SUMMIT COUNTY
— UTAH —

October 9, 2019

Waste & Recycling
Composition Study

FINAL REPORT

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1. INTRODUCTION

Summit County, located east of Salt Lake City and spanning 1,882 square miles to the Wyoming border, is home to roughly 42,000 people as well as a significant portion of the 2.1 million-acre Uinta-Wasatch-Cache National Forest. Home to Park City and other recreation areas, the County attracts visitors throughout the year.

Solid waste and recycling collection are provided by Republic Services, with residential and commercial refuse hauled to the County's landfill outside Coalville, and single stream recyclables delivered to a recycling facility in Salt Lake City.

The County retained MSW Consultants to conduct an inaugural waste characterization study targeting waste and recyclables. The objectives of the study were to:

◆ Develop an accurate composition profile of the disposed waste stream generated by residential households and commercial businesses in the County;

◆ Identify the extent to which materials that could be recycled within the County's recycling program are in fact being captured in the recycling program;

◆ Identify other constituents in the disposed waste stream that could be targeted in new recycling, source reduction, or reuse programs;

◆ Identify the composition of single stream recyclables collected in the County which could be used to negotiate a fair and transparent processing agreement; and

◆ Measure the degree and type of contamination found in the recycling stream to inform future public education efforts aimed at reducing contamination.

This report summarizes the methodology and sampling plan developed to guide the composition study and presents the results of the research in graphical and tabular format. The report also offers observations about opportunities to increase diversion within Summit County.

2. STUDY DESIGN

2.1 GENERATOR SECTORS AND MATERIAL STREAMS

MSW Consultants proposed a sampling plan to obtain, sort and weigh samples of the following material streams:

◆ **Residential Refuse** collected from single-family residences throughout the County,

◆ **Industrial/Commercial/Institutional (ICI) Refuse** collected from County businesses and institutional generators (e.g., schools and government buildings), and

◆ **Single Stream Recyclables** collected from single-family households and multi-family dwellings.

Refuse was divided between residential and ICI generators so the County could identify recycling opportunities and develop public education and outreach strategies that target each audience.

2.2 SAMPLING PLAN

The objective of the sampling plan for any waste characterization study is to obtain a representative distribution of samples from the targeted waste streams and generator sectors. The sampling budget for this waste composition study was set at 50 samples over five days. Table 2-1 summarizes the sampling targets for the study and also shows the actual number of samples obtained. As shown, all targeted samples were obtained during the study.

Table 2-1 Sampling Plan

Generator Sector	Sample Type	Targeted Samples	Actual Samples
Refuse (Residential and ICI)	Manual	40	40
Curbside Single-Stream Recycling	Manual	10	10
Totals		50	50

Prior to deployment, MSW Consultants obtained three months of scale data from the County landfill in order to understand the distribution of inbound deliveries over the course of the week. Scale data was used to further stratify the inbound refuse deliveries. Stratified sampling targets are shown in Table 2-2. As shown, Allied Waste delivers the majority of the tonnage, but ACE Disposal and self-haul wastes are also delivered. Table 2-2 also shows the sample stratification based on the inbound delivery patterns. Sampling targets were set to be consistent with inbound deliveries, and the actual samples obtained were reasonably consistent with the targets. Although the sampling targets were not achieved exactly, the actual samples obtained fell within an allowable variance for reasonably representing the waste stream. Most prominently, the ACE samples were simply re-allocated to Republic.

Table 2-2 Refuse Sample Distribution

Hauler	Tons	Percent of Total	Targeted Samples	Actual Samples
Allied Waste (Republic)	7,621	81.6%	33	37
ACE Disposal	1,260	13.5%	5	3
Roll-off	12	0.1%	0	0
Unnamed (self-haul)	448	4.8%	2	0
Totals	9,340	100.0%	40	40

MSW Consultants interviewed the drivers of the randomly selected inbound loads to determine the generators sector contained within each load. Table 2-3 shows the results of these interviews which were used as a basis to determine the split between residential and ICI refuse. As shown, for purposes of this analysis, it is assumed that roughly 60 percent of the disposed waste originates in the ICI sector, with 40 percent originating in the residential sector.

Table 2-3 Estimated Disposal by Generator Sector

Generator Sector	# of Samples	Tonnage of Sampled Loads	Percent of Sampled Tons
Residential	15	125.8	40.3%
ICI	25	186.5	59.7%
Totals	40	312.3	100.0%

2.3   SUMMIT COUNTY WASTE GENERATION

Summit County maintains weight-based records of the annual quantity of refuse and recyclables. 2018 annual tonnage was provided for use in this report. A total of almost 39,000 tons of refuse was reported, and almost 3,000 tons of recyclables. Refuse was apportioned to the residential and ICI generator sectors using the factors shown in Table 2-3 above. Table 2-4 below summarizes the estimated annual waste collected in Summit County for 2018. As shown, the County managed approximately 42,000 tons of residential and ICI wastes in 2018.

Table 2-4 Waste Quantities (2018)

	All Wastes		Residential Waste Only	
Waste Type	Tons	Percent of Total	Tons	Percent of Total
Refuse – Residential	15,689	37.4%	15,689	74.1%
Refuse – ICI	23,258	55.5%	N/A	N/A
Curbside Recycling	2,975	7.1%	2,975	15.9%
Totals	41,922	100.0%	18,664	100.0%

Table 2-4 also shows that the County recycled 2,975 tons from the residential sector out of an estimated 18,664 tons of waste generated. This suggests that the County's nominal residential recycling rate is approximately 16 percent.

2.4 MATERIAL CATEGORIES

Each sample of refuse and recyclables was sorted into 48 material categories. Table 2-5 shows the breakdown of the material categories within their respective material groups. Detailed definitions for each of these categories is shown in Appendix A.

It should be noted that the sort of recyclables included an additional three categories for materials commonly responsible for contamination in the recycling stream:

◆ Newspaper/magazines in plastic sleeves or wrap. The plastic film sleeve or wrap renders these items unrecyclable because the recycling facility cannot easily remove the plastic to recover the fiber.

◆ Tanglers, which are loosely defined as any item that impairs the sorting equipment at the material recovery facility by wrapping around screens and belts, and so typically includes coat hangers, electrical wires, hoses, cords, rope/string and related items.

◆ Any material in the sample that is contained in bags and cannot be visually confirmed by pre-sort personnel as containing targeted recyclables. Bagged materials, even if they contain entirely recoverable materials, are usually removed at the start of the processing line because many bags of material contain only trash and would contaminate the processing line if they were not removed.

It should be noted that all bagged materials found in recycling samples were set aside until the final day of the waste composition study, and were then broken open and sorted as a single "bagged recyclables" sample. The composition of these bagged recyclables is contained in the results section.

Finally, one of the objectives of this study was to identify constituents that could be diverted from landfill through locally available means. Accordingly, each material was assigned a "recyclability class" which included:

◆ **Targeted Fiber**: All cardboard and paper targeted in the curbside collection programs in the County, including aseptic boxes & gable top cartons.

◆ **Targeted Containers**: Metal cans and plastic bottles and other packaging targeted in the curbside collection programs in the County.

◆ **Food Waste/Compostable Paper**: Food waste and compostable paper that could potentially be diverted via commercial composting or other organics management program.

◆ **Green Waste**: Yard wastes and leaves that could potentially be diverted via a grinding, mulching, or composting program.

◆ **Not Currently Recoverable**: Materials for which there are no readily available outlets for recycling, composting, or other diversion from landfill.

Table 2-5 Material Categories and Groups

Material Category	Material Category
Paper	**Glass**
OCC/Kraft Paper (Uncoated)*	Glass Bottles, Jars & Containers
Newspaper*	Remainder/Composite Glass
Newspaper in Sleeves**	**Organics**
Office Paper (High Grade)*	Food Waste
Magazines, Catalogs & Brochures*	Yard Waste
Phone Books & Directories*	Remainder/Composite Organics
Chipboard/Paperboard*	**C&D**
Aseptic Boxes & Gable Top Cartons*	Wood - Treated/Painted/Stained
Mixed Recyclable Paper (Low Grade)*	Wood - Untreated/Clean
Compostable Paper	Drywall/Gypsum Board
Remainder/Composite Paper	Asphalt Roofing
	Asphalt Paving, Brick, Concrete, & Rock
Plastic	Carpet & Carpet Padding
PET (#1) Bottles and Jars*	Remainder/Composite C & D
PET (#1) Non-bottle Containers*	**HHW**
HDPE (#2) Natural Containers*	HHW
HDPE (#2) Colored Containers*	Batteries (All Types)
Rigid Plastic Containers #3, through #7	Medically-Related Waste
Expanded Polystyrene "Styrofoam"	**Electronics**
Clean Retail Film Bags	All Electronics
Clean Commercial/Consumer Film	**Other**
All Other Film	Textiles & Leather Products
Durable/Bulky Rigid Plastics*	Rubber Products
Remainder/Composite Plastic	Disposable Diapers & Sanitary Products
Metals	Dirt & Fines
Aluminum Containers*	Bulky Materials
Aluminum Foils and Trays*	Other Materials Not Elsewhere Classified
Other Non-Ferrous Metals	Tanglers**
Steel Cans & Lids*	Bagged Material**
Other Ferrous Metals	

*Denotes targeted recyclable materials

**Denotes material categories exclusive to the single stream recyclables material stream

3.   FIELD DATA COLLECTION METHODS

3.1   SAMPLING

Inbound loads of material were randomly selected within the stratified sampling plan. MSW Consultants interviewed the drivers of selected loads to confirm the geographic origin and type of waste, as well as any other pertinent data. This information was noted on a handheld tablet computer, along with a unique identifying number associated with that vehicle on that day.

