OPERATIONS REVIEW
BRUCE AREA SOLID WASTE RECYCLING

GAMSBY AND MANNEROW LIMITED
CONSULTING PROFESSIONAL ENGINEERS
GUELPH – OWEN SOUND – LISTOWEL – KITCHENER – EXETER

February 2014
Our File: 210314-1

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1.0 INTRODUCTION

BASWR is a not-for-profit organization established in 1990 by the former Towns of Southampton and Port Elgin (presently the Town of Saugeen Shores) to provide blue box recyclables collection and processing services for the municipal members from which it was established. Since 1990, BASWR has expanded its service area in the County of Bruce and currently includes the following municipalities:

- Municipality of Arran-Elderslie
- Municipality of Brockton
- Township of Huron-Kinloss
- Municipality of Kincardine
- Town of Saugeen Shores
- Municipality of South Bruce
- Town of South Bruce Peninsula

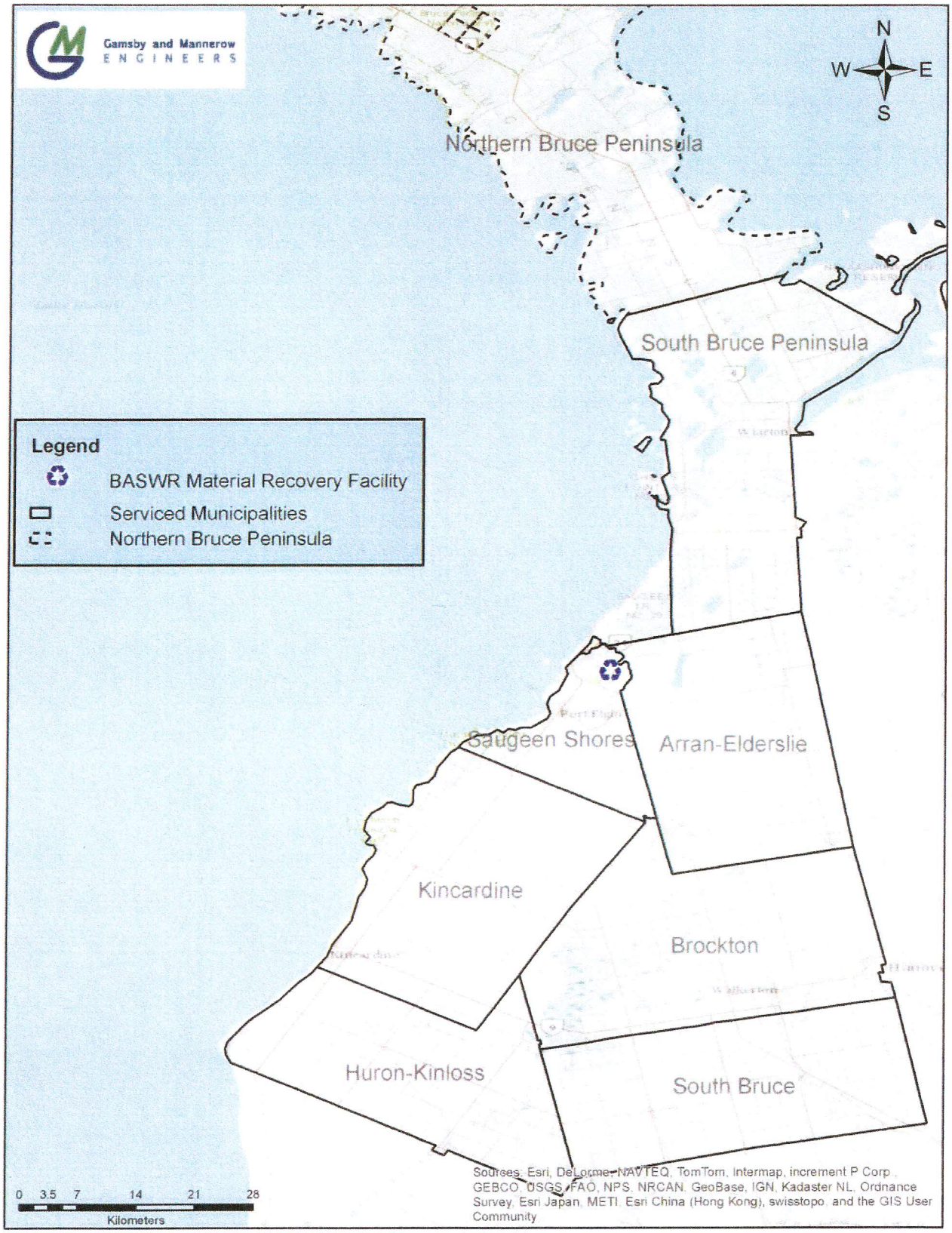
The service area is shown on Figure 1-1.

BASWR provides curbside collection of blue box recyclables to all residents of the member municipalities and services municipal blue box recycling depots and provides contract collection services for industrial, commercial and institutional (IC&I) customers. The blue box recyclables collected by BASWR are processed for market at BASWR's materials recovery facility (MRF) located in the Municipality of Saugeen Shores. BASWR also provides contracted curbside collection of garbage for the Municipality of Kincardine and the Township of Huron-Kinloss.

Residual residential solid waste and other diversion programs not related to blue box recycling are managed separately by the member municipalities as each municipality controls their own waste management policies and associated programming.

Currently, residential residual waste generated within the member municipalities is disposed of at their respective municipal landfills. Collection of curbside garbage is contracted out by the municipalities with the exception of Saugeen Shores who carry out their own curbside collection.

Figure 1-1: BASWR Service Area



2.0 PURPOSE AND SCOPE OF STUDY

The purpose of this Operations Review is to evaluate the efficiency of BASWR's current operations relative to other municipal programs and to determine the applicability of converting BASWR's MRF into a transfer station for blue box recyclables for subsequent transport and processing at a third party MRF. It is our understanding that under this scenario that the third party MRF would be a single stream (comingled) processing facility. Therefore, this evaluation includes an assessment of the following:

- Recovery of blue box materials versus collection and processing methods
- Recovery of individual material types (i.e., fibres, metals, plastics, polycoat and glass)
- Collection and processing costs versus collection/processing methods and recoveries
- Processing costs of self-operated MRFs versus contracted MRFs

Although BASWR services the *industrial, commercial and institutional* (IC&I) sector, this study focuses on the residential sector as funded by the member municipalities.

3.0 PROVINCIAL REGUALTIONS AND POLICY

The Ontario Ministry of the Environment and its Waste Management Policy Branch is responsible for the development of policies, regulations and legislation related to waste management in Ontario. The Branch works with municipalities, the private sector and associations to develop regulations, policies and programs for the management of both hazardous and non-hazardous waste, to ensure proper waste handling and disposal and to encourage waste minimization, diversion and recycling activities.

Provided below are the current acts and regulations associated with blue box recycling in Ontario that are considered applicable to BASWR.

Environmental Protection Act (EPA)
The EPA requires that all waste managers (i.e., those involved in generation, collection, transfer/processing or disposal of waste, unless exempted) obtain approval from the MOE to ensure waste is appropriately managed. The Act also provides authority for the MOE to inspect and enforce the operator's compliance with the Province's rules and regulations.

O. Reg. 101/94 Recycling and Composting Municipal Waste:
Requires municipalities with a population of 5,000 or more to implement and operate curbside blue box recycling programs and programs for home composters. Municipalities with 50,000 or more people must operate a program that collects or accepts leaf and yard waste for diversion.

This regulation outlines the general waste acceptance and processing requirements of transfer stations and processing facilities and outlines the materials that the municipal blue box programs must be equipped to accept and collect for recycling. As outlined in the regulation, the minimum materials collected must include the *Basic Blue Box Waste* and at least two of the *Supplementary Blue Box Waste*. These materials include the following:

Basic Blue Box Waste

1. Aluminum food or beverage cans (including cans made primarily of aluminum).
2. Glass bottles and jars for food or beverages.
3. Newsprint.
4. Polyethylene terephthalate bottles for food or beverages (including bottles made primarily of polyethylene terephthalate).
5. Steel food or beverage cans (including cans made primarily of steel).

