# City of Spruce Grove

# Residential Waste Audit 2019

November 2019

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**S-Cubed Environmental**

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## Report



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## Background

The City of Spruce Grove (the City) is invested in educating and encouraging residents to divert waste through current organics and recycling programs. Haulers and processors may face economic challenges to market certain materials for recycling and as such the City has set new rules for the recycling program. The City contracted S-Cubed Environmental to collect data to see if garbage, recycling and organics diversion efforts have improved or are impacted by these changes and if there has been any reduction in waste generated by residents (kilograms per household per week) as a result of enhanced communication strategies and diversion programs since the waste audit conducted in the summer and fall of 2016. In addition, in 2019 several types of single-use items were weighed and counted to understand generation rates and which stream they are being discarded into. The summer audit occurred in June and the fall audit occurred in November.

The report presents the results of the 2019 fall audit, a comparison of the fall and summer audit results including single-use items, and a comparison of the 2016 and 2019 audits.

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

## 1 Waste Audit Categories

The audit categories for all streams were Paper, Plastics, Metal, Glass, Organics, Beverage Containers, Electronics, Textiles, Household Hazardous Waste, Reusable, and Landfill. The subcategories are shown in Appendix B, and the description explains the types of materials sorted.

The term contamination refers to material found in the sample that does not belong in the respective stream. For example, a black plastic garbage bag is considered contamination if it is found in the organics program and electronics are considered contamination when found in the recycling program.

Categories of materials were grouped into the following four classifications (Table 1) for analysis. Other diversion programs include the Eco Centre and donation centres.

**Table 1** – Waste audit classifications, sub-categories and descriptions

| Classification | THESE MATERIALS CAN BE DIVERTED USING EXISTING PROGRAMS |
|---|---|
| **Compostable** | • Food waste<br>• Compostable paper (napkins, tissues, paper towel)<br>• Shredded paper<br>• Food in packaging (packaging would need to be removed to compost)<br>• Yard and garden materials |
| **Recyclable** | • Paper, cardboard and boxboard<br>• Beverage containers (aluminum, and plastic)<br>• Rigid plastic<br>• Metal (steel food cans) |
| **Other Diversion Programs** | • Textiles (clothing, footwear, towels)<br>• Electronics<br>• Household hazardous waste<br>• Glass food jars |
| **Landfill** | • Non-recyclable paper: coffee cups, drink cups<br>• Non-recyclable plastics: plastic film, garbage bags, items with no plastic recycling symbol #1-7 & flexible plastic<br>• Non-recyclable metal: hangers<br>• Non-recyclable glass & ceramics<br>• Other waste: cigarette butts, rubber gloves, composite materials (chip bags), diapers |

## 2 Waste Audit Methodology

The audit examined the waste from the same sample of 100 homes each season. The goal was to keep the sample communities the same as previous audits for comparison purposes. Due to changes in the hauling schedule, two communities were dropped and another community was selected to represent the 18 homes from the 2016 audit demographics.

GFL Environmental collected the waste from the different neighbourhoods over three days. The hauler collected the samples staring at 7:20 am. Prior to emptying the waste from the sample households, S-Cubed recorded the fullness of the garbage and organic carts and the number of recycling bags and cardboard. Samples were brought to the old Public Works building where

the garbage and the recycling streams were emptied inside the building and the organics emptied onto a concrete pad outside the building.

**Image 1** – Sorting area set up

A team of three to five people sorted the material received into bins lined with black garbage bags, carts, and buckets. The materials were sorted into eleven categories. The contents of each were weighed and recorded in kilograms in a spreadsheet for data analysis. Following the waste sort, materials were deposited into the appropriate bins. All weighing was completed in kilograms.

# 3 Fall Audit Results and Discussion

These results represent a snapshot in time of a sample of homes. Extrapolation of this data to the larger population is subject to a margin of error of approximately ±9.77 percent and is indicative rather than absolute. Waste audit results are presented in Appendix C and D.

## 3.1 Set Out Rate Comparison

Overall, 80 percent of the houses put black garbage carts at the curb (84 percent in summer), 37 percent of the houses put recycling at the curb (28 percent in summer) and 30 percent of the houses put green organic carts out at the curb (58 percent in summer).

In addition to recording the set-out rate, we also recorded the fullness of the garbage and organics cart. The most frequent fullness for the organic cart was less than a quarter full compared to 50 percent full in summer and the fullness average was about 50 percent full for both seasons. This shows that residents are placing their carts at the curb when there are only a few items inside which would generally be food waste. There was no change to the fullness for the garbage cart, which was 100 percent.

This season, more houses (27) had one bag out for recycling compared to the summer audit (24).

The full summer audit report can be found in Appendix F.

## 3.2 Garbage Stream Audit Results (Fall)

80 houses in the sample set out black garbage carts with a total weight of 1208 kilograms. This represents an average of 12.1 kilograms per household, an increase compared to 7.9 kilograms per household in fall 2016, based on 100 households in the sample.

Figure 1 shows the composition of the garbage stream by category.

**Figure 1** – Garbage composition by category

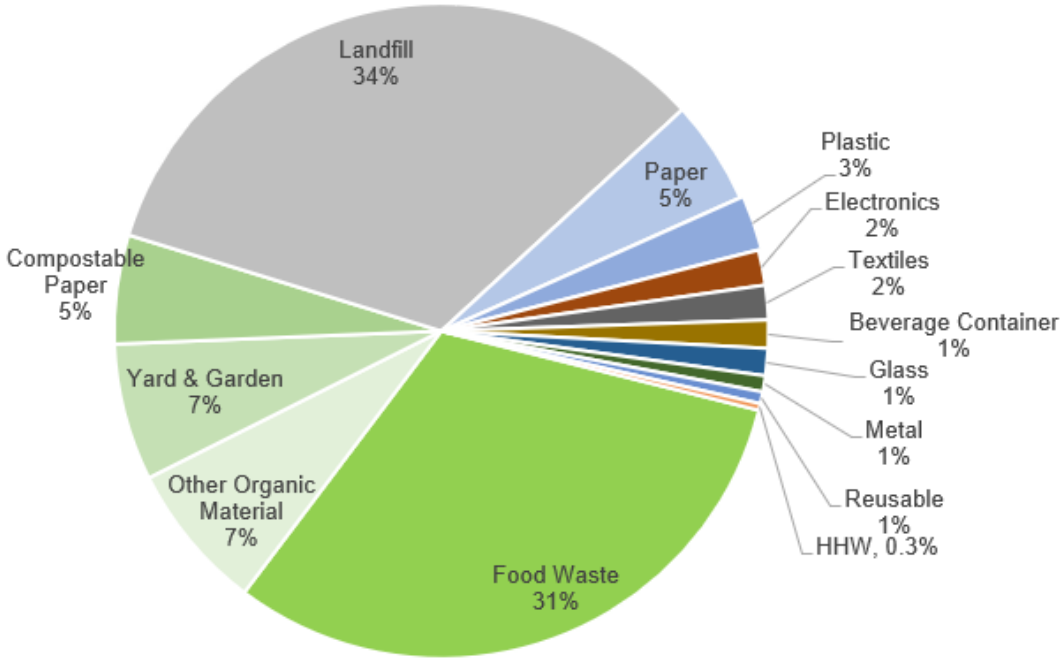



Figure 2 groups these materials by four classifications which is helpful to understand where further opportunities for diversion reside. Table 2 provides a detailed description of the proportion of various materials found in the overall garbage stream.

**Figure 2** – Garbage composition by classification

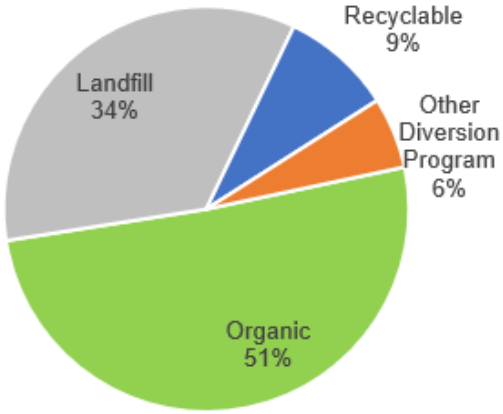


**Table 2** – Composition of the garbage stream in the black garbage cart

| Classification / Sub-categories | Kg | % |
|---|---|---|
| **Organics in Garbage** | **614.2** | **50.8%** |
| Inedible Food Waste | 186.6 | 15.4% |
| Edible Food Waste | 149.4 | 12.4% |
| Animal Waste | 84.2 | 7.0% |
| Yard & Garden | 81.7 | 6.8% |
| Compostable Paper | 64.9 | 5.4% |
| Food in Packaging | 43.3 | 3.6% |
| Other Organic Material | 4.1 | 0.3% |
| **Recyclables in Garbage** | **107.1** | **8.9%** |
| Mixed Paper | 51.9 | 4.3% |
| Rigid Plastic | 18.7 | 1.5% |
| Refundables | 16.8 | 1.4% |
| Metal Containers | 9.6 | 0.8% |
| Cardboard | 9.1 | 0.8% |
| Paper Shopping Bags | 1.1 | 0.09% |
| **Other Diversion Program** | **68.6** | **5.7%** |
| Other Electronics | 20.9 | 1.7% |
| Food Jars | 16.2 | 1.3% |
| Clothing & Footwear | 11.9 | 1.0% |
| Donatable items | 7.1 | 0.6% |
| Other Textiles | 4.8 | 0.4% |
| Household Textiles | 3.9 | 0.3% |
| Aerosols | 2.9 | 0.2% |
| HHW Other | 1.1 | 0.09% |
| **Landfill in Garbage** | **418.0** | **34.6%** |
| Other Waste | 169.8 | 14.1% |
| NR Plastic | 96.2 | 8.0% |
| Hygiene/Diapers/Pet Pads | 72.6 | 6.0% |
| NR Paper | 26.2 | 2.2% |
| C&D Waste | 21.0 | 1.7% |
| Flexible Plastic | 14.0 | 1.2% |
| NR Metal | 9.4 | 0.8% |
| NR Glass & Ceramics | 9.0 | 0.7% |
| **Grand Total** | **1208.0** | **100.0%** |

Below are images of the garbage samples delivered to the sort location.

GARBAGE AUDIT IMAGES | The following images are from the garbage stream and show materials that could be diverted from the landfill.

## Organic Material

51% of the material found in the garbage could be composted instead of sent to a landfill.

Edible food - vegetables

Yard Waste

Inedible food – peels

Food in packaging

## Recyclables

Rigid Plastic

Metal containers

Mixed paper

Beverage Containers

## Other Diversion Programs

HW- Aerosol cans

HW -Batteries

Donatable -hangers

Donatable -makeup tray

Textiles

Electronics - meat grinder

Electronics - filter

Electronics – alarm; curling iron

## Landfill

Other Waste - garden hose

NR Metal – kitchen items

Other Waste - rubber gloves

NR Plastic-toys

Other Waste -wax candle

NR Glass & Ceramics

Coffee cups

Vinyl siding and poly film

Dry wall

Coffee pods

NR Plastic - straws

NR Plastic - lids

Yard waste mixed with bean bag NR plastic pellets

Flexible plastic

Aquarium rock

NR Glass -food jars

## 3.3 Recycling Stream Audit Results (Fall)

The 37 dwellings that set out recycling had a combined total of 178 kilograms of material. This represents an average of 1.8 kilograms per household and in the 2016 fall audit the average was 2.4 kilograms, based on 100 households in the total sample. The reduction may be due to the weather. The contamination level improved in the fall 2019 audit with a seven percent reduction compared to the fall 2016 audit.

Figure 3 depicts the overall composition of the recycling stream. Table 3 provides a detailed description of the proportion of various materials found in the overall recycling stream. Items that do not belong in recycling are aggregated as contamination. Some examples of what we observed included paper or cardboard with plastic overwrap, plastic with excess food residue, mixed material items such as a frozen juice container, padded envelop and paper with coil rings. We also noticed rigid plastic bottles had lids on, which at the processor would have been pulled off as contamination.

**Figure 3** – Recycling composition

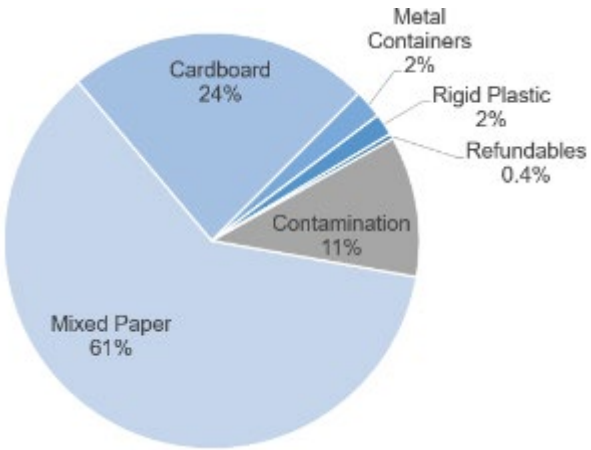



**Table 3** – Composition of the recycling stream in blue bags, fall 2019

| Classification / Subcategories | Kg | % |
|---|---|---|
| **Recyclable** | **158.9** | **89.1%** |
| Mixed Paper | 109.0 | 61.1% |
| Cardboard | 42.2 | 23.6% |
| Metal Containers | 4.0 | 2.2% |
| Rigid Plastic | 3.1 | 1.7% |
| Refundables | 0.7 | 0.4% |
| **Contamination** | **19.5** | **10.9%** |
| NR Plastic | 6.9 | 3.9% |
| Contaminated Recycling | 3.4 | 1.9% |
| Food Jars | 3.0 | 1.7% |
| NR Paper | 2.2 | 1.2% |
| Other Waste | 1.5 | 0.9% |
| Compostable Paper | 1.1 | 0.6% |
| Flexible Plastic | 0.8 | 0.5% |
| Recycling Bags | 0.4 | 0.2% |
| NR Glass & Ceramics | 0.07 | 0.04% |
| Clothing & Footwear | 0.03 | 0.02% |
| **Grand Total** | **178.4** | **100.0%** |

Below are the images of the recycling samples delivered to the sort location.

