FRONTENAC

Report 2019-045

Council Recommend Report

To:	Warden and Council of the County of Frontenac
From:	Kelly Pender, Chief Administrative Officer
Prepared by:	Kelly Pender, Chief Administrative Officer Jannette Amini, Manager of Legislative Services/Clerk
Date of meeting:	April 17, 2019
Re:	**Office of the Chief Administrative Officer – Frontenac Waste Management Review**

Recommendation

Be It Resolved That the Council of the County of Frontenac receive for information and except as final, the Frontenac Waste Management Review dated April 2, 2019, prepared by Cambium Inc.

And Further That a copy of the Frontenac Waste Management Review be forwarded to the Frontenac Townships for their review and consideration and that Frontenac County Council defer further discussion on the matter to the June 19, 2019 meeting in order allow for discussion at the Township level.

Background

In June of 2014, County Council adopted a Strategic Plan facilitated by Performance Concepts Consulting Inc., which included public consultation and meetings with each member Council. The approved Strategic Plan included three specific goals that centred on the following:

- **Seniors and the Aging Tsunami**
- **The Future of Waste Management**
- **Long Range Financial Planning and Economic Development**

The implementation plan for Councils goals set out the following with respect to the future of waste management:

Goal #2: Meet the emerging "post landfill" Solid Waste Management challenge for Frontenac residents:

- ✓ **Coordinate the establishment of a "Made in Frontenac" position and financial plan to be executed by the end of the current Council term, to**

inform the Eastern Ontario Wardens caucus on solid waste management solutions, including energy-from-waste.

- ✓ **Frontenac's position will be supported by technical data and financial planning in collaboration with local municipalities.**

In February of 2017, Council directed staff to investigate options to assist Council to make progress with the Frontenac County Waste Strategic Goal and report back their findings, including considering such programs as recently approved by the Ministry of the Environment and Climate Change to divert all organic material to a local Anaerobic Bio-digester on Wolfe Island and current energy-from-waste technologies for non-organic waste.

Public Works Managers and Cambium determined the best course of action would be to complete the recommended study in order to take full advantage of the changes coming under Bill 151, *Waste Free Ontario Act,* which addresses the options to assist Council with progress towards the Frontenac County Waste Strategic Goal. A grant submission to the Continuous Improvement Fund (CIF) to fund a study that identifies opportunities to develop a regional approach to optimize waste diversion in Frontenac County resulted in the County receiving a grant. The study was focused on Central Frontenac, but will provide our member municipalities with an understanding of both their blue box program and waste stream which will allow them to make decisions regarding optimization and/or negotiations with producers regarding recyclables.

The report is intended to provide each municipality with the data and tools necessary to develop further strategies for addressing the needs of their citizens, while also providing recommendations for continuing to work together on matters such as procurement and data collection.

Comment

After extensive work and data collection with the four Public Works Managers, the Frontenac CAO's group met on April 4, 2019 with Cambium and were presented with updates based on previous meetings with both the CAO's as well as the Public Works Managers. Attached is a copy of the final draft report from Cambium. The draft report has been completed based on the comments provided.

Staff are recommending that a copy of the Frontenac Waste Management Review be forwarded to the Frontenac Townships for their review and consideration and that Frontenac County Council defer further discussion on the matter to the June 19 Council meeting in order allow for discussion at the Township level.

Sustainability Implications

The Cambium report is structured such that each municipality can select best practices and recommendations based upon their priorities under the headings of:

1. Maximum Environmental Benefit
2. Extending Life Expectancy
3. Low Cost

The report will provide each municipality with the ability to select a local solution that reflects their needs and resources, while providing baseline data to prepare for the new reality under the *Waste Free Ontario Act*. In particular, the data collection portion report will provide each municipality to prepare for the changes contemplated by the Act and/or prepare for alternative service delivery.

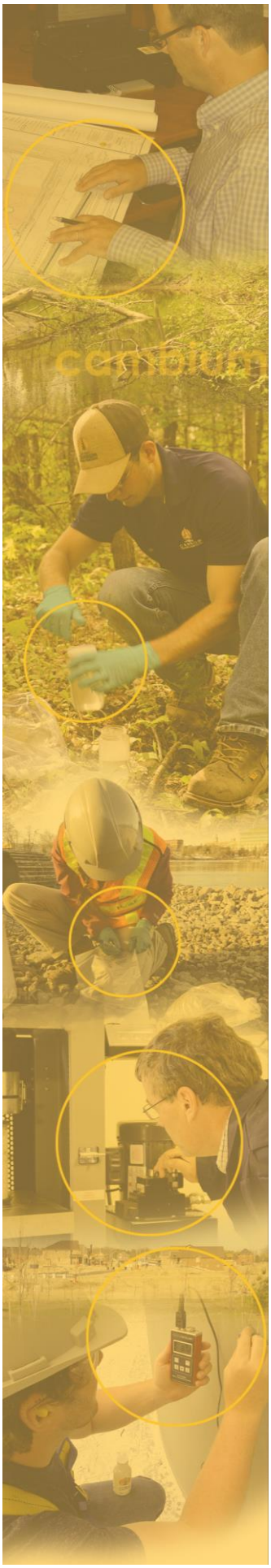
Finally, our appreciation is extended to the four Public Works Managers who have diligently worked with Cambium to collect data and formulate the made in Frontenac recommendations contained in the report. Their time, dedication and skills are appreciated.

Financial Implications

To be determined locally. There are no further financial considerations for the County associated with this report.

Organizations, Departments and Individuals Consulted and/or Affected

Frontenac CAO's Group
Frontenac Public Works Managers



Waste Management Review

Cambium Reference No.: 6164-001

2019-04-11

Prepared for: County of Frontenac

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Executive Summary

An executive summary of this report has been provided as a separate document.

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1.0 Introduction

Cambium Inc. (Cambium) was retained to assist the municipalities of Frontenac County (County) in completing a Waste Management Review (WMR).

The review was initiated by the County, through its 2014 “Wildly Important Goal” of working with its municipalities to develop a “Made in Frontenac” position and financial plan on solid waste management. Additional factors supporting the WMR include: increasing waste management costs, decreasing landfill capacity, the County’s Integrated Community Sustainability Plan and the recently enacted Waste Free Ontario Act.

The four (4) municipalities included in the WMR are: the Municipality of Central Frontenac, the Municipality of Frontenac Islands, the Municipality of North Frontenac and the Municipality of South Frontenac.

Each municipality has a unique set of circumstances (i.e. size, density, island community) that has influenced the design of their waste management program. In addition, each municipality currently operates their waste management program entirely independently of the others, and there is no involvement by the County in any of the programs.

1.1 State of Waste in Ontario

This WMR is being undertaken at a time where a relatively high level of both uncertainty and opportunity exists in the waste arena.

The Waste Free Ontario Act, enacted in 2016, represents an opportunity to move the province toward the circular economy (where waste is essentially eliminated) and shift the responsibility for waste from municipalities to the producers (see Section 1.4 for further discussion). However, the recent change in provincial government has caused uncertainty in the province’s commitment to fully implement the act.

The market for recycled waste streams, mainly Blue Box items, has become unstable following the implementation of China’s National Sword program in January 2018. The program has either banned various streams entirely, or reduced the acceptable contamination rate to such a level that it is not achievable by most municipalities. Other markets for these Blue Box

materials (e.g. Vietnam, Malaysia) are following suit which is severely limiting to places where these items are sent. The result has been stories of diversion cost increases, stockpiling of various streams, and sending others directly to landfill.

The cost of municipal diversion programs continues to rise. New products and materials are entering the market quicker than the waste/recycling industry is able to develop management strategies for them. In the interim, they are disposed of via landfill or incineration. In addition, the amount of heavy materials (e.g. newspapers, magazines and glass jars) in the Blue Box has been declining, while the amount of light, thin and complex plastics has been rising. Manufacturers often prefer lighter products and packaging, which can save them money, consume fewer raw materials and require less energy to transport. But these lighter, thinner, more complex plastics and other packaging materials also increase recycling costs. This trend of "the evolving tonne" continues, whereby lighter plastic and combination packaging are replacing heavier cardboard, glass and fibre materials. The result is a higher cost per tonne.

The overall landfill life remaining in Ontario is approximately 14 years, which is quite short given the requirements and time necessary to open new landfills.[1]

While the current Blue Box funding structure remains in place, disagreement will likely continue between the municipalities and the producers on the calculation for 50% coverage of the program's cost. Status quo is expected to continue for the short to medium term.

Food waste is becoming a very high profile; both from a social point of view and a greenhouse gas emissions point of view (food waste in the landfill generates GHG emissions). A growing effort is underway to reduce food waste for both reasons stated. In addition, the federal government's mandate to reduce GHG emissions has the potential to impact the food waste issue and possibly waste related transportation.

[1] Source: Ontario Waste Management Association, 2017

1.2 WMR Objectives

Based upon discussion with the County and the Municipal Public Works managers, the objective for the project was to explore opportunities for the four municipalities to collaborate to achieve one or more of the following (listed in order to priority):

- Increase waste diversion;
- Reduce the net costs for waste management; and
- Reduce the negative environmental impacts associated with waste management.

Increasing diversion entails increasing the success of the current diversion programs and/or adding new diversion programs. Reducing net costs can be accomplished through increasing the revenue derived from the current waste management programs and/or reducing operating costs (increasing efficiency, eliminating programs). Reducing negative environmental impacts involves diverting more environmentally hazardous waste and reducing greenhouse gas emissions generated from the waste management programs.

Most of the municipalities were in agreement on the prioritization order of the objectives; however, North Frontenac did rank the environmental objective slightly ahead of the financial one. In addition, the best options were anticipated as those which helped achieve more than one objective while not adversely impacting the other(s).

1.3 WMR Approach

The approach to the WMR involved four phases:

1. Complete a detailed review of current waste management programs and practices.
2. Complete a detailed review of the performance of the four waste management programs.
3. Complete a financial review of the four waste management programs.
4. Develop, analyze and prioritize options and opportunities that would assist in achieving the WMR goals.

The approach involved a considerable amount of data gathering, research, site visits and engagement of the municipal Public Works Managers. It was important to gain a very clear

understanding of the current waste management situation in the municipalities, including: program similarities and differences, waste performance and how it was measured, and the financial costs associated with the four programs.

1.4 Potential Impact of Waste Related Legislation

In November 2016, the province of Ontario introduced the most progressive waste legislation in decades – The Waste Free Ontario Act (WFOA). With the vision of creating a "circular economy", the WFOA sets out two bold objectives: zero waste and zero greenhouse gas emissions from the waste sector. The zero waste objective has the potential to extend landfill life by diverting more waste away from them and the zero greenhouse gas emissions objective has the potential to reduce negative environmental impact of landfills.

The associated WFOA strategy established aggressive targets for waste diversion (i.e. waste being "diverted" from landfills through reuse and recycling): 30% diversion by 2020, 50% diversion by 2030 and 80% diversion by 2050.

A foundational component of the WFOA is extended producer responsibility (EPR), whereby the producers must take on greater responsibility (financial and operational) to recover their products, specifically paper and packaging. This will potentially have significant impacts on municipalities, particularly pertaining to the Blue Box Program (BBP). Municipalities may have the opportunity to receive full (100%) funding for their BBP operation. Municipalities may also have the option to leave BBP altogether for the producers to develop and deliver their own program. In completing the WMR, the potential impacts of the Waste Free Ontario Act were considered and highlighted.

In December 2018, the Province unveiled its new environment plan - *Preserving and Protecting our Environment for Future Generations.* In respect to waste, the following actions were proposed:

- Reduce and divert food and organic waste from households and businesses;
- Reduce plastic waste;
- Increase opportunities for Ontarians to participate in waste reduction efforts;

- Make producers responsible for the waste generated from their products and packaging;
- Explore opportunities to recover the value of resources in waste;
- Provide clear rules for compostable products and packaging;
- Support competitive and sustainable end markets for Ontario's waste; and,
- Reduce litter in our neighbourhoods and parks.

Specific details on the above actions are still to come. Of particular interest was the action related to extended producer responsibility, which indicates support of movement in that direction.

2.0 Review of Current Waste Management Programs

This section provides a summary of the current landfill capacity, along with an overview of the waste streams accepted by each municipality at both their landfills and transfer stations. The section also provides a summary of each municipality's waste management bylaws.

2.1 Waste Disposal Site Summary

Each municipality in the County has a unique combination of landfills and transfer stations. In total, there are 11 operating landfills and five (5) transfer stations, as shown in Table 1. Frontenac Islands has no operating landfills, following the closure of their Wolfe Island landfill in 2015.

Table 1 - Waste Disposal Site Summary

	Central Frontenac	Frontenac Islands	North Frontenac**	South Frontenac	Total
Number of Operating Landfills	2*	0	4	5	11
Number of Transfer Stations	1	2	2	1***	5
Total	3	2	6	6	17

* Oso landfill scheduled to close in 2022.

** Addington Highlands (AH) and North Frontenac share the Cloyne waste disposal site, but AH waste is collected, transported and tracked separately. AH residents can only utilize the 506 waste disposal site for household hazardous waste, which is also tracked & invoiced separately.

*** Permanent Household Hazardous Waste Depot

Figure 1 below highlights the locations of all waste disposal sites in the County and denotes landfills with a yellow dot and transfer stations with a red dot.

Figure 1 – Waste Disposal Sites – Frontenac County

2.2 Landfill Capacity Summary

Landfill capacity is the estimated number of years remaining before the landfill is full. It is calculated using the landfill's remaining volume of capacity and its current annual waste generation figures. It does not consider the impact of future potential waste diversion improvements - in other words, it's a "business as usual" scenario.

Table 2 provides a summary of the landfill capacities for each municipality and for the County combined. Note that Frontenac Islands has no operating landfills.

Table 2 - Landfill Capacity Summary

Central Frontenac		North Frontenac		South Frontenac	
Site	Years Remaining[1]	Site	Years Remaining[1]	Site	Years Remaining[1]
Oso	4.5	506	34.0	Portland	27.1
Olden	34.0	Kashwakamak	44.0	Loughborough	7.6
		Mississippi	38.0	Bradshaw	9.5
		Plevna	32.0	Salem	9.5
				Green Bay	14.7
Combined	34.1	Combined	36.0	Combined	20.3
Frontenac County – Combined Years Remaining: 25					

[1] Remaining Site Life as of October 2017.
Source: 2017 Annual Reports for Waste Disposal Sites: Oso, Olden, 506, Kashwakamak, Mississippi Station, Plevna, Portland, Loughborough, Bradshaw, Salem, and Green Bay.

The landfill capacities are updated yearly during the completion of annual monitoring reports. The “years remaining” may increase or decrease depending on a variety of factors.

In the case of Central Frontenac, it is projected that the Oso WDS will close in 2022; therefore, the calculation considered the waste volume that will be added to the Olden WDS following closure.

Overall, if waste practices and diversion follow the current trend, Frontenac County is estimated to have a combined site life of 25 years, meaning it will meet landfill capacity by the end of 2042. As the municipalities look to work more closely together, the option of sharing landfills could be explored.

Point of Interest – it takes 5-10 years to receive approval for the creation of a new landfill.

2.3 Waste Program Summary

All four (4) municipalities offer a combination of waste management programs involving both garbage (waste to landfill) and diversion (re-use, recycle) programs. Garbage programs are

offered at all municipalities while diversion programs vary somewhat, even within the municipalities themselves, as outlined in Table 3 below.

Although all of the municipalities provide a Blue Box recycling program, only South Frontenac, due to its larger population, is required to do so, as any municipality over 10,000 that provides curb side garbage collection must provide Blue Box collection. All other diversion programs offered by the municipalities are “voluntary”. However, the benefits of these programs include extending the life of the landfill, reducing environmental impacts, generating revenue and meeting residents’ expectations.

Table 3 - Waste Diversion Programs Summary

DIVERSION PROGRAM OFFERED	Central Frontenac	Frontenac Islands	North Frontenac	South Frontenac
Mixed Containers (Plastic[1], Aluminum)	Yes	Yes	Yes	Yes
Mixed Fibres/Paper	Yes	Yes	Yes	Yes
Cardboard/OCC	Yes	Yes	Yes	Yes
Glass[2]	Yes	Yes	Yes	Yes
Household Hazardous Waste	No	No	Yes	Yes
Organics	No	Yes (Wolfe Is)	No	No
Appliances, Scrap Metal	Yes	Yes	Yes	Yes
Leaf & Yard	Yes	No	Yes	Yes
Construction	Yes	No	No	Yes
Bulky Plastics[3]	No	Yes	Yes	Yes
Electronics, Tires	Yes	Yes	Yes	Yes
Textiles (Clothing)	No	Yes	Yes	No
Styrofoam[4]	Yes	Yes	Yes	No
Returnable Bottles	Yes	Yes	Yes	No
Mattresses[5]	Yes	Yes (Wolfe Is)	Yes	Yes
Re-Use Centre	Yes	No	No	Yes

Notes:

[1] All municipalities accept plastics #1 through #7, except South Frontenac which does not accept PVC (#3), colored Styrofoam (#6), and other plastics (#7)

[2] All municipalities accept clear and coloured glass; glass must be clean and food grade bottles/jars only. Wolfe Island also accepts mirrors, windows, and broken glass.

[3] All municipalities accept bulky rigid plastics. Central Frontenac adds bulky plastics to the landfill; South Frontenac currently stockpiles bulky plastics until a hauler is contracted to remove this waste from the site.

[4] White Styrofoam packaging (no "peanuts").

[5] All municipalities accept mattresses; mattresses are landfilled in South Frontenac.

NF accepts household garbage and Blue Box recycling at all WDSs and accepts Construction / Demolition waste and large household items at Plevna, 506 and Mississippi. NF also offers a battery recycling program. Batteries are collected at the 506, Plevna, and Mississippi Sites, then transported and processed by KIMCO.

North Frontenac plans to open a Re-Use Centre in 2019 at their 506 waste disposal site. The centre will serve both North Frontenac and Addington Highlands' residents.

Impact of Waste Free Ontario Act – will attempt to harmonize the eligible Blue Box items across the province.

2.4 Waste Bylaw Summary

Each municipality has one or more current waste related by-laws in place, which dictate how waste is to be handled. Table 4 provides a high-level by-law summary.

Table 4 - Summary of Waste Bylaws

Municipality	Bylaw	Year	Areas of Focus
Central Frontenac	#2012-10	2012	Waste site logistics and provisions. Various waste schedules including accepted/prohibited materials, recycling and burning policies and tipping fees.
Frontenac Islands	#07-2016	2016	Waste site logistics and information on accepted/prohibited materials, tipping fees, and direction on the disposal of HHW in Kingston.
North Frontenac	#60-17	2017	Waste site logistics and provisions. Various waste schedules, including accepted/prohibited materials, accepted materials by site, and recycling and burning policies.
North Frontenac	#61-17	2017	Landfill Tipping Fees
South Frontenac	#2005-98	2005	Waste site logistics and provisions. Various waste schedules, including accepted/prohibited materials, HHW agreement, Provincial Offences Act & Fines, and tipping fees.

3.0 Review of Current Waste Management Practices

Waste management practices are the methods in which the waste programs are delivered. Practices include the collection, transportation, and processing of the various waste streams as well as the promotion and education of the programs.

The sections below provide a summary of collection, transportation and processing by waste stream and municipality.

3.1 Waste Collection

Waste collection is the process by which the waste stream is gathered. The main methods include curbside pickup and depot/landfill drop-off. Each municipality offers a slightly different approach to waste collection, as noted in Table 5.

Table 5 - Summary of Waste Program Components

	Central Frontenac	Frontenac Islands	North Frontenac	South Frontenac
Curbside or Depot	Depot	Both	Depot	Both
Permit Required to Access Site	Yes*	No	Yes	No
Bag Limit – Garbage	No	No	No	No
Bag Tag Program	No	No	Yes**	Yes
Clear Bag Required	Yes***	No	Yes	No
Bag Inspection	Yes	No	Yes	No

*Proof required from contractors

**Each clear bag of waste accompanied by an equivalent Blue Box recycling bag is free

***Municipal bags only

Operating Hours

The total operating hours for each municipality's waste disposal sites are provided in Table 6 along with the total number of waste disposal sites. The specific operating hours for each municipality's WDS is detailed in Appendix A.

Table 6 - Summary of Operating Hours

MUNICIPALITY	Central Frontenac	Frontenac Islands	North Frontenac	South Frontenac
Winter Hours (per week)	80	28	60	56
Summer Hours (per week)	80	37.5	123	56
Total Annual Hours per WDS	**4,160**	**1,590**	**4,380**	**2,912**
Total # Waste Disposal Sites	2	2	6	5

Frontenac Islands and North Frontenac reduce operating costs by reducing their waste disposal site hours during the winter months. Central and South Frontenac should consider a similar approach.

Collection Method

The specific waste collection methods by municipality for each waste stream are provided in Table 7.

