# Seattle Public Utilities

# 2010 Residential Waste Stream Composition Study FINAL Report

*prepared by*

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Previous reports on Seattle's Residential Recycling and Waste Streams are available on the Seattle Public Utilities website.

## Waste Composition Reports[1]

2006 Residential Waste Stream Composition Study

2002 Residential Waste Stream Composition Study

1998-1999 Residential Waste Stream Composition Study

1994-1995 Residential Waste Stream Composition Study

## Recycling Composition Reports[2]

2005 Residential Recycling Composition Study

2000-01 Residential Recycling Composition Study

1998/1999 Residential Recycling Composition Study[3]

1993 Residential Recycling Composition Study[4]

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1 http://www.seattle.gov/util/About_SPU/Garbage_System/Reports/Waste_Composition_Reports/index.asp

2 http://www.seattle.gov/util/About_SPU/Recycling_System/Reports/Recycling_Composition_Study/index.asp

3 This report is not available online.

4 This report is not available online.

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# 1 Overview

## 1.1 Introduction and Background

Seattle Public Utilities (SPU) provides for the collection, transfer, and disposal of municipal solid waste (MSW) from within the City of Seattle. As part of this responsibility, SPU designs and implements programs intended to achieve a 60% recycling goal by 2012. SPU has conducted waste composition studies since 1988 to better understand the types and quantities of MSW disposed, to assess the city's recycling potential, and to aid the evaluation of existing programs. These studies have analyzed the residential, commercial, and self-haul waste streams at intervals of about four years. Table 1-1 shows the number of waste samples sorted by these three waste streams from 1988 through the current study in 2010.[5]

**Table 1-1: Samples per Study Period, by Substream**

| Year | Commercial | Residential | Self-Haul | Total |
|---|---|---|---|---|
| 1988-89 | 121 | 212 | 217 | 550 |
| 1990 | 0 | 114 | 203 | 317 |
| 1992 | 251 | 0 | 197 | 448 |
| 1994-95 | 0 | 368 | 0 | 368 |
| 1996 | 348 | 0 | 199 | 547 |
| 1998-99 | 0 | 360 | 0 | 360 |
| 2000 | 347 | 0 | 200 | 547 |
| 2002 | 0 | 309 | 0 | 309 |
| 2004 | 270 | 0 | 216 | 486 |
| 2006 | 0 | 356 | 0 | 356 |
| 2008 | 271 | 0 | 216 | 487 |
| 2010 | 0 | 361 | 0 | 361 |

All of these studies share three common objectives:

- Obtain information about the City's residential, commercial, and self-haul waste streams to estimate the recycling potential for each.
- Understand differences between these three streams to help design, implement, and monitor targeted recycling programs for each stream.
- Establish a baseline for continued long-term measurement of system performance.

This report presents the results of the 2010 residential waste study in four sections. Section 1 briefly introduces the project and the methodology, and Section 2 summarizes the findings. In Section 3, the 2010 findings are compared to those from the 1988/89, 1994/95, 1998/99, 2002, and 2006 residential studies. Detailed results of the 2010 residential waste composition study are presented in Section 4. Appendices follow the main body of the report and provide material definitions, study methodology, comments on sampling events, waste composition calculations, year-to-year comparison calculations, and copies of field forms.

[5] Seattle's residential waste and recycling streams were both sampled in 2010. This report presents results of the waste sampling study; results of the recycling study appear in a separate report.

## 1.2 Seattle's Residential Waste Stream

This study examined waste disposed by two types of residences: single-family and multifamily.[6] In Seattle, the single-family and multifamily waste streams are defined as follows:

- **Single-family:** Primarily detached single-family, duplex, triplex, and four-plex homes. Waste is collected from garbage cans.
- **Multifamily:** Primarily apartments and condominiums with five or more units. Waste is collected from dumpsters.[7]

The contract haulers collect and deliver both single-family and multifamily residential waste to Seattle's two transfer stations. Self-hauled residential waste was not addressed by this study. Self-hauled waste is delivered to a transfer station by the individual homeowner or renter as opposed to a city-contracted hauler.[8]

Contract haulers collect Seattle's residential waste from four collection zones (Zones 1, 2, 3, and 4) shown in Figure 1-1 below.

**Figure 1-1: Seattle's Collection Zones**


Using these two characteristics – residence type and zone – eight sampling groups were established to provide a more detailed and precise analysis. Figure 1-2 depicts these eight residential waste stream sampling groups.

[6] This study measured waste *disposal*, not generation. Waste generation equals the sum of disposed, recycled, and composted amounts.
[7] Through the Clear Alleys Program, multifamily waste from approximately 100 downtown buildings is collected in bags. This waste was excluded from the study due to the difficulty of segregating and obtaining representative samples of this material.
[8] The most recent study on Seattle's self-haul waste was conducted in 2008.

**Figure 1-2: Sampling Groups, by Residence Type and Collection Zone**

| | | Generator Type (Single-family) | Generator Type (Multifamily) |
|---|---|---|---|
| Waste Collection Zones | *One* | Single-family Zone One | Multifamily Zone One |
| | *Two* | Single-family Zone Two | Multifamily Zone Two |
| | *Three* | Single-family Zone Three | Multifamily Zone Three |
| | *Four* | Single-family Zone Four | Multifamily Zone Four |

## 1.3 Study Methodology

The following section provides an overview of the 2010 study methodology. As shown, this waste composition study was conducted in four major steps, presented according to the order in which they occurred during the course of the study. Appendix B contains a detailed description of the methodology.

**Step 1: Develop Sampling Plan**

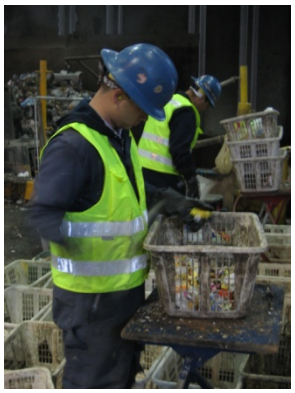
- Samples were allocated among the eight residential sampling groups: about two-thirds to single-family residential waste and about one-third to multifamily residential waste. Both single-family and multifamily samples were evenly split among the four service zones.
- A sampling schedule was constructed for the 2010 calendar year, consisting of two or three consecutive sampling days each month. Sampling days were randomly selected to assure a representative distribution across the days of the week and weeks of the month.
- A complete list of Seattle's residential routes was assembled in conjunction with the City's contracted waste haulers.

**Step 2: Schedule and Collect Waste Samples**

- Prior to each month's sampling, vehicle routes were randomly selected from each of the eight sampling groups.
- The contract haulers were sent a list of the routes chosen for each day of sampling.
- Waste was collected from the designated routes and delivered to the appropriate transfer station for sampling.

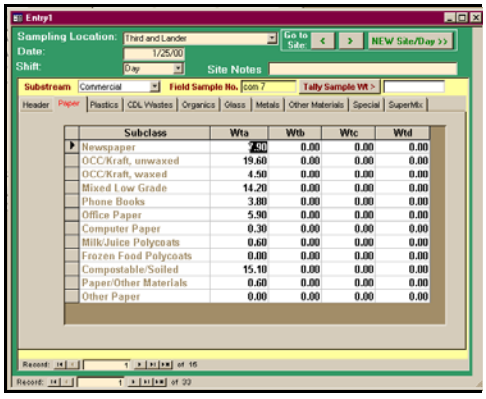
**Step 3: Capture and Sort Samples**

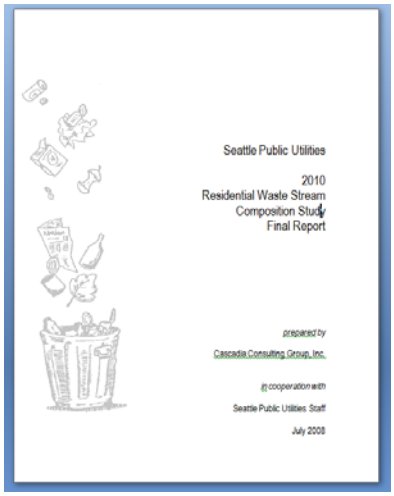
- As each vehicle entered the facility, the sampling crew supervisor verified information with the driver about the waste collected and then directed the front loader operator to scoop a portion of the waste being tipped out of the vehicle. About 250 pounds of this waste was placed on a tarpaulin for sorting.
- For this study, a total of 361 samples were sorted into 102 distinct component categories, such as newspaper or PET plastic bottles. Refer to Appendix A for component definitions and a detailed description of the changes made to the component categories from the 2006 study.



**Step 4: Analyze Data and Prepare Report**

- Each month all sort data were double-entered into a customized database to eliminate data entry errors. At the conclusion of the study, waste composition estimates were calculated by aggregating sampling data using a weighted average procedure. SPU provided annual waste tonnages to perform these calculations. Refer to Appendix D for a description of the calculation methodology.
- This report was prepared based on this data analysis.



# 2 Summary of 2010 Sampling Results

This report presents composition results in the following order. First, a pie chart reflects the composition percentages of the eight broad material categories. Following that, a table lists the top ten components, by weight.[9] Lastly, a detailed table presents the full composition results of all 102 components. Percentages may not add to 100% in tables throughout the report due to rounding.

**Material Designations**

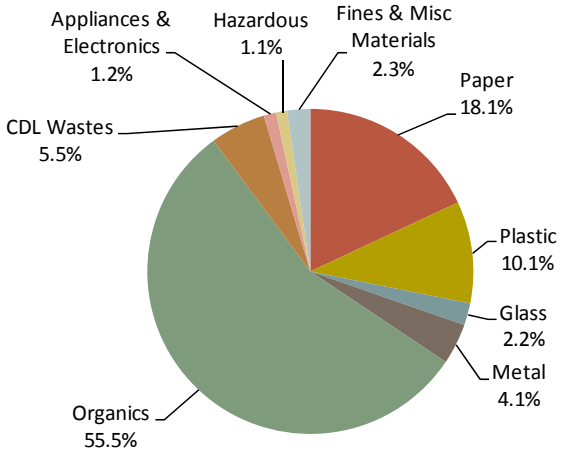
For the sake of clarity, broad categories such as **paper**, **glass**, and **metal** are bolded while material components such as *newspaper*, *clear glass bottles*, and *tin food cans* are italicized.

