



# Agenda

City of Sioux Falls Solid Waste Planning Board  
Downtown Library Meeting Rooms A&B, 200 N. Dakota Ave., Sioux Falls, SD  
Monday, July 17, 2023, 5:30pm

## **Roll call and determination of quorum**

## **Approval of agenda**

## **Approval of minutes of last meeting**

## **Introduction**

## **Unfinished Business**

NA

## **Reports (Information Only)**

1. Landfill – Don Kuper
2. Environmental – Holly Meier
3. Recycling Industry – Shannon Dwire
4. Solid Waste Industry – vacant
5. Citizen Representative – Tim Edman
6. Counties – Lake, Lincoln, McCook, Minnehaha, Turner Representatives

## **Board Member Items**

1. Update on open Board positions (Information Only – Holly Meier)
2. Recycling Task Force report (Action Item – Tim Edman)  
Proposed action: City staff will submit to the full SWPB a copy of the Recycling Report after approval by the Recycling Subcommittee and at least 21 days prior to the next SWPB meeting. The SWPB may approve or revise the report prior to its submittal to the Mayor and City Council.
3. Waste characterization study (Action Item – Tim Edman)  
Proposed action: The chair of the SWPB shall invite and arrange to have a representative of HDR Engineering attend the next SWPB to present the findings of the recent Waste Characterization Study conducted by HDR Engineering and be available to address any questions by the SWPB regarding the study results.
4. Role of the 2019 Solid Waste Management Master Plan (Information Item – Shannon Dwire)
5. Progress Assessment and Goal Review of SWMP (Action Item – Shannon Dwire)  
Proposed action: If the SWMP continues to serve as a guiding document, I recommend allocating dedicated time to thoroughly review and assess our progress towards the goals outlined in the plan. Alternatively, if the SWMP will no longer be utilized as a guiding document, I propose allocating specific time to review the plan itself. This review will help identify any essential goals that may not be included in the new framework.
6. SWPB Composition & Purpose (Action Item – Tim Edman)  
Proposed action: The chair of the SWPB shall establish a five-person subgroup consisting of one city government representative, one county government representative, two citizen representatives, and one recycling industry



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representative to address possible Ordinance revisions to the composition and purpose of the SWPB. The subgroup shall submit its recommendations to the full SWPB no later than December 29, 2023.

7. Revision to Chapter 50.001 (Definitions) (Action Item – Tim Edman)  
Proposed action: The SWPB recommends the definition of “Utility” in City Ordinance Chapter 50.001 be revised as follows:  
UTILITY. Includes the water, sewer, storm sewer, city-owned electric, or any other utility services furnished by the city exclusively to consumers located within the city thereof.
8. Update on no bags enforcement from Millennium (Information Only – Shannon Dwire)
9. Update on rates and budget / 2023 Landfill Rate Study (Information Only – Josh Peterson)

**New Business**

**Public Input**

**Adjournment**

# RECYCLING TASK FORCE REPORT: ASSESSING AND RECOMMENDING IMPROVEMENTS FOR CITY OF SIOUX FALLS RECYCLING

July 2023

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  - C. Waste Characterization Study Results
- VI. Contributing Factors to Declining Recycling Rate
- VII. Recycling Ordinances
- VIII. Recommendations to Improve Recycling

## I. INTRODUCTION

The City of Sioux Falls owns and operates the five-county Sioux Falls Regional Sanitary Landfill (SFSL) and for years has supported recycling a variety of materials to extend the life of the landfill and divert valuable material from the waste stream. The City of Sioux Falls tracks the City's single-stream recycling rate<sup>1</sup> in conjunction with the annual recycling goal established by City Ordinance Chapter § 57.081. The goal is established to extend the life of the five-county Sioux Falls Regional Landfill (SFRL) and to divert useable material from the waste stream. The City hit a record high recycling rate of 23.4 percent in 2018. However, the rate since then has been consistently dropping. In 2022, the recycling rate was 18.7 percent.

At its July and October 2022 meetings, the Solid Waste Planning Board (SWPB) addressed the decline in the City's recycling rate and discussed possible actions the City could take to reverse this trend. The City responded by taking several steps:

- In July 2022, City staff announced it would reach out to individual waste haulers to discuss declining rates, as well as increase random load inspections. Loads have been rejected when a significant amount of recyclables have been observed.
- In September 2022, City staff held 30-60 minute discussions with 14 of the 16 haulers that serve the five-county region to gain a better understanding of their perspective on recycling rate decline, challenges, and concerns.

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<sup>1</sup> The recycling rate is calculated by dividing the total amount of recyclable material collected by waste haulers in the five-county region by the total amount of waste (municipal solid waste and recyclables) collected.

- In September 2022, the City entered into a contract with HDR to conduct a waste characterization study to better identify the municipal solid waste (MSW) materials hauled to the SFRSL. (See Section V.C. for study results.)
- In October 2022, the City of Sioux Falls formed the Recycling Task Force. Task Force members included haulers, recycling industry representatives, Solid Waste Planning Board (SWPB) members, and City staff. Over the course of seven months, the Task Force held twelve 90-minute meetings.

The Task Force was established to: 1) Better understand the causes of the downward-trending recycling rate, and 2) Propose steps that would increase recycling and diversion.

Recycling is a complex issue, and it is likely that several factors have contributed to the downward recycling trend. While definitive answers are challenging to find, the Task Force utilized quantitative and qualitative data to better understand the problem. Subsequently, the Task Force discussed several options on addressing the downward trend.

This report summarizes the work of the Task Force and provides the recommended actions to improve recycling within the five-county region.

## **II. SUPPORT FOR RECYCLING DESPITE CHALLENGES**

Numerous surveys and studies indicate widespread public support for recycling to protect the environment, but also note numerous constraints to recycling behavior. For example, recent research indicated that up to 94 percent of Americans support recycling, 74 percent said it should be a high priority, and only about 35 percent of people actually recycle.<sup>2</sup> Multiple surveys<sup>3 4</sup> indicate the top reasons people do not recycle are lack of convenience and access, lack of knowledge about what can be recycled, lack of time, and not being aware of recycling benefits.

## **III. BACKGROUND OF RECYCLING IN SIOUX FALLS**

In addition to customers, the Sioux Falls waste management system is composed of three stakeholders. First, the City of Sioux Falls owns and operates the Sioux Falls Regional Sanitary Landfill (SFRSL) that serves the five-county region of Minnehaha, Lincoln, Lake, Turner, and McCook Counties, and sets landfill rules around waste and recycling.

Second, private materials recovery facilities (MRFs), including single-stream processor Millennium Recycling and Advanced Recycling that accepts cardboard only, process the recyclable materials. Millennium Recycling is the only MRF in Sioux Falls that accepts single-stream recyclables, and the majority of waste haulers bring the single-stream recycling generated in the five-county region to Millennium. Several haulers bring cardboard to Advanced Recycling for processing.

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<sup>2</sup> Morgan, B. (2021, April 21). *Why is it so hard to recycle?* Forbes.

<https://www.forbes.com/sites/blakemorgan/2021/04/21/why-is-it-so-hard-to-recycle/?sh=24794b4e3b77>

<sup>3</sup> *Why Americans aren't recycling.* (2019, April 22). Waste Advantage Magazine.

<https://wasteadvantagemag.com/why-americans-arent-recycling/>

<sup>4</sup> *This is what stops people from recycling more, finds a global survey.* (2021, Nov 18). World Economic Forum. <https://www.weforum.org/agenda/2021/11/barriers-to-recycling-sustainability-survey/>

Third, private waste haulers pick up recycling from their customers and bring the material to MRFs for processing. The City of Sioux Falls has an open market system for garbage haulers, and residents can select the hauler they desire to provide service. As of 2023, 13 haulers provide service in Sioux Falls.

While this waste management system is not unique, it is not very common to have a City-owned landfill, numerous private haulers, and private MRFs.

The City of Sioux Falls has several rules regarding recycling. Single-stream recycling has been required in the Sioux Falls community since 2013. Additionally, several materials are considered required recyclables: paper, cardboard, plastics #1 and #2, newspaper, electronics, magazines, bulk rate mail, and metal cans (Sioux Falls City Ordinance, § 57.001). Section 57.020 of City of Sioux Falls ordinance states waste haulers are required to pick up recycling at least twice a month. Section 57.021 states “Required recyclables collected shall not be deposited at the sanitary landfill.” Section 57.081 states garbage haulers are required to achieve 80% of the annual recycling goal.

In addition to rules set forth, the City of Sioux Falls, MRFs, haulers, and recycling partners provide education and technical assistance that supports recycling knowledge and behavior. The City of Sioux Falls provides recycling flyers and bin stickers, promotes recycling on social media and in radio advertising, hosts an educational website and searchable tool, supports educational programming and presentations on recycling for classrooms, and provides garbage and recycling containers at a one-to-one ratio in public parks and in downtown Sioux Falls.

Millennium Recycling provides educational recycling guides and information on its website, advances a recycling marketing campaign, provides waste stream reviews, provides classrooms with educational resources, and more.

At least annually, garbage haulers provide recycling information to their customers, as required by City ordinance. Many garbage haulers provide feedback on recycling behavior when collecting material, such as “Oops” stickers that denote what materials customers may be recycling incorrectly, phone calls, and follow-up messages.

The nonprofit BINfluencers, formerly Ecomaniacs, provides education and resources to the public on recycling.

#### **IV. NATIONAL TRENDS IN RECYCLING**

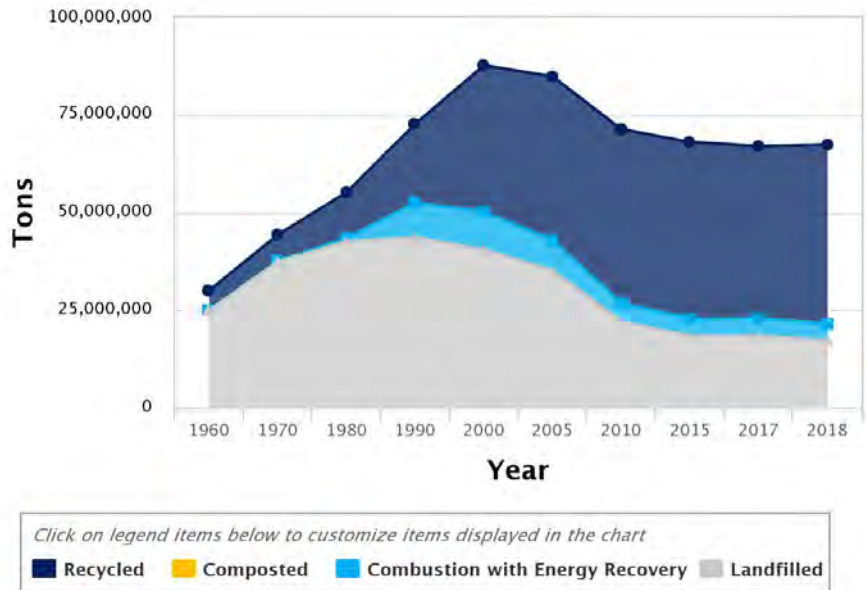
National trends in recycling can provide insight into recycling trends at the local level, and as such trend information is included.

**Paper and Paperboard.**<sup>5</sup> The U.S. Environmental Protection Agency (EPA) data indicates the amount of paper and paperboard in the MSW stream that is recycled and landfilled has been relatively flat in recent years. See Figure 1. EPA classifies products made of paper and paperboard materials as either nondurable goods or as containers and packaging. Nondurable goods include products such as office papers, newspapers, tissue paper, and paper plates and cups. Containers and packaging include products such as corrugated boxes, milk cartons, and bags and sacks.

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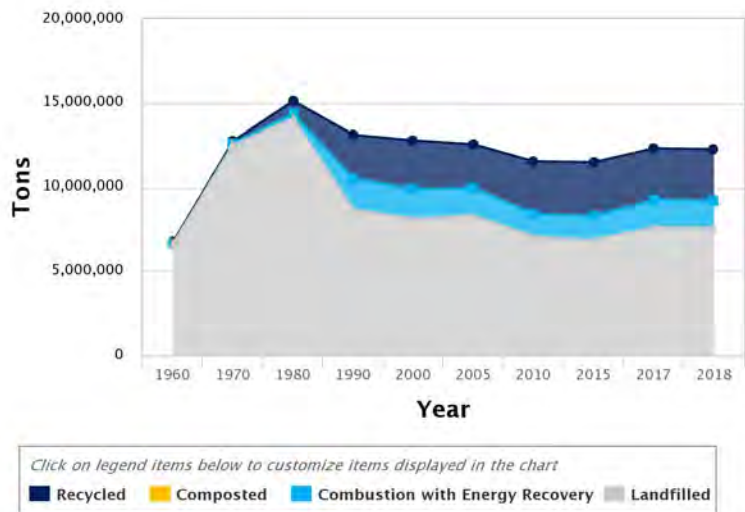
<sup>5</sup> Environmental Protection Agency. *Plastics: Material-Specific Data*. Facts and Figures about Materials, Waste and Recycling. <https://www.epa.gov/facts-and-figures-about-materials-waste-and-recycling/plastics-material-specific-data>

**Figure 1. Paper and Paperboard Waste Management: 1960-2018 (Source: EPA)**



**Glass.**<sup>6</sup> The U.S. EPA data indicates the amount of glass in the MSW stream that is recycled and landfilled also has been relatively flat in recent years. See Figure 2. The glass in MSW primarily consists of containers such as beer and soft drink bottles, wine and liquor bottles, and bottles and jars for food and cosmetics. The data also takes into account glass materials in durable goods like furniture, appliances, and consumer electronics.

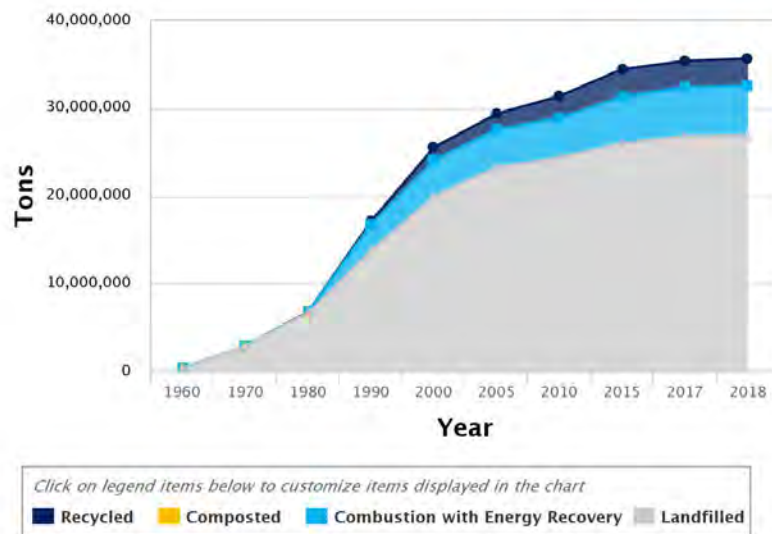
**Figure 2. Glass Waste Management: 1960-2018 (Source: EPA)**



<sup>6</sup> Environmental Protection Agency. *Glass: Material-Specific Data*. Facts and Figures about Materials, Waste and Recycling. <https://www.epa.gov/facts-and-figures-about-materials-waste-and-recycling/glass-material-specific-data#:~:text=The%20amount%20of%20recycled%20glass,with%20energy%20recovery%20that%20year>.

**Plastics.**<sup>7</sup> Extensive literature documents the growing problem associated with plastics, especially in the container and packaging category. The EPA defines this category as products assumed to be discarded within one year after the product is purchased. This includes bags, sacks, wraps, and other forms of polyethylene terephthalate (PET) bottles and jars, and other containers. In 2018, plastic containers and packaging made up about 28 percent of total MSW in the United States. Plastic waste has increased in the United States from 7.4 million tons in 1980 to 35.7 million tons in 2018, and most of this increase is being landfilled. See Figure 3. In part, this is due to the decline in plastic waste exports, which are included in plastic recycling rates. In 2018, only about 10 percent of plastic waste was recycled.

**Figure 3. Plastics Waste Management: 1960-2018 (Source: EPA)**



## V. CITY AND FIVE-COUNTY REGION LANDSCAPE

### A. City of Sioux Falls Growth

Sioux Falls is recognized for its robust growth over the past several years. According to the U.S. Census Bureau, the City’s population increased from 153,888 in 2010 to 196,528 in 2020, and the five-county regional population increased from 239,461 in 2010 to 287,789 in 2020. To better understand the impact of the City’s growth as it relates to recycling, the Task Force gathered data on total waste tonnages, waste per capita, and changes in the municipal solid waste (MSW) stream. The Task Force also looked at housing mix to assess the extent of new, single-family housing development versus new, large-scale apartment complex development. This was done due to concerns that apartment residents find it more difficult or less convenient than single-family homeowners to participate in recycling.

<sup>7</sup> Environmental Protection Agency. *Plastics: Material-Specific Data*. Facts and Figures about Materials, Waste and Recycling. <https://www.epa.gov/facts-and-figures-about-materials-waste-and-recycling/plastics-material-specific-data>

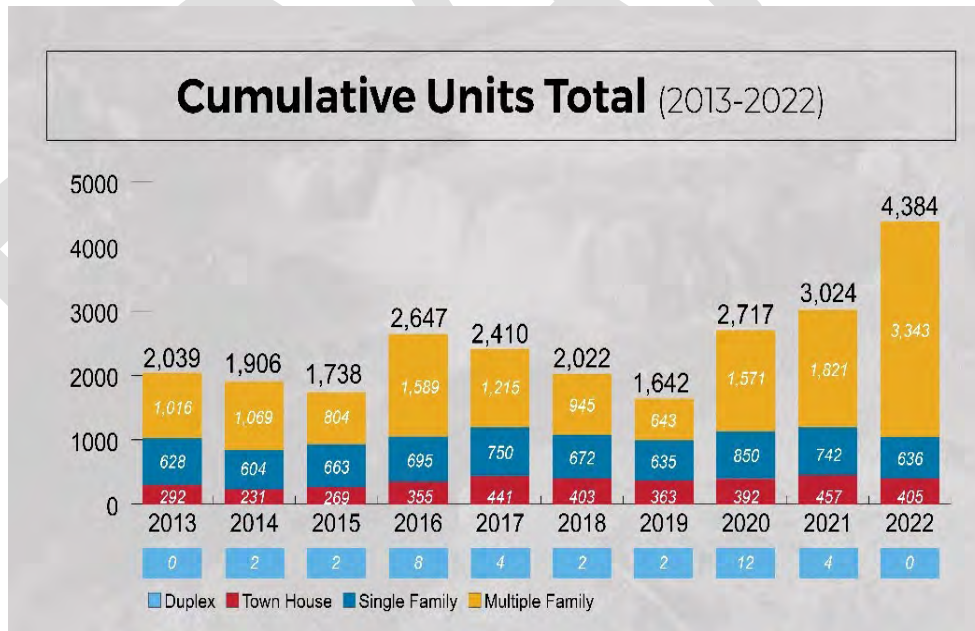
Table 1 below indicates a growing share of the City's housing consists of apartment complexes.

**Table 1. Sioux Falls Single-Family and Apartment Housing Mix<sup>8</sup>**

Resident Structures	2012		2022	
	Units	Percent of Total Residential Structures	Units	Percent of Total Residential Structures
Single-Family House	39,151	58.2%	44,924	52.2%
Apartments (with 2+ units)	19,206	28.6%	28,187	32.8%

As indicated in Figure 4, the number of multiple family building permits issued has dramatically increased in the past three years, while the number of single-family building permits issued has remained relatively constant.

**Figure 4. Cumulative Unit Building Permits, 2013-2022<sup>9</sup>**



<sup>8</sup> This data does not include twinhome, townhouse, duplex, or manufactured housing.

<sup>9</sup> City of Sioux Falls. *City of Sioux Falls Planning and Development Services 2022 Year-End Building Permit Report. Permit Statistics.* <https://www.siouxfalls.org/permit-stats>



## B. Waste Tonnages

Table 2 shows total waste and recyclable tonnages during the past five years. MSW data is the total MSW received by the landfill annually. Recycling data includes recycling tonnages hauled by regional waste haulers and mirrors the recycling data used in the recycling rate.<sup>10</sup> The data in Table 2 shows a drop in tonnages in recyclable materials since 2018, and a general trend of increasing MSW tonnages.

**Table 2. Total Waste and Recyclable Tonnage (2018–2022)**

Year	MSW	Recyclables
2022	211,251	37,615
2021	211,669	42,641
2020	198,496	43,182
2019	205,957	45,713
2018	195,906	46,644

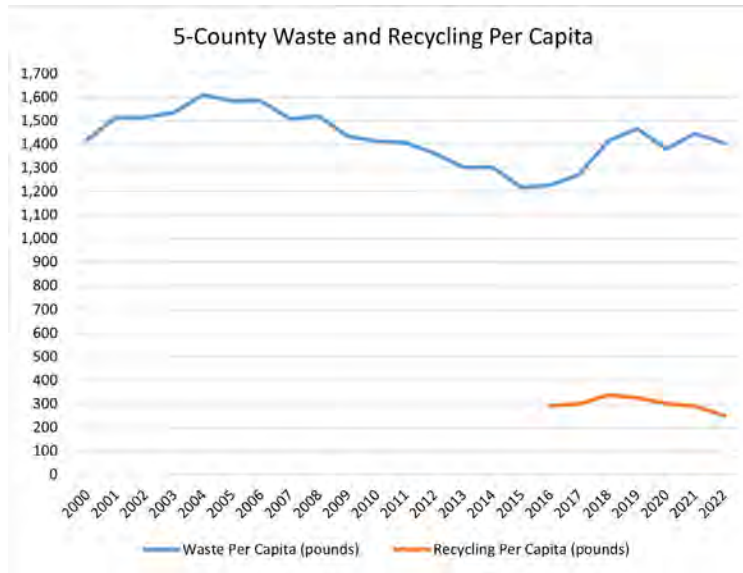
From a per capita perspective, recycling per capita in the five-county region began dropping in 2018, which mirrors the declining recycling rate and dropping recycling tonnages. See Figure 5. Recycling tonnage was at 337 pounds per capita annually in 2018 and at 250 pounds per capita annually in 2022.

