To:	Mr. Joey Hejnowicz, Assistant Analyst, Ms. Gloria Hurtado, Deputy City Manager, City of Santa Rosa
From:	Cascadia Consulting Group
Date:	December 11, 2018
Subject:	Service Opportunities Assessment and Targeted Waste Generation Sectors Memorandum (Task 3.2)

Introduction

Cascadia performed waste modeling to inform the development of Santa Rosa's Zero Waste Plan. The modeling produced the following data points:

- 2018 projected tons by stream (disposal, recycling, organics)
- 2018 projected tons by generator (single family, multi-family, commercial, and self-haul)
- 2018 modeled composition for generators by stream
- Modeled recoverability rates of disposal streams by generator
- Modeled contamination rates of recovery streams by generator
- Top recoverable materials in disposal by generator
- Top contaminants in recovery streams by generator
- 2018 projected inbound recycling rates
- 2018 estimated diversion rates and maximum diversion rates

Data Sources

Cascadia used the following data sources to inform the modeling for Santa Rosa:

- Recology Quarterly Reports of tons of waste for the first and second quarter of 2018 by stream (disposal, recycling, organics) and generator (single family, multi-family, commercial, commercial roll off, and schools);
- Sonoma County Monthly Tonnage Report for January through July of 2018;
- Recoverability classifications from "What Goes Where" on the Recology website for the City of Santa Rosa (https://www.recology.com/recology-sonoma-marin/santa-rosa/what-goes-where/).
- Waste composition data for single family, multi-family, commercial, and self-hauled disposal presented in "Waste Characterization Study 2014 Final Report, Prepared for Sonoma County Waste Management Agency";
- The "2014 Disposal-Facility-Based Characterization of Solid Waste in California" and the "2014 Generator-Based Characterization of Commercial Sector Disposal and Diversion in California" conducted by California Department of Resources Recycling and Recovery (CalRecycle) and published in 2015;
- Proprietary Cascadia data from a waste composition study completed in 2014 for an undisclosed Bay Area community; and

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- Recycling and organics waste composition data for single family, multi-family, and commercial generators from Seattle and King County, Washington waste studies performed in 2012, 2015, 2016, and 2017 available at http://www.seattle.gov/util/Documents/Reports/SolidWasteReports/index.htm and https://kingcounty.gov/depts/dnrp/solid-waste/programs/documents-publications.aspx.

Terms and Definitions

Cascadia used the following definitions to present modeling results.

Franchised Tons	Tons of material generated by the residential and commercial sectors and collected by Recology through either curbside or roll-off service.
Generation	The sum of tons collected of disposal, recycling, and organics material.
Contamination	Materials that Recology does not accept in the curbside recycling or organics collection programs, but that customers inadvertently place in their recycling or organics collection containers. These contaminants affect the quality of the recycling and/or organics products that Recology recovers from their customers.
Capture Rate	The proportion of recyclable and compostable material that is recovered out of all the recyclable and compostable material that is generated.
Inbound Recovery Rate	The proportion of curbside recycled and curbside composted tons (including contamination) to total waste tons generated.
Diversion Rate	The proportion of curbside recycled and curbside composted tons (excluding contamination) to total waste tons generated.
Maximum Diversion Rate	The theoretical diversion rate if all recyclable and compostable materials were collected through the appropriate recovery streams.

Modeling Methods and Findings

This section outlines the assumptions and methodology Cascadia employed as well as the findings for: tons by sector, stream composition, recoverability, and diversion potential.

Annual Tons

Records of residential single family, multi-family, and commercial tons by stream were acquired from Recology's 2018 quarterly records. Since only records from the first and second quarters were available, Cascadia scaled the data to project total tons per year. As shown in Table 1 below, the commercial sector is reported by Recology as three sub-sectors: cart and bin customers, roll off bin customers, and schools.[1] Self-haul tons were reported in the Sonoma County Monthly Tonnage Report. Records were only available from January through July 2018 and were also projected to reflect an entire year.

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[1] Several schools have independent disposal contracts and are therefore reported separately. The schools subsector tons do not include all schools in Santa Rosa.

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Table 1: Estimated Annual Tons

	Estimated Annual Tons					Inbound	Estimated
	Garbage	Recycling	Organics	Generation	% Generation	Recycling Rate	Diversion Rate
Single Family residential	32,570	21,360	25,110	79,040	43%	59%	52%
Multi-family residential	6,310	820	30	7,160	4%	12%	10%
Commercial	56,150	14,800	7,280	78,230	43%	28%	23%
Commercial cart and bin customers	*52,500*	*13,860*	*7,190*	*73,550*	40%		
Commercial roll off customers	*320*	*570*	*-*	*890*	0%		
Schools	*3,330*	*370*	*90*	*3,790*	2%		
Self-haul	17,860	1,010	410	19,280	10%	7%	5%
TOTAL	**112,890**	**37,990**	**32,830**	**183,710**		**39%**	**33%**

Figure 1 presents the proportion of material generated annually by collection stream and by generator type. The single family and commercial sectors are the largest generators, each accounting for 43% of waste generated in the county.

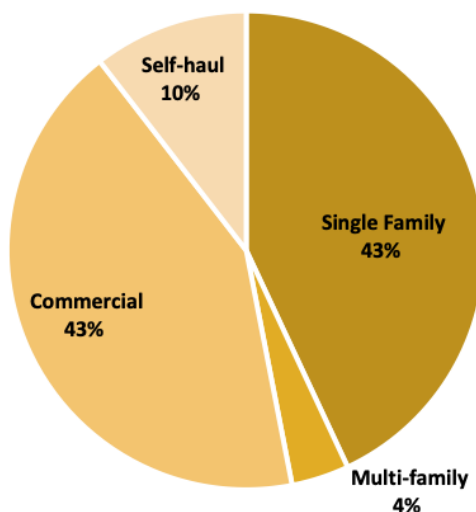**Figure 1: Total Santa Rosa Waste Generation by Generator**

Figure 2 displays annual tons collected for Santa Rosa by stream, as well as the diversion rate achieved by each sector. The single family sector recovers the most recycling and compost. The commercial sector has the greatest diversion potential in tons.
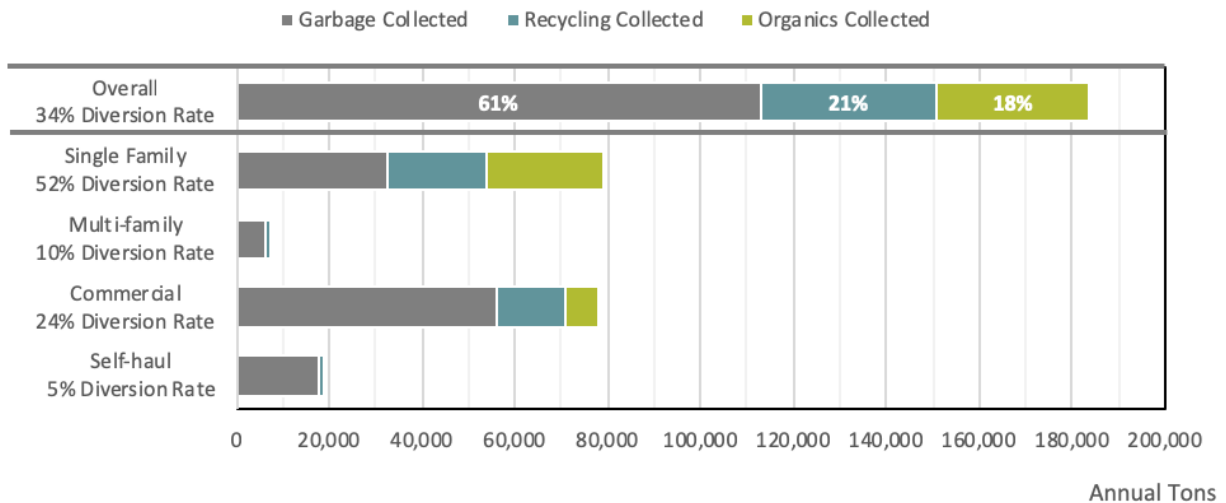
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Figure 2: Annual Tons by Stream

As shown in Figure 3, the single family sector diverts approximately 52% of the waste it generates through recycling and composting. Overall, Santa Rosa's commercial sector diverts 23% of its waste, the multi-family sector diverts just 10% of its waste, and self-haul diverts 5% of its waste.

