

City of St. Albert

Final Report: Residential Curbside Waste Composition Study

November 2022

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S-Cubed Environmental

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1 Executive Summary

The City of St. Albert engaged S-Cubed Environmental to carry out a Curbside Waste Composition Study in the spring and fall of 2022 to collect quantitative baseline data on the performance of its current residential garbage, organics, and recycling collection program.

This curbside waste composition study examined the waste from a sample of 100 households. The sample consisted of 10 homes from a different neighbourhood per day over 10 waste collection days, with the same sample area for both the spring and fall study periods. The Brown Garbage Cart, Green Organics Cart and Blue Recycling Bag streams were studied. The audit categories for all streams were paper, plastics, metal, glass, organics, beverage containers, electronics, textiles, household hazardous waste (HHW), and landfill, with numerous sub-categories for each.

This 2022 residential curbside waste composition study showed a 57% diversion rate. The City of St. Albert is amongst Canada's residential waste diversion leaders.

The biggest waste diversion opportunity in the St. Albert residential sector is to increase the quantity of compostable materials diverted from the Brown Garbage Cart into the Green Organics Cart. On average during the waste composition study, 29% of the Brown Garbage Cart stream consisted of compostable materials. Other opportunities include reducing contamination in the Green Organics Cart and Blue Recycling Bag streams, and fostering diversion of items that can be reused or recycled, but are not accepted in the Green Organics Cart or Blue Recycling Bag.

The City of St. Albert is in the midst of planning and creating a Single-Use Item Reduction Strategy. Based on data collected during this waste composition study, 0.67% of the garbage, recycling and organics streams consisted of single-use items, with a total count of 2,673 single-use items. We expect the new federal Regulation of some single-use plastic items to address approximately 31% of the items that were counted as part of this residential waste composition study. The City may wish to consider how its Single-Use Item Reduction Strategy and educational efforts could complement the federal Regulations that will soon come into force, and lead to overall reduction of single-use items, rather than the replacement of single-use plastic with other single-use items.

Newly approved provincial extended producer responsibility (EPR) legislation will shift the burden of collecting, sorting, processing and recycling many recyclable materials from municipalities such as St. Albert onto the producers of the items. Much of the physical and financial burden for collecting and recycling paper products, plastics, metal, glass, and hazardous / special products from the residential sector will become the responsibility of those who produce these items.

2 Background

The City of St. Albert engaged S-Cubed Environmental to carry out a Curbside Waste Composition Study in the spring and fall of 2022 to collect quantitative baseline data on the performance of its current residential garbage, organics, and recycling collection program.

To date, the City has no quantitative data on the organics, recycling, and garbage streams. The quantitative data collected in this study will be used to help City staff set targets for waste reduction and diversion, optimize consistent and effective communication with residents, identify opportunities for cost savings and inform corporate sustainability reporting.

The City of St. Albert (the City) provides curbside garbage, organics and recycling collection to approximately 21,000 single-family and multi-family households. Garbage is collected biweekly and recycling is collected weekly. Organics is collected weekly from April through October and biweekly from November through March. Recycling is manually collected in bags, while garbage and organics are collected using an automated cart system.

St. Albert residents have year-round access to the Mike Mitchell Recycling Depot, where items such as electronics, tires, household hazardous waste, glass, and Styrofoam are collected for recycling and/or safe disposal. A seasonal Compost Depot is available for residents to drop off yard waste. Programs such as Large Item Drop Off, Curbside Large Item Pick Up, and Christmas Tree Pick Up all encourage waste diversion. The City collects and/or processes more than 20,000 metric tonnes of waste annually.

Since 2017, City staff have conducted extensive waste education and outreach, including an annual Curbside Waste Education Program, which has generally occurred during the summer months. The Curbside Waste Education Program has included qualitative studies of the organics, recycling and garbage streams, and the distribution of educational door hangers and thank you stickers. In 2020 and 2021, the City carried out five week-long studies of contamination trends at Roseridge Waste Management Services Commission Compost Pad (Roseridge Compost Pad), where organics are processed. Information gathered in these studies informed an online education “Oops! What Goes Where?” campaign in the summer of 2021.

One of the two primary waste-related issues the City is currently working to address is contamination in the organics stream. A current challenge is that staff for the contracted organics hauler self-declare if a load has more than 30% contamination, which are consequently landfilled, rather than processed at the Compost Pad. Due to a lack of quantitative data on actual contamination rates, more loads may be visually assessed as exceedingly contaminated than are over the contamination threshold, resulting in more loads being sent to landfill than necessary. This study will provide quantitative data on contamination material types and rates in the organics stream, which can be used to explore ways to reduce the quantity of organics loads being landfilled after being taken to the Roseridge Compost Pad.

A second priority waste topic for the City is to reduce the prevalence of single-use items in the waste stream. This study has been designed to specifically collect detailed data on single-use

items so that results can inform the next steps in establishing a Single-Use Item Reduction Strategy.

In this report, **waste** refers to the combined streams of garbage, organics, and recycling. A glossary of terms used in this report is located in Appendix A.

3 Waste Composition Study Methodology

This curbside waste composition study examined the waste from a sample of 100 households. The sample consisted of 10 homes from a different neighbourhood per day over 10 waste collection days in the spring (May 30th to June 10th) and fall (September 12th to 23th) 2022. The specific homes were chosen randomly based on the criteria that all homes on the street received 3-stream collection and that there were over 20 homes on each street. The 10 homes were all consecutively on one side of the street.

S-Cubed personnel started each day at 7:30 am by visually assessing and recording waste data at the curbside pick-up locations for the 10 sample homes. A daily sampling log sheet with the house addresses to be sampled was used to track waste details (i.e., date, time, number and fullness of the garbage and organics carts, number of recycling bags, presence of visual contamination in the organics carts and recycling bags, presence of loose cardboard, etc.).

For the visual contamination assessment, the following 1-5 rating scale was used:

1- less than 25% contamination;
2- more than 25% contamination;
3- 50% contamination;
4- 75% contamination; and,
5- 100% contamination.



S-Cubed labelled each garbage and organics cart with a luggage tag denoting the house number so that the carts could be returned to the right home. S-Cubed then brought the garbage cart, organics cart and recycling bags into a rented moving truck, and emptied the contents into three separate super-sacks inside the truck used to collect the garbage, recycling and organics streams. Once contents from the garbage and organics carts were emptied into the super sacks, the carts were returned to the curb in front of the appropriate home and the tags were removed. The sample was then transported to the sorting facility at the public works yard.

The super sacks of waste samples were unloaded at the sorting location. A few examples are shown below:









At the sorting site, digital photographs of waste samples were taken before sorting. Samples from each of the garbage, recycling and organics streams were hand-sorted by a team of three people into bins, carts and buckets lined with black garbage bags labelled with the subcategories described below in Section 3. The S-Cubed Team Lead checked the bins often to ensure quality control and that items were consistently classified among team members. Materials were weighed using a floor scale accurate to five grams. Notes about unexpected and unusual materials were documented. Data were recorded in a spreadsheet for data analysis.

4 Waste Composition Study Categories

The audit categories for all streams were paper, plastics, metal, glass, organics, beverage containers, electronics, textiles, household hazardous waste (HHW), and landfill. The sort subcategories are listed in Appendix B, describing the types of materials sorted into each subcategory. Waste composition study results are found in Appendix C.

For each of the garbage, recycling and organics streams, the S-Cubed team separated and counted single-use items found within the stream, including the following: plastic grocery bags, straws, cutlery, lids, takeout plastic cups, and takeout containers (sub-sorted into polystyrene, paper and plastic clamshells). The results of this single-use item analysis are presented in Section 4.6.

The term **contamination** refers to material found in the sample that does not belong in the respective program. For example, a black plastic garbage bag in the organics cart is considered contamination, as the organics cart should only contain compostable items. If a glass jar was found in a recycling bag, it was considered contamination because glass is only accepted for recycling at the Mike Mitchell Recycling Depot.

A list of items accepted in the St. Albert organics and recycling programs can be found here.

5 Comparison of Spring and Fall Waste Composition Results and Discussion

5.1 Set-Out Rate and Cart Observations

This section describes observations made during the visual inspection of the curbside waste pick-up location at each sample home. The set-out rate is the percentage of sample participants that placed a garbage cart, organics cart or recycling bag out for collection on a particular day.

Brown Garbage Cart

The set-out rate for Brown Garbage Carts for the overall waste composition study was 95%. There was no significant difference in the set-out rate for garbage between the spring and fall waste composition study periods, with a 94 percent set-out rate for the Brown Garbage Cart in the spring and a 95 percent set-out rate in the fall. Table 1 summarizes the average set-out rate for garbage and most frequent Brown Garbage Cart fullness level.

Table 1 – Brown Garbage Cart Set-Out Rate and Cart Fullness Assessment – 2022 Study

Parameter Assessed During Visual Inspection	Percent of Homes
Homes with Brown Garbage Cart at the curb	95%
Most frequent cart fullness level	100%

Blue Recycling Bag

The set-out rate for Blue Recycling Bags was 60% for the overall waste composition study. There was a slightly higher set-out rate for Blue Recycling Bags during the fall 2022 residential curbside waste composition study (62%) compared to the spring waste composition study (57%). Table 2 summarizes Blue Recycling Bag set-out rate data for the overall waste composition study.

Table 2 – Blue Recycling Bag Set-Out Rate – 2022 Study

Parameter Assessed During Visual Inspection	Percent of Homes
Blue Recycling Bag(s) or cardboard at the curb	60%
One Blue Recycling Bag	43%
Multiple Blue Recycling Bags	15%
Only cardboard at the curb	3%
Homes with loose cardboard at the curb	27%

Of the households that set out Blue Recycling Bags, 26% had visible contaminants. Visible contaminants included items such as non-recyclable plastic (i.e. clamshell containers, plastic film, plastic cereal box liners, etc.) ~~PET plastic~~, non-refundable tetra containers, hot & cold paper takeout cups, and take-out food bags.

Green Organics Cart

The set-out rate for the Green Organics cart was 71% for the overall waste composition study (Table 3). The set-out rate in the sample area was slightly higher during the fall study period (75%) than during the spring study period (67%). During both spring and fall waste composition study periods, there was weekly collection of the Green Organics Cart.

Table 3 – Green Organics Cart Set-Out Rate and Cart Fullness Assessment – 2022 Study

Parameter Assessed During Visual Inspection	Percent of Homes
Households with Green Organics Cart at the curb	71%
Most frequent cart fullness level	50%

During both spring and fall audits, of the households that set out a Green Organics Cart, 13% had contamination noted during either the curbside lid lift audit, or when the sample was emptied from the green cart into the super sack. Commonly observed contaminants included soil/sod/clay, takeout food bags and containers, hot and cold to-go cups, plastic food wrappers, black garbage bags, plants in plastic pots, plastic plant identification tags and fish tank gravel.

5.2 Brown Garbage Cart Stream

Ninety-five percent of households set garbage at the curb during the two seasons of the waste composition study. On average, households disposed of 17.3 kilograms of garbage every 14 days, as garbage is collected every two weeks. Note that curbside diversion calculations require garbage cart data to be divided by two to compare the quantity of garbage generated every 14 days with the quantity of organics and recycling generated and collected every seven days. Therefore, the garbage generation rate was 8.6 kilograms per household every seven days.

There was a slight decline in the garbage generated between the spring (9.1 kilograms per household every seven days) and fall (8.2 kilograms per household every seven days). Analysis of the Brown Garbage Cart stream composition suggested that one of the main reasons that garbage generation was higher in the spring was that there were relatively large quantities of soil, sod and clay present in the spring study period and none in the fall study period.

Figure 1 shows a comparison of the composition of the Brown Garbage Cart stream between the spring and fall waste composition study periods. The profile of the garbage stream was very similar between the two study periods. On average, 42% of the Brown Garbage Cart stream consisted of compostable, recyclable and reusable materials that could be diverted from the garbage through current St. Albert diversion programs. On average, 58% of the materials in the Brown Garbage Cart stream could not currently be diverted from the landfill in St. Albert. However, there remain opportunities for St. Albert to consider creating more waste diversion opportunities for particular materials, as further detailed in Section 5.

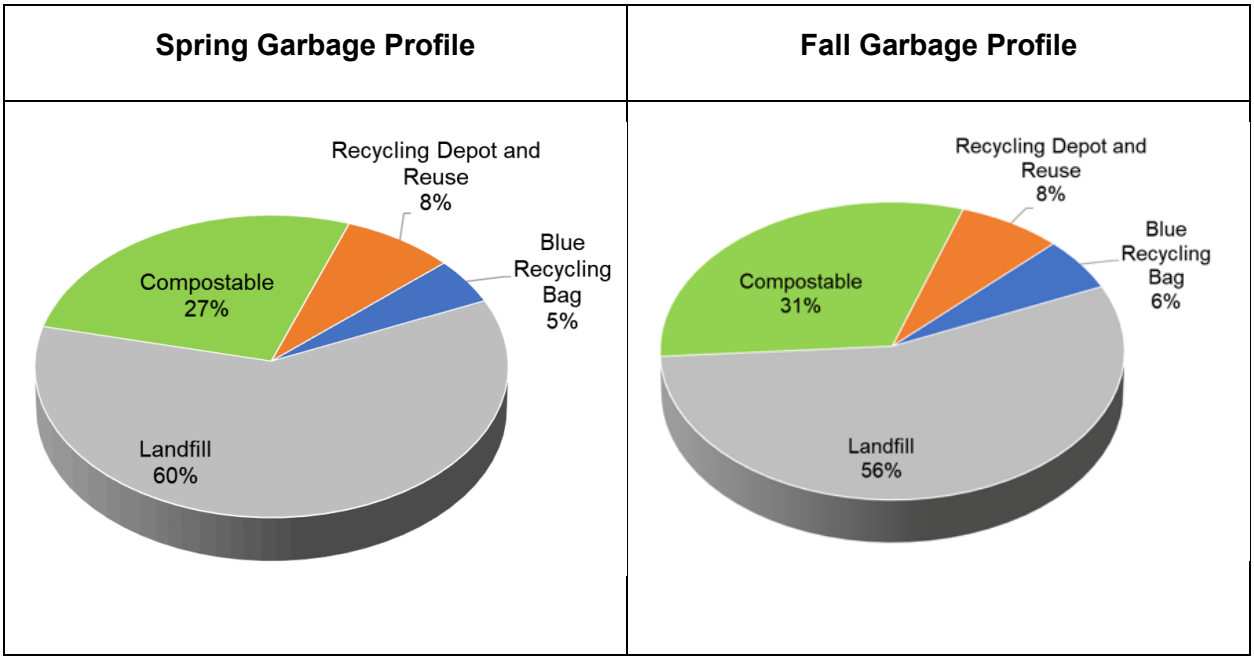


Figure 1 – Composition of the St. Albert Residential Garbage Stream in Spring and Fall 2022

On average over the entire waste composition study, 29% of the garbage stream consisted of compostable items (by weight). Compostable materials in the garbage consisted primarily of edible food waste, inedible food waste, yard and garden materials, food in packaging, and compostable paper.

On average over the entire waste composition study, 8% of materials in the garbage stream could have been diverted to the Mike Mitchell Recycling Depot or donated for reuse. The main materials in this category consisted of glass jars, reusable items, textiles (such as clothing and shoes), and electronics (cell phone, cords, headsets). Household hazardous waste items (excluding electronics) that should be dropped off at Mike Mitchell Recycling Depot made up 0.7% of the Brown Garbage Cart stream. Although this is not a large portion of the garbage stream, it is important that hazardous materials be disposed of properly. When placed in the Brown Garbage Cart, household hazardous materials such as propane tanks, fluorescent lighting tubes, engine oil and household chemicals can potentially injure collections staff and can release toxic chemicals into the environment.

On average over the entire waste composition study, 5% of materials in the garbage stream could have been placed in the Blue Recycling Bag. Materials in this category consisted of mixed paper, rigid plastic and smaller amounts of metal food cans and refundable beverage containers. There was a notably very minimal quantity of cardboard in the garbage stream (0.1%).

Materials for which there is currently no diversion program in St. Albert (58%) consisted mainly of non-recyclable plastic (plant pots, food wrappers), 'other waste' (including items such as coffee pods, packaging with the product inside, medicines, an air filter, office chair, shower hose, furnace filters, fines (small pieces of glass, organic material, and paper that are difficult to pick up)), soil/sod/clay, construction and demolition waste (plywood, carpet, laminate flooring, and ceramic tile), animal waste, and hygiene/diapers/pet pads.

The detailed composition of the residential garbage stream sampled in spring and fall of 2022 is found in Table 4.

Table 4 – Detailed Composition of the St. Albert Residential Garbage in Spring and Fall 2022

	Spring 2022		Fall 2022	
Audit Sub-Categories	KG	%	KG	%
Compostable	**486.2**	**26.8%**	**510.8**	**31.2%**
Edible Food Waste	166.8	9.2%	189.8	11.6%
Inedible Food Waste	80.1	4.4%	99.5	6.1%
Food in Packaging	57.4	3.2%	83.8	5.1%
Compostable Paper	73.1	4.0%	74.3	4.5%
Yard & Garden	99.1	5.5%	61.7	3.8%
Other Organic Waste	9.8	0.5%	1.8	0.1%
Recycling	**89.2**	**4.9%**	**94.6**	**5.8%**
Mixed Paper	36.9	2.0%	44.1	2.7%
Rigid Plastic	28.0	1.5%	27.8	1.7%
Metal Containers	10.6	0.6%	13.1	0.8%
Refundables	11.2	0.6%	7.7	0.5%
Cardboard	2.5	0.1%	1.9	0.1%
Depot	**143.9**	**7.9%**	**122.0**	**7.5%**
Glass Food Containers	27.8	1.5%	46.7	2.9%
Reuse	32.3	1.8%	20.2	1.2%
Clothing and Footwear	39.1	2.2%	19.5	1.2%
Electronics	24.4	1.3%	14.1	0.9%
HHW	13.5	0.7%	10.5	0.6%
Household Textiles	6.0	0.3%	9.6	0.6%
Styrofoam Packaging	0.8	0.04%	1.4	0.09%
Landfill	**1,096.1**	**60.4%**	**909.8**	**55.6%**
NR Plastic	214.0	11.8%	210.3	12.8%
Other Waste	327.4	18.0%	186.7	11.4%
Soil / Sod / Clay	155.0	8.54%	0	0%
C&D Waste	53.4	2.9%	139.0	8.5%
Animal Waste	97.5	5.37%	125.9	7.7%
Hygiene/Diapers/Pet Pads	113.4	6.2%	117.7	7.2%
NR Metal	12.4	0.7%	50.7	3.1%
NR Paper	49.4	2.7%	35.1	2.1%
Garbage Bags	16.4	0.9%	18.3	1.1%
NR Glass & Ceramics	39.6	2.2%	15.0	0.9%
Other Textiles	17.7	0.97%	11.2	0.7%
Non-Compostable Organic Waste	0.01	0.00%	0	0%
Grand Total	**1,815.3**	**100%**	**1,637.2**	**100%**

GARBAGE AUDIT IMAGES | The following images show examples of items found in Brown Garbage Carts.

Organic Material That Could Have Been Diverted

On average across the entire waste composition study, 29% of the material found in the garbage could have been composted or eaten instead of sent to a landfill.



Edible food



Food in packaging



Food in packaging



Inedible food waste



Compostable paper



Yard waste

Materials That Could Have Been Recycled in Blue Recycling Bag

On average, 5% of the material found in the garbage could have been placed in the Blue Recycling Bag.



Rigid Plastic



Mixed paper



Metal containers

Materials That Could Have Been Taken to Mike Mitchell Recycling Depot or to a Thrift Store

On average, 8% of the material found in the garbage could have been diverted to the Mike Mitchell Recycling Depot or donated for reuse.



Blankets



Electronics – if not working, should be taken to Mike Mitchell Recycling Depot for electronics recycling.



Clothing and Footwear

Landfill



Construction waste



Non-recyclable plastic



Non-recyclable metal



Other waste – product, coffee pod and water filter



Cold to-go cups



Styrofoam takeout containers



Non-recyclable plastic plates



Non-recyclable paper

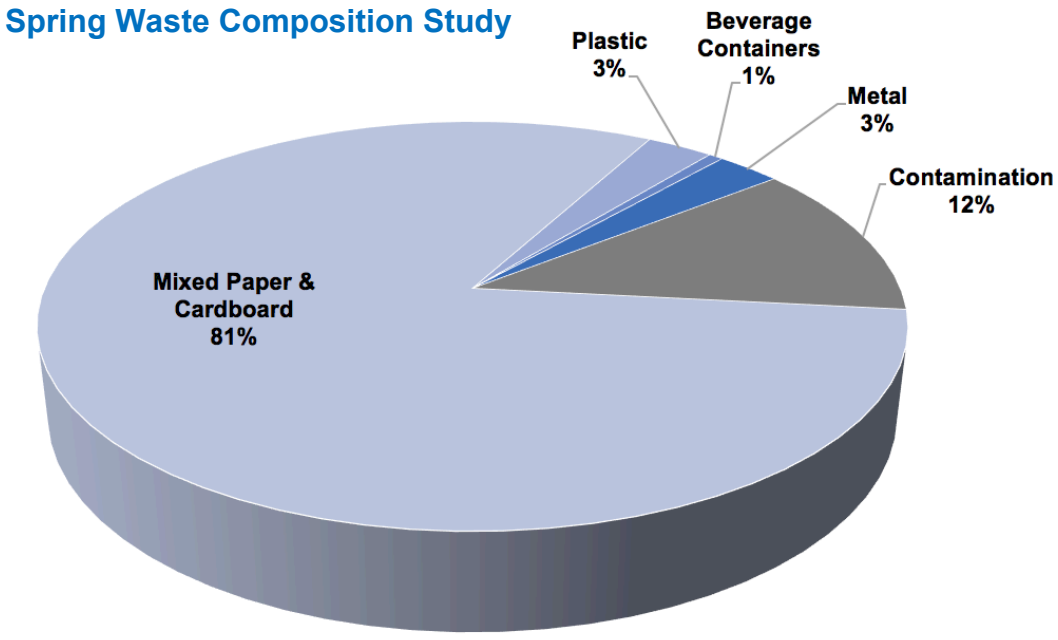


Non-recyclable glass and ceramics

5.3 Blue Recycling Bag Stream

On average, 60% of households set Blue Recycling Bags and/or cardboard at the curb during the two-season waste composition study. The Blue Recycling Bag generation rate was 2.8 kilograms of recycling per household per week. This rate was the same for both the spring and fall study periods. Once contaminants were removed from the Blue Recycling Bag stream, the generation rate fell to an average of 2.5 kilograms of recyclables per household per week.

Figure 2 shows the proportion of the various categories of materials in the recycling stream for both the spring and fall waste composition studies. On average across the entire waste composition study, the recyclable material in the recycling stream consisted predominantly of mixed paper and cardboard (84%), with mixed paper comprising 47% and cardboard 37%. On average, the Blue Recycling Bag stream contained 3.2% rigid plastic, 2.6% metal containers and 0.6% refundable beverage containers.



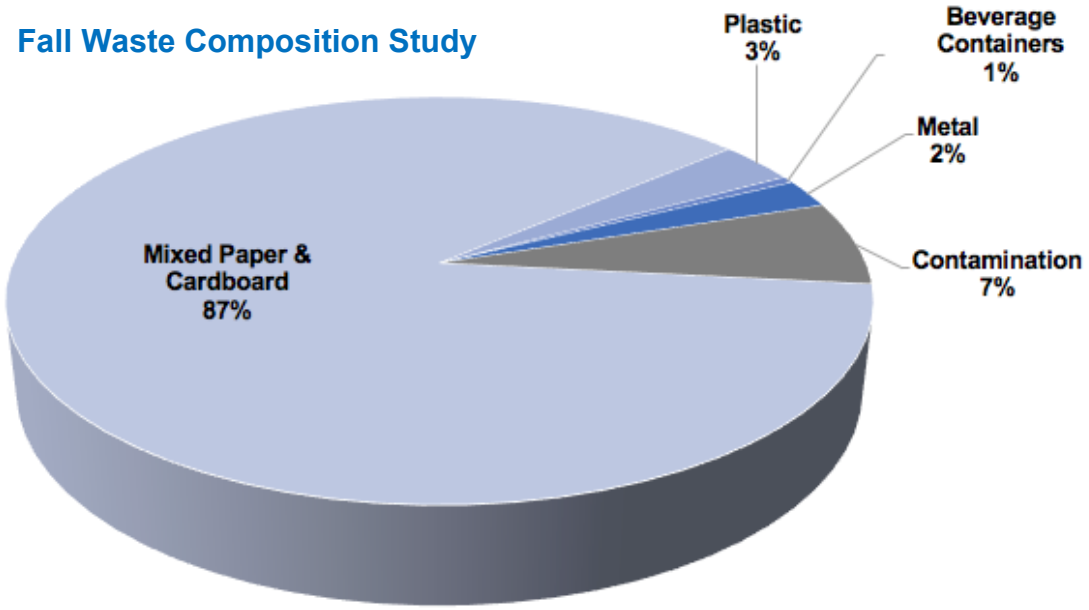


Figure 2 – Composition of the St. Albert Residential Blue Recycling Bag Stream in Spring and Fall 2022.

Figure 2 aggregates items that do not belong in the Blue Recycling Bag as contamination. There was a decline in the proportion of contamination in the Blue Recycling Bag between the spring and fall studies. There was 12% contamination in the Blue Recycling Bag in the spring study and 7% contamination in the fall study, giving an average contamination rate of 9.5%.

During the summer, between the two audit periods, City staff conducted the annual Curbside Waste Education Program. As part of this program, City staff visited households on five streets that were part of the waste composition study. Of these households, ten had set out Blue Recycling Bags that contained visible contamination. City staff left tags on the Blue Recycling Bags that contained contamination, with an explanation of what unacceptable items were present in the bag. In addition, the Blue Recycling Bag was not collected on that collection day. These educational efforts may have played a role in this decreased level of contamination.

The majority of the contamination in the Blue Recycling Bag stream consisted of non-recyclable plastic, glass food containers, non-recyclable paper, contaminated recycling (excess food residue in plastic containers), 'other waste' (including a binder, masks, pen, toilet tank pump, furnace filter, duct tape, dryer sheet), and items that could be donated for reuse.

The detailed composition of the residential Blue Recycling Bag stream sampled in spring and fall of 2022 is in Table 5.

Table 5 – Detailed Composition of the St. Albert Residential Blue Recycling Bag Stream in Spring and Fall of 2022.

	Spring 2022		Fall 2022	
Audit Sub-Categories	KG	%	KG	%
Recycling	**245.8**	**87.7%**	**261.6**	**93.3%**
Mixed Paper	129.2	46.1%	136.8	48.8%
Cardboard	98.7	35.2%	107.3	38.3%
Rigid Plastic	8.2	2.9%	9.5	3.4%
Metal Containers	7.9	2.8%	6.5	2.3%
Refundables	1.8	0.6%	1.5	0.5%
Contamination	**34.4**	**12.3%**	**18.8**	**6.7%**
NR Plastic	7.3	2.6%	6.5	2.3%
NR Paper	6.1	2.2%	2.9	1.0%
Contaminated Recycling	6.1	2.2%	1.9	0.7%
Glass Food Containers	4.0	1.4%	4.2	1.5%
Reuse / Clothing and Footwear	2.5	0.9%	1.0	0.3%
Garbage Bags	2.4	0.9%	0	0%
Other Waste	2.0	0.7%	2.0	0.7%
NR Metal	1.3	0.5%	0.3	0.1%
Electronics	0.8	0.27%	0	0%
Compostable Paper	0.5	0.19%	0	0%
NR Glass & Ceramics	0.4	0.16%	0	0%
C&D Waste	0.4	0.15%	0	0%
HHW	0.2	0.06%	0	0%
Household Textiles	0.1	0.04%	0	0%
Other Textiles	0.1	0.02%	0	0%
Edible Food Waste	0.0	0.02%	0.1	0.04%
Grand Total	**280.2**	**100%**	**280.3**	**100%**

Figure 3 shows the relative quantity of recyclable material and contamination (by weight) present in the Blue Recycling Bags sampled by zone during both the spring and fall study periods. In some instances, the level of contamination in the Blue Recycling Bag by zone varied significantly between the spring and fall study periods both within and across collection zones. Part of this variability may be due to the fact that each zone included only 10 sample households. This small sample size can mean that contamination in the Blue Recycling Bag at a small number of households can substantially alter the rate of contamination in the sampled zone (i.e., if one house sets out a heavily contaminated bag it may skew the contamination for the entire sample size).

