![Minneapolis City of Lakes logo]

August 30, 2022

FINAL REPORT

Residential Waste Characterization & Capture Rate Study
Methodology and Baseline Results

![MSW Consultants logo]

Prepared under subcontract to **Foth**

ACKNOWLEDGEMENTS

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1. INTRODUCTION

1.1 BACKGROUND

The City of Minneapolis Department of Public Works, Solid Waste and Recycling Division (SW&R), provides municipal solid waste (MSW) management services to approximately 107,000 residential customers and a small number of commercial and municipal customers. This service includes regular collection of garbage, recycling, organics, yard waste, large (bulky) materials, the operation of a series of organics drop-off sites, and a garbage/building materials transfer station.

In December 2017, the City of Minneapolis (the City) adopted a Zero Waste Plan that identified strategies to help meet the City's recycling and composting goal of 50% by 2020 and 80% by 2030. In November 2019, the City adopted the Zero Waste Action Plan including specific activities to better measure progress. This Residential Waste Characterization & Capture Rate Study, funded in part by Hennepin County, is a major step toward enhanced measurement and refined planning of the City's recycling programs.

The City tracks its diversion rate as the weight-based percent of the total waste stream that is recycled or composted. A weight-based diversion rate may not provide a full understanding of how well its residents divert waste through the City's recycling or organics recycling programs.

In 2016, Hennepin County completed a waste characterization of Minneapolis' residential garbage. As part of the waste characterization, the results were used to estimate a capture rate of recyclables and organic materials. It is important to note that the County's 2016 study was performed as the City had just begun rolling out its residential organics recycling program and involved sorting of Minneapolis residential garbage only from randomly selected truck loads as delivered to the Hennepin County Energy Center (HERC) in downtown Minneapolis.

In early 2022, the City released a solicitation for consultants for this project. In April 2022, the City retained the project team of Foth Infrastructure and Environment (Foth) and MSW Consultants to perform this Residential Waste Characterization & Capture Rate Study. The first project phase involved the performance of a four-week waste characterization study throughout the month of May 2022.

City staff collected garbage, recycling, and organics cart setouts at 700 randomly selected addresses. Under collaboration with City staff, the consultant project team conducted the sort operations at the City's SW&R Maintenance Facility located at 2710 Pacific Street. The consultant sort crew consisted of a joint team of professional field staff from MSW Consultants and Foth, the City's Recycling Coordinator, as well as independent sort laborers recruited specifically for this study.

MSW Consultants developed the sorting plan to meet the City's technical specifications, and subsequently performed the statistical analysis for the waste characterization study phase of the project. By correlating recycling data with waste data at the curb, the findings will allow City and County planners to observe the effectiveness of the recycling and organics collection program at the level of individual households. Results of the study will be used to update the capture rate data to provide an accurate depiction of the status of residential recycling programs, effectiveness of its educational programs and identify materials and behaviors on which to focus future outreach and education activities. This 2022 capture rate study is similar to the 2016 waste characterization study, with notable differences, and provides updated results and recommendations.

1.2 OBJECTIVES

The objectives of this 2022 Residential Waste Characterization & Capture Rate Study were to accomplish the following goals:

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1. INTRODUCTION

◆ Obtain a comprehensive composition profile of residential garbage, recycling, and organics using a cart/household sampling methodology.

◆ Quantify and characterize recyclables and organics that remain in the disposed residential waste stream.

◆ Identify the main contaminants being placed in the recycling and organics streams so that public outreach can be improved and more targeted to specific materials.

◆ Calculate capture rates for specific materials targeted in the City's curbside recycling and organics collection programs.

1.3 REPORT ORGANIZATION

This first "Sort Report" was authored by MSW Consultants and records the waste characterization methodology, results, and conclusions. A second Final Report authored by Foth provides the executive summary, broader discussion of results, and recommendations for enhanced City recycling program performance based on the results of this capture rate study.

This Sort Report is organized into the following remaining sections:

◆ **Section 2 – Study Design and Methodology:** This section presents an overview of waste disposal and recycling data available from the City on which the analysis is based. Also provided in this section is a summary of the City's sampling plan that was developed to guide the study process and to provide statistically defensible data. Finally, this section summarizes the field data collection methods and analytical methods applied in the study.

◆ **Section 3 – Material Composition:** This section presents the detailed composition profiles for garbage, recycling, and organics from this study, including a delineation of differences between households that subscribe to organics and those that do not. Results are presented in both tabular and graphical format to highlight findings of interest. Additionally, results of several subsorts performed by the City are provided.

◆ **Section 4 – Recycling Analysis**: This section provides detailed capture rate estimates for both organics and non-organics subscribers. The maximum theoretical recycling rate is also calculated.

◆ **Section 5 – Conclusions**: This section presents observations and conclusions that can be drawn from the data contained herein. Additional conclusions are provided in the Final Report prepared by Foth.

◆ **Appendices:** Related documentation and data required for the performance of the residential waste composition study are contained in Appendices. This includes the 2022 Waste Sort Map showing the locations of the randomly selected sample households (Appendix A) and the Material Categories and Definitions (Appendix B).

2. STUDY DESIGN AND METHODOLOGY

2.1 INTRODUCTION

The City's project specifications for this engagement were compiled in a Request for Statements of Interest requiring that a representative sample of garbage, recycling, and source-separated organics carts be retrieved by the City, delivered to a City-provided work location, and sorted into specified categories. This section summarizes the parameters of the study.

2.2 MINNEAPOLIS WASTE GENERATION

As of January 1, 2022, the City served 107,713 households. Just over 51 percent of these households, or 55,171 households, were subscribed to receive organics collection as of this date. These household counts have been used as the basis of analysis in this report.

Table 2-1 summarizes the annual quantity of curbside residential garbage, recycling, organics, and yard waste quantities collected in 2021. This table also calculates the annual tons per household and pounds per week.

Table 2-1 Minneapolis Residential Waste Generation

Material	Annual Tons (CY21)	Households Receiving Service	Tons per Household per Year	Percent of Total Tons	Lbs per Household per Week
Garbage	83,631	107,713	0.78	63.5%	29.9
Recycling	25,249	107,713	0.23	19.2%	9.0
Organics	5,838	55,171	0.11	8.3%	4.1
Yard Waste	17,046	107,713	0.16	12.9%	6.1
Total	**131,764**		**1.27**	**100.0%**	**49.03**

2.3 HOUSEHOLD SELECTION AND CART RETRIEVAL

Based on the City-wide metrics in Table 2-1, MSW Consultants ran simulations to determine the likely margin of error for the composition on individual residential carts. Table 2-2 summarizes the outcome of these simulations.

Table 2-2 Household Sample Size Needed for Selected Margin of Error

Targeted MOE	No. of Households for Garbage	No. of Households for Recycling	No. of Households for Organics
+/- 10%	175	125	<70
+/- 7.5%	325	225	<100
+/- 5%	700	475	225

Based on these estimates, and based on the available budget for this project, the City opted to target the full 700 households to have their carts retrieved and sorted. This is shown in Table 2-3. As a final note, the decision was made to randomly select one-half (350) of the households from the pool of organics subscribers, and then randomly select the remaining 350 from households that do not currently receive curbside organics collection.

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2. STUDY DESIGN AND METHODOLOGY

Table 2-3 Final Sampling Targets

Material	Households Subscribing to Organics	Households Without Organics Collection	Total
Garbage	350	350	700
Recycling	350	350	700
Organics	350	0	350
Total	**1,050**	**700**	**1,750**

The City maintains a database of its residential customer base that contains relevant service level data for garbage, recycling, organics, and yard waste. The City also provided the cart exchange crews. Accordingly, the City managed a randomized selection of households to be targeted in this study. Microsoft Access was used to randomly select the 700 households for the sort. The query was set up to randomize single-family customers for the study. Two separate queries were run, each to pull a randomized list of 350 households throughout the City. The first query was for households that were not signed up for the organics recycling program and second was for those that were signed up for the organics program.

From here the 700 randomly selected households were further broken down into 20 different sort groups. Each sort group represented one day of physical sorting and consisted of 35 households. The regular City crews collect Monday through Friday. Therefore, carts were retrieved by special "cart exchange crews" assigned to this sort project on the morning of each collection day and queued at the sort location overnight, where they were sorted the next day. Table 2-4 summarizes the number of carts selected by day for the duration of the study. Note that the cart count slightly exceeds the number of targeted households. This is because some customers have more than one cart for a particular collection service (e.g., garbage). In such cases, all carts of the same material stream were combined and treated as a single setout.

Table 2-4 Daily Targets

Group	Collection Date	Total Cart Count
Sort 1 - 1ABE	4/25/2022	91
Sort 2 - 2ABE	4/26/2022	95
Sort 3 - 3ABE	4/27/2022	94
Sort 4 - 4ABE	4/28/2022	92
Sort 5 - 5ABE	4/29/2022	87
Sort 6 - 1CD	5/2/2022	95
Sort 7 - 2CD	5/3/2022	95
Sort 8 - 3CD	5/4/2022	94
Sort 9 - 4CD	5/5/2022	94
Sort 10 - 5CD	5/6/2022	101
Sort 11 - 1ABE	5/9/2022	95
Sort 12 - 2ABE	5/10/2022	95
Sort 13 - 3ABE	5/11/2022	92
Sort 14 - 4ABE	5/12/2022	93
Sort 15 - 5ABE	5/13/2022	96
Sort 16 - 1CD	5/16/2022	89
Sort 17 - 2CD	5/17/2022	93

Group	Collection Date	Total Cart Count
Sort 18 - 3CD	5/18/2022	97
Sort 19 - 4CD	5/19/2022	87
Sort 20 - 5CD	5/20/2022	89
Total		**1,864**

Appendix A contains a map of the randomly selected households.

2.4 CART RETRIEVAL PLAN

The City managed retrieval of setouts from the randomly selected households. City staff did the following to facilitate exchange of carts from randomly selected households.

◆ Entered in a work order for each route (garbage, recycling, and organics) for each address notifying the crew to not service the cart.

◆ Cart maintenance crews cleaned and staged carts for the exchange crews each day.

◆ Cart exchange crews were provided with a list of households by day and sort group. The sort day list by household included a summary of the number and size of carts registered to the property in addition to the serial numbers of the carts on site.

    ◆ Cart exchange crews tallied the number, size and type of carts needed for each route. A couple extra of each type of cart was on the truck in the event more carts were found than were registered to the property.

    ◆ There were 3 one-person cart exchange crews who each picked up two truckloads of carts each day.

◆ When at the property, the cart exchange crews staff verified the cart numbers, sizes and type at the property and exchanged only the carts that were not empty.

    ◆ If the cart was empty, it was noted on the sheet that it was empty.

    ◆ If it was not out for collection, it was noted on the sheet as not out.

◆ Carts with material inside were exchanged. A sample ID sticker was placed inside the lid for the sorting staff to verify the sample ID. Cart exchange crews had blank labels to use if there were more carts at the collection point than were registered to the property.

◆ Cart exchange crews left a cart hanger to notify the property they were randomly selected for the study. The cart hanger encouraged residents to take a short survey to provide additional details on how waste was managed at their home.

◆ Cart exchange crews delivered the carts to the staging area for the next day of sorting and turned the tracking paperwork in to the City's sort project manager. The paperwork was scanned for the sorting staff to check in all carts, and the master copy was kept by City staff.

Table 2-5 summarizes the final tallies of carts retrieved from the targeted households. This table also calculates the setout rates observed and projects the annual pounds of material and pounds per household based on the retrieved carts. In the professional opinion of MSW Consultants, these data appear reasonable based on other data points available in our internal databases. In particular, the recycling and organics setout rates are at the high end of typical ranges, which suggests higher than average participation in these programs.

2. STUDY DESIGN AND METHODOLOGY

Table 2-5 Cart Retrieval Summary

Material	Cart Size	Targeted Households	Retrieved Households	Setout Rate	Sorted Weight (lbs)	Lbs Per Setout
Garbage Combined		**700**	**565**	**80.7%**	**19,311.9**	**34.2**
	Large	613	499	81.4%	18,459.0	37.0
	Small	87	66	75.9%	852.9	12.9
Garbage with Organics		354	283	79.9%	8,247.9	29.1
	Large	288	233	80.9%	7,669.0	32.9
	Small	66	50	75.8%	578.9	11.6
Garbage w/o Organics		346	282	81.5%	11,064.0	39.2
	Large	325	266	81.8%	10,790.0	40.6
	Small	21	16	76.2%	274.0	17.1
Recycling Combined		**700**	**526**	**75.1%**	**11,309.5**	**21.5**
	Large	680	514	77.9%	11,129.9	21.7
	Medium	20	12	85.7%	179.6	15.0
Recycling with Organics		349	269	77.1%	6,251.7	23.2
	Large	342	262	76.6%	6,157.6	23.5
	Medium	7	7	100.0%	94.1	13.4
Recycling w/o Organics		325	257	79.1%	5,057.8	19.7
	Large	318	252	79.2%	4,972.3	19.7
	Medium	7	5	71.4%	85.5	17.1
SSO		**350**	**191**	**54.6%**	**1,647.3**	**8.6**
	Medium	0	1	33.3%	5.3	5.3
	Small	350	190	54.1%	1,642.0	8.6
Total			**1,282**		**32,268.7**	**25.2**

Table 2-6 applies the pounds per household and the setout rates to project the annual tonnage. This table then compares the projected tonnage to the reported tonnage. As shown, the estimated tonnage is reasonable when compared with compared the reported tonnage.

Table 2-6 Projected Annual Tonnage vs Reported Annual Tonnage

All Participants	Garbage	Recycling	Organics	Total
Households	107,713	107,713	55,171	107,713
Setout Rate	80.7%	75.1%	54.6%	
Lbs/Setout	34.2	21.5	8.6	
Annual Setouts	52.0	26.0	52.0	
Extrapolated Tons	**77,262**	**22,623**	**6,751**	**106,637**
Actual Tons (2021)	**83,631**	**25,249**	**5,838**	**114,718**
Variance	*-7.6%*	*-10.4%*	*15.6%*	*-7.0%*

The extrapolated tonnage shown in this table has been used as the basis for calculating the capture rates for this study.

2.5   SORTING PLAN

2.5.1   SORT LOCATION

All sorting took place at the City's Public Works yard located at 2710 Pacific Street N in Minneapolis. The City provided a covered sort location, as shown in Figure 2-1.

Figure 2-1 Sorting Location at City Public Works Complex

Figure 2-2 shows the inventory of carts on a customary sort day. Crews were responsible for sorting all carts each day.

Figure 2-2 Carts in Queue Awaiting Sorting

2.5.2 STAFFING PLAN

The project was staffed jointly by Foth and MSW Consultants. City staff provided sampling, cart collection, and even supplemental sort labor throughout. The City's Recycling Coordinator provided training, oversight, and sort labor throughout most of the sort operations. MSW Consultants provided overall work site set-up and training of the sorting teams. MSW Consultants and Foth supplied professional management staff to supervise the sorting at each sort table, a photo of which is shown in Figure 2-3. Sort teams were recruited from the local labor pool. Despite a medical emergency during the work, the sorting teams were able to complete the sorting on schedule.

Figure 2-3 Sort Crew

2.5.3 MATERIAL CATEGORIES

This study updated the list of material categories that were used for the 2016 Hennepin County study. Table 2-7 summarizes the updated material categories. This table also identifies the "Diversion Strategy" that is available for each individual constituent in the waste stream. These diversion strategies were also used in the 2016 Hennepin County study. Specifically, each material was defined as one of the following:

◆ **Recycling Cart**: Includes cardboard, newspaper, and other dry recyclable fibers, as well as metal, glass, plastic, and aseptic containers targeted in the City's curbside recycling program.

◆ **Yard Waste Cart**: Includes leaves, grass, prunings, and trimmings that can be set out with yard waste.

◆ **Organics Cart**: Food, compostable papers, and other compostable items can be placed in this cart.

◆ **Voucher Program**: Includes recoverable C&D debris.

◆ **Recycling Beyond the Cart**: Includes ferrous and nonferrous scrap metal, which is accepted by scrap dealers around the City, and also includes Electronics.

◆ **Recycling Drop-off**: Includes clean plastic film and film bags, which can be dropped off at various retailers within the City that offer take-back programs; and also includes HHW which can be dropped at County facilities.

◆ **Donation Options**: This category includes only clothing, shoes, and leather textile products and includes only those items that could be sorted as "Wearable." It is important to note that no attempt was made to judge the condition of disposed textiles, and, as a practical matter, a large percentage of these items may have been too worn, too damaged, or too contaminated for donation and recovery.

◆ **Garbage**: All other material categories that could not be assigned to one of the above categories were classified as disposable. While other metro areas may have viable recycling programs for certain of these materials, it is not likely that these items will be readily recoverable in the near future. Note that a range of renovation and construction materials are listed as being not currently recoverable in the residential stream, although they might be divertible had they been collected with other C&D.