Generally, a downward trend in waste per capita was seen from 2004 to 2015, with an uptick starting in 2015. In 2015, annual waste per capita was approximately 1,200 pounds, while in 2022, it was 1,400 pounds.

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<sup>10</sup> Note: Recycling tonnages for the recycling rate no longer include yard waste as of 2018. Data tracking for this metric started in 2016.

**Figure 5. Five-County Waste and Recycling Per Capita**



**C. Waste Characterization Study Results**

In September 2022 the City retained the services of HDR to conduct a waste characterization study. The purpose of the study was to assess the types and amounts of material, including recyclable materials, being landfilled. Previous waste characterization studies were performed in 2016 and 2006. In October 2022 and May 2023, the consultant pulled samples of waste material from waste hauler loads brought to the SFRSL for analysis. The months of October and May were chosen to account for possible seasonal differences in what might be deposited at the landfill.

Table 3 shows key results from the study. There was less mixed recyclable paper in the waste stream compared to 2006 and 2016. However, the other categories have remained relatively stable over the past fifteen years.

**Table 3. Waste Characterization Study Results**

Material Group	May 2023	Oct. 2022	2023/2022 Average	2016	2006	% Δ (2022/23-2016)	% Δ (2022/23-2006)
Plastic Bottles, Tubs and Jugs	3.0%	3.3%	3.1%	4.9%	3.3%	-1.8%	-0.2%
Paper <sup>11</sup>	4.0%	3.4%	3.7%	7.5%	15.2%	-3.8%	-11.5%
Glass Bottles/Jars	2.4%	3.6%	3.0%	1.3%	2.9%	+1.7%	+0.1%
Metal Cans <sup>12</sup>	2.2%	2.0%	2.0%	1.7%	1.6%	+0.3%	+0.4%
Cardboard	6.6%	7.3%	6.9%	6.6%	5.8%	+0.3%	+1.1%

<sup>11</sup> “Mixed recyclable paper” category from Waste Characterization Study.

<sup>12</sup> Metal cans includes the “Aluminum containers/cans” and “Ferrous containers/cans” categories from Waste Characterization Study.

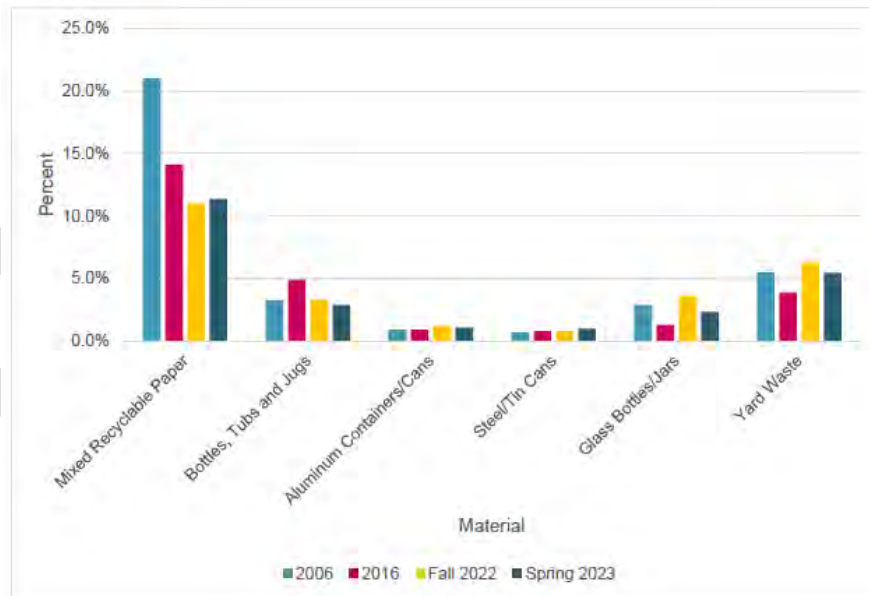
Still, approximately 25% of the material sorted in the 2022/2023 study could have been recycled using existing programs. See Figure 6. Excluding yard waste, which is outside the scope of single-stream recycling, approximately 20% of the material sorted could be recycled using currently available single-stream recycling programs. This poses an opportunity for additional education and behavior change efforts targeted to increase diversion of recyclable materials.

Of note, food waste was the most predominant waste category being landfilled, accounting for approximately 18.3% of the total waste sampled over the two seasons. Plastic Bags and Film was the second most abundant waste category with 9.6% of the total. Currently these categories do not have commercial-scale recycling or diversion infrastructure.

HDR concludes the Discussion and Recommendations section of the Waste Characterization Study with overall guidance on diversion and recycling:

Backyard composting of food waste, food waste reduction, and diverting film plastic have the highest potential for diverting material from the SFRSL based on the City’s infrastructure at this time. The City also provides recycling education on its website, including a searchable disposal and recycling guide. The City could consider whether additional public education on recycling services could be beneficial in increasing diversion and removing recyclable materials from the SFRSL.

**Figure 6. Currently Recyclable or Divertible Materials in Waste Stream (% by Weight)**



**VI. CONTRIBUTING FACTORS TO DECLINING RECYCLING RATE**

In addition to the waste characterization study and housing stock analysis, the Task Force conducted a search for data and recycling trends, and held numerous discussions to understand the root causes of the declining recycling rate. Understanding the root causes of the issue was important to ensure solutions identified addressed the causes adequately. A brief summary follows of potential contributing factors to the declining recycling rate. As implied by the number

of factors included, recycling is a complex topic and numerous issues can contribute to the effectiveness of a recycling program.

**Decreasing Recycling Tonnages.** As noted in Table 2, recycling tonnages have been declining since 2018. The Task Force sought to further investigate what is contributing to these declines.

**Consumer Behavior.** The qualitative data obtained through interviews with 14 of the 16 waste haulers pointed to the belief that residential customers have fewer recyclable materials such as newspaper and magazines in their recycling bins. These types of shifting consumer patterns (e.g., paperless and digital consumption) may contribute to lower recycling tonnages and therefore a lower recycling rate.

**Multi-Family Housing Growth.** The Task Force heard reports about the challenge of recycling at multi-family housing for several reasons, including lack of convenience and access. As noted earlier, multi-family housing growth has been significant over the past ten years, and this may be a contributing factor to a declining recycling rate.

**Landfill Rates Lower Than MRFs.** The Task Force discussed whether the SFRSL fees may have played a role in the decline of recycling rates in recent years. The current rate for the SFRSL is the lowest in South Dakota and the surrounding region. SFRSL rates are set to cover the cost of the landfill operation, which they currently do. However, landfill rates are lower than private MRFs' rates, and this poses a challenge to remain competitive and encourage haulers to prioritize landfilling over recycling, when landfilling is cheaper. The landfill tipping rate will increase in 2024, and prior to then last changed in 2015. The single-stream MRF Millennium Recycling, however, has needed to adjust its fees to address depressed markets, changing material streams, capital investments, employee shortages, and increased transportation expenses.

**Lack of Commercial Participation.** The Task Force discussed the challenges associated with the enforcement of the City's recycling ordinance, which requires recycling at City facilities, schools, businesses, and residences. The Task Force noted an apparent lack of participation in these entities throughout Sioux Falls despite the requirement.

**Lack of Knowledge.** Task force members discussed lack of awareness and knowledge of the recycling program may be a contributing factor to lacking participation or incorrect recycling. During hauler discussions, many of the 14 haulers discussed a need for increased education and stated lack of customer knowledge was a factor in dropping recycling rates. Boosting education and communication by the City, private haulers, and recycling organizations was discussed as an approach to improve recycling. Task Force members emphasized the significance of providing clear and accurate information to residents and businesses about what materials can be recycled, along with the pay-as-you-throw ordinance, which is intended to decrease waste and encourage recycling. However, some people are not aware of this requirement, and some private haulers may not have implemented or communicated it effectively, potentially leading to confusion and lower recycling participation overall.

**Increase in Some Recyclables Entering Landfill.** As indicated by the 2022/2023 waste characterization study, there was a 0.3-1.7% increase in glass, metal, and cardboard being landfilled since the 2016 study. While this is unlikely to have contributed much to the declining recycling rate, it is still noted here.

**Hauler Practices.** The Task Force heard reports that some waste haulers have been sending recyclables to landfills due to perception contaminated recyclables are not accepted at local MRFs or due to additional cost of recycling tipping fees. These actions would result in improper

disposal of materials that could have been recycled. Additionally, reports have shown that some haulers choose to landfill recycling loads due to staffing shortages. Both practices could contribute to lower recycling tonnages and increased landfill waste.

**Packaging Changes.** According to the EPA, packaging waste accounts for about 40 percent of all solid waste in the MSW stream. Approximately 20 percent of that is paper and paperboard that can be recycled.<sup>13</sup> Given economic and environmental concerns, packaging materials and packaging weights have changed significantly over the past decade. Companies such as Amazon and Walmart have made significant investments to reduce packaging volumes. Amazon claims to have reduced the weight of packaging per shipment by 38 percent, eliminating 1.5 million tons of packaging material since 2015. This likely has resulted in a reduction in the weight of recyclable material although quantifying the difference at this point is not known.

**Pandemic Impacts.** The Fibre Box Association reports that corrugated box production reached a record level in 2020, up 3.4 percent from 2019, then another increase of about 6 percent from 2020 to 2021, but shipments fell by nearly four percent in 2022 and were back to more normal levels. The American Forest & Paper Association also reported total containerboard production in 2021 increased 5.6 percent compared to 2020, the 9th year-over-year increase in the previous 10 years. However, in 2022, production decreased by 5 percent when compared to 2021. These organizations have attributed the 2022 declines to homeowner activity. Homebuilders and homeowners during the Covid-19 pandemic created an increased demand for home improvements, goods and appliances, much of which was packaged and shipped to contractors and buyers. Since the pandemic has lessened, consumers are now returning to more normal buying practices, and spending more time traveling, on vacations, and dining out. However, the recycling rate decrease in Sioux Falls began in 2019, indicating that other factors may have off-set the impacts of the pandemic to some extent.

**Change in Plastic Bag Recycling.** The Task Force discussed public confusion regarding the decision in 2019 by Millenium Recycling to stop accepting plastic bags. Some haulers have indicated this change might have contributed to a decline in the recycling rate because people could no longer conveniently bag their recyclables. However, recyclable materials were never allowed to be bagged. Plastic bags were accepted as a single-stream category before 2019, but they had a minimal impact on the recycling tonnage. Therefore, the decision to not accept plastic bags likely had negligible impact on the rate. Nevertheless, confusion among haulers and their customers about the change may have contributed to higher contamination rates.

## VII. RECYCLING ORDINANCES

As noted earlier, Sioux Falls City Ordinance, Chapter 57 – Garbage and Recycling, establishes the City’s solid waste management and recycling requirements. As part of its discussions, the Task Force noted that the City of Sioux Falls utilizes a unique, three-part approach to enforcement of solid waste management and recycling: 1) the City owns and operates the regional landfill and regulates waste brought to it, 2) a private single-stream recycling MRF determines which materials are accepted and the level of contamination allowed, and 3) private haulers are responsible to work with customers to ensure recyclables are separated from MSW.

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<sup>13</sup> Environmental Protection Agency. *Guide to the Facts and Figures Report about Materials, Waste and Recycling*. <https://www.epa.gov/facts-and-figures-about-materials-waste-and-recycling/guide-facts-and-figures-report-about#Sections>

While this approach may have merit, it is not commonly employed by other communities in the state and region. The Task Force also noted that the City's unique approach to solid waste management and recycling can pose challenges for back-end enforcement at the SFRSL. While the City has the authority to reject hauler loads that contain recycled material, this is impractical since there are no other options for the disposal of the load. Effectively monitoring the loads and identifying recyclable materials also relies on landfill staff to randomly inspect loads that contain prohibited materials, which can be difficult and inefficient. Furthermore, the front-end enforcement places the burden of compliance on private haulers, who may not have the resources or expertise to effectively enforce City recycling requirements.

That said, the Task Force finds that the penalties on private haulers operating in Sioux Falls for missing annual recycling goals have been minimal.<sup>14</sup> The Task Force recognizes that some haulers have made considerable efforts to educate their customers and promote recycling. It should also be noted some haulers have focused more on doing business with customers who can contribute significantly to meeting their required recycling percentages. The Task Force recognizes that private haulers incur real costs in complying with the City's recycling ordinances, while non-compliance imposes a cost on a private MRF.

The Task Force conducted a high-level review of Chapter 57 and identified a number of provisions that warrant further review. The Task Force did not attempt to develop specific revisions. Rather, the Task Force recognizes that further review is warranted and there is a need to reach out to additional stakeholders for their input before recommending any possible revisions.

A few examples of the Ordinance provisions identified by the Task Force follows.

#### **Ordinance 57.029 – Apartment Garbage and Recycling Service**

This provision requires the owner of an apartment building to provide recycling containers in a location that is convenient for the deposit and collection of recyclable material. Further, owners must provide written recycling program information to building tenants at the time of leasing and annually thereafter, as well as post such information annually in a conspicuous place for all residents.

*Discussion:* The Task Force recognizes there is a wide variety of apartment buildings in the City in terms of age, number of apartment units, ownership, maintenance, etc. Thus, what constitutes a convenient location for garbage and recyclable material dumpsters will vary. The Task Force discussed issues associated with container distances to resident buildings, container capacity requirements, and hauler access to containers at large-scale, multi-building apartment complexes. The Task Force did not develop any specific revisions to the Ordinance and instead the Task Force will work with the Solid Waste Planning Board's multi-housing representative to seek input from the multi-housing community.

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<sup>14</sup> From 2017 to 2021, four haulers failed to meet the 80% requirement in 2019. In each of the other years during this same period, only one hauler failed to meet the 80% requirement. Total surcharges for not meeting the requirement in 2019 amounted to about \$3,571. From 2016 to 2021, only two haulers failed to meet the 80% requirement for two consecutive years and only one hauler failed to meet the requirement for three years in a row.

### **Ordinance 57.032 – Solid Waste Containing Recyclable Materials**

This provision prohibits haulers from collecting garbage that contains visible recyclable materials, requires the hauler to leave a note to the customer explaining why the waste was not collected, and requires residents and businesses to remove the recyclable materials before the hauler can collect the solid waste.

*Discussion:* The Task Force agreed that this type of front-end enforcement is unrealistic, and it is currently not being followed. Haulers have indicated that garbage containing visible recyclable material is an everyday occurrence. This Ordinance puts haulers in the position of having to deny service to customers that are being charged for such service. The Task Force discussed two options: 1) deleting the Ordinance in its entirety, and 2) shifting the focus of the Ordinance from contaminated trash to contaminated recycling. Rather than prohibiting a hauler from collecting contaminated trash, a modified Ordinance could require that the hauler provide the customer with a note about the recycling behavior to correct and information about best recycling practices. This approach would allow haulers to continue servicing their customers, while also providing customers with valuable feedback on their recycling efforts. Currently, it is likely some customers are unaware their contaminated recyclables must be hauled to the landfill rather than recycled.

### **Ordinance 57.081 – Recycling Goal and Standard**

This provision requires all haulers to annually achieve the standard of at least 80 percent of the City's recycling goal and directs the City's sustainability coordinator to calculate the recycling goal each year by using the data from the previous year.

*Discussion:* Based on this ordinance, each year's recycling goal is selected based on the recycling rate from the previous year. Based on the method, the goal for the following year drops when the rate drops. For example, in 2020 the recycling goal was 22.5 percent but the actual rate was 22.1 percent. Thus, the 2021 goal dropped to 22.1 percent. The Task Force looked at the rate methodology used by other communities to possibly find a better approach. However, it became evident that such a comparison was not useful because of the differences in the recycling programs of other communities. Additionally, many communities do not track recycling at all and most do not show rates as Sioux Falls does. One Task Force member provided recycling percentages in other communities they haul in and they were less than Sioux Falls' rate.

The Task Force discussed the challenging nature of the current methodology that is based on weight and that it can fluctuate with increased MSW per capita or an increase in the trend toward digital and paperless products. However, the Task Force did not have alternative options that would continue to hold parties accountable to recycle. The Task Force then discussed establishing a minimum floor (goal) or overall program performance standards but came to no resolution on the matter. The Task Force agreed further discussion is needed to promote increased recycling and to prevent complacency if the recycling rate continues to decline.

## **VIII. RECOMMENDATIONS TO IMPROVE RECYCLING**

Within the range of stakeholders on the Task Force, various opinions existed on how to improve recycling. On several issues disagreements on the problem and approach occurred. This

speaks to the complexity of addressing recycling while operating within the City of Sioux Falls current system. However, there was a consensus reached on the following:

- Improving resident knowledge and awareness through public education and outreach is needed.
- Better understanding and support is needed to resolve the recycling challenges facing the multi-housing and commercial entities.
- City government can take additional steps to enhance recycling efforts.

Short-term actions planned for the next 1-2 years will focus on these areas of consensus, in addition to reviewing and providing recommendations for ordinance revisions that could improve recycling. See Table 4.

In addition, the Task Force recommends exploring long-term opportunities that require additional time, study, and financial investment but could support additional recycling improvements. These actions include:

- Addressing key SFRSL operational issues,
- Providing incentives for innovative recycling demonstration projects, and
- Examining fundamental governance/business models.

**Table 4. Recommendations to Improve Recycling**

Improve and expand education, outreach, communication, and technical assistance	
<ul style="list-style-type: none"> <li>• Align educational materials from City and Millennium Recycling, and encourage haulers to distribute aligned materials</li> <li>• Continue to promote recycling via City, Millennium, and BINfluencers channels, including marketing campaigns, social media, radio, flyers, bin stickers, emphasizing materials seeing increase at landfill</li> <li>• Work with multi-housing representatives to understand and address recycling challenges at multi-housing locations</li> <li>• Work with commercial business representatives to understand and address recycling challenges at various locations</li> <li>• Collaborate with recycling partners to:               <ul style="list-style-type: none"> <li>○ Develop a comprehensive waste directory tool that will include a website and mobile app</li> <li>○ Create a waste diversion education trailer that will be brought to events for community education</li> <li>○ Provide community presentations on recycling and waste diversion</li> <li>○ Perform waste assessments and technical assistance</li> </ul> </li> </ul>	2023-2024



Boost City of Sioux Falls recycling efforts	
<ul style="list-style-type: none"> <li>• Post updated recycling guides at City facilities</li> <li>• Pilot bagless commercial recycling to better understand benefits and challenges</li> <li>• Communicate recycling reminders and information to City staff</li> <li>• Hold quarterly meetings with Millennium Recycling</li> <li>• Utilize new waste diversion budget to expand education, including collaboration with BINfluencers to expand education, and perform waste assessments and targeted outreach</li> </ul>	2023-2024
Review ordinances and recommend changes that better support recycling	
<ul style="list-style-type: none"> <li>• Review Chapter 57 ordinances and provide recommendations on revisions that could better support recycling, including but not limited to incentives, disincentives, fees, and recycling goal methodology <ul style="list-style-type: none"> <li>○ For example, work with developers, the multi-housing community, and waste haulers on design options/layouts for more efficient and effective location and use of recycling containers</li> </ul> </li> </ul>	2023-2025
Other opportunities to explore	
<ul style="list-style-type: none"> <li>• Explore a feasibility study on a transfer station or MRF at the landfill</li> <li>• Explore utilizing statistically valid surveys to assess recycling attitudes, behaviors, drivers, and constraints</li> <li>• Explore demonstration projects for challenge generators (e.g., multi-housing, commercial, schools)</li> </ul>	



# Solid Waste Characterization Study

City of Sioux Falls, South Dakota

July 7, 2023

## Final Report





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## Appendices

Appendix A: Waste Material Category Definitions

Appendix B: 2022/2023 Waste Sort Data

Appendix C: 2022/2023 Photograph Log



## Acronyms

City	City of Sioux Falls, SD
C&D	Construction and Demolition
DOC	Department of Corrections
E-waste	Electronic Waste
HDR	HDR Engineering, Inc.
HHW	Household Hazardous Waste
ICI	Industrial/Commercial/Institutional
MRF	Materials Recovery Facility
PPE	Personal Protective Equipment
SFRSL	Sioux Falls Regional Sanitary Landfill
Study	Waste Characterization Study

# 1 Introduction

## 1.1 Objectives

HDR Engineering Inc. (HDR) was hired by the City of Sioux Falls, SD (City) to conduct a two-season Waste Characterization Study (Study) of the municipal solid waste (MSW) stream received at the Sioux Falls Regional Sanitary Landfill (SFRSL) located at 26750 464<sup>th</sup> Avenue in Hartford, SD. The SFRSL receives waste from a five-county area near Sioux Falls, SD. The waste is collected from residents and businesses and transported to the SFRSL by private haulers. This Study included visual characterization of a limited number of incoming construction and demolition (C&D) debris loads to the SFRSL during the Study period. The first season of the two-season Study was conducted October 17-21, 2022. The second season was conducted May 1-5, 2023. This final report provides a summary of the data obtained during the two-season Study, compares the data from the first event (October 2022) to the second event (May 2023), and compares the most recent data collected to historical waste studies conducted at the site in 2016 and 2006.