Figure 3: Diversion Rates Overall and by Generator
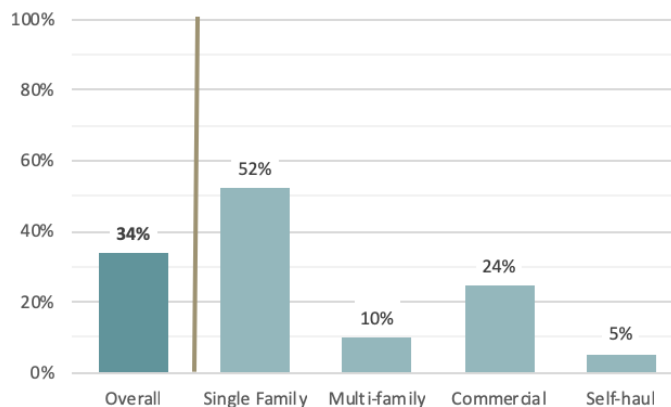
Detailed Compositions

Cascadia modeled the composition of materials in each sector from composition data collected from the 2014 CalRecycle statewide studies (a large dataset of various distinct communities throughout the state of California) and data from a large waste composition study completed in 2014 for a Bay Area community with similar generation patterns to Santa Rosa (the city does not wish to be identified). Cascadia also referenced disposal composition from the 2014 waste characterization study for Sonoma County. To inform recovery compositions, Cascadia referenced composition data from communities in California and Seattle and King County, Washington.

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Distinguishing characteristics that Cascadia took into account when selecting representative compositions for use in modeling included: level of urbanization, geographic proximity, and availability of waste collection and diversion systems such as single stream recycling collection, acceptance of food waste in the organics curbside service, and construction and demolition waste processing.

Material compositions were presented as 30 material types, with a focus on recoverable materials, and were summarized into seven material classes.

Detailed disposal composition results by generator are shown in Tables 2-5.

Table 2: Detailed Disposal Composition: Single Family

Residential - Single Family								
	Garbage		**Recycle**		**Organics**		**Total Generation**	
Material	Est. %	Est. Tons	Est. %	Est. Tons	Est. %	Est. Tons	Est. %	Est. Tons
Paper	**18.4%**	**5,982**	**64.7%**	**13,830**	**5.4%**	**1,362**	**26.8%**	**21,175**
Corrugated Cardboard and Kraft	2.1%	676	18.4%	3,934	1.2%	308	6.2%	4,918
Newspaper	1.2%	381	13.0%	2,786	0.4%	110	4.1%	3,277
Other Recyclable Paper	5.7%	1,850	28.8%	6,153	0.6%	160	10.3%	8,164
Polycoated Paper	0.2%	71	0.7%	140	0.2%	51	0.3%	262
Compostable Paper	8.5%	2,780	1.4%	306	2.8%	708	4.8%	3,794
Non-Recoverable Paper	0.7%	225	2.4%	510	0.1%	25	1.0%	760
Plastic	**13.3%**	**4,342**	**7.2%**	**1,535**	**0.4%**	**96**	**7.6%**	**5,973**
#1 & #2 Plastic Containers	2.0%	653	2.4%	521	0.0%	6	1.5%	1,181
Other Recyclable Plastics	3.5%	1,141	2.7%	585	0.1%	37	2.2%	1,763
Recoverable Film	1.3%	413	0.0%	9	0.0%	2	0.5%	424
Non-recoverable Film	4.8%	1,556	0.7%	142	0.1%	33	2.2%	1,731
Non-recoverable Plastics	1.8%	579	1.3%	277	0.1%	19	1.1%	874
Glass	**2.8%**	**913**	**18.9%**	**4,037**	**0.1%**	**16**	**6.3%**	**4,966**
Glass Containers	2.6%	833	12.8%	2,738	0.1%	15	4.5%	3,586
Non-recoverable Glass	0.2%	80	6.1%	1,299	0.0%	1	1.7%	1,380
Metal	**3.1%**	**1,013**	**3.4%**	**717**	**0.1%**	**30**	**2.2%**	**1,760**
Tin/Steel Cans	0.8%	270	1.4%	294	0.0%	3	0.7%	568
Aluminum Cans & Foil	0.3%	107	0.8%	175	0.0%	6	0.4%	288
Other Recoverable Metal	1.4%	450	0.5%	115	0.1%	21	0.7%	586
Non-recoverable Metal	0.6%	186	0.6%	132	0.0%	-	0.4%	318
Organics	**42.5%**	**13,854**	**3.7%**	**785**	**90.4%**	**22,693**	**47.2%**	**37,330**
Food	24.1%	7,840	1.2%	264	18.0%	4,524	16.0%	12,628
Yard Waste	4.7%	1,545	0.8%	170	72.2%	18,133	25.1%	19,846
Textiles	4.0%	1,314	1.3%	275	0.0%	9	2.0%	1,598
Non-recoverable Organics	9.7%	3,155	0.4%	76	0.1%	26	4.1%	3,258
Construction & Demolition	**11.4%**	**3,719**	**0.5%**	**110**	**1.1%**	**282**	**5.2%**	**4,111**
Recoverable Wood	1.8%	577	0.0%	2	0.0%	6	0.7%	585
Carpet	1.0%	328	0.0%	-	0.0%	-	0.4%	328
Recoverable C&D	5.6%	1,812	0.0%	-	0.0%	0	2.3%	1,812
Non-recoverable C&D	3.1%	1,002	0.5%	109	1.1%	275	1.8%	1,386
Other Materials	**8.4%**	**2,747**	**1.6%**	**346**	**2.5%**	**632**	**4.7%**	**3,724**
Household Hazardous Waste	0.4%	117	0.0%	5	0.0%	0	0.2%	122
Electronic Waste	0.4%	121	0.1%	14	0.0%	-	0.2%	135
Tires	0.1%	16	0.1%	17	0.0%	0	0.0%	33
Bulky Items	0.9%	303	0.0%	-	0.0%	-	0.4%	303
Non-recoverable Other	6.7%	2,190	1.5%	310	2.5%	632	4.0%	3,132
Totals	**100.0%**	**32,570**	**100.0%**	**21,360**	**100.0%**	**25,110**	**100.0%**	**79,040**

Percentages for material types may not total 100% due to rounding.