Table 2-7 Material Categories and Recycling/Diversion Methods

Paper		Metal	
Newspaper*	Recycling Cart	Steel cans	Recycling Cart
Mixed recyclable paper*	Recycling Cart	Aluminum cans	Recycling Cart
Boxboard / paperboard*	Recycling Cart	Other aluminum	Recycling Cart
Plastic-coated paper	Garbage Cart	Other scrap steel	Recycling - Beyond the Cart
Shredded paper	Garbage Cart	Non-ferrous metal	Recycling - Beyond the Cart
Cartons*	Recycling Cart	Mixed metal	Recycling - Beyond the Cart
Cardboard / Kraft paper*	Recycling Cart	Cardboard can	Recycling Cart
Paper cups and to-go containers*	Garbage Cart	**Organics**	
Compostable paper	Organics Cart	Wasted food	Organics Cart
Non-recyclable paper	Garbage Cart	Food waste	Organics Cart
Plastic		Other compostable	Organics Cart
#1 PET bottles	Recycling Cart	Yard waste	Yard Waste Cart
#1 PET non-bottles	Recycling Cart	**HHW**	
#1 PET - fluff	Garbage Cart	HHW	Recycling Drop-off
#2 HDPE Natural	Recycling Cart	Batteries	Garbage Cart
#2 HDPE Pigmented	Recycling Cart	Sharps	Garbage Cart
#3 PVC	Garbage Cart	**C&D Debris**	
#5 PP containers	Recycling Cart	Mixed C&D Debris	Voucher Program
#6 EPS	Garbage Cart	**Textiles**	
#6 PS - rigid	Garbage Cart	Textiles - Wearable	Donation Options
Compostable plastics	Organics Cart	Textiles - all other	Garbage Cart
All other packaging containers	Garbage Cart	**Other Waste**	
Recoverable film/bags	Recycling - Drop-off	Electronics	Recycling - Beyond the Cart
Film: other	Garbage Cart	Small household appliances	Garbage Cart
#7 compostable bags	Organics Cart	Small furniture/hhold goods	Garbage Cart
Multi-layer pouches	Garbage Cart	Tires / rubber	Garbage Cart
Cutlery and straws*	Garbage Cart	Diapers/hygiene products	Garbage Cart
Durable plastic items	Garbage Cart	Pet waste & bedding	Garbage Cart
All other plastic	Garbage Cart	Fines	Garbage Cart
Glass		Other not elsewhere classified	Garbage Cart
Food & beverage glass	Recycling Cart		
Non-recyclable glass	Garbage Cart		

Based on material or condition, may be allowed in organics stream.

Detailed definitions of the material categories are contained in Appendix B.

2. STUDY DESIGN AND METHODOLOGY

It should be noted that half-full bottles of water were sorted into the "Wasted Food" category. Sometimes these containers were observed to contain urine, at which point it was then sorted into the "Other not elsewhere classified" category.

MSW Consultants did not perform any subsorts. However, certain material categories were set aside for City staff to subsort later. Table 2-8 shows the material categories that were set aside for further subsorting by City staff.

Table 2-8 Subsorts Performed by the City

Category	Subsorts	Notes
Straws and Utensils	Sporks, spoons, knives, forks, still in plastic wrapping, labeled compostable	
Batteries	Alkaline, Lithium-Ion, Button	
Paper to-go cups and containers	Molded paper, certified compostable, plastic lined	Some data points separated by stream; one data point combined all streams

At the outset of the study, it was intended that the field data collection crews should count any plastic bags found in recycling carts, as it is preferable to place loose (unbagged) recyclables in carts. This requirement was not performed consistently. Although field personnel reported relatively few incidences of plastic bag usage, no quantitative data are available.

2.5.4 HEALTH & SAFETY

Each of the Team members on this project maintained a Health and Safety Plan governing waste characterization safety and PPE requirements and followed appropriate health and safety practices.

One of the MSW Consultants crew members experienced a medical emergency during the job. The emergency was unrelated to the work. The individual was treated at a local hospital and has recovered.

2.5.5 SORTING PROCEDURES

Sort tables consisted of a 4' x 8' surface with rails, supported by two sawhorses. The table was surrounded by an assortment of buckets into which materials were be sorted. The sort container bins were labeled according to the material categories as described previously.

Carts were systematically logged in by the Crew Chief. The sort crew first lifted and emptied the carts onto the table, a task requiring two sorting staff. After the cart was emptied on the sort table, the sort team immediately began identifying and placing the materials in their respective, labeled containers or passing them along the table to the sorter closest to a given sort container. Sorters specialized in certain material groups, with one team member handling the paper categories, another the plastics, another the glass and metals, and so on. In this way, sorters became highly knowledgeable in a short period of time as to the definitions of individual primary material categories. An example of a sorting table and bins is shown in Figure 2-4.

Figure 2-4 Sort Table and Bins

Selected materials were subsequently set aside for subsorting by the City at a later date.

2.6   DATA MANAGEMENT

2.6.1   DATA RECORDING

The weigh-out and data recording process is a critical aspect of the data gathering procedures. The Crew Chief oversaw all weighing and data recording of each sorted cart. Each bucket containing sorted materials from each sample was carried over to the scale. Sorting laborers assist with carrying and weighing the buckets of sorted material, and the Crew Chief recorded all data.

The Crew Chief used a tablet computer to record the composition weights. The tablet allowed for samples to be tallied in real time so that field data collection can immediately identify and rectify errors associated with light sample weights. Each sample was cross-referenced against the pre-selected cart list to assure accurate tracking of the samples each day. The real-time data entry system offers several important advantages:

◆   The system contains built-in logic and error checking to prevent erroneous entries.

◆   The system sums sample weights in real time so the Crew Chief can confirm achievement of weight targets for each and every sample.

◆   At the end of the workday, the tablet is synchronized with the cloud via Wi-Fi signal, providing data security.

2.6.2   STATISTICAL METHODS

A statistical analysis was performed to calculate the mean composition for each of the material categories and for each material stream in this study. The sample mean composition was determined for each material category by (i) summing the weight of each material in each sample; (ii) summing the total weight of all samples, and (iii) dividing the first value by the second value to determine the percent-by-weight composition. The margins of error at a 90 percent confidence level are provided for each material category as well as for major material groups (e.g., "paper", "plastic", etc.).

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3. MATERIAL COMPOSITION

3.1 COMPOSITION IN THE GARBAGE CARTS

Table 3-1 provides the detailed statistical composition in the garbage carts based on analysis of all of the 565 garbage setouts captured in this 2022 Study. For each material category, the mean percent, margin of error, and estimated pounds per setout are shown. This data includes all garbage cart samples.

Table 3-1 Detailed Composition In All Garbage Carts

Material Category	Mean	MOE	Lbs/ Set-out	Material Category	Mean	MOE	Lbs/ Set-out
Paper	**9.0%**	**1.2%**	**3.1**	**Metal**	**3.8%**	**0.9%**	**1.3**
Newspaper	0.2%	0.1%	0.1	Steel cans	0.5%	0.3%	0.2
Mixed recyclable paper	2.7%	0.4%	0.9	Aluminum cans	0.6%	0.2%	0.2
Boxboard / paperboard	1.2%	0.2%	0.4	Other aluminum	0.3%	0.1%	0.1
Plastic-coated paper	0.3%	0.1%	0.1	Other scrap steel	0.9%	0.5%	0.3
Shredded paper	0.1%	0.1%	0.0	Non-ferrous metal	0.4%	0.2%	0.1
Cartons	0.2%	0.1%	0.1	Mixed metal	1.1%	0.5%	0.4
Cardboard / Kraft paper	3.0%	0.9%	1.0	Cardboard can	0.1%	0.0%	0.0
Paper cups and to-go containers	0.4%	0.1%	0.1	**Organics**	**38.3%**	**4.0%**	**13.1**
Non-Recoverable paper	1.0%	0.2%	0.3	Wasted food	25.1%	4.1%	8.6
Plastic	**11.7%**	**2.0%**	**4.0**	Food waste	6.3%	1.0%	2.1
#1 PET bottles	0.8%	0.1%	0.3	Compostable paper	3.4%	0.4%	1.1
#1 PET non-bottles	0.6%	0.4%	0.2	Other compostable	0.5%	0.2%	0.2
#1 PET - fluff	0.0%	0.0%	0.0	Yard waste	3.1%	1.3%	1.1
#2 HDPE Natural	0.1%	0.0%	0.0	**C&D Debris**	**4.4%**	**1.6%**	**1.5**
#2 HDPE Pigmented	0.3%	0.1%	0.1	Mixed C&D Debris	4.4%	1.6%	1.5
#3 PVC	0.1%	0.1%	0.0	**Textiles**	**7.0%**	**3.5%**	**2.4**
#5 PP containers	0.6%	0.1%	0.2	Textiles - wearable	4.7%	3.6%	1.6
#6 EPS	1.6%	1.9%	0.5	Textiles - all other	2.3%	0.5%	0.8
#6 PS - rigid	0.2%	0.0%	0.1	**Household Hazardous Waste**	**0.6%**	**0.4%**	**0.2**
Compostable plastics	0.0%	0.0%	0.0	HHW	0.5%	0.4%	0.2
All other packaging containers	0.3%	0.1%	0.1	Batteries	0.1%	0.0%	0.0
Recoverable film/bags	0.5%	0.1%	0.2	Sharps	0.0%	0.0%	0.0
Film: other	4.3%	0.7%	1.5	**Other Waste**	**22.1%**	**2.3%**	**7.6**
#7 compostable bags	0.0%	0.0%	0.0	Electronics	1.1%	0.5%	0.4
Multi-layer pouches	0.2%	0.0%	0.1	Small household appliances	0.1%	0.1%	0.0
Cutlery and straws	0.3%	0.3%	0.1	Small furniture and household goods		Not Found	
Durable plastic items	1.1%	0.2%	0.4	Tires / rubber	0.0%	0.0%	0.0
All other plastic	0.8%	0.2%	0.3	Diapers & feminine hygiene products	5.7%	1.1%	1.9
Glass	**3.1%**	**0.5%**	**1.1**	Pet waste & bedding	8.8%	1.5%	3.0
Food & beverage glass	2.3%	0.5%	0.8	Fines	0.8%	0.1%	0.3
Non-recoverable glass	0.8%	0.2%	0.3	Other not elsewhere classified	5.5%	1.1%	1.9
				Grand Total	**100.0%**		**34.2**
				No. of Samples	*565*		
Targeted Recyclable					13.3%	1.6%	4.5
Targeted SSO					32.2%	4.0%	11.0
Yard Waste					3.1%	1.3%	1.1
Not Targeted in Curbside Program					51.4%	4.1%	17.6

"Targeted Recyclables" are those recyclable materials that the City instructs residents to include in the blue recycling carts. "Targeted SSO" (Single Stream Organics) are those compostable materials that the City instructs residents to include in the green organics carts if the household is subscribing to the organics recycling program. "Targeted Yard Waste" are those materials that the City instructs residents to set out for separate collection. Residents can use their own reusable containers, compostable bags, or tie brush in bundles. (No special yard waste cart is provided by the City). "Not Targeted in Curbside Recovery Programs" are those other materials that the City instructs residents to put into the grey trash carts and are not included in recycling carts, organics carts, or for set out as yard waste.

Figure 3-1 compares the 2022 composition of garbage generated from households that subscribe to the City's organics recycling program with those that do not. As shown, households that do not subscribe to

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the organics program have a higher percentage of organic material in the garbage carts than the organics-subscribing households. The reduction in organic material between subscribers and non-subscribers was mainly due to the wasted (unconsumed) food category, which saw a reduction from 29% in non-subscribers to 19.8% in subscribing households.

Figure 3-1 Composition in the Garbage Carts, Organics vs Non-Organics Subscribers
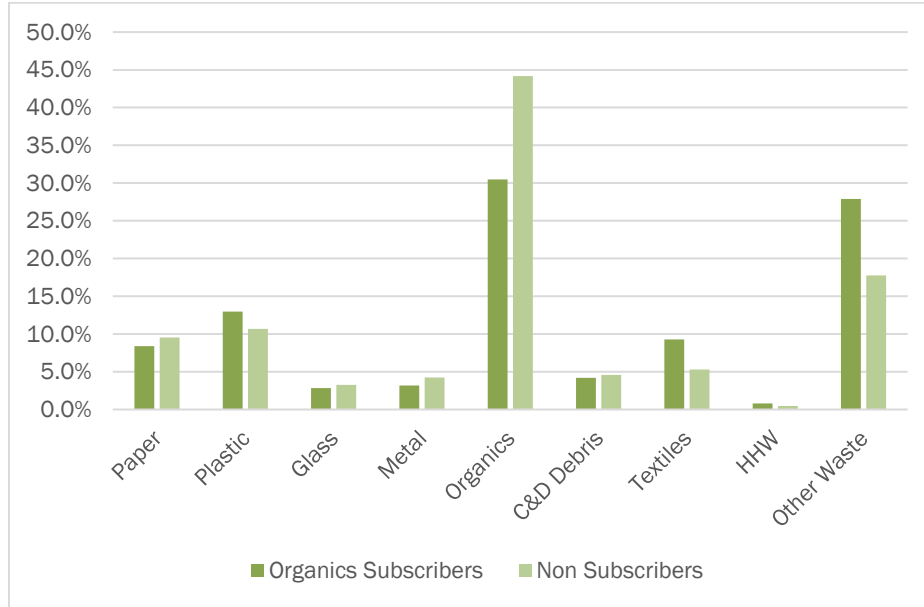
Figure 3-2 breaks down the City's garbage stream by the major material categories as defined for this 2022 Study. This figure also compares these results to the 2016 Study using similar categories. As shown, the amount of organic material as sorted appears to have increased significantly from 2016 to 2022, while there were decreases in paper, C&D Debris and Other Wastes.

Figure 3-2 Comparison of Material Categories in Garbage Streams, 2016 vs 2022
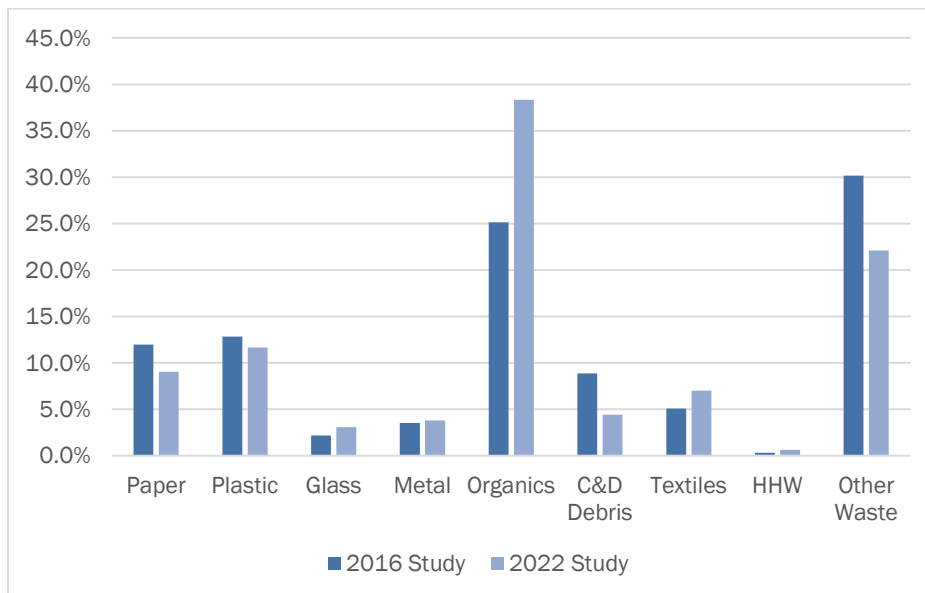
The methods of sampling were different for the 2016 Study. In 2016, samples were collected from randomly selected packer trucks from the Minneapolis residential garbage routes as delivered to the Hennepin Energy Recovery Center (HERC) for disposal. For this 2022 Study, carts were delivered "as is" to the project sort location (without compaction) using City stake body, flatbed trucks using a lift gate.

Also, the material sort categories and associated definitions, while consistent, were not the same between the 2016 Study and this 2022 Study.

Table 3-2 identifies the 10 most prevalent material categories in the Minneapolis residential garbage carts as sorted for this 2022 Study. As shown, Wasted Food (unconsumed food) was found to be the most prevalent material, at 25.1 percent of the total garbage stream (all garbage carts).

Table 3-2 Top 10 Most Prevalent Materials, in the Garbage Carts

Material	Mean Percent
Wasted food	25.1%
Pet waste & bedding	8.8%
Food waste	6.3%
Diapers & feminine hygiene products	5.7%
Other not elsewhere classified	5.5%
Textiles— wearable	4.7%
Mixed C&D Debris	4.4%
Film: other	4.3%
Compostable paper	3.4%
Yard waste	3.1%

Figure 3-3 compares the 10 most prevalent material categories in the garbage carts by organics subscribers and non-subscribers. As shown for this 2022 Study, Wasted Food was found to be the most prevalent material in both groups, although it was much lower amongst the organics subscribers (20% vs 29%). This suggests the City's organics recycling program is helping to significantly reduce and/or divert this material from the garbage stream.

