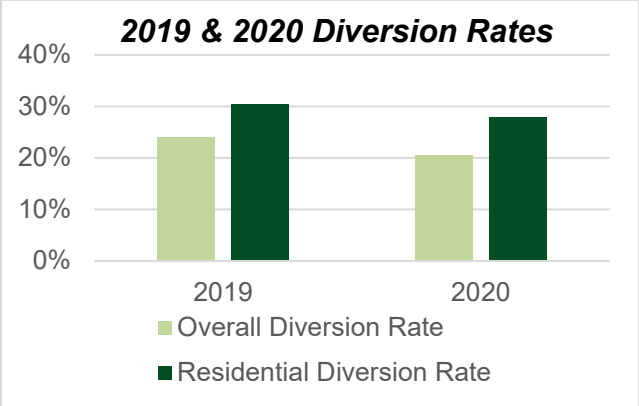
The Township currently operates one landfill at the McDonalds Corners WDS and transfers garbage from the other WDSs and curbside collection program to this landfill for final disposal.

The McDonald's Corners landfill is reaching capacity (space left for garbage); however, the Township is planning an expansion of the site. The Township also has landfill capacity at the Robertson Lake and Snye Road WDSs. Overall, without the McDonald's Corner expansion, the Township has an estimated 9.5 years as of December 2020 based on current rates of fill (5,000 m^3/year). If the 40,000 m^3 expansion is approved, it will add an additional 8 years of remaining capacity in the Township, for a total of 17.5 years.

Waste Generation and Diversion

Cambium determined that Township residents are currently generating approximately 300 kg/person/year of garbage and 55 kg/person/year of recycling.

The waste diversion rate is a measure of the percentage of waste that is kept out of the landfill. It is calculated by dividing the waste diverted (recycling) by the total waste generated (garbage + recycling). Based on the information available, the estimated total waste diversion rate for the Township was 24% in 2019 and 20% in 2020. The "residential only" diversion rate (calculated by excluding the construction demolition) waste was estimated at 30% in 2019 and 28% in 2020.

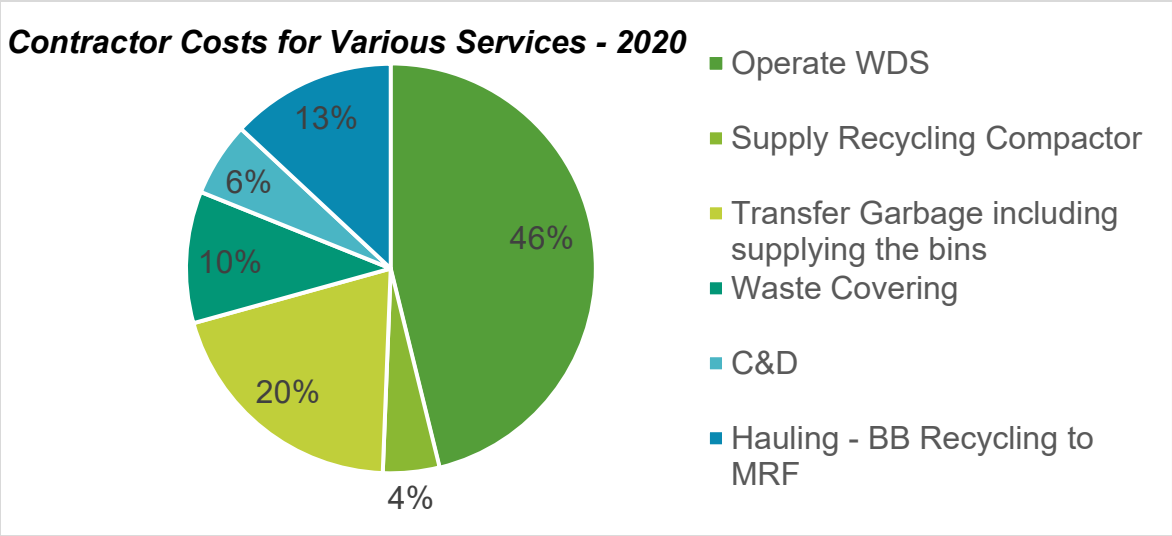


Financial Considerations

The current waste management program operates at a net cost to the Township, meaning the expenses exceed the revenue. In terms of the expenses, the Township experienced a 27% increase in total waste management costs in 2020 versus 2019. The increase was driven by higher WDS operating costs, BB processing fees, and costs to run the household hazardous waste (HHW) program.

The WDS operating costs increased most notably for hauling of Construction Demolition (C&D) and garbage. The increase in BB costs was attributed to increase processing costs, and the higher HHW program costs were associated with more contracted operation of the depot in 2020.

Overall, the third party WDS management fees are the largest expense, at 60% and 55% respectively of the total expenses in 2019 and 2020. The costs are associated with various services as broken down in the Figure below.



These findings help to direct the approach Cambium used to develop initiatives for the Plan.

Community Stakeholder Engagement

Feedback from residents was gathered primarily through a survey. The survey was available online and in hard copy at the WDSs. A total of 314 residents responded to the survey. Overall residents rate the Townships waste services a 4 out of 5. Respondents to the survey were generally supportive of construction demolition recycling, and a mattress recycling program, and not supportive of reducing the number of WDSs. The responses to the surveys were considered in development of the Plan as described further in the report. Survey results are included in Appendix E.

Options, Recommendations, and Implementation

In completing the analysis of current programs and performance, several opportunities for improvement and optimization to meet the Plans goals were noted.

One of the challenges encountered in the project was the “competing” nature existing between the goals in that increasing diversion (and extending landfill life) generally results in higher net operating costs. To meet the goals of the Plan the Township will need to implement a balance of initiatives focused on cost savings and increasing waste diversion.

A total of 57 recommendations were generated through the Plan's development. The Implementation Plan prioritized the top 20 recommendations to implement in the short-term (1 - 3 years) and medium-term (4-6 years). A few planning recommendations are also identified for the longer-term (greater than 6 years).

Short-term (2022, 2023, and 2024)

Short term recommendations were based on two main principles: firstly, that the Township should improve record keeping and performance tracking to support their decision-making processes, and secondly, that there is limited capacity remaining at the existing the McDonald's Corners landfill. For the second principle, the Township needs to prioritize diversion of waste from the landfill site until the WDS expansion is approved or implemented. The short-term recommendations include:

- Implement an improved data management system
- Improve tracking of BB revenues and expenses
- Implement a mattress recycling program
- Chip construction and demolition material to use as alternative daily cover material
- Separate C&D recyclable materials at Middleville and transfer to recycling facility
- Increase chipping of brush to use as alternative daily cover and to give away or use offsite as ground cover
- Initiate plans with the Ministry for future WDS capacity at McDonalds Corners
- Reduce the number of WDSs from seven to five
- Implement reusable alternative daily cover

Medium-term (2025, 2026, and 2027)

Medium term recommendations were based on two principles. Implementing best practices associated with waste management and improving/optimizing service delivery. Medium-term recommendations include:

- Implement a backyard composting program
- Implement improvements to the re-use program
- Reduce the frequency of garbage transfer to the landfill in the winter
- Take responsibility for operating the WDSs, HHW, and curbside garbage collection in-house
- Implement a clear bag garbage policy

At a minimum the implementation plan will help the Township achieve its objectives as follows:

1) Reduce net operating costs by 2030:
    a. Reducing number of WDSs: $40,000 savings annually per site
    b. Seasonally reducing the frequency of hauling garbage from the transfer stations to McDonald's Corners: $16,000 savings annually
    c. Reduce cover and compaction events to twice weekly: $10,000 savings annually
    d. Assuming operation of the WDS: $70,000 savings annually
    e. Township staff operating the HHW depot $30,000 annually
    f. Township staff providing curbside garbage collection $7,000 annually
2) Reduce the annual volume and increase residential diversion rates can be met by:
    a. Implement clear bag policy: 37 tonnes reduction annually
    b. Implement mattress diversion program: 20 tonnes reduction annually
    c. Implement a C&D diversion program: 115 tonnes reduction annually
    d. Use C&D as alternative daily cover: 115 tonnes reduction annually
    e. Other Cover and Compaction Initiatives: 400 tonnes reduction annually
    f. Implement "At Home" composting program: 15 tonnes reduction annually

Implementing the recommendations above help the Township achieve its objectives by providing:

- Plans to reduce the annual landfilled waste by as much as 1,404 m^3 and increase overall diversion rates to 37% by the end of 2027. By implementing the recommendation to improve data tracking, additional measures to reduce waste will be easily identified.
- Plans to reduce annual operating costs by $216,500 through optimization of existing services. With new operating costs proposed to be $44,775 (mattress recycling, chipping C&D etc.) the net annual operating savings are projected at $171,725.
- The initiatives in this Plan could increase the lifespan of the Townships WDSs by 6 years.

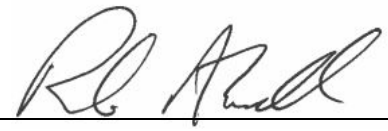
A one-time cost of $53,500 was also identified for the purchase of reusable cover (steel plates) and public education for changes related to the recommendations in this plan.

It is recommended that the Township review their Waste Management Master Plans every 5 to 10 years to measure performance. As the Blue Box program is scheduled to transition in 2026, the Township should formally review this plan following the implementation, in 2027 or 2028.

Respectfully submitted,

Cambium Inc.

Nicole Heikoop, M.Sc., GIT
Technician



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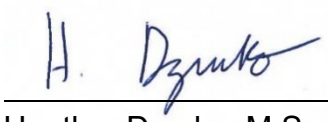

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1.0 Introduction

The Corporation of the Township of Lanark Highlands (Township) contracted Cambium Inc. (Cambium) to prepare a Waste Management Master Plan (the Plan). The Township previously completed a Waste Management Master Plan in 2014 (Lanark Highlands, 2014) to review waste management programs and create a plan to increase waste diversion. That 2014 plan identified the main challenges as having limited budget and personnel for waste management initiatives and a large geographic area with a relatively small population. The 2014 Waste Management Master Plan also included a Waste Recycling Strategy (WRS), to specifically address ways to increase Blue Box (BB) diversion.

The waste management industry is currently undergoing significant changes that will present opportunities and challenges and will likely change how the Township will operate its waste related activities in the future. Specifically, the shift towards Individual Producer Responsibility (IPR) offers a new framework for managing recyclable materials, as discussed in Section 1.4.3. The Plan is also being developed at a critical time, as the Township's existing operating landfill (McDonald's Corners) is nearing capacity and the combined and approved landfill site capacity of the Township is less than 10 years at existing fill rates.

1.1 Goals and Objectives

The goals of the Plan, as identified by the Township, are to

GOALS

1. Optimize service delivery to reduce costs of waste management operations
2. Increase capacity/reduce waste volumes at the landfill
3. Increase waste diversion

The Plan also builds on the WRS included in 2014 and includes recommendations to increase waste diversion. These goals will be accomplished through the implementation of strategically chosen initiatives and operational updates.

In developing the Plan, Cambium utilized research and its expertise in municipal "best practices" for waste reduction programs and planning. The Cambium team also applied awareness of trends and anticipated future regulatory policy changes to support its recommendations.

Through development of the Plan the following objectives have been identified:

OBJECTIVES

1. Implement 3 initiatives to reduce net operating costs by 2030
2. Reduce the annual volume of waste and cover to landfill by 25% through implementation of diversion programs and improved operational practices
3. Increase overall landfill diversion rates to 50% by 2030

1.2 Study Area

The Township covers approximately 1,033 km^2 in the western corner of Lanark County, approximately 100 km west of Ottawa, Ontario. The Township is adjacent to the Tay Valley Township and the Township of Drummond/North Elmsley to the southeast, the Township of Mississippi Mills to the northeast, Frontenac County to the southwest, and Renfrew County to the north-northwest. Formerly, the Township consisted of 5 independent Townships: Lavant Dalhousie, North Sherbrooke, Lanark, Lanark Village, and Darling, until their amalgamation in 1997. The Township's location in the County is shown in pink in Figure 1 below.

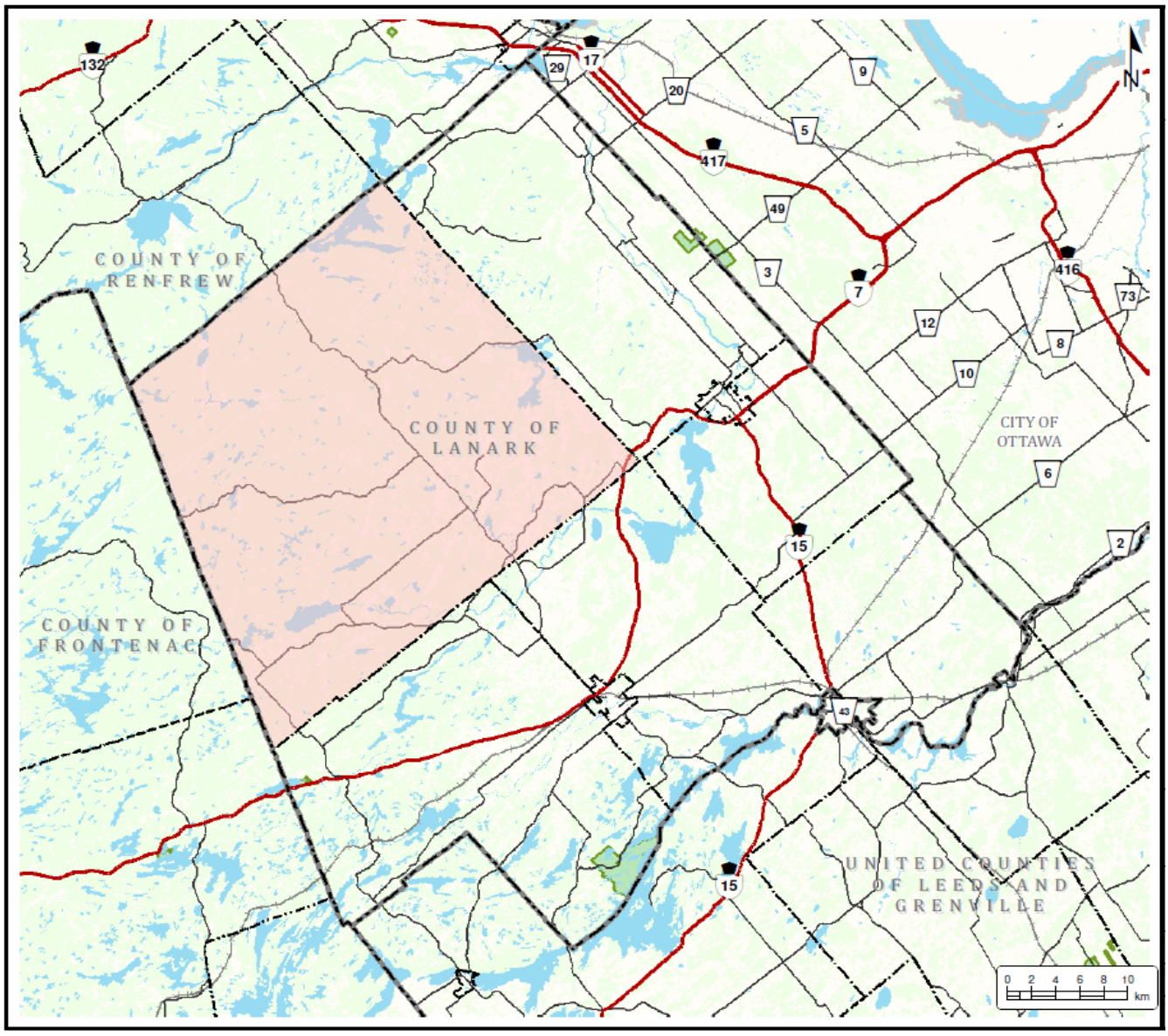

Figure 1 Regional Location of the Township of Lanark Highlands

1.3 Community Characteristics

As reported in 2016 by the Census, a total of 5,338 people reside within the Township, with a total of 3,315 households (including 1,021 seasonal dwellings). Between the 2011 and 2016 Census, the population increased by 1.0%. The average density per square km is 5.1 residents. Generally, the Township consists of low-density rural development with higher population density focused along shorelines and in Lanark Village. There has been a steady

increase in population over the years – in 2006, the Township led Lanark County in terms of population growth. It is assumed that the growth in population is due to seasonal residents turning their cottages into their permanent residence and retirees moving from urban centres (Lanark Highlands, 2007).

Tourism is a large industry within the Township as there are many cottagers and cottage rentals along the shorelines of the Townships lakes and rivers. These waterbodies provide a source of revenue and a focal point of residential and recreation activity that draw people to the Township. Due to a large seasonal population, many businesses operate as seasonal support for the increased population, including a few small contracting and haulage companies. Some industry in the area has been around since early settlement and is still a large economic producer today. These include wood products, farming, and maple syrup (Lanark Highlands, 2007).

1.4 Waste Management Policy

In Canada, waste management is primarily regulated at the provincial level. In Ontario, the following Acts and associated regulations have been developed to ensure environmentally sound waste management practices:

- Environmental Protection Act (EPA)
- Environmental Assessment Act (EAA)
- Resource Recovery and Circular Economy Act (RRCEA)

In addition to the requirements of the legislation referenced above, the current provincial direction includes action items to manage issues around food waste and its related greenhouse gas (GHG) emissions (Ontario, 2018). Both the provincial and federal governments' mandates to reduce GHG emissions have the potential to impact the food waste issue and possibly waste related transportation.

The current overall landfill life remaining in Ontario is approximately 14.5 years as of 2021; this estimate is assuming Ontario continues to export approximately 30% of waste to landfills in the

United States. This lifespan is quite short given the requirements and time necessary to open new landfills (Ontario Waste Management Association, 2021).

Municipalities provide waste management services to municipal residents under the Municipal Act.

1.4.1 Environmental Protection Act (EPA)

The EPA is provincial legislation designed for the protection of the natural environment in Ontario. Regulations under this Act that relate specifically to waste management systems include:

- R.R.O. 1990, Regulation (Reg.) 347 – General Waste Management
- Ontario Regulation (O. Reg.) 232/98 – Landfilling Sites
- Ontario Regulation (O. Reg.) 101/94 – Recycling and Composting of Municipal Waste

1.4.2 Environmental Assessment Act (EAA)

The establishment or expansion of a waste disposal site in Ontario is governed by the Ministry of Environment Conservation and Parks (Ministry) through the Environmental Assessment Act (EAA) and Associated Ontario Regulation 101/07 Waste Management Projects (O. Reg 101/07). O. Reg 101/07 sets out the requirements for evaluating the environmental impacts of the proposed waste management project, as well as the consultation process that should be followed.

1.4.3 Resource Recovery and Circular Economy Act

In 2016, the Resource Recovery and Circular Economy Act was established to provide a provincial strategy focused on developing a circular economy and increasing resource recovery. A fundamental part of this legislation designates that producers become responsible for the post consumer management of their products & packaging, which is referred to as Individual Producer Responsibility (IPR). In 2018 the provincial government released it's a Made-in-Ontario Environment Plan (Ontario, 2018), which maintained the provinces prior

commitment to a shift towards a circular economy and IPR. In 2020 and 2021, we have begun to see this shift in material management with some producers already being regulated to manage their waste (tires, batteries, electronics, and hazardous waste) and others scheduled to shift to this new system between now and 2025 (BB recycling).

Under the Act the following regulations have been enacted to designate end of life management requirements for recoverable materials:

- O. Reg. 449/21 Hazardous and Special Products (HSP)
- O. Reg. 391/21 Blue Box (BB)
- O. Reg 522/20 Electrical and Electronic Equipment (EEE)
- O. Reg. 30/20 Batteries
- O. Reg. 225/18 Tires

Producers or Producer Responsibility Organizations (PRO)s will be responsible for managing each of these programs under the Resource Productivity and Recovery Authority (RPRA). RPRA is an organization delegated by the province to oversee compliance with the regulations. A detailed summary of each of the above noted regulations is included in Appendix A and discussed further in Section 5.0 as it relates to the Plan.

1.4.4 Municipal Act

Although the province establishes the rules for managing waste and operating Waste Disposal Sites (WDSs), municipalities are given the authority under the Municipal Act to provide waste management services to residents in their jurisdiction and enact bylaws to regulate these services.

The Township has enacted the following bylaws related to waste management:

- Operating Manual for the Household Hazardous Waste Depot at the Middleville Waste Site (2006-694) – provides operational procedures and emergency policy for the Household Hazardous Waste Depot

- Waste Disposal Site / Waste Transfer Station Safety, Emergency and Spills Procedure Policy (2007-817) – provides landfill site operation guidelines, information on acceptable materials, and safety and emergency procedures for all WDS/Transfer Station locations
- Household Hazardous Waste Depot Shared Use Agreement (Tay Valley Township) (2010-1072) – discusses terms and conditions for residents of Tay Valley Township to use the Household Hazardous Waste Depot at the Middleville WDS

2.0 Methodology for Plan Development

Cambium worked closely with the Township to outline a roadmap/methodology for the successful development of the Plan. The methodology included:

- Meetings with Township staff
- Site visits to the Townships operating Waste Disposal Sites (WDS)s
- Review of relevant waste policy and legislation
- Review of Township programs, performance, and financial statements
- Community engagement
- Development and assessment of options to achieve the desired outcomes
- Development of the Plan

This approach involved a considerable amount of data gathering and research, as it was important to gain a clear understanding of the Township's current waste management situation, including program operational details, waste performance and measurement, and the financial costs associated with the existing programs.

The Plan is laid out as follows

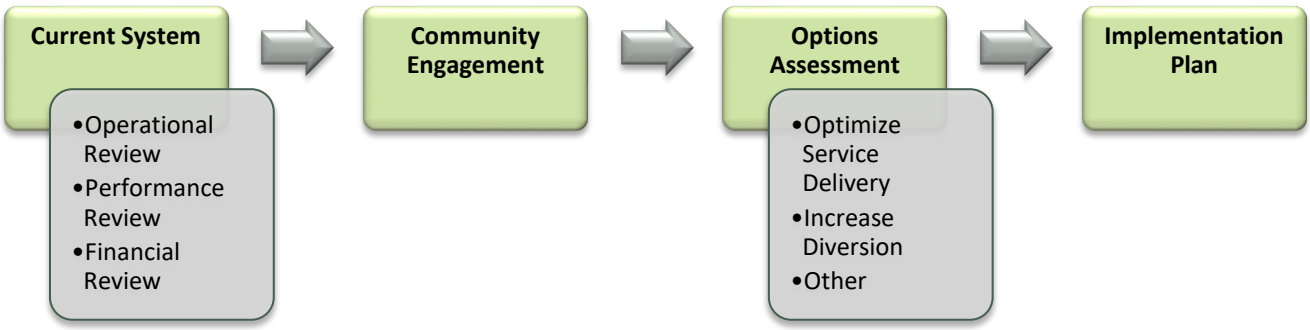

Figure 2 Report Flow

3.0 Current Waste Management System

Permanent and seasonal residents in the Township are currently provided depot drop-off services at seven WDSs, as shown in Figure 3. In addition, 360 households within Lanark Village receive curbside pick-up of both garbage and BB items. All services are operated by a 3rd party contractor. Curbside collection services were provided by Topps Environmental until 2021 when Emterra Environmental was awarded the contract. Day-to-day operations at each WDS location are provided by Robert Alexander (Contractor).