Selected loads of waste designated for sorting were tipped in the designated area at the landfill. From each selected load, one sample of material was selected based on systematic "grabs" from the perimeter of the load. For example, if the tipped pile is viewed from the top as a clock face with 12:00 being the part of the load closest to the front of the truck, the first samples was taken from 3 o'clock, 6 o'clock, 9 o'clock, 12 o'clock, and then from 1, 4, 7, and 10 o'clock, and so-on. This is illustrated in Figure 3-1.

Figure 3-1 Systematic Sampling Procedure for Incoming Loads
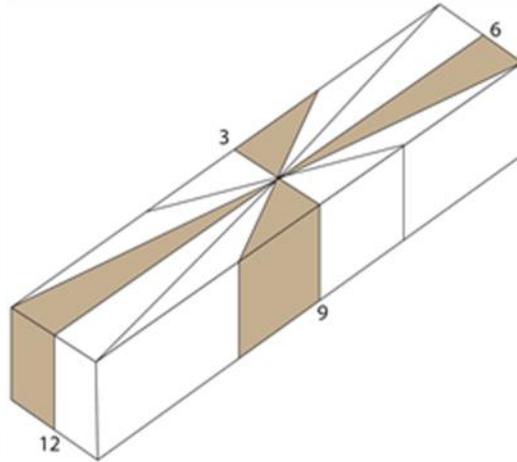
Once the area of the tipped load was selected, MSW Consultants' Field Supervisor coordinated with a County-provided loader operator to take a "grab" sample of wastes from that point in the tipped load. The loader operator removed a sample of waste that exceeded the targeted sample weight and placed the grab sample in a secure area to await sorting.

Samples were deposited in barrels to contain the sample and to enable the sampling team to pre-weigh the sample according to sample mass targets. Each sample was labeled by its identifying number using a white board. The white board for sample identification stayed with the sample until sorting and weigh out was completed.

3.2 MANUAL SORTING

Once each sample had been acquired, the material was manually sorted into the prescribed component categories. Plastic 18-gallon bins with sealed bottoms were used to contain the separated components. Sorters were asked to specialize in certain material groups, with someone handling the paper categories, another the plastics, another the glass and metals, and so on. In this way, sorters were able become highly knowledgeable in a short period of time as to the definitions of individual material categories.

3.3 DATA RECORDING

The weigh-out and data recording process is the most critical process of the sort. The MSW Consultants' Crew Chief oversaw all weighing and data recording of each sample. Once each sample was sorted, and fines swept from the table, the weigh-out was performed. Each bin containing sorted materials from the just-completed samples was carried over to the scale. The sorting crew assisted with carrying and weighing the bins of sorted material, and the Crew Chief recorded all data.

The Crew Chief used a rugged tablet computer to record the composition weights. The tablet allowed for samples to be tallied in real time so that field data collection could immediately identify and rectify errors associated with light sample weights. The tablet synchronizes with the Cloud via internet, providing excellent data security. Each sample was cross-referenced against the Field Supervisor's sample sheet to

assure accurate tracking of the samples each day. The real-time data entry offered several important advantages:

◆ The template contains built-in logic and error checking to prevent erroneous entries.
◆ The template sums sample weights in real time so the Crew Chief can confirm achievement of weight targets for each and every sample.

3.4 DATA ANALYSIS

A statistical analysis was performed to calculate the mean composition for each of the material categories and for each material stream in this study. Samples were first normalized by converting the sample data from weight to percentage. Then, the sample mean was determined by averaging the percent composition of each material across all samples.

Confidence intervals are provided for each material category as well as for major material groups (e.g., "paper", "plastic", etc.). Confidence intervals have been calculated at a 90 percent level of confidence, meaning that we can be 90 percent sure that the upper and lower bounds of a confidence interval successfully capture its respective population mean. (The converse is also true: that there is a 10 percent chance that a confidence interval will fail to capture its population mean.) In general, as the number of samples increases, the width of the confidence intervals decreases, although the more variable the underlying waste stream composition, the less noticeable the improvement for adding incremental samples.

4. RESULTS

4.1 REFUSE COMPOSITION

Figure 4-1 shows the aggregate disposed waste composition by major material group. As shown, organics comprise almost 40 percent of the refuse (excluding C&D debris) disposed at the County landfill.

Figure 4-1 Aggregate Disposed Waste Composition
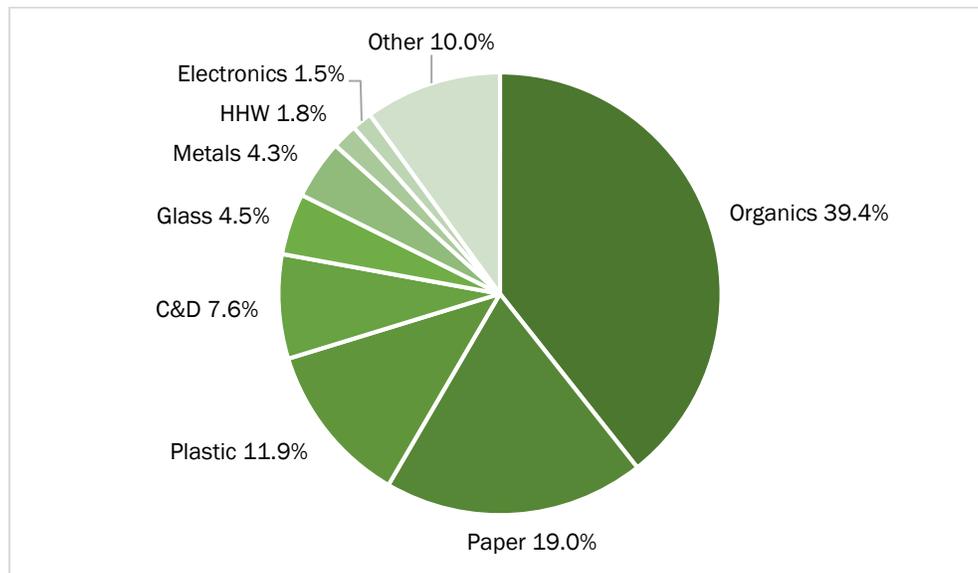
Figure 4-2 provides the recyclability of the aggregate disposed refuse stream. This graphic shows that the majority of the materials being disposed could be diverted through existing recycling programs, composting programs, and third-party recovery programs. It should be noted that this graphic omits the impact of contamination, and as a practical matter it is not possible for all of the divertible materials to

actually be diverted. Nonetheless, this chart suggests that there is still a meaningful fraction of materials that could be diverted from disposal.

Figure 4-2 Recyclability of Aggregate Disposed Wastes
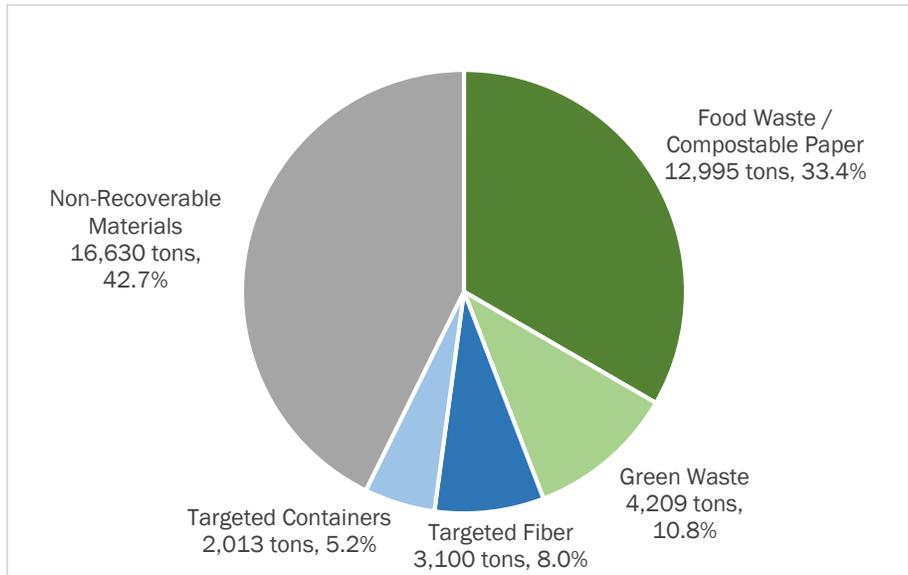
WASTE CHARACTERIZATION STUDY

Table 4-1 provides the detailed tabular composition of the aggregated disposed wastes. This table shows the mean composition, margin of error (at a 90 percent level of confidence) and the estimated tonnage of each of the constituents in the refuse stream.

