THURSTON COUNTY
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THURSTON COUNTY
WASTE COMPOSITION STUDY

DECEMBER 2009

GREEN SOLUTIONS

THURSTON COUNTY
WASTE COMPOSITION STUDY
2008 - 2009

prepared for

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December 2009

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EXECUTIVE SUMMARY

INTRODUCTION

This report provides the results of a study of the quantity and composition of solid waste (garbage) disposed in Thurston County, Washington during 2008 - 2009. The primary objectives of this study were to provide:

- Accurate data on the composition and quantity of disposed materials for evaluating current waste diversion programs, including waste diversion activities at the Thurston County Waste and Recovery Center (WARC).
- Data that can be used for planning future programs.
- Data for specific County buildings and for the City of Olympia.

This waste composition study was conducted by the environmental consulting firm of Green Solutions, with assistance provided by Waste Connections, Thurston County and the City of Olympia. This study was primarily organized by Thurston County, but the City of Olympia provided funds for additional data collection to allow better data to be provided about the City's residential and commercial waste streams (see Appendix A).

OVERVIEW OF THE METHODOLOGIES USED

This study examined mixed municipal solid waste disposed at Thurston County's transfer facilities. Mixed municipal solid waste is a term commonly used for general residential and commercial wastes, including the waste collected by garbage haulers and waste delivered directly to disposal sites by the waste generators themselves (self-haul). This study did not examine source-separated materials (recyclables, yard debris or specially-handled materials such as large appliances).

The intent of this study was to provide data for the County's entire waste stream, but the design of the sampling and data collection procedures also allowed data to be collected on the quantity and composition of waste disposed by specific sources as well. Furthermore, the study was designed to allow data to be collected separately for the City of Olympia for three of the sources. The sources, or **waste generators**, analyzed by this study include:

- **Residential Self-Haul**: waste brought to WARC by the homeowner or renter who generated the load of waste, typically transported using a car or pickup truck.

- **Rural Dropboxes**: waste brought to one of the three satellite facilities: the Rainier, Rochester and Summit Lake Dropbox sites. This waste can be assumed to be primarily Residential Self-Haul because the acceptance policies at these sites limit the size of the loads.

- **Single-Family**: waste collected by Waste Connections or the City of Olympia from single-family homes. This waste is typically bagged before being set out for collection and consists of small pieces of many different types of materials.

- **Multi-Family**: waste collected by Waste Connections or the City of Olympia from apartment buildings. This waste is often bagged before collection and consists of small pieces of many different types of materials.

- **Non-Residential Self-Haul**: waste from businesses or contractors that was brought in by an employee of that business. A substantial amount of this waste stream consists of loads of construction and demolition wastes brought in by construction contractors.

- **General Commercial**: waste from businesses (commercial and industrial) and institutions (schools, hospitals, government offices, etc.). These wastes are typically collected using front-loading garbage trucks (for emptying dumpsters) or trucks carrying roll-off containers and compactors.

- **County Offices**: samples were taken each quarter from four Thurston County facilities in order to provide data to the County on the results of in-house recycling and waste reduction programs.

The quantity (tonnage) of solid waste disposed by each type of generator was determined by applying survey data (from a survey of the incoming traffic) to data from scalehouse records. The survey data was used to allocate self-haul tonnages into Residential and Non-Residential, and to allocate hauler tonnages (for the City of Olympia and Waste Connections) into Single-Family, Multi-Family and General Commercial wastes.

The composition of the County's solid waste stream was determined by randomly selecting and sorting samples of waste at WARC (see photo of sorting crew). Sampling was conducted for six days each quarter. Each sample was sorted into 86 categories of materials. The Glossary provides additional detail on the definitions used for the categories of materials.

This study was conducted over the course of a year to encompass seasonal variations in the quantities and composition of the County's waste stream. The fieldwork for this study was conducted in August and November, 2008, and in February and May, 2009.

Sorting crew working on a sample at WARC, August 22, 2008.

RESULTS AND CONCLUSIONS

Waste Quantities

The waste quantity results are summarized in Table E-1. As shown below, non-residential sources disposed of slightly more waste (52.2% of the County's annual amount) than residential sources (47.8%). For individual sources, General Commercial waste generators disposed of the greatest quantity (42.2% of the total annual amount).

Table E-1
QUANTITIES OF DISPOSED WASTES

Type of Generator	Annual Amounts	
	Tons	Percent
Residential Self-Haul	35,650	20.2%
Rural Dropboxes	3,340	1.9%
Single-Family	37,390	21.2%
Multi-Family	7,990	4.5%
Residential Subtotal	**84,370**	**47.8%**
Non-Residential Self-Haul	17,610	10.0%
General Commercial	74,600	42.2%
Non-Residential Subtotal	**92,210**	**52.2%**
Total	**176,580**	**100.0%**

Waste Composition Results

Waste composition results for the entire County are summarized in Figure E-1, and Table E-2 shows the data for each type of waste generator (see also Table 3 of the main report). The noteworthy results for each generator are:

- **Residential Self-Haul**: self-haul loads from residential sources have more wood and construction debris but less food waste than other residential sources, reflecting activities such as remodeling and other special projects that are often the source of self-haul waste. The largest materials in this waste stream are wood (13.7% by weight) and construction/demolition wastes (10.9%). There are also significant quantities of food waste (9.9%), furniture (8.3%), and plastic products (6.8%).

  Residential self-haul waste contains 14.0% of the materials that could be recycled through a typical curbside recycling program, and another 14.3% consists of organic materials that could be composted. Other types of potentially-recyclable materials contribute 37.6%, leaving only 34.1% of this waste stream that actually needs to be treated as waste currently.

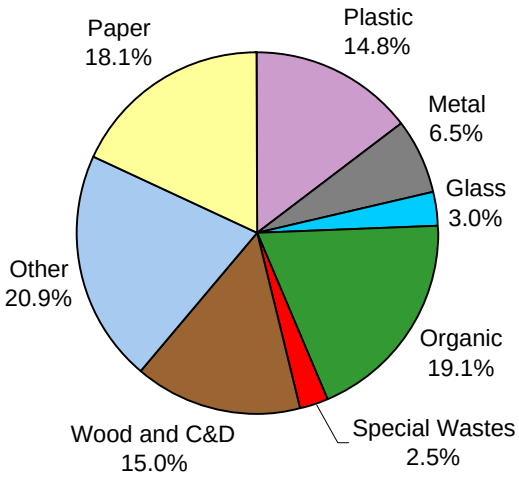
  Residential self-haul customers deliver a significant portion (20.2%) of the total waste stream, but because of their smaller load weights this type of customer represents many more of the transactions at the transfer stations.

- **Rural Dropboxes**: the wastes brought to the three rural stations are a mixture of household garbage and waste from special projects such as home remodeling. Food waste is the material present in the largest quantity (14.7%) in this waste stream, followed by wood (8.5%), mixed metals (6.2%), and furniture (6.1%). The Rural Dropboxes waste stream contains only 11.9% of the typical recyclable materials, but another 20.4% is organic materials that could be composted and an additional 36.2% consists of other materials that could potentially be recycled through a variety of different programs.

- **Single-Family**: the largest category of material in this waste stream is food waste (23.4% by weight). There are also significant amounts of compostable paper (6.8%), mixed waste paper (6.4%), plastic bags and film (6.4%), yard debris (5.9%), and disposable diapers (5.8%).

  Significant quantities of recyclable materials remain in this waste stream despite the widespread availability of recycling and organics collection programs for single-family homes. If residents recycled all of the materials currently accepted through existing recycling and organics collection programs, an additional 52.0% of the single-family waste stream could be recycled. This is the equivalent of 19,440 tons per year of additional recyclable and compostable materials. If

Figure E - 1
WASTE COMPOSITION RESULTS



SUMMARY OF RESULTS:

PAPER	Newspaper	0.9%
	Cardboard	3.8%
	Other Recyclable Paper	6.6%
	Compostable Paper	5.5%
	Non-Recyclable Paper	1.3%
	Paper Subtotal	18.1%
PLASTIC	Plastic Bottles	1.6%
	Film and Bags	5.2%
	Other Plastic	8.0%
	Plastic Subtotal	14.8%
METAL	Aluminum Cans	0.5%
	Tin Cans	0.7%
	Other Metals	5.3%
	Metal Subtotal	6.5%
GLASS	Glass Bottles	2.1%
	Other Glass	0.9%
	Glass Subtotal	3.0%
WOOD, C&D	Wood	9.7%
	Construction, Demolition	5.3%
	Wood, C&D Subtotal	15.0%
SPECIAL WASTES	Animal Excrement	1.9%
	Other Special Wastes	0.6%
	Special Waste Subtotal	2.5%
ORGANIC	Food Waste	16.7%
	Yard Debris	2.4%
	Organic Subtotal	19.1%
OTHER	Disposable Diapers	2.3%
	Textiles	3.6%
	Carpet and Padding	3.0%
	Miscellaneous (1)	12.0%
	Other Subtotal	20.9%

Notes: All figures are percent by weight.

1) "Miscellaneous" includes e-waste, other electronics, tires and other rubber products, cosmetics, pharmaceuticals, furniture, ash, dust, miscellaneous organics, miscellaneous inorganics and residuals.

Table E-2
COMPOSITION OF DISPOSED WASTES

Type of Material	Annual Average by Waste Generator						Total Waste Stream
	Residential Self-Haul	Rural Dropboxes	Single-Family	Multi-Family	Non-Res. Self-Haul	General Commercial	
Recyclable Paper	9.4	6.1	9.1	15.1	5.3	14.6	11.3
Compostable Paper	2.1	3.1	6.8	4.3	1.5	7.7	5.5
Non-Recyclable Paper	1.6	0.6	1.1	1.3	1.0	1.3	1.3
Plastic Bottles	1.2	1.6	1.7	2.5	0.3	2.0	1.6
Plastic Bags, Film	2.4	4.4	6.4	4.9	2.3	6.6	5.2
Other Plastics	8.6	6.1	5.7	5.5	3.8	10.2	8.0
Metals	8.9	14.6	4.5	8.9	5.9	5.9	6.5
Food Waste	9.9	14.7	23.4	19.0	3.5	19.6	16.7
Yard Debris	2.3	2.6	5.9	1.2	0.01	1.3	2.4
Recyclable Glass	2.0	1.9	2.6	4.5	0.3	2.2	2.1
Other Glass	2.3	1.3	0.6	0.4	0.7	0.4	0.9
Disposable Diapers	1.0	2.0	5.8	5.0	0.1	1.5	2.3
Textiles	3.7	4.7	3.8	4.6	0.7	4.0	3.6
Furniture	8.3	6.1	0.05	3.4	8.0	0.9	3.1
Wood Waste	13.7	8.5	2.0	3.8	27.6	8.2	9.7
Const./Demolition	10.9	4.8	0.8	1.5	23.5	1.0	5.3
Animal Excrement	2.7	1.1	5.0	2.8	0.3	0.4	1.9
Other Special Wastes	1.8	0.3	0.4	0.5	0.1	0.2	0.6
Other Materials	7.2	15.5	14.4	10.8	15.1	12.0	13.0
Totals	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Notes: All figures are percentages by weight.

single-family residents also diverted other potentially-recyclable materials (besides those collected through municipal and hauler-based programs), then less than one-third (29.1%) of the current amount of waste would actually need to be disposed as a waste.

- **Multi-Family** (apartments): food waste (19.0%) is present in the largest quantity in this waste stream. Other materials present in large amounts include mixed paper (9.0%), disposable diapers (5.0%), plastic bags and film (4.9%), textiles (4.6%), and cardboard (4.4%).

  The percentage of recyclable materials in apartment wastes is higher than for single-family homes, although the tonnage of recyclable materials disposed is lower due to the smaller overall waste quantities from this type of generator. Coincidentally, the Multi-Family waste stream contains nearly identical amounts of the typical recyclables (24.8% or 1,980 tons per year of the materials typically collected through curbside programs), organics (24.5% or 1,960 tons), and other potentially-recyclable materials (25.0% or 1,986 tons per year).

- **Non-Residential Self-Haul**: loads for this type of generator are often the result of construction activities or other special projects. The large amount of wood (27.6%) and other construction waste (23.5%) in this waste stream clearly shows the influence of construction activities. Other materials present in significant quantities include carpeting (8.9%) and furniture (8.0%).

  The Non-Residential Self-Haul waste stream only contains 11.2% of the "typical" recyclable and compostable materials, or about 1,988 tons per year. There is, however, a large amount of wood and other potentially-recyclable materials in this waste stream, which altogether add up to 63.6% or 11,230 tons per year. Diverting all of the recyclable and compostable materials would only leave one-quarter (25.2%) of this waste stream.

- **General Commercial**: wastes from the commercial, industrial and institutional sources in Thurston County contain large amounts of food waste (19.6%), wood waste (8.2%), mixed waste paper (7.7%), compostable paper (7.7%), and plastic products (7.3%). This waste stream contains 20.8% of the typical recyclable materials, or about 15,510 tons per year, and even more organics that could be composted, at 28.6% or 21,360 tons per year. Other materials that could potentially be recycled amount to 22.7% or 16,944 tons per year, again leaving only about one-quarter (22.7%) of this waste stream that actually needs to be disposed as waste at this time.

- **Total Waste Stream**: overall, the County's waste stream contains significant amounts of food waste (16.7%), wood waste (9.7%), mixed paper (6.2%),

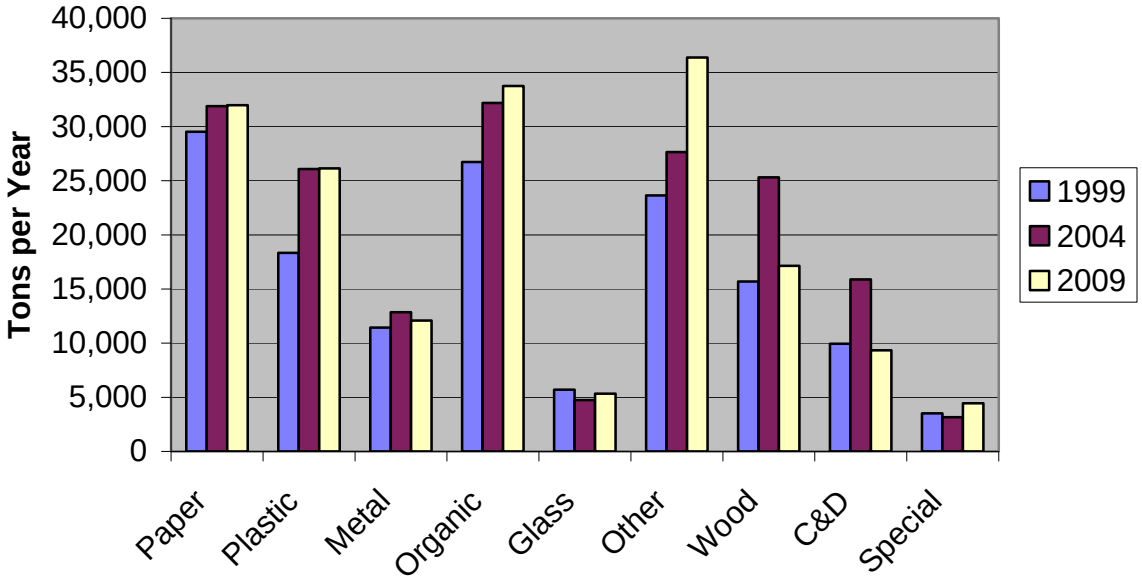
compostable paper (5.5%), plastic products (5.4%), construction and demolition waste (5.3%), and plastic bags and film (5.2%).

The amount of recyclable materials in the County's waste stream that could be handled through a typical curbside recycling program is 16.9% or 29,930 tons per year. An additional 24.6% or 43,490 tons per year consists of organic materials that could be diverted to composting programs. Other types of recycling programs could potentially handle another 31.5%, or 47,490 tons per year, leaving only 26.9% of the wastes from Thurston County that actually need to be handled as a waste.

Comparison to Previous Studies

This is the third waste composition study that Thurston County has conducted over the past ten years. Figure E-2 compares the results of these three studies.

Figure E-2
DISPOSAL TRENDS



Drawing firm conclusions from this data is difficult because several factors can influence these results, but the following general observations can be made:

- **Paper**: the amount of newspaper in Thurston County's waste stream shows a steady decline over the years, as can be expected from increased participation in

recycling programs, but other paper grades first dropped and then increased again, both in terms of percentages and total tonnages.

- **Plastic**: the overall amount of plastic and most of the plastic categories have increased over the past ten years. This increase is most likely a reflection of the increasing popularity of plastics for packaging and other applications.

- **Metal**: the amount of metal in the waste stream shows a steady decline in percentages, but the tonnages have remained fairly steady over the past ten years. This is partly due to an increase in mixed metals offsetting lower amounts of other metals.

- **Food Waste**: the amount of food in Thurston County's waste stream has varied on a percentage basis but the total tonnages show a steady increase. This increase is probably due to the increase in the County's population.

- **Yard Debris**: the percentages and tonnages of yard debris in the County's waste stream increased in the last study and then decreased in the current study.

- **Glass**: the amount of glass in the waste stream has varied over the years, probably due to changes in consumer packaging and in recycling levels.

- **Wood and Construction/Demolition (C&D) Wastes**: the percentage of wood and C&D wastes in the County's waste stream shows a sharp decrease in the current study compared to five years ago, which is likely the result of less construction activity (due to the current economic downturn).

RECOMMENDATIONS

The following recommendations are based on the results of this study:

- There continues to be a significant amount of recyclable materials disposed in Thurston County's waste stream, and some of the materials (cardboard, aluminum cans and plastic bottles) have increased since the previous study. The County could possibly increase waste diversion without creating new infrastructure or programs since a significant portion of the disposed waste stream consists of standard recyclable materials. Increased education and other steps could help increase the recycling rate, although these increases would be incremental. If Thurston County desires to increase the recycling rate substantially over current levels, a different approach may be needed. Alternative approaches could include mandatory recycling, increasing the tipping fee at WARC (which provides an incentive to recycle), disposal bans, and an increased focus on new materials (food waste, construction and demolition wastes, etc.).

- Residential Self-Haul and Rural Dropbox customers are together disposing of more waste (38,990 tons per year) than Single-Family generators (37,390 tons). Many of the Residential Self-Haul customers also have garbage service at their homes and are simply disposing of bulky items or wastes from special projects, but many are also not subscribing to garbage collection services and hence are difficult to reach with the typical diversion programs and associated educational materials. Providing these customers with educational materials at WARC and at the rural dropboxes (through materials distributed by scalehouse personnel, for instance) is an important opportunity to educate them about recycling alternatives. Furthermore, providing this type of information at the same time as informing them about a rate increase is often a good opportunity to get the customer's attention and motivate them to look into alternatives.

  A similar point can be made for Non-Residential Self-Haul customers, who are disposing of large amounts of wood, metals, carpeting and various other construction wastes that could potentially be recycled. Although some of these materials are being recovered at WARC, more could be done by this type of generator to divert materials to other recycling programs. Making sure that they are informed about other programs, especially at the time of a rate increase, would be an important educational opportunity.

- Recent steps have been taken in Thurston County to increase food waste diversion, but for now large amounts of this material remain in the waste stream. More publicity and/or diversion programs for food waste should be considered.

- A recent analysis by Green Solutions concluded that the statewide recovery rates for PET bottles, aluminum cans and glass bottles are not keeping up with other recyclable materials. This can be seen here as well, and it may be time for a different approach for these materials (such as a statewide bottle bill) if recovery rates for these materials are going to be increased significantly over the current rates.

SECTION 1

INTRODUCTION

A. SCOPE AND OBJECTIVES

This report provides the results of a study of the quantity and composition of solid waste (garbage) disposed in Thurston County, Washington during 2008 - 2009. The primary objectives of this study were to provide:

- Accurate data on the composition and quantity of disposed materials for evaluating current waste diversion programs, including waste diversion activities at the Thurston County Waste and Recovery Center (WARC).
- Data that can be used for planning future programs.
- Data for specific County buildings and for the City of Olympia.

This waste composition study was conducted by the environmental consulting firm of Green Solutions, with assistance provided by Waste Connections, Thurston County and the City of Olympia. This study was primarily organized by Thurston County, but the City of Olympia provided funds for additional data collection to allow better data to be provided about the City's residential and commercial waste streams.

B. BACKGROUND

Previous waste characterization studies have been conducted in Thurston County in 1999 and 2004, so that Thurston County now has three studies spanning the past ten years. The materials examined by these studies have changed slightly over the years in response to evolving interests and issues, and also in response to changes that have occurred in the waste stream itself. Changes in the waste stream have occurred as a result of:

- A more extensive recycling and composting system that is diverting a wider variety of materials from the waste stream,
- Changes in packaging and consumer choices, and
- The emergence of new types of materials and new product categories (for example, plastic lumber and small consumer electronics).

As this study began, the United States (and the rest of the world) was entering into an economic recession. Thurston County and most other areas of the nation have experienced significantly reduced waste volumes as a result of this recession,

apparently due to a combination of sharp decreases in construction activities and also in consumer spending. This study was not designed to measure the impact of these factors on the composition of the waste stream, which would have required separating the impacts of reduced waste generation from seasonal changes that occur "naturally," but the impact can be seen in a decrease in the overall waste quantities disposed in Thurston County.

C. CONTENTS OF THIS REPORT

This report consists of the following sections:

Section 2, Characterization of Thurston County's Waste Stream – provides data on the quantity and composition of the County's waste stream. This section also provides detailed data on the breakdown of three of the waste categories (wood, construction/demolition and special wastes) and additional data on the breakdown of light bulbs and hazardous wastes.

Section 3, Conclusions and Recommendations – provides additional interpretation and analysis of the results, and provides recommendations for possible future steps by the County.

Glossary – provides definitions for technical terms used throughout the report as well as the definitions used for the sorting categories.

Appendix A, Waste Composition Data for the City of Olympia – provides results specific to Olympia's waste collection system.

Appendix B, Waste Composition Data for Thurston County Offices – provides the results of quarterly samples taken from four county facilities.

Appendix C, Statistical Certainty of Results – provides data on the confidence intervals associated with the waste composition results.

Appendix D, Composition Data for Specific Non-Residential Generators – provides data for specific non-residential generators that were sampled during the fieldwork for this study.

SECTION II

CHARACTERIZATION OF THURSTON COUNTY'S WASTE STREAM

A. INTRODUCTION

This section provides waste quantity and composition results for the primary types of waste generators and for the county overall, as well as additional information collected during the fieldwork for this study.

B. OVERVIEW OF PROCEDURES

This study examined mixed municipal solid waste brought for disposal to Thurston County's transfer facilities. Mixed municipal solid waste is a term commonly used for general residential and commercial wastes, including the waste collected by garbage haulers and the waste delivered to disposal sites by the waste generators themselves (self-haul). This study did not examine source-separated materials brought to the transfer stations or other facilities for recycling, energy recovery, or composting.

The Thurston County Solid Waste System

The solid waste collection and transfer system for Thurston County consists of one large transfer station, the Thurston County Waste and Recovery Center (WARC), and three satellite stations (or rural dropboxes). The three rural dropboxes are the Rainier Dropbox, Rochester Dropbox and Summit Lake Dropbox. WARC is owned by Thurston County and operated by Waste Connections. This facility includes:

- A waste transfer operation, where waste is compacted into transfer trailers and exported out of the county to the Allied Waste landfill in Klickitat County, Washington.
- An extensive recycling drop-off center.
- A yard debris collection and transfer operation.
- A moderate risk waste collection facility (the "HazoHouse").
- Special collection programs for electronic wastes, appliances and other materials.

This study examined only the wastes brought to the first of these, the transfer operation, and wastes brought to the rural dropboxes.

Types of Waste Generators

The intent of this study was to provide data for the County's entire waste stream, but the design of the sampling and data collection procedures allowed data to be collected on the quantity and composition of waste disposed by different sources as well. Furthermore, the study was designed to allow data to be collected separately for the City of Olympia for three of the sources. Composition data for the three Olympia generators is shown in Appendix A.

The sources, or **waste generators**, analyzed by this study include:

- **Residential Self-Haul**: waste delivered to WARC by the homeowners and renters who generated the load of waste, although in some cases they may be assisting a family member, neighbor or acquaintance who actually generated the waste. This type of waste is typically transported to WARC using a car or pickup truck. There is a clear pattern in the timing of such deliveries, with much of the self-haul waste being brought to WARC on the weekends or in the evenings.

- **Rural Dropboxes**: waste from one of the three satellite facilities: the Rainier, Rochester and Summit Lake Dropbox sites. This waste can be assumed to be primarily Residential Self-Haul because the acceptance policies at these sites limit the size of the loads.

- **Single-Family**: waste collected by Waste Connections or the City of Olympia from single-family homes. This waste is typically bagged before collection, consists of small pieces of many different types of materials, and is delivered to the disposal site most often between mid-morning and mid-afternoon Monday through Friday (Tuesday through Friday on alternating weeks for the City of Olympia loads). Additional samples were taken for Single-Family waste from the City of Olympia to allow this source to be analyzed separately.

- **Multi-Family**: waste collected by Waste Connections or the City of Olympia from apartment buildings. This waste is often bagged before collection, consists of small pieces of many different types of materials, and is delivered to the disposal site most often between early morning and mid-afternoon Monday through Friday. Multi-Family waste is almost always mixed with Commercial waste when collected because both types of customers use dumpsters for garbage collection, but part of the Multi-Family waste is also collected in roll-offs and compactors. Additional samples were taken for Multi-Family waste from the City of Olympia to allow this source to be analyzed separately.

- **Non-Residential Self-Haul**: waste from businesses or contractors that is brought in by an employee of that business. The pattern in the delivery of this waste tends to be the opposite of Residential Self-Haul wastes, occurring

primarily during regular work hours, and is typically brought in with larger vehicles (dump trucks, pickup trucks with trailers, and other trucks). A substantial amount of this waste stream consists of loads of construction and demolition wastes brought in by construction contractors.

- **General Commercial**: waste from businesses (commercial and industrial) and institutions (schools, hospitals, government offices, etc.). These wastes are typically collected using front-loading garbage trucks (for emptying dumpsters) or trucks carrying roll-off containers and compactors, and are usually delivered early morning through mid-afternoon Monday through Friday. Additional samples were taken for Commercial waste from the City of Olympia to allow this source to be analyzed separately.

- **Thurston County Offices**: samples were taken each quarter from four Thurston County facilities in order to provide data to the County on the results of in-house recycling and waste reduction programs. The results of these samples are shown in Appendix B.

Construction and demolition (C&D) wastes and other special wastes were included in the above categories as appropriate for the source and delivery method. C&D waste is often delivered by employees of the construction company and so was frequently included with Non-Residential Self-Haul waste, but C&D waste is also delivered by homeowners (which is defined as Residential Self-Haul waste), or by waste haulers from construction sites (General Commercial waste), or even by waste haulers delivering roll-off containers from do-it-yourself home remodeling projects (Single-Family waste).

Waste Quantity Procedures

The quantity (tonnage) of solid waste disposed by each type of generator was determined by applying survey data (from a survey of the incoming traffic) to transaction data from scalehouse records. The survey data was used to allocate weekly self-haul tonnages into Residential and Non-Residential, and to allocate hauler tonnages (for the City of Olympia and Waste Connections) into Single-Family, Multi-Family and Commercial wastes. Weekly tonnages for each season were determined in this way, and those tonnages were used to determine weighted averages. Weighted averages were used for determining the annual composition averages for each type of waste generator (by combining quarterly data for individual generators) and for determining the annual average for the entire waste stream (i.e., averaging the composition data from all types of generators).

Waste Composition Procedures

The composition of the County's solid waste stream was determined by randomly selecting and sorting samples of waste at WARC. Sampling was conducted for six days each quarter. Each sample was sorted into 86 categories of materials. The Glossary provides additional detail on the definitions used for the categories of materials.

C. RESULTS, WASTE QUANTITIES

Total Waste Quantities

Table 1 shows the results of the waste quantity analysis. The data in Table 1 is based on the quarterly tonnages for each generator, the sum of which were used to calculate a percentage that was applied to the annual total waste stream to derive the annual amounts for each source. The annual percentages of the waste stream contributed by each generator were also used to calculate weighted averages for the composition of the County's entire waste stream. The quarterly tonnages were also used to calculate weighted averages for each generator individually, so that seasonal fluctuations in waste quantities are taken into account when calculating the composition of each generator's waste stream.

Waste disposal rates are often expressed as the total amount of waste disposed divided by the population of the area. Based on the estimated population of 249,800 people in 2009 (from the Washington State Office of Financial Management) and a total waste quantity of 176,578 tons per year, Thurston County's waste disposal rate is 0.71 tons per person per year. This is the equivalent of 3.9 pounds per person per day or 1,414 pounds per person per year. This is a significant decrease from the previous waste composition study, which showed 0.82 tons per person per year in 2004.