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Table 3: Detailed Disposal Composition: Multi-family

Residential - Multi-family	Garbage		Recycle		Organics		Total Generation	
Material	Est. %	Est. Tons	Est. %	Est. Tons	Est. %	Est. Tons	Est. %	Est. Tons
Paper	**22.1%**	**1,396**	**62.3%**	**511**	**10.6%**	**3**	**26.7%**	**1,911**
Corrugated Cardboard and Kraft	2.9%	185	26.8%	220	1.9%	1	5.7%	406
Newspaper	1.8%	116	11.3%	93	0.4%	0	2.9%	209
Other Recyclable Paper	9.1%	576	18.8%	154	1.0%	0	10.2%	730
Polycoated Paper	0.2%	15	0.6%	5	1.1%	0	0.3%	20
Compostable Paper	6.8%	429	2.6%	22	5.8%	2	6.3%	452
Non-Recoverable Paper	1.2%	74	2.2%	18	0.3%	0	1.3%	92
Plastic	**13.7%**	**865**	**8.5%**	**70**	**2.5%**	**1**	**13.1%**	**936**
#1 & #2 Plastic Containers	2.8%	179	3.6%	29	0.1%	0	2.9%	208
Other Recyclable Plastics	3.5%	219	2.6%	21	0.2%	0	3.4%	240
Recoverable Film	1.1%	72	0.2%	2	0.0%	0	1.0%	74
Non-recoverable Film	4.1%	258	1.1%	9	1.0%	0	3.7%	268
Non-recoverable Plastics	2.2%	138	1.0%	8	1.1%	0	2.0%	146
Glass	**4.6%**	**288**	**18.4%**	**151**	**0.9%**	**0**	**6.1%**	**440**
Glass Containers	4.0%	253	15.9%	130	0.9%	0	5.4%	384
Non-recoverable Glass	0.6%	35	2.5%	20	0.0%	0	0.8%	56
Metal	**4.2%**	**267**	**3.0%**	**25**	**0.3%**	**0**	**4.1%**	**293**
Tin/Steel Cans	1.1%	67	1.1%	9	0.0%	0	1.1%	76
Aluminum Cans & Foil	0.4%	28	0.9%	8	0.1%	0	0.5%	36
Other Recoverable Metal	1.7%	108	0.7%	5	0.2%	0	1.6%	114
Non-recoverable Metal	1.0%	64	0.4%	3	0.0%	0	0.9%	67
Organics	**41.7%**	**2,633**	**6.2%**	**51**	**84.2%**	**25**	**37.8%**	**2,707**
Food	25.5%	1,608	3.9%	32	60.4%	18	23.1%	1,657
Yard Waste	2.4%	154	0.6%	5	23.0%	7	2.3%	165
Textiles	5.1%	322	1.0%	8	0.1%	0	4.6%	330
Non-recoverable Organics	8.7%	549	0.8%	6	0.6%	0	7.8%	555
Construction & Demolition	**6.3%**	**399**	**0.2%**	**2**	**0.8%**	**0**	**5.6%**	**401**
Recoverable Wood	1.6%	103	0.0%	0	0.1%	0	1.4%	103
Carpet	0.3%	17	0.0%	-	0.0%	-	0.2%	17
Recoverable C&D	1.7%	109	0.0%	0	0.0%	0	1.5%	109
Non-recoverable C&D	2.7%	170	0.2%	2	0.7%	0	2.4%	172
Other Materials	**7.3%**	**461**	**1.3%**	**11**	**0.7%**	**0**	**6.6%**	**472**
Household Hazardous Waste	0.2%	12	0.0%	0	0.0%	0	0.2%	12
Electronic Waste	0.7%	45	0.0%	0	0.0%	0	0.6%	45
Tires	0.0%	3	0.1%	1	0.0%	0	0.0%	4
Bulky Items	1.8%	113	0.3%	2	0.0%	-	1.6%	116
Non-recoverable Other	4.6%	288	0.9%	7	0.7%	0	4.1%	296
Totals	**100.0%**	**6,310**	**100.0%**	**820**	**100.0%**	**30**	**100.0%**	**7,160**

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Table 4: Detailed Disposal Composition: Commercial

Commercial	Garbage		Recycle		Organics		Total Generation	
Material	Est. %	Est. Tons	Est. %	Est. Tons	Est. %	Est. Tons	Est. %	Est. Tons
Paper	**24.4%**	**13,717**	**59.5%**	**8,809**	**12.2%**	**888**	**29.9%**	**23,410**
Corrugated Cardboard and Kraft	3.9%	2,167	32.9%	4,873	0.8%	57	9.1%	7,095
Newspaper	1.2%	647	3.1%	457	0.2%	14	1.4%	1,117
Other Recyclable Paper	7.4%	4,178	19.2%	2,842	0.8%	57	9.0%	7,076
Polycoated Paper	0.2%	117	0.3%	41	1.0%	75	0.3%	234
Compostable Paper	10.2%	5,734	3.3%	483	8.8%	642	8.8%	6,859
Non-Recoverable Paper	1.6%	874	0.8%	113	0.6%	43	1.3%	1,030
Plastic	**15.5%**	**8,697**	**9.6%**	**1,426**	**2.1%**	**151**	**13.1%**	**10,273**
#1 & #2 Plastic Containers	1.9%	1,078	5.1%	748	0.1%	4	2.3%	1,831
Other Recyclable Plastics	3.0%	1,660	2.1%	313	0.3%	23	2.6%	1,997
Recoverable Film	1.7%	947	0.2%	30	0.0%	2	1.3%	979
Non-recoverable Film	5.8%	3,234	1.3%	198	1.0%	70	4.5%	3,502
Non-recoverable Plastics	3.2%	1,777	0.9%	136	0.7%	52	2.5%	1,964
Glass	**2.8%**	**1,551**	**9.7%**	**1,442**	**0.4%**	**31**	**3.9%**	**3,024**
Glass Containers	2.2%	1,220	8.6%	1,268	0.4%	31	3.2%	2,518
Non-recoverable Glass	0.6%	331	1.2%	175	0.0%	0	0.6%	506
Metal	**3.8%**	**2,117**	**12.3%**	**1,818**	**0.3%**	**23**	**5.1%**	**3,954**
Tin/Steel Cans	0.6%	339	1.9%	280	0.2%	16	0.8%	635
Aluminum Cans & Foil	0.4%	231	0.3%	48	0.0%	2	0.4%	281
Other Recoverable Metal	1.7%	957	9.9%	1,463	0.1%	5	3.1%	2,421
Non-recoverable Metal	1.1%	590	0.2%	26	0.0%	0	0.8%	617
Organics	**36.0%**	**20,188**	**6.5%**	**955**	**73.0%**	**5,317**	**33.8%**	**26,460**
Food	23.2%	13,002	5.3%	790	59.0%	4,298	23.1%	18,089
Yard Waste	4.9%	2,759	0.1%	19	13.8%	1,002	4.8%	3,781
Textiles	3.5%	1,939	0.6%	85	0.0%	3	2.6%	2,027
Non-recoverable Organics	4.4%	2,488	0.4%	61	0.2%	14	3.3%	2,563
Construction & Demolition	**12.5%**	**7,007**	**1.7%**	**257**	**11.7%**	**853**	**10.4%**	**8,116**
Recoverable Wood	4.2%	2,345	0.2%	28	11.3%	820	4.1%	3,194
Carpet	0.7%	386	0.2%	25	0.0%	-	0.5%	411
Recoverable C&D	3.2%	1,821	0.8%	111	0.0%	-	2.5%	1,932
Non-recoverable C&D	4.4%	2,455	0.6%	93	0.4%	32	3.3%	2,580
Other Materials	**5.1%**	**2,873**	**0.6%**	**94**	**0.2%**	**17**	**3.8%**	**2,983**
Household Hazardous Waste	0.7%	371	0.1%	13	0.0%	1	0.5%	385
Electronic Waste	0.6%	341	0.0%	6	0.0%	-	0.4%	348
Tires	0.2%	89	0.1%	8	0.0%	0	0.1%	97
Bulky Items	0.5%	274	0.0%	-	0.0%	-	0.4%	274
Non-recoverable Other	3.2%	1,797	0.4%	66	0.2%	16	2.4%	1,879
Totals	**100.0%**	**56,150**	**100.0%**	**14,800**	**100.0%**	**7,280**	**100.0%**	**78,220**

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Table 5: Detailed Disposal Composition: Self-haul