Wednesday

Thursday

Friday

RECYCLING AUDIT CATEGORIES | The following images are from the recycling stream.

## Recyclable Material

85% of the recyclable material was paper, followed by metal containers and rigid plastic

Cardboard

Rigid plastic

Mixed paper including newsprint

Rigid bottles with lids

Beverage containers

Metal food cans

Mixed paper

## Contamination

The recycling stream had 11% contamination and included materials like the following.

NR Plastic

Contaminated recycling

NR Paper - tetra soup containers

Flexible plastic

Plastic overwrapped cardboard

NR Paper

Grocery bags

Mixed material (composite) items

## 3.4 Organic Waste Stream Audit Results (Fall)

The 30 organic collection carts that were audited contained a total of 444.7 kilograms of material (23 houses in 2016 set out organics). This represents an average of 4.6 kilograms per household which is comparable to the fall 2016 audit which was 4.8 kilograms per household based on 100 households. Contamination levels were higher, at 3.7 percent, compared to the 0.9 percent in the fall 2016 audit. Figure 4 depicts the overall composition of the organics stream. Table 4 shows the composition of the organics stream.

**Figure 4** – Organics composition

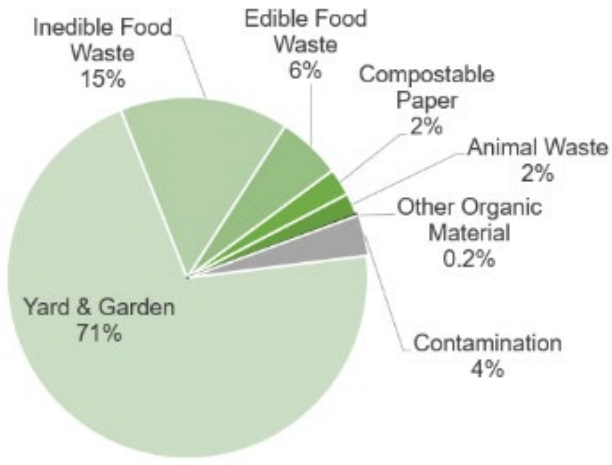


**Table 4** – Composition of the organic stream in the organics cart, fall 2019

| Classification / Subcategories | Kg | % |
|---|---|---|
| **Organics in the Organics Cart** | **428.4** | **96.3%** |
| Yard & Garden | 315.5 | 70.9% |
| Inedible Food Waste | 67.3 | 15.1% |
| Edible Food Waste | 25.6 | 5.8% |
| Compostable Paper | 9.9 | 2.2% |
| Animal Waste | 8.5 | 1.9% |
| Cardboard | 1.1 | 0.2% |
| Other Organic Material | 0.7 | 0.2% |
| **Contamination** | **16.3** | **3.7%** |
| Other Waste | 9.6 | 2.2% |
| NR Plastic | 6.1 | 1.4% |
| C&D Waste | 0.4 | 0.09% |
| NR Paper | 0.1 | 0.03% |
| Refundables | 0.02 | 0.00% |
| **Grand Total** | **444.7** | **100.0%** |

Below are the images of the organic samples delivered to the sort location.

Wednesday

Thursday

Friday

ORGANIC AUDIT CATEGORIES | The following images are from the organic stream. The contamination types were in larger quantities compared to the fall 2016 audit.

## Organic Material

Over 70 percent of the organics was yard waste followed by food waste

Food waste in compostable bags

Vegetables

Yard waste

Compostable paper

## Contamination

The organics stream had 3.5 percent contamination and included materials such as:

Film (coffee cups accepted in organics program)

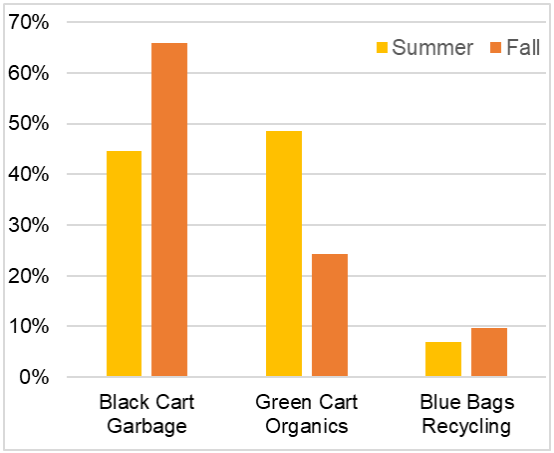
Beverage container

Landscape fabric resulting in the large contamination percent

# 4 2019 Summer and Fall Audit Comparison

The next series of tables and figures compare key results between the first audit performed in summer and the second audit performed in fall audits with some discussions as to the changes between the two seasonal audits. Figure 5 compares the summer audit to the fall audit. The percentages provided for the garbage, organics, and recycling add up to the total quantity of waste generated. During the summer audit, weather was wet and rainy, which meant that grass was growing abundantly. At the time of the November audit, it was snowing with temperatures of -15 C, so not much yard cleanup was being done.

**Figure 5** – Seasonal comparison of the 2019 garbage, organics, and recycling streams




These conditions would impact the quantities of organics generated (yard waste) and thus influence the set-out rate for organics (Table 5). Set out for garbage and recycling was similar between seasons.

**Table 5** – Garbage, recycling and organics set out rates

| Set out rate | Summer | Fall |
|---|---|---|
| Garbage | 84% | 80% |
| Recycling | 55% | 49% |
| Organics | 58% | 30% |

As shown in Table 6, the weather and the season did have an impact on the tonnes of materials generated. The stream most significantly impacted was organics and that resulted in a drop in the curbside waste diversion rate compared to summer.

**Table 6** – Total waste sorted per audit and associated curbside diversion rate

| | Summer | Fall |
|---|---|---|
| **Total Waste Audited (tonnes)** | 3.2 | 1.8 |
| **Diversion Rate** | 55% | 34% |

In addition to Table 6, we can focus on the kilograms per household generated (Table 7) between the audits and see that the organics stream was the most impacted, where as the recycling and garbage had slight seasonal decreases.

**Table 7** – Kilograms per household for all streams

| Kilograms per household | Summer | Fall |
|---|---|---|
| Organics* | 15.3 | 4.4 |
| Recycling* | 2.2 | 1.8 |
| Garbage | 14.1 | 12.1 |

* no contamination removed

Looking into the material types for each stream we can make the following observations:

Focusing on the **organics** stream comparison between the summer and fall results:

- There was a 78 percent decrease in yard waste; of the yard waste in the fall, 26 percent consisted of pumpkins.
- There was a two percent increase in contamination, but that was due to the landscape fabric in one of the fall loads which was covered with frozen chunks of sod.
- Overall, the quantity of compostable material in the green cart was high at 99 percent in summer and 96 percent in fall
- There was a slight drop in the percentage of food recovered in the organics cart between the fall and summer audits (four percent) but the 2019 capture rate is higher compared to the 2016 audit as shown in Table 8

  **Table 8** – Food waste capture rates

| Year | Summer | Fall |
|---|---|---|
| 2016 | 9% | 14% |
| 2019 | 24% | 20% |

In the **recycling** stream, we noted the following comparisons:

- Paper is the greatest material in the recycling stream; fall was 85 percent and summer 80 percent.
- There was a 1.2 percent decline in the contamination rate (summer was 12.2% and fall was 11%).
  - Non-recyclable plastics is the highest material that is contaminating the recycling stream at 3.8 percent for both seasons.
  - Food jars is the second most prevalent contamination (2.5% summer, 1.7% fall).

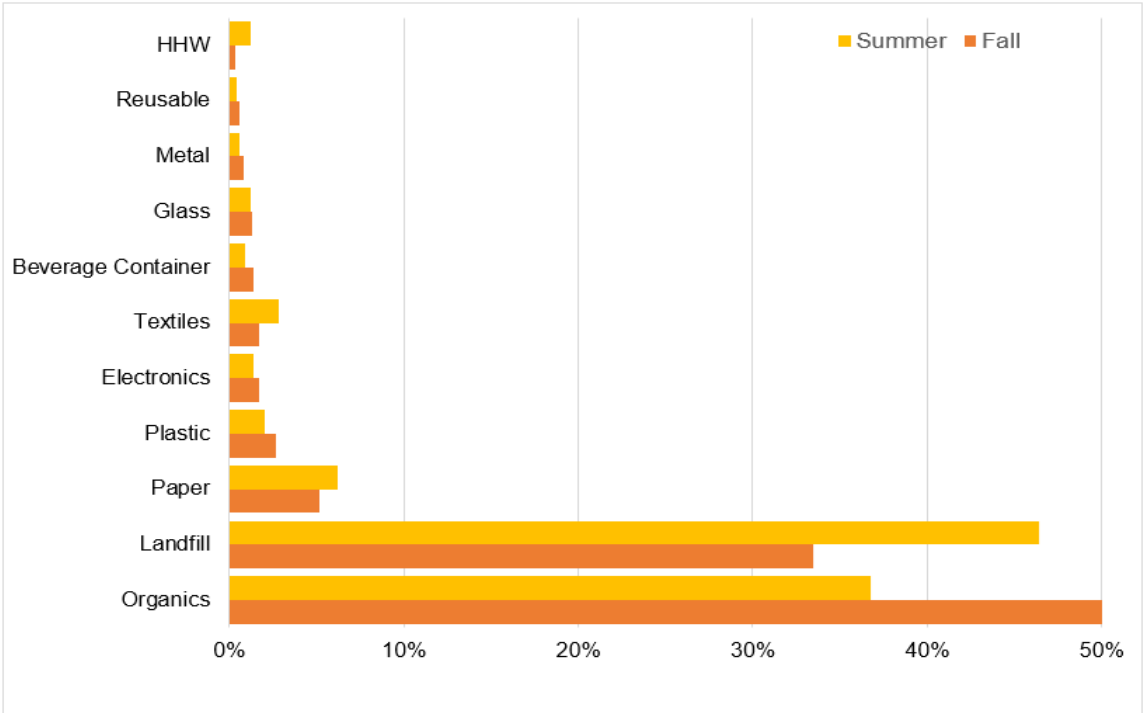
    - Excess product or food residue in or on containers (metal, plastic) and plastic overwrap (1% summer, 1.9 % fall) made up the third largest contamination classified under the contaminated recycling category.
- The quantity of plastic that is no longer accepted in the blue cart is under one percent of the recycling stream. The flexible plastic values for summer was 0.74% and 0.47% for fall.
    - What was observed is lids are not being removed from the rigid and bottle containers which is a request by GFL.

Finally, to compare the **garbage** stream between the two audit periods:

- There was 31 percent more food waste in the garbage compared to summer (note: this number doesn't include food in packaging so food waste would actually be higher).
- Residents are throwing away about 3.5 percent of food that is still in its packaging. This amounts to 2.5 tonnes per year.
- In the summer, 90 percent of the yard waste in the garbage was grass and 10% was trimmings and plants. In the fall, leaves and pumpkins were the predominate items.
- Summer saw more landfill items than the fall and that was attributed to rocks in the garbage (7.6 percent).
- Top three materials in the Landfill category include
    - Other Waste (vehicle rubber matts, toothbrushes, foam core used in picture framing, dirty aluminum foil, birdhouse and cathouse, fines)
    - Non-recyclable plastic is second in the fall but aggregates was second in summer
    - Hygiene and diapers.

**Figure 6** compares the audits by the categories they were sorted into.

**Figure 6** – Garbage composition by category for 2019 audits



## 4.1 Single-use Trends

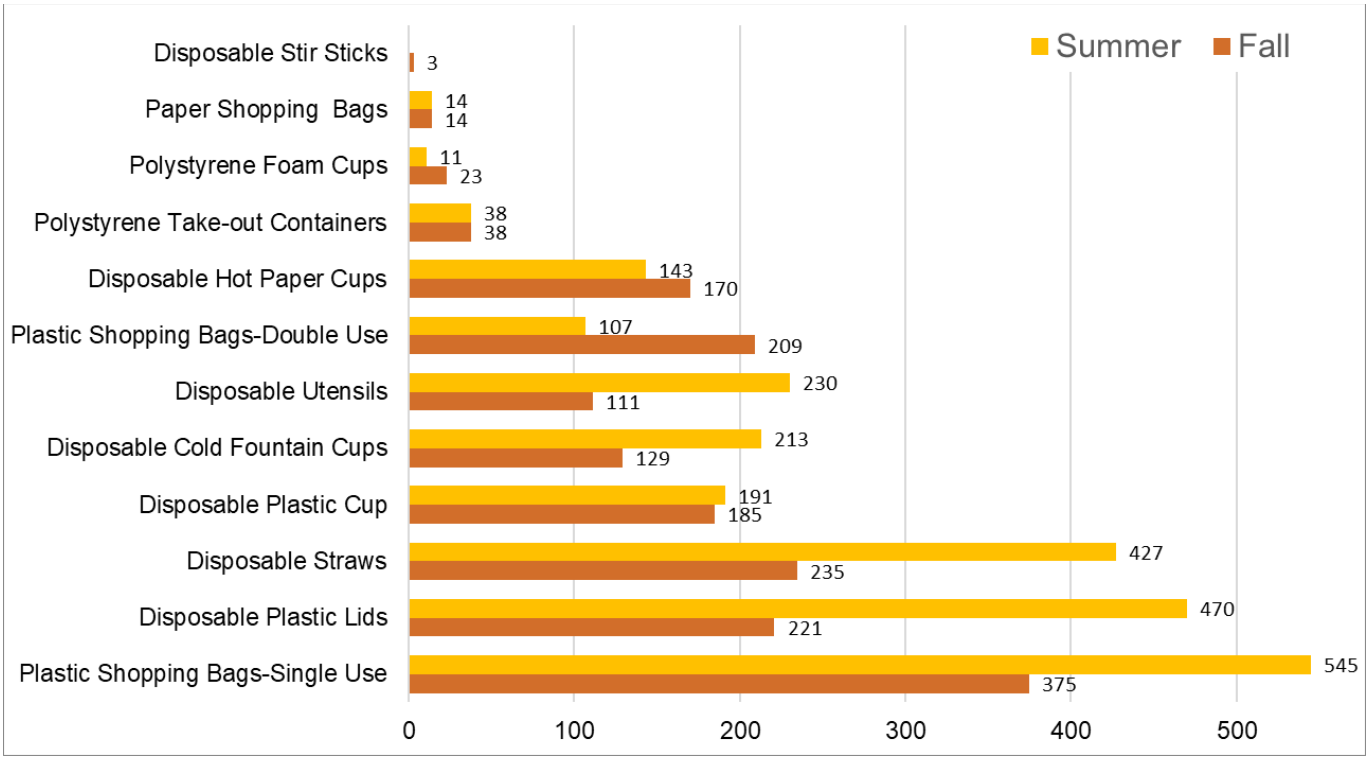
Single-use items are defined as materials that are only used once and then thrown away and include items such as plastic bags, cutlery, cups, straws and take out containers. We did not sample single-use items in 2016, so can only compare between the two seasons in 2019. The sampled households generated an estimated 10.6 kg/hh/yr of single-use items based on the average audit data. Summer results were 11/kg/hh/yr and fall results were 9.7 kg/hh/year of single-use items.