Table 4-1 Detailed Composition of Aggregate Disposed Wastes

Material Category	Est. Percent	Conf. Int (+/-)	Est. Tons	Material Category	Est. Percent	Conf. Int (+/-)	Est Tons
Paper	**19.0%**	**2.1%**	**7,417**	**Glass**	**4.5%**	**4.0%**	**1,746**
OCC/Kraft Paper (Uncoated)	4.1%	1.0%	1,589	Glass Bottles, Jars & Containers	3.8%	0.8%	1,495
Newspaper	0.4%	0.2%	163	Remainder/Composite Glass	0.6%	0.3%	251
Office Paper (High Grade)	0.3%	0.1%	127	**Organics**	**39.4%**	**4.5%**	**15,329**
Magazines, Catalogs & Brochures	0.8%	0.2%	322	Food Waste	23.2%	4.3%	9,018
Phone Books & Directories	0.2%	0.1%	75	Yard Waste	10.8%	2.7%	4,209
Chipboard/Paperboard	1.1%	0.2%	426	Remainder/Composite Organics	5.4%	1.9%	2,102
Aseptic Boxes & Gable Top Cartons	0.3%	0.1%	132	**C&D**	**7.6%**	**4.0%**	**2,967**
Mixed Recyclable Paper (Low Grade)	0.7%	0.2%	266	Wood - Treated/Painted/Stained	2.6%	1.4%	1,009
Compostable Paper	10.2%	1.6%	3,977	Wood - Untreated/Clean	1.1%	0.6%	418
Remainder/Composite Paper	0.9%	0.2%	340	Drywall/Gypsum Board	0.6%	0.5%	234
Plastic	**11.9%**	**1.3%**	**4,619**	Asphalt Roofing	0.0%	0.0%	14
PET (#1) Bottles and Jars	1.4%	0.3%	548	Asphalt Paving, Brick, Concrete, & Rock	1.1%	0.8%	441
PET (#1) Non-bottle Containers	0.3%	0.1%	134	Carpet & Carpet Padding	0.4%	0.4%	157
HDPE (#2) Natural Containers	0.3%	0.1%	120	Remainder/Composite C & D	1.8%	0.9%	694
HDPE (#2) Colored Containers	0.2%	0.1%	90	**HHW**	**1.8%**	**2.1%**	**718**
Rigid Plastic Containers #3, through #7	1.3%	0.2%	495	HHW	0.3%	0.2%	104
Expanded Polystyrene "Styrofoam"	0.2%	0.0%	92	Batteries (All Types)	0.6%	0.6%	226
Clean Retail Film Bags	0.1%	0.0%	23	Medically-Related Waste	1.0%	1.1%	387
Clean Commercial/Consumer Film	0.1%	0.1%	52	**Electronics**	**1.5%**	**1.5%**	**573**
All Other Film	5.1%	0.9%	1,972	All Electronics	1.5%	0.8%	573
Durable/Bulky Rigid Plastics	1.4%	0.5%	555	**Other**	**10.0%**	**1.5%**	**3,895**
Remainder/Composite Plastic	1.4%	0.3%	537	Textiles & Leather Products	2.6%	0.6%	1,025
Metals	**4.3%**	**1.1%**	**1,684**	Rubber Products	1.1%	0.5%	420
Aluminum Containers	0.6%	0.1%	217	Disposable Diapers & Sanitary Products	2.2%	0.5%	841
Aluminum Foils and Trays	0.3%	0.1%	102	Dirt & Fines	3.0%	0.6%	1,151
Other Non-Ferrous Metals	0.3%	0.1%	110	Bulky Materials	0.6%	0.4%	241
Steel Cans & Lids	0.6%	0.1%	247	Other Materials Not Elsewhere Classified	0.6%	0.2%	217
Other Ferrous Metals	2.6%	0.9%	1,008				
				Grand Total	**100%**		**38,947**
				No. of Samples	*40*		

Figure 4-3 and Figure 4-4 compare the residential and commercial disposed waste streams based on percentage composition and absolute tonnage, respectively. These views illustrate, for example, that the percentage of organic materials in the residential waste stream is higher, but on an absolute basis there are more tons of organic materials in the ICI stream.

Figure 4-3 Comparison of Residential and ICI Disposed Waste Composition, Percent
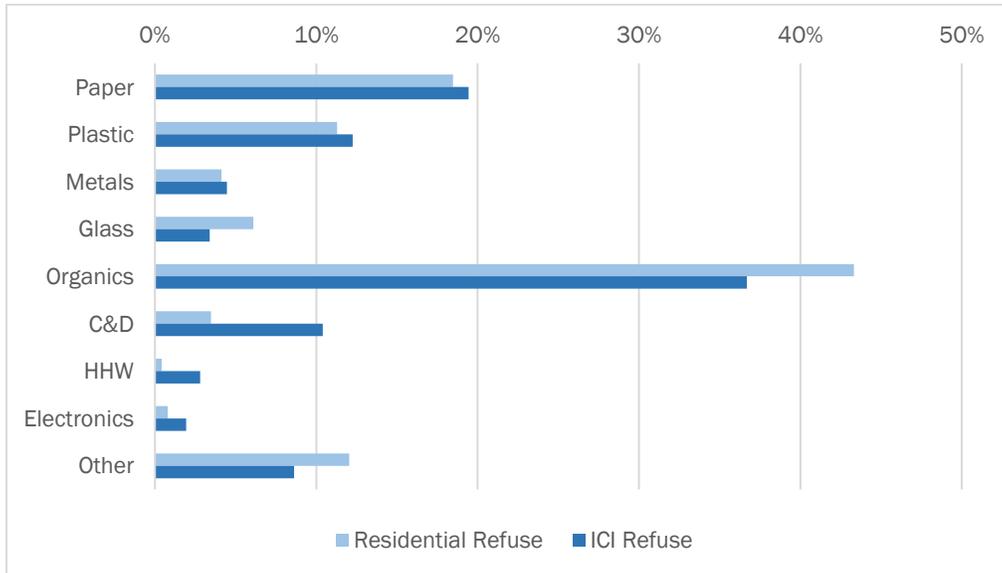
Figure 4-4 Comparison of Residential and ICI Disposed Waste Composition, Tons

MSW CONSULTANTS
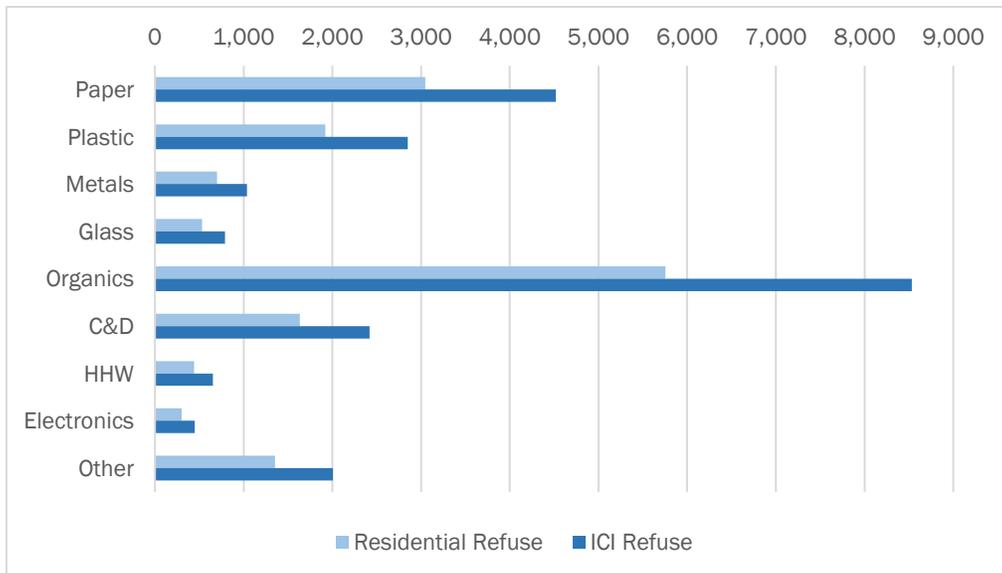
Figure 4-5 compares the recyclability of the residential and ICI disposed waste streams.