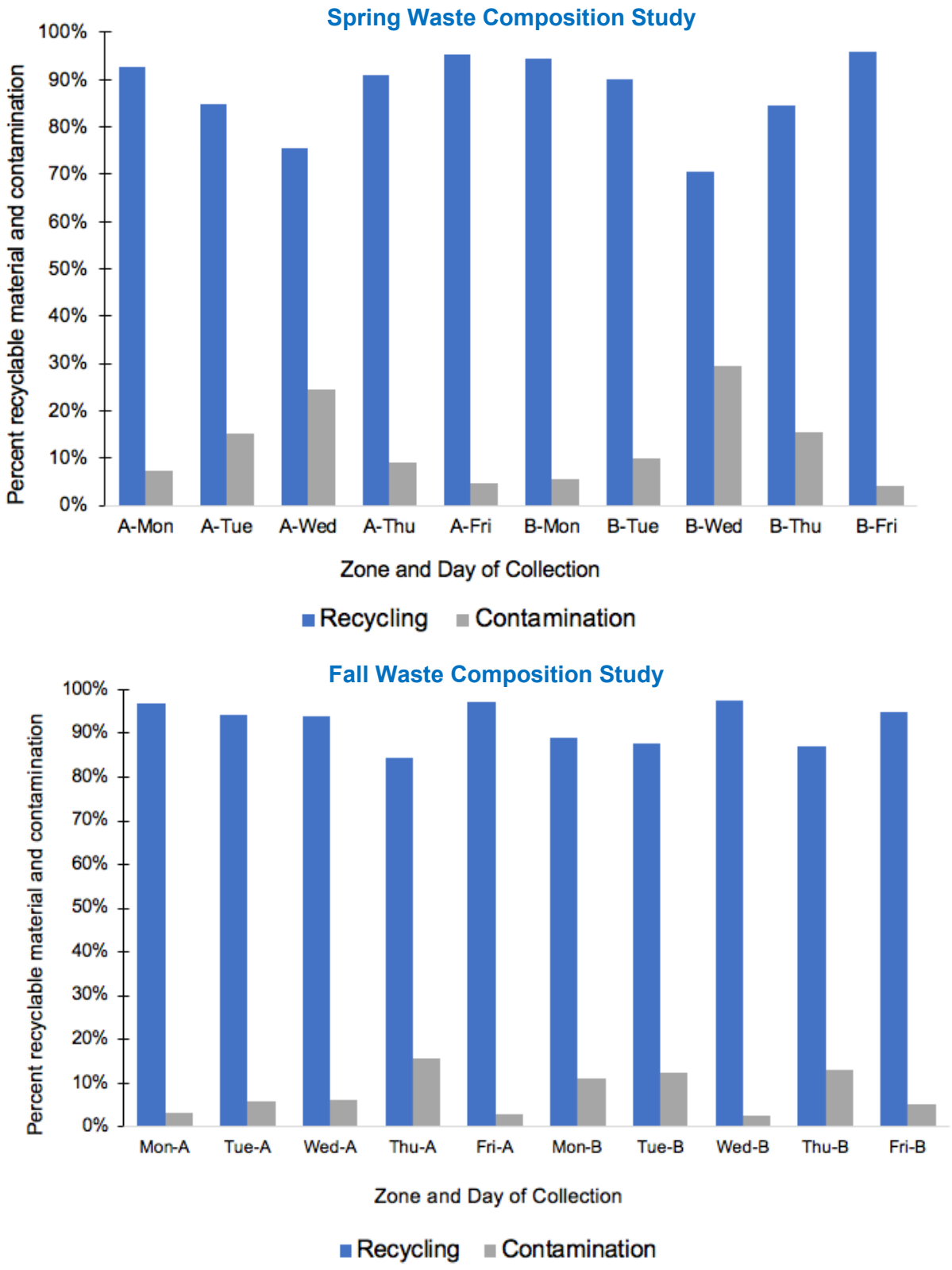


Figure 3 – Quantity of recyclable material and contamination present in Blue Recycling Bags in St. Albert zones sampled in the 2022 waste composition study.

RECYCLING AUDIT CATEGORIES | The following images show examples of items found in the Blue Recycling Bags sampled.

Recyclable Material

Mixed paper and cardboard were the top two items recycled by weight.



Mixed paper



Cardboard



Rigid plastic

Contamination

On average across the entire waste composition study, the recycling stream had 9.5% contamination.



Non-recyclable plastic



Contaminated recycling



Plastic packaging and plastic food containers



Glass food jar



Non-deposit tetra paks



Non-recyclable coffee cups

5.4 Green Organics Cart Stream

On average, 71% of households set a Green Organics Cart at the curb during the two-season waste composition study. During the spring study period, 67% of households sampled set out a Green Organics Cart and during the fall study period, 75% of households sampled set out a Green Organics Cart. The average generation rate was 14.2 kilograms of organics per household per week. Once contaminants were removed from the Green Organics Cart stream, the generation rate fell to an average of 12.2 kilograms of organics per household per week.

The June waste composition study period had an organics generation rate (after contaminants were removed) of 13.2 kilograms per household, while during the September study period, the organics generation rate was lower at 11.2 kilograms per household. The organics generation rate is highly variable by season in zones where households tend to generate large quantities of yard and garden material. The biggest differences in the Green Organics Cart stream between June and September were that the June stream included a larger quantity of yard and garden material and more contamination in the form of soil, sod and clay. There were minimal differences in the quantities of edible food waste, inedible food waste and compostable paper between these two study periods.

Figure 4 shows the proportion of the various categories of materials in the Green Organics Cart for both the spring and fall waste composition studies, with contamination removed. During both study periods, yard and garden material made up the vast majority of the material being placed in the Green Organics Cart. During the spring study period, yard and garden material made up 88% of the Green Organics Cart stream, while during the fall, it made up 82% of the stream. On average between the two study periods, inedible food waste made up 9% of the stream, edible food waste 4%, and compostable paper 2% of the stream. During the late fall, winter and early spring seasons, we would expect food waste and compostable paper to make up a larger proportion of the Green Organics Cart stream, and for the total weight of the organics stream to be lower, when people are doing minimal yard work involving vegetation management.

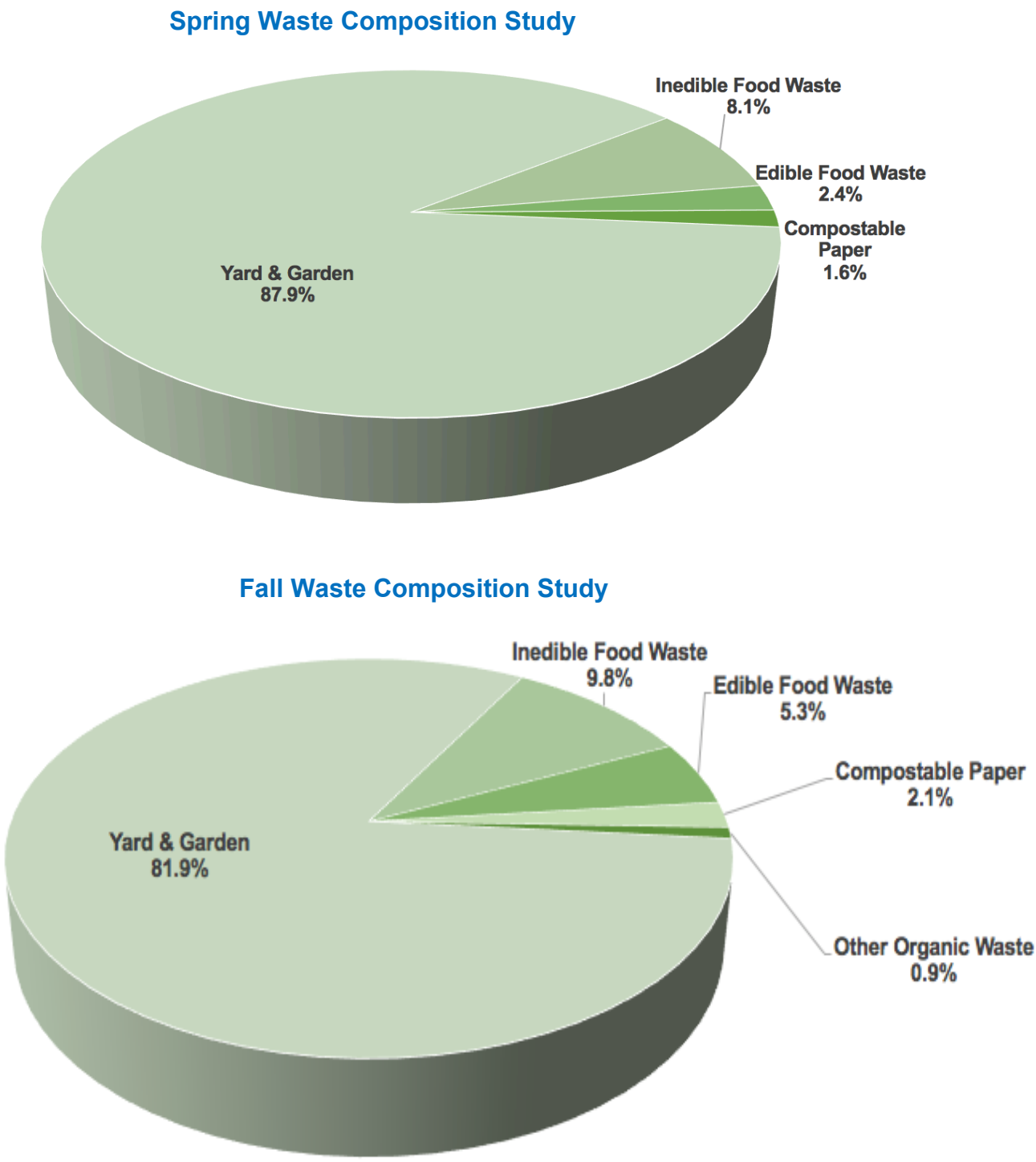
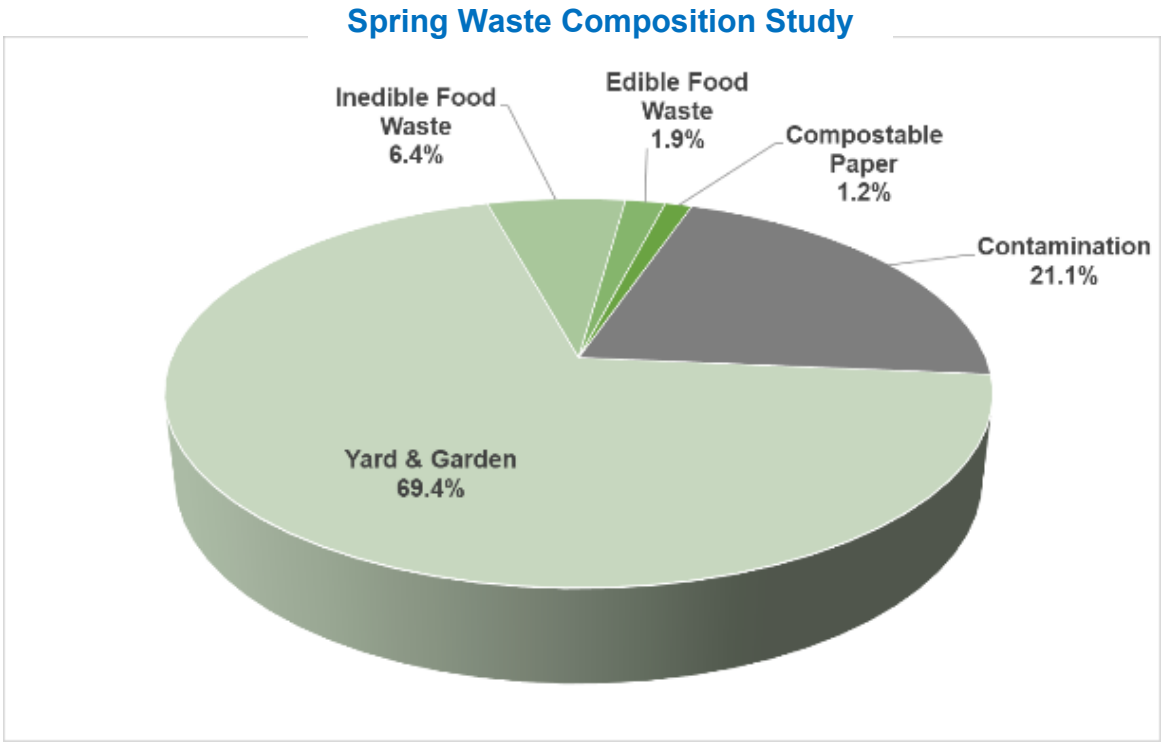


Figure 4 – Composition of the St. Albert Residential Green Organics Carts (With Contamination Removed) in Spring and Fall 2022.

The City of St. Albert has identified contamination in the Green Organics Cart as being a priority to address. Figure 5 shows that the level of contamination in the Green Organics Cart during the spring study (21%) was much higher than in the fall study (4.7%). During the spring study, soil, sod and clay made up the vast majority (92%) of the contamination by weight. The majority of this

contamination originated from six households that had placed soil, sod and clay in the Green Organics Carts, rather than a widespread higher level of contamination across all Green Organics Carts. Although there was a lower rate of contamination during the fall, there was a similar pattern in that a small quantity of households contributed a large proportion of the contaminants, when measured by weight. During the fall, three individual Green Organics Carts contained 57% of the contamination found in the entire organics stream, consisting of fish tank gravel, sod and plants in pots.

Other contaminants not associated with gardening and that were present in the organics stream included non-compostable take-out food and beverage containers, plastic film, aluminum foil, black garbage bags, wipes, oily textiles, meat pads, a coffee pod and composite lumber.



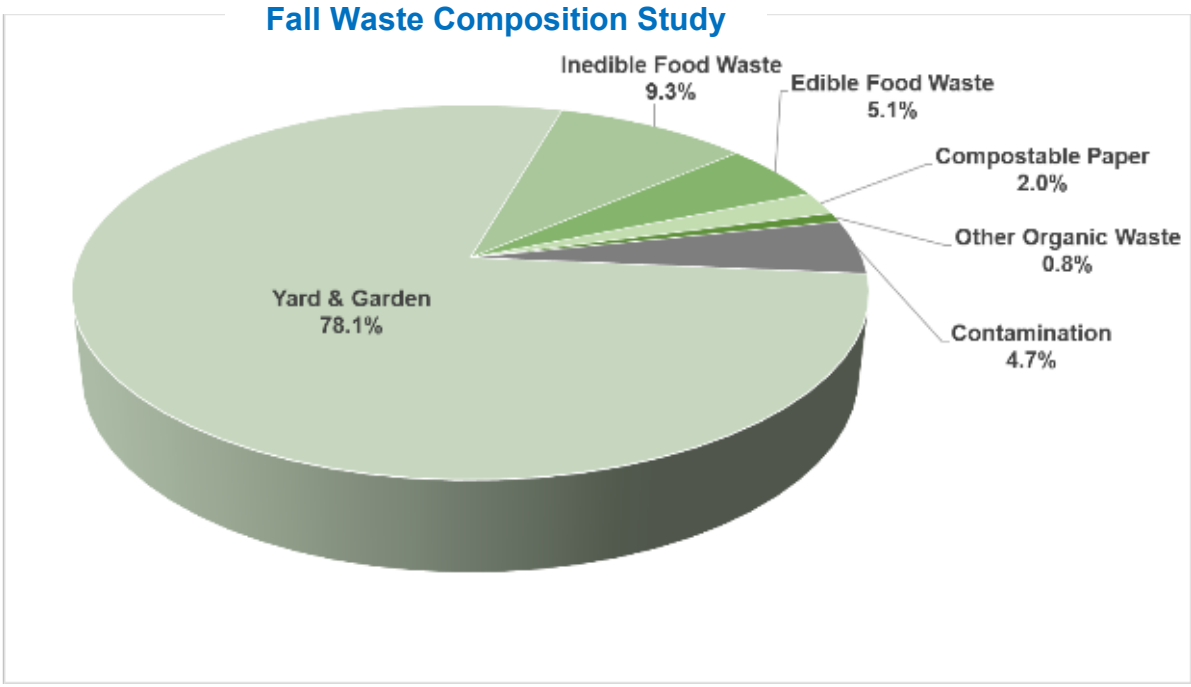
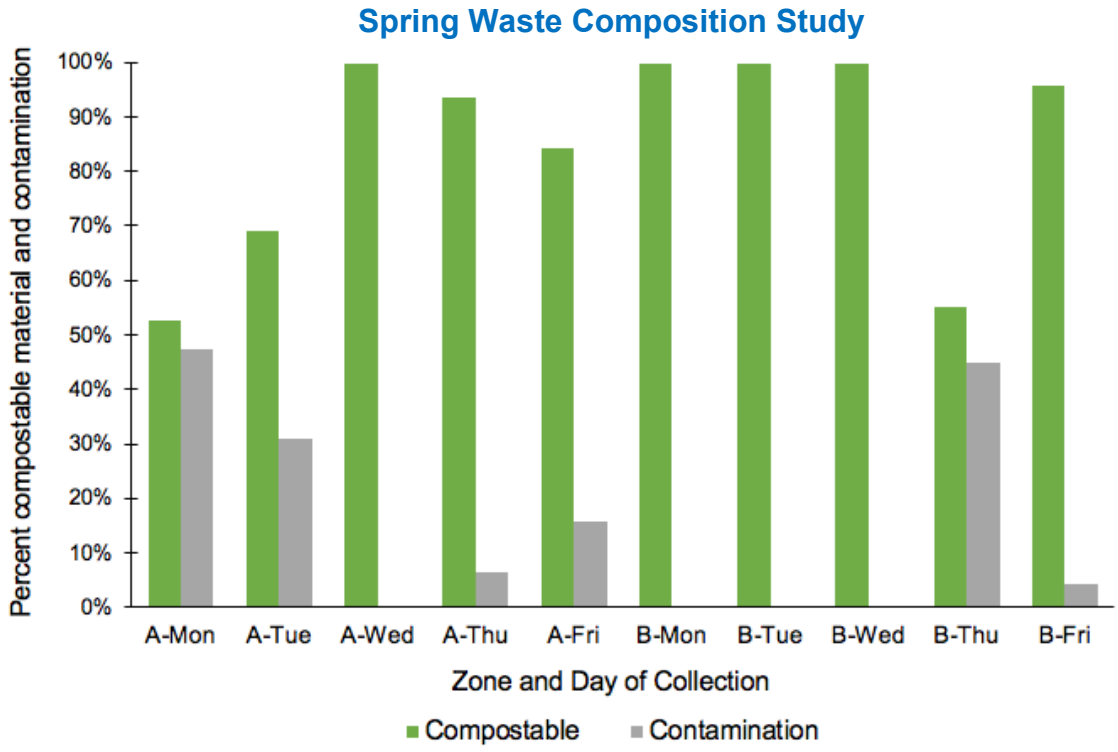


Figure 5 – Composition of the St. Albert Residential Green Organics Carts (Including Contamination) in Spring and Fall 2022

Figure 6 shows the relative quantity of compostable material and contamination present in the Green Organics Carts sampled by zone for both the spring and fall study periods.



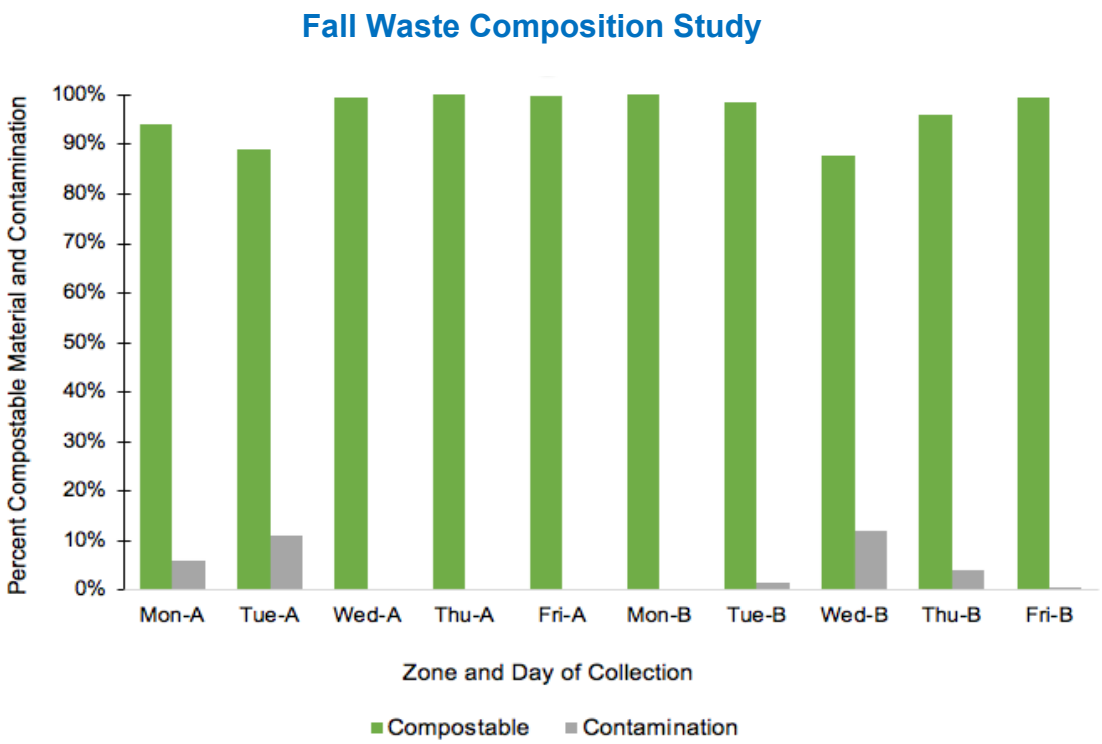


Figure 6 – Quantity of compostable material and contamination present in Green Organics Carts sampled in St. Albert collection zones in spring and fall of 2022.

As depicted in Figure 6, this waste composition study did not show a clear pattern of contamination by collection zone. Given that ten Green Organics Carts were sampled for each collection zone, the sample size by zone was small. This means that contamination present in a small number of Green Organics Carts can skew the level of contamination for the entire zone. In Section 5, we make some recommendations regarding targeting neighbourhoods for outreach and education to address contamination in the Green Organics Carts. It would be best to use the more extensive zone-focused data sets that have been gathered through the Curbside Waste Education Program and summertime lid-lift audits conducted between 2017 and 2022 (excluding 2020) to determine neighbourhoods to focus on, rather than the more limited zone-based data captured in this quantitative waste composition study.

Table 6 shows the detailed composition of the Green Organics Cart stream sampled in spring and fall 2022.

Table 6 – Detailed Composition of St. Albert Residential Green Organics Carts in Spring and Fall 2022

	Spring 2022		Fall 2022	
Audit Sub-Categories	KG	%	KG	%
Compostable	**1,323.6**	**78.9%**	**1,115.6**	**95.3%**
Yard & Garden	1,163.6	69.4%	913.8	78.1%
Inedible Food Waste	107.7	6.4%	109.2	9.3%
Edible Food Waste	31.4	1.9%	59.2	5.1%
Compostable Paper	20.8	1.2%	23.7	2.0%
Other Organic Waste	0.03	0.00%	9.7	0.8%
Contamination	**354.0**	**21.1%**	**55.0**	**4.7%**
Soil / Sod / Clay	327.0	19.5%	12.6	1.1%
Other Waste	17.6	1.1%	38.1	3.3%
NR Paper	4.7	0.3%	2.4	0.2%
NR Plastic	1.6	0.1%	1.0	0.1%
Animal Waste	1.6	0.09%	0.2	0.02%
Other Textiles	1.3	0.1%	0.5	0.04%
Food in Packaging	0.1	0.01%	0	0%
Mixed Paper	0.1	0.01%	0	0%
C&D Waste			0.2	0.01%
Grand Total	**1,677.6**	**100%**	**1,170.6**	**100%**

ORGANIC AUDIT CATEGORIES | The following images show examples of items found in the Green Organics Carts sampled.

Organic Material

On average, 85% of the organic material was yard and garden material followed by smaller amounts of inedible and edible food waste.



Grass clippings



Plants



Apples (yard waste)



Inedible food waste



Edible food waste



Compostable paper

Contamination

The Green Organics Carts had 21% contamination in the spring and 4.7% contamination in the fall.



Soil and sod



Trunk of tree too large to compost



Animal waste in plastic bags



Garbage bag



Wax-lined and shiny paper takeout containers



Aluminum foil and mixed paper

5.5 Total Waste Generation Rates and Curbside Diversion Rates

Figure 7 shows the average proportion of garbage, recycling and organics set out by St. Albert residents during the spring and fall of 2022 (by weight). This graph does not reflect adjustments for the weight of contaminants in the recycling and organics streams. During the two study

periods, on average organics made up 55%, recycling comprised 11% and garbage made up 34% of the total material generated.

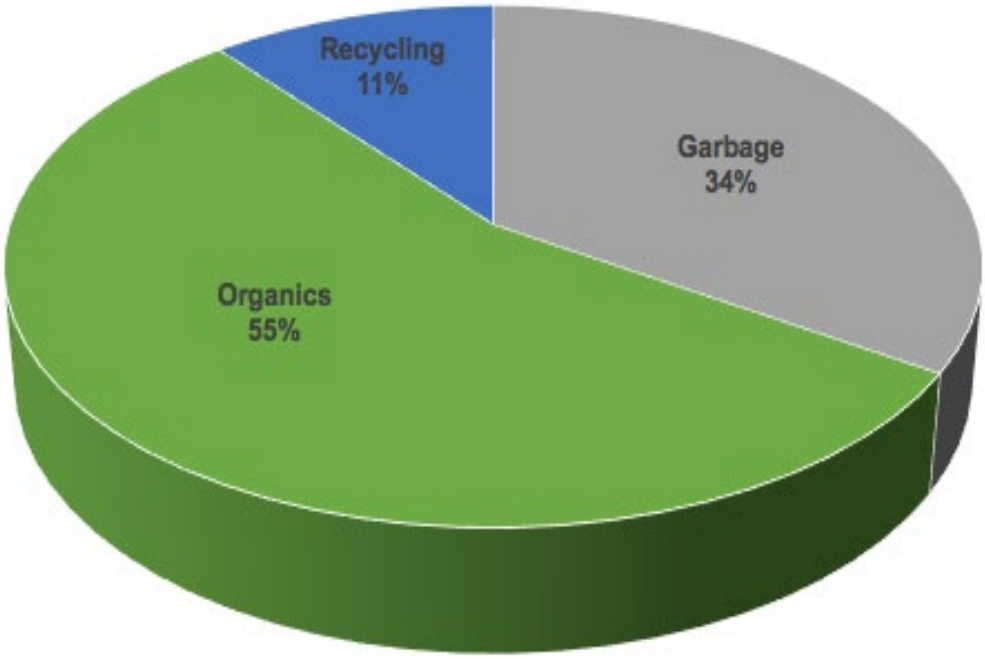


Figure 7 – Average proportion of garbage, recycling, and organics (by weight) set out by St. Albert residents during the spring and fall waste composition study.

Given that the waste composition study occurred in June and September, the quantity of yard and garden material present in the Green Organics Carts was higher than we would expect it to be outside of the gardening season. As a result, we would expect the organics fraction of the total waste stream to be lower in late fall, winter and early spring when people are managing less vegetation in their yards and gardens. This waste generation rate should be considered a snapshot collected during the season when people are most active in their yards and gardens.

Comparing spring and fall periods of the waste composition study, in the spring the proportion of the total waste stream that consisted of organics (58%) was higher than in the fall (52%). This was mainly due to a larger quantity of yard and garden material and soil/sod/clay contamination in the Green Organics Carts during the spring audit period.

Figure 8 compares the quantity of garbage, recycling and organics (by weight) set out by the 100 households sampled during the spring and fall periods of the waste composition study. This graph does not reflect adjustments for the weight of contaminants in the recycling and organics streams. As the graph shows, more organics were set out in the spring than the fall. The quantity of recycling set out remained the same across the two audit periods. There was slightly less garbage set out in the fall than in the spring.

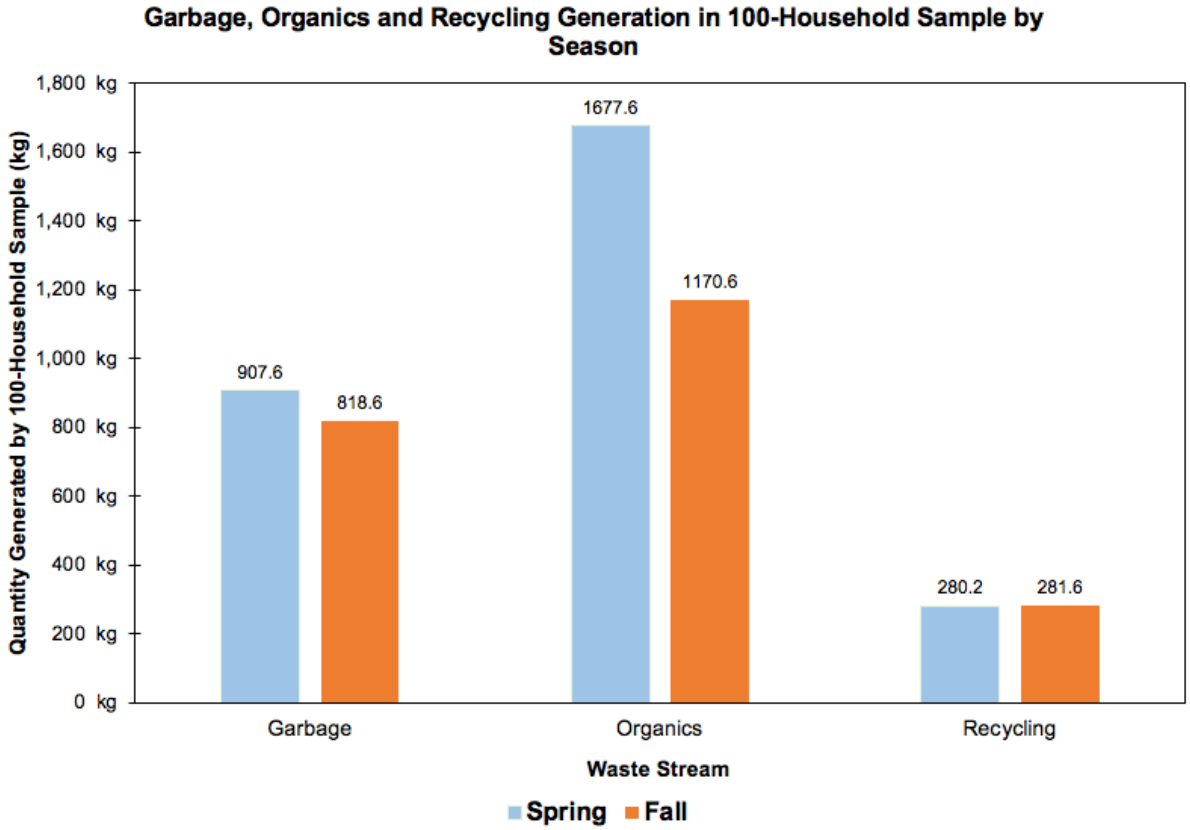


Figure 8 – Quantity of garbage, organics and recycling generated by the 100 households sampled in spring and fall 2022.