## 2.1 Overall Residential Composition

A total of 361 residential waste loads were sampled between January and December 2010. Seattle residents disposed a total of 114,135 tons of waste during this time. The composition estimates were applied to these tons to estimate the amount of waste disposed in 2010 for each component category.

As shown in Figure 2-1, **organics** accounted for more than half of the residential tonnage, while **paper** composed approximately 18% of the residential waste.

**Figure 2-1: Composition Summary – Overall Residential[10]**
**(January – December 2010)**




[9] Since the 1998/99 report, tables listing the largest components (greater than 5% by weight) have been replaced with tables listing the top ten components by weight.

[10] **CDL wastes** includes construction debris components, such as *clean dimensional lumber*, *demo gypsum scrap*, and *asphalt shingles*. **Fines and miscellaneous materials** includes four material components: *sand/soil/dirt*, *nondistinct fines*, *miscellaneous fines*, and *miscellaneous inorganics*.

The top ten components of Seattle's overall residential waste are listed in Table 2-1. When summed, they account for over 71% of the overall residential tonnage. Making up roughly 29%, *food* was the largest single component of this waste. In addition, *animal by-products, disposable diapers,* and *compostable/soiled paper* each account for at least 7% of the overall residential waste stream. Table 2-2 lists the composition percentages, by weight, of each component in Seattle's residential substream.[11]

**Table 2-1: Top Ten Components – Overall Residential**
**(January – December 2010)**

| Material | Est. Percent | Cum. Percent | Est. Tons |
|---|---|---|---|
| Food | 29.0% | 29.0% | 33,123 |
| Animal By-products | 10.2% | 39.2% | 11,597 |
| Disposable Diapers | 7.4% | 46.6% | 8,456 |
| Compostable/Soiled Paper | 7.0% | 53.6% | 7,952 |
| Mixed Low-grade Paper | 5.5% | 59.0% | 6,230 |
| Other Plastic Film | 3.9% | 62.9% | 4,428 |
| Textiles/Clothing | 3.4% | 66.3% | 3,903 |
| Plain OCC/Kraft | 1.8% | 68.1% | 2,078 |
| Leaves and Grass | 1.7% | 69.8% | 1,917 |
| Other Ferrous Metal | 1.4% | 71.3% | 1,642 |
| **Total** | **71.3%** | | **81,327** |

[11] All waste composition results were derived using a 90% confidence level. This means that there is a 90% certainty that the actual composition is within the calculated range. In charts throughout this report, the values graphed represent the mean component percentage, not the range.

## Table 2-2: Composition by Weight – Overall Residential
### (January – December 2010)

| Material | Est. Percent | + / - | Est. Tons |
|---|---|---|---|
| **Paper** | **18.1%** | | **20,608** |
| Newspaper | 1.0% | 0.1% | 1,174 |
| Plain OCC/Kraft | 1.8% | 0.2% | 2,078 |
| Waxed OCC/Kraft | 0.0% | 0.0% | 41 |
| High-grade Paper | 0.9% | 0.2% | 982 |
| Mixed Low-grade Paper | 5.5% | 0.3% | 6,230 |
| Compostable/Soiled | 7.0% | 0.4% | 7,952 |
| Pot. Comp. Sgl-use Food Service | 0.0% | 0.0% | 34 |
| Sgl-use Food Service | 0.4% | 0.1% | 493 |
| Mixed/Other Paper | 1.4% | 0.2% | 1,624 |
| **Plastic** | **10.1%** | | **11,513** |
| #1 PET Bottles | 0.5% | 0.0% | 625 |
| #2 HDPE Natural Bottles | 0.2% | 0.0% | 248 |
| #2 HDPE Colored Bottles | 0.3% | 0.0% | 367 |
| Other Bottles | 0.1% | 0.0% | 60 |
| Tubs | 0.5% | 0.0% | 539 |
| Expanded Poly. Non-food | 0.2% | 0.0% | 203 |
| Expanded Poly. Food-grade | 0.4% | 0.1% | 495 |
| Rigid Poly. Foam Insulation | 0.0% | 0.0% | 0 |
| Pot. Comp. Sgl-use Food Service | 0.0% | 0.0% | 11 |
| Other Single-use Food Service | 0.6% | 0.0% | 703 |
| Other Rigid Packaging | 0.6% | 0.0% | 714 |
| Shopping/Dry Cleaning Bags | 0.4% | 0.0% | 452 |
| Clean Polyethylene Film | 0.1% | 0.1% | 163 |
| Other Film | 3.9% | 0.2% | 4,428 |
| Plastic Pipe | 0.0% | 0.0% | 23 |
| Foam Carpet Padding | 0.1% | 0.1% | 161 |
| Durable Plastic Products | 1.3% | 0.2% | 1,524 |
| Plastic/Other Materials | 0.7% | 0.1% | 795 |
| **Glass** | **2.2%** | | **2,490** |
| Clear Bottles | 0.6% | 0.1% | 632 |
| Green Bottles | 0.5% | 0.1% | 623 |
| Brown Bottles | 0.4% | 0.1% | 445 |
| Container Glass | 0.4% | 0.1% | 402 |
| Fluorescent Tubes | 0.0% | 0.0% | 1 |
| CFLs | 0.0% | 0.0% | 5 |
| Flat Glass | 0.0% | 0.0% | 44 |
| Other Glass | 0.3% | 0.0% | 337 |
| **Metal** | **4.1%** | | **4,623** |
| Aluminum Beverage Cans | 0.3% | 0.1% | 317 |
| Aluminum Foil/Containers | 0.3% | 0.0% | 365 |
| Other Aluminum | 0.0% | 0.0% | 23 |
| Other Nonferrous | 0.0% | 0.0% | 24 |
| Tin Food Cans | 0.5% | 0.0% | 611 |
| Empty Aerosol Cans | 0.2% | 0.0% | 206 |
| Other Ferrous | 1.4% | 0.3% | 1,642 |
| Oil filters | 0.0% | 0.0% | 20 |
| Mixed Metals/Material | 1.2% | 0.2% | 1,415 |
| **Organics** | **55.5%** | | **63,312** |
| Leaves and Grass | 1.7% | 0.5% | 1,917 |
| Prunings | 0.7% | 0.4% | 757 |
| Food | 29.0% | 1.2% | 33,123 |
| Fats, Oils, Grease | 0.7% | 0.2% | 803 |
| Textiles/Clothing | 3.4% | 0.4% | 3,903 |
| Mixed Textiles | 1.3% | 0.2% | 1,466 |
| Carpet | 0.8% | 0.2% | 858 |
| Disposable Diapers | 7.4% | 0.6% | 8,456 |
| Animal By-products | 10.2% | 0.7% | 11,597 |
| Rubber Products | 0.3% | 0.1% | 366 |
| Tires | 0.1% | 0.1% | 66 |

| | Est. Percent | + / - | Est. Tons |
|---|---|---|---|
| **Appliances and Electronics** | **1.2%** | | **1,394** |
| Furniture | 0.4% | 0.3% | 423 |
| Mattresses | 0.1% | 0.1% | 93 |
| Small Appliances | 0.3% | 0.3% | 369 |
| Cell Phones | 0.0% | 0.0% | 1 |
| Audio/Visual Equipment | 0.1% | 0.1% | 157 |
| CRT Monitors | 0.0% | 0.0% | 3 |
| CRT Televisions | 0.0% | 0.0% | 16 |
| Other Electronics | 0.3% | 0.1% | 332 |
| **CDL Wastes** | **5.5%** | | **6,319** |
| Clean Dimension Lumber | 0.4% | 0.1% | 507 |
| Clean Engineered Wood | 0.4% | 0.3% | 476 |
| Pallets | 0.2% | 0.2% | 222 |
| Crates | 0.0% | 0.0% | 28 |
| Other Untreated Wood | 0.2% | 0.1% | 234 |
| New Painted Wood | 0.7% | 0.2% | 853 |
| Old Painted Wood | 0.0% | 0.0% | 33 |
| Creosote-treated Wood | 0.0% | 0.0% | 3 |
| Other Treated Wood | 0.4% | 0.2% | 477 |
| Contaminated Wood | 0.5% | 0.2% | 536 |
| New Gypsum Scrap | 0.0% | 0.0% | 48 |
| Demo Gypsum Scrap | 0.5% | 0.3% | 553 |
| Fiberglass Insulation | 0.0% | 0.0% | 33 |
| Rock/Concrete/Bricks | 0.5% | 0.3% | 571 |
| Asphalt Shingles | 0.0% | 0.0% | 25 |
| Other Asphaltic Roofing | 0.1% | 0.1% | 87 |
| Ceramics | 0.4% | 0.1% | 502 |
| Cement Fiber Board | 0.1% | 0.1% | 66 |
| Other Construction | 0.9% | 0.3% | 1,063 |
| **Hazardous** | **1.1%** | | **1,255** |
| Liquid Latex Paint | 0.4% | 0.3% | 502 |
| Dried Latex Paint | 0.2% | 0.2% | 187 |
| Solvent-based Adhesives | 0.0% | 0.0% | 4 |
| Water-based Adhesives | 0.0% | 0.0% | 0 |
| Oil-based Paint/Thinners | 0.1% | 0.1% | 59 |
| Caustic Cleaners | 0.1% | 0.1% | 90 |
| Pesticides/Herbicides | 0.0% | 0.0% | 14 |
| Dry-cell Batteries | 0.0% | 0.0% | 50 |
| Wet-cell Batteries | 0.0% | 0.0% | 2 |
| Gasoline/Kerosene | 0.0% | 0.0% | 2 |
| Motor Oil/Diesel Oil | 0.0% | 0.0% | 4 |
| Asbestos | 0.0% | 0.0% | 0 |
| Explosives | 0.0% | 0.0% | 6 |
| Medical Wastes | 0.3% | 0.1% | 313 |
| Other Chemicals | 0.0% | 0.0% | 19 |
| Other Potentially Toxic | 0.0% | 0.0% | 4 |
| **Fines and Misc Materials** | **2.3%** | | **2,620** |
| Sand/Soil/Dirt | 0.4% | 0.2% | 511 |
| Non-distinct Fines | 0.1% | 0.1% | 115 |
| Misc. Organics | 1.3% | 0.4% | 1,492 |
| Misc. Inorganics | 0.4% | 0.1% | 502 |
| **Totals** | **100.0%** | | **114,135** |
| Sample Count | 361 | | |

*Confidence intervals calculated at the 90% confidence level. Percentages for material types may not total 100% due to rounding.*

## 2.2 Residential Waste by Subpopulation

In addition to the overall residential substream, waste composition estimates were calculated for the following subpopulations:

- **Residence type**: single-family and multifamily
- **Collection zone**: Zones 1, 2, 3, and 4
- **Residence type and collection zone**: single-family Zone 1, single-family Zone 2, single-family Zone 3, single family Zone 4, multifamily Zone 1, and multifamily Zone 2, multifamily Zone 3, multifamily Zone 4
- **Season**: spring, summer, autumn, and winter
- **Household income**: low and high
- **Household size**: small and large

As with the overall estimates, a weighted average procedure was employed to calculate composition estimates by residence type and service area (see Appendix D for more detail on weighted averages). Several additional steps were needed to calculate composition by household income and household size (see the Demographic Calculations section in Appendix D for more detail).