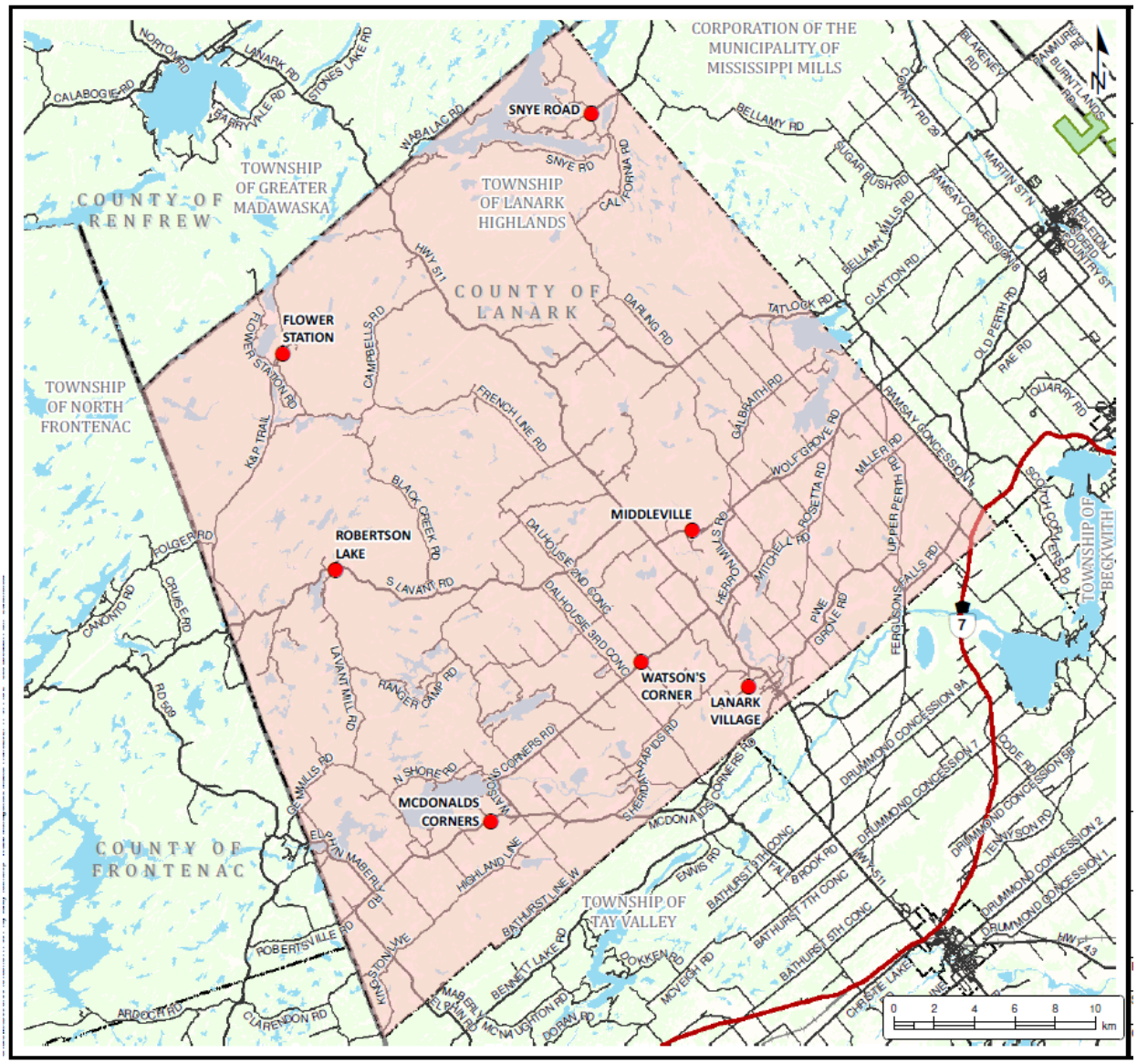

Figure 3 WDS Location Plan

3.1 Operational Review

Details regarding the operation of each waste management program are in Appendix B. The operations included in this Section were reviewed in more detail as it relates to the development of the Plan.

3.1.1 Waste Management Operation Contracts

Waste management contracts provided by the Township are summarized below in Table 1. The contracts for Robert Alexander and Emterra were reviewed in more detail in Section 5.1.1 as it relates to the Plan.

A few key points identified through the contract review noted the following:

- There is no contract for several services including hauling and processing of scrap metal and processing of recycling collected at the WDSs
- Contract lengths are short (1-year contracts)
- Multiple service types (landfill operations and recyclable hauling) are incorporated into one contract with Robert Alexander.

Table 1 Current Waste Management Contracts (2021)

Service	Contractor	Contract Expiry
WDS Staffing & Management	Robert Alexander	December 31, 2021
Hauling BB recycling collect at WDSs to MRF		
Supply garbage & recycling compactor to WDSs*		
Landfill compaction & cover of garbage		
Transfer C & D waste and supply two bins		
Supply scrap metal bin – Lanark WDS		
Curbside Collection Lanark Village – Garbage & Recycling (BB) and Processing Recycling	Emterra	December 31, 2021
Electronics – Supply Depot Collection Bin, Hauling & Processing	Electronic Products Recycling Assoc.	Upon Termination Notice
Scrap Metal – Hauling and Processing (no bins)	Kimco	No contract
Hazardous Waste – Pick-Up & Disposal	Drain All	No contract
BB (Recycling) Processing	GFL	No contract

Notes: MRF means Material Recovery Facility
**No recycling compactor at Flower WDS*

3.1.2 Waste Disposal Site Services

The WDSs offer a variety of services to Township residents as summarized below and in Table 2. Details regarding the operation of each waste management program are in Appendix B. Only residents of the Township are permitted to use the WDSs except for residents of Tay Valley Township who are permitted to use the Household Hazardous Waste (HHW) Depot at Middleville WDS. Of the seven WDSs, only one (McDonald's Corners) has an active landfill.

Table 2 Site Services

Site	Garbage	Blue Box	Electronics	Tires	Scrap Metal	Hazardous Waste	Leaf & Yard	Construction	Bulky Items	Brush	Batteries	Re-Use Centre
Flower Station	Y	Y	Y	Y	Y	N	Y	N	N	Y	N	N
Lanark Village	Y	Y	Y	Y	Y	N	Y	N	N	Y	N	N
McDonald's Corners	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	N	Y
Middleville	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N
Robertson Lake	Y	Y	Y	Y	Y	N	Y	N	N	Y	N	N
Snye Road	Y	Y	Y	Y	Y	N	Y	N	N	Y	N	N
Watson's Corner	Y	Y	Y	Y	Y	N	Y	N	N	Y	N	N

Notes: Y is yes, and N is no

3.1.3 Hours of Operation

The hours of operation at the WDSs (Table 3) vary greatly between each site. During the Plan's development, feedback from residents indicated support for having varied hours at each WDS as it allows residents to pick the best time to fit their schedules (morning, afternoon, or evening).

Compared to other municipalities considered, the Township offers the lowest number of operating hours per week and the second highest number of sites. The data also shows that the Township's few operating hours are spread across a larger number of sites (

Table 4).

Table 3 Township of Lanark Highlands Hours of Operation

Summer Hours per day (Victoria Day – Thanksgiving)								
	Holiday Mon	**Mon**	**Tues**	**Wed**	**Thurs**	**Fri**	**Sat**	**Sun**
McDonald's Corner	2pm to 7pm				4pm to 7pm		9am to 1pm	2pm to 7pm
Lanark Village				12pm to 3pm			9am to 1pm	
Flower Station	4pm to 6pm			4pm to 6pm				4pm to 6pm
Middleville		3pm to 6pm		5pm to 8pm			9am to 3pm	
Robertson Lake	3pm to 6pm			5pm to 7pm			3pm to 6pm	3pm to 6pm
Snye Road	12pm to 6pm				5pm to 7pm			12pm to 6pm
Watson's Corner			4pm to 7pm				2pm to 7pm	
Winter Hours per day (Thanksgiving to Victoria Day)								
	Holiday Mon	**Mon**	**Tues**	**Wed**	**Thurs**	**Fri**	**Sat**	**Sun**
McDonald's Corner					2pm to 5pm		9am to 1pm	12pm to 5pm
Lanark Village				12am to 3pm			9am to 1pm	
Flower Station	3pm to 5pm			3pm to 5pm				3pm to 5pm
Middleville		3pm to 6pm		5pm to 8pm			9am to 3pm	
Robertson Lake	3pm to 6pm			3pm to 5pm			1pm to 4pm	1pm to 4pm
Snye Road	12pm to 6pm				2pm to 4pm			12pm to 4pm
Watson's Corner			2pm to 5pm				2pm to 5pm	

Table 4 Comparison of Number of Sites and Operating Hours per Week

Municipality	WDSs	Summer Hours/WDS /Week	Summer Hours/ Week	Winter Hours/Week
Lanark Highland	7	8	59	55
Tay Valley	3	32	96	56
Hastings Highlands	9	13	115	100
Central Frontenac	3	27	80	80
Minden Hills	4	34	135	87
Highlands East	5	30	148	99
Algonquin Highlands	5	33	164	81
Mississippi Mills	3	22	67	59
North Frontenac	6	19	114	56
Average	5	24	109	74

Notes: Summer Hours/WDS/Week is the average number of hours a WDS is open during the week.

3.1.4 Existing Landfill Capacity and Life

Landfill capacity refers to the volume of waste that can be disposed of at a site, including the volume of daily and/or intermediate cover. The site approved capacity is determined through its design when a site is opened or through a theoretical landfill capacity assessment for historical sites.

In 2008, the Ministry approved the Township's plan to consolidate all landfilling operations to one site and temporarily close the remaining landfill sites and operate them as depot/transfer stations (Lanark Highlands, 2014). The WDSs with remaining landfill capacity would be successively opened and operated as the Township's "one landfill site" in the following order: Middleville, McDonald's Corners, Robertson Lake, and Snye Road. Since the *2014 Integrated Waste Management Plan*, the Middleville landfill has reached capacity and been closed and the Township is currently operating the McDonald's Corners WDS (Lanark Highlands, 2014) as the open landfill site. Two additional WDSs (Robertson Lake, and Snye Road) have landfill capacity remaining. Table 5 outlines the landfill capacity and estimated years of remaining site life.

Table 5 Summary of Site Capacities

Site	Approved Capacity (m^3)	Existing Amount of Fill (m^3, 2020)	Remaining Site Capacity (m3)	Years of Remaining Site Life[3]
Flower Station[1]	1,700	1,700	0	Closed
Lanark Village[1]	-	43,100	0	Closed
McDonald's Corners	62,000	54,310	7,700	1.5
Middleville[1]	45,400	44,140	0	Closed
Robertson Lake[2,4]	33,924	14,500	19,425	4
Snye Road[2]	29,260	8,615	20,645	4
Watson's Corner[1]	6,800	6,800		Closed
Total	179,084		50,070	9.5

Notes:

1. *Closed to landfilling – operates as a Transfer Station (TS)*
2. *Temporarily closed*
3. *Based on an average fill rate of 5,000m^3/year from December 2020*
4. *Remaining capacity of the Site should be verified during the process of Updating the Design and Operations Plan for the Site when it plans to reopen*

In the *2014 Master Plan*, the McDonalds Corners landfill was identified for possible expansion. The Site had an estimated 1.5 years of remaining life at the end of 2020, and the process of designing the proposed expansion has recently been initiated. There are various levels of approvals associated with establishing or expanding a WDS in accordance with the EAA and it is expected that these approvals and the associated site construction will take longer than a year to achieve.

Overall, the Township was estimated to have 9.5 years of remaining combined capacity at the end of 2020 based on current rates of fill (5,000 m^3/year). If a 40,000 m^3 expansion is approved for the McDonalds Corners WDS, it will add an additional 8 years of remaining capacity in the Township, for a total of 17.5 years from the end of 2020.

Capacity Assessment and recommendations related to future landfill capacity options are presented in Section 5.2.14.

3.1.5 Landfill Cover and Compaction

All garbage is collected in compaction bins at each WDS and transferred, by the Contractor, to McDonald's Corners landfill at designated intervals. Garbage from the curbside collection program is also transferred to the McDonald' Corners landfill.

The main considerations for garbage cover and compaction are 1) the compaction rate and 2) the amount of cover material applied.

3.1.5.1 Compaction Rate

The landfilled garbage is crushed (compacted) each operating day and then covered with cover material at the end of each day. Equipment currently used to compact and cover the waste is shown in Figure 4. Limited information was available to help assess compaction rate at the site. Quantities of imported materials were estimated from invoices, however the volume of any other cover materials used is unknown. It is assumed that the WDS is achieving a 500kg/m^3 compaction rate, which is not uncommon for landfills in the area. Compaction rates noted by the US Environmental Protection Agency for a small landfill site are higher up to 700-1000 kg/m^3 (USEPA, April 2016). The actual compaction rate is unknown and would require tonnages of all materials received (including cover and Alternative Daily Cover) to be compared to surveyed volumes of materials landfilled.

Figure 4 Garbage Compaction Equipment – McDonald's Corners WDS

3.1.5.2 Cover

All landfills in Ontario are required to cover the garbage to reduce odours, vermin, litter, leachate generation, etc. The cover requirement for McDonald's Corners is daily during all months, with a minimum thickness of 0.15 m of material.

Primarily, imported sand has been used as cover material. However, in 2021, the Township initiated chipping of brush as an alternative source of cover material. Prior to 2021, brush was burned onsite. At the time of the site visit a fair amount of garbage was showing through the daily cover, and some fully uncovered garbage was also noted.

It is estimated that 35% of the landfill volume is currently being consumed by imported cover material.

Table 6 McDonalds Corners Cover Material

	2019	2020
Cover material quantity used (tonnes)	859	873
Annual fill rate (tonnes)[1]	2500	2400
Cover material % of total landfill space	34	36

Notes: 1. Based on assumed landfill density of 0.5 tonnes/m^3

Based on literature, a small landfill should be able to achieve a 4:1 volume of waste to cover material (20%), and many municipalities implement initiatives to further reduce this quantity (McBean, 1995).

3.2 Performance Review

3.2.1 Waste Quantities

Waste Quantity information is an important metric needed to assess performance and generate meaningful waste management planning recommendations. Typically, this information is required by the WDS Environmental Certificate of Approval (ECA)s, tracked by municipalities, and included in AMRs. While reviewing the 2020 AMRs, limited information regarding the type and quantities of waste received and transferred from the WDSs was available. Unfortunately, many of the records provided were either incomplete or inaccurate, as

not all the necessary information is currently being collected/recorded. As a result, the estimated waste quantities presented in Table 7 were developed from a review of limited data provided and using assumptions/estimates regarding waste density and quantity of cover materials used.

Table 7 Annual Waste Quantities (Tonnes)

	2019	2020
	Tonnes	Tonnes
Curbside Garbage	315	322
Construction, Demolition, and Bulky Items	456	508
WDS Garbage	870	698
Total Waste Disposed (Landfilled)[1]	1,641	1,528
WDS Recycling	311	286
Curbside Recycling	75	79
Electronics	15	6
HHW[2]	14	19
Batteries	0	2
Scrap Metal[3]	104	104
Total Waste Diverted	519	496

**Notes:*

1. *Overall tonnes of waste disposed was based on the surveyed waste volume and using a 500 kg/m^3 assumption (as included in the 2020 AMR) and subtracting an estimated weight of cover.*
2. *Proportion of HHW material diverted from the Townships WDSs. Only a fraction of this is recycled most is disposed in a safe manner.*
3. *Scrap metal for 2020 not available and assumed to be similar to 2019.*

Cambium estimated that the waste landfilled consists of 30% Construction, Demolition and Bulky items and 70% residential garbage.

More detailed tracking of waste quantities and materials used for landfill cover will be an important requirement for the successful implementation of this Plan.

3.2.2 Waste Generation Rate

Performance was measured by evaluating the Townships waste generations and waste diversion rates. For clarity the term garbage is used to capture any waste materials that are sent to landfill or incinerated, while the terms recycling or diversion are used to capture waste materials that are recovered and recycled or re-used. The term waste is used to capture the combination of garbage and recycling.

The Township residents are currently generating approximately 300 kg/person/year of garbage and 55 kg/person/year of recycling. This generation rate doesn't account for the seasonal population, or the materials hauled by Township residents or commercial businesses directly to non-municipal disposal locations. This is in comparison to the Ontario average of 850 kg of waste each year (Ontario, 2017).

3.2.3 Waste Diversion Rate

The waste diversion rate is a measure of the percentage of waste that is kept out of the landfill. It is calculated by dividing the waste diverted (recycling) by the total waste generated (garbage + recycling). Based on the information available, the estimated total diversion rate for the Township was 24% in 2019 and 20% in 2020 (Figure 5).

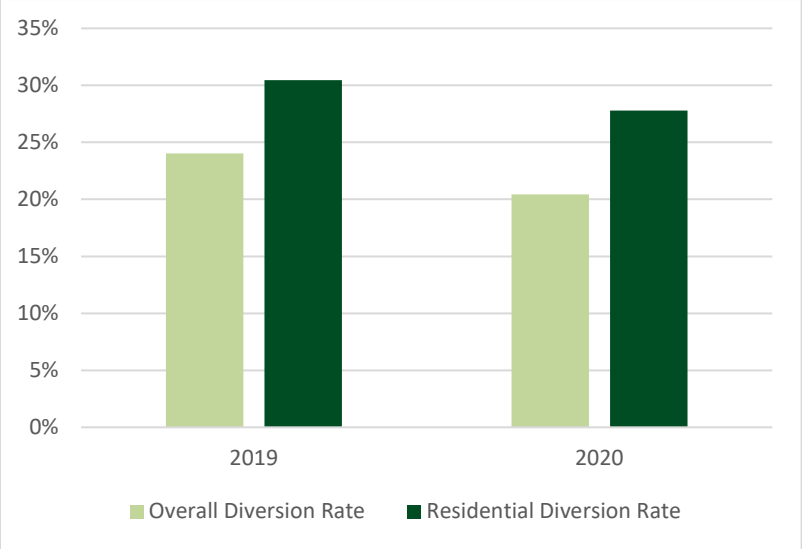

Figure 5 2019 & 2020 Diversion Rates

The "residential only" diversion rate can be calculated by excluding the construction demolition waste. The residential diversion rate was estimated at 30% in 2019 and 28% in 2020. It should be noted that waste generation and waste diversion rates would likely be higher if all diversion program tonnages were recorded. The quantities of the following materials were not included in the diversion estimates:

- Tires
- Brush
- Leaf and Yard Waste
- Reuse Materials

When compared to diversions rates included in the *2014 Master Plan* (between 36% and 42% (2009-2011)) the 2019 and 2020 diversion rates are significantly less. The estimates for garbage generation were similar, however recycling tonnages were significantly different between the 2014 report (reporting 660 tonnes of BB recycling diverted in 2011) compared to the past 5 years in Township of Lanark Highland Report Blue Box Tonnes below.

Table 8 Township of Lanark Highland Report Blue Box Tonnes

	2015	2016	2017	2018	2019
Tonnes Marketed BB Recycling	334	314	318	342	311

Note: Tonnes as reported in the RPRA Datacall

Table 9 below provides residential diversion rates of similar municipalities for comparison:

Table 9 Diversion Rate of Similar Municipalities

Township	2019 Residential Diversion Rate (%)
Hastings Highlands	27.1
Central Frontenac	27.7
North Frontenac	79.0
Minden Hills	35.3
Highlands East	39.9
Algonquin Highlands	28.1

Note: Diversion rates as reported in the RPRA Datacall

3.2.4 Greenhouse Gas Emissions

Part of the Plan's development included an analysis of the Greenhouse Gas (GHG) emissions related to the Township's waste management operations. Generally, these GHG emissions come from three sources: 1) decomposition of waste in landfill, 2) vehicle emissions from transporting waste, 3) emissions from the manufacturing of new materials vs the recycling of existing materials. GHG emissions can be reduced through various waste management

practices including composting and recycling. The model often uses a life cycle approach, which considers sources and sinks for carbon when evaluating net GHG emissions from proposed program changes.

Cambium utilized the Waste Reduction Model (WARM) to calculate GHG emissions of alternative waste management strategies.

The tool can breakdown typical materials found in municipal solid waste into four basic categories:

- metric tons of carbon dioxide equivalent ($MTCO_2e$) which expresses the GHG emissions,
- energy units (million British thermal unit – BTU),
- labor hours,
- wages and taxes in dollars ($).

The model works to compare the pre-existing waste management practices against proposed alternatives. The model doesn't account for emissions from historic quantities of waste. Using the 2020 waste quantities included in Table 7 as the baseline data, and assumptions regarding waste composition the operations currently in place in the Township are estimated to produce:

- 27.38 $MTCO_2e$/year or the equivalent of emissions from 6 passenger vehicles per year.

Waste was identified as a key sector contributing an estimated 4% of total GHG in Ontario or 7 Mega tonnes CO_2e/year (MOECC, 2015). Although the emissions produced by the Township represent a small proportion of the overall emissions from this sector, it is possible for the Township to become part of the solution and implement initiatives which would result in a net negative equivalent of emissions. The complete WARM model summary results are included in (Appendix C)

3.3 Financial Review

As part of the Plan's creation, Cambium also completed a thorough financial analysis of the current operations and on any recommendations being considered. A review of the 2019 and

2020 General Ledger (GL) accounts and related invoices was completed to provide a summary of current net costs. The results are summarized in Table 10.

Table 10 Waste Management Costs

Waste Management Revenues & Expenses			
		2019	2020
Revenue			
	General Waste Levy	$163,623	$163,488
	Lanark Village Levy	$48,175	$47,944
	Miscellaneous Revenue	$144	$3,766
	Stewardship Organization Reimbursements	$94,509	$92,302
	Tipping Fees	$70,724	$78,669
	Total Revenue	$377,175	$386,169
Expenses			
	Advertising / Training/Office Supplies	$1,095	$3,213
	Curbside Collection – Waste & Recycling	$56,856	$52,606
	Hazardous Waste Program	$6,945	$36,513
	Processing – BB Recycling	$30,247	$55,200
	Staff – Wages & Employment Costs[1]	$21,296	$25,552
	Waste Disposal Site – Township Operating Costs[2]	$90,569	$143,000
	Waste Disposal Site – 3rd Party Management	$341,082	$378,049
	Total Expenses	$548,090	$694,133
	Net Cost	$170,915	$307,964

Notes:

1. *Some of the staff wages are related to HHW operation and some to administration*
2. *Township operating costs include hydro, annual monitoring and reports, site maintenance, supplies. and minor capital upgrades to WDSs*

As can be noted, the Township experienced a 27% increase in costs in 2020 driven by higher expenses in BB processing fees, WDS operating costs, and the household hazardous waste (HHW) program (Table 10).

In addition to the overall summary, the financial analysis looked at the individual waste streams. Three programs are generally a net expense to the Township: garbage, BB recycling, and HHW. With the transition to individual producer responsibility (IPR) for both BB (2025) and HHW (2023), there will be an opportunity to further recover the costs of these programs.

The financial analysis also looked at the costs to operate each individual waste disposal site. For any incomplete information, an estimate was included (Table 11).

Table 11 Site Distribution of Operating Costs

	Operating Costs			
Waste Disposal Site	2019	2020	% Increase	$ Increase
Flower	$40,197	$62,969	57%	$22,773
Lanark Village	$47,457	$61,973	31%	$14,516
McDonald's Corner	$127,901	$148,424	6%	$7,855
Middleville	$104,507	$160,053	53%	$68,213
Robertson Lake	$42,525	$51,619	21%	$9,094
Snye Road (White Lake)	$66,085	$81,829	24%	$15,744
Watson's Corner	$41,265	$49,107	19%	$7,842
Sub-Total	$469,938	$615,975	31%	$146,037
Other Costs				
Administration Costs	$21,296	$25,552	20%	$4,256
Curb-Side Pick-Up Costs	$56,856	$52,606	-7%	-$4,250
Total	$548,090	$694,133	27%	$146,043

WDS operating costs increased by thirty percent in 2020, with Middleville and Flower experiencing the greatest increases: 53% and 57% respectively. McDonald's Corners and Middleville are the costliest sites to operate, largely driven by additional cost associated with the landfill (at McDonald's Corners) and the HHW program (at Middleville). None of the other Township WDSs currently offer these services.

More detail on the financial evaluation of these programs is included in Section 3.3.1 to 3.3.4. Considerations for transition to IPR are discussed further in Section 5.1 and 5.2.

3.3.1 Tipping Fees

Revenue for the Township is partially generated from WDS tipping fees for residents and businesses who want to dispose of materials outside of household garbage waste and BB recycling. Table 12 provides an overview of the Township's tipping fees.

Table 12 Tipping Fees

Material	Fee
Drywall	$155.00/tonne
Asphalt Shingles	
Construction Waste	
Un-bagged Waste	
Sofas, Box Springs, and Mattresses	
Refrigeration Units	Tagged unit – No charge
	Non-tagged unit - $15.00
Minimum Fee (less than 0.03 tonnes or 4 ft^3)	$5.00
Illegal Dumping Fine	$1,000

All other accepted materials at any of the WDSs that are not listed in the above table are allowed to be disposed of free of charge.

Table 13 shows tipping fees of local municipalities near the Township including three local disposal facilities with weight-based tipping fees. In general, most small municipalities in close proximity to Lanark County use volume-based disposal fees (i.e., Tay Valley and North Frontenac). The three other local municipal facilities with weight-based tipping fees are the Township of Rideau Lakes, the Township of Bonnechere Valley, and the Ottawa Valley Waste Recovery Centre (OVWRC). Weight based fees provide a better data source for evaluating waste management operations and are preferred over rates based on estimating volumes.

Table 13 Other Municipalities Tipping Fees

Waste Stream	Tay Valley	Bonnechere Valley	Hastings Highland	Rideau Lakes	OVWRC (non-partner)
Residential Garbage Bag Tag	20 bags / year $1.00/ additional bag	$2.00/bag	No charge	$2.50 / bag tag	Not specified
Brush Waste	$5.00/cubic yard	No Charge	No charge	$35.00/tonne	$150.00/tonne
Construction Waste	$55.00/cubic yard	Sorted - $100.00/tonne Unsorted - $225.00/tonne	Depends on load size One tonne truck - $125.00	$222.00/tonne	Sorted - $150.00/tonne Unsorted - $375.00//tonne
Shingles	$130.00/cubic yard	Not specified	Not specified	$222.00/tonne	$150.00/tonne
Appliances and Household Items	Lrg - $20.00 Sm - $15.00 Tagged Fridge - $5.00 Non-tagged Fridge - $25.00	Furniture $100.00/tonne Appliances (doors removed) – no charge	Large item - $30 Small item - $5	$222.00/tonne	Not specified
Mattresses and box springs (per piece)	Not specified	Not specified	Twin/Double - $20 Queen/King - $30	$222.00/tonne	Not specified

3.3.2 Blue Box (BB) Costs

BB materials generated by the Township are processed at two separate facilities. Emterra processes materials collected through the curbside pickup program and GFL processes materials collected at the WDSs. The processing costs associated with the materials collected by Emterra are built into the per stop costs of the curbside collection contract. Previously, Topps Environmental Solutions would include an additional per tonne tipping fee from the processing facility on the monthly curbside collection invoices. There is currently no contract between the Township and GFL. Materials are hauled to the facility under contract with Robert

Alexander, however GFL invoices the Township directly for the costs of processing. Between 2019 and 2020 the costs of processing materials from GFL increased almost $60.00/tonne, translating into an expense increase of approximately $17,000.