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Figure 3-3 Top 10 Materials in Garbage Carts, Subscribers vs Non-Subscribers
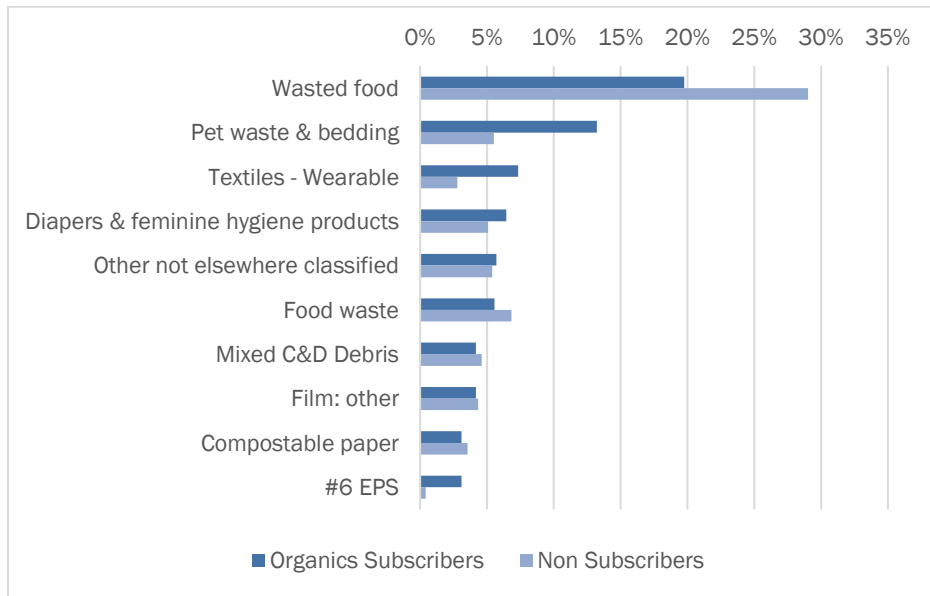
Figure 3-4 compares the 10 most prevalent material categories in Minneapolis residential garbage between the 2016 and 2022 studies. As shown, Food Waste was found to be the most prevalent material in 2016, at 15 percent of the stream. In 2016, Food Waste was a combined category. To compare the 2016 data to the current study, the 2022 percentages of Food Waste and Wasted Food were combined. As shown in the figure, the resulting 2022 Food Waste was more than double that of 2016 (31.3 percent compared to 15 percent). One explanation is that more Food Waste was sorted into other categories in 2016, such as Supermix—Organics; Supermix—Indistinguishable; Other Compostable Organics; and Other Materials Not Elsewhere Classified. Also, the "truck load" sampling method used in 2016 may result in more Food Waste becoming fragmented and not as easily sorted as Food Waste. The 2022 Study used a "cart" sampling method, which better preserves the integrity and form of the materials as generated by residents.

Another explanation for the 2022 increase in Food Waste is the influence of the COVID-19 pandemic. During this time, more people are home and might be preparing and eating more meals at home, resulting in more food waste.

Figure 3-4 Top 10 Materials in Garbage, 2016 vs 2022
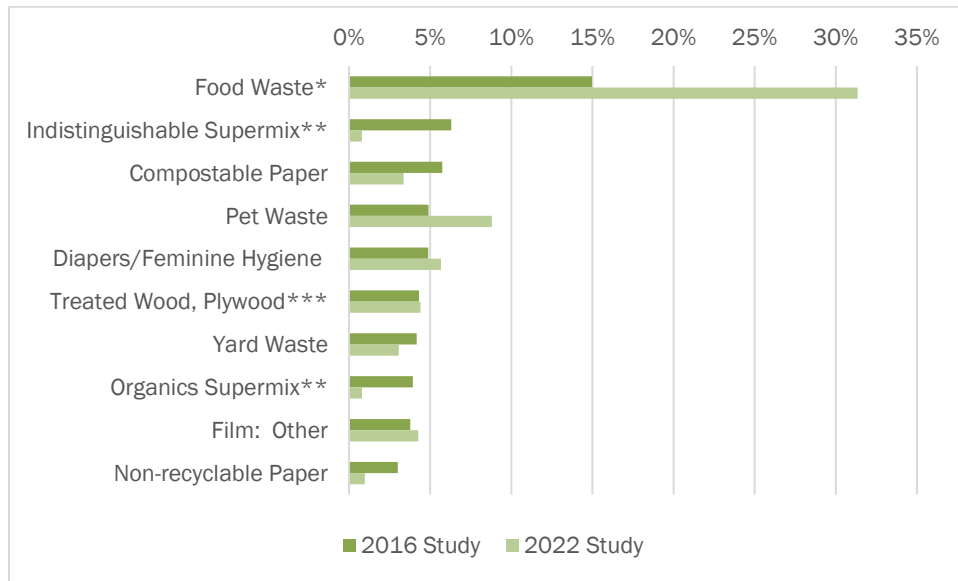
*The Food Waste category in 2016 encompassed more of the food waste materials. To make a direct comparison, the 2022 percentages of Food Waste and Wasted Food were combined.

**Supermix was defined in 2016 as mixed materials having particle sizes below two inches. In 2022, materials were sorted down to particle sizes in the range of ½ inch to ¼ inch and were sorted as "Fines"

***Treated Wood and Plywood were included in the Mixed C&D Debris for the 2022 Study. As such, this category could not be compared, although it should be noted that this category in 2016 was 5.0%, while the entire Mixed C&D Debris material category in 2022 was 4.4%.

Figure 3-5 presents a comparison of targeted recyclables and organics in the garbage carts between organics subscribing and non-subscribing households. As can be seen in the figure for this 2022 Study, targeted organics items in the garbage carts have been significantly reduced in organics subscribing households. Not surprisingly, Non-Subscribing households showed higher levels of targeted recyclables and SSO materials in the refuse stream.

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Figure 3-5 Recyclables and Organics in Garbage Carts, Subscribers vs Non-Subscribers
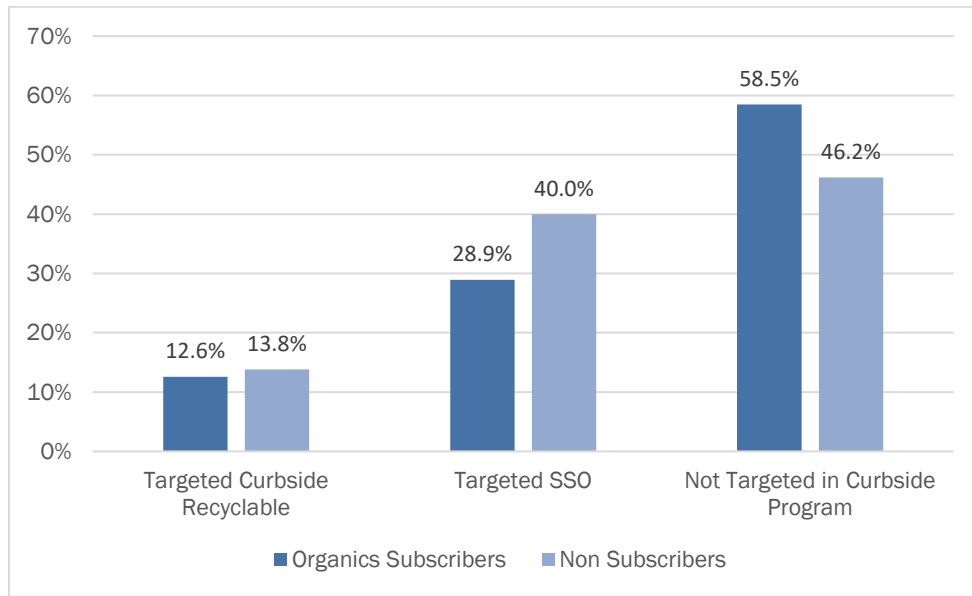
Figure 3-6 presents the composition of materials disposed in the garbage carts in terms of the potential for diverting materials from disposal into appropriate recovery program options. (Refer to the City's "Garbage, Recycling and Cleanup" web site and related web pages, which provide descriptions of each recovery program option.) As shown, there was a significant decrease in garbage and an increase in the presence of curbside organics.

Figure 3-6 Materials Disposed in the Garbage, 2016 Study vs 2022 Study
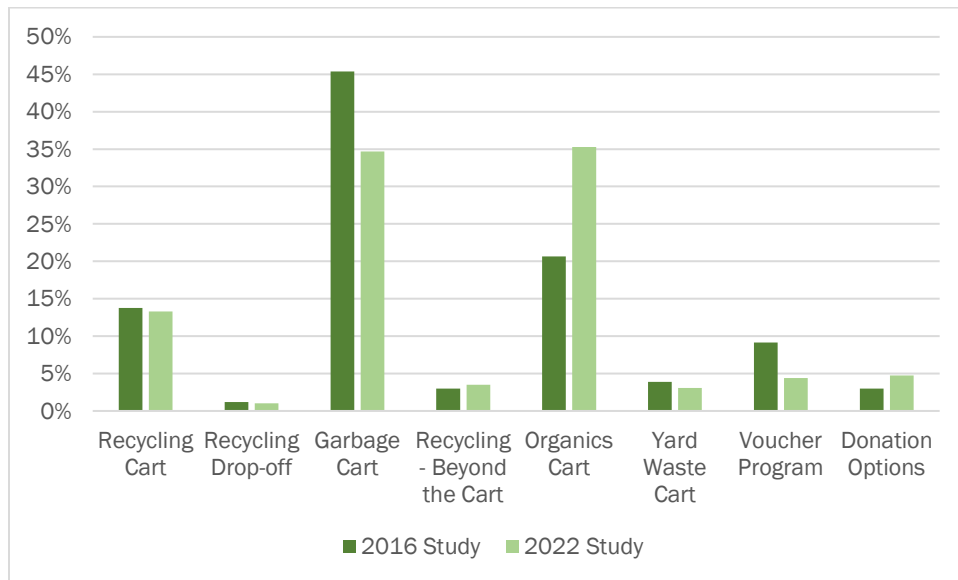
Table 3-3 provides the detailed statistical 2022 composition of materials in the garbage carts from organics program subscribers.

Table 3-3 Composition in Garbage Carts, Organics Subscribers

Material Category	Mean	MOE	Lbs/ Set-out	Material Category	Mean	MOE	Lbs/ Set-out
Paper	**8.4%**	**1.6%**	**2.4**	**Metal**	**3.2%**	**0.9%**	**0.9**
Newspaper	0.2%	0.1%	0.1	Steel cans	0.7%	0.6%	0.2
Mixed recyclable paper	2.3%	0.5%	0.7	Aluminum cans	0.5%	0.2%	0.1
Boxboard / paperboard	1.2%	0.2%	0.3	Other aluminum	0.2%	0.1%	0.1
Plastic-coated paper	0.2%	0.1%	0.1	Other scrap steel	0.5%	0.3%	0.1
Shredded paper	0.0%	0.0%	0.0	Non-ferrous metal	0.4%	0.3%	0.1
Cartons	0.2%	0.0%	0.0	Mixed metal	0.8%	0.3%	0.2
Cardboard / Kraft paper	3.0%	1.2%	0.9	Cardboard can	0.0%	0.0%	0.0
Paper cups and to-go containers	0.4%	0.1%	0.1	**Organics**	**30.5%**	**4.6%**	**8.9**
Non-Recoverable paper	0.9%	0.2%	0.3	Wasted food	19.8%	3.7%	5.8
Plastic	**13.0%**	**4.2%**	**3.8**	Food waste	5.6%	1.6%	1.6
#1 PET bottles	0.6%	0.2%	0.2	Compostable paper	3.1%	0.5%	0.9
#1 PET non-bottles	0.4%	0.1%	0.1	Other compostable	0.5%	0.3%	0.1
#1 PET - fluff	0.0%	0.0%	0.0	Yard waste	1.5%	1.1%	0.4
#2 HDPE Natural	0.1%	0.1%	0.0	**C&D Debris**	**4.2%**	**1.5%**	**1.2**
#2 HDPE Pigmented	0.2%	0.1%	0.1	Mixed C&D Debris	4.2%	1.5%	1.2
#3 PVC	0.1%	0.1%	0.0	**Textiles**	**9.3%**	**8.0%**	**2.7**
#5 PP containers	0.7%	0.3%	0.2	Textiles - wearable	7.3%	8.1%	2.1
#6 EPS	3.1%	4.3%	0.9	Textiles - all other	2.0%	0.6%	0.6
#6 PS - rigid	0.2%	0.1%	0.1	**Household Hazardous Waste**	**0.8%**	**0.8%**	**0.2**
Compostable plastics	0.0%	0.0%	0.0	HHW	0.7%	0.8%	0.2
All other packaging containers	0.4%	0.1%	0.1	Batteries	0.1%	0.0%	0.0
Recoverable film/bags	0.5%	0.2%	0.1	Sharps	0.0%	0.0%	0.0
Film: other	4.2%	0.7%	1.2	**Other Waste**	**27.9%**	**4.2%**	**8.1**
#7 compostable bags	0.0%	0.0%	0.0	Electronics	1.5%	0.9%	0.4
Multi-layer pouches	0.2%	0.1%	0.1	Small household appliances	0.1%	0.1%	0.0
Cutlery and straws	0.4%	0.4%	0.1	Small furniture and household goods		*Not Found*	
Durable plastic items	1.0%	0.4%	0.3	Tires / rubber	0.0%	0.0%	0.0
All other plastic	1.0%	0.4%	0.3	Diapers & feminine hygiene products	6.5%	1.7%	1.9
Glass	**2.8%**	**0.7%**	**0.8**	Pet waste & bedding	13.2%	2.8%	3.9
Food & beverage glass	2.2%	0.7%	0.6	Fines	0.9%	0.2%	0.3
Non-recoverable glass	0.6%	0.2%	0.2	Other not elsewhere classified	5.7%	1.4%	1.7
				Grand Total	**100.0%**		**29.1**
				No. of Samples	*283*		
Targeted Recyclable					11.4%	2.3%	3.3
Targeted SSO					27.4%	4.5%	8.0
Yard Waste					1.5%	1.1%	0.4
Not Targeted in Curbside Program					59.7%	5.8%	17.4

Table 3-4 provides the detailed statistical 2022 composition of materials in the garbage carts from non-organics program subscribers.

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Table 3-4 Composition in Garbage Carts, Non-Organics Subscribers

| Material Category	Mean	MOE	Lbs/ Set-out	Material Category	Mean	MOE	Lbs/ Set-out
Paper	**9.5%**	**1.8%**	**3.7**	**Metal**	**4.2%**	**1.4%**	**1.7**
Newspaper	0.3%	0.2%	0.1	Steel cans	0.3%	0.1%	0.1
Mixed recyclable paper	2.9%	0.6%	1.2	Aluminum cans	0.7%	0.3%	0.3
Boxboard / paperboard	1.2%	0.2%	0.5	Other aluminum	0.3%	0.1%	0.1
Plastic-coated paper	0.4%	0.1%	0.2	Other scrap steel	1.3%	0.8%	0.5
Shredded paper	0.1%	0.1%	0.1	Non-ferrous metal	0.3%	0.2%	0.1
Cartons	0.2%	0.1%	0.1	Mixed metal	1.3%	0.9%	0.5
Cardboard / Kraft paper	2.9%	1.3%	1.2	Cardboard can	0.1%	0.1%	0.0
Paper cups and to-go containers	0.4%	0.1%	0.1	**Organics**	**44.2%**	**5.5%**	**17.3**
Non-Recoverable paper	1.1%	0.3%	0.4	Wasted food	29.0%	6.3%	11.4
Plastic	**10.7%**	**1.6%**	**4.2**	Food waste	6.8%	1.3%	2.7
#1 PET bottles	0.9%	0.2%	0.4	Compostable paper	3.5%	0.6%	1.4
#1 PET non-bottles	0.7%	0.7%	0.3	Other compostable	0.6%	0.3%	0.2
#1 PET - fluff	0.0%	0.0%	0.0	Yard waste	4.2%	2.1%	1.7
#2 HDPE Natural	0.1%	0.1%	0.1	**C&D Debris**	**4.6%**	**2.5%**	**1.8**
#2 HDPE Pigmented	0.3%	0.1%	0.1	Mixed C&D Debris	4.6%	2.5%	1.8
#3 PVC	0.0%	0.0%	0.0	**Textiles**	**5.3%**	**1.1%**	**2.1**
#5 PP containers	0.5%	0.1%	0.2	Textiles - wearable	2.8%	0.7%	1.1
#6 EPS	0.4%	0.1%	0.2	Textiles - all other	2.5%	0.7%	1.0
#6 PS - rigid	0.2%	0.1%	0.1	**Household Hazardous Waste**	**0.5%**	**0.2%**	**0.2**
Compostable plastics	0.0%	0.0%	0.0	HHW	0.3%	0.2%	0.1
All other packaging containers	0.3%	0.1%	0.1	Batteries	0.1%	0.0%	0.0
Recoverable film/bags	0.6%	0.2%	0.2	Sharps	0.1%	0.1%	0.0
Film: other	4.3%	1.1%	1.7	**Other Waste**	**17.8%**	**2.7%**	**7.0**
#7 compostable bags	0.0%	0.0%	0.0	Electronics	0.9%	0.5%	0.3
Multi-layer pouches	0.1%	0.0%	0.0	Small household appliances	0.1%	0.1%	0.0
Cutlery and straws	0.3%	0.4%	0.1	Small furniture and household goods		Not Found	
Durable plastic items	1.2%	0.3%	0.5	Tires / rubber	0.0%	0.0%	0.0
All other plastic	0.7%	0.2%	0.3	Diapers & feminine hygiene products	5.1%	1.4%	2.0
Glass	**3.3%**	**0.7%**	**1.3**	Pet waste & bedding	5.5%	1.5%	2.2
Food & beverage glass	2.4%	0.7%	1.0	Fines	0.8%	0.1%	0.3
Non-recoverable glass	0.9%	0.3%	0.3	Other not elsewhere classified	5.4%	1.7%	2.1
				Grand Total	**100.0%**		**39.2**
				No. of Samples	*282*		
Targeted Recyclable					13.8%	2.3%	5.4
Targeted SSO					35.8%	5.7%	14.0
Yard Waste					4.2%	2.1%	1.7
Not Targeted in Curbside Program					46.2%	5.2%	18.1

3.2 COMPOSITION IN THE RECYCLING CARTS

Table 3-5 provides the detailed statistical composition of materials in the recyclable's carts based on this 2022 analysis of the 526 recycling setouts sampled in this study. Note that the total setout amounts (pounds per setout) reflect two weeks of accumulation due to the City's biweekly recycling collection schedule.