1. Sampled routes were mapped in GIS software.
2. Census blocks were associated with routes.
3. Using 2010 Census and 2005-2009 American Community Survey data, all routes were assigned to household income and size groupings.
4. Composition results were calculated for the top and bottom quartiles.

The largest components for each subpopulation are shown in Table 2-3 (each accounting for more than 5%).

**Table 2-3: Largest Waste Components, by Subpopulation[12]**
**(January – December 2010)**

| Subpopulation | Paper | | Organics | | | Plastic |
|---|---|---|---|---|---|---|
| | Compostable/ Soiled | Mixed Low-grade | Food | Animal By-products | Disposable Diapers | Other Film |
| **Residence Type** | | | | | | |
| Single-family | 7.3% | | 28.8% | 12.8% | 9.9% | |
| Multifamily | 6.6% | 6.2% | 29.3% | 6.8% | | |
| **Collection Zone** | | | | | | |
| Zone 1 | 7.6% | | 27.6% | 11.9% | 9.6% | |
| Zone 2 | 7.4% | 5.5% | 26.8% | 10.4% | 7.7% | |
| Zone 3 | 6.0% | 5.9% | 29.0% | 10.5% | 5.0% | |
| Zone 4 | 7.2% | 5.3% | 31.4% | 8.5% | 8.3% | |
| **Residence Type and Zone** | | | | | | |
| Single-family Zone 1 | 7.5% | | 27.1% | 14.7% | 10.9% | |
| Single-family Zone 2 | 7.2% | | 27.9% | 14.2% | 10.6% | |
| Single-family Zone 3 | 6.2% | | 27.7% | 13.5% | 7.9% | |
| Single-family Zone 4 | 7.7% | 5.1% | 31.1% | 10.3% | 10.0% | |
| Multifamily Zone 1 | 7.8% | 5.4% | 28.7% | 6.1% | 7.0% | |
| Multifamily Zone 2 | 7.6% | 6.6% | 25.4% | 5.3% | | |
| Multifamily Zone 3 | 6.0% | 6.6% | 29.7% | 8.7% | | |
| Multifamily Zone 4 | 6.2% | 5.8% | 32.3% | | | |
| **Season** | | | | | | |
| Spring | 8.4% | 5.8% | 27.0% | 11.7% | 7.0% | |
| Summer | 6.6% | | 28.5% | 9.2% | 7.1% | |
| Fall | 5.6% | 5.4% | 34.6% | 9.5% | 7.3% | |
| Winter | 7.2% | 5.8% | 25.9% | 10.2% | 8.2% | |
| **Demographics** | | | | | | |
| Low Income | 7.6% | 5.0% | 30.3% | 12.4% | 10.5% | |
| High Income | 8.0% | 5.7% | 25.1% | 12.5% | 9.5% | 5.1% |
| Small Households | 6.5% | | 28.3% | 14.1% | 9.2% | |
| Large Households | 8.1% | 5.7% | 29.6% | 10.5% | 10.4% | 5.1% |
| **Overall Residential** | **7.0%** | **5.5%** | **29.0%** | **10.2%** | **7.4%** | **3.9%** |

The following conclusions can be drawn from the waste composition estimates of the overall residential substream and for each subpopulation.

- *Food* typically accounted for about a third of each subpopulation's waste, by weight.
- *Compostable/soiled paper* and *food* were among the largest components for all subpopulations.

[12] A map showing Seattle's residential waste collection zones can be found in Figure 1-1 on page 2.

- Subpopulations share many of the same largest material components, particularly *food* as the most commonly disposed material in all subpopulations; however, the main differences appear to include:[13]
    - Single-family residents discarded a greater percentage of *disposable diapers* and *animal by-products* than did multifamily residents. Conversely, multifamily residents disposed of a greater portion of *mixed low-grade paper*.
    - After *food*, *animal by-products* and *compostable/soiled paper* were the next largest components for Zone 3 and *animal by-products* and *disposable diapers* were the next largest components for Zones 1, 2, and 4.
    - The percentage of *food* disposed was highest in fall (34.6%) and lowest in winter (25.9%).
    - Low-income households discarded relatively more *food* than high-income households. Other large components contributed similar portions to both low and high-income households.
    - Large households disposed of a lower percentage of *animal by-products* and a higher percentage of *compostable/soiled paper*, *food*, and *disposable diapers* than small households.

[13] No statistical tests were performed to identify differences among subpopulations. Therefore, the comparisons may not be statistically significant.

# 3 Trends in Residential Disposal: 1988/89 – 2010

The overall residential results for the 2010 study were compared to previous studies of the residential waste stream to identify trends over time.[14] Seattle's curbside recycling program began in 1988, and the yard waste program followed in 1989. In 2000, the commingled recycling program began.[15] Seattle enacted mandatory recycling in January 2005, and enforcement began in January 2006. Soon after, in mid-2006, the yard waste program expanded to accept vegetative food waste and compostable paper. In April 2009, organics collection frequency increased to weekly city wide and the program was expanded to allow all food waste and compostable paper. In addition, universal organics service was implemented, requiring residents to subscribe to organics collection unless they received an exemption for back yard composting. All four of the previous residential studies followed the same basic methodology as the present 2010 study.[16]

Results were compared year-to-year by examining the changes in the total amount of waste disposed and in composition percentages for each of the eight broad material categories.[17] Statistical t-tests were used to analyze differences in the composition percentages. Section 3.1 provides an overview of the changes in disposed tons over the last 22 years. Section 3.2 compares 2010 composition percentages with earlier studies. See Appendix E for details about year-to-year comparison calculations.

## 3.1 Trends in Tons Disposed Over the Past 22 Years

Figure 3-1 illustrates the changes in disposed tons since the 1988/89 study for each of the eight broad material categories: **paper**, **plastic**, **glass**, **metals**, **organics**, **other materials**, **CDL wastes**, and **hazardous**. The total amount of waste disposed decreased dramatically from 179,968 tons in 1988/89 to 145,591 tons in 1994/95. Residential waste tonnage remained relatively consistent until 2002, then decreased from 142,910 tons to 133,774 tons in 2006. Between 2006 and 2010, the total amount of waste disposed dropped substantially, from 142,910 tons to 114,134 tons. This decrease is likely due to the economic recession and the new organics program described above. Overall, the broad material categories of **paper**, **organics**, and **other materials** (which includes *animal by-products*, *disposable diapers*, *furniture*, and *carpet*) showed the greatest changes.

[14] The composition and tonnage figures presented in this section were calculated using an unweighted analytical process. Thus, they may not be equal to the composition percentages (and associated tonnages) presented in Section 4 as these are derived using a weighted process. Appendix D provides more detail on weighted averages, while Appendix E outlines year-to-year comparison calculations.

[15] The commingled recycling program started in 2000 allowed residents to combine plastic and paper recyclable materials. Glass was still collected in a separate bin. Materials added to the recycling program in 2000 included polycoated paper, aseptic packaging, plastic jars, tubs, and bottles, and clean plastic film bags.

[16] See Appendix B for more detail regarding the methodology.

[17] The material components for each season have been adjusted to match a uniform material list for two reasons: (1) the materials list has changed from 52 material components in 1988/89 to 102 materials in 2010 and (2) several components have been moved to different broad material categories to better reflect new policies in recycling and composting. Therefore, the percentages of broad material categories in Section 3 will not necessarily match the percentages of broad material categories presented in Section 4. This is explained in greater depth in Appendix E.

**Figure 3-1: Trends in Disposed Tons – 1988/89 to 2010**

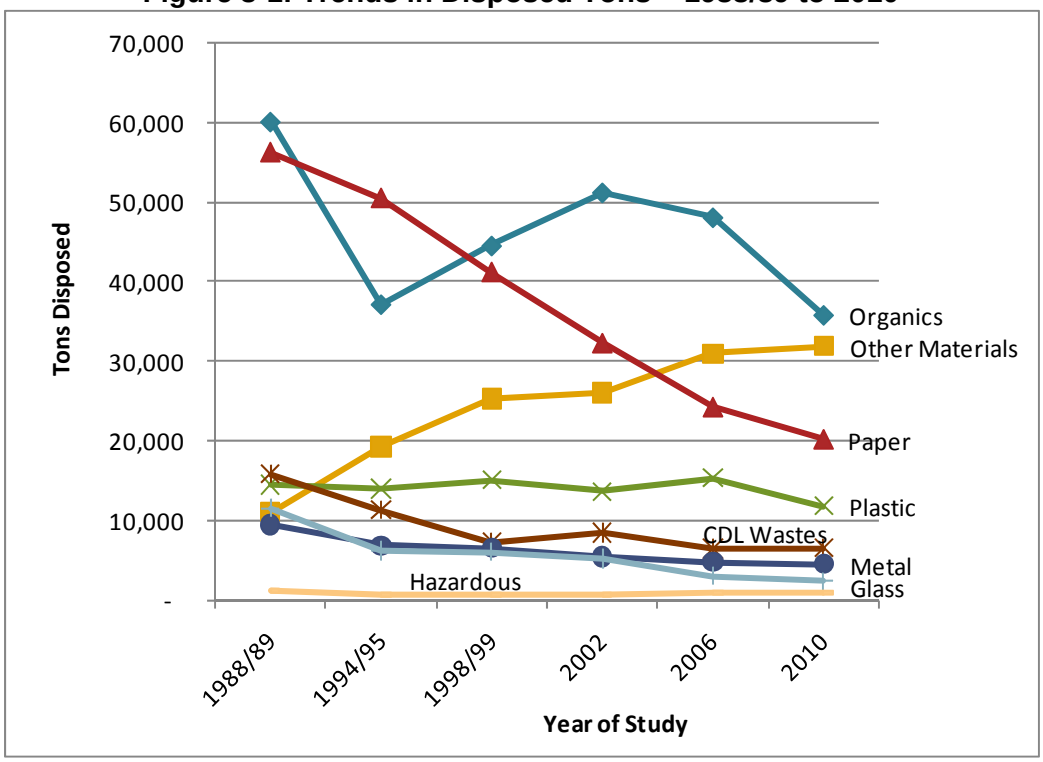



Figure 3-1 graphically shows the following changes in tonnage for each material category over the study years since 1988/89:

- **Paper**. The tonnage of **paper** decreased consistently between study periods since 1988/89. The tonnage dropped by more than 60% from 56,220 tons in 1988/99 to 20,197 tons in 2010. This decrease is due to noticeable decreases in *newsprint, unwaxed OCC/Kraft, mixed low-grade paper*, and *mixed/other* paper between each study period.
- **Plastic**. The tonnage of **plastic** decreased between 2006 and 2010 by almost 3,500 tons. Contributing to this decrease, *other plastic film* dropped from 6,842 to 4,428 tons, and *tubs* decreased from 1,489 to 539 tons. In the previous study period between 2002 and 2006, the material component *other plastic film* had been largely responsible for an overall increase as its tonnage alone more than doubled from 3,111 tons to 6,842 tons.
- **Glass**. Since 1988/89, **glass** tonnage has decreased by 80% from 11,537 tons in 1988/89 to 2,368 tons in 2010.
- **Metal**. The tonnage of **metal** in the waste stream has declined steadily from 9,491 tons in 1988/89 to 4,522 tons in 2010.
- **Organics**. Between 2002 and 2006, **organics** decreased by approximately 3,000 tons with two-thirds of the decrease being directly linked to *food*. Between 2006 and 2010, **organics** decreased again, by 15,545 tons. This decrease is mainly attributed to a decrease in *food* from 44,735 to 33,123 tons. Between 2006 and 2010, *leaves and grass* also decreased, from 2,683 to 1,917 tons.
- **Other Materials**. The tonnage of **other materials** in the waste stream has increased since 1988/89. Early changes are difficult to analyze in detail because many

materials (including *animal-by-products*, *furniture*, *mattresses*, *small appliances*, and *A/V equipment*) were not sorted individually before the 1994/95 study. The increase in **other materials** between 1994/95 and 2006 can be largely attributed to the 7,000 ton increase of *animal-by-products* during this time. Between 2006 and 2010, **other materials** increased again, slightly, by 875 tons.

- **CDL Wastes**. The tonnage of **CDL wastes** decreased by about half between 1988/89 and 1998/99 from 15,830 tons to 7,280 tons, followed by an increase of **CDL waste** in 2002 to 8,469 tons. Between 2006 and 2010, the amount of **CDL waste** remained relatively consistent.
- **Hazardous**. The tonnage of **hazardous** materials has remained fairly steady since 1988/89, decreasing slightly from 1,192 tons in 1988/89 to 979 tons in 2010.

## 3.2 Changes in Composition Percentages

This section presents a comparison of composition percentages between the current study and the 1988/89 study, first, and then a comparison of the current study to the most recent study, 2006.

### 3.2.1 Changes in Composition Percentages: 1988/89 vs. 2010

The bolded broad material categories in Table 3-1 showed statistically significant changes between 1988/89 and 2010. **Paper**, **glass**, **metal**, and **CDL wastes** decreased significantly, while **plastic** and **other materials** increased significantly. The portion of **other materials** disposed in the waste stream showed the greatest change, increasing from 6.1% in 1988/89 to 27.9% in 2010, but some of this increase is be due to changes in material categorization.[18]

**Table 3-1: Changes in Composition Percentages – 1988/99 and 2010 Study Periods**

| | Percent | | Change in | Disposed Tons | |
|---|---|---|---|---|---|
| | 1988/89 | 2010 | Composition % | 1988/89 | 2010 |
| **Paper** | **31.2%** | **17.7%** | **-13.5%** ↓ | **56,220** | **20,197** |
| **Plastic** | **8.1%** | **10.4%** | **2.3%** ↑ | **14,508** | **11,835** |
| **Glass** | **6.4%** | **2.1%** | **-4.3%** ↓ | **11,537** | **2,368** |
| **Metal** | **5.3%** | **4.0%** | **-1.3%** ↓ | **9,491** | **4,522** |
| Organics | 33.4% | 31.4% | -2.0% ↓ | 60,145 | 35,863 |
| **Other Materials** | **6.1%** | **27.9%** | **21.8%** ↑ | **11,046** | **31,866** |
| **CDL Wastes** | **8.8%** | **5.7%** | **-3.1%** ↓ | **15,830** | **6,505** |
| Hazardous | 0.7% | 0.9% | 0.2% ↑ | 1,192 | 979 |
| **Total** | **100%** | **100%** | | **179,968** | **114,135** |

*Note: Bold type indicates statistically significant changes.*

[18] Part of this increase is due to adding several material types to the **other materials** category, such as *furniture*, *small appliances*, and *AV equipment*; in the 1988/89 study these were classified according to their dominant material type (such as **metal** or **plastic**). See Appendix A for a table outlining changes in material categories across study periods. The change in sorting categories may have also affected the estimated proportions of plastic, metal, and glass causing them to be slightly higher in the 1988/89 study. The exact amount of this difference cannot be calculated.

### 3.2.2 Changes in Composition Percentages: 2006 vs. 2010

In Table 3-2, bolded broad material categories differed by a statistically significant amount between the 2006 and 2010 study periods. **Organics** decreased significantly from 36.0% to 31.4% and **plastics** decreased significantly from 11.5% to 10.4%. The composition of **other materials** increased significantly from about 23.2% in 2006 to 27.9% in 2010.

**Table 3-2: Changes in Composition Percentages – 2006 and 2010 Study Periods**

| | Percent | | Change in Composition % | Disposed Tons | |
|---|---|---|---|---|---|
| | 2006 | 2010 | | 2006 | 2010 |
| Paper | 18.1% | 17.7% | -0.4% ↓ | 25,892 | 20,197 |
| **Plastic** | **11.5%** | **10.4%** | **-1.1%** ↓ | **16,372** | **11,835** |
| Glass | 2.3% | 2.1% | -0.2% ↓ | 3,236 | 2,368 |
| Metal | 3.5% | 4.0% | 0.4% ↑ | 5,069 | 4,522 |
| **Organics** | **36.0%** | **31.4%** | **-4.5%** ↓ | **51,408** | **35,863** |
| **Other Materials** | **23.2%** | **27.9%** | **4.8%** ↑ | **33,108** | **31,866** |
| CDL Wastes | 4.8% | 5.7% | 0.9% ↑ | 6,893 | 6,505 |
| Hazardous | 0.7% | 0.9% | 0.2% ↑ | 933 | 979 |
| **Total** | **100%** | **100%** | | **142,910** | **114,135** |

*Note: Bold type indicates statistically significant changes.*

# 4 Composition Results: By Subpopulation

## 4.1 Overview

A total of 361 loads from the residential waste stream were sampled from January to December 2010. Table 4-1 summarizes the sample information for each residential subpopulation as well as the associated tons disposed. The average sample weight for the 361 residential samples was approximately 241 pounds. Seattle Public Utilities and the City's authorized waste haulers provided the total 2010 disposal tonnages presented in this section of the report.

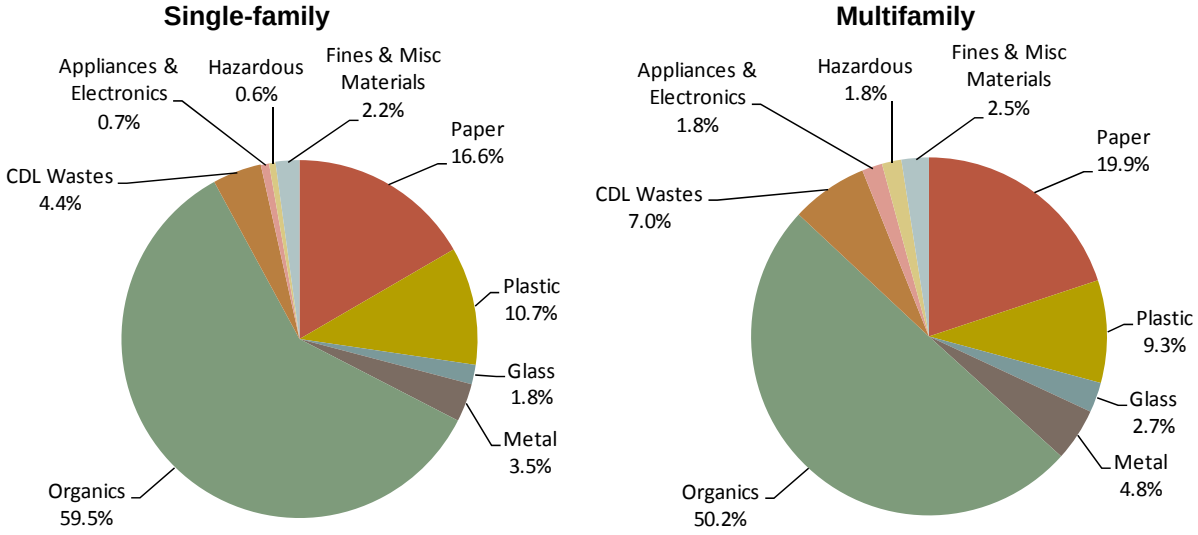
**Table 4-1: Sampling Information, by Subpopulation**
**(January – December 2010)**

| Subpopulation | Total Sample (lbs) | Sample Count | Total Disposal (Tons) | Number of Households |
|---|---|---|---|---|
| ***Residence Type*** | | | | |
| Single-family | 57,999.9 | 240 | 64,315 | 162,521 |
| Multi-family | 29,042.8 | 121 | 49,820 | 126,829 |
| ***Collection Zone*** | | | | |
| Zone 1 | 21,445.4 | 90 | 23,257 | 67,738 |
| Zone 2 | 21,695.6 | 90 | 21,032 | 49,614 |
| Zone 3 | 21,813.7 | 90 | 36,354 | 100,440 |
| Zone 4 | 22,088.1 | 91 | 33,492 | 71,558 |
| ***Residence Type and Zone*** | | | | |
| Single-family Zone 1 | 14,392.5 | 60 | 15,591 | 45,450 |
| Single-family Zone 2 | 14,311.6 | 60 | 11,961 | 30,687 |
| Single-family Zone 3 | 14,677.0 | 60 | 13,431 | 34,052 |
| Single-family Zone 4 | 14,618.8 | 60 | 23,332 | 52,332 |
| Multifamily Zone 1 | 7,052.8 | 30 | 7,666 | 22,288 |
| Multifamily Zone 2 | 7,384.0 | 30 | 9,071 | 18,927 |
| Multifamily Zone 3 | 7,136.7 | 30 | 22,923 | 66,388 |
| Multifamily Zone 4 | 7,469.3 | 31 | 10,160 | 19,226 |
| ***Overall Residential*** | **87,042.7** | **361** | **114,135** | **289,350** |

## 4.2 By Residence Type

Waste composition results were examined for variations between single-family and multifamily residence types. As shown in Figure 4-1, **organics** and **paper** composed the bulk of waste from both single and multifamily residences. **Organics** made up a larger portion of single-family waste (59.5%) than multifamily waste (50.2%). In contrast, **paper** was slightly higher for multifamily than single-family residences: about 20% compared to less than 17%. **Plastic**, the third largest material category, made up around 10% of the waste for both single and multifamily residences.