4As indicated in Section 3.3.2, the Township reports to RPRA annually on BB performance (tonnage and cost) to receive a proportional amount of funding for providing BB collection services. The average costs reported by the Township from 2017 to 2019 are included in Table 14.

Table 14 Blue Box Datacall

Blue Box Program Costs	
Residential Collection Costs	$26,156
Residential Depot Transfer	$127,831
Promotion and Education	$322
Interest on Municipal Capital	$493
Administration	$4,815
Revenue	-$122
Total	$159,495
RPRA Funding Allocation	$62,000

Notes: Average costs reported through 2017-2019 datacall reports, except RPRA funding allocation for 2019 only.

Part of the Plan's development included a detailed financial evaluation of the BB program. A summary of the review can be found in Table 15. The total costs reported to RPRA are lower than the costs calculated through the evaluation, thus the costs of managing the BB program may have been under reported and should be reviewed in detail in the next BB Datacall submission.

Table 15 Blue Box Cost Assessment

Blue Box Program Costs by Cambium	2019	2020
Collection – Curbside – Topps	$ 34,114	$ 31,564
Collection – Depot – R. Alexander	$ 59,297	$ 61,078
Collection – Compaction Bins – R. Alexander	$ 16,392	$ 16,872
Hauling – from WDS to MRF – R. Alexander	$ 47,306	$ 49,339
Processing – Topps	$ 6,873	$ 4,879
Processing – GFL	$ 19,309	$ 55,200
Total	$ 183,290	$ 218,931

Notes:

1. *60% curbside collection costs allocated to Recycling (as it also includes processing fees)*
2. *35% site operating costs R. Alexander allocated to recycling*
3. *Table does not include Public Education, Administration, the Townships Capital Assets related to Recycling*
4. *MRF is Material Recovery Facility where BB recycling is processed*

Areas that require clarification are the method in which all the assets are accounted for, how processing costs were included, and how operating costs are determined. Cambium has calculated the BB Program costs to be at least $200,000. For comparison, the reported BB program costs of other municipalities are included in Table 16.

Table 16 Blue Box Datacall – Municipal Comparison

Total Net Cost for Blue Box	
Lanark Highlands	$ 159,495
Tay Valley	$ 275,502
Algonquin Highlands	$ 171,345
North Frontenac	$ 218,944

Notes: Average costs reported through 2017-2019

3.3.3 WDS Operating Costs

As can be seen in Figure 6, the third party WDS management fees are the largest expense, at 60% and 55% respectively of the total expenses in 2019 and 2020. The fees are broken down into various categories as illustrated in Figure 6. Labour costs are the most significant portion

of the contracted costs; however, it should be noted that labour costs are often one of the primary expenses associated with operating depots.

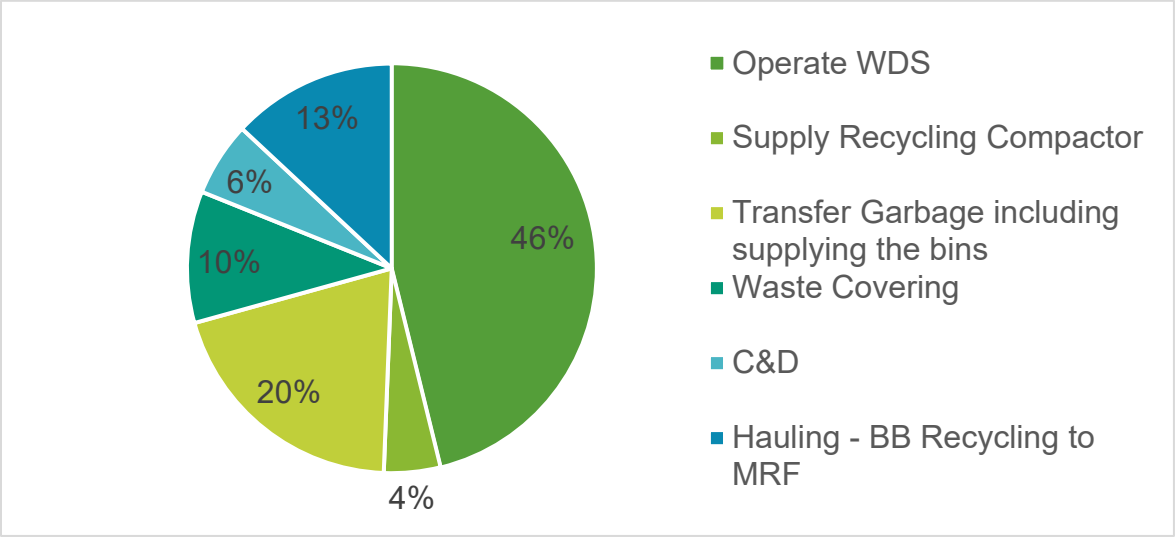

Figure 6 Contractor Costs for Various Services - 2020

Between 2019 and 2020 the main cost increases were associated with transferring Construction & Demolition material and residential garbage to McDonald's Corners WDS, as shown in Table 17. It was noted that there was a large discrepancy between the 2019 and 2020 costs reported in the GL – by reviewing the invoices it was determined that some 2019 contracted costs provided by RA were processed in 2020. The costs determined through a review of the invoices were $341,000 and $378,000 for 2019 and 2020, respectively.

Table 17 Robert Alexander Operating Costs

	% Increase from 2019 to 2020
Operate WDS	1.03
Supply Recycling Compactor	1.03
Transfer Garbage including supplying the bins	1.30
Waste Covering	1.07
C&D transfer	1.75
Hauling – BB Recycling to MRF	1.04
Total	1.11

While finalizing the Waste Management Master Plan, additional 2022 projected costs related to contracts were provided to Cambium for consideration. These costs are not summarized in the Current Waste Management System Section 3.0, however were considered in the financial implications of options discussed in Section 5.0

3.3.4 Household Hazardous Waste

Costs associated with HHW include the labour to operate the Township HHW Depot at Middleville WDS, contracted labour (when Township staff are not available/trained to operate the depot), hauling costs, and processing/disposal fees. Based on our review of the 2019 and 2020 financial statements, a large discrepancy was noted in the costs associated with the HHW program. This is assumed to be a least partly related to a requirement in 2020 to contract operations of the depot instead of operating the depot with trained Township staff. There was also a larger quantity of materials transferred from the site in 2020 and $6,000 worth of supplies for the depot that were charged to the Township in 2020. Cambium is uncertain if Tay Valley Township paid its proportionate share of these costs or the terms of the agreement between Tay Valley Township and the Township of Lanark Highlands allowed for it.

A system to track and proportionally share all costs associated with the HHW depot should be established.

3.3.5 Asset Evaluation

The Township owns capital assets related to the WDSs as outlined in Table 18. The Township is currently developing its asset management plan and therefore details on all assets onsite were not available for review. The age and value of the Township owned equipment requires further investigation. To evaluate the impact of assets on the operation and effectiveness of the site it is important to incorporate their capital costs as well as expected replacement schedule to determine if there are opportunities for change in the future. Based on a comparison of images in the *2014 Master Plan* (Lanark Highlands, 2014) to existing assets, many of the assets, particularly containers and the compactors supplied by Robert Alexander, can be assumed to be at least 15 years old. It was also noted during the 2021 site visits that some of the compactors are rusting (Figure 7), and it was mentioned by staff that there are occasional hydraulic leaks of the equipment (which are properly cleaned up).

Figure 7 Rusted Compactors

Waste management assets are both owned by the Township and supplied by various service providers. For this asset evaluation, only Township owned assets were considered. Some standard amortization values and periods were applied to Township assets to provide an indication of the annual cost of waste related asset management. Based upon the evaluation, it is estimated that an annual cost of approximately $55,000 is required for capital asset management for the WDSs (Table 18). It is possible that with further refinement of asset costs this value could change.

It should be noted that the replacement value of some assets will likely be higher than when they were originally constructed (i.e., the hazardous waste building at Middleville WDS).

Table 18 Asset Evaluation Estimates

Landfill Site Assets	Age	Amortization period	Estimated Cost (per unit)	Number of Units	Annual Cost
Canadian Scales and Scale House	unknown	15	$155,000	2	$20,667
Scale house	unknown	15	$20,000	4	$5,333
Reuse building	unknown	30	$100,000	1	$3,333
Hazardous waste building	unknown	15	$30,000	1	$2,000
Fencing (per meter)1	unknown	15	$75	500	$2,500
Site electrical (per meter)	unknown	20	$90	200	$900
signage (per large sign)	unknown	7	$1,000	7	$1,000
ECA Approvals	unknown	20	$15,000	7	$5,250
20-yard bins	unknown	7	$7,000	3	$3,000
40-yard bins2	unknown	7	$10,000	9	$12,857
Total					$56,840

Notes:

1. *Fencing distance was estimated based on the area around the gate or along roadside, not the property perimeters.*
2. *Three of the 40-yard bins were assumed to be owned by the Township*
3. *Costs for scales and buildings (including hhw building) were approximated based on values in the Townships Asset Management Plan.*

3.3.6 Landfill Cost Model

As costs of services are continually increasing, it is important to review operational costs and capital expenditures to ensure decisions consider financial implications.

Cambium completed an assessment of the value of the current landfill site capacity based on available information. The assessment concluded that the value of the landfill space for garbage is approximately $100/m^3 or $200/tonne (Appendix D). This value considers the closure and post closure costs of the landfill as well as annual operating costs and initial start-up costs (assumed to be $30,000 based on cost of expansion at McDonalds Corners).

4.0 Community and Stakeholder Engagement

Two initiatives were undertaken to obtain valuable insight into the waste management operations and services offered by the Township. Initially, staff and Council were offered the opportunity to comment generally on the services offered, including areas that were working well, and areas for potential improvement. Following the initial sites visits and input from staff and Council, notice was posted on the website and a community waste management planning survey was prepared and distributed.

4.1 Waste Management Survey

A waste management survey was distributed to the residents of the Township to accumulate public opinion on a variety of topics regarding current services and future options. The survey consisted of a total of sixteen questions. Questions ranged in subject matter – how often residents used each service provided, what future goals/services they would like to see, opinions on existing curbside pickup programs, when they used the WDSs, whether the hours of operation were sufficient, and backyard composting. The survey was available in hard copy and electronic format. Hard copies were handed to residents who went to the WDSs in-person, and the electronic surveys were available on the Township's website. The survey was available between September 24, 2021 and October 10, 2021.

A total of 314 residents responded to the survey; 212 used the online survey and 102 complete the in-person survey at the waste disposal sites. The key findings of the survey are as follows:

- the average household that responded had 2 people and used one bin of recycling and less than one bag of garbage weekly.
- 84% of respondents didn't have to drive more than 10 km to access one of the WDSs.
- The days and hours of operation were deemed sufficient by most respondents; when asked about preferences regarding shifting more hours to during the day and less at night, most responses indicated no preference (55%), however 30% of respondents indicted that this would have a negative impact.

- The majority of the respondents preferred maintaining all seven WDSs over closing one or some of the WDSs to decrease operating costs.
- In general, there were six potential program changes that residents responded favorably (or indifferently) to: an improved composting program and/or centralized (at a WDS) composting program, more strict enforcement of recycling/diversion programs, bans on certain waste streams, a construction demolition waste diversion program, and a mattress recycling program.
- 70% of respondents participate in backyard composting, and of those, approximately 66% compost both food scraps and leaf/yard waste.
- The average rating the respondents gave the current waste disposal plan for the Township was 4/5.

More detailed results are summarized in Appendix E and discussed in more detail as they relate to particular options or recommendations being made in the strategy.

5.0 Future Waste Management Program – Options and Recommendations

In completing our analysis of current programs and performance, opportunities for improvement and optimization to meet the Plans goals were noted.

One of the challenges encountered in the project was the “competing” nature existing between the goals in that increasing diversion (and extending landfill life) generally results in higher net operating costs. To meet the goals of the Plan the Township will need to implement a balance of initiatives focused on cost savings and increasing waste diversion.

The opportunities (options) are presented below are organized based on the goal that they relate to most directly, however some options can impact multiple or all goals and objectives of the Plan. The recommendations are further summarized into an implementation plan in Section 6.0.

5.1 Optimize Service Delivery/Reduce Operating Costs

Cambium considered several ways to optimize service delivery and reduce overall waste management costs including:

- Providing Township operated services
- Reducing the number of WDSs
- Implementing waste site passes
- Improving cover and compaction practices
- Adjusting bin type and collection frequency
- Improving data management

5.1.1 Township Operated Services

As outlined in Section 3.1.1, all WDS operations are contracted to a third party. Cambium reviewed contract documents, existing costs, and expected costs of internal operations to determine if costs savings could be realized through delivery of programs using Township staff

and municipally owned equipment. These five services were considered independently to determine costs as it relates to the Township assuming responsibility:

- WDS operation
- Hauling garbage to landfill
- Hauling recycling
- Covering and compacting garbage at the landfill
- Curbside waste and recycling collection
- HHW depot operations

Details on the assessments are included in Section 5.1.1.1 to 5.1.1.6 below. Overall, these services are currently awarded through short term contracts, and multiple services are included in one single contract.

Short term contracts result in challenges finding and financing required assets as contractors don't have time to amortize equipment in short term contracts.

Bundling services that require different types of equipment and resources may limit contractors able to bid on the work. There are many service providers able to provide some but not all the services currently included in a single contract. Specifically, many waste and recycling hauling companies are not organized to provide landfill attendant and cover and compaction services, and vice versa.

Contract terms will need to take into consideration timing of BB transition. General recommendation is made with regards to contracting waste operations below.

Recommendation:

- Consider 5-to-7-year contract terms for services requiring upgraded equipment.
- Consider 5-to-7-year contract terms for services requiring upgraded equipment Include provisions in tender or request for proposal documents to enable the Township to award the various services to different contractors if warranted.

5.1.1.1 WDS Operation

Cambium considered the option for Township employees to be the “attendants” who operate the WDSs. The Township is currently in a position where they have limited information and knowledge regarding the operations of the WDSs. This is partly due to turn over in Township staff associated with the operations, but also a lack of documents and procedures related to the sites as operations have been entirely managed by a third party. The benefit to bringing operations inhouse would be:

- Reduced operating costs
- Increased control and oversite of the WDS operations (e.g., litter control, site maintenance, staff performance)
- Opportunity to increase staff training
- Opportunity to increase public education via staff onsite
- Easier to implement administrative processes (record keeping, deposits, other SOPs)
- Increased knowledge of the operation, and ability to identify improvement opportunities
- Ability to cross-train staff to work at the HHW depot

Drawbacks may include more administrative and supervisory responsibilities for Township staff and a schedule that may be difficult to manage due to short and varied shifts.

Cambium assessed the costs of in-house versus contracted site staff, utilizing the following assumptions:

- The costs for this service would be 100% labour related as maintenance, utility, and material costs are already paid by the Township
- The number of waste disposal sites and hours would remain the same
- There would be one staff operating each site except for McDonald’s Corners where 2 staff would work during the summer and Middleville where 2 staff would work during the summer and on Saturdays in the winter.

- Additional supervisory/administrative requirements, including one part-time lead hand, would be necessary
- The Township would cover some uniform/equipment costs
- Township employees would travel to the WDSs at their own expense

Pricing provided for operations in 2022 was considered as part of the financial assessment. Based on these assumptions the Township could realize a $70,000/year savings in operating costs.

There will be some logistical planning required to implement this transition. The Township should review the hours of operation in detail to determine an appropriate schedule and combination of full time and part time/casual employees. The current hours of operation make it challenging to provide full time hours due to many hours occurring on the same days of the week (Wednesday, Saturday, and Sunday) and overlapping hours of operation. Adjustments may be considered necessary but should still prioritize service to the residents and ensure day, evening, and weekend availability. Hours of operation are further discussed in Section 5.2.10.

Recommendation:

- Move to in-house staffing of WDSs

5.1.1.2 Hauling Garbage from WDSs to Landfill

Cambium assessed the option of maintaining a 3rd party contract for garbage hauling versus taking that service in-house. A few points are noted.

- Services are currently provided using aged equipment that will likely need to be replaced within the next three years (Section 3.3.5)
- There are two types of garbage collection and hauling occurring – collection of residential waste in compactors, and collection of and transfer of C&D in 40-yard bins. This assessment focuses specifically on the transfer and hauling of garbage.

Overall, the costs associated contracted management of these operations are currently in the Townships favour. This is likely due to the use of old and amortized equipment. Cambium

calculated the costs for the Township to provide these services with all new bins and hauling equipment. It should be noted that there would be significant capital investment required up front to provide these services, as the costs associated with purchasing equipment is amortized over 10 years. If the WDS collection equipment was compatible with providing curbside garbage collection (i.e., a truck with a rear load compactor that can be detached at the WDS – like the current system), there may be a benefit to hauling and transferring waste inhouse as well as providing curbside garbage collection only. Further research would need to be completed to determine if this type of equipment is commonly available and manufactured.

The Township would need to apply for Environmental Activity and Sector Registry (EASR) to operate a waste transfer vehicle. There is a one-time fee of $2,000 for the registration and no wait time as the process is designed to streamline approvals for operations with known environmental risks.

General recommendations for contracting services were described in Section 5.1.

More details to consider regarding bin type and frequency of collection which would influence this assessment are also includes in Section 5.1.4.

Recommendation:

- Maintain 3rd party contract for hauling garbage from WDSs to landfill

5.1.1.3 Hauling and Processing of WDS Recycling

Cambium assessed the option of maintaining a 3rd party contract for hauling WDS BB recycling to the processor versus taking that service in-house.

A key point to consider in reviewing any decisions related to BB recycling is that the program is scheduled to transition to IPR in 2025, less than 5 years away. If the Township invests in BB assets and the program transitions away from Township provided service before the usual 10-year equipment amortization period, the Township stands to lose financially on the investment. Therefore, Cambium doesn't recommend the Township invest in any BB recycling related equipment (trucks, bins) unless necessary and remain with contracted recycling services until more information on BB transition is available in 2022 through to the end of 2023.

Cambium noted during WDS visits that recycling is being inconsistently sorted: some sites have one-stream and others have two-stream. As source separated materials are more marketable, and two-stream systems are common, depot operations typically offer a two-stream recycling program.

Recommendations:

- Maintain 3rd party contracted hauling of WDS recycling
- Consider formally (through the tender process) offering a two-stream recycling program at the WDSs
- Either contract with a processing facility prior to tendering for this service or include BB processing in the hauling contract for BB recycling.

5.1.1.4 Site Cover and Compaction

Cambium assessed the option of taking landfill compaction and cover activities in-house versus continuing to contract to a 3rd party.

The assessment considered the costs to purchase a refurbished landfill compactor and loader (amortized over 10 or 20 years) and assumed that the equipment would be operated based upon the existing hours of operation at McDonalds Corners.

It should also be noted that if this service is contracted independently, then additional service providers may bid on the work.

Recommendation:

- Continue to contract site cover and compaction services to a 3rd party

5.1.1.5 Curbside Garbage and Recycling Collection

Cambium assessed the option of taking in-house the curbside collection and hauling of garbage and BB recycling versus continuing to contract these services to a 3rd party. The assessment also considered the option of completing curbside collection and hauling of garbage only in-house.

For both garbage and recycling, the assessment considered the costs to purchase a refurbished “split truck” waste collection vehicle (including amortization), labour, fuel, and vehicle maintenance. Based on this assessment the costs to provide services in house were similar to contracted costs. However, when a tipping fee ($12,000) for processing curbside recycling was included in the assessment it was no longer considered worthwhile. It should also be noted that the recycling program is scheduled to transition in 2025, and at that time there may be a change in how producers manage recycling. Based on these considerations curbside BB recycling collection should continue to be contracted regardless of whether curbside garbage collection is contracted or provided by the Township.

If curbside garbage and recycling collection are done separately, the Township can purchase a smaller single stream truck for collection, reducing the equipment costs compared to that required for both garbage and recycling collection. This option assessment also includes labour, fuel, and vehicle maintenance costs but doesn’t consider potential increases to the existing contract costs by removing the garbage component of the work. Overall, the Township can anticipate a $7,000 per year savings by transitioning to providing curbside collection in house. This could be implemented along with the in-house WDS operations supporting the hiring of staff for waste management services. This option should be considered along side BB transition discussions with producers.

If garbage is removed from the contracted services, the Township should consider the option to switch to a two-stream curbside program through the tendering process. The tender for curbside collection of recycling should continue to include processing as part of the contract. The Township would need to apply for Environmental Activity and Sector Registry (EASR) to operate a waste transfer vehicle.

Recommendation:

- Continue to tender for curbside recycling collection
- Transition to Township operation of curbside garbage collection around the time of BB transition

The recommendations made within Section 5.1.1 will require the following:

X	By-law (may be required)

Note: X indicates a required task

5.1.1.6 HHW Depot Operations

In this Section, hazardous waste management was considered as it relates specifically to site operation. Additional information regarding the hazardous waste program is included in Section 3.3.4. The Township identified a cost of $37,500 in 2021 for contracted operations of the Middleville HHW depot. If the Township was able to provide these services using in-house staff, Cambium estimates the costs would be $7,200, a savings of $30,000. Part of the challenge with providing in-house operation of the HHW depot is retaining staff for one shift a week which only occurs seasonally (Saturdays during the summer). With the transition to in-house operations of WDS and curbside collection of garbage, the Township would have more staff available and the ability to cross train staff to fulfill this operational need.

Recommendation:

- With the transition to in-house operation of WDSs, include staffing the HHW depot

The recommendations made within Section 5.1.1 will require the following:

X	By-law (may be required)

Note: X indicates a required task

5.1.2 Number of Sites

Cambium assessed the option of reducing the number WDSs versus leaving them as is.

The Township is proud to service its residents with seven WDSs, however the relatively large number of sites means that the Township is paying for additional capital resources and ongoing maintenance for each site. The average number of WDSs in similar municipalities evaluated was 5 (as per Section 3.1.3).

The assessment considered the services provided and the location of each WDS as shown in Figure 8. A 10 km radius was identified around the Middleville, Snye Road, McDonalds Corners, and Flower Station WDS to illustrate travel distances.

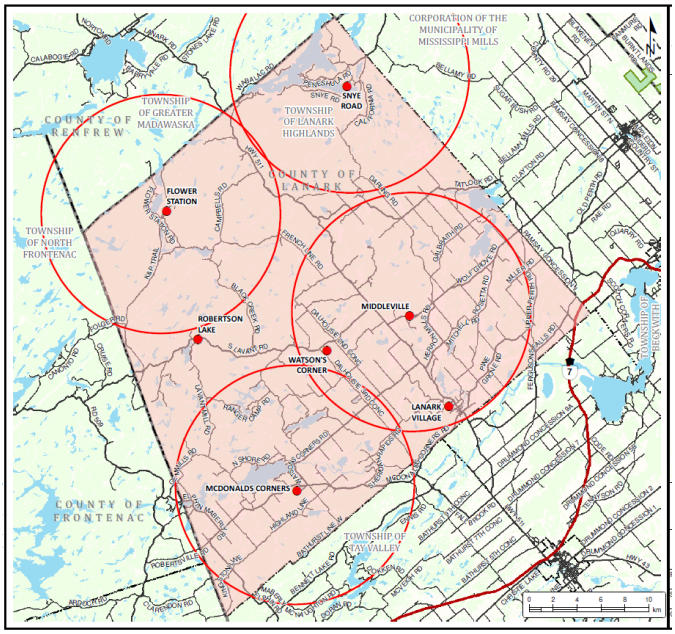

Figure 8 10 km Radius

Based on the assessment, Lanark Village WDS and Watson's Corner WDS were identified as the preferred WDSs for closure. The reasons are as follows:

- The Snye Road and Flower Station WDSs service more remote northern areas in the Township
- Middleville and McDonalds WDSs are designed to provide a larger number of services that are not provided at the other sites.
- Lanark Village WDS and Watson's Corner WDS are in between Middleville and McDonald's Corners WDSs.
- Lanark Village is on the southern boundary of the Township.
- The Lanark Village site is located near the main curbside collection area where residents are less likely to have to visit a WDS on a weekly basis.

- The travel time from Lanark Village to either McDonalds Corners or Middleville WDSs is approximately 15 minutes.

The assessment considered the cost per WDS as included in Table 11. Based on the financial information provided for 2022 contract costs the closure of **one** of these WDSs would save the municipality $40,000/year or an overall savings of $80,000/year if both WDSs are closed. The savings are based on reduced operating costs including labour and site maintenance, bin/container rental fees, and weekly transfer of the waste containers for these sites. The financial assessment considers that the BB costs and environmental monitoring costs per WDS will not result in direct savings from WDS closures.

It should be noted that there would be an additional indirect savings of at least $3,500 per WDS for existing staff time related to completing operating tasks such as reconciling deposits, advertising, record keeping, procurement, and general oversight of the sites.