Table 7 - Summary of Waste Collection Methods

PROGRAM	WASTE COLLECTION METHOD			
	Central Frontenac	**Frontenac Islands**	**North Frontenac**	**South Frontenac**
Garbage	Drop-off	Drop-off - Wolfe Curbside - Howe	Drop-off	Curbside (municipal roads only)
Plastic, Cans, Paper, Cardboard, Glass	Drop-off	Drop-off	Drop-off	Curbside (municipal roads only)
Electronics	Drop-off	Drop-off	Drop-off	Drop-off*
Household Hazardous	Not offered	Not offered	Drop-off	Drop-off*
Organics (Kitchen)	Not offered	Drop-off – Wolfe Not offered – Howe	Not offered	Not offered
Appliances, Scrap Metal	Drop-off	Drop-off	Drop-off	Drop-off
Leaf & Yard	Drop-off	Not offered	Drop-off	Drop-off
Construction	Drop-off	Not offered	Drop-off	Drop-off
Bulky Plastics	Drop-off	Drop-off – Wolfe Island only	Drop-off	Drop-off
Tires	Drop-off	Drop-off	Drop-off	Drop-off
Textiles**	Not offered	Drop-off	Not offered	Not offered
Styrofoam	Drop-off	Drop-off – Wolfe Island only	Drop-off	Curbside (white only)
Returnable Bottles	Drop-off	Drop-off – Wolfe Island only	Drop-off	Not offered
Mattresses	Drop-off	Drop-off – Wolfe Island only	Drop-off	Drop-off

*Drop-off at Keeley Rd. facility only

**North Frontenac textiles are placed in the KIMCO bin with the bulky items. Cost is included in the KIMCO costs. North Frontenac transports all mixed containers to their Plevna site to be compacted, before transporting it to HGC for processing.

3.2 Waste Transportation

Waste transportation is the manner in which the waste stream is moved from its initial collection point to its place of processing or its final resting place. The two main methods are municipal transport or 3rd party contractor transport.

Table 8 provides a summary of the transportation methods by municipality for each waste stream.

Table 8 - Summary of Transportation Methods

PROGRAM	WASTE TRANSPORTATION METHOD			
	Central Frontenac	**Frontenac Islands**	**North Frontenac**	**South Frontenac**
Garbage	In-house; transfer to landfill	Manco (Wolfe Is.); Island Property Mgmt. (Howe)	In-house	In-house & 3rd party (various)*
Plastics, Cans, Paper, Cardboard, Glass	In-house**	Manco	In-house***	Percy Snider / Brian Larmon
Electronics	Waste Management	Tomlinson	Dumpy'z	Goat Transport
Household Hazardous	Not offered	Not offered	Drain-All & KIMCO (batteries)	Brendar Environmental
Organics	Not offered	Debruin Farms (Wolfe Is.)	Not offered	Not offered
Appliances, Scrap Metal	KIMCO	Manco (Wolfe Is.); Kimco (Howe Is.)	KIMCO	Snider / Whaley
Leaf & Yard	In-house	Not offered	In-house	In-house
Construction	In-house	Not offered	In-house	In-house
Bulky Plastics	In-house	Manco (Wolfe Is.)	KIMCO	In-house
Tires	OTS****	OTS	OTS	OTS
Textiles	Not offered	Canadian Diabetes Assoc. (Wolfe Is.)	Not offered	Not offered
Styrofoam	In-house	Manco	In-house	Snider/Larmon
Returnable Bottles	Lion's Club	Various Community Groups	Lion's Club	Not offered
Mattresses	KIMCO	Manco (Wolfe Is.)	KIMCO	In-house

*South Frontenac – uses in-house haulers for Portland area garbage and Percy Snider / Brian Larmon for the rest
**Central Frontenac – in-house haulers transport BB items from each site directly to HGC (Belleville) for processing.
***North Frontenac – in-house haulers transport BB items to Plevna site for compacting, then to HGC (Belleville) for processing
****Ontario Tire Stewardship

Transportation of diverted materials represents a significant cost for the municipalities, particularly Central and North Frontenac who handle transportation in-house. The municipalities could consider partnering on transportation to processors of diverted materials.

3.3 Waste Processing

Waste processing is the manner in which the waste stream managed once it is transported. Generally, garbage is sent to a landfill (municipally-owned or 3rd party-owned) where it remains. Divertible materials are generally sent to processing facilities (materials recovery

facilities or MRFs) where they are sorted, bundled and either processed on site or sold to a processor elsewhere. MRFs can also be municipally owned or 3rd party owned.

Table 9 - Summary of Waste Processing Methods

PROGRAM	WASTE PROCESSING METHOD			
	Central Frontenac	**Frontenac Islands**	**North Frontenac**	**South Frontenac**
Garbage	Own landfill	Waste Management	Own landfill	Own landfill & 3rd party (Storrington area)
Plastics, Cans, Paper, Cardboard, Glass	HGC Belleville	Manco	HGC Belleville	KARC*
Electronics	Waste Management	Tomlinson	Dumpy'z	GOAT Transport
Household Hazardous	Drain-all	Not offered	Drain-all & KIMCO (batteries)	Brendar Environmental
Organics	Not offered	Debruin Farms	Not offered	Not offered
Appliances / Scrap Metal	KIMCO	KIMCO (Wolfe Is.)	KIMCO	KIMCO
Leaf & Yard	In-house; burned	Not offered	In-house; burned w/ brush	In-house; chipped and added as cover
Construction	In-house; stockpiled or chipped and used as cover (Olden)	Not offered	In-house; compacted and landfilled	Drywall & shingles – stockpiled Other – grinded
Bulky Plastics	In-house; landfilled	KIMCO	KIMCO	Stockpiled – Portland Landfill
Tires	OTS**	OTS**	OTS**	OTS**
Textiles	Not offered	Canadian Diabetes Assoc.	Not offered	Not offered
Styrofoam	HGC Management	Manco Recycling	HGC Management	KARC*
Returnable Bottles	LCBO, Beer Store	LCBO, Beer Store	LCBO, Beer Store	Not offered
Mattresses	KIMCO	KIMCO	KIMCO	Waste Connections

*KARC – Kingston Area Recycling Centre
** OTS – Ontario Tire Stewardship

It is noted that Central Frontenac brought in a compactor to increase the lifespan of their sites as well as a shredder to reduce piles of materials. This could become a shareable practice for processing waste onsite.

Impact of Waste Free Ontario Act – if extended producer responsibility is implemented it will partially or fully eliminate the responsibility for municipalities to collect, transport, and process Blue Box streams.

3.4 Promotion & Education

Internal and external promotion and education (P&E) of municipal waste management programs is crucial to their success, particularly when trying to increase diversion. P&E works best when the message is consistent and the delivery method is creative.

Currently, each municipality has their own P&E program. Common methods of communication utilized include flyer handouts, websites, site signage and one-on-one conversations with residents at the WDSs. More unique methods include in-person school education sessions and reaching new homeowners through local real estate agents.

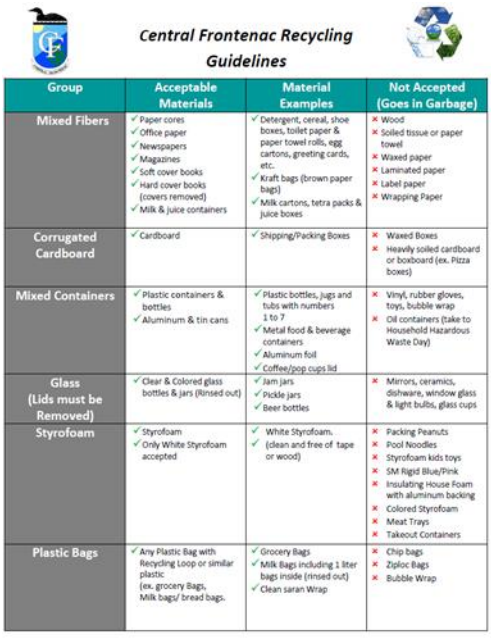
Potentially, the best education option involves the one-on-one conversation with residents with the combination of a clear bag policy and thorough bag inspections by site staff. While clear bags are considered a best practice in the industry, not all municipalities are in favour of the option.

A summary of each municipality's P&E program is provided below.

Central Frontenac

Currently, the municipality offers various handouts to its residents, either online or as a physical copy, including:

- Central Frontenac Recycling Guidelines – Outlines the acceptable and prohibited materials for each recyclable waste stream;
- Waste Disposal Overview – Details logistic information such as operating hours/days, site locations, associated fees, and waste programs and policies;



Central Frontenac Recycling Guidelines

Group	Acceptable Materials	Material Examples	Not Accepted (Goes in Garbage)
Mixed Fibers	✓ Paper cores ✓ Office paper ✓ Newspapers ✓ Magazines ✓ Soft cover books ✓ Hard cover books (covers removed) ✓ Milk & juice containers	✓ Detergent, cereal, shoe boxes, toilet paper & paper towel rolls, egg cartons, greeting cards, etc. ✓ Kraft bags (brown paper bags) ✓ Milk cartons, tetra packs & juice boxes	× Wood × Soiled tissue or paper towel × Waxed paper × Laminated paper × Label paper × Wrapping Paper
Corrugated Cardboard	✓ Cardboard	✓ Shipping/Packing Boxes	× Waxed Boxes × Heavily soiled cardboard or boxboard (ex. Pizza boxes)
Mixed Containers	✓ Plastic containers & bottles ✓ Aluminum & tin cans	✓ Plastic bottles, jugs and tubs with numbers 1 to 7 ✓ Metal food & beverage containers ✓ Aluminum foil ✓ Coffee/pop cups lid	× Vinyl, rubber gloves, toys, bubble wrap × Oil containers (take to Household Hazardous Waste Day)
Glass (Lids must be Removed)	✓ Clear & Colored glass bottles & jars (Rinsed out)	✓ Jam jars ✓ Pickle jars ✓ Beer bottles	× Mirrors, ceramics, dishware, window glass & light bulbs, glass cups
Styrofoam	✓ Styrofoam ✓ Only White Styrofoam accepted	✓ White Styrofoam. ✓ (clean and free of tape or wood)	× Packing Peanuts × Pool Noodles × Styrofoam kids toys × SM Rigid Blue/Pink × Insulating House Foam with aluminum backing × Colored Styrofoam × Meat Trays × Takeout Containers
Plastic Bags	✓ Any Plastic Bag with Recycling Loop or similar plastic (ex. grocery Bags, Milk bags/ bread bags.	✓ Grocery Bags ✓ Milk Bags including 1 liter bags inside (rinsed out) ✓ Clean saran Wrap	× Chip bags × Ziploc Bags × Bubble Wrap

- E-Waste and Battery Recycling – Provides several locations accepting e-waste and dry cell batteries free of charge; and
- A Waste Site Location Map.

In addition to these handouts, each waste policy (i.e. recycling and hazardous waste) is provided on the municipal website.

Frontenac Islands

Currently, the Wolfe Island WDS and Howe Island WDS offer different waste programs, including their P&E programs. P&E material offered by each site is as follows:

- Wolfe Island: Handout flyers outlining accepted/prohibited items for recycling and for organic waste.
- Howe Island: Handout flyers outlining accepted/prohibited items for recycling, operational hours and waste disposal data/information on the WFOA.

In addition, the Wolfe Island site attendant has been teaching proper recycling and its benefits at the local elementary schools and plans to add a lesson on organic composting in the future.

Past P&E events on Howe Island include the Pitch-In and Open House events. However, those events are no longer offered.

North Frontenac

North Frontenac's waste diversion rate has more than doubled since 2014 and the staff feel that their P&E program is a major reason. Their P&E is consistent at each site across their municipality and includes handouts, a website, and site signage. Their website information in particular is very thorough, and not only includes the common waste information but also the benefits of recycling and the various uses for recycled products and packaging.

Recently, the municipality has begun working through local realtors to distribute P&E material to new homeowners. Staff feel that this is also a major contributor to their strong waste diversion rate.

South Frontenac

Given that South Frontenac is the only municipality that provides curbside pick-up of garbage and Blue Box recyclables, their P&E program is somewhat different. The municipality provides the following to residents:

- A Recycle Calendar, to establish which recyclables are picked up and on which day;
- Notices to residents when their Blue Box recyclables are not picked up, explaining why it was rejected and how to fix the issue;
- A waste handout, detailing accepted/prohibited materials and how they should be grouped (i.e. bagged, bundled, or boxed);
- An online explanation of each plastic recycling symbol;
- Information and tips on backyard composting;
- An online explanation of the Household Hazardous Waste program and a list of accepted hazardous and e-waste;
- Information on tire recycling and communal bins; and,
- Local newspaper ads that serve to remind residents of proper waste disposal practices, update them on changes to waste programs, inform the transient community on waste policies and additional ways they can Reduce, Reuse and Recycle.

In addition, South Frontenac offers a Communal Bin & Recycle Station Assistance program (which includes a 50/50 cost share) to encourage seasonal residents to use curbside collection.

3.5 Waste Management Contracts

All four municipalities use 3rd party contractors for a portion of their waste management programs. In some cases, the contracts are formal while in other cases they are a continuation of previous agreements and based on a historical working relationship.

Table 10 summarizes the waste contracts that are currently in place.

Table 10 - Summary of Waste Management Contracts

	Contract Details	Contractor(s)	Expiry	Termination Rights
Central Frontenac	Automotive Materials	Automotive Materials Stewardship Inc.	N/A	Yes
Frontenac Islands	Garbage – Transfer Station – Wolfe Island	Haulage & Processing – Island Property Management	N/A	N/A
	Garbage – Curbside Pickup – Howe Island	Haulage & Processing – Manco	N/A	N/A
	Organics – Transport / Processing (Wolfe Island only)	Debruin Farms	N/A	N/A
North Frontenac	Electronics	Dunphy's	Month to Month	N/A
	Hazardous Waste	Drain-All	November 15, 2018	Yes
	Appliances / Scrap Metal / Textiles / Mattresses	KIMCO	Month to Month	N/A
South Frontenac	Garbage – Pickup / Transport	Brian Larmon Percy Snider	August 31, 2020	Yes
	Recyclables – Curbside Pickup	Brian Larmon, Percy Snider	August 31, 2020	Yes
	Blue Box Processing	KARC	Year to Year	No

Both Central and North Frontenac use HGC (Belleville) for the processing of their Blue Box waste streams; however, there is no contract in place for this service.

Frontenac Islands currently uses Manco to transport and process their Blue Box items, however, there is no contract in place for this service.

South Frontenac currently uses Kingston Area Recycling Centre to process their Blue Box materials. The contract originated in 2006 and remains in place until terminated by either party.

WFOA Impact: with the planned move to extended producer responsibility, it is suggested that municipalities avoid long term contracts and ensure that any contracts entered into have a termination right for the municipality.

3.6 Sharing Effective Programs & Practices

Through the analysis of the current waste management programs and practices of all four municipalities, a number of sharable options were identified which can be adopted by one or more of the municipalities. These include options in collection, transportation, processing and P & E. This is one strategy for achieving the WMR objectives (with the other being the adoption of new programs, policies and practices). A detailed review of the sharable options can be found in Section 8.0.

4.0 Waste Performance Review

The waste performance review evaluated the performance of the various waste management programs in recent years and compares the findings across the four (4) municipalities.

The main source for the waste performance review involved the provincial Datacall information. In addition, supplemental information was gathered directly from each municipality and their various third party contractors.

The analysis presented several significant (and sometimes unexpected) differences in performance between the municipalities. However, it was noted that each municipality uses a variety of methods and sources, particularly for Datacall submissions, to determine the various waste performance metrics. Thus, while comparison across the four municipalities was helpful in determining opportunities for improvement, the results, in some cases, were taken as an opportunity to explore a more consistent or uniform approach.

4.1 What is Datacall?

Datacall is a program operated by the Resource Productivity and Recovery Authority (RPRA), which collects data annually to determine the net Blue Box cost and allocation of funding under the Blue Box Program Plan. The annual Datacall is also the source of information used by RPRA to determine the residential waste diversion rates by municipal program, municipal grouping and the province overall.

It should be noted that for 2016, the Short Form Datacall (SFD) form was introduced and offered to all municipal programs with a population under 30,000. With the SFD, only limited Blue Box data is required to be submitted by eligible municipalities. Central Frontenac and Frontenac Islands have begun using the SFD submission; therefore, 2016 data for these two (2) municipalities is limited.

4.2 Total Waste Generated

One aspect of the waste performance assessment was the total waste generated by each municipality. The total waste generated consists of the waste sent to landfill and the waste diverted from landfill. The 2013 - 2016 totals for each municipality are presented in Table 11.

Diverted waste includes any waste that is not disposed in a landfill while landfilled waste is all waste sent to landfill because it cannot be diverted anywhere else. Examples of diverting materials may include: burning clean wood, sending blue box material to a recycling facility, donating bottles through LCBO/Beer Store programs and donating clothing. Landfill waste can consist of garbage bags, treated wood, construction material and mattresses.

Table 11 - Total Waste Generated

Total Waste Generated (Tonnes)					
	2013	**2014**	**2015**	**2016**	**2017***
Central Frontenac	1,259	1,420	1,536	-	-
Frontenac Islands	737	735	726	-	-
North Frontenac	1,019	1,319	1,312	2,758	2,113
South Frontenac	7,829	7,720	8,397	6,340	5,391
Total	10,844	11,194	11,971	9,098**	7,504**

*Source: 2017 Datacall entry sheets (not final report)
** Total waste for Central Frontenac and Frontenac Islands is not available due to use of the short-form Datacall
Source: Datacall Reports: 2013, 2014, 2015, 2016

South Frontenac produced the most waste each year while Frontenac Islands produced the least, both of which were expected based on the population of each municipality. Two items of note from the table include the significant jump in North Frontenac's numbers from 2015 to 2016 and the significant drop in South Frontenac's numbers over the same two years.

In addition, the total waste generated shows an increasing trend over the 2013-2015 period; however, data is not available for Central Frontenac and Frontenac Islands in 2016 due to their switch to Datacall's Short Form report. A more detailed breakdown for each municipality is presented below.

Central Frontenac

Table 12 provides the breakdown for Central Frontenac, which has shown an increasing trend in diverted tonnage, specifically between 2013 to 2014 when it increased by approximately 35%. Their diversion rate increased by 7.6% over that same period.

Table 12 - Central Frontenac – Waste Generated Breakdown

Central Frontenac				
	2013	**2014**	**2015**	**2016**
Landfill (tonnes)	773	765	857	Not Available
Diverted (tonnes)	486	655	679	Not Available
Total (tonnes)	1,259	1,420	1,536	Not Available
Diversion Rate	38.6%	46.2%	44.2%	Not Available
Source: Datacall				

Frontenac Islands

Table 13 shows a detailed breakdown for Frontenac Islands. From 2013 to 2014, Frontenac Islands saw a decrease of 45% in diverted materials and an increase of 22% in landfilled waste. Over the three years, diverted tonnage and the corresponding diversion rates have declined.

Table 13 - Frontenac Islands - Waste Generated Breakdown

Frontenac Islands				
	2013	**2014**	**2015**	**2016**
Landfill (tonnes)	432	525	525	Not Available
Diverted (tonnes)	305	210	201	Not Available
Total (tonnes)	737	735	726	Not Available
Diversion Rate	41.4%	28.6%	27.7%	Not Available
Source: Datacall				

North Frontenac

Table 14 provides a detailed breakdown for North Frontenac. Between 2015 and 2016, North Frontenac showed a significant increase in its landfilled waste (up 44%), diverted waste (up 227%) and its diversion rate (up 55%).

Table 14 - North Frontenac - Waste Generated Breakdown

North Frontenac				
	2013	**2014**	**2015**	**2016**
Landfill (tonnes)	772	1,021	838	1,210
Diverted (tonnes)	247	298	474	1,549
Total (tonnes)	1,019	1,319	1,312	2,758
Diversion Rate	24.2%	22.6%	36.1%	56.1%
Source: Datacall				

In 2016, North Frontenac experienced a large increase in both its landfilled waste and its diverted tonnage. The change in diverted tonnage was due mainly to their improved tracking of diverted waste streams, specifically wood. The wood tonnage consists of clean (untreated) construction waste wood and trees/brush, both of which are estimated in cubic yards by the site attendant and converted to tonnes. In 2016, North Frontenac reported 1,158 tonnes of diverted wood waste (no wood waste was reported the previous year), which made up the majority of the 227% increase in total diverted tonnes. All clean wood is burned at the end of the season as a training opportunity for the Fire Department, and thus is diverted from landfill.

South Frontenac

Table 15 shows the breakdown for South Frontenac. In 2016, South Frontenac experienced a decrease of 34% in landfilled material and an increase of 11% in diverted materials; resulting in a diversion rate increase of almost 10%.

Table 15 - South Frontenac - Waste Generated Breakdown

	South Frontenac			
	2013	**2014**	**2015**	**2016**
Landfill (tonnes)	6,530	6,081	6,709	4,461
Diverted (tonnes)	1,299	1,639	1,688	1,879
Total (tonnes)	7,829	7,720	8,397	6,340
Diversion Rate	16.6%	21.2%	20.1%	29.6%
Source: Datacall				

According to the municipality, the drop in landfilled tonnes from 2015 to 2016 was due in part to a miscalculation in 2015 reporting, where IC&I tonnage was included.