A more precise approach for waste disposal rates is to express residential waste quantities on the basis of population figures, and non-residential waste quantities on the number of employees (see below).

Residential Waste Quantities

Waste Quantities: The residential waste stream accounts for 47.8% of the County's total waste. This is down from 57.7% in the last waste composition study in 2004. Single-Family contributes 44.4%, Multi-Family accounts for 9.4%, and Residential Self-Haul (including the Rural Dropboxes) accounts for 46.2% of the residential waste quantities.

Residential Per Capita Disposal Rates: Based on 84,370 tons of residential waste per year and the County's 2009 population (249,800 people), the current residential per

Table 1
ANNUAL QUANTITIES OF DISPOSED WASTES BY SOURCE AND TYPE OF GENERATOR

Type of Generator	Annual Amount by Source, Tons			Annual Amounts (2008-2009)	
	City of Olympia	Waste Connections	Self-Haul	Total Tons	Percent
Residential Self-Haul	NA	NA	35,648	35,648	20.2%
Rural Dropboxes	NA	NA	3,341	3,341	1.9%
Single-Family	6,438	30,951	NA	37,388	21.2%
Multi-Family	3,531	4,460	NA	7,990	4.5%
Residential Subtotal	9,968	35,410	38,989	84,368	47.8%
Non-Residential Self-Haul	NA	NA	17,612	17,612	10.0%
General Commercial	18,628	55,970	NA	74,598	42.2%
Non-Residential Subtotal	18,628	55,970	17,612	92,211	52.2%
Totals	28,597	91,380	56,602	176,578	100.0%

The annual amounts shown above are for the period from July 1, 2008 through June 30, 2009, as this period most closely corresponds to the timing of this study.

capita disposal rate for Thurston County is 0.34 tons per person per year or 1.85 pounds per person per day.

Non-Residential Waste Quantities

Waste Quantities: The non-residential waste stream accounts for 52.2% of Thurston County's total waste. 19.2% of this, or 17,610 tons, was Non-Residential Self-Haul waste, and 80.8%, or 74,600 tons, was General Commercial waste.

Disposal Rates per Employee: Based on 92,210 tons of non-residential waste and the County's estimated 2008 employment level of 101,170 workers (from Workforce Explorer), the current non-residential disposal rate for Thurston County is 0.91 tons per employee per year or 7.1 pounds per employee per day (based on 255 workdays per year).

D. RESULTS, WASTE COMPOSITION

Number of Samples

The composition of the County's waste stream was determined by randomly selecting and sorting a total of 259 samples of waste. These samples were allocated between the different types of generators based on the need to examine certain types in greater detail. Additional samples were also taken for three of the generators (Single-Family, Multi-Family and General Commercial) to allow separate results to be reported for the City of Olympia. The number of samples taken each season is shown in Table 2.

Table 2
ALLOCATION OF SAMPLES BY TYPE OF GENERATOR

Type of Generator	August 2008	Nov. 2008	February 2009	May 2009	Total Samples Number	Total Samples Percent
Residential Self-Haul	12	10	10	9	41	16%
Rural Dropboxes	3	3	3	3	12	5%
Single-Family	10	12	12	12	46	18%
Multi-Family	12	10	10	11	43	17%
Residential Subtotal	**37**	**35**	**35**	**35**	**142**	**55%**
Non-Residential Self-Haul	11	10	10	10	41	16%
General Commercial	17	14	15	15	61	24%
Non-Residential Subtotal	**28**	**24**	**25**	**25**	**102**	**39%**
County Buildings	**4**	**3**	**4**	**4**	**15**	**6%**
Totals	**69**	**62**	**64**	**64**	**259**	**100%**

Waste Composition Results

Table 3 shows the annual averages for each generator and for the entire County. As can be seen in this table, there are marked differences in the waste streams of the different types of waste generators. The results for the entire County are also illustrated in Figure 1.

It should be noted that the figures shown in Table 3 have a specific degree of error associated with them. As with all sampling and survey procedures, a certain degree of error is unavoidable but quantifiable (see Appendix C for more details).

Residential Waste Composition

As can be seen in Table 3, there are substantial differences in the composition of wastes from the different residential sources. These differences can be explained by the different activities that created the wastes. Residential Self-Haul waste contains some "regular" household garbage but also contains a large amount of construction debris and other materials that are the result of special projects, since it is these projects that often motivate people to go to the transfer station. The waste from the Rural Dropboxes is similar to self-haul but also contains more regular household garbage (as indicated by the higher amount of food waste). Single-Family waste is influenced by the activities associated with living in, owning and maintaining a home. The waste from apartments (Multi-Family) reflects a more mobile lifestyle and lower recycling participation (as indicated by the amounts of aluminum cans, plastic bottles and glass bottles that are higher than in Single-Family wastes).

The results for each residential generator are illustrated in Figures 2 through 5.

Non-Residential Waste Composition

There are also significant differences between the two types of non-residential wastes. As with residential wastes, this can be explained by the different activities and sources for these wastes. The General Commercial waste stream in Thurston County is influenced by various manufacturing activities and the State Capitol, while the Non-Residential Self-Haul waste stream is dominated by construction activities. Ample evidence of the construction influence is provided by the fact that over half of the Non-Residential Self-Haul waste stream is comprised of wood waste (27.6%) and construction/demolition waste (23.5%).

The results for each non-residential generator are illustrated in Figures 6 and 7.

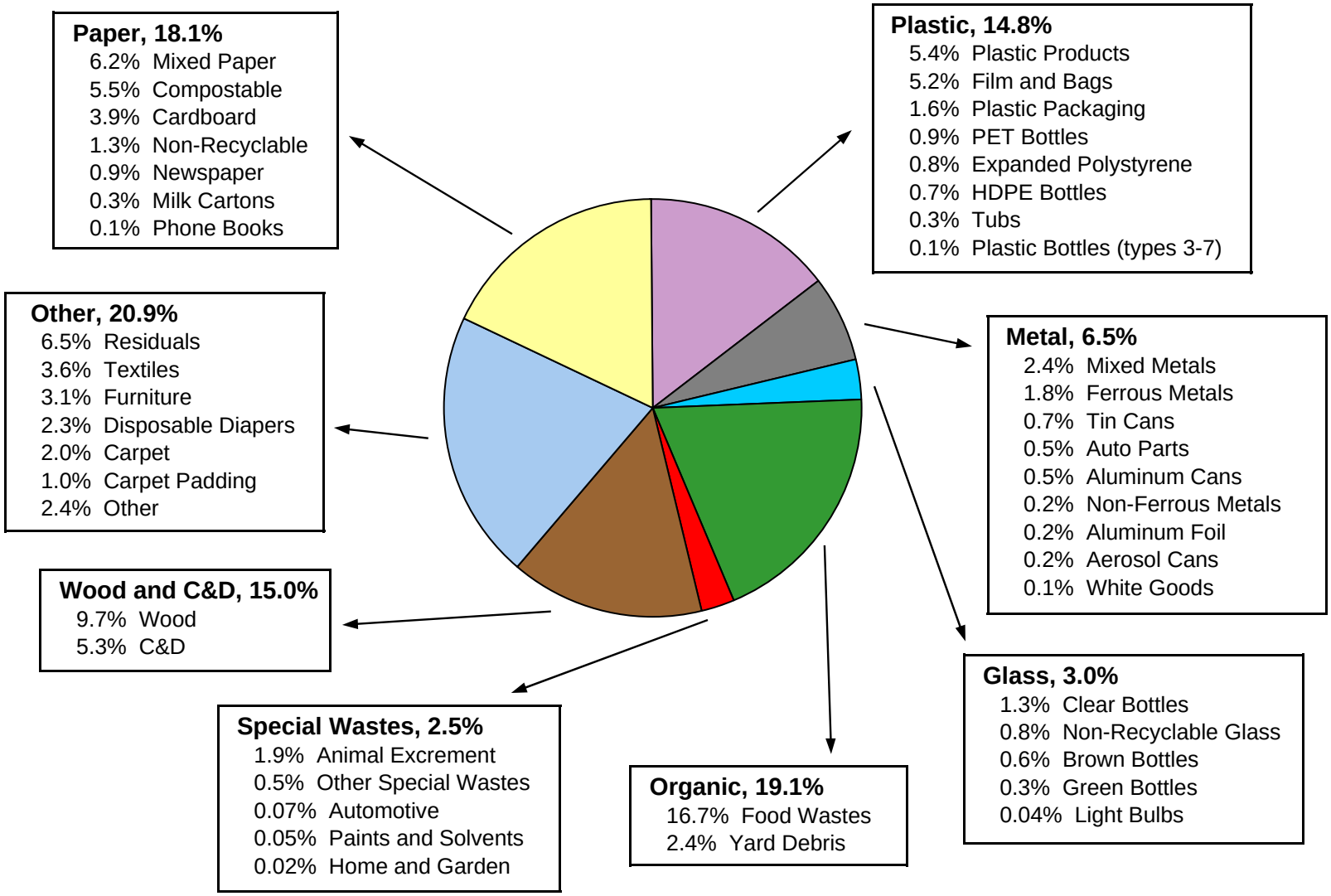
Table 3
WASTE COMPOSITION RESULTS

		Residential Self-Haul	Rural Dropboxes	Single-Family	Multi-Family	Non-Res. Self-Haul	General Commercial	Average for Entire County
PAPER	Newspaper	0.68%	0.57%	0.75%	1.30%	0.13%	1.20%	0.89%
	Cardboard	3.66%	1.58%	1.50%	4.36%	4.31%	5.05%	3.85%
	Mixed Waste Paper	4.89%	3.66%	6.44%	8.98%	0.86%	7.74%	6.18%
	Phone Books	0.05%	0.09%	0.14%	0.18%	0.00%	0.07%	0.08%
	Milk Cartons, Other	0.13%	0.19%	0.26%	0.26%	0.04%	0.51%	0.32%
	Compostable	2.07%	3.13%	6.84%	4.31%	1.49%	7.67%	5.51%
	Non-Recyclable Paper	1.60%	0.63%	1.10%	1.29%	0.97%	1.35%	1.29%
	Paper Subtotal	**13.07%**	**9.85%**	**17.01%**	**20.67%**	**7.80%**	**23.59%**	**18.11%**
PLASTIC	PET Bottles	0.47%	0.85%	0.98%	1.49%	0.23%	1.21%	0.92%
	HDPE Bottles	0.69%	0.69%	0.67%	0.95%	0.02%	0.74%	0.65%
	Bottles 3-7	0.03%	0.09%	0.09%	0.09%	0.01%	0.09%	0.07%
	Tubs	0.14%	0.26%	0.39%	0.31%	0.04%	0.29%	0.26%
	Bags and Film	2.38%	4.35%	6.42%	4.89%	2.27%	6.62%	5.16%
	Plastic Packaging	1.25%	1.17%	1.96%	1.50%	0.32%	1.80%	1.55%
	Other Plastic Products	6.80%	3.84%	2.64%	3.14%	1.39%	7.28%	5.36%
	Expanded Polystyrene	0.40%	0.84%	0.66%	0.56%	2.08%	0.85%	0.83%
	Plastic Subtotal	**12.15%**	**12.09%**	**13.81%**	**12.91%**	**6.37%**	**18.88%**	**14.80%**
METAL	Aluminum Cans	0.31%	0.48%	0.44%	0.94%	0.14%	0.66%	0.50%
	Aluminum Foil	0.19%	0.21%	0.26%	0.14%	0.04%	0.17%	0.18%
	Tin Cans	0.60%	1.02%	1.11%	1.16%	0.10%	0.73%	0.75%
	Mixed Metals	2.75%	6.20%	1.68%	3.85%	3.10%	2.16%	2.42%
	Ferrous Metals	2.63%	5.65%	0.64%	1.05%	2.09%	1.71%	1.75%
	White Goods	0.00%	0.00%	0.00%	1.36%	0.12%	0.00%	0.07%
	Non-Ferrous Metals	0.50%	0.29%	0.12%	0.11%	0.24%	0.07%	0.19%
	Aerosol Cans	0.20%	0.28%	0.25%	0.19%	0.04%	0.14%	0.17%
	Auto Parts	1.76%	0.47%	0.03%	0.15%	0.00%	0.31%	0.51%
	Metal Subtotal	**8.93%**	**14.61%**	**4.54%**	**8.95%**	**5.86%**	**5.95%**	**6.54%**
ORGANIC	Food Waste	9.90%	14.66%	23.41%	19.00%	3.52%	19.62%	16.73%
	Yard Debris	2.30%	2.60%	5.88%	1.21%	0.01%	1.34%	2.38%
	Organics Subtotal	**12.20%**	**17.27%**	**29.29%**	**20.21%**	**3.53%**	**20.97%**	**19.12%**
GLASS	Clear Bottles	1.14%	1.13%	1.51%	2.40%	0.15%	1.33%	1.25%
	Brown Bottles	0.51%	0.56%	0.69%	1.23%	0.05%	0.62%	0.58%
	Green Bottles	0.35%	0.23%	0.40%	0.81%	0.04%	0.25%	0.31%
	Light Bulbs	0.07%	0.03%	0.05%	0.07%	0.00%	0.02%	0.04%
	Non-Recyclable Glass	2.20%	1.23%	0.57%	0.35%	0.74%	0.37%	0.84%
	Glass Subtotal	**4.28%**	**3.19%**	**3.22%**	**4.87%**	**0.99%**	**2.59%**	**3.02%**
OTHER WASTES	E-Waste	0.00%	0.00%	0.02%	1.44%	0.00%	0.06%	0.09%
	Other Electronics	0.23%	0.22%	0.10%	0.14%	0.00%	0.29%	0.20%
	Tires	0.32%	0.13%	0.06%	0.00%	0.00%	0.00%	0.08%
	Rubber	0.15%	0.40%	0.15%	0.23%	0.24%	0.68%	0.39%
	Cosmetics	0.37%	0.29%	0.29%	0.23%	0.00%	0.17%	0.22%
	Pharmaceuticals	0.06%	0.04%	0.08%	0.08%	0.00%	0.02%	0.04%
	Diapers	1.02%	1.98%	5.81%	4.98%	0.07%	1.49%	2.34%
	Textiles	3.72%	4.72%	3.81%	4.63%	0.73%	3.96%	3.60%
	Carpet	1.24%	2.93%	0.72%	0.90%	8.86%	1.49%	2.01%
	Carpet Padding	0.87%	0.56%	0.00%	0.01%	3.68%	0.95%	0.96%
	Furniture	8.29%	6.15%	0.05%	3.40%	7.97%	0.90%	3.13%
	Ash, Dust	0.36%	2.67%	0.47%	0.29%	0.03%	0.30%	0.36%
	Misc. Organics	0.35%	0.05%	0.10%	0.13%	0.01%	0.07%	0.13%
	Misc. Inorganics	0.84%	1.04%	0.34%	0.36%	0.03%	1.31%	0.83%
	Residuals	2.51%	7.07%	11.95%	7.07%	2.41%	6.55%	6.50%
	Other Wastes Subtotal	**20.32%**	**28.24%**	**23.96%**	**23.89%**	**24.03%**	**18.25%**	**20.90%**
WOOD and C&D	Wood	13.65%	8.54%	2.02%	3.76%	27.57%	8.15%	9.71%
	Construction, Demolition	10.90%	4.79%	0.80%	1.45%	23.50%	0.99%	5.29%
	Wood, C&D Subtotal	**24.55%**	**13.33%**	**2.82%**	**5.22%**	**51.07%**	**9.14%**	**15.00%**
SPECIAL WASTES	Paints and Solvents	0.08%	0.04%	0.09%	0.14%	0.01%	0.03%	0.05%
	Automotive	0.10%	0.11%	0.01%	0.08%	0.00%	0.09%	0.07%
	Home and Garden	0.08%	0.02%	0.00%	0.00%	0.00%	0.00%	0.02%
	Other Special Wasts	4.22%	1.26%	5.25%	3.05%	0.35%	0.52%	2.38%
	Actual Hazardous Wastes	0.35%	0.15%	0.04%	0.15%	0.02%	0.14%	0.15%
	Special Waste Subtotal	**4.48%**	**1.43%**	**5.36%**	**3.27%**	**0.36%**	**0.64%**	**2.52%**
TOTALS		**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**
	Pounds of Samples Sorted:	9,512	2,856	9,884	9,395	9,075	13,070	51,554 (1)
	Number of Samples Sorted:	41	12	46	43	41	61	259 (1)

Notes: All figures are percent by weight (except for the bottom two rows).

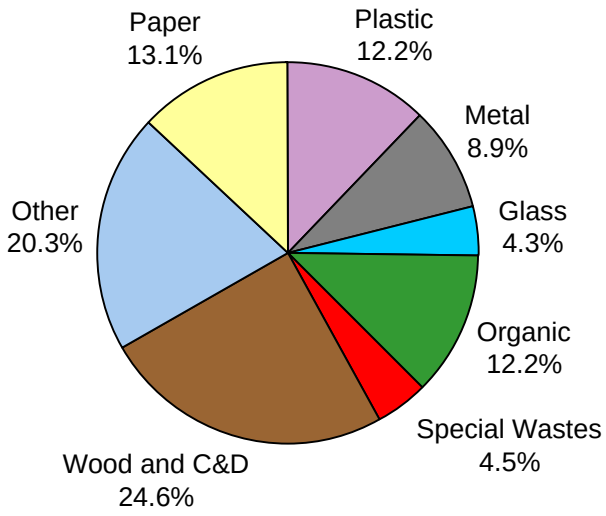
1. The total number of samples and pounds sorted includes 15 samples and 1,862 pounds for specific County buildings.

Figure 1
WASTE COMPOSITION RESULTS



Note: All figures are percent by weight.

Figure 2
RESIDENTIAL SELF - HAUL WASTE

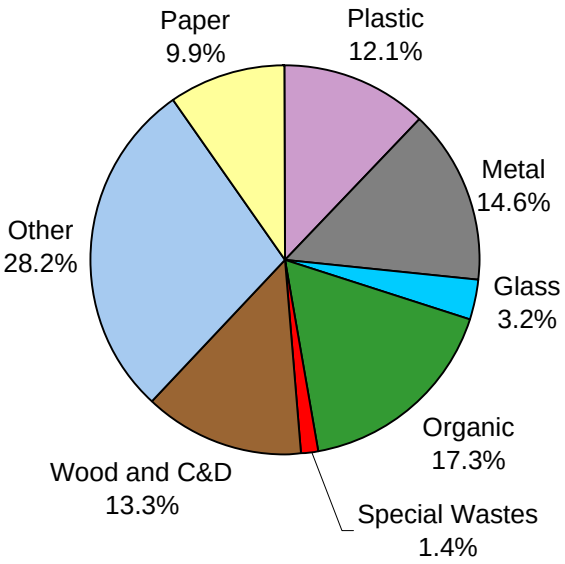


SUMMARY OF WASTE COMPOSITION RESULTS:

PAPER	Newspaper	0.7%
	Cardboard	3.7%
	Other Recyclable Paper	5.1%
	Compostable Paper	2.1%
	Non-Recyclable Paper	1.6%
	Paper Subtotal	13.1%
PLASTIC	Plastic Bottles	1.2%
	Film and Bags	2.4%
	Other Plastic	8.6%
	Plastic Subtotal	12.2%
METAL	Aluminum Cans	0.3%
	Tin Cans	0.6%
	Other Metals	8.0%
	Metal Subtotal	8.9%
GLASS	Glass Bottles	2.0%
	Other Glass	2.3%
	Glass Subtotal	4.3%
WOOD, C&D	Wood	13.7%
	Construction, Demolition	10.9%
	Wood, C&D Subtotal	24.6%
SPECIAL WASTES	Animal Excrement	2.7%
	Other Special Wastes	1.8%
	Special Waste Subtotal	4.5%
ORGANIC	Food Waste	9.9%
	Yard Debris	2.3%
	Organic Subtotal	12.2%
OTHER	Disposable Diapers	1.0%
	Textiles	3.7%
	Carpet and Padding	2.1%
	Miscellaneous (1)	13.5%
	Other Subtotal	20.3%

Notes: All figures are percent by weight.
1) "Miscellaneous" includes e-waste, other electronics, tires and other rubber products, cosmetics, pharmaceuticals, furniture, ash, dust, miscellaneous organics, miscellaneous inorganics and residuals.

Figure 3
RURAL DROPBOX WASTE



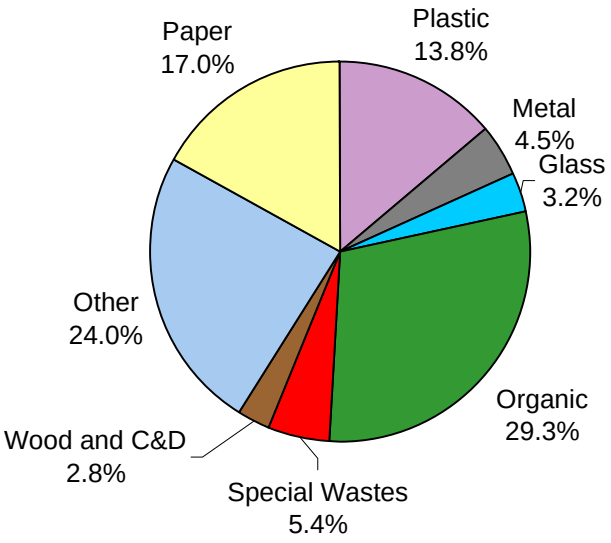
SUMMARY OF WASTE COMPOSITION RESULTS:

PAPER	Newspaper	0.6%
	Cardboard	1.6%
	Other Recyclable Paper	3.9%
	Compostable Paper	3.1%
	Non-Recyclable Paper	0.6%
	Paper Subtotal	9.9%
PLASTIC	Plastic Bottles	1.6%
	Film and Bags	4.4%
	Other Plastic	6.1%
	Plastic Subtotal	12.1%
METAL	Aluminum Cans	0.5%
	Tin Cans	1.0%
	Other Metals	13.1%
	Metal Subtotal	14.6%
GLASS	Glass Bottles	1.9%
	Other Glass	1.3%
	Glass Subtotal	3.2%

WOOD, C&D	Wood	8.5%
	Construction, Demolition	4.8%
	Wood, C&D Subtotal	13.3%
SPECIAL WASTES	Animal Excrement	1.1%
	Other Special Wastes	0.3%
	Special Waste Subtotal	1.4%
ORGANIC	Food Waste	14.7%
	Yard Debris	2.6%
	Organic Subtotal	17.3%
OTHER	Disposable Diapers	2.0%
	Textiles	4.7%
	Carpet and Padding	3.5%
	Miscellaneous (1)	18.0%
	Other Subtotal	28.2%

Notes: All figures are percent by weight.
1) "Miscellaneous" includes e-waste, other electronics, tires and other rubber products, cosmetics, pharmaceuticals, furniture, ash, dust, miscellaneous organics, miscellaneous inorganics and residuals.

Figure 4
SINGLE - FAMILY WASTE

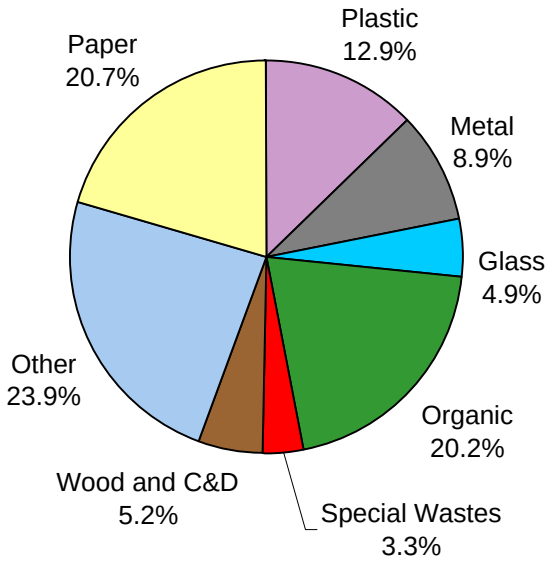


SUMMARY OF WASTE COMPOSITION RESULTS:

PAPER	Newspaper	0.8%
	Cardboard	1.5%
	Other Recyclable Paper	6.8%
	Compostable Paper	6.8%
	Non-Recyclable Paper	1.1%
	Paper Subtotal	17.0%
PLASTIC	Plastic Bottles	1.7%
	Film and Bags	6.4%
	Other Plastic	5.7%
	Plastic Subtotal	13.8%
METAL	Aluminum Cans	0.4%
	Tin Cans	1.1%
	Other Metals	3.0%
	Metal Subtotal	4.5%
GLASS	Glass Bottles	2.6%
	Other Glass	0.6%
	Glass Subtotal	3.2%
WOOD, C&D	Wood	2.0%
	Construction, Demolition	0.8%
	Wood, C&D Subtotal	2.8%
SPECIAL WASTES	Animal Excrement	5.0%
	Other Special Wastes	0.4%
	Special Waste Subtotal	5.4%
ORGANIC	Food Waste	23.4%
	Yard Debris	5.9%
	Organic Subtotal	29.3%
OTHER	Disposable Diapers	5.8%
	Textiles	3.8%
	Carpet and Padding	0.7%
	Miscellaneous (1)	13.6%
	Other Subtotal	24.0%

Notes: All figures are percent by weight.
1) "Miscellaneous" includes e-waste, other electronics, tires and other rubber products, cosmetics, pharmaceuticals, furniture, ash, dust, miscellaneous organics, miscellaneous inorganics and residuals.

Figure 5
MULTI - FAMILY WASTE

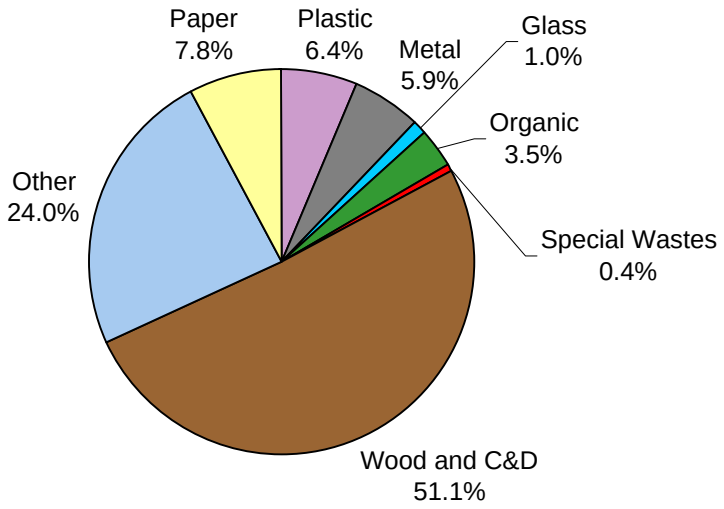


SUMMARY OF WASTE COMPOSITION RESULTS:

PAPER	Newspaper	1.3%
	Cardboard	4.4%
	Other Recyclable Paper	9.4%
	Compostable Paper	4.3%
	Non-Recyclable Paper	1.3%
	Paper Subtotal	20.7%
PLASTIC	Plastic Bottles	2.5%
	Film and Bags	4.9%
	Other Plastic	5.5%
	Plastic Subtotal	12.9%
METAL	Aluminum Cans	0.9%
	Tin Cans	1.2%
	Other Metals	6.9%
	Metal Subtotal	8.9%
GLASS	Glass Bottles	4.4%
	Other Glass	0.4%
	Glass Subtotal	4.9%
WOOD, C&D	Wood	3.8%
	Construction, Demolition	1.5%
	Wood, C&D Subtotal	5.2%
SPECIAL WASTES	Animal Excrement	2.8%
	Other Special Wastes	0.5%
	Special Waste Subtotal	3.3%
ORGANIC	Food Waste	19.0%
	Yard Debris	1.2%
	Organic Subtotal	20.2%
OTHER	Disposable Diapers	5.0%
	Textiles	4.6%
	Carpet and Padding	0.9%
	Miscellaneous (1)	13.4%
	Other Subtotal	23.9%

Notes: All figures are percent by weight.
1) "Miscellaneous" includes e-waste, other electronics, tires and other rubber products, cosmetics, pharmaceuticals, furniture, ash, dust, miscellaneous organics, miscellaneous inorganics and residuals.