Figure 4-5 Recyclability of Residential and ICI Disposed Waste Stream

Residential

- 32.3%
- 17.9%
- 5.6%
- 4.2%
- 40.0%

Commercial

- 34.1%
- 6.0%
- 9.5%
- 5.8%
- 44.5%

- Food Waste / Compostable Paper
- Green Waste
- Targeted Fiber
- Targeted Containers
- Non-Recoverable Materials
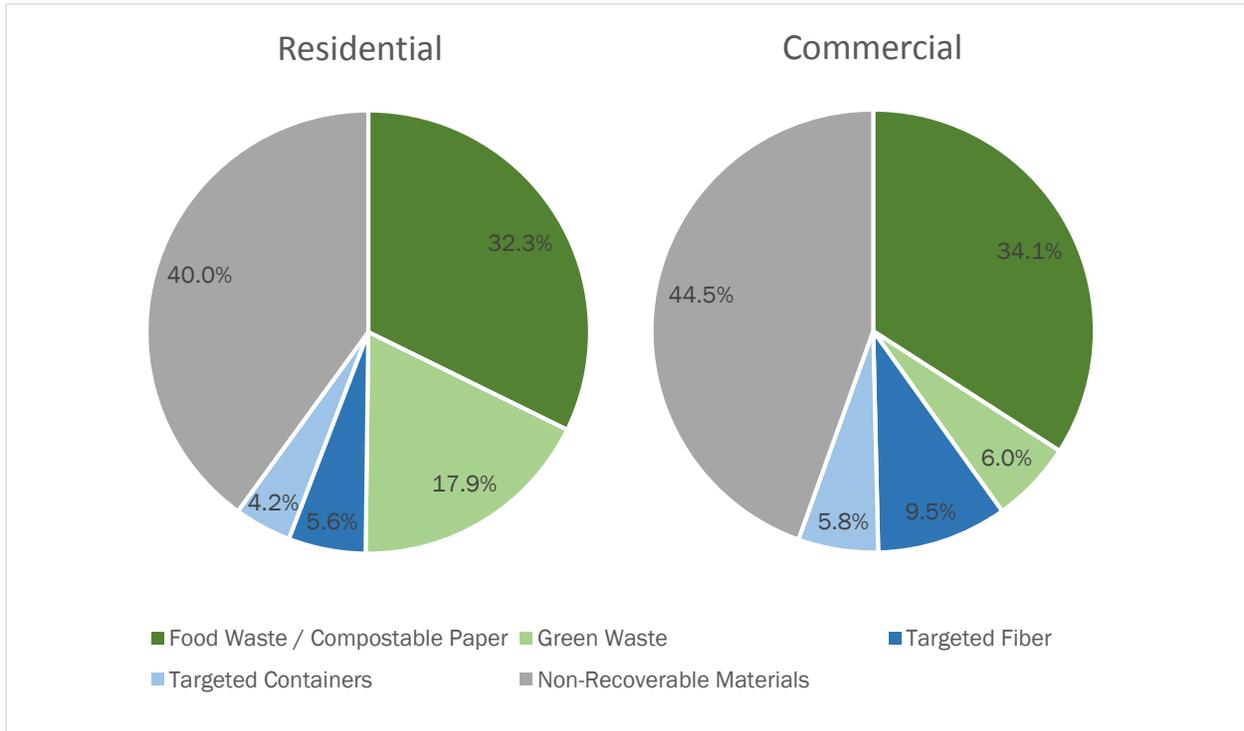
Table 4-2 provides the detailed tabular composition of the residential disposed waste stream.

Table 4-2 Detailed Composition of Residential Disposed Wastes

Material Category	Est. Percent	Conf. Int (+/-)	Est. Tons	Material Category	Est. Percent	Conf. Int (+/-)	Est. Tons
Paper	**18.5%**	**2.9%**	**2,898**	**Glass**	**6.1%**	**2.1%**	**956**
OCC/Kraft Paper (Uncoated)	1.2%	0.4%	187	Glass Bottles, Jars & Containers	5.1%	1.7%	792
Newspaper	0.3%	0.2%	52	Remainder/Composite Glass	1.0%	0.8%	163
Office Paper (High Grade)	0.3%	0.2%	48	**Organics**	**43.3%**	**4.8%**	**6,796**
Magazines, Catalogs & Brochures	1.1%	0.4%	167	Food Waste	20.3%	5.0%	3,181
Phone Books & Directories	0.3%	0.3%	40	Yard Waste	17.9%	6.1%	2,811
Chipboard/Paperboard	1.1%	0.4%	174	Remainder/Composite Organics	5.1%	1.6%	804
Aseptic Boxes & Gable Top Cartons	0.5%	0.3%	75	**C&D**	**3.5%**	**1.6%**	**546**
Mixed Recyclable Paper (Low Grade)	0.9%	0.3%	140	Wood - Treated/Painted/Stained	1.6%	0.7%	253
Compostable Paper	12.0%	3.0%	1,883	Wood - Untreated/Clean	0.2%	0.1%	26
Remainder/Composite Paper	0.8%	0.4%	131	Drywall/Gypsum Board	0.0%	0.0%	3
Plastic	**11.3%**	**1.9%**	**1,770**	Asphalt Roofing	0.0%	0.0%	6
PET (#1) Bottles and Jars	1.1%	0.3%	170	Asphalt Paving, Brick, Concrete, & Rock	0.3%	0.2%	50
PET (#1) Non-bottle Containers	0.4%	0.1%	63	Carpet & Carpet Padding	0.9%	1.0%	135
HDPE (#2) Natural Containers	0.1%	0.1%	23	Remainder/Composite C & D	0.5%	0.3%	72
HDPE (#2) Colored Containers	0.2%	0.1%	38	**HHW**	**0.4%**	**0.3%**	**64**
Rigid Plastic Containers #3, through #7	1.8%	0.5%	283	HHW	0.1%	0.1%	21
Expanded Polystyrene "Styrofoam"	0.3%	0.1%	50	Batteries (All Types)	0.0%	0.0%	5
Clean Retail Film Bags	0.0%	0.0%	4	Medically-Related Waste	0.2%	0.1%	38
Clean Commercial/Consumer Film	0.2%	0.2%	25	**Electronics**	**0.8%**	**0.7%**	**124**
All Other Film	5.0%	1.4%	781	All Electronics	0.8%	0.4%	124
Durable/Bulky Rigid Plastics	0.7%	0.3%	107	**Other**	**12.0%**	**2.6%**	**1,888**
Remainder/Composite Plastic	1.4%	0.4%	224	Textiles & Leather Products	2.9%	0.9%	455
Metals	**4.1%**	**1.5%**	**646**	Rubber Products	1.3%	1.1%	201
Aluminum Containers	0.6%	0.2%	93	Disposable Diapers & Sanitary Products	3.1%	1.0%	492
Aluminum Foils and Trays	0.3%	0.1%	43	Dirt & Fines	3.8%	1.1%	592
Other Non-Ferrous Metals	0.3%	0.2%	41	Bulky Materials	0.2%	0.2%	31
Steel Cans & Lids	0.8%	0.2%	118	Other Materials Not Elsewhere Classified	0.7%	0.4%	116
Other Ferrous Metals	2.2%	1.1%	351				
				Grand Total	**100%**		**15,689**
				No. of Samples	*15*		

Table 4-3 provides the detailed tabular composition of the ICI disposed waste stream.

Table 4-3 Detailed Composition of ICI Disposed Wastes

Material Category	Est. Percent	Conf. Int (+/-)	Est. Tons	Material Category	Est. Percent	Conf. Int (+/-)	Est. Tons
Paper	**19.4%**	**3.0%**	**4,519**	**Glass**	**3.4%**	**1.0%**	**790**
OCC/Kraft Paper (Uncoated)	6.0%	1.5%	1,401	Glass Bottles, Jars & Containers	3.0%	0.8%	703
Newspaper	0.5%	0.2%	110	Remainder/Composite Glass	0.4%	0.2%	87
Office Paper (High Grade)	0.3%	0.2%	79	**Organics**	**36.7%**	**6.7%**	**8,533**
Magazines, Catalogs & Brochures	0.7%	0.2%	155	Food Waste	25.1%	6.1%	5,837
Phone Books & Directories	0.1%	0.2%	35	Yard Waste	6.0%	2.0%	1,398
Chipboard/Paperboard	1.1%	0.3%	252	Remainder/Composite Organics	5.6%	3.0%	1,298
Aseptic Boxes & Gable Top Cartons	0.2%	0.1%	57	**C&D**	**10.4%**	**6.3%**	**2,420**
Mixed Recyclable Paper (Low Grade)	0.5%	0.3%	126	Wood - Treated/Painted/Stained	3.2%	2.2%	756
Compostable Paper	9.0%	1.9%	2,094	Wood - Untreated/Clean	1.7%	0.9%	392
Remainder/Composite Paper	0.9%	0.3%	210	Drywall/Gypsum Board	1.0%	0.8%	231
Plastic	**12.2%**	**1.7%**	**2,849**	Asphalt Roofing	0.0%	0.0%	7
PET (#1) Bottles and Jars	1.6%	0.5%	378	Asphalt Paving, Brick, Concrete, & Rock	1.7%	1.2%	391
PET (#1) Non-bottle Containers	0.3%	0.1%	71	Carpet & Carpet Padding	0.1%	0.1%	22
HDPE (#2) Natural Containers	0.4%	0.2%	97	Remainder/Composite C & D	2.7%	1.4%	621
HDPE (#2) Colored Containers	0.2%	0.1%	52	**HHW**	**2.8%**	**3.3%**	**653**
Rigid Plastic Containers #3, through #7	0.9%	0.2%	212	HHW	0.4%	0.3%	84
Expanded Polystyrene "Styrofoam"	0.2%	0.0%	42	Batteries (All Types)	0.9%	1.0%	221
Clean Retail Film Bags	0.1%	0.1%	19	Medically-Related Waste	1.5%	1.7%	349
Clean Commercial/Consumer Film	0.1%	0.1%	27	**Electronics**	**1.9%**	**2.5%**	**449**
All Other Film	5.1%	1.1%	1,191	All Electronics	1.9%	1.2%	449
Durable/Bulky Rigid Plastics	1.9%	0.8%	448	**Other**	**8.6%**	**1.7%**	**2,006**
Remainder/Composite Plastic	1.3%	0.4%	312	Textiles & Leather Products	2.4%	0.7%	570
Metals	**4.5%**	**1.6%**	**1,038**	Rubber Products	0.9%	0.3%	218
Aluminum Containers	0.5%	0.1%	125	Disposable Diapers & Sanitary Products	1.5%	0.6%	348
Aluminum Foils and Trays	0.3%	0.1%	59	Dirt & Fines	2.4%	0.7%	559
Other Non-Ferrous Metals	0.3%	0.1%	69	Bulky Materials	0.9%	0.6%	211
Steel Cans & Lids	0.6%	0.2%	129	Other Materials Not Elsewhere Classified	0.4%	0.2%	101
Other Ferrous Metals	2.8%	1.2%	657				
				Grand Total	**100%**		**23,258**
				No. of Samples	*25*		