For diverted materials, between 2015 and 2016, the municipality collected roughly the same amount of blue box recyclables; however, they collected an additional 193 tonnes of non-blue box recyclables. These non-blue box materials consisted of bulky goods (303 tonnes), scrap metal (100 tonnes) and wood (150 tonnes). Prior to 2016, there was no wood tonnage recorded, and as such it appears to be the main reason for the diverted waste increase.

4.2.1 Impact of Population

The population of a municipality plays a key role in waste generation and waste statistics. Generally, the higher the population, the higher the total waste generated. In addition, the

municipal population is used to determine various “per capita” figures, which allow for comparison of waste performance across various municipalities.

The Datacall population utilizes the population figures (both permanent & seasonal) supplied by the municipalities and applies a formula to determine the full-time equivalent population, as follows:

$$Permanent\ Population = Reported\ Population + \frac{Reported\ Seasonal\ Households}{2.4}$$

The Reported Seasonal Households is divided by 2.4 because it is assumed that seasonal residents are only in the specified municipality for 5 months of the year.

Table 16 provides a summary of each municipality’s calculated population and its source.

Table 16 - 2016 Population Figures & Sources

Municipality	Reported 2016 Population*	Seasonal Population	Full-time Equivalent Population	% Seasonal	Population Source
Central Frontenac	3,841	854	4,695	18%	Municipal Property Assessment Corporation
Frontenac Islands	1,649	211	1,860	11%	Ministry of Municipal Affairs
North Frontenac	1,842	1,069	2,911	37%	Statistics Canada
South Frontenac	18,646	1,263	19,909	6%**	Statistics Canada

*Source: 2016 Municipal Datacall Input Sheets

While the Datacall figures indicate a 6% increase, the municipality itself estimates a population increase of almost 50% in the summer, greatly increasing the demand for waste services.

It is noted that three different sources for the population numbers are used across the four municipalities. In pursuing a more consistent approach, the municipalities may consider using the same source for their population data.

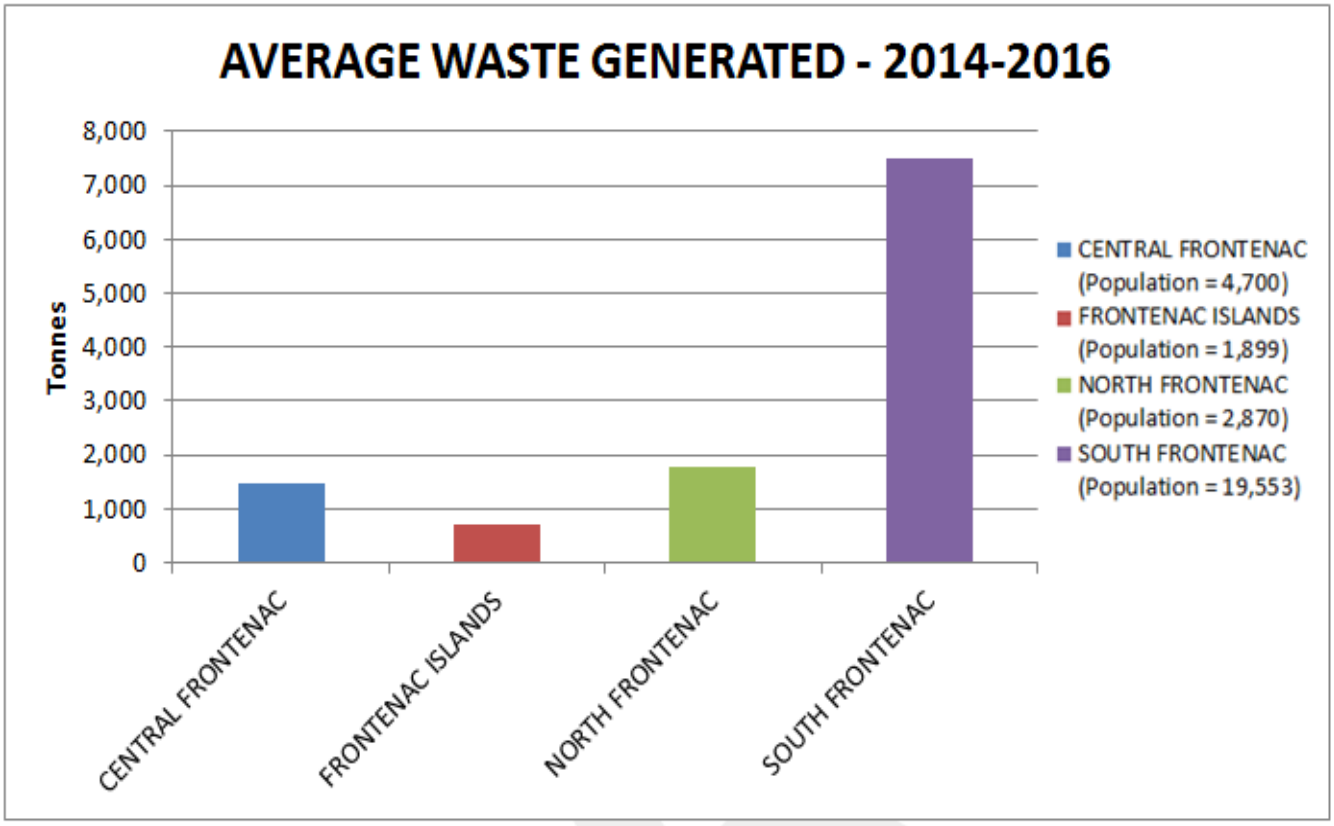
It is also noted that North Frontenac has the highest percentage of seasonal residents. Further on in our report (Figure 3), it is noted that North Frontenac generates more total waste per capita (landfilled + diverted) than the other three municipalities and the province. These two factors may be linked: seasonal residents generate more waste than permanent residents. It is recommended that this connection be explored.

One factor that may not be captured by the current population calculations is the use of the waste disposal sites by the institutional, commercial and industrial (ICI) sector – particularly campgrounds, trailer parks and resorts. This would be less prevalent in South Frontenac, which offers curbside pickup.

4.3 Average Waste Generated

For comparison, the average annual waste generated over the 2014 – 2016 period (2014-2015 in the case of Central Frontenac and Frontenac Islands) was calculated. The results are shown in Figure 2.

Figure 2 - Average Waste Generated



Source: *RPRA Datacall 2014 - 2016*

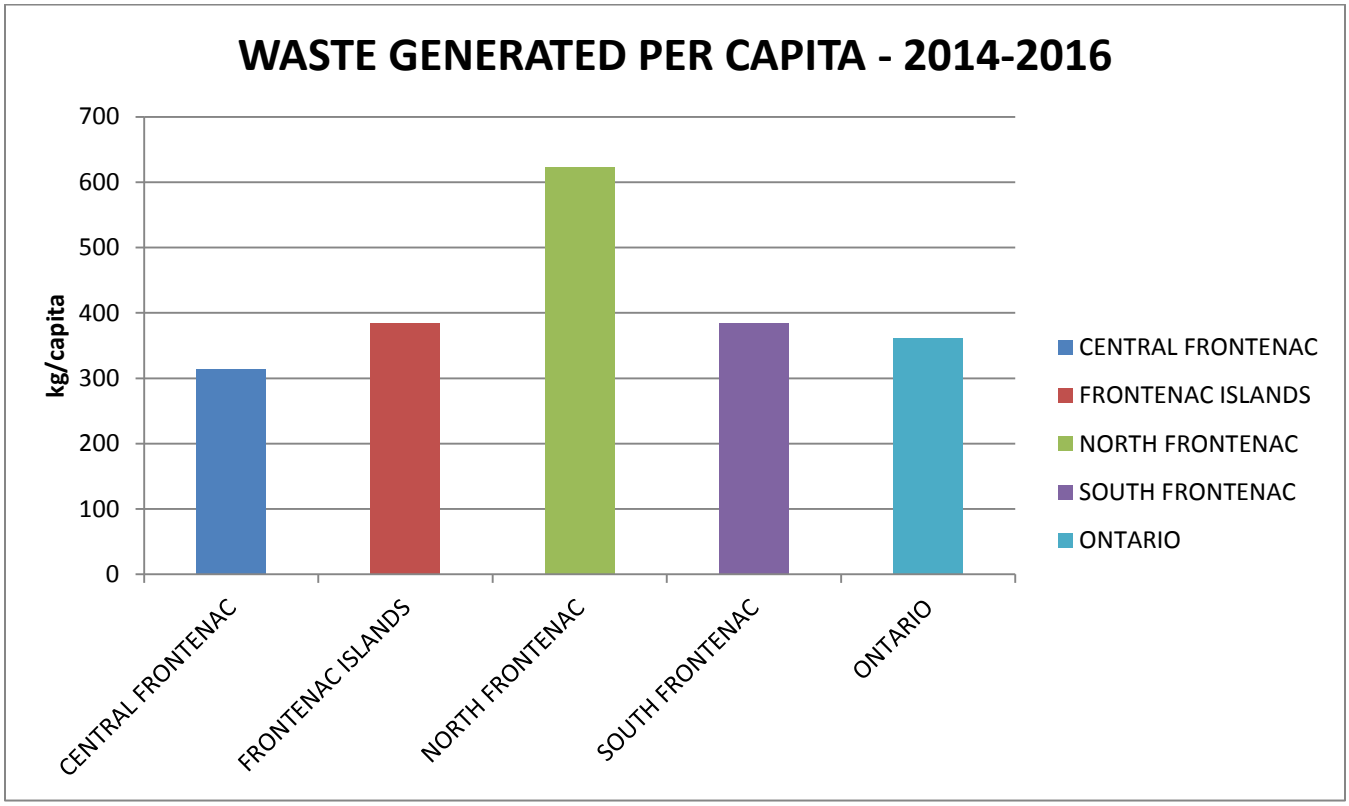
The results generally fall in line with the municipal populations – meaning the higher the population the higher the waste generated. The exception to that is North Frontenac whose average waste was higher, but population was lower, than Central Frontenac.

4.4 Waste Per Capita

The waste distribution among the four municipalities was further illustrated by assessing the waste generated per capita (Figure 3) and the waste generated per household (Figure 3). The provincial average of waste generated per capita is 361 kilograms (kg). Frontenac Islands (385 kg) and South Frontenac (383 kg) generally align with the Ontario average. Central Frontenac (315 kg) has consistently produced less waste per capita than the average Ontarian, while North Frontenac (624 kg) generates more.

The provincial average for waste generated per household is 661 kilograms. Central Frontenac generated the least at 359 kilograms per household (kg/HH). North Frontenac generated 511 kg/HH, Frontenac Islands generated 526 kg/HH and South Frontenac generated the most waste per household, 738kg/HH.

Figure 3 – Average Waste Generated per Capita

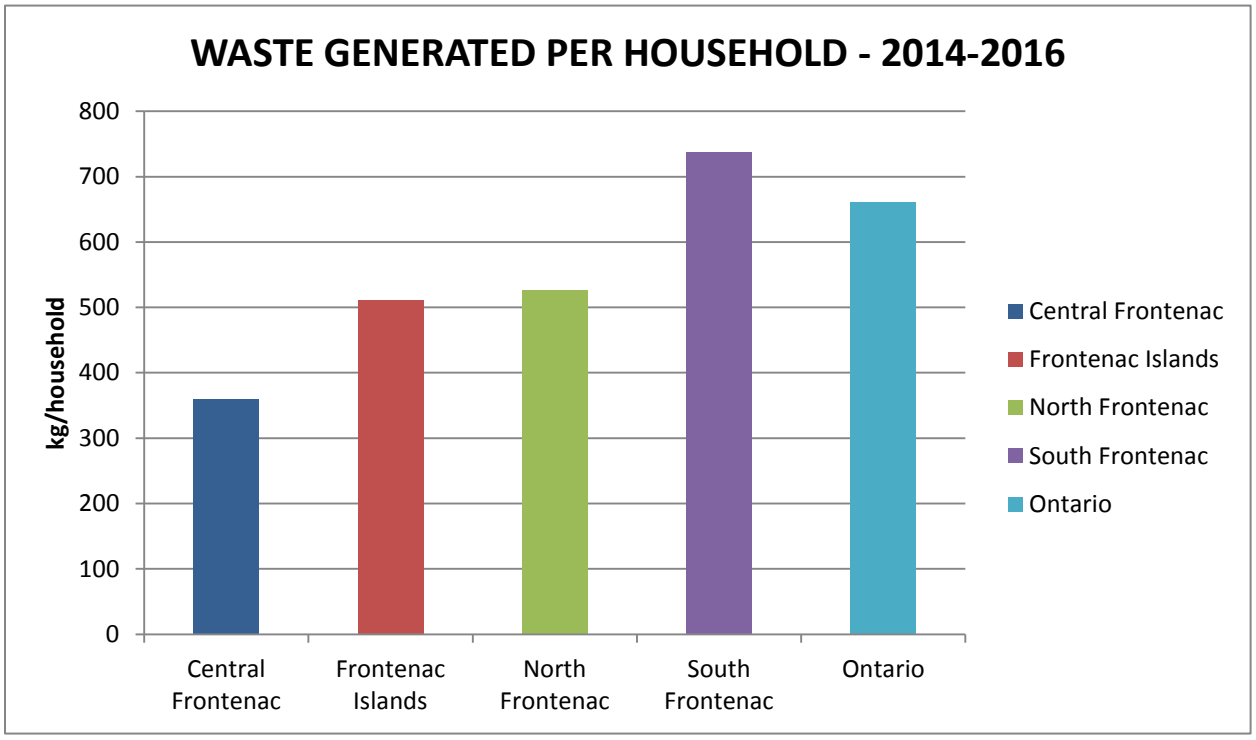


Source: *RPRA Datacall 2014 - 2016*

In North Frontenac, each property receives two (2) access passes to their waste disposal sites. However, since 2017, it was noted that a considerable number of additional passes have been

issued for various reasons to property owners in the municipality. It is possible that these passes are being used by patrons from short term recreational property rentals. This increased occupancy is not reflected in the per capita analysis. The occurrence should be confirmed and quantified if possible.

Figure 4 - Average Waste Generated per Household



Source: RPRA Datacall 2014-2016

4.5 Waste Stream Tonnage Breakdown

Each waste stream is displayed below in Table 17 and includes total tonnage for 2016 and 2017. The tonnages were drawn from several sources including Datacall, 3rd party contractors and the municipalities themselves.

Table 17 – Waste Stream Tonnage Collected

	CF		FI		NF		SF	
	2016	**2017**	**2016**	**2017**	**2016**	**2017**	**2016**	**2017**
Garbage*	1,016	1,036	267	355	1,210	893	4,461	3,538
Mixed Containers (Plastics, Aluminum, Metals)**	93	94	43	41	74	73	272	278
Mixed Fibres**	122	111	65	60	53	56	498	467
Cardboard / OCC**	43	45	28	31	20	25	121	123
Mixed Glass**	31	19	3	11	20	22	119	112
Electronics***	19	16	12	15	9	8	30	32
Hazardous***	Not Available		Not Offered		13	16	60	64
Scrap Metal/Appliances**	78	90	13	8	61	92	100	85
Leaf/Yard (Organics)***	Not Reported		Not Reported		Not Reported		207	199
Wood***	Not Reported		Not Reported		1,158	1,219	150	0
Construction / Mattresses / Bulky Items**	17	38	37	48	131	160	303	418
Tires	Generally Not Tracked.							
Styrofoam (Polystyrene)	1.3	1.7	0.7	0.2	0.5	0.7	1.0	3.3

*****Source: FI tonnage based on 3rd party weigh scale tonnage. NF, SF tonnage based on Datacall (2017 unaudited). CF tonnage based on landfill assessment conversion (volume to tonnage).

** Source: 3rd Party Waste Contractors

*** Source: Datacall and/or Municipal Staff

As would be expected, South Frontenac had the highest tonnages in 2016 and 2017 for each waste stream, while Frontenac Islands generally had the lowest. Items of note include:

- North Frontenac's wood tonnage in both years
- Frontenac Island's high construction/mattress/bulky item tonnage relative to its size and the other municipalities
- all four municipalities showed a noticeable increase in construction/bulky items in 2017

Differing Approaches to Landfill Waste Tonnage

Landfill waste tonnage is a key number used in the calculation of performance metrics (i.e. diversion rate) and landfill life. However, the source and method of calculating the tonnage varies across the municipalities, as outlined in Table 18.

Table 18 - Source of Landfill Waste Tonnage

Municipality	Source
Central Frontenac	Based on estimate of annual volume of landfill waste (completed through annual topographic survey) which was converted to tonnage
Frontenac Islands	Based on weigh scale tonnage supplied by 3rd party landfills
North Frontenac	Based on estimated number of bags disposed, multiplied by average weight per bag. Previously, it was (prior to 2016) based on estimate of annual volume of landfill waste which was converted to tonnage
South Frontenac	Based on weigh scale tonnage of their landfill and a 3rd party landfill. Was previously (prior to 2017) based on estimate of annual volume of landfill waste, which was converted to tonnage

In addition, the landfill waste (or waste disposed), as reported in the Datacall records, adds a residual waste figure to that reported by the municipalities. The residual waste is comprised of the estimated portion of the diverted waste tonnage that was not “recyclable” or “reusable” - essentially the contamination.

Other Recyclables Tonnage Estimate

In addition, each municipality has a different means of estimating “other recyclables” tonnage (including textiles, bulky goods, scrap metal, drywall, wood, brick and concrete, other C&D recyclables). Based on available Datacall records, the following examples were noted:

- South Frontenac uses weigh scales to estimate bulky goods and scrap metal
- North Frontenac uses weigh scales to estimate scrap metal and bulky goods
- North Frontenac also uses volume estimates for drywall and wood material.

4.6 Blue Box Tonnage

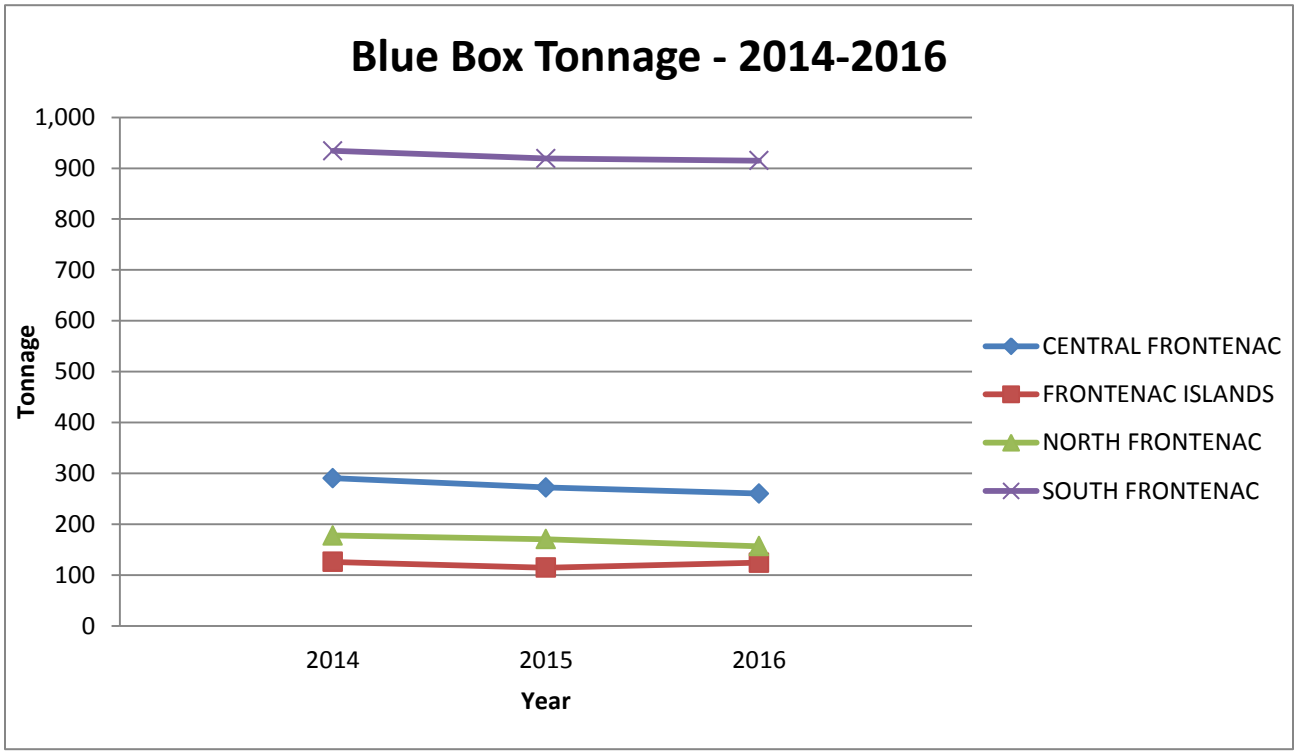
The Blue Box program holds particular interest for the municipalities due to its increasing operational costs and its pending changes as a result of the WFOA.