Self-haul	Garbage		Recycle		Organics		Total Generation	
Material	Est. %	Est. Tons	Est. %	Est. Tons	Est. %	Est. Tons	Est. %	Est. Tons
Paper	**9.5%**	**1,698**	**37.2%**	**375**	**0.4%**	**2**	**10.8%**	**2,076**
Corrugated Cardboard and Kraft	2.0%	350	22.5%	228	0.1%	0	3.0%	578
Newspaper	0.4%	72	0.2%	2	0.0%	0	0.4%	75
Other Recyclable Paper	4.9%	881	12.8%	129	0.0%	0	5.2%	1,011
Polycoated Paper	0.0%	9	0.1%	1	0.0%	0	0.0%	9
Compostable Paper	1.9%	336	1.5%	15	0.3%	1	1.8%	353
Non-Recoverable Paper	0.3%	51	0.0%	-	0.0%	0	0.3%	51
Plastic	**6.3%**	**1,126**	**4.1%**	**41**	**0.1%**	**0**	**6.1%**	**1,168**
#1 & #2 Plastic Containers	0.6%	106	2.4%	24	0.0%	0	0.7%	130
Other Recyclable Plastics	1.9%	336	0.5%	5	0.0%	-	1.8%	341
Recoverable Film	1.0%	173	0.2%	2	0.0%	0	0.9%	175
Non-recoverable Film	0.9%	168	0.2%	2	0.0%	0	0.9%	171
Non-recoverable Plastics	1.9%	343	0.8%	8	0.0%	0	1.8%	351
Glass	**2.1%**	**372**	**8.6%**	**87**	**0.0%**	**0**	**2.4%**	**459**
Glass Containers	0.8%	139	8.6%	87	0.0%	0	1.2%	226
Non-recoverable Glass	1.3%	233	0.0%	0	0.0%	-	1.2%	233
Metal	**3.2%**	**574**	**24.5%**	**247**	**0.0%**	**0**	**4.3%**	**821**
Tin/Steel Cans	0.3%	60	0.3%	3	0.0%	0	0.3%	63
Aluminum Cans & Foil	0.1%	17	0.3%	3	0.0%	0	0.1%	20
Other Recoverable Metal	2.1%	372	12.0%	121	0.0%	0	2.6%	493
Non-recoverable Metal	0.7%	124	11.9%	120	0.0%	0	1.3%	244
Organics	**18.1%**	**3,241**	**16.7%**	**169**	**100.0%**	**410**	**19.8%**	**3,818**
Food	3.5%	631	7.1%	72	0.0%	-	3.6%	703
Yard Waste	6.3%	1,118	5.1%	51	99.6%	408	8.2%	1,576
Textiles	4.2%	759	4.6%	46	0.0%	0	4.2%	805
Non-recoverable Organics	4.1%	732	0.0%	-	0.4%	2	3.8%	734
Construction & Demolition	**51.0%**	**9,100**	**0.1%**	**1**	**0.0%**	**0**	**47.2%**	**9,101**
Recoverable Wood	15.8%	2,815	0.0%	-	0.0%	-	14.6%	2,815
Carpet	5.2%	920	0.0%	-	0.0%	-	4.8%	920
Recoverable C&D	15.5%	2,760	0.0%	-	0.0%	0	14.3%	2,760
Non-recoverable C&D	14.6%	2,605	0.1%	1	0.0%	-	13.5%	2,606
Other Materials	**9.8%**	**1,749**	**8.9%**	**90**	**0.0%**	**0**	**9.5%**	**1,839**
Household Hazardous Waste	0.3%	47	0.0%	-	0.0%	0	0.2%	47
Electronic Waste	0.9%	158	1.1%	11	0.0%	0	0.9%	169
Tires	0.1%	25	0.0%	-	0.0%	-	0.1%	25
Bulky Items	6.3%	1,125	0.0%	-	0.0%	-	5.8%	1,125
Non-recoverable Other	2.2%	394	7.8%	79	0.0%	0	2.5%	472
Totals	**100.0%**	**17,860**	**100.0%**	**1,010**	**100.0%**	**410**	**100.0%**	**19,280**

Percentages for material types may not total 100% due to rounding.

Disposal Recoverability

Cascadia modeled the recoverability of disposed materials by assigning each of the 30 detailed material types to one of four recoverability categories:

- **Curbside recyclable:** materials readily accepted for recycling in Recology's curbside recycling collection system.

- **Curbside compostable**: materials readily accepted for composting in Recology's curbside organics collection system.

- **Other recoverable:** materials that could be recovered or diverted through other collection programs, such as household hazardous waste (HHW) or construction and demolition (C&D) materials.

- **Non-recoverable**: Any materials not readily accepted for recovery or diversion in Recology's current curbside collection programs or in other programs (for example, HHW and C&D) currently in place for Santa Rosa.

Material class and recoverability classification by detailed material type are provided in Table 6.

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Table 6: Detailed Material Types with Classifications

Material Class	Material Type	Recoverability Group	Class by Recoverability
Paper			
	Corrugated Cardboard and Kraft	Curbside Recyclable	Recyclable Paper
	Newspaper	Curbside Recyclable	Recyclable Paper
	Other Recyclable Paper	Curbside Recyclable	Recyclable Paper
	Polycoated Paper	Non-recoverable	Non-recoverable
	Compostable Paper	Curbside Compostable	Compostable Paper
	Non-Recoverable Paper	Non-recoverable	Non-recoverable
Plastic			
	#1 & #2 Plastic Containers	Curbside Recyclable	Plastic
	Other Recyclable Plastics	Curbside Recyclable	Plastic
	Recoverable Film	Other Recoverable	Plastic
	Non-recoverable Film	Non-recoverable	Non-recoverable
	Non-recoverable Plastics	Non-recoverable	Non-recoverable
Glass			
	Glass Containers	Curbside Recyclable	Glass
	Non-recoverable Glass	Non-recoverable	Non-recoverable
Metal			
	Tin/Steel Cans	Curbside Recyclable	Metal
	Aluminum Cans & Foil	Curbside Recyclable	Metal
	Other Recoverable Metal	Curbside Recyclable	Metal
	Non-recoverable Metal	Non-recoverable	Non-recoverable
Organics			
	Food	Curbside Compostable	Compostable Food
	Yard Waste	Curbside Compostable	Compostable Yard Waste & Wood
	Textiles	Other Recoverable	Other Recoverable
	Non-recoverable Organics	Non-recoverable	Non-recoverable
Construction & Demolition			
	Recoverable Wood	Curbside Compostable	Compostable Yard Waste & Wood
	Carpet	Other Recoverable	Other Recoverable
	Recoverable C&D	Other Recoverable	Other Recoverable
	Non-recoverable C&D	Non-recoverable	Non-recoverable
Other Materials			
	Household Hazardous Waste	Other Recoverable	Other Recoverable
	Electronic Waste	Other Recoverable	Other Recoverable
	Tires	Other Recoverable	Other Recoverable
	Bulky Items	Non-recoverable	Non-recoverable
	Non-recoverable Other	Non-recoverable	Non-recoverable

Figure 4 below displays the estimated recoverability of Santa Rosa's disposed materials by sector. The tons of recoverable materials were modeled by summing the weight of detailed material types based on assigned recoverability. For the single family, multi-family, and commercial sectors shown, more than half of disposed waste – as represented by the row labeled "garbage" -- has the potential for recovery through existing recycling and organics programs. For the recycling and organic streams, the brown bars indicate the tons of reported contamination (materials that are incorrectly placed in those streams).

