



Essex-Windsor

4 Season 2022/2023 Waste Composition Summary Report

Prepared for

Essex -Windsor Solid Waste Authority

Prepared by

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EXECUTIVE SUMMARY

AET Group Inc. (AET) conducted a 4 Season 2022/2023 curbside residential waste composition study for Stewardship Ontario in collaboration with Essex-Windsor Solid Waste Authority (EWSWA). All four-season audits consisted of two consecutive 5-day sampling periods. This report summarizes the data collected and analyzed for the 4 seasons.

The key findings of the study are as follows:

Participation Results:

- Garbage Stream – on average, 153 households set out over the course of the four seasons with 0.96 full container equivalents disposed per household every week.
- Fibres Recycling Stream – on average, 63 households set out over the course of the four seasons with 0.84 full container equivalents generated per household every week.
- Containers Recycling Stream – on average, 63 households set out over the course of the four seasons with 0.67 full container equivalents generated per household every week.
- Of all the 4 seasons, Fall 2022 had the highest average participation rate of 74.00% across all the streams. Summer 2023 had the lowest participation rate of 63.88%. Average participation rate for all the seasons in all the streams is 70.33%.

Garbage Stream Composition:

- The average quantity of material generated in the garbage stream by a single-family household over the four seasons is 10.34 kg/hh/wk or 539.12 kg/hh/yr.
- Organic materials (currently accepted in the garbage stream, as there is no source separated organics program) represented on average 48.25% of the garbage stream over four seasons, which equals 4.98 kg/hh/wk or 260.12 kg/hh/yr. This includes items such as food waste and other organics.
- Recyclable materials represent an average 12.22% of the garbage stream by weight at 1.27 kg/hh/wk or 66.04 kg/hh/yr.

Fibres Stream Composition:

- The average quantity of material generated in the fibres stream by a single-family household over four seasons is 1.51 kg/hh/wk or 78.91 kg/hh/yr.
- The average contamination rate was 2.82% over the four seasons. The contamination rate was highest during the summer season, and lowest during the winter season.
- Average cross-contamination in fibres recycling stream over four seasons is 0.71 kg/hh/yr. Opportunity exists for these materials to be placed in the containers stream for recycling.

Containers Stream Composition:

- The average quantity of material generated in the containers stream by a single-family household over the four seasons is 1.02 kg/hh/wk or 53.67 kg/hh/yr.
- The average contamination rate was 10.17% over the four seasons. The contamination rate was highest during spring season and lowest during the winter season.
- Average cross contamination in the containers stream over four seasons is 3.71 kg/hh/yr. Opportunity exists for these materials to be placed in the fibres stream for recycling.

Diversion Rates & Capture Rates:

- Single family households generate an average of 12.87 kg/hh/wk or 671.08 kg/hh/yr of waste (garbage, fibers recycling, and containers recycling combined). Of that, a total of 2.40 kg/hh/wk or 124.89 kg/hh/yr is diverted from landfill, equaling a diversion rate of 18.61%.
- Fall 2022 had the highest diversion rate with 20.34% and Spring 2023 had the lowest at 17.23%.
- 63.49% of all acceptable recyclable fibres and containers were properly captured in the recycling streams over the course of the four-season audits.

1.0 INTRODUCTION

1.1 Definitions

Accepted: Material allowed in EWSWA diversion programs.

Red Box Recycling: It is a part of the EWSWA two stream recycling program. It accepts paper products including; newspapers, mixed fine paper, shredded paper in a bag, magazines and catalogues, telephone books, junk mail, unsoiled boxboard, unsoiled corrugated cardboard, and other recyclable paper packaging. This stream is collected bi-weekly.

Blue Box Recycling: It is a part of the EWSWA two stream recycling program. It accepts recyclable containers including spiral wound containers, aseptic/gable top containers, empty aerosol containers, aluminum cans and foil/trays, steel cans, empty metal paint cans, plastic jugs, plastic tubs and lids, plastic bottles, clamshells and trays, buckets/pails, plastic cups, and glass bottles and jars. This stream is collected bi-weekly.

Capture Rate: The capture rate is the percentage of a specified material collected in a diversion program, out of the total amount of that material generated.

$$\left(\frac{\text{weight of specified material diverted}}{\text{total weight of specified material generated}} \right) \times 100\%$$

Contamination Rate: Percentage of total material that is not accepted in the identified stream.

$$\left(\frac{\text{unsuitable materials in the diversion stream}}{\text{total weight of material in the diversion stream}} \right) \times 100\%$$

Cross-Contamination Rate: Percentage of total material in a specified diversion stream that is unsuitable in that stream but it can be accepted in one of the other waste diversion streams (e.g. Plastic bottles in Red Boxes, newspaper in the Blue Boxes, etc.)

Diversion Rate: Percentage of total material that is diverted from landfill through programs such as recycling or green bin program.

$$\left(\frac{\text{weight of material diverted}}{\text{total weight of all material generated}} \right) \times 100\%$$

Divertible Material: Material that is accepted in the waste diversion programs offered by EWSWA. This includes accepted blue box recycling, red box recycling, and leaf & yard waste. Materials (e.g. household hazardous waste, textiles, scrap metal, etc.) that may be diverted through other reuse or recycling programs that are not a part of curbside collection are not considered divertible in this study.

Garbage Stream: Material set-out at curb side for disposal to landfill. Ideally, this stream should contain material that is not accepted in the blue box recycling, red box recycling or leaf and yard waste programs. These materials are collected on a weekly basis.

| | |
|---------------------------------------|--|
| Household Hazardous Waste: | Materials that are hazardous and cannot be safely collected or disposed of through EWSWA's curbside collection program. Motor Oil is collected seasonally during the recycling collection. |
| Item: | An object or collection of objects within a bag or container that can be loaded onto the hauler's vehicle as one complete unit (e.g. one container/bag of garbage, one piece of furniture, etc.). |
| Landfilled Material: | The total quantity of all material sent to landfill. It incorporates both the waste in the garbage stream and in the bulky item streams, and contamination in the recycling and organics streams. |
| Leaf and Yard Waste: | Leaf and yard waste consists of compostable material that is collected from yards and gardens. Often, this material includes larger and bulkier items than the green bin organics stream and its generation varies greatly from season to season, such as leaves, grass clippings, brush, branches and twigs. |
| Number of Households: | The total quantity of households included in the audit over the two-week sample period. |
| Number of Unique Households: | The total number of households selected for sampling by EWSWA. Even if a household was sampled twice over the two-week period for organics, it would only be recorded as one unique household. |
| Participation Rate: | <p>The percentage of residents who set out material in a given stream at least once over the two-week sample period. The number of unique households includes all houses included in the sample size regardless of them setting out material or not.</p> $\left(\frac{\text{number of unique households that set out material}}{\text{total number of unique households sampled}} \right) \times 100\%$ |
| Set-out Rate: | <p>The percentage of residents who set out material in a given stream each week during the two-week sample period. The information on each households waste is recorded during curbside collection. This information is expressed as the total number of items per household per week (items/hh/wk) and the total full container equivalents per household per week (FCE/hh/wk). The number of households sampled includes all houses included in the sample size regardless of them setting out material or not.</p> <p>Items/hh/wk: $\left(\frac{\text{total number of items}}{\text{total number of households sampled}} \right) \div 2 \text{ weeks}$</p> <p>FCE/hh/wk: $\left(\frac{\text{total \# of full containers equivalent}}{\text{total number of households sampled}} \right) \div 2 \text{ weeks}$</p> |
| Overall Waste Set Out Profile: | It is the total weights of materials generated in all streams (Garbage, Blue Box, Red Box). This only assesses the weights of materials disposed in that specific stream and does not reflect any contamination |

| | |
|---------------------------------|---|
| Blue Box Equivalency: | The fullness equivalency value of the blue box was based on the 22-gallon bin that residents set out biweekly. |
| Red Box Equivalency: | The fullness equivalency value of the red box was based on the 16-gallon bin that residents set out biweekly. |
| Garbage Equivalency: | The fullness value of the garbage was based on the standard 95-gallon cart and/or bags that residents set out weekly. |
| Non-Recyclable Plastics: | The types of plastic materials which are not accepted in the current recycling stream. Examples are polystyrene products (#6 plastics), plastic film packaging, other rigid packaging, etc. |

1.2 Background

Stewardship Ontario in collaboration with Essex-Windsor Solid Waste Authority (EWSWA) contracted AET Group Inc. (AET) to conduct waste composition study in Essex-Windsor County that focused on single family residential waste set out for curbside collection. Material from single family residential sources were sampled over two consecutive five-day sampling periods in Fall 2022, Winter 2023, Spring 2023, and Summer 2023. The collection frequency of each stream is listed in Table 1.1. The dates of each study period are listed in Table 1.2. Table 1.3 below lists the total amounts of homes and the areas where they were sampled from during the 2022/2023 study period. 2 sample areas were chosen in Kingsville to balance the schedule evenly from Monday to Friday.

Table 1.1. Collection Frequency of Source Separation

| Stream | Collection Frequency |
|---------------------------------|--|
| Garbage & Bulky Items | Every 7 days |
| Recycling (Fibres & Containers) | Every 14 days (Seasonal) |
| Leaf and Yard Waste | Every 14 days (Seasonal) |
| Christmas Tree Collection | Drop off at designated Municipal locations |

Table 1.2. Dates of Studies in 2022/2023

| Season | Audit Dates |
|-------------|------------------------|
| Fall 2022 | 11/21/2022 - 12/2/2022 |
| Winter 2023 | 1/16/2023 - 1/27/2023 |
| Spring 2023 | 5/8/2023 - 5/19/2023 |
| Summer 2023 | 9/11/2023 - 9/22/2023 |

Table 1.3. Sample Areas and Total Homes

| Municipality; Street | Number of Homes |
|-----------------------------|-----------------|
| Windsor; Spring Garden Rd. | 10 |
| Windsor; Barcelona Cres. | 10 |
| LaSalle; Orford Rd. | 10 |
| Leamington; Mersea Rd | 10 |
| Windsor; Willistead Cres | 10 |
| Kingsville, Woodfern Ave. | 10 |
| Kingsville, Queen Blvd | 10 |
| Windsor; Robinet Rd | 10 |
| Windsor; Sandpoint Ct. | 10 |
| Lakeshore; Lakeshore Rd 225 | 10 |
| Total | 100 |

Waste and recyclable materials were collected curbside from the designated study areas each day and transported to the Service Bay area at the Essex-Windsor Regional Landfill located at 7700 County Rd 18, Essex ON, N0R 1G0. The curbside waste composition study included collecting and sorting garbage and recycling (both fibres and containers) and maintaining a collection log for each sample area noting collection date, the waste generation period, the weather conditions, and the collection team members. At each residence, the number of items and approximate bin fullness was also recorded on the collection log sheet for each material stream.

The objectives of the curbside waste composition study were to:

- Collect accurate single-family residential waste composition data through the identification of types and quantities of generated waste.
- Calculate various performance measures such as generation, diversion, capture, contamination rates.
- Identify successes and challenges of waste management and diversion programs and
- Develop a 4-season report to detail the findings and provide recommendations for improvements to waste management and diversion programs.

This report summarizes and compares findings and results between the four seasons in which waste audits were completed for Essex-Windsor Solid Waste Authority. This report aims to summarize conclusions and offer recommendations based on multiple studies with comparable data.