Blue Box items are generally grouped into four categories: paper, plastic, metal and glass. The total “marketed” tonnage of those categories over the past 3 years is shown in Figure 5**Error! Reference source not found.**. Marketed tonnage is calculated by subtracting the total of all Blue Box materials collected with the non-recyclable items, or “contaminants”.

In cases where the municipality does not have its marketed tonnage available, the residual figure is calculated through the Datacall system based on the collection type. If the collection

type is multi-stream, then it's calculated as 7% of the collected tonnage. If the collection type was single stream, it's calculated as 11% of the collected tonnage.

Figure 5 - Blue Box Marketed Tonnage

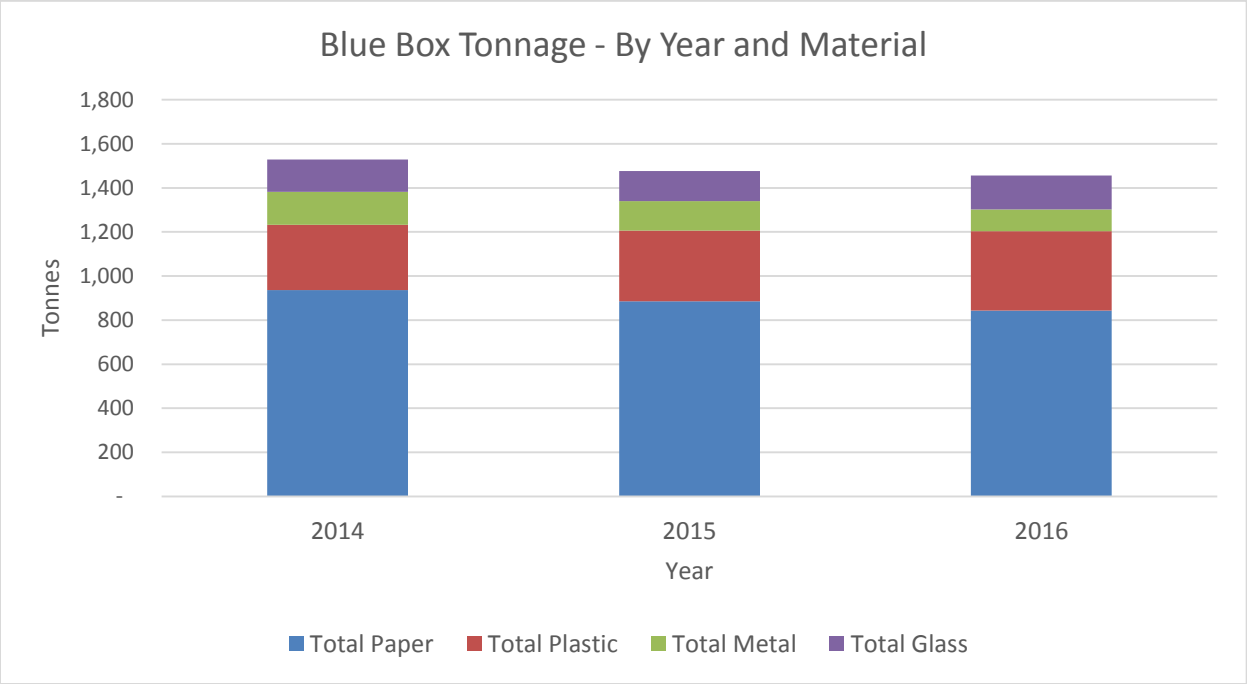


Source: RPRA Datacall 2014 - 2016

Looking at the combined Blue Box tonnage by year and material (Figure 6) between 2014 and 2016, two important trends are noted:

- a decrease in the total tonnage collected over the past 3 years, and
- a shift in materials collected – paper and metal are decreasing, while plastic is increasing.

Figure 6 - Blue Box Tonnage Annual Breakdown



Source: RPRA Datacall 2014 - 2016

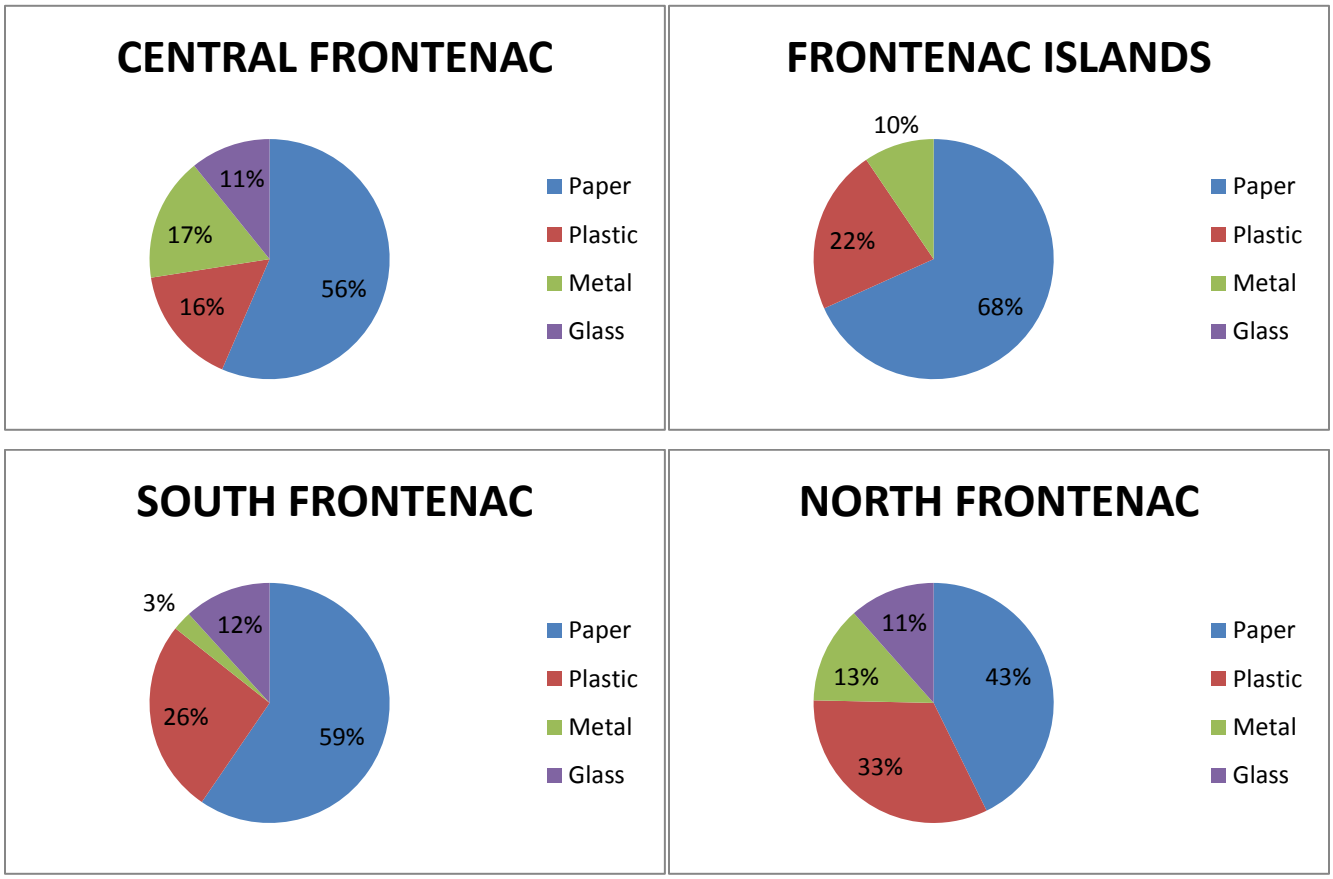
Both trends align with what is happening across the province and beyond, where there has been a shift from the traditional packaging materials of metal, paper and glass to lightweight plastics and laminates. This is referred to as the “evolving tonne” and results in lighter blue box loads that are more expensive to sort and transport.

The analysis also observed the breakdown of Blue Box materials by municipality, as shown in Figure 7. Paper constitutes printed materials and paper packaging such as newsprint, magazines and catalogues, gable top and aseptic containers, paper laminates, corrugated cardboard, boxboard and other paper packaging.

Plastic constitutes plastic packaging such as PET bottles, HDPE bottles and jugs, LDPE/HDPE film, expanded polystyrene, non-expanded polystyrene and plastic laminates.

Metal constitutes aluminium packaging such as aluminium food and beverage containers, aluminium aerosol containers and other aluminium packaging. Metal also constitutes steel and other metal packaging such as steel aerosol containers, steel paint cans, other steel and metal containers and packaging. Glass constitutes clear and coloured glass packaging.

Figure 7– Breakdown of Blue Box Marketed Tonnage per Municipality (2016)



Source: RPRA Datacall 2014 – 2016

Generally, the tonnage of Blue Box materials for each municipality in order from greatest to least was: paper, plastic, metals, glass. The only exception was South Frontenac, whose glass tonnage was higher than its metal tonnage. Each municipality saw the greatest tonnage in paper; however, all have had an increasing tonnage of plastics, as previously discussed.

4.7 Diversion Rates

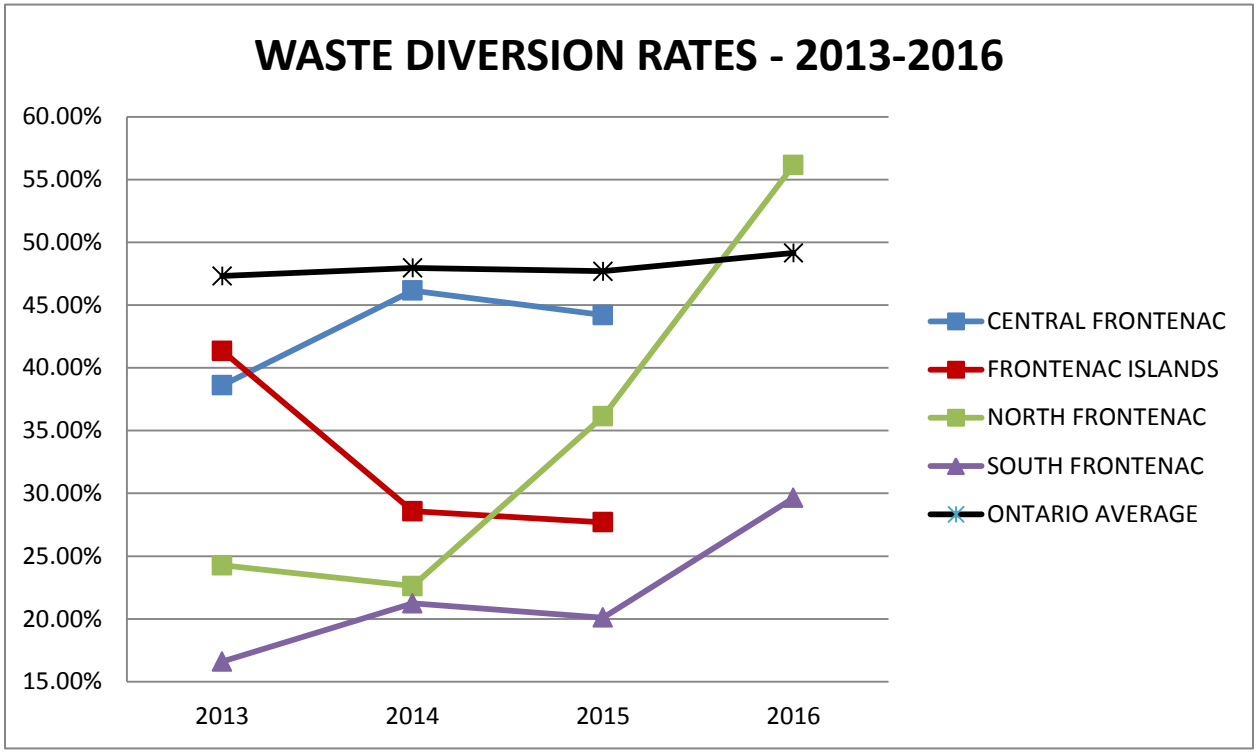
The diversion rate is the key metric used in the waste industry to measure the success of waste diversion programs. It is the percentage of the total waste generated that is diverted from a landfill through diversion programs (Blue Box, composting, etc.) and is determined by the following formula:

$$Diversion\ Rate = \frac{Waste\ Diverted\ from\ Landfill}{Waste\ Diverted + Waste\ Sent\ to\ Landfill}$$

Based on Datacall information, Ontario diverts nearly half of its residential waste (49.2% in 2016), a rate which has hovered in that range over the past 5 years (2012 – 2016)[2]

In comparison, the 2013 - 2016 diversion rates for each of the four municipalities are shown in Figure 8.

Figure 8 - Waste Diversion Rates



Source: RPRA Datacall 2014 – 2016

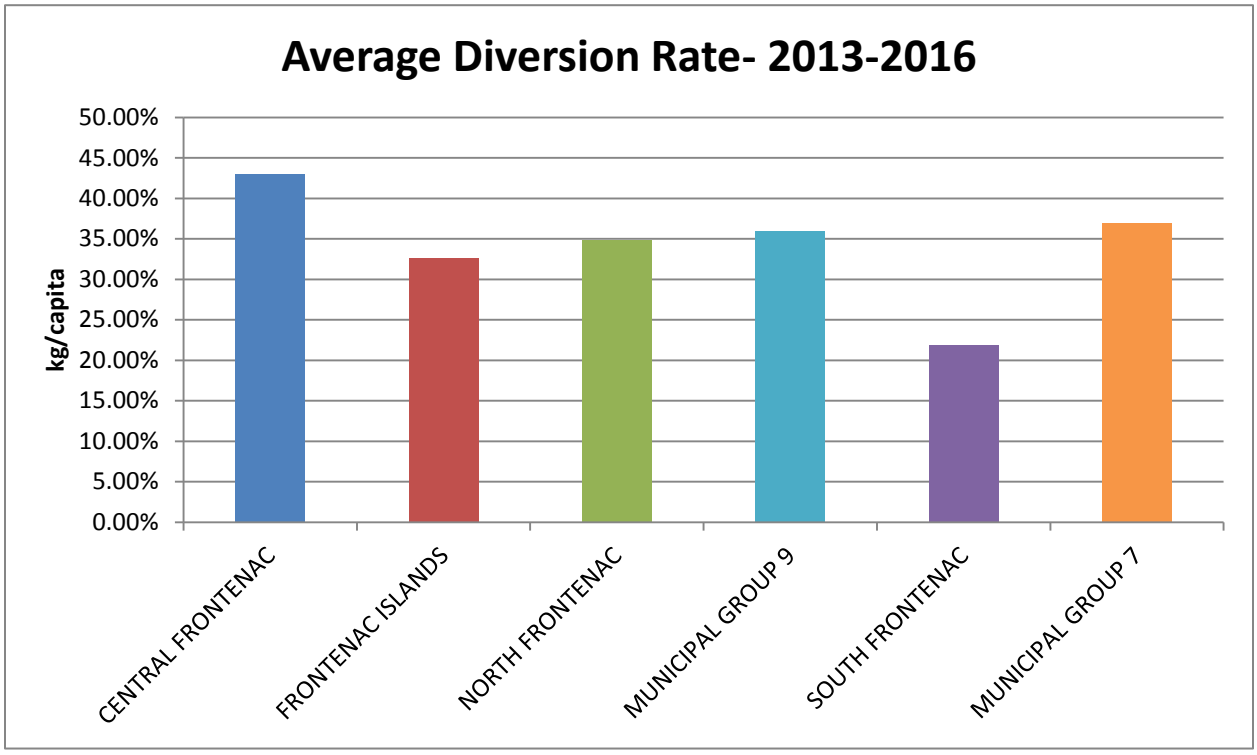
The wide variation and yearly fluctuation in diversion rates for the municipalities, versus the more stable Ontario rate, indicates that changes in reporting, tracking or measuring may have occurred. North Frontenac's more detailed tracking of wood waste as of 2016 is one such example.

Figure 9 compares the average diversion rate (2013-2016) of each municipality with the respective Datacall category averages. With the exception of Central Frontenac, all municipalities are running below their category average. However, it should be noted that the

[2] Source: https://rpra.ca/wp-content/uploads/2018/02/2016-Residential-Diversion-Rates.pdf

Central Frontenac and Frontenac Islands figures are only three year averages, as the 2016 data is not available as a result of the short call.

Figure 9 - Average Diversion Rate vs. Datacall Category



4.7.1 Datacall Diversion Rate Calculation

This section summarizes the methods that Datacall uses to calculate diverted tonnage, disposed tonnage, and the diversion rate (see Appendix B for a more in depth discussion). Note that the values of each waste stream are largely dependent on the type of information that each municipality entered into Datacall; therefore, these explanations are more of an overview. It is suggested to conduct further investigation of the similarities and differences between those municipalities in each of the two relevant municipal groupings (i.e. year-round versus seasonal residents).

Calculation of Diverted Tonnage

Datacall calculates diverted tonnage using the following formula:

$$\text{Diverted Tonnage} = \text{D.1} + \text{D.2} + \text{D.3} + \text{D.4} + \text{D.5} + \text{D.6}$$

Each component is explained below.

D.1 =	Residential Component Deposit, Return and Stewardship Program	Datacall calculates at 5.51 kg/capita.
D.2 =	Residential Reuse	Tonnage collected through municipally sponsored or supported activities.
D.3 =	Residential On-Property Management	Mainly backyard composting (100 kg/composter distributed). Also includes grasscyling, in-home burning and onsite (open) burning.
D.4 =	Residential Recyclables Diverted	Blue Box, scrap metal, WEEE, bulky items, and used tires (7.1 kg/capita). Also includes energy from waste residuals.
D.5 =	Residential Organics Diverted	Yard and kitchen waste
D.6 =	MHSW Treatment	Hazardous waste recycled or reused

Calculation of Disposed Tonnage

Datacall calculates disposed tonnage using the following formula:

$$\text{Disposed Tonnage} = \text{D.7} + \text{D.8} + \text{D.9}$$

Each component is explained below.

D.7 =	Energy from Waste (EFW) Mass Reduction	
D.8 =	Hazardous Waste Disposal	Hazardous materials that were not reused or recycled.
D.9 =	Landfill of Residential Waste	A combination of landfill waste quantities, EFW related waste, and processing residues from diversion programs.

5.0 Financial Review

Our financial review looked at the total costs for each municipality's waste management program. In addition, we reviewed the specific costs associated with each municipality's Blue Box program.

5.1 Cost of Waste Management

Table 19 provides a summary of the 2016 & 2017 net waste management operating costs for each municipality, as well as the net cost per capita and per household. The values do not include capital items.

Table 19 – 2017 Waste Management Operating Costs per Capita

	Central Frontenac		Frontenac Islands		North Frontenac		South Frontenac	
	2016	2017	2016	2017	2016	2017	2016	2017
Total Expenses*	$358,630	$324,285	$205,790	$232,589	$545,165	$502,089	$2,008,335	$2,154,538
Total Revenues*	$198,112	$178,187	$25,806	$89,361	$172,589	$137,611	$535,899	$652,505
Net Cost*	$160,519	$146,097	$179,984	$143,228	$372,576	$364,478	$1,472,436	$1,502,129
Population**	4,695	4,708	1,860	1,860	2,911	2,973	19,910	19,924
Households**	4118	4128	1361	1368	3554	3553	10336	10425
Net Cost per Capita	$34	$31	$97	$77	$128	$123	$74	$75
Net Cost per HH	$39	$35	$132	$105	$105	$103	$142	$144

***Source: Municipal Financial Records**
****Source: 2017 Datacall entry sheets**

The table indicates a wide variation in the net operating costs, which translates to variation in cost per capita and cost per household figures. Central Frontenac operates at a lower cost per capita and per household than the other three (3) municipalities. Part of the reason may be the fact that the municipality operates only three (3) WDS's, which leads to lower operating costs versus those operating more sites.

It's interesting to note the difference between net cost per capita and net cost per household. Three of the four municipalities have a higher figure for net cost per household, while North

Frontenac's figure is lower as a result of their number of households being higher than their population. This situation requires further investigation.

South Frontenac's higher expenses are driven by its curbside pick-up service and much larger population.

Given the small population of Frontenac Island, expenses are relatively high because the island locations result in added costs for transportation (time and ferry crossings).

5.2 Cost of Blue Box Program

The cost of each municipality's Blue Box program is outlined below.