Table 7 summarizes the average set-out rates for garbage, recycling, and organics on both a household basis and a normalized population (per capita) basis over both seasons of the waste composition study. For the recycling and organics streams, data are shown both for the quantity of materials set out at the curbside and the adjusted quantity once contaminants were removed.

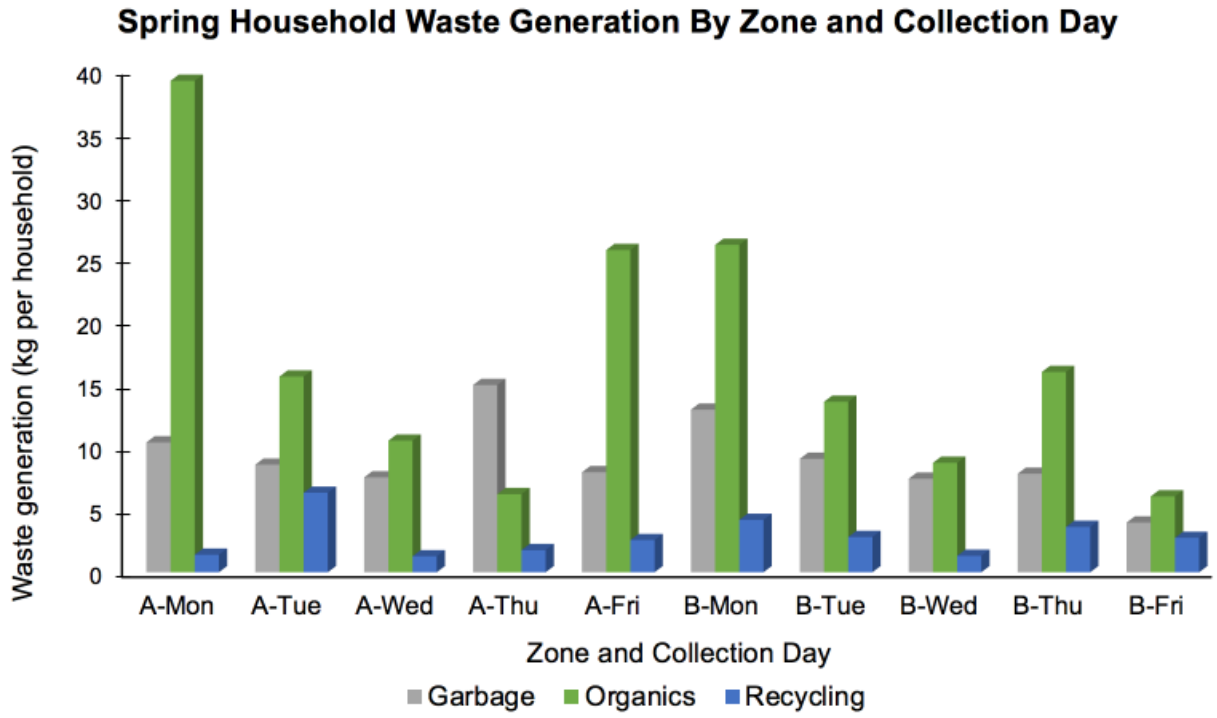
Table 7 – Mean household weekly set-out rates and normalized per capita generation rates for garbage, recycling, and organics in the 2022 St. Albert residential waste composition study.

Material Stream	Mean Household Set-Out Rate (kg/hh/week)	Mean Household Set-Out Rate - Without Contaminants (kg/hh/week)	Normalized Per Capita Generation Rate (kg/capita/week)[1]
Brown Garbage Cart	8.6	n/a	3.2
Blue Recycling Bag	2.8	2.5	0.9[2]
Green Organics Cart	14.2	12.2	4.5[2]

1. Assumption: Average household size of 2.7 (Statistics Canada 2016 Census profile).
2. With contaminants removed.

The curbside diversion rate was 57% for households sampled in the 2022 residential waste composition study. This curbside diversion rate was calculated based on the weight of the organics and recycling streams once contaminants were removed.

There was variability in the quantity of garbage, recyclables and organic materials generated among zones that were sampled. Figure 9 shows the quantity of garbage, recyclables, and organics generated by ten households in each sampled zone in both the spring and fall study periods. Although there are some trends across the two sampling periods, there is also a lot of variability in the data. Given that there were only 10 households per zone sampled, we recommend that City of St. Albert staff also assess more extensive zone-specific data collected through the Curbside Waste Education Program conducted between 2017 and 2022 (excluding 2020) when considering how to target education and outreach efforts by zone.



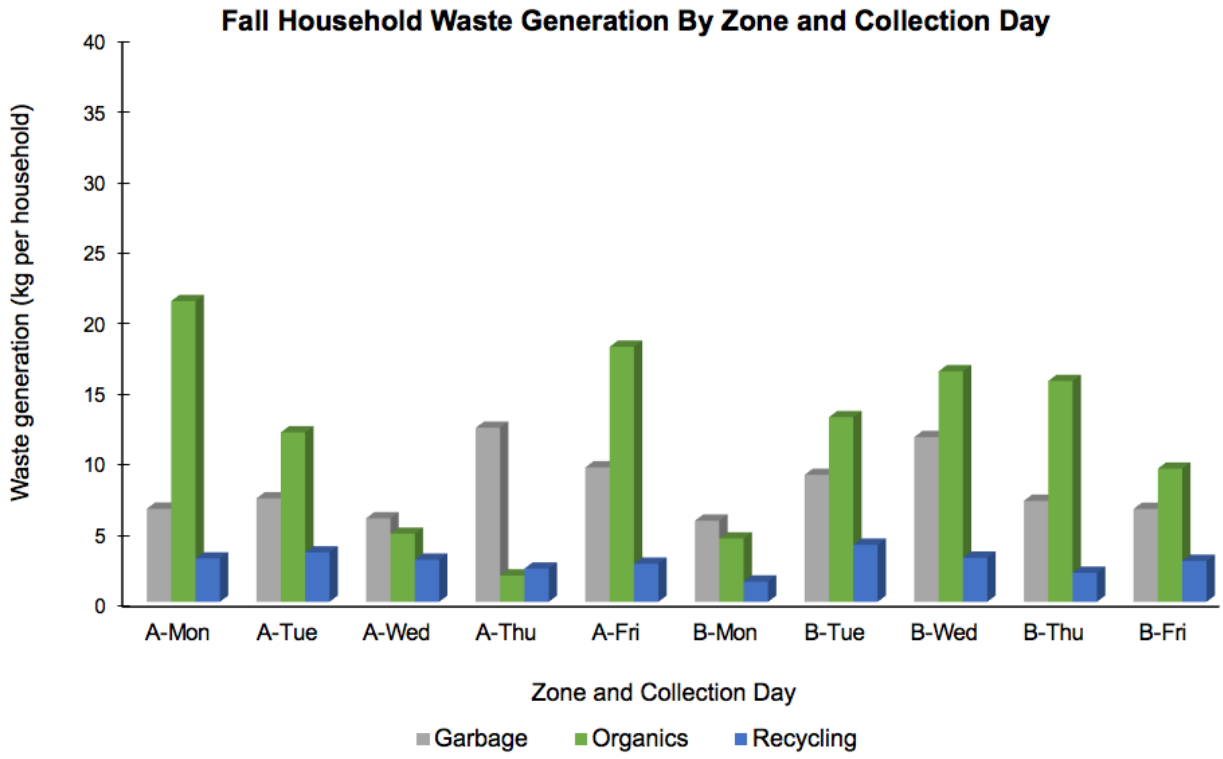


Figure 9 – Quantity of garbage, recyclables and organic materials generated by residents in various St. Albert zones sampled in spring and fall 2022.

5.6 Single-Use Items

For each of the garbage, recycling and organics streams, single-use plastic and paper items were sorted, counted and weighed to measure the quantities present in all three streams. Data from the garbage stream were normalized to a weekly basis (number of single-use items was divided by two) to ensure an accurate comparison with the recycling and organics streams. Ninety-three percent of the single-use items were found in the garbage stream. Approximately 0.67 percent of the total combined garbage (normalized), recycling and organics streams, by weight, consisted of single-use items, which amounted to 34.2 kilograms. There was a total count of 2,673 single-use items (with garbage normalized to a weekly basis – garbage results were divided by two).

Table 8 describes the prevalence of single-use items in each stream by count and weight.

Table 8 – Quantity and weight of single-use items in the St. Albert residential garbage, recycling and organics streams during the 2022 waste composition study.

Material Stream	Single-Use Item Count	Single-Use Item Weight (kg)
Brown Garbage Cart	2,568[1]	31.82[1]
Blue Recycling Bag	73	1.19
Green Organics Cart	32	1.15

1. Note that the numbers shown are the single-use item count and weight for the garbage stream normalized to a weekly basis.

Figure 10 depicts the proportion of different single-use items in the combined garbage, recycling and organics streams across both the spring and fall waste composition study periods. The single-use items that were most commonly counted were grocery bags, paper takeout containers, hot and cold to-go cups, and plastic disposable cups. Detailed single-use item count data is found in Appendix D.

There were no policy changes or education and outreach activities undertaken on the topic of single-use item reduction between the two waste composition study periods. The count and weight data for single-use items between the spring and fall waste composition studies were comparable across all categories. For this reason, we have combined the data into one chart summarizing results from the two study periods.

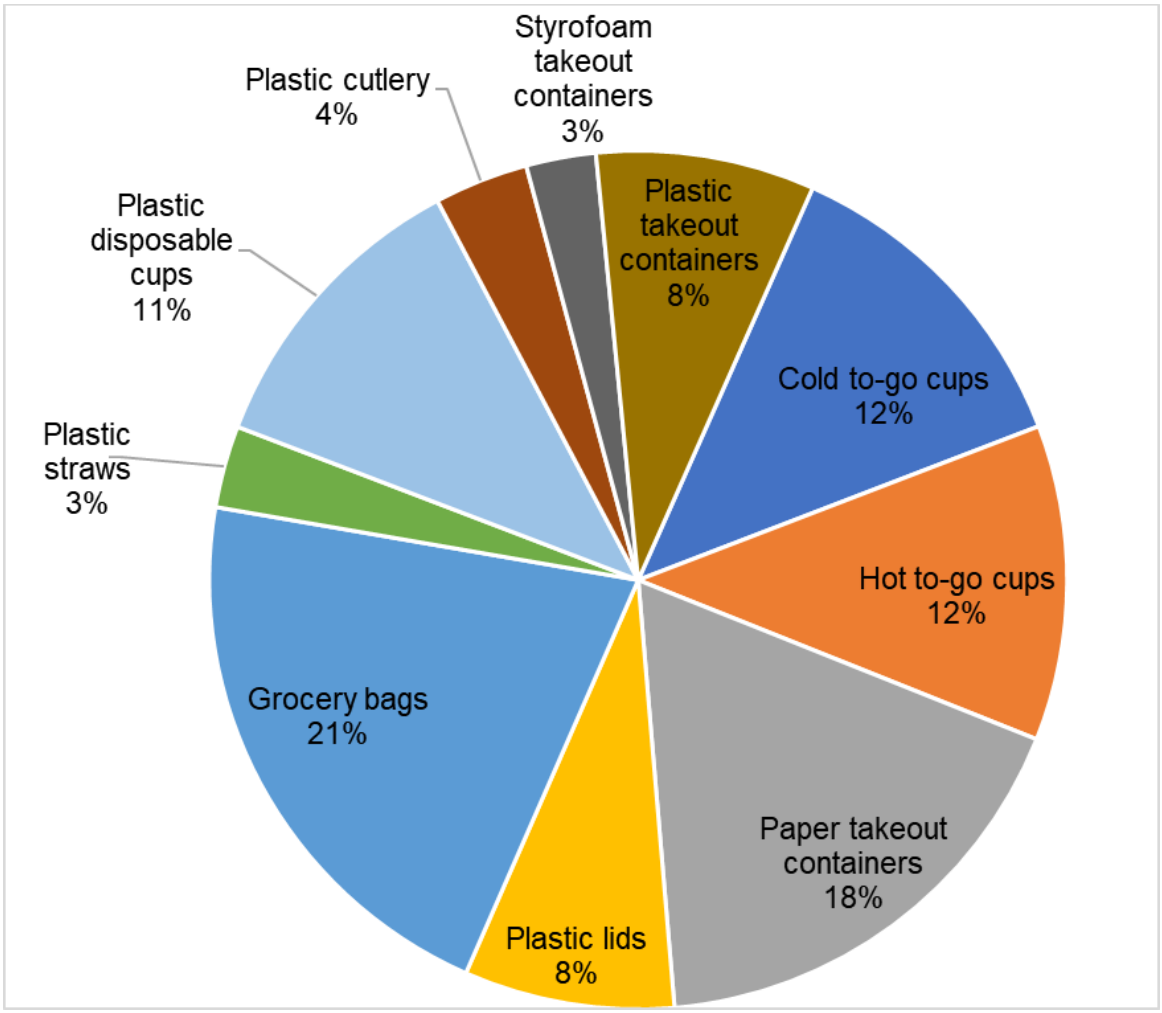


Figure 10 – Proportion of Single-Use Items (by Count) in the Residential Combined Garbage, Recycling and Organics Streams in St. Albert in the 2022 Waste Composition Study.

Extrapolating from the single-use item data collected during the waste composition study, Table 9 provides an estimate of the quantity (by weight) of single-use items that would be disposed of by each household on an annual basis. We estimate that each household in St. Albert generates 7.58 kilograms of single-use items on an annual basis.[1]

[1] Kilograms per household per year (kg/hh/yr) was calculated by determining the proportion of single-use items by weight in each of the garbage, recycling and organics streams from the audit, and multiplying these proportions by the annual tonnages for each stream. 2021 annual waste data was used.

Table 9 – Estimate of the Quantity of Single-Use Items Disposed Of Annually by St. Albert Households.

Single Use Item		kg/hh/yr
NR Paper	Cold to-go cups	1.01
	Hot to-go cups	0.96
NR Plastic	Paper takeout containers	1.34
	Plastic lids	0.65
	Grocery bags single use	0.96
	Grocery bags double use	0.76
	Plastic straws	0.25
	Plastic disposable cups	0.93
	Plastic cutlery	0.29
	Styrofoam takeout containers	0.21
	Plastic takeout containers	0.21
Total		7.58

6 Opportunities to Optimize the Residential Curbside Collection Program

The City of St. Albert has been making ongoing efforts to improve waste diversion and reduce contamination in the organics and recycling streams through its Curbside Waste Education Program. This has led to the City achieving a 57% residential curbside diversion rate (with contaminants removed from Green Organics Cart and Blue Recycling Bag streams) as measured in this waste composition study carried out in spring and fall of 2022.

There remain opportunities to further increase this diversion rate and optimize program performance. This can be achieved by increasing participation in curbside diversion programs, reducing contamination in the Green Organics Cart and Blue Recycling Bag streams, and fostering diversion of items that can be reused or recycled, but are not accepted in the Green Organics Cart or Blue Recycling Bag.

The main broad tactics that are most successfully used by communities to increase waste diversion are the following:

- implement extensive public education and communication;
- make waste diversion convenient and easy;
- provide financial incentives to reward waste diversion; and,
- ban recyclable and/or reusable materials from the waste stream.

These tactics are referred to throughout the recommendations below.

6.1 Divert More Compostable Items to Green Organics Cart

The largest opportunity to increase the residential curbside diversion rate is to increase the quantity of organic material placed in the Green Organics Carts. The waste composition study showed that 29% of the garbage stream consisted of items that could have been eaten or composted (by weight). Compostable materials in the garbage consisted primarily of edible food waste, inedible food waste, yard and garden materials, food in packaging, and compostable paper.

Table 10 presents some approaches that the City may wish to consider to foster increased diversion of compostable items into the Green Organics Cart.

Table 10 – Educational Approaches to Increase Diversion of Compostable Items.

Approach	Rationale and Explanation
Focus some in-person educational outreach on target neighbourhoods where organics diversion is lower.	• Data from the Curbside Waste Education Program and this waste composition study show that organics diversion is lower in some neighbourhoods than others. • Through direct in-person educational outreach, work to identify and address the barriers individuals are facing which lead to lower levels of participation in the Green Organics Cart program. Do residents understand how the program works and how they can participate? Do they feel motivated to participate? Are there language barriers? What other barriers exist for people and how can they be addressed? This educational outreach could be done via a survey, with a prize incentive. • Community-based social marketing techniques have been shown to work well in prompting people to successfully participate in programs such as organics diversion. • The City could also consider sharing the results of this study with residents, with specific neighbourhood-focused information (gathered from the Curbside Waste Education Program) where appropriate. Messaging could be "Congratulations to the City of St. Albert for achieving a 57% waste diversion rate. Let's get to 100% by… separating more food scraps into the Green Organics Cart, etc. "
Expand educational messaging to target organic materials that are less frequently diverted	• The City has carried out a variety of educational campaigns focusing on 'What Goes Where?', with a particular focus on common contaminants in the Green Organics Cart and Blue Recycling Bag streams. • It would be valuable to expand these campaigns to include a positive 'What Goes Where?' focused on prompting residents to place suitable organic materials in the Green Organics Cart. • It would be valuable to place additional messaging directly on the Green Organics Cart, so people are reminded what does and doesn't belong as they use the cart. • Examples of items to target include: food scraps (inedible food), pizza boxes and compostable paper. • Metro Vancouver has a set of "Food scraps aren't garbage" creative imagery and campaign materials (web, print and videos) focused on food scraps recycling and other recycling topics that they share for free with other municipalities (Figure 11).

	 **Figure 11** – Metro Vancouver 'Food-soiled paper isn't garbage' web image.
Engage directly with residents at community events	• The City could consider creating a 'What Goes Where?' composting and recycling educational booth and a 'What Goes Where?' trivia game about the City's waste diversion programs (see Figure 13). It is helpful to be creative and use humour, and to set up the booth throughout the year at places where people are already gathering – sport tournaments, arts events, public gatherings, etc. • As an example, the City of Moncton, New Brunswick created a fun and creative educational display where they set up basketball hoops over recycling and compost bins and people (both adults and children) had to try to shoot the material into the bin through the hoops. They partnered with a local basketball team and a sneaker recycler. • Facilitating such an interactive display creates an ideal opportunity to check-in with residents about their experience participating in waste diversion programs, answer people's waste diversion questions in-person and to gain insight on the barriers and challenges people are facing to participating in diversion programs.



Spin the Wheel of Waste Diversion trivia game.



Compost program educational display and Recycle Right Relay game at an educational booth at the Yellowknife Farmers' Market.

Figure 12 – Example of a compost and recycling program educational display, trivia game and relay race used to directly engage with community members and to foster waste diversion.

Communities that have achieved the highest rates of organics diversion most often use a combination of policy and educational tools. Following extensive education on how to divert materials to the Green Organics Cart, the City may wish to consider exploring banning compostable material from Brown Garbage Carts. The provinces of Nova Scotia and Prince Edward Island have successfully used such bans of compostable and recyclable materials from the residential garbage stream for decades. These bans have been very effective, but require monitoring and enforcement.

6.2 Promote 'Love Food, Hate Waste' – Avoidance of Edible Food Waste

Of the organic materials placed in the Brown Garbage Cart, on average 10% consisted of edible food waste – food that didn't need to enter the waste stream, as it could have been eaten by people. During both the spring and fall study periods, this represented the largest component of organic materials that could be diverted or prevented from entering the Brown Garbage Cart.

The City could consider creating an educational campaign to encourage residents to prevent avoidable food waste.

Preventing avoidable food waste would reduce the overall size of the waste stream to be managed, thus reducing City costs. Reducing edible food waste also saves residents directly as it reduces food purchasing costs, as more food is consumed instead of discarded. The National Zero Waste Council conducted research on household food waste in Canada in 2022 and found that 63% of the food Canadians throw away could have been eaten, and that the average

Canadian household threw out 140 kilograms of avoidable food waste per year – at a cost of more than $1,300 per year.[2]

The National Zero Waste Council provides many tips and resources that can be used by municipalities for educational campaigns on its 'Love Food, Hate Waste' website.

6.3 Reduce Rejection of Organics Loads at Compost Facility Due to Contamination

One of the two primary waste-related issues the City is currently working to address is contamination in the organics stream. Currently, the contracted organics hauler self-declares if a load has more than 30% visual contamination, at which point the load is consequently landfilled, rather than processed at the Roseridge Compost Pad.

Data from this waste composition study indicate that in general there are low levels of contamination in the Green Organics Carts; however, the presence of heavy contaminants such as sod, soil and clay in a small quantity of Green Organics Carts can significantly increase the amount of contamination in a particular load. As an example, during the spring waste composition study there was a 21% contamination level (by weight), and this contamination consisted primarily of soil, sod and clay which originated from six households. During the fall waste composition study, the contamination rate was 4.7%, and three households contributed 57% of the contamination.

Data from this waste composition study suggest that more loads of organics may be being visually assessed as exceeding the 30% contamination threshold, and consequently sent to landfill, than are contaminated beyond this threshold. This results in additional costs to the City, loss of organic resources to the landfill and increased generation of greenhouse gas emissions when organics decompose and create methane in the landfill.

6.3.1 Collaborate with Compost Facility and Organics Haulers to Evaluate Contamination Assessment Approach

It would be valuable for the City to collaborate with the organics hauler and operator of the Compost Facility to explore options to establish a more quantitative and consistent way to assess the level of contamination in a load – with the goal of not seeing relatively uncontaminated loads of organics sent to the landfill unnecessarily.

It may be necessary for organics haulers to periodically re-calibrate their assessment of the contamination threshold by visually assessing sample loads and then quantitatively measuring the level of contamination associated with the visual assessment. It would also be important to train new haulers to calibrate their visual assessment of contaminated loads.

[2] National Zero Waste Council. 2022. Food Waste in the Home.

6.3.2 Continue Curbside Waste Education Program

As in any residential curbside organics diversion program, it is important for the City to continue its efforts to minimize contamination through ongoing education. Detailed contamination data collected during lift-lid audits will provide the best guidance on where to focus educational efforts.

6.3.3 Continue Educational Efforts That Target Problem Contaminants

The City has carried out a variety of educational campaigns focused on common contaminants found in the Green Organics Carts. It would be valuable for the City to continue these efforts. In addition, data from this waste composition study indicate that it would be valuable to increase the educational information available on sod, soil and clay. It would be valuable to add decals to the Green Organics Carts specifying what materials can and cannot go in the cart, and specifically stating that soil, sod and clay cannot be placed in the Green Organics Cart. It would be helpful to place more information on the City's website defining what is meant by 'sod, soil and clay', explaining that it doesn't belong in the Green Organics Cart and clarifying how it should be best managed. See Section 5.3. below for additional recommendations.

Other problem contaminants that it would be helpful to consider focusing additional educational resources on include construction, renovation and demolition (CRD) waste and pet waste in bags. These materials could also be added to educational decals affixed to carts specifying that they don't belong in the Green Organics Carts.

6.3.4 Implement Fines for Deliberate Contamination of Green Organics Carts

The combined results of this waste composition study and the Curbside Waste Education Program indicate that there are challenges with a small number of households deliberately placing garbage bags and other contaminants in the Green Organics Carts. If fines were implemented and there were periodic random checks of Green Organics Carts for deliberate contamination, this would likely help to change the 'behavioural architecture' to prompt reduced contamination. It would be valuable for the City to continue to encourage personnel collecting Green Organics Carts to place a warning sticker on the Green Organics Cart and not collect the cart if contamination is observed during collection.

6.3.5 Require All Single-Use Food Serviceware to Be Compostable

The waste composition study showed that non-compostable take-out food and beverage containers are common contaminants in the Green Organics Cart stream. As part of its Single-Use Item Reduction Strategy, the City could consider requiring that any single-use food serviceware used by St. Albert-based businesses and institutions be made from certified compostable material. This would contribute to the following four inter-related goals:

(a) reduce contamination in the Green Organics Cart;

(b) reduce contamination in the Blue Recycling Bag, as fewer food-contaminated serviceware items would be placed in the recycling stream;

(c) make diversion more convenient, as it does not matter if there is food residue present on compostable items that are placed in the Green Organics Cart; and,

(b) increase the waste diversion rate as a greater proportion of single-use food serviceware could be diverted.

If St. Albert chose to explore and implement this tactic of requiring all single-use food serviceware to be compostable, it would be important to work closely with staff at Roseridge Compost Pad to ensure that the specifications for compostable items fit with what they are able to accept and process at the facility.

6.4 Foster Reuse of Sod, Soil and Clay

The City of St. Albert previously accepted sod, soil and clay at the Compost Depot, and it was stored on-site and used to create berms. However, the City no longer has sufficient space to store this material, and therefore it is no longer accepted at the Compost Depot. The current options that remain for residents to manage this material are: (a) place small amounts in the Brown Garbage Cart; (b) transport small and large quantities to a City of Edmonton facility; (c) manage the material on their own property; and, (d) seek opportunities for the material to be used by others.

Data from the waste composition study showed that occasionally residents are placing sod, soil and clay in their Green Organics Carts – which is considered a contaminant. We would expect this challenge to be particularly common during the spring, summer and fall gardening and landscaping season. We also noted that during the spring waste composition study period, soil, sod and clay made up 8.5% of the Brown Garbage Cart stream.

There would be numerous benefits for the City of St. Albert if it was able to foster local exchange and reuse of soil, sod and clay. Keeping soil, sod and clay out of the Green Organics Carts would reduce contamination in this stream. Keeping these materials out of the Brown Garbage Cart would reduce the quantity of material needing to be handled, transported and disposed of by the City, reduce costs for the City, increase the City's diversion rate and be more environmentally responsible. On a human timescale, soil is a non-renewable resource, as it takes thousands of years to form in nature.

Although soil, sod and clay may be a 'waste' for one household, it is quite probable that contractors or other households in the City may view this same material as a valuable resource. The City could consider approaching local landscaping companies to see if any would be willing to accept small amounts of sod, soil and clay from local residents. If companies are found that are willing to do this, this could be promoted to residents as a beneficial solution for managing these materials. The City could also encourage residents to use community social media groups and the St. Albert Freecycle webpage to give away soil, sod and clay for use by other community members. Details such as these could be posted on the City's webpage, promoted through social media and described within the 'What Goes Where?' entry for the particular items.

Fostering such local reuse would make diversion of these materials more convenient, in comparison with needing to transport the materials to Edmonton and pay a fee to drop off the material at a City of Edmonton facility. It would also address the likely hesitation by some residents to place these materials in the landfill stream given the non-renewable and valuable nature of soil, sod and clay, and promote a culture of reuse and resource valuation.

6.5 Continue to Promote Grasscycling

In spring 2022, the City lauched a Grasscycling educational campaign. Grasscycling is the natural recycling of grass by leaving grass clippings on the lawn after mowing. It is the most convenient, cost-effective and environmentally responsible way to manage grass clippings. It would be valuable for the City to continue this promotional campaign. In addition to being more convenient for homeowners and providing local environmental benefits, grasscycling reduces costs for the City to collect and transport grass clippings to the compost facility.

In some jurisdictions, municipal governments have banned grass clippings from being placed in the garbage or organics stream, thus requiring people to grass-cycle and use their grass clippings on-site. An example of such a jurisdiction is Halifax, Nova Scotia. If the City of St. Albert considers this option, it would be important to first ban grass clippings from the Brown Garbage Cart stream, prior to banning it from the Green Organics Cart stream, so the material isn't removed from the Green Organics Cart and placed in the Brown Garbage Cart, thus reducing diversion.

6.6 Foster Increased Successful Diversion of Glass

Currently, glass is collected for recycling at the Mike Mitchell Recycling Depot. Previously, residents had been able to place glass in the Blue Recycling Bag; however, it is no longer accepted within the Blue Recycling Bag.

Once residents are accustomed to placing an item in a curbside diversion program, it can be challenging to ask residents to continue diverting the item in a less convenient manner, which is the case for glass that now must be transported by residents to the Mike Mitchell Recycling Depot.

During the waste composition study, 2.2% of the material in the Brown Garbage Cart consisted of glass. Glass also made up 15% of the contamination present in the Blue Recycling Bag stream.

It would be helpful for the City to continue educational outreach to remind residents that glass cannot be placed in the Blue Recycling Bag. It would also be helpful for the City to revise its 'What Goes Where?' posters to indicate that glass is collected for recycling at the Mike Mitchell Recycling Depot, rather than stating it belongs in the garbage.

The City may wish to consider creating opportunities to make it more convenient for residents to recycle glass, and then to communicate these additional options to residents. Establishing a few neighbourhood glass collection bins at locations where residents already frequent (such as shopping areas, sports facilities and arts facilities) could make it easier for residents to drop off glass for recycling as part of other routine activities. Such an approach could help to reduce glass

contamination in the Blue Recycling Bag stream and decrease the quantity of glass that residents are placing in the Brown Garbage Cart stream.

Alberta's newly approved EPR framework and regulation (see Section 5.7) will include glass from the residential sector. St. Albert may wish to delay implementing new glass diversion opportunities while it waits for details on how EPR legislation will shift the burden of collecting and recycling this material away from local government and onto producers of packaging.