Comparing the type and number of single-use items between the seasons, Figure 7 shows more disposable hot cups being used in fall (colder temperatures) and more utensils, straws, and disposable plastic and fountain cups used in the summer, which would be expected (picnic season). We also noticed more paper bags from restaurants in the fall count. Plastic shopping bags (that were used only once), disposable lids and straws were the top three items in both seasons by count.

Single-use items in the garbage, for both audits, amounted to 1.5 percent of the overall garbage stream.

A full picture of the data from the single-use items audit can be found Appendix E.

**Figure 7** – Single-use items found in all streams (recycling, organics, garbage) per season in one week



# 5 2016 and 2019 Waste Audit Comparison

This section of the report combines fall and summer audits to draw comparisons between 2016 and 2019. The total sample for all streams for 2016 was 4.04 tonnes and for 2019 it was 4.98 tonnes.

**Figure 8** – Percentage comparison of the 2016 and 2019 garbage, organics, and recyling streams

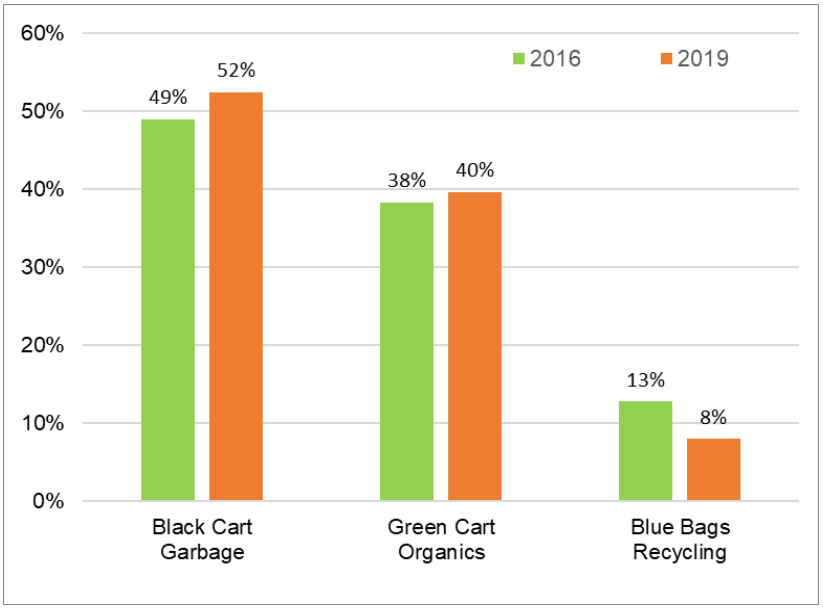


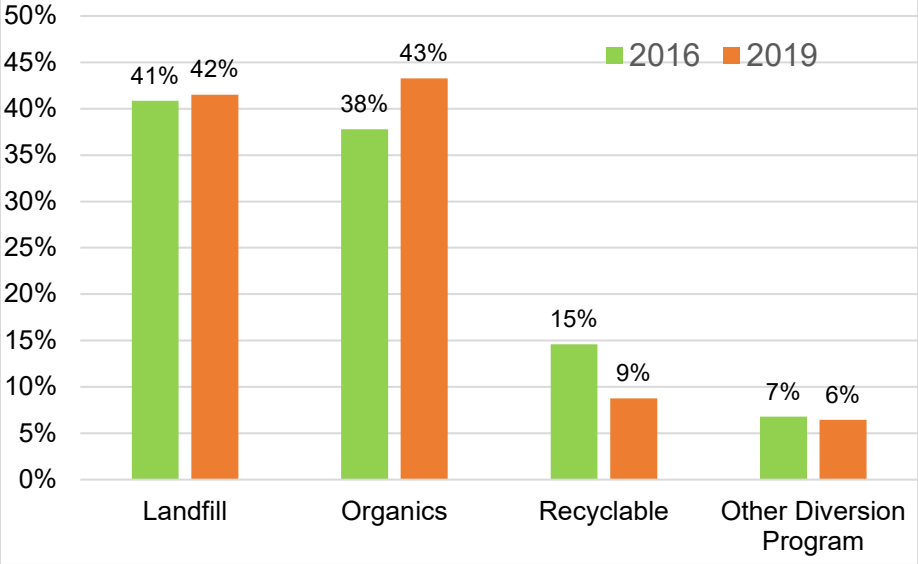

Figure 8 shows the percentages of garbage, organics and recycling in two audits, the first performed in 2016 and the second in 2019. An increase in the organics or recycling stream would be positive because these materials are being diverted. The increase in the garbage stream shows more material is ending up in the landfill that could be diverted.

The 2019 audit showed an increase in the following materials in the garbage cart:

- 5x increase in the quantity of animal waste
- 2x increase in C&D waste and compostable paper
- 1.5x increase in other electronics and hygiene/diapers/pet pads
- 107 kilograms of rocks and dirt observed in 2019 and not in 2016
- The change in materials that are no longer accepted in the recycling program (i.e. flexible plastic) had a minimal impact on the garbage. In 2016 1.43 percent of the garbage contained flexible plastics whereas in 2019, 1.11 percent of the garbage contained flexible plastic.

Delving deeper into the **garbage** stream results, Figure 9 lists the garbage by the four classifications to show residents' success in using the diversion programs and where opportunity lies to reduce garbage generation. In this table, the higher percentage means more materials are ending up in the garbage stream.

**Figure 9** – Classification of the garbage stream

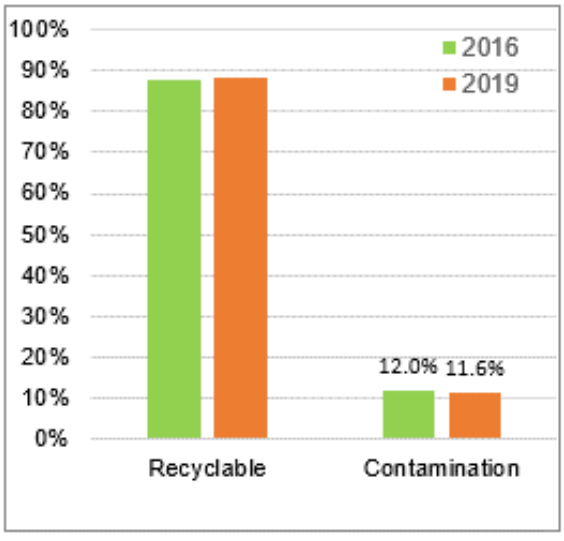



Residents are successfully recycling compared to 2016 as we see less recyclables in the garbage stream. However, there was a five percent increase in organic material in the garbage stream. Food waste is the largest material in the organics fraction, then yard & garden waste and finally compostable paper. A lot of compostable paper includes food paper, napkins, and paper takeout food packaging, but we also realize that tissue is an item that is frequently put in the garbage as opposed to composted. This is likely due to where the tissue is generated and where the kitchen catcher is located; it's not convenient to take tissue to the kitchen.

The blue bag **recycling** program is shown in Figure 10. There was a decrease of 118 kilograms of recycling (in 2016 there was 515 kilograms and in 2019, 397 kilograms) as shown in Figure 8, while the percent of recyclable material is similar between years.

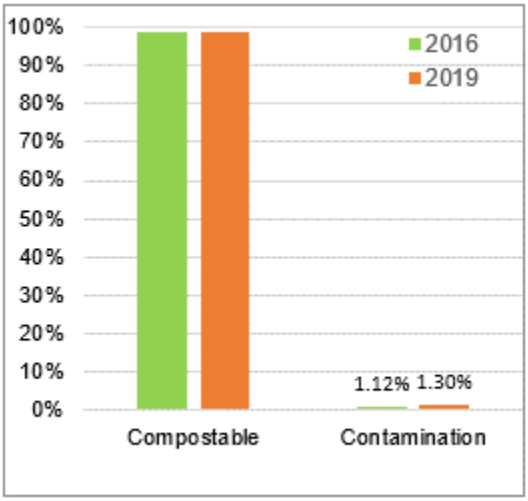
The top three categories in the blue bag program are mixed paper, cardboard and rigid plastic in 2019. In 2016, the top two were the same but food jars were in third and rigid plastic was fourth. Unaccepted plastics were the top contamination both years. As well, items accepted in the blue bag has changed. For example, flexible items (yogurt containers and berry clam shells) and glass are no longer accepted in the blue bag program. Glass is accepted at the Eco Centre and flexible plastics are now landfilled.

**Figure 10** – Blue bag program comparison



The final stream to compare is the **organics** green cart program as shown in Figure 11. Yard and Garden waste makes up around 90 percent of the compostable material in the green cart and has a high capture rate between years. Contamination rates are low in the program and items included treated wood, rope, plastics, some garbage bags, and animal waste in plastic bags.

**Figure 11** – Green cart program comparison




## 5.1 Capture Rate

Another way to measure a program's success and residents' participation in the program is through the capture rate. This is the proportion by weight of an individual material type currently diverted from disposal (recycling or organics) to the total weight of all individual material types that could have been diverted, expressed as a percentage (this only compares the waste audit samples). It was observed that residents' garbage carts are full, but the levels of contamination in the garbage show they do not use the other streams fully. This is further supported by Table 9.

**Table 9** –Diversion, landfill and capture rate summary

| Material Type | Diverted Kg/wk/hh | Landfill Kg/wk/hh | Annual Tonnes Landfilled* | Capture Rate | |
|---|---|---|---|---|---|
| | | | | 2016 | 2019 |
| **Recyclables** | 1.76 | 1.14 | 630 | 60%** | 55% |
| **Yard & Garden Waste** | 8.59 | 0.88 | 487 | 93% | 91% |
| **Food Waste** | 0.94 | 3.45 | 1899 | 12% | 21% |
| **Compostable Paper** | 0.11 | 0.6 | 332 | 17% | 16% |

*Note: Annual tonnes based on 12 months of data and the garbage composition for 2019. Capture rate is calculated by audit weights (diverted material from recycling and organics) divided by (diverted + landfill material) x 100

**Includes glass jars and flexible plastic that was recyclable in 2016

The five percent decrease in recyclables is most noted in metal containers, rigid plastic and refundables, where residents discarded these materials in the garbage instead of recycling. While it is important to look at the percentage change as a gauge of the program's success, the tonnes of material should also be evaluated. There are still almost 2000 tonnes of food waste going to the landfill every year. Addressing this issue to capture more food waste in the organics bin can greatly reduce the City's landfill tipping fees and environmental impacts.

The capture rate of food waste has increased nine percent as noted in Table 9. This is a positive result that is tempered base on the quantity of organics in the garbage, that demonstrates residents have a long way to go to maximize their use of the green cart program.

# 6 Conclusion

The S-Cubed Environmental team sorted garbage, recycling and organics in the summer and fall of 2019 to compare results to the audit in the summer and fall of 2016. The current single-family curbside waste diversion rate is 48 percent, which is a three percent decline from 2016 results (51 percent), influenced by the quantity of organics collected. Diversion rate should not be the sole parameter used to evaluate improvements since residents have other options for recycling such as the Eco Centre, bottle depots and reuse centres. This is where the capture rate information complements and evaluates a programs usage.

Between the two audit years, flexible plastic in the garbage stream made up less than 1.5 percent of that material and therefore, diverting this to the garbage had a minimal impact on the garbage quantity in 2019.

There was a nine percent improvement in food waste capture rates between audit years. This supports the efforts of the Spruce Grove team to invest in engagement activities about food waste diversion and committing to Community Based Social Marketing (CBSM) summer engagement activities. However, seeing that the capture rate is only 21 percent, and the tonnages going to landfill are high (Table 9), there is still a lot of food waste in the garbage that should be diverted to the green cart program.

There is an opportunity for the City to adapt a program to collect garbage every-other week and launch an education (CBSM) campaign based with information that 43 percent of the garbage (average of the summer and fall audit results) contains organic material that belongs in the green cart. This would encourage the residents to use the other streams fully, specifically the green cart, with the aim to increase diversion.

The materials collected for recycling changed between the two audits. Processors are looking for consistent and clean products to provide higher quality materials to end markets. As such, the hauler may limit the types of recyclables accepted. As the markets strengthen and as extended producer responsibility initiatives are explored in the province, the commodity pricing for recyclable materials will improve.