Table 20 Blue Box - Summary of Costs

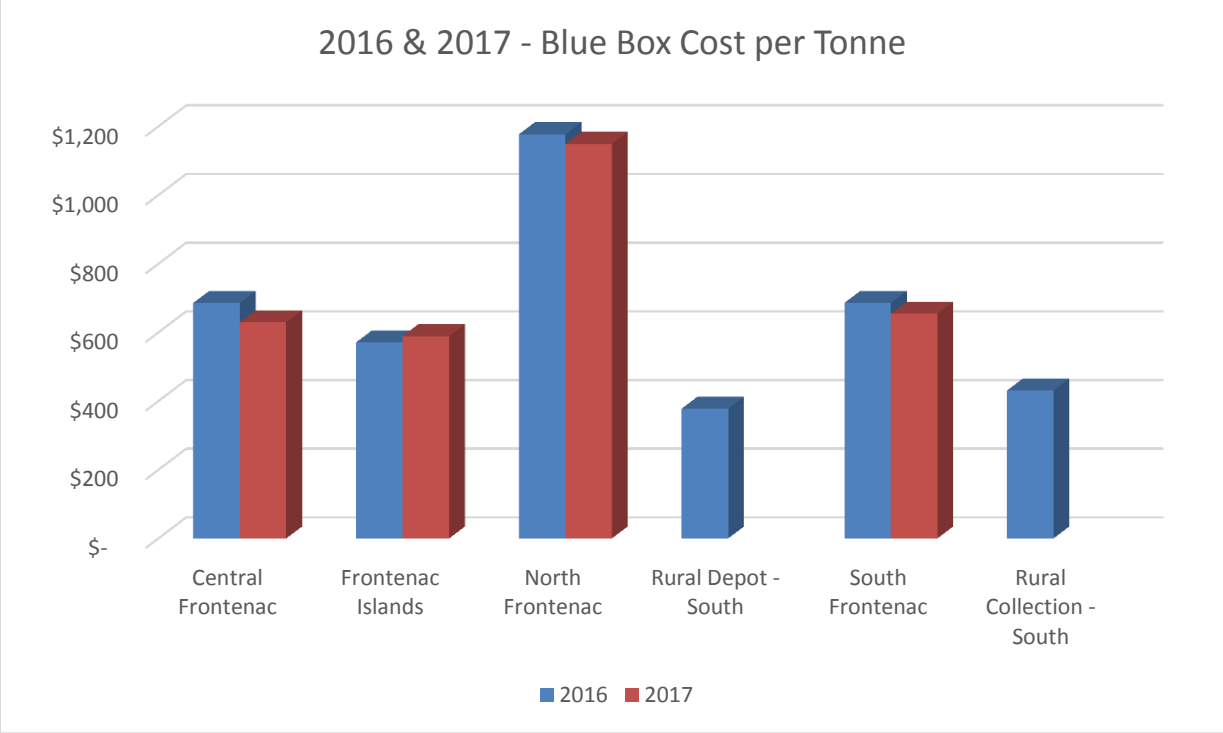
	2014*	2015*	2016*	2017**
Central Frontenac				
Net Cost	$213,821	193,858	$178,434	Not Available
Net Cost per Tonne	$736	$713	$686	$629
Frontenac Islands				
Net Cost	$55,786	$65,606	$70,919	Not Available
Net Cost per Tonne	$443	$573	$571	$589
North Frontenac				
Net Cost	$125,349	$206,231	$184,344	Not Available
Net Cost per Tonne	$706	$1,211	$1,177	$1,149
South Frontenac				
Net Cost	$576,718	$598,802	$627,259	Not Available
Net Cost per Tonne	$617	$652	$686	$655

*** Source: 2014 – 2016 - Datacall annual reports**
**** Source: 2017 – estimated from Datacall entry sheets**

As shown in Figure 10, the net costs per tonne for all four municipalities are significantly higher than their category average. Central Frontenac, North Frontenac and Frontenac Islands are part of the "Rural Depot – South" category, while South Frontenac is part of the "Rural Collection – South" category.

The 2017 category averages were not available at the time of the report.

Figure 10 - Blue Box - Net Costs per Tonne



Net costs per tonne for the Blue Box program are driven by two factors: the net costs and the marketed tonnes. In seeking to understand the reasons for the higher Blue Box costs relative to their categories, a comparison of both categories was completed. The year 2015 was chosen for the comparison as it is the last year that all municipalities completed the long form Datacall. The results are shown in Table 21.

Table 21 – 2015 Blue Box Costs per Tonne versus Category

Blue Box Program - 2015					
Municipality	Marketed Tonnes	Net Costs	Net Costs / Tonne	Tonnes / Capita	Net Cost / Capita
Central Frontenac	272	$193,858	$713	.058	$41
Frontenac Islands	114	$65,606	$573	.061	$35
North Frontenac	170	$206,231	$1,211	.060	$72
Datacall Category 9 Average	288	$145,651	$506	.055	$28
South Frontenac	919	$598,802	$652	.047	$31
Datacall Category 7 Average	579	$248,543	$429	.048	$20
Central Frontenac, Frontenac Islands, and North Frontenac are part of Datacall Category 9. South Frontenac is part of Datacall Category 7					

All municipalities, except South Frontenac, reported less marketed tonnes than their category average, but more marketed tonnes per capita.

All municipalities, except Frontenac Islands, reported higher net costs than their category average. However, all municipalities are higher than their category average from a net cost per capita point of view.

5.3 Revenues from Blue Box program

Revenue from Stewardship Ontario

The Blue Box program is eligible for funding from the stewards (producers) of the Blue Box items. The complex revenue calculation is completed by Stewardship Ontario and is outlined below.

Total Blue Box Funding Allocation = Net Cost Allocation + Recovered Cost Allocation + Best Practices Allocation

Funding Component	Maximum	Description
Allocation re Net Cost	50%	Based on municipal percentage of provincial total net costs (up to a maximum cost threshold for each grouping)
Allocation re Recovered Cost	35%	Based on municipal percentage of provincial total tonnage collected
Allocation re Best Practices	15%	Based on Best Practices Score

Table 22 provides a summary of the 2016 Blue Box funding for each municipality, along with percentage of net Blue Box costs funded.

Table 22 - 2016 Blue Box Funding Summary

Allocation Component	Municipality			
	Central Frontenac	Frontenac Islands	North Frontenac	South Frontenac
Net Cost (50%)	$ 42,703	$ 16,972	$ 41,113	$ 129,776
Recovered Tonnage (35%)	$ 12,945	$ 6,184	$ 7,793	$ 45,532
Best Practices (15%)	$ 10,020	$ 2,238	$ 12,701	$ 32,161
Total Blue Box Funding	$ 65,668	$25,394	$ 61,607	$ 207,469
Total Net Blue Box Costs	$178,434	$70,918	$184,342	$609,832
% of Net Blue Box Cost Recovered	37%	36%	33%	34%

It should be noted that each year's funding is based on results from 2 years prior. Therefore, the 2018 funding reimbursement is based on the costs and performance from the 2016 Blue Box program. Funds are paid out by Stewardship Ontario in equal quarterly installments.

Revenue opportunities noted from the analysis include:

- Increasing best practice scores. In 2016, North Frontenac scored 83% while Central Frontenac, Frontenac Islands and South Frontenac scored 59%, 24% and 63%, respectively.
- Keeping net costs within the category threshold. In 2016, North and South Frontenac's net costs were over their category threshold by $12,000 (7%) and $60,000 (12%) respectively, meaning those costs were not eligible for reimbursement.
- Increasing recovered tonnage from diversion programs.

Revenue from the Sale of Blue Box Materials

In addition to revenue from Stewardship Ontario, municipalities have historically received funds from the sale of various Blue Box items (e.g. plastic, aluminum, cardboard) to recycling processors. Over the years, these rebates have fluctuated based on prices paid by the end-users of the recycled waste streams, or in other words, based on "market conditions."

In 2018, market conditions changed significantly with the world's largest end-user, China, banning or placing severely limiting acceptable contamination rates on many recycled waste streams. In recent months, other countries (e.g. Vietnam) have also placed bans on these

materials. The result is that most, if not all Blue Box streams, are now strictly an expense, with no associated rebate.

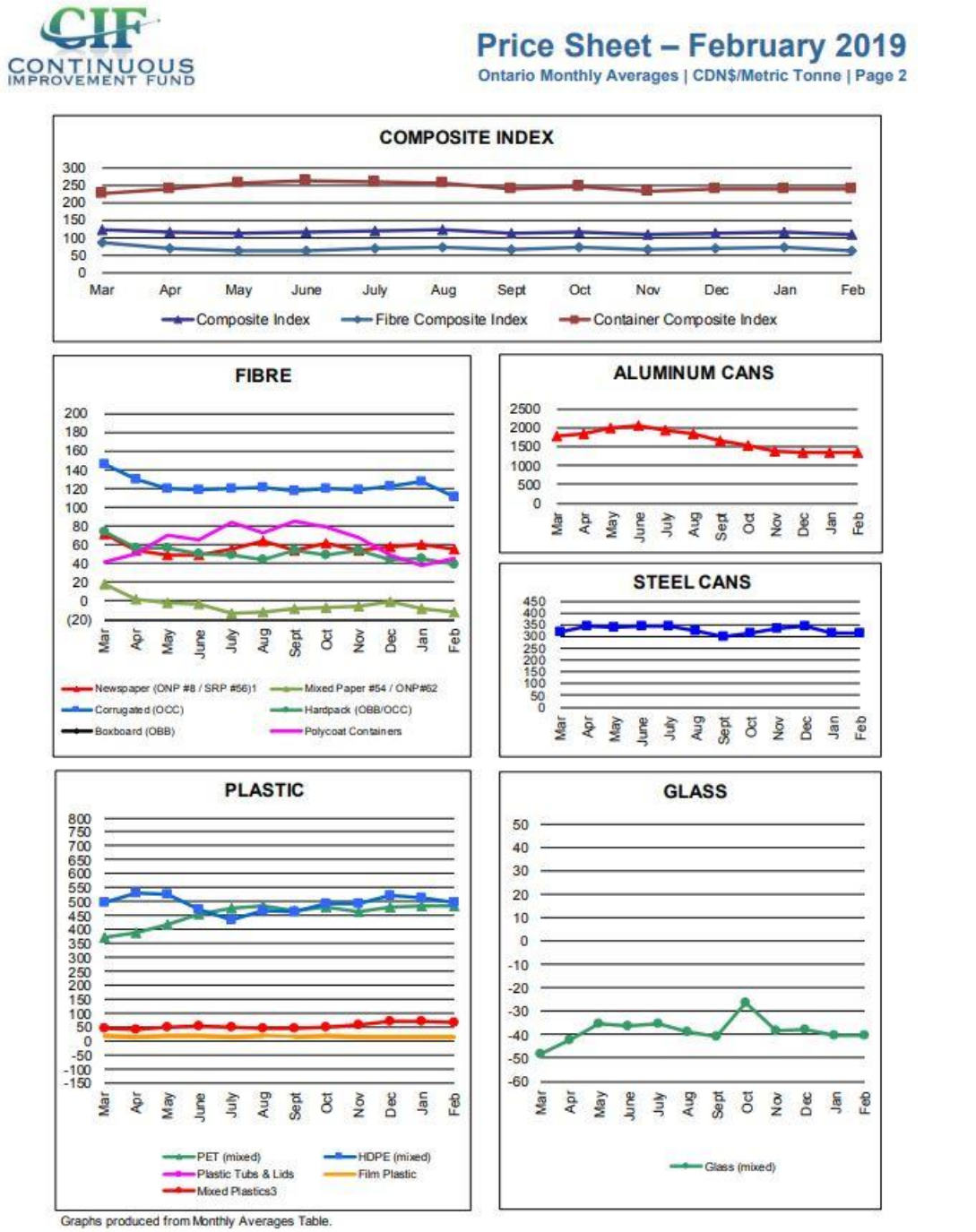
All four municipalities have seen the impact, with processors eliminating rebates and or increasing costs on waste streams such as cardboard and mixed plastics.

An illustration of the changing market is presented in Figure 11.

The fibre market (mixed paper, cardboard) in particular has seen a dramatic decrease in market price, while other streams, such as steel and aluminum cans have maintained or increased their market price.

The municipalities should explore the possibility of source separating higher value streams such as aluminum, in order to generate additional revenue.

Figure 11 - Historical Market Prices Paid for Blue Box Materials



5.4 Cost of Diversion Programs

Some municipal diversion programs generate revenues (through rebates per tonne), while others are strictly an expense. In addition, some waste streams are eligible for full or partial funding from industry stewardship organizations. Below is a summary of each.

Table 23 - Cost Description for Diversion Programs

Waste Stream	Details
Mixed Containers (Plastic, Aluminum) **Mixed Fibres/Paper** **Cardboard/OCC**	Total costs sometimes reduced by material rebate (fluctuates). Total net cost eligible for 50% funding through Stewardship Ontario.
Glass	All program costs are paid for by municipality. Total net cost eligible for 50% funding through Stewardship Ontario
Household Hazardous Waste	Collection & transportation costs are paid for by the municipality. Processing costs are partially paid for by producer organizations (i.e. Stewardship Ontario, Product Care)
Appliances, Scrap Metal	Total costs sometimes reduced by material rebate (fluctuates).
Electronics	All program costs are paid for by the producers through the Ontario Electronics Stewardship (OES)
Tires	Collection costs are paid for by the municipality. Transportation and Processing costs are potentially paid for the producer organization (Ontario Tire Stewardship)
Leaf & Yard **Construction & Demolition** **Bulky Plastics** **Textiles** **Styrofoam** **Mattresses** **Re-Use Centre** **Organics**	All program costs are paid for by municipality

6.0 Summary of Waste Free Ontario Act

The implementation of the WFOA continues, with four programs in particular being transitioned toward the extended producer responsibility model: used tires, waste electronics and electrical equipment, municipal hazardous & special waste, and Blue Box. An overview of each is described below.

6.1 Used Tires Program

The Ontario Tire Stewardship wound up its operations in December 2018. A new tire regulation came into effect on January 1 2019. Under the new regulation, tire producers will be required to meet mandatory collection and management targets. Collection refers to collecting used tires at their end of life and management refers to reusing, retreading or processing used tires after they have been collected.

A producer's annual collection target is based on the producer's tire supply and the tire management target is calculated based on what a producer actually collects in the year. The tire collection and management targets must be met according to the Tire Regulation. Producers have the option of setting up and managing their own collection and management systems to achieve their targets or engaging the services of a producer responsibility organization (PRO) to set up and manage the required collection and management systems. At the time of writing, six (6) PRO's had been established in Ontario.

A comparison summary between the two programs is provided below:

Table 24 - Comparison of Used Tire Programs

ITEM	CURRENT	WFOA
Materials	New & Used Tires	Same
Funding	Producers paid fee/tire to OTS	Producers paid fee/tire to PROs
Responsibility	OTS	PROs
Collection	OTS registered Collector	RPRA Registered Collector
Management	OTS	PROs
P&E	OTS, Processors	PROs
Municipalities		
Obligations	None	None
Common Practice	Collect at WDS- charge/no charge – OTS pick up	Redirect to local collectors
Process	Register as collector with OTS	No registration required Sign up with PRO for pick-up
Costs	• Space for collecting tires • Labour time re paperwork	Ad/Sign on website/Collection site redirecting users to bring their tires elsewhere
Advantages	• Service to residents • Revenue source	• Zero responsibility • Safety: Zero

Also at the time of writing, all four municipalities were planning to continue to collect tires as a service to their residents and avoid improper disposal of tires (i.e. left on vacant properties).

6.2 Waste Electrical and Electronic Equipment

The Ontario Electronic stewardship currently operates and oversees the collection and recycling of end-of-life electronics. In February 2018, the provincial government issued directions to wind up the Waste Electrical and Electronic Equipment (WEEE) Program on June 30, 2020. This will enable the transition of electronic waste to individual producer responsibility under the Resource Recovery and Circular Economy Act 2016. This new “outcomes based” producer responsibility regime holds responsible persons accountable for recovering resources and reducing waste associated with their products and packaging.

6.3 Municipal Hazardous or Special Waste

In April 2018, the Minister of the Environment and Climate Change issued direction to Stewardship Ontario to wind up the Municipal Hazardous or Special Waste (MHSW) program on December 31, 2020. This wind up will allow the transition of materials collected under the

program to individual producer responsibility under the Resource Recovery and Circular Economy Act 2016.

In December 2018, the Minister of the Environment, Conservation and Parks amended the timelines for the wind up of single-use batteries. The waste diversion program for single-use batteries will now cease operation on June 30, 2020, to allow for coordination with waste electrical and electronic equipment. Programs for other MHSW materials will continue to cease operation on December 31, 2020.

6.4 Blue Box

On August 2017, the Minister of the Environment and Climate Change issued directions to the Authority and Stewardship Ontario to work collaboratively with stewards, municipalities and affected stakeholders to develop a proposal for an amended Blue box Program plan and if approved, to submit the proposal by February 2018 for the Minister's consideration. The amended Blue Box plan reflects those elements that stewards have been advocating for some time, such as:

- A transition from the current shared responsibility model to full Extended Producer Responsibility (EPR) is achieved in a thoughtful, orderly and step-wise manner that ensures no disruption to residential recycling services;
- The transfer of operational control over recycling decision occurs as producers' financial obligations increase;
- A consistent recycling experience is provided for all Ontario residents by establishing a broad and uniform set of paper products and packaging to be collected across the province.

6.5 Organics

In addition to the four programs above, the WFOA has also focused on addressing food waste (organics). In April 2018, the Ontario government released the Food and Organic Waste Framework. The framework aimed to reduce food waste, redistribute surplus food, compost organics and restore healthy soils. It also included government commitments related to

organics, and policy statements that directed municipalities and private businesses to take action. For smaller municipalities, the direction was focused on a “best efforts” to reduce organics. At the time of writing, the current provincial government had not taken any further steps to implement an organics strategy.

7.0 Summary of Findings – Current Programs, Policies, Practices

Given the review of the policies, programs, and practices of the four municipalities, along with the current state of the waste in Ontario (Section 1.1), a number of high level findings are noted below.

- A small rural municipal waste management program may be at a disadvantage when weathering the current uncertainty in the provincial waste sector. A collaborative, unified approach across the county and even beyond represents an opportunity to reduce operating costs through efficiencies, and strengthen their “bargaining” position for any pending changes.
- The municipalities would benefit from having a clearer understanding of tonnages and full costs for each waste stream. Better and more accurate data tracking is needed. This is echoed by the Association of Municipalities of Ontario and Stewardship Ontario (via the Continuous Improvement Fund) in anticipation of potential changes driven by the Waste Free Ontario Act.
- A detailed review of the Datacall information revealed low confidence in the relevance of reporting due to questionable completeness of data and an inconsistent approach (e.g. the inclusion of North Frontenac’s wood waste tonnage in 2016 resulted in an artificially high diversion rate). Going forward, the Datacall program should be used as a vehicle to achieve maximum funding for the Blue Box program, but not necessarily as a performance reporting tool.
- Collectively, the four municipalities have an estimated landfill life beyond that of the province.
- If the province does not push forward on extended producer responsibility in the near future, it will likely remain “business as usual” for the next five to ten years. As such, the cost of the Blue Box or other diversion programs will continue to rise.
- Increasing diversion while lowering waste management costs will not be possible over the medium to long term, and municipalities may have to choose one or the other.
- The four municipalities are not receiving 50% recovery of their eligible Blue Box costs.

8.0 Review of Options & Opportunities

8.1 Competing Objectives

One of the challenges encountered in the project was the “competing” nature existing between the three objectives (increase diversion, reduce net operating costs and reduce environmental impact) in that there are few options that assist in achieving all three at the same time.

Increasing diversion (and extending landfill life) and/or reducing environmental impact generally results in higher net operating costs. A focus on reducing net operating costs will likely impede efforts to increase diversion and reduce environmental impact.

In the short term (1-2 years), some movement forward on the three objectives may be achievable, particularly if the four municipalities work collectively.

However, over medium and longer terms (3+ years), it may prove difficult to achieve the highest diversion rate, the lowest environmental impact, and the lowest net costs. Therefore, a decision will likely have to be made on which to pursue.

8.2 Options Review Process

The options for achieving the WMR objectives have been derived from two categories: 1) sharable options currently in use by one or more of the Frontenac municipalities, and 2) new options currently not in use by any of the Frontenac municipalities (and which generally involve working collectively).

The options review process involved two steps:

1. The options were reviewed according to their ability to achieve the objectives
2. With Step 1 in mind, the options were categorized by each municipality as short term, medium term, or long term.

Following that the options were recommended as either short-term (Years 1 – 2) or medium / long-term (Years 3+).

8.2.1 Options Review - Impact on Objectives

The review of each option's impact on the WMR objectives includes the following two components:

- A listing of all options considered along with a brief description (Section 0 & 0)
- An analysis of each option in terms of its impact on each of the WMR objectives (Section 8.3)

The options are not listed in any particular order.

Description of Sharable Options - Programs, Practices and Policies

1. **Implement a County Wide Textile/Clothing Recovery Program**

A simple way to combat large quantities of textiles from entering landfills is to provide textile collection bins at Waste Disposal sites, community centers, municipal offices, local businesses, etc. Third party contractors could be used to collect, maintain and transport clothing to thrift stores such as The Salvation Army or Value Village (via Diabetes Canada). Frontenac Islands currently provides this program.

2. **Implement a Returnable Liquor Bottles Program**

Diverting returnable bottles (i.e. liquor and beer bottles) can increase diversion and reduce operating costs. The income gained could be returned to the community as well, which could incentivize recycling. Currently, North Frontenac, Central Frontenac and Frontenac Islands have such a program in place. Third party, non-profit organizations (e.g. service clubs) could be used to collect, maintain and transport returnable bottles in return for being able to inject the deposit monies into their organizations.