Supplementary Blue Box Waste

1. Aluminum foil (including items made from aluminum foil).
2. Boxboard and paperboard.
3. Cardboard (corrugated).
4. Expanded polystyrene food or beverage containers and packing materials.
5. Fine paper.
6. Magazines.
7. Paper cups and plates.
8. Plastic film being,
    i. linear low density or low density polyethylene grocery bags or bags used for food or beverages, and
    ii. linear low density or low density polyethylene used for wrapping products.
9. Rigid plastic containers being,
    i. high density polyethylene bottles used for food, beverages, toiletries or household cleaners (including bottles made primarily of high density polyethylene), and
    ii. polystyrene containers used for food or beverages (including containers made primarily of polystyrene).
10. Telephone directories.
11. Textiles (not including fibreglass or carpet).
12. Polycoat paperboard containers, being containers made primarily of paperboard and coated with low density polyethylene or aluminum, and used for food or beverages.

Waste Diversion Act, 2002 (WDA)

Designate wastes from which a diversion program must be established and for which stewards pay fees to finance the development, implementation and operation of the program. Currently these wastes include blue box waste, used tires, waste electrical and electronic equipment (WEEE), and municipal hazardous or special waste (MWSW). Under the Act, municipalities are to receive 50% of total net costs for programs developed under the Act by industry funding organizations. Waste Diversion Ontario (WDO) is the organization responsible for developing, implementing and operating waste diversion programs for designated wastes in accordance with the Act and monitors the effectiveness and efficiency of those programs.

O. Reg. 273/02 Blue Box Waste:

Designates specified materials as blue box waste, which consist of, or any combination of the following materials:

- Glass
- Metal
- Paper
- Plastic
- Textiles

3.1 PROPOSED WASTE REDUCTION ACT (BILL 91)

Under the current regulatory framework and more specifically the WDA, emphasis is placed on extended producer responsibility (EPR) where producers (manufacturers, brand owners or first importers) of products and packaging are responsible for the costs associated with the environmental impact of their products. This responsibility extends throughout the product's life-cycle, including its design, manufacturing, packaging, transportation, product use, and diversion or disposal. When the WDA was formed, it is reported that the intent was to encourage producers to adopt or design production practices that were more efficient and products would be designed to produce less (or no) waste (i.e., design products that would last longer, can be reused, or (at least) can easily be recycled after their useful life ends).

Under this regulatory framework, product stewardship agencies were formed for their specific materials (e.g., WEEE) with "eco fees" placed on products (similar to a tax). Under the stewardships, designated recycling contractors have been used and the recycling fees have largely been paid by the consumer. Concern regarding this approach has been raised since it can result in a scenario where innovation and competition between producers to create products with less environmental impact is not encouraged.

Most recently, the Province has introduced Bill 91, which proposes a new Act called the Waste Reduction Act, 2013 (WRA). Bill 91 has not been passed as of the time of this report. Based on a review of available information, it is reported that this Act is intended to be more closely aligned with the original intent of the EPR philosophy. Under the proposed Act, it is our understanding that the philosophy has been refined to individual producer responsibility (IPR), where individual producers are responsible to meet set standards rather than the industrial sectors. Under the proposed Act, the current WDO would be transformed into the Waste Reduction Authority with the responsibility to oversee and enforce compliance with the set standards through penalties (currently not sanctioned under the WDA). Should the WRA be approved, the current WDA will be repealed and the current operating waste diversion programs transitioned into the new framework. It is noted that the implementation of the new Act has yet to have been defined clearly, and it may have significant implications in the coming years for blue box programs and the EPR framework.

The proposed Act was introduced in June 2013 and is currently in the second reading in parliament.

4.0 CURRENT SYSTEM

4.1 SERVICE AREA

BASWR provides blue box recyclables collection and processing services for seven out of the eight municipalities within the County of Bruce. The service area is largely rural consisting primarily of agricultural lands with the population largely divided between numerous towns and villages. The service area is approximately 3,300 km^2 and has a population of approximately 63,000 permanent residents with approximately 32,000 households consisting of primarily single detached homes.

4.2 OPERATION MODEL

BASWR's current operation model consists of multi-stream (sorted) curbside and depot collection of recyclables, as listed in Table 4-1. Curbside collection is provided to all residents for the items listed in Table 4-1 with the exception of corrugated cardboard, which is by depot only. Additional curbside collection is provided to a number of businesses throughout the service area as well a number of depots are available for residential and IC&I sector for drop off of blue box recyclables. Processing of the blue box recyclables for market is completed at BASWR's material recycling facility (MRF) located in the Town of Saugeen Shores, where shown on Figure 1-1.

Table 4-1: BASWR Recyclables

• Aluminum food or beverage cans • Glass bottles and jars for food or beverages • Newsprint • Polyethylene terephthalate bottles for food or beverages • Steel food or beverage cans • Aluminum foil	• Boxboard and paperboard • Corrugated cardboard (depot collection only) • Fine paper • Magazines • Paper cups and plates • Rigid plastic containers

4.3 PROGRAM COSTS

Provided in the table below is a summary of the residential blue box recycling program costs in 2011 (most recent available at time of study).

Table 4-2: BASWR Residential Blue Box Costs

Item	Expenses	Revenue
Collection	$231	---
Processing/Administration	$194	---
Gross Cost	$425	---
Materials Revenue	---	$202
Net Cost	**$223**	---

Note: All values are per tonne

In 2011, the gross cost of the residential blue box program was $425 per tonne of recyclables marketed. This includes collection and processing (including administrative) costs of $231 and $194 per tonne, respectively. With gross revenue of $202 per tonne, the net cost of the residential recycling program in 2011 was $223 per tonne or $13 per capita.

4.4 DIVERSION TONNAGES

In 2011, BASWR diverted 3,721 tonnes of blue box materials, which equates to 59 kg/cap. Provided in the following table are the tonnages diverted of the individual material types and respective percent portions diverted.

Table 4-3: BASWR Diverted Tonnages

Material	Tonnes Marketed	Proportion
Fibres	2478	67%
Plastics	456	12%
Metal	315	8%
Glass	473	13%
Total	3,721	100%

Of note in the table above, is that fibres consist of approximately two thirds of the blue box materials recycled.