2.0 APPROACH AND METHODOLOGY

2.1 Waste Sampling Process

Over the course of the four seasonal audit events, AET's team collected garbage generated over an average of 7 days from single-family residential households and recycling materials generated over an average of 14 days from single-family residential households over the two-week sampling period in Fall 2022, Winter 2023, Spring 2023, and Summer 2023. All garbage and recycling materials were collected from the curbside of the single-family residential houses. The collected material was moved to a Service Bay of Regional Landfill where each waste stream was sorted separately.

2.2 Collection Log

Key information was recorded for each sample area including the collection date, the waste generation period, the weather conditions, and the collection team. At each residence, the number of items and approximate bin fullness was also recorded on the collection log sheet for each material stream. After all surveying and collection was complete, the auditors would revisit each sample area up to two additional times to ensure that no material was missed.

An analysis of the collection data provided total number of items set out, total full container equivalents, total number of households with a set-out and total full container equivalents per household during each seasonal study period.

2.3 Material Sorting Process

All material collected during the 7 days (Garbage) and 14 days (Recycling) sampling period of each season of the study year was sorted and weighed in the Service Bay area at the Essex-Windsor Regional Landfill located at 7700 County Rd 18, Essex ON, N0R 1G0. All collected garbage and recycling materials were sorted and weighed separately. Samples were collected and sorted based on the material i.e., Garbage, fibres, and containers.

Samples were sorted into 7 major waste groups, consisting of 50 individual categories. The full list of sort categories can be found in Appendix B.

Separated/sorted waste was placed in blue boxes and totes, based on the 50 categories, and weighed individually. A digital scale, with precision to 0.01 kg, was used to weigh the sorted waste material. Once all the waste material was classified and weighed, it was disposed of in the appropriate recycling or garbage bins provided on-site.

2.4 Assumptions & Calculations

This audit assumes that the selected households are representative of the composition of waste generated by single family residential properties in the Municipality of Essex-Windsor.

The following calculations were used to calculate the overall generation of waste.

Calculations:

Household Generation Days:

Number of households × Generation Period

Weekly Waste Generation (kg/hh/wk):

$$\left(\frac{\text{Sample Weight (kg)}}{\text{Household Generation Days}} \right) \times (7 \text{ Days})$$

Yearly Waste Generation (kg/hh/yr):

$$\left(\frac{\text{Sample Weight (kg)}}{\text{Household Generation Days}} \right) \times (365 \text{ Days})$$

Diversion Rate:

$$\left(\frac{\text{Weight of Accepted Material in Diversion Stream(s)}}{\text{Weight of all Material Generated}} \right) \times 100\%$$

Capture Rate:

$$\left(\frac{\text{Weight of Recyclable Material Diverted}}{\text{Weight of Recyclable Material Generated}} \right) \times 100\%$$

Participation Rate:

$$\left(\frac{\text{Number of Unique Households that Set Out Material}}{\text{Total Number of Unique Households Samples}} \right) \times 100\%$$

3.0 RESULTS AND DISCUSSION

Results shown in this section are summarized into primary and secondary categories. Detailed audit sort results by material sub-category are available in Appendix A. Please note that for the purposes of this study, materials have been classified as 'recyclable', or 'non-divertible' based on their acceptance into the current recycling program.

For illustrative purposes, some of the results have been extrapolated to estimated generation rates of kilograms per household per week (kg/hh/wk) and kilograms per household per year (kg/hh/yr).

3.1 Participation and Set-out Rates

A total of 100 households were sampled, over the two-week period. Garbage was collected weekly (7 days of generation period) and recycling was collected biweekly (14 days of generation period).

During collection of the sample, auditors noted the number of set-outs, number of items, equivalency of the material to full containers for all the streams. Table 3.1 summarizes number of households sampled during the two-week audit period. If a Hauler collected a sample prior to AET's arrival at the street or a house opted out during the study. This would modify the Number of Houses sampled during a particular season. The only season that didn't have any hauler issues or opt outs was Fall 2022.

Table 3.1 Number of Households Sampled over four season of 2022-2023

| Season | Number of Households Sampled | | |
|-------------------------|------------------------------|------------|------------|
| | Garbage | Fibres | Containers |
| Fall 2022 | 200 | 100 | 100 |
| Winter 2023 | 180 | 90 | 90 |
| Spring 2023 | 179 | 99 | 99 |
| Summer 2023 | 199 | 99 | 98 |
| 4-Season Total | 758 | 388 | 387 |
| 4-Season Average | 190 | 97 | 97 |

Table 3.2 summarizes all four-season participation and set-out data which also include details of number of items and equivalents. Garbage stream had the highest participation with 80.61% set out from the sampled households.

Table 3.2 Four Season Participation and Set-out Summary

| 4 Season 2022/2023 | Garbage | Fibres | Containers |
|---|---------|--------|------------|
| Total number of households sampled | 758 | 388 | 387 |
| Total number of household set-outs | 611 | 252 | 253 |
| Total number of items | 879 | 355 | 325 |
| A - Total number of full container equivalents | 727.25 | 327 | 257.75 |
| B - Average number of items/hh/wk | 1.16 | 0.91 | 0.84 |
| C - Average number of full container equivalents/hh/wk | 0.96 | 0.84 | 0.67 |
| D- Average number of full container equivalents/set out | 1.19 | 1.30 | 1.02 |
| Participation Rate | 80.61% | 64.95% | 65.37% |

B- Average # of Items/hh/wk = Total # of items / Total # of hh's sampled.

C – Average # of full container equivalents /hh/wk = A / Total # of hh's sampled

D- Average # of full container equivalents /set out = A / Total # of hh's set out

Participation Rate = Total # of hh set outs / Total # of hh's sampled

Table 3.3 illustrates the garbage stream participation and set-out rates by single family households over the course of the four seasons. Spring 2023 had the highest participation rate of 84.36%, and the average overall participation rate was 80.61% across all four seasons.

Table 3.3 Garbage Stream Participation and Set-out Rates.

| Garbage | Fall 2022 | Winter 2023 | Spring 2023 | Summer 2023 | 4 Season Average |
|--|-----------|-------------|-------------|-------------|------------------|
| Total number of households sampled | 200 | 180 | 179 | 199 | 190 |
| Total number of household set-outs | 166 | 151 | 151 | 143 | 153 |
| Total number of items | 246 | 207 | 218 | 208 | 220 |
| Total number of full container equivalents | 214 | 174 | 179 | 160 | 182 |
| Average number of items/hh/wk | 1.23 | 1.15 | 1.22 | 1.05 | 1.16 |
| Average number of full container equivalents/hh/wk | 1.07 | 0.97 | 1.00 | 0.81 | 0.96 |
| Average number of full container equivalents/set out | 1.29 | 1.15 | 1.18 | 1.12 | 1.19 |
| Participation Rate | 83.00% | 83.89% | 84.36% | 71.86% | 80.61% |

Table 3.4 illustrates the fibre stream participation and set-out rates by single family households over the course of the four seasons. Fall 2022 had the highest participation of 71.00%, and the average participation rate was 64.95% across all four seasons.

Table 3.4 Fibre Stream Participation and Set-out Rates.

| Fibres | Fall 2022 | Winter 2023 | Spring 2023 | Summer 2023 | 4 Season Average |
|--|-----------|-------------|-------------|-------------|------------------|
| Total number of households sampled | 100 | 90 | 99 | 99 | 97 |
| Total number of household set-outs | 71 | 55 | 66 | 60 | 63 |
| Total number of items | 108 | 82 | 93 | 72 | 89 |
| Total number of full container equivalents | 101 | 76 | 83 | 68 | 82 |
| Average number of items/hh/wk | 1.08 | 0.91 | 0.94 | 0.73 | 0.91 |
| Average number of full container equivalents/hh/wk | 1.01 | 0.84 | 0.84 | 0.68 | 0.84 |
| Average number of full container equivalents/set out | 1.42 | 1.38 | 1.25 | 1.13 | 1.30 |
| Participation Rate | 71.00% | 61.11% | 66.67% | 60.61% | 64.95% |

Table 3.5 illustrates the containers stream participation and set-out rates by single family households over the course of the four seasons. Fall 2022 had the highest participation of 68.00%, and the average participation rate was 65.37% across all four seasons.

Table 3.5 Containers Stream Participation and Set-out Rates.

| Containers | Fall 2022 | Winter 2023 | Spring 2023 | Summer 2023 | 4 Season Average |
|--|-----------|-------------|-------------|-------------|------------------|
| Total number of households sampled | 100 | 90 | 99 | 98 | 97 |
| Total number of household set-outs | 68.00 | 59.00 | 68.00 | 58.00 | 63 |
| Total number of items | 92 | 80 | 79 | 74 | 81 |
| Total number of full container equivalents | 73 | 64 | 63 | 58 | 64 |
| Average number of items/hh/wk | 0.92 | 0.89 | 0.80 | 0.76 | 0.84 |
| Average number of full container equivalents/hh/wk | 0.73 | 0.71 | 0.64 | 0.59 | 0.67 |
| Average number of full container equivalents/set out | 1.07 | 1.09 | 0.93 | 1.00 | 1.02 |
| Participation Rate | 68.00% | 65.56% | 68.69% | 59.18% | 65.37% |

Table 3.6 illustrates the overall material set-out rates for all waste streams for Essex Windsor Solid Waste Authority single family households sampled. This information only assesses the set-out rate of materials in that specific stream and does not reflect any contamination (i.e., recyclables in the garbage, non-divertible items in the recycling, etc.) placed in each stream. Over the course of the four seasonal audits, more than half of the households set-out their garbage, fibres and containers for pickup with a rate of 80.61%, 64.95% and 65.37% respectively.

Table 3.6 Waste Set-outs Rates 2023

| Seasons | Garbage | Fibres | Containers |
|--------------------------|---------------|---------------|---------------|
| Fall 2022 | 83.00% | 71.00% | 68.00% |
| Winter 2023 | 83.89% | 61.11% | 65.56% |
| Spring 2023 | 84.36% | 66.67% | 68.69% |
| Summer 2023 | 71.86% | 60.61% | 59.18% |
| 4-Seasons Average | 80.61% | 64.95% | 65.37% |

3.2 Overall Waste Generation Profile

Table 3.7 and 3.8 illustrate the overall generation rates for all waste streams for EWSWA. This information only assesses the weights of materials disposed in that specific stream and does not reflect any contamination (i.e., recyclables in the garbage, non-divertible items in the recycling, etc.) placed in each stream. Over the course of the four seasonal audits, an average of 10.33 kg/hh/wk of garbage is disposed, 1.51 kg/hh/wk of fibres is recycled, and 1.03 kg/hh/wk of containers is recycled in their respective streams.