Figure 6
NON - RESIDENTIAL SELF - HAUL WASTE



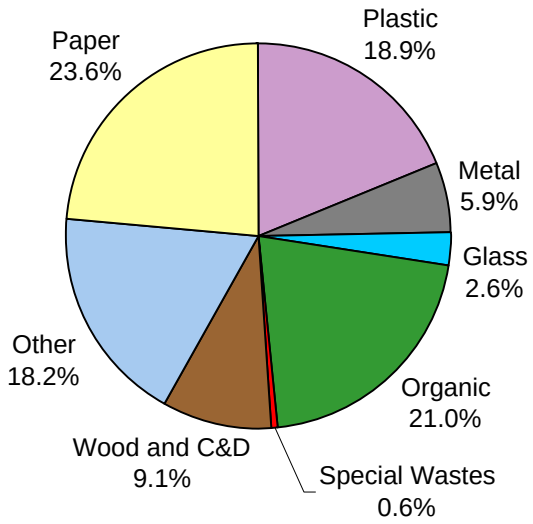
SUMMARY OF WASTE COMPOSITION RESULTS:

PAPER	Newspaper	0.1%
	Cardboard	4.3%
	Other Recyclable Paper	0.9%
	Compostable Paper	1.5%
	Non-Recyclable Paper	1.0%
	Paper Subtotal	7.8%
PLASTIC	Plastic Bottles	0.3%
	Film and Bags	2.3%
	Other Plastic	3.8%
	Plastic Subtotal	6.4%
METAL	Aluminum Cans	0.1%
	Tin Cans	0.1%
	Other Metals	5.6%
	Metal Subtotal	5.9%
GLASS	Glass Bottles	0.2%
	Other Glass	0.7%
	Glass Subtotal	1.0%
WOOD, C&D	Wood	27.6%
	Construction, Demolition	0.1%
	Wood, C&D Subtotal	27.6%
SPECIAL WASTES	Animal Excrement	0.3%
	Other Special Wastes	0.1%
	Special Waste Subtotal	0.4%
ORGANIC	Food Waste	3.5%
	Yard Debris	0.0%
	Organic Subtotal	3.5%
OTHER	Disposable Diapers	0.1%
	Textiles	0.7%
	Carpet and Padding	12.5%
	Miscellaneous (1)	10.7%
	Other Subtotal	24.0%

Notes: All figures are percent by weight.

1) "Miscellaneous" includes e-waste, other electronics, tires and other rubber products, cosmetics, pharmaceuticals, furniture, ash, dust, miscellaneous organics, miscellaneous inorganics and residuals.

Figure 7
GENERAL COMMERCIAL WASTES



SUMMARY OF WASTE COMPOSITION RESULTS:

PAPER	Newspaper	1.2%
	Cardboard	5.1%
	Other Recyclable Paper	8.3%
	Compostable Paper	7.7%
	Non-Recyclable Paper	1.3%
	Paper Subtotal	23.6%
PLASTIC	Plastic Bottles	2.0%
	Film and Bags	6.6%
	Other Plastic	10.2%
	Plastic Subtotal	18.9%
METAL	Aluminum Cans	0.7%
	Tin Cans	0.7%
	Other Metals	4.6%
	Metal Subtotal	5.9%
GLASS	Glass Bottles	2.2%
	Other Glass	0.4%
	Glass Subtotal	2.6%
WOOD, C&D	Wood	8.2%
	Construction, Demolition	1.0%
	Wood, C&D Subtotal	9.1%
SPECIAL WASTES	Animal Excrement	0.4%
	Other Special Wastes	0.3%
	Special Waste Subtotal	0.6%
ORGANIC	Food Waste	19.6%
	Yard Debris	1.3%
	Organic Subtotal	21.0%
OTHER	Disposable Diapers	1.5%
	Textiles	4.0%
	Carpet and Padding	2.4%
	Miscellaneous (1)	10.4%
	Other Subtotal	18.2%

Notes: All figures are percent by weight.
1) "Miscellaneous" includes e-waste, other electronics, tires and other rubber products, cosmetics, pharmaceuticals, furniture, ash, dust, miscellaneous organics, miscellaneous inorganics and residuals.

E. WOOD, C&D AND SPECIAL WASTES

Additional data on the breakdown of wood, construction/demolition, and special wastes is shown in Table 4. Most of this data does not have the same level of statistical certainty as the primary categories of materials due to the lower quantities and greater variability of these materials in the waste stream, but this data may still be useful for future planning activities focused on these types of wastes.

Included in the breakdown for special wastes is an assessment of the amount that met the criteria for hazardous waste. More detail about these wastes is shown in Table 5. Table 5 shows only those materials that were actually classified as hazardous waste (in other words, for several categories there were also non-hazardous items found and these were not included in the figures). The figures shown in Table 5 are for the number of times that each item was found, except for medical waste where the total number of syringes is also shown. It should be noted that these numbers correspond to a variable amount of waste sorted for each generator, so comparing the figures between different types of generators may be misleading. For instance, fewer samples and hence less garbage was sorted for the Rural Dropboxes waste stream, so the lower number of items found in that category are largely the result of that difference.

As shown in Table 5, banned electronic wastes ("e-wastes") were found seven times over the course of the fieldwork. Items found included six televisions (or parts thereof) and one computer monitor. The count for these items is shown in Table 5 but the weight of these is not included in the weight for "actual hazardous wastes."

F. ADDITIONAL DATA AND OBSERVATIONS

Types of Light Bulbs Found

The types of light bulbs found were noted during the fieldwork for this study. For all of the samples taken together, 78.2% by weight of the light bulbs found were the incandescent type, 11.8% were compact fluorescent bulbs (CFLs), and 10.1% were fluorescent bulbs. The number of times that CFLs and fluorescent tubes were found is shown in Table 5, but the weight of the fluorescent tubes and compact fluorescents are not included in the "actual hazardous waste" subtotal (see Tables 3 and 4).

Marketability Data

During the course of this study, data was collected on the marketable condition of the recyclable materials found in most of the samples. Some of the samples were skipped due to time and other constraints, but altogether the marketability data was collected for about two-thirds of the samples. This data was collected in response to concerns

Table 4
BREAKDOWN OF WOOD, C&D AND SPECIAL WASTES

	Residential Self-Haul	Rural Dropboxes	Single-Family	Multi-Family	Non-Res. Self-Haul	General Commercial	Average for Entire County
WOOD WASTE							
Dimension Lumber	4.9%	0.8%	0.5%	0.4%	9.0%	3.5%	3.5%
Pallets, Crates	0%	0%	0%	0%	1.2%	0.2%	0.2%
Treated Wood	0.5%	0.1%	0.01%	0.0%	1.3%	0.2%	0.3%
Roofing	0%	0%	0.1%	0%	4.0%	0.1%	0.5%
Contaminated	0.6%	3.8%	0.01%	0.3%	1.8%	0.9%	0.8%
Stumps, Other Bulky Wood	0.2%	0%	0.6%	0.1%	0%	0.1%	0.2%
Plywood	1.1%	1.4%	0.02%	0.4%	3.3%	1.4%	1.2%
Particleboard, Fiberboard	4.0%	2.0%	0.5%	2.0%	6.9%	1.1%	2.2%
Wood Products	0.7%	0.4%	0.3%	0.5%	0.001%	0.2%	0.3%
Other Wood	1.7%	0%	0%	0.2%	0%	0.3%	0.5%
Total Wood Waste	**13.7%**	**8.5%**	**2.0%**	**3.8%**	**27.6%**	**8.2%**	**9.7%**
CONSTRUCTION AND DEMOLITION (C&D) WASTE							
Ceramics, Porc., Chinc	1.0%	0%	0.02%	0.02%	0.5%	0.1%	0.3%
Rocks, Bricks	0.5%	0.5%	0.02%	0.1%	0%	0.1%	0.2%
Concrete	0.6%	0.5%	0%	0.003%	0.6%	0.2%	0.3%
Soil, Dirt, Fines	0.1%	0.3%	0.5%	0.1%	0%	0.2%	0.2%
Gypsum Board	3.8%	2.5%	0.2%	0.4%	6.9%	0.3%	1.7%
Fiberglass Insulation	0.3%	0.6%	0.05%	0.1%	3.5%	0.1%	0.5%
Other Fiberglass	1.1%	0%	0.002%	0.002%	1.1%	0.02%	0.3%
Roofing	3.0%	0.3%	0.1%	0.6%	7.6%	0.03%	1.4%
Asphalt	0%	0%	0%	0.1%	0%	0%	0.004%
Other C&D	0.4%	0.1%	0.01%	0.1%	3.3%	0.03%	0.4%
Total C&D Waste	**10.9%**	**4.8%**	**0.8%**	**1.5%**	**23.5%**	**1.0%**	**5.3%**
SPECIAL WASTES							
Paints and Solvents;							
Latex Paint	0.02%	0.02%	0.1%	0.1%	0.004%	0.02%	0.04%
Oil-Based Paint	0.001%	0%	0%	0.007%	0.007%	0.006%	0.004%
Solvents	0.1%	0.02%	0%	0.030%	0%	0%	0.01%
Automotive Wastes;							
Motor Oil, Other Oils	0.03%	0.1%	0%	0.1%	0%	0%	0.01%
Oil Filters	0.02%	0%	0.01%	0.01%	0%	0.1%	0.04%
Gasoline, Fuel Oil	0%	0%	0%	0%	0%	0%	0%
Antifreeze	0.03%	0%	0%	0%	0%	0%	0.01%
Other Auto Maintenance	0.01%	0%	0%	0%	0%	0.01%	0.005%
Batteries, Car	0.01%	0%	0%	0%	0%	0%	0.003%
Home and Garden;							
Pesticides, Herbicides	0.02%	0.02%	0%	0%	0%	0%	0.005%
Fertilizer w/Pest. and Herb.	0.003%	0%	0%	0%	0%	0%	0.001%
Fertilizer w/o Pest., Herb.	0.1%	0.002%	0.002%	0%	0%	0%	0.01%
Other;							
Adhesives, Glues	0.2%	0.1%	0.03%	0.04%	0.04%	0.03%	0.1%
Cleaners, Corrosives	0.4%	0%	0.04%	0.1%	0%	0.002%	0.1%
Medical Wastes	0.02%	0.004%	0.03%	0.004%	0.0002%	0.02%	0.02%
Household Batteries	0.1%	0.1%	0.2%	0.1%	0.0%	0.1%	0.1%
Animal Excrement	2.7%	1.1%	5.0%	2.8%	0.3%	0.4%	1.9%
Animal Carcasses	0%	0%	0.01%	0%	0%	0%	0.002%
Gas Cylinders	0%	0%	0.002%	0.01%	0%	0.01%	0.004%
Other Special Wastes	0.8%	0%	0%	0.002%	0%	0.004%	0.2%
Actual Hazardous Waste	**0.35%**	**0.15%**	**0.04%**	**0.15%**	**0.02%**	**0.14%**	**0.15%**
Total Special Waste	**4.5%**	**1.4%**	**5.4%**	**3.3%**	**0.4%**	**0.6%**	**2.5%**

Notes: All figures are percentages by weight.

Table 5
NUMBER OF TIMES HAZARDOUS WASTES WERE FOUND

	Res. Self-Haul	Rural Drop-boxes	Single-Family	Multi-Family	Non-Res. Self-Haul	General Comm.	Totals
Type of Hazardous Waste:							
Oil Paint	1			1	1	1	4
Solvents	4	1		3			8
Motor Oil	3	1		1			5
Oil Filters	1		3	1		4	9
Antifreeze	1						1
Other Auto Maintenance						1	1
Car Batteries	1						1
Pesticides and Herbicides	2	1				1	4
Fertilizers w/o Pesticides	2	1	2				5
Fertilizers w/Pesticides	1						1
Adhesives and Glues	3		1	1	1		6
Cleaners	4			1			5
Medical Waste (and Number of Syringes)	2 (16)	1 (13)	11 (99)	6 (16)	1 (1)	3 (55)	24 (200)
Household Batteries (NiCd only)		1				2	3
Gas Cylinders						1	1
Other	2			1		2	5
Total Number of Times that Hazardous Wastes were Found	**27**	**6**	**17**	**15**	**3**	**15**	**83**
Total Amount of Hazardous Waste, % by Weight	**0.35%**	**0.15%**	**0.04%**	**0.15%**	**0.02%**	**0.14%**	**0.15%**
Additional Materials of Concern:							
Compact Fluorescents	1		5	4		1	11
Fluorescent Tubes	1	1		1		1	4
E-Wastes			1	5		1	7
Subtotal, Materials of Concern	**2**	**1**	**6**	**10**		**3**	**22**

The types of special wastes not shown above include: latex paint (because it is not classified as hazardous); gasoline (because none was found); and animal excrement and carcasses (which are not classified as hazardous).

about the ability to relate the waste composition information, which provides the total quantity of various materials, to the amount that could actually be recovered and marketed through the waste processing system at WARC. The data was collected by noting the general condition of specific materials for individual samples (in other words, whether a particular material from a sample was potentially recyclable).

The marketability assessment only examined the "typical" or "curbside" recyclable materials (paper, bottles and cans). Hence, this analysis shows an artificially low figure for Non-Residential Self-Haul, since the focus on "curbside" materials ignores the wood and other construction materials that could be recovered from these types of loads.

The amount of marketable materials in each waste stream was observed to be:

17.3%	Residential Self-Haul
8.3%	Non-Residential Self-Haul
19.3%	Rural Dropboxes
7.3%	Single-Family, Olympia
8.9%	Single-Family, rest of Thurston County
16.0%	Multi-Family, Olympia
20.2%	Multi-Family, rest of Thurston County
18.5%	General Commercial, Olympia
16.0%	General Commercial, rest of Thurston County
15.2%	County Buildings
14.4%	County-Wide Average

The above figures correspond to the amount of recyclable materials (paper, bottles and cans) that were deemed marketable in the samples. These figures are conservative, since fairly strict standards were used to determine the marketability of the materials. The results shown for each of the generators is a simple average of the quarterly amounts. The figure shown for the county-wide average is a weighted average that is based on the amount of waste disposed by each of the generators.

The marketability data should only be used as an estimate of the amount of materials that could be recovered by a waste processing facility. The actual results from processing waste will vary significantly depending on system design and operating parameters. Source separation programs can generally recover a larger portion of the total amount of recyclable materials (in other words, more than the amount that is indicated as marketable). Since the marketability assessment was based on the condition of the recyclables after those materials had been mixed with garbage (and subsequently contaminated to some degree by food and other materials), it is likely that keeping the materials separate in the first place would allow a substantially greater percentage of the materials to be recycled.

SECTION III

CONCLUSIONS AND RECOMMENDATIONS

A. CONCLUSIONS

Weight of Materials Disposed

The waste quantity and composition results can be combined to show the total weight of disposed materials. Table 6 provides this information for the six waste generators and for the County's entire waste stream.

Analysis of Waste Composition Trends

Table 7 shows the current results for the entire waste stream compared to the results from the two previous studies conducted for Thurston County. Figure 8 provides a graphic illustration of how some types of materials have grown while others have decreased. A few adjustments had to be made in the data to provide results that could be directly compared:

- phone books were added to mixed paper for the current study.
- office paper and magazines were added to mixed paper for the previous studies.
- compostable paper was added to non-recyclable paper for the current study.
- tubs and plastic film were added to plastic packaging for the current study.
- light bulbs were added to non-recyclable glass for the current study.
- pharmaceuticals were added to cosmetics for the current study.
- miscellaneous organics were added to residuals for the current study.
- residuals and fines for the previous two studies were combined.

When examining this data, it is important to bear in mind that:

- The amount of waste disposed in the past year is actually lower than 2004 levels, despite increases in population in the past five years. This is probably due to a combination of the current economic problems, which have led to a decrease in consumption, and new diversion programs, which have led to increases in the amounts of materials recycled and composted.

- The figures shown are percentages, which will change due solely to changes in other materials. For example, the annual tonnage of a material such as

Table 6
WEIGHT OF DISPOSED MATERIALS

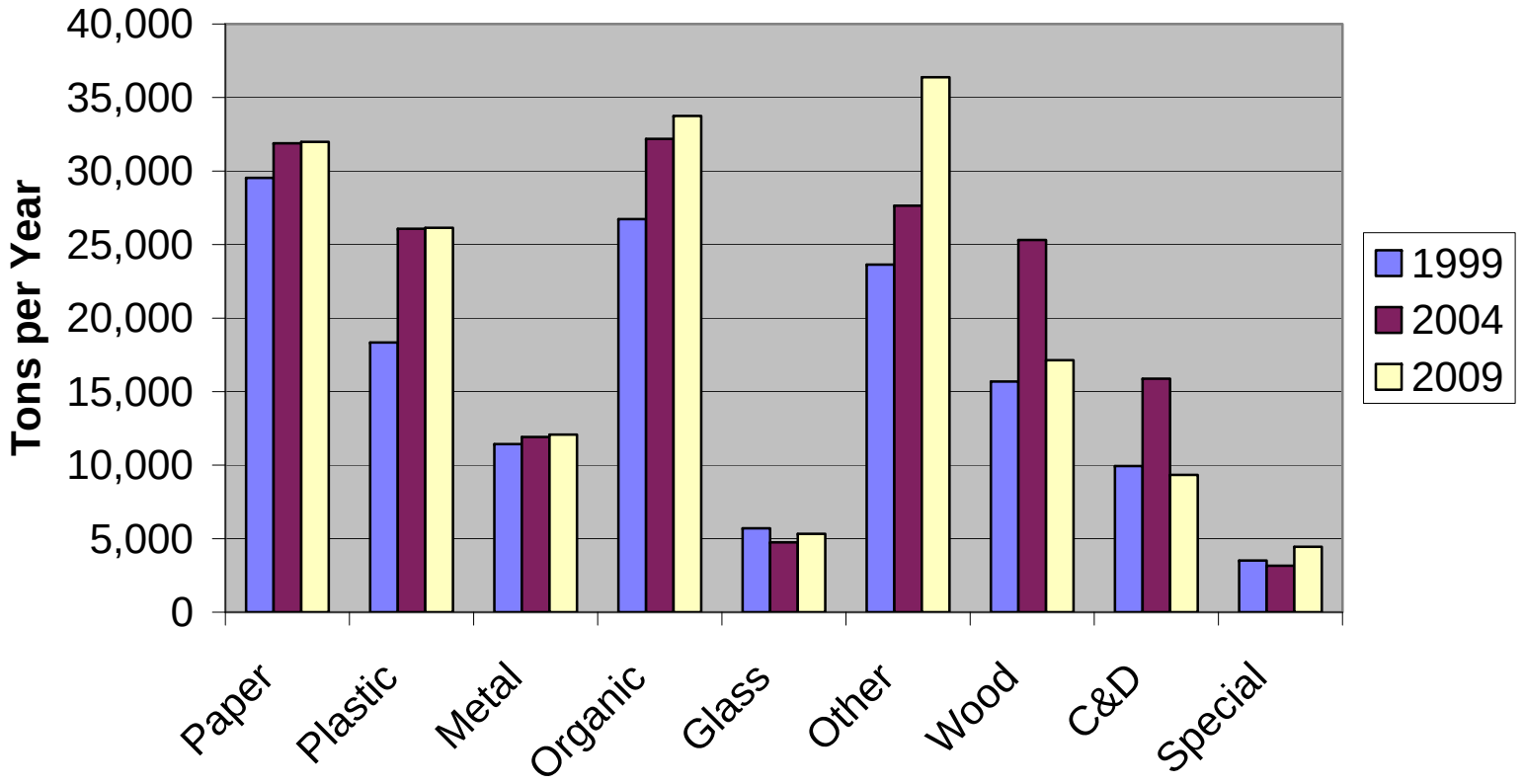
		Residential Self-Haul	Rural Dropboxes	Single-Family	Multi-Family	Non-Res. Self-Haul	General Commercial	Totals for Entire County
PAPER	Newspaper	240	20	280	100	20	900	1,570
	Cardboard	1,310	50	560	350	760	3,770	6,800
	Mixed Waste Paper	1,740	120	2,410	720	150	5,770	10,910
	Phone Books	20	3	50	10	0	50	140
	Milk Cartons, Other	50	10	100	20	10	380	560
	Compostable Paper	740	100	2,560	340	260	5,720	9,730
	Non-Recyclable Paper	570	20	410	100	170	1,000	2,280
	Paper Subtotal	**4,660**	**330**	**6,360**	**1,650**	**1,370**	**17,600**	**31,980**
PLASTIC	PET Bottles	170	30	360	120	40	900	1,630
	HDPE Bottles	240	20	250	80	4	550	1,150
	Bottles 3-7	10	3	30	10	2	60	120
	Tubs	50	10	140	20	10	220	450
	Film and Bags	850	150	2,400	390	400	4,930	9,120
	Plastic Packaging	440	40	730	120	60	1,350	2,740
	Other Plastic Products	2,420	130	990	250	250	5,430	9,470
	Expanded Polystyrene	140	30	250	40	370	640	1,460
	Plastic Subtotal	**4,330**	**400**	**5,160**	**1,030**	**1,120**	**14,080**	**26,140**
METAL	Aluminum Cans	110	20	170	80	20	490	890
	Aluminum Foil	70	10	100	10	10	120	310
	Tin Cans	210	30	420	90	20	550	1,320
	Mixed Metals	980	210	630	310	550	1,610	4,280
	Ferrous Metals	940	190	240	80	370	1,280	3,090
	White Goods	0	0	0	110	20	0	130
	Non-Ferrous Metals	180	10	50	10	40	50	340
	Aerosol Cans	70	10	90	20	10	110	300
	Auto Parts	630	20	10	10	0	230	900
	Metal Subtotal	**3,180**	**490**	**1,700**	**720**	**1,030**	**4,440**	**11,550**
ORGANIC	Food Waste	3,530	490	8,750	1,520	620	14,640	29,550
	Yard Debris	820	90	2,200	100	2	1,000	4,210
	Organics Subtotal	**4,350**	**580**	**10,950**	**1,610**	**620**	**15,640**	**33,750**
GLASS	Clear Bottles	410	40	560	190	30	990	2,220
	Brown Bottles	180	20	260	100	10	460	1,020
	Green Bottles	130	10	150	60	10	190	540
	Light Bulbs	30	1	20	10	0	20	70
	Non-Recyclable Glass	780	40	210	30	130	280	1,480
	Glass Subtotal	**1,530**	**110**	**1,200**	**390**	**170**	**1,930**	**5,330**
OTHER WASTES	E-Waste	0	0	10	110	0	40	170
	Other Electronics	80	10	40	10	0	220	360
	Tires	120	4	20	0	0	0	140
	Rubber	50	10	60	20	40	510	690
	Cosmetics	130	10	110	20	1	130	400
	Pharmaceuticals	20	1	30	10	0	20	80
	Diapers	360	70	2,170	400	10	1,110	4,130
	Textiles	1,330	160	1,430	370	130	2,950	6,360
	Carpet	440	100	270	70	1,560	1,110	3,560
	Carpet Padding	310	20	0	1	650	710	1,690
	Furniture	2,960	210	20	270	1,400	670	5,520
	Ash, Dust	130	90	180	20	10	220	640
	Misc. Organics	120	2	40	10	1	50	230
	Misc. Inorganics	300	30	130	30	10	970	1,470
	Residuals	900	240	4,470	570	420	4,890	11,480
	Other Wastes Subtotal	**7,250**	**940**	**8,960**	**1,910**	**4,230**	**13,610**	**36,900**
	Wood	4,870	290	750	300	4,860	6,080	17,140
WOOD and C&D	Construction, Demolition	3,890	160	300	120	4,140	740	9,340
	Wood, C&D Subtotal	**8,750**	**450**	**1,050**	**420**	**8,990**	**6,820**	**26,480**
	Paints and Solvents	30	1	30	10	2	20	90
SPECIAL WASTES	Automotive	40	4	10	10	0	70	120
	Home and Garden	30	1	1	0	0	0	30
	Other Special Wastes	1,500	40	1,960	240	60	390	4,200
	Actual Haz. Wastes	**120**	**10**	**10**	**10**	**3**	**100**	**260**
	Special Waste Subtotal	**1,600**	**50**	**2,000**	**260**	**60**	**480**	**4,450**
TOTALS		**35,650**	**3,340**	**37,390**	**7,990**	**17,610**	**74,600**	**176,580**

Notes: All figures are tons per year.

Table 7
COMPARISON OF RESULTS TO PREVIOUS STUDIES

		Results as a Percent by Weight			Results in Tons per Year		
		1999	2004	2008-2009	1999	2004	2008-2009
PAPER	Newspaper	1.82%	1.36%	0.89%	2,630	2,430	1,570
	Cardboard	3.68%	3.43%	3.85%	5,320	6,130	6,800
	Mixed Waste Paper	5.89%	5.70%	6.26%	8,510	10,190	11,050
	Milk Cartons, Other	0.30%	0.23%	0.32%	430	400	560
	Non-Recy. Paper	8.74%	7.12%	6.80%	12,630	12,730	12,010
	Paper Subtotal	**20.43%**	**17.83%**	**18.11%**	**29,530**	**31,890**	**31,980**
PLASTIC	PET Bottles	0.52%	0.81%	0.92%	760	1,440	1,630
	HDPE Bottles	0.68%	0.55%	0.65%	980	990	1,150
	Bottles 3-7	0.05%	0.08%	0.07%	68	140	120
	Plastic Packaging	7.24%	6.00%	6.97%	10,460	10,720	12,310
	Other Plastic Products	3.74%	6.67%	5.36%	5,410	11,940	9,470
	Expanded Polystyrene	0.46%	0.47%	0.83%	660	850	1,460
	Plastic Subtotal	**12.69%**	**14.58%**	**14.80%**	**18,340**	**26,080**	**26,140**
METAL	Aluminum Cans	0.42%	0.39%	0.50%	600	690	890
	Aluminum Foil	0.13%	0.14%	0.18%	180	240	310
	Tin Cans	1.00%	0.67%	0.75%	1,450	1,200	1,320
	Mixed Metals	2.58%	2.50%	3.23%	3,730	4,470	5,700
	Ferrous Metals	2.69%	2.74%	1.75%	3,890	4,890	3,090
	White Goods	0.71%	0.28%	0.07%	1,030	500	130
	Non-Ferrous Metals	0.18%	0.32%	0.19%	270	570	340
	Aerosol Cans	0.20%	0.15%	0.17%	290	270	300
	Metal Subtotal	**7.91%**	**7.18%**	**6.84%**	**11,430**	**12,860**	**12,080**
ORGANIC	Food Waste	15.46%	13.63%	16.73%	22,330	24,370	29,550
	Yard Debris	3.04%	4.38%	2.38%	4,400	7,830	4,210
	Organics Subtotal	**18.50%**	**18.00%**	**19.12%**	**26,730**	**32,190**	**33,750**
GLASS	Clear Bottles	1.74%	1.28%	1.25%	2,510	2,300	2,220
	Brown Bottles	0.73%	0.58%	0.58%	1,050	1,040	1,020
	Green Bottles	0.45%	0.27%	0.31%	650	490	540
	Non-Recyclable Glass	1.03%	0.52%	0.87%	1,490	930	1,540
	Glass Subtotal	**3.94%**	**2.66%**	**3.02%**	**5,700**	**4,750**	**5,330**
OTHER	Tires	0.16%	0.04%	0.08%	230	70	140
WASTES	Rubber Products	0.35%	0.29%	0.39%	500	520	690
	Cosmetics	0.14%	0.36%	0.27%	200	640	470
	Disposable Diapers	2.11%	1.55%	2.34%	3,050	2,780	4,130
	Textiles	2.60%	2.50%	3.60%	3,760	4,470	6,360
	Carpeting	2.51%	1.33%	2.97%	3,630	2,370	5,240
	Furniture	1.02%	1.43%	3.13%	1,470	2,550	5,520
	Ash, Dust	0.26%	0.28%	0.36%	370	510	640
	Misc. Inorganics	0.59%	0.13%	0.83%	860	240	1,470
	Residuals	6.63%	7.03%	6.63%	9,580	12,560	11,710
	Other Subtotal	**16.36%**	**14.95%**	**20.60%**	**23,640**	**27,640**	**36,380**
WOOD	Wood	10.86%	14.15%	9.71%	15,690	25,310	17,140
and C&D	Const., Demolition	6.88%	8.88%	5.29%	9,940	15,880	9,340
	Wood, C&D Subtotal	**17.73%**	**23.03%**	**15.00%**	**25,620**	**41,190**	**26,480**
SPECIAL WASTES		**2.43%**	**1.77%**	**2.52%**	**3,510**	**3,160**	**4,450**
TOTAL WASTE STREAM		**100.0%**	**100.0%**	**100.00%**	**144,500**	**178,820**	**176,580**

Figure 8
DISPOSAL TRENDS (TONS DISPOSED ANNUALLY)



newspaper could remain unchanged, but a higher percentage would be shown if there were a large reduction in another material (such as yard debris).

- The types of materials and definitions are not identical from study to study, which could cause false differences or even mask actual differences between the data from different studies.