**Figure 4-1: Composition Summary, by Residence Type**
**(January – December 2010)**



### 4.2.1 Single-family Residences

A total of 240 samples were sorted from single-family loads during the 2010 study period. Single-family residences disposed of approximately 64,315 tons of waste. As shown in Table 4-2, *food* was the largest component, accounting for almost 30% of the total tons disposed by single-family residences in 2010. When added together, all of the top ten components summed to about 75% of the total, by weight. The full single-family composition results are presented in Table 4-4.

**Table 4-2: Top Ten Components – Single-family**
**(January – December 2010)**

| Material | Est. Percent | Cum. Percent | Est. Tons |
|---|---|---|---|
| Food | 28.8% | 28.8% | 18,527 |
| Animal By-products | 12.8% | 41.6% | 8,209 |
| Disposable Diapers | 9.9% | 51.5% | 6,358 |
| Compostable/Soiled Paper | 7.3% | 58.7% | 4,667 |
| Mixed Low-grade Paper | 4.9% | 63.6% | 3,125 |
| Other Plastic Film | 4.4% | 68.0% | 2,842 |
| Textiles/Clothing | 3.2% | 71.2% | 2,082 |
| Mixed/Other Paper | 1.4% | 72.6% | 880 |
| Durable Plastic Products | 1.3% | 73.9% | 850 |
| Mixed Textiles | 1.2% | 75.1% | 786 |
| **Total** | **75.1%** | | **48,325** |

### 4.2.2 Multifamily Residences

From loads of multifamily waste, 121 samples were captured and sorted between January and December 2010. In 2010, Seattle's multifamily residents disposed of 49,820 tons of waste. Table 4-3 lists the top ten components disposed by multifamily residences. *Food* alone accounted for almost 30%, by weight. *Animal by-products* and *compostable/soiled paper* were also large components. The top ten components, listed in Table 4-3, summed to about 67% of the total waste disposed by multifamily residences. The full multifamily composition results are listed in Table 4-5.

**Table 4-3: Top Ten Components – Multifamily**
**(January – December 2010)**

| Material | Est. Percent | Cum. Percent | Est. Tons |
|---|---|---|---|
| Food | 29.3% | 29.3% | 14,597 |
| Animal By-products | 6.8% | 36.1% | 3,388 |
| Compostable/Soiled Paper | 6.6% | 42.7% | 3,285 |
| Mixed Low-grade Paper | 6.2% | 48.9% | 3,104 |
| Disposable Diapers | 4.2% | 53.1% | 2,098 |
| Textiles/Clothing | 3.7% | 56.8% | 1,821 |
| Other Plastic Film | 3.2% | 60.0% | 1,586 |
| Plain OCC/Kraft | 2.7% | 62.7% | 1,343 |
| Leaves and Grass | 2.4% | 65.1% | 1,191 |
| Other Ferrous Metal | 2.0% | 67.1% | 1,020 |
| **Total** | **67.1%** | | **33,434** |

### 4.2.3 Comparisons between Single-family and Multifamily Residences

As the largest component of both single-family and multifamily waste, *food* made up almost 30% of waste for each. *Compostable/soiled paper*, *animal by-products*, *disposable diapers*, *mixed low-grade paper*, *other plastic film*, and *textiles/clothing* were top ten components of waste from both residence types.

Single-family and multifamily waste streams were substantially similar with a few notable differences. *Disposable diapers* accounted for more than twice as much waste from single-family residences (9.9%) as that from multifamily residences (4.2%). In addition, *mixed/other paper*, *durable plastic products*, and *mixed textiles* were a top ten component only for single-family waste. *Plain OCC/Kraft, leaves and grass,* and *other ferrous metal* were a top ten component for multifamily waste only.

## Table 4-4: Composition by Weight – Single-family
### (January – December 2010)

| Material | Est. Percent | + / - | Est. Tons |
|---|---|---|---|
| **Paper** | **16.6%** | | **10,691** |
| Newspaper | 0.7% | 0.1% | 473 |
| Plain OCC/Kraft | 1.1% | 0.1% | 735 |
| Waxed OCC/Kraft | 0.0% | 0.0% | 15 |
| High Grade | 0.8% | 0.2% | 506 |
| Mixed Low Grade | 4.9% | 0.3% | 3,125 |
| Compostable/Soiled | 7.3% | 0.4% | 4,667 |
| Pot. Comp. Sgl-use Food Service | 0.0% | 0.0% | 27 |
| Sgl-use Food Service | 0.4% | 0.0% | 264 |
| Mixed/Other Paper | 1.4% | 0.2% | 880 |
| **Plastic** | **10.7%** | | **6,879** |
| #1 PET Bottles | 0.5% | 0.0% | 314 |
| #2 HDPE Natural Bottles | 0.2% | 0.0% | 112 |
| #2 HDPE Colored Bottles | 0.3% | 0.0% | 218 |
| Other Bottles | 0.1% | 0.0% | 33 |
| Tubs | 0.5% | 0.0% | 326 |
| Expanded Poly. Nonfood | 0.2% | 0.1% | 127 |
| Expanded Poly. Food grade | 0.5% | 0.0% | 319 |
| Rigid Poly. Foam Insulation | 0.0% | 0.0% | 0 |
| Pot. Comp. Sgl-use Food Service | 0.0% | 0.0% | 2 |
| Other Single-use Food Service | 0.6% | 0.0% | 396 |
| Other Rigid Packaging | 0.7% | 0.1% | 471 |
| Shopping/Dry Cleaning Bags | 0.4% | 0.0% | 262 |
| Clean PE Film | 0.1% | 0.0% | 74 |
| Other Film | 4.4% | 0.2% | 2,842 |
| Plastic Pipe | 0.0% | 0.0% | 5 |
| Foam Carpet Padding | 0.1% | 0.1% | 40 |
| Durable Plastic Products | 1.3% | 0.2% | 850 |
| Plastic/Other Materials | 0.8% | 0.1% | 487 |
| **Glass** | **1.8%** | | **1,131** |
| Clear Bottles | 0.4% | 0.1% | 284 |
| Green Bottles | 0.4% | 0.1% | 241 |
| Brown Bottles | 0.3% | 0.1% | 177 |
| Container Glass | 0.4% | 0.1% | 228 |
| Fluorescent Tubes | 0.0% | 0.0% | 1 |
| CFLs | 0.0% | 0.0% | 3 |
| Flat Glass | 0.0% | 0.0% | 24 |
| Other Glass | 0.3% | 0.0% | 172 |
| **Metal** | **3.5%** | | **2,244** |
| Alum. Beverage Cans | 0.2% | 0.1% | 127 |
| Alum. Foil/Containers | 0.4% | 0.0% | 241 |
| Other Aluminum | 0.0% | 0.0% | 13 |
| Other Nonferrous | 0.0% | 0.0% | 10 |
| Tin Food Cans | 0.6% | 0.1% | 356 |
| Empty Aerosol Cans | 0.2% | 0.0% | 126 |
| Other Ferrous | 1.0% | 0.2% | 622 |
| Oil filters | 0.0% | 0.0% | 16 |
| Mixed Metals/Material | 1.1% | 0.2% | 733 |
| **Organics** | **59.5%** | | **38,278** |
| Leaves and Grass | 1.1% | 0.4% | 727 |
| Prunings | 0.6% | 0.5% | 407 |
| Food | 28.8% | 1.3% | 18,527 |
| Fats, Oils, Grease | 0.9% | 0.3% | 579 |
| Textiles/Clothing | 3.2% | 0.3% | 2,082 |
| Mixed Textiles | 1.2% | 0.2% | 786 |
| Carpet | 0.6% | 0.2% | 354 |
| Disposable Diapers | 9.9% | 0.7% | 6,358 |
| Animal By-products | 12.8% | 0.9% | 8,209 |
| Rubber Products | 0.3% | 0.1% | 201 |
| Tires | 0.1% | 0.1% | 49 |