Table 3-5 Detailed Composition of Materials in Recycling Carts, (All Recycling Carts)

Material Category	Mean	MOE	Lbs/ Set-out	Material Category	Mean	MOE	Lbs/ Set-out
Paper	**48.9%**	**2.9%**	**10.5**	**Metal**	**6.4%**	**0.7%**	**1.4**
Newspaper	4.5%	0.9%	1.0	Steel cans	1.3%	0.2%	0.3
Mixed recyclable paper	12.1%	1.6%	2.6	Aluminum cans	4.2%	0.5%	0.9
Boxboard / paperboard	5.9%	0.6%	1.3	Other aluminum	0.2%	0.1%	0.0
Plastic-coated paper	0.1%	0.1%	0.0	Other scrap steel	0.4%	0.2%	0.1
Shredded paper	0.2%	0.1%	0.0	Non-ferrous metal	0.0%	0.0%	0.0
Cartons	1.2%	0.5%	0.3	Mixed metal	0.2%	0.1%	0.0
Cardboard / Kraft paper	21.9%	2.8%	4.7	Cardboard can	0.1%	0.1%	0.0
Paper cups and to-go containers	2.2%	3.2%	0.5	**Organics**	**3.1%**	**0.8%**	**0.7**
Non-Recoverable paper	0.8%	0.3%	0.2	Wasted food	1.7%	0.7%	0.4
Plastic	**16.2%**	**4.1%**	**3.5**	Food waste	0.5%	0.3%	0.1
#1 PET bottles	3.9%	0.4%	0.8	Compostable paper	0.6%	0.1%	0.1
#1 PET non-bottles	1.7%	0.6%	0.4	Other compostable	0.3%	0.2%	0.1
#1 PET - fluff	0.2%	0.3%	0.0	Yard waste	0.0%	0.0%	0.0
#2 HDPE Natural	1.0%	0.1%	0.2	**C&D Debris**	**0.4%**	**0.5%**	**0.1**
#2 HDPE Pigmented	1.2%	0.2%	0.3	Mixed C&D Debris	0.4%	0.5%	0.1
#3 PVC	0.0%	0.0%	0.0	**Textiles**	**0.5%**	**0.4%**	**0.1**
#5 PP containers	1.3%	0.2%	0.3	Textiles - wearable	0.4%	0.4%	0.1
#6 EPS	0.1%	0.1%	0.0	Textiles - all other	0.1%	0.1%	0.0
#6 PS - rigid	0.2%	0.1%	0.0	**Household Hazardous Waste**	**0.1%**	**0.1%**	**0.0**
Compostable plastics	0.0%	0.0%	0.0	HHW	0.0%	0.0%	0.0
All other packaging containers	2.7%	3.9%	0.6	Batteries	0.0%	0.1%	0.0
Recoverable film/bags	0.1%	0.0%	0.0	Sharps	0.0%	0.0%	0.0
Film: other	0.9%	0.6%	0.2	**Other Waste**	**1.8%**	**0.6%**	**0.4**
#7 compostable bags	0.0%	0.0%	0.0	Electronics	0.2%	0.1%	0.0
Multi-layer pouches	0.0%	0.0%	0.0	Small household appliances		*Not Found*	
Cutlery and straws	2.0%	3.1%	0.4	Small furniture and household goods	0.1%	0.2%	0.0
Durable plastic items	0.4%	0.1%	0.1	Tires / rubber		*Not Found*	
All other plastic	0.3%	0.1%	0.1	Diapers & feminine hygiene products	0.2%	0.1%	0.0
Glass	**22.7%**	**2.4%**	**4.9**	Pet waste & bedding	0.3%	0.3%	0.1
Food & beverage glass	22.3%	2.4%	4.8	Fines	0.1%	0.0%	0.0
Non-recoverable glass	0.4%	0.2%	0.1	Other not elsewhere classified	0.9%	0.4%	0.2
				Grand Total	**100.0%**		**21.5**
				No. of Samples	*526*		
Targeted Recyclable					82.8%	6.5%	17.8
Targeted SSO					3.1%	0.8%	0.7
Yard Waste					0.0%	0.0%	0.0
Not Targeted in Curbside Program					14.1%	6.6%	3.0

Figure 3-7 compares material groups within the recycling carts between organics and non-organics subscribing households as set out and analyzed for this 2022 Study. The figure shows significant increases of recyclable material across paper and glass categories. Interestingly, plastics were significantly lower in the organics-subscribing group, possibly because non-organics subscribing households would likely have greater food contamination (therefore more weight) adhering to sorted plastic materials than organics-subscribing households. Indeed, the presence of organics (Wasted Food and Food Waste) in the non-organics group was nearly double that of the organics group.

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Figure 3-7 Minneapolis Residential Recyclables Composition, Subscribers vs Non-Subscribers
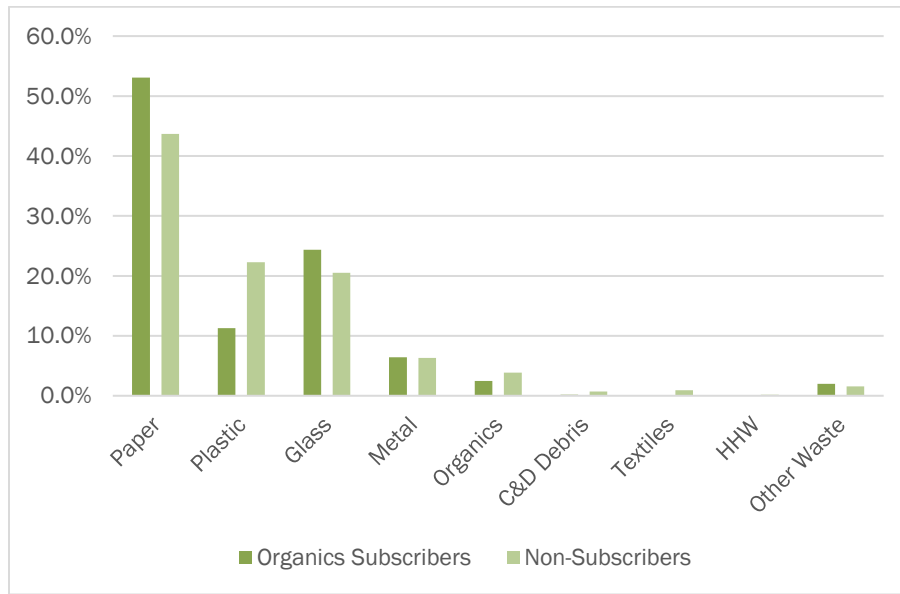
Table 3-6 identifies the 10 most prevalent material categories in the recycling carts. As shown, Food & Beverage Glass was found to be the most prevalent material at 22.3 percent of the stream.

Table 3-6 Top 10 Materials in Recycling Carts, All Carts

Material	Mean Percent
Food & beverage glass	22.3%
Cardboard / Kraft paper	21.9%
Mixed recyclable paper	12.1%
Boxboard / paperboard	5.9%
Newspaper	4.5%
Aluminum cans	4.2%
#1 PET bottles	3.9%
All other packaging containers	2.7%
Paper cups and to-go containers	2.2%
Cutlery and straws	2.0%

Figure 3-8 compares the 10 most prevalent material categories in Minneapolis curbside recycling by organics subscribers and non-subscribers. As shown, Corrugated Cardboard/Kraft Paper and Food & Beverage Glass were found to be the most prevalent materials in organics and non-organics subscribing households. PET bottle/non-bottle percentages were higher in non-organics households, suggesting some liquid or food contamination, which is consistent with anecdotal observations at the sort tables. In general, the data supports the hypothesis that organics-subscribers may also represent the more conscientious recycling program participants (i.e., higher performing resident recyclers).

Figure 3-8 Top 10 Materials in Recycling Carts, Subscribers vs Non-Subscribers
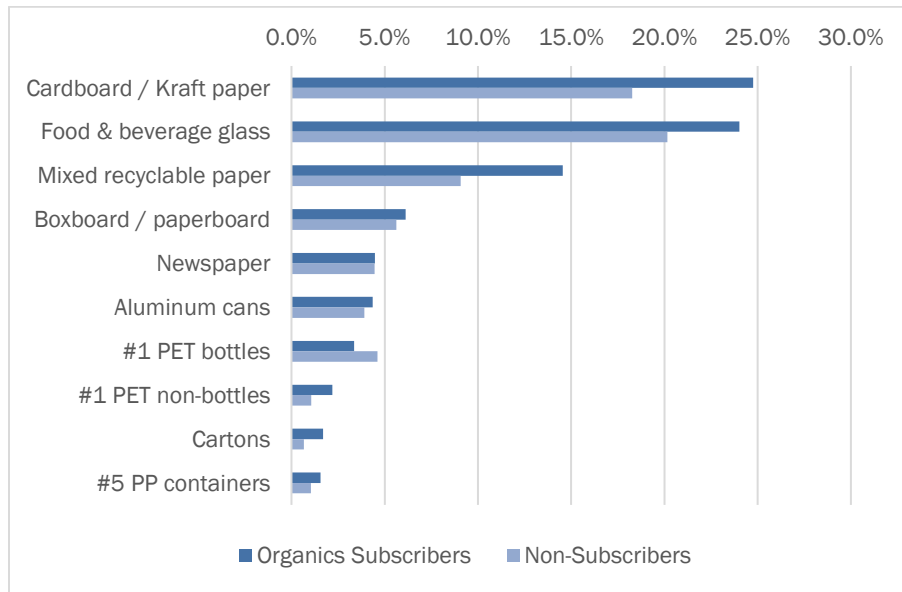
Figure 3-9 and Figure 3-10 present the composition of curbside recyclables in terms of the potential for diverting materials from disposal. These figures simplify the list of diversion strategies to be specific to single stream recyclables. Specifically, each material was defined as one of the following:

◆ **Targeted—Recyclable**: Includes cardboard, newspaper, and other dry recyclable fibers, as well as metal, glass, plastic, and aseptic containers targeted for collection in the City's curbside recycling program that were properly placed into the recyclables carts.

◆ **Misthrow—Yard Waste Collection Program**: Includes leaves, grass, prunings, and trimmings that could have been set out for separate yard waste collection and recovery.

◆ **Misthrow—Organics**: Food, compostable papers, and other compostable items that could have been placed in the organics cart.

◆ **Contamination—Garbage**: All other material categories that could not be assigned to one of the above categories were classified as contamination/garbage. It is not likely that these items will be readily recoverable in the near future.

Figure 3-9 Contamination in Recycling Carts

Misthrow: Yard Waste Cart, 0.04%
Misthrow: Organics Cart, 3.1%
Contamination: Garbage, 11.8%
Targeted: Recycling Cart, 85.0%

Figure 3-10 Comparison of Contamination in Recycling Carts, Subscribers vs Non-Subscribers

Table 3-7 provides the detailed statistical composition of materials in the recycling carts from organics subscribers from this 2022 Study.

Table 3-7 Composition in Recycling Carts, Organics Subscribers

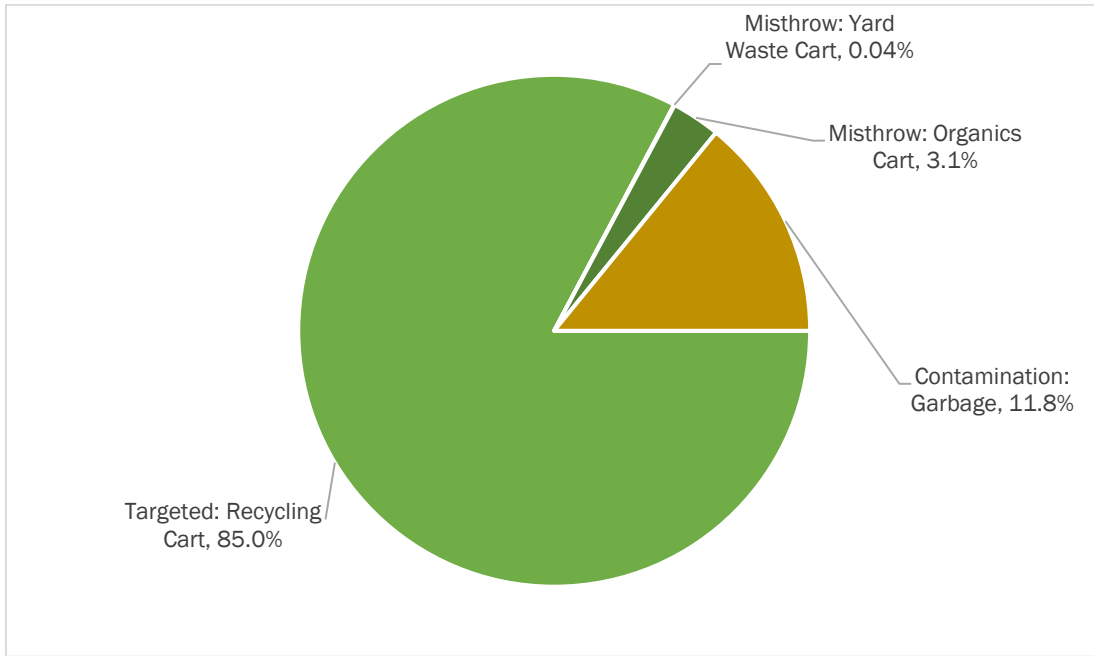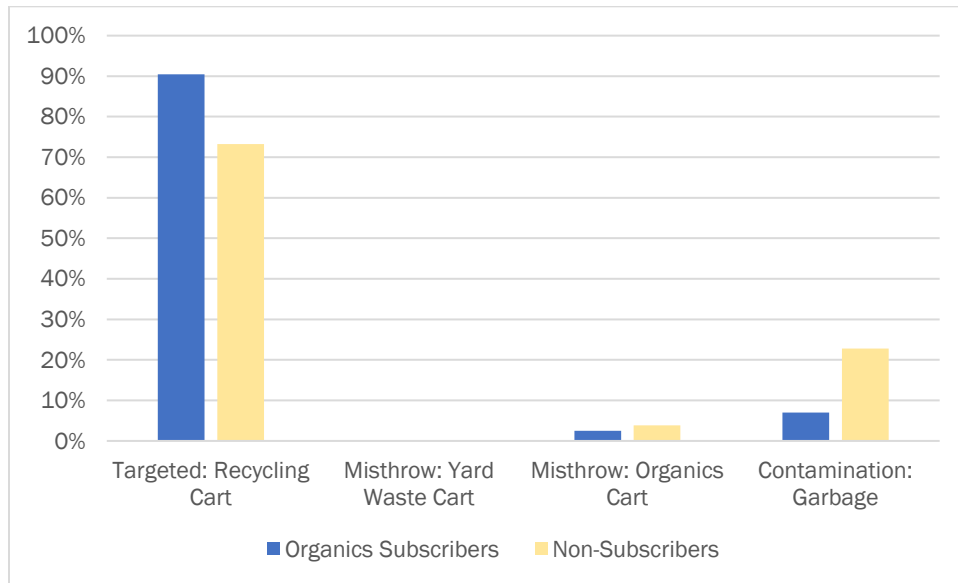| Material Category	Mean	MOE	Lbs/ Set-out	Material Category	Mean	MOE	Lbs/ Set-out
Paper	**53.1%**	**3.0%**	**12.3**	**Metal**	**6.4%**	**0.7%**	**1.5**
Newspaper	4.5%	1.1%	1.0	Steel cans	1.3%	0.2%	0.3
Mixed recyclable paper	14.5%	2.0%	3.4	Aluminum cans	4.4%	0.6%	1.0
Boxboard / paperboard	6.1%	0.6%	1.4	Other aluminum	0.2%	0.0%	0.0
Plastic-coated paper	0.1%	0.0%	0.0	Other scrap steel	0.2%	0.2%	0.1
Shredded paper	0.3%	0.2%	0.1	Non-ferrous metal	0.0%	0.0%	0.0
Cartons	1.7%	0.9%	0.4	Mixed metal	0.2%	0.2%	0.1
Cardboard / Kraft paper	24.8%	3.7%	5.8	Cardboard can	0.1%	0.1%	0.0
Paper cups and to-go containers	0.2%	0.0%	0.0	**Organics**	**2.5%**	**0.9%**	**0.6**
Non-Recoverable paper	1.0%	0.4%	0.2	Wasted food	1.0%	0.5%	0.2
Plastic	**11.3%**	**1.6%**	**2.6**	Food waste	0.5%	0.4%	0.1
#1 PET bottles	3.4%	0.4%	0.8	Compostable paper	0.5%	0.1%	0.1
#1 PET non-bottles	2.2%	1.1%	0.5	Other compostable	0.4%	0.2%	0.1
#1 PET - fluff	0.4%	0.6%	0.1	Yard waste	0.0%	0.1%	0.0
#2 HDPE Natural	0.8%	0.1%	0.2	**C&D Debris**	**0.2%**	**0.3%**	**0.0**
#2 HDPE Pigmented	1.0%	0.2%	0.2	Mixed C&D Debris	0.2%	0.3%	0.0
#3 PVC	0.0%	0.0%	0.0	**Textiles**	**0.1%**	**0.1%**	**0.0**
#5 PP containers	1.6%	0.4%	0.4	Textiles - wearable	0.1%	0.1%	0.0
#6 EPS	0.1%	0.1%	0.0	Textiles - all other	0.1%	0.1%	0.0
#6 PS - rigid	0.2%	0.1%	0.1	**Household Hazardous Waste**	**0.1%**	**0.0%**	**0.0**
Compostable plastics	0.0%	0.0%	0.0	HHW	0.0%	0.0%	0.0
All other packaging containers	0.3%	0.1%	0.1	Batteries	0.0%	0.0%	0.0
Recoverable film/bags	0.1%	0.0%	0.0	Sharps	0.0%	0.0%	0.0
Film: other	0.3%	0.1%	0.1	**Other Waste**	**2.0%**	**0.8%**	**0.5**
#7 compostable bags	0.0%	0.1%	0.0	Electronics	0.1%	0.2%	0.0
Multi-layer pouches	0.0%	0.0%	0.0	Small household appliances		Not Found	
Cutlery and straws	0.0%	0.0%	0.0	Small furniture and household goods		Not Found	
Durable plastic items	0.5%	0.2%	0.1	Tires / rubber		Not Found	
All other plastic	0.3%	0.1%	0.1	Diapers & feminine hygiene products	0.2%	0.2%	0.0
Glass	**24.4%**	**2.4%**	**5.7**	Pet waste & bedding	0.6%	0.6%	0.1
Food & beverage glass	24.0%	2.4%	5.6	Fines	0.1%	0.1%	0.0
Non-recoverable glass	0.4%	0.2%	0.1	Other not elsewhere classified	1.0%	0.6%	0.2
				Grand Total	**100.0%**		**23.2**
				No. of Samples	*269*		
Targeted Recyclable					90.4%	2.0%	21.0
Targeted SSO					2.5%	0.8%	0.6
Yard Waste					0.0%	0.1%	0.0
Not Targeted in Curbside Program					7.1%	1.7%	1.6

