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Halifax Regional Municipality – Solid Waste Resources

Jurisdictional Review and Analysis of Cart Based Collection Programs for Garbage and Recyclables

Prepared by:

AECOM Canada Ltd.
1701 Hollis Street, SH400
Halifax, NS B3J 3M8
Canada

T: 902 428 2021
F: 902 428 2031
www.aecom.com

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Revision History

Rev #	Date	Revised By:	Revision Description
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04	2020-02-24	ND	Formatting Update

AECOM Canada Ltd.
1701 Hollis Street
Sarah Howard Building, Unit 400
Halifax, NS B3J 3M8
Canada

T: 902.428.2021
F: 902.428.2031
aecom.com

To:
Ms. Shannon Betts
Solid Waste Policy Analyst
Halifax Regional Municipality
PO Box 1749
Halifax, NS, B3J 3A5

Project name:
An Analysis of Cart Based Collection Systems for Garbage and Recyclables

Project ref:
60610308

From:
AECOM Canada Ltd.

Date:
February 24, 2020

REPORT – FINAL

Subject: An Analysis of Cart Based Collection Systems for Garbage and Recyclables

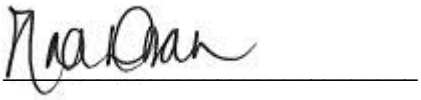
Dear Ms. Betts:

Please find attached our final report in relation to the analysis of cart-based collection systems for garbage and recyclables.

Please contact me at your earliest convenience if you have any questions.

Sincerely,

AECOM Canada Ltd.



Nora Doran, P.Geo.
Senior Project Manager, Environment
nora.doran@aecom.com

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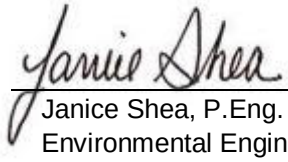
AECOM: 2015-04-13

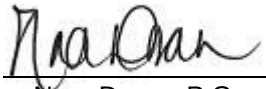
Authors

Report Prepared By:



Janice Shea, P.Eng.
Environmental Engineer, Environment

Report Prepared By:

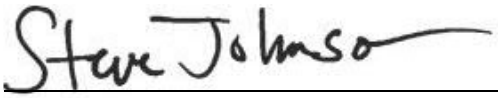


Nora Doran, P.Geo.
Senior Project Manager, Environment

Report Prepared By:

Arnold Paintsil, PhD. Candidate, EIT.
Environmental Engineer, Environment

Report Reviewed By:



Steve Johnson, M.Eng., P.Eng. (AB/BC/NS)
Waste Services Manager, Environment, Canada

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1. Introduction

At the request of Halifax Regional Municipality (HRM) Solid Waste Resources, AECOM Canada Ltd. (AECOM) completed a jurisdictional review and analysis of cart-based collection programs for residential garbage and recyclables in Canada, with the focus of determining the effectiveness of cart-based collection systems for garbage and recycling programs in reducing the use of single-use plastic bags.

The work was conducted by AECOM between July and September 2019 and involved a literature review of various solid waste resource publications and studies, an online review of waste collection programs of various Canadian cities and Municipalities, development of a draft survey and target list of Municipalities/ Cities, outreach and collection of survey responses, data analysis and reporting.

1.1 Background

As the largest municipality in Atlantic Canada, it is key for the HRM to show leadership for programs/policies to be used in the other regions. As per the Request for Proposals (RFP)[1], it is understood that:

- Nova Scotians are looking for ways to reduce their use of single-use plastics
- Halifax Regional Council (Council) is considering a ban on single-use plastic bags
- Council has requested a feasibility study on the use of bins (or carts) for collection and their effectiveness in potentially replacing single-use plastics.

With the recent (June 10, 2019) announcement[2] made by the Canadian Federal Government to reduce single-use plastics as early as 2021, this places even more impetus into evaluating cart solution for municipal solid waste collections within HRM. While the list of the banned items under this Federal initiative has not been fully developed or finalized, the results of this study should help inform municipal decision makers on municipal solid waste solutions that can be considered in conjunction with implementation of the Federal framework. Nova Scotia has since passed legislation[3] banning the use of single-use plastics (with some exemptions). The legislation was passed on September 26, 2019 and takes effect next year. Per the news article[4], the 1-year wait is to allow retailers and the public time to prepare.

1.1.1 Government of Canada, Strategy on Zero-Plastic Waste [5]

In an announcement made on June 10, 2019, the Government of Canada shared its strategy for the reduction of plastic waste. A summary of the news publication is provided below:

- Banning harmful single-use plastics as early as 2021: Specifics of the ban are yet to be determined but single-use plastics such as shopping bags, straws, cutlery etc. are being targeted.
- Extended Producer Responsibility (EPR): Ensuring that companies that manufacture plastic products or sell items with plastic packaging are responsible for the end-of-life management of these materials.
- Working with industry to prevent and retrieve abandoned, lost, or discarded fishing gear, known as ghost fishing gear – a major contributor to marine plastic debris

[1] *Halifax Regional Municipality (HRM) – Request for Professional Consulting Services; An analysis of Cart/Bin Based Collection Systems for Garbage and Recyclables, dated May 29, 2019.*

[2] *Canada to ban harmful single-use plastics and hold companies responsible for plastic waste. Available at: https://pm.gc.ca/en/news/news-releases/2019/06/10/canada-ban-harmful-single-use-plastics-and-hold-companies-responsible . Accessed 03/12/2019.*

[3] *Plastic bag reduction act: Available at: https://nslegislature.ca/legc/bills/63rd_2nd/1st_read/b113.htm. Accessed 03/12/2019*

[4] *Province to ban plastic bags. Available at: https://novascotia.ca/news/release/?id=20190926003 . Accessed 03/12/2019*

[5] *Government of Canada taking action to reduce plastic pollution. Available at: https://nslegislature.ca/legc/bills/63rd_2nd/1st_read/b113.htm. Accessed 03/12/2019*

- Investing in new Canadian technologies
- Mobilizing international support to address plastic pollution
- Reducing plastic waste from federal operations
- Reducing plastic microbeads in freshwater marine ecosystems
- Supporting community-led action and citizen-science activities
- Launching Canada's Plastics Science Agenda

1.2 Existing Conditions – Halifax Regional Municipality

The current garbage and recycling collection schedules for residential curbside collection within HRM are summarized below. Further details on the waste collection system, the type of materials collected and what goes where can be found on the Halifax website[6]. HRM contracts collection services for all waste streams (garbage, recyclables and organics) to private waste haulers on a 5-year basis.

1.2.1 Garbage Collection

Garbage is collected bi-weekly.

- Single Unit/Semi-detached/rowhouse/townhouse
  - 6-bag limit (1 dark, remaining must be clear)
  - Up to 5 bags can be substituted with C&D[7]
  - 1 bulky item
- Apartment buildings up to 6 units
  - 4-bag limit per unit (1 dark, remaining must be clear)
  - 2 bulky items total for the building
  - No C&D permitted

1.2.2 Recycling Collection

Recycling follows a 2-stream collection system and is collected weekly or bi-weekly depending on the area.

- Stream one (bag 1) captures containers and film plastics
- Stream two (bag 2) captures fibres and corrugated cardboard
- No bag limits

1.2.3 Organics Collection

Green cart organics, including leaf and yard waste, are collected on the opposite week from garbage, except in June through September when it is collected weekly. There is a 20-bag limit.

1.3 Study Objective

The purpose of the subject study is to investigate and evaluate different cart-based collection programs for garbage and recyclables in North America and to explore origin, function, cost models for carts vs bag-based as it relates to Halifax and Nova Scotia. This includes an assessment of the value proposition of HRM providing carts for collection in lieu of citizens purchasing garbage and recycling bags, and whether a shift to a cart-based system would provide financial and environmental benefits to HRM taxpayers.

[6] *Halifax Garbage, recycling and green cart collection schedule. Available at: https://www.halifax.ca/home-property/garbage-recycling-green-cart. Accessed 03/12/2019*

[7] *C&D refers to construction and demolition material*

2. Methodology

2.1 Literature Review

AECOM completed a literature review of any relevant content to cart vs bagged systems that were available through the Solid Waste Association of North America (SWANA), Ontario's Continuous Improvement Fund (CIF), Solid Waste Magazines (MSW Management journals, WasteAge 360), and Solid Waste Benchmarking Programs.

Some key questions presented by HRM at the onset of this study, relating to use of single-use plastic bags in the context of evaluating cart-based systems, are listed below. These questions helped shape the focus of AECOM's literature review.

- How many bags are used in bag-based programs?
- What does a typical household spend annually on garbage and recycling bags?
- What is the approximate cost range for the various carts issued to each eligible property?
- What is the plastic weight comparison of a cart compared to the bags it could replace?
- If bags are still used with the cart-based programs, what is the likely reduction in use of bags (as applicable)?
- What role does extended producer responsibility (EPR) play relative to collection of printed paper and packaged items? (i.e. identify if EPR is in place in the surveyed jurisdictions).

2.2 Survey

2.2.1 Survey Development

The AECOM project team initially developed a series of questions as a draft survey and submitted to the HRM Solid Waste Team for review and input. The draft survey included 44 questions in total. AECOM received feedback from HRM and proceeded with transitioning the survey into SurveyMonkey, an on-line cloud-based survey development tool. Once inputted into SurveyMonkey, some questions were modified for ease of reporting and analysis. A copy of the finalized survey is included in **Appendix A**. The finalized survey included 58 questions, in total. Where needed, the survey was also made available in a MS Excel spreadsheet format, as this was requested by a few respondents.

In addition to the online survey, a short-form survey with a reduced number of questions was constructed for those respondents that had limited availability and time to answer the online survey. This short-form included targeted questions that were of the greatest interest to the project. A copy of the short-form survey is also included in **Appendix A**. A letter of support from HRM was also included with the survey and a copy is included in **Appendix A**.

2.2.2 Targeted Cities and Municipalities for Surveying

At the onset of the project, there was a goal of receiving completed surveys from 15 to 20 cities or municipalities from across Canada. A target list of survey respondents was established using 1) the suggested list of cities included in the request for proposal document; 2) using AECOM contacts from participants of the National Solid Waste Benchmarking Initiative (NSWBI); 3) through on-line and telephone research of targeted communities who have recently converted to cart-based systems of comparative community size, based on industry information; and 4) contacts provided by HRM.

The target list of cities/ municipalities for inclusion in the survey is presented in **Table 2-1**, below. AECOM contacted all of the cities/ municipalities included in **Table 2-1** and requested their participation in the survey.

Table 2-1: List of Survey Participants Targeted for Survey Completion

Municipality	Cart Commentary		Population[8]	Responded to Survey
	Garbage	Recyclables		
Vancouver, BC	Cart	Boxes	631,486	Yes
Surrey, BC	Cart	Grey Cart Blue cover	517,887	No
Edmonton, AB	Bags	Bags	932,546	Yes*
Calgary, AB	Cart	Cart	1,414,000	Yes
Red Deer, AB	Black Cart	Blue Cart	100,418	No
Lethbridge, AB	Black Cart - bagged	Blue Cart	92,730	Yes
Strathmore, AB	Black Cart	blue bin service for monthly fee	13,756	No
Saskatoon, SK	Cart - uses bags inside cart	Cart	246,376	Yes
Regina, SK	Cart - bag or bundle all waste items	Cart - uses bag for shredded paper	214,631	No
Winnipeg, MB	Cart - may still use bags inside cart	Cart	735,600	Yes
Sault Ste. Marie, ON	Green garbage cart	Black cart, split-cart	73,368	No
Guelph, ON	Grey Cart	Blue Cart	131,794	No
Region of Peel, ON	Cart - recommends using bag inside	Cart or bag	1,380,000	Yes
Toronto, ON	Cart	Cart	2,730,000	Yes*
Ottawa, ON	Bags	Blue bins (recyclables), black bins (paper)	934,243	Yes*
Montreal, QC	Bag or can	Cart	1,700,000	Yes*
Fredericton, NB	Blue and grey recycle boxes on a voluntary basis	Bags	58,220	Yes
Saint John, NB	Bags	Blue Box (paper & cardboard), Green Box (plastic, metal & milk containers). Use bags only for plastic bags and shredded paper	67,575	No
Province of Prince Edward Island	Black Cart with/without clear plastic bags may be used	Bags	153,244	Yes
St. John's, NL	Cart but uses bags in cart	Bags	106,200	Yes

*denotes the city / municipality completed the short-form survey.

[8] *Population data is based on the Statistics Canada, 2016 Census Profiles for each city/municipalities. https://www12.statcan.gc.ca/census-recensement/2016/dp-pd/prof/index.cfm?Lang=E.*

2.2.3 Survey Approach

To distribute the survey, AECOM followed these steps:

- Phone ahead and confirm if the representative of each respective municipality would agree to participate by completing the survey; and
- Forwarded the survey to participants shortly after confirmation of the municipality's participation.

3. Literature Review

A literature review of applicable publications is presented below. References to these publications are provided in the footnotes.

3.1 Solid Waste Association of North America (SWANA)

3.1.1 City of Guelph: Automated Collection System (SWANA, 2016) [9]

The City of Guelph switched from a manual bag-based collection system to a fully automated cart-based collection system for the organics, recyclables and garbage streams. This transition lasted three (3) years, from 2012 to 2014. The new automated system allows the driver to pick up and empty carts using a control arm, as opposed to the manual system where the driver manually tossed waste into the trucks. Some main priorities they addressed with the new system were minimizing plastic bags, allowing residents weekly yard waste pick up, and to transition to industry best management practices.

Some of the highlights from this study that are most relevant to HRM are:

Implementation:

- During the implementation of the program, residents were allowed to select different sizes of carts to suit their individual needs (small 80 litres/21 gallons, medium 120 litres/32 gallons, large 240 litres/64 gallons and extra-large 360 litres/95 gallons).
- Residents and businesses were given three months to try out their new carts and could request a different cart size exchange at no cost. After this three-month trial period, a charge applied to exchanges.
- All carts have radio-frequency identification (RFID) tags attached that the City can use to monitor the carts. All collection vehicles have RFID readers, which have been employed to record the use of the carts since December 2012. In addition to the RFID readers, each truck is equipped with a GPS and cameras to enable drivers to verify collection of carts and routes.
- To assist residents with mobility issues, the City implemented a cart assistance program where collection staff bring the resident's carts to the curb for collection and then replace them on the property at the end of the collection day.

Operational Savings and Performance:

- A survey of Guelph households revealed 80% of residents using waste carts were satisfied with the City's automated collection system when compared to the previous system.
- The program successfully reduced the collection fleet by four trucks which resulted in operational savings of over $460,000 per year through reduced capital replacement costs, maintenance, fuel costs, and injury and labour costs.
- Reduced Workplace Safety and Insurance Board claims by 95%.
- Reduced replacement labor costs (sick time, injuries, etc.) by 72%.

[9] *Full report available at: https://swana.org/Portals/0/awards/2016/winners/CityofGuelph_CollectionSystem.pdf. Accessed 04/12/2019*

3.1.2 Implementing PAYT in Large Cities with Existing Automated Collection Systems (SWANA,2016) [10]:

The following conclusions are offered regarding the implementation of Pay-As-You-Throw (PAYT) in large U.S. cities based on this limited investigation:

- To implement PAYT programs, over 75% of the large cities surveyed in a recent study chose to use containers of varying volumes – rather than bags or stickers – to provide the pricing incentives.
- Two thirds of the cities with PAYT programs reported that illegal dumping was a problem of medium to high importance.
- The costs of waste disposal represent 24% of the total costs of waste collection and disposal for single family residents in Charlotte, North Carolina. Therefore, if the City were to implement a PAYT program and 50% of additional residential waste was diverted from disposal as a result, the city could expect to save $0.92 per household per month – or $2.35 million per year in disposal costs. These potential costs savings would be offset by the costs of administration and enforcement of the PAYT program as well as any additional costs (such as the requirement to purchase special plastic bags for waste disposal by the residents and the costs of illegal dumping cleanup).
- If the city of Charlotte were to implement a PAYT program, it is likely that the frequency of recyclables collection would have to be increased from a bi-weekly to weekly basis. If this is the case, any savings achieved in disposal costs would be more than offset by increased collection costs.

3.2 Ontario's Continuous Improvement Fund (CIF)[11]

The Continuous Improvement Fund (CIF) is a partnership between various producer associations and municipalities across Ontario whose combined goal is to help develop and improve the efficiency and effectiveness of its recycling and waste practices across all Ontario and create a more uniform method for the province. Since it's formation in 2008, the CIF has funded over 734 waste and recycling projects to continue initiatives and the growth of waste reduction in Ontario.

3.2.1 Blue Box Program

Since 2002, municipal recycling collection programs in Ontario (collectively referred to as 'Blue Box Programs') are funded through an Extended Producer Responsibility (EPR) agreement with Stewardship Ontario, a member of CIF.

Stewardship Ontario drives initiatives to expand materials accepted in the 'Blue Box' program and to close the recycling loop by transforming more recycled materials into new products in Ontario. This has led to new jobs, lowered the cost of recycling, and reduced carbon emissions.

As of August 2019, the Minister of the Environment, Conservation and Parks has directed the Resource Productivity and Recovery Authority (RPRA) and Stewardship Ontario to begin to transition the management of Ontario's Blue Box Program to producers of plastic and other packaging. Further reading on this subject is available on the RPRA blue box transition website[12].

3.2.2 Automated Cart Recycling: A Study of Municipal Collection and Operations in Ontario (CIF, 2016)[13]

A study was completed for various Ontario municipalities with the goal of exploring topics surrounding the implementation of automated cart collection systems and whether its costs were balanced out by main benefits,

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[10] *Technical Memo presented by Jeremy O'Brien (SWANA, 2016). Available for download to SWANA members.*
[11] *https://thecif.ca/*
[12] *RPRA blue box transition. Available at: https://rpra.ca/programs/blue-box/blue-box-transition/. Accessed on: 08/12/2019*
[13] *Available for download at: https://thecif.ca/projects/documents/888-Autocarts_Study_FINAL.pdf. Accessed 04/12/2019*

such as improved collection frequency, reduced claims and cost associated with workers health and safety, and increased participation and diversion.

The report provided an overview on issues and situations that municipalities may wish to consider while evaluating the implementation of an auto-cart system. Information and data regarding the automated cart programs were obtained by using the following approach: a municipal survey, a literature review, and Waste Diversion Ontario (WDO) data-call information.

Below is a summary of the findings of the study:

Benefits

Higher collection efficiency:

- On average, collection costs were 15% less for single stream recycling carts compared to manual single stream collection;
- Research suggests that in respect to stops per hour, automated collection is up to 125% more efficient;
- A reduction in collection staff and fleet requirements can occur with co-collection with garbage and/or organics.

Lower labour cost:

- 60-90% reduction in lower labour injuries and WSIB costs due to a reduction in physical activity for collection staff;
- Automated cart collection can allow for a more diverse workforce (i.e. gender, age, physical ability).

Improved participation and strong residential support:

- This study showed that in six (6) out of seven (7) programs, marketed recycling rates improved between 1-3%;
- It was noted that residents appreciated ease of use, increased home storage capacity, and convenience, which in turn showed an increase in capture of recyclables.
- In this study, surveys in four (4) municipalities suggested that 80% of the residents supported the auto-cart program, post program implementation.

Reduced complaints:

- Reduction in odour, leakage, litter and improved resistance to animals and wind, due to the use of carts, helped to reduce the number of complaints from residents.

Challenges

Higher capital expenditures:

- Costs associated include: purchase of carts (range between $40-$60 /household plus ~$3-$5 in deployment costs), enhanced promotion and education ($3.50-$5 /household), replacement of carts (roughly 1-3% are replaced annually at $65-100 per cart – most municipalities have implemented $21-$35 charge for replacing bins), additional facilities and infrastructure may be required to store and maintain inventory.

High collection truck costs:

- When compared to an over-top recycling truck, the side-loading automated trucks are ~30% more in cost.

Higher residue rates and processing costs:

- Minimum increase of ~5-6% in residue rates for auto-cart programs when compared to single stream;
- ~27% more in processing costs for auto-cart programs when compared to single stream programs.

Changes in recycling materials:

- Due to light weighting and packaging changes volume of Blue Box materials (without compaction or adding materials) are estimated to increase 6%.

3.2.3 Region of Peel: Cart based collection (Peel, 2016)[14]

The region of Peel conducted a pilot study in 2012 to measure the impact of switching from a bag based manual collection system to a cart-based system. The pilot tested bi-weekly garbage and recycling collection on an alternating collection schedule under a four-bag and three-bag bi-weekly garbage limit system, and a bi-weekly, cart-based garbage and recycling collection system, all with weekly organics collection. Based on the findings of the study, the City decided to implement a cart-based system in 2016. Over 80 per cent of participants in the cart pilot programs said they were satisfied with bi-weekly collection. Results also showed that participation in the Region's recycling and organics programs increased and less garbage was being sent to landfill.

The main reasons cited for switching to the bi-weekly cart-based waste collection program was:

- Reduction in the amount of waste sent to the landfill
- Reduction in annual waste collection fees
- Reduction in GHG emissions with fewer collection vehicles on the road
- Reduction n work-related injuries to workers
- Optimal time to change service level, because it allowed for competitive procurement process

The successes and challenges of the program as well as the changes in technology and equipment that was required are summarised below.

- Changes in technology and equipment
    - Switch from manual collection vehicles to automated collection vehicles with GPS
    - Use of Radio Frequency Identification (RFID) for improved asset control and management
    - ANSI compliant garbage, recycling and organic carts

- Successes
    - Increased participation
        - Carts with wheels make it easier to transport waste
        - Lids on carts prevent windblown litter and keep the neighborhoods cleaner
        - Organics carts were fitted with a lock that prevented animal intrusion
        - Carts increase capacity of waste that can be disposed off, making it possible to lengthen collection schedule.
- Challenges
    - The challenges that were encountered in the planning and implementation phase include;
    - Tight timelines to procure carts. It takes time for the municipality to secure a vendor and for the vendor to manufacture and deliver the carts.
    - Public awareness of the program changes and cart selections
    - Public acceptance of changes (switch in collection schedule and switch from bags to carts)

[14] *Taken from 2016 SWANA Collection Excellence Award Entry. Available at: https://swana.org/Portals/0/awards/2016/winners/RegionofPeel_CollectionSystem.pdf. Accessed on: 08/12/2019*

3.2.4 Sault Ste. Marie and GFL Celebrate Five Successful Years of Split-Body Cart Recycling (CIF, 2018)[15,16]

The CIF supported the rollout of split-body carts for curbside collection in Sault Ste. Marie and neighboring Prince Township.

The benefits that were realized from using these split-body carts include:

- A dramatic reduction in windblown litter on collection days;
- Ample space for lightweight containers;
- Ability to place folded and bundled cardboard beside the cart;
- Low contamination levels compared to single stream recycling carts;
- Higher diversion rates than other collection methods;
- Permanent clear instructions on the lids; and
- No need to set out every week if not full.

Photo 1 – View of a split-body cart from Sault Ste. Marie, Ontario

Negative perceptions reportedly included:

- The weight and awkward handling of the cart for some residents;
- The space required to store the cart; and
- The difficulty of placing cardboard in the cart.

The following observations were made for a 2018 waste composition study[15] prepared by AET Group Inc. for the CIF, conducted on 100 households:

- The average contamination level was found to be under 13% at the curb;
- 1% cross-contamination at the curb and 2.7% cross-contamination post-collection;
- Likely cardboard jamming. Required that cardboards be bundled or cut up; and
- Waste diversion rates increased from 25% in 2013 to 70% in 2014 and averaged 66% for 2015/16.

According to the CIF, after five years' experience Sault Ste. Marie and GFL are both satisfied with the move to split-body 95-gallon recycling carts. While this may not be viable solution for every municipality, it has proven to be a very effective alternative collection method that can be applied in both large and small communities.

3.3 Additional Sources of Information

3.3.1 Thinking "Beyond the Box" – an examination of collection mediums for printed paper and packaging waste (Lakhan, 2018)[17]

A study was completed on jurisdictions across North America surrounding the economics and environmental impacts of bag-based programs, including a comparison with cart-based and box-based programs. The scope

[15] *Article available at: https://thecif.ca/sault-ste-marie-and-gfl-celebrate-5-successful-years-with-split-body-cart-recycling/. Accessed on: 04/12/2019*

[16] *Report available for download at: https://thecif.ca/wp-content/uploads/2018/07/786-SSM_Final_Report.pdf. Accessed on: 04/12/2019*

[17] *Available at: https://resource-recycling.com/recycling/wp-content/uploads/sites/3/2018/06/York-University-Beyond-the-Box-Study-final-1.pdf. Accessed on: 05/12/2019*

of the study included a literature review from jurisdictions across North America, a description of the materials and methods for the jurisdictional review and analysis, a discussion on the economics and environmental impacts of bag-based programs in comparison to cart and bin-based programs, reporting on the survey results of interviews with recycling system operators and finally report conclusions and recommendations.

Relevant to the subject study on behalf of HRM as it relates to cart and bag-based programs, the following pros/ cons and general findings from the Lakhan, 2018 study are presented, as they relate to car and bag-based systems. Discussion relating to box-based programs have been omitted as they are beyond the scope of this report.

Bag based collection system:

Pros:
- Items are enclosed and protected from the elements.
- Increased capacity; unlimited recycling.
- Potential to reduce contamination.
- Easier for residents and collectors to handle.
- Eliminates blue box/cart distribution and replacement costs incurred by municipalities.
- Lower collection cost compared to boxes/carts
- Easier to screen for contaminants

Cons:
- Ongoing cost to residents
- Bags can break and tear.
- Potential for processing and collection efficiencies.
- Plastic bags may not be recyclable and create waste.
- Potential safety risks (broken glass, needles).

Cart based collection system:

Pros:
- One-time cost
- Materials are protected from elements/animals.
- Larger capacity.
- Option for automated and semi-automated collection.
- Option for RFID systems.
- 10-year lifespan on average
- Can be stored longer between collections

Cons:
- Capital investment required.
- Large storage requirements.
- Can be difficult for seniors/those with disabilities to handle
- Increased contamination rates where carts used for recycling
- Municipalities require a repair yard
- Reinvestment is needed for replacement of carts
- Stolen carts.

Some conclusions from the study related to bag-based collection systems were as follows:

- In the short term, recycling bags are a convenient and low-cost option for households to add additional recycling capacity at the curbside. The incremental cost of purchasing recycling bags is nominal (as households can purchase these bags at the grocery store) and can be placed at the curbside on a discretionary basis.
- Cost of purchasing additional bags is lower than the cost of purchasing carts. In a case where a household wants to add additional recycling capacity at the curb, they will have to purchase additional carts, regardless of whether it is needed every week. Recycling bags can be purchased on an “as needed” basis for lesser.
- Clear bags (as opposed to opaque carts) discourage willful contamination of waste because of normative pressures. People don’t want to be seen as not participating in an environmentally beneficial activity such as recycling, and thus, are incented (or coerced) to correctly sort recyclables

4. Results - Survey

The results of the survey are presented in this section. Copies of the individual responses for each of the long-form and short-form respondents is included in **Appendix B**. Contact information and the city/ municipality names for each respondent has also been omitted. Question by question summaries, as generated by SurveyMonkey™ for the long-form questionnaire only, are included in **Appendix C.**

4.1 Survey Response

Introductory telephone calls were made to target survey respondents, in advance of sending out the surveys by email. These phone calls were initiated on August 18, 2019 and progressed throughout the survey period. Once a survey respondent was identified, or contact information was established, a follow up email was sent out, along with a link to the SurveyMonkey survey. A letter of support from HRM was also included in the information package sent to target municipalities. Requests for survey participation were emailed between August 23, 2019 and September 17, 2019.

A survey completion rate of 65% was achieved for the survey with responses received from thirteen (13) of twenty (20) target respondents. Nine (9) of the thirteen (13) survey participants completed the 58-question survey on-line facilitated using SurveyMonkey™ software, while four (4) respondents answered a modified short-form version of the survey with responses to twenty-five (25) questions post completion of the 58-question survey. A summary of the municipalities that responded to either survey forms is presented in **Table 4-1.**

4.2 Survey Respondents Profile Summaries

Interpretation of survey results requires an understanding of the waste collection and material-stream context of each of the survey respondents. In some cases, the cities/municipalities surveyed may only use carts for one of the waste streams (i.e. garbage only), whereas others may use carts for all three (3) waste streams, garbage, recyclables and organics. It should be noted that while information was gathered from survey respondents regarding all three (3) waste streams, for the purpose of this report, analysis and reporting is focused to garbage and recycling waste streams only.

The survey respondents represented cities/municipalities that provide curbside waste collection to residential households ranging in size from 24,000 to 338,000 residential households. For comparison purposes, Halifax Regional Municipality services 147,967 residential households with curbside waste collection.

Table 4-1 below presents a summary of the profiles of all thirteen (13) survey respondents, including both short-form and long-form respondents, in the context of the cart-based programs they offer and whether single-use plastic bags are permitted within each cart-based program. Additional information including the number of residential households served and the years experience with carts, are also included by respondent.

Six (6) of thirteen (13) survey respondents operate cart-based garbage and single-stream recycling programs. Years experience with cart-based programs ranged from 1-2 years (St. Johns) to 24 years (Prince Edward Island).

Table 4-1: Summary of Cart-Based Programs by City/Municipality Surveyed

City/Municipality	Survey Response Type	Number of Residential Households	Years' Experience with Carts (inception date)	*Recycling Program*	*Permit bags to contain loose material within Carts*	
				(Single or Multi Stream)	Garbage Cart Program	Recycling Cart Program
Toronto, ON	Short Form	450,000	11 years (2008)	Single	Optional	Prohibited (except for shredded paper)
Edmonton, AB		8,000 (pilot)	< 1 year	Single	Optional	N/A - Bag-based program
Montreal, QC		858,054	6-8 years (2010-2012) for recycling	Single	Optional	Optional
Ottawa, ON		250,000	7 years (2012) for organics program	Multi	Optional	Prohibited
Lethbridge, AB	Long Form	35,000	13 years (2006)	Single	Mandatory	Prohibited
Calgary, AB		330,000	10 years (2009)	Single	Optional	Prohibited
Saskatoon, SK		69,700[18]	Information Not Available	Single	Mandatory	Prohibited
Winnipeg, MB		203,000	9 years (2010) for a portion of the city for garbage; 7 years (2012) for the rest of the city for garbage and recycling	Single	Optional	Prohibited
Region of Peel, ON		338,000	3 years (2016)	Single	Optional	Optional
Vancouver, BC		116,900	14 years (2005)	Multi	Optional	Prohibited
Fredericton, NB		24,000	18 years (2001) Box-based program	Multi	N/A – Bag based program	Optional
Prince Edward Island		74,611	24 years (1995) Pilot Program; 16 years (2003) Province wide	Multi	Prohibited	N/A – Bag based program
St. John's, NL		48,000	1-2 years (2018 and 2019)	Multi	Optional	N/A – Bag based program

** Recycling collection in City of Vancouver is provided by Recycle BC as the industry steward. The boxes and bag are left at the curb after each collection.

[18] *Source:* https://www.saskatoon.ca/sites/default/files/documents/corporate-performance/environmental-corporate-initiatives/2017_integrated_waste_management_report.pdf

In summary, for the garbage waste stream, there are twelve (12) cities/ municipalities of the total thirteen (13) surveyed, that use carts for garbage collection. The survey results indicated the use of single-use plastic bags to contain loose material in garbage carts is:

- mandatory for two (2) jurisdictions;
- optional for nine (9) jurisdictions; and,
- prohibited for one (1) jurisdiction.

In summary, for the recycling waste stream, there are ten (10) cities/ municipalities of the total thirteen (13) surveyed, that use carts for recycling program collection. The survey results indicated the use of single-use plastic bags to contain loose material in recycling carts is as follows:

- optional for three (3) jurisdictions; and,
- prohibited for seven (7) jurisdictions.

Of the jurisdictions that use carts for recycling collection, all locations have single-stream recycling programs. Those jurisdictions with multi-stream recycling programs either used bags or boxes to facilitate collections.

4.3 Review of Long-Form Survey Data

4.3.1 Cart Sizes by Waste Stream

When asked of the sizes of the carts used for each of the waste streams, responses compiled for the) jurisdictions that completed the long-form survey, were as follows:

- Recycling: the 240 L capacity cart was the most common size for recycling with four (4) of six (6) respondents offering the 240 L size cart. The 360 L size is the next popular size with three (3) of six (6) respondents offering this size. The majority of respondents provided a range of sizes to households. The range of sizes that were available including:
    - 120 L, 240 L, 360 L;
    - 240 L or 360 L; and
    - 240 L, 360 L, two 240 L, or 240 L and 360 L.

Photo 2 – Photo showing range of cart sizes. From left to right: 360 L, 240 L, 180 L, 120 L, 80 L. Source: City of Surrey, BC

The remaining respondents that indicated only one size of recycling cart was available, most commonly the 240 L size. **Photo 2** is shown for illustration purposes to demonstrate visually the range of sizes of carts from 80 L to 360 L.

- Garbage: the 240 L capacity cart was the most common size for garbage with seven (7) of seven (7) respondents offering the 240 L size cart. Similar to the recycling carts, the 360 L size is the next popular size with four (4) of the seven (7) respondents also offering the 360 L cart, in addition to the 240 L cart. For three (3) of seven (7) respondents, the 240 L size cart was the only size available to residential households, whereas a range of sizes was made available for residents in the remaining municipalities. The ranges/ options available can be summarized as follows:

- 75 L, 120 L, 180 L, 240 L, 360 L;
- 120 L, 240 L, 360 L;
- 240 L, 360 L;
- 240 L, 360 L, two 240 L, or a 240 L and 360 L; and,
- 95 gal, with 65 gal on request. (i.e. 120 L and 240 L)

- Organics: a reduced number of survey respondents indicated they used carts for organics collection, as compared to responses for garbage and recycling, with only five (5) respondents indicating carts are provided for organics collection. One (1) respondent indicated a range of sizes are made available to residential households, with sizes of 75 L, 120 L, 180 L, 240 L and 360L, whereas the remaining four (4) respondents indicated only one size is available. Three (3) of the remaining four (4) respondents indicated the 240L size is available, with one respondent indicating a 100 L cart is available.

- It should be noted that with organic waste, cart size is typically driven by the amount of yard waste permitted in the program, and not just food waste. During the winter months, yard waste is relatively small compared to the Fall and Spring months. Leaf and yard waste require the larger containers.

4.3.2 Single Stream versus Multi-Stream Recycling

For recycling programs specifically, four (4) of nine (9) respondents (44%) indicated they operate a single-stream recycling program and five (5) of nine (9) respondents (56%) operate multi-stream programs. Single-stream recycling represents the collection of recyclables all in one container (cart/box/bag), whereas multi-stream recycling refers to the process of sorting recyclables by material type before collection.

HRM operates a multi-stream recycling program where containers and plastics are sorted by the resident, placed at the curb, and collected, separately from the paper and fibre recycling stream.

4.3.3 Factors in Decisions for Using a Cart Based Collection System

Survey Question No. 7, asked respondents to identify and rank the influencing factors in their decision to implement a cart-based collection system for the following options:

- By public or Council request;
- To reduce collection costs;
- For worker Safety;
- Best Management Practices; and
- To reduce the use of plastic bags.

Figure 1 shows the results captured from the nine (9) survey respondents. The top three (3) factors presented in order of rankings included 1) worker safety (4.2 ranking score); 2) best management practices (3.9 ranking score) and 3) to reduce collection costs (3.3 ranking score). With regards to the reduction of single-use plastics, six (6) of the nine (9) cities/municipalities surveyed indicated this was the least important factor which influenced their decision to switch to a cart-based collection system.

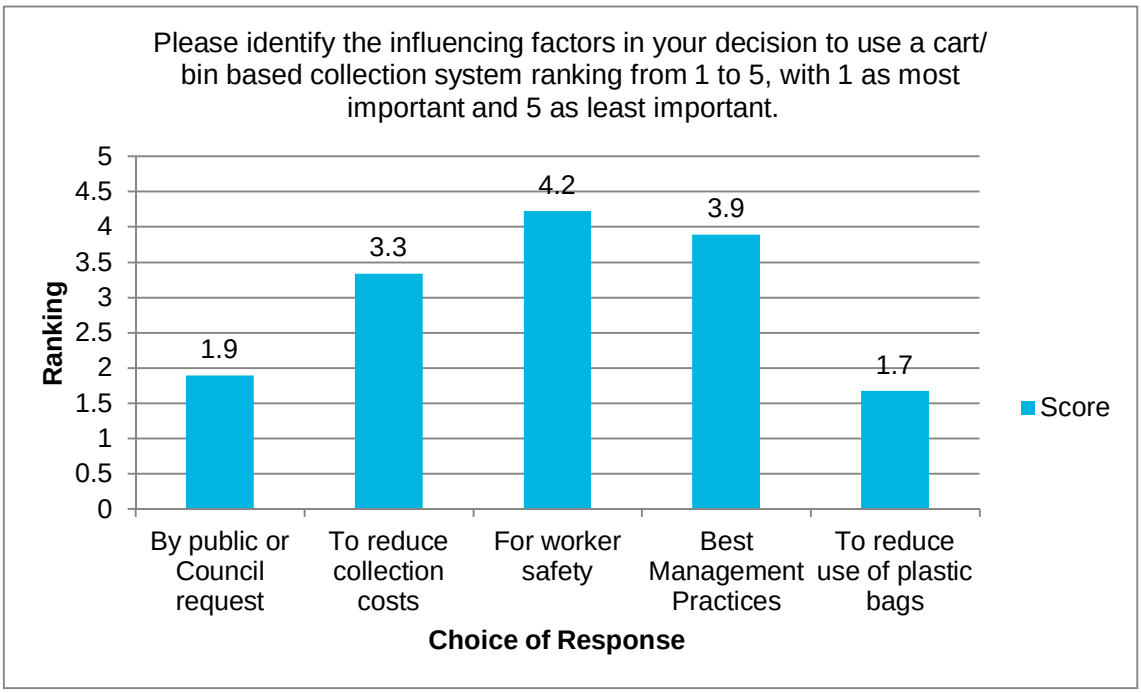

Figure 1: Influencing Factors for Switching to Cart/Bin Based Systems

Respondents were also provided with an option to share additional, open-ended feedback for additional factors which influenced their decision to convert to a cart-based collection system. This feedback was captured as a separate question (Question No. 8). Other influencing factors shared by survey respondents in the decision to use a cart-based collection, included the following:

- Occupational Health & Safety Regulations
- Reduce Greenhouse Gas Emissions
- Ability to track driver productivity and number of households serviced on a daily basis. We can now collect data that we couldn't before.
- Reduction in litter from bags being torn open by birds.
- Windy weather and to control litter with crows and other animals etc.
- Reduce waste generated by households and increase accountability. Reduce fires, overfilling, and other misuse of (old system) shared 300-gallon containers in back lanes.

One respondent indicated it was difficult to rank this information since the changeover to carts started a decade ago and the motivations beyond the public reports aren't known.

4.3.4 Waste Diversion

Waste diversion rates reported by the nine (9) survey respondents ranged from 12% to 63%, with an arithmetic average (mean) diversion rate of 40%.

When asked if the city's/ municipality's waste diversion rate changed with the introduction of carts (Question 11), seven (7) of nine (9) respondents of the respondents said yes, with the remaining two (2) respondents (22%) answering they don't know. Comments provided by the respondents are as follows:

- The diversion rate increased due to the change to bi-weekly collection of garbage and recycling. Organics remained weekly, thus pushing more resident to participate in the organics program.

- Received slightly more garbage in the years following transition from bags to carts. The city accepts unlimited excess waste, which may have been a factor. Significantly more recycling tonnages when supplementing community depots with cart collection.
- Introduction of carts was accompanied with significant other programs, so it is difficult to isolate the effects of the carts.
- Our recycling program is currently voluntary. We noticed an increase in recycling immediately after implementing automated garbage collection. With the introduction of automated garbage collection, we went from a 10-bag weekly limit, to whatever could fit in a 240 L cart. Because of this, residents were almost forced to start recycling so they could fit all their garbage into a 240 L cart. Number of recycling bags collected per week is unlimited.
- Unable to find documentation of diversion rates or waste characterizations from the early 90s.

4.3.5 Contamination rates

The reported contamination rate in the recycling stream ranged from less than 2% to approximately 20%, with the majority of the response in the 10-18% range. When asked how this metric was calculated, 56% of the respondents selected MRF residuals, and the remaining answers were a tie between waste collection audit and "other". No comments were provided.

When asked if the recycling contamination rate improved when the cart-based program was implemented (Question 14), the majority of the survey respondents indicated they did not know. Otherwise, three (3) survey respondents agreed that recycling contamination rates improved, while another three (3) respondents indicated they did not improve. Some comments made by the respondents were as follows:

- The contamination rate increased significantly. Resident's formerly used blue boxes.
- With larger carts, some residents began to place recyclables in plastic shopping bags and also other non-recyclables were easier to place in the carts without detection.
- Enforcement is much more difficult at the curb with automated cart.
- Noticed our recycling depots have had a higher contamination rate and after the introduction of the curbside recycling program, contamination has decreased.
- Changes to MRF auditing protocol and markets also took place, so it is hard to isolate effect of carts on contamination.