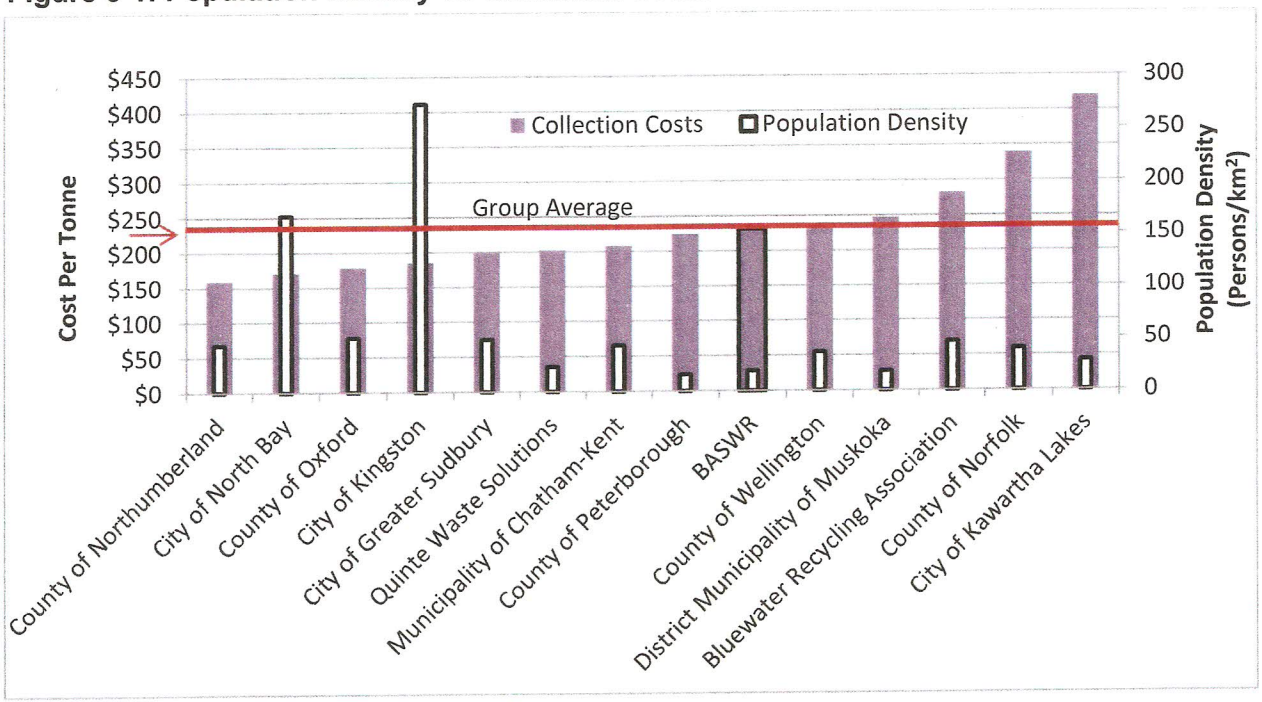
5.0 PERFORMANCE

To complete an evaluation of BASWR's performance, the program costs and material tonnages marketed by BASWR for the residential sector are compared to those of the recycling organizations within BASWR's municipal grouping (*Rural Regional*) as established by Waste Diversion Ontario. Provided in the following sections is an analysis of the costs associated with collection and processing, revenues from marketed blue box materials, and tonnages of blue box materials marketed.

5.1 COLLECTIONS COSTS

Collection costs can vary significantly between programs and are highly dependent on population densities and road networks within the service areas. Consequently, the collection costs have been compared with consideration of the population density as presented in the following figure.

Figure 5-1: Population Density vs Collection Costs



As shown in the previous figure, BASWR's collection costs are average for their municipal grouping. However, based on the population density of BAWSR's service area, which is among the lowest in the grouping, BASWR's collection program is considered to be relatively efficient.

5.2 PROCESSING COSTS AND REVENUE

Processing costs and revenue from materials marketed are considered to be interrelated, as processing operations directly impact the revenue gained from the sale of the processed blue box goods. For example, an increase in residual waste from contamination or a decrease in the quality of the processed materials will decrease revenue from the sale of the materials. To demonstrate the relationship between processing cost and revenue, the following figure shows only the processing costs while Figure 5-3, shows the revenue gained through the sale of blue box materials less the processing costs.

Figure 5-2: Processing Costs

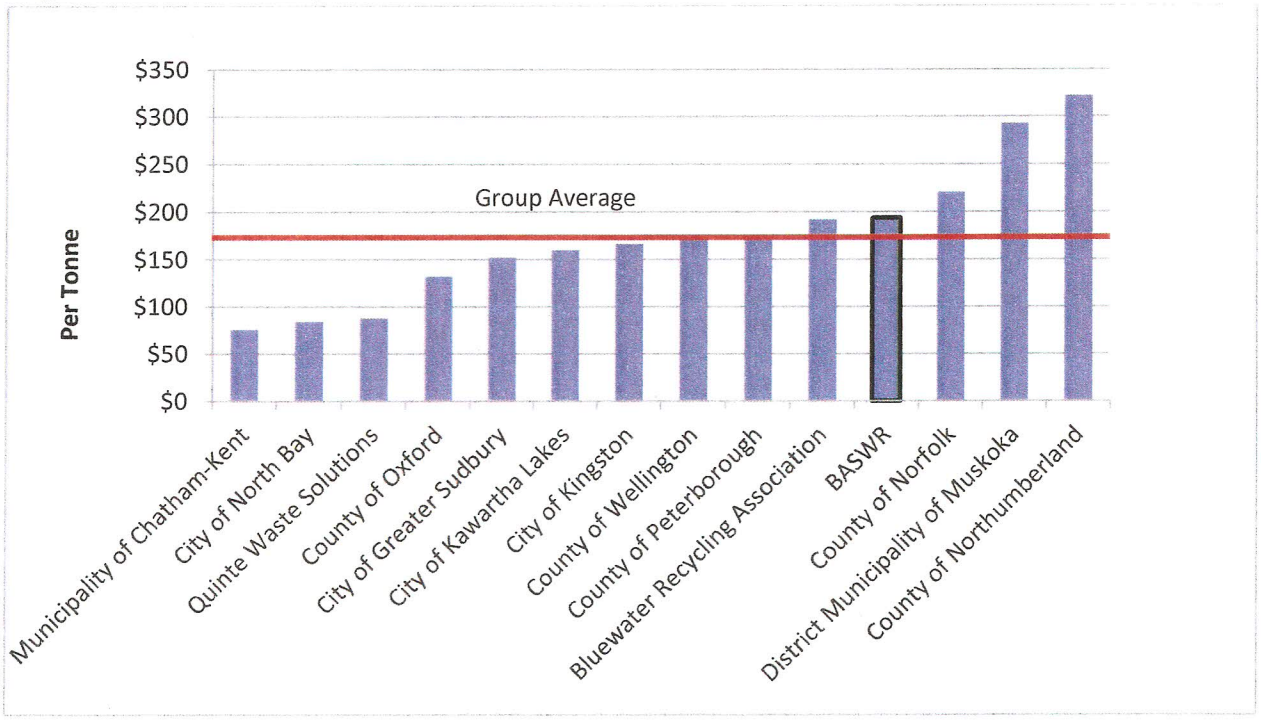
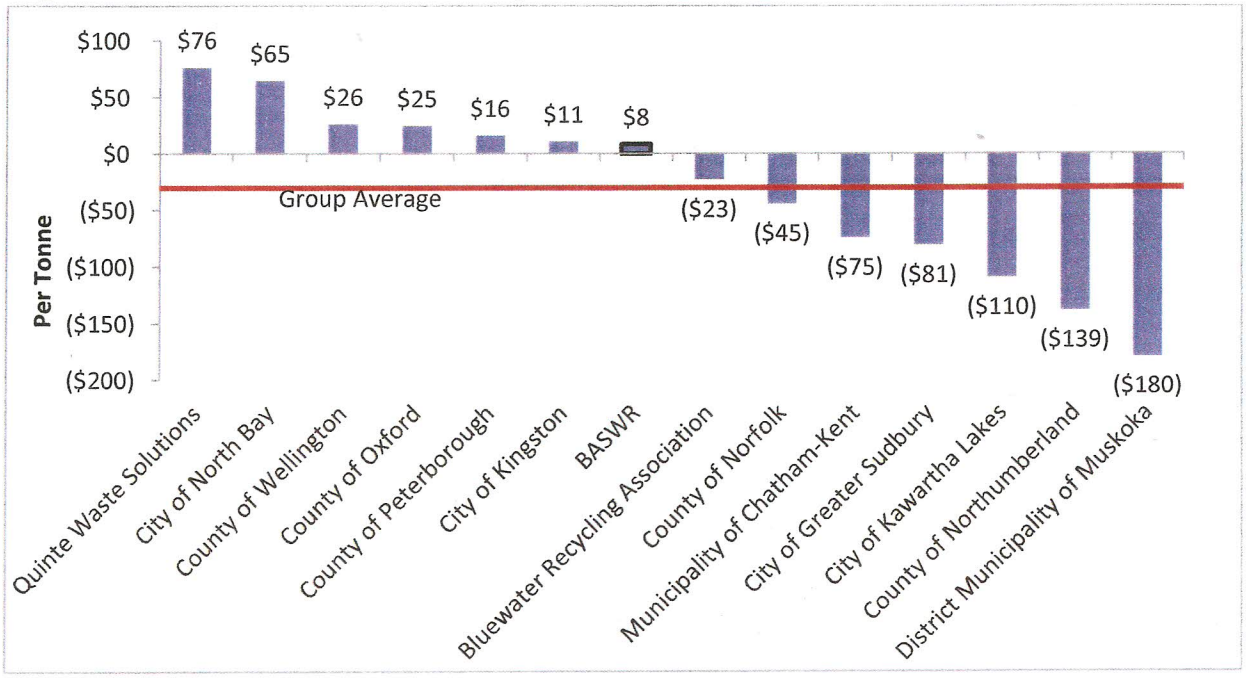