3. MATERIAL COMPOSITION

Table 3-8 provides the detailed statistical composition of materials in the recycling carts from non-organics subscribers from this 2022 Study.

Table 3-8 Composition in Recycling Carts, Non-Organics Subscribers

Material Category	Mean	MOE	Lbs/ Set-out	Material Category	Mean	MOE	Lbs/ Set-out
Paper	**43.7%**	**4.9%**	**8.6**	**Metal**	**6.3%**	**1.3%**	**1.2**
Newspaper	4.5%	1.6%	0.9	Steel cans	1.4%	0.3%	0.3
Mixed recyclable paper	9.1%	2.1%	1.8	Aluminum cans	3.9%	0.8%	0.8
Boxboard / paperboard	5.6%	1.1%	1.1	Other aluminum	0.2%	0.1%	0.0
Plastic-coated paper	0.1%	0.1%	0.0	Other scrap steel	0.5%	0.4%	0.1
Shredded paper	0.2%	0.1%	0.0	Non-ferrous metal	0.0%	0.0%	0.0
Cartons	0.7%	0.2%	0.1	Mixed metal	0.1%	0.1%	0.0
Cardboard / Kraft paper	18.3%	3.7%	3.6	Cardboard can	0.1%	0.1%	0.0
Paper cups and to-go containers	4.7%	6.7%	0.9	**Organics**	**3.9%**	**1.6%**	**0.8**
Non-Recoverable paper	0.6%	0.2%	0.1	Wasted food	2.5%	1.4%	0.5
Plastic	**22.3%**	**8.1%**	**4.4**	Food waste	0.4%	0.3%	0.1
#1 PET bottles	4.6%	0.9%	0.9	Compostable paper	0.8%	0.2%	0.2
#1 PET non-bottles	1.1%	0.2%	0.2	Other compostable	0.2%	0.2%	0.0
#1 PET - fluff	0.0%	0.0%	0.0	Yard waste	0.0%	0.0%	0.0
#2 HDPE Natural	1.3%	0.3%	0.2	**C&D Debris**	**0.7%**	**1.0%**	**0.1**
#2 HDPE Pigmented	1.4%	0.3%	0.3	Mixed C&D Debris	0.7%	1.0%	0.1
#3 PVC	0.0%	0.0%	0.0	**Textiles**	**0.9%**	**0.9%**	**0.2**
#5 PP containers	1.0%	0.2%	0.2	Textiles - wearable	0.8%	0.9%	0.2
#6 EPS	0.2%	0.1%	0.0	Textiles - all other	0.1%	0.1%	0.0
#6 PS - rigid	0.2%	0.1%	0.0	**Household Hazardous Waste**	**0.2%**	**0.2%**	**0.0**
Compostable plastics	0.0%	0.0%	0.0	HHW	0.1%	0.0%	0.0
All other packaging containers	5.7%	8.4%	1.1	Batteries	0.1%	0.1%	0.0
Recoverable film/bags	0.1%	0.0%	0.0	Sharps		*Not Found*	
Film: other	1.5%	1.4%	0.3	**Other Waste**	**1.6%**	**0.8%**	**0.3**
#7 compostable bags	0.0%	0.0%	0.0	Electronics	0.2%	0.2%	0.0
Multi-layer pouches	0.0%	0.0%	0.0	Small household appliances		*Not Found*	
Cutlery and straws	4.4%	6.6%	0.9	Small furniture and household goods	0.3%	0.4%	0.1
Durable plastic items	0.3%	0.2%	0.1	Tires / rubber		*Not Found*	
All other plastic	0.4%	0.2%	0.1	Diapers & feminine hygiene products	0.1%	0.1%	0.0
Glass	**20.5%**	**4.2%**	**4.0**	Pet waste & bedding	0.1%	0.0%	0.0
Food & beverage glass	20.2%	4.2%	4.0	Fines	0.1%	0.1%	0.0
Non-recoverable glass	0.4%	0.2%	0.1	Other not elsewhere classified	0.8%	0.5%	0.2
				Grand Total	**100.0%**		**19.7**
				No. of Samples	*257*		
Targeted Recyclable					73.3%	12.6%	14.4
Targeted SSO					3.8%	1.6%	0.8
Yard Waste					0.0%	0.0%	0.0
Not Targeted in Curbside Program					22.9%	13.2%	4.5

As a final note, the field data collection team ultimately did not capture a rigorous count of the number of plastic bags found in recycling carts. Team members reported qualitatively that the incidence of plastic bags was low overall, which is a positive finding given the issues caused by film bags during processing.

3.3 COMPOSITION IN THE ORGANICS CARTS

Table 3-9 provides the detailed statistical composition of materials found in the organic's carts from organics-participating households based on analysis of the 191 organics setouts captured in this 2022 Study.

Table 3-9 Detailed Composition in the Organics Carts, From Organics-Participating Households

Material Category	Mean	MOE	Lbs/ Set-out	Material Category	Mean	MOE	Lbs/ Set-out
Paper	**4.6%**	**1.9%**	**0.4**	**Metal**	**0.4%**	**0.4%**	**0.0**
Newspaper	0.0%	0.0%	0.0	Steel cans	0.0%	0.1%	0.0
Mixed recyclable paper	0.4%	0.3%	0.0	Aluminum cans	0.1%	0.2%	0.0
Boxboard / paperboard	0.5%	0.4%	0.0	Other aluminum	0.0%	0.0%	0.0
Plastic-coated paper	0.0%	0.0%	0.0	Other scrap steel	0.2%	0.2%	0.0
Shredded paper	0.0%	0.0%	0.0	Non-ferrous metal		*Not Found*	
Cartons	0.0%	0.0%	0.0	Mixed metal	0.0%	0.1%	0.0
Cardboard / Kraft paper	3.0%	1.5%	0.3	Cardboard can	0.0%	0.0%	0.0
Paper cups and to-go containers	0.5%	0.4%	0.0	**Organics**	**86.4%**	**5.7%**	**7.5**
Non-Recoverable paper	0.1%	0.1%	0.0	Wasted food	23.5%	5.9%	2.0
Plastic	**1.8%**	**0.8%**	**0.2**	Food waste	50.6%	6.9%	4.4
#1 PET bottles	0.1%	0.1%	0.0	Compostable paper	3.7%	1.1%	0.3
#1 PET non-bottles	0.1%	0.0%	0.0	Other compostable	5.2%	4.6%	0.4
#1 PET - fluff	0.1%	0.1%	0.0	Yard waste	3.4%	2.1%	0.3
#2 HDPE Natural		*Not Found*		**C&D Debris**		*Not Found*	
#2 HDPE Pigmented	0.1%	0.1%	0.0	Mixed C&D Debris		*Not Found*	
#3 PVC		*Not Found*		**Textiles**	**1.1%**	**1.6%**	**0.1**
#5 PP containers	0.0%	0.0%	0.0	Textiles - wearable	0.3%	0.5%	0.0
#6 EPS	0.1%	0.2%	0.0	Textiles - all other	0.8%	1.1%	0.1
#6 PS - rigid	0.0%	0.0%	0.0	**Household Hazardous Waste**		*Not Found*	
Compostable plastics	0.2%	0.1%	0.0	HHW		*Not Found*	
All other packaging containers	0.0%	0.0%	0.0	Batteries		*Not Found*	
Recoverable film/bags	0.0%	0.0%	0.0	Sharps		*Not Found*	
Film: other	0.6%	0.4%	0.1	**Other Waste**	**2.7%**	**1.6%**	**0.2**
#7 compostable bags	0.2%	0.2%	0.0	Electronics		*Not Found*	
Multi-layer pouches	0.0%	0.0%	0.0	Small household appliances		*Not Found*	
Cutlery and straws	0.0%	0.0%	0.0	Small furniture and household goods		*Not Found*	
Durable plastic items	0.2%	0.2%	0.0	Tires / rubber		*Not Found*	
All other plastic	0.2%	0.2%	0.0	Diapers & feminine hygiene products	0.4%	0.4%	0.0
Glass	**3.0%**	**3.1%**	**0.3**	Pet waste & bedding	1.6%	1.2%	0.1
Food & beverage glass	3.0%	3.1%	0.3	Fines	0.2%	0.2%	0.0
Non-recoverable glass		*Not Found*		Other not elsewhere classified	0.5%	0.7%	0.0
				Grand Total	**100.0%**		**8.6**
				No. of Samples	*191*		
Targeted Recyclable					6.8%	4.1%	0.6
Targeted SSO					80.6%	5.9%	6.9
Yard Waste					3.4%	2.1%	0.3
Not Targeted in Curbside Program					9.2%	4.1%	0.8

Note: Compostable plastic bags containing food scraps were not separated; the material was sorted into the proper food category with the bag. Such bags typically contain significant residual food and moisture, such that sorting them as #7 compostable bags would have been inaccurate due to their increased weight.

Table 3-10 identifies the 10 most prevalent material categories in the organics carts as sorted for this 2022 Study. As shown, Food Waste and Wasted Food were found to be the most prevalent materials at 50.6 and 23.5 percent of the stream, respectively.

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Table 3-10 Top 10 Materials in Organics Carts, From Subscribers vs Non-Subscribers

| Material	Mean Percent
Food waste	50.6%
Wasted food	23.5%
Other compostable	5.2%
Compostable paper	3.7%
Yard waste	3.4%
Food & beverage glass	3.0%
Cardboard / Kraft paper	3.0%
Pet waste & bedding	1.6%
Textiles - all other	0.8%
Film: other	0.6%

Figure 3-11 presents the composition in the organic carts in terms of the potential for diverting more materials from disposal. Similar to the recycling figure (Figure 3-9), this Figure 3-11 was developed by assigning a simplified diversion strategy to each individual constituent in the waste stream. Specifically, each material was defined as one of the following:

◆ **Targeted: Organics Cart**: Includes food, compostable papers, and other compostable items targeted for organics recovery that should be placed in this organics cart. Significantly wet or food-soiled paper and cardboard was also placed in this category, along with compostable plastic cutlery and straws, or compostable paper cups and to-go containers.

◆ **Misthrow: Recycling Cart**: Includes cardboard, newspaper, and other dry recyclable fibers, as well as metal, glass, plastic, and aseptic containers targeted for collection in the City's curbside recycling program.

◆ **Misthrow: Yard Waste Collection Program**: Includes leaves, grass, prunings, and trimmings that could have been set out for separate yard waste collection and recovery.

◆ **Contamination: Garbage**: All other material categories that could not be assigned to one of the above categories were classified as contamination/garbage. It is not likely that these items will be readily recoverable in the near future.

As can be seen in the figure, the most prevalent contaminant in organics materials is mis-thrown recyclables, followed closely by garbage not otherwise recoverable. Although not specifically rejected from the City's organics recycling program, yard waste is considered a "misthrow" and constitutes approximately 3.4% of organics materials.

Figure 3-11 Contamination in the Organics Carts
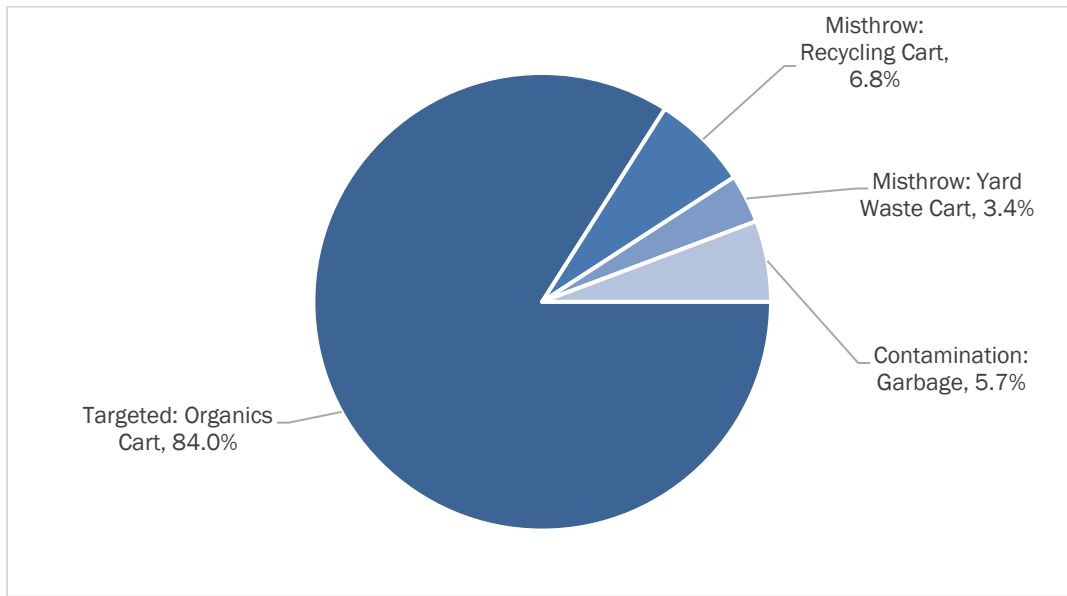
Note the presence of yard waste in the organics carts. While not specifically counted as "contamination" in the organics recycling program by the City of Minneapolis, yard waste is also not promoted as an accepted material in the organics carts because of the separate yard waste collection program.

3. MATERIAL COMPOSITION

3.4 COMPARISON OF RESULTS TO 2016 STUDY

Table 3-11 compares the detailed statistical composition of the garbage streams between the 2016 Study and this 2022 Study.