Table 3.7 Disposed red and blue box recyclables (kg/hh/wk) in each stream

| Material Stream | Fall Weight (kg/hh/wk) | Winter Weight (kg/hh/wk) | Spring Weight (kg/hh/wk) | Summer Weight (kg/hh/wk) | 4 Season Average Weight (kg/hh/wk) |
|-----------------|------------------------|--------------------------|--------------------------|--------------------------|------------------------------------|
| Garbage | 9.63 | 10.43 | 11.43 | 9.82 | 10.33 |
| Fibres | 1.63 | 1.45 | 1.54 | 1.44 | 1.51 |
| Containers | 1.01 | 1.04 | 1.07 | 0.99 | 1.03 |
| Total | 12.27 | 12.92 | 14.04 | 12.25 | 12.87 |

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Table 3.8 Disposed red and blue box recyclables (kg/hh/yr)

| Material Stream | Fall Weight (kg/hh/yr) | Winter Weight (kg/hh/yr) | Spring Weight (kg/hh/yr) | Summer Weight (kg/hh/yr) | 4 Season Average Weight (kg/hh/yr) |
|-----------------|---------------------------|--------------------------------|--------------------------------|--------------------------------|---|
| Garbage | 502.16 | 543.89 | 595.79 | 512.17 | 538.50 |
| Fibres | 85.02 | 75.50 | 80.10 | 75.04 | 78.91 |
| Containers | 52.87 | 54.27 | 56.05 | 51.47 | 53.67 |
| Total | 640.05 | 673.66 | 731.94 | 638.68 | 671.08 |

Table 3.9 illustrates the overall waste generation profile for EWSWA single-family households. This overall waste generation profile includes the sampled garbage and recycling waste combined. Displayed is the overall number of recycled materials (properly diverted from landfill), disposed organics, disposed non-divertible materials, and disposed recyclables generated. Table 3.7 gives a broad overview of the amount of material generated per/hh/wk. It gives a good understanding of the types of materials and composition of garbage and recycling.

Table 3.9 Overall Waste Generation Profile (kg/hh/wk)

| Material | Recycled | Disposed Red Box and Blue Box Recyclables | Disposed Other Recyclables | Disposed Organics | Disposed Non- Divertible | Total | Percentage Breakdown |
|-------------------------|-------------|--|----------------------------------|----------------------|-----------------------------|--------------|-------------------------|
| | kg/hh/wk | kg/hh/wk | kg/hh/wk | kg/hh/wk | kg/hh/wk | kg/hh/wk | % |
| Printed Paper | 0.50 | 0.19 | | | | 0.69 | 5.33% |
| Paper Packaging | 1.03 | 0.51 | | | | 1.54 | 11.97% |
| Plastics | 0.36 | 0.28 | | | 0.59 | 1.22 | 9.50% |
| Metals | 0.17 | 0.12 | | | | 0.29 | 2.22% |
| Glass | 0.34 | 0.17 | | | | 0.51 | 3.96% |
| Food Waste And Organics | | | | 5.02 | | 5.02 | 39.02% |
| Yard Waste | | | | 0.29 | | 0.29 | 2.26% |
| Pet Waste | | | | 0.26 | | 0.26 | 2.00% |
| Diapers/Sanitary | | | | | 0.51 | 0.51 | 3.95% |
| Other Metal | | | 0.11 | | | 0.11 | 0.84% |
| HHW | | | 0.04 | | | 0.04 | 0.34% |
| IIT/AV Equipment | | | 0.02 | | | 0.02 | 0.15% |
| Reusable Textiles | | | | | 0.16 | 0.16 | 1.27% |
| Other Waste | | | | | 2.21 | 2.21 | 17.20% |
| Total | 2.40 | 1.26 | 0.17 | 5.57 | 3.47 | 12.87 | 100.00% |

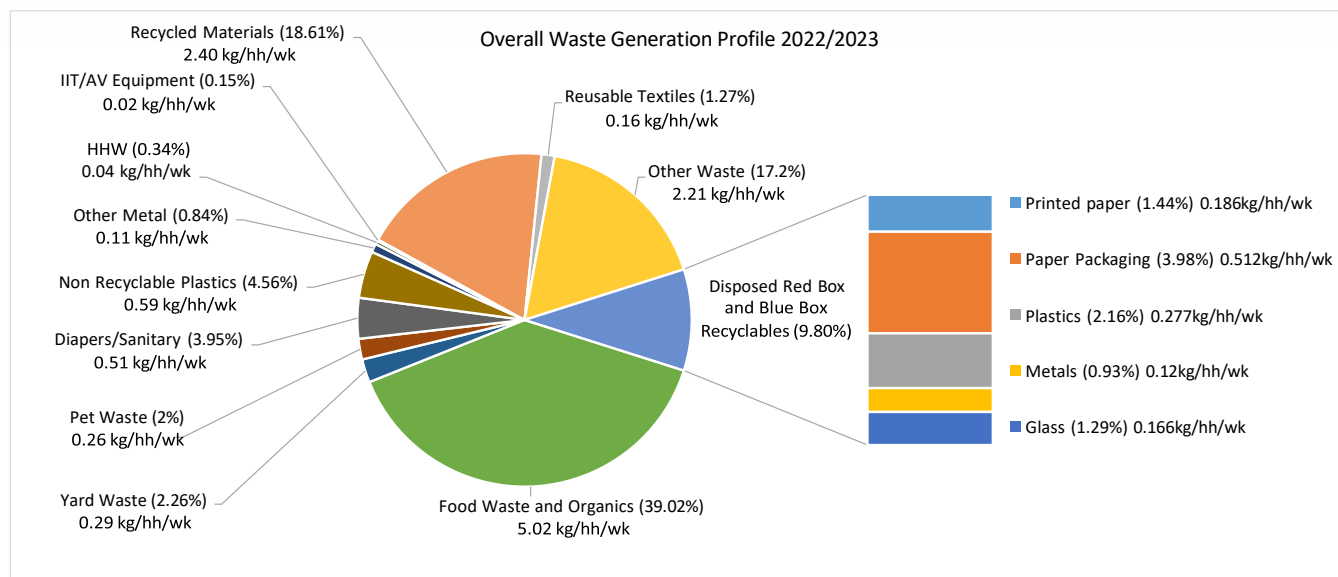


Figure 3.1 Overall Waste Generation Profile (kg/hh/wk)

As depicted in Figure 3.1, disposed food waste and organics constitute an average of 39.02% of the total waste. Recycled material makes up 18.61%, encompassing plastics, papers, metals, and glass correctly captured in the appropriate streams. Other waste (21.76%) includes non-divertible plastics, durable plastics and other waste materials like cat litter, non-usable textiles, pet training pads, and PPE. Additionally, 9.80% consists of disposed recyclable material that could potentially be diverted.

Essex-Windsor Solid Waste Authority had a diversion rate of 18.61% for the waste study period of 2022/2023. This is calculated using the formula:

$$\left(\frac{\text{Weight of Accepted Material in Diversion Stream(s)}}{\text{Weight of all Material Generated}} \right) \times 100\% \rightarrow \left(\frac{2.40 \text{ kg/hh/wk}}{12.87 \text{ kg/hh/wk}} \right) \times 100\% = 18.61\%$$

3.3 Garbage Stream Composition

The garbage generated by the sampled single-family households equated to 10.34 kg/hh/wk or 539.12 kg/hh/yr. Figure 3.2 shows organic/food waste comprised 48.25% of the total garbage, while other waste made up 20.87%. Other non-divertible materials, pet waste (excluding cat litter), diapers/sanitary items, and non-recyclable plastics (mainly polystyrene (PS/#6) products, other rigid packaging, and durable plastic products), accounted for 12.76%. The remaining 18.12% of the garbage stream consisted of disposed divertible materials.

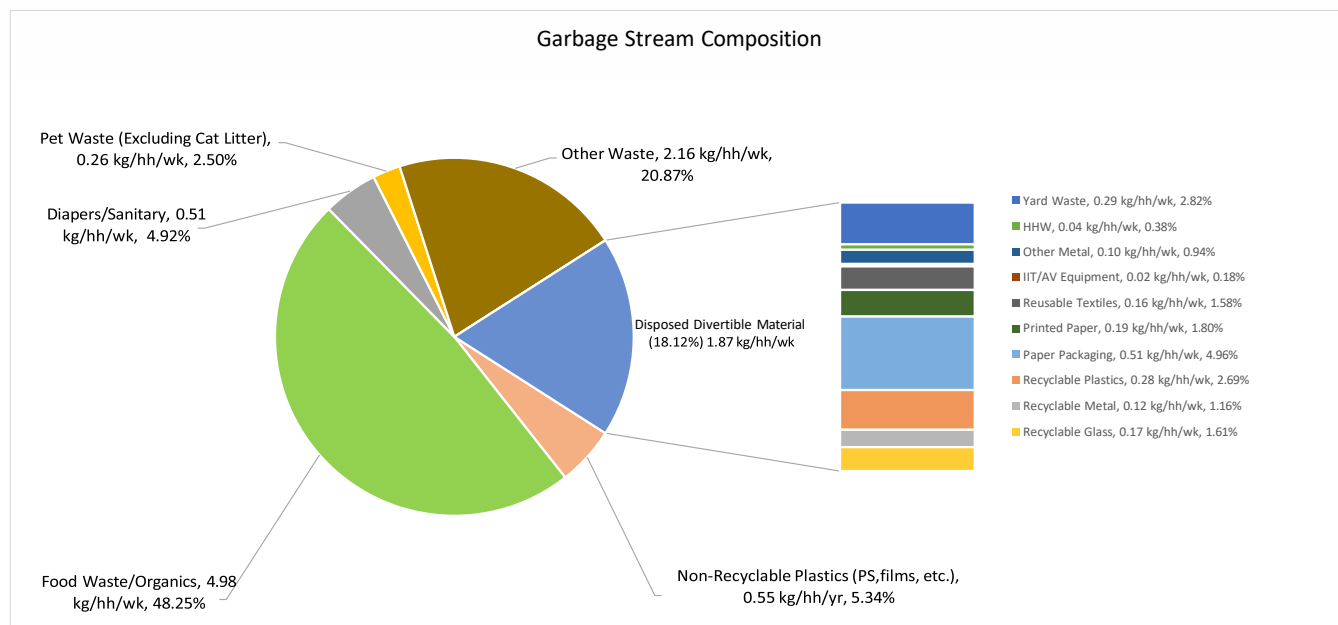


Figure 3.2 Garbage Stream Composition

Table 3.10 Most Common Items Found in the Garbage 2023

| Top 10 Materials in the Garbage | kg/hh/wk | kg/hh/yr | % of Stream |
|---|-------------|---------------|---------------|
| Organics / Food waste | 4.98 | 259.85 | 48.25% |
| Other Waste | 2.16 | 112.41 | 20.87% |
| Diapers and Sanitary products | 0.51 | 26.49 | 4.92% |
| Flexible Film Plastic and Film Packaging | 0.42 | 21.67 | 4.02% |
| Corrugated Cardboard and Boxboard/Molded Pulp | 0.36 | 18.59 | 3.45% |
| Yard Waste | 0.29 | 15.17 | 2.82% |
| Pet Waste (excl. cat litter) | 0.26 | 13.44 | 2.50% |
| Reusable Textiles | 0.16 | 8.53 | 1.58% |
| Carton and Paper Based Packaging | 0.12 | 6.46 | 1.20% |
| #5 PP Bottles and Containers | 0.10 | 5.08 | 0.94% |
| Total | 9.35 | 487.69 | 90.56% |

Table 3.10 provides a list of the most common items found in the garbage stream, the generation rates and percentage of the garbage stream.

Table 3.11 and 3.12 provide a list of the most common recyclable fibre and container items found in the garbage stream respectively, the generation rates and percentage of the garbage stream.