Figure 5-3: Revenue after Processing Costs

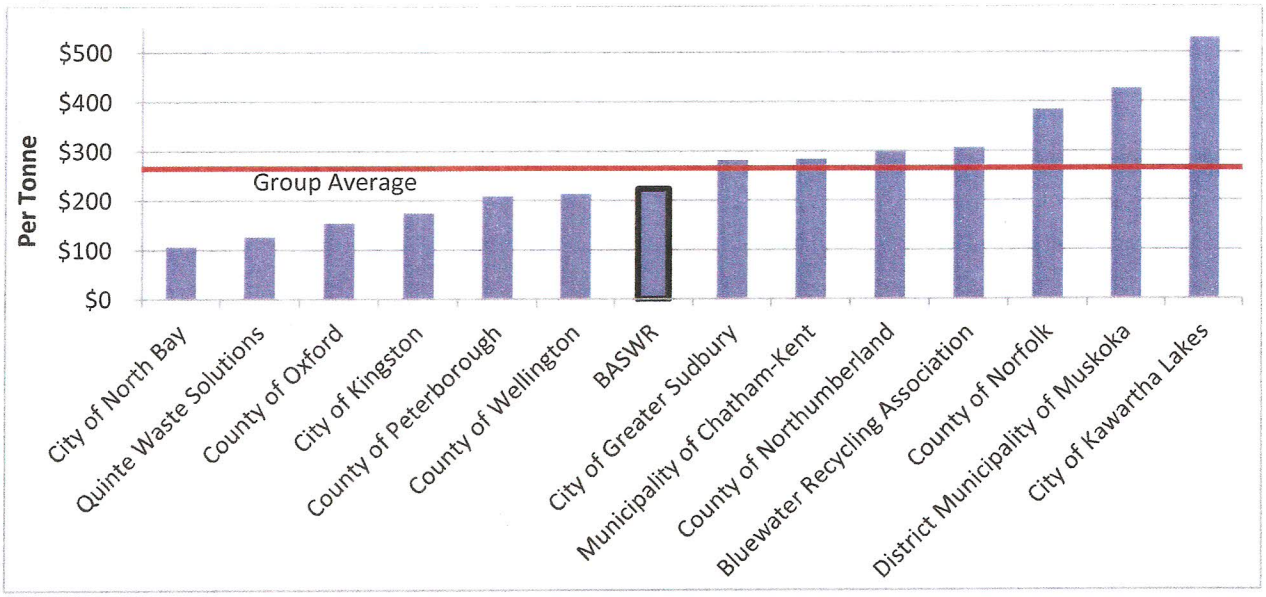


As shown in Figure 5-2, BASWR is below average when only processing costs are considered. However, as shown in Figure 5-3, when the revenue from the materials marketed is realized, BASWR is above the average with net revenue of $8 per tonne. In summary, although BASWR has comparatively higher processing costs, they also have above average revenue from the materials marketed, which more than offset the processing costs.

5.3 Overall Net Costs

Presented in the following figure is a comparison of the overall net costs for the residential blue box program, which include the collection costs, processing costs and revenue gained from the materials marketed.

Figure 5-4: Net Costs

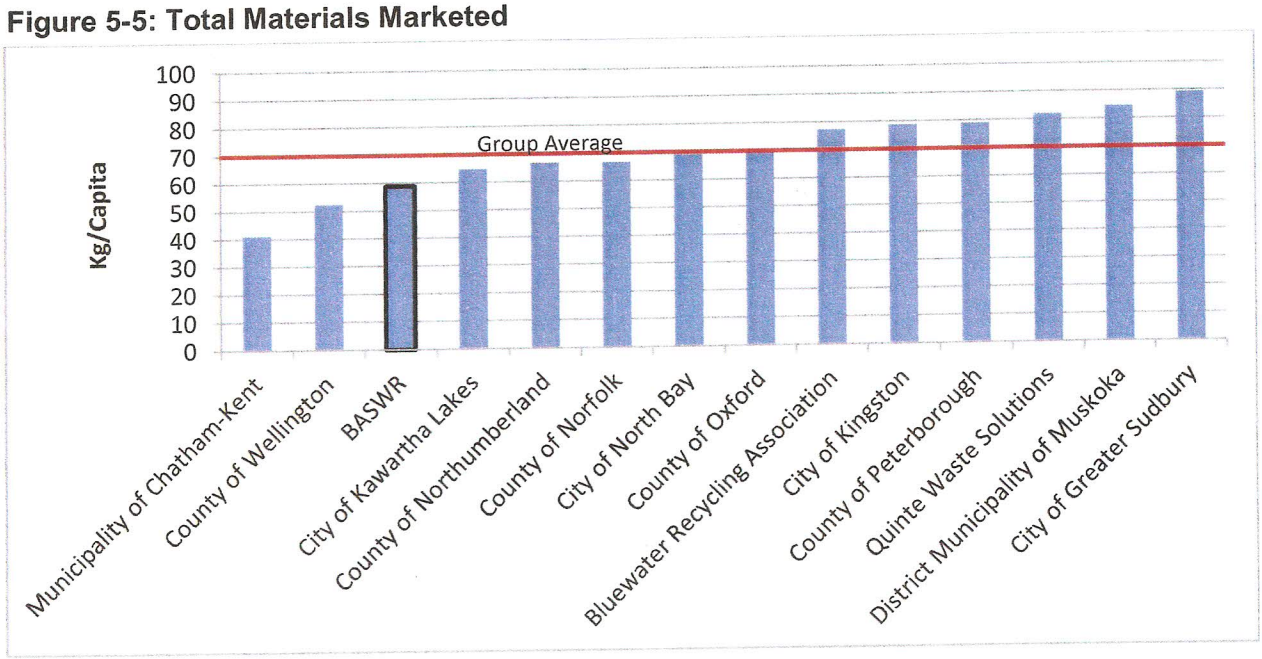


When considering the overall program costs, BASWR is below the average of the municipal grouping on a per tonne basis. Based solely on the net cost comparison scenario, BASWR's recycling program is considered to be performing well relative to the municipal grouping. When considering the relatively low population density and relative distance to potential markets, BASWR's recycling program is considered to be preforming relatively well.