As was expected, respondents to the public survey were generally not in support of reducing the number of WDSs. However, the assessment could not overlook the large number of sites relative to the population and geographic area. If the decision was made to implement all or part of this recommendation the public would require significant advance notice.

Recommendations:

- Close Watson's Corner WDS and the Lanark Village WDS.

These recommendations would require the following:

X	ECA Amendments
X	Public Education/Notification

Note: X indicates a required task

5.1.3 Cover and Compaction

Cambium assessed the possibility of reducing the amount of cover material being used on the landfill.

As discussed in Section 3.1.5.2, it is estimated that the McDonald's Corners landfill is using more cover material than required for the daily cover operation. The assessment considered

three options to reduce the amount and cost of cover material currently being used; frequency of cover application, use of Alternative Daily Cover (ADC), and improved operational practices.

5.1.3.1 Frequency of Cover Application

Best Practice for an operating landfill is to apply daily cover regardless of the quantity and thickness of garbage being received that day. A thicker layer of garbage prior to cover application makes more efficient use of space. With the small quantities of waste coming to the site on a regular basis it is not surprising that significant volumes of cover material are being added. It was noted that the Township currently transfers garbage from its various sites on a weekly basis and assumed that it is not all occurring on the same day of the week. It was also noted that the site is open to accept garbage at the tipping face 3 days per week.

Some municipalities such as Tay Valley Township, have implemented a successful program whereby garbage is only brought to the tipping face for compacting and covering once a week, and the waste remains in containers until that time. This approach reduces the frequency that cover is applied to the garbage and allows for a thicker layer of garbage to be landfilled before cover is applied. Given the number of Lanark sites that require collection on a weekly basis, the assessment considered limiting compacting & cover to twice per week.

Based on contracted costs, it is estimated that consolidating the cover and compaction frequency to 2 days a week could save the municipality approximately $10,000 in operating costs annually. Additionally, it is estimated that the consolidation would reduce the quantity of cover material required by 1/3 or $2,500 in material.

The assessment did not account for any costs associated with negotiation of existing contract changes.

Recommendations:

- Reduce number of days that the landfill accepts garbage and requires cover and compaction.

These recommendations would require the following:

X	ECA Amendments
X	Public Education/Notification

Note: X indicates a required task

5.1.3.2 Alternative Daily Cover (ADC)

Municipalities often look at ADC to reduce the amount of landfill capacity being consumed by cover materials. ADC includes tarps, mats, wood chips, chipped C&D, and contaminated soils (Figure 9).

Figure 9 Examples of ADC (top left: tarp, bottom left: mat, right: mulch)

It is important to note that most ADCs are accompanied by some minimum soil application requirements or soil mixing prior to application as cover, as directed by the Ministry. The estimated costs of various cover materials are presented in Table 19. The assessment utilized a 5-year time period in order to demonstrate the advantage of reusable materials, and also incorporated the value of the landfill space savings over the same period.

Table 19 Alternative Daily Cover Options

Cost Comparison	Quantity	Units	Unit Cost	Material Cost	5-year cost	Value of Landfill space – 5 years (m^3)[1,2]	Benefits
Sand	873	tonnes	$9.50	$8,290	$41,450		Easy to use
Blasting Matts	50	9.2 m^2	$750	$37,500	$37,500	$436,315	One time purchase / Re-Useable
Blasting Matts	25	18.5 m^2	$1,700	$42,500	$42,500	$436,315	One time purchase / Re-Useable
Chipped Brush (wood chips)	76	tonnes	$95	$7,250	$36,250		Organic solution / Reuses existing feedstock
Chipped C&D	115	tonnes	$95	$10,925	$54,625	$115,00	Reuses existing waste as cover
Steel Plates	4	30 m^2	$10,000	$40,000	$40,000	$436,315	One time purchase / Re-useable

Notes:

1. *Landfill space valued at $200/tonne or $100/$m^3$*
2. *Assume reusable alternatives could replace half the volume of cover used*

Chipped C&D

As discussed in Section 5.2.4, chipped C&D waste should be considered for use as alternative daily cover (ADC) to reduce the quantity of additional materials to the landfill. The Ministry has approved stockpiling Bulky items and C&D material until the can be chipped or incorporated into the landfill for other municipalities.

If the C&D and Bulky items are not chipped the Township could consider stockpiling the materials at the tipping face until the days of the week chosen for covering and compacting activities if a reduced frequency is implemented as described in Section 5.1.3.1.

Brush

The use of brush as ADC is discussed in Section 5.2.9

Reusable Cover Materials

Purchasing reusable materials as cover pays for itself over 5 years. It has the additional benefit of indirect costs savings because of a reduction in landfill space as shown in Table 19. The Township requested that blasting matts be considered in the review. Cambium is not familiar with the use of Blasting Matts as an acceptable form of ADC. In our opinion they would reduce litter and vermin, however it is uncertain how well they would perform in terms of reducing leachate impacts. Consultation would be required with the Ministry prior to investing in this option.

Cambium is aware of steel plate being used as ADC in City of Kawartha Lakes and Simcoe County landfills. If the Township proposes to use these reusable cover materials, it is recommended to visit a site where they are in use and piloting a smaller quantity of the technology or prior to investing in the amount of equipment required to provide full ADC advantage.

5.1.3.3 Operational Practices

As compaction rate directly affects the capacity of the landfill space it is important to measure and track this to the greatest detail reasonable. The Township would benefit from better record keeping related to cover activities to assist in quantifying the amount of cover material being used.

Additionally, training to ensure that equipment operators are familiar with best practices for compacting and covering waste is recommended. There are proper ways to place and compact waste and apply cover.

Overall implementation of cover and compaction improvements could result in significant reductions in quantities of cover materials used. It is estimated that if all the options were implemented it could reduce imported cover by over 50%-70% and reduce materials landfilled annually by 400 to 600 tonnes or 800 m^3 to 1200m^3.

Recommendations:

- Implement SOPs to ensure effective placement of waste and use of cover material at the WDS as described in Appendix G.
- Negotiate with the contractor to reduce the frequency that garbage is placed at the tipping face to two days per week.
- Implement a means of monitoring cover and compaction activities, including a record of cover material used to include in an annual operations review.
- Implement steel plates as a reusable cover material

These recommendations would require the following:

X	Standard Operating Procedures
X	ECA Amendments (for new cover or segregating C&D)
X	Public Education/Notification

Note: X indicates a required task

5.1.4 Bin Type and Frequency

Cambium considered two items in this assessment: changes to the collection bin type and/or changes to collection frequency of the bins at the WDSs.

5.1.4.1 Bin Type

The Township currently uses compaction bins at almost all sites for collection of garbage and fibre (cardboard) recycling. A compactor bin allows for a greater volume of waste to be collected – versus loose waste in an open bin – before hauling it away for landfilling or recycling. The result should be fewer hauling trips, and less associated cost. However, this assumes that the compactors are full or near full when hauled. Also, the hauling vehicle cannot

make multiple stops to pick up additional bins of the waste steam – it simply hauls the compactor bin to the landfill or processing plant and returns it back to the site.

Cambium did a quick test to determine the annual capacity of waste in the bins if transferred weekly. While the current bin size and frequency of pick-ups (once per week) indicates up to 8,300 m^3 of compacted garbage could be transferred, waste quantity estimates indicate that less than 3,000 m^3 is garbage is being transferred annually. Additional data collection as discussion in Section 5.1.5 will provide insight into site specific quantities and where bins may not be filled at transfer.

Continuous Improvement Fund (CIF) has a compactor savings tool that can be used to evaluate the cost benefit of having waste compactors onsite. The tool considers the number of sites receiving service, the number of bins required, and the number of transfers occurring to provide an estimated savings and payback period. Based on the results of this tool it may be beneficial for the Township to consider a front-end bin service. An alternative to compactors is front-end bins (Figure 10). Front-end bin service is beneficial when there are a number of sites which require regular collection (due to odour concerns) of smaller quantities of waste. The front-end bin service model would allow the collector to visit multiple sites for collection and then bring a full load of garbage to the landfill, reducing the number of trips required.

Figure 10 Example of front-end bin

If the weight of garbage transferred from the WDSs each week is recorded, the Township could conduct a better assessment of the bin size requirements. The benefit of the compactors may increase with a reduction in the number of operating sites.

5.1.4.2 Frequency of Transfer

As noted in the previous Section, waste bins are not likely full when being transferred. If garbage is transferred every other week, instead of weekly for 6 months of the year (winter), the Township could realize a savings of almost $16,000.

Recommendations:

- Improve and maintain records of garbage tonnages transferred and the frequency of transfers from each WDS to McDonalds Corners to further evaluate this option.
- Reduce frequency of garbage transfer from the WDSs to biweekly in the winter where feasible.

These recommendations require the following:

X	ECA Amendments (may be required depending on WDS specific ECA)

Note: X indicates a required task

5.1.5 Data Management System

Cambium assessed the need for a better data tracking system. Through this review process Cambium has spent significant time importing and reviewing data. As the Township relies on a variety of sources to evaluate their waste management performance, a good tracking system is important. Cambium recommends the use of an electronic spreadsheet (e.g., MS Excel) to manage the various sources of information available on waste quantity and generation.

It would be beneficial for the Township to track weights of materials managed at each WDS (instead of overall). This information can be collected as waste is transferred and weighed at the McDonalds Corners WDS or for recyclable materials can be tracked by the service provider when brought to a recycling facility (i.e., electronics and BB materials). The Township recently started this data collection.

As well, tracking the number of customers using each WDS and if they are residential versus commercial customers to help evaluate services in the future. Currently, this information is not available. Tracking can be done simply by using tally counters and recording daily or hourly number of visitors.

Although there is not a direct cost savings associated with this option, better data would be invaluable in determining the cost and effectiveness of the various waste management programs and services. The costs associated with improved data management consist primarily of administrative time and effort.

Recommendation:

- Develop a waste record keeping SOP and associated tracking sheets as described further in Appendix G.

This recommendation requires the following:

X	Standard Operating Procedures

Note: X indicates a required task

Additional Data Management Option

To facilitate improved data management and service the Township could consider adopting an electronic weigh scale software system at McDonald's Corners WDS. Costs for new software are estimated at $12,500 for initial development, $1,500 for computer and printer, and $1,500-$2,000 per year for the software service agreement and internet access.

New software can improve operations by including additional benefits such as:

- Integration with accounting software
- Abilities to track commercial and residential visits separately
- Expanded data exporting and reporting options

Figure 11 McDonald's Corners scale

- Flagging and customer notification abilities (unpaid accounts or previous issues etc.)
- Storing tared vehicle weights – improve tracking of cover material (weigh in but not out)

- Reduced administrative requirement for inputting information from invoices and miscellaneous reports.
- Calculating the landfill waste density (compaction rate)

5.1.6 Municipal Collaboration

There are several opportunities for the Township to coordinate with the County and other adjacent municipalities. Examples of collaborative opportunities include the following:

- Joint tendering/purchases (such as the Waste Management Master Plan) allows Townships to realize savings in the administrative process. Sometimes there are also economies of scale (e.g., composter orders).

Specifically, with Tay Valley Township, the Township could consider joint tenders for chipping and grinding, scrap metal, landfill cover and compaction

- Collaborative public education initiatives (promotion of the HHW/HSP program or backyard composting)
- Collaborative programs (i.e., the HHW depot, a mattress collection event open to multiple municipalities, bottle drives)
- Shared equipment and/or staff (allows the municipality to have resources available without having to cover full costs associated with owning equipment). For example, if the Township of Lanark Highlands and Tay Valley Township had the same type of garbage collection bins at each WDS there would be opportunity for joint ownership of a hauling truck to collect and empty the garbage compactors. Alternately, one Township could own the equipment and the other Township rents it.

Similar circumstances would apply to the purchase of a grinder for C&D or brush. There are several municipalities in the area that use this type of equipment, it could be purchased and shared.

Recommendation:

- The Township continue to work with adjacent municipalities having similar service models; specifically, consideration should be given to including the Township of North Frontenac, the Township of Central Frontenac, and Tay Valley Township. Other municipalities in Lanark County could also be considered although some have a different service delivery model.
- The group should meet twice a year to share operational challenges and opportunities for collaboration.

5.2 Options to Extend Landfill Life/Increase Diversion

5.2.1 Clear Bag Policy

This option entailed the assessment of implementing a clear bag policy for garbage at both WDSs and curbside.

A clear bag program requires residents to place all garbage in transparent garbage bags. Clear bag policies reduce garbage generation and increase waste diversion and the capture of recyclable materials in three ways:

1. There is social pressure to ensure that no recyclables, organics, or hazardous waste are in the garbage, as the contents are visible to transfer station staff
2. Clear bags prompt residents to reflect on their waste disposal habits and to consider waste diversion options
3. Clear bags facilitate easier screening of waste (depot attendants can accept/reject a bag of garbage at a glance without having to open and audit bags individually).

In addition to increasing BB recycling, the clear bag program also has the benefit of ensuring residents are not placing hazardous material, electronics, or leaf and yard waste in the garbage when there are better ways to manage these materials.

A common concern with clear bag programs is that others can see what is in your garbage. To address residents' privacy concerns, some programs allow the use of a small non-transparent (opaque) bag, such as a grocery bag, inside the clear bag, in which residents can dispose of materials they wish to keep private. There are also options for the Township to run a medical exemption program allowing some residents to maintain privacy for that reason. When introducing the clear bag policy, the public should be provided a minimum six months' notice to allow them to use up their coloured bags.

Many communities across Ontario that have implemented clear bag programs for garbage, including the Township of Algonquin Highlands (2008), the Township of Dysart et al (2007), the Township of Minden Hills (2008), the Township of Central Frontenac (2011), Township of North Frontenac, Tay Valley Township (2016), and the City of Kawartha Lakes (2018).

The cost to implement this policy is minimal and limited to public education and promotion of the change. In addition, the Township may wish to have clear garbage bags stocked in the municipal office and at WDSs for purchase by residents, and it is suggested that local stores that stock garbage bags be advised of the upcoming clear bag policy, so they can have clear bags in stock when the policy takes place.

The Township could expect to see a 10% increase in recycling with the implementation of the program and may also see an increase in some other programs such as electronics and hazardous waste. A 10% increase in recycling equates to a savings of an estimated 37 tonnes of garbage or 73 m^3 of landfill space per year.

To further support clear bag, Cambium compared the emissions from diverting 37 tonnes of recycling to landfill using the EPA WARM Model. The results show that implementing a clear bag program which increases recycling diversion from landfill will reduce GHG emissions by 124.39 $MTCO_2E$, or the equivalent of emissions from 26 passenger vehicles per year.

Recommendation:

- Transition to a clear bag garbage collection program prior to the transition to IPR in 2025.

This recommendation requires the following:

X	By-law
X	Standard Operating Procedures
X	Public Education/Notification

Note: X indicates a required task

5.2.2 Waste Site Passes

During development of the Plan staff identified waste sites passes as an item for consideration. This option was supported by approximately 46% of the respondents to the public survey. Only Township residents are permitted to use the Townships WDSs, however there is no method for staff managing the sites to validate residency. Commonly, a waste pass system is implemented at municipal waste disposal sites to ensure that only waste generated within that municipality is being landfilled at the sites. This is a requirement of each of the sites ECAs as well. There may be instances when contractors working for residents, or renters requiring WDS services need to use the local WDSs but don't have a pass. It is uncertain how many contractors and renters use the municipal WDSs at this time, however there are options to manage this requirement without significant additional requirements.

Two options for waste passes were considered for implementation of a waste site pass: a pass card which would indicate to the attendant that the customer was a resident of the Township or a punch card which would act as both a pass and a way to manage bag limits (Figure 12).

5.2.2.1 WDS Pass Card

The Township would create & distribute a pass card (or two) to each resident, who would then be required to show it to staff to gain access to a WDS. The pass card could be similar to a parking pass which hangs from a vehicle's rear-view. This approach reduces the chances of forgetting the pass and makes it easier for attendants to confirm.

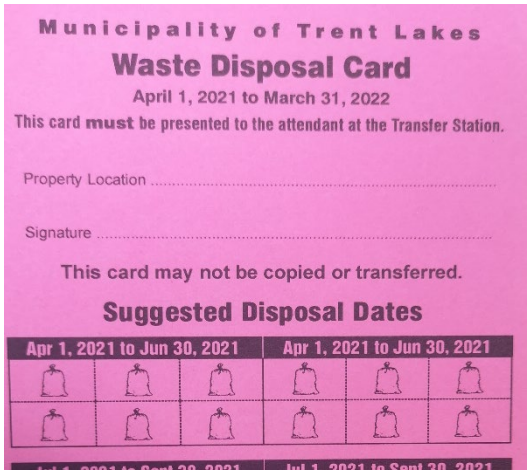

Figure 12 Example of WDS Pass Card/Punch Card

There would have to be some form of requirement for contractors or cottage renters to verify where they are coming from when using the site. Municipalities like the Township of Trent Lakes have implemented a cottage kit, which can be purchased for $3/kit to provide renters with a bag tag for disposal, garbage and recycling bags, as well as instructions on the municipal recycling program. This program is full cost recovery, where the $3/kit covers the cost of production and distribution of kits.

For managing commercial customers or contractors, typically municipalities implement a form which needs to be signed by residents and brought to the WDS confirming the origin of the materials. Passes can have numbers associated with them which could also be included on the contractor forms.

The cost to print waste site cards for residents is estimated at $750/year. A new colour card can be issued every year or two. The cost of implementing the cottage kits covers itself.

The expected increase in diversion is unknown as it is assumed that most residents that use the WDSs are local, however there are some municipalities in the area that have higher tipping fees or accept different materials which may result in waste being transferred to the Township from these areas.

5.2.2.2 Bag Limits/Punch Card

Implementing a bag limit on garbage is considered a best practice for increasing waste reduction. The Township currently has a successful 2 bag garbage limit in place for the curbside pickup service, but no limit at the WDSs. Most waste survey respondents generate one bag or less of garbage per week and the waste quantity data calculated supports this survey result.

It is suggested that the Township implement a system whereby residences have a certain number of free bags of garbage for year, tracked on a punch card pass. The annual punch card would require the attendant onsite to "check off" the number of bags brought to the site. After all of the "free" bags are used, residents are required to pay a fee per additional bag requiring disposal. This system allows for residents to choose their frequency of WDS visits but still maintain some control over the number of free bags disposed.

This type of system is used in other Ontario municipalities, including the Municipality of Trent Lakes where there is an annual limit of 48 bags per residence. From a curbside perspective, the Townships of Mississippi Mills and Carleton Place both have "1 bag" limits.

Recommendations:

- Implement a combination waste pass/punch card system, whereby residents are allocated a bag limit per year, and additional bags are charged a fee. The recommended number of bags for program launch is 1 bag per week or 52 bags per year.
- Implement a partial user pay system that is accompanied by cottage kits and contractor form requirements.

These recommendations would require the following:

X	By-law
X	Public Education/Notification

Note: X indicates a required task

5.2.3 Composting Program

Cambium assessed the option of implementing a formal composting program.

Without any recent Township waste composition studies, industry statistics were used in the assessment. On average, 30% of household garbage generation is organics (WM, 2018). For the Township, that would translate to 15% of the volume (or approximately 240 tonnes) of garbage currently going to landfill (as other waste streams such as C&D also go to landfill). Currently there is no formal Township program in place to support diversion of organic waste from landfill. However, 70% of survey respondents voluntarily participate in some form of backyard composting – either leaf & yard, food waste, or both.

There are two general options for diverting municipal organic waste: 1) decentralized “at home” programs or centralized collection systems at the WDSs. Often municipalities the size of Lanark Highlands choose a decentralized option for promoting composting as it can be costly and inefficient to collect and manage the quantities of organics waste generated. However, the assessment did review both.

5.2.3.1 Decentralized “at Home” Composting

Backyard composters and digesters are the traditional way to provide this program. Townships often order and supply backyard composters and/or digesters to residents at a reduced (subsidized) price to encourage organics waste diversion. A backyard composting program requires some public education to gain traction and be effective. Cambium estimates that with a $30 rebate per unit and with 100 composters and 50 digesters sold, the program would cost $4,500 annually (Table 20). However, it is estimated that this cost would result in 15 tonnes per year of food waste diversion.

Table 20 Backyard Composting Annual Cost

Item	Specifics	Cost
Public Education		$1,000
Composters	For 100 units	$5,000
Digesters	For 50 units	$4,750
Sale of composters	Selling price: $40	$-2,000
Sale of digesters	Selling price: $65	$-3,250
Total		$4,500

There is also an option to participate in a pilot program for at home food dehydrators, which process food waste and produce a dry crumbled organic material that can be mixed into garden beds. Food Cycler has started to pilot this technology with several small municipalities. In discussions with representatives from Food Cycler, Lanark County in cooperation with Mississippi Mills and Carleton Place are looking into piloting this program and there may be opportunities for the Township to get involved in this County initiative. Based on information received from other partnering municipalities and Food Cycler, the retail cost of the unit is subsidized through the bulk order and program participation by Food Cycler, then the County and Township would further subsidize the units for residents. A Food Cycler retails at $500 per unit. The units would be sold to residents for less than $200. The cost to implement this program for 150 residents is expected to be $20,000 and would result in a similar diversion as the backyard composting program but cater to residents who have reasons why they choose not to compost (animals, no space, etc.). Images of each unit are provided below in Figure 13.

Notes: left – composter, middle – digester, right – Food Cycler

Figure 13 "At Home" Composting Options

To further support backyard composting, Cambium compared the emissions from diverting 15 tonnes of organic waste to composting using the EPA WARM Model. Diverting 15 tonnes of organic waste translates to reducing emissions by: (left: composter, centre: digester, right: Food Cycler)

23 $MTCO_2e$, or the equivalent of emissions from 5 passenger vehicles per year.

5.2.3.2 Centralized Composting System

Centralized composting programs either collect/haul or collect/process organic waste at a common location (one or some of the WDSs). Generally, for a program like this to work, the Township would need to ban organics from landfill to encourage residents to source separate the material. There would also be implications associated with the curbside collection program as either a new stream would have to be added to collection or residents would now be required to bring organics to the WDS or compost at home, somewhat defeating the purpose of providing the curbside collection option.

The assessment included a high-level costing for collection locally and hauling to an offsite composting facility. The capital costs were estimated at between $25,000 and $50,000 and the annual operating costs close to $100,000 per year. There are technologies available to conduct composting onsite via in-vessel technology or covered windrow, however these

require regular addition of feedstock and operational oversight and are typically designed for more commercial applications or larger quantities of feedstock.

At this time Cambium would not recommend centralized composting but suggests that the approach could be revisited in the future when a better understanding of the Township's waste composition is available.

Recommendation:

- Implement a decentralized, subsidized "at home" composting program to support organics diversion by residents at their home.

This recommendation required the following:

X	By-law (may be required)
X	Public Education/Notification
X	ECA Amendments (for a centralized system)

Note: X indicates a required task

5.2.4 Construction & Demolition (C&D) Waste

Cambium assessed the options of diverting C&D waste to a recycling facility and of chipping, where possible, C&D waste for use as alternative daily cover.

The Township accepts C&D waste at the Middleville and McDonald's Corners WDS. Since there is a market available for recycled C&D waste, the assessment considered the cost and landfill space savings associated with diversion of this material. As detailed data was not available on the quantity or composition of C&D material, quantities were estimated using tipping fees received (as presented in Section 3.3.1) and Cambium's knowledge of those material streams.

There is also the option of sending Bulky Waste to a transfer station or landfill outside of the Township which was estimated at just over $200/tonne. This option is not currently recommended as the Township has existing capacity and should be looking at options to increase reduction or recycling of waste and reduction in GHG emissions.

5.2.4.1 C&D Chipping and Use as Alternative Daily Cover

The Township receives the bulk of C&D waste at the McDonalds WDS to be landfilled. If the Township considers separating C&D and bulky wastes (furniture, mattresses) onsite and chipping wastes to use as ADC there would be a significant savings in landfill space. Cambium estimates a cost of $7,250 per year to contract out chipping of the C&D waste on a semi-annual basis. This cost would be less if combined with the costs of also chipping brush as there would be less equipment float costs. The costs of chipping would be offset by a reduction in the quantity of imported cover materials needed (estimated $1,700 savings). Chipping would also reduce the fill rate by reducing the quantity of cover being landfilled. There be a one-time cost associated with an ECA amendment application, however this may be incorporated into an application for other changes (landfill expansion) which is currently being considered.

There are several municipalities that use this method including: the Township of North Frontenac, the Township of Central Frontenac, Township of Bonnechere Valley, and the Municipality of Highlands East.

5.2.4.2 C&D Diversion

Tomlinson, located in Carp, Ontario (72.5 km away) operates a C&D recycling operation that will accept some of the construction & demolition materials currently accepted at the Middleville and McDonald’s Corners WDSs. It is proposed that a C&D diversion program be piloted at the Middleville WDS as it is closer to the identified recycling facility and the WDS is already operating a waste transfer system. The tonnage of C&D and costs associated with the pilot project were estimated and included in Table 21.