4.2 RECYCLABLES COMPOSITION

Figure 4-6 shows the composition of the curbside recycling stream in terms of targeted fibers, targeted containers, contaminants, and bagged materials which are a form of contamination. In total, this suggests that contamination in the recycling stream exceeds 37 percent, although some bagged materials contain predominantly recyclable materials. The reason bagged materials are considered to be a contaminant is because most recycling facilities cannot risk allowing a bag of garbage to go through the sort line, where it will contaminate the targeted recyclables. The composition of the bagged materials is discussed later in this section.

Figure 4-6 Composition of Single Stream Recyclables

Contaminants
504 tons, 17.0%

Bagged Material
601 tons, 20.2%

Targeted Fiber
1,615 tons, 54.3%

Targeted Containers
255 tons, 8.6%
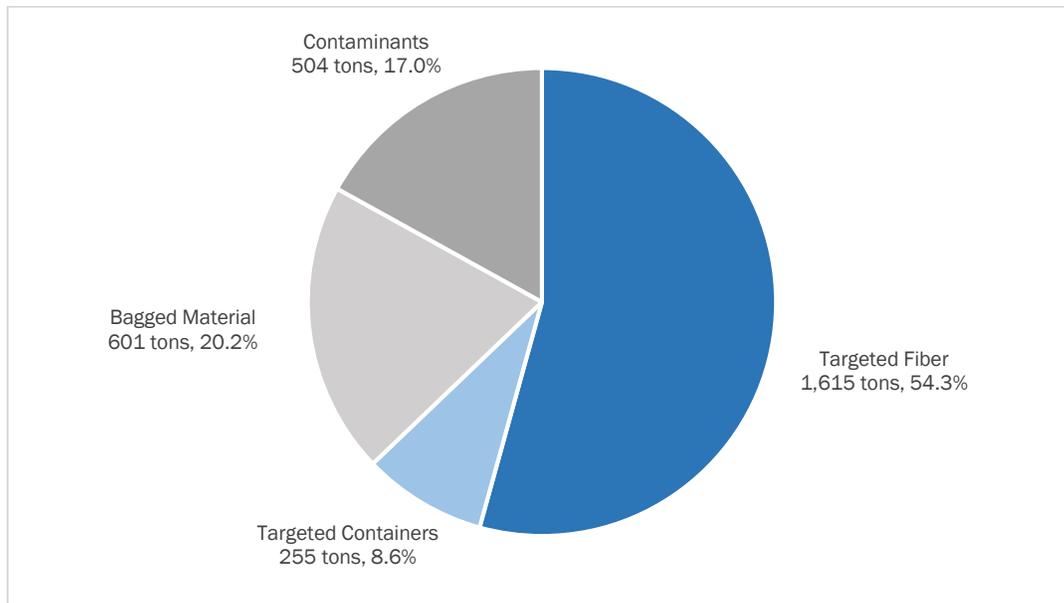
The 37 percent contamination rate is noteworthy because it is likely causing problems at the recycling processing facility. Single stream recycling programs nationwide are said to average 20 percent contamination and some of the newer and more sophisticated recycling facilities have machinery and systems designed to remove many forms of contamination. However, at an average cost of $95 per ton to process single stream recyclables, high contamination results in a costly double-handling of materials ultimately destined for landfill disposal.

Table 4-4 provides the detailed tabular composition of the single stream recyclables. The bagged materials are the single largest contaminant. It should be noted that the sample size for recyclables was relatively low, which contributes to the wider confidence intervals. However, the mean composition appears reasonable compared to other single stream recycling data sets available to MSW Consultants.

Table 4-4 Detailed Composition of Single Stream Recyclables

Material Category	Est. Percent	Conf. Int (+/-)	Est. Tons	Material Category	Est. Percent	Conf. Int (+/-)	Est. Tons
Paper	**55.6%**	**9.7%**	**1,655**	**Glass**	**2.1%**	**0.8%**	**62**
OCC/Kraft Paper (Uncoated)	34.0%	20.7%	1,012	Glass Bottles, Jars & Containers	1.7%	1.6%	50
Newspaper	10.0%	10.5%	297	Remainder/Composite Glass	0.4%	0.9%	12
Newspaper in Sleeves	0.0%	0.0%	0	**Organics**	**1.2%**	**0.6%**	**35**
Office Paper (High Grade)	0.4%	0.4%	11	Food Waste	0.8%	0.7%	23
Magazines, Catalogs & Brochures	2.3%	2.5%	70	Yard Waste	0.4%	0.8%	12
Phone Books & Directories	0.0%	0.0%	0	Remainder/Composite Organics	0.0%	0.1%	1
Chipboard/Paperboard	4.1%	2.3%	122	**C&D**	**1.1%**	**1.5%**	**33**
Aseptic Boxes & Gable Top Cartons	0.3%	0.3%	9	Wood - Treated/Painted/Stained	0.3%	0.7%	10
Mixed Recyclable Paper (Low Grade)	3.1%	3.1%	93	Wood - Untreated/Clean	0.0%	0.0%	0
Compostable Paper	0.9%	0.8%	27	Drywall/Gypsum Board	0.0%	0.0%	0
Remainder/Composite Paper	0.4%	0.6%	13	Asphalt Roofing	0.0%	0.0%	0
Plastic	**11.4%**	**2.4%**	**340**	Asphalt Paving, Brick, Concrete, & Rock	0.7%	1.6%	21
PET (#1) Bottles and Jars	2.1%	1.3%	63	Carpet & Carpet Padding	0.0%	0.0%	0
PET (#1) Non-bottle Containers	0.7%	0.7%	21	Remainder/Composite C & D	0.1%	0.2%	2
HDPE (#2) Natural Containers	0.6%	0.3%	18	**HHW**	**0.1%**	**0.0%**	**2**
HDPE (#2) Colored Containers	1.0%	0.7%	31	HHW	0.0%	0.0%	0
Rigid Plastic Containers #3, through #7	0.7%	0.5%	21	Batteries (All Types)	0.0%	0.1%	1
Expanded Polystyrene "Styrofoam"	0.1%	0.2%	4	Medically-Related Waste	0.0%	0.1%	1
Clean Retail Film Bags	0.0%	0.0%	0	**Electronics**	**0.1%**	**0.3%**	**3**
Clean Commercial/Consumer Film	0.3%	0.4%	8	All Electronics	0.1%	0.2%	3
All Other Film	1.7%	1.1%	50	**Other**	**22.0%**	**8.9%**	**655**
Durable/Bulky Rigid Plastics	2.5%	2.0%	75	Textiles & Leather Products	0.2%	0.3%	5
Remainder/Composite Plastic	1.7%	1.3%	49	Rubber Products	0.0%	0.1%	1
Metals	**6.4%**	**6.5%**	**189**	Disposable Diapers & Sanitary Products	1.0%	2.1%	31
Aluminum Containers	0.8%	0.6%	25	Dirt & Fines	0.3%	0.3%	8
Aluminum Foils and Trays	0.1%	0.1%	3	Bulky Materials	0.0%	0.0%	0
Other Non-Ferrous Metals	0.1%	0.1%	2	Other Materials Not Elsewhere Classified	0.1%	0.1%	3
Steel Cans & Lids	0.6%	0.4%	19	Tanglers	0.2%	0.6%	6
Other Ferrous Metals	4.7%	9.0%	140	Bagged Material	20.2%	17.1%	601
				Grand Total	**100%**		**2,975**
				No. of Samples	*10*		

As previously noted, the bagged materials found in each recycling sample were stored until the last day of the study and were then sorted as a single sample. Table 4-5 provides the detailed tabular composition of the bagged materials found in the single stream recyclables.