| Material | Est. Percent | + / - | Est. Tons |
|---|---|---|---|
| **Appliances and Electronics** | **0.7%** | | **475** |
| Furniture | 0.1% | 0.2% | 88 |
| Mattresses | 0.0% | 0.0% | 4 |
| Small Appliances | 0.2% | 0.1% | 117 |
| Cell Phones | 0.0% | 0.0% | 1 |
| Audio/Visual Equipment | 0.1% | 0.1% | 78 |
| CRT Monitors | 0.0% | 0.0% | 3 |
| CRT Televisions | 0.0% | 0.0% | 0 |
| Other Electronics | 0.3% | 0.1% | 184 |
| **CDL Wastes** | **4.4%** | | **2,854** |
| Clean Dimension Lumber | 0.3% | 0.1% | 206 |
| Clean Engineered Wood | 0.2% | 0.1% | 112 |
| Pallets | 0.0% | 0.0% | 2 |
| Crates | 0.0% | 0.0% | 0 |
| Other Untreated Wood | 0.2% | 0.1% | 152 |
| New Painted Wood | 0.7% | 0.2% | 437 |
| Old Painted Wood | 0.0% | 0.0% | 22 |
| Creosote-treated Wood | 0.0% | 0.0% | 2 |
| Other Treated Wood | 0.2% | 0.1% | 137 |
| Contaminated Wood | 0.3% | 0.1% | 184 |
| New Gypsum Scrap | 0.0% | 0.0% | 4 |
| Demo Gypsum Scrap | 0.4% | 0.3% | 281 |
| Fiberglass Insulation | 0.1% | 0.0% | 32 |
| Rock/Concrete/Bricks | 0.3% | 0.2% | 203 |
| Asphalt Shingles | 0.0% | 0.0% | 25 |
| Other Asphaltic Roofing | 0.1% | 0.1% | 87 |
| Ceramics | 0.5% | 0.1% | 293 |
| Cement Fiber Board | 0.1% | 0.2% | 66 |
| Other Construction | 1.0% | 0.4% | 611 |
| **Hazardous** | **0.6%** | | **378** |
| Liquid Latex Paint | 0.2% | 0.1% | 126 |
| Dried Latex Paint | 0.1% | 0.1% | 48 |
| Solvent-based Adhesives | 0.0% | 0.0% | 4 |
| Water-based Adhesives | 0.0% | 0.0% | 0 |
| Oil-based Paint/Thinners | 0.0% | 0.0% | 2 |
| Caustic Cleaners | 0.0% | 0.0% | 27 |
| Pesticides/Herbicides | 0.0% | 0.0% | 2 |
| Dry-cell Batteries | 0.1% | 0.0% | 39 |
| Wet-cell Batteries | 0.0% | 0.0% | 0 |
| Gasoline/Kerosene | 0.0% | 0.0% | 2 |
| Motor Oil/Diesel Oil | 0.0% | 0.0% | 2 |
| Asbestos | 0.0% | 0.0% | 0 |
| Explosives | 0.0% | 0.0% | 6 |
| Medical Wastes | 0.2% | 0.1% | 116 |
| Other Chemicals | 0.0% | 0.0% | 3 |
| Other Potentially Toxic | 0.0% | 0.0% | 1 |
| **Fines and Misc Materials** | **2.2%** | | **1,386** |
| Sand/Soil/Dirt | 0.3% | 0.2% | 208 |
| Non-distinct Fines | 0.1% | 0.1% | 38 |
| Misc. Organics | 1.3% | 0.2% | 816 |
| Misc. Inorganics | 0.5% | 0.1% | 324 |
| **Totals** | **100.0%** | | **64,315** |
| Sample Count | 240 | | |

*Confidence intervals calculated at the 90% confidence level. Percentages for material types may not total 100% due to rounding.*

## Table 4-5: Composition by Weight – Multifamily
### (January – December 2010)

| Material | Est. Percent | + / - | Est. Tons |
|---|---|---|---|
| **Paper** | **19.9%** | | **9,917** |
| Newspaper | 1.4% | 0.3% | 701 |
| Plain OCC/Kraft | 2.7% | 0.4% | 1,343 |
| Waxed OCC/Kraft | 0.1% | 0.0% | 26 |
| High Grade | 1.0% | 0.5% | 476 |
| Mixed Low Grade | 6.2% | 0.6% | 3,104 |
| Compostable/Soiled | 6.6% | 0.6% | 3,285 |
| Pot. Comp. Sgl-use Food Service | 0.0% | 0.0% | 8 |
| Sgl-use Food Service | 0.5% | 0.1% | 229 |
| Mixed/Other Paper | 1.5% | 0.3% | 744 |
| **Plastic** | **9.3%** | | **4,634** |
| #1 PET Bottles | 0.6% | 0.1% | 312 |
| #2 HDPE Natural Bottles | 0.3% | 0.1% | 136 |
| #2 HDPE Colored Bottles | 0.3% | 0.0% | 149 |
| Other Bottles | 0.1% | 0.0% | 26 |
| Tubs | 0.4% | 0.1% | 214 |
| Expanded Poly. Nonfood | 0.2% | 0.1% | 76 |
| Expanded Poly. Food grade | 0.4% | 0.1% | 176 |
| Rigid Poly. Foam Insulation | 0.0% | 0.0% | 0 |
| Pot. Comp. Sgl-use Food Service | 0.0% | 0.0% | 10 |
| Other Single-use Food Service | 0.6% | 0.1% | 307 |
| Other Rigid Packaging | 0.5% | 0.1% | 242 |
| Shopping/Dry Cleaning Bags | 0.4% | 0.1% | 190 |
| Clean PE Film | 0.2% | 0.2% | 89 |
| Other Film | 3.2% | 0.3% | 1,586 |
| Plastic Pipe | 0.0% | 0.0% | 18 |
| Foam Carpet Padding | 0.2% | 0.2% | 121 |
| Durable Plastic Products | 1.4% | 0.3% | 674 |
| Plastic/Other Materials | 0.6% | 0.2% | 308 |
| **Glass** | **2.7%** | | **1,359** |
| Clear Bottles | 0.7% | 0.1% | 348 |
| Green Bottles | 0.8% | 0.2% | 382 |
| Brown Bottles | 0.5% | 0.1% | 268 |
| Container Glass | 0.3% | 0.1% | 174 |
| Fluorescent Tubes | 0.0% | 0.0% | 0 |
| CFLs | 0.0% | 0.0% | 2 |
| Flat Glass | 0.0% | 0.0% | 19 |
| Other Glass | 0.3% | 0.1% | 166 |
| **Metal** | **4.8%** | | **2,380** |
| Alum. Beverage Cans | 0.4% | 0.1% | 190 |
| Alum. Foil/Containers | 0.2% | 0.1% | 124 |
| Other Aluminum | 0.0% | 0.0% | 10 |
| Other Nonferrous | 0.0% | 0.0% | 14 |
| Tin Food Cans | 0.5% | 0.1% | 254 |
| Empty Aerosol Cans | 0.2% | 0.0% | 81 |
| Other Ferrous | 2.0% | 0.6% | 1,020 |
| Oil filters | 0.0% | 0.0% | 4 |
| Mixed Metals/Material | 1.4% | 0.4% | 682 |
| **Organics** | **50.2%** | | **25,034** |
| Leaves and Grass | 2.4% | 1.0% | 1,191 |
| Prunings | 0.7% | 0.5% | 349 |
| Food | 29.3% | 2.1% | 14,597 |
| Fats, Oils, Grease | 0.4% | 0.3% | 224 |
| Textiles/Clothing | 3.7% | 0.8% | 1,821 |
| Mixed Textiles | 1.4% | 0.4% | 680 |
| Carpet | 1.0% | 0.5% | 503 |
| Disposable Diapers | 4.2% | 0.9% | 2,098 |
| Animal By-products | 6.8% | 1.3% | 3,388 |
| Rubber Products | 0.3% | 0.2% | 165 |
| Tires | 0.0% | 0.1% | 18 |