There is also an opportunity for the City to continue to work with recycling and organics processors to ensure materials collected are being diverted. An example is coffee cups and whether they should be included in the organics, recycling or garbage stream. S-Cubed measured coffee cups as part of the single use study and places them as a landfill item because most cups have a polycoat liner that makes them non-compostable. S-Cubed reached out to the organics processor, Cleanit Greenit, and they can accept coffee cups with an organic waxy layer. At this time it is difficult to separate the waxy, compostable cups with the non-compostable polycoated cups so coffee cups are likley contaminating the organic stream.

Instead of including cups in the organics stream, some recycling processors are able to recycle the cups with this layer, as the polycoat is skimmed off in the process. Chains such as Starbucks and McDonalds are looking for better ways to make the disposable coffee cup (https://www.pri.org/stories/2018-08-13/starbucks-tries-save-6-billion-cups-year-trash-help-mcdonalds). The City should continue to engage in conversation with Cleanit Greenit on how to instruct residents to participate in the program as cup design and processing options evolve.

The City was also interested in gaining additional information on single-use items. Approximately one and a half percent of single-family waste was single-use items, mostly consisting of plastic shopping bags.

## Appendix A: Glossary

**Blue Bag** – recyclable material that is sent to a processor for recycling

**Compost** – a soil-like substance from the breakdown of organic materials that takes place at a composting facility.

**Contamination** – items that are in a recycling or organics program that should not be in those programs.

**Garbage** – material that is sent to a landfill

**Green Organics Cart** – also referred to as the green cart, organics and compostable

**HH** – Households

**HHW**– Household Hazardous Waste

**Organics** – material that is biodegradable and can be processed at a composting facility to produce compost.

**Eco Centre** – a location for residents to divert items that are not accepted in the Blue Cart

**N.R.** – Non-recyclable

**Waste** – a term used to reference all streams (garbage, recycling, organics)

**Waste Composition or Waste Audit** – generic term describing the proportion of various materials in a given waste stream.

## Appendix B: Audit Categories

| Category | Subcategory | Description |
|---|---|---|
| **Paper** | | |
| | Mixed Paper | Boxboard, envelops, paper, brown paper bags, egg carton, white paper, (Books if cover removed), shredded paper, Newsprint, Magazines, Flyers, coffee cup sleeves |
| | Cardboard | Needs to show corrugations |
| **Plastic** | | |
| | Flexible Plastics | Numbers 1, 4, 5, 6, 7 (if something is really brittle, flimsy, this should be in NR Plastic) |
| | Rigid Plastics | HDPE #2, PP #5 and rigid bottles PET#1 & LPDE #4 (non deposit) |
| **Metal** | | |
| | Metal Containers | Food cans, metal cookie tins, foil pie plates etc. NOT TIN FOIL |
| **Glass** | | |
| | Food Jars | Pickle jars |
| **Organics** | | |
| Count | Avoidable Food Waste | Sandwich |
| | Unavoidable Food Waste | Banana peel, bones |
| | Compostable paper | Parchment paper, food soiled napkins, paper plates, fast food packaging (i.e. French fry boxes, brown fast food bags) greasy pizza box, tissue or Kleenex, subway wrappers, shredded paper |
| | Paper shopping bags | New item to sort for in 2019 plus a count |
| | Food in Packaging | Sour cream container, dipping sauce containers, yogurt, cucumber in plastic wrap |
| | Grass | |
| | Animal Waste | In a compostable bag. |
| | Yard & Garden | Leaf, garden cleanup, small branches |
| | Other Organic Waste | Stir sticks, chop sticks, tooth picks, popsicle sticks, compostable plastic (PLA), rabbit bedding |
| **Beverage Containers** | | |
| | Refundables | Plastic, aluminum, tetra, pouches, glass |
| **Electronics** | | |
| | E-Waste | TV, Monitors, Computers, Servers, Laptops, Tablets, Printers, Plotters, Fax Machines, Photocopiers and Scanners |

| Category | Subcategory | Description |
|---|---|---|
| | Other E-Waste | Toothbrush, kitchen and power tools, Calculators, E-Book Readers, Answering Machines, Batteries (Rechargeable), Mobile Phones, Camcorders, CD Players, Circuit Boards, DVD Players, Microwaves, Pagers, Toner Cartridges, Telephones, VCR Video Recorders, Lead Acid Batteries |
| **Textiles** | | |
| | Clothing & Footwear | In a condition that could be donated |
| | Household Textiles | In a condition that could be donated |
| | Other Textiles | Rags and stained or ripped clothing |
| **Household Hazardous Waste** | | |
| | Aerosols | Aerosol cans, butane cans |
| | Other HHW | Batteries, paint cans, mercury items (Eco Centre); Sharps, medicine (Pharmacy) |
| **Reusable** | | |
| | Donatable items | Items that could be donated and reused. |
| **Landfill** | | |
| | Other Waste | Fines, mixed material items (binder), dentist masks, tape, glue, cig butts, elastics, rubber gloves, hand lotion tubes, mop head, office supplies i.e. pens, dryer lint, gum, popcorn bags, black rot, baby wipes, dental floss. Paint rollers. Dirty FOIL |
| | Non-Recyclable Plastic | Wrappers, chip bags, crunchy film, Zip bags, bread bags, cling-wrap, sandwich bags, candy wrappers, blister pak with no number, any plastic items with no #1-7 i.e. toys, cd cases |
| Count | Plastic shopping bags-single-use and double use | New item to sort for in 2019 plus a count |
| Count | Polystyrene take-out containers | New item to sort for in 2019 plus a count |
| Count | Polystyrene foam cups | New item to sort for in 2019 plus a count |
| Count | Plastic drink cups | New item to sort for in 2019 plus a count |
| Count | Disposable straws | New item to sort for in 2019 plus a count |
| Count | Disposable utensils | New item to sort for in 2019 plus a count |
| Count | Disposable lids | New item to sort for in 2019 plus a count |
| Count | Disposable stir sticks | New item to sort for in 2019 plus a count |
| | Non-Recyclable Paper | Pringles Container; cigarette foils, A&W wrappers, ice cream containers, dog food bags as they have a liner, waxy paper, ice cream box, tetra soup box, damaged gift bags with tassels |
| Count | Disposable cold paper fountain cups | New item to sort for in 2019 plus a count |
| Count | Disposable hot drink cups | New item to sort for in 2019 plus a count Paper Starbucks, Tim Hortons, Second Cup |

| Category | Subcategory | Description |
|---|---|---|
| | Non-Recyclable Glass & Ceramics | Window panes, fish tanks, coffee mugs and plates, incandescent light bulbs; |
| | Non-Recyclable Metal | Coat hanger, aluminum foil, and other metal. NOT DIRTY FOIL (other waste) |
| | C&D Waste | Drywall, singles, wood furniture (painted/stained), lumber |
| | Animal Waste | Plastic bag contained animal waste |
| | Hygiene/Diapers | Could also include pet pee pads |
| | Contaminated Recycling | Used for recycling stream |

## Appendix C: Fall 2019 Waste Audit Results

| | Organics | | Garbage | | Recycling | | Total kg | Total % |
|---|---|---|---|---|---|---|---|---|
| **Audit Sub-Categories** | kg | % | kg | % | kg | % | | |
| **Organics** | 427.38 | 96.11% | 614.23 | 50.85% | 1.13 | 0.63% | 1042.74 | 56.95% |
| Animal Waste | 8.48 | 1.91% | 84.22 | 6.97% | 0 | 0.00% | 92.70 | 5.06% |
| Compostable Paper | 9.87 | 2.22% | 64.87 | 5.37% | 1.13 | 0.63% | 75.87 | 4.14% |
| Edible Food Waste | 25.59 | 5.75% | 149.44 | 12.37% | 0 | 0.00% | 175.02 | 9.56% |
| Food in Packaging | | 0.00% | 43.27 | 3.58% | 0 | 0.00% | 43.27 | 2.36% |
| Inedible Food Waste | 67.30 | 15.13% | 186.61 | 15.45% | 0 | 0.00% | 253.91 | 13.87% |
| Other Organic Material | 0.68 | 0.15% | 4.11 | 0.34% | 0 | 0.00% | 4.79 | 0.26% |
| Yard & Garden | 315.47 | 70.94% | 81.73 | 6.77% | 0 | 0.00% | 397.19 | 21.69% |
| **Landfill/Contamination** | 16.23 | 3.65% | 418.05 | 34.61% | 15.33 | 8.59% | 449.61 | 24.55% |
| C&D Waste | 0.40 | 0.09% | 21.00 | 1.74% | 0 | 0.00% | 21.40 | 1.17% |
| Contaminated Recycling | 0 | 0.00% | 0 | 0.00% | 3.43 | 1.92% | 3.43 | 0.19% |
| Flexible Plastic | 0 | 0.00% | 14.02 | 1.16% | 0.84 | 0.47% | 14.86 | 0.81% |
| Garbage bags | 0 | 0.00% | 0 | 0.00% | 0.40 | 0.22% | 0.40 | 0.02% |
| Hygiene/Diapers/Pet Pads | 0 | 0.00% | 72.57 | 6.01% | 0 | 0.00% | 72.57 | 3.96% |
| NR Glass & Ceramics | 0 | 0.00% | 8.95 | 0.74% | 0.07 | 0.04% | 9.02 | 0.49% |
| NR Metal | 0 | 0.00% | 9.40 | 0.78% | 0 | 0.00% | 9.40 | 0.51% |
| NR Paper | 0.12 | 0.03% | 26.20 | 2.17% | 2.18 | 1.22% | 28.49 | 1.56% |
| NR Plastic | 6.14 | 1.38% | 96.16 | 7.96% | 6.88 | 3.85% | 109.18 | 5.96% |
| Other Waste | 9.58 | 2.15% | 169.75 | 14.05% | 1.54 | 0.86% | 180.87 | 9.88% |
| **Paper** | 1.05 | 0.24% | 62.06 | 5.14% | 151.15 | 84.70% | 214.26 | 11.70% |
| Cardboard | 1.05 | 0.24% | 9.07 | 0.75% | 42.17 | 23.63% | 52.28 | 2.86% |
| Mixed Paper | 0 | 0.00% | 51.90 | 4.30% | 108.99 | 61.08% | 160.89 | 8.79% |
| Paper Shopping Bags | 0 | 0.00% | 1.10 | 0.09% | 0 | 0.00% | 1.10 | 0.06% |

| Audit Sub-Categories | Organics | | Garbage | | Recycling | | Total kg | Total % |
|---|---|---|---|---|---|---|---|---|
| | kg | % | kg | % | kg | % | | |
| **Textiles** | 0 | 0.00% | 20.56 | 1.70% | 0.03 | 0.02% | 20.59 | 1.12% |
| Clothing & Footwear | 0 | 0.00% | 11.91 | 0.99% | 0.03 | 0.02% | 11.94 | 0.65% |
| Household Textiles | 0 | 0.00% | 3.87 | 0.32% | 0 | 0.00% | 3.87 | 0.21% |
| Other Textiles | 0 | 0.00% | 4.78 | 0.40% | 0 | 0.00% | 4.78 | 0.26% |
| **Plastic** | 0 | 0.00% | 18.68 | 1.55% | 3.06 | 1.71% | 21.73 | 1.19% |
| Rigid Plastic | 0 | 0.00% | 18.68 | 1.55% | 3.06 | 1.71% | 21.73 | 1.19% |
| **Glass** | 0 | 0.00% | 16.15 | 1.34% | 3.04 | 1.70% | 19.19 | 1.05% |
| Food Jars | 0 | 0.00% | 16.15 | 1.34% | 3.04 | 1.70% | 19.19 | 1.05% |
| **Electronics** | 0 | 0.00% | 20.91 | 1.73% | 0 | 0.00% | 20.91 | 1.14% |
| Other Electronics | 0 | 0.00% | 20.91 | 1.73% | 0 | 0.00% | 20.91 | 1.14% |
| **Hazardous Waste** | 0 | 0.00% | 3.95 | 0.33% | 0 | 0.00% | 3.95 | 0.22% |
| Aerosols | 0 | 0.00% | 2.88 | 0.24% | 0 | 0.00% | 2.88 | 0.16% |
| HHW Other | 0 | 0.00% | 1.07 | 0.09% | 0 | 0.00% | 1.07 | 0.06% |
| **Metal** | 0 | 0.00% | 9.57 | 0.79% | 3.97 | 2.22% | 13.54 | 0.74% |
| Metal Containers | 0 | 0.00% | 9.57 | 0.79% | 3.97 | 2.22% | 13.54 | 0.74% |
| **Beverage Container** | 0.02 | 0.00% | 16.76 | 1.39% | 0.74 | 0.41% | 17.52 | 0.96% |
| Refundables | 0.02 | 0.00% | 16.76 | 1.39% | 0.74 | 0.41% | 17.52 | 0.96% |
| **Reusable** | 0 | 0.00% | 7.06 | 0.58% | 0 | 0.00% | 7.06 | 0.39% |
| Donatable items | 0 | 0.00% | 7.06 | 0.58% | 0 | 0.00% | 7.06 | 0.39% |
| Grand Total | 444.68 | 100% | 1207.97 | 100% | 178.44 | 100% | 1831.09 | 100% |