6.7 Expand Education to Include "Why?" and "What Happens Next?"

One motivator for people to participate in waste diversion programs is to understand why they are being asked to separate items into the Green Organics Cart and Blue Recycling Bag, and what happens to these items once they've placed them in the appropriate collection container.

The City of St. Albert's 'BeWasteWise' App and 'What Goes Where?' tools are great locations to consider including more details on the 'why?' and 'what happens next?' of waste diversion. Educational messaging in these applications can also be used to encourage residents to prioritize waste prevention, and reuse over recycling. Figures 13 and 14 show two examples from the Town of Banff 'What Goes Where?' tool, where information is provided on plastics recycling myth-busting, and tips on how to avoid edible food waste.

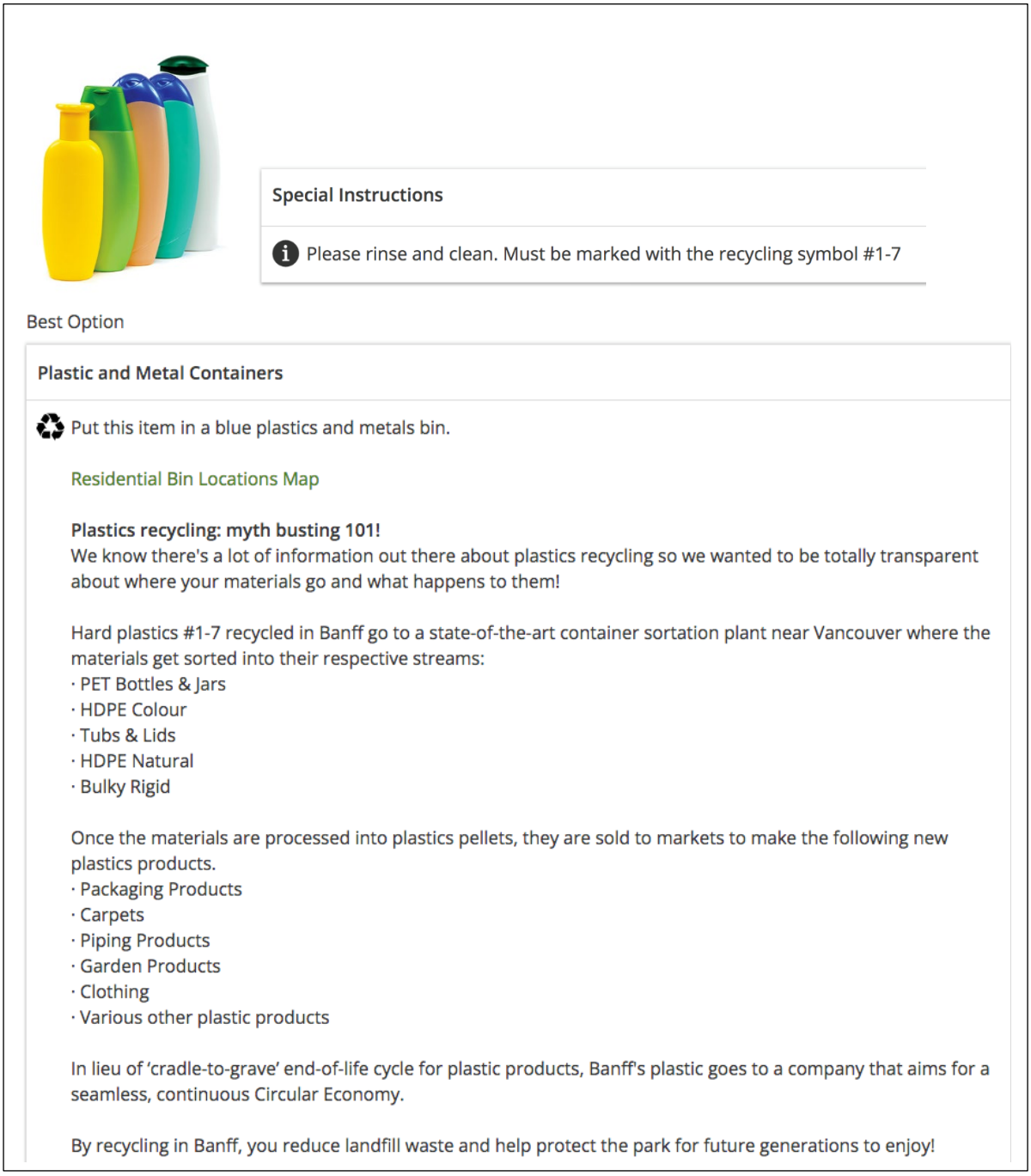


Figure 13 – Town of Banff 'What Goes Where?' educational messaging on the 'Why?' and 'What happens next?' for plastic containers.

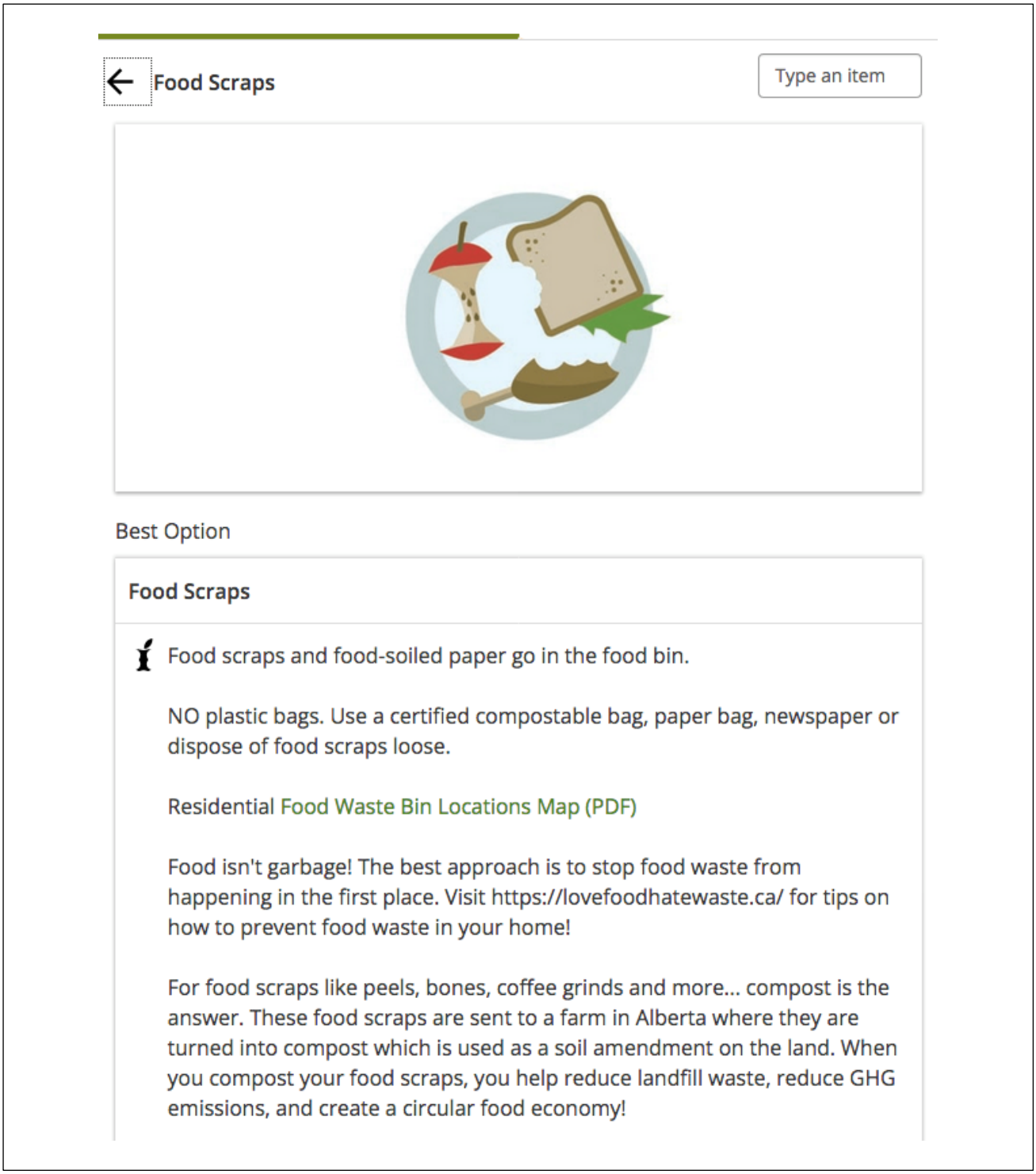


Figure 14 – Town of Banff 'What Goes Where?' educational messaging on the 'Why?' and 'What happens next?' for food scraps.

6.8 Follow Implementation of the New Provincial EPR Legislation

On October 3, 2022, the Government of Alberta passed an Extended Producer Responsibility Regulation. The purpose of this EPR regulatory framework is to shift the physical and financial burden of collecting, sorting, processing and recycling materials to the producer of the products, and away from local governments and taxpayers.

Given how recently this legislation was passed, there are many details to be determined regarding how new EPR programs will work for municipalities. The new EPR framework will be fully implemented by 2025.

Over the coming years, it will be valuable for City of St. Albert staff to participate in meetings and training opportunities on EPR that target the municipal sector. These will likely be provided both through the provincial government and the Recycling Council of Alberta. Participation in these conversations that lead to the establishment of EPR programs will enable St. Albert staff and decision-makers to remain up-to-date with the opportunities that EPR will bring and to be in the best position to adjust and tailor current St. Albert waste diversion programs accordingly.

The City may wish to engage the broader community in learning about EPR and the changes it will bring to recycling in Alberta. The City could consider holding information sessions once more information becomes available, sending a survey to residents to seek feedback and engaging with businesses as appropriate. Such engagement can re-ignite and foster further interest in waste diversion. It also creates an opportunity to continue educating the public about topics such as common items that can be placed in the Green Organics Cart, problem contaminants, etc.

As the physical and financial burden for collecting and recycling paper products, plastics, metal, glass, hazardous and special products from the residential sector become the responsibility of those who produce these items, it may enable St. Albert to focus its municipal resources on fostering diversion of other streams such as organics.

7 Opportunities to Foster Single-Use Item Reduction

The City of St. Albert is in the midst of planning and creating a Single-Use Item Reduction Strategy.

Based on data collected during the spring and fall phases of this waste composition study, 0.67% of the garbage, recycling and organics streams consisted of single-use items, with a total count of 2,673 single-use items. Although single-use items make up a small proportion of the waste stream by weight, they tend to be small and often made of mixed or low-quality material, and thus often cannot be recycled and are some of the more common objects found as litter. As discussed in Section 4.6, the most common single-use items found in the waste composition study were grocery bags, paper takeout containers, hot and cold to-go cups, and plastic disposable cups.

Some benefits of reducing single-use items include reducing resource use on disposable items, having a smaller quantity of materials that need to be collected and managed by the City, reducing

the confusion for residents regarding what to do with items for which it is often not clear whether they can be recycled or composted, and reducing the quantity of non-recyclable and non-compostable items in the waste stream.

7.1 Upcoming Federal Prohibition of Some Single-Use Items

In June 2022, the Government of Canada announced *Single-use Plastics Prohibition Regulations (SUPPR)*. The goal of these Regulations is to ban or restrict the use of certain single-use plastics where there is evidence that they are found in the environment, are often not recycled, and have readily available and viable alternatives.

These Regulations prohibit the manufacture, import and sale of single-use plastic checkout bags, cutlery, foodservice waste made from or containing problematic plastics that are hard to recycle, ring carriers, stir sticks, and straws (with some exceptions). The majority of items addressed under these Regulations will no longer be allowed to be manufactured and imported for sale into Canada as of December 20, 2022. These items will no longer be allowed to be sold in Canada as of December 20, 2023. The two exceptions are ring carriers and flexible straws packaged with beverage containers, which have a more extended prohibition timeline.

We would expect these federal Regulations to address approximately 31% of the items that were counted as part of this residential waste composition study: grocery bags (21%), plastic cutlery (4%), plastic straws (3%) and Styrofoam take-out containers (3%).

The Regulations will also lead to the phase-out of single-use plastic foodservice ware that cannot be recycled – including single-use foodservice ware that includes polystyrene, polyvinyl chloride, oxo-degradable plastic or black plastic made with carbon black. Plastic takeout containers made up eight percent of the single-use items counted, and were relatively common contaminants in the Green Organics Cart and Blue Recycling Bag. Businesses currently using single-use plastic foodservice ware covered by the federal prohibition will need to transition to another type of recyclable or compostable single-use foodservice ware or reusable foodservice ware.

As St. Albert explores options for its own Single-Use Item Reduction Strategy, it may wish to consider how its Strategy and educational efforts could complement and be consistent with the federal Regulations that will soon come into force.

7.2 Reducing Single-Use Items Rather Than Replacing Them

The federal Regulations to prohibit some single-use plastics will likely prompt many businesses and organizations to transition to another type of single-use item – such as single-use foodservice ware made from recyclable plastic or that is compostable. The City may wish to consider tools it could use to reduce the prevalence of single-use items, rather than just replacing one single-use item with another. There are also many common single-use items that the federal Regulations do not address, such as hot and cold to-go cups and plastic disposable cups.

Some common policy tools used to reduce single-use items include:

- banning single-use items for situations in which there are viable and practical reusable options;
- requiring minimum charges for the use of single-use items to provide a financial disincentive – often the fee must be visible to the customer, and the business is able to keep the surcharge;
- prohibiting the use of single-use items in dine-in settings; and,
- requiring that single-use items only be provided on-request;

Some examples of jurisdictions using policy approaches to reduce single-use items, rather than just replace them, are summarized in Table 11. We have focused on policy tools being used for items that are not otherwise covered in the new federal Regulations.

Table 11 – Examples of jurisdictions using policy approaches to reduce single-use items.

Jurisdiction	Examples of Policy Tools
City of Edmonton Charter Bylaw 20117 (will go into effect on July 1, 2023)	• Single-use plastic shopping bags will be banned, and businesses must charge at least 15 cents for a paper bag and at least $1 for a new reusable shopping bag. ○ these minimum fees will increase in 2024 • Single-use cups: restaurants must serve dine-in drink orders in reusable cups and accept reusable customer cups for dine-in and takeout orders. • Accessories such as utensils, straws, pre-packaged condiments and napkins must be available only by request or self-serve.
City of Spruce Grove Single-Use Items Reduction Bylaw (Jan 1, 2022)	• All polystyrene foodservice ware is banned, including plates, cups, bowls, trays, clamshells or lidded containers. • Single-use plastic shopping bags are banned, and businesses must charge at least 15 cents for a paper bag and at least $1 for a new reusable shopping bag. • The City of Spruce Grove also banned plastic straws and plastic checkout bags; however, these will be covered by new federal Regulations.
City of Vancouver Single-Use Item Reduction Strategy (various bylaws between 2020 and 2022)	• Ban on plastic and compostable plastic shopping bags, fees on paper and reusable shopping bags. • Single-use cups: $0.25 fee must be charged. • Single-use utensils: by-request only. • Foam cups and foam take-out containers: by request only.

Jurisdiction	Examples of Policy Tools
City of Victoria Consultation paper and draft bylaw	Draft bylaw proposes that: • single-use straws, utensils, stir sticks, and condiment packages made of any material be distributed only by request; • businesses use only reusable products for dine-in services, with exemptions for businesses that cannot accommodate sanitization procedures for reusable products; and, • $0.25 fee on single-use takeout cup or container.
Town of Banff Single-Use Item Reduction Strategy and Bylaw in development	• developing a Single-Use Item Reduction Strategy intended to complement the upcoming federal Regulations on some single-use plastics.
City of Berkeley, California Single-Use Foodware Rules	• The City of Berkeley, California is known as a worldwide leader in achieving reductions in the use of single-use items. • Businesses that allow customers to eat on-site must use reusable foodware and must provide colour-coded bins for composting, recycling and garbage. • Businesses offering takeout must use BPI-certified compostable foodware, and provide disposable accessory items (e.g. straws, napkins, utensils) only upon request. No single-use plastic is allowed. • $0.25 must be charged for disposable cups. • Disposable accessory items (e.g. straws, stirrers, napkins, utensils, condiment cups/packets, cup sleeves, tops, lids, etc.) are to be provided only by request and must be BPI-certified compostable. • City of Berkeley offers on-site technical assistance to support the transition to reusable foodware.

7.3 Focus on Reuse Instead of Disposable

There are opportunities for municipalities to set policies and support initiatives that focus on reuse of durable items, rather than the single-use and disposal of items. In a number of municipalities and regions across Canada, cup and container-sharing platforms have been developing. Some examples include 'Banff Isn't Disposable' in Banff, Reusables in Vancouver and on Vancouver Island and Friendlier in Guelph, Ontario. Municipal policies that provide structural, financial and educational incentives to reduce single-use items can contribute to the independent establishment of cup and container-sharing programs.

For example, after the federal Regulations are fully implemented, all or almost all plastic takeout containers should be recyclable. The City may wish to focus education on how the new Regulations impact St. Albert residents and that recyclable plastic containers must be rinsed prior to being placed in the Blue Recycling Bag.

8 Conclusions

During recent years, the City of St. Albert has invested significant effort in waste diversion education and outreach. This curbside residential waste composition study shows the City should be proud of its waste diversion accomplishments to date. There also remain significant opportunities for further diversion and waste prevention.

This 2022 residential curbside waste composition study showed a 57% diversion rate.

The biggest waste diversion opportunity in the St. Albert residential sector is to increase the quantity of compostable materials diverted from the Brown Garbage Cart and into the Green Organics Cart. On average during the waste composition study, 29% of the Brown Garbage Cart stream consisted of compostable materials. Other opportunities include reducing contamination in the Green Organics Cart and Blue Recycling Bag streams, and fostering diversion of items that can be reused or recycled, but are not accepted in the Green Organics Cart or Blue Recycling Bag.

The City of St. Albert is in the midst of planning and creating a Single-Use Item Reduction Strategy. Based on data collected during this waste composition study, 0.67% of the garbage, recycling and organics streams consisted of single-use items, with a total count of 2,673 single-use items. We expect the new federal Regulation of some single-use plastic items to address approximately 31% of the items that were counted as part of this residential waste composition study. The City may wish to consider how its Single-Use Item Reduction Strategy and educational efforts could complement the federal Regulation that will soon come into force, and lead to overall reduction of single-use items, rather than the replacement of single-use plastic with other single-use items.

New provincial EPR legislation to be implemented over the coming three years will shift the burden of collecting, sorting, processing and recycling many recyclable materials from municipalities such as St. Albert and onto the producers of the items. As the physical and financial burden for collecting and recycling paper products, plastics, metal, glass, and hazardous & special products from the residential sector become the responsibility of those who produce these items, it should enable St. Albert to focus its municipal resources on fostering diversion of other items such as organics.

Appendix A: Glossary

Biweekly – used to describe the every-other-week collection frequency for garbage, and seasonally, organics.

Blue Recycling Bag – used to collect recyclable material that is sent to a processor for recycling.

Contamination – items that are in a recycling (Blue Recycling Bag), or organics (Green Organics Cart) program that should not be in those programs.

Garbage – material that is sent to a landfill and collected in a Brown Garbage Cart.

Green Organics Cart – cart used to collect organic material for composting.

Organics – the material accepted in the Green Organics Cart program that is compostable and can be processed at the Roseridge Compost Pad to produce compost.

NR – non-recyclable. The material deposited in the Blue Recycling Bag that is not physically able to be recycled or without a current market.

Waste – The combined streams of garbage, recycling, and organics.

Waste Composition Study or Waste Audit – an examination of the proportion of various materials in a given waste stream.

Appendix B: Waste Audit Categories and Single-Use Plastic Items

	Sub-Category	Description and Examples
Paper		
	Mixed Paper	Boxboard, envelopes, paper, brown paper bags, egg cartons, white paper, newsprint, magazines, tissue paper
	Cardboard	Corrugated cardboard
Plastic		
	Rigid	Rigid plastics i.e., laundry detergent bottles, condiment bottles, large yogurt or sour cream containers, windshield washer fluid jug
	Styrofoam packaging	Styrofoam computer or appliance packaging
Metal		
	Metal Containers	Steel cans and pie plate foil containers (must be easily cleaned-otherwise Other Waste)
Glass		
	Glass Food Containers	Food jars
Organics		
	Edible Food Waste	Sandwich
	Inedible Food Waste	Banana peel, bones
	Compostable paper	Food-soiled napkins, paper plates no waxy liner, fast food packaging, tissues (i.e., brown fast-food bags, flour bags, parchment paper); greasy pizza boxes; NO SHINY paper.
	Food in Packaging	Food that could be composted if it was removed from its packaging; captures items that can't be opened in 2 seconds.
	Yard & Garden	grass clippings, leaves
	Other Organic Waste	Stir sticks, chop sticks, toothpicks, popsicle sticks, animal hair, PC compostable coffee pods (wider and shorter).
Beverage Containers		
	Refundables	Aluminum, Tetra Pak, pouches, glass
Electronics		
	Electronics	IT accessories, toothbrush, headphones, audio, visual, kitchen and power tools
Household Hazardous Waste		
	HHW	Batteries, ARMA containers, fluorescent bulbs, paint, used engine oil and filters, propane tanks, household chemicals; aerosol cans, paint cans.
Textiles		
	Clothing and Footwear	Clothing and footwear (wearable/donatable)
	Household	Drapes, pillows (useable/donatable)
	Other	Rags, work gloves, coveralls, non-donatable textiles

Landfill Sub-Category		Description and Example
	Other Waste	Playdough, glue, cig butts, elastics, rubber gloves, hand lotion tubes, lint, dryer lint, q-tips, vacuum bag, broken water sprinkler as due to mixed materials, masks, gloves, wipes, foil & aluminum containers with food residue, paint brushes and rollers, sawdust, drywall residue, incandescent light bulb, toothpaste and product, candles, fines (small residue-broken glass, sand, pieces of paper).
	Non-compostable Organic Waste	BPI-certified compostable paper cups and packaging; coffee pods – including McCafe pods; compostable cutlery; PLA packaging
	Non-compostable Organic Waste	Soil, Clay and Sod
	Reuse	Items that could be donated; gift bags
	Non-Recyclable Paper	Cigarette foils, waxed paper ice cream containers, soup tetra containers, flour & dog food bags as they have a liner, waxy paper, Pringles chip containers, padded envelopes, gift bags with tassels or place in reuse bin; laminated paper, paper that is glittery/shimmery. French fry containers, subway wrappers, anything shiny surface is in this section. DQ ice cream container.
	Count	Hot to-go cups
	Count	Cold to-go cups
	Count	Paper takeout containers (clamshell, fries, Tim Horton's boxes, DQ paper cups)
	Non-Recyclable Plastic	Plant pots, single-use yogurt, sauce cups, lids, wrappers, chip bags, toys, cd cases, crunchy plastic, bacon packaging; food wrap, cookie trays and covers, PET #1 raspberry clamshell (note different from a TO container sandwich clamshell), stretch wrap, plant pots, black plastic containers, and plastic pumps.
	Count	Plastic straws
	Count	Plastic cutlery
	Count	Plastic lids coffee cup/ fountain / slushy
	Count	Plastic disposable cups (cold to-go cups i.e., takeout, solo, smoothie)
	Count	Styrofoam takeout container (cups, clamshells from a deli)
	Count	Clamshell takeout containers (i.e., deli containers, fast food places, PET)
	Count	Grocery bags single-use (i.e., loose)
	Count	Grocery bags double-use (i.e., held garbage)
	Non-Recyclable Glass/ Ceramics	Windowpanes, fish tanks, coffee mugs and plates, perfume bottles
	Non-Recyclable Metal	This is for scrap metal, hangers, metal fry pans
	Garbage Bags	
	C&D waste	Treated and painted wood, drywall, lumber
	Contaminated Recycling	Excess food residue in or on item
	Hygiene/ Diapers/Pet Pads	
	Animal Waste	All types of pet waste and bedding

Appendix C: Waste Audit Results 2022

	Garbage		Recycling		Organics		Total	
	kg	%	kg	%	kg	%	kg	%
Landfill	**2,029.5**	**58.78%**	**44.4**	**7.89%**	**407.0**	**14.29%**	**2,480.9**	**36.15%**
Other Waste	514.0	14.89%	4.0	0.71%	55.7	1.96%	573.7	8.36%
Contaminated Recycling	0.0	0.00%	8.0	1.42%	0.0	0.00%	8.0	0.12%
NR Glass & Ceramics	54.6	1.58%	0.4	0.08%	0.0	0.00%	55.0	0.80%
NR Metal	63.1	1.83%	1.6	0.28%	0.0	0.00%	64.7	0.94%
NR Paper	85.1	2.46%	9.1	1.61%	7.2	0.25%	101.3	1.48%
NR Plastic	423.7	12.27%	13.8	2.45%	2.6	0.09%	440.1	6.41%
Garbage Bags	34.7	1.00%	4.5	0.81%	0.0	0.00%	39.2	0.57%
Hygiene/Diapers/Pet Pads	231.1	6.69%	0.0	0.00%	0.0	0.00%	231.1	3.37%
Reuse	52.5	1.52%	2.5	0.44%	0.0	0.00%	55.0	0.80%
C&D Waste	192.3	5.57%	0.4	0.08%	0.2	0.01%	192.9	2.81%
Animal Waste2	223.4	6.47%	0.0	0.00%	1.8	0.06%	225.2	3.28%
Non-Compostable Organic Waste	0.0	0.00%	0.0	0.00%	0.0	0.00%	0.0	0.00%
Soil / Sod / Clay	155.0	4.49%	0.0	0.00%	339.6	11.92%	494.6	7.21%
Paper	**85.3**	**2.47%**	**472.0**	**83.90%**	**0.1**	**0.00%**	**557.4**	**8.12%**
Mixed Paper	80.9	2.34%	266.0	47.29%	0.1	0.00%	347.1	5.06%
Cardboard	4.4	0.13%	206.0	36.61%	0.0	0.00%	210.4	3.07%
Plastic	**58.0**	**1.68%**	**17.7**	**3.14%**	**0.0**	**0.00%**	**75.7**	**1.10%**
Rigid Plastic	55.8	1.62%	17.7	3.14%	0.0	0.00%	73.5	1.07%
Styrofoam Packaging	2.2	0.06%	0.0	0.00%	0.0	0.00%	2.2	0.03%
Organic	**997.1**	**28.88%**	**0.7**	**0.12%**	**2,439.3**	**85.64%**	**3437.0**	**50.08%**
Edible Food Waste	356.6	10.33%	0.2	0.03%	90.6	3.18%	447.3	6.52%
Inedible Food Waste	179.6	5.20%	0.0	0.00%	217.0	7.62%	396.5	5.78%
Compostable Paper	147.4	4.27%	0.5	0.09%	44.5	1.56%	192.4	2.80%
Yard & Garden	160.8	4.66%	0.0	0.00%	2077.4	72.94%	2238.2	32.61%
Other Organic Waste	11.6	0.33%	0.0	0.00%	9.7	0.34%	21.3	0.31%
Food in Packaging	141.2	4.09%	0.0	0.00%	0.1	0.00%	141.3	2.06%
Beverage Containers	**18.9**	**0.55%**	**3.3**	**0.58%**	**0.0**	**0.00%**	**22.2**	**0.32%**
Refundables	18.9	0.55%	3.3	0.58%	0.0	0.00%	22.2	0.32%
Metal	**23.7**	**0.69%**	**14.4**	**2.56%**	**0.0**	**0.00%**	**38.2**	**0.56%**
Metal Containers	23.7	0.69%	14.4	2.56%	0.0	0.00%	38.2	0.56%
Glass	**74.4**	**2.16%**	**8.1**	**1.44%**	**0.0**	**0.00%**	**82.5**	**1.20%**
Glass Food Containers	74.4	2.16%	8.1	1.44%	0.0	0.00%	82.5	1.20%
Electronics	**38.4**	**1.11%**	**0.8**	**0.13%**	**0.0**	**0.00%**	**39.2**	**0.57%**
Electronics	38.4	1.11%	0.8	0.13%	0.0	0.00%	39.2	0.57%
Textiles	**103.1**	**2.99%**	**1.1**	**0.20%**	**1.7**	**0.06%**	**106.0**	**1.54%**
Clothing and Footwear	58.6	1.70%	1.0	0.17%	0.0	0.00%	59.6	0.87%
Household Textiles	15.6	0.45%	0.1	0.02%	0.0	0.00%	15.8	0.23%

Other Textiles	28.8	0.83%	0.1	0.01%	1.7	0.06%	30.6	0.45%
HHW	**24.0**	**0.70%**	**0.2**	**0.03%**	**0.0**	**0.00%**	**24.2**	**0.35%**
HHW	24.0	0.70%	0.2	0.03%	0.0	0.00%	24.2	0.35%
Grand Total	**3,452.5**	**100.00%**	**562.6**	**100.00%**	**2,848.2**	**100.00%**	**6,863.3**	**100.00%**

In this raw data table, the garbage stream sample represents 14 days of generation, while the recycling and organics stream samples represent 7 days of generation.

Appendix D: Single-Use Item Count from the 2022 Audit

	Garbage		Recycling		Organics		Total Item count	Total kg
Category & Sub-Categories	Count	kg	Count	kg	Count	kg		
NR Paper	**630**	**12.46**	**38**	**0.77**	**26**	**1.11**	**694**	**14.34**
Cold to-go cups	217	4.0	10	0.16	4	0.11	231	4.27
Hot to-go cups	187.5	3.7	16	0.32	3	0.08	206.5	4.06
Paper takeout containers	225.5	4.8	12	0.3	19	0.93	256.5	6.01
NR Plastic	**1,938**	**19.36**	**35**	**0.42**	**6**	**0.035**	**1,979**	**19.81**
Plastic lids	588	2.7	14	0.04	1	0.005	603	2.71
Grocery bags double use	295.5	4.0	1	0.05	4	0.02	300.5	4.03
Grocery bags single use	250	3.1	5	0.045			255	3.19
Plastic straws	232	1.0	4	0.03			236	1.05
Plastic disposable cups	252	3.8	4	0.07			256	3.91
Plastic cutlery	188	1.2	2	0.01			190	1.21
Styrofoam takeout container	73	0.9	3	0.02	1	0.01	77	0.90
Plastic takeout containers	59.5	2.7	2	0.16			61.5	2.82
Grand Total	**2,568**	**31.82**	**73**	**1.19**	**32**	**1.15**	**2,673**	**34.15**

Note: NR = Non-Recyclable

Garbage counts have been normalized (total counts were divided by 2).