Table 3-11 Comparison of Garbage Composition, 2016 Study vs. 2022 Study

Material Category	2016 Mean %	2022 Mean %	Material Category	2016 Mean %	2022 Mean %
Paper	**11.9%**	**9.0%**	**Metal**	**3.5%**	**3.8%**
Newspaper	1.2%	0.2%	Steel cans	0.6%	0.5%
Mixed recyclable paper	3.8%	2.7%	Aluminum cans	0.7%	0.6%
Boxboard / paperboard	1.2%	1.2%	Other aluminum	Not Analyzed	0.3%
Plastic-coated paper*	0.3%	0.3%	Other scrap steel	0.9%	0.9%
Shredded paper	Not Analyzed	0.1%	Non-ferrous metal	0.3%	0.4%
Cartons	0.1%	0.2%	Mixed metal	1.0%	1.1%
Cardboard / Kraft paper	2.4%	3.0%	Cardboard can	Not Analyzed	0.1%
Paper cups and to-go containers	Not Analyzed	0.4%	**Organics**	**25.1%**	**38.3%**
Non-Recoverable paper	3.0%	1.0%	Wasted food	Not Analyzed	25.1%
Plastic	**12.8%**	**11.7%**	Food waste**	15.0%	6.3%
#1 PET bottles	0.8%	0.8%	Compostable paper	5.7%	3.4%
#1 PET non-bottles	0.2%	0.6%	Other compostable	0.2%	0.5%
#1 PET - fluff	Not Analyzed	0.0%	Yard waste	4.2%	3.1%
#2 HDPE Natural	Not Analyzed	0.1%	**C&D Debris**	**8.9%**	**4.4%**
#2 HDPE Pigmented	Not Analyzed	0.3%	Mixed C&D Debris***	8.9%	4.4%
#2 HDPE Bottles	0.4%	Not Analyzed	**Textiles**	**5.1%**	**7.0%**
#2 HDPE Non-Bottles	0.1%	Not Analyzed	Textiles - wearable	3.1%	4.7%
#3 PVC	0.0%	0.1%	Textiles - all other	2.0%	2.3%
#5 PP containers	0.4%	0.6%	**Household Hazardous Waste**	**0.3%**	**0.6%**
#6 EPS	0.4%	1.6%	HHW	0.3%	0.5%
#6 PS - rigid	Not Analyzed	0.2%	Batteries	Not Analyzed	0.1%
Compostable plastics	Not Analyzed	0.0%	Sharps	Not Analyzed	0.0%
All other packaging containers	1.3%	0.3%	**Other Waste**	**30.2%**	**22.1%**
Recoverable film/bags	0.9%	0.5%	Electronics	0.7%	1.1%
Film: Trash Bags	1.1%	Not Analyzed	Small household appliances	0.5%	0.1%
Film: other	3.8%	4.3%	Small furniture and household goods	*1.1%*	*Not Found*
#7 compostable bags	Not Analyzed	0.0%	Mattresses / Box Springs	*0.2%*	Not Analyzed
Multi-layer pouches	Not Analyzed	0.2%	Tires / rubber	0.4%	0.0%
Cutlery and straws	Not Analyzed	0.3%	Diapers & feminine hygiene products	4.9%	5.7%
Durable plastic items	2.7%	1.1%	Pet waste & bedding	4.9%	8.8%
All other plastic	0.7%	0.8%	Supermix (2016)	14.7%	Not Analyzed
Glass	**2.2%**	**3.1%**	Fines	Not Analyzed	0.8%
Food & beverage glass	1.6%	2.3%	Other not elsewhere classified	2.6%	5.5%
Non-recoverable glass	0.6%	0.8%			
			Grand Total	**100.0%**	**100.0%**
			No. of Samples	*51*	*565*
Targeted Recyclable				13.8%	13.3%
Targeted SSO				16.5%	32.2%
Yard Waste				4.2%	3.1%
Not Targeted in Curbside Program				65.6%	51.4%

*Plastic-coated paper was a *Targeted Recyclable* in 2016 but was changed to *Not Targeted in Curbside Program* in 2022.

**Food Waste was a single category in 2016 and encompassed both the Food Waste and Wasted Food categories that were used in 2022.

***C&D Debris was created as a collective category in 2022 due to the City's Voucher Program, which prohibits C&D Debris in household curbside collection.

3.5 SUBSORTS

At the start of manual sorting activity, City staff requested that "Plastic Utensils," "Batteries," and "Paper Cups & To-Go Containers" that had accumulated during the sorting of each sample be set aside and stockpiled on-site. After the main sort was completed, City staff re-sorted these three categories of "subsort" materials into more detailed sub-categories, as summarized in this section.

Figure 3-12 presents the breakdown of Plastic Utensils found in the City's subsort of these materials. The mix among knives, forks and spoons appears reasonable, with a smaller subset of items still contained in plastic wrap. Additionally, just over 7 percent of the cutlery items were labeled compostable.

Figure 3-12 Breakdown of Plastic Utensils
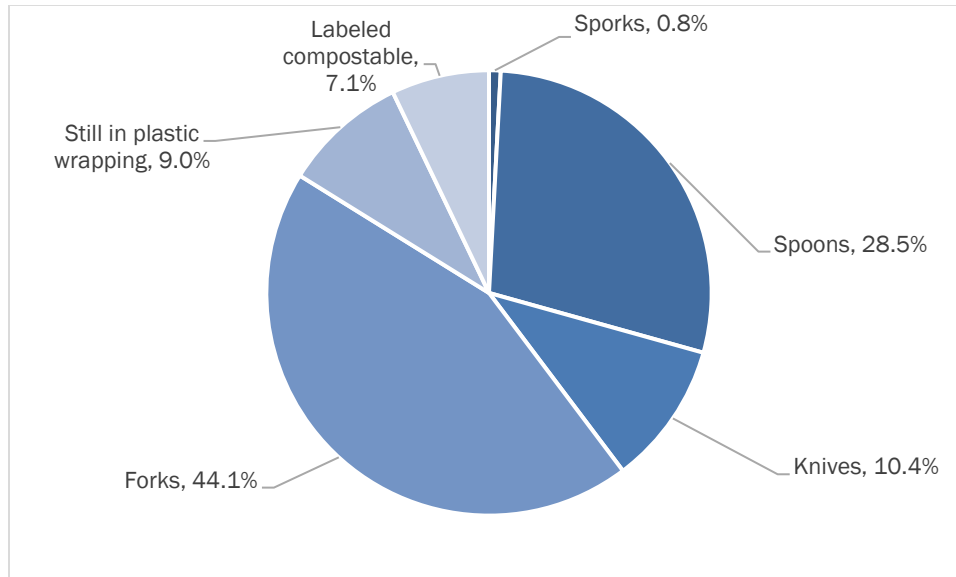
Notes: Items "still in plastic wrapping" include individual forks, fork, and napkin packages, as well as fork, knife, spoon, and napkin packages. "Labeled compostable" does not necessarily imply that items are actually BPI certified.

Table 3-12 presents the breakdown of battery types found in the City's subsort of these materials. As shown, alkaline batteries dominate the weight of the category. As a group, batteries make up a very small portion of generated wastes.

Table 3-12 Breakdown of Batteries

Batteries	Net Weight (oz)	Percent
Alkaline	281.7	98.8%
Lithium-Ion	3.4	1.2%
Button Type	0.2	0.1%
Total	**285.3**	**100.0%**

Notes: Lithium-ion batteries consisted of 5 AA and one cell phone battery. Only 2 "button type" batteries were sorted.

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3. MATERIAL COMPOSITION

Figure 3-13 presents the breakdown of Paper to-Go Cups & Containers found in the City's subsort of these materials. Slightly more non-compostable cups were found.

Figure 3-13 Breakdown of Paper to-Go Cups & Containers
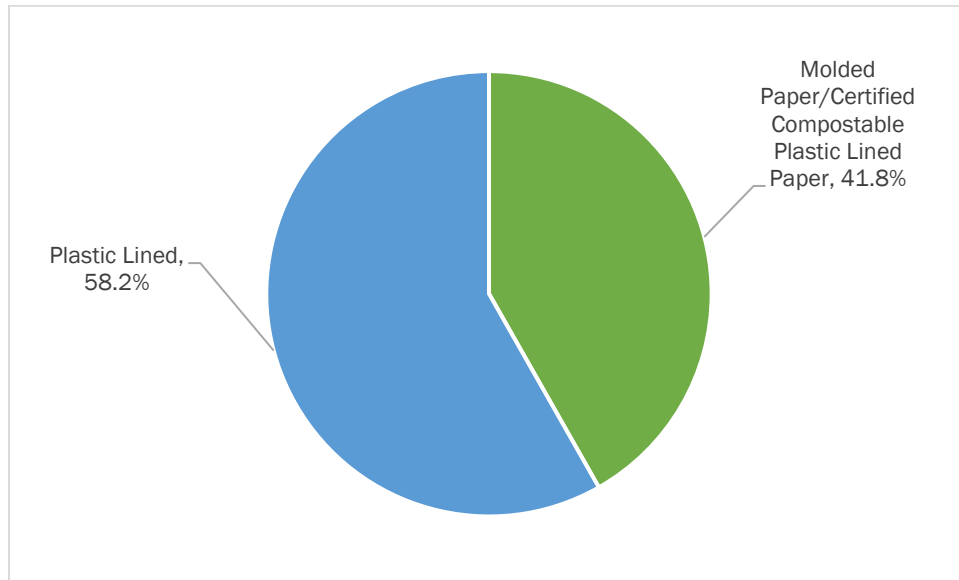
Notes: Plastic Lined cups and containers were determined as not compostable. Molded Paper/Certified Compostable Plastic Lined Paper items were defined as compostable because these items are currently acceptable by the City's contract composting facility.

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4. RECYCLING ANALYSIS

4.1 INTRODUCTION

This section summarizes the current recycling rate and analyzes the capture rates of recyclable materials targeted for recycling. These terms are defined below:

◆ **Recycling Rate**: The percentage of all residential waste generated and collected by the City's Solid Waste & Recycling (SW&R) Division that is ultimately diverted through the City's recyclables collection program. The City's nominal residential recycling rate was 46.5 percent, based on 2021 tonnage. (This calculation excludes the impact of contamination that may have been in the recycled and composted materials and should be considered an unadjusted recycling rate.)

◆ **Capture Rate by Material**: Sometimes called a recovery rate, the capture rate identifies the percentage of a targeted recyclable material that is properly collected through the City's curbside recycling program (and hence "captured" in the recycling program).

This section presents the capture rates of targeted materials found in this study for organics subscribers, non-organics subscribers, and in the aggregate. This section also estimates the maximum theoretical recycling rate within the Minneapolis residential waste stream.

4.2 CAPTURE RATES

Figure 4-1 shows the capture rates for the materials that are currently targeted in the City's curbside residential recycling programs and were targeted in this study. As shown, targeted fiber (newspaper, cardboard, junk mail, etc.) and containers have almost the same capture rate at just over 45%. Compostables include recoverable Organics (food waste, compostable/nonrecyclable paper) and yard waste collectively have a capture rate of almost 43%.

Figure 4-1 Current Capture Rates by Diverted Material Stream
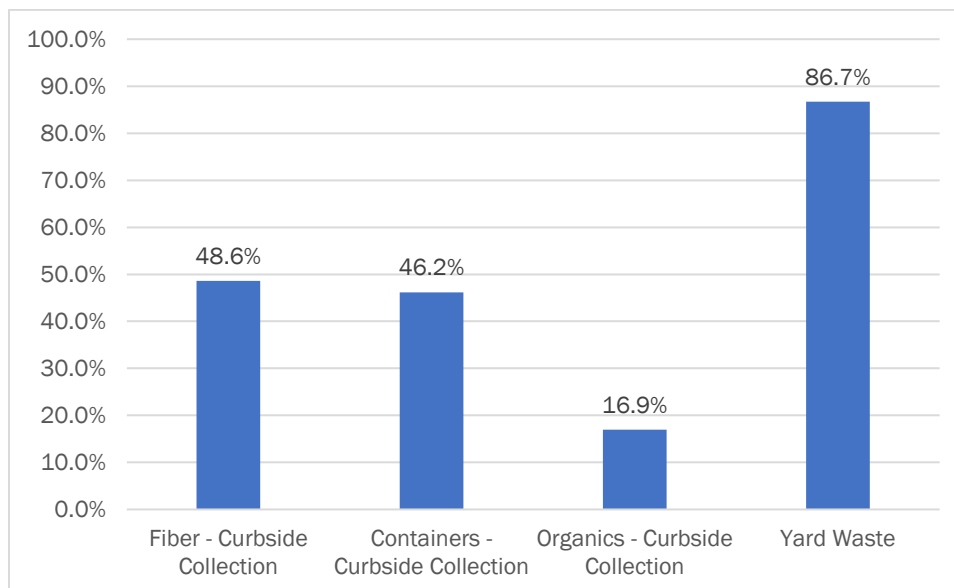
Note that this study did not directly measure curbside yard waste setouts. The total amount of yard wastes generated is therefore based on a combination of reported yard waste tonnage plus the fraction of yard wastes found in the cart audits performed for this study.

4. RECYCLING ANALYSIS

Figure 4-2 compares the capture rates for organics subscribers and non-subscribers. This comparison shows that organics subscribers are more actively using the recycling program to divert materials from disposal than are nonsubscribers.

Figure 4-2 Comparison of Capture Rates by Organics Subscribers vs. Non-Subscribers
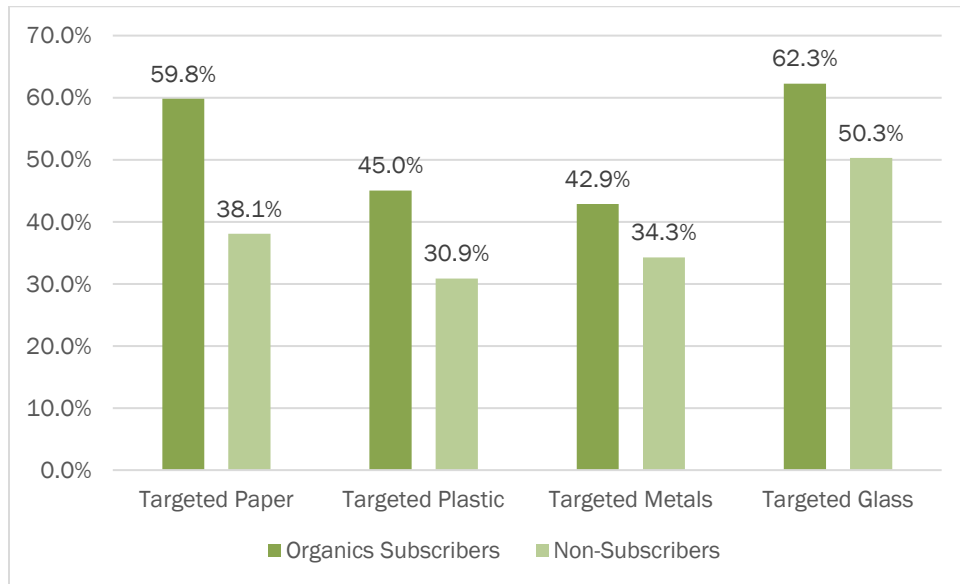
Figure 4-3 compares capture rates from the 2016 Study to the 2022 Study. On the surface, this graphic would appear to show that, although organics capture has increased as the program has matured, many capture rates have decreased since 2016. However, MSW Consultants believes that differences in methodology are largely the cause of these differences in capture rates. One particularly important difference is that the 2016 Study obtained samples from only three routes to represent the City-wide refuse composition. Conversely, the 2022 Study obtained samples from a highly representative selection of households from all neighborhoods across the City. Second, the same type of organic material within the Supermix categories in the 2016 Study were more likely to have been in the 2022 Study garbage cart samples as targeted organics. Also, in the 2016 Study, the compaction of the garbage in the packer truck samples may have increased the amount of organics in the Supermix categories and fines.

Figure 4-3 Comparison of 2022 Capture Rates to 2016 Study
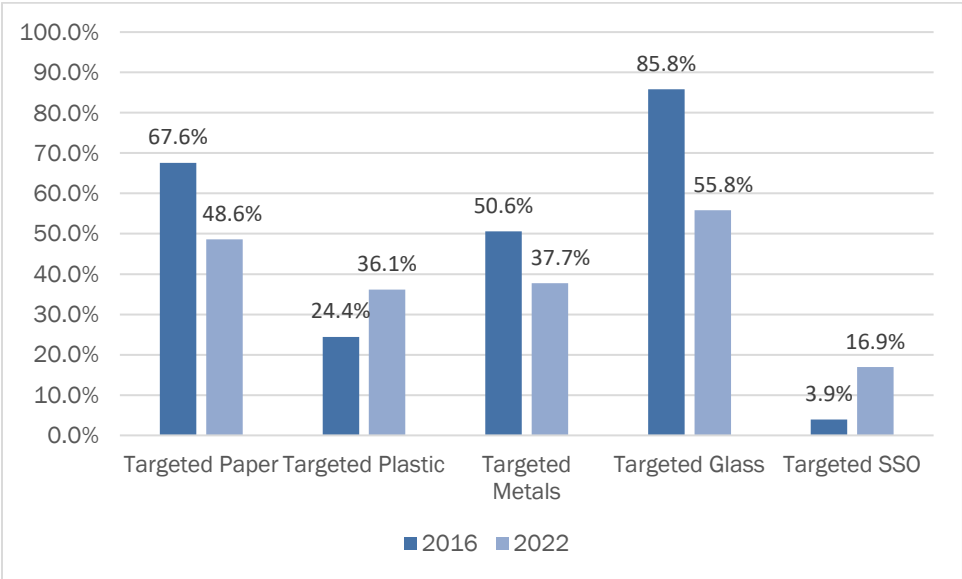
Figure 4-4 depicts the capture rates for each of the individual commodities in the City's curbside collection programs for this 2022 Study. As can be seen from the figure, there are dramatic differences in capture rates across the listed commodities, with excellent capture of newspaper; moderate collection of glass, aluminum cans and corrugated cardboard; and limited capture of organics, polypropylene containers, and steel cans.