## Appendix D: Summer 2019 Waste Audit Results

| Audit Sub-Categories | Organics Kg. | % | Garbage Kg. | % | Recycling Kg. | % | Total Kg | % |
|---|---|---|---|---|---|---|---|---|
| **Organics** | **1,515.62** | **99.23%** | **463.96** | **33.06%** | **0.02** | **0.01%** | **1,979.60** | **62.85%** |
| Grass | 1,008.49 | 66.02% | 85.35 | 6.08% | 0.00 | 0.00% | 1,093.84 | 34.73% |
| Yard & Garden | 394.16 | 25.81% | 10.03 | 0.71% | 0.00 | 0.00% | 404.19 | 12.83% |
| Inedible Food Waste | 63.99 | 4.19% | 138.20 | 9.85% | 0.00 | 0.00% | 202.19 | 6.42% |
| Edible Food Waste | 31.82 | 2.08% | 118.53 | 8.45% | 0.00 | 0.00% | 150.35 | 4.77% |
| Compostable Paper | 13.62 | 0.89% | 56.06 | 3.99% | 0.02 | 0.01% | 69.70 | 2.21% |
| Food In Packaging | 0.00 | 0.00% | 53.89 | 3.84% | 0.00 | 0.00% | 53.89 | 1.71% |
| Animal Waste | 3.55 | 0.23% | 0.00 | 0.00% | 0.00 | 0.00% | 3.55 | 0.11% |
| Other Organic Material | 0.00 | 0.00% | 1.90 | 0.14% | 0.00 | 0.00% | 1.90 | 0.06% |
| **Other Waste** | **8.95** | **0.59%** | **702.62** | **50.07%** | **19.17** | **8.76%** | **730.74** | **23.20%** |
| Other Waste | 7.66 | 0.50% | 225.17 | 16.04% | 6.37 | 2.91% | 239.19 | 7.59% |
| Hygiene/Diapers/Pet Pads | 0.00 | 0.00% | 110.40 | 7.87% | 0.00 | 0.00% | 110.40 | 3.50% |
| Aggregates and Dirt | 0.00 | 0.00% | 107.24 | 7.64% | 0.00 | 0.00% | 107.24 | 3.40% |
| NR Plastic | 0.00 | 0.00% | 77.47 | 5.52% | 8.09 | 3.69% | 85.55 | 2.72% |
| Animal Waste Plastic Bag | 1.29 | 0.08% | 51.60 | 3.68% | 0.00 | 0.00% | 52.89 | 1.68% |
| NR Paper | 0.00 | 0.00% | 49.04 | 3.49% | 2.26 | 1.03% | 51.29 | 1.63% |
| C&D Waste | 0.00 | 0.00% | 38.98 | 2.78% | 0.00 | 0.00% | 38.98 | 1.24% |
| NR Metal | 0.00 | 0.00% | 21.79 | 1.55% | 0.00 | 0.00% | 21.79 | 0.69% |
| NR Glass & Ceramics | 0.00 | 0.00% | 20.95 | 1.49% | 0.14 | 0.06% | 21.09 | 0.67% |
| Contaminated Recycling | 0.00 | 0.00% | 0.00 | 0.00% | 2.32 | 1.06% | 2.32 | 0.07% |
| **Paper** | **2.46** | **0.16%** | **87.05** | **6.20%** | **176.33** | **80.53%** | **265.84** | **8.44%** |
| Mixed Paper | 2.46 | 0.16% | 63.67 | 4.54% | 139.05 | 63.51% | 205.18 | 6.51% |
| Cardboard | 0.00 | 0.00% | 23.07 | 1.64% | 37.03 | 16.91% | 60.10 | 1.91% |

| Audit Sub-Categories | Organics Kg. | % | Garbage Kg. | % | Recycling Kg. | % | Total Kg | % |
|---|---|---|---|---|---|---|---|---|
| Paper Shopping Bags | 0.00 | 0.00% | 0.31 | 0.02% | 0.25 | 0.11% | 0.56 | 0.02% |
| **Textiles** | **0.00** | **0.00%** | **40.05** | **2.85%** | **0.00** | **0.00%** | **40.05** | **1.27%** |
| Clothing & Footwear | 0.00 | 0.00% | 29.64 | 2.11% | 0.00 | 0.00% | 29.64 | 0.94% |
| Household Textiles | 0.00 | 0.00% | 7.83 | 0.56% | 0.00 | 0.00% | 7.83 | 0.25% |
| Other Textiles | 0.00 | 0.00% | 2.58 | 0.18% | 0.00 | 0.00% | 2.58 | 0.08% |
| **Plastic** | **0.00** | **0.00%** | **28.79** | **2.05%** | **10.80** | **4.93%** | **39.59** | **1.26%** |
| Rigid Plastic | 0.00 | 0.00% | 13.71 | 0.98% | 9.22 | 4.21% | 22.93 | 0.73% |
| Flexible Plastic | 0.00 | 0.00% | 15.08 | 1.07% | 1.58 | 0.72% | 16.66 | 0.53% |
| **Glass** | **0.00** | **0.00%** | **17.34** | **1.24%** | **5.56** | **2.54%** | **22.90** | **0.73%** |
| Food Jars | 0.00 | 0.00% | 17.34 | 1.24% | 5.56 | 2.54% | 22.90 | 0.73% |
| **Electronics** | **0.00** | **0.00%** | **19.84** | **1.41%** | **0.00** | **0.00%** | **19.84** | **0.63%** |
| Other Electronics | 0.00 | 0.00% | 18.27 | 1.30% | 0.00 | 0.00% | 18.27 | 0.58% |
| E-Waste | 0.00 | 0.00% | 1.57 | 0.11% | 0.00 | 0.00% | 1.57 | 0.05% |
| **Household Hazardous Waste** | **0.00** | **0.00%** | **17.02** | **1.21%** | **0.35** | **0.16%** | **17.37** | **0.55%** |
| HHW Other | 0.00 | 0.00% | 12.17 | 0.87% | 0.00 | 0.00% | 12.17 | 0.39% |
| Aerosols | 0.00 | 0.00% | 4.85 | 0.35% | 0.35 | 0.16% | 5.20 | 0.16% |
| **Metal** | **0.00** | **0.00%** | **8.73** | **0.62%** | **5.56** | **2.54%** | **14.29** | **0.45%** |
| Metal Containers | 0.00 | 0.00% | 8.73 | 0.62% | 5.56 | 2.54% | 14.29 | 0.45% |
| **Beverage Container** | **0.00** | **0.00%** | **12.35** | **0.88%** | **1.18** | **0.54%** | **13.53** | **0.43%** |
| Refundables | 0.00 | 0.00% | 12.35 | 0.88% | 1.18 | 0.54% | 13.53 | 0.43% |
| **Reusable** | **0.43** | **0.03%** | **5.68** | **0.40%** | **0.00** | **0.00%** | **6.11** | **0.19%** |
| Donatable Items | 0.43 | 0.03% | 5.68 | 0.40% | 0.00 | 0.00% | 6.11 | 0.19% |
| **Grand Total** | **1,527.45** | **100%** | **1,403.42** | **100%** | **218.96** | **100%** | **3,149.82** | **100%** |

# Appendix E: 2019 Single-Use Audit Results

| Count | Season | | |
|---|---|---|---|
| **Single-Use Item** | **Fall** | **Summer** | **Grand Total** |
| Plastic Shopping Bags | 584 | 652 | 1236 |
| Disposable Plastic Lids | 221 | 470 | 691 |
| Disposable Straws | 235 | 427 | 662 |
| Disposable Plastic Cup | 185 | 191 | 376 |
| Disposable Cold Fountain Cups | 129 | 213 | 342 |
| Disposable Utensils | 111 | 230 | 341 |
| Disposable Hot Paper Cups | 170 | 143 | 313 |
| Polystyrene Take-out Containers | 38 | 38 | 76 |
| Polystyrene Foam Cups | 23 | 11 | 34 |
| Paper Shopping Bags | 14 | 14 | 28 |
| Disposable Stir Sticks | 3 | | 3 |
| **Grand Total** | **1713** | **2389** | **4102** |

| Percent | | | |
|---|---|---|---|
| **Single-Use Item** | **Fall** | **Summer** | **Grand Total** |
| Plastic Shopping Bags | 39.37% | 36.85% | 38.00% |
| Disposable Cold Fountain Cups | 12.54% | 17.28% | 15.11% |
| Disposable Plastic Cup | 11.17% | 13.79% | 12.59% |
| Disposable Hot Paper Cups | 18.67% | 11.56% | 14.81% |
| Disposable Plastic Lids | 4.06% | 7.03% | 5.67% |
| Paper Shopping Bags | 5.89% | 5.06% | 5.44% |
| Disposable Utensils | 3.50% | 4.40% | 3.99% |
| Polystyrene Take-out Containers | 3.20% | 2.13% | 2.62% |
| Disposable Straws | 1.35% | 1.80% | 1.59% |
| Polystyrene Foam Cups | 0.24% | 0.11% | 0.17% |
| Disposable Stir Sticks | 0.01% | 0.00% | 0.00% |
| **Grand Total** | **100.00%** | **100.00%** | **100.00%** |

Fall Single-Use results by count, weight and percentage

| Single-Use Item | Garbage | | | Recycling | | | Organics | | | Total # | Total kg | Total Percent |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | # | kg | Percent | # | kg | Percent | # | kg | Percent | | | |
| Disposable Cold Fountain Cups | 126 | 2.28 | 12.6% | 3 | 0.05 | 11.5% | | | 0.0% | 129 | 2.33 | 12.5% |
| Disposable Hot Paper Cups | 163 | 3.305 | 18.3% | 3 | 0.05 | 11.5% | 4 | 0.115 | 100.0% | 170 | 3.47 | 18.7% |
| Disposable Plastic Cup | 183 | 2.045 | 11.3% | 2 | 0.03 | 6.9% | | | 0.0% | 185 | 2.075 | 11.2% |
| Disposable Plastic Lids | 216 | 0.74 | 4.1% | 5 | 0.015 | 3.5% | | | 0.0% | 221 | 0.755 | 4.1% |
| Disposable Stir Sticks | 3 | 0.001 | 0.0% | | | 0.0% | | | 0.0% | 3 | 0.001 | 0.0% |
| Disposable Straws | 234 | 0.25 | 1.4% | 1 | 0.001 | 0.2% | | | 0.0% | 235 | 0.251 | 1.4% |
| Disposable Utensils | 111 | 0.65 | 3.6% | | | 0.0% | | | 0.0% | 111 | 0.65 | 3.5% |
| Paper Shopping Bags | 14 | 1.095 | 6.1% | | | 0.0% | | | 0.0% | 14 | 1.095 | 5.9% |
| Polystyrene Foam Cups | 23 | 0.045 | 0.2% | | | 0.0% | | | 0.0% | 23 | 0.045 | 0.2% |
| Polystyrene Take-out Containers | 38 | 0.595 | 3.3% | | | 0.0% | | | 0.0% | 38 | 0.595 | 3.2% |
| Plastic Shopping Bags | 558 | 7.03 | 39.0% | 26 | 0.2875 | 66.3% | | | 0.0% | 584 | 7.3175 | 39.4% |
| **Grand Total** | **1669** | **18.036** | **100.0%** | **40** | **0.4335** | **100.0%** | **4** | **0.115** | **100.0%** | **1713** | **18.5845** | **100.0%** |

# Appendix F: Summer 2019 Waste Audit Report

# City of Spruce Grove

# Technical Report: Residential Waste Audit

July 2019

**Submitted by: Stacey Schaub-Szabo M.Sc. P.Biol**

**S-Cubed Environmental**

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## Report



## List of Figures and Tables

# 1 Background

The City of Spruce Grove (the City) is invested in educating and encouraging residents to divert waste through current waste and recycling programs. The industry is currently facing challenges to market certain materials for recycling and as such there are new rules of what can go into the recycling program. The City is interested in learning if waste, recycling and organics diversion efforts have improved or are impacted by these changes and if there has been any reduction in waste generated by residents (kilograms per household per week) as a result of enhanced communication strategies and diversion programs since a waste audit conducted in 2016. In addition, several types of single-use items were weighed and counted to understand generation rates and the stream they are being discarded into.

The summer audit was conducted for the City June 19th to 21st, 2019. The audit included material from garbage, recycling and organics streams. A sample of 100 houses was selected from several neighbourhoods that represented the City demographics – declining, status quo, single family, multi-housing and growth.

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

# 2 Waste Audit Categories

The audit categories for all streams were Paper, Plastics, Metal, Glass, Organics, Beverage Containers, Electronics, Textiles, Household Hazardous Waste, Reusable, and Landfill. The subcategories are shown in Appendix B, and the description explains the types of materials sorted.

The term contamination refers to material found in the sample that does not belong in the respective stream. For example, a black plastic garbage bag is considered contamination if it is found in the organics program and electronics are considered contamination when found in the blue cart.

# 3 Waste Audit Methodology

The audit examined the waste from a sample of 100 homes. Due to hauling scheduling changes two communities were dropped and another community was selected to represent the 18 homes from the 2016 audit demographics.

GFL Environmental collected the waste from the different neighbourhoods over two days. The hauler collected the samples staring at 7:20 am. Prior to emptying the waste from the sample households, S-Cubed recorded the fullness of the garbage and organic carts and the number of recycling bags and cardboard. On the third day S-Cubed collected the material. The reason for

this change was due to weather. It rained over the course of the audit and the recycling from other houses was getting stuck in the truck hopper, causing more recycling to be emptied than just the from the sample houses. When this occurred on Thursday, S-Cubed randomly pulled samples of bags and cardboard based on the set outs recorded that morning.

Samples were brought to the old Public Works building where the garbage and the recycling streams were emptied inside the building and the organics emptied onto a concrete pad outside the building.

**Image 1** – Sorting area set up

A team of three to five people sorted the material received into bins lined with black garbage bags, carts, and buckets. The materials were sorted into eleven categories. The contents of each were weighed and recorded in kilograms in a spreadsheet for data analysis. Following the waste sort, materials were deposited into the appropriate bins. All weighing was completed in kilograms.

## 4 Results and Discussion

These results represent a snapshot in time of a sample of homes. Extrapolation of this data to the larger population is subject to a margin of error of approximately ±9.77 percent and is indicative rather than absolute.

During the audit, waste materials were separated into the following four classifications (Table 1). Further details on these sub-categories are found in Appendix B.