### Table 4-5 Composition of Bagged Materials within Single Stream Recyclables

Material Category	Est. Percent	Material Category	Est. Percent
Paper	**36.6%**	**Glass**	**11.9%**
OCC/Kraft Paper (Uncoated)	2.5%	Glass Bottles, Jars & Containers	11.7%
Newspaper	1.3%	Remainder/Composite Glass	0.2%
Newspaper in Sleeves	0.0%	**Organics**	**16.0%**
Office Paper (High Grade)	3.4%	Food Waste	15.4%
Magazines, Catalogs & Brochures	6.1%	Yard Waste	0.0%
Phone Books & Directories	0.0%	Remainder/Composite Organics	0.6%
Chipboard/Paperboard	7.0%	**C&D**	**2.5%**
Aseptic Boxes & Gable Top Cartons	0.7%	Wood - Treated/Painted/Stained	0.1%
Mixed Recyclable Paper (Low Grade)	3.4%	Wood - Untreated/Clean	0.0%
Compostable Paper	10.2%	Drywall/Gypsum Board	0.0%
Remainder/Composite Paper	2.1%	Asphalt Roofing	0.0%
Plastic	**19.3%**	Asphalt Paving, Brick, Concrete, & Rock	0.4%
PET (#1) Bottles and Jars	5.0%	Carpet & Carpet Padding	0.0%
PET (#1) Non-bottle Containers	1.7%	Remainder/Composite C & D	2.0%
HDPE (#2) Natural Containers	0.9%	**HHW**	**0.2%**
HDPE (#2) Colored Containers	1.4%	HHW	0.0%
Rigid Plastic Containers #3, through #7	1.3%	Batteries (All Types)	0.0%
Expanded Polystyrene "Styrofoam"	0.3%	Medically-Related Waste	0.2%
Clean Retail Film Bags	0.3%	**Electronics**	**0.0%**
Clean Commercial/Consumer Film	0.0%	All Electronics	0.0%
All Other Film	6.4%	**Other**	**7.9%**
Durable/Bulky Rigid Plastics	0.2%	Textiles & Leather Products	1.1%
Remainder/Composite Plastic	1.9%	Rubber Products	0.1%
Metals	**5.7%**	Disposable Diapers & Sanitary Products	6.6%
Aluminum Containers	2.3%	Dirt & Fines	0.0%
Aluminum Foils and Trays	0.2%	Bulky Materials	0.0%
Other Non-Ferrous Metals	1.0%	Other Materials Not Elsewhere Classified	0.1%
Steel Cans & Lids	2.1%	Tanglers	0.0%
Other Ferrous Metals	0.0%	Bagged Material	N/A
		Grand Total	**100%**
		No. of Samples	*1*

Figure 4-7 shows the composition of the bagged materials within the curbside recycling stream in terms of targeted fiber, targeted containers, and contaminants. As shown, over 60 percent of the bagged materials were found to be non-targeted materials. i.e., trash that was misplaced in a recycling bin. A small number of careless or apathetic residents can significantly impair the cleanliness of recyclables by using

recycling containers as trash cans. The County may wish to focus public education on keeping bagged materials out of the recycling bin.

**Figure 4-7 Composition of Bagged Materials within Single Stream Recyclables**
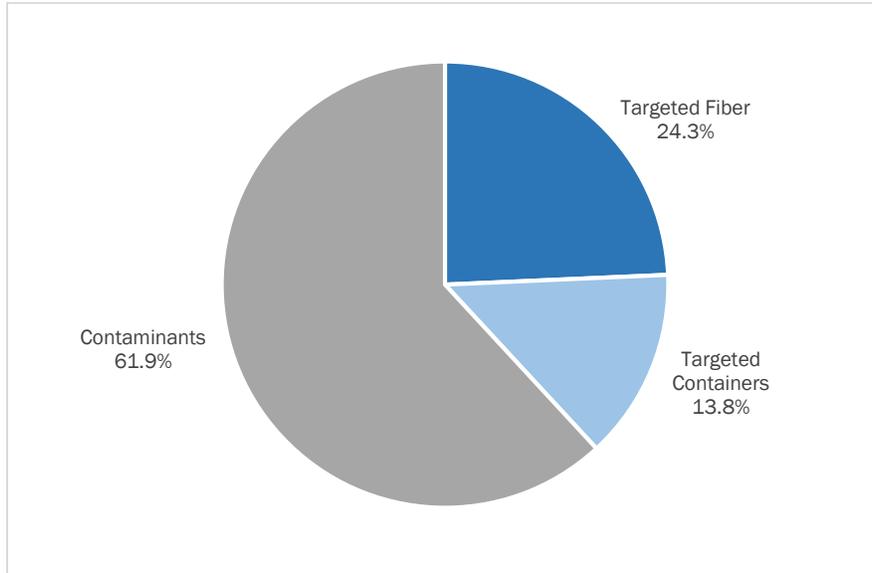
It was noted in Section 2 that Summit County's nominal residential recycling rate is approximately 16 percent. While recycling rates are informative (although often calculated differently from one jurisdiction to the next), capture rates can be more so. A capture rate indicates the fraction of any recyclable material that is actually diverted for recycling (i.e., "captured" in the program). So, capture rates can only be calculated for the materials that are targeted in the County's curbside recycling collection program. The formula for calculating the capture rate for any specific material is shown below.

$$\frac{Tons\ Recycled}{Tons\ Disposed\ as\ Refuse + Tons\ Recycled} = Capture\ Rate$$

Figure 4-8 compares the capture rates achieved for each of the materials targeted in the County's recycling program. For added clarity, the figure has been divided into Targeted Fiber and Container groups. In the Targeted Fiber group, Newsprint has the highest capture rate, at 65 percent, with OCC the next highest at 39 percent. In the Targeted Containers group, capture rates range from a high of 26 percent for HDPE (#2) Colored Containers, to a low of about 2 percent for aluminum containers, plates, and foils. The County achieved an overall capture rate for all targeted recyclable materials of 27 percent. This is at the low end of curbside recycling program capture rates based on a relatively limited amount of available capture rate data.

Figure 4-8 Residential Recycling Capture Rate
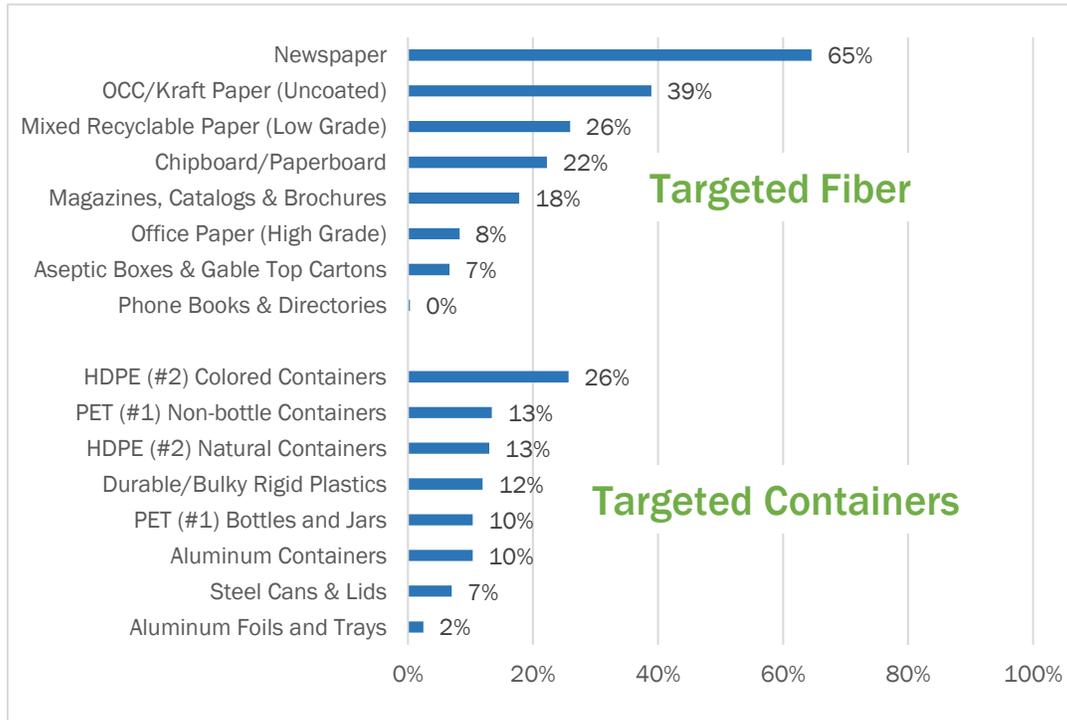
5.   CONCLUSIONS AND RECOMMENDATIONS

MSW Consultants offers the following conclusions and recommendations regarding the Summit County 2019 Waste Composition Study

5.1   CONCLUSIONS

◆ **Successful Inaugural Study**: This study was successful at compiling a baseline understanding of the County's waste stream and the composition of refuse and recyclables. Summit County is among the less populous county governments that have made the investment in a full-blown waste characterization study, which was accomplished through a single seasonal data collection event. Although it is possible that the composition of refuse and recyclables may change somewhat in different seasons (for example, other studies have found that there can be more corrugated cardboard in the late third quarter and fourth quarter of the year, due to an increase in online shopping associated with the holiday season), this study provides a first snapshot that can be used by solid waste and recycling planners and stakeholders.