Figure 4-4 Current Capture Rates by Individual Commodity
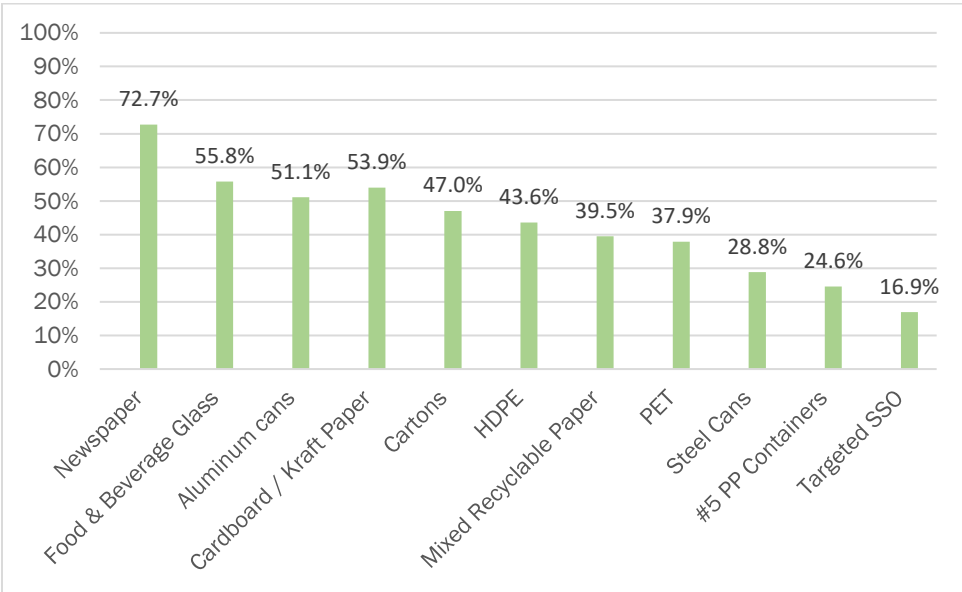
One reason for the lower capture rate of organics compared to the other traditional recyclables as displayed in Figure 4-4 is that the City's organics program is a "subscription-based" program where only households that sign up get the special green organics cart and collection service. The other traditional commodities

are part of the City's curbside recycling program, where all households automatically get a recycling cart; there is no sign-up or subscription required.

The capture rates and recycling rate based on the 2022 Study methodology for all samples are shown in Table 4-1.

Table 4-1 Current Capture Rates and Recycling Rate (2022)

Material Category	Extrapolated Annual Generation (Tons)			Total Generation	Capture Rate
	Refuse	Recycling	Organics		
Targeted Paper	**5,604.3**	**5,153.1**	**264.3**	**11,021.7**	**48.6%**
Newspaper	189.6	505.6	0.6	695.8	72.7%
Mixed recyclable paper	2,072.2	1,368.6	27.7	3,468.6	39.5%
Boxboard / paperboard	906.0	667.3	32.7	1,606.1	41.6%
Cartons	154.4	139.8	3.2	297.3	47.0%
Cardboard / Kraft paper	2,282.1	2,471.8	200.0	4,953.9	53.9%
Targeted Plastic	**1,801.8**	**1,030.779**	**19.0**	**2,851.6**	**36.1%**
#1 PET bottles	599.0	443.721	7.3	1,050.1	42.3%
#1 PET non-bottles	431.9	191.029	3.6	626.6	30.5%
#2 HDPE Natural	111.7	112.702	0.0	224.4	50.2%
#2 HDPE Pigmented	201.0	133.143	4.8	339.0	39.3%
#5 PP Containers	458.2	150.184	3.2	611.6	24.6%
Targeted Metals	**1,070.5**	**656.4**	**14.2**	**1,741.1**	**37.7%**
Steel cans	369.5	150.6	2.5	522.6	28.8%
Aluminum cans	441.1	470.2	9.0	920.3	51.1%
Other aluminum	194.0	20.8	0.5	215.4	9.7%
Cardboard can	65.9	14.8	2.2	82.8	17.9%
Targeted Glass	**1,795.1**	**2,521.7**	**202.5**	**4,519.3**	**55.8%**
Food & beverage glass	1,795.1	2,521.7	202.5	4,519.3	55.8%
Targeted SSO	**27,253.3**	**350.1**	**5,626.8**	**33,230.3**	**16.9%**
Compostable paper	2,592.7	70.3	248.0	2,911.0	8.5%
Compostable plastics	9.7	2.0	12.3	23.9	51.2%
#7 compostable bags	13.7	3.1	12.3	29.2	42.3%
Wasted Food	19,366.8	187.7	1,586.3	21,140.7	7.5%
Food Waste	4,852.3	53.9	3,419.3	8,325.5	41.1%
Other Compostable	418.1	33.1	348.7	799.9	43.6%
Non-Recoverable	**39,737.5**	**12,911.2**	**624.4**	**53,273.1**	
Total	77,262.4	22,623.3	6,751.3	106,637.1	27.5%

The capture rates and recycling rate for organics participating households for 2022 are shown in Table 4-2.

**Table 4-2 Current Capture Rates and Recycling Rate,
Organics Subscribers**

Material Category	Extrapolated Annual Generation (Tons)			Total Generation	Capture Rate
	Refuse	Recycling	Organics		
Targeted Paper	**2,296.1**	**3,314.2**	**264.3**	**5,874.6**	**59.8%**
Newspaper	65.5	287.4	0.6	353.5	81.5%
Mixed recyclable paper	783.8	934.2	27.7	1,745.7	53.5%
Boxboard / paperboard	399.2	393.4	32.7	825.4	47.7%
Cartons	57.3	109.2	3.2	169.6	64.4%
Cardboard / Kraft paper	990.3	1,590.0	200.0	2,780.3	64.4%
Targeted Plastic	**678.1**	**571.2**	**19.0**	**1,268.3**	**45.0%**
#1 PET bottles	188.2	216.0	7.3	411.5	52.5%
#1 PET non-bottles	140.0	140.8	3.6	284.5	49.5%
#2 HDPE Natural	47.2	50.3	0.0	97.5	51.6%
#2 HDPE Pigmented	77.2	64.4	4.8	146.4	44.0%
#5 PP containers	225.5	99.7	3.2	328.4	30.4%
Targeted Metals	**493.0**	**380.6**	**14.2**	**887.8**	**42.9%**
Steel cans	249.2	81.6	2.5	333.3	24.5%
Aluminum cans	151.8	279.5	9.0	440.3	63.5%
Other aluminum	76.0	10.5	0.5	87.0	12.0%
Cardboard can	16.0	9.0	2.2	27.2	33.1%
Targeted Glass	**732.3**	**1,543.4**	**202.5**	**2,478.2**	**62.3%**
Food & beverage glass	732.3	1,543.4	202.5	2,478.2	62.3%
Targeted SSO	**9,670.6**	**159.8**	**5,626.8**	**15,457.2**	**36.4%**
Compostable paper	1,036.9	31.8	248.0	1,316.7	18.8%
Compostable plastics	1.3	1.1	12.3	14.7	83.4%
#7 compostable bags	2.0	3.0	12.3	17.3	71.2%
Wasted Food	6,605.3	64.9	1,586.3	8,256.5	19.2%
Food Waste	1,856.3	34.5	3,419.3	5,310.1	64.4%
Other Compostable	168.7	24.5	348.7	541.9	64.3%
Non-Recoverable	**19,551.1**	**6,878.5**	**624.4**	**27,054.0**	
Total	33,421.1	12,847.7	6,751.3	53,020.1	37.0%

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4. RECYCLING ANALYSIS

The capture rates and recycling rate for 2022 for households that do not subscribe to the City's organics recycling program are shown in Table 4-3.

**Table 4-3 Current Capture Rates and Recycling Rate,
Non-Organics Subscribers**

Material Category	Extrapolated Annual Generation (Tons)			Total Generation	Capture Rate
	Refuse	Recycling	Organics		
Targeted Paper	**3,293.5**	**2,024.7**	**0.0**	**5,318.2**	**38.1%**
Newspaper	123.3	237.3	0.0	360.6	65.8%
Mixed recyclable paper	1,281.3	482.6	0.0	1,763.8	27.4%
Boxboard / paperboard	505.1	298.8	0.0	803.9	37.2%
Cartons	96.5	35.2	0.0	131.7	26.7%
Cardboard / Kraft paper	1,287.2	970.9	0.0	2,258.1	43.0%
Targeted Plastic	**1,117.4**	**498.9**	**0.0**	**1,616.3**	**30.9%**
#1 PET bottles	407.7	245.3	0.0	653.1	37.6%
#1 PET non-bottles	289.8	56.7	0.0	346.5	16.4%
#2 HDPE Natural	64.2	67.0	0.0	131.2	51.1%
#2 HDPE Pigmented	123.2	74.0	0.0	197.2	37.5%
#5 PP containers	232.5	55.8	0.0	288.3	19.4%
Targeted Metals	**576.1**	**300.4**	**0.0**	**876.5**	**34.3%**
Steel cans	121.8	74.7	0.0	196.6	38.0%
Aluminum cans	287.4	208.1	0.0	495.6	42.0%
Other aluminum	117.4	11.2	0.0	128.6	8.7%
Cardboard can	49.4	6.3	0.0	55.7	11.4%
Targeted Glass	**1,058.0**	**1,071.0**	**0.0**	**2,129.0**	**50.3%**
Food & beverage glass	1,058.0	1,071.0	0.0	2,129.0	50.3%
Targeted SSO	**17,472.9**	**204.4**	**0.0**	**17,677.3**	**0.0%**
Compostable paper	1,548.3	41.3	0.0	1,589.7	0.0%
Compostable plastics	8.3	0.9	0.0	9.2	0.0%
#7 compostable bags	11.6	0.2	0.0	11.8	0.0%
Wasted Food	12,676.5	130.9	0.0	12,807.4	0.0%
Food Waste	2,979.9	21.3	0.0	3,001.2	0.0%
Other Compostable	248.2	9.8	0.0	258.0	0.0%
Non-Recoverable	**20,165.8**	**6,530.6**	**0.0**	**26,696.4**	
Total	43,683.7	10,630.0	0.0	54,313.7	19.6%

4.3 MAXIMUM THEORETICAL RECYCLING RATE

As shown in Table 4-4, the current upper limit on the City's residential recycling rate can be calculated by assuming "perfect" capture of all targeted recyclables. This limit is based upon existing recycling markets, technologies, and programs in Minneapolis. This calculation of perfect capture is theoretical only. As shown, excluding yard waste, the maximum recycling rate is estimated to be roughly 50 percent, comprised of almost 209 percent paper, metals, glass and plastics; and another 31 percent of organics. Note that yard waste is excluded from this table.

Table 4-4 Maximum Theoretical Recycling Rate

Material Category	Total Generation	Capture Rate	Recycled	Organics	Disposed
Targeted Paper	**11,021.7**	**100.0%**	**11,021.7**	**0.0**	**0.0**
Newspaper	695.8	100.0%	695.8	0.0	0.0
Mixed recyclable paper	3,468.6	100.0%	3,468.6	0.0	0.0
Boxboard / paperboard	1,606.1	100.0%	1,606.1	0.0	0.0
Cartons	297.3	100.0%	297.3	0.0	0.0
Cardboard / Kraft paper	4,953.9	100.0%	4,953.9	0.0	0.0
Targeted Plastic	**2,851.6**	**100.0%**	**2,851.6**	**0.0**	**0.0**
#1 PET bottles	1,050.1	100.0%	1,050.1	0.0	0.0
#1 PET non-bottles	626.6	100.0%	626.6	0.0	0.0
#2 HDPE Natural	224.4	100.0%	224.4	0.0	0.0
#2 HDPE Pigmented	339.0	100.0%	339.0	0.0	0.0
#5 PP containers	611.6	100.0%	611.6	0.0	0.0
Targeted Metals	**1,741.1**	**100.0%**	**1,741.1**	**0.0**	**0.0**
Steel cans	522.6	100.0%	522.6	0.0	0.0
Aluminum cans	920.3	100.0%	920.3	0.0	0.0
Other aluminum	215.4	100.0%	215.4	0.0	0.0
Cardboard can	82.8	100.0%	82.8	0.0	0.0
Targeted Glass	**4,519.3**	**100.0%**	**4,519.3**	**0.0**	**0.0**
Food & beverage glass	4,519.3	100.0%	4,519.3	0.0	0.0
Targeted SSO	**33,230.3**	**100.0%**	**0.0**	**33,230.3**	**0.0**
Compostable paper	2,911.0	100.0%	0.0	2,911.0	0.0
Compostable plastics	23.9	100.0%	0.0	23.9	0.0
#7 compostable bags	29.2	100.0%	0.0	29.2	0.0
Wasted Food	21,140.7	100.0%	0.0	21,140.7	0.0
Food Waste	8,325.5	100.0%	0.0	8,325.5	0.0
Other Compostable	799.9	100.0%	0.0	799.9	0.0
Non-Recoverable	**53,273.1**	**0.0%**	**0.0**	**0.0**	**53,273.1**
Total	106,637.1		20,133.7	33,230.3	53,273.1
Percent	*100.0%*		*18.9%*	*31.2%*	*50.0%*

Although not shown in this table, it can be easily calculated that roughly half of the Disposed tonnage (approximately 27,000 out of 53,000 disposed tons) would need to be recycled or composted in order to achieve a 75 percent recycling rate.

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5. CONCLUSIONS

The following conclusions can be drawn from the 2022 Study of Minneapolis residential waste composition:

◆ **Methodology Matters**: Although two residential waste characterization and capture rates studies have now been performed for the City of Minneapolis—one in 2016 and this effort in 2022—the methodologies employed were significantly different. The 2016 Study relied on conventional back-of-truck sampling to determine the composition of residential garbage and relied on tonnage reports from truck scale data from the City's recycling, organics, and yard waste programs to calculate capture rates. These reported tons were not further analyzed for accuracy or precision. Conversely, the 2022 Study captured samples from individual garbage, recycling, and organics carts, and sorted out contamination from carts from the latter two types of materials. Also, in the 2016 Study design and material category definitions, there was more food waste material sorted into other unique categories. For example, 2016 Study categories such as Supermix—Organics, Supermix—Indistinguishable, Other Compostable Organics, and Other Materials Not Elsewhere Classified likely contain much of the food waste that was sorted into Wasted Food and Food Waste in the 2022 Study. Supermix was defined in 2016 as mixed materials having particle sizes below two inches. In 2022, materials were sorted down to particle sizes in the range of ½ inch to ¼ inch and were sorted as "Fines". These methodological differences cannot be reconciled and contribute to the differences in the results between the two studies. Consequently, exact comparisons between the two studies are somewhat limited (e.g., organics composition, organics capture rates, etc.).

◆ **Cart Samples Are Best for Understanding Residential Recycling Behavior**: The data obtained in this 2022 Study provided specific recycling behavior data for 1,282 households. The methodology allows the City to understand which recyclables and organics are being left in the garbage carts, and what types and amounts of contaminants are being placed in the recycling and organics carts. Because sorted materials were intercepted before collection into packer trucks and unloading onto a tipping floor, relatively little physical degradation and cross contamination of materials occurred (e.g., breaking of glass containers, shredding of paper, spreading of food waste and moisture contamination within the samples, etc.). Also, the accuracy of sorting was very high in the 2022 Study (e.g., more time spent on sorting fines; etc.). The results of this study provide invaluable insight into public outreach and messaging that may be needed to improve recycling behaviors.

◆ **Correlation Between Organics Subscription and Good Recycling Practices**: Organics collection has expanded significantly since the 2016 Study, with about 51 percent of households now subscribing to this curbside service. It can be confirmed that organics subscribers tend to recycle more actively and more accurately by separately evaluating the recycling and organics diversion behaviors of organics subscribers and non-organics subscribers. Organics subscribers achieved higher capture rates for their recyclables, and their recyclables exhibited significantly lower contamination.