Bearing in mind the difficulty of drawing firm conclusions from this data, some interesting trends can still be observed for each of the major categories:

- **Paper**: the amount of newspaper in Thurston County's waste stream shows a steady decline over the years, as can be expected from increased participation in recycling programs and lower subscription rates, but other paper grades first dropped and then increased again, both in terms of percentages and total tonnages.

- **Plastic**: the overall amount of plastic and most of the plastic categories have increased over the past ten years. This increase is most likely a reflection of the increasing popularity of plastics for packaging and other applications. Plastic bottles, especially PET bottles, provide an example of how plastics have replaced other container materials such as glass and metal. For this reason, the amount of PET bottles in the waste stream continues to grow despite increased recycling programs for this material.

- **Metal**: the amount of metal in the waste stream shows a steady decline in percentages, but the tonnages have remained fairly steady over the past ten years. This is partly due to an increase in mixed metals offsetting lower amounts of other metals.

- **Food Waste**: the amount of food in the County's waste stream has varied on a percentage basis but the total tonnages show a steady increase. This increase is probably due to the increase in the County's population.

- **Yard Debris**: the percentages and tonnages of yard debris in the County's waste stream increased in the last study and then decreased in the current study.

- **Glass**: the amount of glass in the waste stream has varied over the years, probably due to changes in consumer packaging and in recycling levels.

- **Wood and Construction/Demolition (C&D) Wastes**: the percentage of wood and C&D wastes in the County's waste stream shows a sharp decrease in the current study compared to five years ago, which is likely the result of less construction activity (due to the current economic problems).

- Other Wastes: this category includes a number of different materials, and it's interesting to see that several consumer goods (textiles, carpeting and furniture) have increased since the previous study. This is the opposite of what one might expect given the current economic problems, so there must be other reasons behind these changes.

Recycling Potential Assessment

One of the key reasons for conducting a study such as this is to determine how much recyclable material remains in the waste stream. In addition to examining "typical" recyclable materials (those materials that are typically collected through residential curbside and commercial recycling programs), other materials can also be examined, such as organics and other materials that can be recycled through special programs. This data provides important information for planning new or expanded recycling and composting programs.

Table 8 and Figure 9 show the amounts of recyclable materials remaining in the waste stream of each generator. Materials have been grouped into three categories for this analysis:

- **Typical Recyclables**: these are the materials typically collected through curbside and commercial programs. The list of materials for this group is based on Olympia's curbside program, although it should be kept in mind that the exact mix of materials collected varies from area to area and also varies depending on the type of generator (commercial programs often differ from residential).

- **Organics**: these are the materials typically collected through "expanded organics" collection programs, such as used in Olympia and other areas. Although other materials (such as wood and animal excrement) could potentially be considered "organic" (in the sense that these material are carbon-based and could potentially be broken down through composting), these are not included here because current composting systems are generally not equipped to handle these materials.

- **Other Recyclables**: the third group is materials that could potentially be recycled through existing or new recycling programs, including materials that:
  - are recycled currently through programs that are conducted separately from municipal and hauler-based programs (such as textiles and plastic bags);
  - are being recycled to a limited extent currently through a few specialized programs (such as wood and carpeting); and
  - are being diverted to applications that do not meet the definition of recycling (such as wood converted to hog fuel).

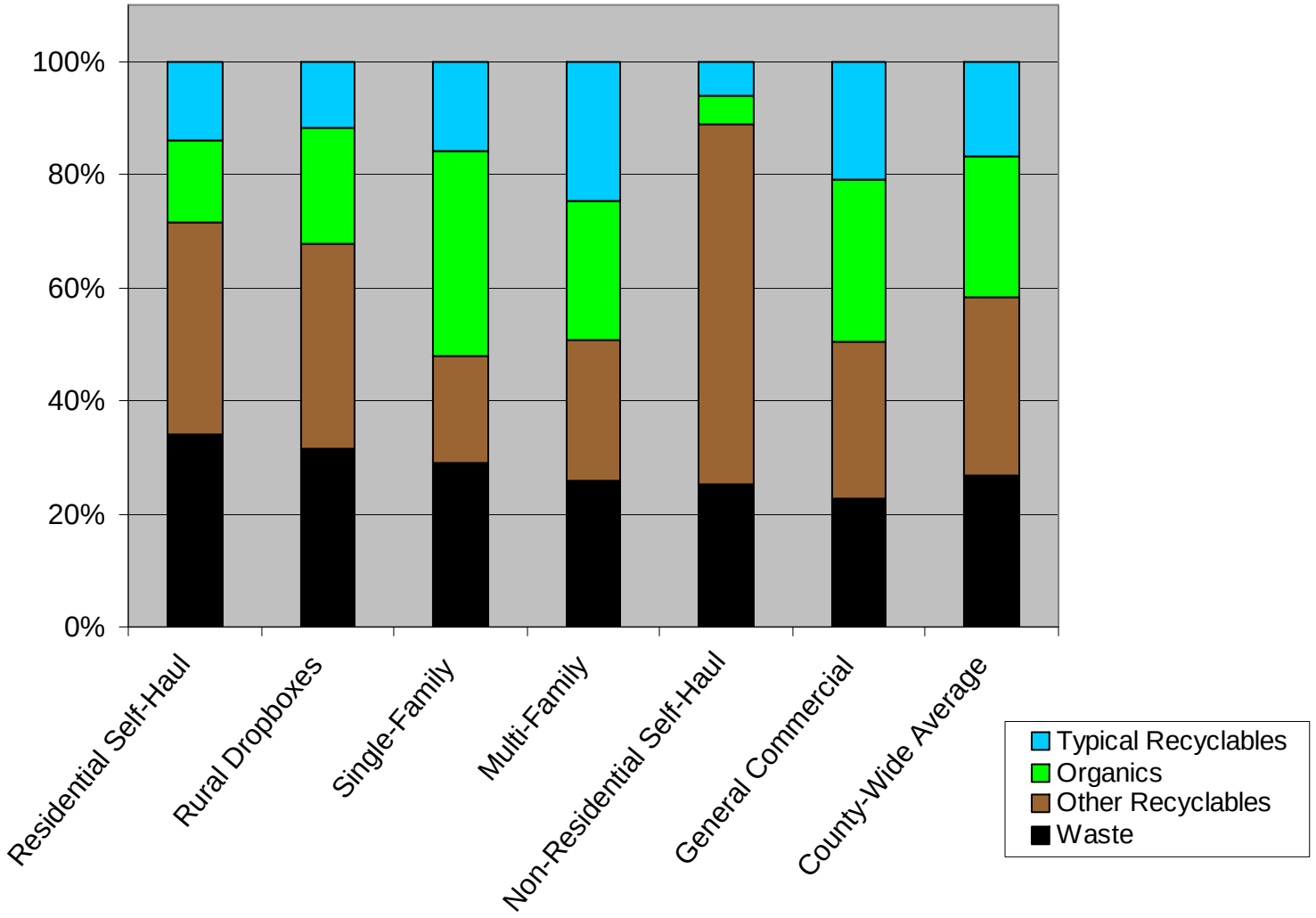
Table 8
RECYCLING POTENTIAL ASSESSMENT

	Residential Self-Haul		Rural Dropboxes		Single-Family		Multi-Family		Non-Res. Self-Haul		General Commercial		Totals for Entire County	
	%	TPY	%	TPY	%	TPY	%	TPY	%	TPY	%	TPY	%	TPY
Typical Recyclables:														
Newspaper	0.68%	240	0.57%	20	0.75%	280	1.30%	100	0.13%	20	1.20%	900	0.89%	1,570
Cardboard	3.66%	1,310	1.58%	50	1.50%	560	4.36%	350	4.31%	760	5.05%	3,770	3.85%	6,800
Mixed Waste Paper	4.89%	1,740	3.66%	120	6.44%	2,410	8.98%	720	0.86%	150	7.74%	5,770	6.18%	10,910
Phone Books	0.05%	20	0.09%	3	0.14%	50	0.18%	10	0.00%	0	0.07%	50	0.08%	140
Milk Cartons, Other	0.13%	50	0.19%	10	0.26%	100	0.26%	20	0.04%	10	0.51%	380	0.32%	560
PET Bottles	0.47%	170	0.85%	30	0.98%	360	1.49%	120	0.23%	40	1.21%	900	0.92%	1,630
HDPE Bottles	0.69%	240	0.69%	20	0.67%	250	0.95%	80	0.02%	4	0.74%	550	0.65%	1,150
Bottles 3-7	0.03%	10	0.09%	3	0.09%	30	0.09%	10	0.01%	2	0.09%	60	0.07%	120
Tubs	0.14%	50	0.26%	10	0.39%	140	0.31%	20	0.04%	10	0.29%	220	0.26%	450
Aluminum Cans	0.31%	110	0.48%	20	0.44%	170	0.94%	80	0.14%	20	0.66%	490	0.50%	890
Aluminum Foil	0.19%	70	0.21%	10	0.26%	100	0.14%	10	0.04%	10	0.17%	120	0.18%	310
Tin Cans	0.60%	210	1.02%	30	1.11%	420	1.16%	90	0.10%	20	0.73%	550	0.75%	1,320
Aerosol Cans	0.20%	70	0.28%	10	0.25%	90	0.19%	20	0.04%	10	0.14%	110	0.17%	300
Glass Bottles	2.01%	720	1.93%	70	2.59%	970	4.45%	350	0.25%	50	2.19%	1,640	2.14%	3,780
Subtotal	**14.0%**	**5,010**	**11.9%**	**406**	**15.9%**	**5,930**	**24.8%**	**1,980**	**6.2%**	**1,106**	**20.8%**	**15,510**	**16.9%**	**29,930**
Organics														
Compostable Paper	2.07%	740	3.13%	100	6.84%	2,560	4.31%	340	1.49%	260	7.67%	5,720	5.51%	9,730
Food Waste	9.90%	3,530	14.66%	490	23.41%	8,750	19.00%	1,520	3.52%	620	19.62%	14,640	16.73%	29,550
Yard Debris	2.30%	820	2.60%	90	5.88%	2,200	1.21%	100	0.01%	2	1.34%	1,000	2.38%	4,210
Subtotal	**14.3%**	**5,090**	**20.4%**	**680**	**36.1%**	**13,510**	**24.5%**	**1,960**	**5.0%**	**882**	**28.6%**	**21,360**	**24.6%**	**43,490**
Other Recyclables														
Plastic Bags and Film	2.38%	850	4.35%	150	6.42%	2,400	4.89%	390	2.27%	400	6.62%	4,930	5.16%	9,120
Plastic Packaging	1.25%	440	1.17%	40	1.96%	730	1.50%	120	0.32%	60	1.80%	1,350	1.55%	2,740
Expanded Polystyrene	0.40%	140	0.84%	30	0.66%	250	0.56%	40	2.08%	370	0.85%	640	0.83%	1,460
Mixed Metals	2.75%	980	6.20%	210	1.68%	630	3.85%	310	3.10%	550	2.16%	1,610	2.42%	4,280
Ferrous Metals	2.63%	940	5.65%	190	0.64%	240	1.05%	80	2.09%	370	1.71%	1,280	1.75%	3,090
White Goods	0.00%	0	0.00%	0	0.00%	0	1.36%	110	0.12%	20	0.00%	0	0.07%	130
Non-Ferrous Metals	0.50%	180	0.29%	10	0.12%	50	0.11%	10	0.24%	40	0.07%	53	0.19%	340
Auto Parts	1.76%	630	0.47%	20	0.03%	10	0.15%	10	0.00%	0	0.31%	230	0.51%	900
Light Bulbs	0.07%	30	0.03%	1	0.05%	20	0.07%	10	0.00%	0	0.02%	15	0.04%	67
E-Waste	0.00%	0	0.00%	0	0.02%	10	1.44%	110	0.00%	0	0.06%	43	0.09%	170
Other Electronics	0.23%	80	0.22%	10	0.10%	40	0.14%	10	0.00%	0	0.29%	220	0.20%	360

Table 8, Recycling Potential Assessment, continued

	Residential Self-Haul		Rural Dropboxes		Single-Family		Multi-Family		Non-Res. Self-Haul		General Commercial		Totals for Entire County	
	%	TPY	%	TPY	%	TPY	%	TPY	%	TPY	%	TPY	%	TPY
Other Recyclables, continued														
Tires	0.32%	120	0.13%	4	0.06%	20	0.00%	0	0.00%	0	0.00%	0	0.08%	140
Textiles	3.72%	1,330	4.72%	160	3.81%	1,430	4.63%	370	0.73%	130	3.96%	2,950	3.60%	6,360
Carpet	1.24%	440	2.93%	100	0.72%	270	0.90%	70	8.86%	1,560	1.49%	1,110	2.01%	3,560
Carpet Padding	0.87%	310	0.56%	20	0.00%	0	0.01%	1	3.68%	650	0.95%	710	0.96%	1,690
Dimension Lumber	4.90%	1,750	0.82%	27	0.53%	200	0.37%	30	8.96%	1,580	3.55%	2,650	3.53%	6,230
Pallets, Crates	0.00%	0	0.00%	0	0.00%	0	0.00%	0	1.24%	220	0.25%	180	0.23%	400
Roofing, Wood	0.00%	0	0.00%	0	0.06%	21	0.00%	0	4.04%	710	0.13%	100	0.47%	830
Stumps, Bulky Wood	0.22%	80	0.00%	0	0.62%	230	0.10%	8	0.00%	0	0.06%	43	0.21%	360
Plywood	1.05%	380	1.45%	48	0.02%	8	0.41%	33	3.34%	590	1.38%	1,030	1.18%	2,080
Particleboard	4.03%	1,440	2.02%	68	0.48%	180	1.99%	160	6.91%	1,220	1.14%	850	2.22%	3,910
Ceramics, Porcelain	1.03%	370	0.00%	0	0.02%	8	0.02%	2	0.50%	88	0.05%	40	0.29%	510
Rocks, Bricks	0.48%	170	0.50%	17	0.02%	9	0.07%	5	0.00%	0	0.10%	74	0.16%	280
Concrete	0.63%	220	0.53%	18	0.00%	0	0.00%	0	0.60%	110	0.16%	120	0.26%	460
Soil, Dirt, Fines	0.10%	36	0.28%	9	0.46%	170	0.08%	6	0.00%	0	0.25%	190	0.23%	410
Gypsum Board	3.79%	1,350	2.53%	85	0.19%	70	0.40%	32	6.93%	1,220	0.29%	220	1.69%	2,980
Roofing (Asphalt)	3.05%	1,090	0.26%	9	0.05%	20	0.65%	52	7.61%	1,340	0.03%	25	1.43%	2,530
Motor Oil, Other Oils	0.03%	12	0.11%	4	0.00%	0	0.07%	6	0.00%	0	0.00%	0	0.01%	21
Oil Filters	0.02%	8	0.00%	0	0.01%	5	0.01%	1	0.00%	0	0.08%	63	0.04%	77
Antifreeze	0.03%	9	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.01%	9
Batteries, Car	0.01%	5	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	5
Household Batteries	0.08%	30	0.13%	0	0.18%	69	0.14%	11	0.01%	1	0.08%	59	0.10%	175
Subtotal	**37.6%**	**13,419**	**36.2%**	**1,229**	**18.9%**	**7,091**	**25.0%**	**1,986**	**63.6%**	**11,229**	**27.8%**	**20,786**	**31.5%**	**55,673**
Other Materials (Wastes)	**34.1%**	**12,131**	**31.5%**	**1,025**	**29.1%**	**10,859**	**25.7%**	**2,064**	**25.2%**	**4,393**	**22.7%**	**16,944**	**26.9%**	**47,487**
Total Waste Stream		**35,650**		**3,340**		**37,390**		**7,990**		**17,610**		**74,600**		**176,580**

Figure 9
RECYCLING POTENTIAL ASSESSMENT



The data shown in Table 8 does not take into account the marketability of the materials (see Section II.F for more details), although that is not a factor here since this assessment assumes that the additional materials would be diverted through source-separation programs and not through a mixed waste processing system. It should be noted, however, that there is no approach that can recover 100% of a recyclable material (although a combination of mandatory requirements together with financial incentives, such as is used for car batteries, can come close).

Waste Composition Conclusions

There are distinct differences in the waste streams of the different types of waste generators (see Tables 3, 4 and 8). For each of the generators, a few noteworthy conclusions can be drawn:

- **Residential Self-Haul**: self-haul loads from residential sources have more wood and construction debris but less food waste than other residential sources, reflecting activities such as remodeling and the other special projects that are often the source of self-haul waste. The largest categories of materials in this waste stream are:

  - wood is the material present in the largest quantity, at 13.7%,
  - followed by construction/demolition wastes, 10.9%,
  - food waste, 9.9%,
  - furniture, 8.3%, and
  - plastic products, 6.8%.

  Residential Self-Haul customers deliver a significant portion (20.2%) of the total waste stream, but because of their smaller load weights this type of customer represents the majority of the transactions at the transfer stations. Residential Self-Haul waste contains 14.0% materials that could be recycled through a typical curbside recycling program, and another 14.3% consists of organic materials that could be composted. Other types of potentially-recyclable materials contribute 37.6%, leaving only 34.1% of this waste stream that actually needs to be treated as waste currently.

- **Rural Dropboxes**: the wastes brought to the three rural stations represent a blend of household garbage and waste from special projects. The waste stream for this generator includes the following materials:

  - food is the material present in the largest quantity, at 14.7%,
  - followed by wood, 8.5%
  - mixed metals, 6.2%,
  - furniture, 6.1%, and
  - ferrous metals, 5.7%.

Rural Dropbox waste contains only 11.9% of the typical recyclable materials, but another 20.4% is organic materials that could be composted, and an additional 36.2% consists of other materials that could potentially be recycled through a variety of different programs.

- **Single-Family**: the largest categories of materials in this waste stream are:

  - food waste is the largest material in this waste stream, at 23.4%,
  - compostable paper, 6.8%,
  - mixed waste paper, 6.4%,
  - plastic bags and film, 6.4%,
  - yard debris, 5.9%, and
  - disposable diapers, 5.8%.

  Significant quantities of recyclable materials remain in this waste stream despite the widespread availability of recycling and organics collection programs for single-family homes. If residents recycled all of the materials currently accepted through existing recycling and organics collection programs, an additional 52.0% of the Single-Family waste stream could be recycled. This is the equivalent of 19,440 tons per year of additional recyclable and compostable materials. If residents also diverted other potentially-recyclable materials (besides those collected through municipal and hauler-based programs), then less than one-third (29.1%) of the current amount of waste would actually need to be disposed.

- **Multi-Family** (apartments): the largest categories of materials in this waste stream are:

  - food waste, at 19.0%, is again the single largest category,
  - mixed paper, 9.0%,
  - disposable diapers, 5.0%,
  - plastic bags and film, 4.9%,
  - cardboard, 4.4%, and
  - textiles, 4.6%.

  The percentage of recyclable materials in apartment wastes is higher than for single-family homes, although the tonnage of recyclable materials disposed is lower due to the smaller overall waste quantities from this type of generator. Coincidentally, the Multi-Family waste stream contains nearly identical amounts of the typical recyclables (24.8% or 1,980 tons per year of the materials typically collected through curbside programs), organics (24.5% or 1,960 tons), and other potentially-recyclable materials (25.0% or 1,986 tons per year).

- **Non-Residential Self-Haul**: like self-haul waste from residential sources, Non-Residential Self-Haul loads are often the result of construction activities or other

special projects. The primary materials in this waste stream include:

- wood, 27.6%,
- construction and demolition waste, 23.5%,
- carpeting, 8.9%,
- furniture, 8.0%, and
- cardboard, 4.3%.

Not counting the wood and other construction materials that could be recycled, the Non-Residential Self-Haul waste stream only contains 11.2% of typical recyclable and compostable materials, or about 1,988 tons per year. The wood and other potentially-recyclable materials in this waste stream, however, add up to 63.6% or 11,230 tons per year. Diverting all of the recyclable and compostable materials would only leave one-quarter (25.2%) of this waste stream.

- **General Commercial**: the differences in the waste streams of the two types of non-residential customers (self-haul and general) highlight the different services needed for these different business types. The largest categories of materials in this waste stream are:

  - food waste, 19.6%,
  - wood waste, 8.2%,
  - mixed paper, 7.7%,
  - compostable paper, 7.7%, and
  - plastic products, 7.3%.

  The General Commercial waste stream contains 20.8% recyclable materials, or about 15,510 tons per year, and even more organics that could be composted, at 28.6% or 21,360 tons per year. Other materials that could potentially be recycled amount to 22.7% or 16,944 tons per year, again leaving only about one-quarter (22.7%) of this waste stream that actually needs to be disposed as waste.

- **Total Waste Stream**: overall, the County's waste stream contains significant amounts of:

  - food waste, 16.7%,
  - wood waste, 9.7%,
  - mixed paper, 6.2%,
  - compostable paper, 5.5%,
  - plastic products, 5.4%,
  - construction and demolition waste, 5.3%, and
  - plastic bags and film, 5.2%.

  The County's waste stream contains 16.9% or 29,930 tons per year of material that could be handled through typical recycling programs, plus an additional

24.6% or 43,490 tons per year of organic materials that could be diverted to composting programs. Other types of recycling programs could potentially handle another 31.5%, or 47,490 tons per year, leaving only 26.9% of the wastes from Thurston County that actually needs to be handled as a waste.

B. RECOMMENDATIONS

The following recommendations are based on the results of this study:

- There continues to be a significant amount of recyclable materials disposed in Thurston County's waste stream, and some of the materials (cardboard, aluminum cans and plastic bottles) have actually increased since the previous study. The County could possibly increase waste diversion without creating new infrastructure or programs since a significant portion of the disposed waste stream consists of standard recyclable materials. Increased education and other steps could help increase the recycling rate, although these increases would be incremental. If Thurston County desires to increase the recycling rate substantially over current levels, a different approach may be needed. Alternative approaches could include mandatory recycling, increasing the tipping fee at WARC (which provides an incentive to recycle), disposal bans, and an increased focus on new materials (food waste, construction and demolition wastes, etc.).

- Residential Self-Haul and Rural Dropbox customers are together disposing of more waste (38,990 tons per year) than Single-Family generators (37,390 tons). Many of the Residential Self-Haul customers also have garbage service at their homes and are simply disposing of bulky items or wastes from special projects, but many are also not subscribing to garbage collection services and hence are difficult to reach with the typical diversion programs and associated educational materials. Providing these customers with educational materials at WARC and at the rural dropboxes (through materials distributed by scalehouse personnel, for instance) is an important opportunity to educate them about recycling alternatives. Furthermore, providing this type of information at the same time as informing them about a rate increase is often a good opportunity to get the customer's attention and motivate them to look into alternatives.

  A similar point can be made for Non-Residential Self-Haul customers, who are disposing of large amounts of wood, metals, carpeting and various other construction wastes that could potentially be recycled. Although some of these materials are being recovered at WARC, more could be done by this type of generator to divert materials to other recycling programs. Making sure that they are informed about other programs, especially at the time of a rate increase, would be an important educational opportunity.

- Recent steps have been taken in Thurston County to increase food waste diversion, but for now large amounts of this material remain in the waste stream. More publicity and/or diversion programs for food waste should be considered.

- A recent analysis by Green Solutions concluded that the statewide recovery rates for PET bottles, aluminum cans and glass bottles are not keeping up with other recyclable materials. This can be seen here as well, and it may be time for a different approach for these materials (such as a statewide bottle bill) if recovery rates for these materials are going to be increased significantly over the current rates.

GLOSSARY

INTRODUCTION

This glossary includes two sets of definitions:

a) Definitions for waste generator types, and

b) Definitions for waste sorting categories, which are shown below in the same order as they appear on the waste sorting form.

A. WASTE GENERATORS

For the purposes of this study, all waste disposed in Thurston County was categorized into one of five sources, including three types of residential waste generators (single-family, multi-family and self-haul) and two types of non-residential (self-haul and general). In addition, samples were taken from four county buildings and this data was kept separate from the other results.

Residential Self-Haul: residential waste delivered to the disposal facility by a homeowner, renter or landlord, typically using cars, vans, jeeps, pick-up trucks, rented trucks and trailers.

Non-Residential Self-Haul: non-residential waste delivered to the disposal facility by the same company that generated the waste, including construction and demolition waste brought in by contractors.

Rural Dropboxes: wastes collected at the three satellite facilities: Rainier, Rochester and Summit Lake.

Single-Family: waste originating from single-family homes and mobile home parks. To be counted in this category, the waste must have been delivered by a municipal collection crew, private garbage hauler, or the manager/owner of a mobile home park.

Multi-Family: wastes collected from apartment buildings. To be counted in this category, the waste must have been delivered by a municipal collection crew or private garbage hauler.

General Commercial: waste from businesses, industries and institutions, delivered by a municipal collection crew or private garbage hauler.

Olympia Special Single-Family, Multi-Family and Commercial: additional samples of waste (in addition to samples randomly chosen as part of the base project) taken from single-family homes, multi-family apartments, and from businesses, industries and institutions.

Special County: additional samples of waste taken from four Thurston County facilities: Building 4; Buildings 1, 2, and 3; Public Health; and Juvenile Justice.

B. WASTE SORTING CATEGORIES

PAPER

Newspaper: printed groundwood newsprint, including glossy ads and Sunday edition magazines delivered with the newspaper (unless these were found separately during sorting).

Cardboard: unwaxed kraft paper corrugated containers and boxes, unless poly- or foil-laminated. This category did not include brown kraft paper bags.

Mixed Waste Paper: high and low-grade recyclable paper, including colored papers, office paper, notebook or other lined paper, envelopes with plastic windows, paperboard, frozen food packaging, carbonless copy paper, egg cartons, magazines, and junk mail.

Phone Books: printed and bound (typically with glue) phone books made primarily of groundwood paper.

Milk Cartons and Other Aseptic Containers: milk cartons and similar gable-top containers (such as orange juice cartons), and juice drink boxes.

Compostable Paper: non-recyclable papers that can be composted, such as towels, tissues, plates, cups, pizza boxes, waxed paper, and waxed cardboard. This category included paper that was contaminated or soiled with food or liquid in its normal use.

Non-Recyclable Paper: non-recyclable types of papers such as carbon paper, laminated paper, paper packaging with metal or plastic parts, and hardcover books.

PLASTIC

PET Bottles: polyethylene terephthalate (PET) bottles, with or without base cups and wrappers, including soda, oil, liquor and other types of bottles. The SPI code for PET is 1.

HDPE Bottles: high density polyethylene (HDPE) milk, juice, detergent, and other bottles. This category did not include motor oil bottles. The SPI code for HDPE is 2.

Bottles Types 3 - 7: all bottles that were not PET or HDPE, where the neck of the container was narrower than the body. Included SPI codes 3 - 7.

Tubs: plastic containers of all resin types that were as wide or wider at the top than the bottom.

Film and Bags: all plastic packaging films and bags. To be counted in this category, the material must have been flexible (i.e., could be bent without making a noise).

Plastic Packaging: all other plastic packaging (besides tubs, bottles, film and bags), and shipping materials and other plastic items which were not themselves finished consumer products, including thermoplastics and thermosetting plastics used for packaging. Also included HDPE motor oil bottles.

Plastic Products: finished plastic products such as toys, toothbrushes, vinyl hose and shower curtains, including non-C&D fiberglass resin products and materials (see also "fiberglass insulation" and "other fiberglass" under C&D Wastes, below).

Expanded Polystyrene: packaging and finished products made of expanded polystyrene. The SPI code for polystyrene (PS) is 6.

METAL

Aluminum Cans: aluminum beverage cans.

Aluminum Foil: aluminum foil and food trays.

Tin Cans: tin-coated steel food containers. This category included bi-metal beverage cans, but not paint cans or other types of cans.

Mixed Metals/Materials: small appliances, motors, insulated wire and finished products containing a mixture of metals and other materials, but which were greater than 50% metal.

Ferrous Metals: raw materials and products made from metal to which a magnet adhered (but including stainless steel), and which were not significantly contaminated with other metals or materials (in the latter case, the item was instead included under "mixed metals/materials"). This category included meal paint cans and other non-food cans.

White Goods: large household appliances or parts thereof. Special note was taken if any of these were found still containing refrigerant.

Non-Ferrous Metals: metallic products and pieces not derived from iron (i.e., to which a magnet did not adhere) and which were not significantly contaminated with other metals or materials.

Aerosol Cans: metal cans used for containing and applying products under pressure. If the can was full or partially full, with the contents making up more than 25% of the total weight, it was included under the category appropriate for the contents.

Auto Parts: auto parts that were made up of at least 50% metal.

SPECIAL WASTES

Latex Paint: water-based paints.

Oil-Based Paint: solvent-based paints.