◆ **Prevalence of Organics**: Not surprisingly, organic wastes, and especially food wastes, are prevalent in the waste stream. Food waste generation tends to be higher in economies that serve a tourist base like that of Summit County. In other similar locales, composting programs (often times established by the private resorts that are generating the wastes) have been successful diverting materials from landfill and creating a closed loop for local agriculture. As an example, Vail Resorts recently announced a commitment to achieve zero waste, which will require a commitment to composting to divert food wastes.

◆ **Recycling Program Improvement**: Although recycling is accessible to Summit County residents, the recycling capture rates observed in this study suggest that improvements are possible to both increasing participation in the program, and also to cleaning up bagged material and contamination in

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the recycling stream. Public education will be important, and there may be other incentives to improve the recycling performance, but it was beyond the scope of this study to provide a more nuanced assessment of the recycling program.

5.2   RECOMMENDATIONS

◆ **Focus on Reducing Bagged Materials in Recycling Program**: First and foremost, the County should focus on educating residents to keep bags out of the recycling stream. Because of the prevalent use of bags in many recycling programs, the industry has begun to spread this message and there are graphics and educational materials available for use by local governments in crafting an education campaign.

◆ **Increase Recycling Program Participation**: In conjunction with reducing the use of bags for recyclables containment, the County may wish to investigate ways to get more households to use the recycling program. The economics of recycling are somewhat complex and it was beyond the scope of this study to identify the best method for increasing participation and at what cost.

◆ **Consider Commercial Organics Pilot Program**: It is highly likely that some commercial operations in Summit County generate a large fraction of food waste and would be interested in having an alternative to landfill for this material. Many county and local governments facilitate food waste diversion by providing a simple composting operation on or adjacent to the landfill or yard waste management parcel. Summit County may wish to engage the business community to investigate the interest in having such an alternative.

◆ **Update Waste Characterization Data**: This study provides a good baseline for ongoing tracking of the County's waste stream characterization. The waste stream is constantly changing due to macro-economic factors that modify material characteristics and change waste generator behavior. Further, waste management and recycling programs may undergo changes over time as local governments adapt to population growth, recycling market changes, and other forces. Other local governments have tended to update their waste composition studies every five to seven years to maintain an understanding of these trends and to update their waste management programs, and Summit County may wish to update this time series in the future.

APPENDIX A
MATERIAL CATEGORY DEFINITIONS

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APPENDIX A – MATERIAL CATEGORY DEFINITIONS

Group	#	Material Category	Material Definition
Paper	1	Corrugated Cardboard/Kraft Paper (Uncoated)	Corrugated boxes or paper bags made from Kraft paper. Wavy center layer sandwiched between two outer layers without wax coating on the inside or outside. Examples include cardboard shipping containers and moving boxes, computer packaging cartons, and sheets and pieces of boxes and cartons. Does not include chipboard. Examples of Kraft paper include paper grocery bags, un-soiled fast food bags, department store bags, and heavyweight sheets of Kraft packing paper. Relatively unsoiled pizza boxes acceptable.
Paper	2	Newspaper	Paper used in newspapers and all items made from newsprint. Examples include newspapers and glossy inserts found in newspapers, and items such as free advertising guides, election guides, plain news packing paper, stapled college class schedules, and tax instruction booklets.
Paper	2R	Newspaper in Sleeves (Recycling Only)	Newspaper as defined above, but in a plastic film retail or delivery sleeve
Paper	3	Office Paper (High Grade)	Paper that is free of ground wood fibers; usually sulfite or sulphate paper; includes office printing and writing papers such as white ledger, color ledger, envelopes, and computer printout paper, bond, rag, or stationary grade paper. This subtype does not include fluorescent-dyed paper or deep-tone dyed paper such as goldenrod colored paper.
Paper	4	Magazines, Catalogs & Brochures	Multi-page bound paper items (glued or stapled) made of glossy coated paper. This paper is usually slick, smooth to the touch, and reflects light. Examples include glossy magazines, catalogs, brochures, and pamphlets. Does not include newspaper inserts.
Paper	5	Phone Books & Directories	This category includes books comprised of thin paper between coated covers. Such items are bound along the spine with glue. Examples include whole or damaged telephone books, yellow pages, real estate listings, and some non-glossy mail order catalogs.
Paper	6	Chipboard/Paperboard	Recyclable chipboard or uncoated paperboard such as cereal boxes, gift boxes and shoe boxes. Does not include coated paperboard such as those used for ice cream or other frozen foods.

Group	#	Material Category	Material Definition
Paper	7	Aseptic Boxes & Gable Top Cartons	Aseptic containers (multi-layered packaging that contains shelf-stable food products such as apple juice, soup, soy/rice milk, etc.) and "gable top" cartons (non-refrigerated items such as granola and crackers; refrigerated items such as milk, juice, egg substitutes, etc.). Rigid food and beverage cartons are usually paper-based, may be any shape, and may include a plastic pour spout as part of the carton.
Paper	8	Mixed Recyclable Paper (Low Grade)	Recyclable paper other than the paper types mentioned above. Examples include junk mail, manila folders, manila envelopes, index cards, white envelopes, white window envelopes, notebook paper, carbonless forms, groundwood paper, softcover books, and deep-toned or fluorescent dyed paper.
Paper	9	Compostable Paper	Low-grade, biodegradable paper that cannot be recycled, as well as food contaminated paper. Examples include paper towels, napkins, paper plates, waxed papers and waxed cardboard, tissues, and unlined paper cups.
Paper	10	Remainder/Composite Paper	Paper products made mostly of paper but combined with large amounts of other materials such as plastic, metal, glues, foil, and moisture. Examples include corrugated cardboard coated with plastic, cellulose insulation, blueprints, sepia, onion skin, foiled lined fast food wrappers, frozen juice containers, carbon paper, self-adhesive notes, hardcover books, and photographs.
Plastic	11	PET (#1) Bottles and Jars	Clear or colored PET bottles or jars. The plastic resin number "1" is visible in the center of the triangular recycling symbol and may also bear the letters "PETE" or "PET". A PET container usually has a small dot left from the manufacturing process, not a seam. It does not turn white when bent.
Plastic	12	PET (#1) Non-bottle Containers	Non-bottle containers such as rectangular PET clamshell or tray containers used for produce; etc. The plastic resin number "1" is visible in the center of the triangular recycling symbol and may also bear the letters "PETE" or "PET". The color is usually transparent, green, or clear. This category only includes PET non-bottle containers that did not previously contain hazardous materials.

Group	#	Material Category	Material Definition
Plastic	13	HDPE (#2) Natural Containers	Natural colored HDPE bottles. This plastic is usually either cloudy white, allowing light to pass through it (natural). When marked for identification, it bears the number "2" in the triangular recycling symbol and may also bear the letters "HDPE. Also includes natural buckets, pails or paint cans made of HDPE and designed to hold 5 gallons or less of material. This category only includes colored HDPE containers that did not previously contain hazardous materials.
Plastic	14	HDPE (#2) Colored Containers	Colored HDPE bottles. In contrast with natural HDPE, the colored HDPE is usually a solid color and opaque. When marked for identification, it bears the number "2" in the triangular recycling symbol and may also bear the letters "HDPE. Also includes colored buckets, pails or paint cans made of HDPE and designed to hold 5 gallons or less of material. This category only includes colored HDPE containers that did not previously contain hazardous materials.
Plastic	15	Rigid Plastic Containers #3, #4, #5, #6, and #7	Bottles, jars, containers, lids, and other packaging that are made of types of plastic other than PET (1) or HDPE (2). Items may be made of vinyl, LDPE, PVC, PP, PS, or other plastic. They may bear the number 3, 4, 5, 6, or 7 in the triangular recycling symbol, or may bear no recycling symbol. Examples include clamshells, trays, tray lids, cups, bowls, plates, hardware and fastener packaging, detergent and cleaning products bottles, squeezable bottles, frozen food containers, microwave food trays, vitamin bottles, cookie trays found in cookie packages, small (less than 1 gallon) brittle (single-use) plant containers such as nursery pots and plant six-packs.
Plastic	16	Expanded Polystyrene "Styrofoam"	Food and Non-food packaging. Includes clamshell "Styrofoam" food containers, as well as cups, plates, and bowls. Includes finished products made of expanded polystyrene such as block Styrofoam padding and packing peanuts.
Plastic	17	Clean Retail Film Bags	Plastic retail bags used to contain merchandise to transport from the place of purchase, given out by the store with the purchase. Retail Film Bags sorted into this category will largely be clean: free of excessive debris or moisture.