Table 3.11 Most Common Recyclable Fibres found in the Garbage 2023

| Top 5 Recyclable Fibres in the Garbage | kg/hh/wk | kg/hh/yr | % of Stream |
|---|-------------|--------------|--------------|
| Corrugated Cardboard and Boxboard/Molded Pulp | 0.36 | 18.59 | 3.45% |
| Carton and Paper Based Packaging | 0.12 | 6.46 | 1.20% |
| Other Residential Printed Paper (Obligated) | 0.08 | 4.01 | 0.74% |
| Newspapers/Newsprint | 0.05 | 2.77 | 0.51% |
| Total | 0.61 | 31.82 | 5.91% |

| | Top 10 Recyclable Containers in the Garbage | kg/hh/wk | kg/hh/yr | % of Stream |
|----|--|-------------|--------------|--------------|
| 1 | #5 PP Bottles and Containers | 0.10 | 5.06 | 0.94% |
| 2 | Clear Glass - food, beverage and other products | 0.08 | 4.06 | 0.76% |
| 3 | Steel Food Cans and Consumer Products | 0.05 | 2.80 | 0.52% |
| 4 | #1 PET Thermoform - Clear, Coloured, Black | 0.05 | 2.59 | 0.48% |
| 5 | #1 PET Bottles - Clear - Non-Alcoholic Beverage PET Beverage less than 1L | 0.04 | 2.32 | 0.43% |
| 6 | Clear Glass - Alcoholic Beverage | 0.04 | 2.16 | 0.40% |
| 7 | #2 HDPE Bottles, Jugs and Packaging (Natural, Coloured, and Black) - Non-Bever | 0.04 | 1.90 | 0.35% |
| 8 | Coloured Glass - Alcoholic Beverage | 0.03 | 1.73 | 0.32% |
| 9 | #1 PET Other Bottles, Jars and Packaging | 0.03 | 1.64 | 0.31% |
| 10 | Aluminum food, foil, trays | 0.03 | 1.46 | 0.27% |
| | Total | 0.50 | 25.74 | 4.78% |

Table 3.12 Most Common Recyclable Containers found in the Garbage 2023

Figure 3.3 to Figure 3.7 provide examples of textiles, organics and recyclables found in the garbage stream.



Figure 3.3 Textile Waste in the Garbage Stream



Figure 3.4 Food Waste in the Garbage Stream



Figure 3.5 Boxboard/OCC in the Garbage Stream



Figure 3.6 Batteries in the Garbage Stream



Figure 3.7 Aluminum Cans (Alcoholic and Non-alcoholic)

3.4 Red Box Fibres Stream Composition

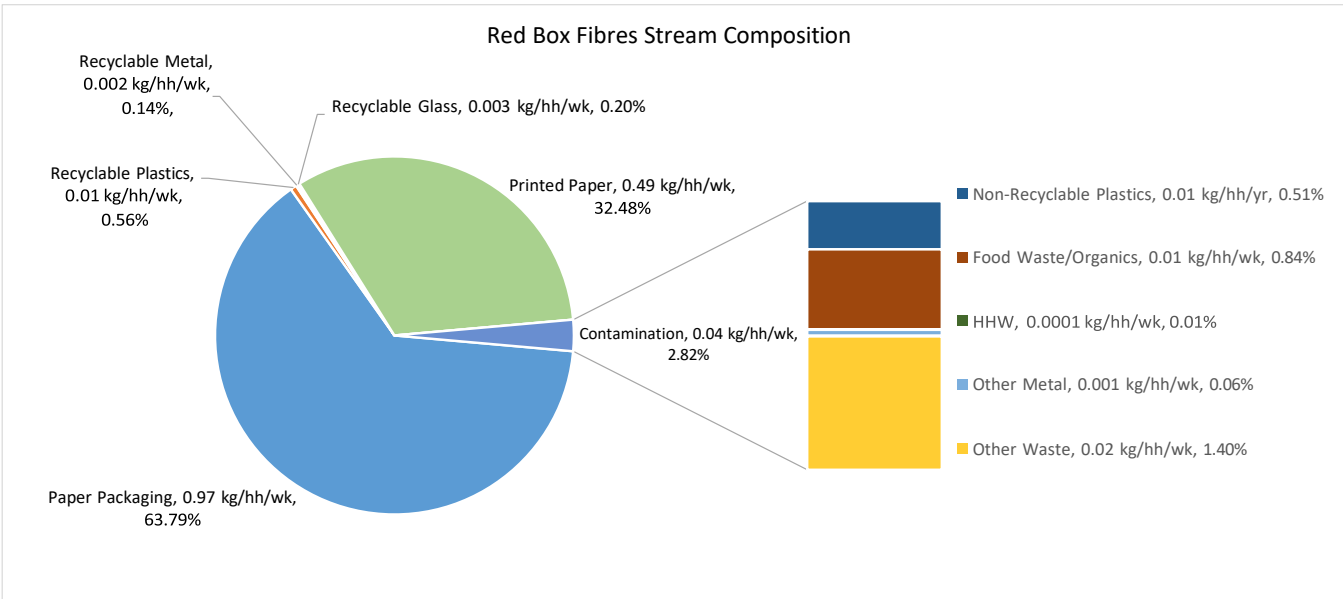


Figure 3.8 Red Box Fibres Stream Composition

The average generation rate for materials placed in the fibres recycling stream was 1.51 kg/hh/wk or 78.91 kg/hh/yr. Recyclable fibres constituted 96.27% of this stream, predominantly comprised of paper packaging, including corrugated cardboard, boxboard, carton, and paper-based packaging, making up 63.79% of the total composition. Printed papers were the second major component, comprising 32.48% of the stream, encompassing newspapers and other residential papers. Cross-contaminating containers accounted for 0.91% of the stream, while the remaining 2.82% consisted of contamination. Table 3.13 provides a detailed breakdown of the fibres recycling stream, with other waste (residual) being the largest contaminant at 1.40%, followed by food waste/organics at 0.84%.

Table 3.13 and Table 3.14 provide a list of the most common materials and contaminants present in the fibres recycling stream, the generation rates and percentage of stream.

Table 3.13 Most Common Materials found in the Red Box Fibres Recycling Stream 2023

| | Top 10 Materials in the Fibres Recycling Stream | kg/hh/wk | kg/hh/yr | % of Stream |
|----|--|-------------|--------------|---------------|
| 1 | Corrugated Cardboard and Boxboard/Molded Pulp | 0.94 | 49.05 | 62.16% |
| 2 | Newspapers/Newsprint | 0.25 | 12.93 | 16.39% |
| 3 | Other Residential Printed Paper (Obligated) | 0.13 | 6.93 | 8.78% |
| 4 | Other Recyclable Paper (Non-obligated) | 0.11 | 5.77 | 7.31% |
| 5 | Other Waste | 0.02 | 1.10 | 1.40% |
| 6 | Organics / Food waste | 0.01 | 0.66 | 0.84% |
| 7 | Carton and Paper Based Packaging | 0.01 | 0.62 | 0.79% |
| 8 | Gable Top Carton – Dairy & Substitutes | 0.00 | 0.24 | 0.31% |
| 9 | Other Rigid Plastic Packaging | 0.00 | 0.20 | 0.26% |
| 10 | Aseptic Containers – Food and other non-beverage | 0.00 | 0.13 | 0.16% |
| | Total | 1.49 | 77.64 | 98.39% |

Table 3.14 Most Common Contaminants in the Red Box Fibres Recycling Stream 2023

| | Top 8 Contaminants in the Fibres Recycling Stream | kg/hh/wk | kg/hh/yr | % of Stream |
|---|---|-------------|-------------|--------------|
| 1 | Other Waste | 0.02 | 1.04 | 1.40% |
| 2 | Organics / Food waste | 0.01 | 0.52 | 0.84% |
| 3 | Other Rigid Plastic Packaging | 0.0039 | 0.20 | 0.26% |
| 4 | Flexible Film Plastic and Film Packaging | 0.0024 | 0.13 | 0.16% |
| 5 | #6 PS - Expanded Polystyrene and Non-Expanded Polystyrene Packaging | 0.0014 | 0.07 | 0.09% |
| 6 | Other Metal | 0.001 | 0.05 | 0.06% |
| 7 | Reusable Textiles | 0.0001 | 0.01 | 0.01% |
| 8 | HHW | 0.0001 | 0.01 | 0.01% |
| | Total | 0.04 | 2.03 | 2.83% |

Figures 3.9 to 3.11 provide examples of contaminating materials found in the fibres recycling stream.



Figure 3.9 Flexible Film/ Plastic Laminate in the Fibres Recycling Stream.



Figure 3.10 Other Rigid Plastics in the Fibres Recycling Stream.



Figure 3.11 Tissue/Toweling in the Fibres Recycling Stream

3.5 Blue Box Containers Stream Composition

The average generation rate for materials placed in the containers stream was 1.02 kg/hh/wk or 53.67 kg/hh/yr. Within this stream, recyclable containers comprised 82.93%, including recyclable plastics (34.00%), recyclable glass (33.10%), and recyclable metals (15.83%). Cross-contaminating fibres, such as paper packaging (6.04%) like boxboard and corrugated cardboard, and printed paper (0.87%) like newspapers, accounted for 6.91% of the stream. The remaining 10.17% consisted of contamination.

Of the contamination, other waste at 3.58% was the largest. Non-Recyclable plastics was the second largest at 2.68%. Food Waste/Organics was the third largest contaminant at 2.47%.

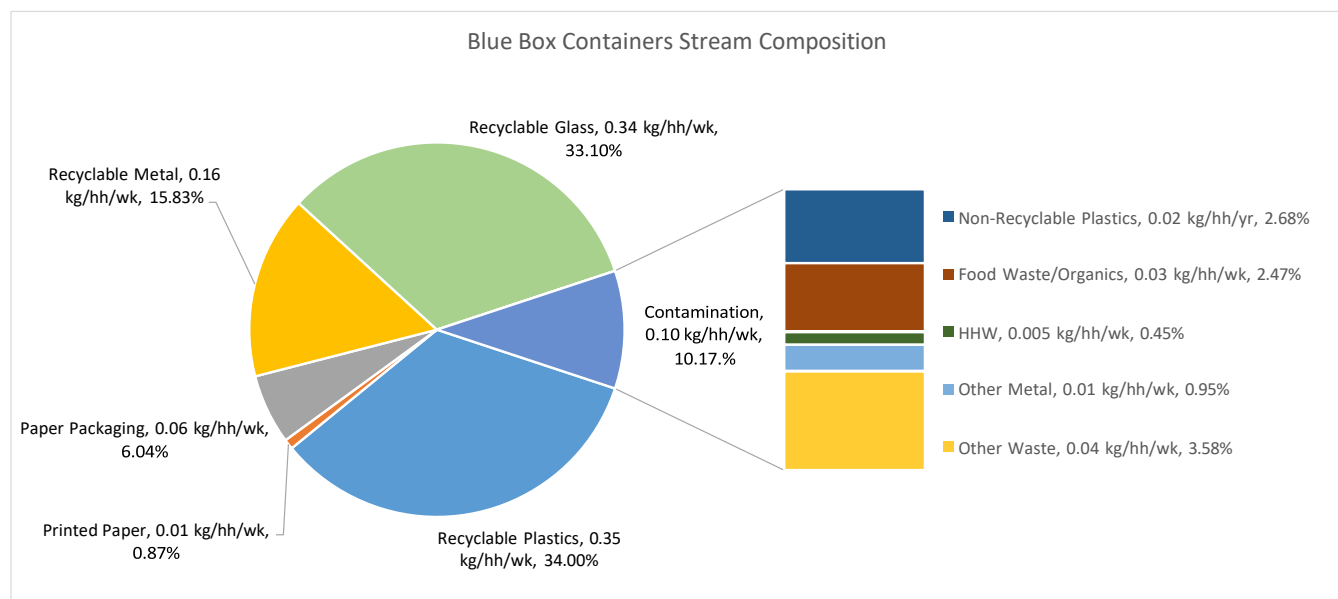


Figure 3.12 Blue Box Containers Stream Composition

Table 3.15 and Table 3.16 provide a list of the most common materials and contaminants present in the containers recycling stream, the generation rates and percentage of stream.