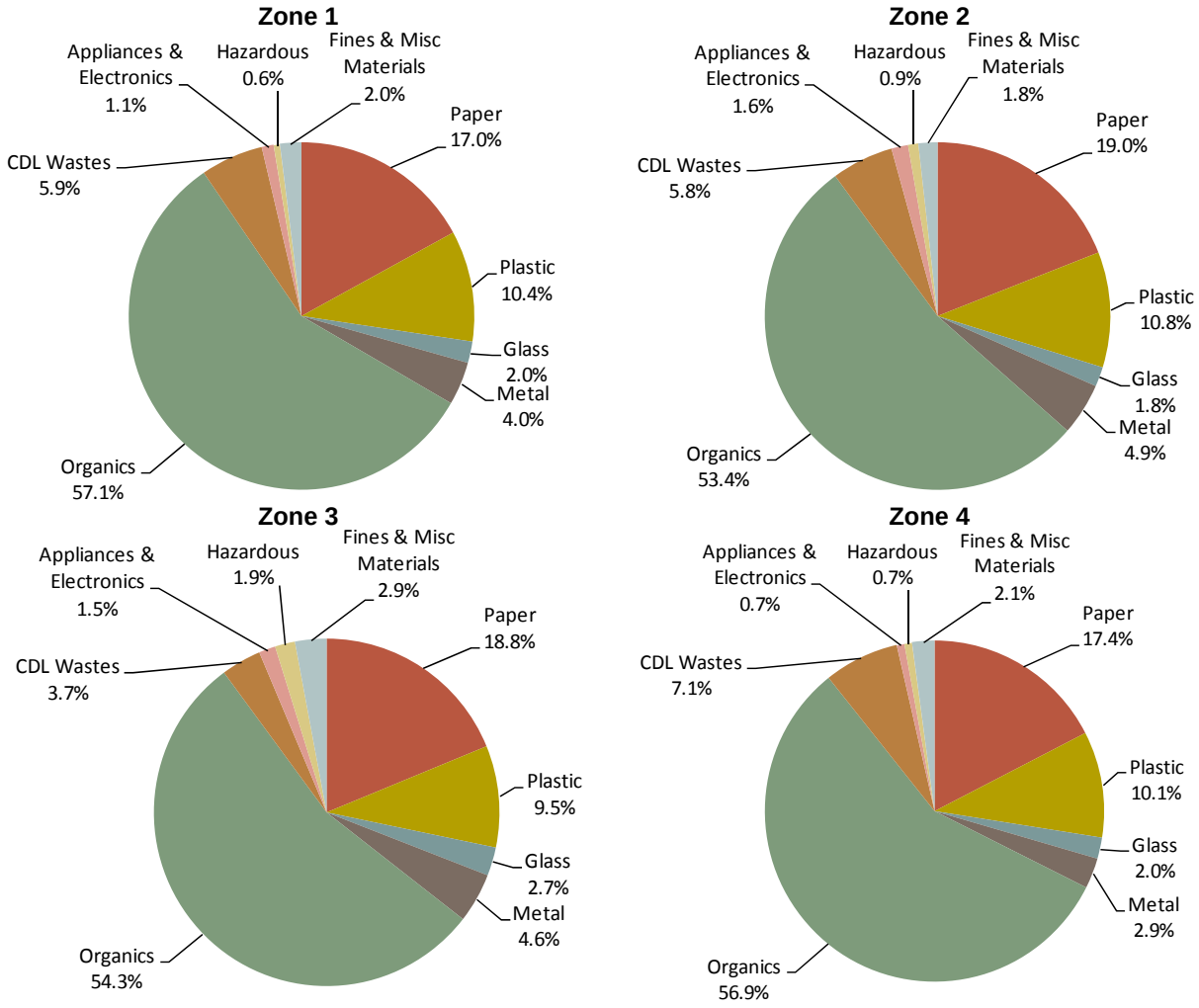
| Material | Est. Percent | + / - | Est. Tons |
|---|---|---|---|
| **Appliances and Electronics** | **1.8%** | | **919** |
| Furniture | 0.7% | 0.7% | 335 |
| Mattresses | 0.2% | 0.2% | 89 |
| Small Appliances | 0.5% | 0.6% | 252 |
| Cell Phones | 0.0% | 0.0% | 0 |
| Audio/Visual Equipment | 0.2% | 0.1% | 79 |
| CRT Monitors | 0.0% | 0.0% | 0 |
| CRT Televisions | 0.0% | 0.1% | 16 |
| Other Electronics | 0.3% | 0.1% | 148 |
| **CDL Wastes** | **7.0%** | | **3,465** |
| Clean Dimension Lumber | 0.6% | 0.3% | 302 |
| Clean Engineered Wood | 0.7% | 0.6% | 365 |
| Pallets | 0.4% | 0.5% | 220 |
| Crates | 0.1% | 0.1% | 28 |
| Other Untreated Wood | 0.2% | 0.1% | 82 |
| New Painted Wood | 0.8% | 0.4% | 415 |
| Old Painted Wood | 0.0% | 0.0% | 11 |
| Creosote-treated Wood | 0.0% | 0.0% | 1 |
| Other Treated Wood | 0.7% | 0.4% | 340 |
| Contaminated Wood | 0.7% | 0.5% | 352 |
| New Gypsum Scrap | 0.1% | 0.1% | 44 |
| Demo Gypsum Scrap | 0.5% | 0.7% | 272 |
| Fiberglass Insulation | 0.0% | 0.0% | 1 |
| Rock/Concrete/Bricks | 0.7% | 0.6% | 369 |
| Asphalt Shingles | 0.0% | 0.0% | 0 |
| Other Asphaltic Roofing | 0.0% | 0.0% | 0 |
| Ceramics | 0.4% | 0.3% | 209 |
| Cement Fiber Board | 0.0% | 0.0% | 0 |
| Other Construction | 0.9% | 0.4% | 452 |
| **Hazardous** | **1.8%** | | **877** |
| Liquid Latex Paint | 0.8% | 0.7% | 376 |
| Dried Latex Paint | 0.3% | 0.4% | 139 |
| Solvent-based Adhesives | 0.0% | 0.0% | 0 |
| Water-based Adhesives | 0.0% | 0.0% | 0 |
| Oil-based Paint/Thinners | 0.1% | 0.2% | 57 |
| Caustic Cleaners | 0.1% | 0.2% | 63 |
| Pesticides/Herbicides | 0.0% | 0.0% | 11 |
| Dry-cell Batteries | 0.0% | 0.0% | 11 |
| Wet-cell Batteries | 0.0% | 0.0% | 2 |
| Gasoline/Kerosene | 0.0% | 0.0% | 0 |
| Motor Oil/Diesel Oil | 0.0% | 0.0% | 2 |
| Asbestos | 0.0% | 0.0% | 0 |
| Explosives | 0.0% | 0.0% | 0 |
| Medical Wastes | 0.4% | 0.2% | 197 |
| Other Chemicals | 0.0% | 0.0% | 16 |
| Other Potentially Toxic | 0.0% | 0.0% | 3 |
| **Fines and Misc Materials** | **2.5%** | | **1,235** |
| Sand/Soil/Dirt | 0.6% | 0.4% | 303 |
| Non-distinct Fines | 0.2% | 0.1% | 77 |
| Misc. Organics | 1.4% | 0.8% | 677 |
| Misc. Inorganics | 0.4% | 0.2% | 179 |
| **Totals** | **100.0%** | | **49,820** |
| Sample Count | 121 | | |

*Confidence intervals calculated at the 90% confidence level. Percentages for material types may not total 100% due to rounding.*

## 4.3 By Collection Zone

Waste composition results were examined for differences across collection zones. For all four collection zones, the broad material categories **organics** and **paper** accounted for the highest percentages of waste. Combined, these two categories accounted for nearly three-quarters of the waste from each collection zone. **Plastic** made up around 10% in each zone. Other than **CDL wastes**, which was slightly greater in Zones 1, 2, and 4 than in Zone 3, very few differences existed in other broad material categories.[19]

**Figure 4-2: Composition Summary, by Zone**
**(January – December 2010)**




[19] In April 2000, Seattle implemented a new city-wide commingled recycling program. Prior to 2000, larger differences existed between areas of the city because recycling collection containers, separation requirements, and pick-up frequencies varied by area in previous years. As a result, tracking disposal composition by collection area was important when evaluating the curbside program and obtaining accurate overall composition results.

### 4.3.1 Collection Zone 1

From Zone 1, 90 samples were sorted between January and December 2010. Seattle's Zone 1 residents disposed of an estimated 23,257 tons of waste in 2010. Table 4-6 lists the top ten components from Zone 1. *Food* accounted for about 28% of this waste. *Animal by-products*, *disposable diapers,* and *compostable/soiled paper* were also large components, each greater than 7% of the total. The top ten components listed in Table 4-6 summed to approximately 73% of the total waste disposed in Zone 1. The full composition results for Zone 1 are listed in Table 4-10.

**Table 4-6: Top Ten Components – Zone 1**
**(January – December 2010)**

| Material | Est. Percent | Cum. Percent | Est. Tons |
|---|---|---|---|
| Food | 27.6% | 27.6% | 6,425 |
| Animal By-products | 11.9% | 39.5% | 2,765 |
| Disposable Diapers | 9.6% | 49.1% | 2,237 |
| Compostable/Soiled Paper | 7.6% | 56.8% | 1,773 |
| Mixed Low-grade Paper | 4.9% | 61.6% | 1,129 |
| Other Plastic Film | 4.2% | 65.8% | 974 |
| Textiles/Clothing | 2.6% | 68.4% | 601 |
| Other Ferrous Metal | 1.6% | 70.0% | 375 |
| Leaves and Grass | 1.5% | 71.5% | 352 |
| Plain OCC/Kraft | 1.3% | 72.8% | 302 |
| **Total** | **72.8%** | | **16,933** |

### 4.3.2 Collection Zone 2

During the calendar year 2010, 90 loads were sampled in Zone 2. Seattle's Zone 2 residents disposed of approximately 21,032 tons in 2010. *Food* accounted for approximately 27% of this waste, by weight. *Animal by-products*, *disposable diapers,* and *compostable/soiled paper* each accounted for more than 7% of the total disposed waste for Zone 2. The top ten components summed to nearly 71% of the total waste disposed in this zone and represented about 14,850 tons in 2010. The full composition results for Zone 2 are listed in Table 4-11.

**Table 4-7: Top Ten Components – Zone 2**
**(January – December 2010)**

| Material | Est. Percent | Cum. Percent | Est. Tons |
|---|---|---|---|
| Food | 26.8% | 26.8% | 5,643 |
| Animal By-products | 10.4% | 37.2% | 2,177 |
| Disposable Diapers | 7.7% | 44.9% | 1,625 |
| Compostable/Soiled Paper | 7.4% | 52.3% | 1,553 |
| Mixed Low-grade Paper | 5.5% | 57.8% | 1,155 |
| Other Plastic Film | 4.2% | 62.0% | 876 |
| Textiles/Clothing | 3.1% | 65.1% | 657 |
| Plain OCC/Kraft | 2.2% | 67.3% | 463 |
| Leaves and Grass | 1.7% | 68.9% | 351 |
| Mixed Metals/Material | 1.7% | 70.6% | 349 |
| **Total** | **70.6%** | | **14,850** |

### 4.3.3 Collection Zone 3

During the calendar year 2010, 91 loads were sampled in Zone 3. Seattle's Zone 3 residents disposed of approximately 33,492 tons in 2010. *Food* accounted for 29.0% of this waste, by weight. *Animal by-products* and *compostable/soiled paper* each accounted for 6% or more percent of the total disposed waste for Zone 3. The top ten components summed to 70.4% and represented 25,587 tons of the annual waste disposed. The full composition results for Zone 3 are listed in Table 4-12.

**Table 4-8: Top Ten Components – Zone 3**
**(January – December 2010)**

| Material | Est. Percent | Cum. Percent | Est. Tons |
|---|---|---|---|
| Food | 29.0% | 29.0% | 10,526 |
| Animal By-products | 10.5% | 39.5% | 3,816 |
| Compostable/Soiled Paper | 6.0% | 45.5% | 2,199 |
| Mixed Low-grade Paper | 5.9% | 51.4% | 2,157 |
| Disposable Diapers | 5.0% | 56.5% | 1,828 |
| Textiles/Clothing | 3.8% | 60.2% | 1,377 |
| Other Plastic Film | 3.6% | 63.8% | 1,295 |
| Plain OCC/Kraft | 2.4% | 66.2% | 883 |
| Leaves and Grass | 2.2% | 68.5% | 808 |
| Other Ferrous Metal | 1.9% | 70.4% | 698 |
| **Total** | **70.4%** | | **25,587** |

### 4.3.4 Collection Zone 4

During the calendar year 2010, 90 loads were sampled from Zone 4. Seattle's Zone 4 residents disposed of approximately 36,354 tons in 2010. *Food* accounted for about 31% of this waste, by weight. *Animal by-products*, *disposable diapers,* and *compostable/soiled paper* each accounted for more than 7% of the total disposed waste for Zone 4. The top ten components summed to more than 73% and represented 24,516 tons of the annual waste disposed. The full composition results for Zone 4 are listed in Table 4-13.