The primary objective of the two-season Study is to provide the City with representative composition data for the MSW delivered to the SFRSL. This data can be used to make future changes to the SFRSL solid waste management and recovery programs. Each load of MSW collected and sorted were identified by landfill staff as one of the following generator types:

- Residential (including single-family and multi-family)
- Industrial/commercial/institutional (ICI); and
- Mixed loads (combination of residential and commercial waste).

Because the primary focus of this Study was on the MSW stream, the Study excluded loads that could be clearly identified as composed of non-MSW, such as C&D debris, special wastes (e.g., contaminated soil, appliances, scrap metal, electronics, or dead animals), yard waste, or other industrial process wastes. A limited number of vehicles exclusively hauling C&D were visually assessed to determine the general composition but were not sorted and weighed.

The results of this waste characterization will allow the City to:

- Identify the types and quantities of potentially recyclable and compostable materials in the MSW stream;
- Gather data on the solid waste streams received at SFRSL that can be used to evaluate and potentially improve existing and future waste management and recovery programs;
- Compare 2006 and 2016 waste characterization results to the 2022/2023 study results to identify changes in the composition of disposed waste over the last 16 years; and
- Identify the types and estimated volume of C&D materials received at the landfill to obtain a general overview regarding the C&D loads arriving at SFRSL.

## 1.2 Existing Disposal Programs

To facilitate sustainable waste management in Sioux Falls, the City has banned certain materials from being disposed of as waste in the landfill and has programs in place to assist with proper waste disposal. It is mandatory for all businesses and residential units, including apartments, to recycle items such as plastics, metal containers, paper, and cardboard. Additional items, such as hazardous materials, electronics, appliances, pharmaceuticals, sharps/needles, wood pallets, Christmas trees, and scrap metal should not be disposed in the landfill and instead properly managed using drop-off sites located within Sioux Falls or at the citizens drop-off area located at the SFRSL. These drop-off locations recycle, beneficially reuse or otherwise properly manage these materials rather than bury them in the landfill. The City provides information on resources for alternative waste disposal, recycling, and donation options in the area. This information can be found on their website: <https://www.siouxfalls.org/public-works/environmental-recycling-hazardous/hhwf>.

A Household Hazardous Waste (HHW) drop-off is available at 1015 E. Chambers Street in Sioux Falls for materials that can be harmful to human health and environment unless properly disposed of. The HHW drop-off also accepts electronics. Examples of products accepted include antifreeze, pool chemicals, used motor oil, and aerosol cans.

SFRSL offers appliance recycling at SFRSL for items such as stoves, refrigerators, and freezers. In addition, there are recycling locations onsite for scrap metal, tires, snow blowers, and lawn mowers. Green waste composting is available at SFRSL for yard waste such as grass, leaves, and plant cuttings. Branches, wood, and wood pallets are required to be separated out from general yard waste and placed in a separate designated area where it is turned into mulch. Finished compost is available to residents free of charge. During the fall season and after some large storm events, additional drop-off sites are added to collect leaves and branches.

## 2 Methodology

### 2.1 Determination of Material Categories and Definitions

Material categories selected for this Study were initially based on categories included in the 2006 and 2016 waste characterization studies, which were updated based on discussions with City staff and Millennium Recycling Inc. (Millennium). Millennium is a regional single stream materials recovery facility (MRF) located at 305 East 50<sup>th</sup> Street N, Sioux Falls, SD. Incorporating Millennium's recycling categories allowed for identification of materials in the incoming waste that could be diverted through recycling. Millennium's recycling categories include mixed paper; cardboard; cartons; plastic bottles, tubs, and jugs; metal cans; and glass jars and bottles<sup>1</sup>. Similarity in categories between the 2006, 2016, and 2022/2023 studies allows for direct comparisons of results, while the changes in 2022/2023 allows for evaluation of recyclable materials accepted at Millennium's MRF.

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<sup>1</sup> <https://www.millenniumrecycling.com/singlestream/>

A total of 41 material categories were selected for the MSW characterization study. Refer to **Section 2.4** for a complete list of the 41 categories. An overview of changes to some of the material categories from the 2006 and 2016 studies included the following:

- The paper category was divided into five subcategories based on Millennium’s sorting process (mixed recyclable paper; cartons/aseptic containers; cardboard & brown paper; low-grade [compostable]; and food service [non-recyclable]).
- The plastics category was divided into six subcategories based on Millennium’s sorting process (bottles, tubs, and jugs; single use/to-go plastics; rigid plastics; non-recyclable/mixed-media plastics; films/bags; and polystyrene).
- Glass was condensed to two subcategories, regardless of color (glass bottles/jars & non-container glass).
- The electronic waste (E-waste) category was divided into “battery containing devices” and “non-battery containing devices” for the fire safety knowledge of the waste haulers, materials recovery facility, and SFRSL.
- The batteries category was divided into “lithium-based batteries” and “other batteries” for the fire safety knowledge of the waste haulers, materials recovery facility, and SFRSL.

## 2.2 Sampling Plan

### 2.2.1 Number of Samples

Conducting a successful waste characterization study requires obtaining a statistically significant number of samples. The number of samples to be sorted (i.e., number of vehicle loads consisting of 200 to 300 pounds) is a function of the waste components to be sorted and the desired precision as applied to each component. HDR utilized the ASTM D5231-92 (2016) Standard Test Method for Determination of the Composition of Unprocessed Municipal Solid Waste<sup>2</sup>. A minimum of 26 samples were required if food waste was used the governing component or a minimum of 50 samples were required if cardboard was as the governing component. This minimum number of samples were needed to determine the annualized percentage of MSW by material type in the loads arriving at the facility with 90 percent level of confidence and desired measurement precision of 10 percent. Forty samples were collected and sorted during each of the 2022/2023 events, which provide 90/10 if food waste is the governing component or 60/40 if cardboard is the governing component.

For the visual assessment done on the C&D loads, ten loads were selected, which is consistent with the amount selected for both the 2006 and 2016 studies. Evaluating ten loads throughout the week provided a general understanding of the type of materials observed from C&D loads.

### 2.2.2 Logistics

The Study was designed in general accordance with ASTM D5231-92 (2016) Standard Test Method for Determination of the Composition of Unprocessed Municipal Solid Waste to analyze randomly selected loads of incoming MSW materials delivered to the SFRSL. Sorting of MSW

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<sup>2</sup> <https://www.astm.org/d5231-92r16.html>



loads occurred at SFRSL inside of the maintenance building. C&D visual inspections occurred at the C&D drop-off area. Labor for the Study was secured by the City through the Department of Corrections (DOC) in partnership with the SFRSL as well as four full-time HDR staff. Two HDR staff members were designated as supervising project managers to coordinate with SFRSL staff, oversee operations, and maintain Study safety procedures. The other two HDR staff members oversaw sorting crews and checked all category bins for correct categorization.

### **2.2.3 Health and Safety**

HDR prepared a site-specific health and safety plan that was followed by HDR staff throughout the sorting events. HDR worked closely with the City to ensure safety within the designated sorting area and the C&D drop-off location. All HDR staff were given thorough safety instructions and acknowledged these instructions prior to sorting each day. All HDR staff and DOC sorting staff were provided with personal protective equipment (PPE) by the HDR field supervisors to ensure safety and proper sorting. PPE included Tyvek, nitrile gloves, cut resistant gloves, rubber gloves, and safety glasses. No injuries or emergencies occurred during the sorting events.

## **2.3 Sample Selection Procedure**

The October 2022 sorting event was conducted at the SFRSL beginning on Monday, October 17, 2022, and concluded on Friday, October 21, 2022. Over the course of the five-day sorting event, 40 total samples were sorted.

The May 2023 sorting event was conducted at the SFRSL beginning on Monday, May 1, 2023, and concluded on Friday, May 5, 2023. Over the course of the five-day sorting event, 40 total samples were sorted.

Each representative sample from a load had a target weight of between 200 and 300 pounds. During the duration of each sorting event, when a sample was needed by the sorting team, the next truck with MSW to enter the SFRSL was selected to be sorted. The driver was informed of the random sampling of their load and information on the load from the scale ticket was collected including total weight, waste hauler, vehicle type, date, and time. The truck was directed to dump their load at the active face as normal. After dumping, a loader was used at the active face to pick up a random portion of the load and then driven to the sorting location. The loader bucket was unloaded into 96-gallon carts. Carts were weighed and weights added together until the target weight (200 to 300 pounds) was achieved. Carts were labeled with their sample number and taken to the sorting team ready for the next sample or staged in an area of the building to be sorted by the next available team.

## **2.4 Sorting Procedure**

Residential, ICI, and mixed load waste was characterized Monday through Friday during the two-season sort. After a sample was acquired and placed in a cart for storage, the material was unloaded onto a tarp in stages and then transferred to the sorting tables to be manually sorted by the crew into the prescribed component categories under the supervision of the HDR staff. A clearly labeled plastic bin was used for each of the 41 categories. All 41 categories were explained to the sorting crew at the beginning of each day, and sorting activities were closely

monitored by HDR staff for the duration of the waste sort event to verify that materials were being sorted into the correct categories. The materials were sorted to particle size of 2-inches or less by hand, until no more than a small amount of homogenous fine material (“mixed residue”) remained. The layer of mixed 2-inch-minus material was allocated to the appropriate categories based on the best judgement of the supervising HDR staff. For example, the layer was classified as food scrap if most of the material appeared to be food residue, or the layer was classified as grit if most of the material appeared to be dirt, fines, or other undistinguishable solids. After sorting of the entire sample was complete, a supervising project manager recorded weights of all categories on the waste composition data sheet (electronic, cloud-based form), making note of the sample number. Once a material category was weighed and recorded, the designated bin was dumped into a roll-off dumpster that SFRSL staff emptied into the active face of the landfill for disposal.

The complete list of material categories used for this 2022/2023 Waste Characterization Study is provided below:

- Paper
  1. Mixed recyclable paper
  2. Cartons/aseptic containers
  3. Corrugated cardboard, single layer cardboard, and other brown paper
  4. Low-grade paper
  5. Food service paper
- Plastics
  6. Bottles, tubs, and jugs
  7. Single use/to-go plastics
  8. Rigid plastics
  9. Non-recyclable plastics
  10. Films/bags
  11. Polystyrene
- Metals
  12. Aluminum containers/cans
  13. Ferrous containers/cans
  14. Other ferrous metals
  15. Other non-ferrous metals
- Glass
  16. Glass bottles/jars
  17. Non-container glass
- Organics
  18. Yard waste
  19. Food waste
- Construction Debris
  20. C&D materials
  21. Carpet/padding
- E-Waste/Durables
  22. Battery-containing devices
  23. Non-battery-containing devices
  24. Lithium-based batteries
  25. Other batteries
  26. Appliances/white goods

- Household Hazardous Waste
  - 27. Automotive products
  - 28. Chemicals
  - 29. Mercury containing products
  - 30. Paint containers
  - 31. Other HHW
- Household Medical Waste
  - 32. Sharps
  - 33. Pharmaceuticals
  - 34. Diapers
  - 35. Medical waste
- Materials
  - 36. Tires and rubber
  - 37. Textiles/clothing
- Others
  - 38. Bulky items
  - 39. Dirt/fines
  - 40. Liquids
  - 41. All other garbage

A summary of the waste categories with definitions and examples of items included in the categories is provided in **Appendix A**.

At the conclusion of each sorting day, bins were visually inspected by a supervising project manager to ensure that no materials were left behind or containers were not broken. Sorting tables and containers remained in place for the duration of each sorting event. At the conclusion of the sorting events, equipment used in sorting was cleaned, broken down, and stored in a designated area of the maintenance facility. Hazardous materials, including lithium batteries, that were found throughout the week were left for proper disposal by SFRSL staff. Other disposable materials were placed in the roll-off and discarded at the active face of the landfill by SFRSL staff.

## 3 Analysis & Results for 2022/2023

### 3.1 Compilation & Analysis of Data

As data was entered into the electronic form during the Study, tare weights were automatically subtracted from the total weights for each category. Additionally, the total weight of the sample was automatically updated with each entry to confirm the sample weight was between the desired range of 200 to 300 pounds. Sample data was exported from the electronic form into Microsoft Excel for further analysis. Detailed information was included in the specially developed Microsoft Excel workbook including ticket number, waste hauler, truck number, truck type, and generator type for each sample.

Following each sorting event, HDR calculated the total weight of each category throughout the course of the event and divided it by the total weight of all the samples sorted (40 samples) to get a percentage of each category by weight. Results of this analysis for the waste sort events

are provided in **Section 3.3**. A complete table of the raw MSW stream data obtained during the waste sort events is provided in **Appendix B**.

Loads that were exclusively C&D consisted of visual inspections to estimate each category's percent by volume. The C&D inspections were combined to determine an estimated percent by volume for the combination of the load inspections for the October 2022 and May 2023 waste sorts. Results of the C&D visual inspections are provided in **Section 3.4**. A complete table of the raw C&D data obtained during the waste sorts is provided in **Appendix B**.

## 3.2 Limiting Factors

HDR weighed each load as it came in to check whether it hit the target weight of 200-300 pounds. Most of the loads were within the target weight range, but six over the course of the study were less than 200 pounds. In most cases, this was due to the presence of bulky or lightweight material that made staging and sorting 200 pounds impractical.

Three samples throughout the week during the October waste sort had a total weight less than 200 pounds due to the composition of materials. Sample #27, #34, and #37 each had a total weight under 200 pounds. Samples #27 and #37 contained mostly C&D material (large pieces of wood) and films. Sample #34 contained mostly cardboard and parts from an automotive shop.

Three samples throughout the week during the May waste sort had a total weight of less than 200 pounds due to the composition of materials. Sample #15, #21, and #31 each had a total weight under 200 pounds. Samples #21 and #31 were ICI loads that contained mostly films. Sample #15 contained primarily yard waste, films, and textiles.

The sorters also found that lightweight material, such as bags and film plastic, plastic bottles, mixed paper, and steel and aluminum cans, was often contaminated with food waste. As per the ASTM Standard, sorters attempted to remove contamination, but some of the materials, particularly films and mixed paper, may have had heavier measured weights due to food residue that could not be removed.

## 3.3 Overall MSW Composition

The composition from the 2022/2023 sorting event is shown in both tables and figures.

**Table 3-1** and **Table 3-2** show the composition found in each waste sort, and **Figure 3-1**, **Figure 3-2**, and **Figure 3-3** show the results visually.

The figures help visualize the data presented in the tables by showing how much of the total waste each material makes up. The material groups in **Figures 3-1** through **3-3** were based on their material types such as plastics, metals, glass, etc. rather than the ability to be recycled. This grouping was done to visualize the material types being disposed while maintaining the readability of the chart.

### 3.3.1 Overall MSW Composition – October 2022

Results from the October 2022 sorting event is provided in **Table 3-1**. Results are expressed in percentage by weight. To evaluate the overall composition of the MSW sampled, the materials



were first organized into groups based on the current availability to recycle. Materials accepted for recycling in the household single stream recycling carts at Millennium were categorized at the top of **Table 3-1**. Materials that should be disposed at the HHW drop-off site were also categorized in **Table 3-1**. The remaining materials were based on the material types such as other plastics, metals, glass, etc.

The percentages included in the table are calculated based on the total weight of each material (e.g., mixed recyclable paper) from all 40 samples divided by the total weight of all sorted material sampled in October 2022.

**Table 3-1 Overall Composition of MSW (% by weight) – October 2022**

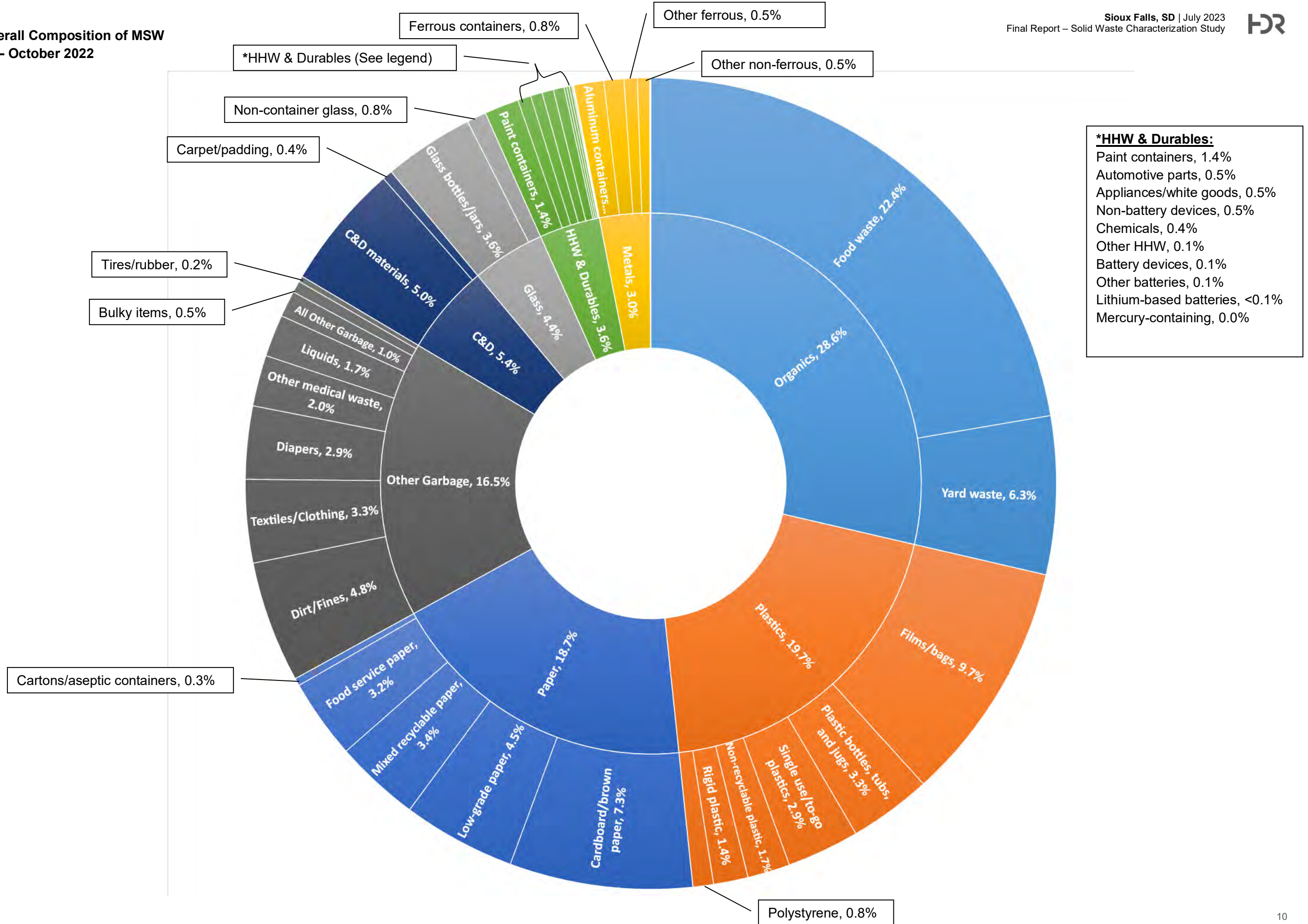
Material Group	Material	Total Weight (pounds)	Percentage of Total
Recyclable Paper	Mixed recyclable paper	332.8	3.4%
Recyclable Paper	Cartons/aseptic containers	27.9	0.3%
Recyclable Paper	Cardboard and brown paper	710.4	7.3%
Recyclable Plastic	Bottles, tubs, and jugs	320.8	3.3%
Recyclable Glass	Glass bottles/jars	348.4	3.6%
Recyclable Metal	Aluminum containers/cans	114.4	1.2%
Recyclable Metal	Ferrous containers/cans	76.4	0.8%
<b>Total - Recyclables</b>		<b>1,931.1</b>	<b>19.9%</b>
Compostable Organics	Yard waste	615.9	6.3%
<b>Total - Compostable Organics</b>		<b>615.9</b>	<b>6.3%</b>
Other Organics	Food waste	2,184.2	22.4%
<b>Total – Other Organics</b>		<b>2,184.2</b>	<b>22.4%</b>
Other Paper	Food service paper	311.1	3.2%
Other Paper	Low-grade paper	441.0	4.5%
<b>Total – Other Paper</b>		<b>752.1</b>	<b>7.7%</b>
Other Plastics	Single use/to-go plastics	282.6	2.9%
Other Plastics	Rigid plastic	134.6	1.4%
Other Plastics	Non-recyclable plastic	166.1	1.7%
Other Plastics	Films/bags	944.9	9.7%
Other Plastics	Polystyrene	80.0	0.8%
<b>Total – Other Plastics</b>		<b>1,608.2</b>	<b>16.5%</b>
Other Metals	Other ferrous metals	51.5	0.5%
Other Metals	Other non-ferrous metals	47.5	0.5%
<b>Total – Other Metals</b>		<b>99.0</b>	<b>1.0%</b>
Other Glass	Non-container glass	75.5	0.8%
<b>Total – Other Glass</b>		<b>75.5</b>	<b>0.8%</b>
HHW	Automotive products	51.5	0.5%
HHW	Chemicals	42.3	0.4%
HHW	Mercury containing products	4.8	0.0%
HHW	Paint containers	134.5	1.4%
HHW	Other HHW	10.0	0.1%
<b>Total – Household Hazardous Waste</b>		<b>243.1</b>	<b>2.4%</b>
Durables	Battery containing devices	10.0	0.1%
Durables	Non-battery containing devices	44.7	0.5%
Durables	Lithium based batteries	3.4	<0.1%
Durables	Other batteries	8.9	0.1%
Durables	Appliances/white goods	45.7	0.5%
<b>Total – E-Waste/Durables</b>		<b>112.7</b>	<b>1.20%</b>



Material Group	Material	Total Weight (pounds)	Percentage of Total
C&D	C&D materials	490.5	5.0%
C&D	Carpet/padding	39.4	0.4%
<b>Total – C&amp;D &amp; Bulky Items</b>		<b>576.0</b>	<b>5.9%</b>
Materials	Tires and rubber	22.7	0.2%
Materials	Textiles/clothing	324.3	3.3%
<b>Total – Materials</b>		<b>347.0</b>	<b>3.5%</b>
Household Medical Waste	Sharps	2.1	0.0%
Household Medical Waste	Pharmaceuticals	2.4	0.0%
<b>Total – Household Medical Waste</b>		<b>4.5</b>	<b>0.1%</b>
Other Medical/Bodily Fluids	Other medical waste	198.9	2.0%
Other Medical/Bodily Fluids	Diapers	284.1	2.9%
<b>Total – Other Medical Waste</b>		<b>483.0</b>	<b>4.9%</b>
Other Garbage	Bulky items	46.1	0.5%
Other Garbage	Dirt/fines	473.8	4.8%
Other Garbage	Liquids	164.3	1.7%
Other Garbage	All other garbage	102.1	1.0%
<b>Total – Other Garbage</b>		<b>786.3</b>	<b>8.0%</b>
<b>GRAND TOTAL</b>		<b>9,772.5</b>	<b>100%</b>



**Figure 3-1: Overall Composition of MSW (% by weight) – October 2022**





### 3.3.2 Overall MSW Composition – May 2023

Results from the May 2023 sorting event is provided in **Table 3-2** and **Figure 3-2**. Results are expressed in percentage by weight. To evaluate the overall composition of the MSW sampled, the materials were organized into groups based on the current availability to recycle.