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**Figure 4: Recoverability of Disposed Materials and Contamination
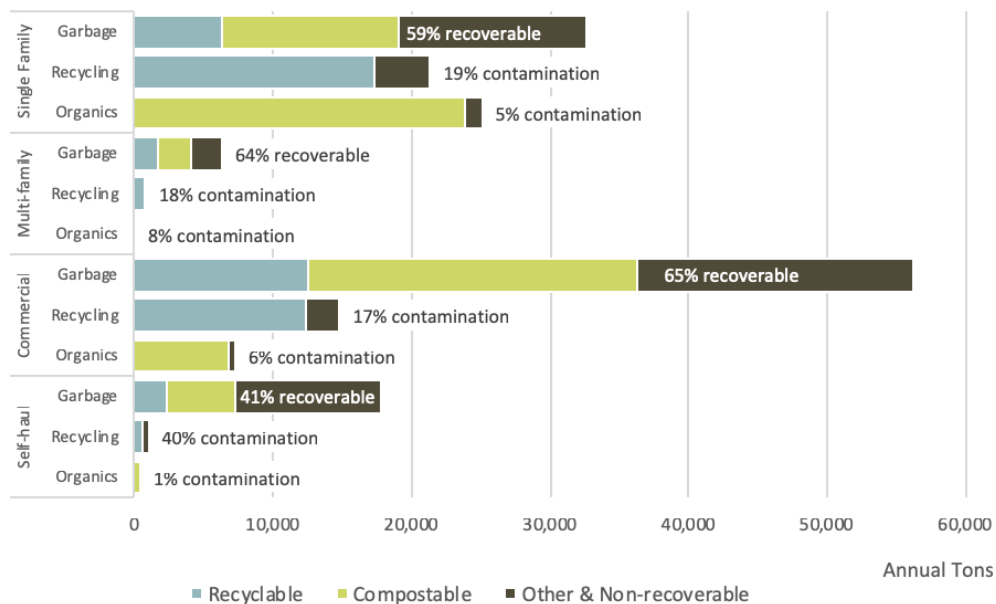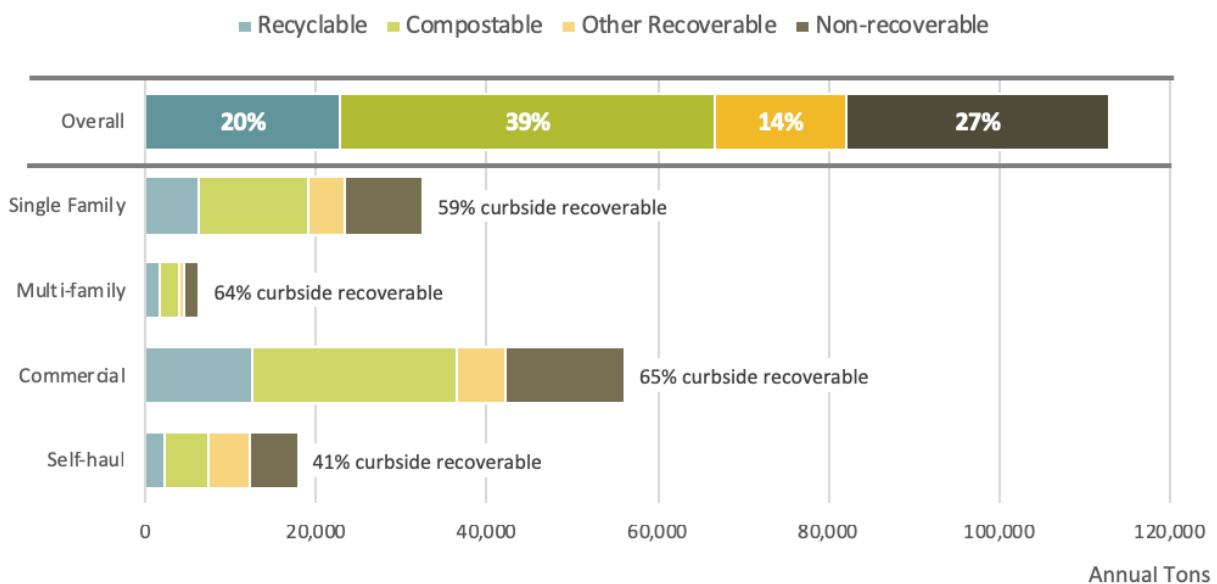of Recovery Streams by Generator Group**

Figure 5 below shows the annual tonnage and composition of garbage by recoverability class. Overall, 73% of Santa Rosa's garbage stream is recoverable or potentially recoverable. An estimated 39% is compostable and another 20% is recyclable.

Figure 5: Recoverability of Materials in the Garbage Stream by Generator Group

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In Figure 6, estimated tons of recoverable materials in Santa Rosa's landfilled waste is presented by recoverability class and sector. As shown below, compostable food and recyclable paper are the most prevalent disposed materials that could be diverted.

Figure 6: Recoverability and Class of Materials in the Garbage Stream by Generator Group
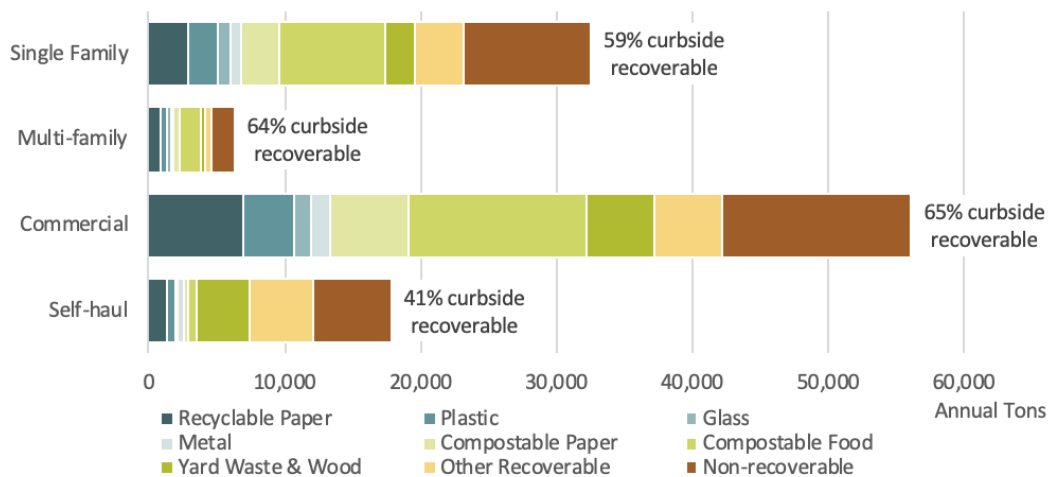
Recoverability and Projected Recovery Rates

For planning purposes, Cascadia estimated a maximum diversion rate for each sector. The maximum diversion rate is based on capturing 100% diversion of recyclable and compostable materials accepted in Santa Rosa's existing programs. Figure 7 shows the maximum potential diversion rate compared to the current estimated diversion rate.

Figure 7: Current and Maximum Diversion Rates Overall and by Generator
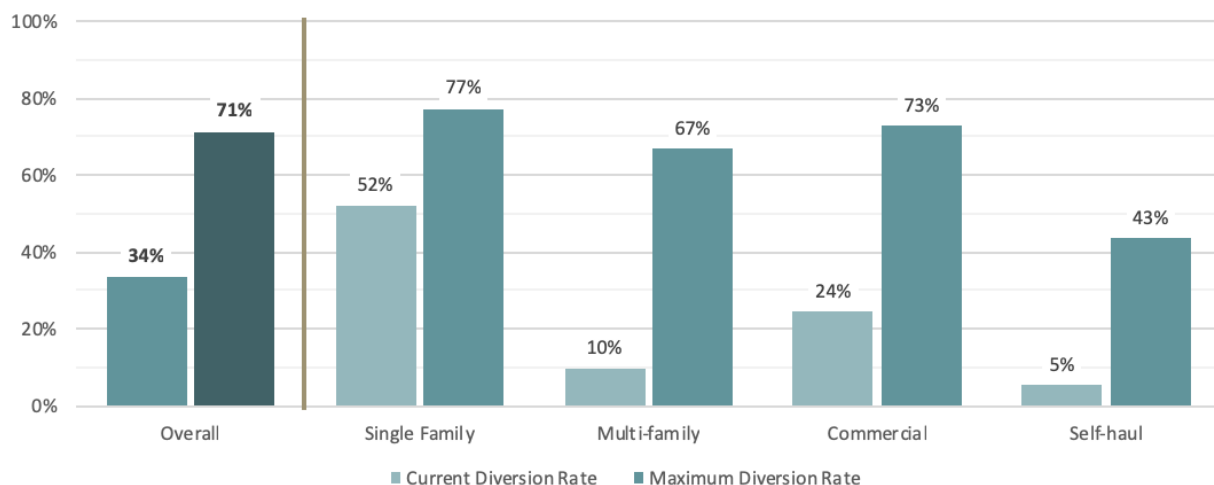
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A capture rate is different from the recovery rate in that it reflects the proportion of recyclable and compostable material that is recovered by the programs out of all the recyclable and compostable material that is generated by that sector. The estimated capture rates for recyclable and compostable materials are shown in Figure 8. As depicted below, 58% of all the recyclable materials generated in Santa Rosa are captured by the recycling programs, and 43% of all the compostable materials generated in Santa Rosa are captured by the composting programs.