3. **Implement Construction & Demolition (C & D) Waste Re-use Program**

A program that requires contractors or building owners to source separate aggregates, roof shingles, wood, drywall, metals, glass, plastics, carpeting and all other forms of construction waste could be implemented. Emphasis must be placed on source separating construction waste at the time of loading or unloading. In addition, adding a "deconstruction process" requirement to demolition permits could further reduce waste to landfill by encouraging reuse

of construction materials where possible. Such a process would require the owner of the permit to leave the building 'open' for a specified time period to allow reusable materials to be salvaged prior to the demolition.

4. Add Re-Use Centres at Waste Disposal Sites

Consider installing a re-use centre at all waste disposal sites (WDS) that allows residents to drop off gently used items and others to pick them up - all free of charge. This program has the potential to increase diversion and extend landfill life. Currently, South Frontenac offers this program and North Frontenac is preparing to launch this year at their 506 waste disposal site.

5. Reduce WDS Operating Hours for Winter Season

Both North Frontenac and Frontenac Islands reduce their operating hours in the winter to reflect the lower seasonal population during that time of year. Both Central and South Frontenac may want to consider a similar approach given that they also have significant seasonal populations. This change would lower operating costs with minimal impact on diversion performance.

6. Implement A Clear Bag Policy With Inspection/Enforcement

Clear bag policies for waste often assist in increasing diversion, even more so when combined with a clear bag inspection policy. With reference to Section 4.0 of this WMR, it is noted that Central Frontenac and North Frontenac have both clear bag and inspection policies, and also have the highest diversion rates of the four municipalities. South Frontenac and Frontenac Islands may want to consider implementing these types of policies.

7. Encourage Greater Use of Backyard Composting

Backyard composting offers the potential to increase diversion, reduce environmental impact and lower net operating costs. Currently, North Frontenac, South Frontenac, and Frontenac Islands offer subsidized composters. Central Frontenac could benefit by adding the program, and all four municipalities could benefit from a stronger, county-wide promotion & education push to increase the use of backyard composters for residents and businesses.

8. Implement 'Bag for a Bag' Program

North Frontenac recently implemented a unique “bag tag” program which has the potential to increase diversion in each municipality. Residents of North Frontenac are required to purchase a bag tag ($2.00) for each bag of garbage they wish to dispose of. However, for every bag of recycling brought to a WDS, the resident receives one free bag tag for their garbage. If they bring in recycling, they would receive one free bag tag for any additional bags of recycling compared to the number of bags of waste. In municipalities without bag tag programs (Central and Frontenac Islands), it may be worthwhile to initiate one.

9. Utilize a Permit Policy for Access to WDSs

Central and North Frontenac have implemented a permit policy, whereby residents and/or contractors must present a permit in order to use the WDS. This option can reduce waste by preventing residents from other municipalities from using their WDS.

10. Eliminate Waste Amnesty Days

A popular, previous program involved waste amnesty days, where tipping fees at WDSs for various streams were temporarily waived, but current best practices have eliminated this offering. By doing so, municipalities can increase diversion and lower their net operating costs.

Central Frontenac continues to offer this program, and should consider eliminating it.

Description of New Options - Programs, Practices and Policies

11. Implement Mattress Recycling Events

With this option, each municipality would carry out one annual mattress recycling event, utilizing one of several mattress recyclers that currently operate in the province. Mattresses could be dropped off at each WDS over a 2 day period (Sat/Sun) and stored in delivery trucks. Residents would be required to a pay mattress recycling fee that would be set to cover the costs of collection and transportation. All the mattresses collected from this event would be delivered to the recycler.

12. Improve Consistency of Waste Disposal Site Experience

Maintaining consistency throughout the sites (diversion programs, disposal process, staff training, etc.) allows residents to become better educated in diversion, thereby increasing diversion and reducing the need for hands-on assistance from site staff, which will reduce costs.

13. Implement Shared / Combined Transportation of Blue Box Items

All municipalities would work together to transport and/or store their Blue Box streams. For example, as commingled recyclables in front end bins. These bins would then be serviced by a single truck that would carry out a "milkrun" across all WDSs across the County of Frontenac. Costs would be shared by all four municipalities, but would likely be lower than the current situation due to economies of scale.

14. Purchase or Contract out a County-wide Mobile Shredder

The municipalities would collectively purchase or contract out a single mobile shredder that would shred all bulky waste. The shredder would be used across all four municipalities equally. Shredded waste would vastly reduce the volume of material being sent to landfill.

15. Improve Tracking of WDS User Behaviour

North Frontenac's extensive tracking system (tracking each vehicle and different waste streams; counting number of bags) has allowed them to measure more accurately the amount of waste users bring in to the depot. Once further reduction and recycling programs are set in place, this system will aid in measuring the overall success of a program. The other municipalities may want to consider this option.

16. Hire a Part-time County Wide Waste Management Coordinator

It would be very difficult to work collectively without such a role. A Waste Coordinator would be responsible for coordinating and overseeing efficiency of waste management operations, reporting to RPRA, creating a "Made in Frontenac" playbook, tendering contracts, researching options, implementing shareable practices, etc.

The role would be funded jointly by the four municipalities, and could be a contract or permanent position.

17. Develop a Datacall "Playbook" with a Consistent and Simplified Approach to Quantifying Waste

Most of the Datacall information is based on estimates, which vary between the municipalities. A standardized approach would be used by all four municipalities to estimate the weight of various materials. A similar format would be used for determining population and seasonal population. For example, counting the number of bags dropped off at each WDS could 1) assist in estimating the weight of materials sent to landfill and 2) measure success of various diversion programs.

18. Implement Fully Costed Tipping Fees for Waste Disposal

Fully costed tipping is an emerging best practice for municipal waste operations.[3] Often, tipping fees do not reflect the long term cost of ownership for landfill and transfer station operations, such as annual monitoring programs and future closure costs. Fully costed tipping fees tend to be higher, and can improve waste diversion and lower operating costs. The first step in implementing fully costed fees involves detailed analysis of the net costs of waste management operations and a survey surrounding municipalities and private transfer stations.

19. Implement Rotating Two-Season Waste Audits

Waste audits provide insight into the success and opportunities for waste diversion programs. The municipalities should consider rotating 2-season waste audits for two municipalities per year. Alternatively, they could lobby Stewardship Ontario's Continuous Improvement Fund to include Frontenac in its future annual audits.

[3] Ecofiscal Commission Report, 2018

20. Implement a More Market-Based Approach to the Collection & Processing of Blue Box Streams

Given the market uncertainty for Blue Box waste streams, the municipalities should consider working to cater their programs to market conditions and projections, and focus on getting high value streams to market, while possibly stockpiling, landfilling or shredding other streams as necessary.

21. Enforce Recycling Practices at IC&I Centres Across all Four Municipalities

Collection may be carried out by a private hauler, but waste from the IC&I sector is brought to the same landfill. The municipalities should consider introducing a PAYT program for IC&I sectors with greater enforcement.

22. Lead by Example

The municipalities should lead by example with their internal waste management activities and ensure that proper and consistent diversion program infrastructure is in place at all municipal properties (offices, arenas, community centres, etc.). If working collectively, they could complete group purchases of infrastructure (e.g. multi-stream bins) to achieve economies of scale.

23. Implement a Disposal Ban on Organics and Textiles

A disposal ban could be implemented after backyard composters and textile depots are fully provided across all four municipalities. This is a long term solution and would depend on the provincial direction taken with the Waste Free Ontario Act.

24. Investigate Possibility of Developing a Centralized, Mini Materials Recovery Facility or a Regional Transfer Station

Consider building a regional transfer station or mini material recovery facility that would be used to consolidate materials from all four municipal sites. The transfer station/material recovery facility could be maintained and operated by a third party agency or handled directly by the County. Material collected at the transfer station could be marketed by the agency or directly by the County.

25. Implement a County-Wide Promotion and Education Program.

All of the Municipalities have promotion and education (P & E) programs in place to better inform its residents of appropriate waste disposal to increase diversion. Many of these practices can be adopted by those municipalities without such a program/practice in place.

26. Investigate the Possibility of a County-Wide Mobile Compactor for High Value Waste Streams

Purchasing or contracting out a front end truck with compaction ability could enable the County to pick up high value waste streams such as aluminium or cardboard. The mobility of the equipment and the ability to have it taken directly to a processor provides an advantage.

27. Pursue Joint Tenders for Waste Related Contracted Services

Consider creating joint tenders for waste related services to reduce costs. Benefits of the services would also be shared between all four municipalities.

28. Explore the Use of Norterra Or Debruin Farms to Support an Organics Diversion Program

Norterra has two facilities in the Kingston area that have the capacity to support composting for up to 20,000MT. The company has advised that it would welcome organics collected by the County. Debruin Farms currently accepts a portion of Wolfe Island’s organics but has the capacity to accept more.

29. Investigate Possibility of Crushing Glass and Sending to Landfill

Glass is costly to transport and to process. However, it does not biodegrade or create greenhouse gas emissions, and thus could be crushed and mixed with landfill cover material. This avoids transportation and processing costs from recycling.

30. Use the Capacity of Smaller Landfills First, Then Close Them

By closing smaller landfills first, human resources could be shifted from one landfill to another. It would also spur increase in cost to dispose and improve diversion.

31. Investigate the Benefits of All Municipalities Using the Same Processor

Using the same processor could result in economies of scale and lower operating costs.

32. Develop a More Detailed Understanding of Net Costs for Each Diversion Program

A detailed understanding of net costs can improve the search for inconsistencies with each program. Better solutions can be found if cost is brought into the equation.

33. Implement Front-end Bins Instead of Roll-off Bins

Most waste disposal sites currently have Roll-off bins to collect recyclable materials. Implementing front-end bins can reduce costs by at least a third, if not more, of the total cost of transportation. It will also increase the serviceability of each site.

8.3 Options Analysis - Impact on Objectives

Each option was reviewed for its impact on the three objectives and rated as positively impacting the objective (given a “+”), negatively impacting the objective (given a “-“), or no impact on the objective (given a “0”). The results of the analysis are shown in below. A brief overview of each objective is as follows:

Increase Waste Diversion	Decreasing the amount and percentage of waste sent to landfill by reducing, reusing, recycling, repairing, etc.
Reduce Net Waste Management Costs	Decreasing the net operating costs of waste management programs. Could be increasing waste related revenue or reducing waste related costs. Does not include capital expenditures.
Reduce Environmental Impact	Reduces environmental impact in three ways: a) prevents hazardous waste from entering landfill b) reduces greenhouse gas emissions from landfill and c) reduces greenhouse gas emissions from transportation.

Table 25 – Summary of Options – Impact on Objectives

Option No.	OPTIONS	IMPACT ON THE 3 OBJECTIVES		
		Increase Waste Diversion /	**Reduce Net Operating Costs for**	**Reduce Environmental Impact**
SHAREABLE OPTIONS				
1	**Implement County Wide Textile/Clothing Recovery**	+	+	0
	Currently practicing: FI.	All collection costs at expense of processor.		
2	**Implement Returnable Liquor Bottles Program**	0	+	0
	Currently practicing: CF & FI	Less glass to be processed.		
3	**Implement C&D Waste Reuse**	+	+	0
	Currently practicing: CF, NF & FI	Construction waste diverted from landfill. Resident/Contractor must source separate. Less C&D reduces transportation & processing costs.		
4	**Add Re-Use centres at waste disposal sites**	+	+	+
	Currently practicing: CF & SF	These centres could include re-usable construction waste, toys, books, souvenirs and re-usable furniture. Long term cost savings from reduced disposal of C&D and bulky waste overshadow cost of building a re-use centre. Frequency of bulk waste pickups decrease and decrease in amount of		
5	**Reduce WDS operating hours during winter season**	0	+	0
	Currently practicing: NF & FI	Reducing operating hours at all waste disposal sites can reduce operation costs.		
6	**Implement clear bag policy + inspection / enforcement**	+	0	+

Option No.	OPTIONS	IMPACT ON THE 3 OBJECTIVES		
		Increase Waste Diversion /	Reduce Net Operating Costs for	Reduce Environmental Impact
	Currently practicing: CF & NF	Clear bags will indicate if recyclables, organics, hazardous or electronic material is in the garbage		
7	**Encourage greater use of backyard composting**	+	+	+
	Currently practising: All municipalities have voluntary purchase program. Consider using FCM Funding to procure backyard composters for all residents	Reduced presence of organics in landfill and extended landfill life. One time initial expenditure on backyard composter. Extended landfill life saves money long term. Reduced methane gas from landfill, replenished nutrients into soil.		
8	**Implement 'Bag for a Bag'**	+	+	+
	Currently practising: NF	Residents are required to purchase a bag tag to dispose of one bag of waste. However if they bring in recycling, they will receive one free bag tag for any additional bags of recycling compared to number of bags of waste.		
9	**Utilize a permit policy for**	+	0	0
	Currently practising: CF & NF	A waste site permit is required to gain access into all of the waste sites. If a resident is unable to show a permit, access into the waste site will be denied.		
10	**Eliminate waste amnesty days**	+	+	+
	Currently practising: SF, NF & FI	Residents are currently allowed to dispose of a single load of household refuse at no charge (up to $40 limit). Eliminating this will reduce		
NEW OPTIONS				
11	**Implement a rotating mattress recycling event**	+	0	0

Option No.	OPTIONS	IMPACT ON THE 3 OBJECTIVES		
		Increase Waste Diversion /	Reduce Net Operating Costs for	Reduce Environmental Impact
	Mattresses have high volume. Recycling them would see increased diversion and reduced volume use at landfill			
12	**Improve the consistency of the waste disposal site experience**	+	+	0
	Consistency at waste disposal sites will ensure increased familiarity of the program for residents. This will lead to an overall decrease in contamination rates			
13	**Implement shared/combined transportation of blue box**	0	+	+
	Group purchase and/or sharing of truck. Cost reduction due to economies of scale. Transportation related GHG's reduced due to less trips overall.			
14	**Collectively purchase or contract out a mobile shredder for use on bulky items**	+	-	+
	Reduces volume of waste. Increases landfill life.			
15	**Improve tracking of WDS user behaviour**	+	+	+
	Tracking WDS user behaviour will allow the ability to increase awareness amongst residents about the recyclability of an item. This can increase landfill life.			
16	**Hire a part-time waste management coordinator**	+	-	+
	Higher focus on waste management activities & diversion activities. Potentially cost neutral or minimal cost as a result of savings from economies of scale.			
17	**Develop a Datacall "Playbook"**	+	+	0
	Developing such a playbook will not only allow all four municipalities create a standardized approach but it can also help focus on revenue maximization			

Option No.	OPTIONS	IMPACT ON THE 3 OBJECTIVES		
		Increase Waste Diversion /	Reduce Net Operating Costs for	Reduce Environmental Impact
18	**Implement full cost of tipping fees for waste disposal (includes monitoring,**	+	+	0
	Completely covers operation costs, cost of monitoring, etc.			
19	**Implement rotating 2-season waste audits - two municipalities per year**	+	-	+
	A waste audit is essential for maximizing the effectiveness of a program, measuring success and improving operations.			
20	**Implement a more market-based approach to the collection & processing of**	-	+	0
	Current diverted streams may end up in landfill. Avoids cost of selling diverted items at a loss.			
21	**Enforce recycling practices at IC&I centres across all four municipalities**	+	+	+
	Waste from ICI also going to same landfill. Focus on ICI can reduce waste. Initial cost from P&E towards ICI, but possible source of revenue from establishing bag tag programs and capturing divertible.			
22	**Lead by example - township owned facilities & spaces**	+	+	+
	All four municipalities need to lead by example and source separate at their own facilities and spaces.			
23	**Consider a disposal ban on organics and textiles across all four municipalities**	+	+	+

Option No.	OPTIONS	IMPACT ON THE 3 OBJECTIVES		
		Increase Waste Diversion /	Reduce Net Operating Costs for	Reduce Environmental Impact
	A disposal ban on organics and textiles across all four municipalities will ensure maximum diversion of these items, which can lead to increased landfill life and reduced environmental impact.			
24	**Investigate possibility of developing a centralized, mini materials recovery facility or a regional transfer station to take advantage of market**	+	-	0
	Developing a centralized MRF or transfer station can greatly reduce operation costs that arise from haulage.			
25	**Implement county wide promotion and education program**	+	-	+
	Would see higher diversion and participation.			
26	**Investigate the possibility of a shared mobile compactor for high value waste streams (aluminium, cardboard)**	+	+	+
	A shared mobile compactor for high value waste streams such as aluminium cans can increase revenue.			
27	**Pursue joint tenders for waste related contracted services**	0	+	0
	Pursuing joint tenders for waste related contracted services can reduce operational costs.			
28	**Explore the use of Norterra or Debruin Farms to support an organics program**	+	-	+

Option No.	OPTIONS	IMPACT ON THE 3 OBJECTIVES		
		Increase Waste Diversion /	Reduce Net Operating Costs for	Reduce Environmental Impact
	Norterra Organics has the capacity to compost organics generated from all four municipalities. Debruin Farms can partially support such a program.			
29	**Investigate possibility of crushing glass and sending it to landfill**	-	-	+
	Such a program will reduce operational costs arising from hauling glass. Glass can instead be used as cover.			
30	**Use capacity of smaller landfills first then close them**	+	+	-
	Cost of operations will reduce- less landfills to manage; possibility to convert into transfer station and focus on generating revenue from recyclables.			
31	**Investigate the benefits of using the same diversion stream processors for all 4 municipalities**	0	+	+
	Using the same processor could result in lower operating costs.			
32	**Develop a more detailed understanding of net costs for each diversion program**	0	+	0
	Can improve search for inconsistency with each program.			
33	**Implement front-end bins instead of roll-off bins**	0	+	+
	Implementing front-end bins can reduce costs by at least a third, if not more, of the total cost of transportation. It will also increase the serviceability of each site.			

8.4 Options Rating as Short, Medium, or Long Term

The second step of the options review involved rating the options as short, medium, or long-term. This step considered the impact of each option on the objectives, but also included subjectivity on the part of the consulting team and the Public Works Managers, based on experience, best practices, and the practicality of implementation.

Specifically, if an option achieved all three objectives if wasn't automatically ranked as a short-term option. For example, Option 23 (Implement a disposal ban on organics and textiles) supports all three objectives but is not feasible in the short-term due to the unavailability of sufficient diversion options for organics and textiles. Similarly, if an option achieved only one objective it was not automatically ranked as a long-term option. Option 27 (Pursue joint tenders for contracted waste services) supports only the "reduce costs" objective but still is feasible sense to pursue in the short-term.

The other consideration involved the desire of the four municipalities to work closer together, and the project team agreed that options which were unanimous were more practical to pursue in the short-term.

Based upon feedback received from the municipalities, a number of the options were unanimously chosen for implementation in the short-term. The others were to be considered for implementation in the medium to long term. However, changes in market conditions or individual municipal situations may make it more practical to push off short-term options or expedite longer term options.

A summary of prioritization of options by each municipality is shown in Appendix C.

8.5 Graphical Summary of Options Analysis

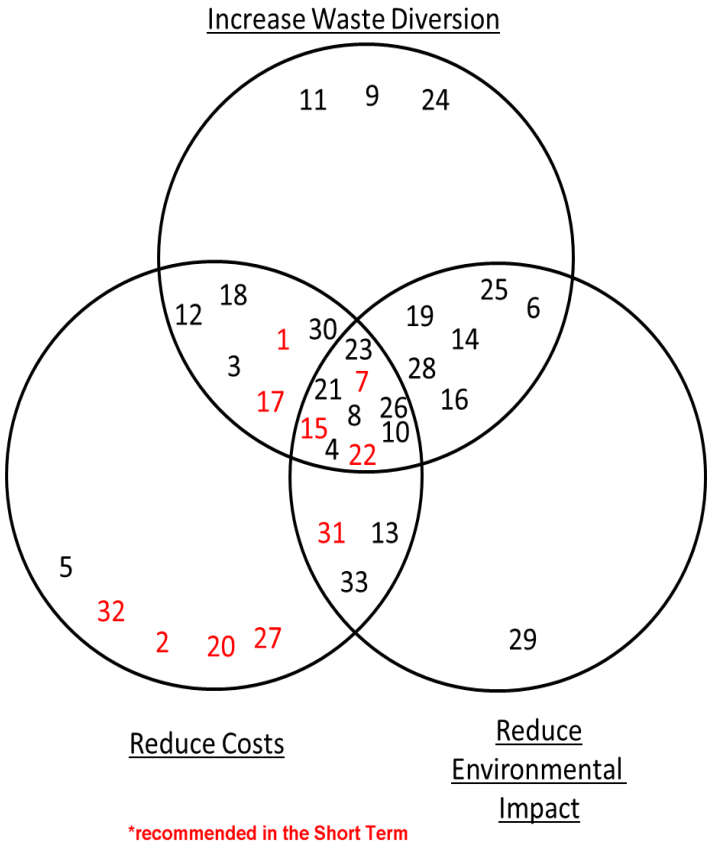
Following the options analysis above, the results were summarized graphically in Figure 12. The figure allows for easy identification of which objectives are achieved by which options, and which options were recommended in the short-term (highlighted by their red font).