**Table 1** – Waste audit classification, sub-categories and descriptions

| | |
|---|---|
| **Organics** | Materials that can be diverted through a composting program, including:<br>• Food waste<br>• Compostable paper (napkins, tissues, paper towel)<br>• Food in packaging (packaging would need to be removed to compost)<br>• Yard and garden materials |
| **Recyclable** | Materials that can be diverted through a recycling program, including: |

| | |
|---|---|
| | • Paper, cardboard and boxboard<br>• Beverage containers (aluminum, glass and plastic)<br>• Rigid plastic<br>• Metal (steel food cans)<br>• Glass (glass jars) |
| **Other Diversion Programs** | Materials that can be diverted by donating to reuse / thrift centres, or managed in another way to avoid being sent to landfill, including:<br><br>• Textiles (clothing, footwear, towels)<br>• Electronics<br>• Household Hazardous waste<br>• Glass food jars |
| **Landfill** | Materials correctly destined for the landfill, for which there are currently no diversion programs, including:<br><br>• Non-recyclable (NR) paper (waxy lined takeout containers)<br>• NR plastics (plastic film, garbage bags, items with no plastic recycling symbol #1-7, wrappers)<br>• NR metal (hangers)<br>• NR glass and ceramics<br>• Other waste (cigarette butts, rubber gloves, composite materials) |

## 4.1 Set Out Rate

Overall, 84 percent of the houses put garbage at the curb (78% in 2016), 38 percent of the houses put recycling at the curb (40% in 2016) and 58 percent of the houses put organics at the curb (56% in 2016).

In addition to recording the set-out rate, we also recorded the fullness of the garbage and organics cart. The most frequent fullness for the organic cart was 50 percent and the most frequent fullness for the garbage cart was 100 percent. Twenty-four residents only had one unit of recycling and fourteen had two or more units.

## 4.2 Garbage Stream Audit Results

Eighty-four houses in the sample set out black garbage carts with a total weight of 1403 kilograms. This represents an average of 14.9 kilograms per household compared to 11.8 kilograms per household in 2016, based on 100 households in the sample. This is an increase, but audits are a snapshot in time so other factors could be at play.

Figure 1 shows the breakdown of the garbage stream. This figure aligns with the 2016 technical memo. Figure 2 groups these materials by four classifications which is helpful in understanding

where further opportunities for diversion reside. Table 2 provides a detailed description of the proportion of various materials found in the overall garbage stream.

**Figure 1** – Garbage composition by sub-category

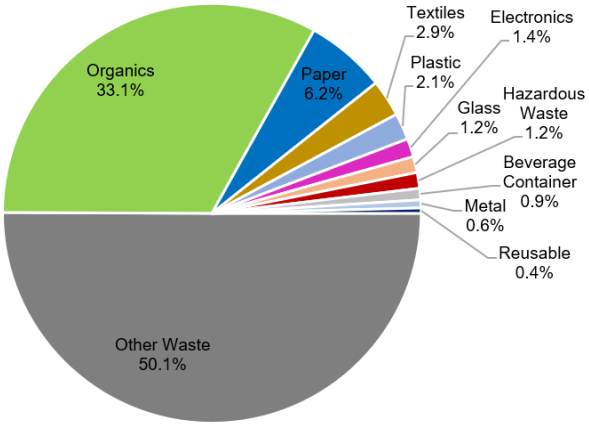



**Figure 2** – Garbage composition by classification

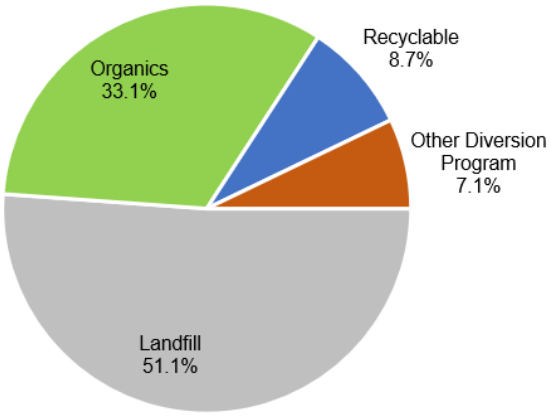



**Table 2** – Composition of the garbage stream in the black garbage dart

| Audit Sub-Categories | Kg. | % |
|---|---|---|
| **Organics** | **463.96** | **33.06%** |
| Inedible Food Waste | 138.20 | 9.85% |
| Edible Food Waste | 118.53 | 8.45% |
| Grass | 85.35 | 6.08% |
| Compostable Paper | 56.06 | 3.99% |
| Food In Packaging | 53.89 | 3.84% |
| Yard & Garden | 10.03 | 0.71% |
| Other Organic Material | 1.90 | 0.14% |
| **Recyclable** | **121.84** | **8.68%** |
| Mixed Paper | 63.67 | 4.54% |
| Cardboard | 23.07 | 1.64% |
| Rigid Plastic | 13.71 | 0.98% |
| Refundables | 12.35 | 0.88% |
| Metal Containers | 8.73 | 0.62% |
| Paper Shopping Bags | 0.31 | 0.02% |
| **Other Diversion Program** | **99.92** | **7.12%** |
| Clothing & Footwear | 29.64 | 2.11% |
| Other Electronics | 18.27 | 1.30% |

| | | |
|---|---|---|
| Food Jars | 17.34 | 1.24% |
| HHW Other | 12.17 | 0.87% |
| Household Textiles | 7.83 | 0.56% |
| Donatable Items | 5.68 | 0.40% |
| Aerosols | 4.85 | 0.35% |
| Other Textiles | 2.58 | 0.18% |
| E-Waste | 1.57 | 0.11% |

| **Landfill** | **717.70** | **51.14%** |
|---|---|---|
| Other Waste | 225.17 | 16.04% |
| Hygiene/Diapers/Pet Pads | 110.40 | 7.87% |
| Aggregates and Dirt | 107.24 | 7.64% |
| NR Plastic | 77.47 | 5.52% |
| Animal Waste Plastic Bag | 51.60 | 3.68% |
| NR Paper | 49.04 | 3.49% |
| C&D Waste | 38.98 | 2.78% |
| NR Metal | 21.79 | 1.55% |
| NR Glass & Ceramics | 20.95 | 1.49% |
| Flexible Plastic | 15.08 | 1.07% |

| **Grand Total** | **1403.42** | **100%** |
|---|---|---|

Below are the images of the garbage samples delivered to the sort location.

Wednesday

Thursday

Friday

GARBAGE AUDIT IMAGES | The following images are from the garbage stream and show materials that could be diverted from the landfill.

## Organic Material

33% of the material found in the garbage could be composted instead of sent to a landfill.


Edible food - bread and meat


Compostable paper

Food in packaging


Other Organic Waste; pet hair; chopsticks, popsicle sticks


Inedible food waste


Vegetables

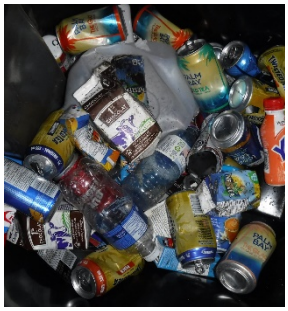
## Recyclables

Improvements can be made in residents' handling of recyclable materials; containers should not contain food debris

Rigid Plastic


Cardboard


Mixed paper


Beverage Containers

## Hazardous Waste and Special Handling

Aerosol cans

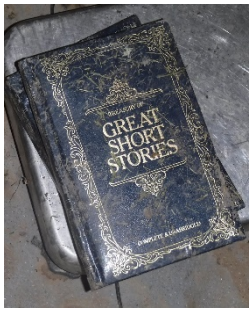
Flourescent tubes

## Textiles and Electronics

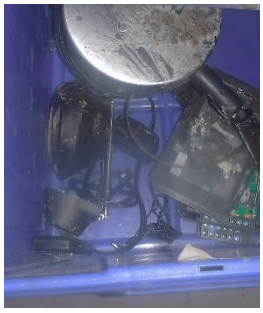
Textiles and electronics should not go to a landfill. They can be taken to the Eco Centre and donation centres.

Donatable items

Metal watering can,




Books



Electronics

## Landfill

Garden Hose

NR Metal - brake pads

Air Filter

NR Plastic-toys

Containers over half full with product

Cutting board

Flexible plastic

C&D Waste

## 4.3 Recycling Stream Audit Results

The thirty-eight dwellings that set out recycling had a combined total of 218 kilograms of material. This represents an average of 2.2 kilograms per household and in the 2016 audit the average was 2.8 kilograms, based on 100 households in the total sample. The recycling processor has made changes to what materials can be recycled, specifically the PET Flexible clamshells, since 2016. In 2016 there was a 17 percent contamination rate which included glass jars. In 2019 the contamination rate jumped to 12 percent with flexible plastic.

**Figure 3** depicts the overall composition of the recycling stream. Table 3 provides a detailed description of the proportion of various materials found in the overall recycling stream. Items that do not belong in the recycling cart are aggregated as contamination. Some examples of what we observed included wrappers, film, aerosol cans, sweater, black garbage bag and plastic shrink-wrapped cardboard. For the later item, residents need to be reminded to removed plastic before recycling the cardboard.

**Figure 3** – Recycling composition

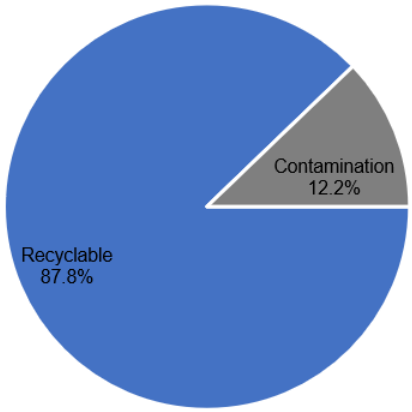



**Table 3** – Composition of the recycling stream in blue bags

| Audit Sub-Categories | Kg. | % |
|---|---|---|
| **Recyclable** | **192.29** | **87.82%** |
| Mixed Paper | 139.05 | 63.51% |
| Cardboard | 37.03 | 16.91% |
| Rigid Plastic | 9.22 | 4.21% |
| Metal Containers | 5.56 | 2.54% |
| Refundables | 1.18 | 0.54% |
| Paper Shopping Bags | 0.25 | 0.11% |
| **Contamination** | **26.67** | **12.18%** |
| NR Plastic | 8.09 | 3.69% |
| Other Waste | 6.37 | 2.91% |
| Food Jars | 5.56 | 2.54% |
| Contaminated Recycling | 2.32 | 1.06% |
| NR Paper | 2.26 | 1.03% |
| Flexible Plastic | 1.58 | 0.72% |
| Aerosols | 0.35 | 0.16% |
| NR Glass & Ceramics | 0.14 | 0.06% |
| Compostable Paper | 0.02 | 0.01% |
| **Grand Total** | **218.96** | **100.0%** |

Below are the images of the recycling samples delivered to the sort location.

Wednesday

Thursday

Friday

RECYCLING AUDIT CATEGORIES | The following images are from the recycling stream.

## Recyclable Material

80% of the recyclable material was paper followed by plastic and metal cans


Mixed paper


Metal containers

Rigid plastic containers

## Contamination

The recycling stream had 12% contamination and included materials like the following.

Electronic plug in

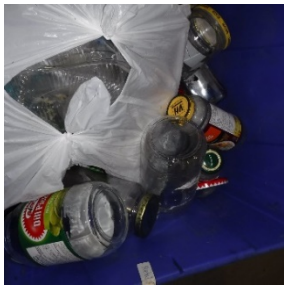
Textile, water bottle

Plastic wrap box

Flexible plastic

Aerosol cans

Film and food wrappers



Glass jars

Mixed material (composite) items

## 4.4 Organic Waste Stream Audit Results

The fifty-eight organic collection carts that were audited contained a total of 1.53 tonnes of material. This represents an average of 15.27 kilograms per household compared to 10.7 kilograms in 2016, based on 100 households. Contamination levels were minimal at 0.6 percent which is excellent compared to other City audits (Airdrie is at 2.2% which had 23% food waste and Devon was at 2.3% which had 2% food waste) and lower than the 2016 audit (1.1%). The weights could show some discrepancy because the Wednesday and Thursday audits were conducted while it was raining. A canopy was used to cover the organics, but the bins on the street in front of people's houses were exposed to the rain. Table 4 shows the composition of the organics stream.

**Table 4** – Composition of the organic stream in the organics cart

| Audit Sub-Categories | Kg. | % |
|---|---|---|
| **Organics** | **1,518.08** | **99.4%** |
| Grass | 1,008.49 | 66.0% |
| Yard & Garden | 394.16 | 25.8% |
| Inedible Food Waste | 63.99 | 4.2% |
| Edible Food Waste | 31.82 | 2.1% |
| Compostable Paper | 13.62 | 0.9% |
| Animal Waste | 3.55 | 0.2% |
| Mixed Paper | 2.46 | 0.2% |
| **Contamination** | **9.37** | **0.6%** |
| Other Waste | 7.66 | 0.5% |
| Animal Waste Plastic Bag | 1.29 | 0.1% |
| Donatable Items | 0.43 | 0.0% |
| NR Plastic | 0.00 | 0.0% |
| NR Paper | 0.00 | 0.0% |
| **Grand Total** | **1,527.45** | **100.0%** |

Below are the images of the organic samples delivered to the sort location.

Wednesday

Thursday

Friday

ORGANIC AUDIT CATEGORIES | The following images are from the organic stream. The contamination types were in smaller quantities compared to the previous audit in 2016.

## Organic Material

Over 90 percent of the organics was yard waste followed by inedible food waste and edible food.