Figure 8: 2015 Capture Rates by Generator
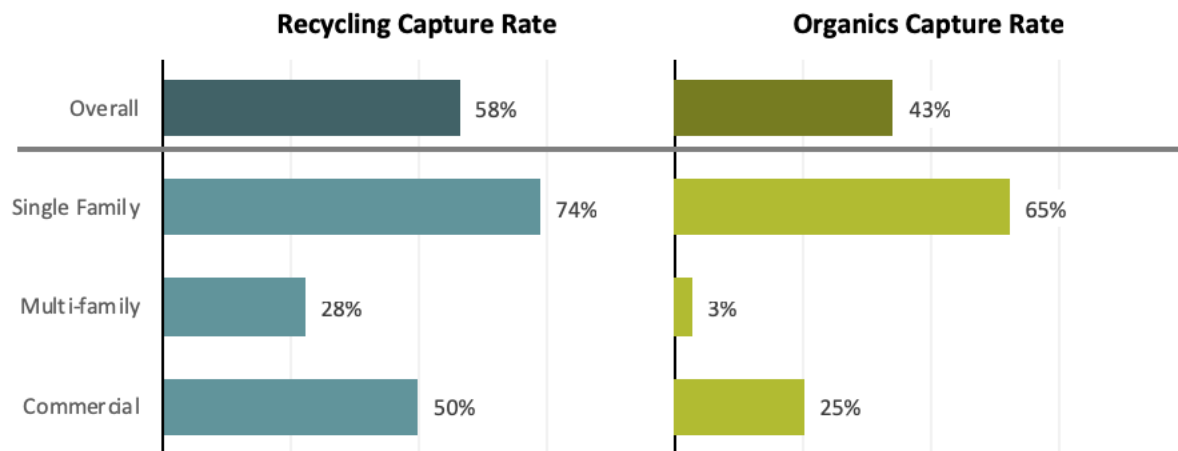
Future Diversion Potential

The majority of waste in Santa Rosa is generated by the single family residential and commercial sectors. The largest amount of recoverable materials not currently being captured in existing programs are compostable paper, recyclable paper, and compostable food, as shown in Figure 6.

The highest potential to substantially increase diversion is in the commercial sector. Given that the maximum potential diversion rate for the commercial sector is 73%, but the current diversion rate in that sector is only 23%, there is much room for improvement. As shown in Table 7 below, the top five recoverable materials found in the commercial garbage stream include food, compostable paper, yard waste and wood. Providing composting technical assistance to Santa Rosa businesses that generate a large amount of food waste and compostable paper – restaurants, hotels, senior living centers, and schools – has the potential to significantly increase diversion in the commercial sector.

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Table 7: Top 5 Recoverable Materials in Garbage: Commercial

Material	Est. Percent	Est. Tons
Food	23.2%	13,002
Compostable Paper	10.2%	5,734
Other Recyclable Paper	7.4%	4,178
Yard Waste	4.9%	2,759
Recoverable Wood	4.2%	2,345
Total	**49.9%**	**28,018**

The single family residential sector's diversion rate of 52% could also be improved by recovering additional compostable food and recyclable paper that is currently being thrown in the garbage. Given that the maximum potential diversion in the single family residential sector is 77%, programs should be designed to encourage participation in existing curbside recycling and composting programs. However, outreach to this sector can be resource-intensive, since each single family residence generates only a small amount of waste.

Although the multi-family sector also has a low diversion rate, it represents a small proportion of Santa Rosa's total waste generation. Therefore, efforts to increase multi-family diversion will have less of an impact on the Santa Rosa's overall diversion rate. Self-haul waste is also a small proportion of Santa Rosa's total waste generation. However, sorting programs at transfer stations in Santa Rosa could target increased diversion from the self-haul sector.

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Appendix A: Material Category Definitions

Paper

Corrugated Cardboard and Kraft: Unwaxed corrugated products and kraft paper and bags made predominantly from paper, unless poly- or foil-laminated.

Newspaper: Printed groundwood newsprint and other minimally bleached groundwood. This category also includes some glossy paper typically used in newspaper insert advertisements.

Other Recyclable Paper: High-grade and low-grade recyclable papers. This includes white or light-colored bond and copy machine papers and envelopes, magazines, phone books, paperback books, colored papers, notebook or other lined paper, envelopes with plastic windows, non-corrugated paperboard, carbonless copy paper, and junk mail.

Polycoated Paper: Predominantly polycoated paper packaging, including milk, ice cream, and aseptic juice containers. This also includes recyclable paper cups of all kinds, including single use coffee cups and cold cups.

Compostable Paper: Includes paper contaminated with food residues at the time of disposal. Examples include pizza boxes and napkins. This also includes compostable paper plates, bowls, tubs, and clamshells that are coated with a compostable/PLA plastic or are non-coated.

Non-recoverable Paper: Paper items that do not fall into another paper category and other non-recoverable paper. Also includes composite items that are predominantly paper by weight.

Plastic

#1 & #2 Plastic Containers: Includes any containers used as packaging marked with a #1 or #2. This includes plastic bottles, jars, tubs, other ridged packaging, clamshells, trays, and plastic cup lids.

Other Recyclable Plastics: All other recyclable containers used as packaging marked with a # 3, #4, #5, #6 or #7 except expanded polystyrene (Styrofoam). Includes bottles, plastic jars, tubs, other ridged packaging, clamshells, trays, and plastic cup lids. Does not include plastics labeled compostable or PLA.

Recoverable Film: Bags made predominantly from plastic. Includes merchandise bags and bulk food bags such as grain or potato bags, pallet wrap, garment bags, newspaper bags, and plastic sleeve packaging.

Non-recoverable Film: Plastic food packaging films, including food-contaminated saran wrap, bulk soup/sauce pouches, and branded packaging. Sometimes includes foil/plastic or paper/plastic composite. Includes candy bar wrappers, chip bags, garbage bags, paper/plastic hybrid sandwich bags, food service tissue with a plastic/foil layer, and mylar coffee pouches.

Non-recoverable Plastic: Plastic items that do not fall into another plastic category and other non-recoverable plastics, such as, expanded polystyrene food service or packaging, empty tubes of toothpaste and toothbrushes, and plastics labeled compostable or PLA. Also includes composite items that are predominantly plastic by weight.

Glass

Glass Jars and Bottles: Clear and colored bottles and jars that are used for food, soft drinks, beer, and wine. This does not include glass serving glasses, glass blocks, or flat glass.

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Non-recoverable Glass: Glass items that do not fall into the Glass Jars and Bottles category. Also includes composite items that are predominantly glass by weight.