4.3.6 Procurement / Implementation

When asked if carts for multiple waste streams (garbage, recyclables, organics) were purchased at the same time or separately (Question 15) four (4) respondents answered that they purchased them individually, and three (3) respondents purchased them all at once. The following comments were made by the respondents:

- We only purchased carts for garbage. Recycling and yard waste will remain manual collection.
- Waste carts were in place long before the recycling program (with carts) was implemented in 2013. Organics cart collections started in the mid-2000s.

4.4 Collection System Based Questions

4.4.1 Type of Collection System

Survey Question 16 asked respondents if they have a manual or automated materials collection system and if automated to indicate the type. The following definitions were provided to the survey respondents to help clarify between the different collection systems:

- **Manual loading**: all material is manually loaded by hand into the truck.

- **Semi-automated loading**: mechanical unloading, along with manual loading.
- **Fully automated loading**: all unloading is done mechanically with the driver using a joystick. In this case, the driver does not leave the cab.

As shown in **Figure 2,** the majority (66.7%) of survey respondents (6 of 9), have fully automated collection systems (**Photo 3**). Two (2) of the total nine (9) survey respondents (22.2%) indicated they use semi-automated materials collection system with mechanical unloading, along manual unloading, and one (1) respondent (11.1%) indicated the collection involved all manual loading.

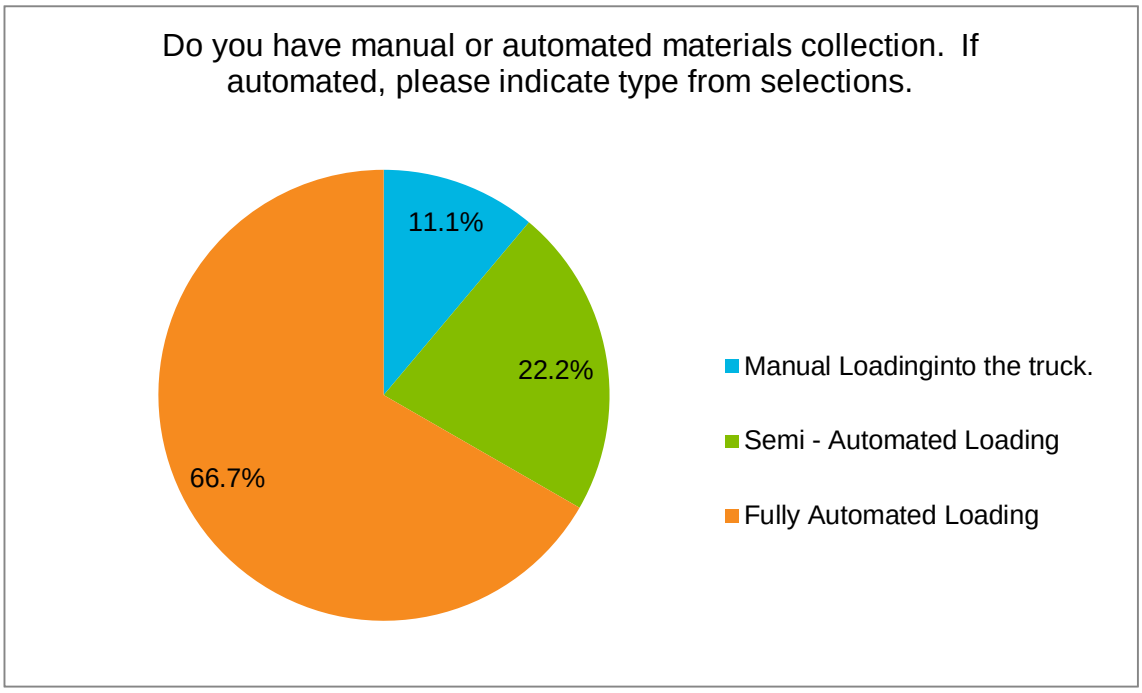

Figure 2: Plot of Materials Collection System Type for Survey Respondents

Photo 3 – Photo of a fully automated cart-based waste collection truck from the City of Guelph. Source: Guelph Mercury file photo

Some comments provided by the respondents were as follows:

- Mix of semi-Automated and Fully Automated - Majority is Fully Automated, but certain routes are not able to accommodate Fully Automated Trucks.
- Some collection is done manually (excess recycling, organics carts, yard waste, bulky items).
- Fully automated except for excess for garbage and organics, where the driver is required to leave the cab and load the excess materials into the cart for a second tip.
- Areas with tighter back lanes have semi-automated rear loaders.
- There are some exceptions. Some one-way streets utilize a cart tipper, which is semi-automated since driver has to get out of truck. Also, a small section of the City in the downtown core will remain full manual collection due to difficulty with issuing carts (density, on-street parking, row-housing with nowhere to store cart).
- Manual loading with cart lifter to lift and empty cart into truck.

4.4.2 Collection Frequencies

Figure 3, **Figure 4** and **Figure 5**, each present the collection frequencies shared by survey respondents, for each of garbage, recycling and organics. The collection frequency for garbage is mainly on a bi-weekly basis (56%). One respondent noted that it is weekly in the summer months and bi-weekly in the winter. Another respondent noted that the collection changed to bi-weekly with the implementation of the green cart, and another noted that it is bi-weekly where one week is organics, the next week is garbage, and once a month is recyclables. Refer to **Figure 3** below.

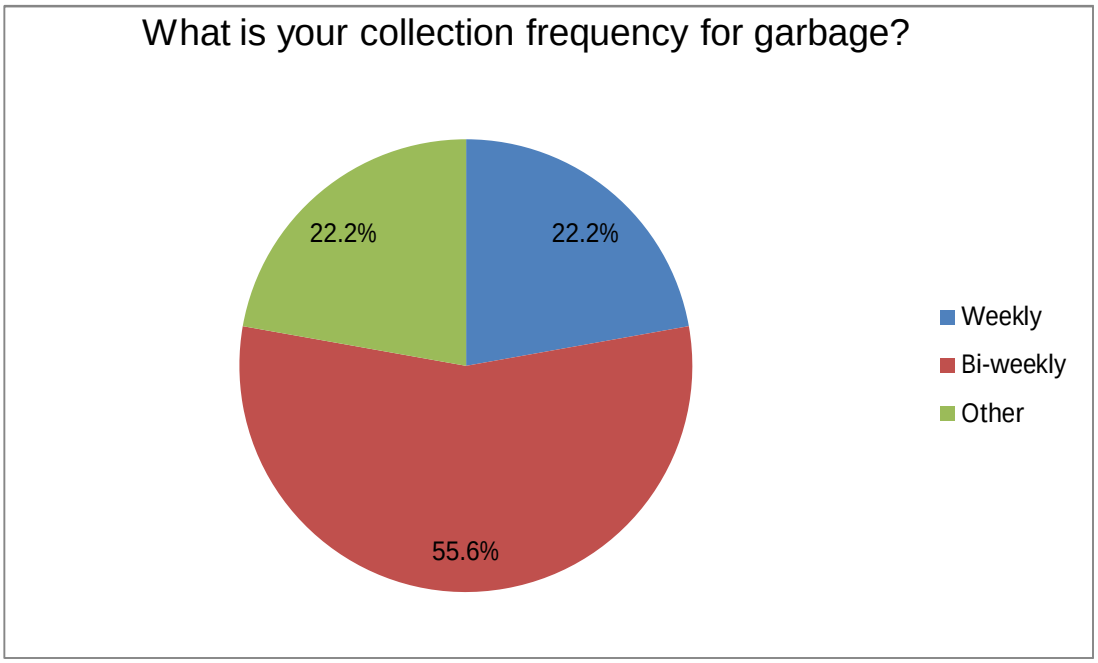

Figure 3: Collection Frequency for Garbage

Figure 4 shows the collection frequency for recyclables is also mainly bi-weekly (44%), with weekly at 33%. One respondent noted that the collection was monthly.

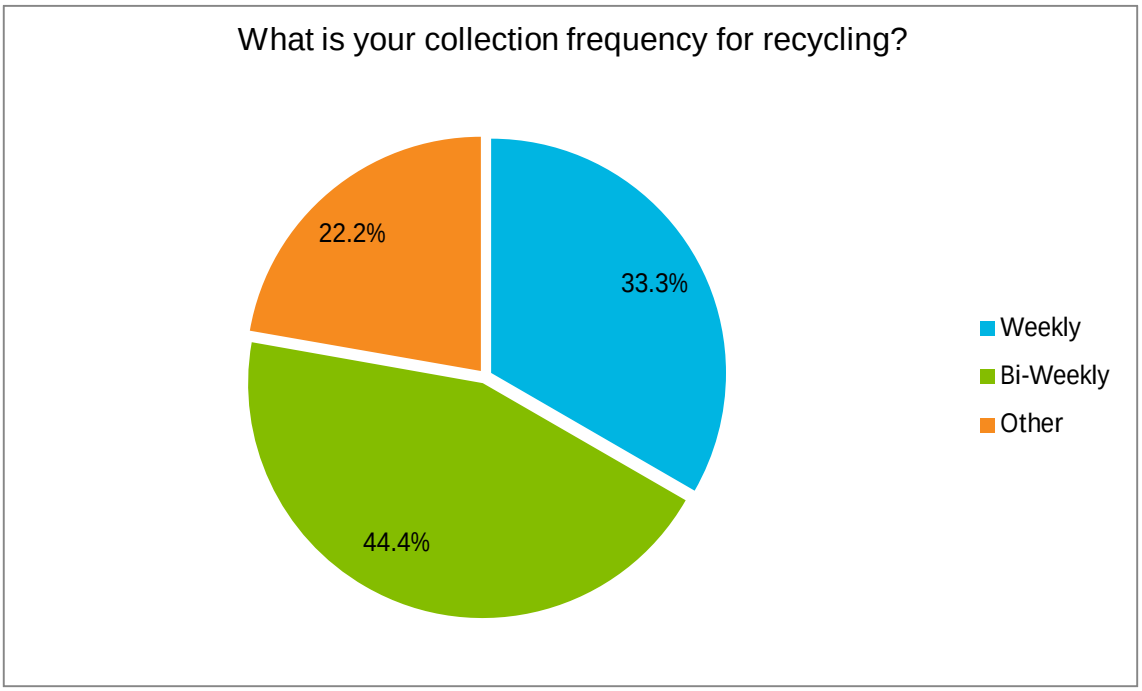

Figure 4: Collection Frequency for Recyclables

The collection frequency for organics seems to be mainly seasonal based, with weekly collection in the summer months, and bi-weekly collection in the winter. See **Figure 5** below.

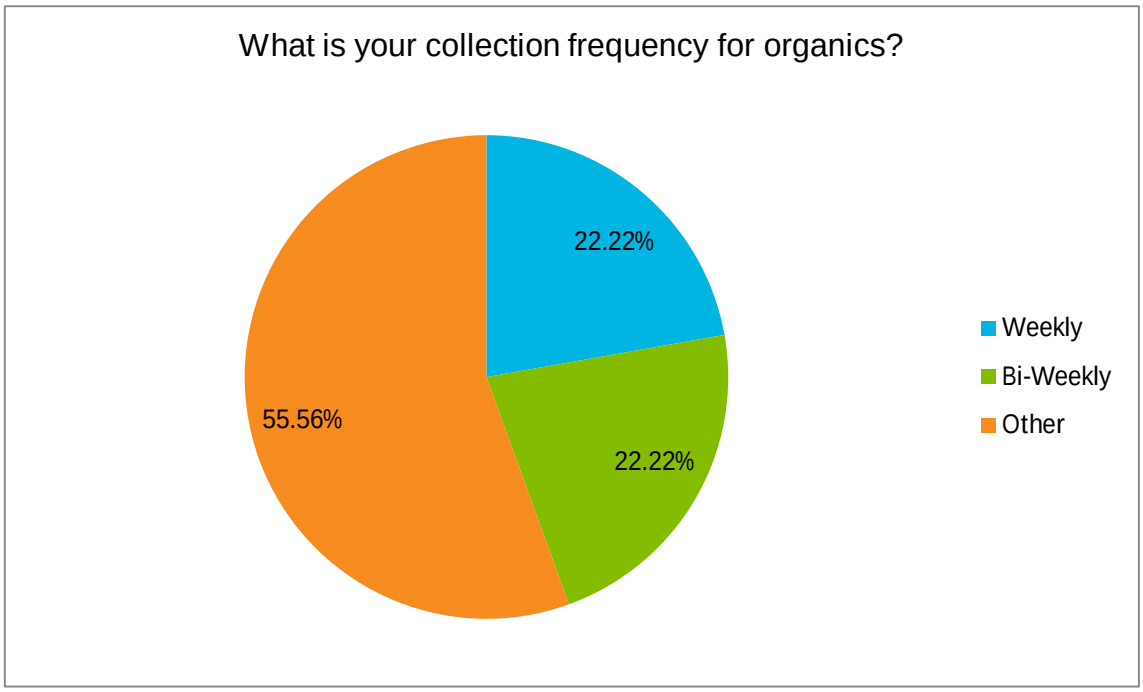

Figure 5: Collection Frequency for Organics

4.4.3 Use of Video or Radio Frequency Identification Technology

Just under half of the respondents (four (4) of nine (9)) use radio frequency identification (RFID) technology for education and enforcement. See **Figure 6** below.

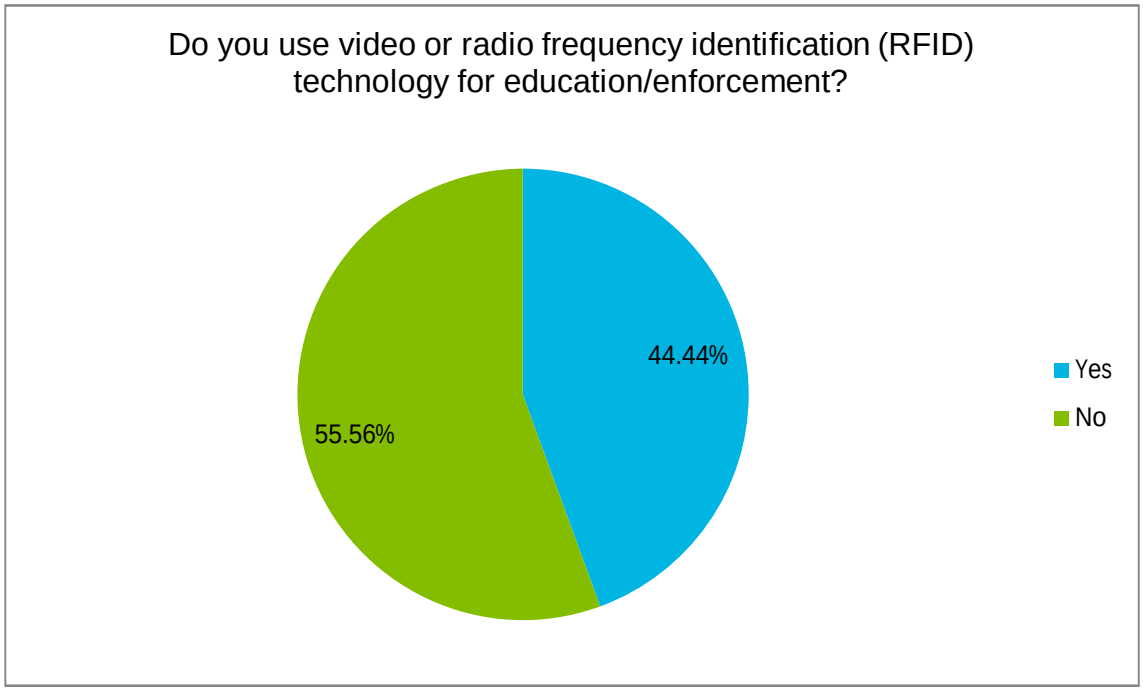

Figure 6: Use of Video or Radio Frequency Identification Technology

4.4.4 Single-Use Plastic Bags in Garbage Carts

When asked if the use of single-use plastic bags to contain loose material in carts is mandatory, optional or prohibited (Question 21), the majority of the respondents said that the use of plastic bags is optional at the resident's discretion with six (6) of nine (9) respondents selecting optional. Two (2) cities/ municipalities indicated the use of single-use plastic bags is mandatory, while only one (1) out of the nine (9) cities/ municipalities surveyed indicated they prohibit the use of plastic bags in the garbage collection system.

A more comprehensive summary of all survey thirteen (13) survey respondents is summarized in **Section 4.2 – Background** of this report. Results for the jurisdictions which completed the long-form survey are summarized in **Figure 7** on the following page.

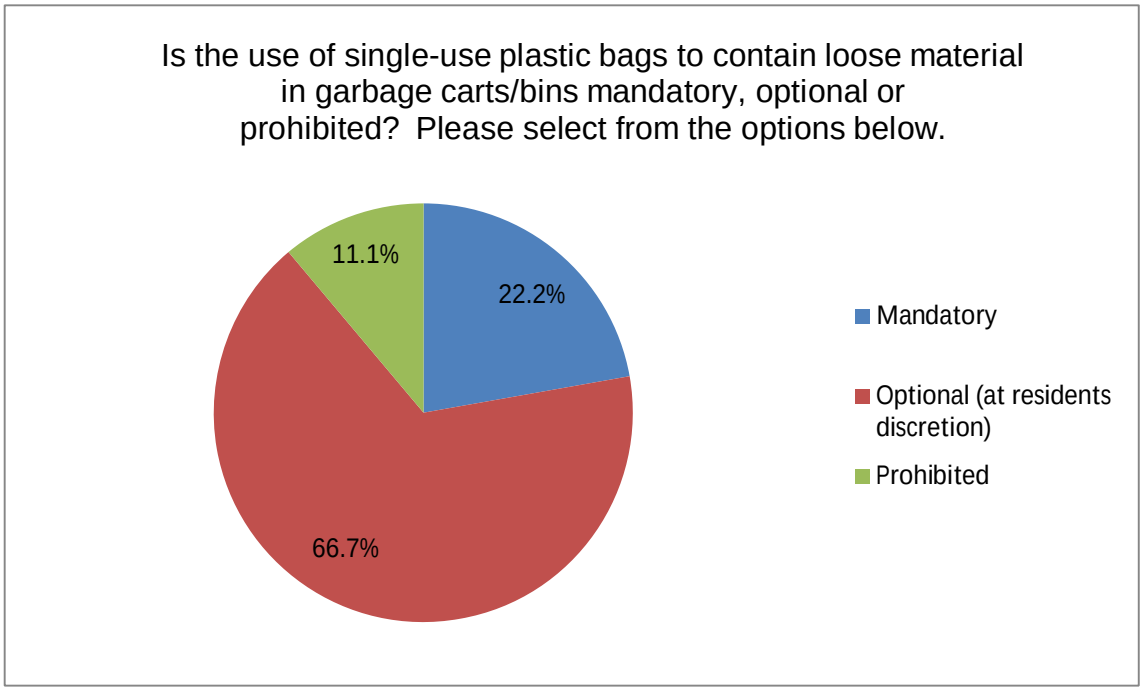

Figure 7: Single-Use Plastic Bags in Garbage Carts/Bins

Six (6) survey respondents provided additional feedback regarding the use of single-use plastic bags to contain garbage within the cart. Three (3) respondents indicated there are no concerns with loose materials in the carts, whereas three (3) respondents indicated that bagging garbage within the carts is a requirement or is encouraged.

For the respondents indicating there are no concerns with loose materials, one respondent indicated that they "do not require materials to be bagged in any waste stream collected. It is up to the resident to choose their preferred storage/disposal method". Another respondent shared that "residents must put the garbage inside the cart in a way that it can fall freely when the cart is emptied. Otherwise residents are responsible for the general care and maintenance of their City-assigned cart. They're also responsible for complying with the Neighbourhood Liveability By-law which deals with odours, illegal dumping, and other injurious effects."

Feedback from respondents indicating that bagging garbage was either encouraged or required, indicated that bagging garbage within the carts is mandatory, however not enforced. They indicated it is very windy in their city/municipality and for that reason they always encourage residents to bag their garbage. "We advise residents to still use bags to help keep the inside of the cart cleaner." Another respondent indicated that bagging the garbage was a waste bylaw requirement. "The use of single-use plastic bags to contain garbage "minimizes the potential for waste materials to blow out of carts during collection. It also minimizes the potential for waste materials to stick to the inside of the cart, thus reducing odours." This respondent also indicated that since its organics program is an optional subscription-based program, a large quantity of organic materials are still ending up in waste carts.

4.4.5 Single-Use Plastic Bags in Recycling Carts

When asked if the use of single-use plastic bags to contain loose material in recycling carts was mandatory, optional or prohibited (Question 22), just over half of the respondents (five (5) of nine (9)) said that the use of bags is prohibited. Half of the remaining respondents (2) indicated that the use of plastic bags are mandatory, while half (2) indicated they are optional at the resident's discretion. Responses are shown in **Figure 8**.

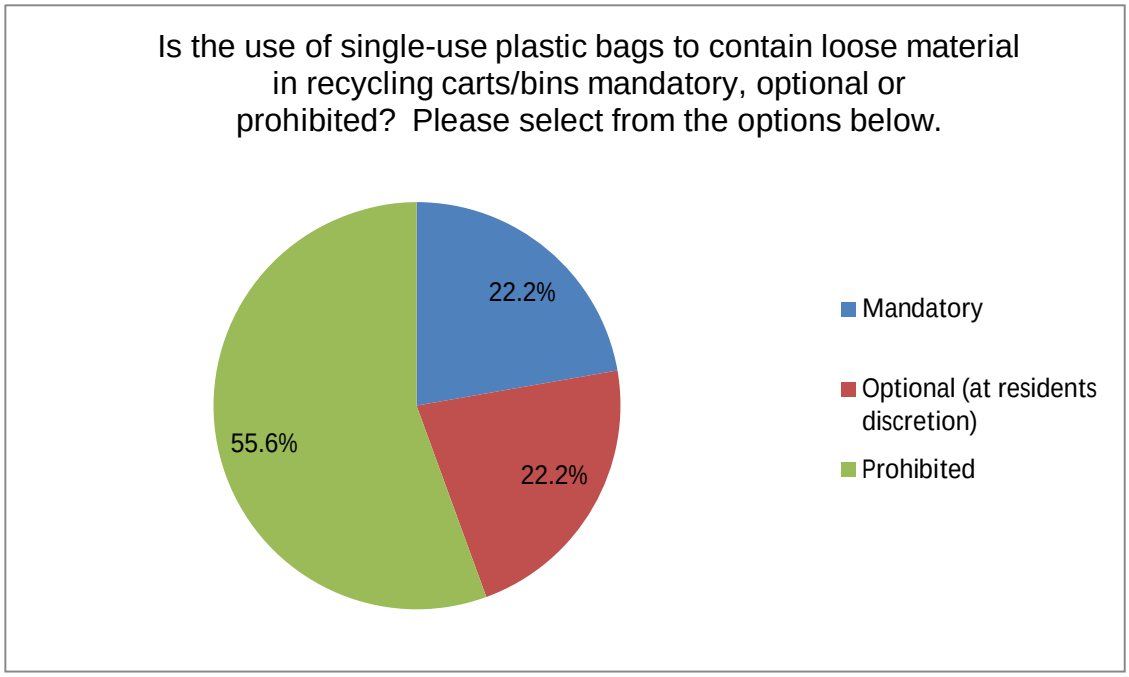

Figure 8: Single-use Plastic Bags in Recycling Carts/Bins

Some comments relating to single-use plastic bags being prohibited to contain recycling included:

- Only optional when using clear recycling bags. It is prohibited to use single use grocery, shopping or garbage bags for recycling.
- No plastic bags are permitted in the curbside recycling program due to other MRFs having issues with bags getting wrapped around their MRF/sorting.
- Plastic bags and film are prohibited from our single stream system as they clog the machinery at the MRF.
- Plastic bags are managed by another organization. Plastic bags are considered to be contamination in all collected recycling streams.
- Under the recycling contract and Waste Bylaw requirements, all materials must be placed loosely into carts so they can be effectively sorted at the MRF. The recycling collection trucks have different hoppers than the waste collection trucks so that loose, blown litter is minimized.

Some comments relating to single-use plastic bags being mandatory to contain recycling included:

- Mandatory to use single-use bags to contain other single-use bags. Clear bags required for shredded paper.

4.4.6 Single-Use Plastic Bags in Organics Carts

Of the four municipalities who provide curbside organics collection, all prohibit use of plastic-bags in the cart. One respondent noted that residents can place organics loosely in their organics cart or use paper or compostable bags.

4.4.7 Single-Use Plastic Bags - Summary

Most of the respondents (six (6) out of nine (9)) said there was no reduction in the number of plastic bags used in the residential curbside collection program since switching to carts. When asked how this was assessed, the majority said that this was either unknown or difficult to assess as this has not been measured prior to implementation. Assumptions were made that there was probably less garbage bags being used, but that residents may still use grocery/shopping bags for their garbage and then place in the garbage cart. The

remaining respondents (three (3) out of nine (9)) said that there was a reduction in the number of plastic bags used. See **Figure 9** below.

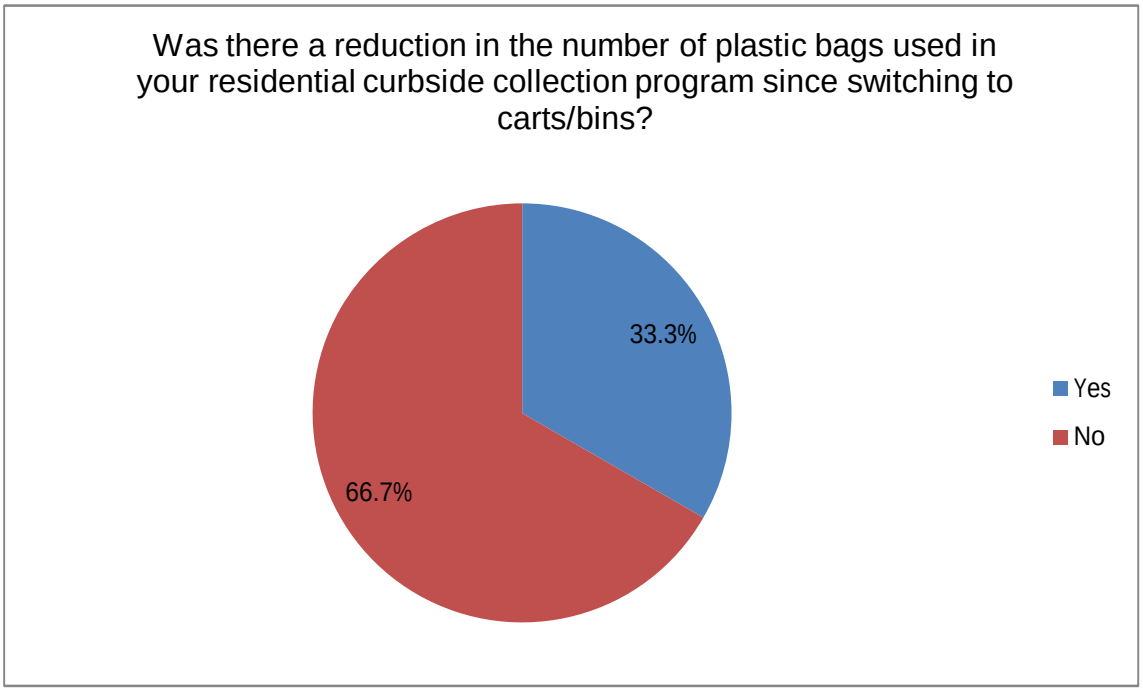

Figure 9: Single-use Plastic Bags in Recycling Carts/Bins

4.4.8 High Level Operational Considerations for Implementing Cart Based Collection Systems

Survey Question No. 25, asked respondents to rank the high-level operational considerations that were considered when selecting their cart-based collection system. Respondents were asked to rank the following eight (8) factors, from 1 (most important) to 8 (least important):

- Street width;
- On-street parking;
- Cart placement at the curb;
- Collection of bulky items;
- Litter;
- Weather (wind/snow/rain);
- Steep hills; and,
- Overhead clearance.

Responses are shown graphically on **Figure 10** and are tabulated in **Table 4-2.**

Each survey respondent provided a ranking from 1 as the most important to 8 as the least important for each of the topics surveyed relating to the operational considerations for implementing a cart-based system. **Table 4-2** shows a tabulated summary of the responses for each operational consideration. Based on the individual rankings made by all nine (9) respondents, a weighted average summary score is tabulated for each operational consideration topic, which develops the overall score (and ranking of importance). In this case, **the higher the weighted scoring total, the more important the operational factor**.

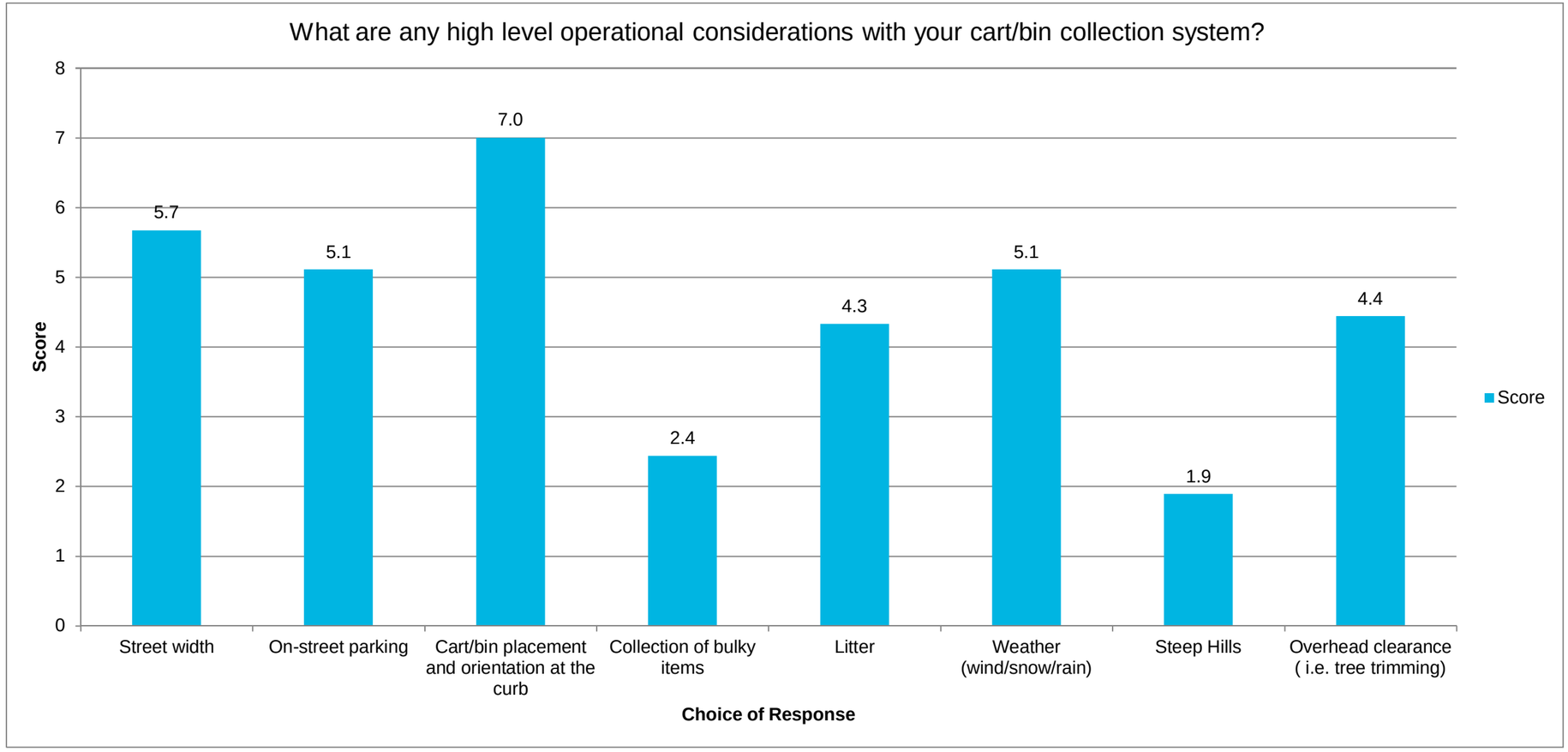

Figure 10: High Level Operational Considerations

Table 4-2: Summary of Ranking Responses and Weighted Scoring by selection for Survey Question No. 25

Placing of Importance	1 (Most Important)		2		3		4		5		6		7		8 (Least Important)		Total	Score
Category / Topic	%	No. of Municipalities Place of Importance*	%	No. of Municipalities Place of Importance*	%	No. of Municipalities Place of Importance*	%	No. of Municipalities Place of Importance*	%	No. of Municipalities Place of Importance*	%	No. of Municipalities Place of Importance*	%	No. of Municipalities Place of Importance*	%	No. of Municipalities Place of Importance*		
Street width	22.22%	2	11.11%	1	11.11%	1	33.33%	3	11.11%	1	11.11%	1	0.00%	0	0.00%	0	9	5.67
On-street parking	0.00%	0	33.33%	3	11.11%	1	22.22%	2	22.22%	2	0.00%	0	0.00%	0	11.11%	1	9	5.11
Cart/bin placement and orientation at the curb	44.44%	4	22.22%	2	22.22%	2	11.11%	1	0.00%	0	0.00%	0	0.00%	0	0.00%	0	9	7
Collection of bulky items	0.00%	0	0.00%	0	0.00%	0	0.00%	0	22.22%	2	22.22%	2	33.33%	3	22.22%	2	9	2.44
Litter	11.11%	1	11.11%	1	11.11%	1	0.00%	0	22.22%	2	22.22%	2	22.22%	2	0.00%	0	9	4.33
Weather (wind/snow/rain)	11.11%	1	11.11%	1	22.22%	2	22.22%	2	11.11%	1	11.11%	1	11.11%	1	0.00%	0	9	5.11
Steep Hills	0.00%	0	0.00%	0	0.00%	0	0.00%	0	11.11%	1	22.22%	2	11.11%	1	55.56%	5	9	1.89
Overhead clearance (i.e. tree trimming)	11.11%	1	11.11%	1	22.22%	2	11.11%	1	0.00%	0	11.11%	1	22.22%	2	11.11%	1	9	4.44

Note: * No. of Municipalities Place of Importance – this refers to the number of the municipalities that selected the place of importance (i.e. Ranking 1 (Most Important) through 8 (Least Important), by Category / Topic.

The total score presented in Table 4-2 is calculated as follows, where:

w = weight of ranked position
x = response count for answer choice

$$\frac{x_1w_1 + x_2w_2 + x_3w_3 \ldots x_nw_n}{\text{Total response count}}$$

Weights are applied in reverse. In other words, the respondent's most preferred choice (which they rank as #1) has the largest weight (in this case a weight of 8), and their least preferred choice (which they rank in the last position) has a weight of 1 For example, for the case of the street width category, the total score for the 'street width' category is calculated as follows:

Total Score = [(2*8) +(1*7) +(1*6) +(3*5) +(1*4)+(1*3)]/9

Total Score = 5.67 for the Street Width category

Table 4-3 is another method to present the operational considerations in order of importance ranked by nine (9) survey respondents. The table shows that 'steep hills' is the least important operational consideration and cart/bin placement at the curb is the most important operational consideration.

Table 4-3: Summary of Combined Rankings by Operational Consideration for 9 Respondents

High-Level Operational Topic	Score	Ranking Importance
Steep Hills	1.89	Least Important
Collection of bulky items	2.44	
Litter	4.33	
Overhead clearance (i.e. tree trimming)	4.44	
On-street parking	5.11	
Weather (wind/snow/rain)	5.11	
Street width	5.67	
Cart/bin placement and orientation at the curb	7.00	Most Important

The cart placement and orientation at the curb is the most important operational consideration from the survey.

Respondents were also provided with an option to share additional, open-ended feedback for additional high-level considerations with using a cart-based collection system. This feedback was captured as a separate question (Question No. 26). Feedback received from seven (7) respondents, included the following:

- We have learned over the years that not all carts or trucks are created equally. Each truck system has its specific challenges and should be considered when selecting both your trucks and carts.
- Bin maintenance requirements.
- Wind and litter are the most important.
- Parking in alleys, acceptable items, excess materials (and placement, size/weight if included), truck cycle speeds, customer education (i.e. tagging carts).

- If using Automated Side Loader, collection from both sides and single side of back lane. Vehicle fuel source (e.g. Conventional Natural Gas or Renewable Natural Gas[19]).
- Overhead clearance in relation to utility lines (taking into considerations line sag, snow pack, and height of vehicle).
- Upgrade of trucks to have automated arm/cart tippers. Integrations with technology (RFID, cameras).
- Back lane collections are challenging and inefficient.
- In addition to overhead obstructions, there are issues with carts being left out, property damage, scavenging, theft, vandalism, and congestion.

4.4.9 Collection System Management and Operation

When asked if residential collection is completed by municipal staff or contracted to a private third-party company, or a combination of public/ private (Question 27), responses from survey participants indicated there was an equal distribution of respondents from each category with three (3) of nine (9) participants for each category: public (33%), private (33%), combination of public/private (33%).

Survey Question No. 28, asked respondents about any modifications needed to collection systems for conversation to a cart-based system. Feedback from generally all respondents indicated that modifications were needed to all three (3) items including truck type, routing and by-laws.

Sixty-six percent (66%) of the respondents indicated that they do allow extra bags to be placed outside of the bins. When asked what stream, the following comments were provided:

- Garbage bag with prepaid sticker.
- Clear plastic bags are options for both blue and grey box items. This is used more in rural areas on once a month pickup.
- Garbage, Organics. Moving towards a tag-a-bag system for garbage.
- Garbage. Up to three bags for a fee.
- Currently up to two clear plastic for waste and two paper bags for compost are permitted on each pick up.

When asked if there was an increase or decrease in fleet staff after implementing the cart system, four (4) out of the nine (9) respondents noted a decrease, four (4) out of the nine (9) respondents noted no change, and one (1) out of the nine (9) respondents noted an increase in fleet staff.

Most respondents (six (6) out of nine (9)) noted that there was no change in collection vehicle maintenance costs after implementing the cart system. Of the remaining respondents, two (2) out of the nine (9) noted an increase, and one (1) out of the nine (9) noted a decrease in maintenance costs.

[19] RNG is natural gas produced from organic waste from farms, forests, landfills, and water treatment plants. The gas is captured, cleaned, and injected in pipelines to be used in the same way as natural gas by homes, businesses, institutions, and industry.

4.5 Financial Based Questions

4.5.1 Procurement Models and Considerations for Cart Purchasing

When asked what procurement model was used for acquiring the carts (Question 32), the majority of the respondents (six (6) out of nine (9))) selected Request for Proposal (RFP). The remaining two (2) out of the nine (9) respondents went through a tender process, and one (1) out of the nine (9) respondents selected sole source.

When asked how the sizes(s)/style(s) of the carts were chosen for **garbage** (Question 33), three (3) out of the nine (9) respondents selected public survey. The remaining six (6) respondents selected consultant recommendation (2 responses), homeowner request (2 responses), other community recommendations (1 response) and collection provider recommendations (1 response). Some comments made included the following:

- Industry standards.
- Extensive public engagement campaign.
- Residents were supplied with the sizes(s) they requested.
- Recommendation from a pilot study. Style was aligned to collection fleet.

When asked how the sizes(s)/style(s) of the carts were chosen for **recyclables**, three (3) out of the nine (9) respondents selected homeowner request. The remaining respondents selected public survey (two (2) out of the nine (9)), consultant recommendation (one (1) out of the nine (9)), other community recommendations (one (1) out the nine (9)) and collection provider recommendations (one (1) out of the nine (9)). Some comments made included the following:

- Industry standards.
- Extensive public engagement campaign.
- Recommendation from a pilot study.
- Largest cart to incentivize recycling.
- Three respondents noted that this was not applicable as they do not use carts for recycling.

When asked how the sizes(s)/style(s) of the carts were chosen for **organics** (Question 35), two (2) out of the nine (9) respondents selected consultant recommendation, one (1) out of the nine (9) selected public survey, one (1) out of the nine (9) selected homeowner request, and one (1) out of the nine (9) selected collection provider recommendations. Some comments made included the following:

- Given the variety of housing stock and yards (vegetation), the City decided to provide a variety of sizes to the residents to match the amount of yard trimmings produced. Residents were supplied with the sizes(s) they requested.
- Accessibility requirements.
- Industry standards.
- Recommendation from a pilot study.
- Largest cart to incentivize composting.
- Three respondents noted that this was not applicable as they do not use carts for organics.

4.5.2 Operational Costs Reported by Survey Participants

The overall annual operating costs ($ CAD) reported by survey respondents for garbage collection (Question 36) ranged from $2,051,882 to upwards of $10,300,000. Many of the respondents were not able to disclose this information or were unable to easily explain in the survey.

The overall annual operating costs ($ CAD) reported by survey respondents for recycling collection (Question 37) ranged from $1,699,316 to $11,500,000. Many of the respondents were not able to disclose this information.