Appendix E: Spring Waste Audit Results 2022



City of St. Albert

Technical Report: Spring Residential Curbside Waste Composition Study

June 2022

Submitted by: Stacey Schaub-Szabo

S-Cubed Environmental

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1 Background

The City of St. Albert (the City) provides curbside garbage, organics and recycling collection to approximately 21,000 single-family and multi-family households. Garbage is collected biweekly and recycling is collected weekly. Organics is collected weekly from April to October and biweekly from November through March. Recycling is manually collected in bags, while garbage and organics are collected using an automated cart system.

St. Albert residents have year-round access to the Mike Mitchell Recycling Depot, where items such as electronics, tires, household hazardous waste and Styrofoam are collected for recycling and safe disposal. A seasonal Compost Depot is available for residents to drop off yard waste. Programs such as Large Item Drop Off, Curbside Large Item Pick Up, and Christmas Tree Pick Up all encourage waste diversion. The City collects and/or processes more than 20,000 metric tonnes of waste annually.

Since 2017, City staff have conducted extensive waste education and outreach, including an annual Curbside Waste Education Program. The City has conducted qualitative studies of the organics, recycling and garbage streams. In 2020 and 2021, it carried out five-week-long studies of contamination trends at Roseridge Waste Management Services Commission Compost Pad (Roseridge Compost Pad), where organics are processed. It also completed qualitative lid-lift curbside waste audits each summer from 2017 to 2022 (excluding 2020). Information gathered in these studies informed an online education “Oops! What Goes Where?” campaign in the summer of 2021.

To date, the City has no quantitative data on the organics, recycling, and garbage streams. The City has engaged S-Cubed Environmental to carry out a residential curbside waste composition study in the spring and fall of 2022. The quantitative data collected will be used to help City staff set targets for waste reduction and diversion, optimize consistent and effective communication with residents, identify opportunities for cost savings and inform corporate sustainability reporting.

One of the two primary waste-related issues the City is currently working to address is contamination in the organics stream. This study will provide quantitative data on contamination material types and rates in the organics stream, which can be used to explore ways to reduce the quantity of organics loads being landfilled after being taken to the Roseridge Compost Pad. A current challenge is that staff for the contracted organics hauler self-declare if a load has more than 30% contamination, which are consequently landfilled, rather than processed at the Compost Pad. Due to a lack of quantitative data on actual contamination rates, more loads may be visually assessed as exceedingly contaminated than are over the contamination threshold, resulting in more loads being sent to landfill than necessary.

The second priority waste topic for the City is reducing single-use items being disposed. This study has been designed to specifically collect detailed data on single-use items so that results can inform the next steps in establishing a Single-Use Item Reduction Strategy.

In this report, **waste** refers to the combined streams of garbage, organics, and recycling. A glossary of terms used in this report is located in Appendix A.

2 Waste Composition Study Methodology

This curbside waste composition study examined the waste from a sample of 100 households. The sample consisted of 10 homes from a different neighbourhood per day over 10 waste collection days between May 30th and June 10th, 2022. The specific homes were chosen randomly based on the criteria that all homes on the street received 3-stream collection and that there were over 20 homes on each street. The 10 homes were all consecutively on one side of the street.

S-Cubed personnel started each day at 7:30 am by visually assessing and recording waste data at the curbside pick-up locations for the 10 sample homes. A daily sampling log sheet with the house addresses to be sampled was used to track waste details (i.e., date, time, number and fullness of the garbage and organics carts, number of recycling bags, presence of visual contamination in the organics carts and recycling bags, presence of loose cardboard, etc.).

For the visual contamination assessment, the following 1-5 rating scale was used:

1- less than 25% contamination;
2- more than 25% contamination;
3- 50% contamination;
4- 75% contamination; and,
5- 100% contamination.



S-Cubed labelled each garbage and organics cart with a luggage tag denoting the house number so that the carts could be returned to the right home. S-Cubed then brought the garbage cart, organics cart and recycling bags into a rented moving truck, and emptied the contents into three separate super-sacks inside the truck used to collect the garbage, recycling and organics streams. Once contents from the garbage and organics carts were emptied into the super sacks, the carts were returned to the curb in front of the appropriate home and the tags were removed. The sample was then transported to the sorting facility at the public works yard.

The super sacks of waste samples were unloaded at the sorting location. A few examples are shown below:







At the sorting site, digital photographs of waste samples were taken before sorting. Samples from each of the garbage, recycling and organics streams were hand-sorted by a team of three people into bins, carts and buckets lined with black garbage bags labelled with the subcategories described below in Section 3. The S-Cubed Team Lead checks the bins often to ensure quality control and that items are consistently classified among team members. Materials were weighed using a floor scale accurate to five grams. Notes about unexpected and unusual materials were documented. Data were recorded in a spreadsheet for data analysis.

3 Waste Composition Study Categories

The audit categories for all streams were paper, plastics, metal, glass, organics, beverage containers, electronics, textiles, household hazardous waste (HHW), and landfill. The sort subcategories are listed in Appendix B, describing the types of materials sorted into each subcategory. Waste composition study results are found in Appendix C.

For each of the garbage, recycling and organics streams, the S-Cubed team separated and counted single-use items found within the stream, including the following: plastic grocery bags, straws, cutlery, lids, takeout plastic cups, and takeout containers (sub-sorted into polystyrene, paper and plastic clamshells). The results of this single-use item analysis are presented in Section 4.6.

The term **contamination** refers to material found in the sample that does not belong in the respective program. For example, a black plastic garbage bag in the organics cart is considered contamination, as the organics cart should only contain compostable items. If a glass jar was found in a recycling bag, it was considered contamination because glass is only accepted for recycling at the Mike Mitchell Recycling Depot.

A list of items accepted in the St. Albert organics and recycling programs can be found here.

4 Spring 2022 Waste Composition Study Results and Discussion

4.1 Set-Out Rate and Cart Observations

This section describes observations made during the visual inspection of the curbside waste pick-up location at each sample home. The set-out rate is the percentage of sample participants that placed a garbage cart, organics cart or recycling bag out for collection on a particular day.

S-Cubed personnel started each day at 7:30 am by visually assessing and recording waste data at the curbside pick-up locations for the 10 sample homes. A daily sampling log sheet with the house addresses to be sampled was used to track waste details (i.e., date, time, number and fullness of the garbage and organics carts, number of recycling bags, presence of visual contamination in the organics carts and recycling bags, presence of loose cardboard, etc.).

Brown Garbage Cart

There was a 94 percent set-out rate for garbage during the spring 2022 residential curbside waste composition study (Table 1). This is a relatively high rate, which may be because garbage is collected biweekly (every two weeks). The most frequent cart fullness category for Brown Garbage Carts was 100%.

Table 1 – Garbage Set-Out Rate and Cart Fullness Assessment in Spring 2022

Parameter Assessed During Visual Inspection	Value
Homes with Brown Garbage Cart at the curb	94%
Homes with extra garbage bags tagged	2%
Most frequent cart fullness level	100%

Blue Recycling Bag

There was a 56 percent set-out rate for Blue Recycling Bags during the spring 2022 residential curbside waste composition study (Table 2). Of these 56 households that had set out a Blue Recycling Bag and cardboard, 45 had set out one bag, 10 households set out multiple bags, and one household only had cardboard. Twenty-five households had set out blue bags which contained visible contamination. Therefore, 45% of blue bags set out had visible contaminants. Visible contaminants included items such as PET plastic, loose plastic film, non-refundable tetra containers and take-out food bags.

Table 2 – Blue Recycling Bag Set-Out Rate in Spring 2022

Parameter Assessed During Visual Inspection	Percent of Homes
Blue Recycling Bag at the curb	56%
Homes with loose cardboard at the curb	25%
Homes in which blue bag had visible contamination	25%

Green Organics Cart

There was a 67 percent set-out rate for the Green Organics Cart during the spring 2022 residential curbside waste composition study (Table 3). At this time of year, there is weekly collection of the Green Organics Cart.

Table 3 – Green Organics Cart Set-Out Rate in Spring 2022

Parameter Assessed During Visual Inspection	Value
Homes with Green Organics Cart at the curb	67%
Most frequent cart fullness level	50%

Thirteen Green Organics Carts (19% of carts) had contamination noted during either the curbside lid lift audit, or when the sample was emptied from the green cart into the super sack. Contaminants included soil/sod/clay, takeout food bags and containers, plastic food wrappers and plant identification tags.

Five carts tipped into the super sack were assessed as visually having more than 75% contamination. Three of these five carts had large amounts of soil/sod/clay, one had two black garbage bags, and one had many takeout container bags. Of the 13 carts visually assessed as being contaminated, five were assessed as visually having less than 10% contamination.

4.2 Brown Garbage Cart Waste Composition Study Results

During the study period, 94% of the 100-household sample set out garbage. The total weight of garbage examined was 1815 kilograms. This represents an average set-out rate of 18.2 kilograms per household every 14 days, as garbage is collected every two weeks. Note that curbside diversion calculations require garbage cart data to be divided by two to compare the quantity of garbage generated every 14 days with the quantity of organics and recycling generated and collected every seven days.

Figure 1 shows the proportion of materials in the garbage stream that cannot otherwise be diverted and must be sent to landfill (60%), along with the proportion of compostable and recyclable materials present in the garbage stream (40%).

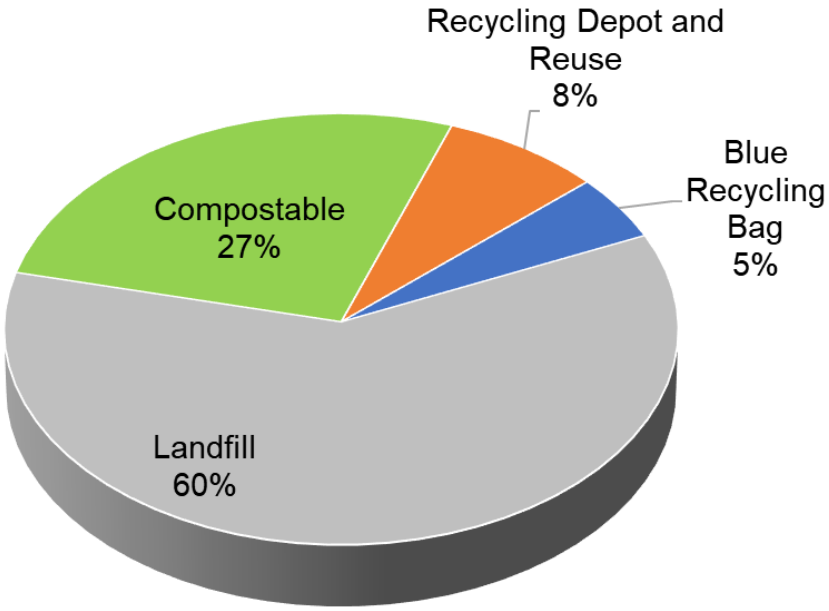


Figure 1 – Composition of the St. Albert Residential Garbage Stream in June 2022

More than a quarter (27%) of the garbage stream consists of compostable items (on a weight basis). Compostable materials in the garbage consisted primarily of edible food waste, followed by yard and garden materials, inedible food waste, and compostable paper.

Eight percent of materials in the garbage stream could have been diverted to the Mike Mitchell Recycling Depot or donated for reuse. The main materials in this category consisted of textiles (such as clothing and shoes), reusable items, glass food containers and electronics (cords, headsets).

Five percent of materials in the garbage stream could have been placed in the Blue Recycling Bag. Materials in this category consisted of mixed paper, rigid plastic and smaller amounts of beverage containers and metal food cans. There was a very minimal quantity of cardboard in the waste stream (0.1%).

Materials correctly placed in the garbage stream (60%) consisted mainly of ‘other waste’, which included items such as coffee pods, packaging with the product inside, medicines, an air filter, fines (small pieces of glass, organic material, and paper that are difficult to pick up), non-recyclable plastic, soil/soil/clay, animal waste, and hygiene/diapers/pet pads.

The composition of the St. Albert residential garbage stream sampled in June 2022 is detailed in Table 4.

Table 4 – Detailed Composition of the St. Albert Residential Garbage Stream in June 2022

Audit Sub-Categories	KG	%
Compostable	**486.2**	**26.8%**
Edible Food Waste	166.8	9.2%
Yard & Garden	99.1	5.5%
Inedible Food Waste	80.1	4.4%
Compostable Paper	73.1	4.0%
Food in Packaging	57.4	3.2%
Other Organic Waste	9.8	0.5%
Recycling	**89.2**	**4.9%**
Mixed Paper	36.9	2.0%
Rigid Plastic	28.0	1.5%
Refundables	11.2	0.6%
Metal Containers	10.6	0.6%
Cardboard	2.5	0.1%
Depot	**143.9**	**7.9%**
Clothing and Footwear	39.1	2.2%
Reuse	32.3	1.8%
Glass Food Containers	27.8	1.5%
Electronics	24.4	1.3%
HHW	13.5	0.7%
Household Textiles	6.0	0.3%
Styrofoam Packaging	0.8	0.04%
Landfill	**1096.1**	**60.4%**
Other Waste	327.4	18.0%
NR Plastic	214.0	11.8%
Soil / Sod / Clay	155.0	8.54%
Hygiene/Diapers/Pet Pads	113.4	6.2%
Animal Waste	97.5	5.37%
C&D Waste	53.4	2.9%
NR Paper	49.4	2.7%
NR Glass & Ceramics	39.6	2.2%
Other Textiles	17.7	0.97%
Garbage Bags	16.4	0.9%
NR Metal	12.4	0.7%
Non-Compostable Organic Waste	0.01	0.00%
Grand Total	**1815.3**	**100%**

GARBAGE AUDIT IMAGES | The following images were from the garbage stream.

Organic Material

Approximately 27% of the material found in the garbage could be composted instead of sent to a landfill.



Edible food



Food in packaging



Compostable paper



Food in packaging



Inedible food waste



Yard waste

Materials That Could Have Been Recycled in Blue Recycling Bag



Rigid Plastic



Beverage containers

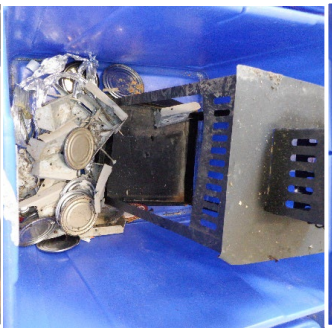


Metal containers

Materials That Could Have Been Taken to Mike Mitchell Recycling Depot or to a Thrift Store


Styrofoam packaging


Aerosol cans


Scrap Metal


Clothing & footwear

Electronics

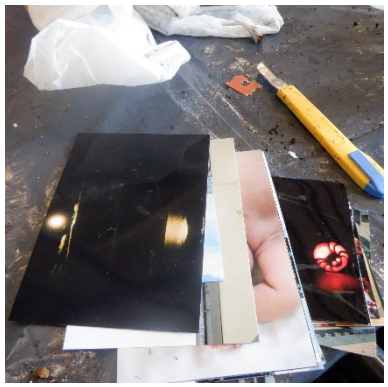

Printer cartridge, cords, hair drier


Single-use vapes

Landfill


Other textiles - rags


Construction waste


Photographs


Coffee pods


Non-recyclable plastic


Shelving, nicely cut up



Other Waste



Cold to-go cups



Styrofoam takeout containers

4.3 Blue Recycling Bag Waste Composition Study Results

During the study period, 56% of the 100-household sample set out recycling. The total weight of recyclables examined was 280 kilograms. This represents an average set-out rate of 2.8 kilograms per household per week. After contamination was removed from the total recycled material, the set-out rate drops to 2.4 kilograms of recyclables per household per week. Figure 2 shows the proportion of the various categories of materials in the recycling stream. This figure aggregates items that do not belong in the Blue Recycling Bag as contamination.

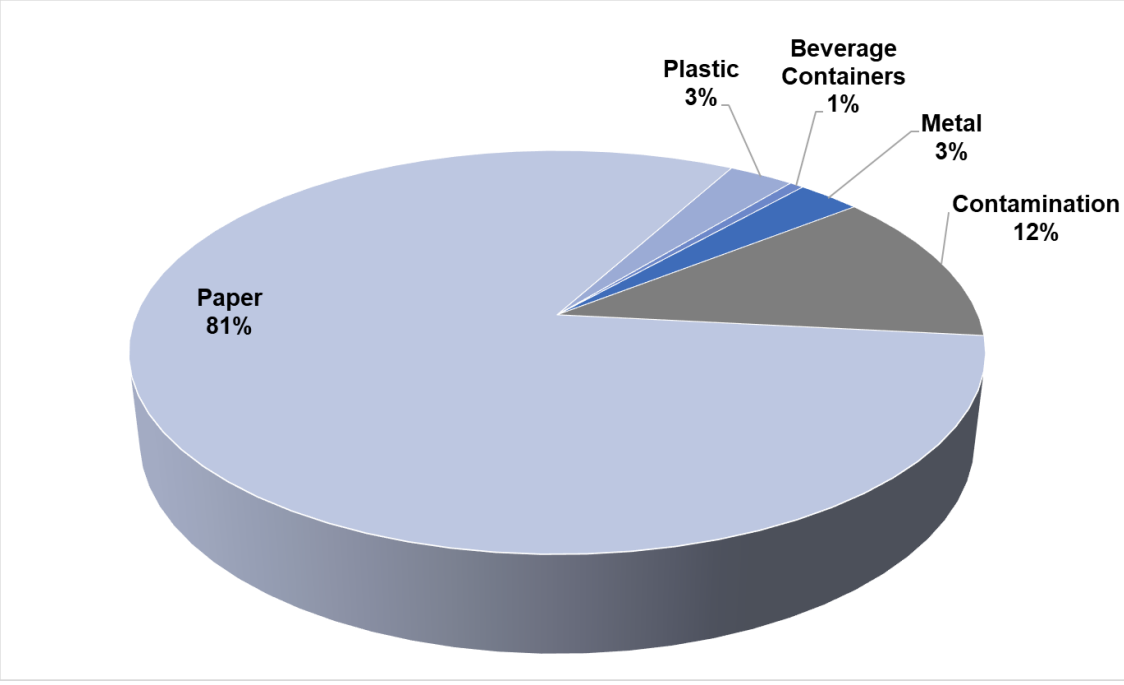


Figure 2 – Composition of the St. Albert Residential Blue Recycling Bag Stream in June 2022

The recyclable material in the recycling stream consisted predominantly of mixed paper (46%) and cardboard (35%), with smaller amounts of rigid plastic and metal food containers.

There was 12 percent contamination in the recycling stream. The majority of the contamination consisted of non-recyclable plastic, non-recyclable paper, contaminated recycling (excess food residue) and glass food containers. There were smaller amounts of donatable items, garbage bags, books with covers, containers with a mix of metal and paper, and non-recyclable metal.

The detailed composition of the St. Albert residential Blue Recycling Bag stream sampled in June 2022 is in Table 5.

Table 5 – Detailed Composition of the St. Albert Residential Blue Recycling Bag Stream in June 2022

Audit Sub-Categories	KG	%
Recycling	**245.8**	**87.7%**
Mixed Paper	129.2	46.1%
Cardboard	98.7	35.2%
Rigid Plastic	8.2	2.9%
Metal Containers	7.9	2.8%
Refundables	1.8	0.6%
Contamination	**34.4**	**12.3%**
NR Plastic	7.3	2.6%
NR Paper	6.1	2.2%
Contaminated Recycling	6.1	2.2%
Glass Food Containers	4.0	1.4%
Reuse	2.5	0.9%
Garbage Bags	2.4	0.9%
Other Waste	2.0	0.7%
NR Metal	1.3	0.5%
Electronics	0.8	0.27%
Compostable Paper	0.5	0.19%
NR Glass & Ceramics	0.4	0.16%
C&D Waste	0.4	0.15%
HHW	0.2	0.06%
Household Textiles	0.1	0.04%
Other Textiles	0.1	0.02%
Edible Food Waste	0.0	0.02%
Other Organic Waste	0.0	0.00%
Grand Total	**280.2**	**100%**

Figure 3 shows the relative quantity of recyclable material and contamination (on a weight basis) present in the Blue Recycling Bags sampled on a neighbourhood basis.

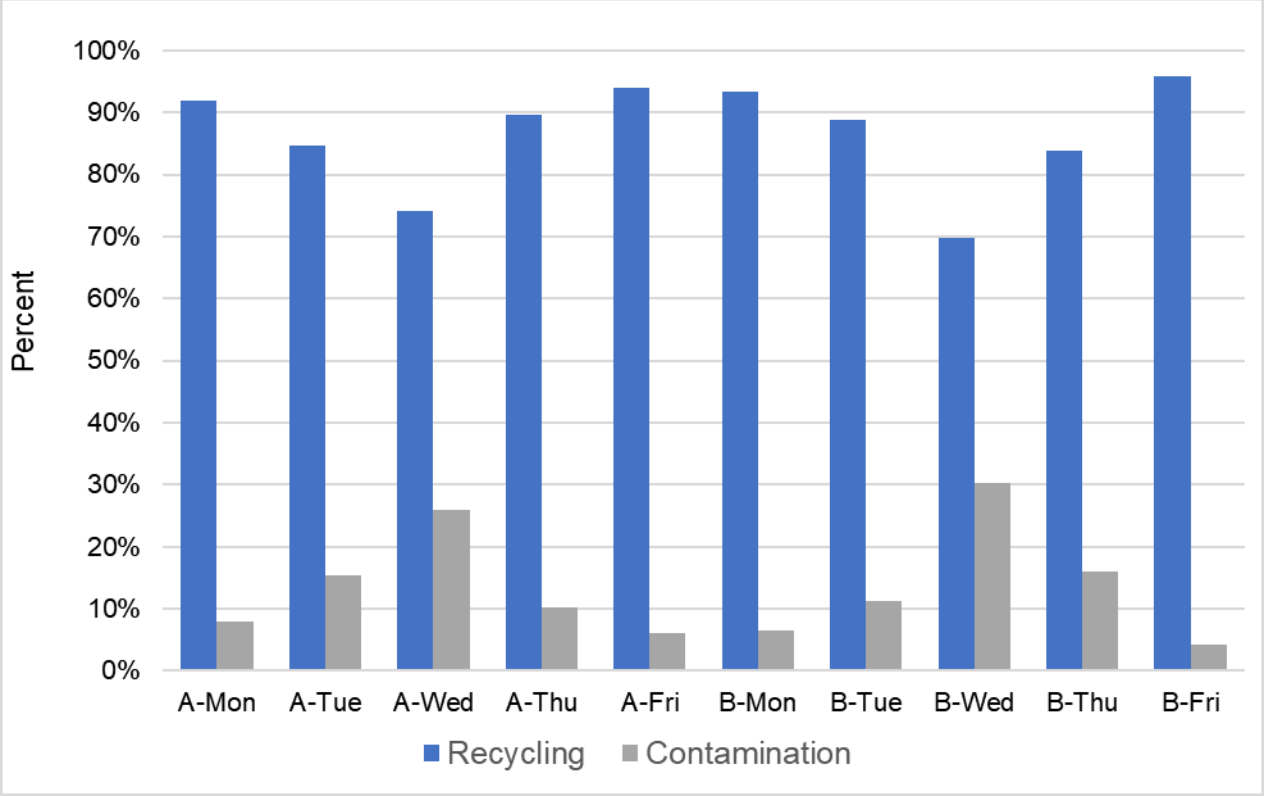


Figure 3 – Quantity of recyclable material and contamination present in Blue Recycling Bags in St. Albert neighbourhoods sampled in the June 2022 waste composition study.

RECYCLING AUDIT CATEGORIES | The following images were from the Blue Recycling Bag program.

Recyclable Material

Mixed paper and cardboard were the top two items recycled by weight.



Mixed paper



Mixed paper



Cardboard



Metal cans



Rigid plastic



Refundable containers

Contamination

The recycling stream had 12% contamination.



Cigarettes and NR paper



Contaminated recycling



Plastic packaging and plastic food containers



Glass food jar



NR plastic



Compostable paper

4.4 Green Organics Cart Waste Composition Study Results

During the study period, 67% of the 100-household sample set out a Green Organics Cart. The total weight of organics examined was 1,678 kilograms. This represents an average set-out rate of 16.8 kilograms per household per week. When contamination was removed from the total organics material, this dropped to a set-out rate of 13.2 kilograms of organics per household per week. Figure 4 shows the proportion of the various categories of materials in the organics stream. This figure aggregated items that did not belong in the Green Organics Cart as contamination.

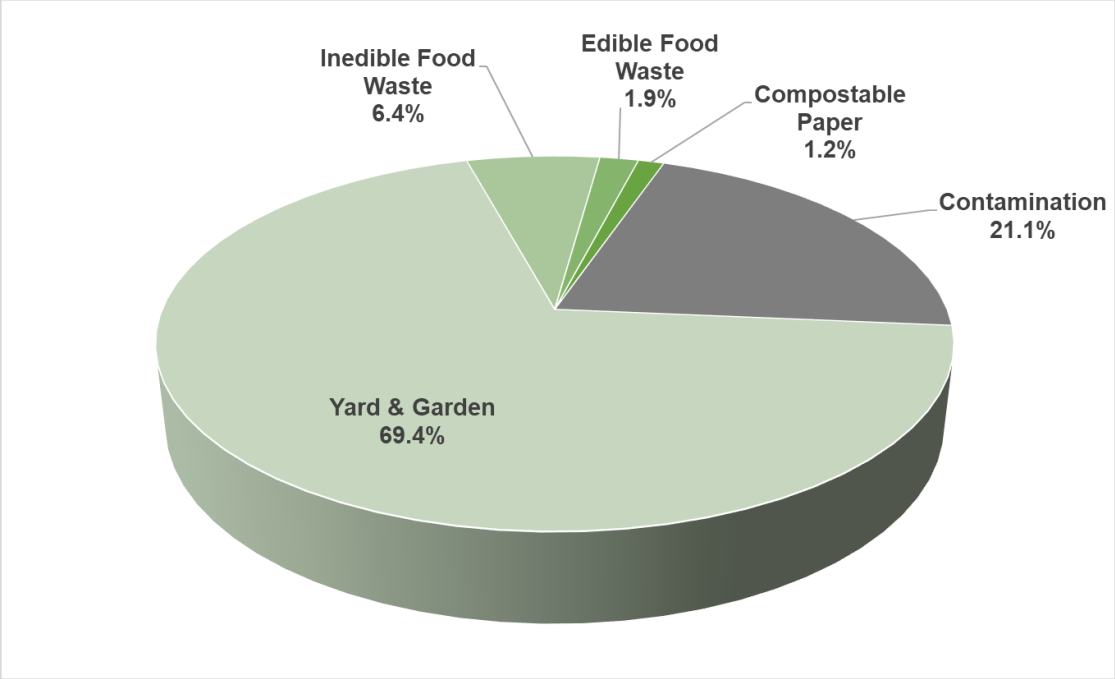


Figure 4 – Composition of the St. Albert Residential Green Organics Cart Stream in June 2022

During the early June study period, the vast majority (88%) of compostable (organic) material in the Green Organics Cart consisted of yard and garden material. Yard and garden material is a component of the organics stream which tends to be highly variable and seasonal – this proportion of yard and garden material and the total weight of the organics fraction would be expected to be much lower during the winter months when people are doing almost no yard work involving vegetation management.

There was a contamination rate of 21% in the Green Organics Cart stream. On a weight-basis, soil, sod, and clay made up the vast majority (92%) of the contamination in the Green Organics Cart. The predominance of soil, sod and clay as a contaminant is likely associated with the gardening season. However, other contaminants were also present, including landscape fabric, wipes, oily textiles, meat pads, a coffee pod, black garbage bags, composite lumber, and other noted subcategories detailed in Table 6.

Table 6 – Detailed Composition of the St. Albert Residential Green Organics Cart Stream in June 2022

Audit Sub-Categories	KG	%
Compostable	**1323.6**	**78.9%**
Yard & Garden	1163.6	69.4%
Inedible Food Waste	107.7	6.4%
Edible Food Waste	31.4	1.9%
Compostable Paper	20.8	1.2%
Other Organic Waste	0.03	0.00%
Contamination	**354.0**	**21.1%**
Soil / Sod / Clay	327.0	19.5%
Other Waste	17.6	1.1%
NR Paper	4.7	0.3%
NR Plastic	1.6	0.1%
Animal Waste	1.6	0.09%
Other Textiles	1.3	0.1%
Food in Packaging	0.1	0.01%
Mixed Paper	0.1	0.01%
Refundables	0.0	0.00%
Grand Total	**1677.6**	**100%**

Figure 5 shows the relative quantity of compostable material and contamination present in the Green Organics Carts sampled on a neighbourhood basis. A small number of households that had soil / clay / sod in the green cart resulted in high contamination for Zone A – Monday, Tuesday, and Friday neighbourhoods.