The percentages included in the table are calculated based on the total weight of each material (e.g., mixed recyclable paper) from all 40 samples divided by the total weight of all sorted material sampled in May 2023.

**Table 3-2: Overall Composition of MSW (% by weight) – May 2023**

Material Group	Material	Total Weight (pounds)	Percentage of Total
Recyclable Paper	Mixed recyclable paper	406.6	4.0%
Recyclable Paper	Cartons/aseptic containers	73.1	0.7%
Recyclable Paper	Cardboard and brown paper	662.1	6.6%
Recyclable Plastic	Bottles, tubs, and jugs	300.0	3.0%
Recyclable Glass	Glass bottles/jars	244.4	2.4%
Recyclable Metal	Aluminum containers/cans	108.5	1.1%
Recyclable Metal	Ferrous containers/cans	106.4	1.1%
<b>Total - Recyclables</b>		<b>1,901.1</b>	<b>18.9%</b>
Compostable Organics	Yard waste	556.5	5.5%
<b>Total - Compostable Organics</b>		<b>556.5</b>	<b>5.5%</b>
Other Organics	Food waste	1,423.8	14.1%
<b>Total – Other Organics</b>		<b>1,423.8</b>	<b>14.1%</b>
Other Paper	Food service paper	400.3	4.0%
Other Paper	Low-grade paper	503.8	5.0%
<b>Total – Other Paper</b>		<b>904.1</b>	<b>9.0%</b>
Other Plastics	Single use/to-go plastics	258.3	2.6%
Other Plastics	Rigid plastic	221.0	2.2%
Other Plastics	Non-recyclable plastic	91.9	0.9%
Other Plastics	Films/bags	950.0	9.4%
Other Plastics	Polystyrene	82.8	0.8%
<b>Total – Other Plastics</b>		<b>1,604.0</b>	<b>15.9%</b>
Other Metals	Other ferrous metals	130.1	1.3%
Other Metals	Other non-ferrous metals	82.3	0.8%
<b>Total – Other Metals</b>		<b>212.4</b>	<b>2.1%</b>
Other Glass	Non-container glass	46.4	0.5%
<b>Total – Other Glass</b>		<b>46.4</b>	<b>0.5%</b>
HHW	Automotive products	43.7	0.4%
HHW	Chemicals	4.4	<0.1%
HHW	Mercury containing products	0.2	<0.1%
HHW	Paint containers	22.9	0.2%
HHW	Other HHW	1.1	<0.1%
<b>Total – Household Hazardous Waste</b>		<b>72.3</b>	<b>0.7%</b>

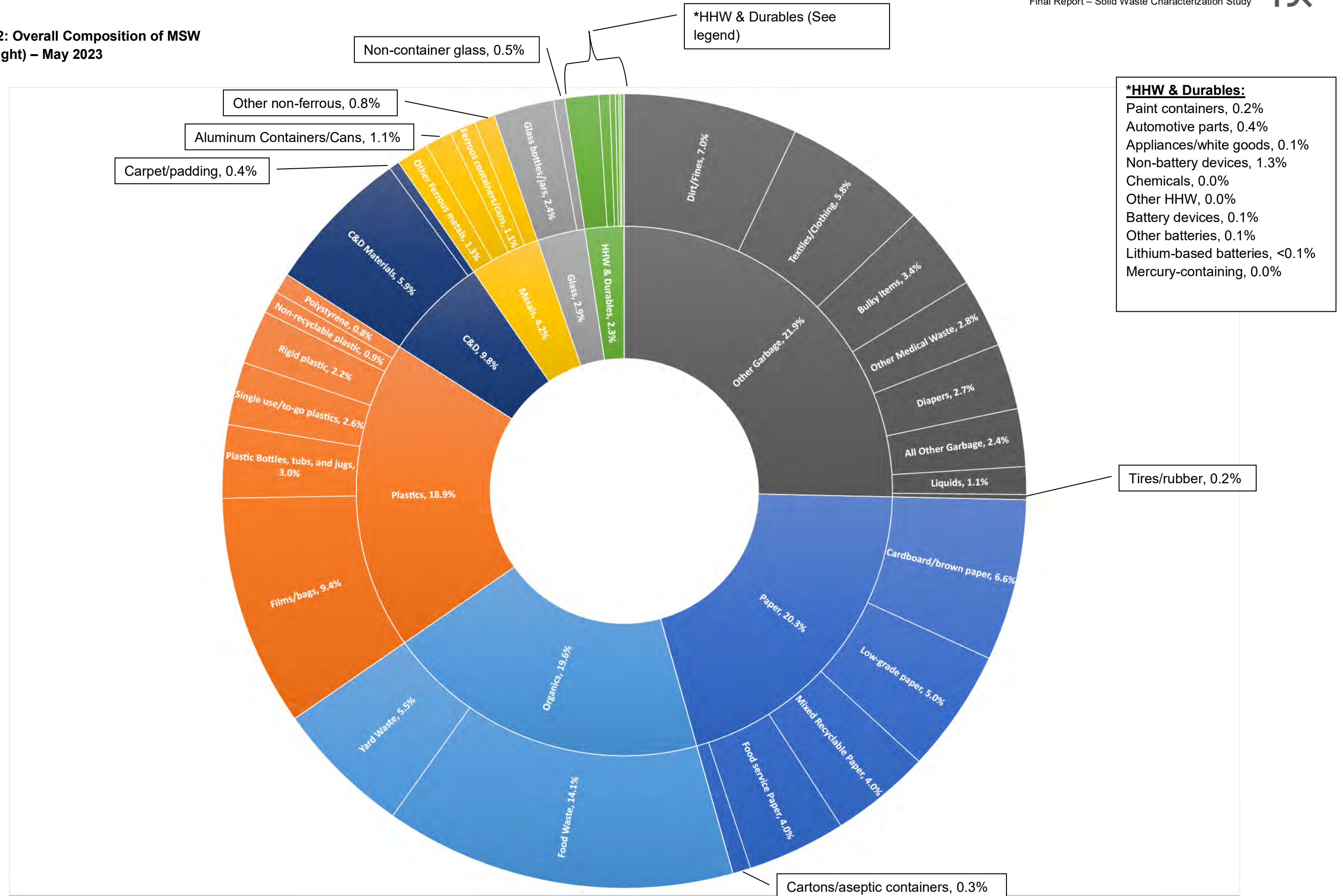




Material Group	Material	Total Weight (pounds)	Percentage of Total
Durables	Battery containing devices	7.6	0.1%
Durables	Non-battery containing devices	136.1	1.3%
Durables	Lithium based batteries	0.3	<0.1%
Durables	Other batteries	6.4	0.1%
Durables	Appliances/white goods	13.8	0.1%
<b>Total – E-Waste/Durables</b>		<b>164.2</b>	<b>1.6%</b>
C&D	C&D materials	597.1	5.9%
C&D	Carpet/padding	42.0	0.4%
<b>Total – C&amp;D &amp; Bulky Items</b>		<b>639.1</b>	<b>6.3%</b>
Materials	Tires and rubber	21.4	0.2%
Materials	Textiles/clothing	583.9	5.8%
<b>Total – Materials</b>		<b>605.3</b>	<b>6.0%</b>
Household Medical Waste	Sharps	0.4	<0.1%
Household Medical Waste	Pharmaceuticals	1.8	<0.1%
<b>Total – Household Medical Waste</b>		<b>2.2</b>	<b>&lt;0.1%</b>
Other Medical/Bodily Fluids	Other medical waste	282.4	2.8%
Other Medical/Bodily Fluids	Diapers	268.8	2.7%
<b>Total – Other Medical Waste</b>		<b>551.2</b>	<b>5.5%</b>
Other Garbage	Bulky items	344.0	3.4%
Other Garbage	Dirt/fines	704.9	7.0%
Other Garbage	Liquids	113.4	1.1%
Other Garbage	All other garbage	237.0	2.4%
<b>Total – Other Garbage</b>		<b>1,399.3</b>	<b>13.9%</b>
<b>GRAND TOTAL</b>		<b>10,081.9</b>	<b>100%</b>



**Figure 3-2: Overall Composition of MSW  
(% by weight) – May 2023**





### 3.3.3 Overall MSW Composition – 2022/2023

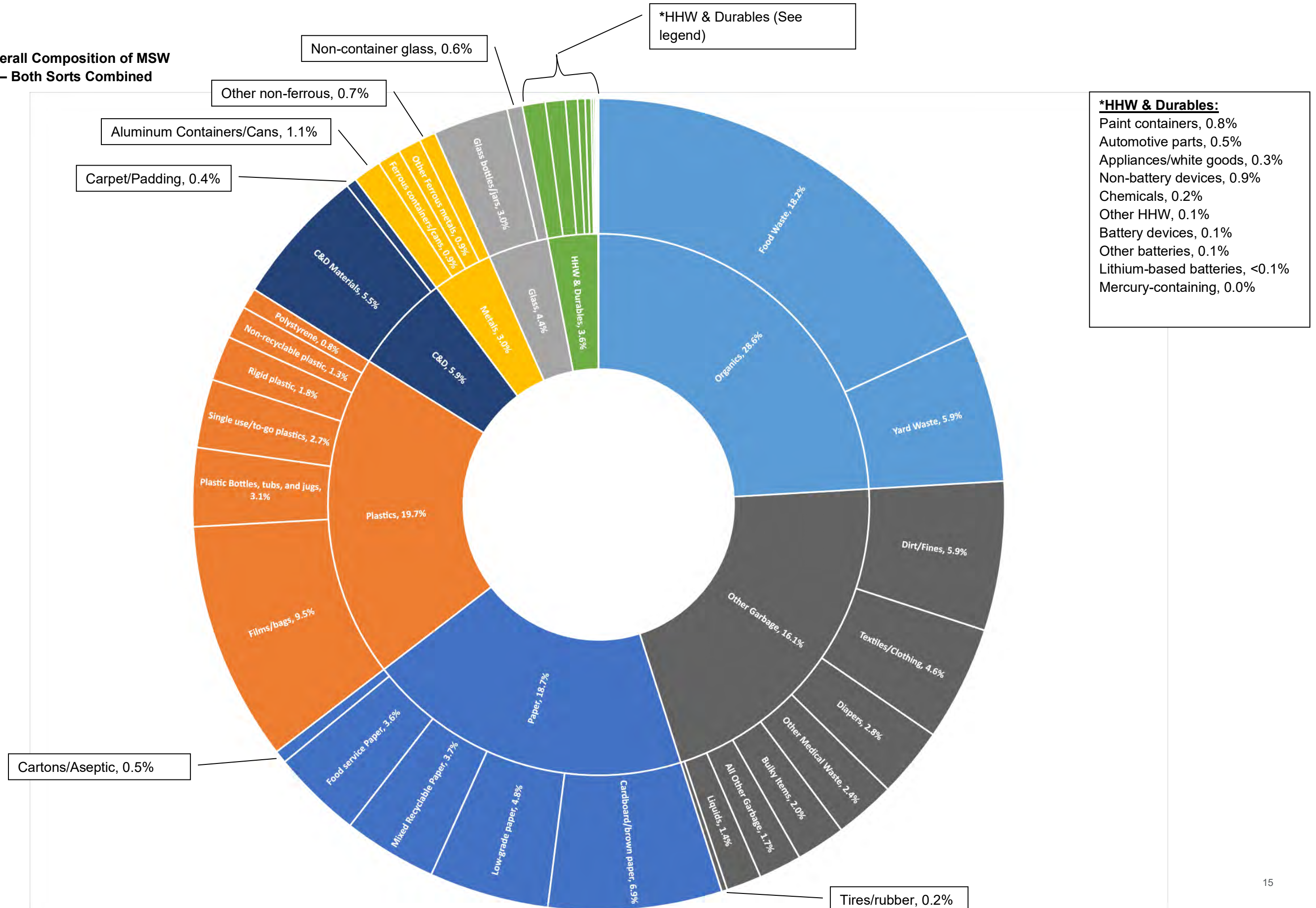
The overall composition of the 2023/2023 waste sort is shown in **Figure 3-3** below. There was some variation between the October 2022 and May 2023 sort due to the wide variety of material in MSW. However, there were patterns in the most abundant materials found in the waste stream in October and May. During both sorting events, food waste made up the largest fraction of the waste by weight, followed by plastic bags and films. The largest material categories for each sort were ranked and is included in **Table 3-3** below.

**Table 3-3: Material Rankings for 2022/2023 Study (% by weight)**

Ranking	October 2022		May 2023	
	Material Type	Percent	Material Type	Percent
1	Food Waste	22.4%	Food Waste	14.1%
2	Films/bags	9.7%	Films/bags	9.4%
3	Cardboard/brown paper	7.3%	Dirt/Fines	6.6%
4	Yard Waste	6.3%	Cardboard/brown paper	5.5%
5	C&D Materials	5.0%	C&D Materials	5.9%
6	Liquids	4.8%	Textiles/Clothing	1.1%
7	Low-grade paper	4.5%	Yard Waste	5.0%
8	Glass bottles/jars	3.6%	Low-grade paper	2.4%
9	Mixed Recyclable Paper	3.4%	Mixed Recyclable Paper	4.0%
10	All Other Garbage	3.3%	Food service Paper	14.1%

As shown in the table, food waste, bags and film, cardboard, yard waste, C&D materials, low-grade paper, and mixed recyclable paper made up seven of the top ten materials in both studies. This indicates that the data collected during the Study period shows a consistent pattern, and that the results provide a clear picture of which materials are most prevalent in the waste stream. As discussed in more detail in **Section 5.1**, many of the materials found in large quantities in the MSW stream are currently recyclable using the City’s existing programs or could potentially be diverted.

**Figure 3-3: Overall Composition of MSW  
 (% by weight) – Both Sorts Combined**





### 3.3.4 Comparison by Load Type – May 2023

The data for the May 2023 sort was evaluated based on the type of load. The truck driver for each selected load reported to landfill staff whether the load was residential, mixed, or ICI, and the information was recorded. This information was not included in the October 2022 sorting event.

Residential loads had a larger proportion of food waste (20.2%) than mixed loads (11.6%) and ICI loads (7.2%). Food waste was still the most abundant material in the mixed loads, but materials such as cardboard and bags and films were more abundant in mixed loads compared to residential loads. The most abundant material categories in ICI loads were bags and films (13.0%), C&D material (10.8%), food waste (7.2%), and cardboard (7.0%). The high percentage of films in the ICI load may be partially due to two loads, Load #31 (41.4% bags and films) and Load #21 (24.8%). Load #31 had a large quantity of clean, unused plastic shipping bags that contributed to the high percentage of films. This may present an opportunity for the City to coordinate with local businesses that generate a large quantity of clean film to divert or recycle that material (see **Section 5**).

**Table 3-4: Composition of Residential, Mixed, and ICI Loads (% by weight) – May 2023**

Material Category	Average – All Loads	Average – Residential Loads	Average – Mixed Loads	Average – ICI Loads
Mixed Recyclable Paper	4.0%	3.7%	4.7%	3.5%
Cartons/Aseptic Containers	0.7%	0.4%	1.2%	0.5%
Cardboard	6.7%	4.0%	9.3%	7.0%
Plastic Bottles (#1-7)	2.9%	2.7%	3.4%	2.6%
Glass Bottles/Jars	2.3%	2.6%	2.5%	1.7%
Aluminum Beverage Containers/Cans	1.1%	0.8%	1.2%	1.3%
Ferrous Containers/Cans	1.0%	0.7%	0.8%	1.7%
<b>Total - Recyclables</b>	<b>18.7%</b>	<b>14.9%</b>	<b>23.1%</b>	<b>18.3%</b>
Yard Waste	5.5%	7.0%	2.8%	6.7%
<b>Total – Compostable Organics</b>	<b>5.5%</b>	<b>7.0%</b>	<b>2.8%</b>	<b>6.7%</b>
Food Waste	13.6%	20.2%	11.6%	7.2%
<b>Total – Other Organics</b>	<b>13.6%</b>	<b>20.2%</b>	<b>11.6%</b>	<b>7.2%</b>
Food Service Paper	3.9%	3.9%	4.5%	3.2%
Compostable (Low Grade) Paper	5.0%	5.7%	4.6%	4.7%
<b>Total – Other Paper</b>	<b>8.90%</b>	<b>9.60%</b>	<b>9.10%</b>	<b>7.90%</b>
Single-use Plastics	2.6%	3.1%	2.6%	1.8%
Rigid Plastic	2.5%	1.2%	2.8%	3.8%
Non-Recyclable Plastics	0.9%	1.0%	1.1%	0.5%
Film/Wrap/Bags	9.9%	8.3%	9.2%	13.0%
Polystyrene (Styrofoam)	1.0%	0.7%	0.7%	1.7%
<b>Total – Other Plastics</b>	<b>16.90%</b>	<b>14.30%</b>	<b>16.40%</b>	<b>20.80%</b>
Other Ferrous Metals	1.3%	1.2%	1.3%	1.6%



Material Category	Average – All Loads	Average – Residential Loads	Average – Mixed Loads	Average – ICI Loads
Other Non-Ferrous Metals	0.8%	0.8%	0.8%	1.0%
<b>Total – Other Metals</b>	<b>2.1%</b>	<b>2.0%</b>	<b>2.1%</b>	<b>2.6%</b>
Non-Container Glass	0.5%	0.5%	0.5%	0.3%
<b>Total – Other Glass</b>	<b>0.5%</b>	<b>0.5%</b>	<b>0.5%</b>	<b>0.3%</b>
Automotive Products	0.4%	0.4%	0.3%	0.6%
Chemicals	0.0%	0.0%	0.1%	0.0%
Mercury-Containing Products	0.0%	0.0%	0.0%	0.0%
Paint Containers	0.2%	0.2%	0.4%	0.0%
Other HHW	0.0%	0.0%	0.0%	0.0%
<b>Total – Household Hazardous Waste</b>	<b>0.2%</b>	<b>0.2%</b>	<b>0.5%</b>	<b>0.0%</b>
Battery-Containing Devices	0.1%	0.1%	0.1%	0.0%
Non-battery Containing Devices	1.4%	0.8%	2.9%	0.2%
Lithium Based Batteries	<0.1%	<0.1%	<0.1%	<0.1%
Other Batteries	0.1%	0.1%	0.0%	0.0%
Appliances/White Goods	0.1%	0.3%	0.1%	0.0%
<b>Total – E-Waste/Durables</b>	<b>1.6%</b>	<b>1.2%</b>	<b>3.0%</b>	<b>0.2%</b>
Construction and Demolition Materials	6.0%	2.5%	5.9%	10.8%
Carpet/Carpet Padding	0.4%	0.9%	0.0%	0.2%
<b>Total – C&amp;D &amp; Bulky Items</b>	<b>6.4%</b>	<b>3.4%</b>	<b>5.9%</b>	<b>11.0%</b>
Tires and Rubber	0.2%	0.0%	0.1%	0.6%
Textiles/Leather/Clothing	5.8%	8.4%	4.6%	3.9%
<b>Total – Materials</b>	<b>6.0%</b>	<b>8.4%</b>	<b>4.7%</b>	<b>4.5%</b>
Sharps	<0.1%	<0.1%	<0.1%	<0.1%
Pharmaceuticals	<0.1%	<0.1%	<0.1%	<0.1%
<b>Total – Household Medical Waste</b>	<b>&lt;0.1%</b>	<b>&lt;0.1%</b>	<b>&lt;0.1%</b>	<b>&lt;0.1%</b>
Other Medical Waste	3.0%	0.5%	2.8%	6.7%
Diapers	2.6%	3.9%	2.2%	1.3%
<b>Total – Other Medical Waste</b>	<b>5.6%</b>	<b>4.4%</b>	<b>5.0%</b>	<b>8.0%</b>
Bulky Items	3.0%	0.4%	6.4%	2.2%
Dirt/Fines	7.0%	9.6%	6.0%	4.6%
Liquids	1.1%	1.1%	0.9%	1.4%
All Other Garbage	2.4%	2.3%	1.5%	3.5%
<b>Total – Other Garbage</b>	<b>13.5%</b>	<b>13.4%</b>	<b>14.8%</b>	<b>11.7%</b>
<b>Total Sample %</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

### 3.4 Construction and Demolition Visual Inspections

In addition to characterizing the MSW stream of the SFRSL, this Study also included a visual C&D waste characterization of the C&D drop-off location. Visual inspections of C&D loads are the preferred approach as the weight and bulk of the materials involved makes physical sorting



challenging. Ten randomly selected loads throughout the duration of the sorting event were visually inspected, consistent with the amount selected for both the 2006 and 2016 studies. Once a selected load entered the C&D area, information about the waste hauler was gathered from the driver. They were then instructed to dump their load as normal.