Food waste in compostable bags

Root vegetables

Yard waste

Compostable paper

## Contamination

The organics stream had 0.6 percent contamination and included materials such as:

Garbage bag and film

Pet waste in plastic bags

# 5 Summer Audit comparison

Table 5 compares key results between the two audits to show how the City's programs have grown and developed. On a weekly basis the following was noted:

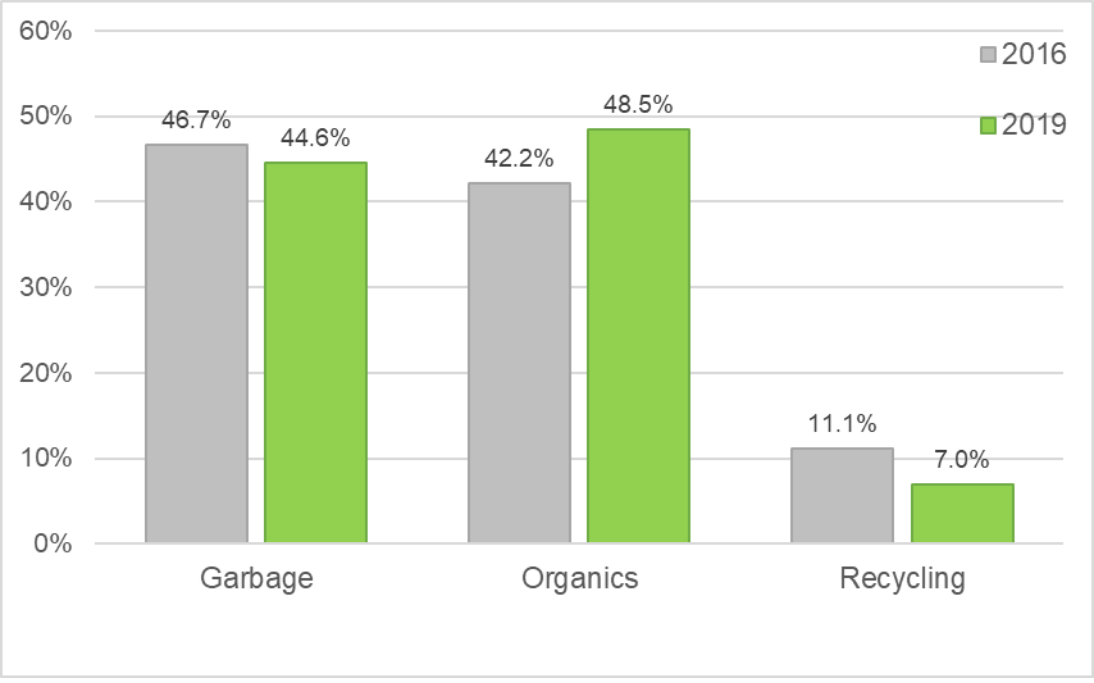
- Diversion rate improved 4% which was influenced by the amount of organics collected.
- Total waste was 60% more than the 2016 audit.
- There is an increase in the garbage per household for the sample compared to 2016.
- Cart set out rate for garbage increased 8% from 2016, 2% for organics from 2016 and decreased 2% for recycling.

**Table 5** – Summer waste audit comparison

| | 2019 | 2016 |
|---|---|---|
| Diversion Rate | 55% | 51% |
| Audit total waste sampled (tonnes) | 4.00 | 2.52 |
| Kilograms per household | | |
| garbage | 14.1 | 11.8 |
| organics* | 15.3 | 10.6 |
| recycling* | 2.2 | 2.8 |
| * no contamination removed | | |
| Set out rate | | |
| garbage | 84% | 78% |
| recycling | 38% | 40% |
| organics | 58% | 56% |

Figure 4 pictorially compares the summer audits between the two years, 2016 and 2019.

**Figure 4** – Comparison of waste generated between the two audits represented as a percentage of the total waste stream



The recycling program no longer includes flexible plastic materials as those items are currently more difficult to market and are not desired by the processor. The flexible plastic equated to 1.1% which now is ending up in the garbage stream.

Even though diversion is higher and there is more organics in the green cart, we need to look at what still remains in the garbage stream. Table 6 shows the capture rates of recyclables and organics. To achieve reduction in garbage tonnes to landfill residents need to utilize the green cart for organics.

**Table 6** - Capture rate for materials in the garbage stream

| Material Type | Diverted kg/wk/hh | Landfill kg/wk/hh | Capture Rate % | Landfilled tonnes per year[1] |
|---|---|---|---|---|
| Recyclables | 192.3 | 121.8 | 61% | 6.3 |
| Food Waste | 95.8 | 310.6 | 24% | 16.2 |
| Compostable Paper | 13.6 | 56.1 | 20% | 2.9 |

Note – 1- Calculation based on the summer waste audit composition results

Table 7 compares the contamination rates between audits for the recycling, organics and garbage streams. The organics has a low contamination rate at 0.6%, the recycling has a contamination rate of 12%, but the hauler would like this to be below 10%. The garbage audit shows that 49% of the materials could be diverted to existing programs.

**Table 7** – Comparison of waste streams between audits

Organics

| Classification | 2019 | 2016 |
|---|---|---|
| Organic | 99.4% | 98.9% |
| Contamination | 0.6% | 1.1% |

Recycling

| Classification | 2019 | 2016 |
|---|---|---|
| Recycling | 87.8% | 83% |
| Contamination | 12.2% | 17% |

Garbage

| Classification | 2019 | 2016 |
|---|---|---|
| Landfill | 51% | 42% |
| Contamination | 49% | 58% |
| Organics | 33% | 36% |
| Recycling | 9% | 13% |
| Other Diversion Programs | 7% | 9% |

## 6 Single-use Trends

The sampled households generated an estimated 11/kg/hh/yr of single-use items (based on summer audit results). Figure 5 depicts single-use items by type. The highest category of single-use items was plastic shopping bags at 37 percent. Of these plastic shopping bags, 79 percent were used once and 11 percent were used twice, meaning they were used to

hold garbage. Approximately 92 percent of single-use items are generated in the garbage stream and 8 percent are generated in the recycling stream, by weight. Approximately 2 percent of the overall waste stream consisted of single-use plastics. A full picture of the data from the single-use items audit can be found Appendix D.

**Figure 5** - The percentage of single-use items found in the waste stream by weight

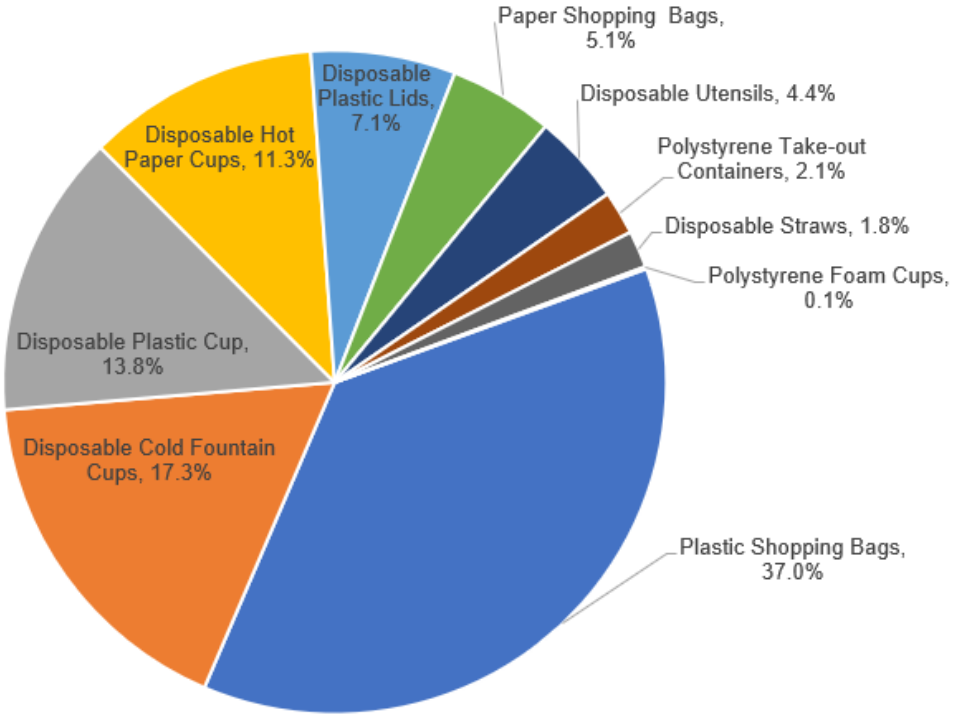
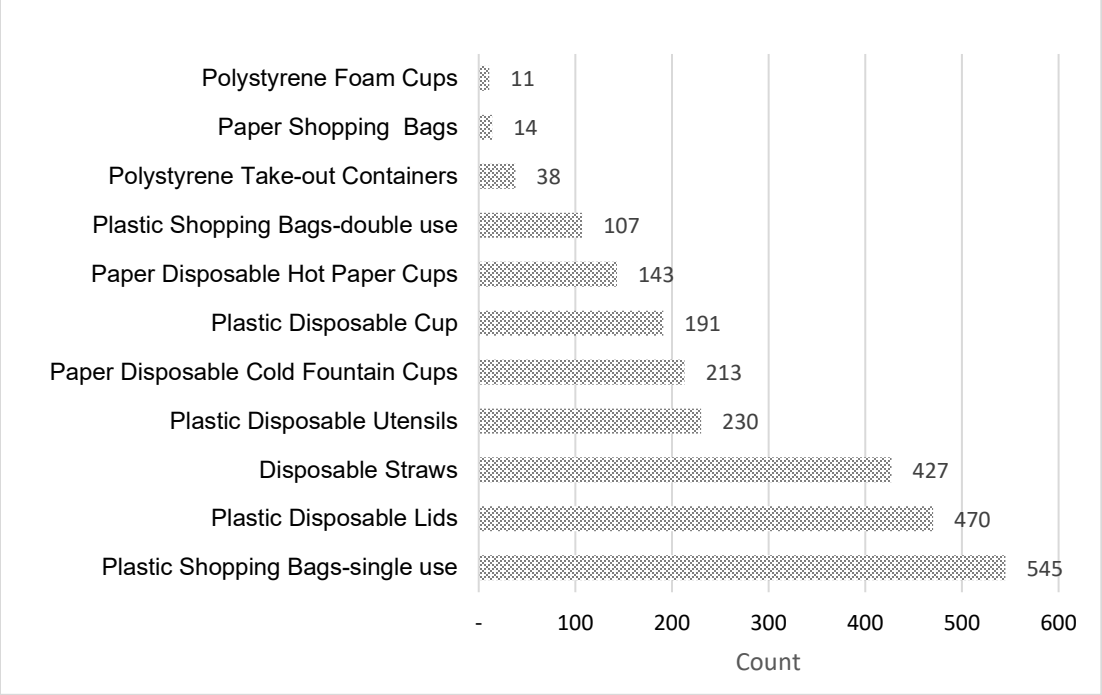



Figure 6 shows the count of single-use items found in the combined waste streams from one weeks worth of generation.

**Figure 6** – Single-use items found in the waste streams in one week




A full picture of the waste stream composition can be found in Appendix C.

## 7 Conclusions

S-Cubed Environmental team members collected garbage, recycling and organics in June of 2019.

On a weekly basis the following was noted:

- Average household sets out approximately 14.9 kg of garbage, 2.2 kg of recyclables and 15.3 kg of organics;
- Average household sets out approximately 14.9 kg of garbage with 13% (1.9 kg) consisting of recyclables and 33% (4.9 kg) consisting of organics;
- Average household sets out approximately 2.2 kg of recyclables with a contamination rate of 12.2% (0.3 kg) comprised of non-divertible other materials and organics;
- Average household sets out approximately 15.3 kg of organics with a contamination rate of 0.6% (9.2 kg) comprised of plastic films;
- The overall capture rate for recyclables generated by single family residential households is approximately 61%;
- The overall capture rate for green cart food waste generated by single family residential households is approximately 24%;
- About 49% of the garbage stream could be diverted to the blue bag or green cart programs;
- The current single-family curbside waste diversion rate is 55%, a 4% improvement, influenced by the amount of organics collected;
- Total waste sorted was 60% more than the 2016 audit an increase in the garbage per household for the sample compared to 2016;

- Garbage tonnage data for June 2019 and June 2016 show a 4.5 kilogram decrease in garbage per household suggesting that the households sampled generate more than the average Spruce Grove resident;
- Cart set out rate for garbage increased 8% from 2016, 2% for organics from 2016 and decreased 2% for recycling;
- Average fullness of the garbage cart was 100% and the fullness of the organics cart was 50%;
- Approximately 2% of single-family waste was single-use items, mostly consisting of plastic shopping bags.

It was observed that residents' garbage carts are full, but the levels of contamination show they do not use the other streams fully. If the program adapted garbage collection to every-other week and launched an education campaign, it would allow the residents to use the other streams fully with the aim to increase diversion.