Metal

Tin/Steel Cans: Food cans, including zinc, tin, plastic-coated, and lined steel food containers.

Aluminum Cans & Foil: Beverage cans composed of aluminum only and other types of aluminum containers such as pans and trays.

Other Recyclable Metals: Commonly recyclable ferrous and non-ferrous metal items such as sheet metal, cable, paint and other non-food "tin cans," empty aerosol cans, and appliances. Excludes composite materials or electronics.

Non-recoverable Metal: Metal items that do not fall into other metal categories, including metal caps/lids. Also includes composite items predominantly metal by weight, such as umbrellas and coated wire.

Organics

Food: Food material resulting from the processing, storage, preparation, cooking, handling, or consumption of food.

Yard Waste: Compostable plants, pruning, and trimmings including incidental amounts of soil. Woody material must be less than four inches in diameter.

Textiles: Cloth, clothing, shoes and boots, purses, belts, and rope made of 100% cotton, leather, wool, other naturally-occurring fibers, unknown fibers, synthetic fibers, rubber, or a mixture of materials.

Non- recoverable Organics: Includes combustible materials such as wax, bar soap, cigarette butts, scraps of leather and <100% leather products including shoes and belts, feminine hygiene products, ash, and other organic materials not classified elsewhere.

C&D

Recoverable Wood: Wood pallets, dimensional lumber, and other unpainted or stained wood products with only trace amounts of metal, glue, or other contaminants.

Carpet: General category of flooring applications consisting of various natural or synthetic fibers bonded to some type of backing material, including carpet pad.

Recoverable C&D: Recoverable construction, demolition, or land clearing waste such as concrete, asphalt shingles, and clean gypsum wallboard.

Non-recoverable C&D: Construction debris that cannot be classified elsewhere and mixed fine building material scraps. Includes other roofing, ceramics, demolition gypsum board, dried latex paints, ceiling tiles, and fiberglass insulation.

Other Materials

Household Hazardous Waste: Items that are hazardous to human and environmental health. Examples include vehicle and equipment fluids, fluorescent lights, lead acid car batteries, cleaning products, and medical waste.

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Electronic Waste: Any items with circuitry powered by electricity including televisions, computers, cell phones, and tablets.

Tires: Vehicle tires of all types.

Bulky Items: Furniture such as upholstered chairs, mattresses, microwaves, and other over-sized items.

Non-recoverable Other: All materials not fitting into one of the above categories, multi-material composite or indistinct items not elsewhere defined including materials such as residual, personal care products (shampoo, cosmetics), ash, and plastic fiber wipes (baby wipes or Swiffer sheets).

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Appendix B: Additional Tables

The tables below provide (1) additional detail about materials that could potentially be recovered from the garbage streams in the various sectors, (2) top appropriate materials found in various streams, and (3) top contaminants, or incorrect materials, found in various streams.

Table 8: Top 5 Materials in Single Family Garbage

Material	Est. Percent	Est. Tons
Food	24.1%	7,840
Non-recoverable Organics	9.7%	3,155
Compostable Paper	8.5%	2,780
Non-recoverable Other	6.7%	2,190
Other Recyclable Paper	5.7%	1,850
Total	**54.7%**	**17,815**

Table 9: Top 5 Recoverable Materials in Single Family Garbage

Material	Est. Percent	Est. Tons
Food	24.1%	7,840
Compostable Paper	8.5%	2,780
Other Recyclable Paper	5.7%	1,850
Yard Waste	4.7%	1,545
Other Recyclable Plastics	3.5%	1,141
Total	**46.5%**	**15,156**

Table 10: Top 5 Materials in Single Family Recycling

Material	Est. Percent	Est. Tons
Other Recyclable Paper	28.8%	6,153
Corrugated Cardboard and Kraft	18.4%	3,934
Newspaper	13.0%	2,786
Glass Containers	12.8%	2,738
Non-recoverable Glass	6.1%	1,299
Total	**79.2%**	**16,910**

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Table 11: Top 5 Contaminants (Materials that cannot be recycled) in Single Family Recycling

Material	Est. Percent	Est. Tons
Non-recoverable Glass	6.1%	1,299
Non-Recoverable Paper	2.4%	510
Non-recoverable Other	1.5%	310
Non-recoverable Plastics	1.3%	277
Textiles	1.3%	275
Total	**12.5%**	**2,671**

Table 12: Top 5 Materials in Single Family Organics

Material	Est. Percent	Est. Tons
Yard Waste	72.2%	18,133
Food	18.0%	4,524
Compostable Paper	2.8%	708
Non-recoverable Other	2.5%	632
Corrugated Cardboard and Kraft	1.2%	308
Total	**96.8%**	**24,305**

Table 13: Top 5 Contaminants (Materials that cannot be composted) in Single Family Organics

Material	Est. Percent	Est. Tons
Non-recoverable Other	2.5%	632
Non-recoverable C&D	1.1%	275
Polycoated Paper	0.2%	51
Non-recoverable Film	0.1%	33
Non-recoverable Organics	0.1%	26
Total	**4.1%**	**1,017**

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Table 14: Top 5 Materials in Multi-family Garbage

Material	Est. Percent	Est. Tons
Food	25.5%	1,608
Other Recyclable Paper	9.1%	576
Compostable Paper	6.8%	429
Glass Containers	4.0%	253
Other Recyclable Plastics	3.5%	219
Total	**48.9%**	**3,085**

Table 15: Top 5 Recoverable Materials in Multi-family Garbage

Material	Est. Percent	Est. Tons
Food	25.5%	1,608
Other Recyclable Paper	9.1%	576
Non-recoverable Organics	8.7%	549
Compostable Paper	6.8%	429
Textiles	5.1%	322
Total	**55.2%**	**3,484**

Table 16: Top 5 Materials in Multi-family Recycling

Material	Est. Percent	Est. Tons
Corrugated Cardboard and Kraft	26.8%	220
Other Recyclable Paper	18.8%	154
Glass Containers	15.9%	130
Newspaper	11.3%	93
Food	3.9%	32
Total	**76.7%**	**629**

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Table 17: Top 5 Contaminants in Multi-family Recycling

Material	Est. Percent	Est. Tons
Non-recoverable Glass	2.5%	20
Non-Recoverable Paper	2.2%	18
Non-recoverable Film	1.1%	9
Textiles	1.0%	8
Non-recoverable Plastics	1.0%	8
Total	**7.7%**	**63**

Table 18: Top 5 Materials in Multi-family Organics

Material	Est. Percent	Est. Tons
Food	60.4%	18
Yard Waste	23.0%	7
Compostable Paper	5.8%	2
Corrugated Cardboard and Kraft	1.9%	1
Non-recoverable Plastics	1.1%	0
Total	**92.4%**	**28**

Table 19: Top 5 Contaminants in Multi-family Organics

Material	Est. Percent	Est. Tons
Non-recoverable Plastics	1.1%	0
Polycoated Paper	1.1%	0
Non-recoverable Film	1.0%	0
Non-recoverable C&D	0.7%	0
Non-recoverable Other	0.7%	0
Total	**4.7%**	**0**

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Table 20: Top 5 Materials in Garbage: Commercial

Material	Est. Percent	Est. Tons
Food	23.2%	13,002
Compostable Paper	10.2%	5,734
Other Recyclable Paper	7.4%	4,178
Non-recoverable Film	5.8%	3,234
Yard Waste	4.9%	2,759
Total	**51.5%**	**28,907**

Table 21: Top 5 Recoverable Materials in Garbage: Commercial

Material	Est. Percent	Est. Tons
Food	23.2%	13,002
Compostable Paper	10.2%	5,734
Other Recyclable Paper	7.4%	4,178
Yard Waste	4.9%	2,759
Recoverable Wood	4.2%	2,345
Total	**49.9%**	**28,018**