A visual characterization was then performed by HDR staff to assess the estimated percent by volume of material types within the load. These estimations were recorded on individual data sheets for each selected load.

### 3.4.1 C&D Visual Inspections – October 2022

Individual load estimations were combined to determine an overall estimated percent by volume for all 10 loads (Table 3-5), representing the observed C&D waste stream.

**Table 3-5: C&D Estimated Composition (% by Volume) – October 2022**

Material Category	Estimated Percent by Volume
OCC (Cardboard)	25.5%
Wood (Treated)	22.0%
Wood (Non-Treated)	11.2%
Yard Waste	9.5%
Drywall/Gypsum	8.0%
Other -- Bags of Garbage, Tar Paper, Aluminum and Tin Cans, Insulation, Tires, Etc.	6.9%
Plastic- Other	6.2%
Carpet	5.2%
Plastic Film/Wrap/Bags	3.5%
Shingles	1.0%
Paper	0.5%
Durables - Electrical Appliances, Computers, TVs	0.1%
Concrete/Rubble/Bricks	0.1%
Metal	0.2%
Glass	0.1%
Food Waste	0.1%
<b>Total C&amp;D</b>	<b>100%</b>

### 3.4.2 C&D Visual Inspections – May 2023

Individual load estimations were combined to determine an overall estimated percent by volume for all 10 loads (Table 3-6), representing the observed C&D waste stream.



**Table 3-6: C&D Estimated Composition (% by Volume) – May 2023**

Material Category	Estimated Percent by Volume
OCC (Cardboard)	8.0%
Wood (Treated)	28.5%
Wood (Non-treated)	5.0%
Yard Waste	0.5%
Drywall/Gypsum	4.0%
Other -- Bags of Garbage, Tar Paper, Aluminum and Tin Cans, Insulation, Tires, Etc.	18.5%
Plastic - Other	7.5%
Carpet	0.5%
Plastic Film/Wrap/Bags	19.5%
Shingles	0.5%
Paper	1.5%
Durables - Electrical Appliances, Computers, TVs	1.5%
Concrete/Rubble/Bricks	0%
Metal	3.5%
Glass	0%
Food Waste	1.0%
<b>Total C&amp;D</b>	<b>100%</b>

**3.4.3 C&D Visual Inspections – Combined**

The results from each sorting event were combined for an overall 2022/2023 Study evaluation. Landfill policy does not allow for cardboard in C&D loads, but cardboard made up approximately 17% of the C&D loads evaluated during the study period. Treated wood was the largest quantity of material in the observed C&D loads, followed by cardboard. The results of the 2016 Study indicated that Other, Durables, and Treated Wood were the most common materials. The differences between the 2016 and 2022/2023 Study may be due to the differences in types of loads selected for each Study.

**Table 3-7: C&D Estimated Composition (% by Volume) – 2022/2023**

Material Category	Estimated Percent by Volume
OCC (Cardboard)	17.0%
Wood (Treated)	25.3%
Wood (Non-treated)	8.0%
Yard Waste	4.8%
Drywall/Gypsum	6.0%
Other -- Bags of Garbage, Tar Paper, Aluminum and Tin Cans, Insulation, Tires, Etc.	12.8%





Material Category	Estimated Percent by Volume
Plastic - Other	6.8%
Carpet	2.8%
Plastic Film/Wrap/Bags	11.8%
Shingles	0.8%
Paper	1.3%
Durables - Electrical Appliances, Computers, TVs	0.8%
Concrete/Rubble/Bricks	0.0%
Metal	1.8%
Glass	0.0%
Food Waste	0.5%
<b>Total C&amp;D</b>	<b>100%</b>

## 4 Comparison to 2006 & 2016 Study Results

To provide the City with an understanding of key changes observed between the 2006 and 2016 waste characterization study and the current (2022/2023) waste characterization study, HDR has developed the following table (**Table 3-8**) comparing the MSW composition observed in each respective study year (2006, 2016, & 2022/2023). Because some of the categories were changed from the historical studies to the current study, there were some assumptions that had to be made to compare the data across the three studies. The assumptions are included in **Table 3-8**.

Key changes observed in the MSW composition include:

- A notable decrease was observed in total paper in the MSW stream compared to 2022/2023 since 2016 (-5.2%) and 2006 (-10.6%).
- Recyclable plastics (bottles, tubs, and jugs) showed a slight decreased in 2022/2023 (-1.8%) compared to 2016 and 2006 (-0.2%). However, total plastics in the MSW stream in 2022 increased from 2016 (+3.3%) and 2006 (+4.4%).
- Food waste showed the largest increase compared to 2022/2023 since 2016 (+10.7%), with a smaller increase compared to 2006 (+1.9%).
- The largest decreases in 2022/2023, when compared to 2016, was observed in all other garbage (-7.5%) and grit/small fines (-5.9%). When compared to 2006, the largest decreases in 2022/2023 were observed in mixed paper (-11.5%) and C&D (-3.5%).



**Table 3-8: Comparison of MSW Composition (% by weight) to Historical Data**

Subcategory	2022/2023 Sort			Historical		Comparison		Assumptions
	May 2023	October 2022	Average 2022/2023 Sort	2016	2006	% Δ (2022/23-2016)	% Δ (2022/23-2006)	
Mixed recyclable paper	4.0%	3.4%	3.7%	7.5%	15.2%	-3.8%	-11.5%	
Cartons/aseptic containers	0.7%	0.3%	0.5%	N/A	N/A	+0.5%	+0.5%	Data was accounted for in other subcategories in 2016 & 2006.
Cardboard and other brown paper	6.6%	7.3%	6.9%	6.6%	5.8%	+0.3%	+1.1%	
Food service paper	4.0%	3.2%	3.6%	2.8%	2.7%	+0.8%	+0.9%	Non-Recyclable Paper
Low-grade paper	5.0%	4.5%	4.8%	7.8%	6.4%	-3.0%	-1.6%	Compostable Paper
<b>Total Paper</b>	<b>20.3%</b>	<b>18.7%</b>	<b>19.5%</b>	<b>24.7%</b>	<b>30.1%</b>	<b>-5.2%</b>	<b>-10.6%</b>	
Bottles, tubs, and jugs	3.0%	3.3%	3.1%	4.9%	3.3%	-1.8%	-0.2%	#1, #2, & Other plastic containers (2016 & 2006)
Single use/to-go plastics	2.6%	2.9%	2.7%	3.8%	5.0%	-1.1%	-2.3%	Other plastic products
Non-recyclable (mixed media) plastic	0.9%	1.7%	1.3%	N/A	N/A	+1.3%	+1.3%	Data was accounted for in other subcategories in 2016 & 2006.
Rigid plastic	2.2%	1.4%	1.8%	N/A	N/A	+1.8%	+1.8%	Data was accounted for in other subcategories in 2016 & 2006.
Polystyrene	0.8%	0.8%	0.8%	N/A	N/A	+0.8%	+0.8%	Data was accounted for in other subcategories in 2016 & 2006.
Films/bags	9.4%	9.7%	9.6%	7.3%	6.6%	+2.3%	+3.0%	
<b>Total Plastics</b>	<b>18.9%</b>	<b>19.8%</b>	<b>19.3%</b>	<b>16.0%</b>	<b>14.9%</b>	<b>+3.3%</b>	<b>+4.4%</b>	
Aluminum containers/cans	1.1%	1.2%	1.1%	0.9%	0.9%	+0.2%	+0.2%	
Ferrous containers/cans	1.1%	0.8%	0.9%	0.8%	0.7%	+0.1%	+0.2%	
Other ferrous metals	1.3%	0.5%	0.9%	0.9%	2.3%	+0.0%	-1.4%	
Other non-ferrous metals	0.8%	0.5%	0.7%	0.2%	0.5%	+0.5%	+0.2%	
<b>Total Metals</b>	<b>4.3%</b>	<b>3.0%</b>	<b>3.6%</b>	<b>2.8%</b>	<b>4.4%</b>	<b>+0.8%</b>	<b>-0.8%</b>	
Glass bottles/jars	2.4%	3.6%	3.0%	1.3%	2.9%	+1.7%	+0.1%	



Subcategory	2022/2023 Sort			Historical		Comparison		Assumptions
	May 2023	October 2022	Average 2022/2023 Sort	2016	2006	% Δ (2022/23-2016)	% Δ (2022/23-2006)	
Non-container glass	0.5%	0.8%	0.6%	0.3%	0.2%	+0.3%	+0.4%	
<b>Total Glass</b>	<b>2.9%</b>	<b>4.4%</b>	<b>3.6%</b>	<b>1.6%</b>	<b>3.1%</b>	<b>+2.0%</b>	<b>+0.5%</b>	
Yard waste	5.5%	6.3%	5.9%	3.9%	5.5%	+2.0%	+0.4%	Grass/Leaves & Brush/trees (2016 & 2006)
<b>Total Yard Waste</b>	<b>5.5%</b>	<b>6.3%</b>	<b>5.9%</b>	<b>3.9%</b>	<b>5.5%</b>	<b>+2.0%</b>	<b>+0.4%</b>	
Food waste	14.1%	22.4%	18.3%	7.6%	16.4%	+10.7%	+1.9%	
<b>Total Food Waste</b>	<b>14.1%</b>	<b>22.4%</b>	<b>18.3%</b>	<b>7.6%</b>	<b>16.4%</b>	<b>+10.7%</b>	<b>+1.9%</b>	
C&D materials	5.9%	5.0%	5.5%	8.2%	9.0%	-2.7%	-3.5%	Wood Waste & C&D Waste (2016 & 2006)
Carpet/padding	0.4%	0.4%	0.4%	N/A	N/A	+0.4%	+0.4%	Data was accounted for in other subcategories in 2016 & 2006.
<b>Total C&amp;D Waste</b>	<b>6.3%</b>	<b>5.4%</b>	<b>5.9%</b>	<b>8.2%</b>	<b>9.0%</b>	<b>-2.3%</b>	<b>-3.1%</b>	
Appliances/white goods	0.1%	0.5%	0.3%	2.0%	2.9%	-1.7%	-2.6%	
Battery containing devices	0.1%	0.1%	0.1%	0.0%	0.0%	+0.1%	+0.1%	
Non-battery containing devices	1.3%	0.5%	0.9%	0.5%	2.1%	+0.4%	-1.2%	
<b>Total E-Waste/Durables</b>	<b>1.5%</b>	<b>1.1%</b>	<b>1.3%</b>	<b>2.5%</b>	<b>5.0%</b>	<b>-1.2%</b>	<b>-3.7%</b>	
Textiles/clothing	5.8%	3.3%	4.5%	5.1%	2.7%	-0.6%	+1.8%	
<b>Total Textiles and Leathers</b>	<b>5.8%</b>	<b>3.3%</b>	<b>4.5%</b>	<b>5.1%</b>	<b>2.7%</b>	<b>-0.6%</b>	<b>+1.8%</b>	
Diapers	2.7%	2.9%	2.8%	2.7%	2.4%	+0.1%	+0.4%	
<b>Total Diapers</b>	<b>2.7%</b>	<b>2.9%</b>	<b>2.8%</b>	<b>2.7%</b>	<b>2.4%</b>	<b>+0.1%</b>	<b>+0.4%</b>	
Tires and rubber	0.2%	0.2%	0.2%	2.0%	0.6%	-1.8%	-0.4%	
<b>Total Tires &amp; Rubber</b>	<b>0.2%</b>	<b>0.2%</b>	<b>0.2%</b>	<b>2.0%</b>	<b>0.6%</b>	<b>-1.8%</b>	<b>-0.4%</b>	
Automotive products	0.4%	0.5%	0.5%	0.5%	0.2%	+0.0%	+0.3%	
Chemicals	<0.1%	0.4%	0.2%	1.1%	0.0%	-0.9%	0.2%	
Mercury containing	<0.1%	<0.1%	<0.1%	0.0%	0.0%	+0.0%	+0.0%	



Subcategory	2022/2023 Sort			Historical		Comparison		Assumptions
	May 2023	October 2022	Average 2022/2023 Sort	2016	2006	% Δ (2022/23-2016)	% Δ (2022/23-2006)	
<b>products</b>								
<b>Paint containers</b>	0.2%	1.4%	0.8%	N/A	N/A	+0.8%	+0.8%	Data was accounted for in other subcategories in 2016 & 2006.
<b>Other HHW</b>	<0.1%	0.1%	0.1%	0.2%	0.4%	-0.1%	-0.3%	
<b>Lithium based batteries</b>	<0.1%	<0.1%	<0.1%	0.0%	0.0%	+0.0%	+0.0%	Lead Acid Batteries (2016 & 2006)
<b>Other batteries</b>	0.1%	0.1%	0.1%	0.0%	0.1%	+0.1%	+0.0%	
<b>Total Household Hazardous Waste</b>	<b>0.8%</b>	<b>2.5%</b>	<b>1.7%</b>	<b>1.8%</b>	<b>0.7%</b>	<b>-0.1%</b>	<b>+1.0%</b>	
<b>Pharmaceuticals</b>	<0.1%	<0.1%	<0.1%	N/A	N/A	+0.0%	+0.0%	Not distinguishable in previous years
<b>Sharps</b>	<0.1%	<0.1%	<0.1%	0.1%	0.0%	-0.1%	0.0%	
<b>Total Pharmaceuticals &amp; Sharps</b>	<b>&lt;0.1%</b>	<b>&lt;0.1%</b>	<b>&lt;0.1%</b>	<b>0.1%</b>	<b>0.0%</b>	<b>-0.1%</b>	<b>0.0%</b>	
<b>Dirt/fines</b>	7.0%	4.8%	5.9%	11.8%	2.3%	-5.9%	3.6%	
<b>Total Fines/Super Mix</b>	<b>7.0%</b>	<b>4.8%</b>	<b>5.9%</b>	<b>11.8%</b>	<b>2.3%</b>	<b>-5.9%</b>	<b>3.6%</b>	
<b>Other medical waste</b>	2.8%	2.0%	2.4%	N/A	N/A	+2.4%	+2.4%	Data was accounted for in other subcategories in 2016 & 2006.
<b>Bulky items</b>	3.4%	0.5%	2.0%	N/A	N/A	+2.0%	+2.0%	Data was accounted for in other subcategories in 2016 & 2006.
<b>Liquids</b>	1.1%	1.7%	1.4%	N/A	N/A	+1.4%	+1.4%	Data was accounted for in other subcategories in 2016 & 2006.
<b>All other garbage</b>	2.4%	1.0%	1.7%	9.2%	2.9%	-7.5%	-1.2%	Data was accounted for in other subcategories in 2016 & 2006.
<b>Total Other Materials</b>	<b>9.7%</b>	<b>5.2%</b>	<b>7.5%</b>	<b>9.2%</b>	<b>2.9%</b>	<b>-1.7%</b>	<b>4.6%</b>	
<b>GRAND TOTAL</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>			

**Note:** N/A = indicates an assumption that data for this subcategory was accounted for in other subcategories during the 2016 and 2006 studies. The change in % weight was recorded as the 2022/2023 average value.



## 5 Key Findings and Recommendations

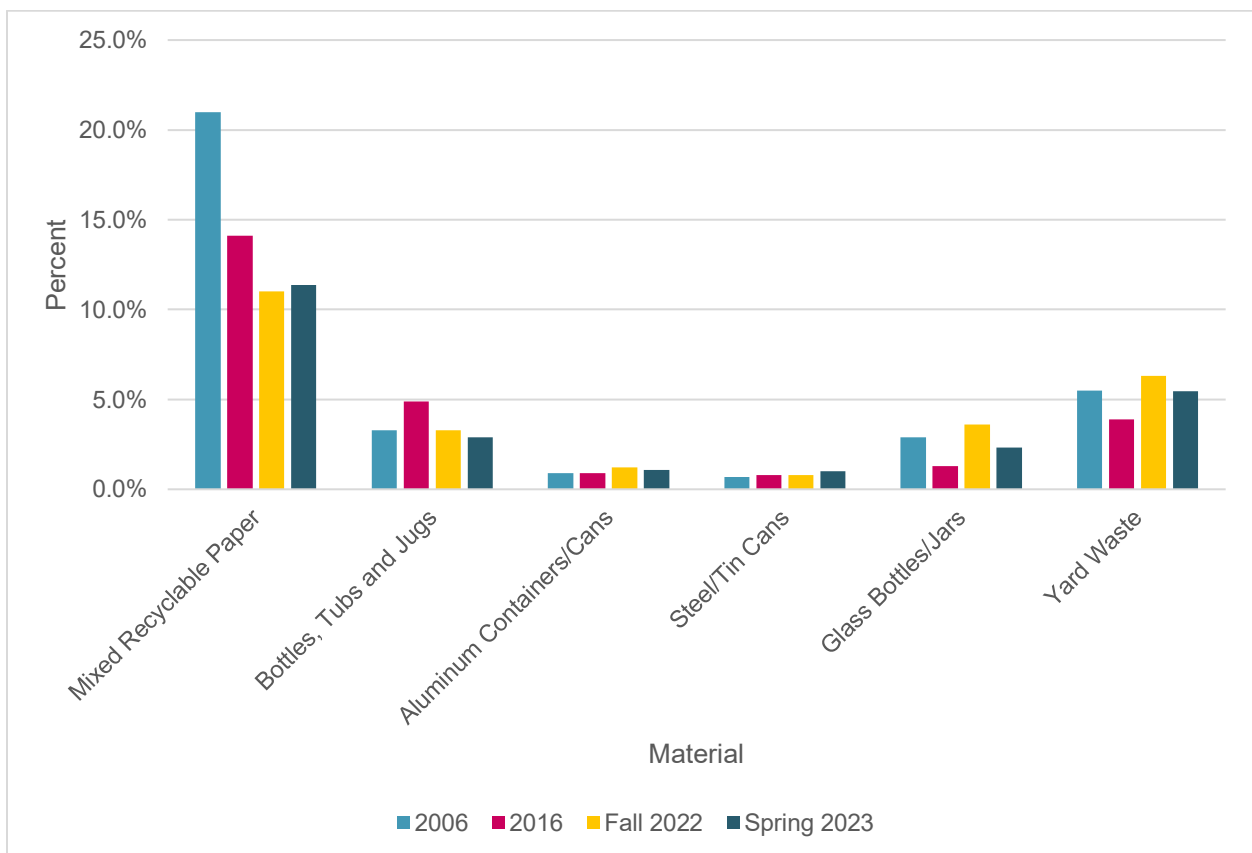
After sorting, separating, and tabulating nearly 20,000 pounds of MSW, the analyzed data provides the City of Sioux Falls an increased understanding of the materials received and being disposed at the SFRSL. This data can be used to drive decisions around future waste management strategies by identifying the waste streams with the highest potential for diversion from landfilling. **Food Waste** was the most predominant waste category, accounting for approximately 18.3% of the total waste sampled over the two seasons. **Plastic Bags and Film** was the second most abundant waste category with 9.6% of the total.

### 5.1 Potentially Recyclable or Divertible Materials

A large percentage of the material sorted during the Study (25%) was material that could have been disposed of using the City’s existing recycling infrastructure. Mixed recyclable paper, recyclable plastic, steel and aluminum cans, glass bottles and jars, and yard waste were all found in the MSW stream during the 2022/2023 Study. **Figure 3-4** shows material in the waste stream that could have been recycled in 2006, 2016, and 2022/2023.