Table 21 C&D Diversion Program & Chipping Costs

C&D Pilot Diversion Program	
Mixed C&D for Diversion (tonnes)	115
Landfill Space (m^3) assume 500kg/m^3	231
Processing Cost ($110/tonnes)	$12,705
Hauling Cost ($180/tonne)	$20,790
Cost per tonne	$290
Total Cost	$33,495
Existing Contract (hauling cost: $70/tonne)	$8,085
Net Cost Increase	$25,410
Chipping C&D	
Mixed C&D for Chipping (tonnes)	115
Landfill Space (m^3) assume 500kg/m^3	231
Cover material savings ($9.50/tonne)	$1,093
Chipping ($750/hour)	$7,500
Cost per tonne	$48
Net Cost Increase	$6,407

The impact on GHG emissions of piloting a diversion program and recycling C&D waste was evaluated using the WARM model. The model showed that a C&D recycling program would result in an estimated:

77.8 $MTCO_2e$ reduction in emissions or the equivalent of removing annual emissions from 17 passenger vehicles.

Recommendations:

- Apply for ECA amendments to pilot the use of chipped C&D and bulky waste as ADC and implement the pilot project.

Develop and pilot a Construction and Demolition recycling program at the Middleville WDS.

These recommendations would require the following:

X	By-law (optional)
X	Standard Operating Procedures
X	ECA Amendments
X	Public Education/Notification

Note: X indicates a required task

5.2.5 Mattress Recycling

Cambium assessed the option of recycling mattresses rather than the current practice of landfilling them.

There is a good business case for mattress recycling. Mattresses represent a difficult material to landfill as the springs in them prevent good compaction – thus they take up a relatively large amount of landfill space (Figure 14). Alternatively, there is currently a market for recycling these products when they are no longer usable. Recyc-Mattress is one company providing this service, recycling mattresses for many municipalities at their facilities in Toronto and Point-Claire, Quebec.

Figure 14 Landfilled Mattresses are Difficult to Compact

In terms of cost, the program can be designed, via tipping fees, to be cost neutral. Many municipalities recognize this and charge residents between $10-$30/mattress for disposal. A few examples were included in Table 13. The Township currently charges residents a tipping fee of $155/tonne for mattresses, which equates to between $10 and $20 per mattress. The best way to implement the program in the Township would be through mattress collection events. Costs to implement a mattress recycling program is estimated at $30 per mattress and includes collection, hauling and recycling costs. This program would involve the following:

- delivery of a trailer to a WDS,
- trailer left onsite to collect mattresses for seven days
- Township staff to oversee collection of mattresses
- Removal of the trailer and mattress recycling

The model is dependent on getting 100 mattress per trailer. Trailers can hold anywhere from 80 to 130 mattresses depending on their size and how they are loaded into the trailer.

Implementing a mattress diversion program would increase diversion by an estimated 60 m^3/per 100 mattresses. Based on quantities from other municipalities and Recyc-Mattress Inc. the Township produces at least 400 mattresses per year. It would be beneficial for the Township to track the mattress tipping fees received separately from other tipping fees, to measure the financial viability of the program.

If the Township decided to proceed with the implementation of a mattress recycling program it would be best accompanied by a per mattress disposal fee to recover or offset program costs and make the cost more transparent to residents, as well as implement a ban on landfilling of mattresses in the Township. An estimate was used to evaluate the costs of offering mattress recycling events (Table 22).

Table 22 Cost of Pilot Mattress Recycling Event

Option - Mattress Recycling	1 event	4 events
Average size of mattress (m^3)	0.62	0.62
Number of mattresses	100	400
Total space saving (m^3)	62	248
Total tonnage	4.54	18.14
Estimated cost	$3,090	$12,610
Estimated revenue (charge $25/mattress)	$2,500	$10,000
Net Recycling Program Cost	$590	$2,610

Notes: The weight of mattresses was estimated to be 45kg

There are other resources for residents looking to recycling mattresses who cannot wait for Township run mattress recycling events. Tomlinson's Waste Recovery Centre in Carp receives

mattresses from the public for recycling and many retailers will accept old mattresses when purchasing new ones and these return-to-vendor programs encourage development of the circular economy.

This is also a program that could be offered in cooperation with adjacent municipalities to provide more frequent accessibility of the program to residents of both Townships and/or to share the costs of implementing the program.

Recommendations:

- Implement a landfill mattress ban
- Implement a per mattress recycling fee of $25/mattress
- Implement two recycling events per year ($3,000/event)
- Contact adjacent municipalities to determine willingness to partner on mattress recycling events

These recommendations would require the following:

X	By-law
X	Standard Operating Procedures
X	Public Education/Notification

Note: X indicates a required task

5.2.6 Reuse Programs

Cambium assessed the option of additional reuse opportunities in addition to the reuse centre at McDonalds Corners.

It was noted during the Site visits that several WDSs have set aside items for potential pick-up and reuse by other residents. Although a few highly desirable reuse items (such as bikes, chairs, etc.) are often set aside at municipal WDSs, a large collection such as the one at

Robertson Lake WDS requires a proper program (Figure 15). While it is likely that a few of the items will be taken for reuse, many items will not be due to damage and will need to be hauled to the landfill at McDonald's Corners WDS by Township staff. As there are no fees associated with the programs offered at Robertson Lake WDS, it is assumed that all these items were accepted at no charge.

Figure 15 Unofficial Reuse Centre at Robertson Lake WDS

Residents have expressed an interest in increased reuse opportunities and Cambium fully recognizes the rational for increasing reuse. However, the Township also needs to manage resources and ensure costs are appropriately allocated for managing waste disposal. Reuse centres established without a proper plan in place, such as the current Robertson Lake program result in unnecessary additional cost to the Township.

To establish a successful reuse program, the WDS should have the following:

- Covered areas to ensure materials are not damaged while being stored
- Ministry ECA approval
- An agreement/acknowledgement as to who is responsible for the operations (contractor, volunteers, or the Township)
- Proper tracking of costs associated with running the program including the costs of disposing items that are not taken for reuse
- Proper screening to ensure only desirable items are accepted

Alternately, this could be an opportunity to increase Public Education about reuse in the Township by educating residents on the approved WDS to accept reuse materials and alternatives such as Kijiji, Facebook Marketplace, and others.

The costs associated with establishing or operating an additional Reuse Centre were not considered in the development of this Plan.

The Diabetes Association often works with municipalities to offer a collection program for textiles and small household items. There is no cost for the services, and they pick up the materials that are collected. A diabetes collection bin could be located at Robertson Lake WDS or Middleville WDS as an alternative diversion program for residents.

At the time of the site visits many bulky items were being stored outside of the reuse centre at McDonalds Corners. The management of the facility has been affected by COVID and measures to operate outdoors had to be implemented, however the facility should be required to ensure that all bulky items accepted for diversion are kept indoors during inclement weather or not accepted if the facility is full. It is understood that bulky items being accepted at the Re-Use Centre are charged a tipping fee and therefore should remain in good condition to avoid having to be sent to landfill.

Recommendations:

- Limit the acceptable reuse items to 5 “quick pick” items – for those WDSs without a formal reuse program.
- Other items should be directed to the appropriate location at the McDonald’s Corners Reuse Site or other resale platforms. Most reuse materials should not be accepted at no costs at the WDS which only transfer waste.
- Charge residents to dispose of bulky items if the Re-Use centre is at capacity.
- Contact Diabetes Association to determine if services can be provided at one or several of the Townships WDSs.

These recommendations will require the following:

X	Standard Operating Procedures
X	ECA Amendments
X	Public Education/Notification

Note: X indicates a required task

Other Options

This section consists of options that were important to consider, but which don't directly impact one of the Plan's noted objectives or goals.

5.2.7 Blue Box Transition Planning

Under the provincial BB Regulation, the Township will transition to individual producer responsibility (IPR) on January 1, 2025. On that date, producers, or Producer Responsibility Organizations (PROs), will assume both operational and financial responsibility for the Township's BB program.

The producers are required to continue the BB program but will have flexibility in how the program is delivered. The key points for the Township to consider are as follows:

- Producers will decide if they will work with the Township in any way to deliver BB Services, or go it alone
- Producer will get to decide if they will offer depot service, curbside service, or a combination of both. However, at minimum, producers will be required to maintain the curbside collection service for Lanark Village.
- During the transition period – January 1, 2023 – December 31, 2025 – Producers are required to continue to accept the same BB items that each individual municipality is currently accepting. Effective January 1, 2026, producers will collect only the consistent set of BB items, as dictated by the provincial regulation.

Many of the implementation details of IPR are still to be determined, however, it is recommended that the Township begins preparing for the transition now.

It is expected the producers will initiate discussions with municipalities in the short-term to determine if they will partner with them on delivering the new BB program. It is also expected that a key discussion item will be the costs that municipalities are incurring to deliver the BB program, as producers will be looking to set a price to pay municipalities for their potential component of BB services.

Given that, it is crucial that the Township have a detailed understanding of the BB program costs.

As previously discussed, (Section 3.3.2), it may be that the Township has been underreporting actual costs associated with managing the BB. Correcting this for the remaining years until transition may result in increased BB funding but is also necessary to have the detailed understanding of BB cost.

When transition is occurring, and depending on the agreement model, some BB costs (hauling, processing, capital bin investments, etc.) will be simple to justify to the producers if a competitive procurement process is used. However, it is anticipated that others (depot operating, administration, and public education costs) are the costs that will be up for negotiation. In addition to the detailed understanding of BB related cost, the Township will also need to be able to justify those cost and have a solid understanding on which costs would be eliminated by IPR (e.g., BB processing), and which may still remain (e.g. depot staffing).

Based on the service options in O. Reg. 391, the Township should consider the following:

Producer chooses to provide depot service

If the producer chooses to continue providing depot services at the WDSs, what are the major conditions that need to be considered and what will the Township negotiate:

- The Township currently provides staff to oversee proper diversion of materials and notify hauler of full bins. Is the Township willing to continue providing this service and at what cost?
- The Township currently provides all signage and public education at the WDSs and on the website. Is the Township interested in continuing to provide these services if there is no reimbursement?
- What is the implication if public education materials provided by the producer are inadequate or not readily accessible to residents?

Producers chooses to provide curbside service

Based on discussions with the Association of Municipalities Ontario (AMO), the method of recycling collection is intended to be equivalent to that of waste collection. Therefore, should the plan to transition the entire Township to curbside BB collection be presented to the municipality by producers or PROs, additional consultation should occur with organizations such as AMO, and the Continuous Improvement Fund (CIF), to seek direction and support on managing this transition. The Township must also consider how they will plan to manage these materials at the WDSs:

- Will the Township continue to accept materials at the WDSs at their own cost?
- Will the Township implement bans on receiving these materials and implement stricter enforcement to encourage residents to use the services provided by the producers?
- If curbside collection is implemented, how will the Township deal with residents who are not able to place their recycling out on collection day due to seasonality of their property (i.e., they are only at the residence on weekends).

Recommendations:

- Develop and maintain a detailed breakdown of all costs associated with the BB recycling program – both depot and curbside.
- Develop an overview of the potential scenarios associated with the BB IPR transition and consider the implication of each.

5.2.7.1 Blue Box Materials

The regulation defines specific eligible sources that will fall under the new BB program to be any residence or facility in the community. Therefore, the Township should ensure a clear understanding of the quantity of BB materials which are collected from non-eligible sources at the WDSs.

As noted in the previous section, effective January 1, 2026, the producers will collect only the BB items designated in the regulation. The Township currently accepts most of the designated

items, however, a few items such as straws/cutlery/dishes associated with take-out food will be added.

In addition to providing service to residences, O. Reg. 391 includes requirements for eligible Facilities (including multi-residential buildings, schools, retirement homes, and long-term care homes) and a calculated number of Public Space Receptacles.

Recommendations:

- The Township should identify eligible sources in the community and ensure that Facilities in the community are aware of their eligibility for service and how to ensure that they are considered in the future program. The Township may wish to facilitate this process to increase diversion from the Townships WDSs.
- The Township will be eligible for a limited quantity of public space recycling containers. The quantity is yet to be confirmed; however, they should anticipate this service and consider potential locations for these containers.

The recommendations in Section 5.2.7 will require the following:

X	By-law (may be required post transition)
X	Public Education (may be required post transition)
X	ECA Amendments (may be required post transition)

Note: X indicates a required task

5.2.8 Hazardous and Special Products Transition (HSP)

Hazardous and Special Products (HSPs) are materials designated under O. Reg 449/21 as a material that producers are required to manage – meaning subject to IPR. For clarity, a list of materials currently accepted and managed at the Middleville Hazardous waste depot is sorted into designated and non-designated materials below in Table 23.

Table 23 HSP Materials Accepted at Middleville HHW Depot

Designated Materials	Non-Designated Materials
145I - Paint	Pharmaceuticals
148C - Batteries single use	Fire Extinguishers
3311 - Propane	146T - CFL Bulbs & Tubes
212L - Antifreeze	Mercury
252L - Oil Filters	Sharps
Plastic Containers	148C - Corrosive Liquid
242A - Pesticides	263I - Flammables Organic
1471I - Fertilizers	1481 - Oxidizing Solids (nitrates)
331I - Aerosols	252L - Oil

A review of the quantities of materials managed in 2019 and 2020 determined that less than half (about 47%) of the hazardous materials managed at the depot are designated (included) under the HSP or Battery regulation. This is an important consideration when deciding how to manage the existing hazardous waste depot.

Designated HSP materials are transitioning to full producer responsibility between now and January 1, 2023. During transition the producers are required to maintain the same number of events and collection depots in each municipality for existing categories of HSP materials (O. Reg. 449/21 Section 7 (2)). Section 8 of the regulation includes minimum requirements for collection frequency.

Following transition, large producers will be required to establish a collection location for the items as summarized in Table 24.

The Township should expect to continue receiving free collection of designated HSP materials; however, any costs associated with management of the depot will need to be negotiated through an agreement with the producers. It is expected that as the program develops new opportunities will be established with producers.

Table 24 Hazardous Waste Collection Requirements

HSP Designated Materials	Collection Site Requirements Based on Population of Local Municipality		Lanark Highlands - Number of Collection Sites Required
	No requirement	500,000 or less	5,338
Automotive Products:	Under 1,000	1 site per 1,000	5
Anti-freeze			
Oil filters			
Oil containers			
Paints and Coatings	Under 5,000	1 site per 1,000	5
Pesticides and Solvents	Under 10,000	1 site per 250,000	0
Pressurized Containers	Under 10,000	1 site per 250,000	0
Non-refillable			

Recommendation:

- Ensure that an agreement is in place to receive compensation for the proportion of designated HSP materials managed,

5.2.8.1 Collaboration with Tay Valley Township

The agreement between the Township and Tay Valley Township was not provided for consideration as part of this Plan. However, a plan should be established to ensure that proportional allocation of all costs (including operation of the HHW depot) is established. The financial review included in Section 3.3.4 identified some uncertainty as to the cost sharing of the hazardous waste services.

Recommendations:

- Ensure that a cost-sharing agreement is in place with Tay Valley for operation of the hazardous waste depot at the Middleville waste disposal site
- Ensure that the above agreement considers new service agreements with producers.

These recommendations will require the following:

X	By-law Amendments (may be required post transition)
X	ECA Amendments (may be required post transition)
X	Public Education (may be required post transition)

Note: X indicates a required task

5.2.9 Brush Management

Cambium assessed the option of chipping brush versus burning it.

During the site visits, large stockpiles of brush were noted at several of the WDSs. At some sites there did appear to be some separation of brush from leaf & yard waste but in other instances the two were mixed (Figure 16).

Figure 16 Brush Pile at Lanark Village WDS

To date, management of the brush has included controlled burns when the piles reached a significant size. In 2021, some chipping of material was initiated so that it could be used as alternative daily cover at the McDonalds Corner's WDS. In order to ensure chipping costs are kept to a minimum, the Township should maintain clearly defined separate areas for leaf and yard waste. Signs to delineate the two separate locations are estimated at $1,500 for all seven sites.

The assessment of chipping versus controlled burning indicated an estimated $20,000/year in additional cost associated with chipping the materials at all WDSs. However, at McDonalds Corners WDS, this material can be used to offset some of the costs for cover material (historically estimated at $8,500 per year but over $20,000 in 2021). Although wood chips cannot fully eliminate the requirement for an aggregate cover material that support vehicles, with proper use it can significantly decrease the quantities.

Additionally, clean wood chips are not considered "waste" under O. Reg. 347 if used as ground cover. The Township could consider using wood chips at parks and trails in the municipality

and consider a program to return wood chips to residents. This would be a valuable way to return resources to the community.

To further support the chipping and alternate use of yard waste, Cambium compared the emissions from burning yard waste to composting yard waste. Burning 1,000 m^3 of yard waste releases 113 $MTCO_2E$ more GHG emissions when compared to composting the same quantity of brush. Landfilling brush on the other hand does result in greater emissions than burning brush. Therefore, the use of wood chip placement should be thoughtfully considered when applied as cover and placed closer to the edge of the landfill where wood chips would have a chance to decompose before getting covered and becoming part of the oxygen deprived landfill which results in the production of methane. This could be included as part of a standard operating procedure for managing compaction and cover at the landfill.

Cambium also considered the option of centralizing brush or implementing fees to discourage the collection of brush at landfill sites and encourage backyard composting of the material. The results were variable due to the number of assumptions involved with estimating the quantities of brush. However, it can be generally assumed that by centralizing the location where brush is accepted, chipping costs would decrease as there would be less time associated with mobilizing and demobilizing equipment and travelling to the various sites. As well, if chipped material is hauled to McDonald's Corners WDS to be used as an Alternate Daily Cover (ADC), centralizing the collection of the material would result in decreased hauling costs. Implementing a tipping fee would result in revenue that could offset the costs of chipping. Assuming 2,500 yd^3 at \$5/yd^3 the Township would receive \$12,500 in revenue. If the collection of brush was centralized at a site with a scale, a \$65/tonne tipping fee would be equivalent.

Recommendations:

- The Township improve the separation of brush from leaf and yard waste onsite.
- Chip brush and use it as ground cover or alternative daily cover at McDonalds Corners WDS.
- Compost Leaf and Yard waste separately and use as an interim or final cover

These recommendations require the following:

X	Public Education/Notification
X	Standard Operating Procedures

Note: X indicates a required task

5.2.10 Hours of Operation

Cambium assessed the option of reducing the WDS sites' hours of operation versus leaving them as is.

The assessment examined the monthly tonnages for each site to consider if it was worthwhile to change the hours of operation from summer hours to winter hours on Labour Day weekend instead of Thanksgiving. The results indicated there would be a minimal savings from making this switch and that relatively significant quantities of materials are still being received this time of year.

Therefore, no change is being recommended to seasonal hours.

It was also noted during the review that on Saturdays and Sundays the hours of operation in the summer overlap such that at least 5 different people would be required for each day (not including HHW staff). The hours could be adjusted to be more evenly distributed through all hours on the weekends and allow for some employees to switch from working one site to another if needed. However, this would currently depend on the Contractors ability to accommodate an adjustment to the schedule. A proposal for revised hours of operation and accompanying schedule for Township staff is provided in Appendix F.

Recommendation*:*

- The Township should review the hours of operation to determine if there can be improvements to accommodate better scheduling of operating staff and reduce overlap in WDS hours.

These recommendations will require the following:

X	ECA Amendments (site dependant)
X	Public Education/Notification

Note: X indicates a required task

5.2.11 Tipping Fees

Cambium assessed the option of increasing tipping fees for the various streams.

The Township's tipping fees were compared to adjacent and/or similar sized municipalities in Section 3.3.1.

The recommendations being made related to tipping fees apply more specifically to the implementation of specific programs. Based on Council's decision to implement certain programs they should consider also adjusting the tipping fees as follows:

5.2.11.1 Mixed Load Fees

One challenge to successful diversion of waste from landfill is encouraging users to properly sort materials as opposed to dumping mixed waste at the tipping face of the landfill. Although staff are usually available to answer questions about where to dispose of material, loads of material are often dumped at the tipping face before mixed load issues are identified.

With the recommendation to implement a clear bag policy (Section 5.2.1) it is important to identify a strategy to deal with residents coming to a WDS with opaque (non-clear) bags. Generally, there are two options: 1) deny disposal of the opaque bag, or 2) charge a mixed load fee. Option 1 has the potential to generate conflict between the resident. Thus option 2 is being recommended. Implementing a mixed load fee would provide customers with an option to either pay the fee (and for staff to sort the material appropriately) or to manage the materials appropriately (in clear bags and/or sorted into the correct waste streams).

It is recommended that the mixed load fee be twice the current tipping rate to provide a significant disincentive to mix waste – thus $310/tonne for each unsorted load. The Township may consider allowing a small quantity of recyclables in the landfill (for example a dump load of material that contains one or two cardboard boxes may not be charged the mixed load fee). The City of Kawartha Lakes has implemented a 10% rule when applying the mixed load fee (if 10% or more of materials are incorrectly sorted or in opaque bags then the mixed fee applies).

5.2.11.2 Construction & Demolition Fees

The Pilot program to divert C&D waste as well as the program to chip C&D wastes (Section 5.2.4) result in increase costs to the municipality. To offset these cost increases, the Township should consider a $200/tonne fee for C&D materials. This is less than the costs in Rideau Lakes of $222/tonne. It is estimated that this increase would result in approximately $25,000 in additional revenue to help cover the costs associated with chipping and diverting C&D materials.

5.2.11.3 Leaf and Yard Fees

As discussed in Section 5.2.9, to offset the cost of managing Brush, the Township should consider implementing a $65/tonne or $5/yd^3 fee to bring the material to the WDS. Rideau Lakes and OVWRC are examples of site that have fees for brush and yard waste. As the quantity of the material is unknown, the related revenue is uncertain but estimated at $12,500.

accommodate an adjustment to the schedule.

Recommendation*:*

- The Township should implement tipping fees changes as recommended with program changes
- To reduce administrative burden program changes and tipping fee changes can be scheduled to come effective later to reduce bylaw amendments required.

These recommendations will require the following:

X	ECA Amendments (site dependant)
X	Public Education/Notification

Note: X indicates a required task

5.2.12 Training

The Township should implement an annual training for all WDS operating staff. This training will ensure that employees working at the WDS are familiar with the requirements for the

ECAs, and the Townships waste management programs. The training sessions can be an opportunity to gather information from staff about site operations, improvement initiatives, and relay important information about any upcoming changes or initiatives that the Township wants to reinforce.

Recommendation:

- Site operators receive annual training directed by the Township on ECA and operational requirements for the WDSs.

This recommendation will require the following:

X	Standard Operating Procedures

Note: X indicates a required task

5.2.13 Public Education

Public education is a key component in any strategy focused on increasing waste diversion. The waste survey suggested that 38% of respondents specified an interest in increased community education and communication from the Township.

Information on the Township's WDSs and collection program are easily available for review on the Township's website. The website is the most cost-effective way for the Township to share information about waste programs. Additionally, most residents visit the WDS at least every other week to deposit their household waste and recycling (Figure 17). The Township should consider greater use of the site staff to educate residents on

Figure 17 Example of Waste Site Infographics

upcoming changes or concerted efforts to improve a particular program (i.e., share “little known facts”).

Residents should receive communication and information about any new programs and major changes to services well in advance. Following each option review, Cambium has identified where public education would be beneficial. Public education costs can vary depending on level of effort. Cost estimates for various initiatives are included in Table 25.

Table 25 Public Education Costs

Item	Cost	Notes
Website Updates	$720	For approx. 24 hours of work to update with all recommended changes
Cottage kits	$75	for 60 kits
Educational Material Support from Cambium	$3,500	For 2 program changes
By-law Updates	$3,000	
Waste Site Promo Material	$5,500	Signs (approx. $1,000 each) for each WDS and handouts (approx. $500 in printing fees)
Radio Advertising	$500	Approximate for one week of advertising
Staff Training	$300	2 hours of training with each staff of new initiatives, can be worked into regular staff training - 5 staff
Total	$13,565	

Through the development of the Plan, Cambium identified 12 initiatives that would require some form of public education for successful implementation as follows:

- Closure of sites
- Change in operational practices
- Clear bag policy
- Waste site user card
- Backyard composting
- C&D diversion and chipping
- Mattress ban/diversion program
- Reuse centre updates
- BB transition program
- HHW updates
- Brush chipping and ADC
- Hours changing

Recommendations:

- Residents should receive communication and information about any new programs and major changes associated with this Plan well in advance
- Updated By-laws and waste management reports (this Plan, annual monitoring reports, etc.) should be added to the Township's website

These recommendations will require the following:

X	Public Education/Notification

Note: X indicates a required task

5.2.14 Future Waste Disposal Site Capacity

Cambium reviewed the Townships overall landfill capacity as discussed in Section3.1.4. The Township currently has less than 10 years approved capacity, and potentially 8 years expansion capacity at the McDonalds Corners WDS.

Both the Robertson Lake WDS and the Snye Road WDS have remaining capacity that can be used once McDonald's Corners WDS reaches capacity. As identified in the *2020 Annual Monitoring Reports* (AMR)s, both of these temporarily closed landfills are contaminating off-site and require acquisition of Contaminant Attenuation Zones (CAZ) to meet Ministry compliance

criteria. Condition 18 (2) of the Robertson Lake ECA also requires submission of a plan to the Ministry prior to the use of additional capacity. Cambium has also noted a discrepancy between the capacity of the Robertson Lake WDS identified in the AMRs (33,924 m^3) and the total approved capacity noted in the ECA (55,460 m^3). The difference in reported volumes is 21,526 m^3 and equates to 4 years of waste disposal capacity at current landfilling rates

As the Township's capacity is expected to be met at McDonald's Corners WDS prior to the site expansion being approved, the Township should notify the Ministry of its intent to apply for expansion and request a temporary expansion approval. It makes sense to continue operating in this location until all remaining capacity is utilized as there is insufficient time to complete the necessary process to begin using the capacity at any of the other WDSs. A temporary approval at this site will also allow for continued use of the scales at the site to obtain valuable waste quantity information.