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Group	#	Material Category	Material Definition
Plastic	18	Clean Commercial/Consumer Film (consumer product film)	Film plastic used to wrap merchandise to transport to the consumer. Includes dry-cleaning plastic bags, newspaper sleeves intended for one-time use, and non-bag commercial and industrial packaging film used for large-scale packaging or transport packaging. Examples include shrink-wrap, mattress bags, furniture wrap, and film bubble wrap. Commercial/Consumer Film products sorted into this category will largely be clean: free of excessive debris or moisture.
Plastic	19	All Other Film	Plastic film or bags that are non-recyclable. Examples include garbage bags, and other types of plastic bags (sandwich bags, zip (recloseable) bags, produce bags, frozen vegetable bags), juice pouches, painting tarps, food wrappers such as candy-bar wrappers.
Plastic	20	Durable/Bulky Rigid Plastics	Plastic items other than containers or film plastic, that are made to last for more than one use. These items may bear the numbers 1 through 7 in the triangular recycling symbol. Examples include crates, buckets (including 5-gallon buckets), baskets, totes, large plastic garbage cans, large tubs, large storage tubs/bins (usually with lids), flexible (non-brittle) and durable flower pots of 1 gallon size or larger, lawn furniture, large plastic toys, tool boxes, first aid boxes, and some sporting goods, CDs and their cases, plastic housewares such as durable (not single-use) dishes, cups, and cutlery.
Plastic	21	Remainder/Composite Plastic	Plastic that cannot be put in any other type or subtype. Includes items made mostly of plastic but combined with other materials. Examples include auto parts made of plastic attached to metal, plastic drinking straws, produce trays, foam packing blocks (not including expanded polystyrene blocks), plastic strapping, handles and knobs, plastic cup lids, some kitchenware, plastic toys, plastic string (as used for hay bales), and plastic rigid bubble/foil packaging (as for medications).
Metals	22	Aluminum Containers (Not Magnetic)	Aluminum containers for food or beverage. Also includes aluminum cat food containers.
Metals	23	Aluminum Foils and Trays (Not Magnetic)	Non-container aluminum products such as aluminum foil or aluminum food trays. Does not include items significantly contaminated with food or other material.

Group	#	Material Category	Material Definition
Metals	24	Other Non-Ferrous Metals (Not Magnetic)	Any metal item, other than aluminum cans, foils or trays, that is not stainless steel and that is not magnetic. These items may be made of aluminum, copper, brass, bronze, lead, zinc, or other metals. Examples include copper wire, shell casings, and brass pipe. Also includes composite material that is mostly non-ferrous metal by weight.
Metals	25	Steel Cans & Lids (Magnetic)	Steel or tin food or other containers. Includes aerosol containers. If significant food or other product remains in the container (greater than the weight of the container), it shall instead be sorted in that product material category.
Metals	26	Other Ferrous Metals (Magnetic)	Any iron or steel that is magnetic or any stainless-steel item. This type does not include tin/steel cans. Examples include structural steel beams, metal clothes hangers, metal pipes, stainless steel cookware, security bars, and scrap ferrous items. Also includes composite material that is mostly ferrous metal by weight.
Glass	27	Glass Bottles, Jars & Containers	Includes all glass bottles and jars, regardless of color. Examples include beer and soft drink bottles, and jars for food or other materials. If significant food or other product remains in the container (greater than the weight of the container), it shall instead be sorted in that product material category.
Glass	28	Remainder/Composite Glass	Non-container glass. This category includes items made mostly of glass but combined with other materials. Examples include Pyrex, Corningware, crystal and other glass tableware, mirrors, non-fluorescent light bulbs, auto windshields, laminated glass, or any curved glass. Uncoated plate glass - includes window and door glass, table-tops, and some auto glass (side windows).
Organics	29	Food Waste	Food wastes and scraps, including meat, bone, dairy, grains, rinds, teabags, coffee grounds with filters, etc. Excludes the weight of food containers, except when container weight is not appreciable compared to the food inside. Compostable peanuts, food packaging with food scraps, and small wooden produce crates are also included in this category.
Organics	30	Yard Waste	Plant material, including woody material, from any public or private landscapes. Examples include leaves, grass clippings, plants, brush and branch prunings and trimmings.

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Group	#	Material Category	Material Definition
Organics	31	Remainder/Composite Organics	Organic material that is not food or yard waste. Includes cork, popsicle sticks, hair, animal waste, cigarette butts, chopsticks, woven baskets, and small non-construction related wood products.
C&D	32	Wood - Treated/Painted/Stained	Wood that contains an adhesive, paint, stain, fire retardant, pesticide or preservative. Does not include wood furniture.
C&D	33	Wood - Untreated/Clean	Any wood which does not contain an adhesive, paint, stain, fire retardant, pesticide or preservative; includes such items as bulky wood waste or scraps from newly built wood products. Does not including land clearing debris or yard waste prunings and trimmings. The presences of nails or screws are acceptable.
C&D	34	Drywall/Gypsum Board	Interior wall covering made of a sheet of gypsum sandwiched between paper layers. Examples include used or unused, broken or whole sheets of sheetrock, drywall, gypsum board, plasterboard, gypsum board, gyproc, and wallboard.
C&D	35	Asphalt Roofing	Composite shingles and other roofing material made with asphalt. Examples include asphalt shingles and attached roofing tar and tar paper.
C&D	36	Asphalt Paving, Brick, Concrete, and Rock	Includes asphalt paving materials, set or unset, and all types of fire-clay bricks. Includes Portland cement mixtures (set or unset), with or without aggregate materials (gravel, etc.). Includes rock gravel larger than 2"in diameter.
C&D	37	Carpet & Carpet Padding	Flooring applications consisting of various natural or synthetic fibers bonded to some type of backing material. Carpet padding may include plastic, foam, felt, or other material used under the carpet to provide insulation and padding.
C&D	38	Remainder/Composite Construction & Demolition	Construction and demolition material that cannot be put in any other type or subtype. This type may include items from different types combined, which would be very hard to separate. Also includes fiberglass insulation, ceramic fixtures, and other miscellaneous C&D Materials not mentioned above.
HHW	39	Household Hazardous Waste or HHW	Hazardous household items containing paints, thinners, solvents, vehicle equipment fluids, cleaners, pesticides/herbicides and fertilizers. Includes fluorescent bulbs and CFLs, light ballasts, and mercury-containing devices.
HHW	40	Batteries (All Types)	Dry batteries, rechargeable batteries and lead-acid batteries.

Group	#	Material Category	Material Definition
HHW	41	Medically-Related Waste	Treated or untreated medical waste. Includes bandages, gauze, diabetic strips, syringes, needles, other sharps, and medical tubing. Includes similar items from veterinary usage, medical research, or industrial laboratories.
Electronics	42	All Electronics	Includes all electronic items with a circuit board, including CRTs or other video displays, plasma and LCD monitors. cell phones, personal computers, laptop computers, notebook computers, processors, keyboards, etc. Includes stereos, VCRs, DVD players, etc. This category does not include automated typewriters or typesetters.
Other	43	Textiles & Leather Products	Includes clothing, fabrics, curtains, blankets, stuffed animals, and other cloth material. Also includes leather products including belts, leather handbags, purses, and wallets. This category includes footwear that is mostly cloth or leather. Does not include carpeting.
Other	44	Rubber Products	Finished products and scrap materials made of natural and synthetic rubber, such as bathmats, inner tubes (not tires), rubber hoses, and foam rubber. Includes rubber gloves and footwear (if predominately rubber).
Other	45	Disposable Diapers & Sanitary Products	Adult and baby disposable diapers, and feminine hygiene products.
Other	46	Dirt & Fines	Small mixed fragments 2" and smaller, and includes miscellaneous fines (paper, plastic, glass, etc.), sand, and dirt.
Other	47	Bulky Materials	Large, hard-to-handle items that are not defined separately. Examples include all sizes and types of furniture, mattresses, box springs, and base components.
Other	48	Other Materials Not Elsewhere Classified	Any other type of waste material not listed in any other sort category. Includes cosmetics, shampoos, lotions, etc.
Other	49R	Tanglers (Recycling Only)	Non-film bag materials that get entangled in MRF sorting equipment, such as hoses, coat hangers, electrical cords, rope, etc.
Other	50R	Bagged Material (Recycling Only)	Bagged materials present in recycling samples in which the contents cannot be readily identified as recyclables. The entire day's collection of bagged materials will be set aside on a daily basis and sorted as a separate recycling sample at the end of the day.

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