Table 3.15 Most Common Materials found in the Blue Box Containers Recycling Stream 2023

| | Top 10 Materials in the Containers Recycling Stream | kg/hh/wk | kg/hh/yr | % of Stream |
|----|---|-------------|--------------|---------------|
| 1 | Clear Glass - food, beverage and other products | 0.16 | 8.31 | 15.48% |
| 2 | #1 PET Bottles - Clear - Non-Alcoholic Beverage PET Beverage less than 1L | 0.09 | 4.80 | 8.94% |
| 3 | Steel Food Cans and Consumer Products | 0.08 | 4.17 | 7.77% |
| 4 | #2 HDPE Bottles, Jugs and Packaging (Natural, Coloured, and Black) - Non-Beverage | 0.07 | 3.59 | 6.70% |
| 5 | Aluminum Beverage Containers (UBC) | 0.06 | 3.00 | 5.59% |
| 6 | Clear Glass - Alcoholic Beverage | 0.06 | 2.88 | 5.37% |
| 7 | #1 PET Thermoform - Clear, Coloured, Black | 0.05 | 2.79 | 5.19% |
| 8 | Coloured Glass - Alcoholic Beverage | 0.05 | 2.76 | 5.14% |
| 9 | #1 PET Other Bottles, Jars and Packaging | 0.05 | 2.38 | 4.43% |
| 10 | #5 PP Bottles and Containers | 0.04 | 2.21 | 4.12% |
| | Total | 0.71 | 36.88 | 68.73% |

Table 3.16 Most Common Contaminants in the Blue Box Containers Recycling Stream 2023

| | Top Contaminants in the Containers Recycling Stream | kg/hh/wk | kg/hh/yr | % of Stream |
|---|---|-------------|-------------|---------------|
| 1 | Other Waste | 0.04 | 1.92 | 3.58% |
| 2 | Organics / Food waste | 0.03 | 1.32 | 2.47% |
| 3 | Other Rigid Plastic Packaging | 0.01 | 0.68 | 1.27% |
| 4 | Other Metal | 0.01 | 0.51 | 0.95% |
| 5 | Flexible Film Plastic and Film Packaging | 0.01 | 0.40 | 0.75% |
| 6 | #6 PS - Expanded Polystyrene and Non-Expanded Polystyrene Packaging | 0.01 | 0.34 | 0.63% |
| 7 | HHW | 0.00 | 0.24 | 0.45% |
| 8 | Yard Waste | 0.00 | 0.02 | 0.03% |
| 9 | Reusable Textiles | 0.00 | 0.01 | 0.01% |
| | Total | 0.10 | 5.45 | 10.14% |

Figure 3.13 to Figure 3.16 provides examples of contaminating materials found in the containers recycling stream.



Figure 3.13 Other Plastics (non-packaging/durable/rigid) in Containers Recycling Stream

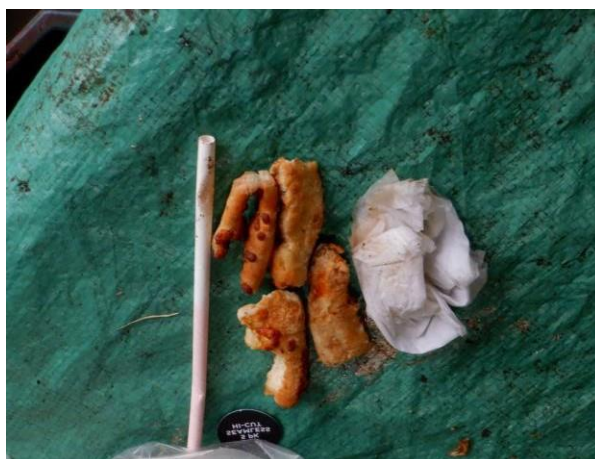


Figure 3.14 Unavoidable food in the Containers Recycling Stream



Figure 3.15 Boxboard/Cores/Molded Pulp in the Containers Recycling Stream



Figure 3.16 Flexible Film Plastic and Plastic Laminates in the Containers Recycling Stream

3.6 Capture Rates

The following section outlines Essex-Windsor Solid Waste Authority capture rates for all recyclable materials included in the Municipality's recycling programs. The capture rates shown in Table 3.17 have been determined by calculating the amount of each divertible material captured within the recycling streams compared to the overall amount of that specific material generated (disposed within the garbage and placed within the recycling streams together). The primary material with the lowest capture rate is plastic, at 56.36%. The primary material with the highest capture rate is printed paper, at 72.95%. The capture rate for all recyclable materials is 63.49%.

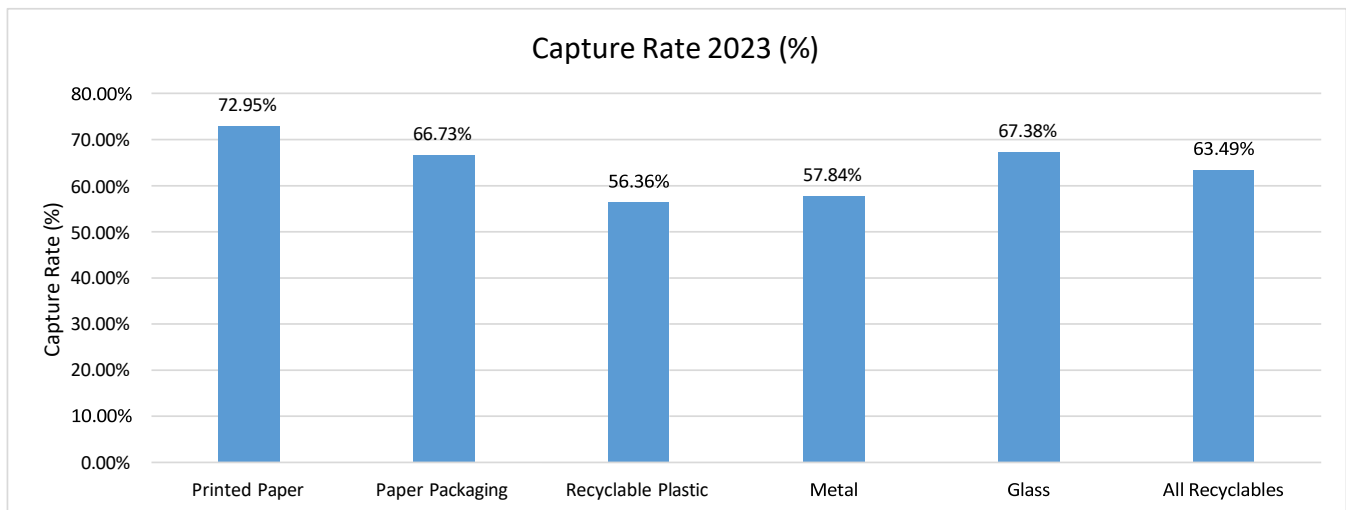


Figure 3.17 Capture Rates of Primary Material Categories

Table 3.17 Capture Rates of Recyclable Materials

| Material Category | Accepted Stream | Diverted kg/hh/yr | Disposed kg/hh/yr | Capture Rate (%) |
|---|-----------------|-------------------|-------------------|------------------|
| Newspapers/Newsprint | Red | 12.90 | 2.94 | 81.45% |
| Other Residential Printed Paper (Obligated) | Red | 6.91 | 4.14 | 62.55% |
| Carton and Paper Based Packaging | Red | 0.62 | 6.99 | 8.18% |
| Corrugated Cardboard and Boxboard/Molded Pulp | Red | 48.91 | 19.88 | 71.10% |
| Other Recyclable Paper (Non-obligated) | Red | 5.75 | 3.04 | 65.42% |
| Total Red Bin (Fibres) | | 75.10 | 36.98 | 67.00% |
| Gable Top Containers - Food and other non-beverage | Blue | 0.16 | 0.26 | 38.26% |
| Gable Top Carton – Beverage non-dairy | Blue | 0.18 | 0.30 | 37.68% |
| Gable Top Carton – Dairy & Substitutes | Blue | 0.48 | 0.66 | 41.74% |
| Aseptic Containers - Food and other non-beverage | Blue | 0.17 | 0.22 | 43.32% |
| Aseptic Carton – Beverage non-dairy | Blue | 0.28 | 0.71 | 28.14% |
| Aseptic Carton – Dairy & Substitutes | Blue | 0.08 | 0.04 | 64.59% |
| Aseptic Containers - Alcoholic Beverage | Blue | 0.00 | 0.13 | 0.00% |
| #1 PET Bottles - Clear - Non-Alcoholic Beverage PET Beverage less than 1L | Blue | 4.79 | 2.42 | 66.42% |
| #1 PET Bottles - Clear - Non-Alcoholic Beverage PET Beverage 1L and greater | Blue | 1.43 | 0.34 | 80.62% |
| #1 PET Bottles - Coloured & Black- Non-Alcoholic Beverage PET Beverage less than 1L | Blue | 0.05 | 0.03 | 64.67% |
| #1 PET Bottles - Coloured & Black- Non-Alcoholic Beverage PET Beverage 1L and greater | Blue | 0.20 | 0.03 | 88.31% |
| #1 PET Bottles - Clear, Coloured & Black - Alcoholic Beverage | Blue | 0.09 | 0.03 | 74.22% |
| #1 PET Other Bottles, Jars and Packaging | Blue | 2.37 | 1.72 | 57.92% |
| #1 PET Thermoform - Clear, Coloured, Black | Blue | 2.78 | 2.68 | 50.95% |
| #2 HDPE Bottles (Natural, Coloured & Black) - Non-Alcoholic Beverage - Non-dairy | Blue | 0.07 | 0.09 | 44.48% |
| #2 HDPE Bottles (Natural, Coloured, & Black) - Non-Alcoholic Beverage - Dairy and Dairy Substitutes | Blue | 0.46 | 0.20 | 69.17% |
| #2 HDPE Bottles, Jugs and Packaging (Natural, Coloured, and Black) - Non-Beverage | Blue | 3.58 | 1.95 | 64.71% |
| #5 PP Bottles - Non-Alcoholic Beverage | Blue | 0.17 | 0.21 | 45.20% |
| #5 PP Bottles and Containers | Blue | 2.20 | 5.16 | 29.92% |
| Aluminum food, foil, trays | Blue | 0.34 | 1.47 | 18.89% |
| Aluminum Beverage Containers (UBC) | Blue | 2.99 | 1.39 | 68.29% |
| Aluminum Containers - Alcoholic Beverage | Blue | 0.98 | 0.64 | 60.56% |
| Steel - Non-Alcoholic Beverage | Blue | 0.02 | 0.12 | 16.61% |
| Steel Food Cans and Consumer Products | Blue | 4.16 | 2.87 | 59.14% |
| Clear Glass - Non-Alcoholic Beverage | Blue | 2.09 | 0.35 | 85.56% |
| Clear Glass - Alcoholic Beverage | Blue | 2.87 | 2.20 | 56.57% |
| Clear Glass - food, beverage and other products | Blue | 8.28 | 4.18 | 66.45% |
| Coloured Glass - Non-Alcoholic Beverage | Blue | 0.26 | 0.05 | 84.46% |
| Coloured Glass - Alcoholic Beverage | Blue | 2.75 | 1.73 | 61.39% |
| Coloured Glass - food, beverage and other products | Blue | 1.46 | 0.30 | 83.06% |
| Total Blue Bin (Containers) | | 45.75 | 32.50 | 58.46% |
| Total | | 120.84 | 69.48 | 63.49% |

3.7 Diversion Rates

The diversion rates for each season and the overall diversion rates are shown in the table below. The table also shows the highest achievable diversion rates. This is determined by calculating the amount of total material diverted through the recycling streams compared to the overall amount of material generated. The highest achievable diversion rate is calculated by assessing the total divertible material generated in all streams compared to the total amount of material generated.