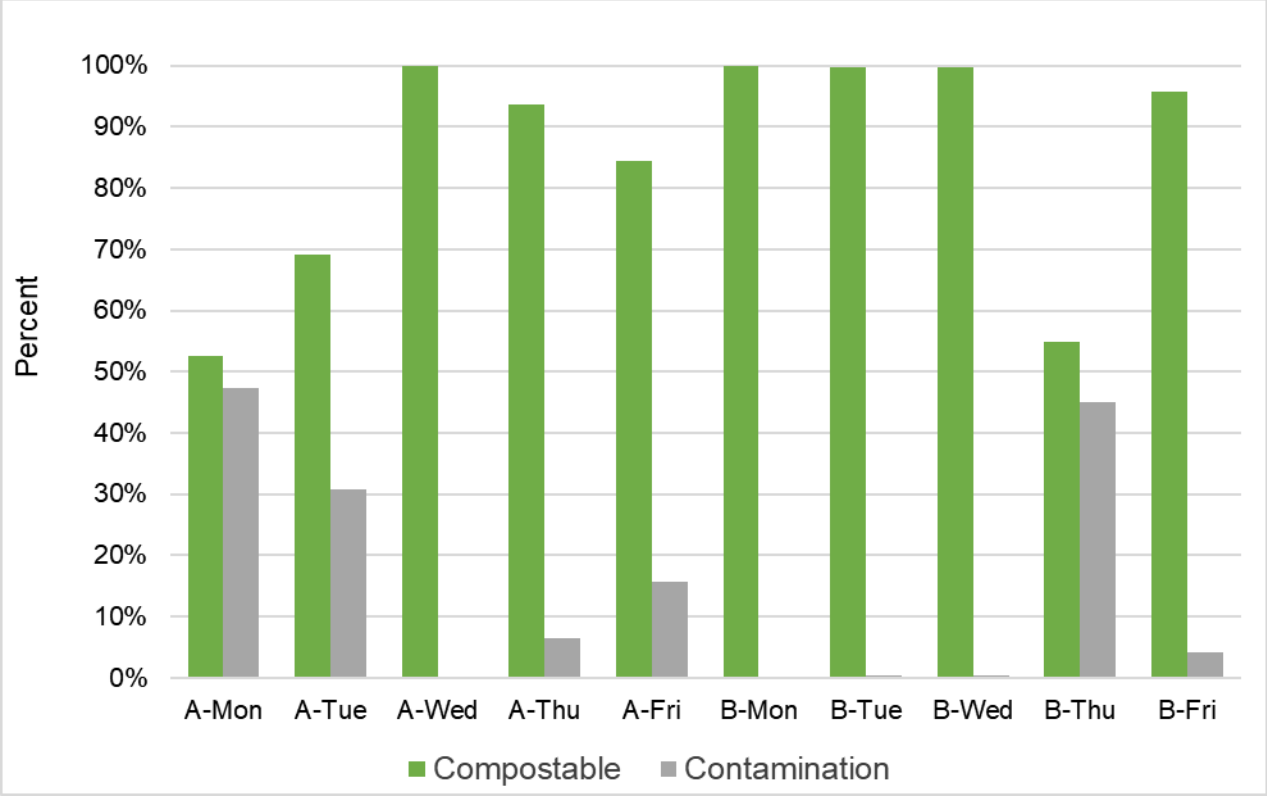


Figure 5 – Quantity of compostable material and contamination present in Green Organics Carts sampled in St. Albert neighbourhoods in June 2022.

ORGANIC AUDIT CATEGORIES | The following images are from the Green Organics Cart program.

Organic Material

Approximately seventy percent of the organic material was yard waste followed by smaller amounts of inedible and edible food waste.



Inedible food



Plants



Edible food waste



Branches



Compostable paper



Grass

Contamination

The organics stream had 21 percent contamination of which 19.5% was soil / sod / clay.



Soil and sod



Plastic wrapper and pizza box
plastic chair



Animal waste in plastic bags



Contamination sample



Wax-lined and shiny paper
takeout containers



Foil and mixed paper

4.5 Total Waste Generation Rates and Curbside Diversion Rates

Figure 6 shows the proportion of garbage (normalized), recycling and organics (on a weight basis) set out by St. Albert residents during the June 2022 residential waste composition study. This graph does not reflect adjustments for the weight of contaminants in the recycling and organics

streams. It should be noted that given that the waste composition study took place during the spring yard cleaning and gardening season, the quantity of yard and garden material in the Green Organics Cart was likely higher than it would be during the winter and early spring when less yard and garden material is being generated.

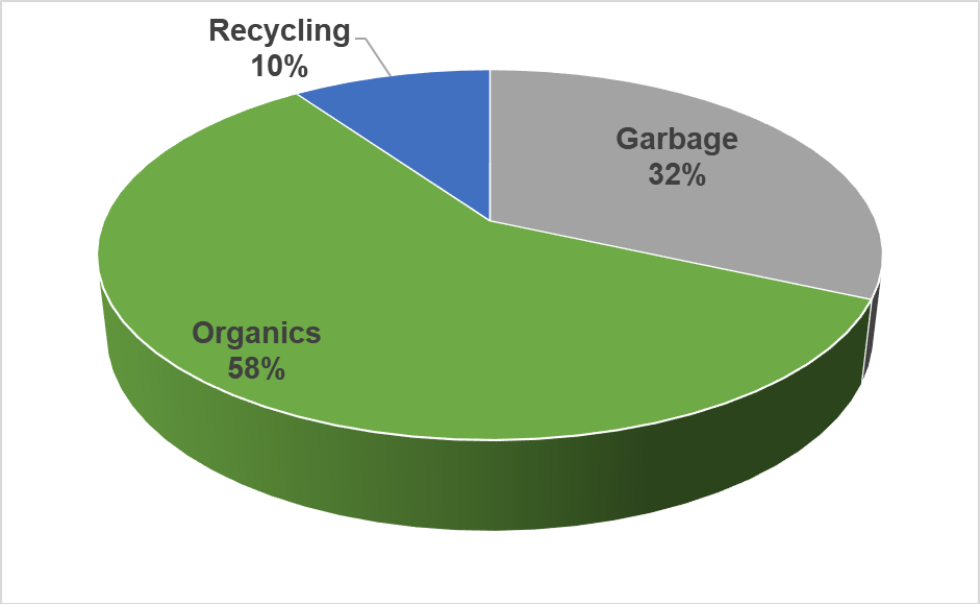


Figure 6 – Proportion of garbage, recycling, and organics (on a weight basis) set out by St. Albert residents during the June 2022 waste composition study.

Table 7 summarizes the average set-out rates for garbage, recycling, and organics on both a household basis and a normalized population (per capita) basis. For the recycling and organics streams, data are shown both for the quantity of materials set out at the curbside and the adjusted quantity once contaminants were removed.

Table 7 – Mean household weekly set-out rates and normalized per capita generation rates for garbage, recycling, and organics in the St. Albert residential waste composition study in June 2022.

Material Stream	Mean Household Set-Out Rate (kg/hh/week)	Mean Household Set-Out Rate - Without Contaminants (kg/hh/week)	Normalized Per Capita Generation Rate (kg/capita/week)[1]
Brown Garbage Cart	9.1	n/a	3.4
Blue Recycling Bag	2.8	2.4	0.9[2]
Green Organics Cart	16.8	13.2	4.9[2]

1. Assumption: Average household size of 2.7 (Statistics Canada 2016 Census profile).
2. With contaminants removed.

The curbside diversion rate was 55% for households sampled as part of the June 2022 residential waste composition study. This curbside diversion rate was calculated based on the weight of the organics and recycling streams once contaminants were removed. The curbside diversion rate with no contamination removed was 68%.

There was variability in the quantity of garbage, recyclables and organic materials set out among neighbourhoods that were sampled. Figure 7 shows the quantity of garbage, recyclables, and organics set out by ten households in each sampled neighbourhood.

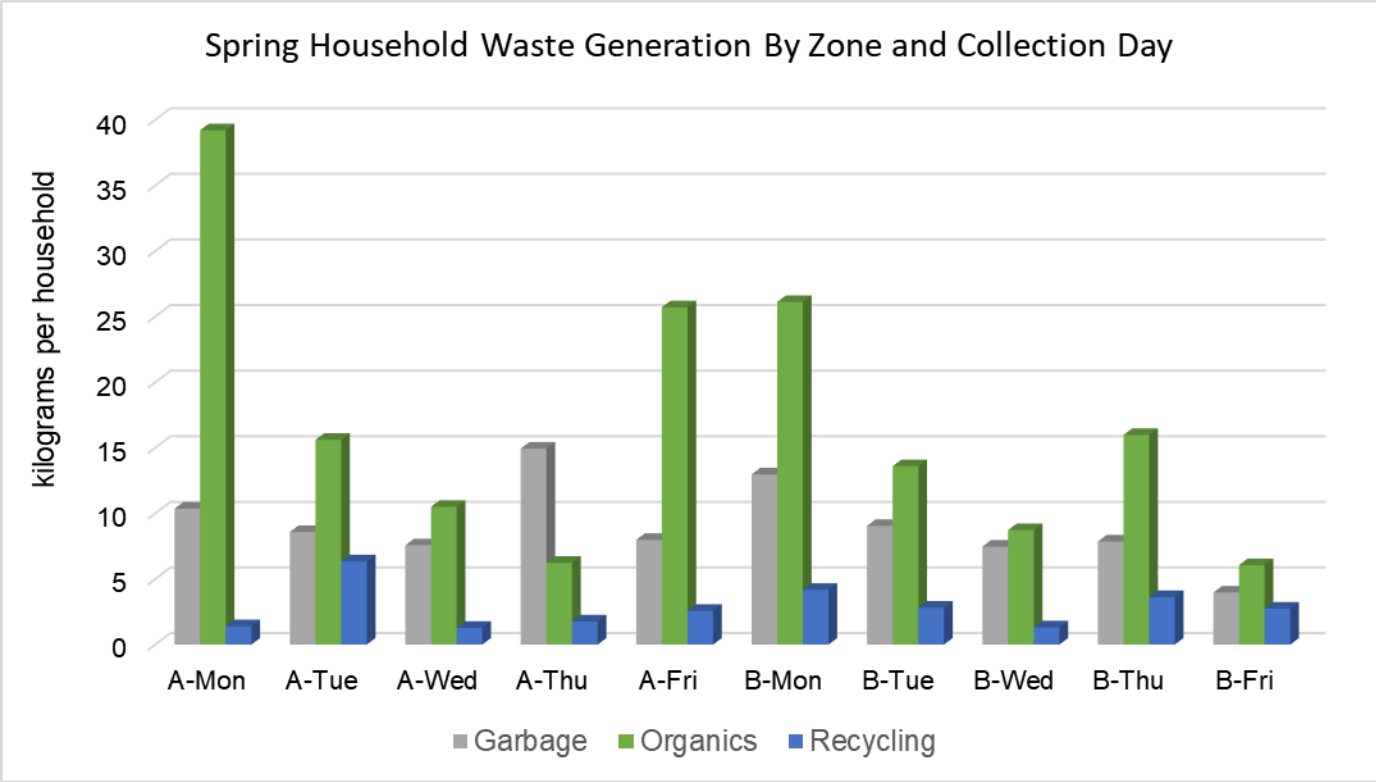


Figure 7 – Quantity of garbage, recyclables and organic materials set out by residents in various St. Albert neighbourhoods sampled in June 2022.

4.6 Single-Use Item Waste Composition Study Results

For each of the garbage (normalized), recycling and organics streams, single-use plastic and paper items were sorted, counted and weighed to measure the quantities present in all three streams. Almost all (94%) of the single-use items were found in the garbage stream. Approximately 0.52 percent of the total combined garbage, recycling and organics streams consisted of single-use items, which amounted to 15 kilograms. There was a total count of 1223 single-use items.

Table 8 describes the prevalence of single-use items in each stream by count and weight.

Table 8 – Quantity and weight of single-use items in the St. Albert residential garbage, recycling and organics streams in June 2022.

Material Stream	Single-Use Item Count	Single-Use Item Weight (kg)
Brown Garbage Cart	1178[1]	14.1[1]
Blue Recycling Bag	31	0.52
Green Organics Cart	14	0.41

1. Note that the numbers shown are the normalized single-use item count and weight for the garbage stream.

Figure 8 depicts the proportion of different single-use items in the combined garbage, recycling and organics streams. The single-use items that were most commonly counted were grocery bags, paper takeout containers, cold to-go cups, hot to-go cups and plastic disposable cups. Detailed single-use item count data is found in Appendix D.

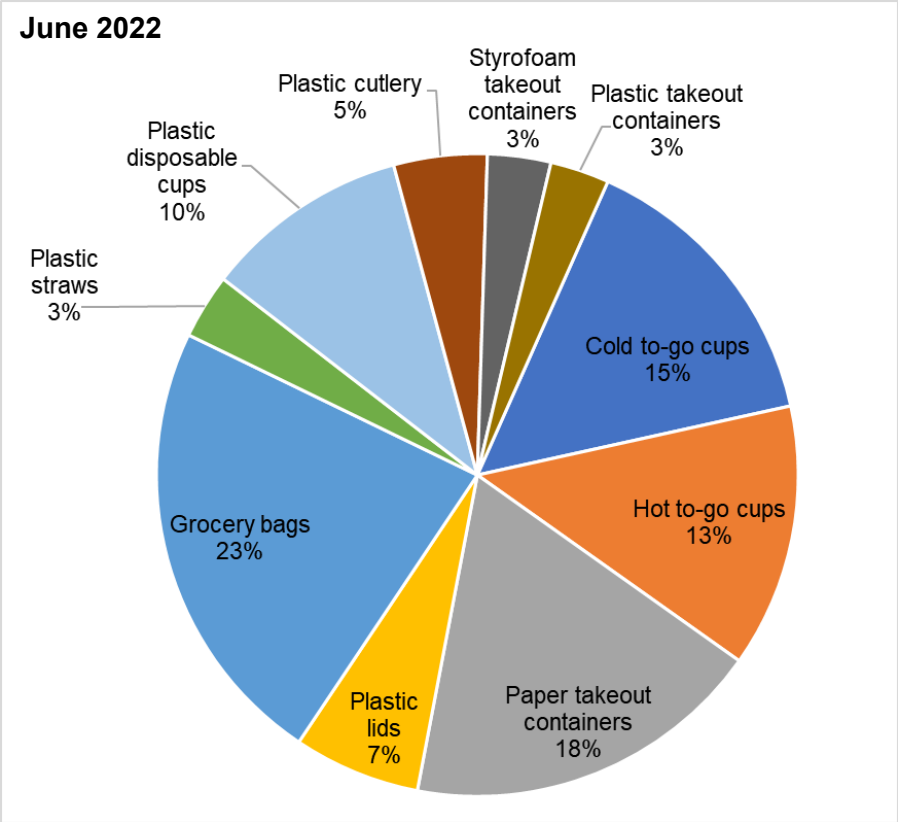


Figure 8 – Proportion of Single-Use Items (by Count) in the Residential Combined Garbage, Recycling and Organics Streams in St. Albert in June 2022.

Extrapolating from the single-use item data collected during the June 2022 waste composition study, Table 9 provides an estimate of the quantity (by weight) of single-use items that would

be disposed of by each household on an annual basis. We estimate that each household in St. Albert generates 6.77 kilograms of single-use items on an annual basis.[1]

Table 9 – Estimate of the Quantity of Single-Use Items Disposed Of Annually by St. Albert Households – June 2022

Single Use Item		kg/hh/yr
NR Paper	Cold to-go cups	1.02
	Hot to-go cups	0.90
NR Plastic	Paper takeout containers	1.17
	Plastic lids	0.44
	Grocery bags single-use	0.71
	Grocery bags double-use	0.85
	Plastic straws	0.22
	Plastic disposable cups	0.71
	Plastic cutlery	0.32
	Styrofoam takeout containers	0.22
	Plastic takeout containers	0.22
Total		6.77

5 Preliminary Conclusions

During recent years, the City of St. Albert has invested significant effort in waste diversion education and outreach. The curbside residential waste composition study completed in June 2022 shows the City should be proud of its waste diversion accomplishments to date. There also remain significant opportunities for further diversion and waste prevention.

The June 2022 residential curbside waste composition study showed a 59% diversion rate (68% without contamination removed). The set-out rate for the Blue Recycling Bags (56%) and Green Organics Carts (67%) show that a relatively large proportion of residents are participating in these programs. We found it notable that there was an extremely low quantity of cardboard in the waste stream (0.1%), showing that residents understand this material is recyclable and are demonstrating a high degree of success in separating it for recycling.

The City of St. Albert is amongst Canada's residential waste diversion leaders. As a brief comparison of where the curbside diversion rate of 59% fits amongst other Canadian communities, communities that have achieved some of the highest rates of curbside waste diversion to date in Canada include Airdrie, AB (73%), Nanaimo, BC (66%) and Vancouver, BC (64%). Numerous communities across Canada have set waste diversion targets between 70%

[1] Kilograms per household per year (kg/hh/yr) was calculated from curbside weights for each stream and added together. (i.e. (Percent of single-use item from audit multiplied by annual tonnes) divided by 1000 to convert to kilograms and divided by the number of residents)). 2021 annual waste data used.

and 80%, with many setting a long-term aspirational goal of zero waste. A few examples of such communities include Banff, Calgary, Cochrane and Okotoks.

The biggest waste diversion opportunity in the St. Albert residential sector is to increase the quantity of compostable materials diverted from the Brown Garbage Cart and into the Green Organics Cart. Currently 27% of the Brown Garbage Cart stream consists of compostable materials.

Quantifying contamination in the organics stream was identified as one of the priority goals for this waste composition study. The quantitative data collected in this study showed that most green carts being collected have minimal amounts of contamination. Based on the 100-household sample studied, there was a 21% contamination rate for the Green Organics Carts. However, on a weight basis, 92% of this contamination consisted of soil, sod and clay, with the majority of this contamination originating from three households. The City may wish to consider focusing some targeted educational outreach this summer and fall on helping residents to understand how they can properly dispose of soil, sod and clay, and if there are options available locally to have this material accepted for reuse, rather than disposal in the landfill.

On a weight basis, the level of total contamination was well below the 30% threshold beyond which loads are not accepted for processing at Roseridge Compost Pad. The level of contamination from typical items such as plastic bags, non-compostable paper and other non-compostable items was less than 2% by weight of the organics stream. The City may wish to consider opportunities to work with the organics hauler to train staff in accurate visual assessment of how 30% contamination in an organics load visually appears. Given the light weight of items such as plastics and paper, they can visually appear like a lot, when their weight is very low. Visual assessment training for haul staff could help to reduce the number of loads of green cart material that are likely being sent to landfill unnecessarily.

Based on data collected during this first phase of the waste composition study, 0.52% of the garbage, recycling and organics streams consisted of single-use items, with a total count of 1223 single-use items. The most commonly found items were grocery bags, paper takeout containers, cold to-go cups, hot to-go cups and plastic disposable cups.

On June 20, 2022, the federal government announced regulations indicating that the manufacture and import of six single-use plastic items will come into effect in December, 2022. These six items are: checkout bags, cutlery, foodservice ware made from or containing problematic plastics that are hard to recycle; ring carriers; stir sticks; and straws (with some exceptions).

These federal regulations should address 34% of the items that were counted as part of the single-use item tracked in this study: grocery bags (23%), plastic cutlery (5% of items), plastic straws (3%) and Styrofoam takeout containers (3%). However, the federal regulations will not address the remaining single-use items at this time.

Appendix A: Glossary

Biweekly – used to describe the every-other-week collection frequency for garbage, and seasonally, organics.

Blue Recycling Bag – used to collect recyclable material that is sent to a processor for recycling.

Contamination – items that are in a garbage (brown cart), recycling (blue bag), or organics (green cart) program that should not be in those programs.

Garbage – material that is sent to a landfill.

Green Cart – cart used to collect organic material for composting.

Organics – the material accepted in the green cart program that is compostable and can be processed at the Roseridge composting facility to produce compost.

NR – non-recyclable. The material deposited in the Blue Recycling Bag that is not physically able to be recycled or without a current market.

Waste – The combined streams of garbage, recycling, and organics.

Waste Composition Study or Waste Audit – an examination of the proportion of various materials in a given waste stream.

Appendix B: Waste Audit Categories and Single-Use Plastic Items

	Sub-Category	Description and Examples
Paper		
	Mixed Paper	Boxboard, envelopes, paper, brown paper bags, egg cartons, white paper, newsprint, magazines, tissue paper
	Cardboard	Corrugated cardboard
Plastic		
	Rigid	Rigid plastics i.e., laundry detergent bottles, condiment bottles, large yogurt or sour cream containers, windshield washer fluid jug
	Styrofoam packaging	Styrofoam computer or appliance packaging
Metal		
	Metal Containers	Steel cans and pie plate foil containers (must be easily cleaned-otherwise Other Waste)
Glass		
	Glass Food Containers	Food jars
Organics		
	Edible Food Waste	Sandwich
	Inedible Food Waste	Banana peel, bones
	Compostable paper	Food-soiled napkins, paper plates no waxy liner, fast food packaging, tissues (i.e., brown fast-food bags, flour bags, parchment paper); greasy pizza boxes; NO SHINY paper.
	Food in Packaging	Food that could be composted if it was removed from its packaging; captures items that can't be opened in 2 seconds.
	Yard & Garden	grass clippings, leaves
	Other Organic Waste	Stir sticks, chop sticks, toothpicks, popsicle sticks, animal hair, PC compostable coffee pods (wider and shorter).
Beverage Containers		
	Refundables	Aluminum, Tetra Pak, pouches, glass
Electronics		
	Electronics	IT accessories, toothbrush, headphones, audio, visual, kitchen and power tools
Household Hazardous Waste		
	HHW	Batteries, ARMA containers, fluorescent bulbs, paint, used engine oil and filters, propane tanks, household chemicals; aerosol cans, paint cans.
Textiles		
	Clothing and Footwear	Clothing and footwear (wearable/donatable)
	Household	Drapes, pillows (useable/donatable)
	Other	Rags, work gloves, coveralls, non-donatable textiles

Landfill Sub-Category		Description and Example
	Other Waste	Playdough, glue, cig butts, elastics, rubber gloves, hand lotion tubes, lint, dryer lint, q-tips, vacuum bag, broken water sprinkler as due to mixed materials, masks, gloves, wipes, foil & aluminum containers with food residue, paint brushes and rollers, sawdust, drywall residue, incandescent light bulb, toothpaste and product, candles, fines -small residue-broken glass, sand, pieces of paper.
	Non-compostable Organic Waste	BPI Certified compostable paper cups and packaging; coffee pods – including McCafe pods; compostable cutlery; PLA packaging
	Non-compostable Organic Waste	Soil, Clay and Sod
	Reuse	Items that could be donated; gift bags
	Non-Recyclable Paper	Cigarette foils, ice cream containers, soup tetra containers, flour & dog food bags as they have a liner, waxy paper, pringles container, padded envelope, gift bags with tassels or place in reuse bin; laminated paper, paper that is glittery/shimmery. French fry containers, subway wrappers, anything shiny surface is in this section. DQ ice cream container.
	Count	Hot to-go cups
	Count	Cold to-go cups
	Count	Paper takeout containers (clamshell, fries, Tim Horton's boxes, DQ paper cups)
	Non-Recyclable Plastic	Plant pots, single-use yogurt, sauce cups, lids, wrappers, chip bags, toys, cd cases, crunchy plastic, bacon packaging; food wrap, cookie trays and covers, PET #1 raspberry clamshell (note different from a TO container sandwich clamshell), stretch wrap, plant pots, black plastic containers, and plastic pumps.
	Count	Plastic straws
	Count	Plastic cutlery
	Count	Plastic lids coffee cup/ fountain / slushy
	Count	Plastic disposable cups (cold to-go cups i.e., takeout, solo, smoothie)
	Count	Styrofoam takeout container (cups, clamshells from a deli)
	Count	Clamshell takeout containers (i.e., deli containers, fast food places, PET)
	Count	Grocery bags single-use (i.e., loose)
	Count	Grocery bags double-use (i.e., held garbage)
	Non-Recyclable Glass/ Ceramics	Windowpanes, fish tanks, coffee mugs and plates, perfume bottles
	Non-Recyclable Metal	This is for scrap metal, hangers, metal fry pans
	Garbage Bags	
	C&D waste	Treated and painted wood, drywall, lumber
	Contaminated Recycling	Excess food residue in or on item
	Hygiene/ Diapers/Pet Pads	
	Animal Waste	All types of pet waste and bedding

Appendix C: Waste Audit Results 2022

	Garbage		Recycling		Organics		Total kg	Total %
	kg	%	kg	%	kg	%		
Landfill or Contamination	**1110.7**	**61.2%**	**28.7**	**10.2%**	**352.5**	**0.2**	**1491.9**	**39.5%**
Other Waste	327.4	18.0%	2.0	0.7%	17.6	1.1%	347.0	9.2%
Contaminated Recycling	--	0.0%	6.1	2.2%	--	0.0%	6.1	0.2%
NR Glass & Ceramics	39.6	2.2%	0.4	0.2%	--	0.0%	40.0	1.1%
NR Metal	12.4	0.7%	1.3	0.5%	--	0.0%	13.7	0.4%
NR Paper	49.4	2.7%	6.1	2.2%	4.7	0.3%	60.3	1.6%
NR Plastic	214.0	11.8%	7.3	2.6%	1.58	0.09%	222.9	5.9%
Garbage Bags	16.4	0.9%	2.4	0.9%	--	0.0%	18.9	0.5%
Hygiene/Diapers/Pet Pads	113.4	6.2%	--	0.0%	--	0.0%	113.4	3.0%
Reuse	32.3	1.8%	2.5	0.9%	--	0.0%	34.8	0.9%
C&D Waste	53.4	2.9%	0.4	0.2%	--	0.0%	53.8	1.4%
Animal Waste	97.5	5.4%	--	0.0%	1.6	0.1%	99.1	2.6%
Non-Compostable Organic Waste	0.0	0.0%	--	0.0%	--	0.0%	0.0	0.0%
Soil / Sod / Clay	155.0	8.5%	--	0.0%	327.0	19.5%	482.0	12.8%
Paper	**39.3**	**2.2%**	**227.9**	**81.3%**	**0.1**	**0.0%**	**267.3**	**7.1%**
Mixed Paper	36.9	2.0%	129.2	46.1%	0.1	0.0%	166.1	4.4%
Cardboard	2.5	0.1%	98.7	35.2%	--	0.0%	101.1	2.7%
Plastic	**28.8**	**1.6%**	**8.2**	**2.9%**	**--**	**0.0%**	**37.0**	**1.0%**
Rigid Plastic	28.0	1.5%	8.2	2.9%	--	0.0%	36.2	1.0%
Styrofoam Packaging	0.8	0.0%	--	0.0%	--	0.0%	0.8	0.0%
Organic	**486.2**	**26.8%**	**0.6**	**0.2%**	**1323.7**	**78.9%**	**1810.5**	**48.0%**
Edible Food Waste	166.8	9.2%	0.0	0.0%	31.4	1.9%	198.2	5.3%
Inedible Food Waste	80.1	4.4%	--	0.0%	107.7	6.4%	187.8	5.0%
Compostable Paper	73.1	4.0%	0.5	0.2%	20.8	1.2%	94.4	2.5%
Yard & Garden	99.1	5.5%	--	0.0%	1163.6	69.4%	1262.7	33.5%
Other Organic Waste	9.8	0.5%	0.0	0.0%	0.0	0.0%	9.8	0.3%
Food in Packaging	57.4	3.2%	--	0.0%	0.1	0.0%	57.5	1.5%
Beverage Containers	**11.2**	**0.6%**	**1.8**	**0.6%**	**0.0**	**0.0%**	**13.0**	**0.3%**
Refundables	11.2	0.6%	1.8	0.6%	0.0	0.0%	13.0	0.3%
Metal	**10.6**	**0.6%**	**7.9**	**2.8%**	**--**	**0.0%**	**18.6**	**0.5%**
Metal Containers	10.6	0.6%	7.9	2.8%	--	0.0%	18.6	0.5%
Glass	**27.8**	**1.5%**	**4.0**	**1.4%**	**--**	**0.0%**	**31.7**	**0.8%**
Glass Food Containers	27.8	1.5%	4.0	1.4%	--	0.0%	31.7	0.8%
Electronics	**24.4**	**1.3%**	**0.8**	**0.3%**	**--**	**0.0%**	**25.1**	**0.7%**
Electronics	24.4	1.3%	0.8	0.3%	--	0.0%	25.1	0.7%
Textiles	**62.8**	**3.5%**	**0.2**	**0.1%**	**1.3**	**0.1%**	**64.2**	**1.7%**
Clothing and Footwear	39.1	2.2%	--	0.0%	--	0.0%	39.1	1.0%
Household Textiles	6.0	0.3%	0.1	0.0%	--	0.0%	6.1	0.2%
Other Textiles	17.7	1.0%	0.1	0.0%	1.3	0.1%	19.0	0.5%
HHW	**13.5**	**0.7%**	**0.2**	**0.1%**	**--**	**0.0%**	**13.7**	**0.4%**
HHW	13.5	0.7%	0.2	0.1%	--	0.0%	13.7	0.4%
Grand Total	**1815.3**	**100%**	**280.2**	**100%**	**1677.6**	**100%**	**3773.1**	**100.0%**

The data presented is not normalized.