The overall annual operating costs ($ CAD) reported by survey respondents for organics collection (Question 38) ranged from $2,051,882 to $7,100,000 (equipment and operatory salary/benefits only). Many of the respondents were not able to disclose this information, or said this question was not applicable.

4.5.3 Summary of Feedback on Costs with Implementing a Cart-based system

Survey Question No. 39, asked respondents to provide feedback on what costs (in Canadian Dollars) were incurred for implementing their cart-based collection system. Respondents were asked to select those categories that applied and were also encouraged to provide written feedback responses for each entry. The following categories were included:

- Public education;
- Procurement Costs
- Collection fleet;
- Maintenance yard;
- RFID technology and Information Technology;
- Administrative costs;
- Distribution / deployment costs – initial delivery, etc.;
- Cost to resident for cart; and,
- Other costs.

Results are summarized in **Table 4-4**. Response feedback was quite limited as many of the respondents were not able to disclose this confidential information.

Table 4-4: Summary of Feedback on Costs Incurred for Implementing Cart-Based System

Category	Feedback
Public Education	• $300,000 contract to firm to develop branding and public awareness • $140,000 annual budget for advertising, etc.
Procurement Costs	• $2,400,000 • Cart balance as of March 31, 2019 was $7,400,000
Collection Fleet	• Fleet procurement – 29 CNG Automated Trucks - $10,000,000. 4 CNG/4 Diesel Semi-Automated Trucks - $2,200,000. • $4,500,000 • Completed by private contractors
Maintenance Yard	• No Responses / unable to disclose
RFID Technology and IT	• Significant but hard to quantify (developed custom software solution to manage our customers and assets. Also tie-ins with our billing system, 311, and the overhead required to store Fleetmind data. • $300,000
Administrative Costs	• Significant but hard to quantify as there is support from many parts of the organization
Distribution / deployment costs – initial delivery, etc.	• Cart supply and delivery tender in 2012 was $14.5M; temporary summer staff was hired to assist with cart delivery. • $225,000
Cost to Resident for cart	• No cost to resident (tax-based service) • Cost for cart included in annual residential fee currently at $205 per household and $495 per cottage/seasonal home

4.5.4 Changes to the Materials Recovery Facility (MRF)

Survey Question No. 40 asked if there were costs to modify receiving facilities (MRF, organics, landfill) and seven (7) of the nine (9) respondents answered no.

4.6 Impact Based Questions

4.6.1 Cart Replacement: Rates, Responsibilities, Costs, Warranties

Table 4-5 summarizes the feedback received respecting cart replacement rates, in terms of number of carts replaced per year, as well as the cost of cart replacement for each waste stream.

Table 4-5: Summary of Cart Replacement Rates and Costs for Garbage, Recyclables and Organics

Waste Stream	Feedback on Replacement Rates	Feedback on Replacement Costs
Garbage	• 3-5% • 300-500 • 0.26% (based on serviced carts) • 7% (approximately 5,000) • Minimal, not applicable, too early to tell	• $60 Average per cart + labour • Free if defect, $100 if lost • $53.95 plus trip cost $54.61 • $65 plus $25 for delivery • $60-$80 • Fluctuates annually based on cart contracts
Recyclables	• 300-500 per year? • 1.28% (based on serviced carts) • In 2015, $490,000 was spent replacing and the purchase of new carts of all types. 2016: $490,000; 2017: $700,000. 2018: $430,000	• Free if defect, $100 if lost • $54.30 plus trip cost $54.61
Organics	• 3-5% • 0.36% (based on serviced carts) • Based on calls to 311, requests to repair or replace carts of all types were: 1,152 (2013), 1,098 (2014), 876 (2015), 833 (2016), and 1,007 (2017) • Low, not applicable	• $60 Average per cart + labour • $50.30 plus trip cost $54.61 • $70-$100

Survey Question 42 asked who has the responsibility for cart replacement. Five (5) out of the nine (9) respondents indicated it was the municipality that has this responsibility. Two (2) of the three (3) respondents who selected “other” indicated that they will replace the carts, implying a responsibility of the city/municipality. One (1) respondent indicated it is the responsibility of the property owner unless damaged by a contractor or third party (i.e. vandalism). Results interpretation suggests seven (7) of the nine (9) respondents indicate it is the city / municipality that replaces the carts.

When asked what the warranty is on the carts (Survey Question 44), the majority of the respondents (six (6) out of the nine (9)) said there is a standard 10-year warranty. One (1) respondent said they have a 12-year warranty, and another respondent said it is dependent on the make.

4.7 Municipality Issue Based Questions

4.7.1 Municipality Opinions on how Cart Based Program is going

The consensus from the respondents on cart-based programs was positive. Cart-based collection programs do come with increased challenges; however, it is noted that the benefits to routing and manpower outweigh the costs.

Positive feedback shared by survey participants indicated the implementation of carts have achieved many goals such as reducing garbage and increasing recycling, reduction in litter, reduction in worker's injuries, mitigation of environmental impacts, and increased collection and diversion rates. The RFID readers and video on the truck make following up on missed service complaints much easier to handle. Data collected by trucks is also valuable for driver productivity, set-out rates, tracking per-capita weights, etc. It has received positive feedback from the residents.

Challenges shared by survey participants, involved implementation elements including managing assets and IT systems, in some cases increased contamination rates, and the complexities of maintaining an inventory of carts.

4.7.2 Identified Barriers to Participation

When asked if there were any barriers to participation (Question 49) that were identified by the public, the main response was storage space. Aesthetics was the second most popular barrier, followed by odour complaints and difficulty moving the carts.

These barriers seem to be managed through education efforts, staff visits to provide assistance, open houses for residents to see and select their cart sizes, customer call centers, and webpages for the public to access.

4.7.3 Assistance Programs for Disability and Special Populations

Survey Question No. 50 asked if there are assistance programs available for the disabled and special populations. The majority of the respondents (eight (8) out of nine (9)) said that they had an assistance program available for disability and special populations. The programs / services and how they are funded are as follows:

By Application Basis

- There is a non-advertised program where city crews aid residents in ensuring that their garbage makes it to the curb for collection (pack-out service) - elderly, disability, injury, etc. This is done through an application and site review process.
- We allow medical exemptions for seniors or those with disabilities or special needs. Residents requesting exemptions must fill out and submit an exemption form. It is reviewed by City staff.

Lead by Contractor

- We have a walk-up service where our contractor will collect the cart from an accessible location away from the curb for people with medical conditions that provide documentation. The cost of this service is included in the cost of collection for each stream.
- Foremen are able to determine locations suitable for special collections. The driver is then able to complete additional tasks at this location such as getting out and moving cart to a location for collection. This is site dependent. Same service to all residents.
- Walk up service for household where no one is able to move the cart to the collection point. These costs are included in the cost of collection for each stream.
- We provide backyard collection for disable or elderly etc. The contractor outlines this in collection contracts and provides price per collection.

4.8 Lessons Learned

4.8.1 Lessons Learned from Switching to Cart Based System

Survey Question No. 52 provided an option for survey participants to provide open-ended feedback to HRM on lessons learned during the implementation and transition to a cart program. The raw data results of these responses are included in **Appendix C**. A summary of this information is presented below:

- **Public education and outreach** are key for a successful implementation. Change is difficult for residents, but having a comprehensive education program, social media campaign and advertising helps tremendously. Feedback from the public is valuable and it's important that residents know that changes are coming. Realize that you will get some resistance from people. Have a plan for how to deal with exceptions to the norms. It was recommended to implement a program to accommodate residents who are not able to place their carts at the collection point. Public engagement should take place with the affected communities.

- **Multi-year / phased approach** was recommended as changing to an automated program is a big change from manual collection for both the waste collectors and residents. By starting with a small population, you can learn lessons that you can then use to ensure that the majority of your roll-out goes smoothly. It's much easier to fix mistakes for a small percentage of the City than the whole City. It was also recommended to deliver carts in the summer, as winter delivery has many challenges.

- **Cart selection and distribution** may become a challenge if you are offering multiple sizes to the residents. Educating people to choose the appropriate size, physically handling a variety of size options and delivering the right size to the right property during implementation, managing residents that want to change sizes, and keeping track of carts & sizes at each property for billing purposes. It was also recommended that the electronic chips in carts would be nice to have as opposed to just serial numbers.

- **Space limitations** by way of narrow roads and access may lead to collections challenges. Fully automated collection may not always work in these tight areas and semi-automated trucks may need to be used in some areas. It was recommended to be prepared to deal with locations that have space constraints such as townhouses.

- **Transition / training of staff** will be required on new equipment and additional support staff is recommended to handle customer calls and support drivers on placement education. It was noted that there were significant growing pains in first year and that staff were pushed, and significant overtime was incurred. Mental health may be a concern.

Some additional recommendations and comments from the respondents are as follows:

- Ensure there is a system in place to track cart maintenance calls and have clearly defined responsibilities for cart damages.
- Transitioning to new services was complicated as first blue then black then green cart were introduced with several years between. This leads to routing challenges as it included collection day changes which can be problematic depending on delivery timeframe, full city collection or quadrant-based switch over. Best to launch service as resident receives cart for simplicity of operation and communication. Challenging to transition/train staff
- Collection management system was not implemented until 2017 - 5 years after the carts had been delivered. Data quality is a large issue if trying to track assets based on RFID/SN due to entropy. If services contracted, need to consider relationship between contractor and cart damage.
- ICI properties became targets for excess and illegal dumping for a short while after implementation.

- As carts are City assets, but responsibility of current property owner, there could be conflicts in tenant-landlord relationships and the sale of properties. We had policies developed in advance to address these conflicts.
- Accuracy of data on households (locations, number of apartments, etc.) is key to ensuring that delivery goes smoothly. You want to make sure contractor has reliable, accurate and up-to-date data to do the deliveries. At the end of the roll-out of the program, you want to have confidence that the data you get back from the contractor is accurate. I.E., "garbage in, garbage out"
- For purchase of carts, we stated required specifications in a tender call and awarded to lowest bidder meeting specs. For technology upgrades (cameras, RFID readers, back-office software), we issued a separate RFP and evaluated more on software capabilities over cost.
- We also had to update our by-laws and are in the process of updating our routes.

4.8.2 Recommendations on What Could be Done Differently

The majority of respondents have been very pleased with how the transition to the cart-based system has gone so far, and that they are happy with their decision to make the switch. Some of the recommendations that were provided mainly revolved around the importance of public education and engagement. Another recommendation was to ensure that the implementation plan matches the available staff, other resources and time. Ensuring there's a capital plan in place to replace the carts as they reach end of life.

4.8.3 Benefits from Switching to Cart Based System

One of the main benefits that was realized from switching over to a cart-based system was a reduction in collection worker injuries, reduced workers compensation costs and reduced disability claims. Six (6) of the nine (9) respondents mentioned they achieved improved workers safety by switching to a cart-based collection, in their comments.

Some additional benefits that were noted include:

- Reduced litter in neighbourhoods,
- Increased participation in recycling
- Better resident awareness of their waste management,
- Improved diversion
- Increase in collection efficiency, and
- Reduced greenhouse gas emissions.

5. Analysis and Discussion

The focus of this undertaking was to evaluate cart-based residential collection programs for garbage and recycling, as it relates to Halifax Regional Municipality and specifically as it relates to the use of single-use plastic bags.

This section summarizes the analysis completed by AECOM of some key questions asked by HRM at the on-set of the study, relating to the use of single-use plastic bags for garbage and recycling and the number of plastic bags that could potentially be replaced by using carts.

To synthesize the data gathered as a part of this undertaking, Section 5.1, includes a discussion of some core topics as it relates to study observations and findings in relation to key considerations, motivations, lessons learned and findings relating to the use of cart-based collection programs of the jurisdictions surveyed.

5.1 Analysis

As outlined in the study objective, some key questions presented by HRM at the onset of this study, relating to use of single-use plastic bags in the context of evaluating cart-based systems, are listed below.

- How many bags are used in bag-based programs?
- What does a typical household spend annually on garbage and recycling bags?
- What is the approximate cost range for the various carts issued to each eligible property?
- What is the plastic weight comparison of a cart compared to the bags it could replace?
- If bags are still used with the cart-based programs, what is the likely reduction in use of bags (as applicable)?
- What role does extended producer responsibility (EPR) play relative to collection of printed paper and packaged items? (i.e. identify if EPR is in place in the surveyed jurisdictions).

AECOM has endeavored to provide responses to these questions in the following report sub-sections.

5.1.1 How many bags are used in bag-based programs?

In the absence of audit information for HRM garbage and recycling set out rates, AECOM accessed a study[20] by AET Group Inc., on behalf of the Continuous Improvement Fund, that summarizes the results of a 2012/13 residential curbside waste audit conducted across 7 municipalities within Ontario. The audit involved, four seasonal 2-week audits completed across 7 municipalities in Ontario. The municipalities were classified into five (5) different municipal groups including: 1) large urban, 2) medium urban, 3) small urban, 4) urban regional and 5) rural regional. For each municipality, a sample size of 100 households were used as a part of the audit. In accordance with the report information, “the sampled households were pre-selected and remained the same throughout all four seasonal audits. Collection data gathered included the total number of household’s sampled, total number of items set out per household and total number of full container equivalents set out per household (by stream).”.

A summary of the set-out rates (i.e. total number of items set out per household audited) for garbage and recycling is as summarized in **Table 5-1.**

[20] *https://thecif.ca/projects/documents/711-Participation_Analysis.pdf Accessed 17/10/2019*

Table 5-1: Summary of Residential Curbside Set-Out Rates for Garbage and Recycling

Description	Large Urban		Medium Urban		Small Urban	
	Recycling (Containers & Fibres)	Garbage	Recycling (Containers & Fibres)	Garbage	Recycling (Containers & Fibres)	Garbage
Average number of full container equivalents/household/week	1.21	1.32	1.53	0.79	1.27	0.52
Average number of full container equivalents/set out	1.62	1.58	1.86	0.98	1.79	1.08

As per the report, the total number of items refers to the number of containers/bags set out regardless of size/capacity. Full container equivalents is the number of standard bins or carts that would be required to hold a certain number of set-outs. For the recycling stream, the report indicates that calculations were made to adjust the different cart sizes to standard 16 gallon (i.e. 60 L) blue box equivalents. This did not alter the number of items set out, but rather the full container equivalents (volume) set out. For the garbage stream, the report indicated that cart sizes were adjusted to the number of standard garbage bag equivalents, however the report did not provide a definition for a standard garbage bag equivalents in terms of capacity /volume.

Therefore, based on these estimates, the average household sets out and uses less than 2 bags of garbage and less than 2 bags of recycling per week.

5.1.2 What does a typical household spend annually on garbage and recycling bags?

Assuming each household puts out 2 bags of garbage and 2 bags of recycling per week, the typical household spends approximately $94 on bags per year. The calculations below detail the annual cost of garbage and recycling bags for HRM assuming a total of 147,967 households. For the calculation, it is assumed that the average (standard) recycling and garbage bag sizes are 75L and 135L respectively.

For garbage:

- Assuming a set out of 4 bags over the 2-week period,
- Total bags = 26 weeks*4 bags*147,967HH = 15,388,568
- Average cost of garbage bags = $10 for 20, 135L bags (source: Walmart[21])
- Total cost of bags per year = $7,694,284
- Price per household per year = $52

For recycling:

- Assuming a set out of 4 bags over the 2-week period,
- Total bags = 26 weeks*4 bags*147,967 HH = 15,388,568
- Average cost of recycling bags = $16 for 40, 75L bags (source: Walmart[22])
- Total cost of bags per year = $6,155,427.20
- Price per household per year = $41.60

[21] *Accessed 17/10/2019: https://www.walmart.ca/en/ip/glad-clear-garbage-bags-extra-large-135-litres-20-trash-bags/6000039455867*

[22] *https://www.walmart.ca/en/ip/glad-easy-tie-regular-recycling-blue-bags/6000197536250*

5.1.3 What is the approximate cost range for the various carts issued to each eligible property?

Question No. 39, of the survey asked the respondents what the costs (in Canadian Dollars) incurred for implementing their cart-based system were. This included items such as fleet modification/replacement, cart distribution, purchase of carts and costs to the resident for carts, as examples. However, in relation to the cost to residents for carts, three (3) respondents indicated there is no cost to residents. One respondent was not able to disclose. Two respondents, the City of Vancouver and Island Waste Management Corporation (IWMC) on PEI, provided information, as follows:

The City of Vancouver provided a link to its website[23] for more information on costs to residents for garbage carts, based on cart size. **Table 5-2** includes a summary of the annual rates charged to residents for 2017 to 2019, for garbage carts ranging in size from 75 L to 360 L. Annual rates range from $83 per year to $163 per year.

Table 5-2: Summary of Garbage Cart Sizes and Annual Rates to Residents for the City of Vancouver[24]

Cart/Bin size	2019	2018	2017
75 L	$83	$84	$75
120 L	$96	$96	$86
180 L	$112	$114	$102
240 L	$129	$131	$117
360 L	$163	$165	$148

Information shared by IWMC indicated that the cost for carts is included in an 'annual residential fee currently at $205 per household, and $495 per cottage/ seasonal home'.

5.1.4 What is the plastic weight comparison of a cart/bin compared to bags it could replace?

The weight comparison between a cart/bin as compared to bags it could replace is dependant on the design of the cart/bin, and the size and film thickness of the bag. For this estimate we have calculated based on cart/bin sizes from CIF and a 135 litre low linear density bag with a thickness of 0.7 MIL (1/1000")[25].

The product specifications for carts used in the blue box program in most municipalities across Ontario, can be accessed on the CIF website. The average weight of a 356 L cart is given as 20 kg (44 lb)[26], while the weight of a 90 L bin is specified as 2.3 kg (5 lb)[27]. Walmart specifies the assembled weights[28] of the clear 135 Litre garbage bags as 1.85 lb per 20 bags (0.0925 lb, 0.04 kg each). In weight comparison, one, 90 L bin equals approximately 58 plastics bags, while one, 356 L cart equals 500 plastic bags.

For a cart, the savings on the plastic weight in comparison to the plastic bags it could replace, is approximately in 5 years. Where, one, 356 L cart equals 500 bags in plastic weight comparison, and assuming 2-135 Litre bags per week (104 bags per year) are saved by using a cart if bags are not permitted. It will take 4.8 years (500 bags / 104 bags per year) to use the equivalent bags of a 356 L cart.

For 147,967 households, over a one-year period, replacing both recycling and garbage bags with carts could potentially save 1,231,085[29] kg (1,231 tonnes) of plastic bags from the landfill. The average life of a cart is 7 to

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[23] Accessed 09/01/2020: https://vancouver.ca/home-property-development/getting-garbage-bins.aspx
[24] Accessed 09/01/2020: https://vancouver.ca/home-property-development/flat-rates.aspx#garbage
[25] Accessed 09/01/2020: https://www.plasticplace.com/thickness/
[26] Accessed 17/10/2019: https://thecif.ca/wp-content/uploads/2019/08/2019-Carts-Datasheet-August.pdf
[27] Accessed 17/10/2019: https://thecif.ca/wp-content/uploads/2019/10/2019-Blue-Boxes-Datasheet-Oct1.pdf
[28] Assembled weight may include weight of packaging.
*[29] Total weight = Sum (Number of bags used per year for recycling and garbage) *weight of each bag*

10 years. Assuming a life of 7 years, 8,617,595 kg (8,618 tonnes) of plastic bags/airspace could be saved from the landfill if bags are not permitted within the cart program.

5.1.5 If bags are still used with the cart-based programs, what is the likely reduction in use of bags (as applicable)?

Given many of the jurisdictions require or prefer the use of plastic bags to contain waste within carts, it is implied in these cases there will be a continued usage of single-use plastic bags to contain waste and small reduction in the usage of single-use plastic bags. Other reasons shared for using plastic bags within carts was to reduce the amount of wind-blown litter when tipping the carts, and for cart-cleanliness reasons, both for reducing the waste that may stick to the inside of the cart and also to reduce odours. Regardless of whether waste is to be contained within carts, residents may choose to use small plastic bags within kitchen garbage receptacles, sometimes referred to as 'kitchen catchers', to contain waste within the home.

5.1.6 What role does extended producer responsibility (EPR) play relative to collection of printed paper and packaged items? (i.e. identify if EPR is in place in the surveyed jurisdictions).

Most recently, AECOM conducted a study for Divert NS, on behalf of the Municipal-Provincial Priorities Group, on the Efficiency and Effectiveness of the Solid Waste Resource Management System of Nova Scotia (AECOM, 2019). Within the report is an analysis of the role of municipalities in waste management in relation to the implementation of extended producer responsibility (EPR) programs.

The following excerpts from AECOM (2019) are presented, in relation to the response to the question of the role of EPR relative to the collection of printed paper and packaged items, as well as the jurisdictions where EPR is in place, of the survey participants.

Extended Producer Responsibility Overview:

"Industry-operated recycling programs, called Extended Producer Responsibility (EPR) programs, are being implemented in Canada. The uptake in EPR programs stems from the Canadian Council of Ministers of the Environment (CCME) 2009 Canada-wide Action Plan on Extended Producer Responsibility (CAP-EPR), in which all of Canada's provinces and territories committed to work towards implementing EPR programs for a range of materials. All provinces, except Alberta, have implemented several EPR programs since that time.

EPR and shared responsibility programs have been implemented across Canada for a range of materials in every province except Alberta, including programs for tires, electronic waste, paint and paint containers, household hazardous waste, pharmaceuticals and sharps, beverage containers, used oil and antifreeze materials, batteries, and packaging and printed paper (PPP) / packaging and paper product (PPP)."

In relation to the role of EPR in printed and paper packaging:

"*Shared responsibility PPP programs exist in Saskatchewan, Manitoba, Ontario, and Quebec where municipalities operate the programs and accept the risks and liabilities of marketing the materials they generate, and producers provide varying degrees of funding – i.e., a percentage of municipal costs that are discounted by an efficiency factor."*

In relation to the surveyed jurisdictions where EPR is in place:

"British Columbia is the first, and to date only, province in Canada to implement a full EPR program for residential PP. In BC, producers are responsible for 100 per cent of the costs, risks and liabilities associated with collecting and recycling residential and streetscape packaging and paper to meet regulated outcomes."

5.2 Discussion

Following completion of the literature review and survey, there are some core topics or themes that can highlighted from the subject study in relation to topics including reduced claims and cost associated with worker health and safety, increased participation and diversion, improved collection efficiency, and plastic bag useage, as they relate to cart-based systems. A discussion on these topics is presented below.

5.2.1 Reduced Claims and Costs Associated with Worker Health and Safety

One of the main benefits that has been an outcome from switching to a cart-based system, is that there is a very noticeable reduction in collection worker injuries and associated reduced workers compensation costs and disability claims. If using a fully automated system, this greatly reduces the chances of workers being injured due to items such as lifting the materials and slips, trips, and falls. In switching to fully automated systems, there is also a reduction in the number of workers, as the fully automated collection vehicles require only one operator. There are also collection efficiencies (see Section 5.2.3), which also can result in a reduction of the total number of workers.

Survey results indicated the most important factor which influenced the decision to switch to a cart-based collection system was to improve worker safety.

5.2.2 Increased Participation and Diversion

Results from the survey showed that when asked if the municipalities waste diversion rate changed with the introduction of carts, seven (7) of nine (9) respondents (78%) of the respondents said yes, it showed an increase. Through the implementation of a cart-based system, there has been an improvement in resident awareness of their waste management and a more uniform neighbourhood appearance. There has also been an increase in diversion. The Split Body Carts report (Section 3.2.4) completed for Sault Ste. Marie stated that the 95-gallon split-body recycling carts were viewed positively for achieving higher diversion rates than other collection methods, and that Sault Ste. Marie's has the highest residential diversion rate (70.1%[30] in 2014) among its Datacall group members of comparable municipalities. A breakdown of the waste diversion rates of Sault Ste. Marie and other Ontario municipalities is available for download on the Resource Productivity & Recovery Authority website.

While several factors impact the participation in and success of a cart-based program, it should be noted that the introduction of new waste collection systems (in this case, switching from bags to carts), is usually accompanied by public education. Residents are educated on the benefits and the effectiveness of the program. The carts may also be provided for 'free' to encourage public participation. The initial public education and should influence public participation and the resulting diversion rate.

5.2.3 Improved Collection Efficiency

Another benefit that has been an outcome in switching to a cart-based system has been an increase in the number of houses serviced per route. One of the main findings from the survey is that the majority of the respondents use a fully automated collection system, which seems to be a driver of these collection efficiencies. An automated collection system reduces the loading time and the time spent on each residence. This translates into serving more houses per route and ultimately reducing the cost of operations (driver hours, truck hours and fuel etc.).

[30] *Waste diversion rate available on the Resource Productivity & Recovery Authority website. https://rpra.ca/programs/about-the-datacall/ Accessed 10/12/2019*

5.2.4 Use of Carts in Reduction of Single-Use Place Bags

Survey results (long form + short form) indicated there are twelve (12) cities/ municipalities of the total thirteen (13) surveyed, that use carts for garbage collection. The survey results indicated the use of single-use plastic bags to contain loose material in garbage carts is:

- mandatory for two (2) jurisdictions;
- optional for nine (9) jurisdictions; and,
- prohibited for one (1) jurisdiction.

Survey results (long form + short form) indicated there are ten (10) cities/ municipalities of the total thirteen (13) surveyed, that use carts for recycling program collection. The survey results indicated the use of single-use plastic bags to contain loose material in recycling carts is:

- optional for three (3) jurisdictions; and,
- prohibited for seven (7) jurisdictions.

Based on the feedback shared as a part of the survey, most respondents (six (6) out of nine (9) said there was **no reduction** in the number of plastic bags used in the residential curbside collection program since switching to carts. When asked how this was assessed, the majority said that this was either unknown or difficult to assess as this has not been measured. Assumptions were made that there were probably less garbage bags being used, but that residents may still use grocery/shopping bags for their garbage and then place in the garbage cart. The remaining respondents (three (3) out of nine (9)) said that there was a reduction in the number of plastic bags used.

As noted earlier in Section 5.2.3, since many of the jurisdictions require or prefer the use of plastic bags to contain waste within carts, it is implied in these cases there will be a continued use of single-use plastic bags to contain waste and small reduction in the usage of single-use plastic bags. Other reasons shared for using plastic bags within carts was to reduce the amount of wind-blown litter when tipping the carts, and for cart-cleanliness reasons, both for reducing the waste that may stick to the inside of the cart and also to reduce odours. Regardless of whether waste is to be contained within carts, residents may choose to use small plastic bags within kitchen garbage receptacles anyway, sometimes referred to as ‘kitchen catchers’, to contain waste within the home.

6. Conclusions

The work conducted by AECOM between July and September 2019 and involved a literature review of various solid waste resource publications and studies, an online review of waste collection programs of various Canadian cities and Municipalities, development of a draft survey and target list of Municipalities/ Cities, outreach and collection of survey responses, data analysis and reporting.

The following conclusions can be drawn from the short-form and long-form survey results:

- Survey results indicated the top factors for the decision to move to a cart-based collection system were worker safety, best management practices, and to reduce collection costs.
- Key recommendations for implementing a cart-based collection system focused on public engagement, outreach and education. Change may be difficult for residents, but having an educational program, social media campaign and advertising will help tremendously.
- The top-three high-level operational considerations for implementing cart systems included: cart placement and orientation at the curb, street width, weather and on-street parking (tied).
- Survey results indicated there was no measurable reduction in the number of plastic bags used in residential curbside collection programs since switching to carts. Results indicate the use of plastic bags to contain garbage within carts are optional or at the residents' discretion for most respondents, whereas results indicated the use of plastic bags to contain recycling and organics were prohibited for a majority of survey respondents.

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Appendix A

Survey Information

- Survey – Long Form (Blank)
- Survey – Short Form (Blank)
- Letter to Municipalities/Cities on behalf of HRM

Client: Halifax Regional Municipality - Solid Waste Division
Project: An Analysis of Cart/Bin Based Collection Systems for Garbage and Recyclables
Deliverable: Cart / Bin Analysis Survey - FINAL

HALIFAX AECOM

Jurisdictional Review Survey - Analysis of Cart/Bin Based Collection Systems for Garbage and Recyclables - a survey for Halifax Regional Municipality

AECOM Canada Ltd. has been retained on behalf of Halifax Regional Municipality, Solid Waste Resources Department, to conduct a jurisdictional review and analysis of cart/bin based collection programs for garbage and recyclables. The results of this jurisdictional survey are to provide HRM information to help guide staff in making recommendations to Regional Council respecting cart/bin-based options for residential curbside collection.

We appreciate your assistance and time for completing this survey, and any lessons learned you may wish to share from your experiences.
The results of this survey will be compiled into a report that will be presented to Halifax Regional Municipal Council in December, 2019. As this report will be posted publicly, it should be noted that answers provided to this survey will be a part of this public record.

Please do not hesitate to reach out to HRM staff or the AECOM project staff with any questions. Thank you for your valuable input.
Survey Contacts:
Shannon Betts, Policy Analyst, Halifax Regional Municipality, Solid Waste Division
email: bettss@halifax.ca telephone: +1-902-476-2470

Nora Doran, Project Manager, AECOM Canada Ltd.
email: nora.doran@aecom.com telephone: +1-902-428-2028

	Questions	Style of Answer
	Baseline and Background Questions	
1	Screen out question: Does your municipality use carts/bins for residential collection of garbage and recycling?	Yes / No - If no, survey complete. If yes, continue
2	Please provide the following information: City/Municipality/Region (include contact name, email, and phone number)	
3	If so, what material streams do you use carts/bins for?	If yes, for what material streams do you use cart/bins. Choose all options that apply. - Garbage - Organics - Recyclables - Paper - Other: explain
4	Do you have a single or multi-stream recycling program?	Drop down menu with following selections: - Single - Multi-stream - Other: explain
5	How many residential households do you service with curbside collection?	Provide Number:
6	What are the size of carts per recycling, garbage and organics?	
7	Please identity the influencing factors in your decision to use a cart based collection system ranking from 1-5 most to least important. 1 is most important and 5 as least important	Ranking Response (for Excel completion, please put a number beside each listing. - By Public or Council Request - To Reduce Collection Costs - For Worker Safety - Best Management Practices - To reduce use of plastic bags

8	Are there any other influencing factors in your decision to use a cart/bin based collection system that are not listed in Question 7, above? If yes, please specify:	
9	When did you start using carts / bins for curbside collection?	
10	What is your municipality's diversion rate (%)?	
11	Did your municipality's waste diversion rate change with the introduction of carts/bins for garbage and recyclables?	Yes / No / Don't Know
12	What is the contamination rate in your recycling stream?	
13	How is this metric calculated?	Drop down menu with following selections: - MRF residuals - Waste collection audit - Other: explain
14	Did the recycling contamination rate change when cart/bin collection system was implemented?	Yes / No / Don't Know
15	Did you purchase and implement carts/bins at the same time for multiple streams (i.e. garbage, recyclables, organics) or separately as individual purchases?	Drop down menu with following selections: - Individually - All at once - Other: explain
	Proposed Questions	**Style of Answer**
	Collection Questions	
16	Do you have manual or automated materials collection and if automated please indicate type from selections.	Drop down menu with following selections: - Manual Loading: All material is manually loaded by hand, into the truck. - Semi - Automated: Mechanical unloading, along with manual loading - Fully Automated: All unloading is done mechanically with the driver using a joystick. In this case, the driver does not leave the cab. - Other: explain
17	What is your collection frequency for garbage?	Drop down menu with following selections: - Weekly - Bi-weekly - Other: explain
18	What is your collection frequency for recycling?	Drop down menu with following selections: - Weekly - Bi-weekly - Other: explain
19	What is your collection frequency for organics?	Drop down menu with following selections: - Weekly - Bi-weekly - Other: explain
20	Do you use video or radio frequency identification (RFID) technology for education/enforcement?	Yes / No
21	Is the use of single-use plastic bags to contain loose material in **garbage** carts/bins mandatory, optional or prohibited? Please select from the options below.	Drop down menu with following selections: - Mandatory - Optional (at residents discretion) - Prohibited - Other: explain

	What is the reasoning behind this answer?	
22	Is the use of single-use plastic bags to contain loose material in recycling carts/bins mandatory, optional or prohibited? Please select from the options below.	Drop down menu with following selections: - Mandatory - Optional (at residents discretion) - Prohibited
	What is the reasoning behind this answer?	
23	Is the use of single-use plastic bags to contain loose material in organics carts/bins, mandatory, optional or prohibited? Please select from the options below.	Drop down menu with following selections: - Mandatory - Optional (at residents discretion) - Prohibited - Other: explain
	What is the reasoning behind this answer?	
24	Was there a reduction in the number of plastic bags used in your residential curbside collection program since switching to carts/bins?	Yes / No
	How is this assessed?	
25	What are any high level operational considerations with your cart/bin collection system? Please rank your selections from 1 to 8 with 1 as most important and 8 as least important.	Please rank the selections below (place ranking number beside selection): - Street width - On-street parking - Cart/bin placement and orientation at the curb - Collection of bulky items - Litter - Weather (wind/snow/rain) - Steep hills - Overhead clearance (i.e. tree trimming) - Other: explain
26	Are there any other high-level operational considerations with your cart/bin based collection system that are not included in Question 25, above?	Yes/ No. If yes, please specify
27	Is residential collection completed by municipal staff or contracted to a private third-party company?	Drop down menu with following selections: - Public - Private - Combination of public / private
28	Was there any modifications needed to the collection system when converting to a cart/bin system?	Drop down menu with following selections: - Truck type - Routing - By-laws (bin access/removal/type) - Other: explain
29	Do you allow for extra bags to be placed outside of the bins?	Yes / No . If yes, which stream
30	Was there an increase or decrease in fleet staff after implementing the cart/bin system?	Increase / Decrease / No Change
31	Was there in increase or decrease in collection vehicle maintenance costs after implementing the cart/bin system?	Increase / Decrease / No Change
	Proposed Questions	**Style of Answer**
	Financial Questions	

Client: Halifax Regional Municipality - Solid Waste Division
Project: An Analysis of Cart/Bin Based Collection Systems for Garbage and Recyclables
Deliverable: Cart / Bin Analysis Survey - FINAL

32	What was the procurement model you used for acquiring carts/bins?	Drop down menu with following selections: - Sole source - RFP - Other: explain
33	How were the size(s)/style(s) of the carts/bins chosen for garbage?	Check Boxes - choose all that apply: - Public survey - Consultant recommendation - Homeowner request - Other community recommendations - Collection provider recommendations - Other: explain
34	How were the size(s)/style(s) of the carts/bins chosen for recycling?	Drop down menu with following selections: - Public survey - Consultant recommendation - Homeowner request - Other community recommendations - Collection provider recommendations - Other: please explain
35	How were the size(s)/style(s) of the carts/bins chosen for organics?	Drop down menu with following selections: - Public survey - Consultant recommendation - Homeowner request - Other community recommendations - Collection provider recommendations - Other: explain
40	What are your overall annual operating costs (in Canadian Dollars) of garbage collection?	
41	What are your overall annual operating costs (in Canadian Dollars) of recycling collection?	
42	What are your overall annual operating costs (in Canadian Dollars) of organics collection?	
43	What costs (in Canadian Dollars) were incurred for implementing this system? Include items such as fleet modification/replacement, cart distribution, purchase of carts, etc.	- Public education: $ - Procurement costs: $ - Collection fleet: $ - Maintenance yard: $ - RFID technology and IT: $ - Administrative costs: $ - Distribution / deployment costs - initial delivery, etc.: $ - Cost to resident for cart: $ - Other: explain
44	Was there costs to modify receiving facilities (MRF, organics, landfill)?	Yes / No

Client: Halifax Regional Municipality - Solid Waste Division
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Deliverable: Cart / Bin Analysis Survey - FINAL

	Impacts Questions	
45	What are the cart replacement rates (# per year) for garbage, recyclables and organics?	- Garbage: - Recyclables: -Organics:
46	Who has the responsibility for replacement?	Drop down menu with following selections: - Municipality - Homeowner - Other: explain
47	What is the cost of cart replacement for garbage, recyclables and organics?	- Garbage: - Recyclables: -Organics:
48	What is the warranty on the carts/bins?	
49	Were any changes required at the receiving facilities (specifically MRF) to accommodate material collected in carts/bins? i.e. handling of loose material	- Yes / No If yes, please specify:
50	How was the cart purchase funded?	- Resident billed / pays direct cost -Tax Funds -Other, please specify:
51	How is your residential collection financed?	Drop down menu with the following selections: - Through the general tax rate - Separate flat rate charge on tax bill - User pay based on cart size - Other: explain
	Proposed Questions	**Style of Answer**
	Municipality Issue Questions	
52	What is the municipality's opinion on how the cart based program is working?	
53	What (if any) barriers to participation were identified by the public and how were these overcome?	Drop down menu with following selections: - Storage space - Odour - Aesthetics - Difficulties moving the cart - Other:
54	Are there assistance programs available for disability and special populations?	Yes / No. If yes, please elaborate.
55	How are these programs funded and administered? Please elaborate.	

Client: Halifax Regional Municipality - Solid Waste Division
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	Lessons Learned	
56	Do you have any lessons learned during the implementation and transition to the cart/bin program?	
57	Do you have any recommendations on what could be done differently?	
58	What benefits were realized in switching to a cart/bin based system?	

Thank you for taking the time to complete this survey. The results of this survey will be incorporated into a report prepared by the Halifax Regional Municipality (HRM) Solid Waste Team. This report will be submitted to HRM Council and is anticipated to be posted publically in December, 2019. The report will be made available to all survey respondents at this time.

Survey – Short Form

	Questions	Answer
1	What material streams do you use carts/bins for?	Garbage - Recycling - Organics -
2	Do you have a single or multi-stream recycling program?	
3	How many residential households do you service with curbside collection?	
4	When did you start using carts / bins for curbside collection?	
5	What were the main reasons for implementing carts?	
6	Did the recycling contamination rate change when cart/bin collection system was implemented?	
7	Do you have manual, semi-automated or automated materials collection for garbage, recycling and organics?	Garbage – Recycling – Organics -
8	Do you use video or radio frequency identification (RFID) technology for education/enforcement?	Yes / No
9	Is the use of single-use plastic bags to contain loose material in **garbage** carts/bins mandatory, optional or prohibited? Please select from the options below.	- Mandatory - Optional (at residents discretion) - Prohibited
10	What is the reasoning behind this answer?	
11	Is the use of single-use plastic bags to contain loose material in recycling carts/bins mandatory, optional or prohibited? Please select from the options below.	- Mandatory - Optional (at residents discretion) - Prohibited
12	What is the reasoning behind this answer?	

13	What are any high level operational considerations with your cart/bin collection system? Such as: Street width - On-street parking - Cart/bin placement and orientation at the curb - Collection of bulky items - Litter - Weather (wind/snow/rain) - Steep hills - Overhead clearance (i.e. tree trimming) - Other: explain	
14	Are there any other high-level operational considerations with your cart/bin based collection system that are not included in Question 25, above?	
15	Is residential collection completed by municipal staff or contracted to a private third-party company?	Mix of private and municipal staff
16	Do you allow for extra bags to be placed outside of the bins?	Yes / No . If yes, which stream
17	Was there an increase or decrease in fleet staff after implementing the cart/bin system?	Increase / Decrease / No Change
18	Was there in increase or decrease in collection vehicle maintenance costs after implementing the cart/bin system?	Increase / Decrease / No Change
19	How were the size(s)/style(s) of the carts/bins chosen for garbage? - Public survey - Consultant recommendation - Homeowner request - Other community recommendations - Collection provider recommendations - Other: explain	
20	How were the size(s)/style(s) of the carts/bins chosen for recycling? - Public survey - Consultant recommendation - Homeowner request - Other community recommendations - Collection provider recommendations - Other: explain	

21	How was the cart purchase funded?	- Resident billed / pays direct cost -Tax Funds -Other, please specify:
22	What is the municipality's opinion on how the cart based program is working?	
23	What (if any) barriers to participation were identified by the public and how were these overcome? - Storage space - Odour - Aesthetics - Difficulties moving the cart - Other:	
24	Do you have any lessons learned during the implementation and transition to the cart/bin program? What could have been done different?	
25	What benefits were realized in switching to a cart/bin based system?	

To Whom It May Concern,

Halifax Regional Municipality, Solid Waste Resources has retained the services of AECOM to conduct a jurisdictional review and analysis of bin/cart based collection programs for garbage and recyclables. This review will give us a better understanding of other systems and guide staff in making recommendations to Regional Council respecting cart-based options for residential curbside collection.

We appreciate the time you take to fill out this survey, along with sharing lessons learned from your experience you may wish to share.

Please do not hesitate to reach out to HRM staff or the AECOM project staff with any questions. Thank you for your valuable input.