Solvents: chlorinated and flammable solvents, paint strippers, solvents contaminated with other products such as paints, degreasers, other cleaners if the primary ingredient is a solvent, and alcohols such as methanol and isopropanol. Alcoholic beverages intended for human consumption were included under "food waste."

Adhesives and Glues: glues and adhesives of various sorts, including rubber cement, wood putty, glazing and spackling compounds, caulking compounds, grout, and joint fillers.

Cleaners and Corrosives: various acids and bases whose primary purpose was to clean surfaces, unclog drains, and perform other functions.

Medical Waste: wastes related to medical activities, including syringes, tubing, bandages, medicine, and other wastes, and not restricted to just those wastes regulated as pathogenic or infectious.

Motor Oil, Other: used or new lubricating oils and oil filters, primarily those used in cars but also including other materials with similar characteristics.

Oil Filters: filters such as those used in cars and similar filters from other applications.

Gasoline and Fuel Oil: gasoline, diesel fuel and light fuel oils, such as used for home heating.

Antifreeze: automobile and other antifreeze mixtures based on ethylene or propylene glycol, also brake and other fluids if glycol-based.

Other Automotive Maintenance: other products used for automobile maintenance, generally of a non-hazardous nature, such as car wax, polishes, autobody fillers, etc.

Car Batteries: car, motorcycle, and other lead-acid batteries used for motorized vehicles.

Household Batteries: batteries of various sizes and types, as commonly used in households.

Animal Excrement: feces and associated wastes from animals, such as bags of used kitty litter.

Animal Carcasses: carcasses of small animals and pieces of larger animals unless the item was the result of food preparation.

Gas Cylinders: pressurized gas cylinders with the contents making up more than 25% of the total weight (if less than 25% or empty, the gas cylinders were counted as metal).

Pesticides and Herbicides: a variety of poisons whose purpose was to discourage or kill pests, weeds or microorganisms. Fungicides and wood preservatives, such as pentachlorophenol, were also included in this category.

Fertilizers with Pesticides/Herbicides: fertilizers that contained weed killer or other ingredients designed to eliminate weeds and/or pests.

Fertilizers without Pesticides/Herbicides: fertilizers without herbicide or pesticide additives.

Other Hazardous and Special Waste: problem wastes that did not fall into one of the above categories, such as asbestos-containing wastes (if this is the primary hazard associated with the waste), gunpowder, other unspent ammunition, and radioactive materials.

ORGANICS

Food Waste: food waste and scraps, including bones, rinds, etc., and including the food container when the container weight was not appreciable compared to the food inside.

Yard and Garden: grass clippings, leaves and weeds, and prunings four inches or less in diameter.

GLASS

Clear, Green and Brown Glass Containers: three separate categories for bottles and jars that were clear, green or brown in color. Blue bottles were included with green glass.

Light Bulbs: light bulbs of all types, including incandescent, CFLs, other fluorescent bulbs, and other types of light bulbs.

Non-Recyclable Glass: window glass, glassware, mirrors, and other glass that was not recyclable. Ceramics (plates and knickknacks) were not included here but were placed under "miscellaneous inorganics" (see below).

OTHER WASTES

E-Wastes: electronic wastes as defined by Washington's State law (Chapter 173-900 WAC), including computers (base units and monitors), televisions, laptops, and other products with video displays greater than four inches diagonally.

Other Electronics: other products that contained circuit boards and electronic components (as a significant portion of the product), such as radios and similar products.

Tires: vehicle tires of all types, including bicycle tires and including rims if attached.

Rubber Products: finished products and scrap materials made of rubber, such as bath mats, inner tubes, rubber hose and foam rubber (except carpet padding, see "carpeting", below).

Cosmetics: bottles and other containers of cosmetics, shampoo, other hair care products, and other products, where the weight of the product was greater than the weight of the container (i.e., the product was more than 50% of the total weight of the item).

Pharmaceuticals: bottles and other containers of pills, prescription drugs, medications, salves and lotions with active ingredients (such as antibiotics), and vitamins, in any amount of active ingredient or product (except residues inside squeeze tubes and similar items).

Disposable Diapers: disposable baby diapers and protective undergarments for adults.

Textiles: cloth, clothing, rope, tennis shoes, and rubberized cloth.

Carpeting: pieces of carpeting.

Carpet Padding: foam rubber and other materials used as padding under carpets.

Furniture and Mattresses: furniture and mattresses made of various materials and in any condition.

Ash and Dust: fireplace, burn barrel or firepit ash, as well as bags of vacuum cleaner dust.

Miscellaneous Organics: miscellaneous organic materials that could be sorted out of the sample but that did not fit into another category, such as wax.

Miscellaneous Inorganics: miscellaneous inorganic materials that could be sorted out of the sample but that did not fit into another category, such as ceramic products.

Residuals: mixed waste that remained on the sorting table after all the materials that could practicably be removed were sorted out. This material consisted primarily of small pieces of various types of paper and plastic, but also contained small pieces of broken glass and other materials.

WOOD WASTES

Dimension Lumber: wood commonly used in construction for framing and related uses, including 2 x 4's and 2 x 6's.

Pallets: partial or whole pallets and similar shipping containers.

Treated Wood: wood treated with preservatives such as creosote, including dimension lumber if treated. Did not include painted or varnished wood.

Roofing: wood that was used for roofing of buildings, such as cedar shingles or shakes. Roofing made from non-wood materials was classified under another category (see "roofing wastes" under C&D, below).

Contaminated Wood: wood that was contaminated with other wastes in such a way that it could not easily be separated, but consisting primarily (over 50%) of wood. Examples include wood with sheetrock nailed to it or with tiles glued to it.

Stumps and Other Bulky Wood: stumps of trees and shrubs, with the adhering soil (if any), and other natural woods, such as logs and branches, in excess of four inches in diameter.

Plywood: a wood product built up of two or more veneer sheets glued or cemented together.

Particle Board / Fiberboard: a building material made up of fibers of various substances (but typically made from wood chips) pressed together to form large sheets or boards.

Wood Products: goods and products fabricated primarily (over 50% by weight) from wood, including toys, household items, and similar goods, but not including furniture.

Other Wood Waste: other types of wood that did not fit into the above categories.

CONSTRUCTION AND DEMOLITION (C&D) WASTES

Ceramics, Porcelain, and China: used toilets and sinks. Non-C&D ceramics, such as plates and other dishes, were categorized under "miscellaneous inorganics."

Rocks and Brick: rock, gravel, and bricks of various types and sizes.

Concrete: cement (mixed or unmixed), concrete blocks, and similar wastes.

Soil, Dirt, and Non-Distinct Fines: soil, sand, dirt and similar materials, where these could be recovered separately from the fines measured as part of the normal sorting procedure.

Gypsum Board: used or new gypsum wallboard, sheetrock or drywall present in recoverable amounts or pieces (generally any piece larger than two inches square was recovered from the sample).

Fiberglass Insulation: did not include other types of insulation or other fiberglass products.

Other Fiberglass: durable, large products such as shower stalls and bathtubs. Small, non-C&D objects were categorized with "other plastic products."

Roofing Waste: asphalt and fiberglass shingles, tar paper, and similar wastes from demolition or installation of roofs. Did not include cedar shingle or shakes (see wood subcategory, "roofing wood").

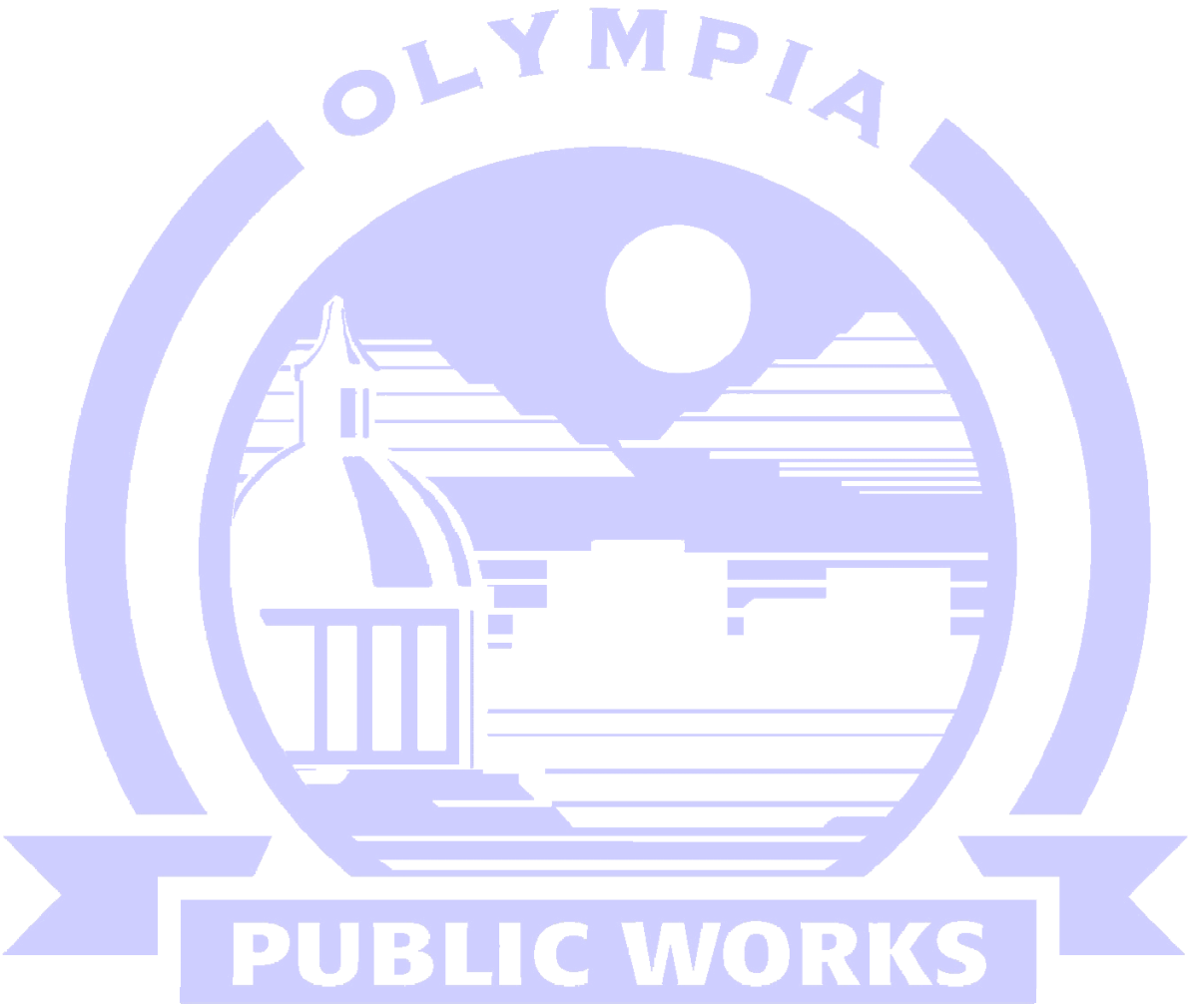
Asphalt: asphalt paving material.

Other C&D: Construction and demolition wastes not included in the above categories.

APPENDIX A

WASTE COMPOSITION DATA FOR THE CITY OF OLYMPIA

CITY OF OLYMPIA
WASTE COMPOSITION STUDY



DECEMBER 2009

GREEN SOLUTIONS

CITY OF OLYMPIA
WASTE COMPOSITION STUDY
2008 - 2009

prepared for

Public Works Waste ReSources
Olympia, Washington

prepared by

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December 2009

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SECTION I

INTRODUCTION

A. SCOPE AND OBJECTIVES

This report provides the results of a study of the quantity and composition of solid waste (garbage) disposed by the City of Olympia, Washington during 2008 - 2009. The primary objectives of this study were to provide:

- Data specific to the City of Olympia.
- Accurate data on the composition and quantity of disposed materials for evaluating current waste diversion programs.
- Data that can be used for planning future programs.

This waste composition study was conducted by the environmental consulting firm of Green Solutions, with assistance provided by Waste Connections, Thurston County and the City of Olympia. This study was primarily organized by Thurston County, but the City of Olympia provided funds for additional data collection to allow better data to be provided about the City's residential and commercial waste streams.

B. BACKGROUND

Local Programs

City of Olympia employees and trucks collect garbage, recyclables and organics from residential and commercial waste generators in the city. There are three basic types of waste generators collected by the City: single-family, multi-family and commercial. Residential and commercial waste generators may also "self-haul" their wastes and recyclables to various facilities. For garbage, the primary facility used by self-haulers from Olympia is the Thurston County Waste and Recovery Center (WARC) in Lacey. Self-hauled wastes are not addressed in this report, but are included in the main report for Thurston County.

The wastes generated by commercial establishments and multi-family buildings are collected either in dumpsters (which are emptied by the City crews at least once per week, or more often if necessary) or in roll-offs and compactors (which may be emptied less than weekly, depending on the size of the container and the amount of waste).

Single-family homes in Olympia are served by a variety of waste and recycling collection programs. There are about 13,500 residential garbage customers in the city.

The garbage from these residential customers is collected Tuesday through Friday of one week, and recyclables are collected Tuesday through Friday of alternating weeks. Organics are collected on alternating Mondays (half of the city is collected on one Monday, and the other half on the next Monday). The monthly fee paid by single-family customers is based on the size of the garbage container they choose, and four sizes are offered (20, 35, 65 and 95-gallon carts). This volume-based approach, coupled with the alternating weekly schedule, helps to encourage participation in waste reduction and recycling programs.

For the curbside recycling program, Olympia offers three sizes of recycling carts for single-family residential customers. The three sizes of carts are 32-gallon, 64-gallon, and 96-gallon. The recycling program uses a single-stream approach (all recyclables can be placed in one cart, including glass and cardboard).

The yard waste collection program in Olympia was recently expanded through the addition of food waste and compostable paper. This expansion of materials increased the tonnages collected in the first year by about 400 tons. The expanded organics program collected about 4,000 tons in 2008, and also increased the number of subscribers from 5,725 to about 6,400 customers. The organics collection program is voluntary, with the choice of either a 35-gallon or 95-gallon green cart (at the same cost for either size) for the organics collection program. Currently, about 47% of the residential garbage customers have signed up for the organics collection program.

National Conditions

As this study began, the United States (and the rest of the entire world) was entering into an economic recession. The City of Olympia and most other areas of the nation have experienced significantly reduced waste volumes as a result of this recession, apparently due to a combination of sharp decreases in construction activities and also in consumer spending. This study was not designed to measure the impact of these factors on the composition of the waste stream, which would have required separating the impacts of reduced waste generation from seasonal changes that occur normally, but the impact can be seen in a decrease in the overall waste quantities disposed in the City of Olympia.

SECTION II

CHARACTERIZATION OF THE CITY OF OLYMPIA'S WASTE STREAM

A. INTRODUCTION

This section provides waste quantity and composition results for the three types of waste generators serviced by the City of Olympia and for the City overall.

B. OVERVIEW OF PROCEDURES

This study examined mixed municipal solid waste brought for disposal to the Thurston County's Waste and Recovery Center (WARC). "Mixed municipal solid waste" is the term commonly used for general residential and commercial wastes collected by municipal and private garbage haulers. This term can also be applied to garbage brought by the waste generator to disposal facilities (i.e., residential and non-residential "self-haul" waste). Self-haul waste is included in the Thurston County report, but not in this report. Instead, this report focuses only on the waste collected by the City of Olympia.

Types of Waste Generators

The intent of this study was to provide data for the waste collected by Olympia's system, both in aggregate and for specific sources. The three sources, or **waste generators**, from Olympia include:

- **Single-Family**: waste that is collected from single-family homes. This waste is typically bagged before collection and consists of many different types of materials. This waste is collected Tuesday through Friday on alternating weeks.

- **Multi-Family**: waste that is collected from apartment buildings. This waste consists of small pieces of many different types of materials, plus some bulky items, and is collected Monday through Friday. Multi-Family waste is collected using dumpsters as well as roll-offs and compactors, and is often mixed with General Commercial waste when collected by trucks that empty the dumpsters.

- **General Commercial**: waste from businesses (commercial and industrial) and institutions (schools, hospitals, government offices, etc.). These wastes are collected Monday through Friday using front-loading garbage trucks (for emptying dumpsters) and by trucks carrying roll-off containers and compactors.

Construction and demolition (C&D) wastes and other special wastes were included in the above categories based on the source and delivery method. C&D wastes, for instance, is often collected using roll-off containers from construction sites (which was defined as General Commercial waste) or from home remodeling projects (which was defined as Single-Family waste if the homeowner was doing the work), or smaller amounts may appear in any one of the three types of garbage containers.

Waste Quantity Procedures

The quantity (tonnage) of solid waste disposed by each type of generator was determined by applying survey data (from a survey of the incoming trucks that was conducted as part of this project) to transaction data from scalehouse records. The survey data was used to allocate the collection tonnages from the City into the three categories of waste generators: Single-Family, Multi-Family and General Commercial wastes. Collection tonnages for each type of generator for a two-week period each season (a two-week period was necessary due to the alternating collection schedule for the Single-Family waste) were determined in this way. The tonnages for these four two-week periods were summed up, the percentage of the total calculated, and that percentage was applied to the annual total amount of waste at WARC to determine the annual total for each type of generator. These figures were used to calculate weighted averages of the annual composition figures for each type of waste generator (by combining seasonal data) and for determining the annual average for the entire waste stream (by combining the composition data from all types of generators).

To illustrate the process described above, the City's General Commercial waste volumes calculated each quarter (based on the survey data and waste receipts for a two-week period) were 708.7 tons in August, 691.3 tons in November, 618.2 tons in February and 880.3 tons in May, for an eight-week total of 2,898.4 tons. The total amount of waste delivered to WARC by all types of generators (including self-haul) for the same two-week periods each quarter was 27,475 tons. Hence, the City's General Commercial sources disposed of 10.55% of the total during those eight weeks. Multiplying this figure by the annual total from all sources (176,579 tons) yields a figure of 18,628 tons of waste disposed by the City's General Commercial customers.

Waste Composition Procedures

The composition of the City's solid waste stream was determined by randomly selecting and sorting samples of waste at WARC. Sampling was conducted for six days each quarter. Each sample was sorted into 86 categories of materials. The Glossary provides additional detail on the definitions used for the categories of materials.

C. RESULTS, WASTE QUANTITIES

Total Waste Quantities

Table 1 shows the results of the waste quantity analysis.

Table 1
ANNUAL QUANTITIES OF DISPOSED WASTES BY TYPE OF GENERATOR

Type of Generator	Annual Amount, Tons	Percentage of Total
Single-Family	6,438	22.5%
Multi-Family	3,531	12.4%
Residential Subtotal	**9,968**	**34.9%**
General Commercial	18,628	65.1%
Totals	**28,597**	**100.0%**

Note: The annual amounts correspond to a period from July 1, 2008 through June 30, 2009, as this period most closely corresponds to the timing of the study.

Quarterly tonnages for each generator were also used to calculate weighted averages of the composition results for each generator individually, so that seasonal fluctuations in waste quantities are taken into account when calculating the composition of each generator's waste stream. The annual percentage of the waste stream contributed by each generator was used to calculate weighted averages for the composition of the entire city's waste stream, and for calculations such as the tons per year for each material and each generator.

D. RESULTS, WASTE COMPOSITION

Number of Samples

The composition of the City's waste stream was determined by randomly selecting and sorting a total of 71 samples of waste. The number of samples taken each season is shown in Table 2.

Waste Composition Results

Table 3 shows the composition data (annual averages) for each generator and for the City. The results for the entire City collection system are also illustrated in Figure 1.

Table 2
ALLOCATION OF SAMPLES BY TYPE OF GENERATOR

Type of Generator	August 2008	Nov. 2008	February 2009	May 2009	Total Samples Number	Total Samples Percent
Single-Family	4	6	6	6	22	31%
Multi-Family	6	4	5	5	20	28%
Residential Subtotal	**10**	**10**	**11**	**11**	**42**	**59%**
General Commercial	9	6	7	7	29	41%
Totals	**19**	**16**	**18**	**18**	**71**	**100%**

The figures shown in Table 3 have a specific degree of error associated with them. As with all sampling and survey procedures, a certain degree of error is unavoidable but quantifiable (see Appendix C of the Thurston County report for more details).

As can be seen in Table 3, there are substantial differences in the composition of wastes from the different sources. These differences can be explained by the different activities that create the wastes. Waste from Single-Family Homes is influenced by the activities associated with living in, owning and maintaining a home. The waste from apartments (Multi-Family) reflects a more mobile lifestyle and lower recycling participation (as indicated by the larger amounts of recyclable paper, plastic bottles, aluminum and tin cans, and glass bottles). Commercial waste is closely related to the type of business activities that produced the wastes.

The results for each generator are illustrated in Figures 2 through 4.

E. WOOD, C&D AND SPECIAL WASTES

Additional data on the breakdown of wood, construction and demolition wastes, and special wastes is shown in Table 4. Most of this data does not have the same level of statistical certainty as the primary categories due to the lower quantities and greater variability of these materials in the waste stream, but may still be useful for future planning activities focused on these types of wastes.

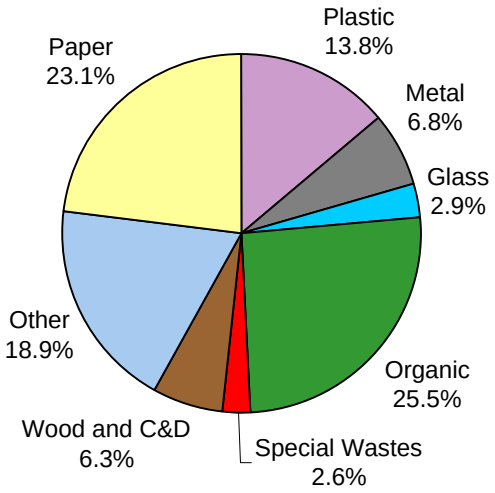
Included in the breakdown for special wastes is an assessment of the amount of materials that would be classified as hazardous waste. These materials are shown as a separate figure near the bottom of both Tables 3 and 4 (see "Actual Hazardous Wastes"). The materials included in this figure are also included in other special waste categories (such as motor oil or oil paint). In other words, the figure for "Actual Hazardous Wastes" is a separate subtotal for just the hazardous wastes.

Table 3
WASTE COMPOSITION RESULTS FOR THE CITY OF OLYMPIA'S WASTE COLLECTION SYSTEM

		Single-Family, Olympia	Multi-Family Olympia	Commercial, Oympia	Average for City Collections
PAPER	Newspaper	0.92%	1.51%	1.29%	1.23%
	Cardboard	0.93%	4.35%	4.64%	3.77%
	Mixed Waste Paper	5.82%	7.66%	9.01%	8.12%
	Phone Books	0.10%	0.13%	0.16%	0.14%
	Milk Cartons, Other	0.26%	0.23%	0.47%	0.39%
	Compostable	6.60%	3.91%	9.19%	7.95%
	Non-Recyclable Paper	0.93%	1.90%	1.62%	1.50%
	Paper Subtotal	**15.56%**	**19.68%**	**26.36%**	**23.10%**
PLASTIC	PET Bottles	0.76%	1.49%	0.93%	0.96%
	HDPE Bottles	0.63%	0.90%	0.92%	0.85%
	Bottles 3-7	0.08%	0.06%	0.03%	0.04%
	Tubs	0.44%	0.30%	0.22%	0.28%
	Bags and Film	6.94%	4.07%	7.05%	6.66%
	Plastic Packaging	2.17%	1.42%	1.90%	1.90%
	Other Plastic Products	3.06%	3.15%	2.20%	2.51%
	Expanded Polystyrene	0.71%	0.52%	0.59%	0.61%
	Plastic Subtotal	**14.79%**	**11.91%**	**13.85%**	**13.82%**
METAL	Aluminum Cans	0.42%	0.88%	0.51%	0.53%
	Aluminum Foil	0.30%	0.16%	0.12%	0.17%
	Tin Cans	0.88%	1.11%	0.78%	0.84%
	Mixed Metals	1.24%	3.99%	2.72%	2.55%
	Ferrous Metals	0.61%	0.49%	1.87%	1.41%
	White Goods	0.00%	1.89%	0.00%	0.23%
	Non-Ferrous Metals	0.13%	0.10%	0.06%	0.08%
	Aerosol Cans	0.24%	0.11%	0.18%	0.19%
	Auto Parts	0.00%	0.00%	1.16%	0.76%
	Metal Subtotal	**3.82%**	**8.74%**	**7.40%**	**6.76%**
ORGANIC	Food Waste	23.44%	18.75%	22.38%	22.17%
	Yard Debris	4.76%	1.36%	3.26%	3.36%
	Organics Subtotal	**28.20%**	**20.11%**	**25.65%**	**25.54%**
GLASS	Clear Bottles	0.94%	1.99%	1.60%	1.50%
	Brown Bottles	0.43%	1.09%	0.52%	0.57%
	Green Bottles	0.23%	0.51%	0.40%	0.37%
	Light Bulbs	0.06%	0.06%	0.02%	0.03%
	Non-Recyclable Glass	0.29%	0.23%	0.58%	0.47%
	Glass Subtotal	**1.94%**	**3.87%**	**3.12%**	**2.94%**
OTHER	E-Waste	0.14%	1.51%	0.23%	0.37%
WASTES	Other Electronics	0.10%	0.06%	0.54%	0.38%
	Tires	0.09%	0.00%	0.00%	0.02%
	Rubber	0.15%	0.25%	1.13%	0.80%
	Cosmetics	0.40%	0.12%	0.09%	0.16%
	Pharmaceuticals	0.06%	0.07%	0.03%	0.04%
	Diapers	7.58%	5.14%	1.04%	3.02%
	Textiles	4.32%	4.61%	2.02%	2.86%
	Carpet	1.25%	1.72%	0.44%	0.78%
	Carpet Padding	0.00%	0.00%	0.77%	0.50%
	Furniture	0.00%	6.44%	0.94%	1.41%
	Ash, Dust	0.34%	0.17%	0.17%	0.20%
	Misc. Organics	0.07%	0.10%	0.11%	0.10%
	Misc. Inorganics	0.77%	0.20%	0.62%	0.60%
	Residuals	11.90%	6.73%	6.36%	7.65%
	Other Waste Subtotal	**27.17%**	**27.13%**	**14.48%**	**18.90%**
WOOD	Wood	1.60%	3.60%	6.02%	4.72%
and C&D	Construction and Demolition	1.48%	1.92%	1.52%	1.56%
	Wood, C&D Subtotal	**3.08%**	**5.52%**	**7.53%**	**6.28%**
SPECIAL	Paints and Solvents	0.13%	0.03%	0.10%	0.10%
WASTES	Automotive	0.01%	0.00%	0.12%	0.08%
	Home and Garden	0.01%	0.00%	0.00%	0.00%
	Other Special Wastes	5.28%	3.02%	1.39%	2.47%
	Actual Hazardous Wastes	0.09%	0.03%	0.21%	0.16%
	Special Waste Subtotal	**5.43%**	**3.04%**	**1.61%**	**2.65%**
TOTALS		100.00%	100.00%	100.00%	100.00%
	Tons Collected per Year:	6,438	3,531	18,628	28,597
	Pounds of Samples Sorted:	4,795	4,472	6,230	15,497
	Number of Samples Sorted:	22	20	29	71

Notes: All figures are percent by weight (except for the bottom three rows).

Figure 1
CITY-WIDE RESULTS FOR OLYMPIA

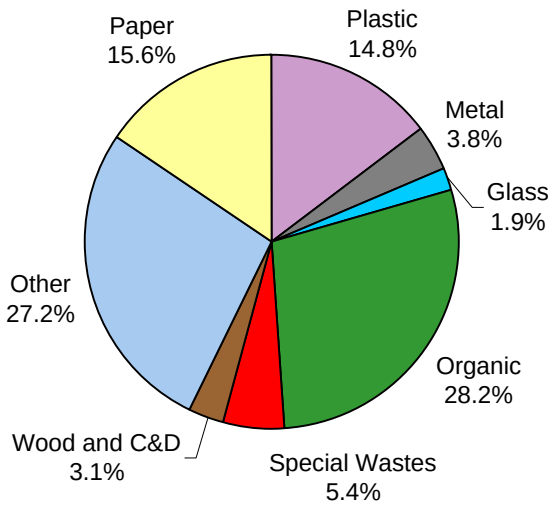


SUMMARY OF RESULTS:

PAPER	Newspaper	1.2%
	Cardboard	3.8%
	Other Recyclable Paper	8.7%
	Compostable Paper	8.0%
	Non-Recyclable Paper	1.5%
	Paper Subtotal	23.1%
PLASTIC	Plastic Bottles	1.9%
	Film and Bags	6.7%
	Other Plastic	5.3%
	Plastic Subtotal	13.8%
METAL	Aluminum Cans	0.5%
	Tin Cans	0.8%
	Other Metals	5.4%
	Metal Subtotal	6.8%
GLASS	Glass Bottles	2.4%
	Other Glass	0.5%
	Glass Subtotal	2.9%
WOOD, C&D	Wood	4.7%
	Construction, Demolition	1.6%
	Wood, C&D Subtotal	6.3%
SPECIAL WASTES	Animal Excrement	2.2%
	Other Special Wastes	0.4%
	Special Waste Subtotal	2.6%
ORGANIC	Food Waste	22.2%
	Yard Debris	3.4%
	Organic Subtotal	25.5%
OTHER	Disposable Diapers	3.0%
	Textiles	2.9%
	Carpet and Padding	1.3%
	Miscellaneous (1)	11.7%
	Other Subtotal	18.9%

Notes: All figures are percent by weight.
1) "Miscellaneous" includes e-waste, other electronics, tires and other rubber products, cosmetics, pharmaceuticals, furniture, ash, dust, miscellaneous organics, miscellaneous inorganics and residuals.