The Township should continue to pursue diversion efforts to reduce annual waste volumes. Table 26 summarizes the initiatives that directly impact the waste volume of the landfill and the potential waste diversion that could occur.

Table 26 Potential Waste Diversion

Program	tonnes	m3
Backyard Composting	15	30
Clear Bag Waste Collection	37	73
Construction Demolition (diversion)	115	231
Construction Demolition (ADC)	115	231
Mattress Recycling	20	250
Cover and Compaction	400	800
Total	702	1404

There are also indirect capacity savings that can be realized through implementation of some of the other options. Additionally, through the collection of better data, the Township can continue to identify additional opportunities for landfill diversion.

The average landfill rate is currently 5,000 m^3 per year, as described in Section 3.1.4, resulting in an estimated 17.5 years of remaining landfill capacity. Using the above tonnage of waste

diverted and cover quantity reductions, the updated average fill rate would be approximately 3,600 m^3. This reduced annual fill rate would result in a remaining landfill capacity of 24 years. The initiatives outlined in this Plan could increase the lifespan of the WDSs of the Township by six years.

Cambium considered sites that would be valuable to develop longer term into a transfer station designed to manage larger quantities of materials once the Townships landfill are closed. Middleville WDS is currently set up as a transfer station with scales. It also has the HHW depot and sufficient space. This location would also be the closest to some of the more likely transfer stations for waste once all the WDS capacity in the Township is utilized. McDonalds Corners is also a large enough site with the reuse centre and scales in place and could also be considered for longer term development into a transfer station however the distance to end disposal locations may be further from this location than from Middleville WDS.

Recommendations:

- Prioritize obtaining CAZs for the Robertson Road and Snye Road WDSs
- Request temporary approval to continue use of the McDonald's Corners landfill
- Implement diversion programs and initiatives to extend existing landfill site life
- Choose Middleville WDS or McDonalds Corners WDS as a central WDS transfer station for future operations, design an improved layout, and invest in improved waste transfer infrastructure at this location.

These recommendations will require the following:

X	ECA Amendments (may be required for site operating diversion program)

Note: X indicates a required task

6.0 Implementation Plan

Through the option assessments a list of 57 recommendations were generated, summarized in Appendix H.

The implementation plan prioritizes the top 24 recommendations from options considered in Section 5.0 to meet the goals and objectives identified for the Plan. In this section priority recommendations were categorized as short-term (1-3 years), medium-term (3-6 years) and longer-term (greater than 6 years). Given the significant changes currently occurring in Ontario's waste management sector, the short-term options include greater implementation details and financial implications while longer term options are more general in nature and provide for longer term planning horizons.

There isn't a specific Waste Management By-law, rather By-laws, which inform specific objectives/tasks. The Township may consider creating a Waste Management By-law which consolidates operating decisions regarding the WDSs such as acceptable non-acceptable materials, tipping fees, operating hours etc. If a Waste Management By-law is created, it should reflect the program changes if approved as well as date that they become effective. Alternately, the Township can continue to implement objective specific By-laws for various requirements as they are approved by Council.

Short term recommendations were based on two main principles: firstly, that the Township should improve record keeping and performance information to support their decision-making processes, and secondly, that there is limited capacity remaining at the existing the McDonald's Corners landfill and work need to be done to prioritize diversion of waste from the landfill site until the WDS expansion is approved or implemented.

Short-Term recommendations are consolidated in Table 27.

Table 27 Short-Term Recommendations (2022, 2023, and 2024)

	Recommendation	Action	Implications	Section
1	Data Management System	Implement record keeping SOP and tracking sheets	Minimal cost (staff time), major benefit – ability to assess performance	Section 5.1.5
2	Track BB Costs	Maintain a Spreadsheet of BB Costs	Minimal cost (staff time), major benefit – increase funding through datacall, and improve for possible transition negotiations	Section 5.2.7
3	Mattress Recycling Program – Events	Ban mattresses from landfill Implement mattress collection events Implement a mattress fee at collection events Promote mattress collection events	Minimal cost, Significant impact on WDS capacity, Waste diversion program	Section 5.2.5
4	Pilot Construction Demolition Recycling	Separate C&D Ship loads of C&D from Middleville WDS to Tomlinson	Some costs associated, significant impact on WDS capacity, waste diversion program	Section 5.2.4.2
6	Chip Construction Demolition Material	Separate appropriate C&D and Bulky items to be chipped and used as ADC	Some costs associated, diverts C&D from being landfilled, reduces amount of cover needing purchased	Section 5.2.4.1
5	Chip Brush	Separate brush from Leaf and Yard Waste and haul to McDonald's Corners for chipping biannually. Chipped brush as an ADC	Some costs associated, eliminated burning of brush which emits GHGs, reduces amount of cover needing purchased	Section 5.2.9
7	Notify and Plan for Future WDS Capacity with Ministry	Determining which WDS will operate as the landfill once McDonald's Corners reaches capacity	Some costs associated (staff time and CAZ reports for Robertson and Snye), improve the future transition	Section 5.2.14

	Recommendation	Action	Implications	Section
8	Reduce WDS to 5	Closure of two WDSs	Cost saving associated, lots of public notification and education	Section 5.1.1.6
9	Reduce Landfill Covering Days	Negotiate with Contractor to reduce days waste is tipped and requires cover and compaction	Cost savings due to reduced number of operating days	Section 5.1.3.1
10	Reusable Alternative Daily Cover	One-time purchase of a mat/tarp that is approved as an ADC	Cost saving after initial purchase, impact on WDS capacity	Section 5.1.3.2
11	Procurement Process Updates	Refine tendering specifications for contract services	Increase potential service providers and improve pricing	Section 5.1.1

Medium term recommendations were based on improving two main principles. Shifting a focus to implementing best practices associated with waste management and improving/optimizing service delivery. Medium-Term recommendations are consolidated in Table 28.

Table 28 Medium-Term Recommendations (2025 to 2027)

	Recommendation	Action	Implications	Section
12	Waste Site Passes	Implement waste site passes to easily identify residents and track usage of WDSs	Minimal costs associated, benefits WDS operators as they can easily identify residents and track tonnage if punch card also implemented	Section 5.2.2
13	Backyard Composting	Increase public education on “At Home” composting and set up subsidization of composters/digesters for residents	Some costs associated, waste diversion program, impact on WDS capacity	Section 5.2.3.1
14	Reuse Improvements	Charge residents bulky item tipping fee if Reuse Centre at capacity at McDonald’s Corners, implement 5 “quick picks” at other WDS so unofficial Reuse centres don’t get too large	Potential revenue increase from bulky item tipping fees	Section 5.2.6
15	Bin Size and Frequency	Seasonally haul garbage from the transfer stations every other week	Costs savings due to reduced hauling	Section 5.1.4.2
16	Township Staff Operation of WDSs	Switch to Township staff operating of WDSs,	Cost savings to have Township staff operate WDSs and increases control over operations	Section 5.1.1.1
17	Township Staff Operation of HHW Depot	Switch to Township staff operating HHW depot	Cost savings to have Township staff operate	Section 5.1.1.5
18	Township Staff Operation of Curbside Garbage Collection	Switch to Township staff collecting garbage and Township owned Fleet	Cost savings to have Township staff operate	Section 5.1.1.6

	Recommendation	Action	Implications	Section
19	Review and Update Hours of Operation	Reduce overlapping hours	Efficiencies in staffing, required for Township to assume operating responsibility	Section 5.2.10
20	Clear Bag Policy	Implement clear bag policy for garbage to increase operators ease of screening	Increases waste diversion	Section 5.2.1

Longer term recommendations were considered to start guiding future planning processes and consideration for management of waste.

Table 29 Longer-Term or Additional Recommendations (2028 onwards)

	Recommendation	Action	Implications	Section
21	Prepare operating plans for Robertson Lake (Consider moving scales)		Some costs associated, increased operational efficiency	Section 5.2.14
22	Prepare closure plans for McDonalds Corners WDS		Some costs associated	Section 5.2.14
23	Design improvements at Middleville or McDonalds Corners WDS		Some costs associated, increased operational efficiency	Section 5.2.14
24	Review and Update the Waste Management Master Plan			

Based on the short-term and medium-term suggestions outlined in the tables above and described in Section 5.0, the cost of the changes suggested in this Plan are estimated to be $53,565 upfront, and $44,775 annually. The total cost savings are estimated to be $216,500 annually. Table 30 outlines the cost breakdown of all the options combined below.

Table 30 Cost Summary for All Options

Option	Costs	Cost Savings	Notes
Closing a WDS Site		$40,000/year/site	Approximate
Twp Operation of WDS		$70,000/year	Approximate
Twp Operation of HHW Depot		$30,000/year	Approximate
Twp Operation of Curbside Program		Net $6,000/year	Amortizes cost of collection truck
Bin Type and Frequency		$16,000/year	Seasonally reduce transfer
Data Management System	$1,000 labour costs	unknown	Administrative requirements
Waste Site Passes	$750 once/two-years		Purchase the passes
“At Home” Composting	$4,500/year	$3,000 landfill space savings	Buy and subsidize composters/digesters
C&D Diversion	$25,000/year	$23,000/year landfill space savings	For hauling and processing at recycling facility
Mattress Pilot Events	$600-2,600/year	$30,000 savings of landfill space	Events can be cost recovery
Optimizing Cover and Compaction		$12,500/year	Reduce frequency and material
C&D/Brush as ADC	$12,000/year	$2,000/year $150,000 indirect from saving landfill	Chipper rental and savings from using ADC
Operator Training	$300/year		
Public Education	$13,565 once		Signage and website updates for options
Reusable Cover	$40,000 once	>$400,000 savings in landfill space	Purchase reusable cover
One-Time Fees	$53,565	-	Cost savings in total doesn’t account for landfill space saved
Annual	$44,775	$216,500	

Several of the options recommended will increase the operational costs compared to the costs of the current practices. In most cases, these recommendations are made as ways to increase diversion rates, increase landfill saving space, or both.

As outline in Table 26, there is a potential to divert an extra 302 tonnes of waste to recycling facilities rather than landfilling it at McDonald's Corners. If 100% of the potential diversion is realised the diversion rate would increase to 37%, an increase of 17% to the 2020 diversion rate.

Landfill space saving and increasing the site life of the WDSs within the Township have an indirect cost savings for the Township. Cambium calculated the value of landfill space to be $100/tonne. If approximately 380 tonnes of waste are diverted every year, then the Township is indirectly saving $38,000/year in landfill space.

7.0 Closing

In conclusion the Township offers a well-rounded waste management program, offering many services to residents at multiple locations and times of day. Several recommendations have been made with the intent to improve operations, reduce costs and increase efficiency. The Township should consider these options and implement those which they consider to be the most in line with their priorities and needs.

The first objective of finding a minimum of three solutions to reduce net operating costs by 2025 can be met with the following options: switching to Township operated and staffed WDSs, Township staff HHW depot, Township staffed curbside garbage collection, reducing the number of WDSs to five, reducing the frequency of hauling from the transfer stations to McDonald's Corners WDS during the winter months to biweekly, and reducing the amount of cover and compaction events to twice weekly. One-time costs are estimated at $53,565, while net annual savings are projected at $171,725.

The second objective to reduce the annual volume of waste and cover to landfill by 25% can be achieved through implementation of diversion programs and improved operational practices and alternative daily cover. The initiatives in this plan can decrease the annual volume of material being landfilled annually by 1404 m^3 (over 25% of the 2020 volume of 5000m^3). This is estimated to provide an additional 6 years of landfill capacity for the Township.

The final objective of increasing the diversion rate to 50% by 2030 can be met by implementing programs and practices including a clear bag policy, mattress diversion program, diversion of C&D waste, chipping C&D and bulky items to use as an ADC, and implementing an "At Home" composting program. These programs have the potential to increase diversion by 302 tonnes and result in a 37% diversion rate. By implementing the recommendation to improve data tracking additional measures to reduce waste will be easily identified.

It is recommended that the Township review their Waste Management Master Plans every 5 to 10 years to measure performance. As the Blue Box program is scheduled to transition in 2026, the Township should formally review this plan following the implementation of the IPR programs in 2027 or 2028.

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Standard Limitations

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A site assessment is created using data and information collected during the investigation of a site and based on conditions encountered at the time and particular locations at which fieldwork is conducted. The information, sample results and data collected represent the conditions only at the specific times at which and at those specific locations from which the information, samples and data were obtained and the information, sample results and data may vary at other locations and times. To the extent that Cambium's work or report considers any locations or times other than those from which information, sample results and data was specifically received, the work or report is based on a reasonable extrapolation from such information, sample results and data but the actual conditions encountered may vary from those extrapolations.

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Appendix A

Resource Recovery Regulation Details

Summary of Regulations under the Resource Recovery and Circular Economy Act

Hazardous and Special Products (HSP)

Ontario Regulation (O. Reg.) 449/21 (Government of Ontario, 2021a) was instated to make producers of HSP responsible for collecting, managing, and/or promoting the recycling or proper disposal of these products. An HSP includes: paints, pesticides, solvents, oil filters, oil containers, antifreeze, pressurized containers, mercury-containing devices, and fertilizers.

This regulation came into force on July 1, 2021; however, producer obligations under the regulation take effect on October 1, 2021. This regulation is designed to seamlessly transition with the Municipal Hazardous or Special Waste (MHSW) program which is scheduled to end on September 30, 2021.

The transition to the new HSP regulation is to make producers environmentally accountable and financially responsible for collecting and managing HSP at end-of-life (Ontario's Regulatory Registry, 2021). The switch from the MHSW Program will transition costs away from municipalities and municipal taxpayers. The HSP regulation will require producers to:

- establish free collection networks for consumers
- manage all collected materials properly, including meeting procedures for recycling, where possible, or disposal
- provide promotion and education materials to increase awareness
- register, report, provide audited/verified sales data, keep records, and meet other requirements
- transparently reflect any related charges that are intended to be passed on to consumers

BB

O. Reg. 391/21 (Government of Ontario, 2021b) was instated to make producers fully accountable and financially responsible for their products and packaging once they reach their end of life and are disposed. The regulation sets mandatory and enforceable requirements for

BB collection systems and gives producers choices for resource recovery options. BB materials include: glass, flexible or rigid plastic, metal, paper, or a combination of these materials. There is a separate category for beverage containers within the O. Reg. 391/21. There are three types of BB materials: product packaging, paper products, or packaging-like products.

This regulation was finalized on June 3, 2021 and implementation of the program starts on July 1, 2023. Once municipalities and First Nations communities start transitioning their blue box programs to the new framework, BB producers will become fully accountable and financially responsible for collecting and recycling their BB materials when consumers discard them. Producers will also have to report certified compostable products and packaging, however, there are no collection or resource recovery requirements for these products.

Upon initiation of the program, producers are required to report annually to the Authority on their performance meeting their management requirements (RPRA, 2021).

Electrical and Electronic Equipment (EEE)

O. Reg. 522/20 (Government of Ontario, 2020b) was instated to make EEE producers environmentally accountable and financially responsible for collecting and managing their products at end-of-life. This regulation was passed on September 21, 2020, and is the transition from the previous Waste Electrical and Electronic Equipment program.

This regulation is being implemented to lower costs for the people of Ontario by allowing producers to find new and innovative ways to reduce costs, manage their products and packaging more efficiently, and reduce the amount of waste sent to landfills. Producers of EEE are required to:

- establish free collection networks for consumers
- achieve management requirements through reduction, reuse, and/or recycling activities
- provide promotion and education materials to increase consumer awareness
- register, report, keep records, and undertake audits related to management activities

To facilitate an efficient delivery model and allow for economies of scale, producers would have the flexibility to meet their obligations individually, or collaboratively with other producers, by retaining service providers (Ontario's Regulatory Registry, 2019).

Batteries

O. Reg. 30/20 (Government of Ontario, 2020b) was instated to make battery producers environmentally accountable and financially responsible for collecting and managing their products at end-of-life. This regulation was put in place to replace the MSHW program. O. Reg. 30/20 was implemented with O. Reg 522/20 on September 21, 2020 and has the same requirements on producers.

Tires

O. Reg. 225/18 (Government of Ontario, 2018) was instated to make tire producers environmentally accountable and financially responsible for collecting and managing their products at end-of-life. The tire program was transitioned to IPR on January 1, 2019. Tire producers that are required to collect 10,000 kg or more of product in a calendar year must satisfy the following requirements:

- in local municipalities with one or more retail locations that supplied the producer's tires or vehicles with their tires were provided to consumers in the previous calendar year, the producer shall establish and operate as many tire collection sites in the subsequent calendar year as are equal to or greater than 75 per cent of the number of retail locations in the municipality that were operating in the previous calendar year.
- in local municipalities with a population of 5,000 or more but without a retail location that supplies the producer's tires or vehicles with their tires are provided to consumers, the producer shall establish and operate at least one tire collection site.

Producers must also implement a promotion and education program by indicating the person responsible for imposing the charge and how the charge will be used to collect, reduce, reuse, and recover tires (RCO, 2018).

Appendix B

Waste Management Program Details

Garbage Service

Curbside waste collection occurs weekly with a limit of 2 garbage bags per week per household (5 bag limit for industrial, commercial, and institutional (IC&I) establishments); for residents in Lanark Village who receive curbside pick-up. If a household receiving curbside pick up has more than the bag limit, the additional waste may be taken to any WDS for disposal without any additional fee. Curbside collection of garbage and recycling was provided by Topps Environmental until 2021 when the contract was awarded to Emterra. All garbage collected curbside is taken to the Townships active landfill sites, currently at McDonald's Corners.

There are currently no limits on the number of household garbage bags residents are allowed to dispose at the WDS. During the site visits it was noted that both the Middleville and McDonald's Corners WDS have scales in place to allow for weight based tipping fees. These scales are owned by the Township. The other WDSs primarily accept items that are no charge to residents and therefore any major financial transactions only occur at the two WDS with scales. Based on the information provided for development of the Plan it is suspected that limited tracking of site usage (number of vehicles or bags of residential garbage) is being conducted.

Transfer of garbage from each WDS to McDonald's Corners is currently contracted to Robert Alexander, who transfers one waste compaction transfer unit per week from each site. The compactor bins are emptied on the active face of the waste mound at McDonald's Corners WDS, as directed by the equipment operator onsite (also contracted to Robert Alexander) to complete the daily cover requirements. An additional waste compaction transfer unit at McDonald's Corners WDS is also added to the active face weekly; in total seven waste compaction transfer units per week are added to the active face at McDonald's Corners WDS. Weights of the residential garbage from each site are not recorded when they arrive at McDonald's Corners.

Construction Demolition Materials and Bulky Items

Construction/Demolition materials and Bulky Items such as mattresses, couches, desks, large chairs, construction demolition waste and bulky plastics are currently charged a tipping fee if $155/tonne for disposal and landfilled at McDonald's Corner WDS. Middleville WDS also accepts these materials, which are kept separate and hauled to McDonald's Corner on an as needed basis by Robert Alexander for landfilling.

Scrap Metals

Scrap metals are picked up at all WDSs by Kimco Steel Sales in Kingston on an as needed basis. 100% of the revenue from the scrap metals is rebated to the Township and subsidizes the hauling costs. It is assumed that all metal is recycled.

BB Recycling

The Townships offers a weekly single stream curbside recycling program where all BB materials (paper, plastics, glass, metals, etc.) are mixed in one recycling bin. Emterra is currently the curbside collection contractor and brings BB recycling to their facility in Renfrew.

At the WDS sites BB materials are inconsistently sorted into one or two streams depending on the site. According to a draft Township report on waste management assets, Robert Alexander supplies cardboard recycling compaction transfer units to each WDS, except Flower Station. Ownership of other BB recycling containers and waste bins is a combination of Township and Contractor as described in Section 3.3.5.

Note: Figure of bins at Lanark Village WDS – from Right to Left – Electronics, Garbage, Fibres, Containers

BB materials collected at the WDS are currently transferred by Robert Alexander to a transfer station operated by GFL in Carleton Place.

Note: Left: single stream recycling (paper and containers) containers at Robertson Lake WDS, Right: fibres container at Middleville WDS

Accepted and not accepted materials are listed below:

Accepted Materials		
Main Materials	Included Items	Disposal & Handling Tips
Cardboard	Boxboard Cereal Boxes Cracker Boxes Tissue Boxes “Paper” Egg Cartons Toilet Paper/ Paper Towel Rolls	All cardboard should be flattened and bundled
Plastics	Food & Beverage Containers Milk and Juice Cartons Ice cream Containers	All containers should be rinsed and clean
Film Plastics	Grocery & Shopping Bags Outer wrap from cases of water Toilet paper and paper towel packaging	Places all film plastics into one “bag of bags”
Metals	Open and empty Paint Cans Tin Cans Aluminum cans Pie Plates Trays Foil Wrap	Paint cans must be clean All remaining materials should be properly rinsed and cleaned with no food residue
Glass	Clear and Coloured Glass Food and Beverage Bottles Jars	Contents must be scraped clean and rinsed
Paper	Newspaper Magazines Catalogues Flyers Junk Mail Office Paper	Bundle together if possible

Non-Acceptable Materials	
Plastics	Rubbermaid Tupperware Plastic Toys Plastic Strapping Bubble Wrap
Breakables	Picture Frames Glass or Ceramic Dishes Dirty Flower Pots Small or Large Appliances Electronics Window Pane Glass
Organics/Paper	Diapers Compost Hardcover Books
Foam/Fibres	Styrofoam Sponge Foam Foam Sheeting Solar Blankets Fiberglass Feed Bags
Scrap & Metals	Car Tires Car Parts Pots and Pans Hangers Oil Containers

Batteries/Electrical and Electronic Equipment (EEE)

Battery Waste is only collected at Middleville TS. Battery Waste includes: rechargeable batteries (SSLA/PB Small Sealed Lead Acid, Ni-MH Nickel Metal Hydride, Li Ion Lithium Ion, and Ni-Cd Nickel Cadmium) and single-use batterie (Alkaline and Lithium Primary).

EEE waste is collected at Middleville WDS only. EEE waste includes: desktop computers, portable computers, computer peripheral including modems, monitors, televisions, printing devices including copiers, scanners, typewriters, telephones (physical and accessories),

cellular phones, audio and video players, cameras, equalizers, (pre)amplifiers, radios, receivers, speakers, tuners, turntables, video players/projectors, video recorders, and personal hand held computers.

All batteries and EEE Waste are handled by Electronic Producers Recycling Association (EPRA) in a contract with the Township. EPRA provides electronic collection bins at all WDS (except Robertson Road) and provides a pick-up service for the waste as needed, and a reimbursement to the Township of $150.00 per tonne. The EPRA collection program is based on the current Waste Diversion Act and may need to be updated to reflect new legislation.

Hazardous Waste

Residents of the Township (and Tay Valley Township residents) are able to dispose of Hazardous Household Waste at the Middleville Hazardous Waste Depot. Hazardous Waste includes waste with danger, flammable, poison, toxic and/or corrosive symbols on the packaging. Middleville Hazardous Waste Depot is only open seasonally between Victoria Day Weekend and Thanksgiving Weekend; proof of identification/residence may be requested by Waste Attendants. Prior to dumping, the Township provides a spreadsheet for residents to record the total amount of items and a rough estimate of the volume of material that is being disposed. The Township shares a proportion of the costs associated with managing the hazardous waste depot with Tay Valley Township.

Green Waste

Brush, Leaf and Yard, and Kitchen Organics are three waste streams that are not currently designated for reuse under legislation. Provincial policy does consider future management options; however, these options do not apply to single-dwelling residential buildings in communities with a population under 20,000. Large industrial or commercial facilities regulated by O. Reg. 103/94 that generate at least 300 kg of food/organic waste a week will be required to have a 70% waste reduction and resource recovery of food and organic waste generated in the facility by 2025 (50% for large industrial and commercial facilities not regulated by O. Reg. 103/94 but do generate at least 300 kg of food/organic waste a week), and any education

institutes or hospitals that generate 150 kg of food/organic waste a week must also have a 70% waste reduction and resource recovery.

Brush

Brush is accepted at all of the WDS within the Township. As per the ECA's for each WDS burning of clean brush is permitted as per Guideline C-7, "Burning at Landfill Sites". Under the current ECA's it can also be used as an alternative daily cover. Recently the Township initiated a chipping program for managing Brush.

Re-Use Centre

There is a Re-Use centre at the McDonald's Corner WDS which is a volunteer run initiative operated by a group called the "ReUsers". The Reuse Centre accepts small to large items, in good shape, from Township residents. The items are sorted and put on display in the "store" where residents can take what they can use at no cost. The centre was instated to divert materials from the landfill and extend the life of articles in good condition. Materials that are accepted are: books, clothing, housewares, craft materials, furniture, electronics, small appliances, sports and garden equipment, reusable windows, and doors. Donations from outside of Township residents are discouraged due to lack of space. At the time of the site visit many bulky items were being stored outside of the reuse centre. The management of the facility has been affected by COVID and measures to operate outdoors had to be implemented, however the facility should be required to ensure that all bulky items accepted for diversion are kept indoors during inclement weather or not accepted if the facility is full.