◆ **Maximum Residential Recycling Potential**: Similar to the 2016 Study, this study confirms that it is not possible to achieve a 75 percent recycling rate for residentially generated wastes within the current recycling collection framework. Even at maximum recycling for all targeted constituents in the residential waste stream, the overall recycling rate (excluding yard waste, which was outside the scope of this study) is estimated to be roughly 50 percent. Achieving a 75 percent recycling rate would require expanding the City's recycling program to allow recycling or other diversion of roughly half of the disposed tonnage, or approximately 27,000 out of 53,000 disposed tons.
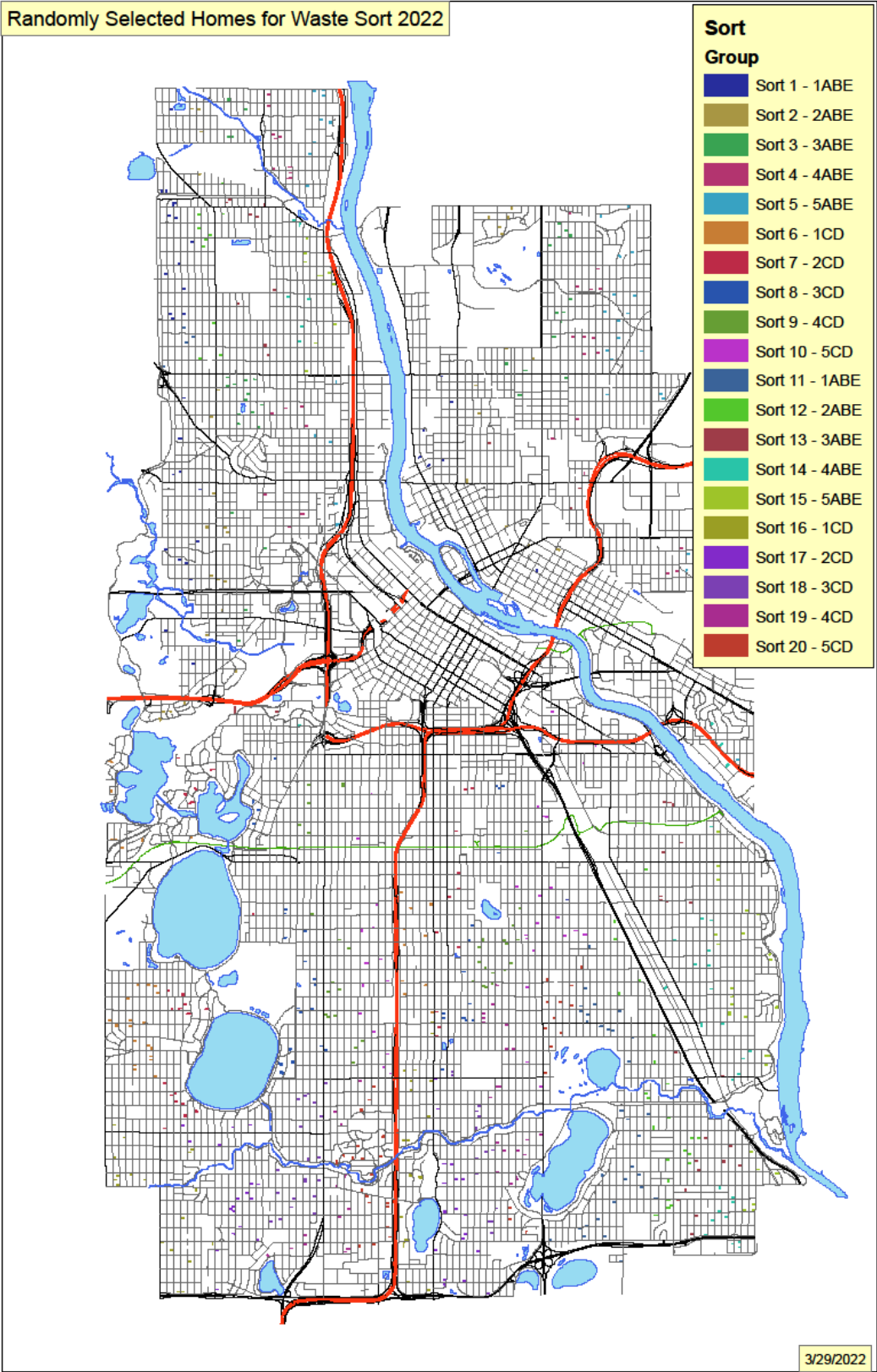
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APPENDIX A

2022 WASTE SORT MAP

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APPENDIX A – WASTE SORT MAP

Randomly Selected Homes for Waste Sort 2022

Sort Group

- Sort 1 - 1ABE
- Sort 2 - 2ABE
- Sort 3 - 3ABE
- Sort 4 - 4ABE
- Sort 5 - 5ABE
- Sort 6 - 1CD
- Sort 7 - 2CD
- Sort 8 - 3CD
- Sort 9 - 4CD
- Sort 10 - 5CD
- Sort 11 - 1ABE
- Sort 12 - 2ABE
- Sort 13 - 3ABE
- Sort 14 - 4ABE
- Sort 15 - 5ABE
- Sort 16 - 1CD
- Sort 17 - 2CD
- Sort 18 - 3CD
- Sort 19 - 4CD
- Sort 20 - 5CD

3/29/2022

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APPENDIX B

MATERIAL CATEGORIES AND DEFINITIONS

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APPENDIX B – MATERIAL CATEGORIES AND DEFINITIONS

Material Group	Material Category	Material Definition
Paper	Newspaper	Printed groundwood newsprint, including glossy advertisements and inserts typically found in newspapers.
	Mixed Recyclable Paper	High grade continuous form computer paper, white paper including bond, photocopy, notebook paper, index cards, computer cards, notebook paper, xerographic, typing paper, tablets (yellow and with clear glue binding), manila file folders, nonglossy fax paper, and colored ledger paper primarily found in offices. Low grade recyclable paper is a broad category of paper that includes things like mail, phone books, all envelopes (with and without windows), glossy coated paper, paper-back books, construction paper, etc. Magazines/catalogs. Soft and hard cover books. Freezer boxes. Excludes paper items that light up or play music.
	Boxboard/Paperboard	Uncoated boxboard such as cereal, cracker, shoes boxes, and paper cores (from paper towel, toilet paper, wrapping paper, aluminum foil, and plastic wrap). Does not include heavily soiled, food contaminated, or wet boxes such as refrigerated and frozen food boxes.
	Plastic-Coated Paper	Refrigerated boxes (butter), laminated paper, paper-based rewards/membership cards from junk mail, sticker backings, etc. Does not include frozen food boxes.
	Shredded Paper	Bagged or piles of loose shredded paper.
	Cartons	Gable top and aseptic containers. Made mainly from paper in the form of paperboard as well as thin layers of polyethylene. The shelf-stable cartons also have a thin layer of aluminum. Products in refrigerated cartons include milk, juice, cream, egg substitutes, soy, and grain milk. Products in shelf-stable cartons include juice, milk, soy and grain milk, soup and broth, and wine. Does not include plastic pouches.

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Material Group	Material Category	Material Definition
	Cardboard/Kraft Paper	Corrugated cardboard usually has three layers. The center wavy layer is sandwiched between the two outer layers. It does not have any wax coating on the inside or outside. Examples include entire cardboard containers such as shipping and moving boxes, computer packaging cartons, and sheets and pieces of boxes and cartons. This subcategory includes Kraft paper that are not excessively contaminated with food or liquid. This category does not include chipboard boxes such as cereal and tissue boxes.
	Paper Cups & To-Go Containers	Any to-go container made of paper, whether lined or not. Includes Chinese take-out with metal handle. Includes paper cups.
	Compostable Paper	Non-recyclable compostable paper. Includes napkins, paper towels, and tissues; uncoated paper plates, and food containers; paper egg cartons; pizza boxes; soiled paper bags. Does not include fast food wraps, plastic coated paper, coffee cups, cartons, or freezer boxes. Unlined molded pulp.
	Non-Recyclable Paper	All other paper that is not recyclable or compostable. Examples include gift wrap (with glitter, foil, reflective areas or velvet), contaminated paper craft projects (with paint, glue, glitter, etc.), thermal receipt paper, loose shredded paper, blueprint paper, carbon paper, paper used to dispose of chewing gum, paper sprayed with paint heavy glue or tape, cigarette packages, photographs, cardboard with Styrofoam glued to side(s), and paper coated with plastic or metal.
Plastic	#1 Pet Bottles	Narrow necked clear and colored plastic containers that bear the label #1 PET or PETE (polyethylene terephthalate).
	#1 Pet Non-Bottles	Other thermoform jars, trays, or clam shells that bear the label #1 PET or PETE (polyethylene terephthalate).
	#1 PET - FLUFF	PET fiber insulated packaging used for shipping packages like meal delivery service goods. Commonly has plastic film on both sides and states it can be recycled in your 'plastics bin' at home.

Material Group	Material Category	Material Definition
	#2 HDPE Natural	Natural containers (without color) that bear the label #2 HDPE (high-density polyethylene). Examples include dairy products, detergent, fabric softener, bleach, etc.
	#2 HDPE Pigmented	Pigmented containers (with color) that bear the label #2 HDPE (high-density polyethylene). Examples include dairy products, detergent, fabric softener, bleach, etc.
	#3 PVC	Includes flexible plastic blister packaging coded #3 (PVC) such as rigid plastic (around electronics and toys) piping, fencing, etc., and flexible PVC such as tubing.
	#5 PP Containers	This subcategory includes all bottles, jars, tubs, lids, cups, clamshells, trays, etc. that bears the label #5 or "PP".
	#6 EPS	Plastic products made of #6 PS expanded polystyrene (Styrofoam). Examples are cold and hot drink cups, packing peanuts, molded shipping packaging, coolers, takeout food trays and clamshells, etc. This subcategory excludes rigid #6 PS packaging.
	#6 PS - Rigid	Rigid #6 plastic containers; clamshells, cold cups, cookie trays, etc.
	Compostable Plastics	Cups, utensils, containers labeled PLA #7 or BPI certified.
	All Other Packaging Containers	Means plastic containers that are made of types of plastic other than #1 PET, #2 HDPE, or #5 PP. Items may be made of #4 LDPE, Other, dual labeled or unlabeled. When marked for identification, these items may bear the number "4," "7" or Dual Label #5 - #7 in the triangular recycling symbol. This subcategory includes Keurig coffee containers and plastic containers that do not have the chasing arrows.

Material Group	Material Category	Material Definition
	Recoverable Film/Bags	This category includes shrink film and plastic bag recycling accepted by recycling drop-off programs. Includes plastic grocery bags, retail bags, dry cleaning bags, newspaper sleeves, cereal bags, bread bags, produce bags, plastic wrap from paper products (pack of paper towels), salt bags, ice bags, stretch/shrink wrap, and 6-pack holder rings and zipper bags. Does not include frozen food bags, bags with strings or rigid handles, soil or mulch bags, bubble wrap, food containers, bottles, bags with plant-based additives or compostable bags. Do not include material that is significantly wet or contaminated with residue.
	Other Film	Plastic bags used as trash receptables, to collect and contain trash. Other film means all other plastic film that is not categorized as recoverable film/bags or trash bags. Also includes recoverable film/bags that are highly contaminated. Examples include pouches with laundry products, frozen vegetable bags, food wrappers such as candy bar wrappers, potato chip bags, yogurt tubes, cheese wrappers, mailing pouches, bank bags, X-ray film, metallized film (such as balloons).
	#7 Compostable Bags	BPI certified compostable plastic bags.
	Multi-layer Pouches	Examples include flexible plastic pouches (containing food, sauces, soup, drinks), pouches with laundry products, yogurt tubes. Also includes flex plastic pouches that use sealable zipper tops (trail mix, etc.).
	Cutlery & Straws	Plastic cutlery and straws.

Material Group	Material Category	Material Definition
	Durable Plastic Items	Plastic items other than bottles, containers, or film. These items are made to last for more than one use. Includes bulky items and other smaller items. Examples of bulky items include crates, buckets (including 5-gallon buckets), baskets, totes, large plastic garbage cans, large tubs, large storage tubs/bins (usually with lids) that do not have sharp corners, flexible (non-brittle) flowerpots of 1-gallon size or larger, lawn furniture, large plastic toys, toolboxes, first aid boxes, and some sporting goods. Examples of other durable items include CDs and their cases, plastic housewares such as dishes, cups, and cutlery.
	All Other Plastic	Plastic that cannot be put in any other type. These items are usually recognized by their optical opacity. This type includes items made mostly of plastic but combined with other materials. Examples include auto parts made of plastic attached to metal, unlabeled plastic cups, produce trays, unlabeled cookie trays found in cookie packages, plastic strapping, plastic lids, some kitchen ware, toys, window blinds, plastic lumber, insulating foam, imitation ceramics, handles and knobs, plastic string, plastic rigid bubble/foil packaging (as for medications), small (less than 1 gal) plant containers such as nursery pots and plant sixpacks, any unlabeled plastic products, and new Formica, vinyl, or linoleum.
Metal	Steel Cans	Steel or tin food & beverage containers means rigid containers made mainly of steel that are Bimetal Cans. These items stick to a magnet and may be tin coated. This subtype is used to store food, and beverages.
	Aluminum Cans	Containers such as used beverage containers (UBC) and other cans made from aluminum used for containing soda, fruit, juice, sports drinks, iced tea, beer, food, pet food, etc.
	Other Aluminum	Includes clean aluminum foil, trays, and tins (with no food residue).

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Material Group	Material Category	Material Definition
	Other Scrap Steel	Metal composed primarily of iron, plus other scrap ferrous including clothes hangers, sheet metal products, pipes, miscellaneous metal scraps, and other magnetic metal items. This category excludes food and beverage containers.
	Non-Ferrous Metal	Non-ferrous metal means any metal item, other than aluminum cans and foil, that is neither stainless steel nor magnetic. These items may be made of aluminum, copper, brass, bronze, lead, or zinc. Examples include aluminum window frames, aluminum siding, copper wire, brass pipe.
	Mixed Metal	Metal that cannot be put in any other type. This subcategory includes items made mostly of metal but combined with other materials and items made of both ferrous metal and non-ferrous metal combined. Examples include insulated wire and finished products that contain a mixture of metals, plastic, and other materials, whose weight is derived significantly from the metal portion of its construction.
	Cardboard Cans	Items with a steel bottom and boxboard sides (Pringles, mixed nuts, juice concentrate, crescent rolls, etc.).
Glass	Food & Beverage Glass	Glass such as clear, brown, green, and blue containers for food, beverage, wine, liquor, and beer.
	Non-Recyclable Glass	All other glass that was not originally used for food or beverage containers. Examples including ceramics or pottery, drinking glasses or bowls, glass plates, Pyrex, glass vases or decorative glass items, cooking utensils, ash trays, mirrors, incandescent light bulbs, window glass, plate glass, and fragments. If the glass is broken and not 100% identifiable as food or beverage glass, it belongs to Non-Recyclable Glass.

Material Group	Material Category	Material Definition
Organics	Wasted Food	Uneaten food/ food that could have been eaten before being put into the organics. Includes: ½ a fruit, veggies, or more remaining of item; ½ a loaf of bread; leftovers (this category has been broken out from the 'food waste' category in Hennepin County sort). When feasible, food will be removed from containers (e.g., Tupperware, carry-out containers, etc.) and the food will be placed in the Wasted Food category and the container will be placed in the appropriate category. ½-full water bottles also sorted here.
	Food Waste	Food preparation wastes, food scraps, bones; eggshells; coffee grounds, filters, and tea bags. Meat trimmings, shells, etc.—all inedible parts of food.
	Other Compostables	Includes houseplant trimmings, cotton balls, hair and nail clippings, Q-tips with paper stems, wood chopsticks, popsicle sticks, toothpicks.
	Yard Waste	Yard waste means grass clippings, leaves, branches, sticks, garden waste, brush, stumps, and non-woody plant material such as cut flowers.
HHW	Household Hazardous Waste	Paints and solvents, automotive products, mercury-containing items, and other household hazardous waste. Also includes COVID-19 home test kits.
	Batteries	Alkaline batteries and Li, Li-Ion, Ni-CD, Ni-MH, Zn, Zn-Air, etc. batteries.
	Sharps	Needles and syringes, including those enclosed in plastic containers.
C&D Debris	Mixed C&D Debris	Clean lumber, pallets, crates, treated wood, painted wood, plywood, gypsum drywall, concrete, brick, rock, carpet and carpet padding, and all other wastes related to construction and home renovation.
Other Wastes	Textiles—Wearable	Apparel, clothes, shoes, bags, hats, etc.
	Textiles—All Other	All other items made of natural or manmade woven thread, yarn, fabric, or cloth. This subcategory includes fabric trimmings, draperies, towels, and all natural and synthetic cloth fibers.

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Material Group	Material Category	Material Definition
	Electronics	Electronics include TVs, cable boxes, CD players/stereos, computer monitors and CPUs (towers), computer peripherals (keyboard, mouse, speakers, cables), DVD/Blu-ray players, fax machines, phones, printers and copy/print/fax/scan combination units, radios, receivers, satellite dishes, scanners, and VCRs.
	Small Household Appliances	Electrically powered household products with very little or no circuit boards fabricated from metals and plastics not easily separable into individual materials. Examples include hair dryers, toasters, coffee makers, etc.
	Small Furniture & Household Goods	Furniture and household goods, like wicker baskets, candles, and decorations that do not fall under other categories.
	Tires/Rubber	This category includes vehicle tires, tubes, and other material mainly made of rubber. Examples include tires from trucks, automobiles, motorcycles, heavy equipment, bicycles, some shoes, and floor mats.
	Diapers & Feminine Hygiene Products	Diapers & feminine hygiene products.
	Pet Waste & Bedding	Pet waste, including the bag, and pet bedding.
	Fines	Materials ranging in size from 1/2' to 1/4".
55	Other Not Elsewhere Classified	Other not elsewhere classified.

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