Appendix D: Single-Use Item Count from the Spring 2022 Audit

Category & Sub-Categories	Garbage		Recycling		Organics		Total Item count	Total kg
	Count	kg	Count	kg	Count	kg		
NR Paper	**582**	**12.29**	**17**	**0.44**	**12**	**0.39**	**611**	**13.11**
Cold to-go cups	227	4.35	4	0.06	1	0.01	232	4.41
Hot to-go cups	184	3.50	7	0.20	2	0.05	193	3.75
Paper takeout containers	171	4.44	6	0.18	9	0.34	186	4.96
NR Plastic	**1727**	**15.88**	**8**	**0.09**	**2**	**0.02**	**1731**	**15.95**
Plastic lids	531	1.90	5	0.01	1	0.01	537	1.91
Grocery bags single use	290	3.74		0.01			290	3.74
Grocery bags double use	230	3.01	1	0.05			231	3.06
Plastic straws	227	0.98	1	0.00			228	0.98
Plastic disposable cups	197	3.06	1	0.03			198	3.09
Plastic cutlery	181	1.39					175	1.36
Styrofoam takeout container	52	0.91			1	0.01	53	0.92
Clamshell takeout container	11	0.51					11	0.51
Plastic takeout containers	8	0.39					8	0.39
Total	**2309**	**28.16**	**25**	**0.52**	**14**	**0.41**	**2348**	**29.09**

Note: NR = Non-Recyclable

In this raw data table, the garbage stream sample represents 14 days of generation, while the recycling and organics stream samples represent 7 days of generation.

Appendix F: Fall Waste Audit Results 2022



City of St. Albert

Technical Report: Fall Residential Curbside Waste Composition Study

October 2022

Submitted by: Stacey Schaub-Szabo

S-Cubed Environmental

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1 Background

The City of St. Albert (the City) provides curbside garbage, organics and recycling collection to approximately 21,000 single-family and multi-family households. Garbage is collected biweekly and recycling is collected weekly. Organics is collected weekly from April to October and biweekly from November through March. Recycling is manually collected in bags, while garbage and organics are collected using an automated cart system.

St. Albert residents have year-round access to the Mike Mitchell Recycling Depot, where items such as electronics, tires, household hazardous waste and Styrofoam are collected for recycling and safe disposal. A seasonal Compost Depot is available for residents to drop off yard waste. Programs such as Large Item Drop Off, Curbside Large Item Pick Up, and Christmas Tree Pick Up all encourage waste diversion. The City collects and/or processes more than 20,000 metric tonnes of waste annually.

Since 2017, City staff have conducted extensive waste education and outreach, including an annual Curbside Waste Education Program. The City has conducted qualitative studies of the organics, recycling and garbage streams. In 2020 and 2021, it carried out five-week-long studies of contamination trends at Roseridge Waste Management Services Commission Compost Pad (Roseridge Compost Pad), where organics are processed. It also completed qualitative lid-lift curbside waste audits each summer from 2017 to 2022 (excluding 2020). Information gathered in these studies informed an online education “Oops! What Goes Where?” campaign in the summer of 2021.

To date, the City has no quantitative data on the organics, recycling, and garbage streams. The City has engaged S-Cubed Environmental to carry out a residential curbside waste composition study in the spring and fall of 2022. The quantitative data collected will be used to help City staff set targets for waste reduction and diversion, optimize consistent and effective communication with residents, identify opportunities for cost savings and inform corporate sustainability reporting.

One of the two primary waste-related issues the City is currently working to address is contamination in the organics stream. This study will provide quantitative data on contamination material types and rates in the organics stream, which can be used to explore ways to reduce the quantity of organics loads being landfilled after being taken to the Roseridge Compost Pad. A current challenge is that staff for the contracted organics hauler self-declare if a load has more than 30% contamination, which are consequently landfilled, rather than processed at the Compost Pad. Due to a lack of quantitative data on actual contamination rates, more loads may be visually assessed as exceedingly contaminated than are over the contamination threshold, resulting in more loads being sent to landfill than necessary.

The second priority waste topic for the City is reducing single-use items being disposed. This study has been designed to specifically collect detailed data on single-use items so that results can inform the next steps in establishing a Single-Use Item Reduction Strategy.

In this report, **waste** refers to the combined streams of garbage, organics, and recycling. A glossary of terms used in this report is located in Appendix A.

2 Waste Composition Study Methodology

This curbside waste composition study examined the waste from a sample of 100 households. The sample consisted of 10 homes from a different neighbourhood per day over 10 waste collection days between September 12th and September 23th, 2022. The specific homes were chosen randomly based on the criteria that all homes on the street received 3-stream collection and that there were over 20 homes on each street. The 10 homes were all consecutively on one side of the street.

S-Cubed personnel started each day at 7:30 am by visually assessing and recording waste data at the curbside pick-up locations for the 10 sample homes. A daily sampling log sheet with the house addresses to be sampled was used to track waste details (i.e., date, time, number and fullness of the garbage and organics carts, number of recycling bags, presence of visual contamination in the organics carts and recycling bags, presence of loose cardboard, etc.).

For the visual contamination assessment, the following 1-5 rating scale was used:

1- less than 25% contamination;
2- more than 25% contamination;
3- 50% contamination;
4- 75% contamination; and,
5- 100% contamination.



S-Cubed labelled each garbage and organics cart with a luggage tag denoting the house number so that the carts could be returned to the right home. S-Cubed then brought the garbage cart, organics cart and recycling bags into a rented moving truck, and emptied the contents into three separate super-sacks inside the truck used to collect the garbage, recycling and organics streams. Once contents from the garbage and organics carts were emptied into the super sacks, the carts were returned to the curb in front of the appropriate home and the tags were removed. The sample was then transported to the sorting facility at the public works yard.

The super sacks of waste samples were unloaded at the sorting location. A few examples are shown below:









At the sorting site, digital photographs of waste samples were taken before sorting. Samples from each of the garbage, recycling and organics streams were hand-sorted by a team of three people into bins, carts and buckets lined with black garbage bags labelled with the subcategories described below in Section 3. The S-Cubed Team Lead checks the bins often to ensure quality control and that items are consistently classified among team members. Materials were weighed using a floor scale accurate to five grams. Notes about unexpected and unusual materials were documented. Data were recorded in a spreadsheet for data analysis.

3 Waste Composition Study Categories

The audit categories for all streams were paper, plastics, metal, glass, organics, beverage containers, electronics, textiles, household hazardous waste (HHW), and landfill. The sort subcategories are listed in Appendix B, describing the types of materials sorted into each subcategory. Waste composition study results are found in Appendix C.

For each of the garbage, recycling and organics streams, the S-Cubed team separated and counted single-use items found within the stream, including the following: plastic grocery bags, straws, cutlery, lids, takeout plastic cups, and takeout containers (sub-sorted into polystyrene, paper and plastic clamshells). The results of this single-use item analysis are presented in Section 4.6.

The term **contamination** refers to material found in the sample that does not belong in the respective program. For example, a black plastic garbage bag in the organics cart is considered contamination, as the organics cart should only contain compostable items. If a glass jar was found in a recycling bag, it was considered contamination because glass is only accepted for recycling at the Mike Mitchell Recycling Depot.

A list of items accepted in the St. Albert organics and recycling programs can be found here.

4 Fall 2022 Waste Composition Study Results and Discussion

4.1 Set-Out Rate and Cart Observations

This section describes observations made during the visual inspection of the curbside waste pick-up location at each sample home. The set-out rate is the percentage of sample participants that placed a garbage cart, organics cart or recycling bag out for collection on a particular day.

S-Cubed personnel started each day at 7:30 am by visually assessing and recording waste data at the curbside pick-up locations for the 10 sample homes. A daily sampling log sheet with the house addresses to be sampled was used to track waste details (i.e., date, time, number and fullness of the garbage and organics carts, number of recycling bags, presence of visual contamination in the organics carts and recycling bags, presence of loose cardboard, etc.).

Brown Garbage Cart

There was a 95 percent set-out rate for garbage during the fall 2022 residential curbside waste composition study (Table 1). This is a high rate, which may be because garbage is collected biweekly (every two weeks). The most frequent cart fullness category for Brown Garbage Carts was 100%.

Table 1 – Garbage Set-Out Rate and Cart Fullness Assessment in Fall 2022

Parameter Assessed During Visual Inspection	Value
Homes with Brown Garbage Cart at the curb	95%
Most frequent cart fullness level	100%

Blue Recycling Bag

There was a 63 percent set-out rate for Blue Recycling Bags during the fall 2022 residential curbside waste composition study (Table 2). Of these 63 households that had set out a Blue Recycling Bag and cardboard, 40 had set out one bag, 19 households set out multiple bags, and four households only had cardboard. Twenty-one households had set out blue bags which contained visible contamination. Therefore, 36% of blue bags at the curb had visible contaminants. Visible contaminants included items such as PET plastic, loose plastic film, non-refundable tetra containers, hot & cold paper takeout cups, and take-out food bags.

Table 2 – Blue Recycling Bag Set-Out Rate in Fall 2022

Parameter Assessed During Visual Inspection	Percent of Homes
Blue Recycling Bag or cardboard at the curb	63%
Homes with loose cardboard at the curb	27%
Homes in which blue bag had visible contamination	36%

Green Organics Cart

There was a 75 percent set-out rate for the Green Organics Cart during the fall 2022 residential curbside waste composition study (Table 3). At this time of year, there is weekly collection of the Green Organics Cart.

Table 3 – Green Organics Cart Set-Out Rate in Fall 2022

Parameter Assessed During Visual Inspection	Value
Homes with Green Organics Cart at the curb	75%
Most frequent cart fullness level	50%

Fourteen Green Organics Carts had contamination noted during either the curbside lid lift audit, or when the sample was emptied from the green cart into the super sack. Contaminants included fish tank gravel, sod, plants in plastic pots, plant labels, black garbage bags and hot or cold to-go cups.

4.2 Brown Garbage Cart Waste Composition Study Results

During the study period, 95% of the 100-household sample set out garbage. The total weight of garbage examined was 1637 kilograms. This represents an average set-out rate of 16.4 kilograms per household every 14 days, as garbage is collected every two weeks. Note that curbside diversion calculations require garbage cart data to be divided by two to compare the quantity of garbage generated every 14 days with the quantity of organics and recycling generated and collected every seven days. Therefore, the garbage generation rate was 8.2 kilograms per household every seven days.

Figure 1 shows the proportion of materials in the garbage stream that cannot otherwise be diverted and must be sent to landfill (56%), along with the proportion of compostable and recyclable materials present in the garbage stream (44%).

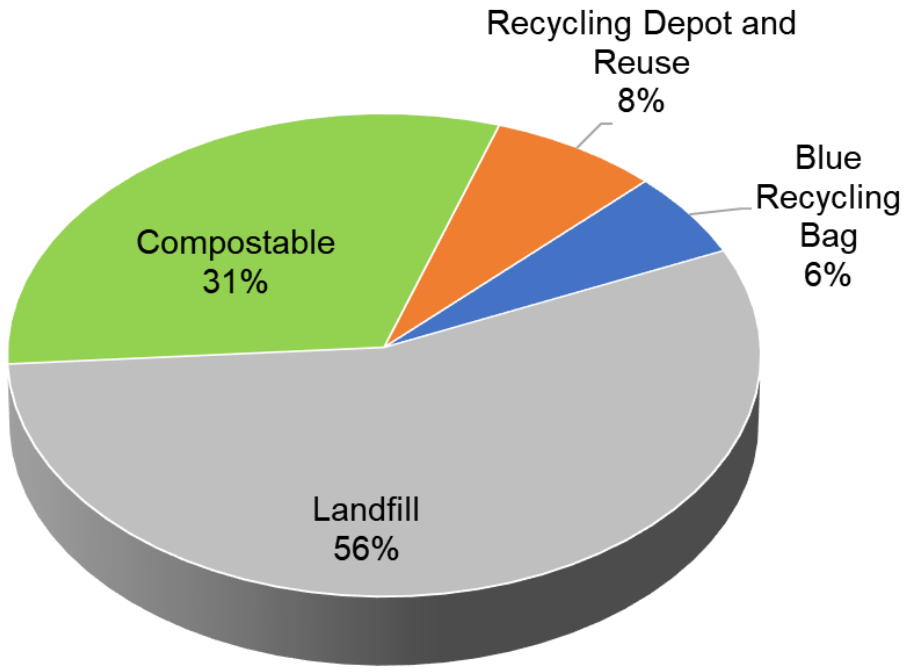


Figure 1 – Composition of the St. Albert Residential Garbage Stream in September 2022

Almost one third (31%) of the garbage stream consists of compostable items (on a weight basis). Compostable materials in the garbage consisted primarily of edible food waste, followed by inedible food waste, food in packaging, and compostable paper.

Eight percent of materials in the garbage stream could have been diverted to the Mike Mitchell Recycling Depot or donated for reuse. The main materials in this category consisted of glass food containers, reusable items, textiles (such as clothing and shoes), and electronics (cell phone, cords, headsets).

Six percent of materials in the garbage stream could have been placed in the Blue Recycling Bag. Materials in this category consisted of mixed paper, rigid plastic and smaller amounts of metal food cans and beverage containers. There was a notably very minimal quantity of cardboard in the garbage stream (0.1%).

Materials correctly placed in the garbage stream (56%) consisted mainly of non-recyclable plastic (plant pots, food wrappers), ‘other waste’ (including items such as wooden blinds, an office chair, shower hose, coffee pods, packaging with the product inside, medicines, furnace filters), construction and demolition waste (plywood, carpet, laminate flooring, and ceramic tile), animal waste, and hygiene/diapers/pet pads.

The composition of the St. Albert residential garbage stream sampled in September 2022 is detailed in Table 4.

Table 4 – Detailed Composition of the St. Albert Residential Garbage Stream in September 2022

Audit Sub-Categories	KG	%
Compostable	**510.8**	**31.2%**
Edible Food Waste	189.8	11.6%
Inedible Food Waste	99.5	6.1%
Food in Packaging	83.8	5.1%
Compostable Paper	74.3	4.5%
Yard & Garden	61.7	3.8%
Other Organic Waste	1.8	0.1%
Recycling	**94.6**	**5.8%**
Mixed Paper	44.1	2.7%
Rigid Plastic	27.8	1.7%
Metal Containers	13.1	0.8%
Refundables	7.7	0.5%
Cardboard	1.9	0.1%
Depot	**122.0**	**7.5%**
Glass Food Containers	46.7	2.9%
Reuse	20.2	1.2%
Clothing and Footwear	19.5	1.2%
Electronics	14.1	0.9%
HHW	10.5	0.6%
Household Textiles	9.6	0.6%
Styrofoam Packaging	1.4	0.09%
Landfill	**909.8**	**55.6%**
NR Plastic	210.3	12.8%
Other Waste	186.7	11.4%
C&D Waste	139.0	8.5%
Animal Waste	125.9	7.7%
Hygiene/Diapers/Pet Pads	117.7	7.2%
NR Metal	50.7	3.1%
NR Paper	35.1	2.1%
Garbage Bags	18.3	1.1%
NR Glass & Ceramics	15.0	0.9%
Other Textiles	11.2	0.7%
Grand Total	**1637.2**	**100%**

GARBAGE AUDIT IMAGES | The following images were from the garbage stream.

Organic Material

Approximately 31% of the material found in the garbage could be composted or eaten instead of sent to a landfill.



Edible food



Food in packaging



Compostable paper



Food in packaging



Inedible food waste



Yard waste

Materials That Could Have Been Recycled in Blue Recycling Bag



Rigid Plastic



Mixed paper



Metal containers

Materials That Could Have Been Taken to Mike Mitchell Recycling Depot or to a Thrift Store



Blankets



Electronics



Aerosol Containers

Landfill



Ice pack – water should be drained



C&D waste-plywood and ceramic tile



Non-recyclable metal



Other waste – product, coffee pod and water filter



Non-recyclable plastic plates



Damaged instruments



Other Waste



Non-recyclable paper



Non-recyclable glass and ceramics

4.3 Blue Recycling Bag Waste Composition Study Results

During the study period, 62% of the 100-household sample set out recycling. The total weight of recyclables examined was 280 kilograms. This represents an average set-out rate of 2.8 kilograms per household per week. After contamination was removed from the total recycled material, the set-out rate drops to 2.6 kilograms of recyclables per household per week. Figure 2 shows the proportion of the various categories of materials in the recycling stream. This figure aggregates items that do not belong in the Blue Recycling Bag as contamination.

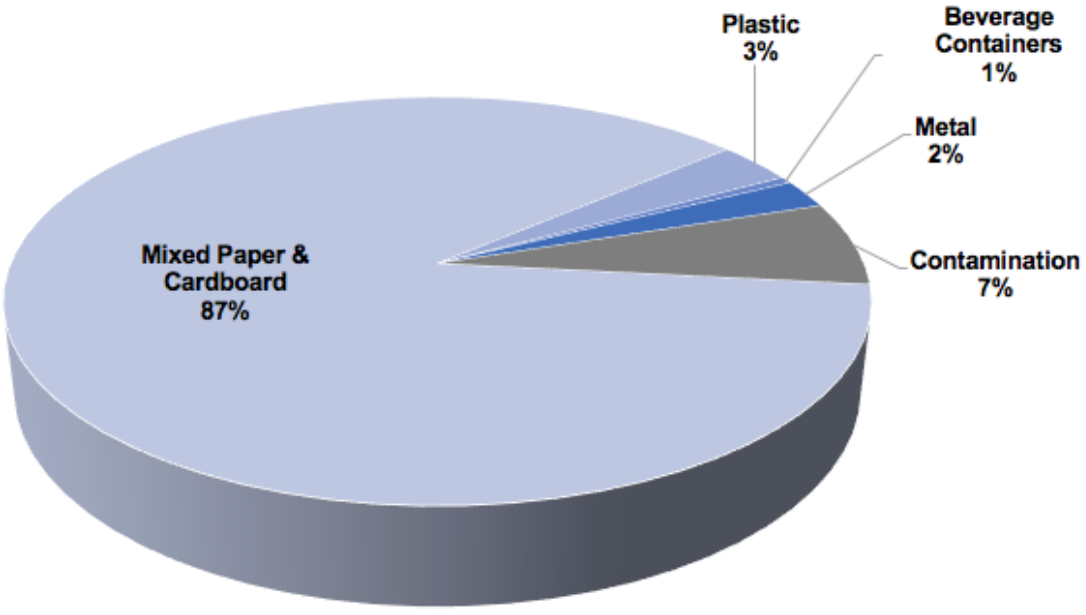


Figure 2 – Composition of the St. Albert Residential Blue Recycling Bag Stream in September 2022.

The recyclable material in the recycling stream consisted predominantly of mixed paper (49%) and cardboard (38%), with smaller amounts of rigid plastic and metal food containers.

There was seven percent contamination in the recycling stream. The majority of the contamination consisted of non-recyclable plastic, glass food containers, non-recyclable paper, 'other waste' (including a binder, masks, pen, toilet tank pump, furnace filter, duct tape, bounce sheet), and contaminated recycling (excess food residue in plastic containers).

The detailed composition of the St. Albert residential Blue Recycling Bag stream sampled is in Table 5.

Table 5 – Detailed Composition of the St. Albert Residential Blue Recycling Bag Stream in September 2022.

Audit Sub-Categories	KG	%
Recycling	**261.6**	**93.3%**
Mixed Paper	136.8	48.8%
Cardboard	107.3	38.3%
Rigid Plastic	9.5	3.4%
Metal Containers	6.5	2.3%
Refundables	1.5	0.5%
Contamination	**18.8**	**6.7%**
NR Plastic	6.5	2.3%
Glass Food Containers	4.2	1.5%
NR Paper	2.9	1.0%
Other Waste	2.0	0.7%
Contaminated Recycling	1.9	0.7%
Clothing and Footwear	1.0	0.3%
NR Metal	0.3	0.1%
Edible Food Waste	0.1	0.04%
Grand Total	**280.3**	**100%**

Figure 3 shows the relative quantity of recyclable material and contamination (on a weight basis) present in the Blue Recycling Bags sampled on a neighbourhood basis.

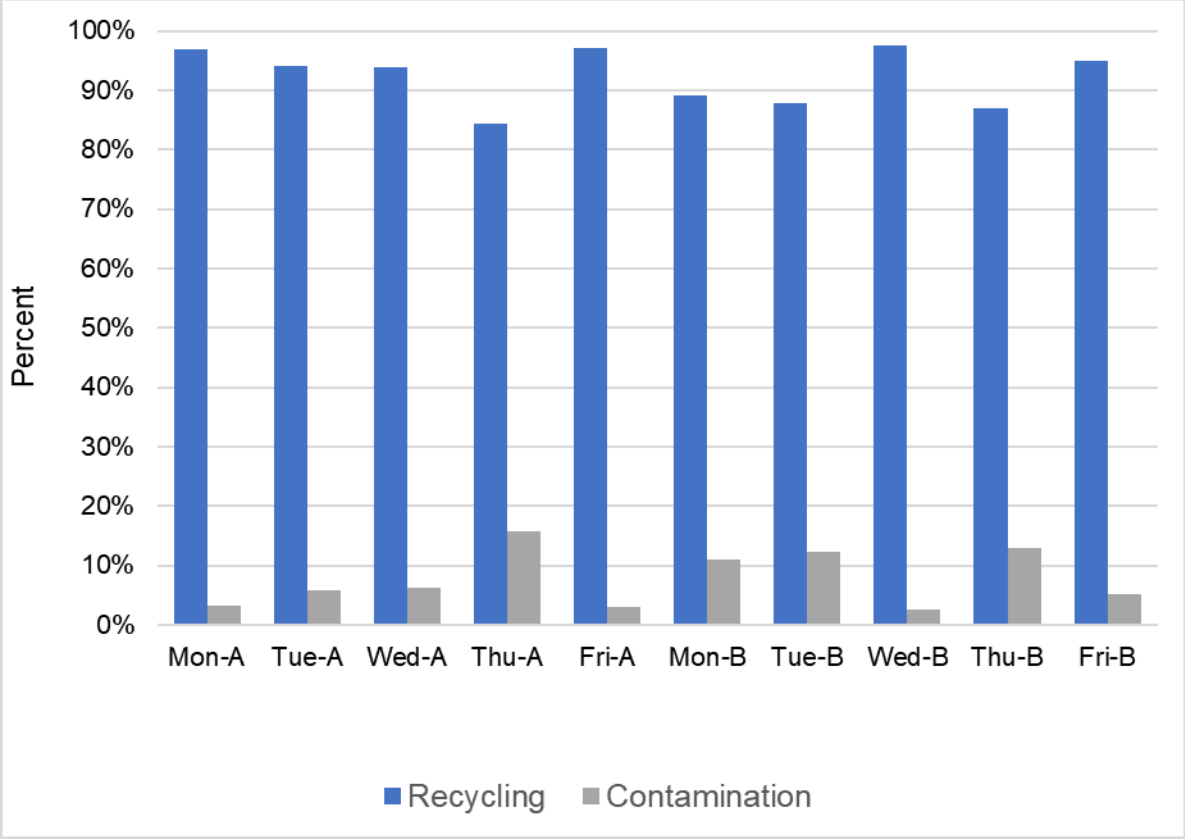


Figure 3 – Quantity of recyclable material and contamination present in Blue Recycling Bags in St. Albert neighbourhoods sampled in the September 2022 waste composition study.

RECYCLING AUDIT CATEGORIES | The following images were from the Blue Recycling Bag program.

Recyclable Material

Mixed paper and cardboard were the top two items recycled by weight.



Mixed paper



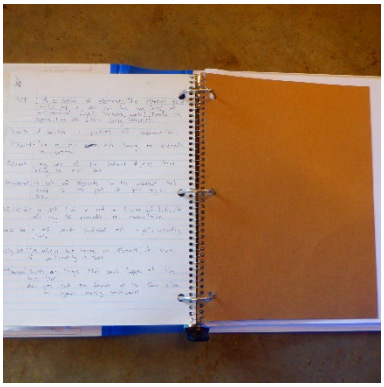
Rigid plastic



Metal cans

Contamination

The recycling stream had 7% contamination.



Binder



Contaminated recycling



Food cartons



Glass food jar



NR plastic



Coffee cups

4.4 Green Organics Cart Waste Composition Study Results

During the study period, 75% of the 100-household sample set out a Green Organics Cart. The total weight of organics examined was 1,171 kilograms. This represents an average set-out rate of 11.7 kilograms per household per week. When contamination was removed from the total organics material, this dropped to a set-out rate of 11.2 kilograms of organics per household per week. Figure 4 shows the proportion of the various categories of materials in the organics stream. This figure aggregated items that did not belong in the Green Organics Cart as contamination.

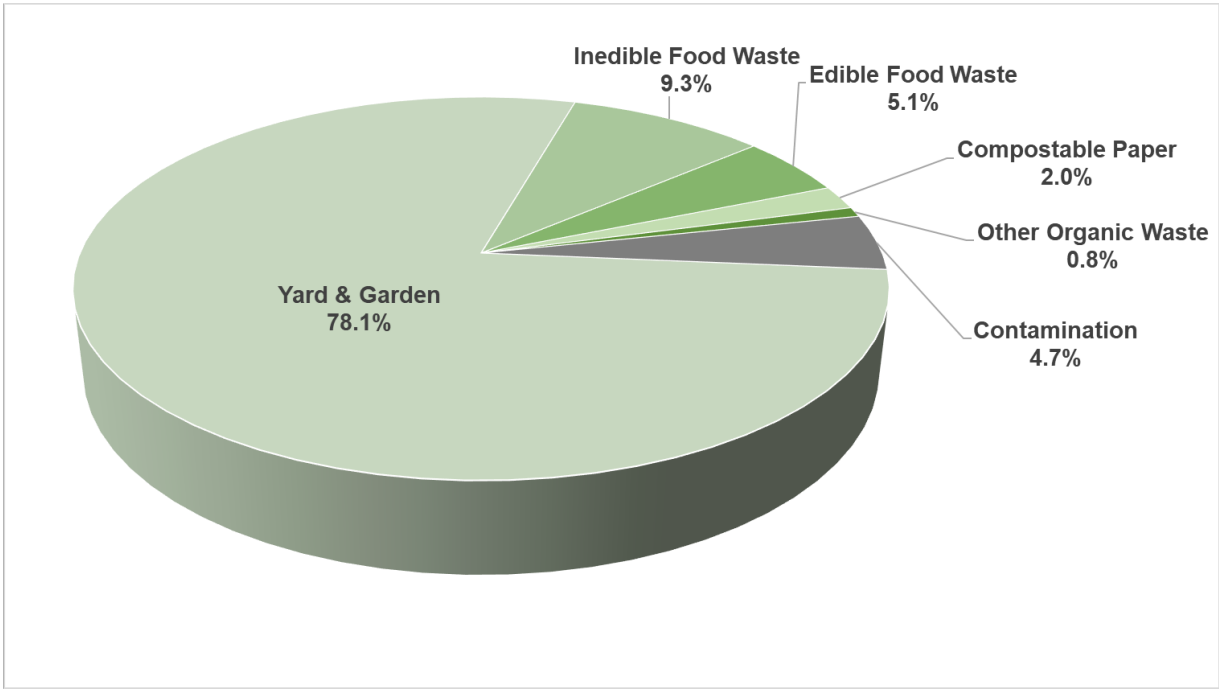


Figure 4 – Composition of the St. Albert Residential Green Organics Carts in September 2022

More than three-quarters (78%) of compostable (organic) material in the Green Organics Cart consisted of yard and garden material. Yard and garden material is a component of the organics stream which tends to be highly variable and seasonal. We observed remnants of many summer garden plants in the sample assessed. This proportion of yard and garden material and the total weight of the organics fraction would be expected to be much lower during the winter months when people are doing almost no yard work involving vegetation management.

There was a contamination rate of 4.7% in the Green Organics Cart stream sampled in September 2022. On a weight-basis, three individual Green Organics Carts contained 57% of the contamination found in the entire organics stream. These three carts had heavy contaminants which included fish tank gravel, sod and plants in pots. The presence of plant pots, plastic plant labels and tree trunks too large to compost are contaminants associated with the gardening season. Other contaminants not associated with gardening that were present in the Green Organics Cart stream included non-compostable take-out food and beverage containers, green

foam from a flower arrangement, plastic film, aluminum foil, one black garbage bag, and other noted subcategories detailed in Table 6.

Table 6 – Detailed Composition of St. Albert Residential Green Organics Carts in September 2022

Audit Sub-Categories	KG	%
Compostable	**1115.6**	**95.3%**
Yard & Garden	913.8	78.1%
Inedible Food Waste	109.2	9.3%
Edible Food Waste	59.2	5.1%
Compostable Paper	23.7	2.0%
Other Organic Waste	9.68	0.8%
Contamination	**55.0**	**4.7%**
Other Waste	38.1	3.3%
Soil / Sod / Clay	12.6	1.1%
NR Paper	2.4	0.2%
NR Plastic	1.0	0.1%
Other Textiles	0.5	0.04%
Animal Waste	0.2	0.02%
C&D Waste	0.2	0.01%
Metal Containers	0.0	0.003%
NR Metal	0.0	0.001%
Refundables	0.0	0.000%
Grand Total	**1170.6**	**100%**

Figure 5 shows the relative quantity of compostable material and contamination present in the Green Organics Carts sampled on a neighbourhood basis.