Sincerely,

Shannon Betts
Solid Waste Policy Analyst
Halifax Solid Waste Resources
Cell 902.476.2470
Email bettss@halifax.ca

Jordan Vallis, P. Eng.
Solid Waste Engineer
Halifax Solid Waste Resources
Cell 902.292-1570
Email vallisj@halifax.ca

cc: Laurie Lewis, Program Manager, Policy & Outreach
Robert Orr, P. Eng., Program Manager, Engineering & Contract Services

Appendix B

Survey Results

- Survey Results – Long Form Survey – Individual Responses
- Survey Results – Short Form Survey – Summary of Individual Responses

#1

COMPLETE

Collector:	Web Link 1 (Web Link)
Started:	Monday, August 26, 2019 2:22:12 PM
Last Modified:	Monday, August 26, 2019 4:54:05 PM
Time Spent:	02:31:52
IP Address:	167.129.197.41

Page 2

Q2 Does your municipality use carts/bins for residential collection of garbage or recycling?

Yes

Q3 If yes, for what material streams do you use carts/bins? Choose all options that apply.

Garbage,

Recyclables,

Organics,

Paper,

Other: Please explain:

Paper and other household packaging recyclables are collected in one co-mingled recycling cart.

Q4 Do you have a single or multi-stream recycling program?

Multi-stream

Q5 How many residential households do you service with curbside collection?

70,000

Q6 What are the size of carts for recycling, garbage and organics?

Recycling	**95 gal**
Garbage	**95 gal and some 65 gal on request**
Organics	**95 gal**

Q7 Please identify the influencing factors in your decision to use a cart/ bin based collection system ranking from 1 to 5, with 1 as most important and 5 as least important.

By public or Council request	**4**
To reduce collection costs	**1**
For worker safety	**2**
Best Management Practices	**3**
To reduce use of plastic bags	**5**

Q8 Are there any other influencing factors in your decision to use a cart/bin based collection system that are not listed in Questions 7, above?

Yes,

If yes, please specify:

Reduce waste generated by households and increase accountability. Reduce fires, overfilling, and other misuse of shared 300 gallon containers in back lanes.

Q9 When did you start using carts / bins for curbside collection?

Some neighbourhoods since the early 90s. Other neighbourhoods had been using shared 300 gallon containers in back lanes until 2010, but since then all households now have rollout carts.

Q10 What is your municipality's waste diversion rate (%)?

23

Q11 Did your municipality's waste diversion rate change with the introduction of carts/bins for garbage and recyclables?

Don't know,

Please explain::

Unable to find documentation of diversion rates or waste characterizations from the early 90s.

Q12 What is the contamination rate (%) in your recycling stream?

10%

Q13 How is this metric calculated?

Waste collection audit

Q14 Did the recycling contamination rate improve when cart/bin collection system was implemented?

No,

Don't know,

Please explain:

The curbside recycling program was implemented in 2013. We've always had carts since Day 1.

Q15 Did you purchase and implement carts/bins at the same time for multiple streams (i.e. garbage, recyclables, organics) or separately as individual purchases?	**Individually,** Other: Please explain: Waste carts were in place long before the recycling program (with carts) was implemented in 2013. Organics cart collections started in the mid-2000s.
Q16 Do you have manual or automated materials collection. If automated, please indicate type from selections.	**Fully Automated Loading: all unloading is done mechanically with the driver using a joystick. In this case, the driver does not leave the cab.**
Q17 What is your collection frequency for garbage?	**Other,** If other, please explain: Weekly in the summer months (from May through September inclusive) and bi-weekly in the winter months.
Q18 What is your collection frequency for recycling?	**Bi-Weekly**
Q19 What is your collection frequency for organics?	**Other,** If other, please explain: Bi-weekly from May through the first week of November.
Q20 Do you use video or radio frequency identification (RFID) technology for education/enforcement?	**Yes**
Q21 Is the use of single-use plastic bags to contain loose material in garbage carts/bins mandatory, optional or prohibited? Please select from the options below.	**Mandatory,** Please explain the reasoning behind your selection: Waste Bylaw requirement. Minimizes the potential for waste materials to blow out of carts during collection. Also minimizes the potential for waste materials to stick to the inside of the cart, thus reducing odours. As the organics program is an optional subscription based program, a large quantity of organic materials are still ending up in waste carts.
Q22 Is the use of single-use plastic bags to contain loose material in recycling carts/bins mandatory, optional or prohibited? Please select from the options below.	**Prohibited ,** Please explain the reasoning behind your selection: Under the recycling contract and Waste Bylaw requirements, all materials must be placed loosely into carts so they can be effectively sorted at the MRF. The recycling collection trucks have different hoppers than the waste collection trucks so that loose, blown litter is minimized.

Q23 Is the use of single-use plastic bags to contain loose material in organics carts/bins, mandatory, optional or prohibited? Please select from the options below.

Prohibited

Q24 Was there a reduction in the number of plastic bags used in your residential curbside collection program since switching to carts/bins?

No,

How is this assessed?:

No data on this. See #11 above.

Q25 What are any high level operational considerations with your cart/bincollection system? Please rank your selections from 1 to 8 with 1 as most important and 8 as least important.

Street width	**4**
On-street parking	**2**
Cart/bin placement and orientation at the curb	**3**
Collection of bulky items	**7**
Litter	**5**
Weather (wind/snow/rain)	**6**
Steep Hills	**8**
Overhead clearance (i.e. tree trimming)	**1**

Q26 Are there any other high-level operational considerations with your cart/bin based collection system that are not included in Question 25, above?

Yes,

If yes, please specify:

Back lane collections are challenging and inefficient. In addition to overhead obstructions, there are issues with carts being left out, property damage, scavenging, theft, vandalism, and congestion.

Q27 Is residential collection completed by municipal staff or contracted to a private third-party company?

Combination of Public/Private

Q28 Was there any modifications needed to the collection system when converting to a cart/bin system?

Other: Please explain.:

All of the above. New trucks, new routes, new bylaw requirements.

Q29 Do you allow for extra bags to be placed outside of the bins?

No

Q30 Was there an increase or decrease in fleet staff after implementing the cart/bin system?

Decrease

Q31 Was there in increase or decrease in collection vehicle maintenance costs after implementing the cart/bin system?

No change

Q32 What was the procurement model you used for acquiring carts/bins?

RFP

Q33 How were the size(s)/style(s) of the carts/bins chosen for garbage? Choose all options that apply.

Other: Please explain.:

Feel free to call

Q34 How were the size(s)/style(s) of the carts/bins chosen for recycling? Choose all options that apply.

Other: Please explain.:

Largest cart to incentivize recycling.

Q35 How were the size(s)/style(s) of the carts/bins chosen for organics?

Other: Please explain.:

Largest cart to incentivize composting.

Q36 What are your overall annual operating costs (in Canadian Dollars) for garbage collection?

Loaded question. Can't easily be explained in one box.

Q37 What are your overall annual operating costs (in Canadian Dollars) for recycling collection?

Same as above. Feel free to call me.

Q38 What are your overall annual operating costs (in Canadian Dollars) for organics collection?

Ditto.

Q39 What costs (in Canadian Dollars) were incurred for implementing this system? Include items such as fleet modification/replacement, cart distribution, purchase of carts, etc.

Other: **To be discussed outside of this survey.**

Q40 Were there costs to modify receiving facilities (MRF, organics, landfill)?

No

Q41 What are the cart/bin replacement rates (# per year) for garbage, recyclables and organics?

Garbage: **Approx 5000 or 7%**

Recyclables: **Under contract**

Organics: **Low**

Q42 Who has the responsibility for cart/bin replacement?

Municipality

Q43 What is the cost of cart/bin replacement for garbage, recyclables and organics?

Garbage:

Fluctuates annually based on cart contracts.

Q44 What is the warranty on the carts/bins?

10 years

Q45 Were any changes required at the receiving facilities (specifically MRF) to accommodate material collected in carts/bins? i.e. handling of loose material

No,

If yes, please specify::

MRF was constructed with cart collection in mind.

Q46 How was the cart purchase funded

Other (please specify):
Property tax funded for waste. Utility for recycling.
Subscription fees for organics.

Q47 How is your residential collection financed?

Other: Please explain.:
Property tax funded for waste. Utility for recycling.
Subscription fees for organics.

Q48 What is the municipality's opinion on how the cart/bin based program is working?

Can discuss further.

Q49 What, if any, barriers to participation were identified by the public and how were these overcome?

Storage space,

Odour,

Aesthetics,

Difficulties moving the cart,

Other: Please explain:

Education, customer call centre, webpage, time and experience.

Q50 Are there assistance programs available for disability and special populations?

Yes,
If yes, please elaborate:
Additional info will be provided directly to Halifax.

Q51 How are these programs funded and administered? Please elaborate.

Same as above.

Q52 Do you have any lessons learned during the implementation and transition to the cart/bin program?

Feel free to call.

Q53 Do you have any recommendations on what could be done differently?

Feel free to call.

Q54 What benefits were realized in switching to a cart/bin based system?

Has been in place for decades.

#2

COMPLETE

Collector:	Web Link 1 (Web Link)
Started:	Tuesday, August 27, 2019 7:30:22 AM
Last Modified:	Tuesday, August 27, 2019 8:57:11 AM
Time Spent:	01:26:49
IP Address:	142.176.20.1

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Q2 Does your municipality use carts/bins for residential collection of garbage or recycling?

Yes

Q3 If yes, for what material streams do you use carts/bins? Choose all options that apply.

Garbage,

Organics

Q4 Do you have a single or multi-stream recycling program?

Multi-stream

Q5 How many residential households do you service with curbside collection?

74,611

Q6 What are the size of carts for recycling, garbage and organics?

Garbage	**240L**
Organics	**240L**

Q7 Please identify the influencing factors in your decision to use a cart/ bin based collection system ranking from 1 to 5, with 1 as most important and 5 as least important.

By public or Council request	**5**
To reduce collection costs	**4**
For worker safety	**2**
Best Management Practices	**1**
To reduce use of plastic bags	**3**

Q8 Are there any other influencing factors in your decision to use a cart/bin based collection system that are not listed in Questions 7, above?

Yes,

If yes, please specify:

windy weather and to control litter with crows and other animals etc.

Q9 When did you start using carts / bins for curbside collection?

Pilot them in 1995 went Island wide in 2003

Q10 What is your municipality's waste diversion rate (%)?

over 50%

Q11 Did your municipality's waste diversion rate change with the introduction of carts/bins for garbage and recyclables?

Yes

Q12 What is the contamination rate (%) in your recycling stream?

5-6%

Q13 How is this metric calculated?

MRF residuals

Q14 Did the recycling contamination rate improve when cart/bin collection system was implemented?

Yes,

Please explain:

On PEI we introduced cart collection for waste and organics and Blue Bag program for recyclables at the same time when our Waste Watch program started

Q15 Did you purchase and implement carts/bins at the same time for multiple streams (i.e. garbage, recyclables, organics) or separately as individual purchases?

All at once

Q16 Do you have manual or automated materials collection. If automated, please indicate type from selections.

Semi - Automated Loading: mechanical unloading, along with manual loading.

,

Other: Please explain.:

maunual loading with cart lifter to lift and empty cart into truck .

Q17 What is your collection frequency for garbage?

Bi-weekly ,

If other, please explain:

Bi weekly one week organics next week Waste and monthly collections of recyclables

Q18 What is your collection frequency for recycling?

Other,

If other, please explain:

Monthly

Q19 What is your collection frequency for organics?	**Bi-Weekly**
Q20 Do you use video or radio frequency identification (RFID) technology for education/enforcement?	**No**
Q21 Is the use of single-use plastic bags to contain loose material in garbage carts/bins mandatory, optional or prohibited? Please select from the options below.	**Prohibited**
Q22 Is the use of single-use plastic bags to contain loose material in recycling carts/bins mandatory, optional or prohibited? Please select from the options below.	**Prohibited**
Q23 Is the use of single-use plastic bags to contain loose material in organics carts/bins, mandatory, optional or prohibited? Please select from the options below.	**Prohibited**
Q24 Was there a reduction in the number of plastic bags used in your residential curbside collection program since switching to carts/bins?	**Yes,** How is this assessed?: prior to the introduction of carts residents placed waste and compost curbside in plastic bags.

Q25 What are any high level operational considerations with your cart/bincollection system? Please rank your selections from 1 to 8 with 1 as most important and 8 as least important.

Street width	**6**
On-street parking	**2**
Cart/bin placement and orientation at the curb	**1**
Collection of bulky items	**7**
Litter	**5**
Weather (wind/snow/rain)	**3**
Steep Hills	**8**
Overhead clearance (i.e. tree trimming)	**4**

Q26 Are there any other high-level operational considerations with your cart/bin based collection system that are not included in Question 25, above?	**No**
Q27 Is residential collection completed by municipal staff or contracted to a private third-party company?	**Private**

Q28 Was there any modifications needed to the collection system when converting to a cart/bin system?	**Truck type**
Q29 Do you allow for extra bags to be placed outside of the bins?	**Yes,** If yes, which stream?: Currently up to two clear plastic for waste and two paper bags for compost are permitted on each pick up.
Q30 Was there an increase or decrease in fleet staff after implementing the cart/bin system?	**No change**
Q31 Was there in increase or decrease in collection vehicle maintenance costs after implementing the cart/bin system?	**No change**
Q32 What was the procurement model you used for acquiring carts/bins?	**RFP**
Q33 How were the size(s)/style(s) of the carts/bins chosen for garbage? Choose all options that apply.	**Consultant recommendation**
Q34 How were the size(s)/style(s) of the carts/bins chosen for recycling? Choose all options that apply.	Other: Please explain.: we do not use carts for recycling we went with Blue bag 1 (All Paper) and Blue Bag 2 Metal Plastic and glass. by doing this we had a presort of recyclables and less cross contamination
Q35 How were the size(s)/style(s) of the carts/bins chosen for organics?	**Consultant recommendation**

Q36 What are your overall annual operating costs (in Canadian Dollars) for garbage collection?

Year ending March 31 2019 residential collection contracts $2,051,882

Q37 What are your overall annual operating costs (in Canadian Dollars) for recycling collection?

Year ending march 31, 2019 Residential Recycling Contracts $1,699,316

Q38 What are your overall annual operating costs (in Canadian Dollars) for organics collection?

year End March 31, 2019 Compost residential collection contracts $2,051,882

Q39 What costs (in Canadian Dollars) were incurred for implementing this system? Include items such as fleet modification/replacement, cart distribution, purchase of carts, etc.

Public education:	**annual budget for advertizing etc $140,000 per year**
Procurement costs:	**Cart balance as of March 31, 2019 was $7.4M**
Collection fleet:	**all done by private contractors**
Cost to resident for cart:	**Cost for cart included in annual residential fee currently at $205 per household and 495 per cottage/seasonal home**

Q40 Were there costs to modify receiving facilities (MRF, organics, landfill)? **No**

Q41 What are the cart/bin replacement rates (# per year) for garbage, recyclables and organics?

Garbage:	**we currently have 74,611 waste carts located in customers yards some are over 20 years old . We currently replace 3-5% per year.**
Recyclables:	**no carts used**
Organics:	**we currently have 74,611 waste carts located in customers yards some are over 20 years old . We currently replace 3-5% per year**

Q42 Who has the responsibility for cart/bin replacement? Other: Please explain.:
IWMC owns all carts and replaces all carts

Q43 What is the cost of cart/bin replacement for garbage, recyclables and organics?

Garbage:	**$60-80**
Recyclables:	**non**
Organics:	**$70-100**

Q44 What is the warranty on the carts/bins?

depends on make very little warranty used or needed

Q45 Were any changes required at the receiving facilities (specifically MRF) to accommodate material collected in carts/bins? i.e. handling of loose material **No**

Q46 How was the cart purchase funded Other (please specify):
IWMC Crown corporation of Province We borrowed $30M to start our Island Wide Program

Q47 How is your residential collection financed?

Separate flat rate charge on bill

Q48 What is the municipality's opinion on how the cart/bin based program is working?

have very little issues

Q49 What, if any, barriers to participation were identified by the public and how were these overcome?

Storage space,

Aesthetics

Q50 Are there assistance programs available for disability and special populations?

Yes,
If yes, please elaborate:
we provide Bach yard collection for disable or elderly etc

Q51 How are these programs funded and administered? Please elaborate.

contractor is outlined this in collection contracts and provides price per collection

Q52 Do you have any lessons learned during the implementation and transition to the cart/bin program?

we did not have option to have chips in carts when program started would be nice to have these in all carts as opposed to just serial numbers.

Q53 Do you have any recommendations on what could be done differently?

no we are happy with our decision.

Q54 What benefits were realized in switching to a cart/bin based system?

less litter

#3

COMPLETE

Collector:	Web Link 1 (Web Link)
Started:	Thursday, August 29, 2019 9:28:42 AM
Last Modified:	Thursday, August 29, 2019 10:40:03 AM
Time Spent:	01:11:20
IP Address:	72.142.121.16

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Q2 Does your municipality use carts/bins for residential collection of garbage or recycling?

Yes

Q3 If yes, for what material streams do you use carts/bins? Choose all options that apply.

Garbage

Q4 Do you have a single or multi-stream recycling program?

Multi-stream

Q5 How many residential households do you service with curbside collection?

48000

Q6 What are the size of carts for recycling, garbage and organics?

Recycling	**N/A**
Garbage	**240 L**
Organics	**N/A**

Q7 Please identify the influencing factors in your decision to use a cart/ bin based collection system ranking from 1 to 5, with 1 as most important and 5 as least important.

By public or Council request	**3**
To reduce collection costs	**4**
For worker safety	**1**
Best Management Practices	**2**
To reduce use of plastic bags	**5**

Q8 Are there any other influencing factors in your decision to use a cart/bin based collection system that are not listed in Questions 7, above?

Yes,

If yes, please specify:

Ability to track driver productivity and number of households serviced on a daily basis. We can now collect data that we couldn't before. Reduction in litter from bags being torn open by birds.

Q9 When did you start using carts / bins for curbside collection?

June 2018 and June 2019

Q10 What is your municipality's waste diversion rate (%)?

12% by weight (recycling/garbage)

Q11 Did your municipality's waste diversion rate change with the introduction of carts/bins for garbage and recyclables?

Yes,

Please explain::

Our recycling program is currently voluntary. We noticed an increase in recycling immediately after implementing automated garbage collection. With the introduction of automated garbage collection, we went from a 10 bag weekly limit, to whatever could fit in a 240 L cart. Because of this, residents were almost forced to start recycling so they could fit all their garbage into a 240 L cart. Number of recycling bags collected per week is unlimited.

Q12 What is the contamination rate (%) in your recycling stream?

<2%

Q13 How is this metric calculated?

MRF residuals

Q14 Did the recycling contamination rate improve when cart/bin collection system was implemented?

Don't know,

Please explain:

Too early to tell. We only rolled out carts to 1/3 of the City in 2018. The remainder of the City only started participating in June 2019. Also it would be difficult to tell because the MRF services the eastern region of Newfoundland and not just St. John's.

Q15 Did you purchase and implement carts/bins at the same time for multiple streams (i.e. garbage, recyclables, organics) or separately as individual purchases?

Other: Please explain:

We only purchased carts for garbage. Recycling and yard waste will remain manual collection.

Q16 Do you have manual or automated materials collection. If automated, please indicate type from selections.	**Fully Automated Loading: all unloading is done mechanically with the driver using a joystick. In this case, the driver does not leave the cab.** **,** Other: Please explain.: There are some exceptions. Some one-way streets utilize a cart tipper, which is semi-automated since driver has to get out of truck. Also, a small section of the City in the downtown core will remain full manual collection due to difficulty with issuing carts (density, on-street parking, row-housing with nowhere to store cart)
Q17 What is your collection frequency for garbage?	**Weekly**
Q18 What is your collection frequency for recycling?	**Bi-Weekly**
Q19 What is your collection frequency for organics?	**Bi-Weekly,** If other, please explain: Seasonal yard waste collection only.
Q20 Do you use video or radio frequency identification (RFID) technology for education/enforcement?	**Yes**
Q21 Is the use of single-use plastic bags to contain loose material in garbage carts/bins mandatory, optional or prohibited? Please select from the options below.	**Optional (at residents discretion) ,** Please explain the reasoning behind your selection: We advise residents to still use bags to help keep the inside of the cart cleaner.
Q22 Is the use of single-use plastic bags to contain loose material in recycling carts/bins mandatory, optional or prohibited? Please select from the options below.	**Mandatory,** Please explain the reasoning behind your selection: We don't use carts for recycling. All blue, clear bags.
Q23 Is the use of single-use plastic bags to contain loose material in organics carts/bins, mandatory, optional or prohibited? Please select from the options below.	Other (please specify): We don't use carts for organics. We only pick-up yard waste seasonally. Yard waste must be in paper compostable bags.
Q24 Was there a reduction in the number of plastic bags used in your residential curbside collection program since switching to carts/bins?	**Yes,** How is this assessed?: We don't know. But we can assume that there are probably less garbage bags being used now by residents

Q25 What are any high level operational considerations with your cart/bincollection system? Please rank your selections from 1 to 8 with 1 as most important and 8 as least important.

Street width	**4**
On-street parking	**2**
Cart/bin placement and orientation at the curb	**3**
Collection of bulky items	**8**
Litter	**6**
Weather (wind/snow/rain)	**1**
Steep Hills	**5**
Overhead clearance (i.e. tree trimming)	**7**

Q26 Are there any other high-level operational considerations with your cart/bin based collection system that are not included in Question 25, above?

Yes,

If yes, please specify:

Upgrade of trucks to have automated arm/cart tippers.
Integrations with technology (RFID, cameras)

Q27 Is residential collection completed by municipal staff or contracted to a private third-party company?

Public

Q28 Was there any modifications needed to the collection system when converting to a cart/bin system?

Truck type

Q29 Do you allow for extra bags to be placed outside of the bins?

No

Q30 Was there an increase or decrease in fleet staff after implementing the cart/bin system?

No change

Q31 Was there in increase or decrease in collection vehicle maintenance costs after implementing the cart/bin system?

Decrease

Q32 What was the procurement model you used for acquiring carts/bins?

Sole source

Q33 How were the size(s)/style(s) of the carts/bins chosen for garbage? Choose all options that apply.

Public survey,

Other: Please explain.:

The City underwent a public engagement period where residents were given all the information and were allowed to provide feedback to assist City staff and council in making a decision. A slim majority of residents chose the medium size (240 L) cart as the preferred option. City staff also preferred this size.

Q34 How were the size(s)/style(s) of the carts/bins chosen for recycling? Choose all options that apply.

Other: Please explain.:

Not applicable

Q35 How were the size(s)/style(s) of the carts/bins chosen for organics?

Other: Please explain.:

Not applicable

Q36 What are your overall annual operating costs (in Canadian Dollars) for garbage collection?

8,000,000

Q37 What are your overall annual operating costs (in Canadian Dollars) for recycling collection?

Cost included in garbage collection cost indicated in question 36

Q38 What are your overall annual operating costs (in Canadian Dollars) for organics collection?

cost included in garbage collection cost indicated in question 36

Q39 What costs (in Canadian Dollars) were incurred for implementing this system? Include items such as fleet modification/replacement, cart distribution, purchase of carts, etc.

Procurement costs:	**2,400,000**
Collection fleet:	**4,500,000**
Maintenance yard:	**0**
RFID technology and IT:	**300,000**
Distribution / deployment costs - initial delivery, etc.:	**225000**
Cost to resident for cart:	**0**

Q40 Were there costs to modify receiving facilities (MRF, organics, landfill)?

No

Q41 What are the cart/bin replacement rates (# per year) for garbage, recyclables and organics?

Garbage:	**Too early to tell**
Recyclables:	**N/A**
Organics:	**N/A**

Q42 Who has the responsibility for cart/bin replacement? **Homeowner**

Q43 What is the cost of cart/bin replacement for garbage, recyclables and organics?

Garbage:	**$65 plus $25 for delivery**
Recyclables:	**N/A**
Organics:	**N/A**

Q44 What is the warranty on the carts/bins?

Ten years

Q45 Were any changes required at the receiving facilities (specifically MRF) to accommodate material collected in carts/bins? i.e. handling of loose material **No**

Q46 How was the cart purchase funded

Other (please specify):
Fully funded by the City through capital funds. There was no direct charge to homeowners

Q47 How is your residential collection financed? **Through the general tax rate**

Q48 What is the municipality's opinion on how the cart/bin based program is working?

Great so far. Reduction in litter, reduction in worker injuries. RFID readers and video on the truck make following up on missed service complaints much easier to handle. Data collected by trucks is also valuable for driver productivity, set-out rates, tracking per-capita weights, etc.

Windy days can be a challenge because empty carts can blow around, resulting in an increase in calls to 311 for missing carts.

It's too early in our program to fully assess the program and give proper feedback.

Q49 What, if any, barriers to participation were identified by the public and how were these overcome?

Storage space,

Aesthetics,

Difficulties moving the cart,

Other: Please explain:

Weather. Many residents feared that the program wouldn't work in the winter

Q50 Are there assistance programs available for disability and special populations?

Yes,
If yes, please elaborate:
We allow medical exemptions for seniors or those with disabilities or special needs.

Q51 How are these programs funded and administered? Please elaborate.

Resident requesting exemption must fill out and submit an exemption form. It is reviewed by City staff.

Q52 Do you have any lessons learned during the implementation and transition to the cart/bin program?

We would recommended doing a multi-year implementation. We rolled out to approximately 1/3 of the City in 2018 and followed up with the remainder one year later in 2019. Changing to an automated program is a big change from manual collection for both the garbage collectors and residents. By starting with a small population, you can learn lessons that you can then use to ensure that the majority of your roll-out goes smoothly. Phase 2 of our roll-out in 2019 went better than Phase 1 in 2018 as we knew that potential problems we would encounter. It's much easier to fix mistakes for a small percentage of the City than the whole City.

We would also recommend public engagement before you roll-out the program. Feedback from the public is valuable and it's important that residents know that changes are coming. Realize that you will get some resistance from people. Have a plan for how to deal with exceptions to the norms.

Accuracy of data on households (locations, number of apartments, etc.) is key to ensuring that delivery goes smoothly. You want to make sure contractor has reliable, accurate and up-to-date data to do the deliveries. At the end of the roll-out of the program, you want to have confidence that the data you get back from the contractor is accurate. I.E., "garbage in, garbage out"

For purchase of carts, we stated required specifications in a tender call and awarded to lowest bidder meeting specs. For technology upgrades (cameras, RFID readers, back-office software), we issued a separate RFP and evaluated more on software capabilities over cost.

We also had to update our by-laws and are in the process of updating our routes.

Q53 Do you have any recommendations on what could be done differently?

No. We've been pleased with how things have gone so far. A lot of planning went into this project.

Q54 What benefits were realized in switching to a cart/bin based system?

Worker safety is vastly improved, litter in neighbourhoods is reduced and participation in recycling is increased. It's still too early to tell if collection has become more efficient.

#4

COMPLETE

Collector:	Web Link 1 (Web Link)
Started:	Monday, August 26, 2019 11:28:03 AM
Last Modified:	Thursday, August 29, 2019 11:41:47 AM
Time Spent:	Over a day
IP Address:	198.163.58.124

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Q2 Does your municipality use carts/bins for residential collection of garbage or recycling?

Yes

Q3 If yes, for what material streams do you use carts/bins? Choose all options that apply.

Garbage,

Recyclables

Q4 Do you have a single or multi-stream recycling program?

Single

Q5 How many residential households do you service with curbside collection?

203,000

Q6 What are the size of carts for recycling, garbage and organics?

Recycling	**240L; upgrade to 360L, 240+240L, or 240+360L available**
Garbage	**240L; upgrade to 360L, 240+240L, or 240+360L available**
Organics	**n/a**

Q7 Please identify the influencing factors in your decision to use a cart/ bin based collection system ranking from 1 to 5, with 1 as most important and 5 as least important.

By public or Council request	**4**
To reduce collection costs	**2**
For worker safety	**3**
Best Management Practices	**1**
To reduce use of plastic bags	**5**

Q8 Are there any other influencing factors in your decision to use a cart/bin based collection system that are not listed in Questions 7, above?

Yes,

If yes, please specify:

It is difficult to rank question 7 as the changeover started a decade ago and the motivations beyond the public reports aren't known.

Q9 When did you start using carts / bins for curbside collection?

February 2010 for northwest quadrant garbage; Rest of city for garbage and recycling in 2012

Q10 What is your municipality's waste diversion rate (%)?

33%

Q11 Did your municipality's waste diversion rate change with the introduction of carts/bins for garbage and recyclables?

Yes,

Please explain::

Introduction of carts was accompanied with significant other programs, so it is difficult to isolate the effects of the carts.

Q12 What is the contamination rate (%) in your recycling stream?

18%

Q13 How is this metric calculated?

Other: Please explain:

Waste audits at MRF.

Q14 Did the recycling contamination rate improve when cart/bin collection system was implemented?

Don't know,

Please explain:

Changes to MRF auditing protocol and markets also took place, so it is hard to isolate effect of carts on contamination.

Q15 Did you purchase and implement carts/bins at the same time for multiple streams (i.e. garbage, recyclables, organics) or separately as individual purchases?

Other: Please explain:

About 45,000 northwest garbage carts in 2010. 145,000 garbage carts and 190,000 recycling carts in 2012

Q16 Do you have manual or automated materials collection. If automated, please indicate type from selections.

Fully Automated Loading: all unloading is done mechanically with the driver using a joystick. In this case, the driver does not leave the cab.

,

Other: Please explain.:

Areas with tighter back lanes have semi-automated rear loaders.

Q17 What is your collection frequency for garbage?	**Weekly**
Q18 What is your collection frequency for recycling?	**Weekly**
Q19 What is your collection frequency for organics?	**Other,** If other, please explain: Seasonal bi-weekly leaf and yard waste service collected manually. No residential food waste program.
Q20 Do you use video or radio frequency identification (RFID) technology for education/enforcement?	**Yes**
Q21 Is the use of single-use plastic bags to contain loose material in garbage carts/bins mandatory, optional or prohibited? Please select from the options below.	**Optional (at residents discretion) ,** Please explain the reasoning behind your selection: Residents must put the garbage inside the cart in a way that it can fall freely when the cart is emptied. Otherwise residents are responsible for the general care and maintenance of their City-assigned cart. They're also responsible for complying with the Neighbourhood Liveability By-law which deals with odours, illegal dumping, and other injurious effects.
Q22 Is the use of single-use plastic bags to contain loose material in recycling carts/bins mandatory, optional or prohibited? Please select from the options below.	**Prohibited ,** Please explain the reasoning behind your selection: Plastic bags and film are prohibited from our single stream system as they clog the machinery at the MRF.
Q23 Is the use of single-use plastic bags to contain loose material in organics carts/bins, mandatory, optional or prohibited? Please select from the options below.	Other (please specify): No residential food waste collection program
Q24 Was there a reduction in the number of plastic bags used in your residential curbside collection program since switching to carts/bins?	**No,** How is this assessed?: Not measured

Q25 What are any high level operational considerations with your cart/bincollection system? Please rank your selections from 1 to 8 with 1 as most important and 8 as least important.

Street width	**2**
On-street parking	**5**
Cart/bin placement and orientation at the curb	**1**
Collection of bulky items	**6**
Litter	**7**
Weather (wind/snow/rain)	**4**
Steep Hills	**8**
Overhead clearance (i.e. tree trimming)	**3**

Q26 Are there any other high-level operational considerations with your cart/bin based collection system that are not included in Question 25, above?

Yes,

If yes, please specify:

If using ASL, collection from both sides or single side of back lane. Vehicle fuel source (e.g. CNG or RNG). Overhead clearance in relation to utility lines (taking into considerations line sag, snow pack, and height of vehicle)

Q27 Is residential collection completed by municipal staff or contracted to a private third-party company?

Private

Q28 Was there any modifications needed to the collection system when converting to a cart/bin system?

Other: Please explain.:
All services contracted, so all new vehicles required. Collection changes from a five-day cycle that was bumped by holidays to a fixed day-of-the-week schedule that collects on most holidays. By-law was updated as well.

Q29 Do you allow for extra bags to be placed outside of the bins?

Yes,
If yes, which stream?:
Garbage. Up to three bags for a fee

Q30 Was there an increase or decrease in fleet staff after implementing the cart/bin system?

No change

Q31 Was there in increase or decrease in collection vehicle maintenance costs after implementing the cart/bin system?

No change

Q32 What was the procurement model you used for acquiring carts/bins?

Other: Please explain.:
Tender

Q33 How were the size(s)/style(s) of the carts/bins chosen for garbage? Choose all options that apply.

Public survey,

Other community recommendations,

Other: Please explain.:

Extensive public engagement campaign

Q34 How were the size(s)/style(s) of the carts/bins chosen for recycling? Choose all options that apply.

Public survey,

Homeowner request,

Other community recommendations ,

Other: Please explain.:

Extensive public engagement campaign

Q35 How were the size(s)/style(s) of the carts/bins chosen for organics?

Other: Please explain.:

n/a

Q36 What are your overall annual operating costs (in Canadian Dollars) for garbage collection?

$10.3M (2018)

Q37 What are your overall annual operating costs (in Canadian Dollars) for recycling collection?

$11.5M (2018)

Q38 What are your overall annual operating costs (in Canadian Dollars) for organics collection?

$2.9M (manual leaf and yard waste) (2018)

Q39 What costs (in Canadian Dollars) were incurred for implementing this system? Include items such as fleet modification/replacement, cart distribution, purchase of carts, etc.

Public education:	**$300k contract to firm to develop branding and public awareness. 2.0 FTEs hired**
Procurement costs:	**n/a**
Collection fleet:	**n/a**
Maintenance yard:	**n/a**
RFID technology and IT:	**Significant, but hard to quantify as we've developed a custom software solution to manage our customers and assets. Also tie-ins with our billing system, 311, and the overhead required to store Fleetmind data.**
Administrative costs:	**Significant, but hard to quantify as there's support from many parts of the organization.**
Distribution / deployment costs - initial delivery, etc.:	**Cart supply and delivery tender in 2012 was $14.5M; temporary summer staff were hired to assist with cart delivery.**
Cost to resident for cart:	**$0**
Other:	**Costs are hard to quantify for some areas due to all the other system changes that took place at the same time.**

Q40 Were there costs to modify receiving facilities (MRF, organics, landfill)? **No**

Q41 What are the cart/bin replacement rates (# per year) for garbage, recyclables and organics?

Garbage:	**This is a loaded question as there are implications for either warranty, collection practices, or condition of asset**
Recyclables:	**In 2015, $490,000 was spent replacing and the purchase of new carts of all types. 2016: $490,000; 2017: $700,000. 2018: $430,000**
Organics:	**Based on calls to 311, requests to repair or replace carts of all types were: 1152 (2013), 1098 (2014), 876 (2015), 833 (2016), and 1007 (2017)**

Q42 Who has the responsibility for cart/bin replacement? Other: Please explain.:
Property owner unless damaged by contractor or third party (e.g. vandalism)

Q43 What is the cost of cart/bin replacement for garbage, recyclables and organics?

Garbage:

See: https://winnipeg.ca/waterandwaste/billing/fees.stm#cartreplacements

Q44 What is the warranty on the carts/bins?

10 years.

Q45 Were any changes required at the receiving facilities (specifically MRF) to accommodate material collected in carts/bins? i.e. handling of loose material

Yes,

If yes, please specify::

Upgrade to capacity at MRF; 2011 - 45,800 tonnes recycling (pre recycling cart); 2013 - 53,600 tonnes (first full year post recycling carts)

Q46 How was the cart purchase funded

Other (please specify):
Mixture of debt and stewardship funding

Q47 How is your residential collection financed?

Other: Please explain.:
Hybrid: garbage collection is financed through the mill rate. Diversion programs are supported through a combination of a flat utility fee, external funding, and the Utility's revenues.

Q48 What is the municipality's opinion on how the cart/bin based program is working?

Cart achieved many goals such as reducing garbage, and increasing recycling. Positive feedback from residents. Challenges with managing assets and IT systems. Environmental performance has improved steadily since the Comprehensive Integrated Waste Management Strategy was implemented. Carts were only part of that strategy, though. Leaf and Yard waste collection, residential depots, and other system improvements contribute to successes.

Q49 What, if any, barriers to participation were identified by the public and how were these overcome?

Storage space,

Odour,

Aesthetics,

Difficulties moving the cart,

Other: Please explain:

There were a lot of speculative complaints, but in general, once carts were received and actually used, opinions became positive.

Q50 Are there assistance programs available for disability and special populations?

Yes,
If yes, please elaborate:
Walk up service for household where no one is able to move the cart to the collection point

Q51 How are these programs funded and administered? Please elaborate.

These are included in the cost of collection for each stream

Q52 Do you have any lessons learned during the implementation and transition to the cart/bin program?

Phasing the implementation probably would have helped.

Collection management system was not implemented until 2017 - 5 years after the carts had been delivered. Data quality is a large issue if trying to track assets based on RFID/SN due to entropy. If services contracted, need to consider relationship between contractor and cart damage.

Significant growing pains in first year. Staff were pushed and significant overtime was incurred. Mental health was a concern.

You will need to implement a program to accommodate residents who are not able to place their carts at the collection point. Public engagement should take place with the affected communities.

ICI properties became targets for excess and illegal dumping for a short while after implementation.

As carts are City assets, but responsibility of current property owner, there could be conflicts in tenant-landlord relationships and the sale of properties. We had policies developed in advance to address these conflicts.

Q53 Do you have any recommendations on what could be done differently?

Ensure implementation plan matches available staff, other resources and time. Ensuring there's a capital plan in place to replace the carts as they reach end of life. If decisions are made to track carts via RFID, poor data quality is a significant risk. If collection services are contracted, onus should be on the contractor to ensure that their equipment is calibrated properly and regularly with supporting records.

Q54 What benefits were realized in switching to a cart/bin based system?

Garbage limits, reduced illegal dumping (previously had communal bins in some areas), higher quality recyclable material and more material, less potential to injure workers, uniform neighbourhood appearance, modernization of by-law and service standards, lower cost of collection.

#5

COMPLETE

Collector:	Web Link 1 (Web Link)
Started:	Wednesday, August 28, 2019 10:31:19 AM
Last Modified:	Thursday, August 29, 2019 6:27:54 PM
Time Spent:	Over a day
IP Address:	198.160.191.9

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Q2 Does your municipality use carts/bins for residential collection of garbage or recycling?

Yes

Q3 If yes, for what material streams do you use carts/bins? Choose all options that apply.

Garbage,

Recyclables,

Organics

Q4 Do you have a single or multi-stream recycling program?

Single

Q5 How many residential households do you service with curbside collection?

Approximately 330,000

Q6 What are the size of carts for recycling, garbage and organics?

Recycling	**240 Litre**
Garbage	**240 Litre**
Organics	**240 Litre**

Q7 Please identify the influencing factors in your decision to use a cart/ bin based collection system ranking from 1 to 5, with 1 as most important and 5 as least important.

By public or Council request	**5**
To reduce collection costs	**2**
For worker safety	**1**
Best Management Practices	**3**
To reduce use of plastic bags	**4**

Q8 Are there any other influencing factors in your decision to use a cart/bin based collection system that are not listed in Questions 7, above?

No

Q9 When did you start using carts / bins for curbside collection?

2009

Q10 What is your municipality's waste diversion rate (%)?

Per cent of Residential Waste Diverted from Landfill Through Blue and Green Cart Programs was 55% in 2018.

Q11 Did your municipality's waste diversion rate change with the introduction of carts/bins for garbage and recyclables?

Yes,

Please explain::

Received slightly more garbage in the years following transition from bags to carts. Calgary accepts unlimited excess waste, which may have been a factor. Received slightly more garbage in the years following transition from bags to carts for Garbage. Calgary accepts unlimited excess waste, which may have been a factor. Significantly more recycling tonnages when supplementing community depots with cart collection.

Q12 What is the contamination rate (%) in your recycling stream?

12-15%

Q13 How is this metric calculated?

MRF residuals

Q14 Did the recycling contamination rate improve when cart/bin collection system was implemented?

Don't know,

Please explain:

Have used cart based collection since the beginning of the recycling program.

Q15 Did you purchase and implement carts/bins at the same time for multiple streams (i.e. garbage, recyclables, organics) or separately as individual purchases?

Individually

Q16 Do you have manual or automated materials collection. If automated, please indicate type from selections.	**Fully Automated Loading: all unloading is done mechanically with the driver using a joystick. In this case, the driver does not leave the cab.** **,** Other: Please explain.: Fully automated except for excess for garbage and organics, where the driver is required to leave the cab and load the excess materials into the cart for a second tip.
Q17 What is your collection frequency for garbage?	**Bi-weekly ,** If other, please explain: Changed to bi-weekly with the implementation of the Green Cart Program.
Q18 What is your collection frequency for recycling?	**Weekly**
Q19 What is your collection frequency for organics?	**Other,** If other, please explain: Weekly, Bi-weekly in Winter (November-March).
Q20 Do you use video or radio frequency identification (RFID) technology for education/enforcement?	**No**
Q21 Is the use of single-use plastic bags to contain loose material in garbage carts/bins mandatory, optional or prohibited? Please select from the options below.	**Optional (at residents discretion)**
Q22 Is the use of single-use plastic bags to contain loose material in recycling carts/bins mandatory, optional or prohibited? Please select from the options below.	**Mandatory,** Please explain the reasoning behind your selection: Mandatory to use single-use bags to contain other single-use bags. Clear bags required for shredded paper.
Q23 Is the use of single-use plastic bags to contain loose material in organics carts/bins, mandatory, optional or prohibited? Please select from the options below.	**Prohibited**
Q24 Was there a reduction in the number of plastic bags used in your residential curbside collection program since switching to carts/bins?	**No,** How is this assessed?: Unknown

Q25 What are any high level operational considerations with your cart/bincollection system? Please rank your selections from 1 to 8 with 1 as most important and 8 as least important.