The graphical summary reveals that, at minimum, all of the short-term options supported the 'Reduce Costs' objective. Only three short term options supported all three objectives.

The result of the analysis led to the creation of an approach that is unique to the region, and forms the “Made in Frontenac” path forward found in Section 9.0.

Figure 12 Graphical Summary of Options Analysis

SHAREABLE OPTIONS	1	Implement county wide textile/clothing recovery program
	2	Implement returnable liquor bottles program
	3	Implement C&D waste reuse program
	4	Add re-use centres at waste disposal sites
	5	Reduce WDS operating hours during winter season
	6	Implement clear bag policy + inspection / enforcement
	7	Encourage greater use of backyard composting
	8	Implement 'Bag for a Bag' program
	9	Utilize a permit policy for access to WDS's
	10	Eliminate waste amnesty days
NEW OPTIONS	11	Implement mattress recycling event
	12	Improve consistency of waste disposal site experience
	13	Implement shared/combined transportation of blue box
	14	Purchase or contract out a county-wide mobile shredder
	15	Improve tracking of WDS site user behaviour
	16	Hire a part-time waste management coordinator
	17	Develop a datacall “Playbook” in a consistent and simplified
	18	Implement full cost of tipping fees for waste disposal
	19	Implement rotating 2-season waste audits
	20	Implement a more market-based approach to the collection
	21	Enforce recycling practices at IC&I centres across all four
	22	Lead by example - corporate/city owned spaces.
	23	Implement a disposal ban on organics and textiles
	24	Investigate possibility of developing a centralized, mini
	25	Implement county wide promotion and education program
	26	Investigate the possibility of a county-wide mobile
	27	Pursue joint tenders for waste related contacted services
	28	Exploration of use of Norterra or Debruin farms to support
	29	Investigate possibility of crushing glass and sending it to
	30	Use up capacity of smaller landfills first then close them
	31	Investigate the benefits of all municipalities using the same
	32	Develop a more detailed understanding of net costs for each
	33	Implement front-end bins instead of roll-off bins



9.0 Our 'Made in Frontenac' Path Forward

This WMR was initiated by the County, through its 2014 "Wildly Important Goal" of working with its municipalities to develop a "Made in Frontenac" position and financial plan for solid waste management. There was desire expressed by the municipalities to take control of their own destiny, which included working more closely together on waste management.

In addition, throughout the review the municipalities expressed an openness to trying new approaches to waste management. Given the current uncertainty of the state of waste in Ontario, this willingness to break away from the status quo can bode well. As expressed by one Public Works Manager during the WMR, "the current waste management procedures, specifically the Blue Box program, were developed during a different time with different conditions. It doesn't mean that they make sense now".

9.1 Guiding Strategies

As noted in the WMR, it is nearly impossible to achieve all three objectives: the highest diversion rate, the lowest environmental impact, and the lowest net operating costs. In the short-term (1 – 2 years), some movement forward on the three objectives may be achievable, particularly if the four municipalities work together. However, over the medium to long term (3+ years), a decision will likely have to be made between the objectives, and this may be impacted by changes related to the Waste Free Ontario Act.

Thus, the path forward begins with a more collective approach among the four Frontenac municipalities. This is also prudent to be better positioned to deal with future changes in the waste sector in Ontario.

Our Made in Frontenac approach to waste management will be based on the following guiding strategies:

- Create as much consistency as possible/pragmatic in the policies, processes and practices of all four municipalities
- Develop a collective approach, where possible/pragmatic, to waste collection, transportation, processing and promotion & education

- Report collectively and annually to municipal Council & the communities
- Develop a Frontenac approach to waste performance reporting including Datacall reporting
- Continue to improve the understanding of the performance and costs of waste management programs
- Remain fully engaged in evolving waste management legislation in Ontario
- Explore opportunities to work with others beyond Frontenac County
- Begin exploring opportunities to support the transition to a circular economy

9.2 Short Term Options – Years 1 – 2

The short term options will centre on developing the ability for the four municipalities to work more closely together and to implement the actions that will have the most impact on the three objectives: increase waste diversion/increase landfill life, reduce net operating costs and reduce environmental impact.

Recommended Options

- Implement county wide textile/clothing recovery program
- Implement returnable liquor bottles program
- Encourage greater use of backyard composting
- Improve tracking of WDS site user behaviour
- Develop a Datacall “Playbook” to standardize the approach & focus on revenue maximization
- Lead by example
- Pursue joint tenders for waste related contracted services
- Investigate the benefits of using the same diversion stream processors for all 4 municipalities
- Develop a more detailed understanding of net costs for each diversion program

- Implement a more market-based approach to the collection & processing of Blue Box.

9.3 Medium and Long Term Options – Years 3+

The medium term options will be partially dictated by how the state of the waste industry evolves over the next three years – in particular, individual producer responsibility and the Blue Box program. Over the medium to long term (3+ years), it may prove very difficult to achieve all three objectives as diversion program costs will continue to rise. In that case, a choice between the objectives or prioritization will have to be made.

Recommended Options

- Hire part-time county wide waste management coordinator
- Add Re-Use Centres at waste disposal sites
- Reduce WDS operating hours during winter season
- Implement clear bag policy and/or bag inspection/enforcement
- Eliminate waste amnesty days
- Investigate the possibility of a county-wide mobile compactor for high value waste streams(aluminium, cardboard)
- Investigate possibility of crushing glass and sending it to landfill
- Implement Front-end bins instead of Roll-off bins
- Implement rotating 2-season waste audits – two municipalities per year to short term from medium term.
- Implement shared/combined transportation Blue Box items
- Improve the consistency of the WDS experience
- Utilize a permit policy for access to WDSs
- Implement C&D Waste Reuse Program
- Implement fully costed tipping fees for waste disposal (includes cost of monitoring, expansion, etc.)

- Investigate possibility of developing a centralized, mini materials recovery facility or a Regional Transfer Station to take advantage of market conditions
- Explore the use of Norterra or Debruin Farms to support an organics program
- Implement a strategy of using up capacity of smaller landfills first, then closing them
- Implement 'Bag for a Bag' program
- Implement a rotating mattress recycling event
- Collectively purchase or contract out a mobile shredder for use on bulky items
- Enforce recycling practices at IC&I centres across all four municipalities
- Implement County Wide Promotion and Education program

9.4 Sample Annual Report

One of the guiding strategies calls for annual collective reporting on waste management. A sample annual report can be found in Appendix D

10.0 Conclusion

The County of Frontenac's waste management review looked at the current policies, programs, practices and costs of all four municipalities. It identified options for a more efficient and effective approach in managing waste. These options place emphasis on improving the performance of existing waste diversion programs and include future initiatives that will further increase their diversion efforts.

The objectives of reducing costs, increasing diversion and reducing environmental impact were used to analyse these initiatives. This analysis, which included significant input from the municipalities, produced a series of short-term recommendations and longer term options.

Overall, greater collaboration amongst the municipalities was the consistent message, particularly in light of the current state of waste in Ontario.

The result was a 'Made in Frontenac' path forward on waste management, which includes all four municipalities working more closely together.

Glossary of Terms

Bag Tag	A clearly identifiable sticker approved for sale by resolution of the Council of the Municipality and used to indicate that a fee has been paid for the disposal of the tagged waste.
Best Practices	Waste system practices concerning diversion programs that result in the attainment of provincial and municipal material diversion goals in the most cost-effective way possible.
Blue Box	A plastic container, often blue in colour, for conveying acceptable recyclable materials. Also refers to a municipal curbside or transfer station recycling program.
Capture Rate	The amount of materials diverted from the waste stream for recycling expressed as a percentage of the total quantity generated of those materials.
Co-mingled	Recycling programs where a number of different materials are mixed together, not collected separately.
Composting	The controlled microbial decomposition of organic matter, such as food and yard wastes, in the presence of oxygen, into humus, a soil-like material. Compost can be used in vegetable and flower gardens, hedges, etc.
Construction & Demolition Waste (C & D)	Solid waste produced in the course of residential, commercial, industrial, or institutional building construction, demolition or renovation (e.g. lumber, concrete, brick, plaster, glass, stone, drywall, wire, paint, etc.).
Continuous Improvement Fund (CIF)	Provides grants and loans to municipalities to execute projects that will increase the efficiency of municipal Blue Box recycling and help boost system effectiveness.
Disposal	Final placement or destruction of wastes. Disposal is typically accomplished through the use of approved sanitary landfills or incineration with or without energy recovery.

Diversion	The process of reducing, recycling, or reusing materials with the purpose of keeping waste out of landfills.
Diversion Rate	The percentage of waste diverted from landfill through means of diversion programs (Blue Box, composting, etc.). The diversion rate is determined by dividing the total quantity of waste diverted by the total amount diverted and disposed. Also known as the waste diversion rate.
Environmental Compliance of Approval (ECA)	A license or permit issued by the Ministry of Environment, Conservation and Parks for the operation of a waste management site/ facility or system.
Extended Producer Responsibility (EPR)	A policy to shift the responsibility of a product's life cycle away from the municipality to the producers and to provide incentives for producers to consider the environmental impacts in the selection of materials and the design of their product(s).
Federation of Canadian Municipalities (FCM)	A national organization that represents the interests of municipalities in Canada.
Green Municipal Fund (GMF)	A funding program established by the Federation of Canadian Municipalities to support municipal sustainability initiatives, including waste management projects and studies.
Hazardous Waste	Any residual hazardous materials which by their nature are potentially hazardous to human health and/or the environment, as well as any materials, wastes or objects assimilated to a hazardous material. Hazardous waste is defined by Ontario Regulation 347 and may be explosive, gaseous, flammable, toxic, radioactive, corrosive, combustive or leachable.
Landfill	An approved, engineered site/facility used for the long-term or permanent disposal of waste.

Municipal Hazardous or Special Waste (MHSW)	Includes the following materials that are considered hazardous waste materials generated from the municipal sector (paints, solvents, adhesives, pesticides, acids/bases, aerosols, fuels and batteries). Also sometimes referred to as Household Hazardous Waste.
MOLOK™	A patented type of container used to hold source separated organics.
Ontario Electronic Stewardship (OES)	The Industry Funding Organization (IFO) for Waste Electrical and Electronic Equipment. Companies that are designated as stewards for Waste Electrical and Electronic Equipment can discharge their legal obligations under the Waste Diversion Act by registering, reporting and paying fees to OES.
Ontario Tire Stewardship (OTS)	The Industry Funding Organization established to develop a diversion program for used tires. Companies that are designated as stewards for used tires can discharge their legal obligations under the Waste Diversion Act by registering, reporting and paying fees to OTS.
Organic Waste	Waste of animal or plant origin, typically food, yard waste, and paper. It is what feeds a compost site.
Pay As You Throw / User Pay	A program in which every individual bag or container of waste to be disposed of is paid for directly by the resident, commonly by the purchase of bag tags.
Plastics #1	Polyethylene Terephthalate (PETE or PET): typically used to make soda/water bottles, mouthwash/peanut butter containers, etc. This plastic can be safe, but is known to allow bacteria to accumulate.
Plastics #2	High Density Polyethylene (HDPE): typically opaque plastic that is used to make milk jugs, juice bottles, shampoo bottles, etc. One of the 3 plastics considered to be safe.
Plastics #3	Polyvinyl chloride (PVC): typically used to make food wrap, plumbing pipes, detergent bottles, etc. It is linked to several health issues and contains the carcinogen, DEHA.

Plastics #4	Low Density Polyethylene (LDPE): typically found in squeezable bottles, shopping bags, clothing, carpet, bread bags, etc. One of the 3 plastics considered to be safe.
Plastics #5	Polypropylene (PP): typically found in yogurt containers, ketchup bottles, medicine bottles, etc. Considered one of the safer plastics.
Plastics #6	Polystyrene (PS): Styrofoam; found in egg cartons, meat trays, and disposable plates/cups. This plastic poses a health risk, leaching potentially toxic chemicals, especially when heated.
Plastics #7	Other/miscellaneous plastic; typically found in sunglasses, iPod and computer cases, hard plastic toys, etc. Includes polycarbonate, which contains the toxic chemical bisphenol-A (BPA), linked to several health issues.
Promotion & Education Materials (P&E)	Materials prepared and distributed by a municipality to help promote the proper participation in waste management and waste diversion programs.
Recyclables	Any material destined for recycling, often through the Blue Box program. Includes materials such as: glass, metal food and beverage cans, aluminum foil, rigid shell plastic, containers, newspaper, cardboard, fine paper, boxboard.
RPRA	The Resource Productivity and Recovery Authority. The regulatory authority supporting the new Waste Free Ontario Act.
Source Separated Organics (SSO)	This includes residential organic waste such as food waste and non-recyclable paper that is segregated for composting or other organic waste processing. Some municipalities have widened the definition of SSO to include diapers, sanitary products and pet waste.
Stewardship Ontario	The Industry Funding Organization (IFO) that operates the Blue Box (recycling) and Orange Drop (municipal hazardous & special wastes) programs.

Transfer Station	A depot-style location where residents of a Municipality may come to dispose of their wastes; residents generally separate wastes into designated areas. Accumulated wastes are transferred to a disposal site or diversion facility.
Waste	A general term that describes all waste generated including “garbage,” recyclables, organic waste, leaf and yard waste, MHSW, and WEEE.
Waste Audit	Exercise of determining the quantity and composition of waste which is disposed.
Waste Diversion Ontario (WDO)	A non-crown corporation created under the Waste Diversion Act (WDA) on June 27, 2002. WDO was established to develop, implement and operate waste diversion programs for a wide range of materials (Blue Box Waste, Used Tires, Used Oil Material, Waste Electrical and Electronic Equipment and Municipal Hazardous or Special Waste) under the WDA.
Waste Electrical and Electronics Equipment (WEEE)	Any broken or unwanted electrical or electronic appliances including computers, phones and other items that have reached the end of their usable life.
Waste Management Plan (WMP)	A plan designed to help an organization, such as municipality, achieve goals and best practices in the area of waste management.
Waste Stream	The waste output of a community, region, or facility. Total waste can be categorized into different waste stream components (e.g., organic waste, construction waste, household hazardous waste, or white goods).
White Goods	Refers to larger home appliances (e.g. refrigerators, washing machines, etc.) that are often finished in white enamel. It is becoming more common for these items to have different finishes, however the name still refers to these types of appliances.

Appendix A

Operating Hours of Waste Disposal Sites

10.1.1 Municipality of Central Frontenac

Table 26 - CF Operating Hours

Winter/Summer	Oso	Olden	Hinchinbrooke
MONDAY	8 AM - 12 PM	CLOSED	1 PM - 5 PM
TUESDAY	1 PM - 5 PM	CLOSED	8 AM - 12 PM
WEDNESDAY	CLOSED	8 AM - 5 PM	CLOSED
THURSDAY	CLOSED	8 AM - 5 PM	CLOSED
FRIDAY	8 AM - 12 PM	8 AM - 5 PM	1 PM - 5 PM
SATURDAY	8 AM - 12 PM	8 AM - 5 PM	1 PM - 5 PM
SUNDAY	1 PM - 5 PM	8 AM - 5 PM	8 AM - 12 PM
SITE TOTAL	20 hours	40 hours	20 hours

Notes: All sites are closed between 12 – 1 PM.

10.1.2 Municipality of Frontenac Islands

Table 27 - FI Operating Hours

Winter/Summer	Wolfe Island	Howe Island
MONDAY	9 AM - 5 PM	CLOSED
TUESDAY	CLOSED	6 PM - 8 PM
WEDNESDAY	9 AM - 5 PM	CLOSED
THURSDAY	CLOSED	6 PM - 8 PM[1]
FRIDAY	CLOSED	CLOSED
SATURDAY	9 AM – 5 PM	8:30 AM – 12 PM
SUNDAY	9 AM – 5 PM[1]	CLOSED
SITE TOTAL	22.5/30 hours	5.5/7.5 hours

Notes:

All sites are closed between 12 – 12:30 PM.

[1] Summer operating hours: June – September (Wolfe Island) or May – September (Howe Island).

10.1.3 Municipality of North Frontenac

Table 28 - NF Winter Operating Hours

Winter	506	Kashwakamak	Mississippi	Plevna	Ompah	Cloyne
MONDAY	9 AM - 1 PM	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED
TUESDAY	CLOSED	CLOSED	10 AM - 2 PM	CLOSED	CLOSED	CLOSED
WEDNESDAY	CLOSED	CLOSED	CLOSED	10 AM - 4 PM[1]	CLOSED	1 PM - 4 PM
THURSDAY	9 AM - 1 PM	CLOSED	CLOSED	CLOSED	CLOSED	Closed
FRIDAY	1 PM - 4 PM	CLOSED	CLOSED	10 AM - 4 PM[1]	CLOSED	9 AM - 12 PM
SATURDAY	9 AM - 1 PM	CLOSED	10 AM - 2 PM	CLOSED	CLOSED	CLOSED
SUNDAY	CLOSED	12 PM - 4 PM	CLOSED	10 AM - 4 PM[1]	12 PM - 4 PM	9 AM - 4 PM[1]
SITE TOTAL	15 hours	4 hours	8 hours	16.5 hours	4 hours	12.5 hours

Notes: New operating hours effective March 2017. Winter hours: October – May.

[1]Select sites are closed between 1 – 1:30 PM.

Table 29 - NF Summer Operating Hours

Summer	506	Kashwakamak	Mississippi	Plevna	Ompah	Cloyne
MONDAY	9 AM - 2 PM	CLOSED	CLOSED	CLOSED	CLOSED	9 AM - 4:30 PM[1]
TUESDAY	9 AM - 2 PM	CLOSED	10 AM - 2 PM	CLOSED	CLOSED	CLOSED
WEDNESDAY	9 AM - 6 PM[1]	CLOSED	CLOSED	8:30 AM – 4:30 PM[1]	10 AM - 2 PM	9 AM - 1 PM
THURSDAY	CLOSED	12 PM - 5 PM	CLOSED	9 AM - 2 PM	CLOSED	Closed
FRIDAY	1 PM - 5 PM	CLOSED	CLOSED	9 AM - 5 PM[1]	12 PM - 4 PM	9 AM - 1 PM
SATURDAY	12 PM - 5 PM	9 AM - 1 PM	10 AM - 4 PM[1]	CLOSED	CLOSED	9 AM - 2 PM
SUNDAY	10 AM - 3 PM	10 AM - 4 PM[1]	CLOSED	9 AM - 5 PM[1]	1 PM - 5 PM	9 AM - 4:30 PM[1]
SITE TOTAL	32.5 hours	14.5 hours	9.5 hours	27.5 hours	12 hours	27 hours

Notes: New operating hours effective March 2017. Summer hours: May – September.

[1]Select sites are closed between 1 – 1:30 PM.

10.1.4 Municipality of South Frontenac

Table 30 - SF Operating Hours

Winter/Summer	Portland	Loughborough	Bradshaw	Salem	Green Bay
MONDAY	CLOSED	8:30 AM - 4:30 PM	CLOSED	CLOSED	CLOSED
TUESDAY	CLOSED	CLOSED	CLOSED	8:30 AM - 4:30 PM	CLOSED
WEDNESDAY	8:30 AM - 4:30 PM	CLOSED	CLOSED	CLOSED	CLOSED
THURSDAY	CLOSED	CLOSED	8:30 AM - 4:30 PM	CLOSED	CLOSED
FRIDAY	CLOSED	CLOSED	CLOSED	CLOSED	8:30 AM – 4:30 PM[1]
SATURDAY	8:30 AM - 4:30 PM	8:30 AM - 4:30 PM	CLOSED	CLOSED	CLOSED
SUNDAY	CLOSED	CLOSED	CLOSED	CLOSED	12:30 PM – 4:30 PM[2]
SITE TOTAL	16 hours	16 hours	8 hours	8 hours	8 hours

Notes:

[1] Winter operating hours shown. Summer operating hours: June – October; 8:30 AM – 12:30 PM.

[2] Summer operating hours: June – October.

Appendix B

Datacall Diversion Calculations

Datacall Diversion Rate Calculation

This section summarizes the methods that Datacall uses to calculate diverted tonnage, disposed tonnage, and the diversion rate. Note that the values of each waste stream are largely dependent on the type of information the municipality entered into Datacall; therefore, most explanations are high level.

Calculation of Diverted Tonnage

Datacall calculates diverted tonnage using the following formula:

$$\text{Diverted Tonnage} = \text{D.1} + \text{D.2} + \text{D.3} + \text{D.4} + \text{D.5} + \text{D.6}$$

Where:

- D.1 = Residential Component Deposit, Return and Stewardship Program
- D.2 = Residential Reuse
- D.3 = Residential On-Property Management
- D.4 = Residential Recyclables Diverted
- D.5 = Residential Organics Diverted
- D.6 = MHSW Treatment/Refuse/Recycling

D.1 Residential Component Deposit-Return and Stewardship Program

- Refers to activities where certain components of the residential waste stream are managed through programs that are independent or parallel to the municipal waste management system. [i] (i.e. The Beer Store deposit return program)
- Tonnage is his is input by the municipality.