5.4 MASS MARKETED

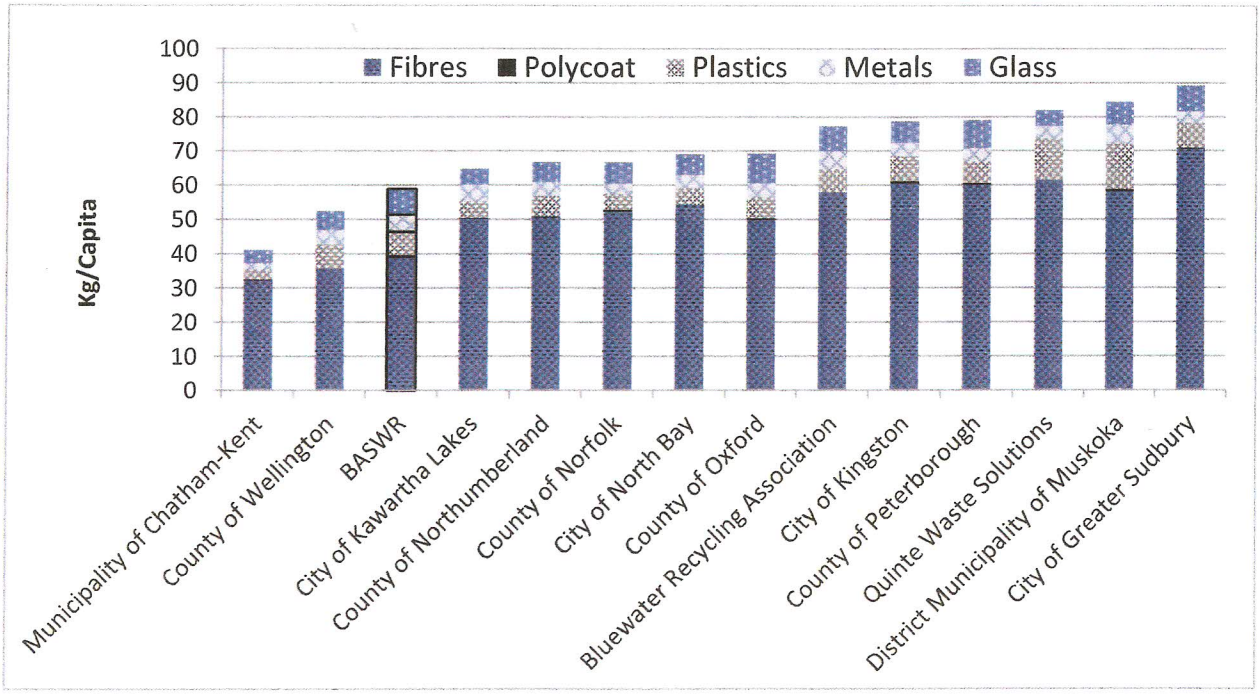
A comparison of BASWR's materials marketed on a per capita basis is presented in the following figure.

Figure 5-5: Total Materials Marketed



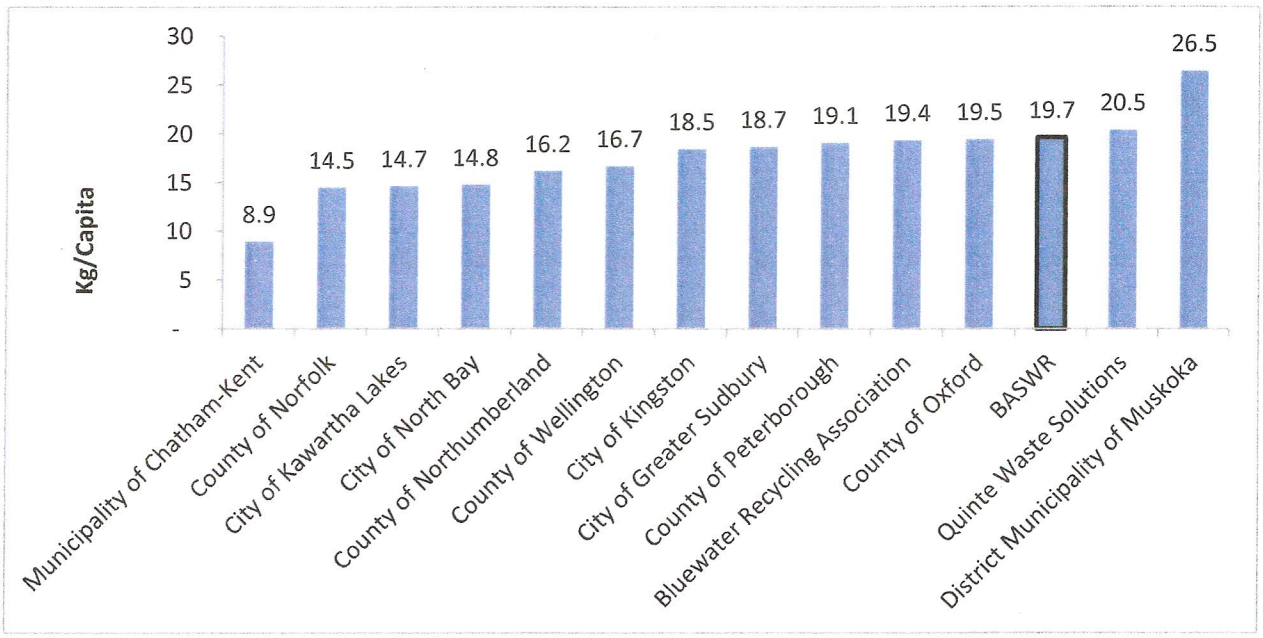
In terms of mass of materials marketed, BASWR is well below the group average of 70 kg per capita at 59 kg per capita. Based on this analysis, BASWR's mass of materials marketed are relatively low. To gain insight as to why BASWR's mass of materials marketed are relatively low, further analysis based on material types has been completed. Presented in the following figure are the masses marketed based on materials type.

Figure 5-6: Diversion of Material Types Marketed



As shown in Figure 5-6, BASWR has a proportionately lower mass of fibres marketed relative to the municipal grouping. When fibres are excluded, BASWR is shown to have a relatively high rate of diversion as shown in the following figure.

Figure 5-7: Diversion of Blue Box Recyclables (Excluding Fibres)



At this time, the exact factors contributing to the relatively low diversion of fibres are unknown. However, possible reasons may be that residents in the BASWR service area are primarily in a rural residential setting and may receive less print media, such as flyers or newspapers, and that on-property burning of fibres is more common. Generally, it can be concluded that BASWR's recovery rates of plastics, glass and metals is relatively high and if less fibres are generated into the waste stream or are burned on-property, the recovery rate for fibres may also be high, even though the mass of fibres processed by BASWR is relatively low.

5.5 PERFORMANCE SUMMARY

In summary BASWR's recycling program is considered to be relatively cost efficient with net costs being below the municipal grouping. When considering collection costs separately, BASWR's are above average, but are considered to be very cost competitive given their relatively low population density. BASWR's processing costs alone are also slightly above average, but were offset by above average revenues for marketed materials recycled.

In terms of mass of materials marketed, BASWR is below the group average. Based on an analysis of material types diverted, BASWR was found to have a proportionately lower mass of fibres marketed relative to the municipal grouping. When fibres are excluded, BASWR is shown to have a relatively high rate of diversion. Possible reasons for the low diversion tonnage of fibres include: the service area may receive less print media, such as flyers or newspapers; and/or on-property burning of fibres is more common based on the rural nature of the service area.

6.0 EVALUATION OF OPERATIONAL/CONTRACT MODELS

This section of the report reviews the operational/contract model that BASWR currently employs in comparison to differing operational models currently utilized by other recycling programs. The purpose of this section is to determine if there are any cost/diversion rate advantages of one operational method over another.

6.1 OPERATIONAL METHODS

For the purposes of this report, the operational methods are broken down into three categories, as follows:

Comingled: Single stream collection and processing (no sorting at the curb).

Two Stream: Dual stream collection and processing (containers and fibres are separated at the curb).