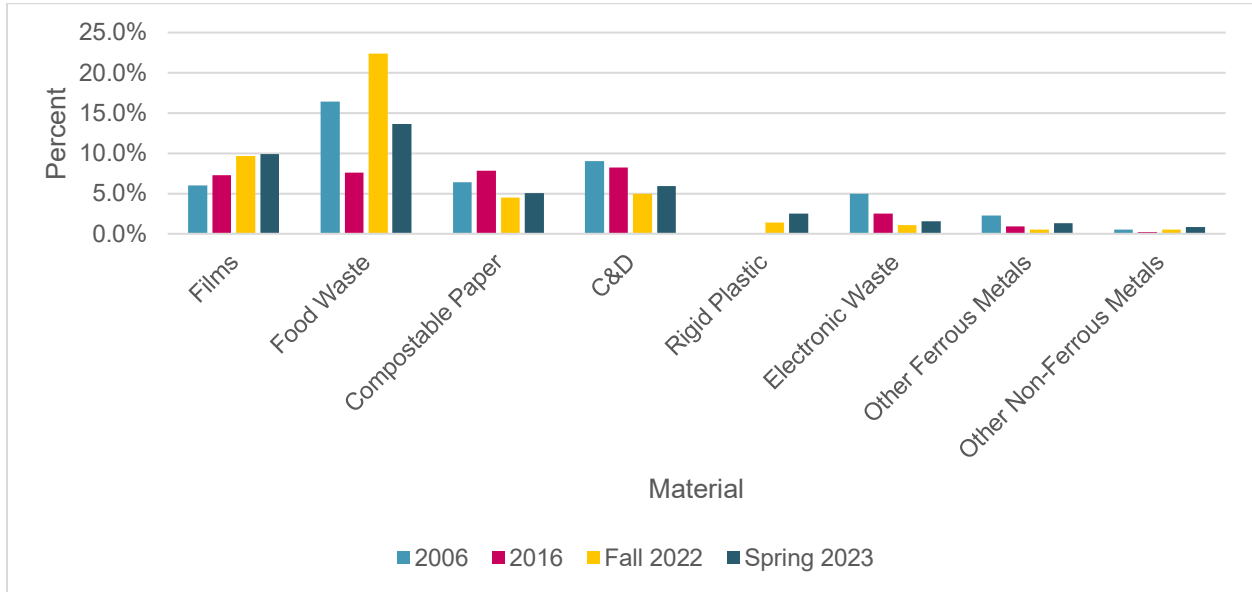
There was less mixed recyclable paper in the waste stream compared to 2006 and 2016. However, the other categories have remained relatively stable over the past fifteen years.

**Figure 3-4: Currently Recyclable Materials in Waste Stream (% by weight)**



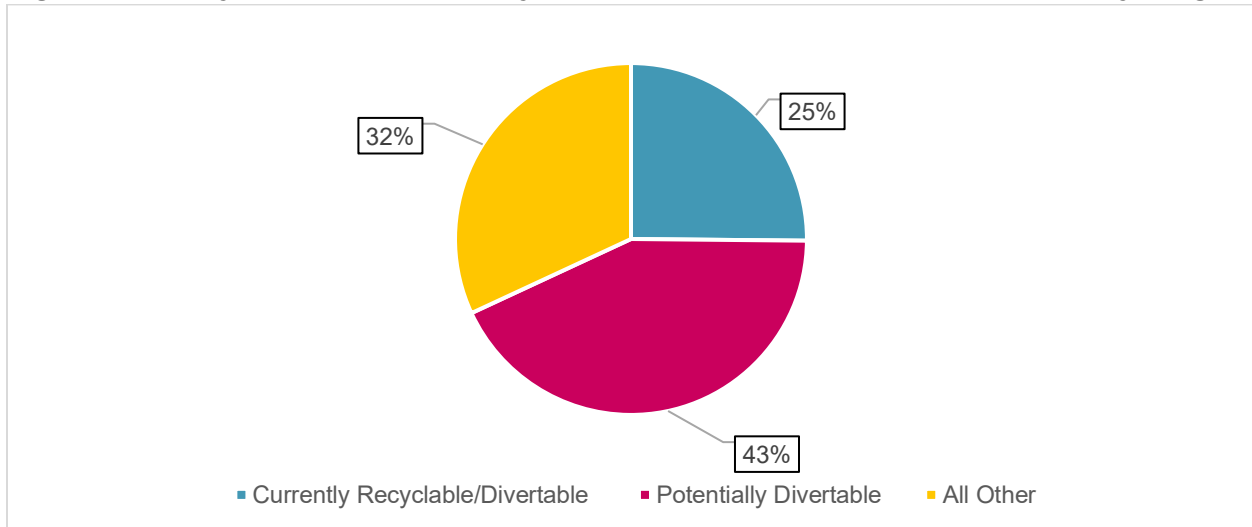
There were also materials that are potentially recyclable or divertible in the waste stream. Plastic bags and films, food waste, compostable paper, C&D, rigid plastic, electronic waste, and other metals can potentially be recycled or diverted, although they are not currently accepted curbside. The SFRSL accepts C&D, furniture, appliances, mattresses, and tires, and the City’s Household Hazardous Waste Facility accepts hazardous waste and electronics. Infrastructure for diverting these streams is **Figure 3-5** below shows potentially divertible materials in the waste stream over the Study period.

**Figure 3-5: Potentially Divertible Materials in Waste Stream (% by weight)**



Overall, 25% of the material sorted in the 2022/2023 study could have been recycled using existing curbside recycling streams and an additional 43% is potentially divertible, as shown in **Figure 3-6**.

**Figure 3-6: Recyclable and Potentially Divertible Materials in Waste Stream (% by weight)**



## 5.2 Discussion and Recommendations

As discussed in **Section 5.1**, approximately 25% of the material evaluated in the 2022/2023 Study could be diverted using traditional recycling methods that are already offered by the City through curbside carted recycling. An additional 43% could be recycled or diverted, but the City does not have the infrastructure in place at this time. The City currently offers collection and composting of yard and wood waste. The largest portion of the waste stream was food waste, which could potentially be collected and composted. Long-term, the City could consider investing in infrastructure to support food waste composting. The City's existing yard waste composting site would need to be modified for food waste feedstock. This would require coordinating with private haulers, public education, and identifying and acquiring additional space and potentially different technologies for food waste composting. As a short-term measure, the City could encourage its residents to participate in backyard composting and could provide education and training to promote composting and food waste reduction.

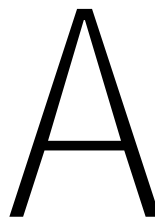
Plastic bags and film were also abundant in the waste stream. There are technologies available to reuse, recycle, or reprocess film, but the film would likely need to be source-separated prior to arriving at the landfill. Many of the films observed in the study were disposed in residential or mixed loads and were therefore contaminated by food waste, liquid, or grit by the time they arrived at the landfill. However, some ICI loads also showed a significant amount of clean films such as mail packaging materials. Sustainable Products, Inc.<sup>3</sup> is a South Dakota-based company that accepts plastic, including films, to recycle into end user products such as lumber and fenceposts. The City could consider partnering with Sustainable Products, Inc. to recycle some of its film material. The City has a drop-off area for residents at the landfill and could add a film collection point.

Backyard composting of food waste, food waste reduction, and diverting film plastic have the highest potential for diverting material from the SFRSL based on the City's infrastructure at this time. The City also provides recycling education on its website, including a searchable disposal and recycling guide.<sup>4</sup> The City could consider whether additional public education on recycling services could be beneficial in increasing diversion and removing recyclable materials from the SFRSL.

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<sup>3</sup> <https://www.sustainableproductsinc.com/>

<sup>4</sup> <https://www.siouxfalls.org/public-works/environmental-recycling-hazardous/green/disposal-all>



# A

## Waste Material Category Definitions

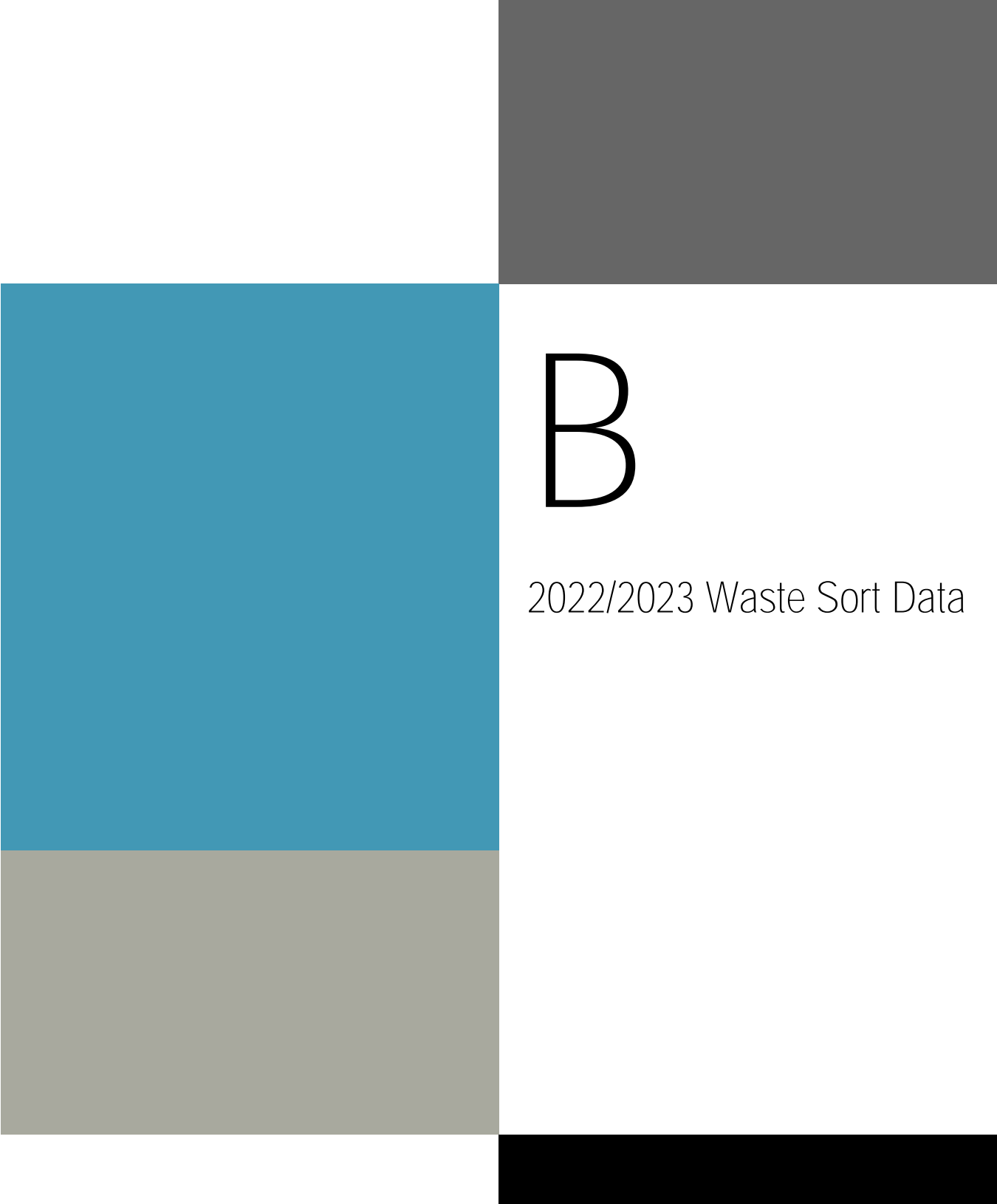


**Appendix A -  
MSW Characterization Form - Sioux Falls Regional Landfill**

Category	Material Group	Material	Definition
Paper	Recyclable Paper	Mixed recyclable paper	Newspaper, printed advertisements, magazines, catalogs, books, office paper, junk mail, miscellaneous paper.
		Cartons/aseptic containers	Gable-top cartons, aseptic juice boxes, and other similar containers made of coated paperboard.
		Cardboard and brown paper	Corrugated cardboard (uncoated cardboard boxes with a wavy core) as well as single layer cardboard and other brown paper such as cereal boxes/paper bags.
	Other Paper	Food service paper	A component of Low Grade Paper, this category includes items specific to fast food service such as paper cups, paper plates, and other paper food service items generated in a typical fast food restaurant.
		Low-grade paper	All remaining paper not categorized in other paper categories, including contaminated paper and grades such as napkins, paper towels, and tissues.
Plastics	Recyclable Plastic	Bottles, tubs, and jugs	Clear and colored bottles, tubs, and jugs. Examples include soda bottles, water bottles, milk jugs, yogurt tubs, shampoo bottles, etc. This does not include clamshell containers.
	Other Plastics	Single use/to-go plastics	Clear and colored plastic non-bottle containers. Examples include clamshell containers, fruit or vegetable platters, and some clear disposable cups.
		Rigid plastic	Non-container rigid plastic items such as plastic drums, crates, baskets, toys, refuse totes, lawn furniture, flower pots, laundry baskets, and other large plastic items. This does not include electronic toys.
		Films/bags	Grocery and shopping bags typically received at point of purchase. Loose garbage bags and non-retail plastic bags, shrink wrap, re-sealable bags, plastic sheeting, food bags & wrappers, and saran wrap, etc.
		Polystyrene	Container and non-container materials made of expanded polystyrene, which are typically white but may be pigmented. Examples include coolers, packaging materials, some egg cartons, and disposable cups and plates.
		Non-recyclable plastic	Any plastic materials not categorized above, such as deodorant cases, plastic utensils, straws, etc.
Metals	Recyclable Metal	Aluminum containers/cans	Aluminum soft drink, beer, and some food cans.
		Ferrous containers/cans	Tin-plated steel cans, usually food containers and aerosol cans, including labels. This also includes steel caps.
	Other Metals	Other ferrous metals	Non-container, ferrous metals. Examples include metal clothes hangers, sheet metal products, pipes, miscellaneous metal scraps, pots and pans, and other magnetic metal items.
		Other non-ferrous metals	Non-container, non-ferrous materials. Examples include pie plates, clean aluminum foil, and catering trays, and other non-magnetic metal items, such as copper wiring and tubing, and brass fixtures.
Glass	Recyclable Glass	Glass bottles/jars	Clear, green, and amber glass bottles and jars as well as broken glass pieces.
	Other Glass	Non-container glass	Window panes, mirrors, ceramics, drinking glasses, and glass containers other than clear, green or amber bottles/jars.
Organics	Compostable	Yard waste	Shrub and brush pruning's, household bedding plants, weeds, leaves, grass clippings, and other landscaping and gardening wastes.
	Other	Food waste	Meat, fruit and vegetable waste (includes coffee grinds and tea bags).
Household Hazardous Waste		Automotive products	Products produced for an automotive vehicle including rotors and break pads.
		Chemicals	Hazardous compounds such as oven cleaners, degreasers, drain cleaners, etc.
		Mercury containing products	Products containing mercury including lightbulbs and thermostats.
		Paint containers	Paints and stains (non-empty cans).
		Other HHW	Items usually associated with household hazardous waste collection centers, such as cleaners, oil and oil filters, pool chemicals, solvents, etc.

**Appendix A -  
MSW Characterization Form - Sioux Falls Regional Landfill**

Category	Material Group	Material	Definition
E-Waste/Durables		Battery containing devices	Electronic devices that contain a battery such as e-cigarettes, cell phones, and computers.
		Non-battery containing devices	Electronic devices that do not contain a battery such as monitors, printers, and keyboards.
		Lithium-based batteries	Rechargeable batteries.
		Other batteries	Household batteries such as AA, AAA, C, D, and 9V.
		Appliances/white goods	Household appliances such as refrigerators, stoves, coffee makers, microwaves, fans, irons, hair dryers, electrical kitchenware, vacuums, and salvageable items such as machinery.
C&D & Bulky Items		C&D materials	Construction and demolition debris including concrete, drywall, insulation, and roofing materials, wood waste (treated & untreated), painted and unpainted lumber, pallets, and dimensional lumber. This also includes treated/painted wood furniture including chairs, cabinets, dressers, etc.
		Carpet/padding	Carpet and carpet padding. This also includes large rugs.
Materials	Tires/Rubber	Tires & rubber	Small and large tires and other items made of rubber.
	Textiles	Textiles/clothing	Clothing apparel, rags, leather, blankets, curtains, shoes, wallets, purses, belts, and scrap leather.
Household Medical Waste/ Bodily Fluids Waste		Sharps	Medical devices with a sharp point including needles and scalpels.
		Pharmaceuticals	Medicinal drugs.
		Diapers	Absorbent material soaked with urine and/or feces.
		Other medical waste	All other wastes not included in the above categories.
Other Garbage		Bulky items	All furniture made of wood, metal, or mixed materials such as desks, chairs, etc. Mattresses & Box Springs, other household bulky items not classified as electronics or appliances (bikes, ceramic sinks, & toilets).
		Dirt/fines	Indistinguishable items less than a two-inch square. Also includes used cat litter and pet waste.
		Liquids	All liquids within containers were emptied into this category.
		All other garbage	All other wastes not included in the above categories.

The page features several large, solid-colored rectangular blocks. A large grey block is in the top right. A large blue block is on the left side, extending from the top to the bottom. A large grey block is at the bottom left. A black block is at the bottom right. The text 'B' and '2022/2023 Waste Sort Data' is positioned to the right of the blue block.

# B

2022/2023 Waste Sort Data

October 2022 Waste Sort Raw Data - Net Weight (lbs.)