Although all the seasons show similar diversion rates, Fall 2022 has the highest with 20.42% and Spring 2023 with the lowest (17.23%). Fall 2022 has the highest achievable diversion rate of 31.31% while, Summer 2023 has the lowest with 26.79%. Over the course of 4 seasons, the single-family households show a combined diversion rate of 18.61% with the highest possible rate of 28.47%.

Table 3.18 and Figure 3.18 compare the current and achievable diversion rates over the seasons.

Essex-Windsor Solid Waste Authority

2022/2023 – 4 Season Curbside Residential Waste Composition Study
May 2024

Table 3.18 Diversion Rate Summary

| Season | Total Divertible Material Generated | | Total Diverted Material | | Total Material Generated | | Highest Possible Diversion Rate (%) | Current Diversion Rate (%) |
|-----------------|-------------------------------------|---------------|-------------------------|---------------|--------------------------|---------------|-------------------------------------|----------------------------|
| | kg/hh/wk | kg/hh/yr | kg/hh/wk | kg/hh/yr | kg/hh/wk | kg/hh/yr | | |
| Fall 2022 | 3.84 | 200.41 | 2.51 | 130.69 | 12.27 | 640.05 | 31.31% | 20.42% |
| Winter 2023 | 3.73 | 194.31 | 2.39 | 124.49 | 12.92 | 673.66 | 28.84% | 18.48% |
| Spring 2023 | 3.78 | 197.00 | 2.42 | 126.11 | 14.04 | 731.94 | 26.92% | 17.23% |
| Summer 2023 | 3.28 | 171.10 | 2.27 | 118.28 | 12.25 | 638.68 | 26.79% | 18.52% |
| 4-Season | 3.66 | 190.71 | 2.40 | 124.89 | 12.87 | 671.08 | 28.47% | 18.61% |

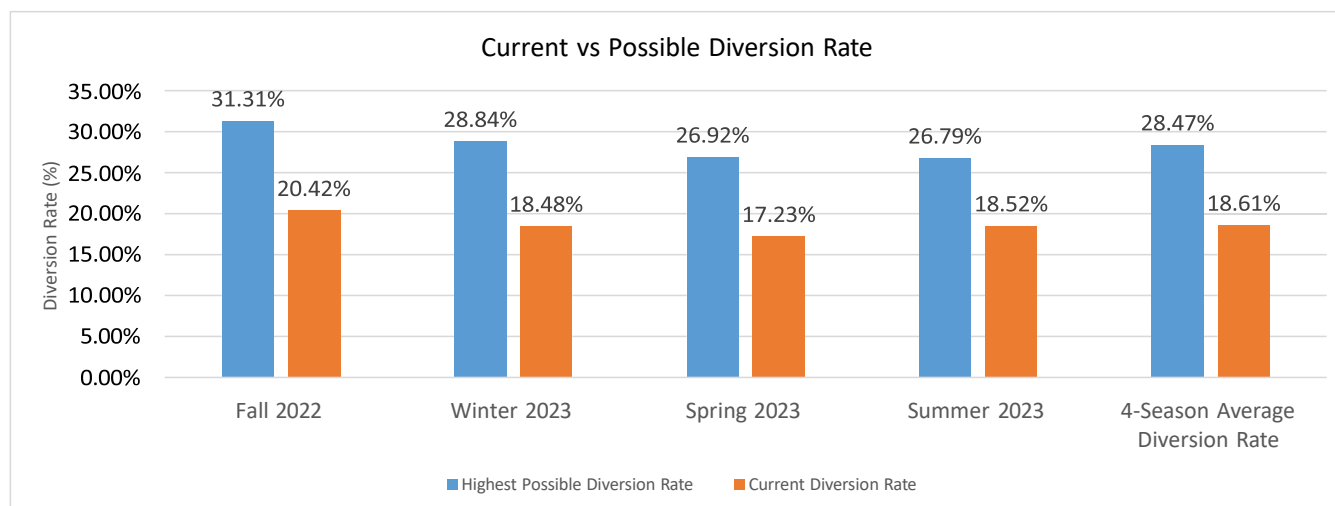


Figure 3.18 Current Diversion rate vs Highest Possible Diversion Rate

4.0 RECOMMENDATION

Presented are program recommendations for Essex-Windsor Solid Waste Authority based on resident interaction and audit results over the course of the residential waste studies for 2022/2023. The diversion rate for Essex-Windsor Solid Waste Authority across four seasons was 18.61% in 2022/2023.

Curbside organics will begin to be collected curbside in 2025. This will have a positive effect on diversion rates, and the amount of material being sent to landfill. Disposed organics was one of the greatest contributors to landfill waste in 2022/2023, accounting for 48.25% of the garbage stream generated in 2022/2023. Conducting Waste audits prior to and after green bin implementation will help assess how the program is performing.

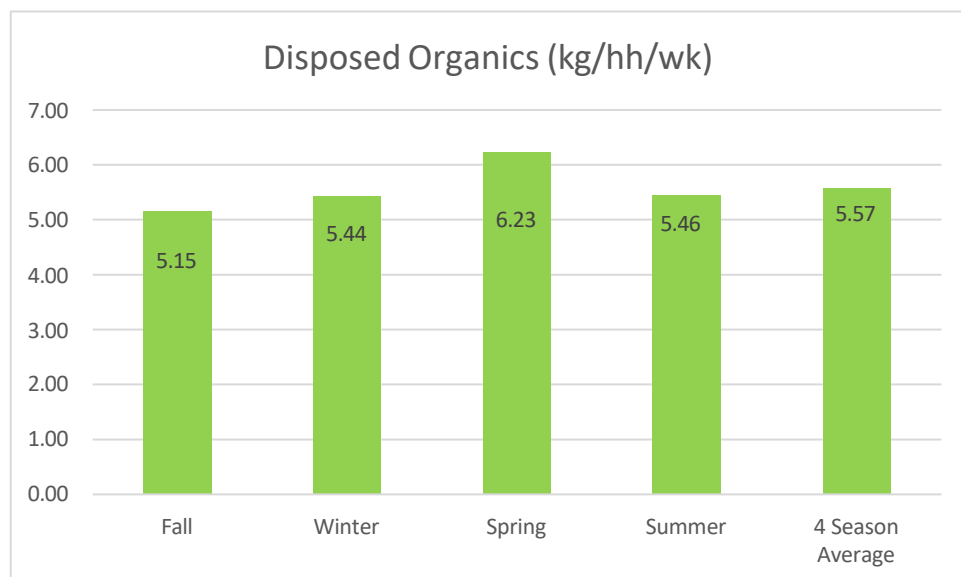


Figure 4.1 Disposed Organics (kg/hh/wk)

- Providing residents alternatives of waste reductions by investing on educational topic, such as:
 - Food inventories at home.
 - Family meal plans.
 - The creation of cookbooks with recipes of how to use leftovers creatively.
 - Guides of how to save and eat leftovers safely.
 - The benefits of avoiding or reducing food waste.
- Providing residents with alternative options like home composters or community composting.

Figure 4.2 below shows the recycling participation rate of households sampled over the course of the four seasons. There shows there is still room for increasing the recycling participation rate of single-family households for Essex Windsor Solid Waste Authority.

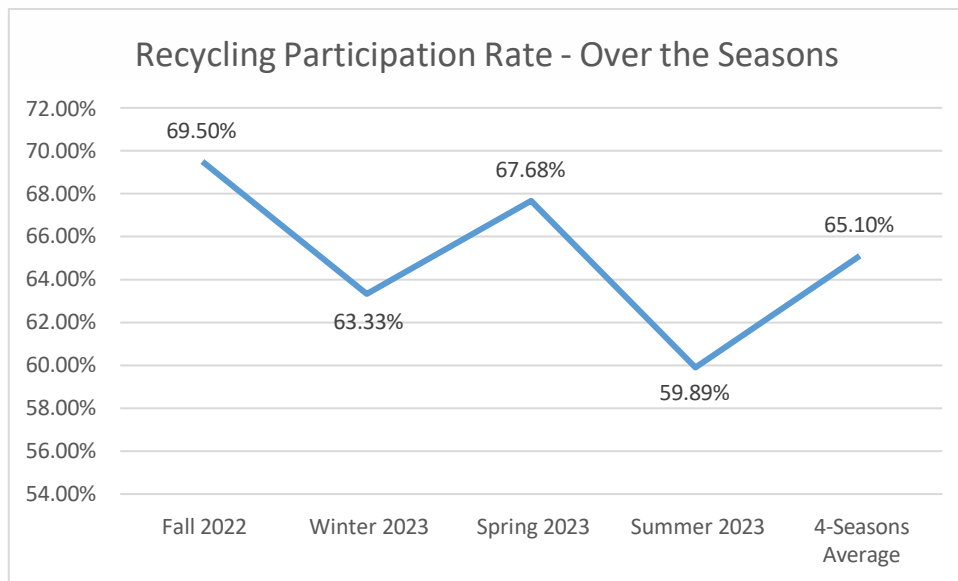


Figure 4.2 Recycling Participation rate Over the Seasons

Some recommendations to increase participation and diversion can be:

- Implementing a shift from weekly to bi-weekly garbage collection frequency can encourage households to more diligently separate materials into other streams rather than disposing of them in the garbage. This change is particularly effective in promoting the proper disposal of organics, motivating residents to participate actively in waste segregation. This will also promote higher participation rates.
- Providing residents with alternative options like home composters or community composting.
 - Tabletop composting equipment, such as the FoodCycler, offers a convenient and space-efficient solution for composting kitchen waste at home.
- Incentivize participation and diversion efforts through reward programs. I.e. Gold Bin in City of Hamilton worked well to encourage residents to set out their Recycling and Green Bin each week, then reward them with a gold bin at the end of the study.
- Promote the RecycleCoach application more among residents to make the source separation process more convenient.

Almost half of the waste stream contains organic waste. Ensure adequate educational and promotional drives are done in 2024 to make the maximum number of residents aware about the new Curbside Organics/ Green bin program.

Sharing the findings of waste audits with the community through reports, town hall meetings, or online platforms. This enhances community awareness, educates residents about waste management practices, and fosters a sense of engagement and responsibility. It provides a platform to recognize and celebrate successful waste diversion efforts, inspiring others to participate.