Table 22: Top 5 Materials in Recycling: Commercial

Material	Est. Percent	Est. Tons
Corrugated Cardboard and Kraft	32.9%	4,873
Other Recyclable Paper	19.2%	2,842
Other Recoverable Metal	9.9%	1,463
Glass Containers	8.6%	1,268
Food	5.3%	790
Total	**75.9%**	**11,236**

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Table 23. Top 5 Contaminants in Recycling: Commercial

Material	Est. Percent	Est. Tons
Other Recoverable Metal	9.9%	1,463
Non-recoverable Film	1.3%	198
Non-recoverable Glass	1.2%	175
Non-recoverable Plastics	0.9%	136
Non-Recoverable Paper	0.8%	113
Total	**14.1%**	**2,085**

Table 24. Top 5 Materials in Organics: Commercial

Material	Est. Percent	Est. Tons
Food	59.0%	4,298
Yard Waste	13.8%	1,002
Recoverable Wood	11.3%	820
Compostable Paper	8.8%	642
Polycoated Paper	1.0%	75
Total	**93.9%**	**6,837**

Table 25. Top 5 Contaminants in Organics: Commercial

Material	Est. Percent	Est. Tons
Polycoated Paper	1.0%	75
Non-recoverable Film	1.0%	70
Non-recoverable Plastics	0.7%	52
Non-Recoverable Paper	0.6%	43
Non-recoverable C&D	0.4%	32
Total	**3.7%**	**272**

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Table 26. Top 5 Materials in Self-haul Garbage

Material	Est. Percent	Est. Tons
Recoverable Wood	15.8%	2,815
Recoverable C&D	15.5%	2,760
Non-recoverable C&D	14.6%	2,605
Bulky Items	6.3%	1,125
Yard Waste	6.3%	1,118
Total	**58.4%**	**10,423**

Table 27. Top 5 Recoverable Materials in Self-haul Garbage

Material	Est. Percent	Est. Tons
Recoverable Wood	15.8%	2,815
Yard Waste	6.3%	1,118
Other Recyclable Paper	4.9%	881
Food	3.5%	631
Corrugated Cardboard and Kraft	2.0%	350
Total	**32.4%**	**5,795**

Table 28. Top 5 Materials in Self-haul Recycling

Material	Est. Percent	Est. Tons
Corrugated Cardboard and Kraft	22.5%	228
Other Recyclable Paper	12.8%	129
Other Recoverable Metal	12.0%	121
Non-recoverable Metal	11.9%	120
Glass Containers	8.6%	87
Total	**67.8%**	**685**

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Table 29. Top 5 Contaminants in Self-haul Recycling

Material	Est. Percent	Est. Tons
Other Recoverable Metal	12.0%	121
Non-recoverable Metal	11.9%	120
Non-recoverable Other	7.8%	79
Textiles	4.6%	46
Electronic Waste	1.1%	11
Total	**37.3%**	**377**

Table 30. Top 5 Materials in Self-haul Organics

Material	Est. Percent	Est. Tons
Yard Waste	99.6%	408
Non-recoverable Organics	0.4%	2
Compostable Paper	0.3%	1
Corrugated Cardboard and Kraft	0.1%	0
Polycoated Paper	0.0%	0
Total	**100.4%**	**411**

Table 31. Top 5 Contaminants in Self-haul Organics

Material	Est. Percent	Est. Tons
Non-recoverable Organics	0.4%	2
Polycoated Paper	0.0%	0
Recoverable Film	0.0%	0
Non-recoverable Plastics	0.0%	0
Other Recoverable Metal	0.0%	0
Total	**0.5%**	**2**

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Appendix C: Tables for Schools

Table 32: Detailed Disposal Composition: Schools

Commercial - Schools	Garbage		Recycle		Organics		Total Generation	
Material	Est. %	Est. Tons	Est. %	Est. Tons	Est. %	Est. Tons	Est. %	Est. Tons
Paper	**23.0%**	**766**	**74.4%**	**275**	**42.7%**	**38**	**28.4%**	**1,078**
Corrugated Cardboard and Kraft	4.2%	140	47.1%	174	0.0%	-	8.2%	312
Newspaper	1.7%	56	4.5%	17	0.0%	-	1.9%	72
Other Recyclable Paper	8.1%	271	12.8%	47	1.4%	1	8.4%	320
Polycoated Paper	0.1%	3	0.5%	2	1.0%	1	0.1%	5
Compostable Paper	7.6%	254	9.0%	33	40.4%	36	8.6%	324
Non-Recoverable Paper	1.2%	42	0.6%	2	0.0%	-	1.2%	44
Plastic	**13.1%**	**435**	**10.7%**	**40**	**0.1%**	**0**	**12.5%**	**474**
#1 & #2 Plastic Containers	2.1%	71	1.4%	5	0.0%	-	2.0%	76
Other Recyclable Plastics	2.4%	79	0.8%	3	0.1%	0	2.2%	82
Recoverable Film	1.5%	50	0.0%	0	0.0%	-	1.3%	50
Non-recoverable Film	3.0%	99	0.7%	3	0.0%	-	2.7%	102
Non-recoverable Plastics	4.1%	136	7.7%	29	0.0%	-	4.3%	165
Glass	**0.9%**	**30**	**7.1%**	**26**	**0.0%**	**-**	**1.5%**	**55**
Glass Containers	0.8%	27	7.1%	26	0.0%	-	1.4%	53
Non-recoverable Glass	0.1%	3	0.0%	-	0.0%	-	0.1%	3
Metal	**2.6%**	**87**	**0.4%**	**2**	**0.0%**	**-**	**2.3%**	**88**
Tin/Steel Cans	0.2%	7	0.3%	1	0.0%	-	0.2%	8
Aluminum Cans & Foil	0.1%	4	0.0%	0	0.0%	-	0.1%	4
Other Recoverable Metal	1.4%	47	0.0%	-	0.0%	-	1.3%	47
Non-recoverable Metal	0.9%	29	0.1%	0	0.0%	-	0.8%	29
Organics	**41.2%**	**1,371**	**0.6%**	**2**	**57.2%**	**51**	**37.6%**	**1,427**
Food	21.5%	717	0.6%	2	27.8%	25	19.7%	745
Yard Waste	14.0%	467	0.0%	-	29.4%	26	13.0%	494
Textiles	3.2%	107	0.0%	-	0.0%	-	2.8%	107
Non-recoverable Organics	2.4%	81	0.0%	-	0.0%	-	2.1%	81
Construction & Demolition	**14.4%**	**478**	**6.6%**	**25**	**0.0%**	**-**	**13.3%**	**503**
Recoverable Wood	4.9%	163	0.0%	-	0.0%	-	4.3%	163
Carpet	0.4%	14	6.6%	25	0.0%	-	1.0%	38
Recoverable C&D	2.6%	88	0.0%	-	0.0%	-	2.3%	88
Non-recoverable C&D	6.4%	213	0.0%	-	0.0%	-	5.6%	214
Other Materials	**4.9%**	**164**	**0.1%**	**1**	**0.0%**	**-**	**4.3%**	**165**
Household Hazardous Waste	0.6%	19	0.0%	-	0.0%	-	0.5%	19
Electronic Waste	0.0%	1	0.0%	0	0.0%	-	0.0%	1
Tires	0.0%	-	0.0%	-	0.0%	-	0.0%	-
Bulky Items	0.8%	27	0.0%	-	0.0%	-	0.7%	27
Non-recoverable Other	3.5%	117	0.1%	0	0.0%	-	3.1%	118
Totals	**100.0%**	**3,330**	**100.0%**	**370**	**100.0%**	**90**	**100.0%**	**3,790**

Percentages for material types may not total 100% due to rounding.

Figure 9: Recoverability of Garbage Stream Waste: Schools