Category	Material	Monday									Tuesday								Wednesday							
		Unique Load ID																								
		9	8	7	6	5	4	3	2	1	17	16	15	14	13	12	11	10	24	23	22	21	20	19	18	
Total Recyclable Materials	Mixed Recyclable Paper	8.2	28.3	7.6	7.2	0.0	11.4	2.4	5.2	4.2	8.5	6.8	17.8	6.2	6.3	1.3	4.5	3.2	17.9	5.6	1.6	5.0	22.1	8.6	0.3	
	Cartons/aseptic containers	1.6	0.0	0.0	1.0	0.0	0.9	1.5	0.1	0.8	0.8	0.3	1.1	0.5	0.7	0.1	0.4	0.3	0.7	0.7	5.6	0.0	0.9	1.2	0.2	
	Cardboard/brown paper	8.0	19.4	20.4	22.5	12.6	8.5	15.8	49.0	39.3	8.8	20.0	12.0	15.9	10.0	8.9	19.5	14.2	12.0	21.9	15.0	13.5	22.4	26.2	9.9	
	Plastic Bottles, tubs, and jugs	11.4	6.5	7.5	9.8	0.0	7.2	5.9	5.8	5.1	10.3	7.9	6.8	10.6	5.3	1.4	8.1	6.1	7.1	10.2	24.2	5.5	9.1	17.5	3.1	
	Glass bottles/jars	1.1	5.4	13.5	17.5	0.0	8.0	17.8	7.1	1.9	9.3	35.7	3.5	10.6	1.0	0.0	4.4	6.3	6.2	15.4	21.7	0.5	3.6	15.3	9.7	
	Aluminum containers/cans	1.0	4.2	4.0	2.7	0.0	4.0	0.4	1.8	0.7	3.8	2.9	1.4	2.7	3.1	0.0	3.8	1.7	3.1	5.1	12.7	2.2	3.1	6.7	0.6	
	Ferrous containers/cans	2.8	2.8	1.2	5.7	0.0	1.5	0.0	2.2	0.0	2.7	2.8	1.1	4.7	2.9	0.0	0.1	1.1	2.3	1.9	0.4	0.7	1.6	2.4	0.0	
Organics	Yard Waste	123.5	8.0	0.0	22.2	0.0	19.1	0.0	21.8	9.1	33.2	0.8	9.7	2.2	0.2	5.7	70.1	70.1	15.9	0.0	0.0	0.0	0.0	2.8	0.0	
	Food Waste	57.3	68.9	62.7	50.3	207.5	44.5	182.0	44.3	134.2	53.4	56.4	86.1	62.9	6.1	3.2	11.1	47.5	66.9	118.4	69.2	16.9	35.3	41.9	13.5	
Other Paper	Low-grade paper	16.8	17.9	5.8	11.2	0.0	15.8	15.7	7.0	17.0	15.3	13.7	16.8	15.0	11.2	1.8	11.6	5.3	16.5	7.8	11.3	21.3	8.3	15.2	7.8	
	Food service Paper	6.5	12.7	5.3	2.3	0.0	10.1	10.2	25.3	15.3	6.7	8.3	13.7	14.5	5.3	2.1	10.7	2.1	9.0	7.9	10.3	9.4	6.6	10.3	10.3	
Other Plastics	Rigid plastic	2.8	0.9	8.0	3.1	0.0	3.9	0.8	9.8	18.1	0.4	4.0	0.9	4.9	14.6	0.0	3.2	1.7	1.3	1.6	0.0	22.8	4.5	1.6	0.0	
	Single use/to-go plastics	6.1	8.1	9.7	4.2	0.6	9.2	14.0	7.0	16.3	8.3	11.1	6.9	9.8	3.2	1.0	6.8	6.9	9.5	7.0	8.9	11.0	7.5	9.8	8.2	
	Non-recyclable plastic	3.2	1.9	1.0	1.5	0.0	4.9	2.2	4.9	0.3	5.3	1.8	1.1	2.7	0.2	1.0	4.2	0.4	6.1	0.2	2.0	51.5	2.7	8.2	0.6	
	Films/bags	21.9	13.9	21.0	12.2	1.6	30.5	45.9	27.7	32.6	16.5	11.0	13.6	19.9	18.9	10.5	16.4	14.5	23.6	26.7	32.1	28.9	28.8	34.5	8.0	
	Polystyrene	1.8	2.5	1.6	1.0	0.3	1.4	3.4	2.6	0.5	1.9	1.9	2.5	2.3	2.0	0.6	2.0	1.6	1.1	0.2	0.9	11.5	3.1	1.9	1.4	
Other Metals	Other Ferrous metals	0.0	1.3	0.0	0.0	0.0	1.3	0.1	0.5	0.7	1.1	8.1	0.0	1.3	0.0	0.0	0.0	2.5	0.0	0.0	0.0	0.5	0.7	5.1	0.0	
	Other non-ferrous metals	2.9	2.0	0.0	1.9	0.1	1.7	1.0	1.4	1.9	1.6	0.4	2.1	0.9	0.1	0.0	2.2	3.1	2.6	0.0	0.0	0.1	0.1	7.2	0.4	
Other Glass	Non-container glass	0.7	0.0	0.6	0.0	0.0	0.0	1.5	0.0	0.8	2.7	0.8	1.9	1.4	0.0	0.0	0.0	0.0	1.6	0.0	0.0	0.0	12.6	1.9	0.0	
HHW	Automotive products	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.2	0.0	2.6	13.1	0.0	3.8	0.0	0.0	0.8	0.0	0.0	0.0	4.4	0.0	
	Chemicals	2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	1.3	0.4	10.3	0.0	0.0	0.0	1.9	0.0	0.0	0.0	7.8	0.4	0.4	0.0	
	Mercury containing products	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.9	0.1	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.2	0.0	0.0	0.1	1.0	0.0	
	Paint containers	0.0	0.8	0.0	0.0	0.0	7.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	78.4	0.0	12.8	0.7	0.0	0.0	0.0	0.0	0.0	0.8	0.0	
	Other HHW	0.0	0.0	0.0	0.1	0.0	3.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	0.0	5.2	0.0	0.0	0.0	0.0	0.1	0.0	
Durables	Battery containing devices	0.3	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.0	1.4	1.1	0.4	
	Non-battery containing devices	5.9	0.0	0.6	0.0	0.0	1.0	0.0	1.3	0.0	0.2	0.3	0.5	1.5	5.2	4.1	7.9	0.0	1.9	0.1	0.0	1.3	0.9	0.3	0.3	
	Lithium based batteries	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	
	Other batteries	0.3	0.3	0.0	0.1	0.0	0.6	0.0	0.1	0.1	0.0	0.2	0.3	0.4	0.0	0.0	0.0	0.9	1.3	0.1	0.6	0.4	0.2	0.5	0.0	
	Appliances/White Goods	7.0	0.0	0.0	2.2	0.0	0.9	0.0	0.0	0.0	0.8	0.0	1.2	0.0	0.0	0.0	0.0	0.0	6.0	0.0	0.0	0.0	0.0	0.0	0.0	
C&D	C&D Materials	6.0	3.4	0.6	0.0	6.3	0.0	8.1	9.2	0.0	2.0	5.2	4.9	2.4	14.1	150.0	0.7	70.6	1.0	2.9	0.0	2.1	15.0	0.8	6.7	
	Carpet/Padding	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	22.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	Bulky Items	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.4	0.0	
Medical	Sharps	9.5	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.1	0.0	0.3	0.1	0.0	0.1	0.0	0.0	
	Pharmaceuticals	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.5	0.0	0.2	0.1	0.0	0.0	0.0	
Other Garbage	Diapers	0.0	29.0	10.1	13.6	0.0	5.1	7.3	0.1	1.2	5.7	8.0	9.7	5.9	8.8	0.0	2.0	0.8	19.0	0.0	0.4	0.0	3.1	6.6	0.0	
	Other Medical Waste	1.6	1.6	0.3	0.4	0.0	2.1	5.1	0.4	2.4	0.5	0.4	1.0	0.2	5.1	2.1	0.4	0.5	1.3	3.0	5.4	1.0	0.3	3.7	135.0	
	Dirt/Fines	22.6	15.0	3.8	21.4	0.0	22.7	0.2	9.4	0.4	14.1	2.7	5.0	34.1	17.6	2.0	4.6	2.9	14.1	38.6	5.2	0.2	5.1	10.3	0.0	
	Liquids	10.9	5.0	0.0	5.4	0.0	2.5	2.4	3.8	8.2	14.5	1.4	2.2	1.8	4.7	2.2	7.8	1.4	4.5	4.5	3.4	1.7	12.6	3.8	0.0	
	Textiles/Clothing	12.5	0.0	38.6	16.3	0.0	5.4	11.9	0.4	1.8	5.3	5.8	6.5	6.6	10.6	2.9	5.4	1.4	29.6	3.2	0.6	0.4	15.8	30.1	0.0	
	All Other Garbage	1.7	4.6	0.0	3.7	0.0	2.1	1.9	0.5	0.3	5.2	3.7	0.6	2.3	10.1	0.0	1.2	0.0	8.9	2.6	1.9	1.1	1.0	4.5	0.0	
	Tires and rubber	1.5	0.0	0.0	0.0	0.0	0.0	0.4	1.4	0.1	0.0	2.6	0.1	0.0	0.0	0.0	0.6	2.8	0.0	0.0	0.0	0.4	0.0	0.1	0.0	
<b>Total Sample Weight (lbs.)</b>		<b>360.2</b>	<b>268.5</b>	<b>224.0</b>	<b>239.5</b>	<b>229.0</b>	<b>236.8</b>	<b>357.9</b>	<b>250.1</b>	<b>313.3</b>	<b>241.5</b>	<b>228.8</b>	<b>231.6</b>	<b>257.2</b>	<b>283.4</b>	<b>211.1</b>	<b>228.3</b>	<b>272.5</b>	<b>290.3</b>	<b>293.1</b>	<b>234.8</b>	<b>218.0</b>	<b>229.0</b>	<b>292.4</b>	<b>216.4</b>	

October 2022 Waste Sort Raw Data - Net Weight (lbs.)

Category	Material	Thursday								Friday							
		32	31	30	29	28	27	26	25	40	39	38	37	36	35	34	33
		Total Recyclable Materials	Mixed Recyclable Paper	4.1	3.8	6.7	5.8	8.3	13.4	15.6	5.4	6.0	15.2	11.7	0.2	5.9	6.4
Cartons/aseptic containers	0.2		0.2	0.4	0.1	0.1	0.0	0.4	0.9	0.8	4.2	0.5	0.0	0.5	0.0	0.2	0.0
Cardboard/brown paper	7.2		3.3	13.8	18.1	31.9	9.2	23.7	4.0	16.6	26.5	27.0	7.1	20.4	19.9	46.7	9.3
Plastic Bottles, tubs, and jugs	5.4		3.9	5.0	18.6	7.6	1.3	9.8	5.9	13.9	25.8	8.2	0.0	12.3	1.4	4.0	5.3
Glass bottles/jars	18.8		13.6	7.4	27.1	14.1	0.0	10.6	3.3	14.2	8.4	10.3	0.0	4.8	0.3	0.0	0.0
Aluminum containers/cans	2.3		2.8	1.9	8.4	6.4	0.4	2.2	1.7	3.6	5.9	2.9	0.0	1.7	0.1	0.8	1.6
Ferrous containers/cans	1.9		1.2	2.3	4.0	4.8	0.0	1.8	2.2	6.1	2.5	0.0	0.0	2.9	0.0	4.8	1.0
Organics	Yard Waste	19.3	34.5	16.4	34.8	8.7	0.0	10.6	71.0	0.0	0.0	5.6	0.0	0.0	0.0	0.6	0.0
	Food Waste	61.7	55.4	61.3	36.1	43.4	0.7	37.6	28.4	29.8	27.5	30.5	0.0	37.3	183.9	7.1	3.0
Other Paper	Low-grade paper	16.3	9.7	19.0	12.5	16.0	1.5	9.0	12.4	4.8	15.7	9.0	0.0	6.3	0.5	7.5	14.7
	Food service Paper	6.6	5.6	8.3	10.3	9.0	0.2	7.5	13.0	2.8	15.8	7.4	0.1	3.3	2.0	2.9	1.4
Other Plastics	Rigid plastic	1.0	0.6	0.8	2.0	1.6	0.0	6.1	1.9	0.4	0.7	3.3	0.0	4.4	0.0	0.7	2.2
	Single use/to-go plastics	7.8	3.6	10.2	7.4	8.7	0.4	9.0	10.6	2.9	7.7	4.2	0.0	7.2	9.4	1.4	1.0
	Non-recyclable plastic	1.8	4.3	2.9	2.4	0.8	0.0	3.1	6.0	1.6	0.7	9.8	0.0	12.2	0.0	0.3	12.3
	Films/bags	22.1	9.5	24.7	28.6	31.7	28.7	19.2	21.2	17.1	39.7	19.0	112.6	11.5	8.2	3.7	36.2
	Polystyrene	0.7	0.4	2.6	5.1	1.5	1.6	0.2	1.0	0.7	3.8	1.3	0.0	2.7	1.9	1.5	5.0
Other Metals	Other Ferrous metals	1.0	0.0	0.5	0.5	0.4	0.1	2.5	1.4	0.5	0.1	0.0	0.0	6.9	0.0	1.6	12.8
	Other non-ferrous metals	0.6	0.2	1.4	0.0	0.3	0.0	0.1	1.0	2.2	0.2	6.3	0.0	0.2	0.0	0.1	1.2
Other Glass	Non-container glass	0.5	0.3	1.9	5.3	0.1	0.0	1.3	0.6	32.3	0.0	1.5	0.0	0.7	0.0	4.5	0.0
HHW	Automotive products	0.0	0.0	0.2	0.0	0.5	0.0	4.0	0.5	1.5	0.0	0.0	0.0	0.0	0.0	17.6	0.0
	Chemicals	0.0	2.2	1.2	0.3	0.0	0.0	0.0	0.0	0.0	0.4	5.5	6.1	1.0	0.0	0.0	0.0
	Mercury containing products	0.1	0.1	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0
	Paint containers	0.0	0.0	0.6	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.6	0.0	0.0	28.0
	Other HHW	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Durables	Battery containing devices	0.0	0.0	0.3	0.2	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.6	0.0	0.0	0.2
	Non-battery containing devices	0.0	3.1	1.1	0.6	2.5	0.0	1.7	0.4	0.5	0.1	0.3	0.0	0.1	0.0	1.0	0.0
	Lithium based batteries	0.0	0.0	0.4	0.0	0.0	0.0	0.3	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Other batteries	0.0	0.6	0.1	0.3	0.0	0.0	0.2	0.2	0.9	0.2	0.0	0.0	0.0	0.0	0.0	0.0
	Appliances/White Goods	0.0	0.0	0.0	0.0	0.0	0.0	10.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	17.1	0.0
C&D	C&D Materials	0.0	5.1	9.0	0.7	10.5	50.5	2.1	1.9	0.4	0.0	18.2	42.9	19.1	12.4	3.2	2.5
	Carpet/Padding	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.1	0.0	0.0	14.7
	Bulky Items	0.0	16.6	0.0	0.0	5.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.6	0.0
Medical	Sharps	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.3	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
	Pharmaceuticals	0.1	0.0	0.6	0.1	0.0	0.0	0.0	0.1	0.0	0.1	0.1	0.0	0.1	0.0	0.0	0.0
Other Garbage	Diapers	10.5	0.0	5.5	12.5	5.9	0.0	11.5	1.4	37.2	2.5	46.4	0.0	13.4	0.0	0.0	0.9
	Other Medical Waste	2.2	0.2	3.0	0.7	4.9	1.3	1.4	1.1	0.5	2.8	1.9	0.0	1.7	0.0	0.1	3.3
	Dirt/Fines	4.9	49.0	23.6	19.8	5.5	0.3	26.0	14.2	5.7	14.2	28.7	2.2	12.6	0.0	0.0	15.1
	Liquids	1.6	3.1	13.9	2.9	8.4	0.5	1.6	0.0	6.1	6.0	5.9	0.0	4.6	0.0	3.1	1.9
	Textiles/Clothing	7.0	6.4	3.5	11.9	5.7	1.1	10.5	27.2	3.9	2.0	9.2	0.3	20.1	0.0	0.3	4.1
	All Other Garbage	7.7	1.6	2.0	0.5	10.6	1.3	2.4	3.9	0.0	1.8	6.8	0.0	1.2	3.2	0.2	1.0
	Tires and rubber	0.0	0.0	2.8	0.2	0.1	2.1	0.9	0.0	6.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Total Sample Weight (lbs.)</b>		<b>213.6</b>	<b>240.9</b>	<b>255.7</b>	<b>278.4</b>	<b>255.4</b>	<b>114.6</b>	<b>243.0</b>	<b>243.6</b>	<b>219.6</b>	<b>230.7</b>	<b>282.0</b>	<b>171.5</b>	<b>222.8</b>	<b>249.6</b>	<b>143.4</b>	<b>209.0</b>

May 2023 Waste Sort Raw Data - Net Weight (lbs)  
Sioux Falls Regional Landfill

Load #	Monday						Tuesday								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Generator Type	ICI	Mixed	Residential	Residential	Mixed	ICI	Mixed	ICI	Residential	ICI	Mixed	ICI	Mixed	Residential	Mixed
Material Type															
Mixed Recyclables	13.6	9.2	7.1	17.7	36.2	10.1	4.9	10.7	11.1	3.2	15.8	14.4	15.6	14.7	6.4
Cartons/Aseptic Containers	2.1	0.5	0.4	0.2	0.5	1.4	1.1	3.5	0.6	2.0	4.4	0.9	2.5	0.3	1.4
Cardboard	9.2	31.4	10.4	9.9	7.5	28.9	21.0	16.7	15.5	3.2	45.0	5.2	22.8	14.1	7.2
Compostable (Low Grade) Paper	23.4	7.0	14.3	16.1	12.1	4.9	14.0	7.4	10.9	14.3	14.7	15.6	16.1	7.6	15.7
Food Service Paper	30.9	6.2	5.4	11.4	9.5	6.1	23.8	8.0	20.3	7.5	7.1	3.6	12.5	11.8	11.7
Plastic Bottles (#1-7)	15.5	12.2	5.0	7.9	3.5	12.0	9.4	9.3	8.7	6.2	8.8	5.9	13.1	13.8	2.8
Single-use Plastics	12.3	5.6	5.4	5.1	7.3	7.9	10.5	4.4	12.2	4.0	4.8	4.8	13.1	7.5	8.7
Rigid Plastic	1.1	2.9	1.8	6.1	4.8	2.5	10.3	6.2	0.4	0.9	2.3	5.0	0.0	3.6	0.9
Non-Recyclable Plastics	0.9	2.3	1.0	0.2	0.6	2.7	0.2	2.7	2.0	1.5	4.4	0.5	2.6	0.0	1.6
Film/Wrap/Bags	36.0	21.3	16.4	25.6	42.0	20.1	34.4	17.7	21.4	16.4	20.1	17.3	29.8	18.6	19.3
Polystyrene (Styrofoam)	1.3	3.0	2.4	2.7	1.1	3.0	0.8	4.7	2.7	1.2	1.6	3.6	0.6	1.9	1.7
Aluminum Beverage Containers/Cans	6.9	3.6	1.3	0.9	1.5	4.7	1.5	4.7	1.8	1.0	2.7	4.0	3.5	2.6	0.8
Steel/Tin (Ferrous) Containers/Cans	0.4	1.9	2.1	1.8	0.5	4.3	2.0	0.0	2.1	0.0	3.4	0.5	0.8	1.8	2.1
Other Ferrous Metals	1.4	2.2	0.0	6.4	0.1	0.0	0.2	1.0	0.0	0.3	0.5	2.9	0.4	0.0	0.0
Other Non-Ferrous Metals	0.5	5.0	2.1	1.2	0.6	3.5	9.8	0.0	0.6	0.0	0.0	5.0	0.0	1.0	1.9
Glass Bottles/Jars	41.5	17.5	4.6	2.7	16.6	0.0	10.8	4.7	5.6	0.0	4.6	0.0	2.5	10.6	4.0
Non-Container Glass	0.0	0.0	3.9	0.0	0.0	1.7	0.0	0.0	1.5	2.1	0.0	2.6	0.6	1.2	1.3
Yard Waste	0.0	13.1	16.6	15.0	4.7	13.5	0.3	22.4	11.7	0.0	4.9	4.3	3.7	4.4	28.3
Food Waste	50.7	44.5	54.8	41.7	13.3	52.8	53.6	26.4	59.7	7.9	56.3	17.5	55.6	67.5	0.6
Construction and Demolition Materials	2.3	20.7	17.8	4.2	4.8	1.2	0.2	6.1	0.0	0.2	7.2	99.9	1.3	5.6	0.7
Carpet/Carpet Padding	0.0	0.0	0.0	36.4	0.0	0.0	0.0	2.9	0.0	0.0	0.0	2.7	0.0	0.0	0.0
Tires and Rubber	0.0	1.0	0.0	0.3	1.7	0.0	0.1	3.6	0.0	0.0	0.0	0.0	0.0	0.0	0.6
Battery-Containing Devices	0.0	0.8	0.5	0.4	0.0	0.7	0.1	0.0	1.1	0.0	0.0	0.0	0.4	1.0	0.0
Non-battery Containing Devices	0.4	0.0	1.1	0.2	51.3	0.8	7.5	0.0	13.9	0.8	2.4	0.0	5.3	0.0	1.6
Lithium Based Batteries	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other Batteries	0.7	0.9	0.0	0.3	0.0	0.3	0.1	0.0	0.0	0.0	0.0	0.4	0.5	0.4	0.0
Appliances/White Goods	0.0	0.0	0.0	1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.4	0.0
Automotive Products	5.4	3.5	0.0	0.0	0.1	0.0	0.0	2.3	0.0	0.0	0.3	0.6	1.2	0.4	0.0
Chemicals	0.0	0.0	0.3	1.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.3	0.0	0.7	0.0
Mercury-Containing Products	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Paint Containers	0.0	1.8	3.5	0.3	0.0	0.0	0.0	0.0	1.6	0.0	0.0	0.0	0.0	0.0	0.0
Other HHW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Diapers	2.4	9.1	7.7	3.1	4.0	17.1	3.8	11.1	3.3	3.1	3.2	0.0	1.2	32.1	10.3
Sharps	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pharmaceuticals	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.2	0.1	0.0	0.0	0.0	0.0	0.2	0.0
Other Medical Waste	2.7	1.3	4.8	1.7	2.7	4.9	11.1	1.9	0.6	135.9	3.3	0.1	25.9	1.4	0.1
Dirt/Fines	5.3	19.9	27.4	4.7	0.8	10.3	6.9	33.0	28.3	1.4	5.6	15.1	4.3	7.3	22.6
Bulky Items	0.0	62.4	12.5	0.0	0.0	12.2	0.0	17.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Liquids	11.0	2.2	2.2	9.7	2.7	5.7	4.0	2.5	2.8	0.0	4.1	0.0	6.9	4.8	0.5
Textiles/Leather/Clothing	5.7	22.6	19.4	22.9	3.9	2.8	8.8	11.7	40.8	0.0	13.6	2.6	15.3	40.5	17.0
All Other Garbage	14.5	9.3	3.5	2.9	2.1	7.7	2.7	2.8	15.6	0.0	11.1	3.3	3.5	7.4	1.3
<b>Sample Weight (lbs)</b>	<b>298.1</b>	<b>344.9</b>	<b>255.7</b>	<b>262.7</b>	<b>236.5</b>	<b>243.8</b>	<b>254.5</b>	<b>245.7</b>	<b>297.0</b>	<b>213.1</b>	<b>252.2</b>	<b>238.6</b>	<b>261.6</b>	<b>288.2</b>	<b>171.1</b>

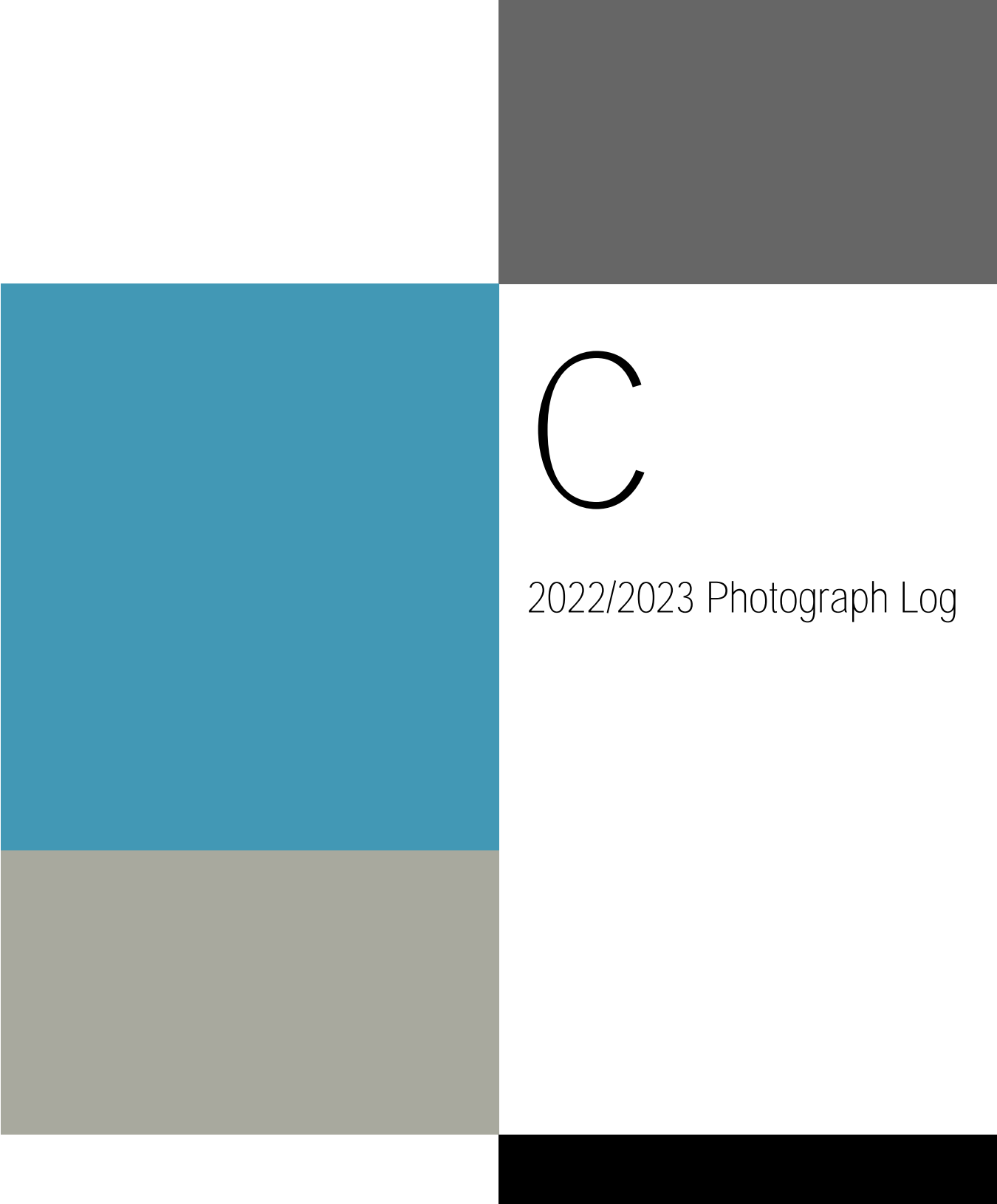
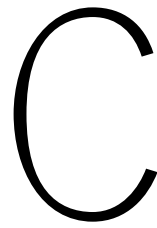
May 2023 Waste Sort Raw Data - Net Weight (lbs)  
Sioux Falls Regional Landfill