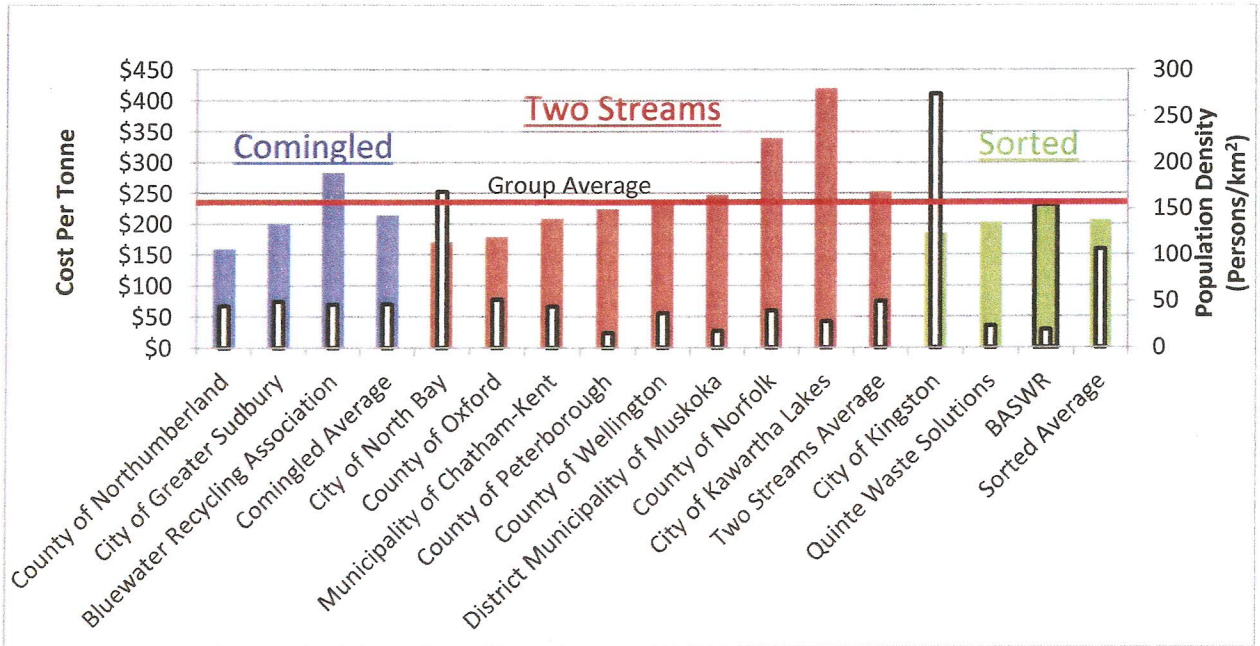
Sorted: Multiple stream collection and processing (plastic, metals, glass and fibres are separated at the curb).

The purpose of this comparison is to determine if there is a trend with regards to cost efficiencies and diversion tonnage associated with the operational methods. The analysis will evaluate collection costs, processing costs and revenue gained, similar to Section 5.0, but will be in comparison to the separate operational methods.

6.1.1 Collection

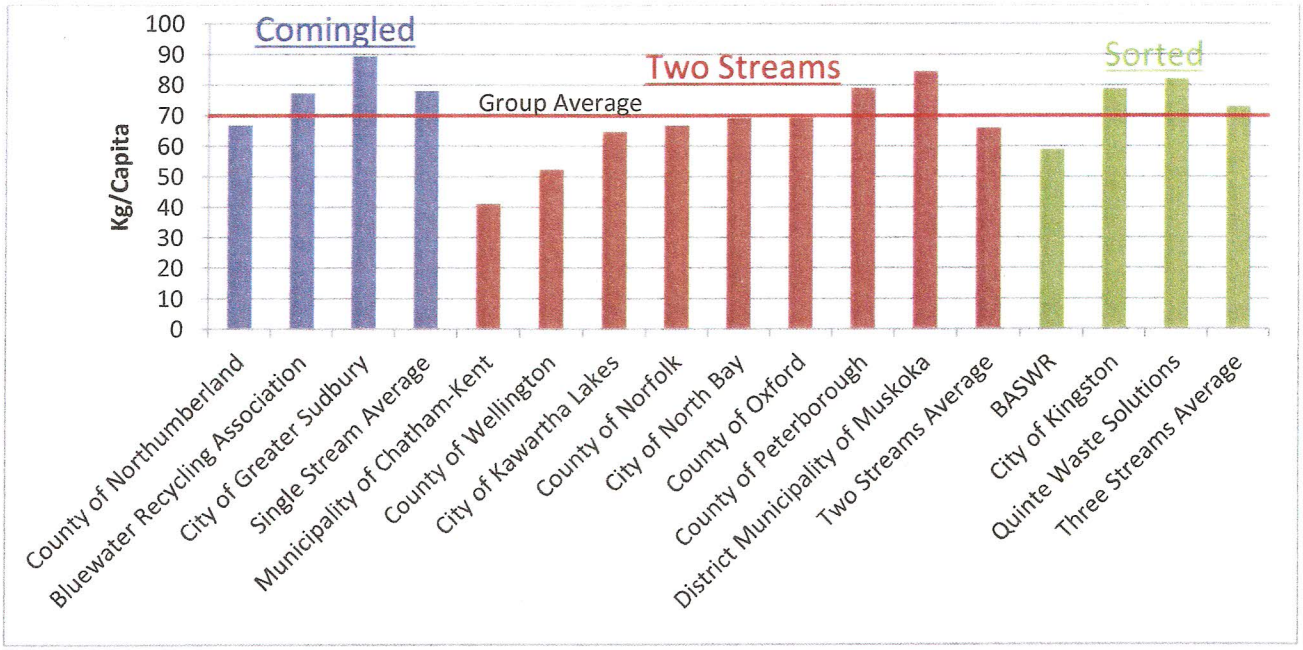
Presented in the following figure is a comparison of the collection costs for each recycling program within the municipal grouping and are categorized based on their operational methods.

Figure 6-1: Streams & Population Density vs Collection Costs



As shown in the previous figure, collection costs are relatively similar on average between the three different collection methods. In other words, there does not appear to be a cost advantage to comingled or two stream collection over sorted collection. To consider the mass of blue box material collected and diverted from disposal, a comparison has been completed between the operational methods and is presented in the following figure.

Figure 6-2: Streams vs Diversion Mass

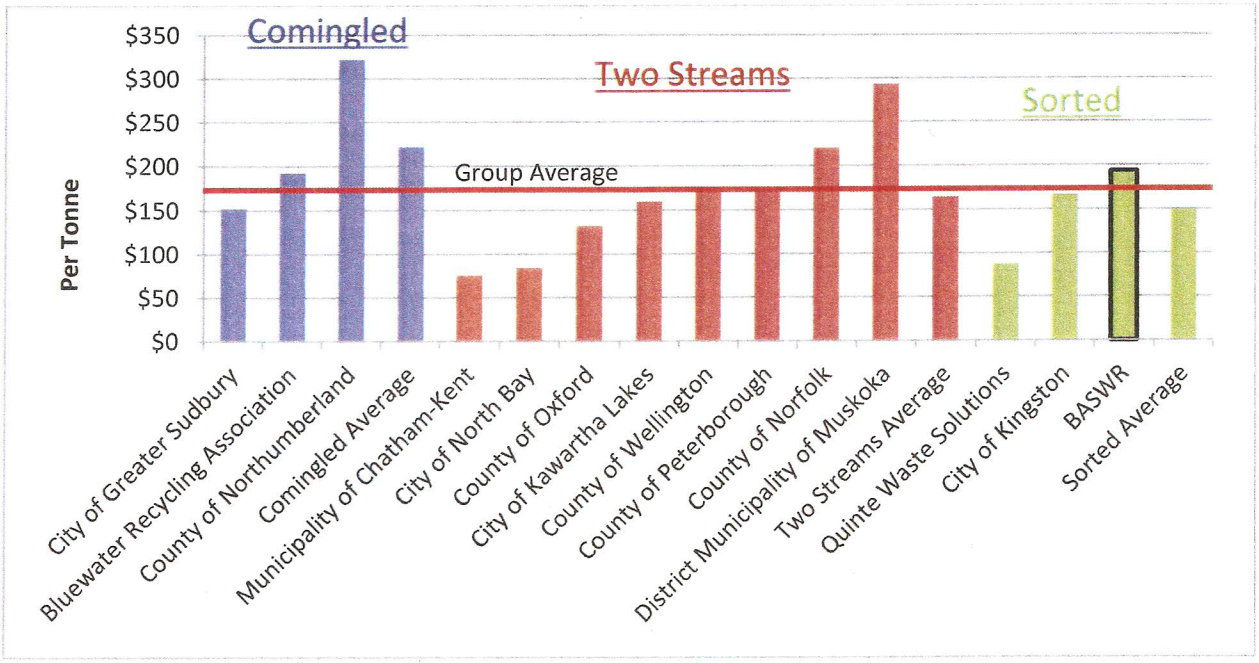


On average more blue box material is being captured through comingled collection. However, the difference is not considered to be significant, especially in comparison to sorted collection.