Figure 2
OLYMPIA SINGLE-FAMILY WASTE



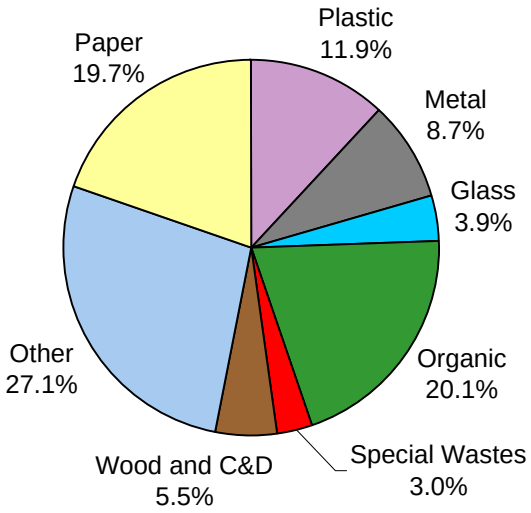
SUMMARY OF WASTE COMPOSITION RESULTS:

PAPER	Newspaper	0.9%
	Cardboard	0.9%
	Other Recyclable Paper	6.2%
	Compostable Paper	6.6%
	Non-Recyclable Paper	0.9%
	Paper Subtotal	15.6%
PLASTIC	Plastic Bottles	1.5%
	Film and Bags	6.9%
	Other Plastic	6.4%
	Plastic Subtotal	14.8%
METAL	Aluminum Cans	0.4%
	Tin Cans	0.9%
	Other Metals	2.5%
	Metal Subtotal	3.8%
GLASS	Glass Bottles	1.6%
	Other Glass	0.3%
	Glass Subtotal	1.9%
WOOD, C&D	Wood	1.6%
	Construction, Demolition	1.5%
	Wood, C&D Subtotal	3.1%
SPECIAL WASTES	Animal Excrement	4.8%
	Other Special Wastes	0.6%
	Special Waste Subtotal	5.4%
ORGANIC	Food Waste	23.4%
	Yard Debris	4.8%
	Organic Subtotal	28.2%
OTHER	Disposable Diapers	7.6%
	Textiles	4.3%
	Carpet and Padding	1.2%
	Miscellaneous (1)	14.0%
	Other Subtotal	27.2%

Notes: All figures are percent by weight.

1) "Miscellaneous" includes e-waste, other electronics, tires and other rubber products, cosmetics, pharmaceuticals, furniture, ash, dust, miscellaneous organics, miscellaneous inorganics and residuals.

Figure 3
OLYMPIA MULTI-FAMILY WASTE

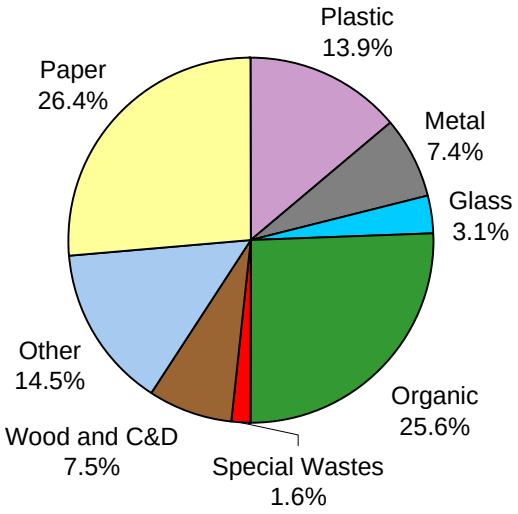


SUMMARY OF WASTE COMPOSITION RESULTS:

PAPER	Newspaper	1.5%
	Cardboard	4.3%
	Other Recyclable Paper	8.0%
	Compostable Paper	3.9%
	Non-Recyclable Paper	1.9%
	Paper Subtotal	19.7%
PLASTIC	Plastic Bottles	2.4%
	Film and Bags	4.1%
	Other Plastic	5.4%
	Plastic Subtotal	11.9%
METAL	Aluminum Cans	0.9%
	Tin Cans	1.1%
	Other Metals	6.7%
	Metal Subtotal	8.7%
GLASS	Glass Bottles	3.6%
	Other Glass	0.3%
	Glass Subtotal	3.9%
WOOD, C&D	Wood	3.6%
	Construction, Demolition	1.9%
	Wood, C&D Subtotal	5.5%
SPECIAL WASTES	Animal Excrement	2.9%
	Other Special Wastes	0.2%
	Special Waste Subtotal	3.0%
ORGANIC	Food Waste	18.8%
	Yard Debris	1.4%
	Organic Subtotal	20.1%
OTHER	Disposable Diapers	5.1%
	Textiles	4.6%
	Carpet and Padding	1.7%
	Miscellaneous (1)	15.7%
	Other Subtotal	27.1%

Notes: All figures are percent by weight.
1) "Miscellaneous" includes e-waste, other electronics, tires and other rubber products, cosmetics, pharmaceuticals, furniture, ash, dust, miscellaneous organics, miscellaneous inorganics and residuals.

Figure 4
OLYMPIA COMMERCIAL WASTE



SUMMARY OF WASTE COMPOSITION RESULTS:

PAPER	Newspaper	1.3%
	Cardboard	4.6%
	Other Recyclable Paper	9.6%
	Compostable Paper	9.2%
	Non-Recyclable Paper	1.6%
	Paper Subtotal	26.4%
PLASTIC	Plastic Bottles	1.9%
	Film and Bags	7.1%
	Other Plastic	4.9%
	Plastic Subtotal	13.9%
METAL	Aluminum Cans	0.5%
	Tin Cans	0.8%
	Other Metals	6.1%
	Metal Subtotal	7.4%
GLASS	Glass Bottles	2.5%
	Other Glass	0.6%
	Glass Subtotal	3.1%
WOOD, C&D	Wood	6.0%
	Construction, Demolition	1.5%
	Wood, C&D Subtotal	7.5%
SPECIAL WASTES	Animal Excrement	1.2%
	Other Special Wastes	0.4%
	Special Waste Subtotal	1.6%
ORGANIC	Food Waste	22.4%
	Yard Debris	3.3%
	Organic Subtotal	25.6%
OTHER	Disposable Diapers	1.0%
	Textiles	2.0%
	Carpet and Padding	1.2%
	Miscellaneous (1)	10.2%
	Other Subtotal	14.5%

Notes: All figures are percent by weight.
1) "Miscellaneous" includes e-waste, other electronics, tires and other rubber products, cosmetics, pharmaceuticals, furniture, ash, dust, miscellaneous organics, miscellaneous inorganics and residuals.

Table 4
BREAKDOWN OF WOOD, C&D AND SPECIAL WASTES FOR CITY OF OLYMPIA WASTE STREAMS

	Single-Family Homes	Multi-Family Residential	General Commercial	Average for Entire City
WOOD WASTE				
Dimension Lumber	0.56%	0.44%	0.48%	0.49%
Pallets, Crates	0%	0%	0.98%	0.64%
Treated Wood	0.03%	0%	0.01%	0.01%
Roofing	0%	0%	0%	0%
Contaminated	0.05%	0%	2.28%	1.50%
Stumps, Other Bulky Wood	0.41%	0%	0.23%	0.24%
Plywood	0.01%	0.9%	0.2%	0.2%
Particleboard, Fiberboard	0.21%	2.03%	1.58%	1.33%
Wood Products	0.33%	0.20%	0.25%	0.26%
Other Wood	0%	0%	0%	0%
Total Wood Waste	**1.6%**	**3.6%**	**6.0%**	**4.7%**
CONSTRUCTION AND DEMOLITION (C&D) WASTE				
Ceramics, Porcelain, China	0.03%	0%	0%	0.006%
Rocks, Bricks	0.03%	0%	0.13%	0.09%
Concrete	0%	0%	0%	0%
Soil, Dirt, Fines	0.44%	0%	0.95%	0.72%
Gypsum Board	0.89%	0.33%	0.37%	0.48%
Fiberglass Insulation	0.02%	0.02%	0%	0.01%
Other Fiberglass	0.01%	0.004%	0%	0.003%
Roofing	0.03%	1.39%	0.01%	0.18%
Asphalt	0%	0%	0%	0%
Other C&D	0.03%	0.18%	0.06%	0.07%
Total C&D Waste	**1.5%**	**1.9%**	**1.5%**	**1.6%**
SPECIAL WASTES				
Paints and Solvents;				
Latex Paint	0.13%	0.01%	0.08%	0.08%
Oil-Based Paint	0%	0%	0.02%	0.02%
Solvents	0%	0.02%	0%	0.002%
Automotive Wastes;				
Motor Oil, Other Oils	0%	0%	0%	0%
Oil Filters	0.01%	0%	0.09%	0.06%
Gasoline, Fuel Oil	0%	0%	0%	0%
Antifreeze	0%	0%	0%	0%
Other Auto Maintenance	0%	0%	0.03%	0.02%
Batteries, Car	0%	0%	0%	0%
Home and Garden;				
Pesticides, Herbicides	0%	0%	0.001%	0.001%
Fertilizer w/Pest. and Herb.	0%	0%	0%	0%
Fertilizer w/o Pest., Herb.	0.01%	0%	0%	0.002%
Other;				
Adhesives, Glues	0.13%	0.002%	0.05%	0.06%
Cleaners, Corrosives	0%	0.02%	0.01%	0.01%
Medical Wastes	0.01%	0.001%	0.07%	0.05%
Household Batteries	0.31%	0.10%	0.08%	0.14%
Animal Excrement	4.82%	2.88%	1.18%	2.21%
Animal Carcasses	0.002%	0%	0%	0.0005%
Gas Cylinders	0.004%	0.02%	0%	0.004%
Other Special Wastes	0%	0%	0.008%	0.005%
Actual Hazardous Waste	**0.09%**	**0.03%**	**0.21%**	**0.16%**
Total Special Waste	**5.43%**	**3.04%**	**1.61%**	**2.65%**

Notes: All figures are percentages by weight.

SECTION III

CONCLUSIONS AND RECOMMENDATIONS

A. CONCLUSIONS

Weight of Materials Disposed

The waste quantity and composition results can be combined to show the total weight of disposed materials. Table 5 provides this information for the three waste generators and for the City's entire collection system.

The data shown in Table 5 can be useful for planning recovery programs for specific materials by more clearly indicating where the amounts of specific materials are being generated. For instance, the amount of cardboard in the Multi-Family and General Commercial waste streams are nearly equal (4.35% versus 4.64%, respectively), but because there is significantly more Commercial waste (18,628 tons per year versus 3,531 tons per year for Multi-Family), there are more tons of cardboard being disposed by Commercial generators. The following section provides more information about the recyclable, compostable, and potentially-recyclable materials.

Recycling Potential Assessment

One of the key reasons for conducting a study such as this is to determine how much recyclable materials remain in the waste stream (see Table 6 and Figure 5). In addition to examining "typical" recyclable materials (those materials that are typically collected through the residential curbside and commercial recycling programs), other potentially-recyclable materials can also be examined. This data provides important information for planning new or expanded recycling and composting programs.

Materials have been broadly grouped into three categories for this analysis:

- **Typical Recyclables**: these are the materials that are typically collected through curbside and commercial programs. The list of materials for this group is based on Olympia's curbside recycling program.

- **Organics**: these are the materials that are collected through the "expanded organics" collection program used in Olympia. Although other materials could potentially be considered "organic" (such as wood and animal excrement, in the sense that these materials are carbon-based and could potentially be broken down through composting), these are not included here because current composting systems are not equipped to handle these materials.

Table 5
WEIGHT OF DISPOSED MATERIALS
FOR CITY OF OLYMPIA WASTE STREAMS

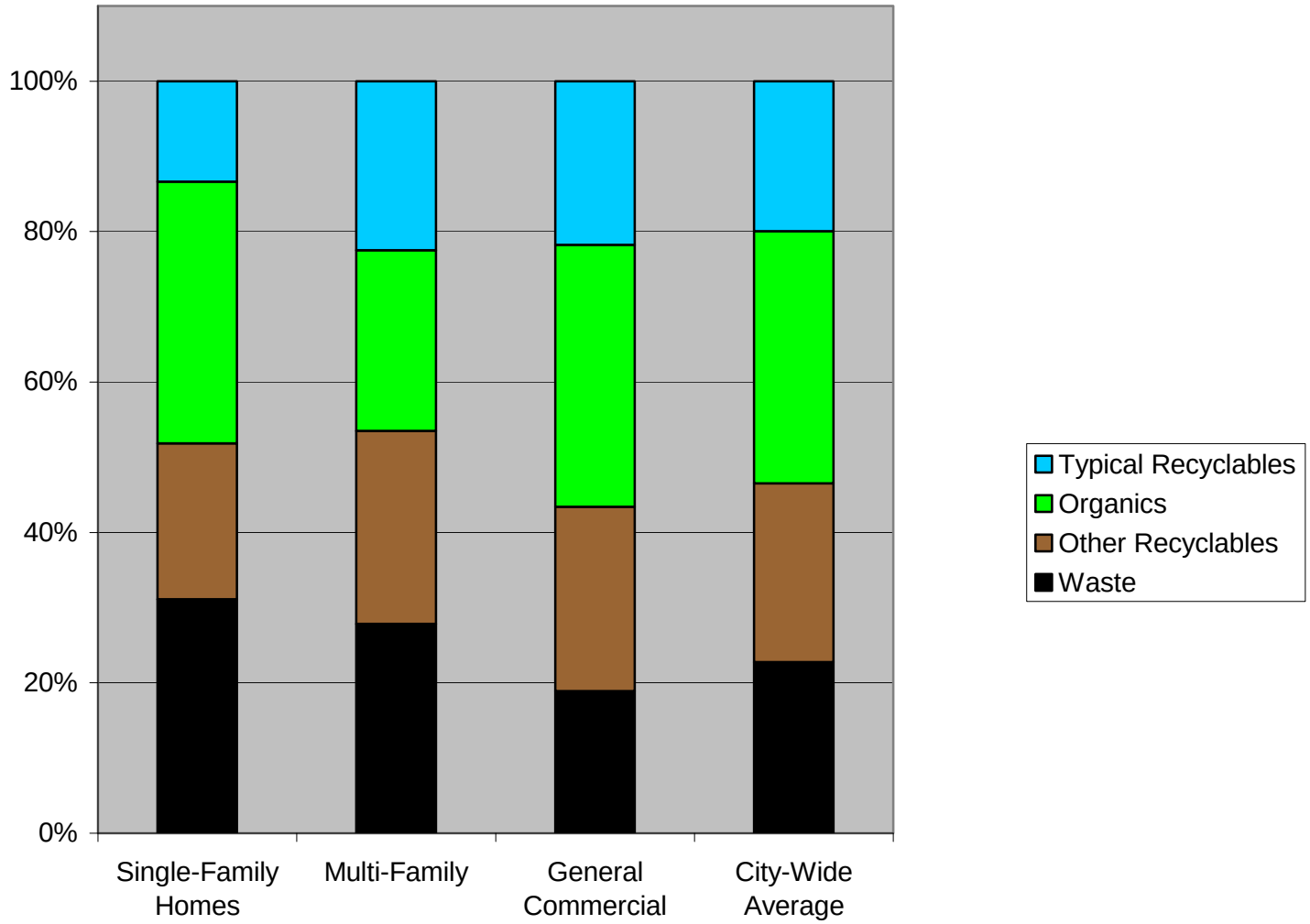
		Single-Family Homes	Multi-Family Residential	General Commercial	Totals for Entire City
PAPER	Newspaper	59	53	239	351
	Cardboard	60	154	864	1,078
	Mixed Waste Paper	374	270	1,678	2,322
	Phone Books	6	5	30	41
	Milk Cartons, Other	16	8	87	111
	Compostable Paper	425	138	1,711	2,274
	Non-Recyclable Paper	60	67	301	428
	Paper Subtotal	**1,001**	**695**	**4,911**	**6,607**
	PET Bottles	49	53	174	276
PLASTIC	HDPE Bottles	41	32	171	244
	Bottles 3-7	5	2	6	13
	Tubs	29	11	41	81
	Film and Bags	447	144	1,314	1,905
	Plastic Packaging	140	50	354	544
	Other Plastic Products	197	111	409	717
	Expanded Polystyrene	46	18	111	175
	Plastic Subtotal	**952**	**420**	**2,580**	**3,952**
METAL	Aluminum Cans	27	31	95	153
	Aluminum Foil	20	6	23	49
	Tin Cans	57	39	145	241
	Mixed Metals	80	141	507	728
	Ferrous Metals	39	17	347	403
	White Goods	0	67	0	67
	Non-Ferrous Metals	8	3	11	22
	Aerosol Cans	15	4	34	53
	Auto Parts	0	0	217	217
	Metal Subtotal	**246**	**308**	**1,378**	**1,932**
ORGANIC	Food Waste	1,509	662	4,170	6,341
	Yard Debris	306	48	608	962
	Organics Subtotal	**1,815**	**710**	**4,777**	**7,302**
GLASS	Clear Bottles	60	70	298	428
	Brown Bottles	28	38	96	162
	Green Bottles	15	18	74	107
	Light Bulbs	4	2	4	10
	Non-Recyclable Glass	19	8	108	135
	Glass Subtotal	**125**	**137**	**580**	**842**
OTHER	E-Waste	9	53	43	105
WASTES	Other Electronics	6	2	100	108
	Tires	6	0	0	6
	Rubber	10	9	211	230
	Cosmetics	26	4	16	46
	Pharmaceuticals	4	3	5	12
	Diapers	488	182	193	863
	Textiles	278	163	375	816
	Carpet	80	61	82	223
	Carpet Padding	0	0	143	143
	Furniture	0	227	176	403
	Ash, Dust	22	6	31	59
	Misc. Organics	5	4	21	30
	Misc. Inorganics	50	7	116	173
	Residuals	766	238	1,184	2,188
	Other Waste Subtotal	**1,749**	**958**	**2,698**	**5,405**
	Wood	103	127	1,121	1,351
WOOD	Construction, Demolition	95	68	283	446
and C&D	**Wood, C&D Subtotal**	**198**	**195**	**1,403**	**1,796**
	Paints and Solvents	9	1	19	29
SPECIAL	Automotive	1	0	22	23
WASTES	Home and Garden	1	0	0	1
	Other Special Wastes	340	107	259	706
	Actual Hazardous Wastes	**6**	**1**	**38**	**45**
	Special Waste Subtotal	**350**	**107**	**300**	**757**
TOTALS		**6,438**	**3,531**	**18,628**	**28,597**

Notes: All figures are tons per year.

Table 6
RECYCLING POTENTIAL ASSESSMENT
FOR CITY OF OLYMPIA WASTE STREAMS

	Single-Family Homes		Multi-Family Residential		General Commercial		Totals for Entire City	
	%	TPY	%	TPY	%	TPY	%	TPY
Typical Recyclables:								
Newspaper	0.92%	59	1.51%	53	1.29%	239	1.23%	351
Cardboard	0.93%	60	4.35%	154	4.64%	864	3.77%	1,078
Mixed Waste Paper	5.82%	374	7.66%	270	9.01%	1,678	8.12%	2,322
Phone Books	0.10%	6	0.13%	5	0.16%	30	0.14%	41
Milk Cartons, Other	0.26%	16	0.23%	8	0.47%	87	0.39%	111
PET Bottles	0.76%	49	1.49%	53	0.93%	174	0.96%	276
HDPE Bottles	0.63%	41	0.90%	32	0.92%	171	0.85%	244
Bottles 3-7	0.08%	5	0.06%	2	0.03%	6	0.04%	13
Tubs	0.44%	29	0.30%	11	0.22%	41	0.28%	81
Aluminum Cans	0.42%	27	0.88%	31	0.51%	95	0.53%	153
Aluminum Foil	0.30%	20	0.16%	6	0.12%	23	0.17%	49
Tin Cans	0.88%	57	1.11%	39	0.78%	145	0.84%	241
Aerosol Cans	0.24%	15	0.11%	4	0.18%	34	0.19%	53
Glass Bottles	1.60%	103	3.58%	126	2.51%	468	2.44%	697
Subtotal	**13.4%**	**861**	**22.5%**	**794**	**21.8%**	**4,055**	**20.0%**	**5,710**
Organics								
Compostable Paper	6.60%	425	3.91%	138	9.19%	1,711	7.95%	2,274
Food Waste	23.44%	1,509	18.75%	662	22.38%	4,170	22.17%	6,341
Yard Debris	4.76%	306	1.36%	48	3.26%	608	3.36%	962
Subtotal	**34.8%**	**2,240**	**24.0%**	**848**	**34.8%**	**6,489**	**33.5%**	**9,577**
Other Recyclables								
Plastic Bags and Film	6.94%	447	4.07%	144	7.05%	1,314	6.66%	1,905
Plastic Packaging	2.17%	140	1.42%	50	1.90%	354	1.90%	544
Expanded Polystyrene	0.71%	46	0.52%	18	0.59%	111	0.61%	175
Mixed Metals	1.24%	80	3.99%	141	2.72%	507	2.55%	728
Ferrous Metals	0.61%	39	0.49%	17	1.87%	347	1.41%	403
White Goods	0.00%	0	1.89%	67	0.00%	0	0.23%	67
Non-Ferrous Metals	0.13%	8	0.10%	3	0.06%	11	0.08%	22
Auto Parts	0.00%	0	0.00%	0	1.16%	217	0.76%	217
Light Bulbs	0.06%	4	0.06%	2	0.02%	4	0.03%	10
E-Waste	0.14%	9	1.51%	53	0.23%	43	0.37%	105
Other Electronics	0.10%	6	0.06%	2	0.54%	100	0.38%	108
Tires	0.09%	6	0.00%	0	0.00%	0	0.02%	6
Textiles	4.32%	278	4.61%	163	2.02%	375	2.86%	816
Carpet	1.25%	80	1.72%	61	0.44%	82	0.78%	223
Carpet Padding	0.00%	0	0.00%	0	0.77%	143	0.50%	143
Dimension Lumber	0.56%	36	0.44%	15	0.48%	90	0.49%	141
Pallets, Crates	0.00%	0	0.00%	0	0.98%	183	0.64%	183
Stumps, Other Bulky Wood	0.41%	27	0.00%	0	0.23%	43	0.24%	70
Plywood	0.01%	1	0.93%	33	0.20%	37	0.25%	71
Particleboard, Fiberboard	0.21%	14	2.03%	72	1.58%	294	1.33%	379
Ceramics, Porcelain, China	0.03%	2	0.00%	0	0.00%	0	0.01%	2
Rocks, Bricks	0.03%	2	0.00%	0	0.13%	25	0.09%	27
Soil, Dirt, Fines	0.44%	28	0.00%	0	0.95%	177	0.72%	206
Gypsum Board	0.89%	57	0.33%	12	0.37%	69	0.48%	138
Roofing (Asphalt)	0.03%	2	1.39%	49	0.01%	1	0.18%	52
Oil Filters	0.01%	1	0.00%	0	0.09%	16	0.06%	17
Household Batteries	0.31%	20	0.10%	3	0.08%	15	0.14%	39
Subtotal	**20.7%**	**1,333**	**25.7%**	**905**	**24.5%**	**4,559**	**23.8%**	**6,797**
Other Materials (Wastes)	**31.1%**	**2,004**	**27.9%**	**984**	**18.9%**	**3,525**	**22.8%**	**6,513**
Total Waste Stream		**6,438**		**3,531**		**18,628**		**28,597**

Figure 5
RECYCLING POTENTIAL ASSESSMENT



- **Other Recyclables**: the third group includes materials that could potentially be recycled through existing or new recycling programs. This group includes materials that:
  - are recycled currently through programs that are conducted separately from the City's programs (such as textiles, plastic bags, wood and carpeting).
  - are being diverted to applications that do not strictly meet the definition of recycling (such as wood converted to hog fuel).

The data shown in Table 6 and Figure 5 does not take into account the marketability of the materials (see Section II.F of the Thurston County report for more details), although that is a minor factor here since this assessment assumes that the additional materials would be diverted through a source-separation collection program and not a mixed waste processing system. It should be noted, however, that there is no approach that can recover 100% of a recyclable material (although a combination of mandatory requirements together with financial incentives, such as is used for car batteries, can come close). In addition, the list of potentially-recyclable materials in Table 6 does not include several materials that were not found in Olympia's waste stream (wood roofing, concrete, motor oil, antifreeze, and car batteries).

As can be seen in Table 6 and Figure 5, a significant amount of recyclable and compostable materials remain in the City's waste streams. If all of the recyclable, compostable and potentially-recyclable materials could be diverted from disposal, only 22.8% of the City's waste would remain.

Waste Composition Conclusions

There are distinct differences in the wastes from different types of waste generators (see Tables 3, 4 and 5). A few noteworthy conclusions can be drawn for each generator:

- **Single-Family**: the largest categories of materials present in this waste stream are:

  - food waste, 23.4%,
  - disposable diapers, 7.6%,
  - plastic bags and film, 6.9%,
  - compostable paper, 6.6%,
  - mixed waste paper, 5.8%,
  - animal excrement, 4.8%,
  - yard debris, 4.8%, and
  - textiles, 4.3%.

  Significant quantities of recyclable materials remain in this waste stream despite the widespread availability of recycling and yard debris collection programs for

single-family homes. If residents recycled all of the materials currently accepted through the City's existing recycling and organics collection programs, an additional 48% of the Single-Family waste stream could be diverted from disposal. This is the equivalent of 3,101 tons per year of additional recyclable and compostable materials.

- **Multi-Family** (apartments): the largest categories of materials present in the waste stream for this generator are:

  - food waste, 18.8%,
  - mixed paper, 7.7%,
  - furniture, 6.4%,
  - disposable diapers, 5.1%,
  - textiles, 4.6%,
  - cardboard, 4.4%,
  - plastic bags and film, 4.1%, and
  - mixed metals, 4.0%.

  The percentage of recyclable materials in apartment wastes is higher than for Single-Family wastes, although the tonnage figure for recyclable materials is lower due to the smaller waste quantities disposed by Multi-Family generators. The amount of compostable organics is lower than for Single-Family waste, on both a percentage and tonnage basis. The Multi-Family waste stream contains 46.5% or 1,642 tons per year of recyclable and compostable materials.

- **General Commercial**: the largest categories of materials present in the waste from this source are:

  - food waste, 22.4%,
  - compostable paper, 9.2%,
  - mixed paper, 9.0%,
  - plastic bags and film, 7.1%,
  - wood waste, 6.0%, and
  - cardboard, 4.6%.

  The General Commercial waste stream contains 56.6% recyclable and compostable materials, or about 10,544 tons per year. Potentially-recyclable materials comprise another 24.5%, leaving less than one-fifth (18.9%) of this waste stream that actually needs to be treated as a waste.

- **Total Waste Stream**: overall, the City's waste stream contains significant amounts of:

  - food waste, 22.2%,
  - mixed paper, 8.1%,

- compostable paper, 8.0%,
- plastic bags and film, 6.7%,
- wood waste, 4.7%, and
- cardboard, 3.8%.

The amount of recyclable and compostable materials that could be handled through existing programs and facilities is 53.5% or 15,287 tons per year.

B. RECOMMENDATIONS

The following recommendations are based on the results of this study:

- There continues to be a significant amount of recyclable materials disposed in the City of Olympia's waste streams. The City could increase waste diversion without creating new infrastructure or programs since a significant portion of the disposed waste stream consists of standard recyclable materials. If the City of Olympia desires to increase the recycling rate substantially over current levels, however, a different approach may be needed. Alternative approaches could include mandatory recycling or targeted programs such as disposal bans.

- Recent steps have been taken to increase food waste diversion, but for now large amounts of this material remain in the waste stream. More publicity and/or diversion programs for food waste should be considered.