	Wednesday											Thursday			
Load #	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Generator Type	Residential	Residential	Mixed	ICI	ICI	ICI	Residential	Residential	Residential	Residential	Mixed	Residential	Mixed	Mixed	Mixed
Material Type															
Mixed Recyclables	10.4	2.9	14.7	18.8	22.9	0.1	3.5	9.8	6.7	17.4	18.1	13.1	2.8	8.3	12.1
Cartons/Aseptic Containers	3.5	0.0	0.4	0.0	1.9	0.2	0.6	0.2	1.4	3.4	1.0	0.9	30.8	0.0	0.0
Cardboard	8.0	4.7	14.8	29.8	2.6	15.9	5.1	6.5	9.4	30.1	67.7	8.0	9.4	15.8	16.3
Compostable (Low Grade) Paper	13.5	21.6	12.7	11.3	19.7	3.0	13.9	25.4	15.4	7.8	5.9	15.3	9.6	6.2	5.7
Food Service Paper	15.8	0.0	13.1	3.6	11.9	0.6	6.6	9.7	8.6	11.4	8.9	6.1	2.5	6.2	4.7
Plastic Bottles (#1-7)	7.2	4.1	7.3	6.9	2.2	0.7	2.9	7.0	4.7	8.4	12.1	7.1	2.0	10.7	8.1
Single-use Plastics	9.0	16.3	5.6	5.5	2.0	0.5	6.5	7.0	8.4	7.6	4.8	4.1	1.5	3.1	4.4
Rigid Plastic	4.5	7.5	14.3	14.0	1.7	26.5	0.5	2.1	0.7	4.4	4.1	0.7	27.6	1.4	10.5
Non-Recyclable Plastics	3.2	8.5	3.7	0.0	1.1	0.3	3.3	0.8	2.4	1.3	9.1	4.8	0.0	3.4	2.6
Film/Wrap/Bags	26.2	32.9	22.2	23.0	55.0	31.0	16.3	28.0	16.5	19.9	11.7	20.8	3.4	21.4	19.7
Polystyrene (Styrofoam)	2.7	1.0	1.7	0.3	0.7	12.0	0.7	0.7	0.8	3.0	0.9	1.2	0.0	0.4	2.5
Aluminum Beverage Containers/Cans	3.4	2.6	3.8	1.9	1.3	1.2	1.8	2.8	1.0	2.7	6.2	2.5	0.8	2.9	4.3
Steel/Tin (Ferrous) Containers/Cans	3.3	1.7	3.3	1.2	3.9	0.0	0.6	2.1	0.5	1.4	1.3	1.1	0.0	2.5	4.1
Other Ferrous Metals	0.6	3.4	1.8	0.5	0.5	0.0	2.3	15.0	0.1	0.1	1.6	0.4	0.0	17.7	0.7
Other Non-Ferrous Metals	3.6	1.0	0.9	0.0	1.4	3.2	2.4	1.0	1.4	2.0	5.3	9.3	0.0	0.5	1.1
Glass Bottles/Jars	8.3	1.7	10.1	0.0	0.0	0.0	8.6	2.7	10.2	2.4	8.3	7.7	0.0	2.0	1.1
Non-Container Glass	0.2	2.3	0.0	0.2	0.1	0.0	0.3	0.0	0.5	1.6	9.4	1.3	0.0	0.0	0.5
Yard Waste	6.3	41.3	19.4	1.3	117.8	0.0	25.5	45.8	25.9	0.0	0.0	0.3	0.0	0.0	15.7
Food Waste	91.3	63.2	26.8	22.7	0.0	2.1	28.4	56.4	61.1	51.6	18.4	43.7	2.3	19.9	44.0
Construction and Demolition Materials	3.9	1.8	3.0	77.9	23.6	11.9	16.5	3.8	1.6	15.0	11.8	16.0	0.0	76.1	33.4
Carpet/Carpet Padding	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tires and Rubber	0.0	0.0	0.3	6.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5
Battery-Containing Devices	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.2	0.0	0.0	0.0
Non-battery Containing Devices	0.1	0.8	4.8	0.5	0.0	0.0	0.5	0.0	0.0	0.1	5.0	0.3	0.0	0.0	0.3
Lithium Based Batteries	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other Batteries	0.0	0.5	0.0	0.0	0.0	0.0	0.2	0.3	0.4	0.0	0.0	0.0	0.0	0.1	0.0
Appliances/White Goods	0.0	5.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Automotive Products	0.7	0.3	2.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.3	0.1	0.0	0.0	1.6
Chemicals	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.6	0.0	0.0	0.0	0.0
Mercury-Containing Products	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Paint Containers	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.3	0.0	0.0	0.0	7.2
Other HHW	0.0	0.3	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Diapers	9.6	13.8	6.0	1.0	0.0	0.0	2.2	24.0	2.9	7.3	0.0	6.3	0.0	17.9	1.1
Sharps	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pharmaceuticals	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.5
Other Medical Waste	3.5	2.0	0.4	14.2	0.4	0.9	0.5	0.4	0.2	2.1	1.1	0.3	0.0	3.4	0.9
Dirt/Fines	16.8	16.8	26.3	5.6	2.4	2.2	33.9	1.6	62.0	13.1	18.8	29.0	0.0	36.6	26.2
Bulky Items	0.0	1.3	0.0	21.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	198.0	0.0	10.5
Liquids	2.6	0.8	0.0	0.1	7.1	0.0	1.2	2.1	6.0	1.7	0.8	0.4	2.2	0.0	3.2
Textiles/Leather/Clothing	18.8	15.7	17.5	4.9	0.0	12.3	6.8	12.7	12.5	28.2	1.7	41.8	0.0	28.6	15.4
All Other Garbage	6.1	5.6	13.4	1.1	9.5	0.6	8.6	1.2	7.7	3.2	4.8	7.3	0.0	4.2	0.7
<b>Sample Weight (lbs)</b>	<b>283.1</b>	<b>282.4</b>	<b>251.5</b>	<b>273.8</b>	<b>289.7</b>	<b>125.2</b>	<b>200.4</b>	<b>269.9</b>	<b>269.1</b>	<b>247.3</b>	<b>247.0</b>	<b>250.1</b>	<b>292.9</b>	<b>289.3</b>	<b>259.6</b>

May 2023 Waste Sort Raw Data - Net Weight (lbs)  
Sioux Falls Regional Landfill

	Thursday (Continued)									Friday
Load #	31	32	33	34	35	36	37	38	39	40
Generator Type	ICI	Mixed	ICI	Residential	Residential	Residential	Mixed	Residential	Mixed	ICI
Material Type										
Mixed Recyclables	2.5	8.9	2.4	6.8	7.1	10.8	5.9	5.0	3.1	1.8
Cartons/Aseptic Containers	0.6	2.0	0.4	0.3	0.6	0.9	0.6	0.8	0.7	0.1
Cardboard	13.0	29.5	31.0	9.3	8.8	6.5	15.7	9.2	29.8	17.2
Compostable (Low Grade) Paper	9.7	9.3	3.9	17.9	15.0	8.8	12.9	15.3	19.3	10.6
Food Service Paper	11.5	8.5	3.3	17.2	11.6	7.1	15.8	8.7	29.8	1.3
Plastic Bottles (#1-7)	4.8	4.4	6.0	7.2	6.0	9.1	14.2	5.9	15.7	1.2
Single-use Plastics	4.0	5.1	1.5	7.8	8.3	7.3	8.7	8.8	5.7	1.2
Rigid Plastic	0.0	17.3	2.4	3.1	0.5	1.6	0.0	8.8	1.5	16.5
Non-Recyclable Plastics	0.0	0.0	0.3	1.4	4.6	2.5	4.0	2.2	7.1	2.1
Film/Wrap/Bags	72.7	22.3	6.3	23.1	21.8	14.7	29.3	19.9	25.0	10.5
Polystyrene (Styrofoam)	1.6	3.1	0.7	2.0	1.5	1.7	3.0	1.8	2.3	4.2
Aluminum Beverage Containers/Cans	1.2	1.6	8.4	1.8	1.7	1.8	5.7	1.0	3.8	0.8
Steel/Tin (Ferrous) Containers/Cans	0.0	0.0	41.1	2.6	4.0	0.4	2.5	2.6	2.5	0.0
Other Ferrous Metals	0.0	15.2	11.0	2.0	8.4	2.8	3.6	2.9	1.8	22.3
Other Non-Ferrous Metals	0.3	0.0	5.1	4.2	0.8	0.4	1.2	0.5	1.3	4.2
Glass Bottles/Jars	0.0	0.0	6.1	5.8	7.4	11.2	2.3	8.2	12.2	2.4
Non-Container Glass	0.0	0.0	0.5	5.2	2.3	0.0	0.9	0.0	5.9	0.3
Yard Waste	1.1	0.1	26.9	22.6	2.4	14.8	0.5	34.6	0.0	11.3
Food Waste	9.1	12.6	6.4	60.2	32.5	47.4	34.4	35.4	49.2	1.8
Construction and Demolition Materials	0.0	44.3	57.5	0.0	0.4	0.0	4.1	3.8	6.7	11.8
Carpet/Carpet Padding	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tires and Rubber	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	6.0
Battery-Containing Devices	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	0.0
Non-battery Containing Devices	0.0	9.3	1.8	8.2	7.2	0.1	2.1	1.6	8.1	0.0
Lithium Based Batteries	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0
Other Batteries	0.0	0.1	0.0	0.0	0.0	0.0	0.0	1.0	0.2	0.0
Appliances/White Goods	0.0	2.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Automotive Products	3.4	0.0	5.0	0.0	5.5	6.3	0.0	2.1	0.0	0.0
Chemicals	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mercury-Containing Products	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Paint Containers	0.0	0.0	0.8	2.3	0.0	0.8	0.0	0.0	0.1	0.0
Other HHW	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.1	0.0
Diapers	0.0	0.0	0.6	2.4	14.1	15.6	2.6	9.0	20.9	0.0
Sharps	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0
Pharmaceuticals	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0
Other Medical Waste	0.0	0.1	0.0	0.3	1.1	1.5	49.6	0.6	0.3	0.2
Dirt/Fines	1.4	4.3	18.2	14.2	52.8	50.2	14.2	9.3	30.4	25.7
Bulky Items	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.0
Liquids	8.9	1.5	0.0	2.6	1.0	3.8	0.0	1.9	4.5	1.9
Textiles/Leather/Clothing	1.5	2.6	8.1	20.7	21.6	6.7	6.1	20.4	13.1	38.6
All Other Garbage	28.5	0.0	19.6	0.0	9.9	12.6	3.5	0.2	0.1	0.9
<b>Sample Weight (lbs)</b>	<b>175.8</b>	<b>205.1</b>	<b>275.3</b>	<b>251.3</b>	<b>258.9</b>	<b>247.8</b>	<b>243.4</b>	<b>222.5</b>	<b>302.9</b>	<b>203.9</b>





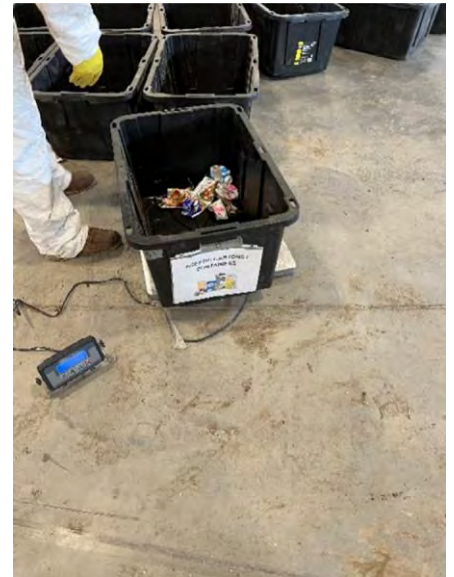
2022/2023 Photograph Log



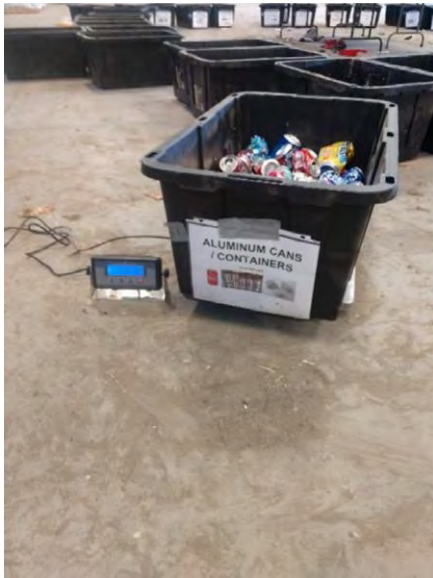
*Weighing Textiles/Clothing Bin*



*Weighing Compostable Paper Bin*



*Weighing Cartons/Aseptic Container Bin*



*Weighing Aluminum Cans Bin*



*Weighing Mixed Recycling Paper Bin*



*Weighing Sharps Basket*



*Weighing Carpet/Padding Bin*



*Weighing Steel/Tin Cans Bin*



*Weighing Liquids Bin*



*Weighing Non-Recyclable Plastics Bin*



*Weighing Grit/Fines Bin*



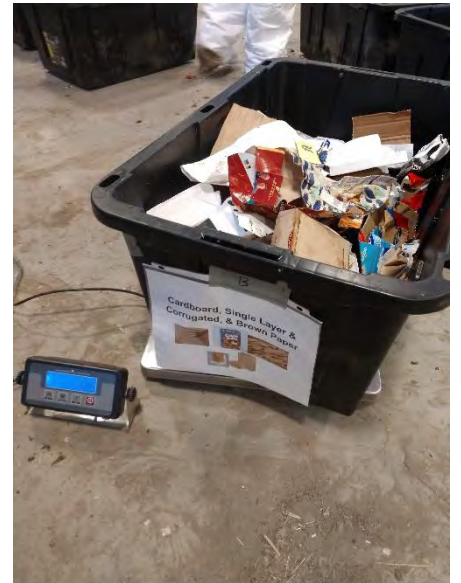
*Weighing Lithium-Based Batteries Bin*



*Weighing Other Non-Ferrous Metals Bin*



*Weighing Yard Waste Bin*



*Weighing Cardboard Bin*



*Weighing Tires/Rubber Bin*



*Weighing Automotive Products Bin*



*Weighing Food Service Paper Bin*



*Weighing Battery Containing Devices Bin*



*Weighing Construction and Demolition Bin*



*Weighing Polystyrene Bin*



*Weighing Chemicals Bin*



*Weighing Pharmaceuticals Bin*



*Weighing Mercury Containing Products Bin*



*Weighing Paints/Stains Bin*



*Weighing Plastic Containers (#1-#7) Bin*



*Weighing Rigids Plastics Bin*



*Weighing Other Glass Bin*



*Weighing Single-Use/To-Go Plastics Bin*



*Weighing Other Medical Waste Bin*



*Weighing Non-Battery Containing Devices Bin*



*Weighing All Other Garbage Bin*



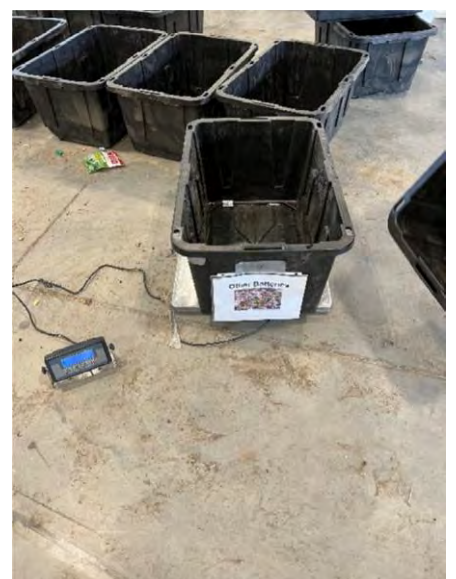
*Weighing Glass Bottles and Jars Bin*



*Weighing Food Waste Bin*



*Weighing Diapers Bin*



*Weighing Other Batteries Bin*



*Weighing Bags & Film Plastics Bin*



*Weighing Chemicals Bin*



*Observing C&D Load*



*Observing C&D Load*



*Food Waste from Commercial Load*



*Grabbing Sample*



*Sorting Process*





Weighing mixed recyclable paper.



Weighing cartons/aseptic containers.



Weighing cardboard and brown paper.



Weighing low-grade paper.



Weighing food service paper.



Weighing bottles, tubs, and jugs.



Weighing single use/to-go plastics.



Weighing rigid plastics.



Weighing non-recyclable plastics.



Weighing films/bags.



Weighing polystyrene.



Weighing aluminum containers/cans.



Weighing ferrous containers/cans.



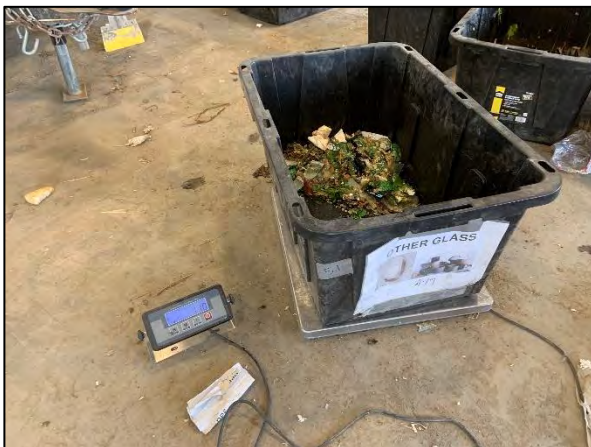
Weighing other ferrous metals.



Weighing other non-ferrous metals.



Weighing glass bottles/jars.



Weighing non-container glass.



Weighing yard waste.



Weighing food waste.



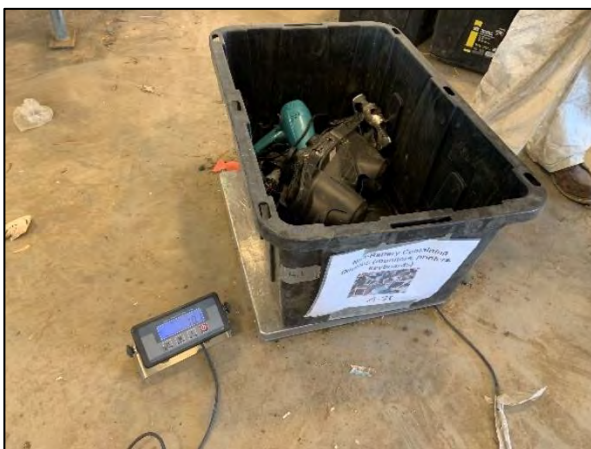
Weighing C&D materials.



Weighing carpet/padding.



Weighing battery-containing devices.



Weighing non-battery-containing devices.



Weighing lithium-based batteries.



Weighing other batteries.



Weighing appliances/white goods.



Weighing automotive products.



Weighing chemicals.



Weighing paint containers.



Weighing other HHW.



Weighing tires and rubber.



Weighing sharps.



Weighing pharmaceuticals.



Weighing diapers.



Weighing other medical waste.



Weighing textiles/clothing.



Weighing bulky items.



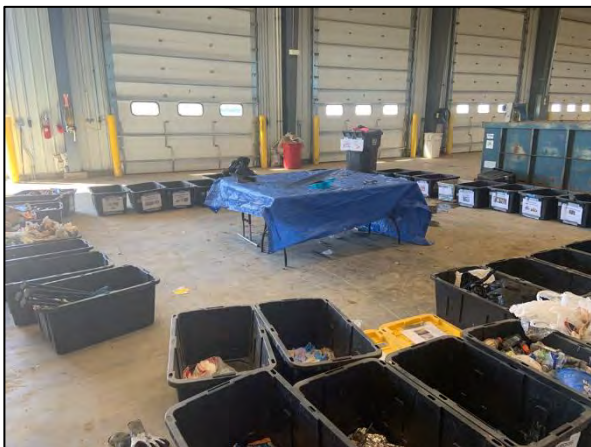
Weighing liquids.



Weighing grit/fines.



Weighing all other garbage.



Sorting station.



Sorting municipal solid waste.



Weighing and recording data.



Evaluating C&D loads.



Evaluating C&D loads.



Evaluating C&D loads.