D.2 Residential Reuse

- Refers to tonnages collected through municipally sponsored or supported activities such as bins in drop off areas or during special collection days to allow people to drop off used items, or municipal reuse centers such as the Halton Reuse Centre
- Tonnage is estimated by municipality and input into Datacall. If no municipally sponsored program exists, the value is zero.

D.3 Residential On-Property Management

- Refers to the combination 6 factors:
    - backyard composting - tonnage estimated by multiplying number of composters x an average composter diversion rate of 100kg/unit/year. The resulting tonnage is considered diverted.
    - grasscycling – grass clippings as a percentage of leaf & yard waste stream. Tonnage is estimated based on municipal policies on grass clippings. The resulting tonnage is considered diverted.
    - garburators – tonnage estimated by multiplying number of garburators x 72 kg/units/year. Tonnage could be considered diverted or disposed depending on end use.
    - evapotranspiration – refers to the weight reduction that occurs when transporting organics from the house and the curb. It is only applicable where municipalities use aerated carts for source separation organics collection. This would be estimated by the Municipality. The resulting tonnage is considered diverted.
    - in-home burning – tonnage burned in fireplace. This tonnage is considered disposed (garbage)
    - onsite (open) burning – tonnage burned in barrel or fire pit. This tonnage is considered disposal (garbage)
- Tonnage is estimated by municipality and input into Datacall

D.4 Residential Recyclables Diverted

- Refers to a combination of factors:
    - Residential Recyclables Marketed (Blue Box, Bulky Goods, Scrap Metal, WEEE, Other),
    - Residential Waste Incineration & EFW, Bottom Ash Recycled; GAP C.6,
    - Residential Waste Incineration & EFW, and
    - Residential Tonnes, Used Tires Program.
- All are input by the Municipality.

D.5 Residential Organics Diverted

- Refers to the combination of yard and kitchen waste, and is calculated by deducting Residue from Processed. This is input by the Municipality.

D.6 MHSW Treatment/Refuse/Recycling

- Refers to MHSW that is reused and/or recycled. If MHSW is recycled/reuse then is considered diverted. Otherwise it is considered disposed. Tonnage is input by the municipality based on documentation.

Note on Marketed Tonnage

The diverted tonnage used to calculate the diversion rate is the marketed tonnes, as opposed to collected tonnes. The collected tonnage is described as the entirety of the material collected, and the marketed tonnage is described as the total material collected minus residue/non-recyclables. Therefore, the collected tonnage will always be greater than the marketed tonnage.

According to the RPRA, many municipalities do not know their marketed tonnage. As a result, RPRA calculates marketed tonnes using a Municipal Funding Allocation Model.

Calculation of Disposed Tonnage

At a high level, Datacall calculates disposed tonnage using the following formula:

$$\text{Disposed Tonnage} = \text{D.7} + \text{D.8} + \text{D.9}$$

Where:

- D.7 = Residential Energy from Waste (EFW) Mass Reduction
- D.8 = Hazardous Waste Disposal
- D.9 = Landfill of Residential Waste

D.7 Residential Energy from Waste (EFW) Mass Reduction

Residential Energy from Waste (EFW) Mass Reduction comes from Garbage, Residential Garbage Disposed, total of column Tonnes Disposed at EFW Facilities or at Other Facilities as Fuel less total of GAP Questions p) if disposed or recycled, q), r) and s).

D.8 Hazardous Waste Disposal

- Refers to materials such as paint, pesticides, used oil, etc.
- Tonnage is input by municipality based on documentation. If documentation shows tonnage reused and recycled, then HSW is diverted. Otherwise HSW should be considered disposed.

D.9 Landfill of Residential Waste

- Refers to a combination of garbage including:
  - Landfilled waste quantities
  - EFW related waste (ash, residue)
  - Processing Residues from diversion program (Blue Box, WEEE, textiles, bulky goods, scrap metal, drywall, wood, C & D)
- Tonnage is input by municipalities based on documentation and estimates.

Calculation of Diversion Rate

$$Diversion\ Rate = \frac{Total\ Residential\ Waste\ Diverted}{Total\ Residential\ Waste\ Generated}$$

Appendix C

Prioritization of Options

				Legend	Short Term	1-2 Years
					Medium Term	3-5 Years
					Long Term	5+ Years

		Options	MUNICIPALITY A	MUNICIPALITY B	MUNICIPALITY C	MUNICIPALITY D
SHAREABLE OPTIONS	1	Implement county wide textile/clothing recovery program	Short Term	Short Term	Short Term	Short Term
	2	Implement returnable liquor bottles program	Short Term	Short Term	Short Term	Short Term
	3	Implement C&D waste reuse program	Medium Term	Medium Term	Medium Term	Medium Term
	4	Add re-use centres at waste disposal sites	Short Term	Long Term	Long Term	Long Term
	5	Reduce WDS operating hours during winter season	Short Term	Short Term	Short Term	Long Term
	6	Implement clear bag policy + inspection / enforcement	Short Term	Long Term	Short Term	Short Term
	7	Encourage greater use of backyard composting	Short Term	Short Term	Short Term	Short Term
	8	Implement 'Bag for a Bag' program	Short Term	Long Term	Medium Term	Long Term
	9	Utilize a permit policy for access to WDS's	Short Term	Long Term	Medium Term	Long Term
	10	Eliminate waste amnesty days	Short Term	Long Term	Short Term	Short Term
NEW OPTIONS	11	Implement mattress recycling event	Long Term	Long Term	Long Term	Long Term
	12	Improve consistency of waste disposal site experience	Medium Term	Medium Term	Medium Term	Short Term
	13	Implement shared/combined transportation of blue box	Medium Term	Medium Term	Short Term	Long Term
	14	Purchase or contract out a county-wide mobile shredder	Medium Term	Long Term	Long Term	Medium Term
	15	Improve tracking of WDS site user behaviour	Short Term	Short Term	Short Term	Short Term
	16	Hire a part-time waste management coordinator	Medium Term	Medium Term	Short Term	Medium Term
	17	Develop a datacall “Playbook” in a consistent and simplified	Short Term	Short Term	Short Term	Short Term
	18	Implement full cost of tipping fees for waste disposal	Medium Term	Long Term	Medium Term	Medium Term
	19	Implement rotating 2-season waste audits	Short Term	Long Term	Short Term	Long Term
	20	Implement a more market-based approach to the collection	Short Term	Short Term	Short Term	Short Term
	21	Enforce recycling practices at IC&I centres across all four	Long Term	Long Term	Long Term	Long Term
	22	Lead by example - corporate/city owned spaces.	Short Term	Short Term	Short Term	Short Term
	23	Implement a disposal ban on organics and textiles	Long Term	Long Term	Long Term	Long Term
	24	Investigate possibility of developing a centralized, mini	Long Term	Long Term	Long Term	Long Term
	25	Implement county wide promotion and education program	Medium Term	Short Term	Short Term	Short Term
	26	Investigate the possibility of a county-wide mobile	Medium Term	Long Term	Medium Term	Long Term
	27	Pursue joint tenders for waste related contacted services	Short Term	Short Term	Short Term	Short Term
	28	Exploration of use of Norterra or Debruin farms to support	Medium Term	Long Term	Medium Term	Short Term
	29	Investigate possibility of crushing glass and sending it to	Short Term	Long Term	Medium Term	Medium Term
	30	Use up capacity of smaller landfills first then close them	Long Term	Short Term	Short Term	Long Term
	31	Investigate the benefits of all municipalities using the same	Short Term	Short Term	Short Term	Short Term
	32	Develop a more detailed understanding of net costs for each	Short Term	Short Term	Short Term	Short Term
	33	Implement front-end bins instead of roll-off bins	Long Term	Medium Term	Medium Term	Long Term

Appendix D

Sample Annual Report

COUNTY OF FRONTENAC

SOLID WASTE MANAGEMENT

2017 ANNUAL REPORT

1.0 State of Waste in Ontario – Review & Preview

The Waste Free Ontario Act, enacted in 2016, represents an opportunity to move the province towards the circular economy (where waste is essentially eliminated) and shift the responsibility for waste from municipalities to the producers (see section 1.4 for further discussion). However, the recent change in provincial government has resulted in uncertainty in the province's commitment to fully implement the act.

The market for recycled waste streams, mainly Blue Box items, has become unstable following the implementation of China's National Sword program in January 2018. The program has either banned various streams entirely, or reduced the acceptable contamination rate to such a level, that it is not achievable by most municipalities. Other markets for these materials (e.g. Vietnam, Malaysia) are following suit which is severely limiting places where these items can be sent. The result has been stories of diversion cost increases, stockpiling various streams, and sending others straight to landfill.

The cost of municipal diversion programs continues to rise. For years, the amount of heavy materials (like newspapers, magazines and glass jars) in the Blue Box has been plunging, while the amount of light, thin and complex plastics has dramatically risen. Manufacturers often prefer lighter products and packaging, which can save them money, consume fewer raw materials and require less energy to transport. But these lighter, thinner, more complex plastics and other packaging materials also increase recycling costs.

The overall landfill life remaining in Ontario is approximately 14 years, which is quite short given the requirements and time necessary to open new landfills. (OWMA 2017)

While the current Blue Box funding structure remains in place, disagreement will likely continue between the municipalities and the producers on the calculation for 50% coverage of the program's cost. Status quo is likely to continue.

New products and materials continue to enter the market quicker than the waste industry is able to develop ways to deal with these new materials. In the interim they are disposed of via landfill or incineration. The trend of "the evolving tonne" continues, whereby lighter plastic and combination packaging are replacing heavier cardboard, glass, and fibre materials. The result is a higher cost per tonne.

Food waste is becoming very high profile, both from a social point of view and a greenhouse gas emissions point of view (food waste in the landfill generates GHG emissions). A growing effort is being made to reduce food waste for both reasons stated. In addition, the federal government's mandate to reduce GHG emissions has the potential impact the food waste issue, and possible waste related transportation.

2.0 Financial Review

Our financial review looked at the total costs for each municipality's waste management program over the past year. In addition, we reviewed the specific costs associated with each municipality's Blue Box program.

2.1 Net Cost of Waste Management

Figure 1 provides a summary of the 2017 net waste management operating costs, as well as the net cost per capita. The values do not include capital items.

Figure 1 - 2017 Net Waste Management Costs

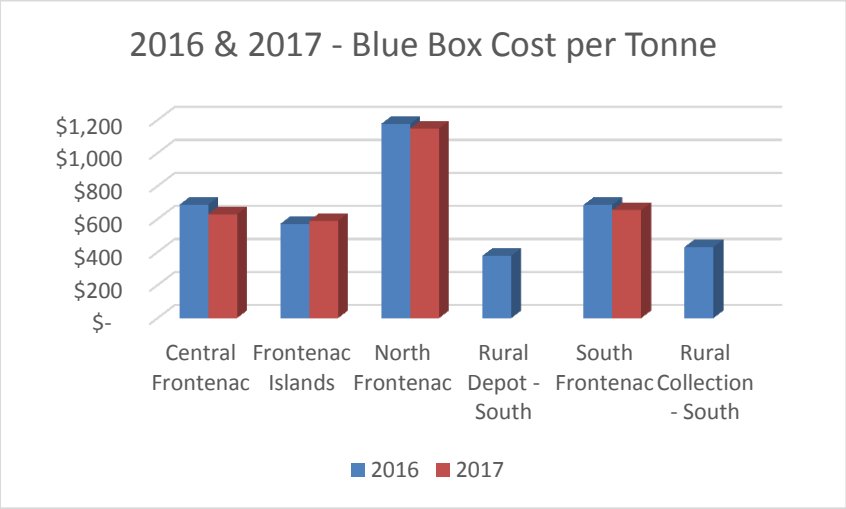
	Central Frontenac	Frontenac Islands	North Frontenac	South Frontenac	County Total
	2017	2017	2017	2017	2017
Total Expenses*	$324,285	$232,589	$502,089	$2,014,147	$3,073,110
Total Revenues*	$178,187	$89,361	$137,611	$369,018	$774,177
Net Cost*	$146,097	$143,228	$364,478	$1,645,129	$2,298,933
Population**	4,708	1,860	2,973	19,924	29,465
Net Cost per Capita	$31	$77	$123	$83	$78

The table indicates a wide variation in the net operating costs and the costs per capita. Central Frontenac operates at a significantly lower cost per capita, while North Frontenac is significantly higher. One key difference of note between those two municipalities is that Central Frontenac operates three (3) waste disposal sites, while North Frontenac operates six, likely resulting in higher operating costs (e.g. wages). South Frontenac's higher expenses are driven by its curbside pick-up service and much larger population. Given their much smaller population, Frontenac Island's expenses are relatively high; however, their island locations result in added cost for transportation (time and ferry crossings).

2.2 Cost Per Tonne - Blue Box Program

As shown in Figure 2, the net costs per tonne for all four municipalities are significantly higher than their category average. Central Frontenac, North Frontenac and Frontenac Islands are part of the "Rural Depot – South" category, while South Frontenac is part of the "Rural Collection – South" category. The 2017 category averages were not yet available at the time of the report.

Figure 2 - Blue Box Cost per Tonne



Source: Datacall Reports

2.3 Revenues from Blue Box program (Stewardship Ontario)

Figure 3 provides a summary of the 2016 Blue Box funding for each municipality, along with percentage of net Blue Box costs funded.

Figure 3 - 2016 Blue Box Revenue

Allocation Component	Municipality				
	Central Frontenac	Frontenac Islands	North Frontenac	South Frontenac	County Total
Net Cost (50% Maximum)	$ 42,703	$ 16,972	$ 41,113	$ 129,776	$230,564
Recovered Tonnage (35% Maximum)	$ 12,945	$ 6,184	$ 7,793	$ 45,532	$72,454
Best Practices (15% Maximum)	$ 10,020	$ 2,238	$ 12,701	$ 32,161	$57,120
Total Blue Box Funding	$ 65,668	$25,394	$ 61,607	$ 207,469	$360,138
Total Net Blue Box Costs	$178,434	$70,918	$184,342	$609,832	$1,043,526
% of Net Blue Box Cost Recovered	37%	36%	33%	34%	35%

It should be noted that each year's funding is based on results from 2 years prior – so the 2018 funding reimbursement is based upon the costs and performance from the 2016 Blue Box program. Funds are paid out by Stewardship Ontario in equal quarterly installments.

Revenue opportunities noted from the analysis include:

- Increasing best practice scores. In 2016 North Frontenac scored 83% while Central Frontenac, Frontenac Islands, and South Frontenac scored 59%, 24%, and 63% respectively.
- Keeping net costs within the category threshold. In 2016, North and South Frontenac's net costs were over their category threshold by $12,000 (7%) and $60,000 (12%) respectively, meaning those costs were not eligible for reimbursement.
- Increasing recovered tonnage from diversion programs.

2.4 Revenue from the Sale of Diverted Materials

In addition to revenue from Stewardship Ontario, municipalities have historically received funds from the sale of various Blue Box items (e.g. plastic, aluminum, cardboard) to recycling processors. Over the years, these rebates have fluctuated based on prices being paid by the end-users of the recycled waste streams, or in other words based on "market conditions."

In 2018 market conditions changed significantly with the world's largest end-user, China, banning or placing severely limiting acceptable contamination rates on many recycled waste streams. In recent months, other countries (e.g. Vietnam) have also placed bans on these materials. The result is that most, if not all Blue Box streams, are now strictly an expense, with no associated rebate.

All four municipalities have seen the impact, with processors eliminating rebates and or increasing costs on waste streams such as cardboard and mixed plastics.

The fibre market (mixed paper, cardboard) in particular has seen a dramatic decrease in market price, while other streams, such as steel and aluminum cans have maintained or increased their market price.

The municipalities should explore the possibility of source separating higher value streams such as aluminum, in order to generate additional revenue.

3.0 Waste Performance Review

The waste performance review looked at how the various waste management programs have performed in recent years, and compares the findings across the four (4) municipalities.

The main source for the waste performance review was the provincial Datacall information. In addition, supplemental information was gathered directly from each municipality and their various third party contractors.

3.1 Total Waste Generated & Diverted

One aspect of the waste performance assessment was the total waste generated by each municipality. The total waste generated consists of the waste sent to landfill plus the waste diverted from landfill. The 2013 - 2016 totals for each municipality are shown in Table 1.5.

Diverted waste includes any waste that is not placed in a landfill while landfilled waste is classified as all waste that cannot be diverted somewhere else. Examples of diverted materials may include: burning clean wood, sending blue box material to a recycling facility, donating bottles through LCBO/Beer Store programs, and donating clothing. Landfill waste can consist of garbage bags, treated wood, construction material, and mattresses.

Figure 4 - Total Waste Generated

	2017 Waste Performance			
	Landfilled Waste	**Diverted Waste**	**Total* Waste**	**Diversion Rate**
Central Frontenac	1,536	-	-	
Frontenac Islands	726	-	-	
North Frontenac	1,312	2,758	2,113	
South Frontenac	8,397	6,340	5,391	
County Total	11,971	9,098**	7,504**	

*Source: 2017 Datacall entry sheets (not final report)

** Total waste for Central Frontenac and Frontenac Islands is not available due to the short-form Datacall being used.

Source: Datacall Reports: 2013, 2014, 2015, 2016

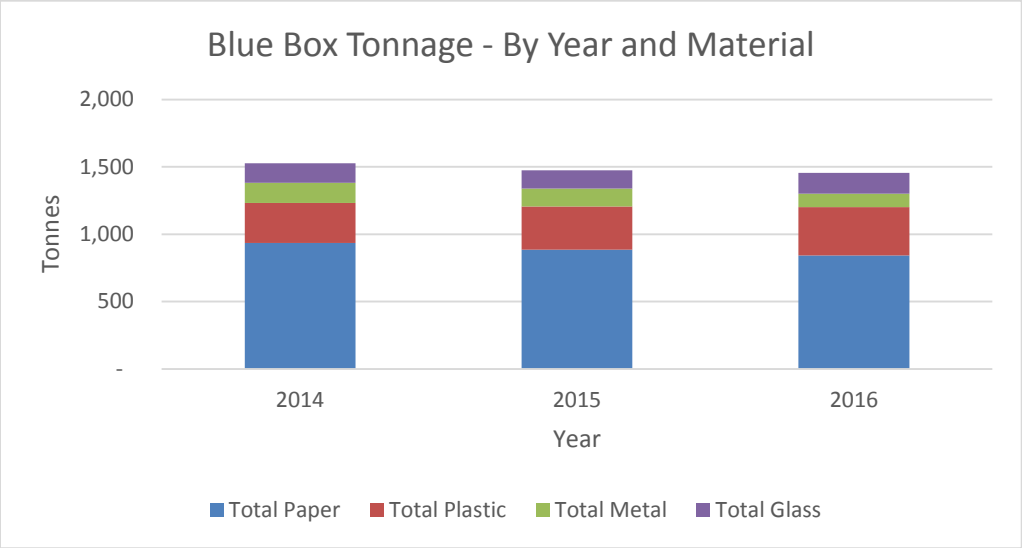
In addition, the total waste generated shows an increasing trend over the 2013-2015 period, however, data is not available for Central Frontenac and Frontenac Islands in 2016, due to their switch to Datacall's Short Form report. A more detailed breakdown for each municipality is shown below.

3.2 Blue Box Tonnages

Looking at the combined Blue Box tonnage by year and material (**Error! Reference source not found.**) between 2014 and 2016, two important trends are noted:

- a decrease in the total tonnage collected over the past 3 years, and
- a shift in materials collected – paper and metal are dropping, while plastic is increasing.

Figure 5 - Breakdown of Blue Box Tonnage



Source: Datacall 2014 - 2016

Both trends are in line with what is happening across the province and beyond, where there has been a shift away from the traditional packaging materials of metal, paper and glass and towards lightweight plastics and laminates. This is referred to as the "evolving tonne", and the result is lighter blue box loads that are more expensive to sort and transport.

4.0 Challenges & Opportunities

One of the challenges encountered in the project was the "competing" nature existing between the three objectives (increase diversion, reduce net operating costs, and reduce environmental impact) in that there are few options that assist in achieving all three.

Increasing diversion (and extending landfill life) generally results in higher operating costs. Reducing environmental impact also generally results in higher operating costs. And thus, a focus on reducing net operating costs will likely impede efforts to increase diversion and reduce environmental impact.

In short, it's nearly impossible to have the highest diversion rate, the lowest environmental impact, and the lowest net costs. So over the medium to long term (5+ years), a decision will have to be made on which to pursue.

In the short-term (1 – 5 years) some movement forward on the three objectives may be achievable, particularly if the four municipalities work collectively.

The options for achieving the WMR objectives have been derived from two categories: 1) sharable options currently being used by one or more municipalities, and 2) new options currently not being used by any of the Frontenac municipalities.