Street width	**4**
On-street parking	**3**
Cart/bin placement and orientation at the curb	**1**
Collection of bulky items	**8**
Litter	**7**
Weather (wind/snow/rain)	**5**
Steep Hills	**6**
Overhead clearance (i.e. tree trimming)	**2**

Q26 Are there any other high-level operational considerations with your cart/bin based collection system that are not included in Question 25, above?

Yes,

If yes, please specify:

Parking in alleys, acceptable items, excess materials (and placement, size/weight if included), truck cycle speeds, customer education (ie tagging carts)

Q27 Is residential collection completed by municipal staff or contracted to a private third-party company?

Public

Q28 Was there any modifications needed to the collection system when converting to a cart/bin system?

Other: Please explain.:
All of the listed. Truck type - Transitioned from two employee reartipper to one person sideloader Routing - Size of routes increased as sideloader automated collection could service more households/day Bylaw - Carts required all storage and set out requirements needed to be changed and updated.

Q29 Do you allow for extra bags to be placed outside of the bins?

Yes,
If yes, which stream?:
Garbage, Organics. Moving towards a tag-a-bag system for garbage.

Q30 Was there an increase or decrease in fleet staff after implementing the cart/bin system?

Decrease

Q31 Was there in increase or decrease in collection vehicle maintenance costs after implementing the cart/bin system?

Increase

Q32 What was the procurement model you used for acquiring carts/bins?

RFP

Q33 How were the size(s)/style(s) of the carts/bins chosen for garbage? Choose all options that apply.

Other: Please explain.:

Recommendation from a pilot study for size. Style was aligned to collection fleet (standard ANSI parameters met).

Q34 How were the size(s)/style(s) of the carts/bins chosen for recycling? Choose all options that apply.

Other: Please explain.:

Recommendation from a pilot

Q35 How were the size(s)/style(s) of the carts/bins chosen for organics?

Other: Please explain.:

Recommendation from a pilot

Q36 What are your overall annual operating costs (in Canadian Dollars) for garbage collection?

Unable to disclose

Q37 What are your overall annual operating costs (in Canadian Dollars) for recycling collection?

Unable to disclose

Q38 What are your overall annual operating costs (in Canadian Dollars) for organics collection?

Unable to disclose

Q39 What costs (in Canadian Dollars) were incurred for implementing this system? Include items such as fleet modification/replacement, cart distribution, purchase of carts, etc.

Public education:	**Unable to disclose**
Procurement costs:	**Unable to disclose**
Collection fleet:	**Unable to disclose**
Maintenance yard:	**Unable to disclose**
RFID technology and IT:	**Unable to disclose**
Administrative costs:	**Unable to disclose**
Distribution / deployment costs - initial delivery, etc.:	**Unable to disclose**
Cost to resident for cart:	**Unable to disclose**
Other:	**Unable to disclose**

Q40 Were there costs to modify receiving facilities (MRF, organics, landfill)? **Yes**

Q41 What are the cart/bin replacement rates (# per year) for garbage, recyclables and organics?

Garbage:	**0.26% (based on serviced carts)**
Recyclables:	**1.28% (based on serviced carts)**
Organics:	**0.36% (based on serviced carts)**

Q42 Who has the responsibility for cart/bin replacement? **Municipality**

Q43 What is the cost of cart/bin replacement for garbage, recyclables and organics?

Garbage:	**$53.95 plus trip cost $54.61**
Recyclables:	**$54.30 plust trip cost $54.61**
Organics:	**$50.30 plust trip cost $54.61**

Q44 What is the warranty on the carts/bins?

Standard 10-year warranty

Q45 Were any changes required at the receiving facilities (specifically MRF) to accommodate material collected in carts/bins? i.e. handling of loose material

Yes,

If yes, please specify::

Recycling could not be accomodated at existing third party facility (used to process source seperated recycling). Transitioned to single stream service with a significant increase in recycling volumes required a new RFP for a different third party processor.

Q46 How was the cart purchase funded

Other (please specify):
Initial cart purchase for garbage carts from capital budget, which was funded by reserve and debt. Funding for the blue and green cart program carts is included in rate charged to residents.

Q47 How is your residential collection financed? **Separate flat rate charge on bill**

Q48 What is the municipality's opinion on how the cart/bin based program is working?

It meets our needs to balance cost of service, safety of employees, mitigating environmental impacts, and customer needs.

Q49 What, if any, barriers to participation were identified by the public and how were these overcome?

Storage space,

Odour,

Aesthetics,

Difficulties moving the cart,

Other: Please explain:

Storage space only stipulates carts must be kept on property between collection days. Residents educated on transitioning from existing garbage enclosures and raised platforms. Supported by office and field staff managing customer phone inquiries. Odour - primarily a organics issue as most odours from garbage transition to organics. Organics is weekly in summer which is no different than previous garbage collection so odour issue the same. In winter material freezes and reduces odours, supported through tips to reduce odours in resident house. Aestheic issue outweighed by increased efficency. Difficult moving carts managed by special collection in reasonable scenarios.

Q50 Are there assistance programs available for disability and special populations?

Yes,

If yes, please elaborate:

Foreman are able to determine locations suitable for special collections. The driver is then able to complete additional tasks at this location such as getting out and moving cart to a location for collection. Site dependent.

Q51 How are these programs funded and administered? Please elaborate.

User fee. Same service to all residents

Q52 Do you have any lessons learned during the implementation and transition to the cart/bin program?

Deliver cart in summer. Winter delivery has too many challenges. Transitioning to new services was complicated as first blue then black then green cart were introduced with several years between. This leads to routing challenges as it included collection day changes which can be problematic depending on delivery timeframe, full city collection or quadrant based switch over. Best to launch service as resident receives cart for simplicity of operation and communication. Challenging to transition/train staff on new equipment and achieve operational efficiency immediately on roll-out of service (if vehicles are different from existing fleet) need to have additional support staff and equipment to help with unfinished beats, missed portions of routes. Support rollout with additional field staff to handle customer calls and support drivers on placement education, especially in tight lanes or cul-de-sacs where space constraints exist.

Q53 Do you have any recommendations on what could be done differently?

See Q52 as Calgary roll-out experience would be unique.

Q54 What benefits were realized in switching to a cart/bin based system?

Improve safety statistics, increase number of houses serviced per route, better resident awareness of their waste management, improved diversion (as program was simpler and more convenient).

#6

COMPLETE

Collector: Web Link 1 (Web Link)
Started: Monday, August 26, 2019 2:23:41 PM
Last Modified: Monday, September 09, 2019 9:54:50 AM
Time Spent: Over a week
IP Address: 142.166.255.194

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Q2 Does your municipality use carts/bins for residential collection of garbage or recycling?

Yes

Q3 If yes, for what material streams do you use carts/bins? Choose all options that apply.

Other: Please explain:

Blue and grey recycle boxes for those who participate in volunteer recycle collection; garbage bins are not required

Q4 Do you have a single or multi-stream recycling program?

Multi-stream

Q5 How many residential households do you service with curbside collection?

24,000 (est)

Q6 What are the size of carts for recycling, garbage and organics?

Recycling	**19 gallons**

Q7 Please identify the influencing factors in your decision to use a cart/ bin based collection system ranking from 1 to 5, with 1 as most important and 5 as least important.

By public or Council request	**4**
To reduce collection costs	**2**
For worker safety	**3**
Best Management Practices	**1**
To reduce use of plastic bags	**5**

Q8 Are there any other influencing factors in your decision to use a cart/bin based collection system that are not listed in Questions 7, above?

Yes,

If yes, please specify:

We have blue/grey recycle to help sorting at home which augments our MRF sorting.

Q9 When did you start using carts / bins for curbside collection?

2001

Q10 What is your municipality's waste diversion rate (%)?

38 (est)

Q11 Did your municipality's waste diversion rate change with the introduction of carts/bins for garbage and recyclables?	**Yes**

Q12 What is the contamination rate (%) in your recycling stream?

UA

Q13 How is this metric calculated?	**Waste collection audit**
Q14 Did the recycling contamination rate improve when cart/bin collection system was implemented?	**Yes**
Q15 Did you purchase and implement carts/bins at the same time for multiple streams (i.e. garbage, recyclables, organics) or separately as individual purchases?	**All at once**
Q16 Do you have manual or automated materials collection. If automated, please indicate type from selections.	**Manual Loading: all material is manually loaded by hand into the truck.**
Q17 What is your collection frequency for garbage?	**Other,** If other, please explain: City of Fredericton, Village of New Maryland are weekly. Village of Hanwell bi-weekly. Numerous rural areas once a month.
Q18 What is your collection frequency for recycling?	**Other,** If other, please explain: City of Fredericton, Village of New Maryland alternates blye/grey box weekly. Village of Hanwell bi-weekly. Rural areas once a month.
Q19 What is your collection frequency for organics?	**Other,** If other, please explain: No organic collection

Q20 Do you use video or radio frequency identification (RFID) technology for education/enforcement?	**No**
Q21 Is the use of single-use plastic bags to contain loose material in garbage carts/bins mandatory, optional or prohibited? Please select from the options below.	**Optional (at residents discretion)**
Q22 Is the use of single-use plastic bags to contain loose material in recycling carts/bins mandatory, optional or prohibited? Please select from the options below.	**Optional (at residents discretion)**
Q23 Is the use of single-use plastic bags to contain loose material in organics carts/bins, mandatory, optional or prohibited? Please select from the options below.	Other (please specify): Not applicable.
Q24 Was there a reduction in the number of plastic bags used in your residential curbside collection program since switching to carts/bins?	**No,** How is this assessed?: Difficult question as we continue to receive plastic bags on a regular basis in our blue bins.

Q25 What are any high level operational considerations with your cart/bincollection system? Please rank your selections from 1 to 8 with 1 as most important and 8 as least important.

Street width	**5**
On-street parking	**4**
Cart/bin placement and orientation at the curb	**1**
Collection of bulky items	**6**
Litter	**2**
Weather (wind/snow/rain)	**3**
Steep Hills	**7**
Overhead clearance (i.e. tree trimming)	**8**

Q26 Are there any other high-level operational considerations with your cart/bin based collection system that are not included in Question 25, above?	**No**
Q27 Is residential collection completed by municipal staff or contracted to a private third-party company?	**Combination of Public/Private**
Q28 Was there any modifications needed to the collection system when converting to a cart/bin system?	**Routing**

Q29 Do you allow for extra bags to be placed outside of the bins?	**Yes,** If yes, which stream?: Clear plastic bags are options for both blue and grey box items. This is used more in rural areas on once a month pickup.
Q30 Was there an increase or decrease in fleet staff after implementing the cart/bin system?	**No change**
Q31 Was there in increase or decrease in collection vehicle maintenance costs after implementing the cart/bin system?	**No change**
Q32 What was the procurement model you used for acquiring carts/bins?	**RFP**
Q33 How were the size(s)/style(s) of the carts/bins chosen for garbage? Choose all options that apply.	**Consultant recommendation ,** **Collection provider recommendations**
Q34 How were the size(s)/style(s) of the carts/bins chosen for recycling? Choose all options that apply.	**Consultant recommendation ,** **Collection provider recommendations**
Q35 How were the size(s)/style(s) of the carts/bins chosen for organics?	**Consultant recommendation,** **Collection provider recommendations**

Q36 What are your overall annual operating costs (in Canadian Dollars) for garbage collection?

UA

Q37 What are your overall annual operating costs (in Canadian Dollars) for recycling collection?

UA

Q38 What are your overall annual operating costs (in Canadian Dollars) for organics collection?

NA

Q39 What costs (in Canadian Dollars) were incurred for implementing this system? Include items such as fleet modification/replacement, cart distribution, purchase of carts, etc.

Other:	**All available on website annual report**

Q40 Were there costs to modify receiving facilities (MRF, organics, landfill)?

Yes

Q41 What are the cart/bin replacement rates (# per year) for garbage, recyclables and organics?

Garbage:	**Minimal**
Recyclables:	**Infrequent**

Q42 Who has the responsibility for cart/bin replacement?

Other: Please explain.:
We will replace

Q43 What is the cost of cart/bin replacement for garbage, recyclables and organics?

Garbage:	**$5000**
Recyclables:	**$5000**
Organics:	**NA**

Q44 What is the warranty on the carts/bins?

NA

Q45 Were any changes required at the receiving facilities (specifically MRF) to accommodate material collected in carts/bins? i.e. handling of loose material

Yes,

If yes, please specify::

Was built around new program including baler, belt etc

Q46 How was the cart purchase funded

Other (please specify):
Purchased by FRSW

Q47 How is your residential collection financed?

Through the general tax rate

Q48 What is the municipality's opinion on how the cart/bin based program is working?

Looking for ways to increase and maintain consistency.

Q49 What, if any, barriers to participation were identified by the public and how were these overcome?

Other: Please explain:

Collection Frequency

Q50 Are there assistance programs available for disability and special populations?

No

Q51 How are these programs funded and administered? Please elaborate.

UA

Q52 Do you have any lessons learned during the implementation and transition to the cart/bin program?

Program is 18 years old and well received.

Q53 Do you have any recommendations on what could be done differently?

Education is paramount. But recycling remains volunteer-based.

Q54 What benefits were realized in switching to a cart/bin based system?

Cleaner collection/pickup/sorting.

#7

COMPLETE

Collector:	Web Link 1 (Web Link)
Started:	Monday, September 09, 2019 9:43:14 AM
Last Modified:	Monday, September 09, 2019 10:05:54 AM
Time Spent:	00:22:39
IP Address:	165.225.34.99

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Q2 Does your municipality use carts/bins for residential collection of garbage or recycling?

Yes

Q3 If yes, for what material streams do you use carts/bins? Choose all options that apply.

Garbage,

Recyclables,

Other: Please explain:

includes Paper, metal cans, cardboard and hard plastics #1-7

Q4 Do you have a single or multi-stream recycling program?

Single

Q5 How many residential households do you service with curbside collection?

35,000

Q6 What are the size of carts for recycling, garbage and organics?

Recycling	**240L/360L blue carts**
Garbage	**240L/360L black carts**

Q7 Please identify the influencing factors in your decision to use a cart/ bin based collection system ranking from 1 to 5, with 1 as most important and 5 as least important.

By public or Council request	**4**
To reduce collection costs	**3**
For worker safety	**1**
Best Management Practices	**2**
To reduce use of plastic bags	**5**

Q8 Are there any other influencing factors in your decision to use a cart/bin based collection system that are not listed in Questions 7, above?	**No**

Q9 When did you start using carts / bins for curbside collection?

2006

Q10 What is your municipality's waste diversion rate (%)?

35%

Q11 Did your municipality's waste diversion rate change with the introduction of carts/bins for garbage and recyclables?	**Yes**

Q12 What is the contamination rate (%) in your recycling stream?

10%

Q13 How is this metric calculated?	**MRF residuals**
Q14 Did the recycling contamination rate improve when cart/bin collection system was implemented?	**Yes,** Please explain: Noticed our recycling depots have had a higher contamination rate and after the introduction of the curbside recycling program, contamination has decreased
Q15 Did you purchase and implement carts/bins at the same time for multiple streams (i.e. garbage, recyclables, organics) or separately as individual purchases?	**Individually**
Q16 Do you have manual or automated materials collection. If automated, please indicate type from selections.	**Semi - Automated Loading: mechanical unloading, along with manual loading.**
Q17 What is your collection frequency for garbage?	**Bi-weekly**
Q18 What is your collection frequency for recycling?	**Bi-Weekly**

Q19 What is your collection frequency for organics?

Other,
If other, please explain:
N/a if approved in Oct. recommended summer weekly, and biweekly winter

Q20 Do you use video or radio frequency identification (RFID) technology for education/enforcement?

Yes

Q21 Is the use of single-use plastic bags to contain loose material in garbage carts/bins mandatory, optional or prohibited? Please select from the options below.

Mandatory,
Please explain the reasoning behind your selection:
But not enforced because its very windy here and we encourage residents to always bag their garbage

Q22 Is the use of single-use plastic bags to contain loose material in recycling carts/bins mandatory, optional or prohibited? Please select from the options below.

Prohibited ,
Please explain the reasoning behind your selection:
No plastic bags are permitted in the curbside recycling program due to other MRFs having issues with bags getting wrapped around their MRF/sorting

Q23 Is the use of single-use plastic bags to contain loose material in organics carts/bins, mandatory, optional or prohibited? Please select from the options below.

Other (please specify):
N/a

Q24 Was there a reduction in the number of plastic bags used in your residential curbside collection program since switching to carts/bins?

No,
How is this assessed?:
UNKNOWN

Q25 What are any high level operational considerations with your cart/bincollection system? Please rank your selections from 1 to 8 with 1 as most important and 8 as least important.

Street width	**3**
On-street parking	**8**
Cart/bin placement and orientation at the curb	**4**
Collection of bulky items	**5**
Litter	**1**
Weather (wind/snow/rain)	**2**
Steep Hills	**6**
Overhead clearance (i.e. tree trimming)	**7**

Q26 Are there any other high-level operational considerations with your cart/bin based collection system that are not included in Question 25, above?

Yes,
If yes, please specify:
WIND AND LITTER ARE MOST IMPORTANT

Q27 Is residential collection completed by municipal staff or contracted to a private third-party company?	**Public**
Q28 Was there any modifications needed to the collection system when converting to a cart/bin system?	Other: Please explain.: ALL three. Routing, truck type and by-law
Q29 Do you allow for extra bags to be placed outside of the bins?	**No**
Q30 Was there an increase or decrease in fleet staff after implementing the cart/bin system?	**Decrease**
Q31 Was there in increase or decrease in collection vehicle maintenance costs after implementing the cart/bin system?	**No change**
Q32 What was the procurement model you used for acquiring carts/bins?	**RFP**
Q33 How were the size(s)/style(s) of the carts/bins chosen for garbage? Choose all options that apply.	**Homeowner request**
Q34 How were the size(s)/style(s) of the carts/bins chosen for recycling? Choose all options that apply.	**Homeowner request**
Q35 How were the size(s)/style(s) of the carts/bins chosen for organics?	Other: Please explain.: n/a

Q36 What are your overall annual operating costs (in Canadian Dollars) for garbage collection?

Approximately $3 million

Q37 What are your overall annual operating costs (in Canadian Dollars) for recycling collection?

Approximately $3 million

Q38 What are your overall annual operating costs (in Canadian Dollars) for organics collection?

n/a

Q39 What costs (in Canadian Dollars) were incurred for implementing this system? Include items such as fleet modification/replacement, cart distribution, purchase of carts, etc.

Other:	**$4.5 millon total including fleet, carts, outreach, etc**

Q40 Were there costs to modify receiving facilities (MRF, organics, landfill)? **No**

Q41 What are the cart/bin replacement rates (# per year) for garbage, recyclables and organics?

Garbage:	**300-500**
Recyclables:	**300-500**

Q42 Who has the responsibility for cart/bin replacement? **Municipality**

Q43 What is the cost of cart/bin replacement for garbage, recyclables and organics?

Garbage:	**free if defect, $100 if lost**
Recyclables:	**free if defect, $100 if lost**

Q44 What is the warranty on the carts/bins?

10 years

Q45 Were any changes required at the receiving facilities (specifically MRF) to accommodate material collected in carts/bins? i.e. handling of loose material

Yes,

If yes, please specify::

MRF designed to accept loose material

Q46 How was the cart purchase funded

Other (please specify):
utility fee

Q47 How is your residential collection financed?

Other: Please explain.:
utility fee

Q48 What is the municipality's opinion on how the cart/bin based program is working?

Faster than rear load collection, limits amount of waste collected per household

Q49 What, if any, barriers to participation were identified by the public and how were these overcome?

Storage space,

Odour,

Difficulties moving the cart,

Other: Please explain:

we offer two sizes of carts, bag their garbage, special needs program

Q50 Are there assistance programs available for disability and special populations?

Yes

Q51 How are these programs funded and administered? Please elaborate.

Program is funded as part of utility fee, once a request is received, an assessment is done and if complies with requirements service is provided to support residents.

Q52 Do you have any lessons learned during the implementation and transition to the cart/bin program?

Education & Outreach is key for a successful implementation. Focus Groups. Change is difficult for residents, but having a comprehensive Education program, Social Media Campaign and advertising helps tremendously.

Q53 Do you have any recommendations on what could be done differently?

XXX

Q54 What benefits were realized in switching to a cart/bin based system?

Overall a huge improvement in worker safety, less WCB claims, an increase in efficiency, more households can be service by trucks resulting in less operating cost.

#8

COMPLETE

Collector:	Web Link 1 (Web Link)
Started:	Monday, September 16, 2019 2:03:37 PM
Last Modified:	Monday, September 16, 2019 3:38:44 PM
Time Spent:	01:35:06
IP Address:	198.96.115.20

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Q2 Does your municipality use carts/bins for residential collection of garbage or recycling?

Yes

Q3 If yes, for what material streams do you use carts/bins? Choose all options that apply.

Garbage,

Recyclables,

Organics

Q4 Do you have a single or multi-stream recycling program?

Single

Q5 How many residential households do you service with curbside collection?

338,000

Q6 What are the size of carts for recycling, garbage and organics?

Recycling	**120 L, 240 L, 360 L**
Garbage	**120 L, 240 L, 360 L**
Organics	**100 L**

Q7 Please identify the influencing factors in your decision to use a cart/ bin based collection system ranking from 1 to 5, with 1 as most important and 5 as least important.

By public or Council request	**4**
To reduce collection costs	**1**
For worker safety	**2**
Best Management Practices	**3**
To reduce use of plastic bags	**5**

Q8 Are there any other influencing factors in your decision to use a cart/bin based collection system that are not listed in Questions 7, above?

Yes,

If yes, please specify:

Reduce GreenHouse Gas Emissions (bi-weekly service)

Q9 When did you start using carts / bins for curbside collection?

2016

Q10 What is your municipality's waste diversion rate (%)?

Approximately 50%

Q11 Did your municipality's waste diversion rate change with the introduction of carts/bins for garbage and recyclables?

Yes,

Please explain::

The diversion rate increase due to the change to bi-weekly collection of garbage and recycling. Organics remained weekly, thus pushing more resident to participate in the organics program

Q12 What is the contamination rate (%) in your recycling stream?

Approximately 20%

Q13 How is this metric calculated?

MRF residuals

Q14 Did the recycling contamination rate improve when cart/bin collection system was implemented?

No,

Please explain:

The contamination rate increased significantly. Resident's formerly used blue boxes. With larger carts, some residents began to place recyclables in plastic shopping bags and also other non-recyclables were easier to place in the carts without detection. Enforcement is much more difficult at the curb with automated cart collection.

Q15 Did you purchase and implement carts/bins at the same time for multiple streams (i.e. garbage, recyclables, organics) or separately as individual purchases?

All at once

Q16 Do you have manual or automated materials collection. If automated, please indicate type from selections.	**Fully Automated Loading: all unloading is done mechanically with the driver using a joystick. In this case, the driver does not leave the cab.** **,** Other: Please explain.: Some colelction is done manually, excess recycling, organics carts, yard waste, bulky items
Q17 What is your collection frequency for garbage?	**Bi-weekly**
Q18 What is your collection frequency for recycling?	**Bi-Weekly**
Q19 What is your collection frequency for organics?	**Weekly**
Q20 Do you use video or radio frequency identification (RFID) technology for education/enforcement?	**No**
Q21 Is the use of single-use plastic bags to contain loose material in garbage carts/bins mandatory, optional or prohibited? Please select from the options below.	**Optional (at residents discretion) ,** Please explain the reasoning behind your selection: The Region does not require materials to be bagged in any waste stream collected. It is up to the resident to choose their preferred storage/disposal method.
Q22 Is the use of single-use plastic bags to contain loose material in recycling carts/bins mandatory, optional or prohibited? Please select from the options below.	**Optional (at residents discretion) ,** Please explain the reasoning behind your selection: Only optional when using clear recycling bags. It is prohibited to use single use grocery, shopping or garbage bags for recycling.
Q23 Is the use of single-use plastic bags to contain loose material in organics carts/bins, mandatory, optional or prohibited? Please select from the options below.	Other (please specify): Plastic bags are prohibited for use in the organics program. Residents are allowed to place organics loosely in their organics cart or use paper or compostable bags.

Q24 Was there a reduction in the number of plastic bags used in your residential curbside collection program since switching to carts/bins?

No,

How is this assessed?:

This is difficult to assess and has not been measure. I wold hazard a guess that residents still use grocery/shopping bags for their garbage and place in the garbage cart. There has obviously been a reduction in the use of black garbage bags when the Region moved away from a bag-based garbage collection system. As noted earlier, we have seen an increase in the use of single use shopping/grocery bags in the recycling. We have had success reducing this number with our "Let it Loos" campaign, but it is a constant struggle to keep the number of bagged recyclables down.

Q25 What are any high level operational considerations with your cart/bincollection system? Please rank your selections from 1 to 8 with 1 as most important and 8 as least important.

Street width	**1**
On-street parking	**5**
Cart/bin placement and orientation at the curb	**2**
Collection of bulky items	**7**
Litter	**3**
Weather (wind/snow/rain)	**4**
Steep Hills	**8**
Overhead clearance (i.e. tree trimming)	**6**

Q26 Are there any other high-level operational considerations with your cart/bin based collection system that are not included in Question 25, above?

Yes,

If yes, please specify:

Bin maintenance requirements

Q27 Is residential collection completed by municipal staff or contracted to a private third-party company?

Private

Q28 Was there any modifications needed to the collection system when converting to a cart/bin system?

Other: Please explain.:

The conversion occurred concurrently with a new collection contract, therefore, new trucks, routing, etc. was designed in the collection contract.

Q29 Do you allow for extra bags to be placed outside of the bins?

Yes

Q30 Was there an increase or decrease in fleet staff after implementing the cart/bin system?

Increase

Q31 Was there in increase or decrease in collection vehicle maintenance costs after implementing the cart/bin system?	**No change**
Q32 What was the procurement model you used for acquiring carts/bins?	Other: Please explain.: Tender Process - Bidders had t meet minimum specifications
Q33 How were the size(s)/style(s) of the carts/bins chosen for garbage? Choose all options that apply.	**Public survey,** **Homeowner request,** Other: Please explain.: Industry Standards
Q34 How were the size(s)/style(s) of the carts/bins chosen for recycling? Choose all options that apply.	**Public survey,** **Homeowner request,** Other: Please explain.: Industry Standards
Q35 How were the size(s)/style(s) of the carts/bins chosen for organics?	**Public survey,** **Homeowner request,** Other: Please explain.: Accessibility Requirements, Industry Standards

Q36 What are your overall annual operating costs (in Canadian Dollars) for garbage collection?

$0

Q37 What are your overall annual operating costs (in Canadian Dollars) for recycling collection?

$0

Q38 What are your overall annual operating costs (in Canadian Dollars) for organics collection?

$0

Q39 What costs (in Canadian Dollars) were incurred for implementing this system? Include items such as fleet modification/replacement, cart distribution, purchase of carts, etc.

Public education:	**$0**
Procurement costs:	**$0**
Collection fleet:	**$0**
Maintenance yard:	**$0**
RFID technology and IT:	**$0**
Administrative costs:	**$0**
Distribution / deployment costs - initial delivery, etc.:	**$0**
Cost to resident for cart:	**No cost to resident, tax-based service**
Other:	**$0**

Q40 Were there costs to modify receiving facilities (MRF, organics, landfill)? **No**

Q41 What are the cart/bin replacement rates (# per year) for garbage, recyclables and organics?

Garbage:	**n/a**
Recyclables:	**n/a**
Organics:	**n/a**

Q42 Who has the responsibility for cart/bin replacement? **Municipality**

Q43 What is the cost of cart/bin replacement for garbage, recyclables and organics?

Garbage:	**n/a**
Recyclables:	**n/a**
Organics:	**n/a**

Q44 What is the warranty on the carts/bins?

10 Years

Q45 Were any changes required at the receiving facilities (specifically MRF) to accommodate material collected in carts/bins? i.e. handling of loose material **No**

Q46 How was the cart purchase funded **Tax funds**

Q47 How is your residential collection financed?

Through the general tax rate

Q48 What is the municipality's opinion on how the cart/bin based program is working?

The cart program is working well, diversion rates have increased, there remains challenges in dealing with increased contamination rates and the complexities of maintaining an inventory of carts

Q49 What, if any, barriers to participation were identified by the public and how were these overcome?

Storage space,

Aesthetics,

Other: Please explain:

Open houses were held in each ward for residents to see the cart sizes and choose their carts, questions were answered.

Q50 Are there assistance programs available for disability and special populations?

Yes,

If yes, please elaborate:

We have a walk up service, where our contractor will collect the cart from an accessiblae location away from the curb for people with medical conditions that provide documentation

Q51 How are these programs funded and administered? Please elaborate.

Programs are funded through residential taxes.

Q52 Do you have any lessons learned during the implementation and transition to the cart/bin program?

- be prepared to deal with locations that have space constraints, i.e. townhouses
- ensure there is a system in place to track cart maintenance calls and have clearly defined responsibilities for cart damages

Q53 Do you have any recommendations on what could be done differently?

n/a

Q54 What benefits were realized in switching to a cart/bin based system?

-lower collection costs
-safer work for collectors
- reduced greenhouse gas emissions
- reduced litter (for recyclables)

#9

COMPLETE

Collector:	Web Link 1 (Web Link)
Started:	Thursday, August 29, 2019 10:04:26 AM
Last Modified:	Wednesday, September 18, 2019 9:36:15 AM
Time Spent:	Over a week
IP Address:	104.129.198.70

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Q2 Does your municipality use carts/bins for residential collection of garbage or recycling?

Yes

Q3 If yes, for what material streams do you use carts/bins? Choose all options that apply.

Garbage,

Organics

Q4 Do you have a single or multi-stream recycling program?

Multi-stream

Q5 How many residential households do you service with curbside collection?

105,000 single family, 11,900 multi-family (garbage), 21,100 multi-family (organics)

Q6 What are the size of carts for recycling, garbage and organics?

Garbage	**75L, 120L, 180L, 240L, 360L**
Organics	**75L, 120L, 180L, 240L, 360L**

Q7 Please identify the influencing factors in your decision to use a cart/ bin based collection system ranking from 1 to 5, with 1 as most important and 5 as least important.

By public or Council request	**4**
To reduce collection costs	**5**
For worker safety	**1**
Best Management Practices	**3**
To reduce use of plastic bags	**2**

Q8 Are there any other influencing factors in your decision to use a cart/bin based collection system that are not listed in Questions 7, above?

Yes,

If yes, please specify:

Occupational Health & Safety Regulation introduced in BC 1998 (under authority of the Workers Compensation Act) required that the risk of (musculoskeletal) injuries to workers be eliminated or, if that is not practical, be minimized.

Q9 When did you start using carts / bins for curbside collection?

Garbage: 2005, Yard Trimmings: 2006

Q10 What is your municipality's waste diversion rate (%)?

Metro Vancouver Diversion Rate (of which the City of Vancouver is a part) - 63%.
http://www.metrovancouver.org/dashboards/services/solid-waste/Pages/Waste-diversion-rate.aspx

Q11 Did your municipality's waste diversion rate change with the introduction of carts/bins for garbage and recyclables?

Don't know

Q12 What is the contamination rate (%) in your recycling stream?

N/A - Collected by RecycleBC

Q13 How is this metric calculated?

Other: Please explain:
N/A

Q14 Did the recycling contamination rate improve when cart/bin collection system was implemented?

No,

Please explain:

Recycling collection program did not change (manual box and bag collection).

Q15 Did you purchase and implement carts/bins at the same time for multiple streams (i.e. garbage, recyclables, organics) or separately as individual purchases?

Individually

Q16 Do you have manual or automated materials collection. If automated, please indicate type from selections.

Fully Automated Loading: all unloading is done mechanically with the driver using a joystick. In this case, the driver does not leave the cab.

,

Other: Please explain.:
Mix of semi-Automated and Fully Automated - Majority is Fully-Automated, but certain routes are not able to accommodate Fully-Automated Trucks

Q17 What is your collection frequency for garbage?	**Bi-weekly**
Q18 What is your collection frequency for recycling?	**Weekly,** If other, please explain: (RecycleBC)
Q19 What is your collection frequency for organics?	**Weekly**
Q20 Do you use video or radio frequency identification (RFID) technology for education/enforcement?	**No**
Q21 Is the use of single-use plastic bags to contain loose material in garbage carts/bins mandatory, optional or prohibited? Please select from the options below.	**Optional (at residents discretion) ,** Please explain the reasoning behind your selection: No concerns with loose material in bins.
Q22 Is the use of single-use plastic bags to contain loose material in recycling carts/bins mandatory, optional or prohibited? Please select from the options below.	**Prohibited ,** Please explain the reasoning behind your selection: Managed by RecycleBC: http://recyclebc.ca/wp-content/uploads/2019/04/Recycling_Guide_2019_Vancouver web.pdf Plastic bags are considered to be contamination in all collected recycling streams
Q23 Is the use of single-use plastic bags to contain loose material in organics carts/bins, mandatory, optional or prohibited? Please select from the options below.	**Prohibited**
Q24 Was there a reduction in the number of plastic bags used in your residential curbside collection program since switching to carts/bins?	**Yes,** How is this assessed?: Plastic bags no longer used for residential curbside collection of yard trimmings and leaves. Plastic bags prohibited from organics carts.

Q25 What are any high level operational considerations with your cart/bincollection system? Please rank your selections from 1 to 8 with 1 as most important and 8 as least important.

Street width	**1**
On-street parking	**4**
Cart/bin placement and orientation at the curb	**2**
Collection of bulky items	**5**
Litter	**6**
Weather (wind/snow/rain)	**7**
Steep Hills	**8**
Overhead clearance (i.e. tree trimming)	**3**

Q26 Are there any other high-level operational considerations with your cart/bin based collection system that are not included in Question 25, above?

Yes,

If yes, please specify:

We have learned over the years that not all carts or trucks are created equally. Each truck system has its specific challenges and should be considered when selecting both your trucks and carts

Q27 Is residential collection completed by municipal staff or contracted to a private third-party company?

Combination of Public/Private

Q28 Was there any modifications needed to the collection system when converting to a cart/bin system?

Other: Please explain.:
Truck Type - Yes Routing - Yes By-Laws - Yes

Q29 Do you allow for extra bags to be placed outside of the bins?

Yes,
If yes, which stream?:
Garbage bag with prepaid sticker

Q30 Was there an increase or decrease in fleet staff after implementing the cart/bin system?

Decrease

Q31 Was there in increase or decrease in collection vehicle maintenance costs after implementing the cart/bin system?

Increase

Q32 What was the procurement model you used for acquiring carts/bins?

RFP

Q33 How were the size(s)/style(s) of the carts/bins chosen for garbage? Choose all options that apply.

Other: Please explain.:

Other - with the variety of housing stock and yards (vegetation) in Vancouver, the City decided to provide a variety of sizes for residents to match to the amount of yard trimmings produced. Residents were supplied the size(s) they requested.

Q34 How were the size(s)/style(s) of the carts/bins chosen for recycling? Choose all options that apply.

Other: Please explain.:

N/A

Q35 How were the size(s)/style(s) of the carts/bins chosen for organics?

Other: Please explain.:

Other - with the variety of housing stock (and residents per property) in Vancouver, the City decided to provide a variety of sizes for residents to match to the amount of garbage residents produced. Residents were supplied the size(s) they requested.

Q36 What are your overall annual operating costs (in Canadian Dollars) for garbage collection?

$4,600,000 - Equipment and Operator Salary/Benefits only

Q37 What are your overall annual operating costs (in Canadian Dollars) for recycling collection?

N/A - RecycleBC

Q38 What are your overall annual operating costs (in Canadian Dollars) for organics collection?

$7,100,000 - Equipment and Operator Salary/Benefits only

Q39 What costs (in Canadian Dollars) were incurred for implementing this system? Include items such as fleet modification/replacement, cart distribution, purchase of carts, etc.

Collection fleet:	**Fleet Procurement: - 29 CNG Automated Trucks - $10,000,000. 4 CNG/4 Diesel Semi-Automated Trucks - $2,200,000.**
Maintenance yard:	**N/A**
RFID technology and IT:	**N/A**
Cost to resident for cart:	**https://vancouver.ca/home-property-development/garbage-bins-and-green-bins.aspx**

Q40 Were there costs to modify receiving facilities (MRF, organics, landfill)? **No**

Q41 What are the cart/bin replacement rates (# per year) for garbage, recyclables and organics?

Garbage:	**3-5%**
Organics:	**3-5%**

Q42 Who has the responsibility for cart/bin replacement? **Municipality**

Q43 What is the cost of cart/bin replacement for garbage, recyclables and organics?

Garbage:	**$60 Average per cart + Labour**
Organics:	**$60 Average per cart + Labour**

Q44 What is the warranty on the carts/bins?

12 years
https://www.toter.com/12-year-warranty

Q45 Were any changes required at the receiving facilities (specifically MRF) to accommodate material collected in carts/bins? i.e. handling of loose material **No**

Q46 How was the cart purchase funded **Resident billed / pays direct cost**

Q47 How is your residential collection financed? **User pay based on cart size**

Q48 What is the municipality's opinion on how the cart/bin based program is working?

Cart collection comes with increased challenges, but the benefits to routing and manpower far outweigh the costs.

Q49 What, if any, barriers to participation were identified by the public and how were these overcome?

Storage space,

Odour,

Other: Please explain:

Space/location to set out cart for collection. Overcome through education efforts and staff field visits to provide assistance.

Q50 Are there assistance programs available for disability and special populations?

Yes,
If yes, please elaborate:
There is a non-advertised program where City crews aid residents in ensuring that their garbage makes it to the curb for collection (pack-out service) - elderly, disability, injury, etc. This is done through an application and site review process.

Q51 How are these programs funded and administered? Please elaborate.

N/A

Q52 Do you have any lessons learned during the implementation and transition to the cart/bin program?

Fully automated collection doesn't work in some tight lanes in Vancouver where space is limited - semi-automated collection trucks are used in these area.
Offering 5 sizes of carts is a challenge, educating people to choose the appropriate size, physically handling 5 sizes and delivering the right size to the right property during implementation, managing residents that want to change sizes, and keeping track of carts & sizes at each property for billing purposes.
Probably can’t do too much promotion and education; reaching everybody in the City is a challenge.
Once cart rollout started, there was a lot of interest and demand from residents asking when they would get their cart.

Q53 Do you have any recommendations on what could be done differently?

No answer provided

Q54 What benefits were realized in switching to a cart/bin based system?

Reduction in collection worker injuries resulting in reduced workers compensation costs and reduced disability claims.