6.1.2 Processing and Revenue

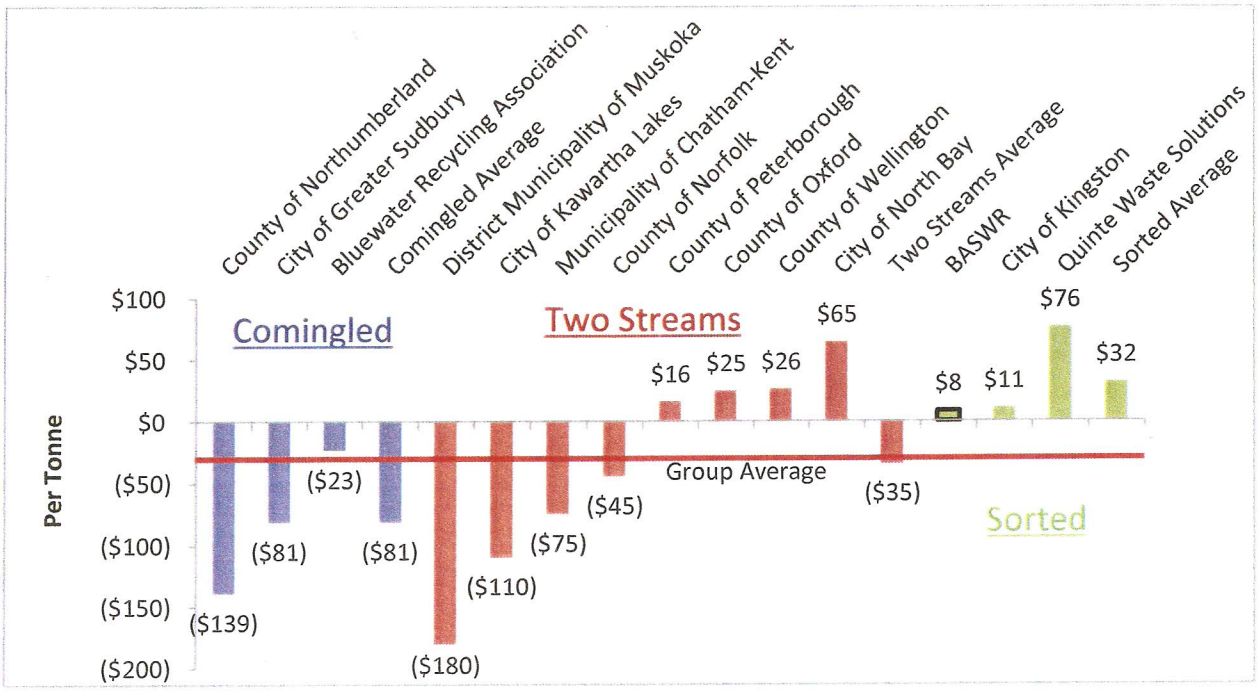
This section focuses on the processing costs and the resulting revenues from the materials marketed for each operational method. Presented in the following figure are the processing costs for each recycling program categorized under their associated operational method.

Figure 6-3: Streams vs Processing Costs



Based on this comparison, the processing costs for comingled operations are significantly more on average than the two stream or sorted operations. When considering the processing costs, revenues from marketed materials must also be considered, as revenues are dependent on the quality of the materials, which is largely dependent on the processing. Provided in the following figure are the net revenues after processing costs.

Figure 6-4: Streams vs Revenue after Processing Costs

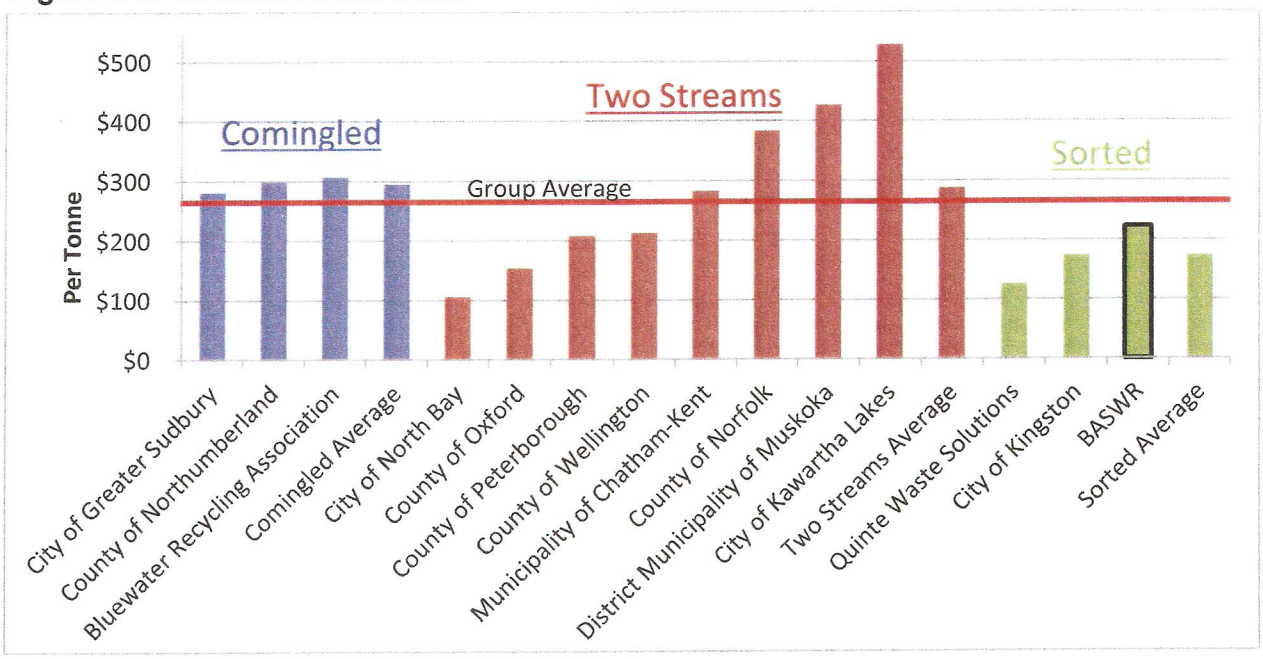


As shown in the figure above, the revenues gained from marketing of materials more than offset the processing costs of the recycling programs that use the sorted operational method with a net processing difference from comingled operations of over $100 per tonne on average.

6.1.3 Overall Net Costs

Presented in the following figure are the overall net costs, which include the collection costs, processing costs, and revenues gained from marketed materials.