APPENDIX B

WASTE COMPOSITION DATA FOR THURSTON COUNTY BUILDINGS

WASTE COMPOSITION DATA FOR THURSTON COUNTY BUILDINGS

A. INTRODUCTION

This appendix shows the composition data from samples that were taken each quarter from four Thurston County buildings.

B. METHODOLOGY

In order to determine the composition of wastes from County offices, Thurston County staff assisted with the arrangements necessary to sample four county facilities each quarter. The four facilities were:

- Building #4,
- County Courthouse,
- Juvenile Justice center, and
- Public Health offices.

One sample was taken each quarter from each of these buildings, except in November when one of the samples had to be skipped (in November, the Juvenile Justice sample appeared to have been contaminated with wastes from other sources). In most cases, the entire contents of the dumpsters for these facilities was brought separately to WARC and sorted there. The waste container for the County Courthouse was a roll-off container, however, so that container was dumped at WARC and a 200-pound sample taken of it.

The results of these samples are shown in Table B-1.

Table B - 1
QUARTERLY DATA AND ANNUAL AVERAGES FOR COUNTY BUILDINGS

		Building 4					Public Health				
		August	November	February	May	Average	August	November	February	May	Average
PAPER	Newspaper	0.70%	1.67%	0.94%	0.00%	0.83%	0.00%	0.00%	0.00%	0.00%	0.00%
	Cardboard	0.23%	1.43%	0.94%	0.45%	0.77%	0.36%	0.73%	1.80%	0.73%	0.91%
	Mixed Waste Paper	4.69%	2.87%	19.79%	7.72%	8.77%	2.17%	2.18%	14.87%	4.39%	5.90%
	Phone Books	0.00%	0.00%	9.90%	0.00%	2.47%	0.00%	0.00%	0.00%	0.00%	0.00%
	Milk Cartons, Other	0.12%	0.12%	0.12%	0.45%	0.21%	0.36%	0.19%	0.23%	1.46%	0.56%
	Compostable	27.92%	16.01%	11.78%	29.05%	21.19%	34.69%	29.86%	15.32%	15.76%	23.91%
	Non-Recyclable Paper	2.23%	1.67%	0.24%	2.72%	1.72%	3.43%	1.46%	2.70%	5.13%	3.18%
	Paper Subtotal	**35.91%**	**23.79%**	**43.72%**	**40.40%**	**35.95%**	**41.01%**	**34.42%**	**34.94%**	**27.48%**	**34.46%**
PLASTIC	PET Bottles	0.59%	0.12%	0.71%	0.91%	0.58%	0.54%	1.09%	0.45%	0.73%	0.70%
	HDPE Bottles	0.12%	0.00%	1.41%	0.00%	0.38%	0.18%	0.19%	1.35%	1.46%	0.80%
	Bottles 3-7	0.23%	0.00%	0.00%	0.00%	0.06%	0.00%	0.00%	0.00%	0.00%	0.00%
	Tubs	0.23%	0.72%	0.94%	1.36%	0.81%	1.36%	1.09%	1.14%	1.46%	1.26%
	Bags and Film	7.51%	7.17%	7.31%	9.08%	7.77%	7.05%	10.20%	11.72%	10.25%	9.80%
	Plastic Packaging	6.22%	4.54%	6.36%	5.90%	5.76%	4.88%	4.73%	9.46%	6.59%	6.42%
	Other Plastic Products	2.58%	3.82%	4.24%	1.82%	3.12%	3.07%	3.28%	3.15%	6.59%	4.02%
	Expanded Polystyrene	0.23%	0.96%	0.94%	0.91%	0.76%	0.18%	0.36%	0.45%	0.00%	0.25%
	Plastic Subtotal	**17.73%**	**17.33%**	**21.92%**	**19.97%**	**19.24%**	**17.26%**	**20.94%**	**27.73%**	**27.09%**	**23.26%**
METAL	Aluminum Cans	0.23%	0.24%	0.00%	0.45%	0.23%	0.00%	0.19%	0.23%	0.00%	0.11%
	Aluminum Foil	0.12%	0.12%	0.05%	0.09%	0.10%	0.18%	0.36%	0.23%	0.73%	0.38%
	Tin Cans	0.70%	0.96%	2.12%	2.51%	1.57%	0.36%	0.00%	0.23%	0.00%	0.15%
	Mixed Metals	0.70%	0.48%	2.36%	0.91%	1.11%	0.00%	0.00%	0.23%	0.00%	0.06%
	Ferrous Metals	0.00%	0.12%	5.42%	0.45%	1.50%	0.00%	2.18%	0.00%	0.00%	0.55%
	White Goods	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	Non-Ferrous Metals	0.12%	0.12%	0.00%	0.45%	0.18%	0.00%	0.00%	0.00%	0.73%	0.18%
	Aerosol Cans	0.70%	0.00%	0.00%	0.00%	0.18%	0.00%	0.73%	0.00%	0.00%	0.18%
	Auto Parts	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	Metal Subtotal	**2.59%**	**2.05%**	**9.94%**	**4.87%**	**4.86%**	**0.54%**	**3.47%**	**0.94%**	**1.46%**	**1.60%**
HHW and	Latex Paint	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
SPECIAL	Oil-Based Paint	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	Solvents	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	Adhesives, Glues	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	Cleaners, Corrosives	0.00%	0.36%	0.00%	0.00%	0.09%	0.00%	0.00%	0.00%	0.00%	0.00%
	Medical Wastes	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	Motor Oil, Other	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	Oil Filters	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	Gasoline, Fuel Oil	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	Antifreeze	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	Other Auto Maint.	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	Batteries, Car	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	HH Batt	0.00%	0.48%	0.05%	1.14%	0.42%	0.04%	0.00%	0.00%	0.00%	0.01%
	Animal Excrement	0.00%	0.24%	0.00%	0.00%	0.06%	0.00%	0.00%	0.00%	0.00%	0.00%
	Animal Carcasses	0.00%	0.00%	0.00%	0.00%	0.00%	0.82%	0.00%	0.00%	0.00%	0.20%
	Gas Cylinders	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	Pesticides, Herbicides	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	Fert. w/pest	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	Fert. w/o pest	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	Other HW	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	Actual Hazardous Wastes	0.00%	0.48%	0.00%	0.00%	0.12%	0.00%	0.00%	0.00%	0.00%	0.00%
	Special Waste Subtotal	**0.00%**	**1.08%**	**0.05%**	**1.14%**	**0.57%**	**0.85%**	**0.00%**	**0.00%**	**0.00%**	**0.21%**
ORGANICS	Food Waste	16.66%	40.63%	12.96%	17.70%	21.99%	9.76%	17.48%	10.37%	11.72%	12.33%
	Yard Debris	0.12%	0.24%	0.05%	1.14%	0.39%	0.54%	0.00%	0.00%	5.86%	1.60%
	Org. Subtotal	**16.78%**	**40.87%**	**13.01%**	**18.85%**	**22.38%**	**10.30%**	**17.48%**	**10.37%**	**17.57%**	**13.93%**
GLASS	Clear Bottles	1.06%	0.00%	0.47%	0.00%	0.38%	0.72%	0.00%	0.00%	0.00%	0.18%
	Brown Bottles	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	Green Bottles	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	Light Bulbs	0.00%	0.00%	0.00%	0.00%	0.00%	0.09%	0.00%	0.23%	0.00%	0.08%
	Non-Recyclable Glass	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.19%	0.09%	0.73%	0.25%
	Glass Subtotal	**1.06%**	**0.00%**	**0.47%**	**0.00%**	**0.38%**	**0.82%**	**0.19%**	**0.32%**	**0.73%**	**0.52%**
OTHER	E-Waste	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
WASTES	Other Electronics	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	Tires	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	Rubber	4.46%	0.24%	0.12%	0.69%	1.38%	5.06%	2.91%	4.74%	3.31%	4.01%
	Cosmetics	0.36%	0.00%	0.05%	0.00%	0.10%	0.09%	0.92%	0.00%	0.00%	0.25%
	Pharm.	0.00%	0.00%	0.00%	0.00%	0.00%	0.04%	0.36%	0.23%	3.66%	1.07%
	Diapers	3.99%	0.72%	1.18%	0.45%	1.58%	7.59%	6.02%	13.52%	7.32%	8.61%
	Textiles	2.82%	0.48%	0.47%	0.24%	1.00%	0.09%	0.92%	0.45%	1.46%	0.73%
	Carpet	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	Carpet Padding	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	Furniture	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	Ash, Dust	0.00%	0.48%	2.12%	4.32%	1.73%	1.54%	0.00%	0.00%	0.00%	0.38%
	Miscellnaeous Organics	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	Miscellnaeous Inorganics	0.00%	0.00%	0.94%	0.00%	0.24%	0.00%	6.92%	0.00%	3.31%	2.56%
	Residuals	14.08%	9.80%	5.66%	9.08%	9.65%	14.81%	5.46%	6.76%	6.59%	8.41%
	Other Wastes Subtotal	**25.70%**	**11.71%**	**10.54%**	**14.78%**	**15.68%**	**29.22%**	**23.51%**	**25.71%**	**25.66%**	**26.02%**
WOOD	Dimension Lumber	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	Pallets/Crates	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	Treated Wood	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	Roofing	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	Contaminated	0.23%	0.00%	0.00%	0.00%	0.06%	0.00%	0.00%	0.00%	0.00%	0.00%
	Stumps/Other Bulky	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	Plywood	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	Particleboard/Fiberboard	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	Wood Products	0.00%	0.05%	0.36%	0.00%	0.10%	0.00%	0.00%	0.00%	0.00%	0.00%
	Other Wood	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	Wood Subtotal	**0.23%**	**0.05%**	**0.36%**	**0.00%**	**0.16%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**
C&D	Ceramics, Porc., China	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	Rocks, Bricks	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	Concrete	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	Soil, Dirt, Fines	0.00%	2.63%	0.00%	0.00%	0.66%	0.00%	0.00%	0.00%	0.00%	0.00%
	Gypsum Board	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	Fiberglass Insulation	0.00%	0.12%	0.00%	0.00%	0.03%	0.00%	0.00%	0.00%	0.00%	0.00%
	Other Fiberglass	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	Roofing	0.00%	0.36%	0.00%	0.00%	0.09%	0.00%	0.00%	0.00%	0.00%	0.00%
	Asphalt	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	Other C&D	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	C&D Subtotal	**0.00%**	**3.12%**	**0.00%**	**0.00%**	**0.78%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**
TOTAL	TOTAL	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Table B - 1
QUARTERLY DATA AND ANNUAL AVERAGES FOR COUNTY BUILDINGS, PAGE TWO

		County Courthouse					Juvenille Justice				
		August	November	February	June	Average	August	November	February	May	Average
PAPER	Newspaper	1.52%	3.72%	0.56%	0.38%	1.54%	7.22%	NA	2.26%	1.45%	3.64%
	Cardboard	2.42%	0.56%	2.81%	1.19%	1.75%	0.49%		0.75%	1.16%	0.80%
	Mixed Waste Paper	9.70%	8.74%	6.41%	13.61%	9.61%	4.10%		6.78%	9.85%	6.91%
	Phone Books	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%		0.00%	0.00%	0.00%
	Milk Cartons, Other	3.64%	6.23%	5.73%	1.30%	4.22%	0.98%		1.70%	1.16%	1.28%
	Compostable	11.52%	18.23%	11.36%	14.90%	14.00%	17.55%		13.18%	19.71%	16.81%
	Non-Recyclable Paper	0.61%	0.19%	0.06%	0.11%	0.24%	0.33%		0.75%	0.87%	0.65%
	Paper Subtotal	**29.40%**	**37.66%**	**26.93%**	**31.48%**	**31.37%**	**30.67%**		**25.42%**	**34.19%**	**30.10%**
PLASTIC	PET Bottles	1.97%	1.49%	2.47%	0.97%	1.73%	1.15%		3.39%	2.03%	2.19%
	HDPE Bottles	0.00%	0.23%	0.56%	0.27%	0.27%	0.82%		0.00%	0.58%	0.47%
	Bottles 3-7	0.08%	0.14%	0.00%	0.00%	0.06%	0.00%		0.00%	0.00%	0.00%
	Tubs	0.38%	0.42%	0.17%	0.32%	0.32%	0.82%		1.13%	1.74%	1.23%
	Bags and Film	7.73%	4.65%	11.69%	7.23%	7.83%	8.69%		9.79%	8.69%	9.06%
	Plastic Packaging	5.84%	0.74%	1.01%	1.08%	2.17%	3.20%		3.77%	2.90%	3.29%
	Other Plastic Products	0.76%	0.84%	2.02%	2.59%	1.55%	0.16%		1.51%	1.16%	0.94%
	Expanded Polystyrene	1.21%	0.56%	1.12%	0.76%	0.91%	0.00%		0.75%	0.58%	0.44%
	Plastic Subtotal	**17.97%**	**9.07%**	**19.06%**	**13.23%**	**14.83%**	**14.85%**		**20.33%**	**17.68%**	**17.62%**
METAL	Aluminum Cans	0.76%	0.37%	0.45%	0.22%	0.45%	0.66%		1.88%	1.02%	1.19%
	Aluminum Foil	0.30%	0.23%	0.06%	0.06%	0.16%	0.09%		0.00%	0.00%	0.03%
	Tin Cans	0.53%	0.28%	0.17%	0.22%	0.30%	0.66%		0.95%	2.18%	1.26%
	Mixed Metals	0.00%	0.00%	0.22%	3.46%	0.92%	1.56%		0.00%	0.00%	0.52%
	Ferrous Metals	0.00%	0.05%	0.06%	3.35%	0.86%	0.00%		0.00%	0.00%	0.00%
	White Goods	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%		0.00%	0.00%	0.00%
	Non-Ferrous Metals	0.00%	0.05%	0.00%	0.06%	0.03%	0.00%		0.00%	0.00%	0.00%
	Aerosol Cans	0.61%	0.00%	0.00%	0.00%	0.15%	0.00%		0.38%	0.00%	0.13%
	Auto Parts	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%		0.00%	0.00%	0.00%
	Metal Subtotal	**2.20%**	**0.98%**	**0.96%**	**7.35%**	**2.87%**	**2.96%**		**3.21%**	**3.20%**	**3.12%**
HHW and	Latex Paint	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%		0.00%	0.00%	0.00%
SPECIAL	Oil-Based Paint	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%		0.00%	0.00%	0.00%
	Solvents	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%		0.00%	0.00%	0.00%
	Adhesives, Glues	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%		0.00%	0.00%	0.00%
	Cleaners, Corrosives	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%		0.00%	0.00%	0.00%
	Medical Wastes	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%		0.00%	0.00%	0.00%
	Motor Oil, Other	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%		0.00%	0.00%	0.00%
	Oil Filters	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%		0.00%	0.00%	0.00%
	Gasoline, Fuel Oil	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%		0.00%	0.00%	0.00%
	Antifreeze	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%		0.00%	0.00%	0.00%
	Other Auto Maint.	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%		0.00%	0.00%	0.00%
	Batteries, Car	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%		0.00%	0.00%	0.00%
	HH Batt	0.03%	0.05%	0.06%	0.00%	0.03%	0.33%		1.13%	0.00%	0.49%
	Animal Excrement	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%		0.57%	0.00%	0.19%
	Animal Carcasses	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%		0.00%	0.00%	0.00%
	Gas Cylinders	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%		0.00%	0.00%	0.00%
	Pesticides, Herbicides	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%		0.00%	0.00%	0.00%
	Fert. w/pest	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%		0.00%	0.00%	0.00%
	Fert. w/o pest	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%		0.00%	0.00%	0.00%
	Other HW	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%		0.00%	0.00%	0.00%
	Actual Hazardous Wastes	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%		0.00%	0.00%	0.00%
	Special Waste Subtotal	**0.03%**	**0.05%**	**0.06%**	**0.00%**	**0.03%**	**0.33%**		**1.70%**	**0.00%**	**0.68%**
ORGANICS	Food Waste	23.79%	36.92%	42.39%	33.69%	34.20%	29.69%		27.48%	22.02%	26.40%
	Yard Debris	0.00%	0.70%	0.02%	0.11%	0.21%	0.00%		0.00%	0.44%	0.15%
	Org. Subtotal	**23.79%**	**37.62%**	**42.41%**	**33.80%**	**34.40%**	**29.69%**		**27.48%**	**22.46%**	**26.55%**
GLASS	Clear Bottles	0.30%	0.28%	0.00%	0.22%	0.20%	1.07%		3.39%	0.00%	1.49%
	Brown Bottles	0.23%	0.02%	0.00%	0.00%	0.06%	0.00%		0.00%	0.00%	0.00%
	Green Bottles	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%		0.00%	0.00%	0.00%
	Light Bulbs	0.08%	0.00%	0.00%	0.00%	0.02%	0.00%		0.00%	0.00%	0.00%
	Non-Recyclable Glass	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%		1.13%	0.00%	0.38%
	Glass Subtotal	**0.61%**	**0.30%**	**0.00%**	**0.22%**	**0.28%**	**1.07%**		**4.52%**	**0.00%**	**1.86%**
OTHER	E-Waste	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%		0.00%	0.00%	0.00%
WASTES	Other Electronics	0.00%	0.00%	0.00%	0.27%	0.07%	0.00%		0.00%	0.00%	0.00%
	Tires	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%		0.00%	0.00%	0.00%
	Rubber	1.75%	0.23%	2.42%	2.59%	1.75%	2.55%		2.83%	1.16%	2.18%
	Cosmetics	0.53%	0.42%	0.34%	0.86%	0.54%	0.41%		0.00%	0.00%	0.14%
	Pharm.	1.06%	0.00%	0.00%	0.00%	0.27%	0.00%		0.00%	0.00%	0.00%
	Diapers	0.08%	0.84%	0.34%	0.65%	0.48%	1.64%		2.26%	1.02%	1.64%
	Textiles	1.82%	0.56%	3.04%	4.43%	2.46%	2.79%		0.95%	7.82%	3.85%
	Carpet	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%		0.00%	0.00%	0.00%
	Carpet Padding	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%		0.00%	0.00%	0.00%
	Furniture	8.49%	0.00%	0.00%	0.00%	2.12%	0.00%		0.00%	0.00%	0.00%
	Ash, Dust	0.61%	1.30%	0.00%	0.00%	0.48%	0.09%		0.00%	0.00%	0.03%
	Miscellnaeous Organics	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%		0.00%	0.00%	0.00%
	Miscellnaeous Inorganics	0.00%	0.00%	0.00%	0.00%	0.00%	0.66%		6.78%	4.06%	3.83%
	Residuals	11.67%	3.91%	4.39%	2.16%	5.53%	12.14%		4.52%	8.40%	8.35%
	Other Waste Subtotal	**26.00%**	**7.26%**	**10.52%**	**10.96%**	**13.68%**	**20.27%**		**17.33%**	**22.46%**	**20.02%**
WOOD	Dimension Lumber	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%		0.00%	0.00%	0.00%
	Pallets/Crates	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%		0.00%	0.00%	0.00%
	Treated Wood	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%		0.00%	0.00%	0.00%
	Roofing	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%		0.00%	0.00%	0.00%
	Contaminated	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%		0.00%	0.00%	0.00%
	Stumps/Other Bulky	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%		0.00%	0.00%	0.00%
	Plywood	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%		0.00%	0.00%	0.00%
	Particleboard/Fiberboard	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%		0.00%	0.00%	0.00%
	Wood Products	0.00%	0.37%	0.06%	0.32%	0.19%	0.16%		0.00%	0.00%	0.05%
	Other Wood	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%		0.00%	0.00%	0.00%
	Wood Subtotal	**0.00%**	**0.37%**	**0.06%**	**0.32%**	**0.19%**	**0.16%**		**0.00%**	**0.00%**	**0.05%**
C&D	Ceramics, Porc., China	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%		0.00%	0.00%	0.00%
	Rocks, Bricks	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%		0.00%	0.00%	0.00%
	Concrete	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%		0.00%	0.00%	0.00%
	Soil, Dirt, Fines	0.00%	0.00%	0.00%	0.22%	0.05%	0.00%		0.00%	0.00%	0.00%
	Gypsum Board	0.00%	0.00%	0.00%	0.06%	0.01%	0.00%		0.00%	0.00%	0.00%
	Fiberglass Insulation	0.00%	0.00%	0.00%	1.40%	0.35%	0.00%		0.00%	0.00%	0.00%
	Other Fiberglass	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%		0.00%	0.00%	0.00%
	Roofing	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%		0.00%	0.00%	0.00%
	Asphalt	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%		0.00%	0.00%	0.00%
	Other C&D	0.00%	6.70%	0.00%	0.97%	1.92%	0.00%		0.00%	0.00%	0.00%
	C&D Subtotal	**0.00%**	**6.70%**	**0.00%**	**2.65%**	**2.34%**	**0.00%**		**0.00%**	**0.00%**	**0.00%**
TOTAL	TOTAL	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%		100.00%	100.00%	100.00%

APPENDIX C

STATISTICAL CERTAINTY OF RESULTS

STATISTICAL CERTAINTY OF RESULTS

A. INTRODUCTION

This appendix shows the confidence intervals associated with waste composition results.

B. METHODOLOGY

For this type of study, statistical certainty can be expressed using confidence intervals. Confidence intervals are the range of values for which one can be confident (to a given degree, such as 90% confident) that the true value falls within. The confidence limits are sometimes shown as a "+ or – value", such as 5% newspaper +/- 1%. For this study, a confidence interval of 90% was used, so that in this example one can be 90% confident that the true value for newspaper falls between 4% and 6%.

The calculation of confidence intervals for this study is complicated slightly by the use of weighted averages. The calculation of confidence intervals for weighted averages begins with calculating standard deviations for each material for each generator and for each season. The standard deviation is then converted to the standard error of the mean (SEM) by dividing the standard deviation by the square root of the number of samples. Once the SEM has been determined for each material, each season and each waste generator, it can be manipulated in the same way as the composition figures by using weighted averages as appropriate for the data being combined. The SEM's can then be multiplied by a factor of 1.64 and then added or subtracted from the average composition values to derive the upper and lower confidence limits, respectively. The factor of 1.64 is determined by the choice of a 90% confidence interval.

C. RESULTS

Table C-1 shows the confidence limits associated with the composition results for each generator and for the entire County.

Table C-1
CONFIDENCE LIMITS BY TYPE OF GENERATOR

		Residential Self-Haul			Non-Residential Self-Haul			Rural Dropboxes		
		Average	LCL	UCL	Average	LCL	UCL	Average	LCL	UCL
PAPER	Newspaper	0.68%	0.00%	1.52%	0.13%	0.00%	0.27%	0.57%	0.01%	1.13%
	Cardboard	3.66%	1.19%	6.14%	4.31%	0.68%	7.94%	1.58%	0.66%	2.51%
	Mixed Waste Paper	4.89%	1.31%	8.46%	0.86%	0.00%	1.75%	3.66%	2.28%	5.04%
	Phone Books	0.05%	0.01%	0.09%	0.00%	0.00%	0.00%	0.09%	0.00%	0.21%
	Milk Cartons, Other	0.13%	0.00%	0.27%	0.04%	0.00%	0.08%	0.19%	0.04%	0.34%
	Compostable	2.07%	0.92%	3.21%	1.49%	0.00%	3.39%	3.13%	1.76%	4.49%
	Non-Recyclable Paper	1.60%	0.00%	3.34%	0.97%	0.00%	2.10%	0.63%	0.36%	0.89%
	Paper Subtotal	**13.07%**	**6.13%**	**20.02%**	**7.80%**	**2.38%**	**13.21%**	**9.85%**	**7.50%**	**12.21%**
PLASTIC	PET Bottles	0.47%	0.19%	0.76%	0.23%	0.00%	0.46%	0.85%	0.44%	1.26%
	HDPE Bottles	0.69%	0.33%	1.05%	0.02%	0.00%	0.05%	0.69%	0.38%	1.01%
	Bottles 3-7	0.03%	0.00%	0.06%	0.01%	0.00%	0.03%	0.09%	0.02%	0.15%
	Tubs	0.14%	0.02%	0.27%	0.04%	0.00%	0.10%	0.26%	0.10%	0.42%
	Bags and Film	2.38%	1.30%	3.45%	2.27%	0.34%	4.21%	4.35%	2.71%	6.00%
	Plastic Packaging	1.25%	0.25%	2.24%	0.32%	0.00%	0.65%	1.17%	0.69%	1.65%
	Other Plastic Products	6.80%	1.74%	11.86%	1.39%	0.41%	2.37%	3.84%	1.83%	5.84%
	Expanded Polystyrene	0.40%	0.12%	0.67%	2.08%	0.00%	5.09%	0.84%	0.06%	1.63%
	Plastic Subtotal	**12.15%**	**6.46%**	**17.85%**	**6.37%**	**1.50%**	**11.25%**	**12.09%**	**8.03%**	**16.15%**
METAL	Aluminum Cans	0.31%	0.04%	0.58%	0.14%	0.00%	0.29%	0.48%	0.16%	0.80%
	Aluminum Foil	0.19%	0.05%	0.32%	0.04%	0.00%	0.09%	0.21%	0.04%	0.38%
	Tin Cans	0.60%	0.11%	1.10%	0.10%	0.00%	0.22%	1.02%	0.44%	1.59%
	Mixed Metals	2.75%	0.85%	4.65%	3.10%	0.00%	6.61%	6.20%	2.19%	10.21%
	Ferrous Metals	2.63%	0.27%	5.00%	2.09%	0.00%	4.51%	5.65%	1.26%	10.04%
	White Goods	0.00%	0.00%	0.00%	0.12%	0.00%	0.30%	0.00%	0.00%	0.00%
	Non-Ferrous Metals	0.50%	0.00%	1.11%	0.24%	0.00%	0.55%	0.29%	0.00%	0.60%
	Aerosol Cans	0.20%	0.00%	0.42%	0.04%	0.00%	0.10%	0.28%	0.04%	0.52%
	Auto Parts	1.76%	0.00%	4.23%	0.00%	0.00%	0.00%	0.47%	0.00%	1.11%
	Metal Subtotal	**8.93%**	**3.34%**	**14.53%**	**5.86%**	**0.18%**	**11.54%**	**14.61%**	**7.18%**	**22.03%**
ORGANIC	Food Waste	9.90%	4.08%	15.72%	3.52%	0.00%	7.48%	14.66%	4.75%	24.57%
	Yard Debris	2.30%	0.00%	4.92%	0.01%	0.00%	0.02%	2.60%	0.08%	5.13%
	Organics Subtotal	**12.20%**	**4.72%**	**19.68%**	**3.53%**	**0.00%**	**7.50%**	**17.27%**	**6.44%**	**28.09%**
GLASS	Clear Bottles	1.14%	0.26%	2.02%	0.15%	0.00%	0.33%	1.13%	0.77%	1.50%
	Brown Bottles	0.51%	0.00%	1.16%	0.05%	0.00%	0.13%	0.56%	0.00%	1.19%
	Green Bottles	0.35%	0.00%	0.78%	0.04%	0.00%	0.11%	0.23%	0.08%	0.38%
	Light Bulbs	0.07%	0.02%	0.13%	0.00%	0.00%	0.00%	0.03%	0.00%	0.05%
	Non-Recyclable Glass	2.20%	0.00%	4.91%	0.74%	0.00%	1.89%	1.23%	0.00%	2.82%
	Glass Subtotal	**4.28%**	**0.37%**	**8.19%**	**0.99%**	**0.00%**	**2.40%**	**3.19%**	**0.89%**	**5.49%**
OTHER	E-Waste	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
WASTES	Other Electronics	0.23%	0.00%	0.58%	0.00%	0.00%	0.00%	0.22%	0.00%	0.49%
	Tires	0.32%	0.00%	0.81%	0.00%	0.00%	0.00%	0.13%	0.00%	0.30%
	Rubber	0.15%	0.02%	0.28%	0.24%	0.00%	0.48%	0.40%	0.02%	0.77%
	Cosmetics	0.37%	0.09%	0.64%	0.00%	0.00%	0.01%	0.29%	0.10%	0.48%
	Pharmaceuticals	0.06%	0.00%	0.13%	0.00%	0.00%	0.00%	0.04%	0.00%	0.07%
	Diapers	1.02%	0.00%	2.50%	0.07%	0.00%	0.18%	1.98%	0.53%	3.42%
	Textiles	3.72%	1.07%	6.37%	0.73%	0.00%	1.80%	4.72%	2.29%	7.14%
	Carpet	1.24%	0.00%	3.05%	8.86%	0.00%	18.32%	2.93%	0.77%	5.09%
	Carpet Padding	0.87%	0.00%	2.11%	3.68%	0.00%	7.69%	0.56%	0.00%	1.31%
	Furniture	8.29%	0.16%	16.42%	7.97%	0.00%	17.68%	6.15%	0.00%	14.38%
	Ash, Dust	0.36%	0.00%	0.74%	0.03%	0.00%	0.09%	2.67%	0.00%	6.23%
	Misc. Organics	0.35%	0.00%	0.85%	0.01%	0.00%	0.01%	0.05%	0.00%	0.12%
	Misc. Inorganics	0.84%	0.00%	1.98%	0.03%	0.00%	0.08%	1.04%	0.14%	1.94%
	Residuals	2.51%	1.36%	3.66%	2.41%	0.43%	4.38%	7.07%	3.51%	10.62%
	Other Waste Subtotal	**20.32%**	**10.94%**	**29.70%**	**24.03%**	**5.92%**	**42.14%**	**28.24%**	**17.51%**	**38.96%**
WOOD	**Wood**	**13.65%**	**2.44%**	**24.86%**	**27.57%**	**11.12%**	**44.01%**	**8.54%**	**1.54%**	**15.55%**
and C&D	**C&D**	**10.90%**	**2.45%**	**19.35%**	**23.50%**	**8.88%**	**38.11%**	**4.79%**	**1.88%**	**7.70%**
SPECIAL	**Special Waste**	**4.48%**	**0.84%**	**8.13%**	**0.36%**	**0.00%**	**0.85%**	**1.43%**	**0.14%**	**2.71%**

Notes:
LCL = Lower Confidence Limit for 90% confidence interval.
UCL = Upper Confidence Limit for 90% confidence interval.
All figures are percentages by weight.