Table B-2: Summary of Short Form Survey Responses (Confidential – Jurisdiction Names Removed)

	Questions	Respondent 10	Respondent 11	Respondent 12	Respondent 13
1	What material streams do you use carts/bins for?	Garbage (4 cart sizes, 75 – 360 litres) Recycling (4 cart sizes, 75 – 360 litres) Organics (75 litres?)	Garbage – for multi residential buildings next year Recycling - same Organics – curbside and multi residential up to 240L	Garbage – mainly bags for building with less than 9 units, garbage cans and rolling bins in parts of few boroughs. Multi dwellings : rolling bins, containers Recycling – small bins, rolling bins and plastic bags Organics - small bins and rolling bins	Garbage Organics
2	Do you have a single or multi-stream recycling program?	Single-stream	Glass metal plastic and fiber collection in different carts	Single stream	Multi (waste, organics) ***Single stream recycling using bags***
3	How many residential households do you service with curbside collection?	450,000	250000 homes	859 054 units (540 869 buildings of 8 and less units and 318 185 multi dwellings) Garbage and recycling: close to 100 % of residential households. Some multi dwellings use private companies Organics : The implementation of all the buildings of 8 and less units will be completed at the end of 2019.	Currently a pilot of 8,000 homes (carts)
4	When did you start using carts / bins for curbside collection?	2008	Carts are only used for organics full roll out in 2012	Organics : in 2015 Recycling : between 2010 and 2012 in building of 8 or less units when urban density permitted it	April 2019
5	What were the main reasons for implementing carts?	Old blue boxes too small for residents capacity needs and caused blowing litter; User Pay system, single stream program implementation	New organic program	To increase collection performance and the quantity of residual materials collected	To improve diversion from landfill
6	Did the recycling contamination rate change when cart/bin collection system was implemented?	No - not at the time of implementation.	No change for multi residential	Multi dwellings : worst quality In building of 8 or less units : no	unknown
7	Do you have manual, semi-automated or automated materials collection for garbage, recycling and organics?	Garbage – Semi-automated and Automated Recycling – Semi-automated and Automated Organics - Semi-automated and Automated	Garbage – Recycling – Organics – semi automated for organics	Garbage – manual and semi-automated Recycling – manual and semi-automated Organics – manual and semi-automated	Garbage - automated Organics – automated
8	Do you use video or radio frequency identification (RFID) technology for education/enforcement?	No	Yes / No we do not	Yes in only one borough (Saint-Laurent) for data and follow up	No. However in full implementation we plan to

	Questions	Respondent 10	Respondent 11	Respondent 12	Respondent 13
9	Is the use of single-use plastic bags to contain loose material in **garbage** carts/bins mandatory, optional or prohibited? Please select from the options below.	Optional (at residents discretion)	- Mandatory - Optional (at residents discretion) optinal - Prohibited	Optional (at residents discretion)	Optional (at residents discretion)
10	What is the reasoning behind this answer?	The yuck material is in the green bin so the garbage stream is relatively clean	No reason	No reason	n/a
11	Is the use of single-use plastic bags to contain loose material in recycling carts/bins mandatory, optional or prohibited? Please select from the options below.	Prohibited except for shredded paper	- Mandatory - Optional (at residents discretion) - Prohibited not approved	- Optional (at residents discretion)	n/a – bag based program
12	What is the reasoning behind this answer?	Loose shredded paper in a bin has airborne tendencies while dumping.	Plastic bags are not part of the recycling program	But not recommended because of possible issues in sorting center	n/a
13	What are any high level operational considerations with your cart/bin collection system? Such as: Street width - On-street parking - Cart/bin placement and orientation at the curb - Collection of bulky items - Litter - Weather (wind/snow/rain) - Steep hills - Overhead clearance (i.e. tree trimming) - Other: explain	A few properties that have steep slopes, or dense housing such as row housing having issues with the bin program. Semi-automated lifers are required in areas with dense on-street parking such as in the downtown core.	Guidelines are in place for builders at the planning stage no cart service for curbside	Urban density Street width On-street parking Weather : snow	Parking, cart placement
14	Are there any other high-level operational considerations with your cart/bin based collection system that are not included in Question 25, above?	No	No other	No	
15	Is residential collection completed by municipal staff or contracted to a private third-party company?	Mix of private and municipal staff	Mix of private and municipal staff	Mix of private and municipal staff Mainly private staff but some boroughs have municipal staff 2 boroughs : 100 % recycling collected by municipal staff 6 boroughs : have a mix of private and municipal staff depending on the stream.	In pilot all work is conducted by city.
16	Do you allow for extra bags to be placed outside of the bins?	Yes / No . If yes, which stream Yes for garbage bags with city issues tags and clear bags for the occasional excess recycling	Yes / No . If yes, which stream no cart service	Yes / No . If yes, which stream In general yes	Yes – Garbage
17	Was there an increase or decrease in fleet staff after implementing the cart/bin system?	Increase / Decrease / No Change Approximately 10% reduction "collection" staff	Increase / Decrease / No Change n/a	No Change	No change – Pilot only

	Questions	Respondent 10	Respondent 11	Respondent 12	Respondent 13
18	Was there an increase or decrease in collection vehicle maintenance costs after implementing the cart/bin system?	Increase – With automation of collection, more maintenance (greasing lifters,sensors) is required	Increase / Decrease / No Change n/a	No Change	No change
19	How were the size(s)/style(s) of the carts/bins chosen for garbage? - Public survey - Consultant recommendation - Homeowner request - Other community recommendations - Collection provider recommendations - Other: explain	Residents can choose the size of Recycling and Garbage bins that suits them, Organics is one standard size. Initial implementation: Survey on-line, or mail back card for resident(s) to choose bin size.	n/a	In general, because rolling bins are pratical	Chosen by public survey and study of waste volumes.
20	How were the size(s)/style(s) of the carts/bins chosen for recycling? - Public survey - Consultant recommendation - Homeowner request - Other community recommendations - Collection provider recommendations - Other: explain	See above	n/a	Rolling bins are practical for collection Increase the quantity Easy to handle	n/a
21	How was the cart purchase funded?	- Resident billed / pays direct cost -Tax Funds -Other, please specify: Covered under our capital budget through property tax	- Resident billed / pays direct cost -Tax Funds -Other, please specify:	-Mainly Tax Funds for recycling bins For organics bins, city will receive a percent of a provincial funds -	Utility rate
22	What is the municipality's opinion on how the cart based program is working?	Great, no going back.	n/a	Rolling bins are the best for the cleanliness of the streets and collection	Results have been positive
23	What (if any) barriers to participation were identified by the public and how were these overcome? - Storage space - Odour - Aesthetics - Difficulties moving the cart - Other:	Storage and steep slopes. We have less than 1 percent of our households that could not accommodate a bin and have been exempted, instead they must place bags to the curb for recycling.	n/a	All of those	-storage space - “yuck factor” for organics bins
24	Do you have any lessons learned during the implementation and transition to the cart/bin program? What could have been done different?	Dedicate as many resources that you can to customer services	n/a	Rolling bins must be adapted to urban density and type of client	Resident education is key Just in time delivery of carts prior to beginning cart service
25	What benefits were realized in switching to a cart/bin based system?	Reduction in litter, reduction in injuries, more streamlined program, etc.	n/a	Reduction of the operating costs Cleanliness of the streets	Continuing to monitor

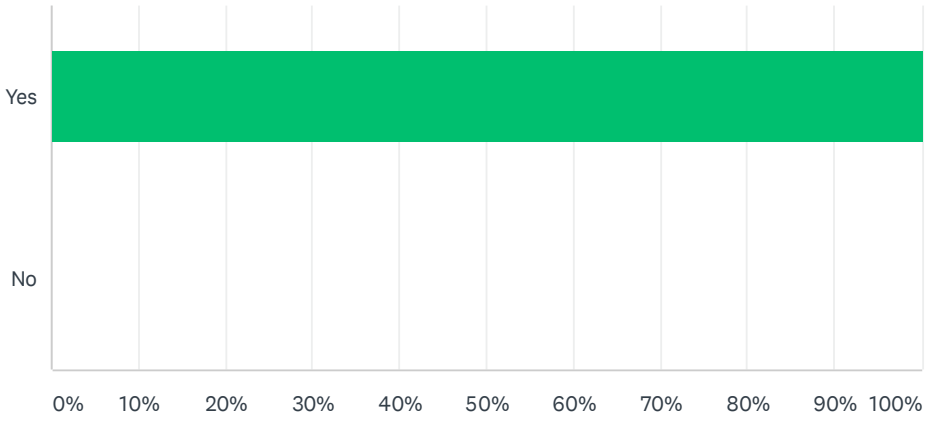
Appendix C

Survey Results

- Long Form Survey Results – Question by Question Summaries

Q2 Does your municipality use carts/bins for residential collection of garbage or recycling?

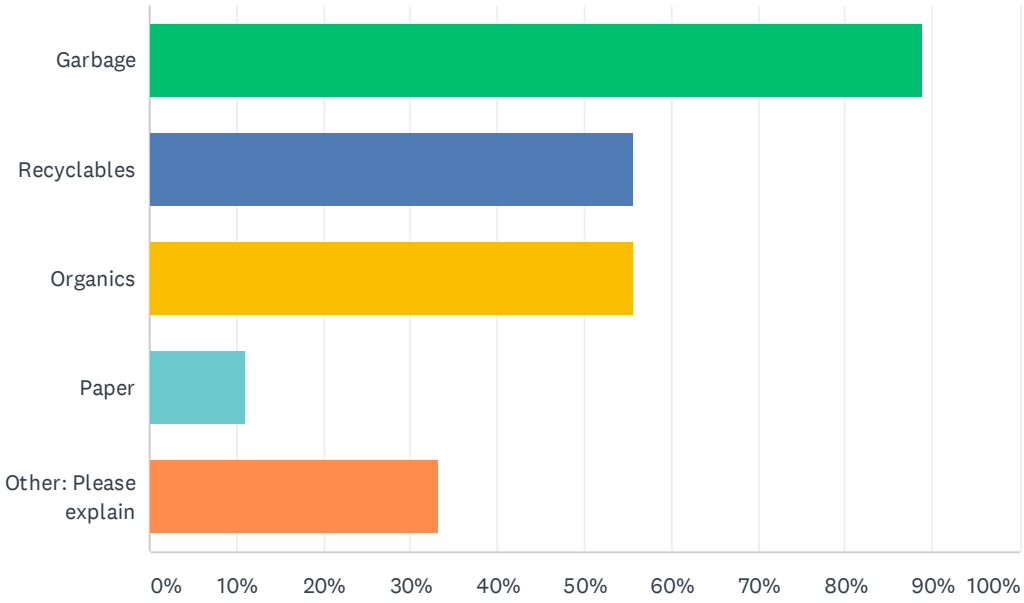
Answered: 9 Skipped: 0



ANSWER CHOICES	RESPONSES	
Yes	100.00%	9
No	0.00%	0
TOTAL		9

Q3 If yes, for what material streams do you use carts/bins? Choose all options that apply.

Answered: 9 Skipped: 0

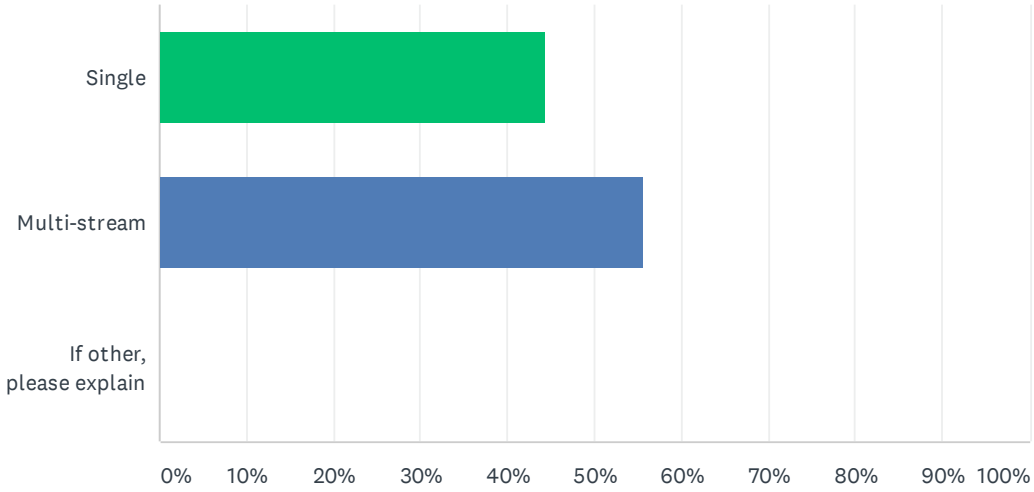


ANSWER CHOICES	RESPONSES	
Garbage	88.89%	8
Recyclables	55.56%	5
Organics	55.56%	5
Paper	11.11%	1
Other: Please explain	33.33%	3
Total Respondents: 9		

#	OTHER: PLEASE EXPLAIN	DATE
1	includes Paper, metal cans, cardboard and hard plastics #1-7	9/9/2019 11:06 AM
2	Blue and grey recycle boxes for those who participate in volunteer recycle collection; garbage bins are not required	9/9/2019 10:55 AM
3	Paper and other household packaging recyclables are collected in one co-mingled recycling cart.	8/26/2019 5:54 PM

Q4 Do you have a single or multi-stream recycling program?

Answered: 9 Skipped: 0



ANSWER CHOICES	RESPONSES	
Single	44.44%	4
Multi-stream	55.56%	5
If other, please explain	0.00%	0
TOTAL		9

#	IF OTHER, PLEASE EXPLAIN	DATE
	There are no responses.	

Q5 How many residential households do you service with curbside collection?

Answered: 9 Skipped: 0

#	RESPONSES	DATE
1	105,000 single family, 11,900 multi-family (garbage), 21,100 multi-family (organics)	9/18/2019 10:36 AM
2	338,000	9/16/2019 4:38 PM
3	35,000	9/9/2019 11:06 AM
4	24,000 (est)	9/9/2019 10:55 AM
5	Approximately 330,000	8/29/2019 7:28 PM
6	203,000	8/29/2019 12:42 PM
7	48000	8/29/2019 11:40 AM
8	74,611	8/27/2019 9:57 AM
9	70,000	8/26/2019 5:54 PM

Q6 What are the size of carts for recycling, garbage and organics?

Answered: 9 Skipped: 0

ANSWER CHOICES	RESPONSES	
Recycling	77.78%	7
Garbage	88.89%	8
Organics	77.78%	7

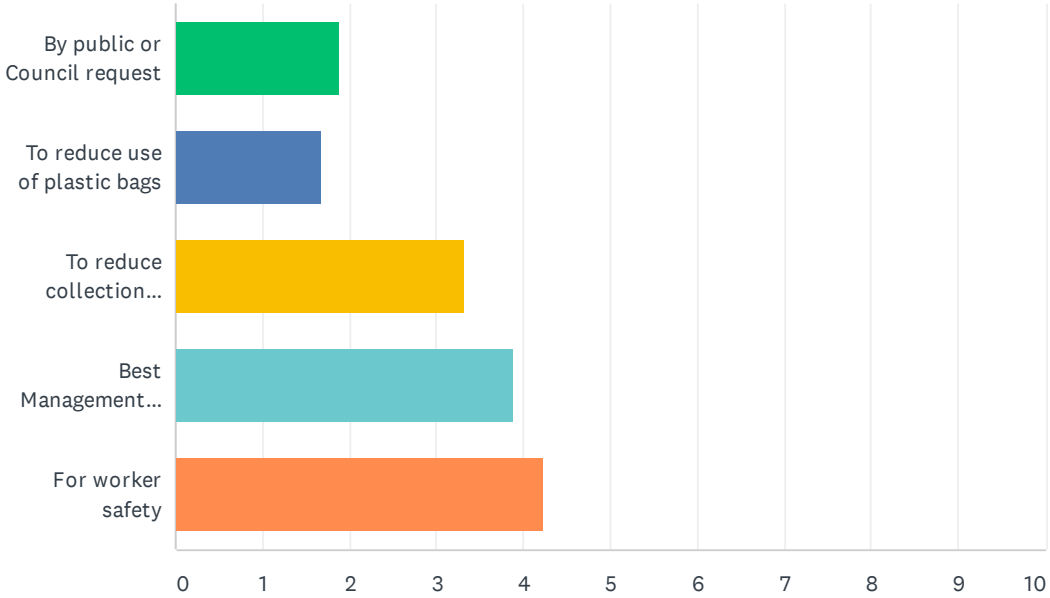
#	RECYCLING	DATE
1	120 L, 240 L, 360 L	9/16/2019 4:38 PM
2	240L/360L blue carts	9/9/2019 11:06 AM
3	19 gallons	9/9/2019 10:55 AM
4	240 Litre	8/29/2019 7:28 PM
5	240L; upgrade to 360L, 240+240L, or 240+360L available	8/29/2019 12:42 PM
6	N/A	8/29/2019 11:40 AM
7	95 gal	8/26/2019 5:54 PM

#	GARBAGE	DATE
1	75L, 120L, 180L, 240L, 360L	9/18/2019 10:36 AM
2	120 L, 240 L, 360 L	9/16/2019 4:38 PM
3	240L/360L black carts	9/9/2019 11:06 AM
4	240 Litre	8/29/2019 7:28 PM
5	240L; upgrade to 360L, 240+240L, or 240+360L available	8/29/2019 12:42 PM
6	240 L	8/29/2019 11:40 AM
7	240L	8/27/2019 9:57 AM
8	95 gal and some 65 gal on request	8/26/2019 5:54 PM

#	ORGANICS	DATE
1	75L, 120L, 180L, 240L, 360L	9/18/2019 10:36 AM
2	100 L	9/16/2019 4:38 PM
3	240 Litre	8/29/2019 7:28 PM
4	n/a	8/29/2019 12:42 PM
5	N/A	8/29/2019 11:40 AM
6	240L	8/27/2019 9:57 AM
7	95 gal	8/26/2019 5:54 PM

Q7 Please identify the influencing factors in your decision to use a cart/ bin based collection system ranking from 1 to 5, with 1 as most important and 5 as least important.

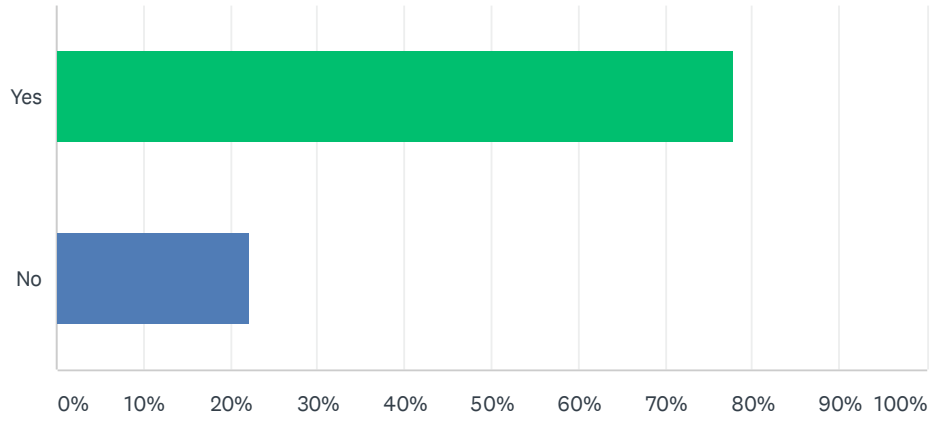
Answered: 9 Skipped: 0



	1	2	3	4	5	TOTAL	SCORE
By public or Council request	0.00% 0	0.00% 0	11.11% 1	66.67% 6	22.22% 2	9	1.89
To reduce use of plastic bags	0.00% 0	11.11% 1	11.11% 1	11.11% 1	66.67% 6	9	1.67
To reduce collection costs	22.22% 2	33.33% 3	11.11% 1	22.22% 2	11.11% 1	9	3.33
Best Management Practices	33.33% 3	22.22% 2	44.44% 4	0.00% 0	0.00% 0	9	3.89
For worker safety	44.44% 4	33.33% 3	22.22% 2	0.00% 0	0.00% 0	9	4.22

Q8 Are there any other influencing factors in your decision to use a cart/bin based collection system that are not listed in Questions 7, above?

Answered: 9 Skipped: 0



ANSWER CHOICES	RESPONSES	
Yes	77.78%	7
No	22.22%	2
Total Respondents: 9		

#	IF YES, PLEASE SPECIFY	DATE
1	Occupational Health & Safety Regulation introduced in BC 1998 (under authority of the Workers Compensation Act) required that the risk of (musculoskeletal) injuries to workers be eliminated or, if that is not practical, be minimized.	9/18/2019 10:36 AM
2	Reduce GreenHouse Gas Emissions (bi-weekly service)	9/16/2019 4:38 PM
3	We have blue/grey recycle to help sorting at home which augments our MRF sorting.	9/9/2019 10:55 AM
4	It is difficult to rank question 7 as the changeover started a decade ago and the motivations beyond the public reports aren't known.	8/29/2019 12:42 PM
5	Ability to track driver productivity and number of households serviced on a daily basis. We can now collect data that we couldn't before. Reduction in litter from bags being torn open by birds.	8/29/2019 11:40 AM
6	windy weather and to control litter with crows and other animals etc.	8/27/2019 9:57 AM
7	Reduce waste generated by households and increase accountability. Reduce fires, overfilling, and other misuse of shared 300 gallon containers in back lanes.	8/26/2019 5:54 PM

Q9 When did you start using carts / bins for curbside collection?

Answered: 9 Skipped: 0

#	RESPONSES	DATE
1	Garbage: 2005, Yard Trimmings: 2006	9/18/2019 10:36 AM
2	2016	9/16/2019 4:38 PM
3	2006	9/9/2019 11:06 AM
4	2001	9/9/2019 10:55 AM
5	2009	8/29/2019 7:28 PM
6	February 2010 for northwest quadrant garbage; Rest of city for garbage and recycling in 2012	8/29/2019 12:42 PM
7	June 2018 and June 2019	8/29/2019 11:40 AM
8	Pilot them in 1995 went Island wide in 2003	8/27/2019 9:57 AM
9	Some neighbourhoods since the early 90s. Other neighbourhoods had been using shared 300 gallon containers in back lanes until 2010, but since then all households now have rollout carts.	8/26/2019 5:54 PM

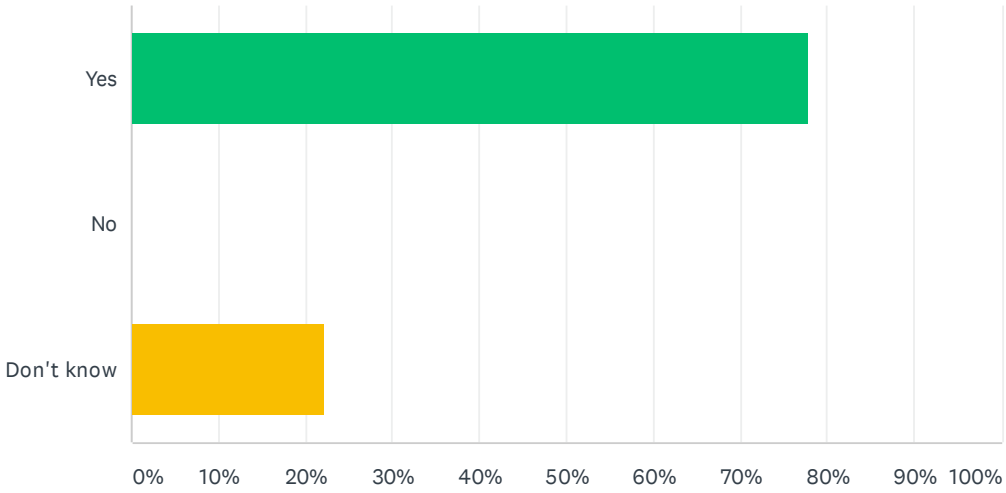
Q10 What is your municipality's waste diversion rate (%)?

Answered: 9 Skipped: 0

#	RESPONSES	DATE
1	Metro Vancouver Diversion Rate (of which the City of Vancouver is a part) - 63%. http://www.metrovancouver.org/dashboards/services/solid-waste/Pages/Waste-diversion-rate.aspx	9/18/2019 10:36 AM
2	Approximately 50%	9/16/2019 4:38 PM
3	35%	9/9/2019 11:06 AM
4	38 (est)	9/9/2019 10:55 AM
5	Per cent of Residential Waste Diverted from Landfill Through Blue and Green Cart Programs was 55% in 2018.	8/29/2019 7:28 PM
6	33%	8/29/2019 12:42 PM
7	12% by weight (recycling/garbage)	8/29/2019 11:40 AM
8	over 50%	8/27/2019 9:57 AM
9	23	8/26/2019 5:54 PM

Q11 Did your municipality's waste diversion rate change with the introduction of carts/bins for garbage and recyclables?

Answered: 9 Skipped: 0



ANSWER CHOICES	RESPONSES	
Yes	77.78%	7
No	0.00%	0
Don't know	22.22%	2
TOTAL		9

#	PLEASE EXPLAIN:	DATE
1	The diversion rate increase due to the change to bi-weekly collection of garbage and recycling. Organics remained weekly, thus pushing more resident to participate in the organics program	9/16/2019 4:38 PM
2	Received slightly more garbage in the years following transition from bags to carts. Calgary accepts unlimited excess waste, which may have been a factor. Received slightly more garbage in the years following transition from bags to carts for Garbage. Calgary accepts unlimited excess waste, which may have been a factor. Significantly more recycling tonnages when supplementing community depots with cart collection.	8/29/2019 7:28 PM
3	Introduction of carts was accompanied with significant other programs, so it is difficult to isolate the effects of the carts.	8/29/2019 12:42 PM
4	Our recycling program is currently voluntary. We noticed an increase in recycling immediately after implementing automated garbage collection. With the introduction of automated garbage collection, we went from a 10 bag weekly limit, to whatever could fit in a 240 L cart. Because of this, residents were almost forced to start recycling so they could fit all their garbage into a 240 L cart. Number of recycling bags collected per week is unlimited.	8/29/2019 11:40 AM
5	Unable to find documentation of diversion rates or waste characterizations from the early 90s.	8/26/2019 5:54 PM

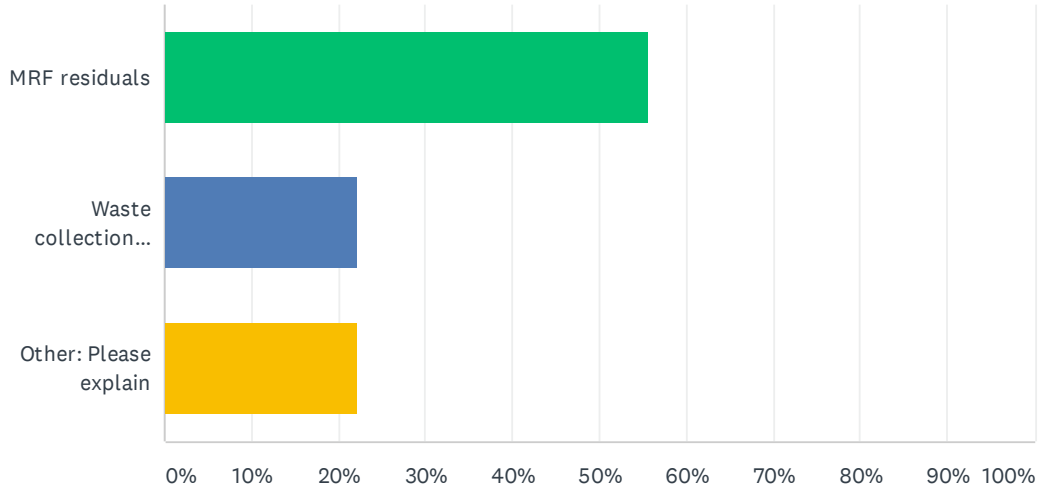
Q12 What is the contamination rate (%) in your recycling stream?

Answered: 9 Skipped: 0

#	RESPONSES	DATE
1	N/A - Collected by RecycleBC	9/18/2019 10:36 AM
2	Approximately 20%	9/16/2019 4:38 PM
3	10%	9/9/2019 11:06 AM
4	UA	9/9/2019 10:55 AM
5	12-15%	8/29/2019 7:28 PM
6	18%	8/29/2019 12:42 PM
7	<2%	8/29/2019 11:40 AM
8	5-6%	8/27/2019 9:57 AM
9	10%	8/26/2019 5:54 PM

Q13 How is this metric calculated?

Answered: 9 Skipped: 0

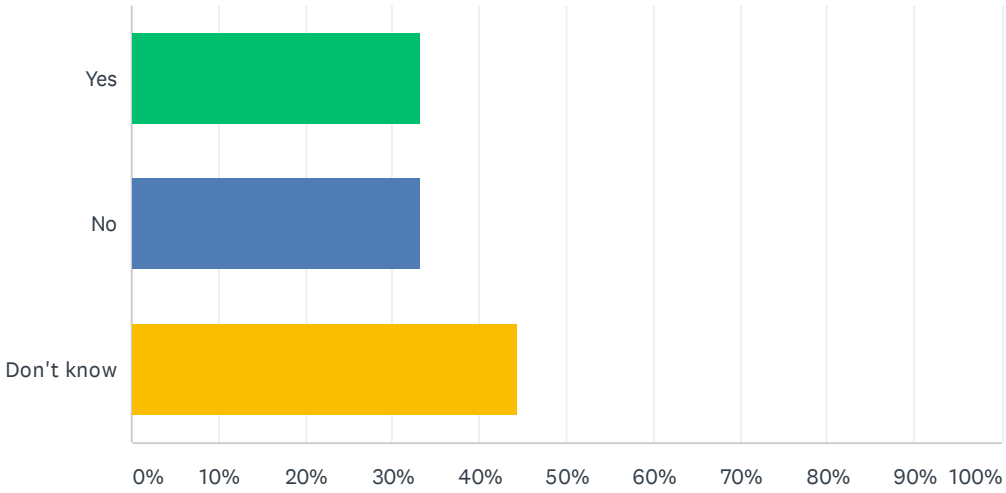


ANSWER CHOICES	RESPONSES	
MRF residuals	55.56%	5
Waste collection audit	22.22%	2
Other: Please explain	22.22%	2
TOTAL		9

#	OTHER: PLEASE EXPLAIN	DATE
1	N/A	9/18/2019 10:36 AM
2	Waste audits at MRF.	8/29/2019 12:42 PM

Q14 Did the recycling contamination rate improve when cart/bin collection system was implemented?

Answered: 9 Skipped: 0

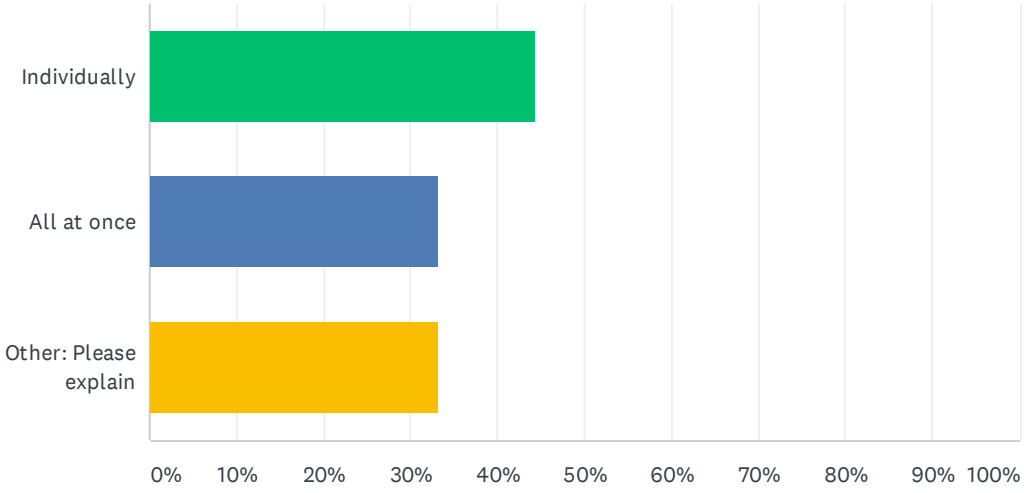


ANSWER CHOICES	RESPONSES	
Yes	33.33%	3
No	33.33%	3
Don't know	44.44%	4
Total Respondents: 9		

#	PLEASE EXPLAIN	DATE
1	Recycling collection program did not change (manual box and bag collection).	9/18/2019 10:36 AM
2	The contamination rate increased significantly. Resident's formerly used blue boxes. With larger carts, some residents began to place recyclables in plastic shopping bags and also other non-recyclables were easier to place in the carts without detection. Enforcement is much more difficult at the curb with automated cart collection.	9/16/2019 4:38 PM
3	Noticed our recycling depots have had a higher contamination rate and after the introduction of the curbside recycling program, contamination has decreased	9/9/2019 11:06 AM
4	Have used cart based collection since the beginning of the recycling program.	8/29/2019 7:28 PM
5	Changes to MRF auditing protocol and markets also took place, so it is hard to isolate effect of carts on contamination.	8/29/2019 12:42 PM
6	Too early to tell. We only rolled out carts to 1/3 of the City in 2018. The remainder of the City only started participating in June 2019. Also it would be difficult to tell because the MRF services the eastern region of Newfoundland and not just St. John's.	8/29/2019 11:40 AM
7	On PEI we introduced cart collection for waste and organics and Blue Bag program for recyclables at the same time when our Waste Watch program started	8/27/2019 9:57 AM
8	The curbside recycling program was implemented in 2013. We've always had carts since Day 1.	8/26/2019 5:54 PM

Q15 Did you purchase and implement carts/bins at the same time for multiple streams (i.e. garbage, recyclables, organics) or separately as individual purchases?

Answered: 9 Skipped: 0

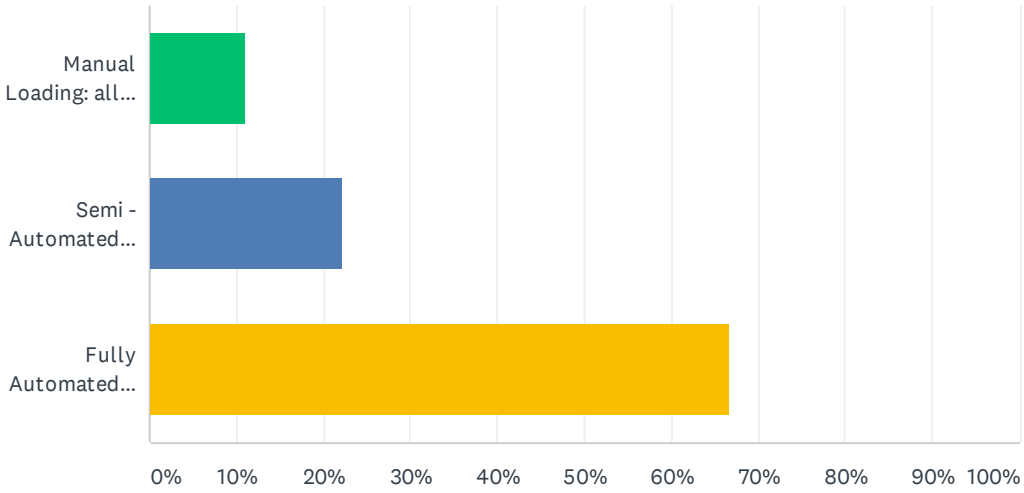


ANSWER CHOICES	RESPONSES	
Individually	44.44%	4
All at once	33.33%	3
Other: Please explain	33.33%	3
Total Respondents: 9		

#	OTHER: PLEASE EXPLAIN	DATE
1	About 45,000 northwest garbage carts in 2010. 145,000 garbage carts and 190,000 recycling carts in 2012	8/29/2019 12:42 PM
2	We only purchased carts for garbage. Recycling and yard waste will remain manual collection.	8/29/2019 11:40 AM
3	Waste carts were in place long before the recycling program (with carts) was implemented in 2013. Organics cart collections started in the mid-2000s.	8/26/2019 5:54 PM

Q16 Do you have manual or automated materials collection. If automated, please indicate type from selections.

Answered: 9 Skipped: 0

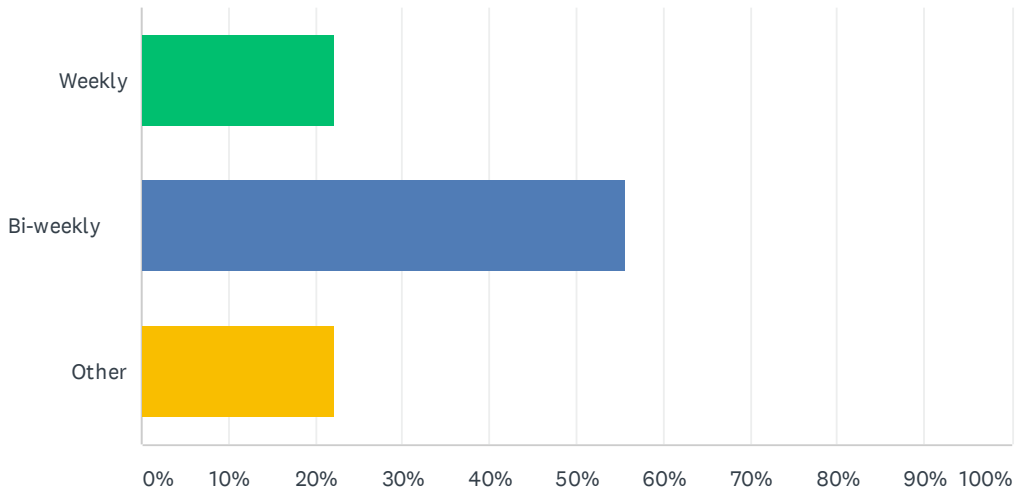


ANSWER CHOICES	RESPONSES	
Manual Loading: all material is manually loaded by hand into the truck.	11.11%	1
Semi - Automated Loading: mechanical unloading, along with manual loading.	22.22%	2
Fully Automated Loading: all unloading is done mechanically with the driver using a joystick. In this case, the driver does not leave the cab.	66.67%	6
TOTAL		9

#	OTHER: PLEASE EXPLAIN.	DATE
1	Mix of semi-Automated and Fully Automated - Majority is Fully-Automated, but certain routes are not able to accommodate Fully-Automated Trucks	9/18/2019 10:36 AM
2	Some colelction is done manually, excess recycling, organics carts, yard waste, bulky items	9/16/2019 4:38 PM
3	Fully automated except for excess for garbage and organics, where the driver is required to leave the cab and load the excess materials into the cart for a second tip.	8/29/2019 7:28 PM
4	Areas with tighter back lanes have semi-automated rear loaders.	8/29/2019 12:42 PM
5	There are some exceptions. Some one-way streets utilize a cart tipper, which is semi-automated since driver has to get out of truck. Also, a small section of the City in the downtown core will remain full manual collection due to difficulty with issuing carts (density, on-street parking, row-housing with nowhere to store cart)	8/29/2019 11:40 AM
6	maunual loading with cart lifter to lift and empty cart into truck .	8/27/2019 9:57 AM

Q17 What is your collection frequency for garbage?

Answered: 9 Skipped: 0

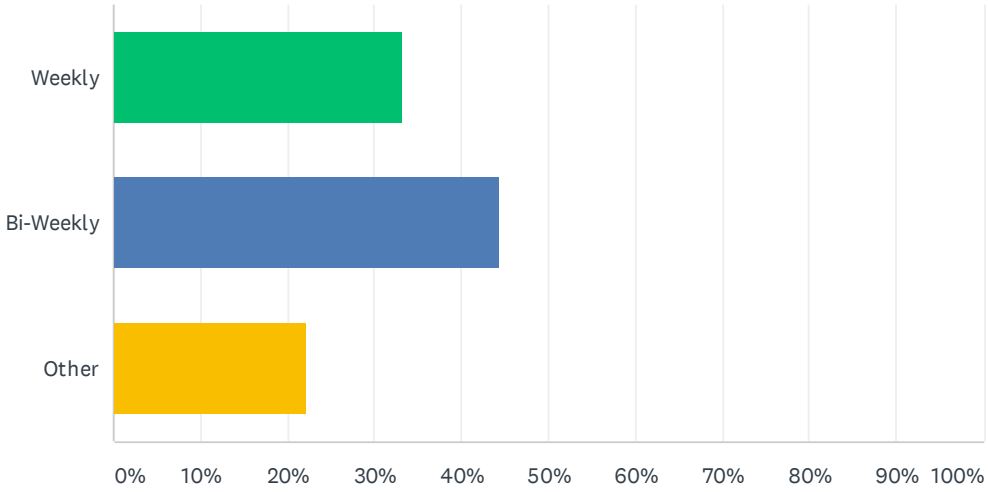


ANSWER CHOICES	RESPONSES	
Weekly	22.22%	2
Bi-weekly	55.56%	5
Other	22.22%	2
TOTAL		9

#	IF OTHER, PLEASE EXPLAIN	DATE
1	City of Fredericton, Village of New Maryland are weekly. Village of Hanwell bi-weekly. Numerous rural areas once a month.	9/9/2019 10:55 AM
2	Changed to bi-weekly with the implementation of the Green Cart Program.	8/29/2019 7:28 PM
3	Bi weekly one week organics next week Waste and monthly collections of recyclables	8/27/2019 9:57 AM
4	Weekly in the summer months (from May through September inclusive) and bi-weekly in the winter months.	8/26/2019 5:54 PM

Q18 What is your collection frequency for recycling?

Answered: 9 Skipped: 0

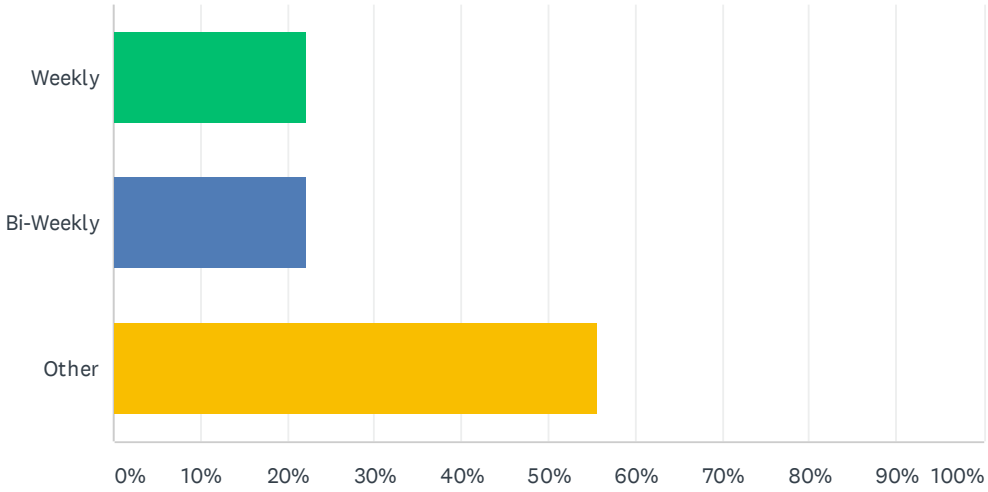


ANSWER CHOICES	RESPONSES	
Weekly	33.33%	3
Bi-Weekly	44.44%	4
Other	22.22%	2
TOTAL		9

#	IF OTHER, PLEASE EXPLAIN	DATE
1	(RecycleBC)	9/18/2019 10:36 AM
2	City of Fredericton, Village of New Maryland alternates blye/grey box weekly. Village of Hanwell bi-weekly. Rural areas once a month.	9/9/2019 10:55 AM
3	Monthly	8/27/2019 9:57 AM

Q19 What is your collection frequency for organics?