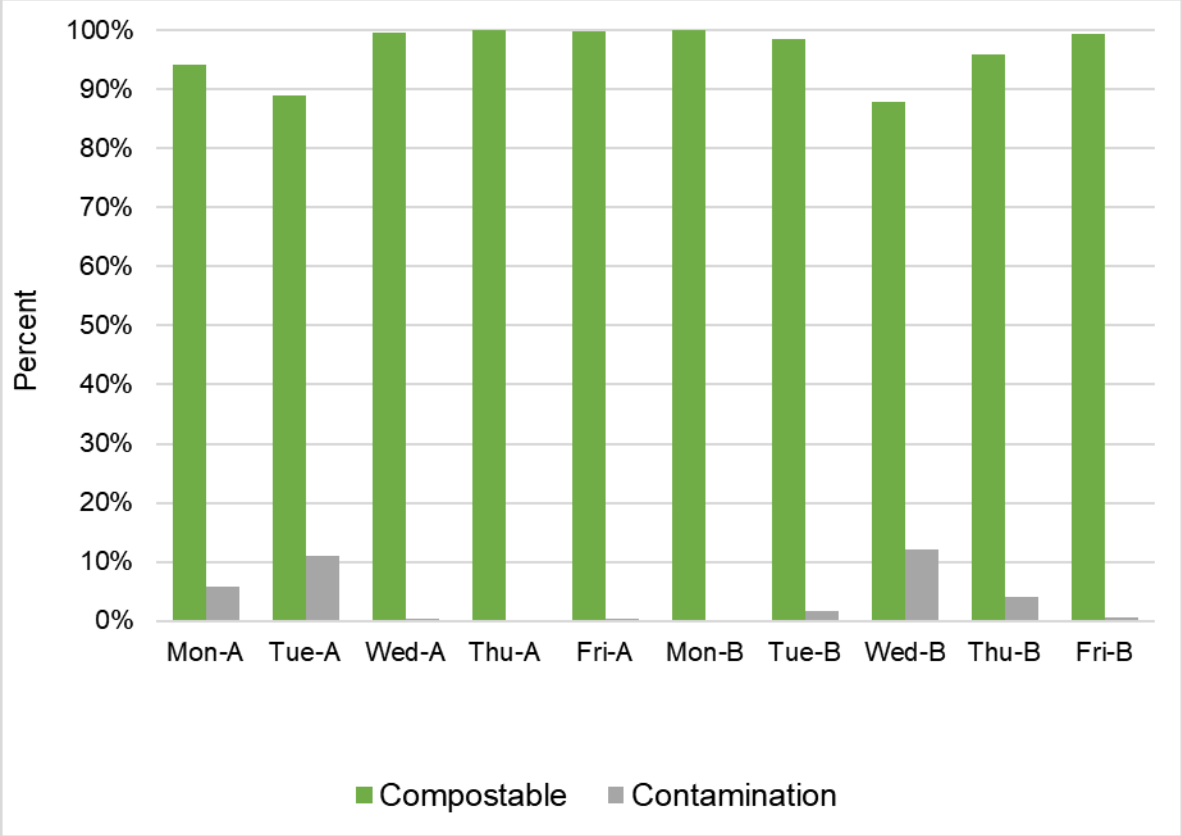


Figure 5 – Quantity of compostable material and contamination present in Green Organics Carts sampled in St. Albert neighbourhoods in September 2022.

ORGANIC AUDIT CATEGORIES | The following images are from the Green Organics Cart program.

Organic Material

Approximately 78% of the organic material was yard and garden material followed by smaller amounts of inedible and edible food waste.



Inedible food



Plants



Edible food waste



Apples (yard waste)



Compostable paper



Grass clippings

Contamination

The Green Organics Cart stream had 4.7 percent contamination.



Trunk of tree too large



Foil and plastic cap



Hot and cold to-go cups



Garbage bag



Wax-lined and shiny paper takeout containers



Floral arranging foam

4.5 Total Waste Generation Rates and Curbside Diversion Rates

Figure 6 shows the proportion of garbage, recycling and organics set out by St. Albert residents during the September 2022 residential waste composition study (on a weight basis). This graph does not reflect adjustments for the weight of contaminants in the recycling and organics streams. It should be noted that given that the waste composition study took place during the fall yard-

cleaning and gardening season, the quantity of yard and garden material in the Green Organics Cart was very likely higher than it would be during the late fall, winter and early spring when less yard and garden material is being generated.

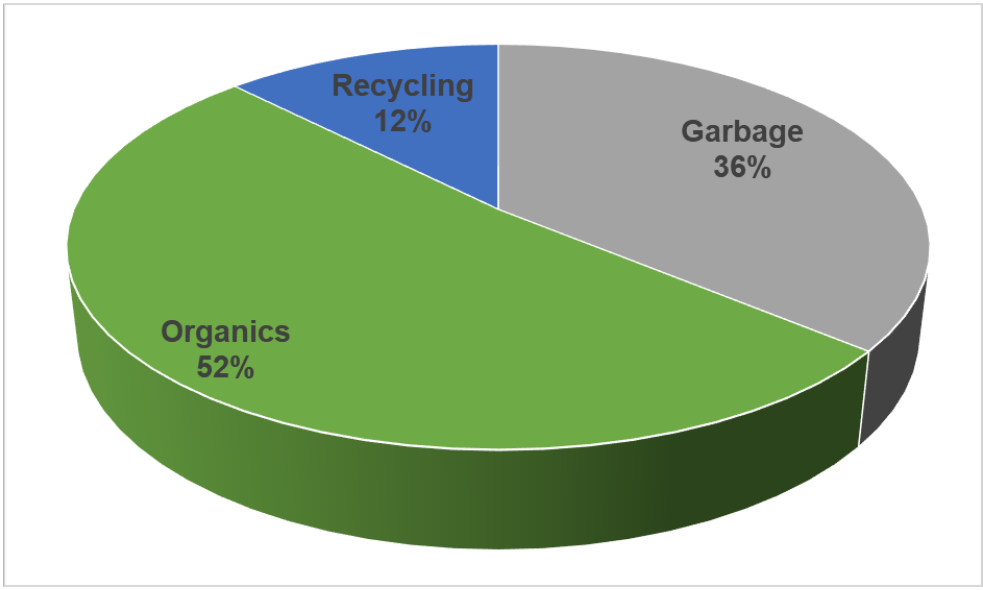


Figure 6 – Proportion of garbage, recycling, and organics (on a weight basis) set out by St. Albert residents during the September waste composition study.

Table 7 summarizes the average set-out rates for garbage, recycling, and organics on both a household basis and a normalized population (per capita) basis. For the recycling and organics streams, data are shown both for the quantity of materials set out at the curbside and the adjusted quantity once contaminants were removed.

Table 7 – Mean household weekly set-out rates and normalized per capita generation rates for garbage, recycling, and organics in the St. Albert residential waste composition study in September 2022.

Material Stream	Mean Household Set-Out Rate (kg/hh/week)	Mean Household Set-Out Rate - Without Contaminants (kg/hh/week)	Normalized Per Capita Generation Rate (kg/capita/week)[1]
Brown Garbage Cart	8.2	n/a	3.0
Blue Recycling Bag	2.8	2.6	1.0[2]
Green Organics Cart	11.7	11.2	4.1[2]

1. Assumption: Average household size of 2.7 (Statistics Canada 2016 Census profile).
2. With contaminants removed.

The curbside diversion rate was 61% for households sampled as part of the September 2022 residential waste composition study. This curbside diversion rate was calculated based on the weight of the organics and recycling streams once contaminants were removed. The curbside diversion rate with no contamination removed was 64%.

There was variability in the quantity of garbage, recyclables and organic materials set out among neighbourhoods that were sampled. Figure 7 shows the quantity of garbage, recyclables, and organics set out by ten households in each sampled neighbourhood.

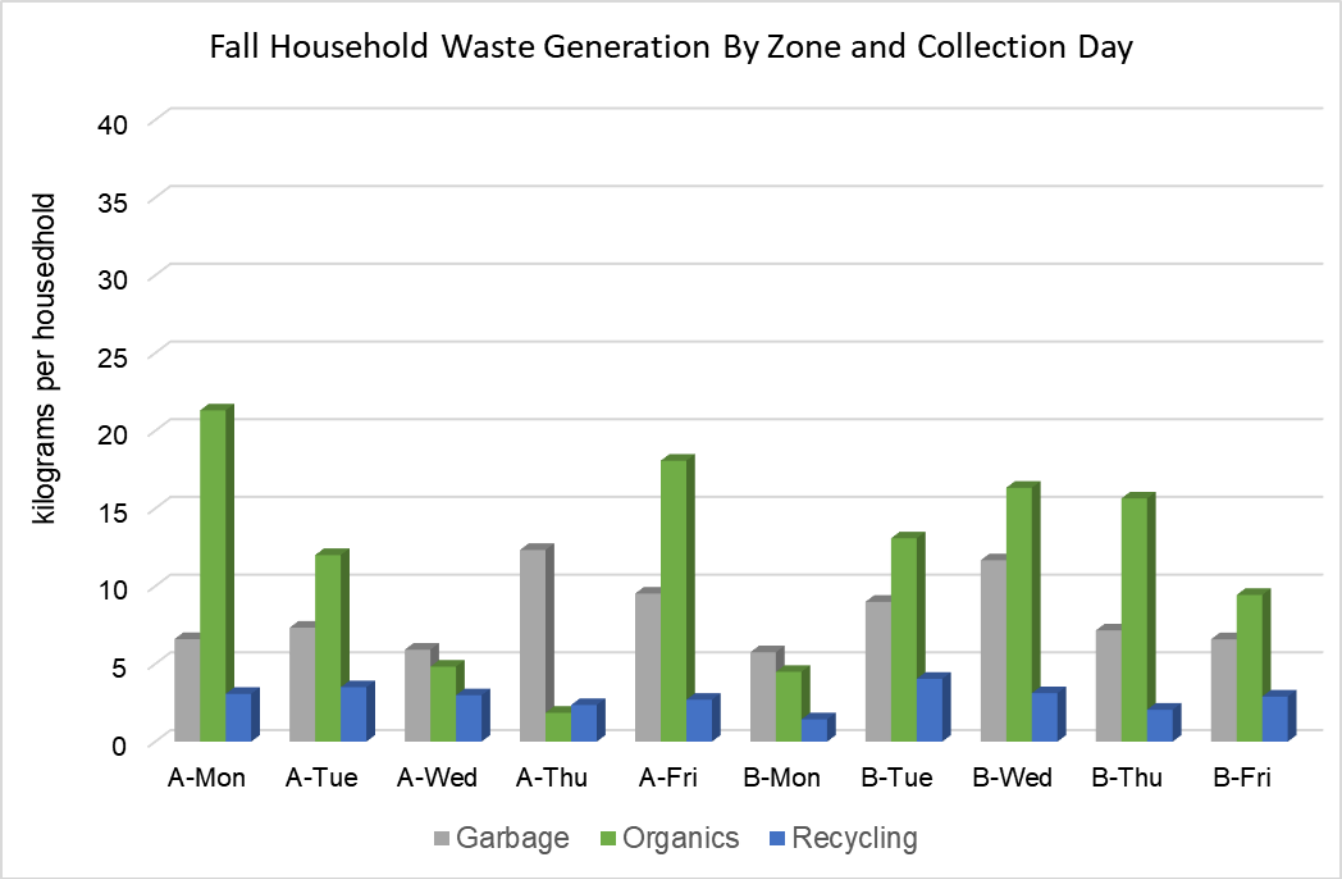


Figure 7 – Quantity of garbage, recyclables and organic materials set out by residents in various St. Albert neighbourhoods sampled in September 2022.

4.6 Single-Use Item Waste Composition Study Results

For each of the garbage, recycling and organics streams, single-use plastic and paper items were sorted, counted and weighed to measure the quantities present in all three streams. Data from the garbage stream were normalized to a weekly basis to ensure an accurate comparison with the recycling and organics streams. Almost all (93%) of the single-use items were found in the garbage stream. Approximately 0.8 percent of the total combined garbage (normalized), recycling and organics streams consisted of single-use items, which amounted to 19.1 kilograms. There was a total count of 1,450 single-use items.

Table 8 describes the prevalence of single-use items in each stream by count and weight.

Table 8 – Quantity and weight of single-use items in the St. Albert residential garbage, recycling and organics streams in September 2022.

Material Stream	Single-Use Item Count	Single-Use Item Weight (kg)
Brown Garbage Cart	1390[1]	17.73[1]
Blue Recycling Bag	42	0.65
Green Organics Cart	18	0.74

1. Note that the numbers shown are the single-use item count and weight for the garbage stream normalized to a weekly basis.

Figure 8 depicts the proportion of different single-use items in the combined garbage, recycling and organics streams. The single-use items that were most commonly counted were grocery bags, paper takeout containers, plastic takeout containers, plastic disposable cups, hot to-go cups, cold to-go cups, and plastic lids. Detailed single-use item count data is found in Appendix D.

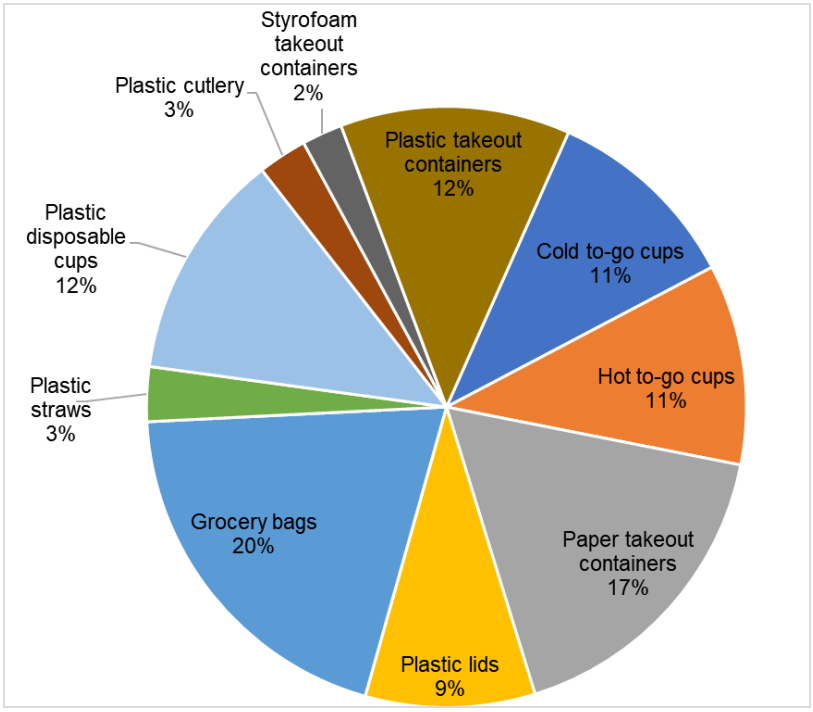


Figure 8 – Proportion of Single-Use Items (by Count) in the Residential Combined Garbage, Recycling and Organics Streams in St. Albert in September 2022.

Extrapolating from the single-use item data collected during the September 2022 waste composition study, Table 9 provides an estimate of the quantity (by weight) of single-use

items that would be disposed of by each household on an annual basis. We estimate that each household in St. Albert generates 8.49 kilograms of single-use items on an annual basis.[1]

Table 9 – Estimate of the Quantity of Single-Use Items Disposed Of Annually by St. Albert Households – September.

Single Use Item		kg/hh/yr
NR Paper	Cold to-go cups	1.00
	Hot to-go cups	1.03
NR Plastic	Paper takeout containers	1.55
	Plastic lids	0.88
	Grocery bags single use	1.24
	Grocery bags double use	0.66
	Plastic straws	0.28
	Plastic disposable cups	1.18
	Plastic cutlery	0.25
	Styrofoam takeout containers	0.21
	Plastic takeout containers	0.21
Total		8.49

5 Preliminary Conclusions

During recent years, the City of St. Albert has invested significant effort in waste diversion education and outreach. The curbside residential waste composition study completed in September 2022 shows the City should be proud of its waste diversion accomplishments to date. There also remain significant opportunities for further diversion and waste prevention.

The September 2022 residential curbside waste composition study showed a 61% diversion rate (64% without contamination removed). The set-out rate for the Blue Recycling Bags (62%) and Green Organics Carts (75%) show that a relatively large proportion of residents are participating in these programs. We found it notable that there was an extremely low quantity of cardboard in the waste stream (0.1%), showing that residents understand this material is recyclable and are demonstrating a high degree of success in separating it for recycling.

The City of St. Albert is amongst Canada's residential waste diversion leaders. As a brief comparison of where the curbside diversion rate of 61% fits amongst other Canadian communities, communities that have achieved some of the highest rates of curbside waste diversion to date in Canada include Airdrie, AB (73%), Nanaimo, BC (66%) and Vancouver, BC

[1] Kilograms per household per year (kg/hh/yr) was calculated by determining the proportion of single-use items by weight in each of the garbage, recycling and organics streams from the audit, and multiplying these proportions by the annual tonnages for each stream. 2021 annual waste data was used.

(64%). Numerous communities across Canada have set waste diversion targets between 70% and 80%, with many setting a long-term aspirational goal of zero waste. A few examples of such communities include Banff, Calgary, Cochrane and Okotoks.

The biggest waste diversion opportunity in the St. Albert residential sector is to increase the quantity of compostable materials diverted from the Brown Garbage Cart and into the Green Organics Cart. In the fall waste composition study, 31% of the Brown Garbage Cart stream consisted of compostable materials.

Quantifying contamination in the organics stream was identified as one of the priority goals for this waste composition study. The quantitative data collected in this fall study showed that most green carts being collected have minimal amounts of contamination. Based on the 100-household sample studied, there was a 4.7% contamination rate for the Green Organics Carts. It is notable that on a weight-basis, three individual Green Organics Carts contained 57% of the contamination found in the entire organics stream. Much of this contamination consisted of fish tank gravel, sod and plants in pots.

The level of contamination in the Green Organics Carts was significantly below the 30% threshold beyond which loads are not accepted for processing at Roseridge Compost Pad. The City may wish to consider opportunities to work with the organics hauler to train staff in accurate visual assessment of how 30% contamination in an organics load visually appears. Given the light weight of items such as plastics and paper, they can visually appear like a lot, when their weight is very low. Visual assessment training for haul staff could help to reduce the number of loads of green cart material that are likely being sent to landfill unnecessarily.

Based on data collected during this fall phase of the waste composition study, 0.8% of the garbage, recycling and organics streams consisted of single-use items, with a total count of 1450 single-use items. The most commonly found items were paper takeout containers and grocery bags.

On September 20, 2022, the federal government announced regulations indicating that the manufacture and import of six single-use plastic items will come into effect in December, 2022. These six items are: checkout bags, cutlery, foodservice ware made from or containing problematic plastics that are hard to recycle; ring carriers; stir sticks; and straws (with some exceptions).

These federal regulations should address 25% of the items that were counted as part of the single-use item tracked in the fall phase of this waste composition study: grocery bags (17%), plastic cutlery (3% of items), plastic straws (3%) and Styrofoam takeout containers (2%). However, the federal regulations will not address the remaining single-use items at this time.

Appendix A: Glossary

Biweekly – used to describe the every-other-week collection frequency for garbage, and seasonally, organics.

Blue Recycling Bag – used to collect recyclable material that is sent to a processor for recycling.

Contamination – items that are in a garbage (brown cart), recycling (blue bag), or organics (green cart) program that should not be in those programs.

Garbage – material that is sent to a landfill.

Green Cart – cart used to collect organic material for composting.

Organics – the material accepted in the green cart program that is compostable and can be processed at the Roseridge composting facility to produce compost.

NR – non-recyclable. The material deposited in the Blue Recycling Bag that is not physically able to be recycled or without a current market.

Waste – The combined streams of garbage, recycling, and organics.

Waste Composition Study or Waste Audit – an examination of the proportion of various materials in a given waste stream.

Appendix B: Waste Audit Categories and Single-Use Plastic Items

	Sub-Category	Description and Examples
Paper		
	Mixed Paper	Boxboard, envelopes, paper, brown paper bags, egg cartons, white paper, newsprint, magazines, tissue paper
	Cardboard	Corrugated cardboard
Plastic		
	Rigid	Rigid plastics i.e., laundry detergent bottles, condiment bottles, large yogurt or sour cream containers, windshield washer fluid jug
	Styrofoam packaging	Styrofoam computer or appliance packaging
Metal		
	Metal Containers	Steel cans and pie plate foil containers (must be easily cleaned-otherwise Other Waste)
Glass		
	Glass Food Containers	Food jars
Organics		
	Edible Food Waste	Sandwich
	Inedible Food Waste	Banana peel, bones
	Compostable paper	Food-soiled napkins, paper plates no waxy liner, fast food packaging, tissues (i.e., brown fast-food bags, flour bags, parchment paper); greasy pizza boxes; NO SHINY paper.
	Food in Packaging	Food that could be composted if it was removed from its packaging; captures items that can't be opened in 2 seconds.
	Yard & Garden	grass clippings, leaves
	Other Organic Waste	Stir sticks, chop sticks, toothpicks, popsicle sticks, animal hair, PC compostable coffee pods (wider and shorter).
Beverage Containers		
	Refundables	Aluminum, Tetra Pak, pouches, glass
Electronics		
	Electronics	IT accessories, toothbrush, headphones, audio, visual, kitchen and power tools
Household Hazardous Waste		
	HHW	Batteries, ARMA containers, fluorescent bulbs, paint, used engine oil and filters, propane tanks, household chemicals; aerosol cans, paint cans.
Textiles		
	Clothing and Footwear	Clothing and footwear (wearable/donatable)
	Household	Drapes, pillows (useable/donatable)
	Other	Rags, work gloves, coveralls, non-donatable textiles

Landfill Sub-Category		Description and Example
	Other Waste	Playdough, glue, cig butts, elastics, rubber gloves, hand lotion tubes, lint, dryer lint, q-tips, vacuum bag, broken water sprinkler as due to mixed materials, masks, gloves, wipes, foil & aluminum containers with food residue, paint brushes and rollers, sawdust, drywall residue, incandescent light bulb, toothpaste and product, candles, fines -small residue-broken glass, sand, pieces of paper.
	Non-compostable Organic Waste	BPI Certified compostable paper cups and packaging; coffee pods – including McCafe pods; compostable cutlery; PLA packaging
	Non-compostable Organic Waste	Soil, Clay and Sod
	Reuse	Items that could be donated; gift bags
	Non-Recyclable Paper	Cigarette foils, ice cream containers, soup tetra containers, flour & dog food bags as they have a liner, waxy paper, pringles container, padded envelope, gift bags with tassels or place in reuse bin; laminated paper, paper that is glittery/shimmery. French fry containers, subway wrappers, anything shiny surface is in this section. DQ ice cream container.
	Count	Hot to-go cups
	Count	Cold to-go cups
	Count	Paper takeout containers (clamshell, fries, Tim Horton's boxes, DQ paper cups)
	Non-Recyclable Plastic	Plant pots, single-use yogurt, sauce cups, lids, wrappers, chip bags, toys, cd cases, crunchy plastic, bacon packaging; food wrap, cookie trays and covers, PET #1 raspberry clamshell (note different from a TO container sandwich clamshell), stretch wrap, plant pots, black plastic containers, and plastic pumps.
	Count	Plastic straws
	Count	Plastic cutlery
	Count	Plastic lids coffee cup/ fountain / slushy
	Count	Plastic disposable cups (cold to-go cups i.e., takeout, solo, smoothie)
	Count	Styrofoam takeout container (cups, clamshells from a deli)
	Count	Clamshell takeout containers (i.e., deli containers, fast food places, PET)
	Count	Grocery bags single-use (i.e., loose)
	Count	Grocery bags double-use (i.e., held garbage)
	Non-Recyclable Glass/ Ceramics	Windowpanes, fish tanks, coffee mugs and plates, perfume bottles
	Non-Recyclable Metal	This is for scrap metal, hangers, metal fry pans
	Garbage Bags	
	C&D waste	Treated and painted wood, drywall, lumber
	Contaminated Recycling	Excess food residue in or on item
	Hygiene/ Diapers/Pet Pads	
	Animal Waste	All types of pet waste and bedding

Appendix C: Fall Waste Audit Results 2022

	Garbage		Recycling		Organics		Total kg	Total %
	kg	%	kg	%	kg	%		
Landfill or Contamination	**1110.7**	**61.2%**	**28.7**	**10.2%**	**352.5**	**0.2**	**1491.9**	**39.5%**
Other Waste	327.4	18.0%	2.0	0.7%	17.6	1.1%	347.0	9.2%
Contaminated Recycling	--	0.0%	6.1	2.2%	--	0.0%	6.1	0.2%
NR Glass & Ceramics	39.6	2.2%	0.4	0.2%	--	0.0%	40.0	1.1%
NR Metal	12.4	0.7%	1.3	0.5%	--	0.0%	13.7	0.4%
NR Paper	49.4	2.7%	6.1	2.2%	4.7	0.3%	60.3	1.6%
NR Plastic	214.0	11.8%	7.3	2.6%	1.58	0.09%	222.9	5.9%
Garbage Bags	16.4	0.9%	2.4	0.9%	--	0.0%	18.9	0.5%
Hygiene/Diapers/Pet Pads	113.4	6.2%	--	0.0%	--	0.0%	113.4	3.0%
Reuse	32.3	1.8%	2.5	0.9%	--	0.0%	34.8	0.9%
C&D Waste	53.4	2.9%	0.4	0.2%	--	0.0%	53.8	1.4%
Animal Waste	97.5	5.4%	--	0.0%	1.6	0.1%	99.1	2.6%
Non-Compostable Organic Waste	0.0	0.0%	--	0.0%	--	0.0%	0.0	0.0%
Soil / Sod / Clay	155.0	8.5%	--	0.0%	327.0	19.5%	482.0	12.8%
Paper	**39.3**	**2.2%**	**227.9**	**81.3%**	**0.1**	**0.0%**	**267.3**	**7.1%**
Mixed Paper	36.9	2.0%	129.2	46.1%	0.1	0.0%	166.1	4.4%
Cardboard	2.5	0.1%	98.7	35.2%	--	0.0%	101.1	2.7%
Plastic	**28.8**	**1.6%**	**8.2**	**2.9%**	**--**	**0.0%**	**37.0**	**1.0%**
Rigid Plastic	28.0	1.5%	8.2	2.9%	--	0.0%	36.2	1.0%
Styrofoam Packaging	0.8	0.0%	--	0.0%	--	0.0%	0.8	0.0%
Organic	**486.2**	**26.8%**	**0.6**	**0.2%**	**1323.7**	**78.9%**	**1810.5**	**48.0%**
Edible Food Waste	166.8	9.2%	0.0	0.0%	31.4	1.9%	198.2	5.3%
Inedible Food Waste	80.1	4.4%	--	0.0%	107.7	6.4%	187.8	5.0%
Compostable Paper	73.1	4.0%	0.5	0.2%	20.8	1.2%	94.4	2.5%
Yard & Garden	99.1	5.5%	--	0.0%	1163.6	69.4%	1262.7	33.5%
Other Organic Waste	9.8	0.5%	0.0	0.0%	0.0	0.0%	9.8	0.3%
Food in Packaging	57.4	3.2%	--	0.0%	0.1	0.0%	57.5	1.5%
Beverage Containers	**11.2**	**0.6%**	**1.8**	**0.6%**	**0.0**	**0.0%**	**13.0**	**0.3%**
Refundables	11.2	0.6%	1.8	0.6%	0.0	0.0%	13.0	0.3%
Metal	**10.6**	**0.6%**	**7.9**	**2.8%**	**--**	**0.0%**	**18.6**	**0.5%**
Metal Containers	10.6	0.6%	7.9	2.8%	--	0.0%	18.6	0.5%
Glass	**27.8**	**1.5%**	**4.0**	**1.4%**	**--**	**0.0%**	**31.7**	**0.8%**
Glass Food Containers	27.8	1.5%	4.0	1.4%	--	0.0%	31.7	0.8%
Electronics	**24.4**	**1.3%**	**0.8**	**0.3%**	**--**	**0.0%**	**25.1**	**0.7%**
Electronics	24.4	1.3%	0.8	0.3%	--	0.0%	25.1	0.7%
Textiles	**62.8**	**3.5%**	**0.2**	**0.1%**	**1.3**	**0.1%**	**64.2**	**1.7%**
Clothing and Footwear	39.1	2.2%	--	0.0%	--	0.0%	39.1	1.0%
Household Textiles	6.0	0.3%	0.1	0.0%	--	0.0%	6.1	0.2%
Other Textiles	17.7	1.0%	0.1	0.0%	1.3	0.1%	19.0	0.5%
HHW	**13.5**	**0.7%**	**0.2**	**0.1%**	**--**	**0.0%**	**13.7**	**0.4%**
HHW	13.5	0.7%	0.2	0.1%	--	0.0%	13.7	0.4%
Grand Total	**1815.3**	**100%**	**280.2**	**100%**	**1677.6**	**100%**	**3773.1**	**100.0%**

The data presented is not normalized.

Appendix D: Single-Use Item Count from the Fall 2022 Audit

Category & Sub-Categories	Garbage		Recycling		Organics		Total Item count	Total kg
	Count	kg	Count	kg	Count	kg		
NR Paper	**582**	**12.29**	**17**	**0.44**	**12**	**0.39**	**611**	**13.11**
Cold to-go cups	227	4.35	4	0.06	1	0.01	232	4.41
Hot to-go cups	184	3.50	7	0.20	2	0.05	193	3.75
Paper takeout containers	171	4.44	6	0.18	9	0.34	186	4.96
NR Plastic	**1727**	**15.88**	**8**	**0.09**	**2**	**0.02**	**1731**	**15.95**
Plastic lids	531	1.90	5	0.01	1	0.01	537	1.91
Grocery bags single use	290	3.74		0.01			290	3.74
Grocery bags double use	230	3.01	1	0.05			231	3.06
Plastic straws	227	0.98	1	0.00			228	0.98
Plastic disposable cups	197	3.06	1	0.03			198	3.09
Plastic cutlery	181	1.39					175	1.36
Styrofoam takeout container	52	0.91			1	0.01	53	0.92
Clamshell takeout container	11	0.51					11	0.51
Plastic takeout containers	8	0.39					8	0.39
Total	**2309**	**28.16**	**25**	**0.52**	**14**	**0.41**	**2348**	**29.09**

Note: NR = Non-Recyclable

In this raw data table, the garbage stream sample represents 14 days of generation, while the recycling and organics stream samples represent 7 days of generation.