Note: Reuse Centre at McDonald's Corners WDS

Appendix C

WARM Model Data

GHG Emissions Analysis -- Summary Report

Version 15

GHG Emissions Waste Management Analysis for Township of Lanark Highlands (completed by Cambium Inc
Prepared by: Baseline - 2020 year
Project Period for this Analysis: 01/01/20 to 12/31/2(

Note: If you wish to save these results, rename this file (e.g., WARM-MN1) and save it. Then the "Analysis Inputs" sheet of the "WARM" file will be blank when you are ready to make another model run.

GHG Emissions from Baseline Waste Management ($MTCO_2E$): 27.36

Material	Tons Recycled	Tons Landfilled	Tons Combusted	Tons Composted	Tons Anaerobically Digested	Total $MTCO_2E$
Corrugated Containers	127.91	-	-	NA	NA	(401.07)
Mixed Paper (general)	73.09	-	-	NA	NA	(259.16)
Food Waste	NA	306.00	-	-	-	425.51
Mixed Plastics	73.09	-	-	NA	NA	(67.66)
Mixed Electronics	6.13	-	-	NA	NA	(4.82)
Mixed Metals	144.60	-	-	NA	NA	(634.99)
Glass	51.16	-	-	NA	NA	(14.14)
Asphalt Shingles	-	76.00	-	NA	NA	1.29
Carpet	-	5.00	-	NA	NA	0.08
Clay Bricks	NA	60.00	NA	NA	NA	1.02
Concrete	-	65.00	NA	NA	NA	1.10
Dimensional Lumber	-	80.00	-	NA	NA	(73.81)
Drywall	-	51.00	NA	NA	NA	(3.28)
Fiberglass Insulation	NA	10.00	NA	NA	NA	0.17
Vinyl Flooring	NA	15.00	-	NA	NA	0.25
Wood Flooring	NA	25.00	-	NA	NA	(21.56)
Mixed MSW	NA	850.85	-	NA	NA	1,078.35
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GHG Emissions from Alternative Waste Management Scenario ($MTCO_2E$): 27.36

Material	Tons Source Reduced	Tons Recycled	Tons Landfilled	Tons Combusted	Tons Composted	Tons Anaerobically Digested	Total $MTCO_2E$	Change (Alt - Base) $MTCO_2E$
Corrugated Containers	-	127.91	-	-	NA	NA	(401.07)	0.00
Mixed Paper (general)	-	73.09	-	-	NA	NA	(259.16)	0.00
Food Waste	-	NA	306.00	-	-	-	425.51	0.00
Mixed Plastics	-	73.09	-	-	NA	NA	(67.66)	0.00
Mixed Electronics	NA	6.13	-	-	NA	NA	(4.82)	0.00
Mixed Metals	-	144.60	-	-	NA	NA	(634.99)	0.00
Glass	-	51.16	-	-	NA	NA	(14.14)	0.00
Asphalt Shingles	-	-	76.00	-	NA	NA	1.29	0.00
Carpet	-	-	5.00	-	NA	NA	0.08	0.00
Clay Bricks	-	NA	60.00	NA	NA	NA	1.02	0.00
Concrete	NA	-	65.00	NA	NA	NA	1.10	0.00
Dimensional Lumber	-	-	80.00	-	NA	NA	(73.81)	0.00
Drywall	-	-	51.00	NA	NA	NA	(3.28)	0.00
Fiberglass Insulation	-	NA	10.00	NA	NA	NA	0.17	0.00
Vinyl Flooring	-	NA	15.00	-	NA	NA	0.25	0.00
Wood Flooring	-	NA	25.00	-	NA	NA	(21.56)	0.00
Mixed MSW	NA	NA	850.85	-	NA	NA	1,078.35	0.00
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GHG Emissions Analysis -- Summary Report

Version 15

GHG Emissions Waste Management Analysis for Township of Lanark Highlands (completed by Cambium Inc.

Prepared by: Recycling C&D - 2020 year

Project Period for this Analysis: 01/01/20 to 12/31/2(

Note: If you wish to save these results, rename this file (e.g., WARM-MN1) and save it. Then the "Analysis Inputs" sheet of the "WARM" file will be blank when you are ready to make another model run.

GHG Emissions from Baseline Waste Management ($MTCO_2E$): -94.66

Material	Tons Recycled	Tons Landfilled	Tons Combusted	Tons Composted	Tons Anaerobically Digested	Total $MTCO_2E$
Asphalt Shingles	-	76.00	-	NA	NA	1.29
Carpet	-	5.00	-	NA	NA	0.08
Clay Bricks	NA	60.00	NA	NA	NA	1.02
Concrete	-	65.00	NA	NA	NA	1.10
Dimensional Lumber	-	80.00	-	NA	NA	(73.81)
Drywall	-	51.00	NA	NA	NA	(3.28)
Fiberglass Insulation	NA	10.00	NA	NA	NA	0.17
Vinyl Flooring	NA	15.00	-	NA	NA	0.25
Wood Flooring	NA	25.00	-	NA	NA	(21.56)
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GHG Emissions from Alternative Waste Management Scenario ($MTCO_2E$): -172.42

Material	Tons Source Reduced	Tons Recycled	Tons Landfilled	Tons Combusted	Tons Composted	Tons Anaerobically Digested	Total $MTCO_2E$	Change (Alt - Base) $MTCO_2E$
Asphalt Shingles	-	-	76.00	-	NA	NA	1.29	0.00
Carpet	-	2.50	2.50	-	NA	NA	(5.91)	-5.99
Clay Bricks	-	NA	60.00	NA	NA	NA	1.02	0.00
Concrete	NA	32.50	32.50	NA	NA	NA	0.35	-0.75
Dimensional Lumber	-	40.00	40.00	-	NA	NA	(143.29)	-69.48
Drywall	-	25.50	25.50	NA	NA	NA	(0.93)	2.35
Fiberglass Insulation	-	NA	10.00	NA	NA	NA	0.17	0.00
Vinyl Flooring	-	NA	15.00	-	NA	NA	0.25	0.00
Wood Flooring	-	NA	25.00	-	NA	NA	(21.56)	0.00
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Total Change in GHG Emissions ($MTCO_2E$): (77.76)

Note: a negative value (i.e., a value in parentheses) indicates an emission reduction; a positive value indicates an emission increase.

This is equivalent to…

Removing annual emissions from	**17**	Passenger Vehicles
Conserving	**8,750**	Gallons of Gasoline
Conserving	**3,240**	Cylinders of Propane Used for Home Barbeques
	0.00000%	Annual CO_2 emissions from the U.S. transportation sector
	0.00000%	Annual CO_2 emissions from the U.S. electricity sector

a) For explanation of methodology, see the EPA WARM Documentation:
Documentation Chapters for Greenhouse Gas Emission and Energy Factors Used in the Waste Reduction Model (WARM)
-- available on the Internet at https://www.epa.gov/warm/documentation-chapters-greenhouse-gas-emissio and-energy-factors-used-waste-reduction-model

b) Emissions estimates provided by this model are intended to support voluntary GHG measurement and reporting initiatives.

c) The GHG emissions results estimated in WARM indicate the full life-cycle benefits waste management alternatives. Due to the timing of the GHG emissions from the waste management pathways, (e.g., avoided landfilling and increased recycling), the actual GHG implications may accrue over the long-term. Therefore, one should not interpret the GHG emissions implications as occurring all in one year, but rather through time.

GHG Emissions Analysis -- Summary Report

Version 15

GHG Emissions Waste Management Analysis for Township of Lanark Highlands (completed by Cambium Inc.

Prepared by: Clear Bag Implementation

Project Period for this Analysis: 01/01/20 to 12/31/2(

Note: If you wish to save these results, rename this file (e.g., WARM-MN1) and save it. Then the "Analysis Inputs" sheet of the "WARM" file will be blank when you are ready to make another model run.

GHG Emissions from Baseline Waste Management (MTCC_2E): 13.08

Material	Tons Recycled	Tons Landfilled	Tons Combusted	Tons Composted	Tons Anaerobically Digested	Total $MTCO_2E$
Corrugated Containers	127.91	12.79	-	NA	NA	(379.84)
Mixed Paper (general)	73.09	7.31	-	NA	NA	(248.64)
Food Waste	NA	306.00	-	-	-	425.51
Mixed Plastics	73.09	7.31	-	NA	NA	(67.54)
Mixed Electronics	6.13	0.62	-	NA	NA	(4.80)
Mixed Metals	144.60	4.02	-	NA	NA	(634.93)
Glass	51.16	5.12	-	NA	NA	(14.05)
Asphalt Shingles	-	76.00	-	NA	NA	1.29
Carpet	-	5.00	-	NA	NA	0.08
Clay Bricks	NA	60.00	NA	NA	NA	1.02
Concrete	-	65.00	NA	NA	NA	1.10
Dimensional Lumber	-	80.00	-	NA	NA	(73.81)
Drywall	-	51.00	NA	NA	NA	(3.28)
Fiberglass Insulation	NA	10.00	NA	NA	NA	0.17
Vinyl Flooring	NA	15.00	-	NA	NA	0.25
Wood Flooring	NA	25.00	-	NA	NA	(21.56)
Mixed MSW	NA	814.30	-	NA	NA	1,032.03
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GHG Emissions from Alternative Waste Management Scenario (MTCC_2E): -111.31

Material	Tons Source Reduced	Tons Recycled	Tons Landfilled	Tons Combusted	Tons Composted	Tons Anaerobically Digested	Total $MTCO_2E$	Change (Alt - Base) $MTCO_2E$
Corrugated Containers	-	140.70	-	-	NA	NA	(441.17)	-61.34
Mixed Paper (general)	-	80.40	-	-	NA	NA	(285.08)	-36.44
Food Waste	-	NA	306.00	-	-	-	425.51	0.00
Mixed Plastics	-	80.40	-	-	NA	NA	(74.43)	-6.89
Mixed Electronics	NA	6.75	-	-	NA	NA	(5.30)	-0.50
Mixed Metals	-	148.62	-	-	NA	NA	(652.65)	-17.72
Glass	-	56.28	-	-	NA	NA	(15.55)	-1.50
Asphalt Shingles	-	-	76.00	-	NA	NA	1.29	0.00
Carpet	-	-	5.00	-	NA	NA	0.08	0.00
Clay Bricks	-	NA	60.00	NA	NA	NA	1.02	0.00
Concrete	NA	-	65.00	NA	NA	NA	1.10	0.00
Dimensional Lumber	-	-	80.00	-	NA	NA	(73.81)	0.00
Drywall	-	-	51.00	NA	NA	NA	(3.28)	0.00
Fiberglass Insulation	-	NA	10.00	NA	NA	NA	0.17	0.00
Vinyl Flooring	-	NA	15.00	-	NA	NA	0.25	0.00
Wood Flooring	-	NA	25.00	-	NA	NA	(21.56)	0.00
Mixed MSW	NA	NA	814.30	-	NA	NA	1,032.03	0.00
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Total Change in GHG Emissions ($MTCO_2E$): (124.39)

Note: a negative value (i.e., a value in parentheses) indicates an emission reduction; a positive value indicates an emission increase.

This is equivalent to…		
Removing annual emissions from	**26**	Passenger Vehicles
Conserving	**13,997**	Gallons of Gasoline
Conserving	**5,183**	Cylinders of Propane Used for Home Barbeques
	0.00001%	Annual CO_2 emissions from the U.S. transportation sector
	0.00001%	Annual CO_2 emissions from the U.S. electricity sector

a) For explanation of methodology, see the EPA WARM Documentation:
Documentation Chapters for Greenhouse Gas Emission and Energy Factors Used in the Waste Reduction Model (WARM)
-- available on the Internet at https://www.epa.gov/warm/documentation-chapters-greenhouse-gas-emissio and-energy-factors-used-waste-reduction-model

b) Emissions estimates provided by this model are intended to support voluntary GHG measurement and reporting initiatives.

c) The GHG emissions results estimated in WARM indicate the full life-cycle benefits waste management alternatives. Due to the timing of the GHG emissions from the waste management pathways, (e.g., avoided landfilling and increased recycling), the actual GHG implications may accrue over the long-term. Therefore, one should not interpret the GHG emissions implications as occurring all in one year, but rather through time.

GHG Emissions Analysis -- Summary Report

Version 15

GHG Emissions Waste Management Analysis for Township of Lanark Highlands (completed by Cambium Inc.

Prepared by: Organics Diversion

Project Period for this Analysis: 01/01/20 to 12/31/2(

Note: If you wish to save these results, rename this file (e.g., WARM-MN1) and save it. Then the "Analysis Inputs" sheet of the "WARM" file will be blank when you are ready to make another model run.

GHG Emissions from Baseline Waste Management ($MTCO_2E$): 27.36

Material	Tons Recycled	Tons Landfilled	Tons Combusted	Tons Composted	Tons Anaerobically Digested	Total $MTCO_2E$
Corrugated Containers	127.91	-	-	NA	NA	(401.07)
Mixed Paper (general)	73.09	-	-	NA	NA	(259.16)
Food Waste	NA	306.00	-	-	-	425.51
Mixed Plastics	73.09	-	-	NA	NA	(67.66)
Mixed Electronics	6.13	-	-	NA	NA	(4.82)
Mixed Metals	144.60	-	-	NA	NA	(634.99)
Glass	51.16	-	-	NA	NA	(14.14)
Asphalt Shingles	-	76.00	-	NA	NA	1.29
Carpet	-	5.00	-	NA	NA	0.08
Clay Bricks	NA	60.00	NA	NA	NA	1.02
Concrete	-	65.00	NA	NA	NA	1.10
Dimensional Lumber	-	80.00	-	NA	NA	(73.81)
Drywall	-	51.00	NA	NA	NA	(3.28)
Fiberglass Insulation	NA	10.00	NA	NA	NA	0.17
Vinyl Flooring	NA	15.00	-	NA	NA	0.25
Wood Flooring	NA	25.00	-	NA	NA	(21.56)
Mixed MSW	NA	850.85	-	NA	NA	1,078.35
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GHG Emissions from Alternative Waste Management Scenario ($MTCO_2E$): 4.27

Material	Tons Source Reduced	Tons Recycled	Tons Landfilled	Tons Combusted	Tons Composted	Tons Anaerobically Digested	Total $MTCO_2E$	Change (Alt - Base) $MTCO_2E$
Corrugated Containers	-	127.91	-	-	NA	NA	(401.07)	0.00
Mixed Paper (general)	-	73.09	-	-	NA	NA	(259.16)	0.00
Food Waste	-	NA	290.70	-	15.30	-	402.42	-23.09
Mixed Plastics	-	73.09	-	-	NA	NA	(67.66)	0.00
Mixed Electronics	NA	6.13	-	-	NA	NA	(4.82)	0.00
Mixed Metals	-	144.60	-	-	NA	NA	(634.99)	0.00
Glass	-	51.16	-	-	NA	NA	(14.14)	0.00
Asphalt Shingles	-	-	76.00	-	NA	NA	1.29	0.00
Carpet	-	-	5.00	-	NA	NA	0.08	0.00
Clay Bricks	-	NA	60.00	NA	NA	NA	1.02	0.00
Concrete	NA	-	65.00	NA	NA	NA	1.10	0.00
Dimensional Lumber	-	-	80.00	-	NA	NA	(73.81)	0.00
Drywall	-	-	51.00	NA	NA	NA	(3.28)	0.00
Fiberglass Insulation	-	NA	10.00	NA	NA	NA	0.17	0.00
Vinyl Flooring	-	NA	15.00	-	NA	NA	0.25	0.00
Wood Flooring	-	NA	25.00	-	NA	NA	(21.56)	0.00
Mixed MSW	NA	NA	850.85	-	NA	NA	1,078.35	0.00
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Total Change in GHG Emissions ($MTCO_2E$): (23.09)

Note: a negative value (i.e., a value in parentheses) indicates an emission reduction; a positive value indicates an emission increase.

This is equivalent to…

Removing annual emissions from	**5**	Passenger Vehicles
Conserving	**2,599**	Gallons of Gasoline
Conserving	**962**	Cylinders of Propane Used for Home Barbeques
	0.00000%	Annual CO_2 emissions from the U.S. transportation sector
	0.00000%	Annual CO_2 emissions from the U.S. electricity sector

a) For explanation of methodology, see the EPA WARM Documentation:
Documentation Chapters for Greenhouse Gas Emission and Energy Factors Used in the Waste Reduction Model (WARM)
-- available on the Internet at https://www.epa.gov/warm/documentation-chapters-greenhouse-gas-emissio and-energy-factors-used-waste-reduction-model

b) Emissions estimates provided by this model are intended to support voluntary GHG measurement and reporting initiatives.

c) The GHG emissions results estimated in WARM indicate the full life-cycle benefits waste management alternatives. Due to the timing of the GHG emissions from the waste management pathways, (e.g., avoided landfilling and increased recycling), the actual GHG implications may accrue over the long-term. Therefore, one should not interpret the GHG emissions implications as occurring all in one year, but rather through time.

Appendix D

Landfill Cost Model

Landfill Capacity Costing Model
Continuous Improvement Fund

Municipality: Township of Lanark Highlands

Site Name: McDonalds Landfill

Date Complet 18-Nov-21

Completed By Heather Dzurko, Cambium

Total Estimated Landfill Life from Opening to Closure: 8 years — Estimated Life from November 18, 2021

Interest rate 3% annual rate

A) STARTUP COSTS (excl HST)

		Total Lump Sum	Site Life	Annualized Cost	Data Source/Explanatory Notes
1)	Land	$ -	8 yr.	$ -	
2)	Public Consultation	$ -	8 yr.	$ -	
3)	Approvals and Fees	$ 1,500	8 yr.	$ 207	
4)	Consulting/Engineering	$ 18,500	8 yr.	$ 2,559	
5)	Site Preparation/Construction	$ 10,000	8 yr.	$ 1,383	
6)	Other	$ -	8 yr.	$ -	
7)	Other	$ -	8 yr.	$ -	

Subtotal A) Annualized Startup Costs $ 4,149 per year

B) ANNUAL OPERATING COSTS (excl HST)

		Typical Annual Costs	Data Source/Explanatory Notes
1)	Staffing	$ 71,600	contracted costs plue 30,000 for overhead, management, and administration costs
2)	Environmental Services (Monitoring & Analysis)	$ 8,200	includes MOECC
3)	Annual Reporting to MOECC		
4)	Equipment (rental or annualized cost)	$ 41,000	includes fuel
5)	Equipment Fuel	$ -	
6)	Buildling, Grounds, and Equipment Maintenance (Repair)	$ 7,000	
7)	Utilities (electricity/propane/water)	$ 3,300	
8)	Sanitary Facilities	$ -	

9)	Safety Related Expenses	$ -	
10)	Printing and General Supplies	$ 500	
11)	Purchase/Placement of Soil Cover	$ 9,000	
12)	Gravel/Road Building		
13)	Waste Bins/Movements	$ 29,250	
14)	Signage/Fencing	$ 500	
15)	Animal/Bird Control	$ -	
16)	Leases/Property Taxes		
17)	Royalties Paid	$ -	
18)	Small Tools/Equipment	$ 500	
19)	Other		
20)	Other		
	Subtotal B) Annual Operating Costs	$ 170,850 per year	

C) CAPITAL COSTS (excl HST)

		Total Lump Sun	Site Life	Annualized Cost	Data Source/Explanatory Notes
1)	Construction Projects Not Covered Under B) (Total Site Lifetime Estimate)	$ -	8	$ -	
2)	Other (Total Site Lifetime Estimate)		8		
3)	Cell Capping and Closure	$ 250,000	8	$ 65,298	
	Subtotal C) Annualized Capital Costs			$ 65,298 per year	

D) POST CLOSURE COSTS (excl HST) O. Reg. 232/98, s. 18

(Note: Assumes post closure period equals Site Life)

		Annual Costs	Closure perio	Annualized Cost	Data Source/Explanatory Notes
1)	Monitoring and Reporting	$ 9,000	25	$ 33,350	
2)	Final Capping and Closure	$ 2,000	25	$ 149	
2)	Maintenance	$ 1,500	25	$ 3,363	

3)	Other (contingency costs)	$ 2,000	25	$ 4,484		
	Subtotal D) Annualized Post Closure Costs			$ 41,346	per year	
E)	**ADMINISTRATIVE SUPPORT**	**5% of total of A+B+C+D**		$ 14,082		
	TOTAL ESTIMATED ANNUALIZED COST (A+B+C+D+E+F)			$ 295,725		
	Prior 5 year ***Average*** Total Waste Tonnage Received	1,500	tonnes			
	Prior 5 year ***Average*** Blue Box Tonnage Received	375	tonnes			
	calculated % Blue Box of Total	25.0%				
	Prior 5 year ***Average*** Volume Consumed - Total Waste	3,000	cubic metres			
	Prior 5 year ***Average*** Volume Consumed - Blue Box	2,262	cubic metres			
	calculated % Blue Box of Total	75.4%				

ESTIMATED ANNUAL COST PER CUBIC METRE	$	99	per cubic metre
BLUE BOX - ESTIMATED ANNUAL ALLOCATION	$	222,977	total cost
BLUE BOX - ESTIMATED ANNUAL COST PER TONNE	$	595	per tonne
Garbage - ESTIMATED ANNUAL ALLOCATION	$	295,725	total cost
Garbage - ESTIMATED ANNUAL ALLOCATION	$	197	per tonne

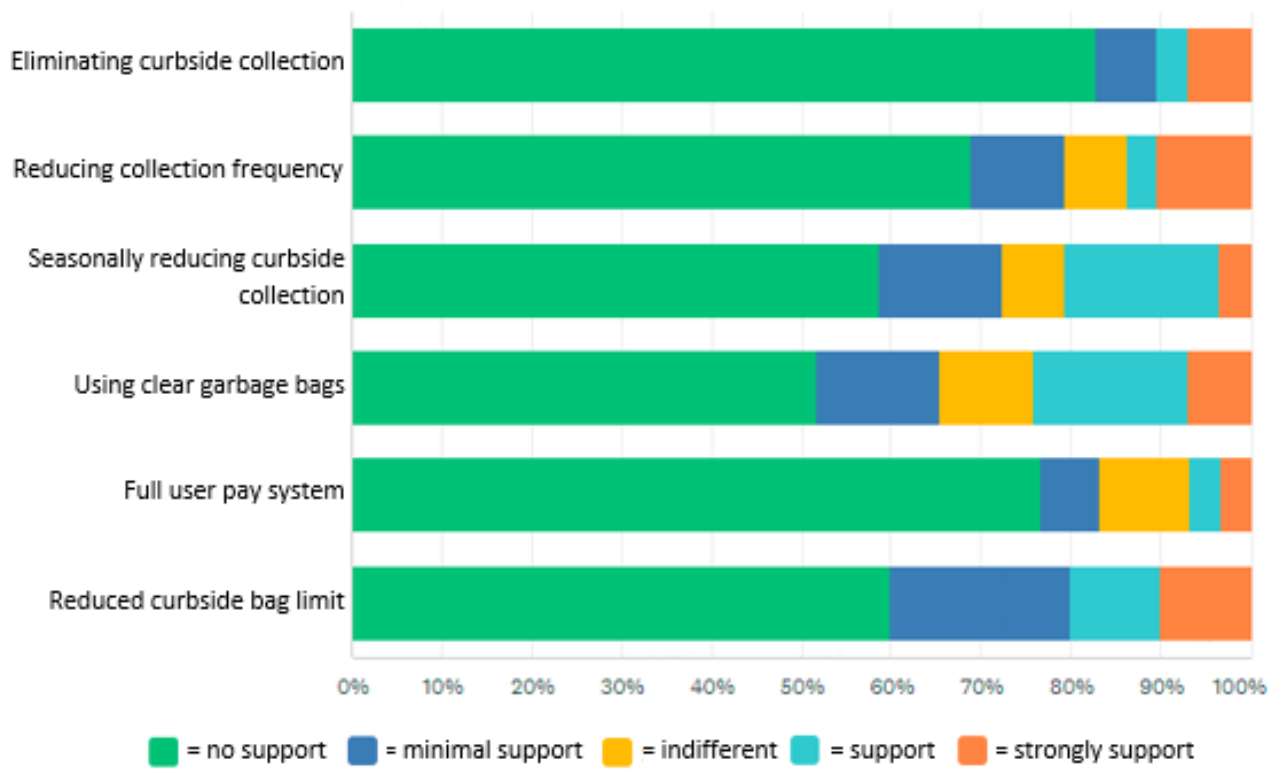
Appendix E

Public Survey Analysis

Population per household and amount of waste generated per household

As would be expected, there is a strong correlation between the amount of people living within a household and the amount of recycling and waste that household generates per week. For households that only have one resident, 100% of the respondents said that they generate less than one to one bin of recycling per week, and 96% said that they generate less than one to one bag of garbage per week. Households with two residents (most common demographic) answered that 70% generate less than one to one bin of recycling per week and 81% generate less than one to one bag of garbage per week. Households with five or more residents responded that 58% of the households generated 2 or more bins of recycling and 70% generated one to two bags of garbage per week.