Answered: 9 Skipped: 0

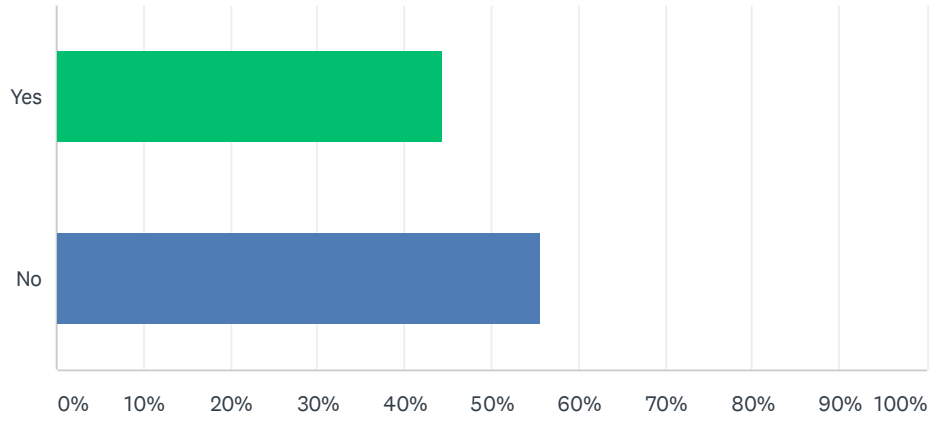


ANSWER CHOICES	RESPONSES	
Weekly	22.22%	2
Bi-Weekly	22.22%	2
Other	55.56%	5
TOTAL		9

#	IF OTHER, PLEASE EXPLAIN	DATE
1	N/a if approved in Oct. recommended summer weekly, and biweekly winter	9/9/2019 11:06 AM
2	No organic collection	9/9/2019 10:55 AM
3	Weekly, Bi-weekly in Winter (November-March).	8/29/2019 7:28 PM
4	Seasonal bi-weekly leaf and yard waste service collected manually. No residential food waste program.	8/29/2019 12:42 PM
5	Seasonal yard waste collection only.	8/29/2019 11:40 AM
6	Bi-weekly from May through the first week of November.	8/26/2019 5:54 PM

Q20 Do you use video or radio frequency identification (RFID) technology for education/enforcement?

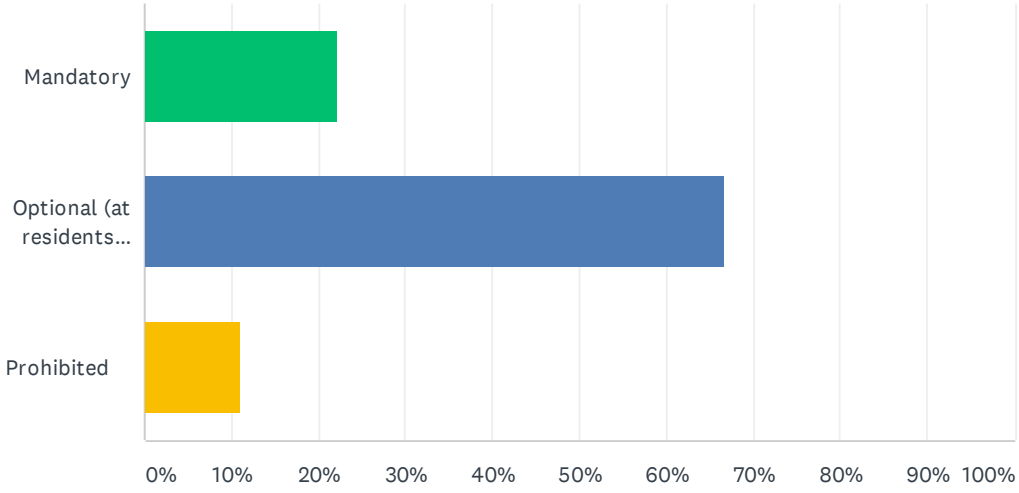
Answered: 9 Skipped: 0



ANSWER CHOICES	RESPONSES	
Yes	44.44%	4
No	55.56%	5
TOTAL		9

Q21 Is the use of single-use plastic bags to contain loose material in garbage carts/bins mandatory, optional or prohibited? Please select from the options below.

Answered: 9 Skipped: 0

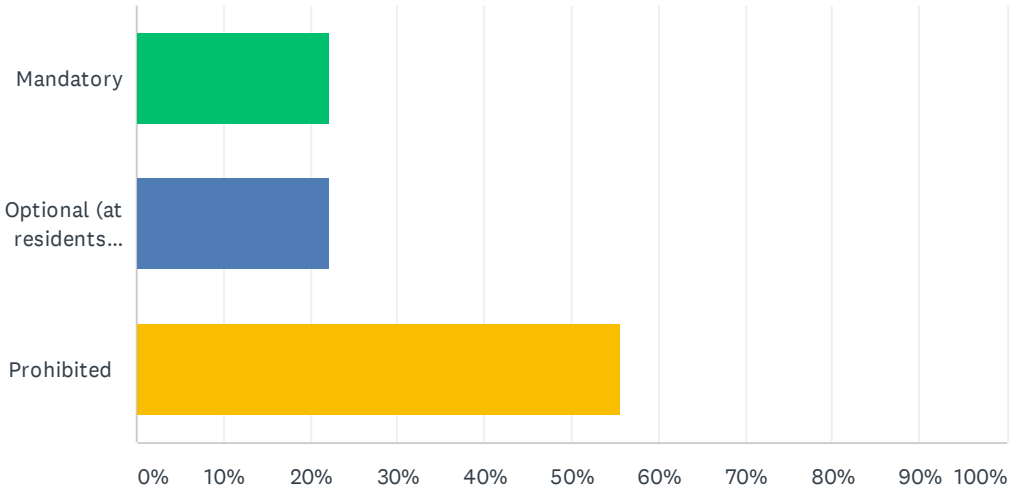


ANSWER CHOICES	RESPONSES	
Mandatory	22.22%	2
Optional (at residents discretion)	66.67%	6
Prohibited	11.11%	1
TOTAL		9

#	PLEASE EXPLAIN THE REASONING BEHIND YOUR SELECTION	DATE
1	No concerns with loose material in bins.	9/18/2019 10:36 AM
2	The Region does not require materials to be bagged in any waste stream collected. It is up to the resident to choose their preferred storage/disposal method.	9/16/2019 4:38 PM
3	But not enforced because its very windy here and we encourage residents to always bag their garbage	9/9/2019 11:06 AM
4	Residents must put the garbage inside the cart in a way that it can fall freely when the cart is emptied. Otherwise residents are responsible for the general care and maintenance of their City-assigned cart. They're also responsible for complying with the Neighbourhood Liveability By-law which deals with odours, illegal dumping, and other injurious effects.	8/29/2019 12:42 PM
5	We advise residents to still use bags to help keep the inside of the cart cleaner.	8/29/2019 11:40 AM
6	Waste Bylaw requirement. Minimizes the potential for waste materials to blow out of carts during collection. Also minimizes the potential for waste materials to stick to the inside of the cart, thus reducing odours. As the organics program is an optional subscription based program, a large quantity of organic materials are still ending up in waste carts.	8/26/2019 5:54 PM

Q22 Is the use of single-use plastic bags to contain loose material in recycling carts/bins mandatory, optional or prohibited? Please select from the options below.

Answered: 9 Skipped: 0

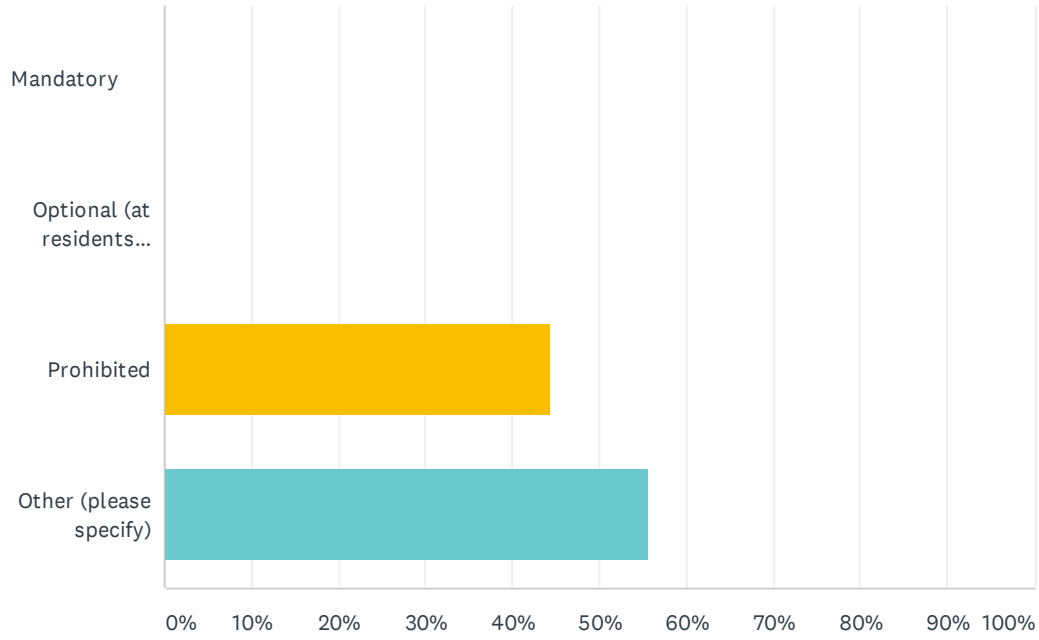


ANSWER CHOICES	RESPONSES	
Mandatory	22.22%	2
Optional (at residents discretion)	22.22%	2
Prohibited	55.56%	5
TOTAL		9

#	PLEASE EXPLAIN THE REASONING BEHIND YOUR SELECTION	DATE
1	Managed by RecycleBC: http://recyclebc.ca/wp-content/uploads/2019/04/Recycling_Guide_2019_Vancouverweb.pdf Plastic bags are considered to be contamination in all collected recycling streams	9/18/2019 10:36 AM
2	Only optional when using clear recycling bags. It is prohibited to use single use grocery, shopping or garbage bags for recycling.	9/16/2019 4:38 PM
3	No plastic bags are permitted in the curbside recycling program due to other MRFs having issues with bags getting wrapped around their MRF/sorting	9/9/2019 11:06 AM
4	Mandatory to use single-use bags to contain other single-use bags. Clear bags required for shredded paper.	8/29/2019 7:28 PM
5	Plastic bags and film are prohibited from our single stream system as they clog the machinery at the MRF.	8/29/2019 12:42 PM
6	We don't use carts for recycling. All blue, clear bags.	8/29/2019 11:40 AM
7	Under the recycling contract and Waste Bylaw requirements, all materials must be placed loosely into carts so they can be effectively sorted at the MRF. The recycling collection trucks have different hoppers than the waste collection trucks so that loose, blown litter is minimized.	8/26/2019 5:54 PM

Q23 Is the use of single-use plastic bags to contain loose material in organics carts/bins, mandatory, optional or prohibited? Please select from the options below.

Answered: 9 Skipped: 0

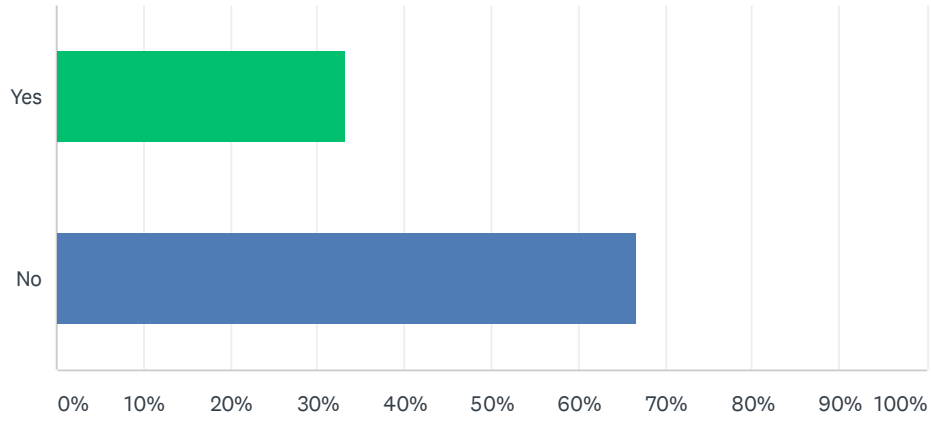


ANSWER CHOICES	RESPONSES	
Mandatory	0.00%	0
Optional (at residents discretion)	0.00%	0
Prohibited	44.44%	4
Other (please specify)	55.56%	5
TOTAL		9

#	OTHER (PLEASE SPECIFY)	DATE
1	Plastic bags are prohibited for use in the organics program. Residents are allowed to place organics loosely in their organics cart or use paper or compostable bags.	9/16/2019 4:38 PM
2	N/a	9/9/2019 11:06 AM
3	Not applicable.	9/9/2019 10:55 AM
4	No residential food waste collection program	8/29/2019 12:42 PM
5	We don't use carts for organics. We only pick-up yard waste seasonally. Yard waste must be in paper compostable bags.	8/29/2019 11:40 AM

Q24 Was there a reduction in the number of plastic bags used in your residential curbside collection program since switching to carts/bins?

Answered: 9 Skipped: 0

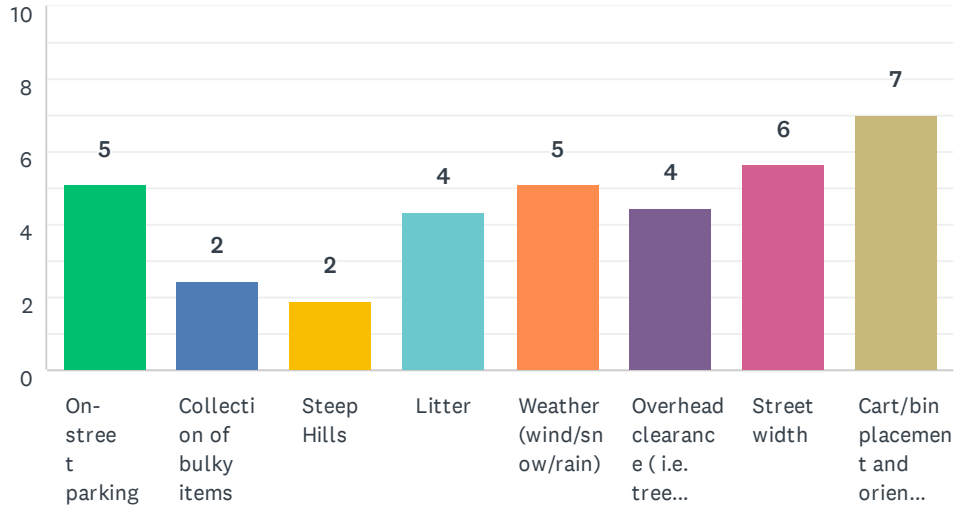


ANSWER CHOICES	RESPONSES	
Yes	33.33%	3
No	66.67%	6
TOTAL		9

#	HOW IS THIS ASSESSED?	DATE
1	Plastic bags no longer used for residential curbside collection of yard trimmings and leaves. Plastic bags prohibited from organics carts.	9/18/2019 10:36 AM
2	This is difficult to assess and has not been measure. I wold hazard a guess that residents still use grocery/shopping bags for their garbage and place in the garbage cart. There has obviously been a reduction in the use of black garbage bags when the Region moved away from a bag-based garbage collection system. As noted earlier, we have seen an increase in the use of single use shopping/grocery bags in the recycling. We have had success reducing this number with our "Let it Loos" campaign, but it is a constant struggle to keep the number of bagged recyclables down.	9/16/2019 4:38 PM
3	UNKNOWN	9/9/2019 11:06 AM
4	Difficult question as we continue to receive plastic bags on a regular basis in our blue bins.	9/9/2019 10:55 AM
5	Unknown	8/29/2019 7:28 PM
6	Not measured	8/29/2019 12:42 PM
7	We don't know. But we can assume that there are probably less garbage bags being used now by residents	8/29/2019 11:40 AM
8	prior to the introduction of carts residents placed waste and compost curbside in plastic bags.	8/27/2019 9:57 AM
9	No data on this. See #11 above.	8/26/2019 5:54 PM

Q25 What are any high level operational considerations with your cart/bincollection system? Please rank your selections from 1 to 8 with 1 as most important and 8 as least important.

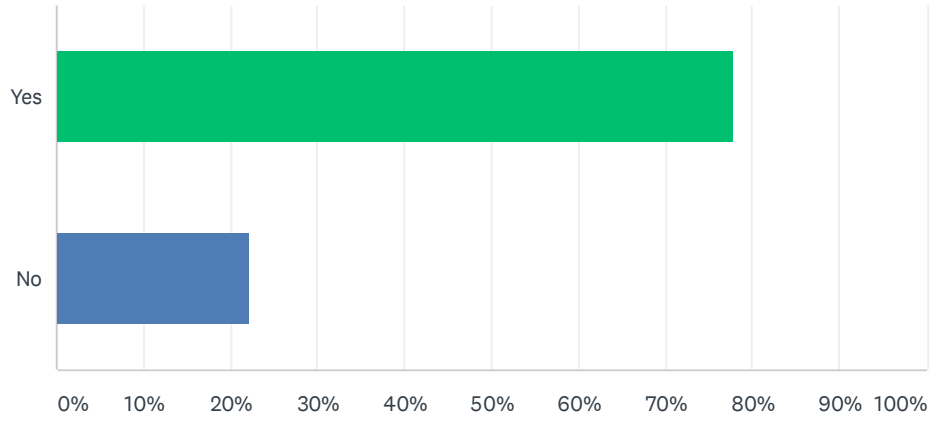
Answered: 9 Skipped: 0



	1	2	3	4	5	6	7	8	TOTAL	SCORE
On-street parking	0.00% 0	33.33% 3	11.11% 1	22.22% 2	22.22% 2	0.00% 0	0.00% 0	11.11% 1	9	5.11
Collection of bulky items	0.00% 0	0.00% 0	0.00% 0	0.00% 0	22.22% 2	22.22% 2	33.33% 3	22.22% 2	9	2.44
Steep Hills	0.00% 0	0.00% 0	0.00% 0	0.00% 0	11.11% 1	22.22% 2	11.11% 1	55.56% 5	9	1.89
Litter	11.11% 1	11.11% 1	11.11% 1	0.00% 0	22.22% 2	22.22% 2	22.22% 2	0.00% 0	9	4.33
Weather (wind/snow/rain)	11.11% 1	11.11% 1	22.22% 2	22.22% 2	11.11% 1	11.11% 1	11.11% 1	0.00% 0	9	5.11
Overhead clearance (i.e. tree trimming)	11.11% 1	11.11% 1	22.22% 2	11.11% 1	0.00% 0	11.11% 1	22.22% 2	11.11% 1	9	4.44
Street width	22.22% 2	11.11% 1	11.11% 1	33.33% 3	11.11% 1	11.11% 1	0.00% 0	0.00% 0	9	5.67
Cart/bin placement and orientation at the curb	44.44% 4	22.22% 2	22.22% 2	11.11% 1	0.00% 0	0.00% 0	0.00% 0	0.00% 0	9	7.00

Q26 Are there any other high-level operational considerations with your cart/bin based collection system that are not included in Question 25, above?

Answered: 9 Skipped: 0

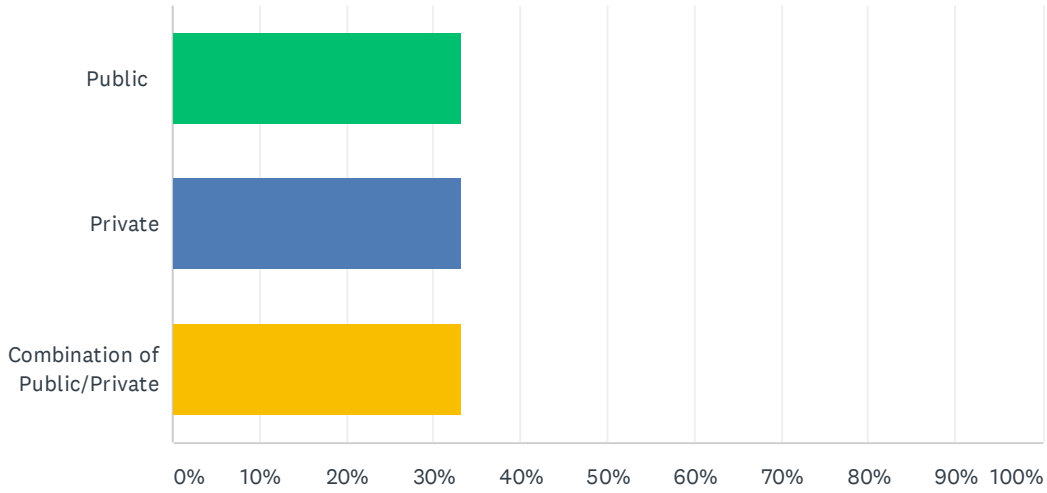


ANSWER CHOICES	RESPONSES	
Yes	77.78%	7
No	22.22%	2
Total Respondents: 9		

#	IF YES, PLEASE SPECIFY	DATE
1	We have learned over the years that not all carts or trucks are created equally. Each truck system has its specific challenges and should be considered when selecting both your trucks and carts	9/18/2019 10:36 AM
2	Bin maintenance requirements	9/16/2019 4:38 PM
3	WIND AND LITTER ARE MOST IMPORTANT	9/9/2019 11:06 AM
4	Parking in alleys, acceptable items, excess materials (and placement, size/weight if included), truck cycle speeds, customer education (ie tagging carts)	8/29/2019 7:28 PM
5	If using ASL, collection from both sides or single side of back lane. Vehicle fuel source (e.g. CNG or RNG). Overhead clearance in relation to utility lines (taking into considerations line sag, snow pack, and height of vehicle)	8/29/2019 12:42 PM
6	Upgrade of trucks to have automated arm/cart tippers. Integrations with technology (RFID, cameras)	8/29/2019 11:40 AM
7	Back lane collections are challenging and inefficient. In addition to overhead obstructions, there are issues with carts being left out, property damage, scavenging, theft, vandalism, and congestion.	8/26/2019 5:54 PM

Q27 Is residential collection completed by municipal staff or contracted to a private third-party company?

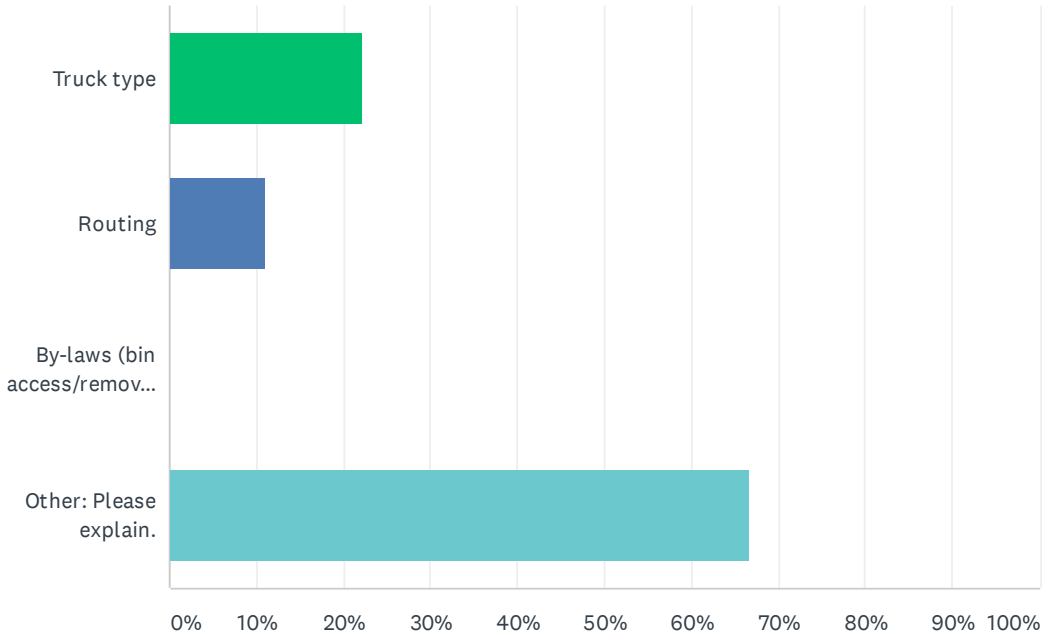
Answered: 9 Skipped: 0



ANSWER CHOICES	RESPONSES	
Public	33.33%	3
Private	33.33%	3
Combination of Public/Private	33.33%	3
TOTAL		9

Q28 Was there any modifications needed to the collection system when converting to a cart/bin system?

Answered: 9 Skipped: 0

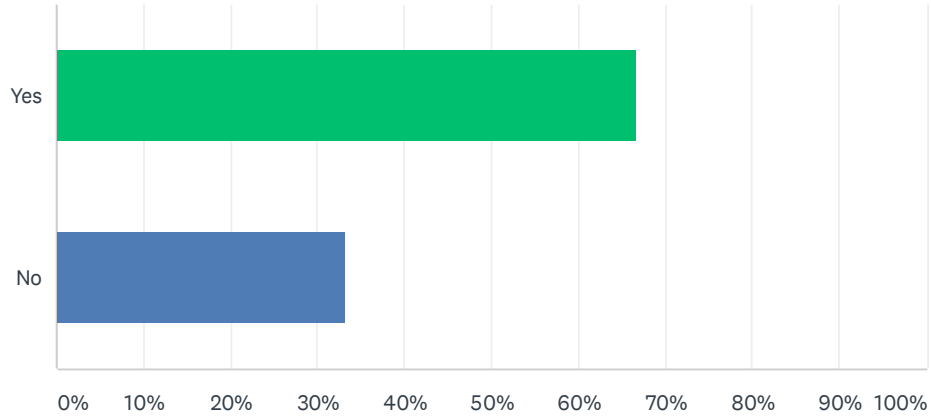


ANSWER CHOICES	RESPONSES	
Truck type	22.22%	2
Routing	11.11%	1
By-laws (bin access/removal/type)	0.00%	0
Other: Please explain.	66.67%	6
TOTAL		9

#	OTHER: PLEASE EXPLAIN.	DATE
1	Truck Type - Yes Routing - Yes By-Laws - Yes	9/18/2019 10:36 AM
2	The conversion occurred concurrently with a new collection contract, therefore, new trucks, routing, etc. was designed in the collection contract.	9/16/2019 4:38 PM
3	ALL three. Routing, truck type and by-law	9/9/2019 11:06 AM
4	All of the listed. Truck type - Transitioned from two employee reartipper to one person sideloader Routing - Size of routes increased as sideloader automated collection could service more households/day Bylaw - Carts required all storage and set out requirements needed to be changed and updated.	8/29/2019 7:28 PM
5	All services contracted, so all new vehicles required. Collection changes from a five-day cycle that was bumped by holidays to a fixed day-of-the-week schedule that collects on most holidays. By-law was updated as well.	8/29/2019 12:42 PM
6	All of the above. New trucks, new routes, new bylaw requirements.	8/26/2019 5:54 PM

Q29 Do you allow for extra bags to be placed outside of the bins?

Answered: 9 Skipped: 0

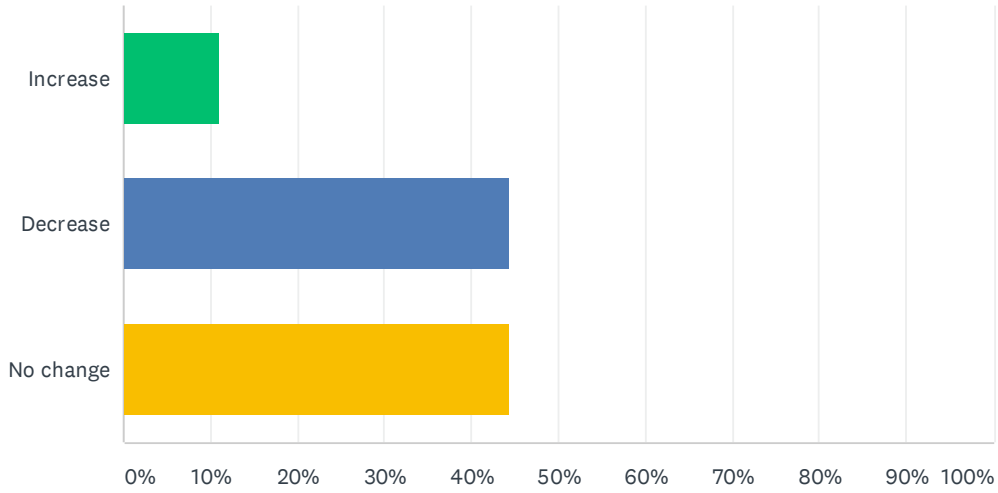


ANSWER CHOICES	RESPONSES	
Yes	66.67%	6
No	33.33%	3
TOTAL		9

#	IF YES, WHICH STREAM?	DATE
1	Garbage bag with prepaid sticker	9/18/2019 10:36 AM
2	Clear plastic bags are options for both blue and grey box items. This is used more in rural areas on once a month pickup.	9/9/2019 10:55 AM
3	Garbage, Organics. Moving towards a tag-a-bag system for garbage.	8/29/2019 7:28 PM
4	Garbage. Up to three bags for a fee	8/29/2019 12:42 PM
5	Currently up to two clear plastic for waste and two paper bags for compost are permitted on each pick up.	8/27/2019 9:57 AM

Q30 Was there an increase or decrease in fleet staff after implementing the cart/bin system?

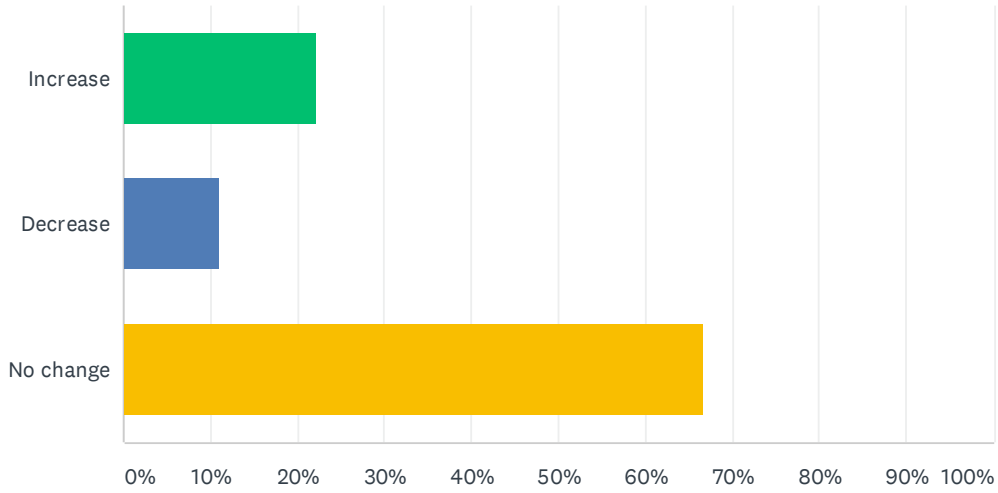
Answered: 9 Skipped: 0



ANSWER CHOICES	RESPONSES	
Increase	11.11%	1
Decrease	44.44%	4
No change	44.44%	4
TOTAL		9

Q31 Was there in increase or decrease in collection vehicle maintenance costs after implementing the cart/bin system?

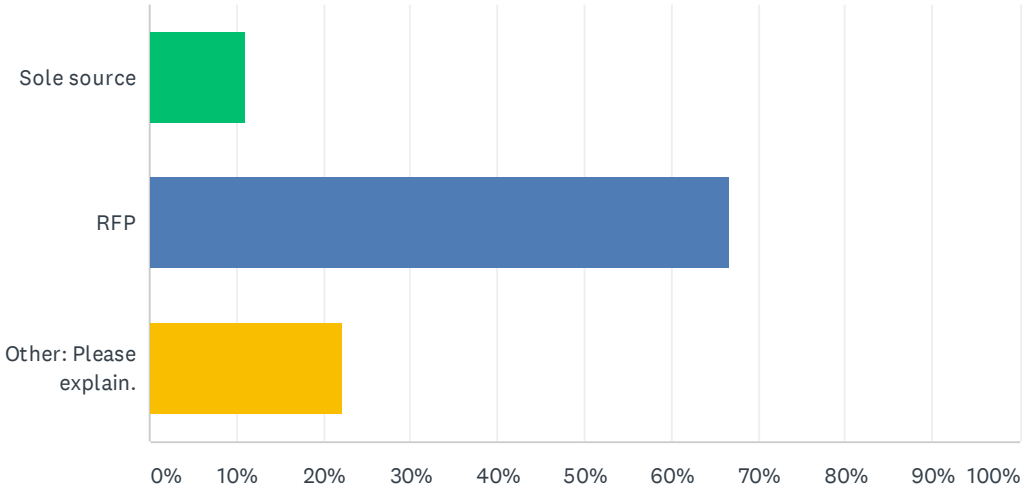
Answered: 9 Skipped: 0



ANSWER CHOICES	RESPONSES	
Increase	22.22%	2
Decrease	11.11%	1
No change	66.67%	6
TOTAL		9

Q32 What was the procurement model you used for acquiring carts/bins?

Answered: 9 Skipped: 0

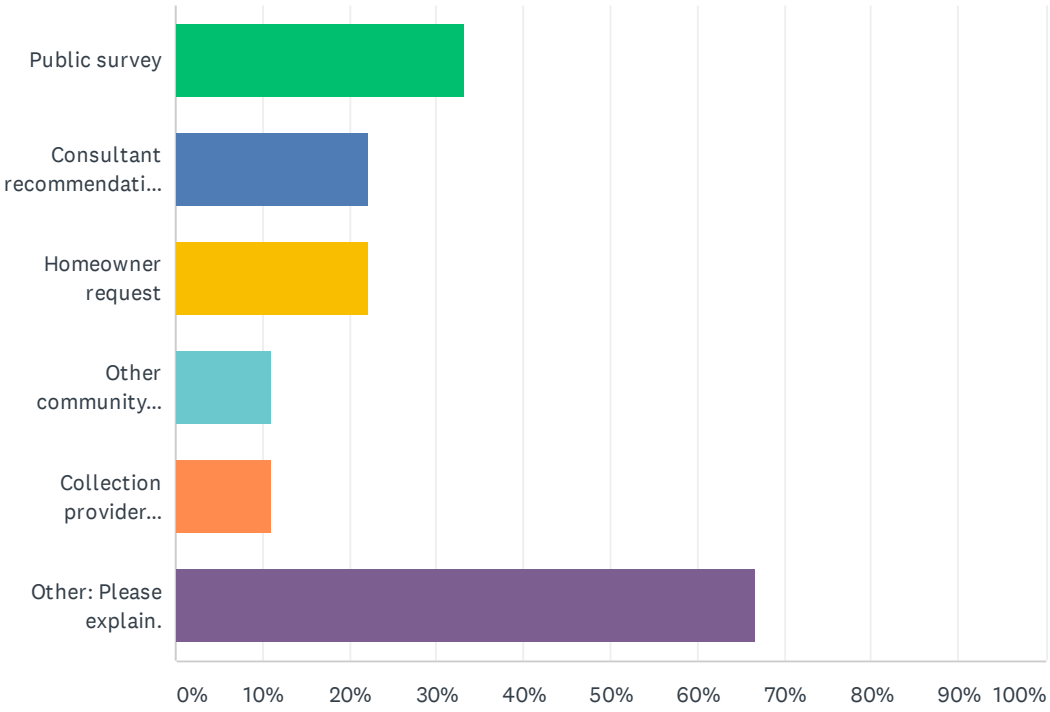


ANSWER CHOICES	RESPONSES	
Sole source	11.11%	1
RFP	66.67%	6
Other: Please explain.	22.22%	2
TOTAL		9

#	OTHER: PLEASE EXPLAIN.	DATE
1	Tender Process - Bidders had t meet minimum specifications	9/16/2019 4:38 PM
2	Tender	8/29/2019 12:42 PM

Q33 How were the size(s)/style(s) of the carts/bins chosen for garbage? Choose all options that apply.

Answered: 9 Skipped: 0

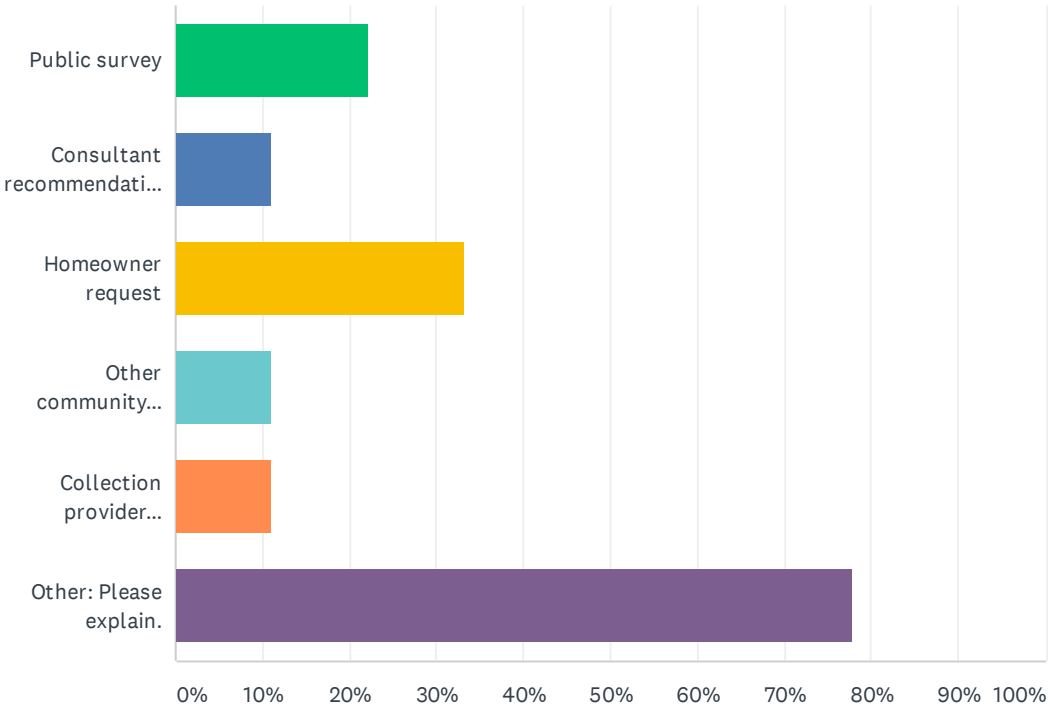


ANSWER CHOICES	RESPONSES	
Public survey	33.33%	3
Consultant recommendation	22.22%	2
Homeowner request	22.22%	2
Other community recommendations	11.11%	1
Collection provider recommendations	11.11%	1
Other: Please explain.	66.67%	6
Total Respondents: 9		

#	OTHER: PLEASE EXPLAIN.	DATE
1	Other - with the variety of housing stock and yards (vegetation) in Vancouver, the City decided to provide a variety of sizes for residents to match to the amount of yard trimmings produced. Residents were supplied the size(s) they requested.	9/18/2019 10:36 AM
2	Industry Standards	9/16/2019 4:38 PM
3	Recommendation from a pilot study for size. Style was aligned to collection fleet (standard ANSI parameters met).	8/29/2019 7:28 PM
4	Extensive public engagement campaign	8/29/2019 12:42 PM
5	The City underwent a public engagement period where residents were given all the information and were allowed to provide feedback to assist City staff and council in making a decision. A slim majority of residents chose the medium size (240 L) cart as the preferred option. City staff also preferred this size.	8/29/2019 11:40 AM
6	Feel free to call	8/26/2019 5:54 PM

Q34 How were the size(s)/style(s) of the carts/bins chosen for recycling? Choose all options that apply.