Table C-1, continued
CONFIDENCE LIMITS BY TYPE OF GENERATOR

		Single-Family, County			Single-Family, Olympia			Multi-Family, County		
		Average	LCL	UCL	Average	LCL	UCL	Average	LCL	UCL
PAPER	Newspaper	0.72%	0.26%	1.17%	0.92%	0.26%	1.58%	1.14%	0.51%	1.76%
	Cardboard	1.62%	0.99%	2.25%	0.93%	0.37%	1.50%	4.37%	2.75%	6.00%
	Mixed Waste Paper	6.56%	5.19%	7.94%	5.82%	4.80%	6.83%	10.03%	6.51%	13.55%
	Phone Books	0.14%	0.00%	0.29%	0.10%	0.00%	0.24%	0.21%	0.00%	0.47%
	Milk Cartons, Other	0.26%	0.15%	0.36%	0.26%	0.16%	0.35%	0.28%	0.18%	0.37%
	Compostable	6.89%	5.69%	8.08%	6.60%	5.67%	7.54%	4.63%	3.38%	5.88%
	Non-Recyclable Paper	1.13%	0.52%	1.74%	0.93%	0.49%	1.38%	0.81%	0.40%	1.22%
	Paper Subtotal	**17.32%**	**14.96%**	**19.68%**	**15.56%**	**13.69%**	**17.42%**	**21.46%**	**16.58%**	**26.34%**
PLASTIC	PET Bottles	1.02%	0.72%	1.33%	0.76%	0.58%	0.93%	1.49%	1.15%	1.82%
	HDPE Bottles	0.68%	0.47%	0.89%	0.63%	0.43%	0.84%	0.99%	0.70%	1.27%
	Bottles 3-7	0.09%	0.03%	0.15%	0.08%	0.02%	0.13%	0.11%	0.03%	0.19%
	Tubs	0.37%	0.26%	0.49%	0.44%	0.29%	0.59%	0.31%	0.22%	0.41%
	Bags and Film	6.32%	5.48%	7.15%	6.94%	6.11%	7.78%	5.54%	3.68%	7.40%
	Plastic Packaging	1.92%	1.41%	2.43%	2.17%	1.67%	2.67%	1.56%	1.11%	2.01%
	Other Plastic Products	2.55%	1.52%	3.59%	3.06%	1.80%	4.31%	3.12%	1.36%	4.89%
	Expanded Polystyrene	0.65%	0.40%	0.90%	0.71%	0.56%	0.86%	0.59%	0.41%	0.76%
	Plastic Subtotal	**13.60%**	**11.78%**	**15.43%**	**14.79%**	**13.30%**	**16.29%**	**13.71%**	**11.06%**	**16.35%**
METAL	Aluminum Cans	0.45%	0.29%	0.61%	0.42%	0.25%	0.58%	0.98%	0.60%	1.37%
	Aluminum Foil	0.25%	0.16%	0.35%	0.30%	0.23%	0.38%	0.13%	0.08%	0.17%
	Tin Cans	1.16%	0.84%	1.48%	0.88%	0.67%	1.09%	1.19%	0.90%	1.48%
	Mixed Metals	1.77%	0.74%	2.79%	1.24%	0.29%	2.19%	3.74%	1.24%	6.25%
	Ferrous Metals	0.65%	0.03%	1.26%	0.61%	0.25%	0.97%	1.49%	0.00%	3.05%
	White Goods	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.94%	0.00%	2.35%
	Non-Ferrous Metals	0.12%	0.05%	0.19%	0.13%	0.01%	0.25%	0.11%	0.04%	0.19%
	Aerosol Cans	0.25%	0.13%	0.37%	0.24%	0.09%	0.39%	0.26%	0.11%	0.41%
	Auto Parts	0.03%	0.00%	0.08%	0.00%	0.00%	0.00%	0.27%	0.00%	0.63%
	Metal Subtotal	**4.68%**	**3.31%**	**6.06%**	**3.82%**	**2.74%**	**4.91%**	**9.12%**	**4.99%**	**13.25%**
ORGANIC	Food Waste	23.40%	19.69%	27.11%	23.44%	18.29%	28.58%	19.20%	15.32%	23.07%
	Yard Debris	6.12%	2.15%	10.08%	4.76%	0.00%	9.60%	1.09%	0.21%	1.98%
	Organics Subtotal	**29.51%**	**24.17%**	**34.86%**	**28.20%**	**21.65%**	**34.75%**	**20.29%**	**16.34%**	**24.24%**
GLASS	Clear Bottles	1.62%	0.90%	2.35%	0.94%	0.42%	1.46%	2.73%	1.78%	3.69%
	Brown Bottles	0.74%	0.32%	1.16%	0.43%	0.12%	0.75%	1.35%	0.31%	2.38%
	Green Bottles	0.43%	0.19%	0.68%	0.23%	0.00%	0.45%	1.05%	0.38%	1.72%
	Light Bulbs	0.05%	0.02%	0.07%	0.06%	0.02%	0.10%	0.09%	0.02%	0.16%
	Non-Recyclable Glass	0.63%	0.00%	1.44%	0.29%	0.08%	0.50%	0.45%	0.11%	0.80%
	Glass Subtotal	**3.48%**	**1.94%**	**5.02%**	**1.94%**	**1.19%**	**2.70%**	**5.67%**	**3.54%**	**7.80%**
OTHER	E-Waste	0.00%	0.00%	0.00%	0.14%	0.00%	0.34%	1.37%	0.00%	3.43%
WASTES	Other Electronics	0.10%	0.00%	0.26%	0.10%	0.00%	0.21%	0.20%	0.00%	0.45%
	Tires	0.06%	0.00%	0.12%	0.09%	0.00%	0.23%	0.00%	0.00%	0.00%
	Rubber	0.15%	0.07%	0.23%	0.15%	0.02%	0.27%	0.21%	0.03%	0.40%
	Cosmetics	0.26%	0.08%	0.44%	0.40%	0.23%	0.58%	0.32%	0.14%	0.51%
	Pharmaceuticals	0.08%	0.01%	0.16%	0.06%	0.02%	0.10%	0.10%	0.00%	0.21%
	Diapers	5.44%	3.88%	7.01%	7.58%	4.69%	10.48%	4.85%	2.72%	6.98%
	Textiles	3.71%	2.08%	5.33%	4.32%	2.93%	5.71%	4.65%	2.91%	6.39%
	Carpet	0.61%	0.00%	1.51%	1.25%	0.00%	3.11%	0.24%	0.00%	0.61%
	Carpet Padding	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.00%	0.04%
	Furniture	0.06%	0.00%	0.15%	0.00%	0.00%	0.00%	1.00%	0.00%	2.46%
	Ash, Dust	0.50%	0.21%	0.79%	0.34%	0.05%	0.63%	0.38%	0.11%	0.66%
	Misc. Organics	0.11%	0.00%	0.25%	0.07%	0.02%	0.13%	0.15%	0.04%	0.26%
	Misc. Inorganics	0.25%	0.01%	0.49%	0.77%	0.00%	1.58%	0.49%	0.10%	0.87%
	Residuals	11.96%	9.87%	14.05%	11.90%	9.15%	14.65%	7.34%	5.17%	9.52%
	Other Waste Subtotal	**23.30%**	**19.78%**	**26.81%**	**27.17%**	**22.14%**	**32.20%**	**21.33%**	**16.29%**	**26.36%**
WOOD	**Wood**	**2.10%**	**0.07%**	**4.13%**	**1.60%**	**0.19%**	**3.02%**	**3.89%**	**1.55%**	**6.24%**
and C&D	**C&D**	**0.66%**	**0.13%**	**1.19%**	**1.48%**	**0.07%**	**2.89%**	**1.08%**	**0.00%**	**2.27%**
SPECIAL	**Special Waste**	**5.34%**	**2.69%**	**7.99%**	**5.43%**	**3.65%**	**7.22%**	**3.45%**	**1.74%**	**5.16%**

Notes:
LCL = Lower Confidence Limit for 90% confidence interval.
UCL = Upper Confidence Limit for 90% confidence interval.
All figures are percentages by weight.

Table C-1, continued
CONFIDENCE LIMITS BY TYPE OF GENERATOR

		Multi-Family, Olympia			General Commercial, County			General Commercial, Olympia		
		Average	LCL	UCL	Average	LCL	UCL	Average	LCL	UCL
PAPER	Newspaper	1.51%	0.69%	2.33%	1.18%	0.38%	1.97%	1.29%	0.49%	2.08%
	Cardboard	4.35%	2.26%	6.44%	5.19%	3.32%	7.06%	4.64%	1.84%	7.43%
	Mixed Waste Paper	7.66%	5.18%	10.13%	7.31%	4.95%	9.68%	9.01%	6.68%	11.33%
	Phone Books	0.13%	0.00%	0.30%	0.04%	0.00%	0.11%	0.16%	0.00%	0.40%
	Milk Cartons, Other	0.23%	0.11%	0.36%	0.53%	0.13%	0.92%	0.47%	0.09%	0.84%
	Compostable	3.91%	2.86%	4.95%	7.17%	4.05%	10.28%	9.19%	6.79%	11.58%
	Non-Recyclable Paper	1.90%	0.15%	3.65%	1.26%	0.21%	2.31%	1.62%	0.60%	2.64%
	Paper Subtotal	**19.68%**	**14.95%**	**24.41%**	**22.67%**	**17.98%**	**27.37%**	**26.36%**	**21.20%**	**31.52%**
PLASTIC	PET Bottles	1.49%	0.97%	2.01%	1.30%	0.68%	1.93%	0.93%	0.58%	1.29%
	HDPE Bottles	0.90%	0.60%	1.20%	0.68%	0.29%	1.07%	0.92%	0.43%	1.41%
	Bottles 3-7	0.06%	0.02%	0.09%	0.11%	0.00%	0.21%	0.03%	0.00%	0.06%
	Tubs	0.30%	0.18%	0.42%	0.31%	0.16%	0.47%	0.22%	0.12%	0.33%
	Bags and Film	4.07%	2.93%	5.21%	6.47%	4.66%	8.28%	7.05%	5.14%	8.97%
	Plastic Packaging	1.42%	0.83%	2.02%	1.77%	0.93%	2.61%	1.90%	1.26%	2.54%
	Other Plastic Products	3.15%	1.94%	4.37%	8.97%	0.00%	18.28%	2.20%	0.86%	3.53%
	Expanded Polystyrene	0.52%	0.32%	0.71%	0.94%	0.38%	1.50%	0.59%	0.33%	0.86%
	Plastic Subtotal	**11.91%**	**8.96%**	**14.86%**	**20.55%**	**11.70%**	**29.41%**	**13.85%**	**11.05%**	**16.66%**
METAL	Aluminum Cans	0.88%	0.49%	1.27%	0.71%	0.29%	1.13%	0.51%	0.32%	0.70%
	Aluminum Foil	0.16%	0.10%	0.21%	0.18%	0.01%	0.35%	0.12%	0.03%	0.22%
	Tin Cans	1.11%	0.74%	1.49%	0.72%	0.32%	1.11%	0.78%	0.27%	1.29%
	Mixed Metals	3.99%	0.00%	8.49%	1.97%	0.14%	3.80%	2.72%	0.00%	5.98%
	Ferrous Metals	0.49%	0.03%	0.96%	1.66%	0.15%	3.17%	1.87%	0.00%	3.78%
	White Goods	1.89%	0.00%	4.58%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	Non-Ferrous Metals	0.10%	0.00%	0.20%	0.08%	0.00%	0.16%	0.06%	0.00%	0.11%
	Aerosol Cans	0.11%	0.05%	0.17%	0.13%	0.04%	0.22%	0.18%	0.05%	0.31%
	Auto Parts	0.00%	0.00%	0.00%	0.02%	0.00%	0.06%	1.16%	0.00%	2.71%
	Metal Subtotal	**8.74%**	**2.98%**	**14.49%**	**5.46%**	**2.38%**	**8.55%**	**7.40%**	**2.58%**	**12.22%**
ORGANIC	Food Waste	18.75%	12.81%	24.69%	18.71%	10.56%	26.85%	22.38%	13.76%	31.01%
	Yard Debris	1.36%	0.00%	3.13%	0.70%	0.00%	1.55%	3.26%	0.00%	6.90%
	Organics Subtotal	**20.11%**	**14.69%**	**25.53%**	**19.41%**	**11.01%**	**27.81%**	**25.65%**	**15.96%**	**35.34%**
GLASS	Clear Bottles	1.99%	0.90%	3.07%	1.24%	0.45%	2.02%	1.60%	0.64%	2.55%
	Brown Bottles	1.09%	0.17%	2.00%	0.65%	0.09%	1.20%	0.52%	0.03%	1.00%
	Green Bottles	0.51%	0.02%	1.00%	0.21%	0.04%	0.38%	0.40%	0.00%	0.80%
	Light Bulbs	0.06%	0.00%	0.12%	0.02%	0.00%	0.04%	0.02%	0.00%	0.05%
	Non-Recyclable Glass	0.23%	0.01%	0.45%	0.30%	0.00%	0.68%	0.58%	0.00%	1.32%
	Glass Subtotal	**3.87%**	**1.96%**	**5.78%**	**2.41%**	**1.09%**	**3.73%**	**3.12%**	**1.26%**	**4.97%**
OTHER	E-Waste	1.51%	0.00%	3.73%	0.00%	0.00%	0.00%	0.23%	0.00%	0.59%
WASTES	Other Electronics	0.06%	0.00%	0.13%	0.21%	0.00%	0.49%	0.54%	0.00%	1.36%
	Tires	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	Rubber	0.25%	0.00%	0.56%	0.53%	0.06%	0.99%	1.13%	0.40%	1.86%
	Cosmetics	0.12%	0.00%	0.23%	0.20%	0.01%	0.40%	0.09%	0.00%	0.17%
	Pharmaceuticals	0.07%	0.00%	0.15%	0.02%	0.00%	0.05%	0.03%	0.00%	0.07%
	Diapers	5.14%	2.28%	8.00%	1.64%	0.28%	3.01%	1.04%	0.24%	1.84%
	Textiles	4.61%	2.70%	6.53%	4.60%	1.55%	7.65%	2.02%	0.65%	3.38%
	Carpet	1.72%	0.00%	4.21%	1.84%	0.00%	4.66%	0.44%	0.00%	1.09%
	Carpet Padding	0.00%	0.00%	0.00%	1.01%	0.00%	2.56%	0.77%	0.00%	1.93%
	Furniture	6.44%	0.00%	15.80%	0.88%	0.00%	1.82%	0.94%	0.00%	2.38%
	Ash, Dust	0.17%	0.00%	0.34%	0.34%	0.00%	0.68%	0.17%	0.00%	0.41%
	Misc. Organics	0.10%	0.00%	0.22%	0.06%	0.00%	0.14%	0.11%	0.00%	0.26%
	Misc. Inorganics	0.20%	0.03%	0.38%	1.53%	0.00%	3.67%	0.62%	0.03%	1.21%
	Residuals	6.73%	4.79%	8.68%	6.62%	4.30%	8.94%	6.36%	4.33%	8.38%
	Other Waste Subtotal	**27.13%**	**17.15%**	**37.11%**	**19.50%**	**12.46%**	**26.54%**	**14.48%**	**9.26%**	**19.70%**
WOOD	**Wood**	**3.60%**	**0.98%**	**6.21%**	**8.86%**	**0.72%**	**17.00%**	**6.02%**	**1.06%**	**10.97%**
and C&D	**C&D**	**1.92%**	**0.00%**	**4.74%**	**0.81%**	**0.11%**	**1.52%**	**1.52%**	**0.00%**	**3.42%**
SPECIAL	**Special Waste**	**3.04%**	**0.81%**	**5.28%**	**0.32%**	**0.09%**	**0.54%**	**1.61%**	**0.58%**	**2.64%**

Notes:
LCL = Lower Confidence Limit for 90% confidence interval.
UCL = Upper Confidence Limit for 90% confidence interval.
All figures are percentages by weight.

Table C-1, continued
CONFIDENCE LIMITS BY TYPE OF GENERATOR

		Average for Entire County		
		Average	LCL	UCL
PAPER	Newspaper	0.89%	0.22%	1.55%
	Cardboard	3.85%	1.87%	5.83%
	Mixed Waste Paper	6.18%	3.93%	8.43%
	Phone Books	0.08%	0.00%	0.18%
	Milk Cartons, Other	0.32%	0.09%	0.54%
	Compostable	5.51%	3.53%	7.49%
	Non-Recyclable Paper	1.29%	0.21%	2.37%
	Paper Subtotal	**18.11%**	**13.39%**	**22.83%**
	PET Bottles	0.92%	0.52%	1.32%
PLASTIC	HDPE Bottles	0.65%	0.34%	0.96%
	Bottles 3-7	0.07%	0.01%	0.13%
	Tubs	0.26%	0.13%	0.38%
	Bags and Film	5.16%	3.70%	6.63%
	Plastic Packaging	1.55%	0.84%	2.26%
	Other Plastic Products	5.36%	0.82%	9.90%
	Expanded Polystyrene	0.83%	0.20%	1.46%
	Plastic Subtotal	**14.80%**	**9.49%**	**20.12%**
METAL	Aluminum Cans	0.50%	0.22%	0.78%
	Aluminum Foil	0.18%	0.06%	0.30%
	Tin Cans	0.75%	0.37%	1.13%
	Mixed Metals	2.42%	0.32%	4.52%
	Ferrous Metals	1.75%	0.10%	3.40%
	White Goods	0.07%	0.00%	0.18%
	Non-Ferrous Metals	0.19%	0.00%	0.40%
	Aerosol Cans	0.17%	0.04%	0.30%
	Auto Parts	0.51%	0.00%	1.21%
	Metal Subtotal	**6.54%**	**2.72%**	**10.37%**
ORGANIC	Food Waste	16.73%	10.43%	23.04%
	Yard Debris	2.38%	0.22%	4.54%
	Organics Subtotal	**19.12%**	**11.94%**	**26.29%**
GLASS	Clear Bottles	1.25%	0.51%	2.00%
	Brown Bottles	0.58%	0.07%	1.09%
	Green Bottles	0.31%	0.04%	0.58%
	Light Bulbs	0.04%	0.01%	0.07%
	Non-Recyclable Glass	0.84%	0.00%	1.89%
	Glass Subtotal	**3.02%**	**1.04%**	**4.99%**
OTHER	E-Waste	0.09%	0.00%	0.24%
WASTES	Other Electronics	0.20%	0.00%	0.49%
	Tires	0.08%	0.00%	0.20%
	Rubber	0.39%	0.08%	0.70%
	Cosmetics	0.22%	0.05%	0.40%
	Pharmaceuticals	0.04%	0.00%	0.09%
	Diapers	2.34%	0.99%	3.68%
	Textiles	3.60%	1.38%	5.82%
	Carpet	2.01%	0.00%	4.61%
	Carpet Padding	0.96%	0.00%	2.23%
	Furniture	3.13%	0.00%	6.58%
	Ash, Dust	0.36%	0.01%	0.72%
	Misc. Organics	0.13%	0.00%	0.30%
	Misc. Inorganics	0.83%	0.00%	1.91%
	Residuals	6.50%	4.50%	8.50%
	Other Waste Subtotal	**20.90%**	**13.09%**	**28.71%**
WOOD	**Wood**	**9.71%**	**2.05%**	**17.37%**
and C&D	**C&D**	**5.29%**	**1.42%**	**9.16%**
SPECIAL	**Special Waste**	**2.52%**	**0.92%**	**4.12%**

Notes:
LCL = Lower Confidence Limit for 90% confidence interval.
UCL = Upper Confidence Limit for 90% confidence interval.
All figures are percentages by weight.

APPENDIX D

COMPOSITION DATA FOR SPECIFIC NON-RESIDENTIAL GENERATORS

COMPOSITION DATA FOR SPECIFIC NON-RESIDENTIAL GENERATORS

A. INTRODUCTION

This appendix shows data for specific non-residential sources.

B. METHODOLOGY

During the course of the study, waste samples were randomly selected and sorted from a number of specific sources. These samples, which are also included in the average results for the Non-Residential Self-Haul and General Commercial waste streams, are from the following businesses and institutions:

- **Schools**: includes one sample each from Capitol High School, Riverside High School and two other schools.
- **General retail**: includes two samples from K-Mart (one in August 2008 and one in November 2008) and a sample from Fred Meyer.
- **Grocery stores**: includes a sample from an Albertsons store and one other grocery store.
- **Value Village**: two samples happened to be taken from Value Village stores, one in November 2008 and the other in February 2009.
- **GSA (State Capitol)**: two samples were randomly selected from this source as well, one in February 2009 and the other in May 2009.
- **Roofing**: includes four samples from various roofing companies.
- **Construction**: includes 20 samples from various construction companies.

The waste composition data for these generators is shown in Table D-1. At the bottom of Table D-1 is shown the number of samples for each generator, which is provided as an indicator of the level of reliability of the results. For instance, the results for grocery stores, Value Village and GSA are only based on two samples, which means that these results are potentially subject to a significant level of random error.

Although the data in Table D-1 generally has less statistical certainty than the primary results of this study, it is provided here as supplemental data to assist commercial recycling programs.

Table D-1
SPECIFIC NON-RESIDENTIAL GENERATORS

		Schools	General Retail	Grocery Stores	Value Village	GSA (State Capitol)	Construction and Demolition	
							Roofing	All Other
PAPER	Newspaper	1.0%	0.3%	1.0%	0.2%	1.2%	0.0%	0.1%
	Cardboard	3.3%	11.0%	9.8%	12.5%	2.8%	0.8%	5.4%
	Mixed Waste Paper	9.7%	7.6%	3.3%	7.8%	7.9%	0.5%	0.8%
	Phone Books	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Milk Cartons, Other	2.6%	0.1%	0.3%	0.0%	0.3%	0.0%	0.0%
	Compostable	10.4%	9.5%	12.7%	0.2%	12.6%	0.0%	0.2%
	Non-Recyclable Paper	1.1%	0.8%	1.0%	4.0%	1.8%	0.3%	1.6%
	Paper Subtotal	**28.2%**	**29.2%**	**28.1%**	**24.7%**	**26.5%**	**1.5%**	**8.1%**
PLASTIC	PET Bottles	2.7%	0.1%	0.7%	0.1%	1.8%	0.0%	0.2%
	HDPE Bottles	0.4%	0.2%	0.4%	0.0%	0.1%	0.0%	0.0%
	Bottles 3-7	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%
	Tubs	0.6%	0.1%	0.4%	0.3%	0.6%	0.0%	0.0%
	Bags and Film	7.5%	7.4%	9.2%	0.4%	7.5%	0.8%	1.4%
	Plastic Packaging	1.5%	0.8%	3.2%	0.5%	2.1%	0.1%	0.1%
	Other Plastic Products	1.0%	2.7%	1.1%	8.3%	2.3%	1.8%	1.6%
	Expanded Polystyrene	1.3%	0.7%	0.6%	0.0%	0.6%	0.0%	0.2%
	Plastic Subtotal	**15.0%**	**12.0%**	**15.7%**	**9.6%**	**15.1%**	**2.6%**	**3.6%**
METAL	Aluminum Cans	0.6%	0.1%	0.3%	0.0%	0.6%	0.0%	0.2%
	Aluminum Foil	0.1%	0.1%	0.5%	0.0%	0.2%	0.0%	0.1%
	Tin Cans	0.8%	0.1%	0.4%	0.2%	1.0%	0.0%	0.0%
	Mixed Metals	0.1%	4.2%	0.0%	16.2%	1.8%	0.0%	3.0%
	Ferrous Metals	1.3%	1.5%	0.1%	10.4%	0.4%	3.0%	1.8%
	White Goods	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Non-Ferrous Metals	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.3%
	Aerosol Cans	0.1%	0.0%	0.0%	0.0%	0.1%	0.0%	0.1%
	Auto Parts	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Metal Subtotal	**3.0%**	**5.9%**	**1.3%**	**26.8%**	**4.1%**	**3.0%**	**5.5%**
ORGANICS	Food Waste	31.3%	23.5%	37.7%	0.1%	19.1%	0.3%	0.6%
	Yard Debris	3.1%	0.0%	2.6%	0.0%	0.2%	0.0%	0.0%
	Org. Subtotal	**34.4%**	**23.5%**	**40.3%**	**0.1%**	**19.3%**	**0.3%**	**0.6%**
GLASS	Clear Bottles	1.4%	0.5%	0.8%	0.0%	1.7%	0.0%	0.1%
	Brown Bottles	0.1%	0.0%	0.7%	0.0%	0.3%	0.0%	0.0%
	Green Bottles	0.0%	0.0%	2.0%	0.0%	0.6%	0.0%	0.0%
	Light Bulbs	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Non-Recyclable Glass	0.1%	0.2%	0.0%	1.7%	0.1%	0.0%	1.3%
	Glass Subtotal	**1.5%**	**0.7%**	**3.6%**	**1.7%**	**2.7%**	**0.0%**	**1.4%**
OTHER	E-Waste	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
WASTES	Other Electronics	1.0%	0.0%	0.0%	0.4%	0.0%	0.0%	0.0%
	Tires	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Rubber	0.2%	0.2%	0.3%	0.0%	0.5%	0.0%	0.5%
	Cosmetics	0.1%	0.0%	0.0%	0.3%	0.0%	0.0%	0.0%
	Pharm.	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%
	Diapers	0.8%	0.1%	0.0%	0.0%	1.2%	0.0%	0.1%
	Textiles	1.4%	0.1%	0.8%	24.2%	0.4%	0.0%	0.4%
	Carpet	0.0%	0.0%	0.0%	0.0%	0.5%	0.0%	10.5%
	Carpet Padding	0.9%	0.0%	0.0%	0.0%	0.0%	0.0%	6.3%
	Furniture	5.7%	0.0%	0.0%	3.8%	0.0%	0.0%	1.9%
	Ash, Dust	0.6%	0.0%	0.0%	0.0%	0.6%	0.0%	0.0%
	Misc. Org.	0.1%	0.1%	0.0%	0.6%	0.0%	0.0%	0.0%
	Misc. Inorg.	1.1%	0.1%	2.3%	2.3%	0.6%	0.0%	0.0%
	Residuals	5.7%	2.6%	6.3%	1.7%	7.6%	2.5%	2.8%
	Other Wastes Subtotal	**17.6%**	**3.4%**	**9.7%**	**33.2%**	**11.3%**	**2.5%**	**22.4%**
WOOD	Wood	0.0%	24.2%	1.4%	3.9%	20.4%	44.3%	32.5%
and C&D	Const./Demo. Wastes	0.2%	0.9%	0.0%	0.0%	0.0%	45.9%	25.4%
	Wood, C&D Subtotal	**0.2%**	**25.1%**	**1.4%**	**3.9%**	**20.4%**	**90.1%**	**57.8%**
SPECIAL	**Special Wastes**	**0.1%**	**0.2%**	**0.0%**	**0.0%**	**0.7%**	**0.0%**	**0.7%**
	TOTAL	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**
	Number of Samples	**4**	**3**	**2**	**2**	**2**	**4**	**20**

All figures are percentages by weight, except for the sample numbers shown in the bottom row.