Conduct workshops or webinars to address the issues of improper waste management and resolve common questions and concerns about waste management. Collaborate with schools to conduct these workshops and try to integrate waste diversion education into the curriculum.

5.0 CONCLUSIONS

AET Group Inc. (AET) conducted a 4 Season 2022/2023 curbside residential waste composition study for Stewardship Ontario in collaboration with Essex-Windsor Solid Waste Authority (EWSWA). All four-season audits consisted of two consecutive 5-day sampling periods. This report summarizes the data collected and analyzed for the 4 seasons.

The key findings of the study are as follows:

Participation Results:

- Garbage Stream – on average, 153 households set out over the course of the four seasons with 0.96 full container equivalents disposed per household every week.
- Fibres Recycling Stream – on average, 63 households set out over the course of the four seasons with 0.84 full container equivalents generated per household every week.
- Containers Recycling Stream – on average, 63 households set out over the course of the four seasons with 0.67 full container equivalents generated per household every week.
- Of all the 4 seasons, Fall 2022 had the highest average participation rate of 74.00% across all the streams. Summer 2023 had the lowest participation rate of 63.88%. Average participation rate for all the seasons in all the streams is 70.33%.

Garbage Stream Composition:

- The average quantity of material generated in the garbage stream by a single-family household over the four seasons is 10.34 kg/hh/wk or 539.12 kg/hh/yr.
- Organic materials (currently accepted in the garbage stream, as there is no source separated organics program) represented on average 48.25% of the garbage stream over four seasons, which equals 4.98 kg/hh/wk or 260.12 kg/hh/yr. This includes items such as food waste and other organics.
- Recyclable materials represent an average 12.22% of the garbage stream by weight at 1.27 kg/hh/wk or 66.04 kg/hh/yr.

Fibres Stream Composition:

- The average quantity of material generated in the fibres stream by a single-family household over four seasons is 1.51 kg/hh/wk or 78.91 kg/hh/yr.
- The average contamination rate was 2.82% over the four seasons. The contamination rate was highest during the summer season, and lowest during the winter season.
- Average cross-contamination in fibres recycling stream over four seasons is 0.71 kg/hh/yr. Opportunity exists for these materials to be placed in the containers stream for recycling.

Containers Stream Composition:

- The average quantity of material generated in the containers stream by a single-family household over the four seasons is 1.02 kg/hh/wk or 53.67 kg/hh/yr.
- The average contamination rate was 10.17% over the four seasons. The contamination rate was highest during spring season and lowest during the winter season.
- Average cross contamination in the containers stream over four seasons is 3.71 kg/hh/yr. Opportunity exists for these materials to be placed in the fibres stream for recycling.

Diversion Rates & Capture Rates:

- Single family households generate an average of 12.87 kg/hh/wk or 671.08 kg/hh/yr of waste (garbage, fibers recycling, and containers recycling combined). Of that, a total of 2.40 kg/hh/wk or 124.89 kg/hh/yr is diverted from landfill, equaling a diversion rate of 18.61%.
- Fall 2022 had the highest diversion rate with 20.34% and Spring 2023 had the lowest at 17.23%.
- 63.49% of all acceptable recyclable fibres and containers were properly captured in the recycling streams over the course of the four-season audits.

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Waste Audit Manager

Disclaimer

AET Group Inc. makes no warranty and assumes no liability for the information contained in this report outlining the waste audit study results. These results reflect measurements made over 10 days in each season as described in the methodology. As such, waste generation measurements should be considered snapshots and may not reflect accurately conditions across the Essex-Windsor Solid Waste Authority over time. These reported generation, capture, diversion, and contamination rates more accurately reflect the quantity of each material generated over the study period and have been extrapolated to calculate weekly and yearly rates as outlined in the calculations.

APPENDIX A
WASTE AUDIT SORT RESULTS



| Activity | | Status | | Priority | | Due Date | | Owner | | Assignee | | Category | | Sub-category | | Project | | Phase | | Task | | Status | | Progress | | Completion | | Start Date | | End Date | | Duration | | Frequency | | Recurring | | Notes | | Comments | | Attachments | | Links | | References | | Related | | History | | Log | | Audit | | Version | | Meta | | System | | Database | | API | | Frontend | | Backend | | Mobile | | Web | | Desktop | | Server | | Cloud | | Network | | Security | | Compliance | | Legal | | Finance | | HR | | Marketing | | Sales | | Support | | Operations | | IT | | Facilities | | Transportation | | Energy | | Environment | | Health | | Education | | Government | | Non-Profit | | Academia | | Research | | Industry | | Public | | Private | | Military | | Space | | Aerospace | | Defense | | Intelligence | | Counterterrorism | | Cybersecurity | | Biotechnology | | Nanotechnology | | Artificial Intelligence | | Robotics | | Autonomous Vehicles | | Aerospace | | Marine | | Agriculture | | Forestry | | Fishing | | Hunting | | Golfing | | Skiing | | Snowboarding | | Swimming | | Surfing | | Climbing | | Hiking | | Camping | | Travel | | Vacation | | Business | | Education | | Healthcare | | Retail | | Food | | Beverage | | Fashion | | Beauty | | Personal Care | | Home Goods | | Electronics | | Toys | | Books | | Music | | Movies | | TV Shows | | Video Games | | Board Games | | Puzzles | | Card Games | | Table Games | | Sports | | Recreation | | Hobbies | | Gardening | | Pet Care | | Vehicles | | Boats | | Aircraft | | Spacecraft | | Rockets | | Satellites | | Drones | | Robots | | AI | | ML | | DL | | NLP | | CV | | Audio | | Image | | Video | | AR | | VR | | XR | | MR | | Hologram | | 3D | | 4D | | 5D | | 6D | | 7D | | 8D | | 9D | | 10D | | 11D | | 12D | | 13D | | 14D | | 15D | | 16D | | 17D | | 18D | | 19D | | 20D | | 21D | | 22D | | 23D | | 24D | | 25D | | 26D | | 27D | | 28D | | 29D | | 30D | | 31D | | 32D | | 33D | | 34D | | 35D | | 36D | | 37D | | 38D | | 39D | | 40D | | 41D | | 42D | | 43D | | 44D | | 45D | | 46D | | 47D | | 48D | | 49D | | 50D | | 51D | | 52D | | 53D | | 54D | | 55D | | 56D | | 57D | | 58D | | 59D | | 60D | | 61D | | 62D | | 63D | | 64D | | 65D | | 66D | | 67D | | 68D | | 69D | | 70D | | 71D | | 72D | | 73D | | 74D | | 75D | | 76D | | 77D | | 78D | | 79D | | 80D | | 81D | | 82D | | 83D | | 84D | | 85D | | 86D | | 87D | | 88D | | 89D | | 90D | | 91D | | 92D | | 93D | | 94D | | 95D | | 96D | | 97D | | 98D | | 99D | | 100D | | 101D | | 102D | | 103D | | 104D | | 105D | | 106D | | 107D | | 108D | | 109D | | 110D | | 111D | | 112D | | 113D | | 114D | | 115D | | 116D | | 117D | | 118D | | 119D | | 120D | | 121D | | 122D | | 123D | | 124D | | 125D | | 126D | | 127D | | 128D | | 129D | | 130D | | 131D | | 132D | | 133D | | 134D | | 135D | | 136D | | 137D | | 138D | | 139D | | 140D | | 141D | | 142D | | 143D | | 144D | | 145D | | 146D | | 147D | | 148D | | 149D | | 150D | | 151D | | 152D | | 153D | | 154D | | 155D | | 156D | | 157D | | 158D | | 159D | | 160D | | 161D | | 162D | | 163D | | 164D | | 165D | | 166D | | 167D | | 168D | | 169D | | 170D | | 171D | | 172D | | 173D | | 174D | | 175D | | 176D | | 177D | | 178D | | 179D | | 180D | | 181D | | 182D | | 183D | | 184D | | 185D | | 186D | | 187D | | 188D | | 189D | | 190D | | 191D | | 192D | | 193D | | 194D | | 195D | | 196D | | 197D | | 198D | | 199D | | 200D | | 201D | | 202D | | 203D | | 204D | | 205D | | 206D | | 207D | | 208D | | 209D | | 210D | | 211D | | 212D | | 213D | | 214D | | 215D | | 216D | | 217D | | 218D | | 219D | | 220D | | 221D | | 222D | | 223D | | 224D | | 225D | | 226D | | 227D | | 228D | | 229D | | 230D | | 231D | | 232D | | 233D | | 234D | | 235D | | 236D | | 237D | | 238D | | 239D | | 240D | | 241D | |
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Stewardship Ontario/CIF Waste Studies Winter 2023 Waste Sort Results for Curbside

[illegible]

| Material Category | | Material ID | | Material Name | | Material Description | | Material Specification | | Material Grade | | Material Type | | Material Weight | | Material Volume | | Material Price | | Material Cost | | Material Value | | Material Status | | Material Location | | Material Date | | Material User | | Material Project | | Material Notes | | Material Comments | | Material Actions | |
|---|--|-------------|---------------|----------------------|------------------------|----------------------|---------------|------------------------|-----------------|----------------|---------------|----------------|-----------------|-------------------|---------------|-----------------|------------------|----------------|-------------------|------------------|--|----------------|--|-----------------|--|-------------------|--|---------------|--|---------------|--|------------------|--|----------------|--|-------------------|--|------------------|--|
| | | Material ID | Material Name | Material Description | Material Specification | Material Grade | Material Type | Material Weight | Material Volume | Material Price | Material Cost | Material Value | Material Status | Material Location | Material Date | Material User | Material Project | Material Notes | Material Comments | Material Actions | | | | | | | | | | | | | | | | | | | |
| Data Collection Instructions: Please download the data for all materials in the system. The data is organized by material category and material type. The data is organized by material weight and material volume. The data is organized by material price and material cost. The data is organized by material value and material status. The data is organized by material location and material date. The data is organized by material user and material project. The data is organized by material notes and material comments. The data is organized by material actions and material status. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1. METALS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1. STEEL | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.1. Carbon Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.2. Alloy Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.3. Stainless Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.4. Cast Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.5. Forged Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.6. Welded Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.7. Cold Rolled Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.8. Hot Rolled Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.9. Galvanized Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.10. Galvalume Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.11. Aluminum Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.12. Inconel Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.13. Titanium Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.14. Copper Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.15. Brass Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.16. Bronze Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.17. Nickel Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.18. Cobalt Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.19. Manganese Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.20. Chromium Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.21. Vanadium Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.22. Niobium Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.23. Zirconium Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.24. Hafnium Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.25. Tantalum Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.26. Niobium Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.27. Zirconium Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.28. Hafnium Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.29. Tantalum Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.30. Niobium Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.31. Zirconium Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.32. Hafnium Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.33. Tantalum Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.34. Niobium Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.35. Zirconium Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.36. Hafnium Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.37. Tantalum Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.38. Niobium Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.39. Zirconium Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.40. Hafnium Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.41. Tantalum Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.42. Niobium Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.43. Zirconium Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.44. Hafnium Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.45. Tantalum Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.46. Niobium Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.47. Zirconium Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.48. Hafnium Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.49. Tantalum Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.50. Niobium Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.51. Zirconium Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.52. Hafnium Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.53. Tantalum Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.54. Niobium Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.55. Zirconium Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.56. Hafnium Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.57. Tantalum Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.58. Niobium Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.59. Zirconium Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.60. Hafnium Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.61. Tantalum Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.62. Niobium Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.63. Zirconium Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.64. Hafnium Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.65. Tantalum Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.66. Niobium Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.67. Zirconium Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.68. Hafnium Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.69. Tantalum Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.70. Niobium Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.71. Zirconium Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.72. Hafnium Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.73. Tantalum Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.74. Niobium Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.75. Zirconium Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.76. Hafnium Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.77. Tantalum Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.78. Niobium Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.79. Zirconium Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.80. Hafnium Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.81. Tantalum Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.82. Niobium Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.83. Zirconium Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.84. Hafnium Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.85. Tantalum Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.86. Niobium Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.87. Zirconium Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.88. Hafnium Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.89. Tantalum Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.90. Niobium Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.91. Zirconium Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.92. Hafnium Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.93. Tantalum Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.94. Niobium Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.95. Zirconium Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.96. Hafnium Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.97. Tantalum Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.98. Niobium Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.99. Zirconium Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.100. Hafnium Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.101. Tantalum Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.102. Niobium Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.103. Zirconium Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.104. Hafnium Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.105. Tantalum Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.106. Niobium Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.107. Zirconium Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.108. Hafnium Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.109. Tantalum Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.110. Niobium Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.111. Zirconium Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.112. Hafnium Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.113. Tantalum Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.114. Niobium Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.115. Zirconium Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.116. Hafnium Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.117. Tantalum Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.118. Niobium Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.119. Zirconium Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.120. Hafnium Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.121. Tantalum Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.122. Niobium Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.123. Zirconium Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.124. Hafnium Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.125. Tantalum Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.126. Niobium Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.127. Zirconium Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.128. Hafnium Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.129. Tantalum Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.130. Niobium Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.131. Zirconium Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.132. Hafnium Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.133. Tantalum Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.134. Niobium Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.135. Zirconium Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.136. Hafnium Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.137. Tantalum Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.138. Niobium Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.139. Zirconium Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.140. Hafnium Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.141. Tantalum Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.142. Niobium Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.143. Zirconium Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.144. Hafnium Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.145. Tantalum Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.146. Niobium Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.147. Zirconium Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.148. Hafnium Steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.149. Tantal | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