Answered: 9 Skipped: 0

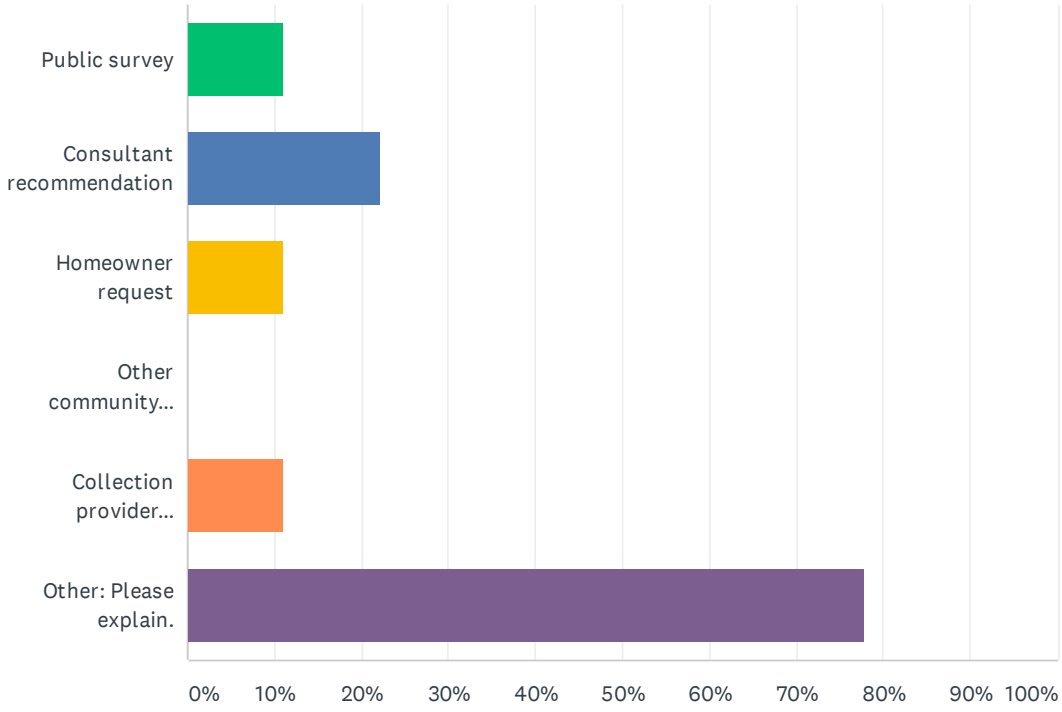


ANSWER CHOICES	RESPONSES	
Public survey	22.22%	2
Consultant recommendation	11.11%	1
Homeowner request	33.33%	3
Other community recommendations	11.11%	1
Collection provider recommendations	11.11%	1
Other: Please explain.	77.78%	7
Total Respondents: 9		

#	OTHER: PLEASE EXPLAIN.	DATE
1	N/A	9/18/2019 10:36 AM
2	Industry Standards	9/16/2019 4:38 PM
3	Recommendation from a pilot	8/29/2019 7:28 PM
4	Extensive public engagement campaign	8/29/2019 12:42 PM
5	Not applicable	8/29/2019 11:40 AM
6	we do not use carts for recycling we went with Blue bag 1 (All Paper) and Blue Bag 2 Metal Plastic and glass. by doing this we had a presort of recyclables and less cross contamination	8/27/2019 9:57 AM
7	Largest cart to incentivize recycling.	8/26/2019 5:54 PM

Q35 How were the size(s)/style(s) of the carts/bins chosen for organics?

Answered: 9 Skipped: 0



ANSWER CHOICES	RESPONSES	
Public survey	11.11%	1
Consultant recommendation	22.22%	2
Homeowner request	11.11%	1
Other community recommendations	0.00%	0
Collection provider recommendations	11.11%	1
Other: Please explain.	77.78%	7
Total Respondents: 9		

#	OTHER: PLEASE EXPLAIN.	DATE
1	Other - with the variety of housing stock (and residents per property) in Vancouver, the City decided to provide a variety of sizes for residents to match to the amount of garbage residents produced. Residents were supplied the size(s) they requested.	9/18/2019 10:36 AM
2	Accessibility Requirements, Industry Standards	9/16/2019 4:38 PM
3	n/a	9/9/2019 11:06 AM
4	Recommendation from a pilot	8/29/2019 7:28 PM
5	n/a	8/29/2019 12:42 PM
6	Not applicable	8/29/2019 11:40 AM
7	Largest cart to incentivize composting.	8/26/2019 5:54 PM

Q36 What are your overall annual operating costs (in Canadian Dollars) for garbage collection?

Answered: 9 Skipped: 0

#	RESPONSES	DATE
1	$4,600,000 - Equipment and Operator Salary/Benefits only	9/18/2019 10:36 AM
2	$0	9/16/2019 4:38 PM
3	Approximately $3 million	9/9/2019 11:06 AM
4	UA	9/9/2019 10:55 AM
5	Unable to disclose	8/29/2019 7:28 PM
6	$10.3M (2018)	8/29/2019 12:42 PM
7	8,000,000	8/29/2019 11:40 AM
8	Year ending March 31 2019 residential collection contracts $2,051,882	8/27/2019 9:57 AM
9	Loaded question. Can't easily be explained in one box.	8/26/2019 5:54 PM

Q37 What are your overall annual operating costs (in Canadian Dollars) for recycling collection?

Answered: 9 Skipped: 0

#	RESPONSES	DATE
1	N/A - RecycleBC	9/18/2019 10:36 AM
2	$0	9/16/2019 4:38 PM
3	Approximately $3 million	9/9/2019 11:06 AM
4	UA	9/9/2019 10:55 AM
5	Unable to disclose	8/29/2019 7:28 PM
6	$11.5M (2018)	8/29/2019 12:42 PM
7	Cost included in garbage collection cost indicated in question 36	8/29/2019 11:40 AM
8	Year ending march 31, 2019 Residential Recycling Contracts $1,699,316	8/27/2019 9:57 AM
9	Same as above. Feel free to call me.	8/26/2019 5:54 PM

Q38 What are your overall annual operating costs (in Canadian Dollars) for organics collection?

Answered: 9 Skipped: 0

#	RESPONSES	DATE
1	$7,100,000 - Equipment and Operator Salary/Benefits only	9/18/2019 10:36 AM
2	$0	9/16/2019 4:38 PM
3	n/a	9/9/2019 11:06 AM
4	NA	9/9/2019 10:55 AM
5	Unable to disclose	8/29/2019 7:28 PM
6	$2.9M (manual leaf and yard waste) (2018)	8/29/2019 12:42 PM
7	cost included in garbage collection cost indicated in question 36	8/29/2019 11:40 AM
8	year End March 31, 2019 Compost residential collection contracts $2,051,882	8/27/2019 9:57 AM
9	Ditto.	8/26/2019 5:54 PM

Q39 What costs (in Canadian Dollars) were incurred for implementing this system? Include items such as fleet modification/replacement, cart distribution, purchase of carts, etc.

Answered: 9 Skipped: 0

ANSWER CHOICES	RESPONSES	
Public education:	44.44%	4
Procurement costs:	55.56%	5
Collection fleet:	66.67%	6
Maintenance yard:	55.56%	5
RFID technology and IT:	55.56%	5
Administrative costs:	33.33%	3
Distribution / deployment costs - initial delivery, etc.:	44.44%	4
Cost to resident for cart:	66.67%	6
Other:	66.67%	6

#	PUBLIC EDUCATION:	DATE
1	$0	9/16/2019 4:38 PM
2	Unable to disclose	8/29/2019 7:28 PM
3	$300k contract to firm to develop branding and public awareness. 2.0 FTEs hired	8/29/2019 12:42 PM
4	annual budget for advertizing etc $140,000 per year	8/27/2019 9:57 AM

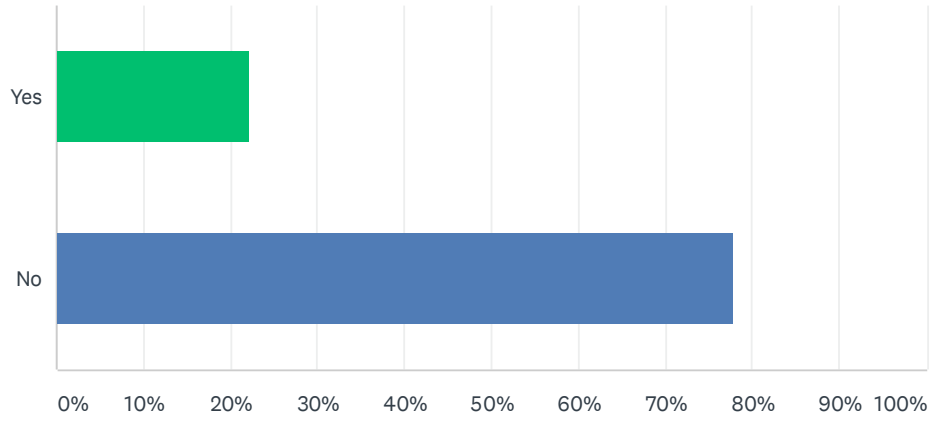
#	PROCUREMENT COSTS:	DATE
1	$0	9/16/2019 4:38 PM
2	Unable to disclose	8/29/2019 7:28 PM
3	n/a	8/29/2019 12:42 PM
4	2,400,000	8/29/2019 11:40 AM
5	Cart balance as of March 31, 2019 was $7.4M	8/27/2019 9:57 AM

#	COLLECTION FLEET:	DATE
1	Fleet Procurement: - 29 CNG Automated Trucks - $10,000,000. 4 CNG/4 Diesel Semi-Automated Trucks - $2,200,000.	9/18/2019 10:36 AM
2	$0	9/16/2019 4:38 PM
3	Unable to disclose	8/29/2019 7:28 PM
4	n/a	8/29/2019 12:42 PM
5	4,500,000	8/29/2019 11:40 AM
6	all done by private contractors	8/27/2019 9:57 AM

#	MAINTENANCE YARD:	DATE
1	N/A	9/18/2019 10:36 AM
2	$0	9/16/2019 4:38 PM
3	Unable to disclose	8/29/2019 7:28 PM
4	n/a	8/29/2019 12:42 PM
5	0	8/29/2019 11:40 AM
#	**RFID TECHNOLOGY AND IT:**	**DATE**
1	N/A	9/18/2019 10:36 AM
2	$0	9/16/2019 4:38 PM
3	Unable to disclose	8/29/2019 7:28 PM
4	Significant, but hard to quantify as we've developed a custom software solution to manage our customers and assets. Also tie-ins with our billing system, 311, and the overhead required to store Fleetmind data.	8/29/2019 12:42 PM
5	300,000	8/29/2019 11:40 AM
#	**ADMINISTRATIVE COSTS:**	**DATE**
1	$0	9/16/2019 4:38 PM
2	Unable to disclose	8/29/2019 7:28 PM
3	Significant, but hard to quantify as there's support from many parts of the organization.	8/29/2019 12:42 PM
#	**DISTRIBUTION / DEPLOYMENT COSTS - INITIAL DELIVERY, ETC.:**	**DATE**
1	$0	9/16/2019 4:38 PM
2	Unable to disclose	8/29/2019 7:28 PM
3	Cart supply and delivery tender in 2012 was $14.5M; temporary summer staff were hired to assist with cart delivery.	8/29/2019 12:42 PM
4	225000	8/29/2019 11:40 AM
#	**COST TO RESIDENT FOR CART:**	**DATE**
1	https://vancouver.ca/home-property-development/garbage-bins-and-green-bins.aspx	9/18/2019 10:36 AM
2	No cost to resident, tax-based service	9/16/2019 4:38 PM
3	Unable to disclose	8/29/2019 7:28 PM
4	$0	8/29/2019 12:42 PM
5	0	8/29/2019 11:40 AM
6	Cost for cart included in annual residential fee currently at $205 per household and 495 per cottage/seasonal home	8/27/2019 9:57 AM
#	**OTHER:**	**DATE**
1	$0	9/16/2019 4:38 PM
2	$4.5 millon total including fleet, carts, outreach, etc	9/9/2019 11:06 AM
3	All available on website annual report	9/9/2019 10:55 AM
4	Unable to disclose	8/29/2019 7:28 PM
5	Costs are hard to quantify for some areas due to all the other system changes that took place at the same time.	8/29/2019 12:42 PM
6	To be discussed outside of this survey.	8/26/2019 5:54 PM

Q40 Were there costs to modify receiving facilities (MRF, organics, landfill)?

Answered: 9 Skipped: 0



ANSWER CHOICES	RESPONSES	
Yes	22.22%	2
No	77.78%	7
TOTAL		9

Q41 What are the cart/bin replacement rates (# per year) for garbage, recyclables and organics?

Answered: 9 Skipped: 0

ANSWER CHOICES	RESPONSES	
Garbage:	100.00%	9
Recyclables:	88.89%	8
Organics:	77.78%	7

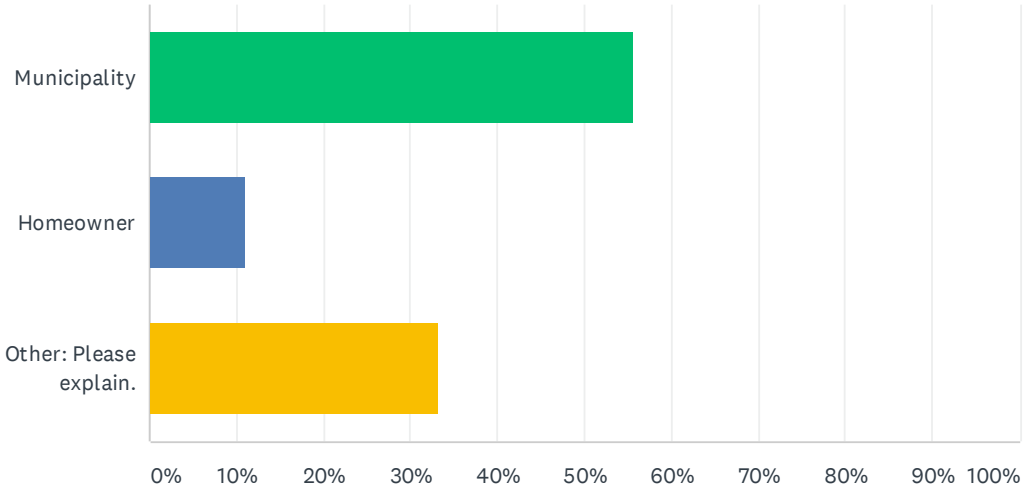
#	GARBAGE:	DATE
1	3-5%	9/18/2019 10:36 AM
2	n/a	9/16/2019 4:38 PM
3	300-500	9/9/2019 11:06 AM
4	Minimal	9/9/2019 10:55 AM
5	0.26% (based on serviced carts)	8/29/2019 7:28 PM
6	This is a loaded question as there are implications for either warranty, collection practices, or condition of asset	8/29/2019 12:42 PM
7	Too early to tell	8/29/2019 11:40 AM
8	we currently have 74,611 waste carts located in customers yards some are over 20 years old . We currently replace 3-5% per year.	8/27/2019 9:57 AM
9	Approx 5000 or 7%	8/26/2019 5:54 PM

#	RECYCLABLES:	DATE
1	n/a	9/16/2019 4:38 PM
2	300-500	9/9/2019 11:06 AM
3	Infrequent	9/9/2019 10:55 AM
4	1.28% (based on serviced carts)	8/29/2019 7:28 PM
5	In 2015, $490,000 was spent replacing and the purchase of new carts of all types. 2016: $490,000; 2017: $700,000. 2018: $430,000	8/29/2019 12:42 PM
6	N/A	8/29/2019 11:40 AM
7	no carts used	8/27/2019 9:57 AM
8	Under contract	8/26/2019 5:54 PM

#	ORGANICS:	DATE
1	3-5%	9/18/2019 10:36 AM
2	n/a	9/16/2019 4:38 PM
3	0.36% (based on serviced carts)	8/29/2019 7:28 PM
4	Based on calls to 311, requests to repair or replace carts of all types were: 1152 (2013), 1098 (2014), 876 (2015), 833 (2016), and 1007 (2017)	8/29/2019 12:42 PM
5	N/A	8/29/2019 11:40 AM
6	we currently have 74,611 waste carts located in customers yards some are over 20 years old . We currently replace 3-5% per year	8/27/2019 9:57 AM
7	Low	8/26/2019 5:54 PM

Q42 Who has the responsibility for cart/bin replacement?

Answered: 9 Skipped: 0



ANSWER CHOICES	RESPONSES	
Municipality	55.56%	5
Homeowner	11.11%	1
Other: Please explain.	33.33%	3
TOTAL		9

#	OTHER: PLEASE EXPLAIN.	DATE
1	We will replace	9/9/2019 10:55 AM
2	Property owner unless damaged by contractor or third party (e.g. vandalism)	8/29/2019 12:42 PM
3	IWMC owns all carts and replaces all carts	8/27/2019 9:57 AM

Q43 What is the cost of cart/bin replacement for garbage, recyclables and organics?

Answered: 9 Skipped: 0

ANSWER CHOICES	RESPONSES	
Garbage:	100.00%	9
Recyclables:	66.67%	6
Organics:	66.67%	6

#	GARBAGE:	DATE
1	$60 Average per cart + Labour	9/18/2019 10:36 AM
2	n/a	9/16/2019 4:38 PM
3	free if defect, $100 if lost	9/9/2019 11:06 AM
4	$5000	9/9/2019 10:55 AM
5	$53.95 plus trip cost $54.61	8/29/2019 7:28 PM
6	See: https://winnipeg.ca/waterandwaste/billing/fees.stm#cartreplacements	8/29/2019 12:42 PM
7	$65 plus $25 for delivery	8/29/2019 11:40 AM
8	$60-80	8/27/2019 9:57 AM
9	Fluctuates annually based on cart contracts.	8/26/2019 5:54 PM
#	RECYCLABLES:	DATE
1	n/a	9/16/2019 4:38 PM
2	free if defect, $100 if lost	9/9/2019 11:06 AM
3	$5000	9/9/2019 10:55 AM
4	$54.30 plust trip cost $54.61	8/29/2019 7:28 PM
5	N/A	8/29/2019 11:40 AM
6	non	8/27/2019 9:57 AM
#	ORGANICS:	DATE
1	$60 Average per cart + Labour	9/18/2019 10:36 AM
2	n/a	9/16/2019 4:38 PM
3	NA	9/9/2019 10:55 AM
4	$50.30 plust trip cost $54.61	8/29/2019 7:28 PM
5	N/A	8/29/2019 11:40 AM
6	$70-100	8/27/2019 9:57 AM

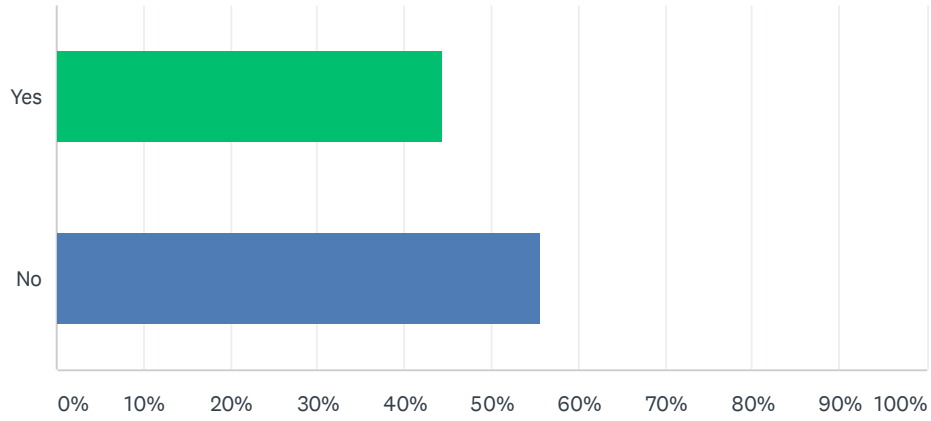
Q44 What is the warranty on the carts/bins?

Answered: 9 Skipped: 0

#	RESPONSES	DATE
1	12 years https://www.toter.com/12-year-warranty	9/18/2019 10:36 AM
2	10 Years	9/16/2019 4:38 PM
3	10 years	9/9/2019 11:06 AM
4	NA	9/9/2019 10:55 AM
5	Standard 10-year warranty	8/29/2019 7:28 PM
6	10 years.	8/29/2019 12:42 PM
7	Ten years	8/29/2019 11:40 AM
8	depends on make very little warranty used or needed	8/27/2019 9:57 AM
9	10 years	8/26/2019 5:54 PM

Q45 Were any changes required at the receiving facilities (specifically MRF) to accommodate material collected in carts/bins? i.e. handling of loose material

Answered: 9 Skipped: 0

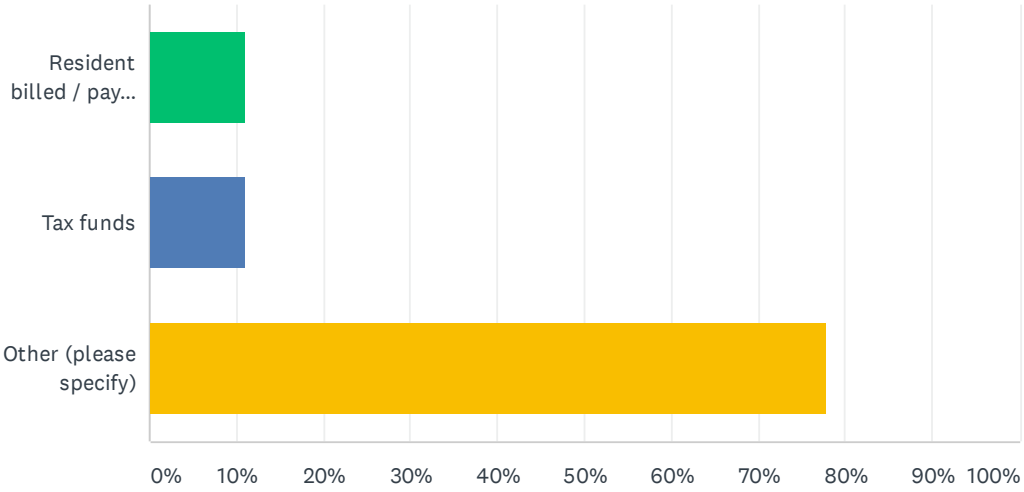


ANSWER CHOICES	RESPONSES	
Yes	44.44%	4
No	55.56%	5
Total Respondents: 9		

#	IF YES, PLEASE SPECIFY:	DATE
1	MRF designed to accept loose material	9/9/2019 11:06 AM
2	Was built around new program including baler, belt etc	9/9/2019 10:55 AM
3	Recycling could not be accomodated at existing third party facility (used to process source seperated recycling). Transitioned to single stream service with a significant increase in recycling volumes required a new RFP for a different third party processor.	8/29/2019 7:28 PM
4	Upgrade to capacity at MRF; 2011 - 45,800 tonnes recycling (pre recycling cart); 2013 - 53,600 tonnes (first full year post recycling carts)	8/29/2019 12:42 PM
5	MRF was constructed with cart collection in mind.	8/26/2019 5:54 PM

Q46 How was the cart purchase funded

Answered: 9 Skipped: 0

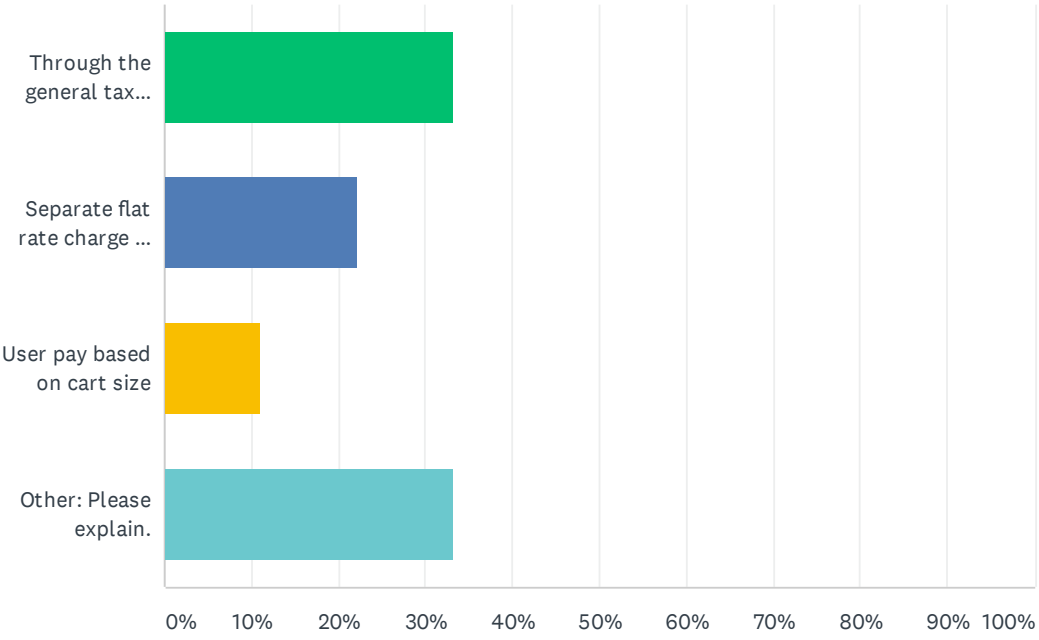


ANSWER CHOICES	RESPONSES	
Resident billed / pays direct cost	11.11%	1
Tax funds	11.11%	1
Other (please specify)	77.78%	7
TOTAL		9

#	OTHER (PLEASE SPECIFY)	DATE
1	utility fee	9/9/2019 11:06 AM
2	Purchased by FRSW	9/9/2019 10:55 AM
3	Initial cart purchase for garbage carts from capital budget, which was funded by reserve and debt. Funding for the blue and green cart program carts is included in rate charged to residents.	8/29/2019 7:28 PM
4	Mixture of debt and stewardship funding	8/29/2019 12:42 PM
5	Fully funded by the City through capital funds. There was no direct charge to homeowners	8/29/2019 11:40 AM
6	IWMC Crown corporation of Province We borrowed $30M to start our Island Wide Program	8/27/2019 9:57 AM
7	Property tax funded for waste. Utility for recycling. Subscription fees for organics.	8/26/2019 5:54 PM

Q47 How is your residential collection financed?

Answered: 9 Skipped: 0



ANSWER CHOICES	RESPONSES	
Through the general tax rate	33.33%	3
Separate flat rate charge on bill	22.22%	2
User pay based on cart size	11.11%	1
Other: Please explain.	33.33%	3
TOTAL		9

#	OTHER: PLEASE EXPLAIN.	DATE
1	utility fee	9/9/2019 11:06 AM
2	Hybrid: garbage collection is financed through the mill rate. Diversion programs are supported through a combination of a flat utility fee, external funding, and the Utility's revenues.	8/29/2019 12:42 PM
3	Property tax funded for waste. Utility for recycling. Subscription fees for organics.	8/26/2019 5:54 PM

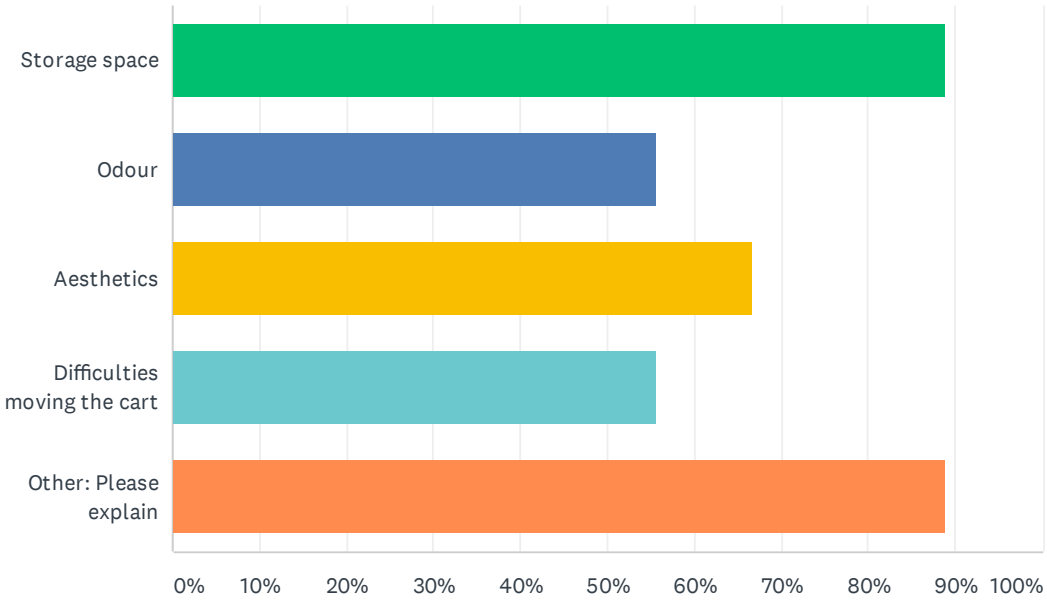
Q48 What is the municipality's opinion on how the cart/bin based program is working?

Answered: 9 Skipped: 0

#	RESPONSES	DATE
1	Cart collection comes with increased challenges, but the benefits to routing and manpower far outweigh the costs.	9/18/2019 10:36 AM
2	The cart program is working well, diversion rates have increased, there remains challenges in dealing with increased contamination rates and the complexities of maintaining an inventory of carts	9/16/2019 4:38 PM
3	Faster than rear load collection, limits amount of waste collected per household	9/9/2019 11:06 AM
4	Looking for ways to increase and maintain consistency.	9/9/2019 10:55 AM
5	It meets our needs to balance cost of service, safety of employees, mitigating environmental impacts, and customer needs.	8/29/2019 7:28 PM
6	Cart achieved many goals such as reducing garbage, and increasing recycling. Positive feedback from residents. Challenges with managing assets and IT systems. Environmental performance has improved steadily since the Comprehensive Integrated Waste Management Strategy was implemented. Carts were only part of that strategy, though. Leaf and Yard waste collection, residential depots, and other system improvements contribute to successes.	8/29/2019 12:42 PM
7	Great so far. Reduction in litter, reduction in worker injuries. RFID readers and video on the truck make following up on missed service complaints much easier to handle. Data collected by trucks is also valuable for driver productivity, set-out rates, tracking per-capita weights, etc. Windy days can be a challenge because empty carts can blow around, resulting in an increase in calls to 311 for missing carts. It's too early in our program to fully assess the program and give proper feedback.	8/29/2019 11:40 AM
8	have very little issues	8/27/2019 9:57 AM
9	Can discuss further.	8/26/2019 5:54 PM

Q49 What, if any, barriers to participation were identified by the public and how were these overcome?

Answered: 9 Skipped: 0

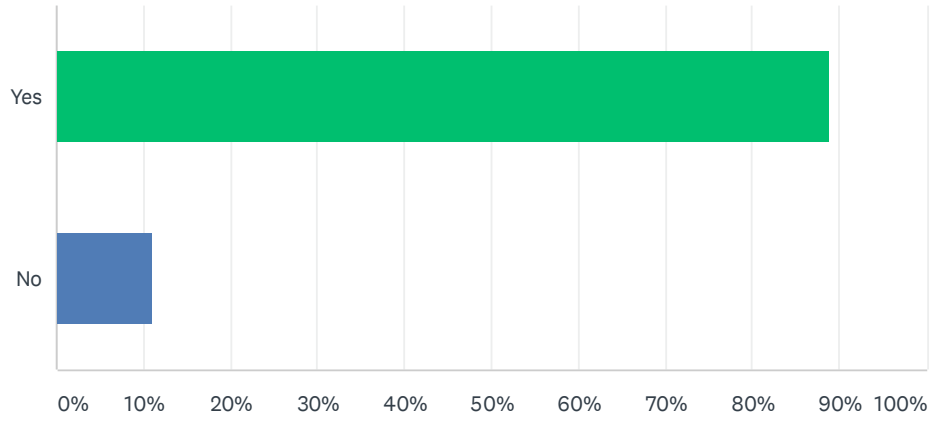


ANSWER CHOICES	RESPONSES	
Storage space	88.89%	8
Odour	55.56%	5
Aesthetics	66.67%	6
Difficulties moving the cart	55.56%	5
Other: Please explain	88.89%	8
Total Respondents: 9		

#	OTHER: PLEASE EXPLAIN	DATE
1	Space/location to set out cart for collection. Overcome through education efforts and staff field visits to provide assistance.	9/18/2019 10:36 AM
2	Open houses were held in each ward for residents to see the cart sizes and choose their carts, questions were answered.	9/16/2019 4:38 PM
3	we offer two sizes of carts, bag their garbage, special needs program	9/9/2019 11:06 AM
4	Collection Frequency	9/9/2019 10:55 AM
5	Storage space only stipulates carts must be kept on property between collection days. Residents educated on transitioning from existing garbage enclosures and raised platforms. Supported by office and field staff managing customer phone inquiries. Odour - primarily a organics issue as most odours from garbage transition to organics. Organics is weekly in summer which is no different than previous garbage collection so odour issue the same. In winter material freezes and reduces odours, supported through tips to reduce odours in resident house. Aestheic issue outweighed by increased efficency. Difficult moving carts managed by special collection in reasonable scenarios.	8/29/2019 7:28 PM
6	There were a lot of speculative complaints, but in general, once carts were received and actually used, opinions became positive.	8/29/2019 12:42 PM
7	Weather. Many residents feared that the program wouldn't work in the winter	8/29/2019 11:40 AM
8	Education, customer call centre, webpage, time and experience.	8/26/2019 5:54 PM

Q50 Are there assistance programs available for disability and special populations?

Answered: 9 Skipped: 0



ANSWER CHOICES	RESPONSES	
Yes	88.89%	8
No	11.11%	1
TOTAL		9

#	IF YES, PLEASE ELABORATE	DATE
1	There is a non-advertised program where City crews aid residents in ensuring that their garbage makes it to the curb for collection (pack-out service) - elderly, disability, injury, etc. This is done through an application and site review process.	9/18/2019 10:36 AM
2	We have a walk up service, where our contractor will collect the cart from an accessiblae location away from the curb for people with medical conditions that provide documentation	9/16/2019 4:38 PM
3	Foreman are able to determine locations suitable for special collections. The driver is then able to complete additional tasks at this location such as getting out and moving cart to a location for collection. Site dependent.	8/29/2019 7:28 PM
4	Walk up service for household where no one is able to move the cart to the collection point	8/29/2019 12:42 PM
5	We allow medical exemptions for seniors or those with disabilities or special needs.	8/29/2019 11:40 AM
6	we provide Bach yard collection for disable or elderly etc	8/27/2019 9:57 AM
7	Additional info will be provided directly to Halifax.	8/26/2019 5:54 PM

Q51 How are these programs funded and administered? Please elaborate.

Answered: 9 Skipped: 0

#	RESPONSES	DATE
1	N/A	9/18/2019 10:36 AM
2	Programs are funded through residential taxes.	9/16/2019 4:38 PM
3	Program is funded as part of utility fee, once a request is received, an assessment is done and if complies with requirements service is provided to support residents.	9/9/2019 11:06 AM
4	UA	9/9/2019 10:55 AM
5	User fee. Same service to all residents	8/29/2019 7:28 PM
6	These are included in the cost of collection for each stream	8/29/2019 12:42 PM
7	Resident requesting exemption must fill out and submit an exemption form. It is reviewed by City staff.	8/29/2019 11:40 AM
8	contractor is outlined this in collection contracts and provides price per collection	8/27/2019 9:57 AM
9	Same as above.	8/26/2019 5:54 PM

Q52 Do you have any lessons learned during the implementation and transition to the cart/bin program?

Answered: 9 Skipped: 0

#	RESPONSES	DATE
1	Fully automated collection doesn't work in some tight lanes in Vancouver where space is limited - semi-automated collection trucks are used in these area. Offering 5 sizes of carts is a challenge, educating people to choose the appropriate size, physically handling 5 sizes and delivering the right size to the right property during implementation, managing residents that want to change sizes, and keeping track of carts & sizes at each property for billing purposes. Probably can't do too much promotion and education; reaching everybody in the City is a challenge. Once cart rollout started, there was a lot of interest and demand from residents asking when they would get their cart.	9/18/2019 10:36 AM
2	- be prepared to deal with locations that have space constraints, i.e. townhouses - ensure there is a system in place to track cart maintenance calls and have clearly defined responsibilities for cart damages	9/16/2019 4:38 PM
3	Education & Outreach is key for a successful implementation. Focus Groups. Change is difficult for residents, but having a comprehensive Education program, Social Media Campaign and advertising helps tremendously.	9/9/2019 11:06 AM
4	Program is 18 years old and well received.	9/9/2019 10:55 AM
5	Deliver cart in summer. Winter delivery has too many challenges. Transitioning to new services was complicated as first blue then black then green cart were introduced with several years between. This leads to routing challenges as it included collection day changes which can be problematic depending on delivery timeframe, full city collection or quadrant based switch over. Best to launch service as resident receives cart for simplicity of operation and communication. Challenging to transition/train staff on new equipment and achieve operational efficiency immediately on roll-out of service (if vehicles are different from existing fleet) need to have additional support staff and equipment to help with unfinished beats, missed portions of routes. Support rollout with additional field staff to handle customer calls and support drivers on placement education, especially in tight lanes or cul-de-sacs where space constraints exist.	8/29/2019 7:28 PM
6	Phasing the implementation probably would have helped. Collection management system was not implemented until 2017 - 5 years after the carts had been delivered. Data quality is a large issue if trying to track assets based on RFID/SN due to entropy. If services contracted, need to consider relationship between contractor and cart damage. Significant growing pains in first year. Staff were pushed and significant overtime was incurred. Mental health was a concern. You will need to implement a program to accommodate residents who are not able to place their carts at the collection point. Public engagement should take place with the affected communities. ICI properties became targets for excess and illegal dumping for a short while after implementation. As carts are City assets, but responsibility of current property owner, there could be conflicts in tenant-landlord relationships and the sale of properties. We had policies developed in advance to address these conflicts.	8/29/2019 12:42 PM
7	We would recommended doing a multi-year implementation. We rolled out to approximately 1/3 of the City in 2018 and followed up with the remainder one year later in 2019. Changing to an automated program is a big change from manual collection for both the garbage collectors and residents. By starting with a small population, you can learn lessons that you can then use to ensure that the majority of your roll-out goes smoothly. Phase 2 of our roll-out in 2019 went better than Phase 1 in 2018 as we knew that potential problems we would encounter. It's much easier to fix mistakes for a small percentage of the City than the whole City. We would also recommend public engagement before you roll-out the program. Feedback from the public is valuable and it's important that residents know that changes are coming. Realize that you will get some resistance from people. Have a plan for how to deal with exceptions to the norms. Accuracy of data on households (locations, number of apartments, etc.) is key to ensuring that delivery goes smoothly. You want to make sure contractor has reliable, accurate and up-to-date data to do the deliveries. At the end of the roll-out of the program, you want to have confidence that the data you get back from the contractor is accurate. I.E., "garbage in, garbage out" For purchase of carts, we stated required specifications in a tender call and awarded to lowest bidder meeting specs. For technology upgrades (cameras, RFID readers, back-office software), we issued a separate RFP and evaluated more on software capabilities over cost. We also had to update our by-laws and are in the process of updating our routes.	8/29/2019 11:40 AM
8	we did not have option to have chips in carts when program started would be nice to have these in all carts as opposed to just serial numbers.	8/27/2019 9:57 AM
9	Feel free to call.	8/26/2019 5:54 PM

Q53 Do you have any recommendations on what could be done differently?

Answered: 9 Skipped: 0

#	RESPONSES	DATE
1	No answer provided	9/18/2019 10:36 AM
2	n/a	9/16/2019 4:38 PM
3	XXX	9/9/2019 11:06 AM
4	Education is paramount. But recycling remains volunteer-based.	9/9/2019 10:55 AM
5	See Q52 as Calgary roll-out experience would be unique.	8/29/2019 7:28 PM
6	Ensure implementation plan matches available staff, other resources and time. Ensuring there's a capital plan in place to replace the carts as they reach end of life. If decisions are made to track carts via RFID, poor data quality is a significant risk. If collection services are contracted, onus should be on the contractor to ensure that their equipment is calibrated properly and regularly with supporting records.	8/29/2019 12:42 PM
7	No. We've been pleased with how things have gone so far. A lot of planning went into this project.	8/29/2019 11:40 AM
8	no we are happy with our decision.	8/27/2019 9:57 AM
9	Feel free to call.	8/26/2019 5:54 PM

Q54 What benefits were realized in switching to a cart/bin based system?

Answered: 9 Skipped: 0

#	RESPONSES	DATE
1	Reduction in collection worker injuries resulting in reduced workers compensation costs and reduced disability claims.	9/18/2019 10:36 AM
2	-lower collection costs -safer work for collectors - reduced greenhouse gas emissions - reduced litter (for recyclables)	9/16/2019 4:38 PM
3	Overall a huge improvement in worker safety, less WCB claims, an increase in efficiency, more households can be service by trucks resulting in less operating cost.	9/9/2019 11:06 AM
4	Cleaner collection/pickup/sorting.	9/9/2019 10:55 AM
5	Improve safety statistics, increase number of houses serviced per route, better resident awareness of their waste management, improved diversion (as program was simpler and more convenient).	8/29/2019 7:28 PM
6	Garbage limits, reduced illegal dumping (previously had communal bins in some areas), higher quality recyclable material and more material, less potential to injure workers, uniform neighbourhood appearance, modernization of by-law and service standards, lower cost of collection.	8/29/2019 12:42 PM
7	Worker safety is vastly improved, litter in neighbourhoods is reduced and participation in recycling is increased. It's still too early to tell if collection has become more efficient.	8/29/2019 11:40 AM
8	less litter	8/27/2019 9:57 AM
9	Has been in place for decades.	8/26/2019 5:54 PM

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