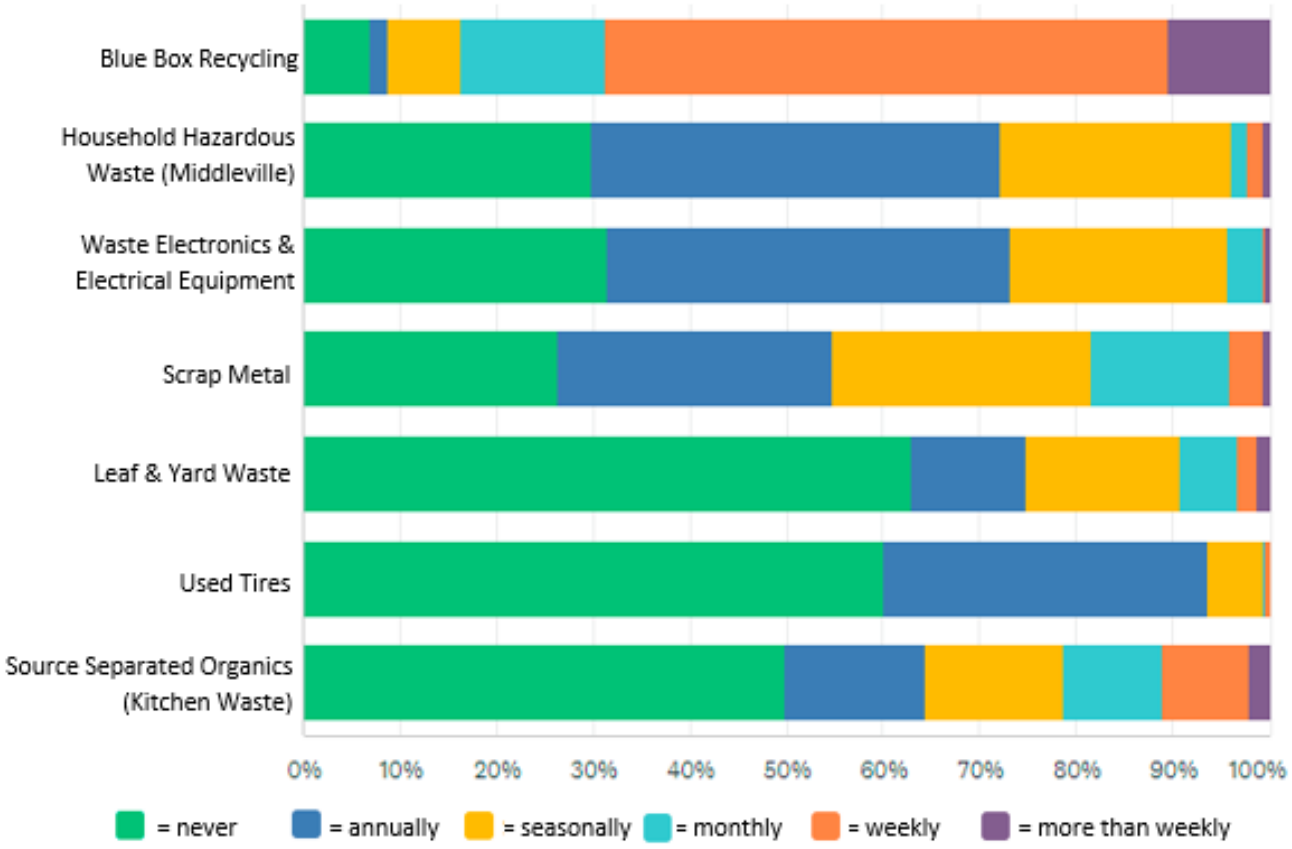
Curbside Pickup Options



Approximately 550 households within the community of Lanark Village receive curbside pickup services weekly. Of the respondents to the survey, 30 of them receive curbside pickup. The figure above shows the opinions of those 30 residents regarding potential changes to the

curbside pickup services. For all of the option, the majority of the answers were no to minimal support. The three options that received some support from these residents was as follows: 21% of respondents supported seasonally reducing curbside collection (i.e., biweekly pickup during winter months), 24% of respondents supported using clear garbage bags to increase collector safety and increase recycling diversion, and 20% supported reducing curbside bag limit to only allowing 1 bag without a tag weekly.

Waste Diversion Program Usage



As is shown in the figure above, the amount each service is used at the WDSs is variable. The most commonly used service is the BB service which 58% of households use weekly, and 15% use monthly. HHW is not commonly used, with 30% of respondents saying they never use the service and 42% saying they use it once a year. E-waste is another stream not commonly used, with 31% never using it and 42% using it annually. 26% of respondents never use the

scrap metal services, 28% use it annually, and 27% use it seasonally. Leaf and yard waste are not used by 63% of the respondents (more on leaf and yard waste below), but 16% of respondents use it seasonally. Used tire services are not used by 50% of the households, 34% of respondents use it annually. The Re-Use Centre at McDonald's Corner is used annually by 14% of respondents, seasonally by 14%, monthly by 10%, and weekly by 9%.

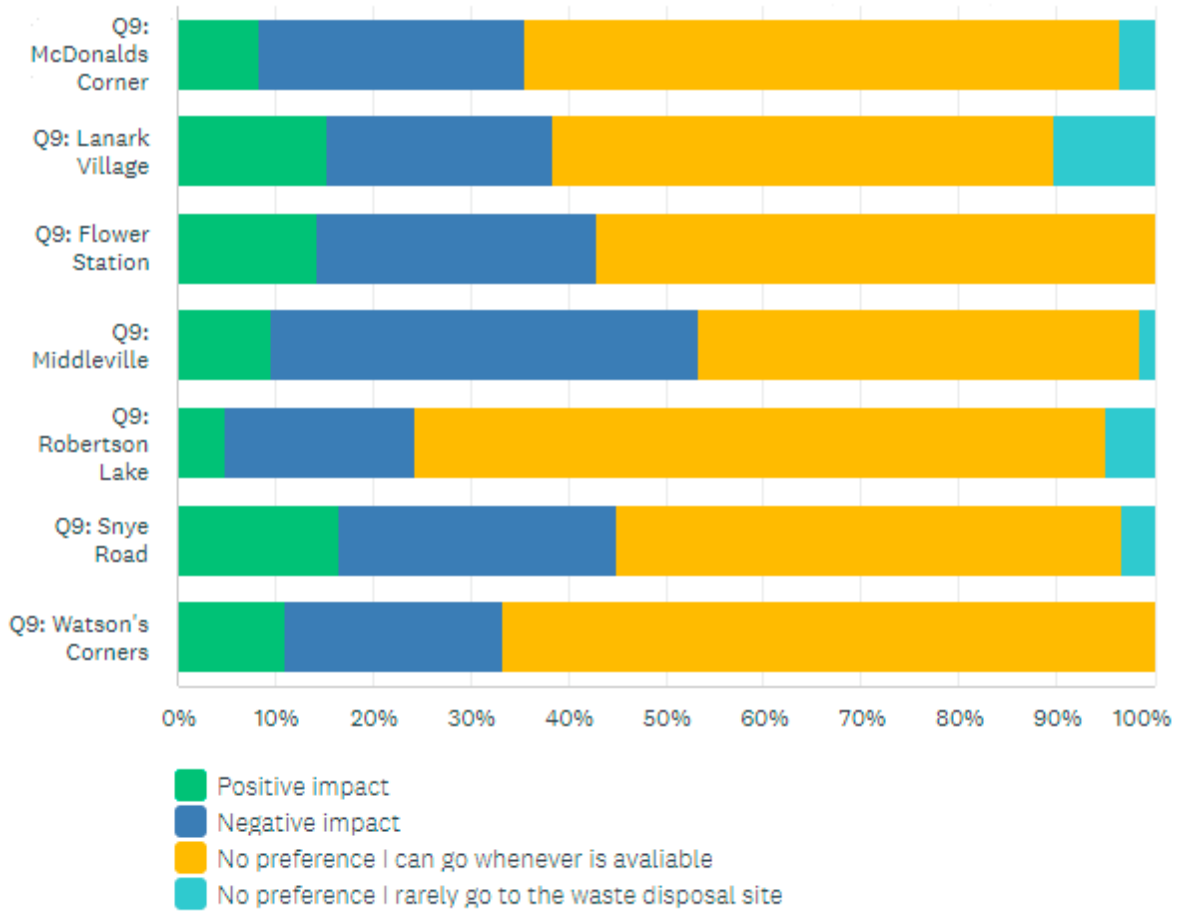
Some of the 550 households that receive curbside pickup services will also drop-off recyclables at the WDS's – these residents used each recyclable service at the same frequency as other residents without curbside option with the exception of the BB stream, which is used weekly by 58% residents without curbside, however, is only used weekly by 37% of the residents who receive curbside pickup.

Days and Hours of Operation

When asked if the hours of operation were sufficient for each respondent, the general answer was yes at all of the WDSs. Four sites had slightly lower satisfaction rates with the hours of operation: 22% of residents did not think hours were sufficient at Watson's Corner TS, 20% at Snye TS, 15% at Middleville TS, and 15% at Lanark Village TS.

When asked whether having more hours shift to during the day and reducing the amount of night hours, most people answered that there would be no effect because they can visit the WDSs whenever. Looking at the answers saying this would have an impact (either positive or negative), a higher proportion of residents at both Middleville TS and McDonald's Corner WDS (the two larger sites) said that the shift would have a negative impact on them versus a positive impact. The other five WDSs also showed that the second highest vote was that the hours shift would have a negative impact, however proportionately this was lower.

It should be noted that based off of the average age demographic for the Township and the number of residents noting that only two people lived within the household, it is assumed that a large portion of the surveys received were from an elderly retired population. This population generally has more flexible schedules and therefore may skew the data stating that the hours of operation are sufficient; this is further highlighted by the number of respondents that stated they could visit the WDS whenever.



Reduction of number of WDSs

One of the options on the survey outlined that having seven WDSs was costly and that reducing the number of Sites would directly impact the cost of the Township's waste management program. The residents were asked whether they would like to maintain the current seven WDSs and services, move to three centralized WDSs offering more services, closing one of the existing WDSs, or closing two of the existing WDSs. For residents at all WDSs, the majority of the answers was to maintain the current number of Sites with the services they provide. The second most common answer at 18% support was to move to three centralized WDSs. Closing one WDS received 10% support and closing two WDSs received 8% support. The two WDSs that received the least support for any changes to the WDSs and services were Flower Station TS and Watson's Corner TS, the two smaller sites within the Township. From reading individual comments left at the end of the surveys, residents who

used Flower Station TS were very concerned about this site closing, as the next closest Site would result in an approximately 50 km roundtrip for the community this one resident was coming from. The residents who used Watson's Corner TS did not have as many concerns in the comments about the potential for their site closing, and one comment mentioned that they frequently went to Robertson Lake TS as well and that this site was also convenient for them.

Potential Program Changes Support

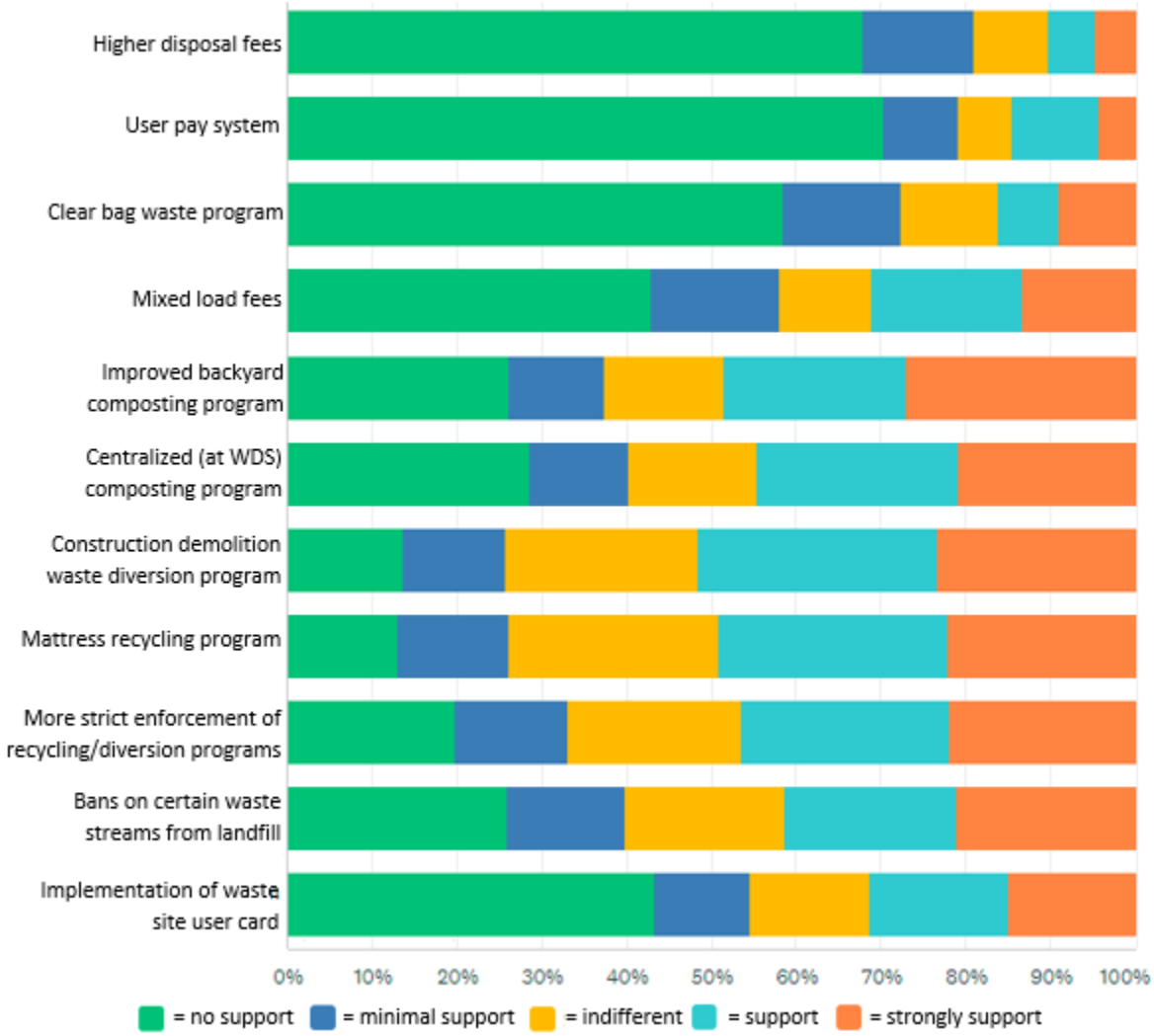
Of the 11 potential program changes proposed, the respondents to the public survey were favourable (or indifferent) to six of these options. A construction demolition waste diversion program was highly favoured with 51% of the respondents in support 23% more voting indifference. The other program that was widely supported was a mattress recycling program, with 49% support and 25% indifference. The results of the support for these programs were widespread for residents that used each WDS.

There were two composting options presented: an improved backyard composting program and a centralized (at a WDS) composting program. There was fairly even support for both of these programs, with approximately 47% support and approximately 15% indifference. It is noted that there was extra support for both of these options from residents who most frequently used Lanark Village TS.

The options of more strict enforcement of recycling/diversion programs and bans of certain waste streams from the landfill were both relatively well supported with approximately 45% support and approximately 20% indifference. There was especially strong support from residents that use Robertson Lake TS and Snye Road TS most frequently.

The final option that was at least somewhat supported was the implementation of waste site user cards. In general, 31% of the respondents showed support for this program change, with 14% voting indifference. The most support for this option was at McDonald's Corner WDS, which is the largest with the highest traffic flow and the most amount of recycling services. A waste site user card at McDonald's Corner WDS would allow the attendants to regulate that all people at the site were authorized to be there and would help with traffic flow; this was mentioned by several residents in the comments section at the end of the survey.

All of the responses regarding potential program changes are outlined in the figure below:



Seasonal Residents

The Township WDSs service many seasonal residents – 14% of the respondents to the public survey are seasonal residents who also use the WDSs offered to them. The WDSs that are most used by the majority of the seasonal population were Snye Road TS (37% of seasonal respondents) and Robertson Lake TS (35% of seasonal respondents); none of the seasonal residents responded as using Watson's Corner TS most frequently. 95% of the seasonal population reported being within 10 km of one of the WDSs. Most seasonal resident answers

were comparable to the permanent residents; the only small difference was that less seasonal residents participated in backyard composting.

Additional Changes and Services Comments

A comment that was received commonly was to increase recycling options to include: Styrofoam, plastic bags, Tetra Packs, glass, and plastic foam. Additionally, it was mentioned several times that the brush pile has built up and now residents don't have enough room to add additional brush. It was suggested that brush be burned more regularly, or chipped and added as cover (which was a generally supported option when asked in the survey).

Appendix F

Proposed Hours of Operation

Proposed Operating Hours							
	Summer Hours per day (Victoria day - Thanksgiving)						
	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
McDonalds Corners					10am to 2pm	9am to 2pm	4pm to 7pm
Lanark Village		12pm to 4pm				9am to 12pm	
Flower Station			2pm to 4pm			3pm to 5pm	
Middleville		12pm to 6pm					9am to 3pm
Robertson Lake			5pm to 7pm			3pm to 5pm	4pm to 7pm
Snye Road					4pm to 7pm	1pm to 6pm	
Watson Corners	2pm to 7pm						4pm to 7pm

Staffing Hours

	Summer Hours per day (Victoria day - Thanksgiving)						
	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
McDonalds Corners					4	5	3
Lanark Village		4				3	
Flower Station			2			2	
Middleville		6					6
Robertson Lake			2			3	3
Snye Road					3	5	
Watson Corners	5						3
							Total

Proposed Schedule

	Summer Hours per day (Victoria day - Thanksgiving)						
	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
McDonalds Corners					B	A, C	A
Lanark Village		A				A	
Flower Station			A			C	
Middleville		C					A,B,C
Robertson Lake			A			B	B
Snye Road					B	B	
Watson Corners	C						C

Total hours per staff: **Person A = 25 hours** **Person B = 24 hours** **Person C = 27 hours**

Appendix G

Waste Management Master Plan Supplementary Document

Included in the development of the Plan were several supplementary materials to further define the recommendations and implementation plans. These items included:

1. Two sample public education pieces for diversion programs. These can be used as templates and updated when the programs are ready to be implemented.
2. Two standard operating procedures (SOP), one for cover and compaction and one for record keeping practices. These SOPs can be used as templates for future procedures as well to outline standard requirements and ensure consistent approach to these operational requirements.
3. Record keeping forms for tracking waste material types and quantities
4. Training templates that can be used to educate staff on landfill and transfer station operations, legislative requirements, and waste management programs. The training sessions include information such as:

– General Information:

1. Applicable Legislation:
    a. Environmental Protection Act and Ontario Regulation 347
    b. Resource Recovery and Circular Economy Act
    c. Environmental Compliance Approval
2. Environmental Factors
    a. Leachate
    b. Landfill gas
    c. Odour, pests, and litter
3. Landfill Operations
    a. Health and safety
    b. Site inspections and maintenance
    c. Landfill grading, compacting, and covering

Township Specific Information:

1. Township attendant duties and bylaws
2. Load assessments - WDSs and waste streams
3. Record Keeping
4. Emergency Procedures
5. Waste Management Master Plan

Appendix H

Table of Recommendations

Number	Option	Recommendation
1	Township Operated Services	Consider 5-to-7-year contract terms for services requiring upgraded equipment.
2		Consider 5-to-7-year contract terms for services requiring upgraded equipment Include provisions in tender or request for proposal documents to enable the Township to award the various services to different contractors if warranted
3		Move to in-house staffing of WDSs
4		Maintain 3rd party contract for hauling garbage from WDSs to landfill
5		Maintain 3rd party contracted hauling of WDS recycling
6		Consider formally (through the tender process) offering a two-stream recycling program at the WDSs
7		Either contract with a processing facility prior to tendering for this service or include BB processing in the hauling contract for BB recycling.
8		Continue to contract site cover and compaction services to a 3rd party
9		Continue to tender for curbside recycling collection
10		Transition to Township operation of curbside garbage collection around the time of BB transition
11		With the transition to in-house operation of WDSs, include staffing the HHW depot
12	Number of Sites	Close Watson's Corner WDS and the Lanark Village WDS.
13	Cover and Compaction	Reduce number of days that the landfill accepts garbage and requires cover and compaction
14		Implement SOPs to ensure effective placement of waste and use of cover material at the WDS.
15		Negotiate with the contractor to reduce the frequency that garbage is placed at the tipping face to two days per week.
16		Implement a means of monitoring cover and compaction activities, including a record of cover material used to include in an annual operations review.
17		Implement a reusable cover material
18	Bin Type and Frequency	Improve and maintain records of garbage tonnages transferred and the frequency of transfers from each WDS to McDonalds Corners to further evaluate this option.

Number	Option	Recommendation
19		Reduce frequency of garbage transfer from the WDSs to biweekly in the winter where feasible
20	Data Management System	Develop a waste record keeping SOP and associated tracking sheets as described further in Appendix G
21	Municipal Collaboration	The Township continue to work with adjacent municipalities having similar service models; specifically, consideration should be given to including the Township of North Frontenac, the Township of Central Frontenac, and Tay Valley Township. Other municipalities in Lanark County could also be considered although some have a different service delivery model.
22		The group should meet twice a year to share operational challenges and opportunities for collaboration.
23	Clear Bag Policy	Transition to a clear bag garbage collection program prior to the transition to IPR in 2025
24	Waste Site Passes	Implement a combination waste pass/punch card system, whereby residents are allocated a bag limit per year, and additional bags are charged a fee. The recommended number of bags for program launch is 1 bag per week or 52 bags per year.
25		Implement a partial user pay system that is accompanied by cottage kits and contractor form requirements.
26	Composting Program	Implement a decentralized, subsidized “at home” composting program to support organics diversion by residents at their home
27	Construction & Demolition (C&D) Waste	Apply for ECA amendments to pilot the use of chipped C&D and bulky waste as ADC and implement the pilot project.
28		Develop and pilot a Construction and Demolition recycling program at the Middleville WDS
29	Mattress Recycling	Implement a landfill mattress ban
30		Implement a per mattress recycling fee of $25/mattress
31		Implement two recycling events per year ($3,000/event)
32		Contact adjacent municipalities to determine willingness to partner on mattress recycling events
33	Reuse Programs	Limit the acceptable reuse items to 5 “quick pick” items – for those WDSs without a formal reuse program.

Number	Option	Recommendation
34		Other items should be directed to the appropriate location at the McDonald's Corners Reuse Site or other resale platforms. Most reuse materials should not be accepted at no costs at the WDS which only transfer waste.
35		Charge residents to dispose of bulky items if the Re-Use centre is at capacity.
36		Contact Diabetes Association to determine if services can be provided at one or several of the Townships WDSs.
37	Blue Box Transition Planning	Develop and maintain a detailed breakdown of all costs associated with the BB recycling program – both depot and curbside.
38		Develop an overview of the potential scenarios associated with the BB IPR transition and consider the implication of each.
39		The Township should identify eligible sources in the community and ensure that Facilities in the community are aware of their eligibility for service and how to ensure that they are considered in the future program. The Township may wish to facilitate this process to increase diversion from the Townships WDSs.
40		The Township will be eligible for a limited quantity of public space recycling containers. The quantity is yet to be confirmed; however, they should anticipate this service and consider potential locations for these containers.
41	Hazardous and Special Products Transition (HSP)	Ensure that an agreement is in place to receive compensation for the proportion of designated HSP materials managed,
42		Ensure that a cost-sharing agreement is in place with Tay Valley for operation of the hazardous waste depot at the Middleville waste disposal site
43		Ensure that the above agreement considers new service agreements with producers
44	Brush Management	The Township improve the separation of brush from leaf and yard waste onsite.
45		Chip brush and use it as ground cover or alternative daily cover at McDonalds Corners WDS.
46		Compost Leaf and Yard waste separately and use as an interim or final cover
47	Hours of Operation	The Township should review the hours of operation to determine if there can be improvements to accommodate better scheduling of operating staff and reduce overlap in WDS hours.

Number	Option	Recommendation
48	Tipping Fees	The Township should implement tipping fees changes as recommended with program changes
49		To reduce administrative burden program changes and tipping fee changes can be scheduled to come effective later to reduce bylaw amendments required.
50	Training	Site operators receive annual training directed by the Township on ECA and operational requirements for the WDSs
51	Public Education	Residents should receive communication and information about any new programs and major changes associated with this Plan well in advance
52		Updated By-laws and waste management reports (this Plan, annual monitoring reports, etc.) should be added to the Township's website
53	Future Waste Disposal Site Capacity	Prioritize obtaining CAZs for the Robertson Road and Snye Road WDSs
54		Request temporary approval to continue use of the McDonald's Corners landfill
55		Implement diversion programs and initiatives to extend existing landfill site life
56		Choose Middleville WDS or McDonalds Corners WDS as a central WDS transfer station for future operations, design an improved layout, and invest in improved waste transfer infrastructure at this location
57		Review the Waste Management Master Plan in 5-10 years