[illegible]

APPENDIX B
WASTE AUDIT CATEGORIES GUIDE



| Stewardship Ontario Waste Composition Studies 2022/2023 - Material Categories | |
|---|--|
| Material Category | Description / Examples |
| PRINTED PAPER | |
| Newspapers/Newsprint | Daily and weekly newspapers, publications (e.g. TV guides, Auto Trader, Real Estate News) plus inserts and flyers made of newsprint |
| Other Residential Printed Paper (Obligated) | Mixed fine paper, bills and statements, ad mail, etc. Includes non-newsprint flyers and advertising, promotional calendars. Glossy magazines, catalogues, calendars, annual reports and product manuals (must be bound, i.e. stapled or glued). Telephone books and other directories such as the Yellow Pages. Includes shredded paper as high probability it was obligated paper (bills and statements). |
| PAPER PACKAGING | |
| Gable Top Containers - Food and other non-beverage | Polycoat containers with a gable shaped top for foods, sugar, molasses etc. |
| Gable Top Carton – Beverage non-dairy | Non-alcoholic non-dairy beverage polycoat cartons e.g. gable-top cartons that contained juices |
| Gable Top Carton – Dairy & Substitutes | Milk and milk substitutes in gable-top polycoat cartons e.g. Milk and soy milk, coconut milk, almond milk, etc. |
| Aseptic Containers - Food and other non-beverage | Polycoat fibre and foil containers (e.g. Tetra Pak) for soup, sauces etc. |
| Aseptic Containers – Beverage non-dairy | Non-alcoholic non-dairy beverage aseptic cartons e.g. gable-top cartons that contained juices |
| Aseptic Containers – Dairy & Substitutes | Milk and milk substitutes in aseptic cartons e.g. Milk and soy milk, coconut milk, almond milk, etc. |
| Aseptic Containers - Alcoholic Beverage | Polycoat fibre and foil containers (e.g. Tetra Pak) for wine and other spirits |
| Carton and Paper Based Packaging | Packaging made of primarily fibre (paper) including: Spiral wound containers, polycoated containers, beverage cups (hot and cold drink), laminated paper packaging. |
| Corrugated Cardboard and Boxboard/Molded Pulp | Includes micro-flute corrugated containers, pizza boxes, waxed corrugated containers, electronic product boxes such as television and computer boxes, boxes used to direct mail for residential consumers. Kraft paper bags and wrap, grocery or retail bags, potato bags, some pet food bags, includes brown, white, and coloured Kraft paper and bags. Boxboard, paperboard, cereal box, shoe box, frozen food box, cores from toilet paper/toweling/gift wrap, etc. Includes wet-strength boxboard, fast food, ice cream boxes, cartons such as fry/onion ring boxes and paper plates. Molded pulp packaging such as egg cartons, drink trays, other trays, molded pulp flower pots/trays, etc. |
| PLASTICS | |
| #1 PET Bottles - Clear - Non-Alcoholic Beverage PET Beverage less than 1L | Clear and translucent #1 plastic bottles for non-alcoholic beverages such as pop and juice with volume less than 1 litre. |
| #1 PET Bottles - Clear - Non-Alcoholic Beverage PET Beverage 1L and greater | Clear and translucent #1 plastic bottles for non-alcoholic beverages such as pop and juice with volume 1 litre or greater |
| #1 PET Bottles - Coloured & Black- Non-Alcoholic Beverage PET Beverage less than 1L | Solid colour and black #1 plastic bottles for non-alcoholic beverages such as pop and juice with a volume less than 1 Litre. |
| #1 PET Bottles - Coloured & Black- Non-Alcoholic Beverage PET Beverage 1L and greater | Solid colour and black #1 plastic bottles for non-alcoholic beverages such as pop and juice with a volume of 1 Litre or greater. |
| #1 PET Bottles - Clear, Coloured & Black - Alcoholic Beverage | All #1 plastic bottles for alcoholic beverages such as vodka or other spirits. |
| #1 PET Other Bottles, Jars and Packaging | Clear and solid colour (opaque) #1 plastic bottles, jars and packaging for foods and other consumer products such as cooking oil, honey, dish soap, shampoos, etc. |
| #1 PET Thermoform - Clear, Coloured, Black | #1 clamshells, #1 egg cartons, #1 trays, #1 blister packaging, #1 drink cups, etc. #1 coloured PET microwaveable trays, etc. #1 black PET microwaveable trays, etc. |
| #2 HDPE Bottles (Natural, Coloured & Black) - Non-Alcoholic Beverage - Non-dairy | #2 plastic bottles and jugs for non-alcoholic non-dairy beverages such as juice, etc. |
| #2 HDPE Bottles (Natural, Coloured, & Black) - Non-Alcoholic Beverage - Dairy and Dairy Substitutes | #2 plastic bottles and jugs for non-alcoholic beverages such as milk and milk substitutes (almond and soy milk) |
| #2 HDPE Bottles, Jugs and Packaging (Natural, Coloured, and Black) - Non-Beverage | #2 plastic plastic packaging for laundry soap, shampoo, windshield washer fluid, etc. |
| Flexible Film Plastic and Film Packaging | HDPE & LDPE film, dry cleaning bags, bread bags, frozen food bags, milk bags, toilet paper and paper towel over-wrap, lawn seed bags, grocery and retail carry-out bags, laminated plastic film and bags that are at least 85% plastic (by weight). Includes chip bags, vacuum sealed bags, cereal liners, candy wraps, pasta bags, boil in a bag, plastic based food pouches, etc. |
| #5 PP Bottles - Non-Alcoholic Beverage | # 5 plastic bottles for non-alcoholic beverages |
| #5 PP Bottles and Containers | # 5 plastic bottles and containers for food, and consumer products: tubs and lids marked #5, bottles, etc. |
| #6 PS - Expanded Polystyrene and Non-Expanded Polystyrene Packaging | # 6 Foam take-out containers such as drink cups, large, white or coloured packaging foam, meat trays, etc. #6 Polystyrene, clamshell containers such as berry and muffin containers, opaque clamshell containers such as food take-out containers, yogurt containers, rigid trays, small milk or cream containers for hot beverages, cold drink cups. |
| #6 PS Non-Expanded Polystyrene Bottles - Non-Alcoholic Beverage - Non-Dairy | #6 Non-expanded Polystyrene bottles for Non-alcoholic non-dairy beverages; includes PS containers for beverages like orange juice and water and typically have an aluminum foil lid. |
| Other Rigid Plastic Packaging | Other rigid containers (#3, #4 & #7), non-PET blister packaging, unmarked/coded packaging, plant pots and trays, pails etc. |
| Other Rigid Plastic Packaging - Non-Alcoholic Beverage Bottles | #3, #4, #7 & unmarked/coded plastic bottles for Non-alcoholic beverages |
| METALS | |
| Aluminum- Food, Foil and Foil Trays | Aluminum pet food cans, food cans (e.g., sardine cans) foil wrap, pie plates, baking trays, aerosol containers, etc. |
| Aluminum Beverage Containers | Beverage cans for non-alcoholic drinks such as pop and water, etc. |
| Aluminum Containers - Alcoholic Beverage | Beverage cans for alcoholic drinks such as beer, ciders, coolers, etc. |
| Steel - Non-Alcoholic Beverage | Non-alcoholic beverages such as fruit juices, etc. |
| Steel Food Cans, and Consumer Products | Steel packages for foods (soup, beans, peaches cans, etc.), and consumer products (paint, etc.), includes aerosol cans. |
| GLASS | |
| Clear Glass - Non-Alcoholic Beverage | Bottles for pop, water, juice and other non-alcoholic beverages |
| Clear Glass - Alcoholic Beverage | Wine bottles, spirit bottles, single-serve cooler bottles, beer bottles |
| Clear Glass - food, beverage and other products | Food containers (such as pickle jars, salsa jars and dairy tubs), other consumer products (cosmetic containers for creams, etc.) |
| Coloured Glass - Non-Alcoholic Beverage | Bottles for pop, water, juice and other non-alcoholic beverages |
| Coloured Glass - Alcoholic Beverage | Wine bottles, spirit bottles, single-serve cooler bottles, beer bottles |
| Coloured Glass - food, beverage and other products | Food containers (such as pickle jars, salsa jars and dairy tubs), other consumer products (cosmetic containers for creams, etc.) |
| OTHER MATERIALS | |
| Other Waste | All other materials not obligated for Blue Box Program - not listed above. Kitty litter, socks with holes, parchment paper, non-obligated aluminum foil... |
| Other Recyclable Paper (Non-obligated) | e.g. home office paper, school binder paper, books, greetings cards, etc. |
| Organics/Food Waste | All Food waste Other compostable materials: Food-soiled paper napkins, paper towel, & tissues (provided it is free of contaminants, such as household cleaners) Food-soiled paper plates, and muffin wrappers, coffee filters, tea bags, (un-waxed and un-plasticized) Waxed paper Wooden stir sticks, chop sticks, popsicle sticks, toothpicks Household plants (including soil) & cut flowers, Human and animal hair Pumpkins |
| Pet Waste (no kitty litter) | |
| Diapers/Sanitary | |
| Reusable Textiles | Reusable Textiles (Dirty rags/contaminated textiles exempted) |
| Yard Waste | |
| Other Metal | |
| HHW (note what types) | Batteries, paint, solvents etc. |
| ITT AV (WEEE) | Information Technology, Telecommunications, Audio-visual equipment |