## Appendix A: Glossary

**Blue Bag** – recyclable material that is sent to a processor for recycling

**Compost** – a soil-like substance from the breakdown of organic materials that takes place at a composting facility.

**Contamination** – items that are in a recycling or organics program that should not be in those programs.

**Garbage** – material that is sent to a landfill

**Green Organics Cart** – also referred to as the green cart, organics and compostable

**HH** – Households

**HHW** – Household Hazardous Waste

**Organics** – material that is biodegradable and can be processed at a composting facility to produce compost.

**Eco Centre** – a location for residents to divert items that are not accepted in the Blue Cart

**N.R.** – Non-recyclable

**Waste Composition or Waste Audit** – generic term describing the proportion of various materials in a given waste stream

## Appendix B: Audit Categories

| Category | Subcategory | Description |
|---|---|---|
| **Paper** | | |
| | Mixed Paper | Boxboard, envelops, paper, brown paper bags, egg carton, white paper, (Books if cover removed), shredded paper, Newsprint, Magazines, Flyers, coffee cup sleeves |
| | Cardboard | Needs to show corrugations |
| **Plastic** | | |
| | Flexible Plastics | Numbers 1, 4, 5, 6, 7 (if something is really brittle, flimsy, this should be in NR Plastic) |
| | Rigid Plastics | HDPE #2, PP #5 and rigid bottles PET#1 & LPDE #4 (non deposit) |
| **Metal** | | |
| | Metal Containers | Food cans, metal cookie tins, foil pie plates etc. NOT TIN FOIL |
| **Glass** | | |
| | Food Jars | Pickle jars |
| **Organics** | | |
| Count | Avoidable Food Waste | Sandwich |
| | Unavoidable Food Waste | Banana peel, bones |
| | Compostable paper | Parchment paper, food soiled napkins, paper plates, fast food packaging (i.e. French fry boxes, brown fast food bags) greasy pizza box, tissue or Kleenex, subway wrappers, shredded paper |
| | Paper shopping bags | New item to sort for in 2019 plus a count |
| | Food in Packaging | Sour cream container, dipping sauce containers, yogurt, cucumber in plastic wrap |
| | Grass | |
| | Animal Waste | In a compostable bag. |
| | Yard & Garden | Leaf, garden cleanup, small branches |
| | Other Organic Waste | Stir sticks, chop sticks, tooth picks, popsicle sticks, compostable plastic (PLA), rabbit bedding |
| **Beverage Containers** | | |
| | Refundables | Plastic, aluminum, tetra, pouches, glass |
| **Electronics** | | |
| | E-Waste | TV, Monitors, Computers, Servers, Laptops, Tablets, Printers, Plotters, Fax Machines, Photocopiers and Scanners |

| Category | Subcategory | Description |
|---|---|---|
| | Other E-Waste | Toothbrush, kitchen and power tools, Calculators, E-Book Readers, Answering Machines, Batteries (Rechargeable), Mobile Phones, Camcorders, CD Players, Circuit Boards, DVD Players, Microwaves, Pagers, Toner Cartridges, Telephones, VCR Video Recorders, Lead Acid Batteries |
| **Textiles** | | |
| | Clothing & Footwear | In a condition that could be donated |
| | Household Textiles | In a condition that could be donated |
| | Other Textiles | Rags and stained or ripped clothing |
| **Household Hazardous** | | |
| | Aerosols | Aerosol cans, butane cans |
| | Other HHW | Batteries, sharps, paint cans, medicine, Mercury items |
| **Reusable** | | |
| | Donatable items | Items that could be donated and reused. |
| **Landfill** | | |
| | Other Waste | Fines, mixed material items (binder), dentist masks, tape, glue, cig butts, elastics, rubber gloves, hand lotion tubes, mop head, office supplies i.e. pens, dryer lint, gum, popcorn bags, black rot, baby wipes, dental floss. Paint rollers. Dirty FOIL |
| | Non-Recyclable Plastic | Wrappers, chip bags, crunchy film, Zip bags, bread bags, cling-wrap, sandwich bags, candy wrappers, blister pak with no number, any plastic items with no #1-7 i.e. toys, cd cases |
| Count | Plastic shopping bags-single-use and double use | New item to sort for in 2019 plus a count |
| Count | Polystyrene take-out containers | New item to sort for in 2019 plus a count |
| Count | Polystyrene foam cups | New item to sort for in 2019 plus a count |
| Count | Plastic drink cups | New item to sort for in 2019 plus a count |
| Count | Disposable straws | New item to sort for in 2019 plus a count |
| Count | Disposable utensils | New item to sort for in 2019 plus a count |
| | Disposable lids | New item to sort for in 2019 plus a count |
| Count | Disposable stir sticks | New item to sort for in 2019 plus a count |
| | Non-Recyclable Paper | Pringles Container; cigarette foils, A&W wrappers, ice cream containers, dog food bags as they have a liner, waxy paper, ice cream box, tetra soup box, damaged gift bags with tassels |
| Count | Disposable cold paper fountain cups | New item to sort for in 2019 plus a count |
| Count | Disposable hot drink cups | New item to sort for in 2019 plus a count Paper Starbucks, Tim Hortons, Second Cup |

| Category | Subcategory | Description |
|---|---|---|
| | Non-Recyclable Glass & Ceramics | Window panes, fish tanks, coffee mugs and plates, incandescent light bulbs; |
| | Non-Recyclable Metal | Coat hanger, aluminum foil, and other metal. NOT DIRTY FOIL (other waste) |
| | C&D Waste | Drywall, singles, wood furniture (painted/stained), lumber |
| | Animal Waste | Plastic bag contained animal waste |
| | Hygiene/Diapers | Could also include pet pee pads |
| | Contaminated Recycling | Used for recycling stream |

## Appendix C: Summer 2019 Waste Audit Results

| Audit Sub-Categories | Organics Kg. | % | Garbage Kg. | % | Recycling Kg. | % | Total Kg | % |
|---|---|---|---|---|---|---|---|---|
| **Organics** | **1,515.62** | **99.23%** | **463.96** | **33.06%** | **0.02** | **0.01%** | **1,979.60** | **62.85%** |
| Grass | 1,008.49 | 66.02% | 85.35 | 6.08% | 0.00 | 0.00% | 1,093.84 | 34.73% |
| Yard & Garden | 394.16 | 25.81% | 10.03 | 0.71% | 0.00 | 0.00% | 404.19 | 12.83% |
| Inedible Food Waste | 63.99 | 4.19% | 138.20 | 9.85% | 0.00 | 0.00% | 202.19 | 6.42% |
| Edible Food Waste | 31.82 | 2.08% | 118.53 | 8.45% | 0.00 | 0.00% | 150.35 | 4.77% |
| Compostable Paper | 13.62 | 0.89% | 56.06 | 3.99% | 0.02 | 0.01% | 69.70 | 2.21% |
| Food In Packaging | 0.00 | 0.00% | 53.89 | 3.84% | 0.00 | 0.00% | 53.89 | 1.71% |
| Animal Waste | 3.55 | 0.23% | 0.00 | 0.00% | 0.00 | 0.00% | 3.55 | 0.11% |
| Other Organic Material | 0.00 | 0.00% | 1.90 | 0.14% | 0.00 | 0.00% | 1.90 | 0.06% |
| **Other Waste** | **8.95** | **0.59%** | **702.62** | **50.07%** | **19.17** | **8.76%** | **730.74** | **23.20%** |
| Other Waste | 7.66 | 0.50% | 225.17 | 16.04% | 6.37 | 2.91% | 239.19 | 7.59% |
| Hygiene/Diapers/Pet Pads | 0.00 | 0.00% | 110.40 | 7.87% | 0.00 | 0.00% | 110.40 | 3.50% |
| Aggregates and Dirt | 0.00 | 0.00% | 107.24 | 7.64% | 0.00 | 0.00% | 107.24 | 3.40% |
| NR Plastic | 0.00 | 0.00% | 77.47 | 5.52% | 8.09 | 3.69% | 85.55 | 2.72% |
| Animal Waste Plastic Bag | 1.29 | 0.08% | 51.60 | 3.68% | 0.00 | 0.00% | 52.89 | 1.68% |
| NR Paper | 0.00 | 0.00% | 49.04 | 3.49% | 2.26 | 1.03% | 51.29 | 1.63% |
| C&D Waste | 0.00 | 0.00% | 38.98 | 2.78% | 0.00 | 0.00% | 38.98 | 1.24% |
| NR Metal | 0.00 | 0.00% | 21.79 | 1.55% | 0.00 | 0.00% | 21.79 | 0.69% |
| NR Glass & Ceramics | 0.00 | 0.00% | 20.95 | 1.49% | 0.14 | 0.06% | 21.09 | 0.67% |
| Contaminated Recycling | 0.00 | 0.00% | 0.00 | 0.00% | 2.32 | 1.06% | 2.32 | 0.07% |
| **Paper** | **2.46** | **0.16%** | **87.05** | **6.20%** | **176.33** | **80.53%** | **265.84** | **8.44%** |
| Mixed Paper | 2.46 | 0.16% | 63.67 | 4.54% | 139.05 | 63.51% | 205.18 | 6.51% |
| Cardboard | 0.00 | 0.00% | 23.07 | 1.64% | 37.03 | 16.91% | 60.10 | 1.91% |

| Audit Sub-Categories | Organics Kg. | % | Garbage Kg. | % | Recycling Kg. | % | Total Kg | % |
|---|---|---|---|---|---|---|---|---|
| Paper Shopping Bags | 0.00 | 0.00% | 0.31 | 0.02% | 0.25 | 0.11% | 0.56 | 0.02% |
| **Textiles** | **0.00** | **0.00%** | **40.05** | **2.85%** | **0.00** | **0.00%** | **40.05** | **1.27%** |
| Clothing & Footwear | 0.00 | 0.00% | 29.64 | 2.11% | 0.00 | 0.00% | 29.64 | 0.94% |
| Household Textiles | 0.00 | 0.00% | 7.83 | 0.56% | 0.00 | 0.00% | 7.83 | 0.25% |
| Other Textiles | 0.00 | 0.00% | 2.58 | 0.18% | 0.00 | 0.00% | 2.58 | 0.08% |
| **Plastic** | **0.00** | **0.00%** | **28.79** | **2.05%** | **10.80** | **4.93%** | **39.59** | **1.26%** |
| Rigid Plastic | 0.00 | 0.00% | 13.71 | 0.98% | 9.22 | 4.21% | 22.93 | 0.73% |
| Flexible Plastic | 0.00 | 0.00% | 15.08 | 1.07% | 1.58 | 0.72% | 16.66 | 0.53% |
| **Glass** | **0.00** | **0.00%** | **17.34** | **1.24%** | **5.56** | **2.54%** | **22.90** | **0.73%** |
| Food Jars | 0.00 | 0.00% | 17.34 | 1.24% | 5.56 | 2.54% | 22.90 | 0.73% |
| **Electronics** | **0.00** | **0.00%** | **19.84** | **1.41%** | **0.00** | **0.00%** | **19.84** | **0.63%** |
| Other Electronics | 0.00 | 0.00% | 18.27 | 1.30% | 0.00 | 0.00% | 18.27 | 0.58% |
| E-Waste | 0.00 | 0.00% | 1.57 | 0.11% | 0.00 | 0.00% | 1.57 | 0.05% |
| **Hazardous Waste** | **0.00** | **0.00%** | **17.02** | **1.21%** | **0.35** | **0.16%** | **17.37** | **0.55%** |
| HHW Other | 0.00 | 0.00% | 12.17 | 0.87% | 0.00 | 0.00% | 12.17 | 0.39% |
| Aerosols | 0.00 | 0.00% | 4.85 | 0.35% | 0.35 | 0.16% | 5.20 | 0.16% |
| **Metal** | **0.00** | **0.00%** | **8.73** | **0.62%** | **5.56** | **2.54%** | **14.29** | **0.45%** |
| Metal Containers | 0.00 | 0.00% | 8.73 | 0.62% | 5.56 | 2.54% | 14.29 | 0.45% |
| **Beverage Container** | **0.00** | **0.00%** | **12.35** | **0.88%** | **1.18** | **0.54%** | **13.53** | **0.43%** |
| Refundables | 0.00 | 0.00% | 12.35 | 0.88% | 1.18 | 0.54% | 13.53 | 0.43% |
| **Reusable** | **0.43** | **0.03%** | **5.68** | **0.40%** | **0.00** | **0.00%** | **6.11** | **0.19%** |
| Donatable Items | 0.43 | 0.03% | 5.68 | 0.40% | 0.00 | 0.00% | 6.11 | 0.19% |
| **Grand Total** | **1,527.45** | **100%** | **1,403.42** | **100%** | **218.96** | **100%** | **3,149.82** | **100%** |

# Appendix D: Summer 2019 Single-Use Audit Results

| Audit Micro-Categories | Organic Item Count | Garbage Item Count | Kg. | % | Recycling Item Count | Kg. | % | Total Item Count | Total Kg. | Total % |
|---|---|---|---|---|---|---|---|---|---|---|
| **Total NR Plastic** | 1 | 1,933 | 77.47 | 5.52% | 89 | 8.16 | 3.73% | 2,171 | 88.11 | 64.13% |
| Non Single Use NR Plastic | - | | 63.49 | 4.52% | | 7 | 0.92 | | 71 | 0.81 |
| Plastic Shopping Bags | - | 615 | 7.84 | 0.56% | 37 | 0.29 | 0.13% | 652 | 8.13 | 9.22% |
| Plastic Disposable Cup | - | 179 | 2.82 | 0.20% | 12 | 0.22 | 0.10% | 191 | 3.04 | 3.45% |
| Plastic Disposable Lids | - | 452 | 1.48 | 0.11% | 18 | 0.07 | 0.03% | 470 | 1.55 | 1.76% |
| Plastic Disposable Utensils | - | 230 | 0.97 | 0.07% | - | 0.00 | 0.00% | 230 | 0.97 | 1.10% |
| Polystyrene Take-out Containers | - | 38 | 0.47 | 0.03% | - | 0.00 | 0.00% | 38 | 0.47 | 0.53% |
| Disposable Straws | 1 | 408 | 0.38 | 0.03% | 18 | 0.02 | 0.01% | 427 | 0.40 | 0.45% |
| Polystyrene Foam Cups | - | 11 | 0.03 | 0.00% | - | 0.00 | 0.00% | 11 | 0.03 | 0.03% |
| **Total NR Paper** | 4 | 348 | 46.07 | 3.28% | - | 2.18 | 1.00% | 211 | 48.73 | 35.47% |
| Non Single Use NR Paper | - | - | 42.28 | 3.01% | - | 2.18 | 1.00% | - | 44.46 | 91.23% |
| Paper Disposable Cold Fountain Cups | 1 | 212 | 3.79 | 0.27% | - | 0.00 | 0.00% | 138 | 2.52 | 5.17% |
| Paper Disposable Hot Cups | 3 | 136 | 2.42 | 0.17% | 4 | 0.08 | 0.03% | 66 | 1.20 | 2.46% |
| **Recyclable Paper** | - | | 0.56 | 0.04% | - | 0.00 | 0.00% | 7 | 0.56 | 1.14% |
| Paper Shopping Bags | - | 12 | 0.87 | 0.06% | 2 | 0.25 | 0.11% | 7 | 0.56 | 0.41% |
| **Total count & kg of single use items** | 5 | 2,293 | 21.06 | | 91 | 0.92 | | 2,389 | 18.86 | |