Figure 6-5: Streams vs Net Costs

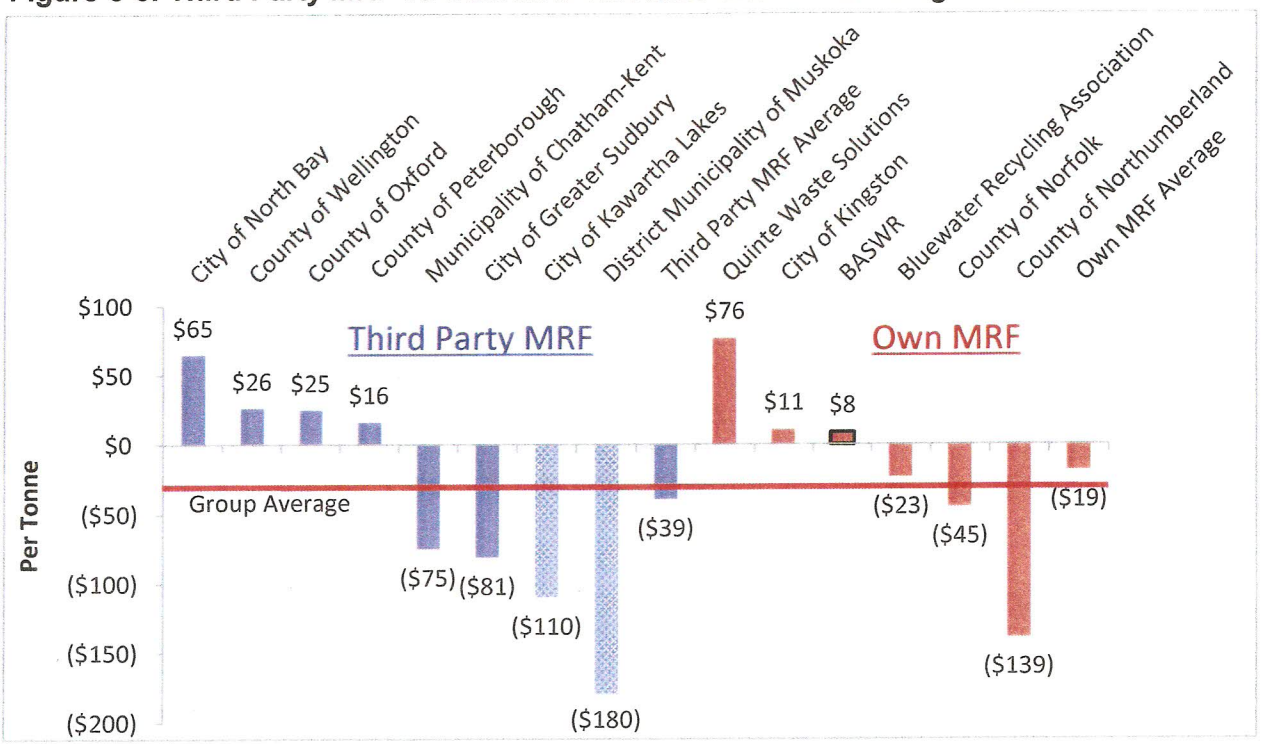


As shown in the previous figure, the total net costs of comingled operations are above the municipal grouping average and are over $100 per tonne more on average than sorted operations. Based on this analysis, it would appear that sorted operations are generally more cost efficient than comingled operations at this time.

6.2 CONTRACT MODEL

In this evaluation, the contract model refers to self-owned and operated MRFs or MRFs that are owned and operated by a third party (contracted by municipal organizations to process recyclables). Under BASWR's model, their MRF is owned and operated by BASWR. The purpose of this evaluation is to determine if there is a discernible cost benefit in processing costs/revenues between these two scenarios. Presented in the following figure are the net revenues after processing costs.

Figure 6-6: Third Party MRF vs Own MRF Revenue after Processing Costs



As shown above, the "Own MRF" scenario has processing costs exceeding revenues by $19 per tonne on average compared to $39 per tonne on average for the "Third Party MRF" scenario. Generally, there does not appear to be a discernible relationship between costs and MRF contracts alone. However, there may be a relationship in costs versus collection systems where blue box recyclables, collected at the curb, are stored intermittently at a transfer station prior to being transported to a MRF. This intermediate transfer stage is employed at the City of Kawartha Lakes and the District Municipality of Muskoka. The transfer stage may contribute to the higher overall processing costs experienced by the City of Kawartha Lakes and the District Municipality of Muskoka (as shown in Figure 6-6) due to the additional costs associated with the operation of the transfer station and transporting of the recyclables to a MRF.

6.2.1 Cost Comparison Scenario

Based on the cost and operational review completed above, it appears that sorted collection systems typically perform relatively well, and collection systems that use an intermediate transfer station with distant processing, have relatively poor cost performance. We believe this operational information provides relatively high certainty with respect to evaluating cost performance, as opposed to cost estimates, which are typically sensitive to individual component estimates and have the potential for exclusion of cost requirements. However, to provide additional certainty regarding the reported information and evaluation, a cost estimate has been completed where third party processing would be completed. Under this scenario, BASWR would operate a transfer station for intermittent storage of blue box recyclables collected at the curb before shipping to a third party MRF. This is due to the location of BASWR's service area and relative distance to other MRFs and markets.

To evaluate the potential costs that would be expected to be incurred from the use of a third party MRF, quotes for processing of recyclables and revenue sharing were received by third party MRFs and compared to BASWR's current processing costs and revenues. Based on the quotes received from available MRFs located nearest to BASWR (approximately two hour travel time), BASWR could expect to pay $90 to $110 per tonne in processing fees and could expect a return in revenue of around $100 per tonne depending on the current "basket rate" for blue box recyclables. This equates to a net expense of approximately $10 per tonne or a net revenue of approximately $10 per tonne, which is similar to BASWR's current net revenue of $8 per tonne after processing.

However, under this scenario, BASWR would also have additional expenses related to the operation of the transfer station and transporting of recyclables to a third party MRF, which would add to the costs already provided. Consequently, it is clear that a cost increase would be realized through switching to a transfer station with 3rd Party MRF. Further, there is no direct evidence that there would be a significant increase in recycled volumes that may off-set increased costs with saved landfill capacity. Therefore, it is evident that the current system offers a net cost advantage without conducting a more detailed review of individual system costs.

Lastly, additional benefits, with respect to the maintenance of the existing system versus switching to a third party processing model, include the value of local employment and cost security related to a self-operated MRF. As such, this additional analysis indicates that there is no net benefit to using a third party MRF, and is consistent with the operational review data for similar municipalities.

6.3 Summary of Findings

In summary, the sorted collection/processing method appears to be more cost efficient in comparison to both two stream and comingled methods. In general comingled was found to have significantly higher processing costs, with processing costs being higher than revenues from materials marketed in all cases. In contrast, the sorted method had lower processing costs with revenues for materials marketed exceeding processing costs. Based on a review of collection costs only, these were found to be similar between methods and did not equate to significant savings for the comingled method of collection. In terms of mass materials diverted on a per capita basis, the comingled method did have a higher mass of recyclables marketed per

capita. However, the difference in mass marketed is not considered to be significant, especially when considering the comparatively high cost of commingled recycling within the municipal groups compared.

When comparing contract models there does not appear to be a significant relationship between costs and MRF contracts. However, it is noted that there appears to be a relationship in costs versus contract where blue box recyclables, collected at the curb, are stored intermittently at a transfer station prior to being transported to a MRF. Where an intermittent transfer station is employed, the costs associated with the operation and transfer of the recyclables from the transfer station to a MRF appears to significantly increase the overall programs costs. This correlates with the cost comparison scenario completed in Section 6.2.1.

7.0 CONCLUSIONS AND RECOMMENDATIONS

The purpose of this Operations Review was to evaluate the efficiency of BASWR's current operations relative to other municipal programs and determine the applicability of converting BASWR's MRF into a transfer station for blue box recyclables for subsequent transport and processing at a third party MRF. Under such a scenario, it is our understanding the third party MRF would be a comingled processing facility.

This study evaluated BASWR's performance within their municipal grouping and compared program costs and diversion performance between collection/processing methods and contract models. To provide additional certainty, initial cost estimates were evaluated for a comingled collection system with BASWR's property to operate as a transfer station with off-site processing at a third party MRF.

Based on the findings of this review, BASWR's current method of collection, and operation of their own MRF, appears to be the most cost efficient model for the current service area at this time. Therefore, in the immediate future, it is recommended that BASWR maintain their operation model and the operation of their own MRF.

It is recommended that the findings of this report be reviewed and updated when:

- changes to the program are considered or when operational changes are required that have implications on the cost scenario (such as development of a new processing facility), or
- when regulatory changes have impact to the operational and/or recyclable market costs.

Respectfully submitted,

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