**Table 4-9: Top Ten Components – Zone 4**
**(January – December 2010)**

| Material | Est. Percent | Cum. Percent | Est. Tons |
|---|---|---|---|
| Food | 31.4% | 31.4% | 10,529 |
| Animal By-products | 8.5% | 39.9% | 2,838 |
| Disposable Diapers | 8.3% | 48.2% | 2,765 |
| Compostable/Soiled Paper | 7.2% | 55.4% | 2,427 |
| Mixed Low-grade Paper | 5.3% | 60.8% | 1,789 |
| Other Plastic Film | 3.8% | 64.6% | 1,283 |
| Textiles/Clothing | 3.8% | 68.4% | 1,268 |
| Other Construction Wastes | 1.9% | 70.3% | 643 |
| Durable Plastic Products | 1.6% | 71.9% | 533 |
| Mixed/Other Paper | 1.3% | 73.2% | 440 |
| **Total** | **73.2%** | | **24,516** |

### 4.3.5 Comparisons among Collection Zones

In all four collection zones, *food* and *animal by-products* were the first and second largest (respectively) components of waste. While *compostable/soiled paper* was the third largest component for Zone 3, *disposable diapers* was the third largest components for Zones 1, 2, and 4. Seven of the components were common to the top ten lists from all four zones: *food, animal by-products, disposable diapers, compostable/soiled paper, mixed low-grade paper, other plastic film, and textiles/clothing*. Three of the zones (Zones 1, 2, and 3) also commonly shared *leaves and grass* as a top ten component. Components in the top ten list of only one or two zones included *other ferrous metal* (Zones 1 and 3), *mixed metals/material* (Zone 2), *other construction wastes* (Zone 4), and *durable plastic products* (Zone 4).

## Table 4-10: Composition by Weight – Zone 1
### (January – December 2010)

| Material | Est. Percent | + / - | Est. Tons |
|---|---|---|---|
| **Paper** | **17.0%** | | **3,954** |
| Newspaper | 0.8% | 0.2% | 190 |
| Plain OCC/Kraft | 1.3% | 0.2% | 302 |
| Waxed OCC/Kraft | 0.0% | 0.0% | 5 |
| High Grade | 0.8% | 0.2% | 180 |
| Mixed Low Grade | 4.9% | 0.5% | 1,129 |
| Compostable/Soiled | 7.6% | 0.7% | 1,773 |
| Pot. Comp. Sgl-use Food Service | 0.0% | 0.0% | 7 |
| Sgl-use Food Service | 0.4% | 0.1% | 100 |
| Mixed/Other Paper | 1.2% | 0.3% | 268 |
| **Plastic** | **10.4%** | | **2,412** |
| #1 PET Bottles | 0.5% | 0.1% | 119 |
| #2 HDPE Natural Bottles | 0.2% | 0.0% | 53 |
| #2 HDPE Colored Bottles | 0.3% | 0.1% | 75 |
| Other Bottles | 0.1% | 0.0% | 14 |
| Tubs | 0.5% | 0.1% | 119 |
| Expanded Poly. Nonfood | 0.2% | 0.1% | 47 |
| Expanded Poly. Food grade | 0.4% | 0.1% | 92 |
| Rigid Poly. Foam Insulation | 0.0% | 0.0% | 0 |
| Pot. Comp. Sgl-use Food Service | 0.0% | 0.0% | 0 |
| Other Single-use Food Service | 0.7% | 0.1% | 162 |
| Other Rigid Packaging | 0.7% | 0.1% | 154 |
| Shopping/Dry Cleaning Bags | 0.4% | 0.1% | 99 |
| Clean PE Film | 0.1% | 0.0% | 15 |
| Other Film | 4.2% | 0.3% | 974 |
| Plastic Pipe | 0.0% | 0.0% | 2 |
| Foam Carpet Padding | 0.2% | 0.2% | 49 |
| Durable Plastic Products | 1.0% | 0.2% | 243 |
| Plastic/Other Materials | 0.8% | 0.3% | 194 |
| **Glass** | **2.0%** | | **465** |
| Clear Bottles | 0.5% | 0.1% | 105 |
| Green Bottles | 0.5% | 0.1% | 108 |
| Brown Bottles | 0.4% | 0.1% | 87 |
| Container Glass | 0.4% | 0.1% | 97 |
| Fluorescent Tubes | 0.0% | 0.0% | 0 |
| CFLs | 0.0% | 0.0% | 2 |
| Flat Glass | 0.0% | 0.0% | 6 |
| Other Glass | 0.3% | 0.1% | 59 |
| **Metal** | **4.0%** | | **936** |
| Alum. Beverage Cans | 0.2% | 0.1% | 52 |
| Alum. Foil/Containers | 0.4% | 0.1% | 90 |
| Other Aluminum | 0.0% | 0.0% | 6 |
| Other Nonferrous | 0.0% | 0.0% | 3 |
| Tin Food Cans | 0.5% | 0.1% | 116 |
| Empty Aerosol Cans | 0.2% | 0.0% | 40 |
| Other Ferrous | 1.6% | 0.8% | 375 |
| Oil filters | 0.0% | 0.0% | 4 |
| Mixed Metals/Material | 1.1% | 0.3% | 252 |
| **Organics** | **57.1%** | | **13,270** |
| Leaves and Grass | 1.5% | 0.7% | 352 |
| Prunings | 0.6% | 0.4% | 128 |
| Food | 27.6% | 1.7% | 6,425 |
| Fats, Oils, Grease | 0.9% | 0.4% | 213 |
| Textiles/Clothing | 2.6% | 0.5% | 601 |
| Mixed Textiles | 1.2% | 0.4% | 275 |
| Carpet | 0.9% | 0.5% | 202 |
| Disposable Diapers | 9.6% | 1.4% | 2,237 |
| Animal By-products | 11.9% | 1.2% | 2,765 |
| Rubber Products | 0.3% | 0.1% | 69 |
| Tires | 0.0% | 0.0% | 2 |

| Material | Est. Percent | + / - | Est. Tons |
|---|---|---|---|
| **Appliances and Electronics** | **1.1%** | | **259** |
| Furniture | 0.4% | 0.4% | 99 |
| Mattresses | 0.1% | 0.2% | 29 |
| Small Appliances | 0.3% | 0.2% | 68 |
| Cell Phones | 0.0% | 0.0% | 1 |
| Audio/Visual Equipment | 0.1% | 0.1% | 30 |
| CRT Monitors | 0.0% | 0.0% | 0 |
| CRT Televisions | 0.0% | 0.0% | 0 |
| Other Electronics | 0.1% | 0.1% | 33 |
| **CDL Wastes** | **5.9%** | | **1,362** |
| Clean Dimension Lumber | 0.6% | 0.2% | 142 |
| Clean Engineered Wood | 0.1% | 0.0% | 13 |
| Pallets | 0.7% | 0.9% | 151 |
| Crates | 0.0% | 0.0% | 0 |
| Other Untreated Wood | 0.2% | 0.2% | 52 |
| New Painted Wood | 0.6% | 0.3% | 146 |
| Old Painted Wood | 0.0% | 0.0% | 0 |
| Creosote-treated Wood | 0.0% | 0.0% | 2 |
| Other Treated Wood | 0.4% | 0.2% | 88 |
| Contaminated Wood | 0.4% | 0.2% | 98 |
| New Gypsum Scrap | 0.0% | 0.0% | 3 |
| Demo Gypsum Scrap | 0.6% | 0.5% | 131 |
| Fiberglass Insulation | 0.0% | 0.0% | 4 |
| Rock/Concrete/Bricks | 1.0% | 1.2% | 241 |
| Asphalt Shingles | 0.1% | 0.1% | 17 |
| Other Asphaltic Roofing | 0.0% | 0.0% | 0 |
| Ceramics | 0.7% | 0.2% | 154 |
| Cement Fiber Board | 0.0% | 0.0% | 5 |
| Other Construction | 0.5% | 0.3% | 114 |
| **Hazardous** | **0.6%** | | **134** |
| Liquid Latex Paint | 0.2% | 0.2% | 56 |
| Dried Latex Paint | 0.1% | 0.1% | 22 |
| Solvent-based Adhesives | 0.0% | 0.0% | 0 |
| Water-based Adhesives | 0.0% | 0.0% | 0 |
| Oil-based Paint/Thinners | 0.0% | 0.0% | 1 |
| Caustic Cleaners | 0.0% | 0.0% | 6 |
| Pesticides/Herbicides | 0.0% | 0.0% | 2 |
| Dry-cell Batteries | 0.0% | 0.0% | 11 |
| Wet-cell Batteries | 0.0% | 0.0% | 0 |
| Gasoline/Kerosene | 0.0% | 0.0% | 0 |
| Motor Oil/Diesel Oil | 0.0% | 0.0% | 0 |
| Asbestos | 0.0% | 0.0% | 0 |
| Explosives | 0.0% | 0.0% | 5 |
| Medical Wastes | 0.1% | 0.1% | 28 |
| Other Chemicals | 0.0% | 0.0% | 2 |
| Other Potentially Toxic | 0.0% | 0.0% | 1 |
| **Fines and Misc Materials** | **2.0%** | | **466** |
| Sand/Soil/Dirt | 0.1% | 0.0% | 16 |
| Non-distinct Fines | 0.2% | 0.2% | 44 |
| Misc. Organics | 1.3% | 0.3% | 306 |
| Misc. Inorganics | 0.4% | 0.1% | 99 |
| **Totals** | **100.0%** | | **23,257** |
| Sample Count | 90 | | |

## Table 4-11: Composition by Weight – Zone 2
### (January – December 2010)

| Material | Est. Percent | + / - | Est. Tons |
|---|---|---|---|
| **Paper** | **19.0%** | | **3,998** |
| Newspaper | 1.1% | 0.2% | 225 |
| Plain OCC/Kraft | 2.2% | 0.4% | 463 |
| Waxed OCC/Kraft | 0.0% | 0.0% | 1 |
| High Grade | 0.9% | 0.3% | 184 |
| Mixed Low Grade | 5.5% | 0.5% | 1,155 |
| Compostable/Soiled | 7.4% | 0.7% | 1,553 |
| Pot. Comp. Sgl-use Food Service | 0.1% | 0.1% | 16 |
| Sgl-use Food Service | 0.5% | 0.1% | 96 |
| Mixed/Other Paper | 1.5% | 0.3% | 305 |
| **Plastic** | **10.8%** | | **2,267** |
| #1 PET Bottles | 0.6% | 0.1% | 127 |
| #2 HDPE Natural Bottles | 0.2% | 0.1% | 48 |
| #2 HDPE Colored Bottles | 0.4% | 0.1% | 87 |
| Other Bottles | 0.1% | 0.0% | 15 |
| Tubs | 0.5% | 0.1% | 101 |
| Expanded Poly. Nonfood | 0.1% | 0.1% | 29 |
| Expanded Poly. Food grade | 0.4% | 0.0% | 89 |
| Rigid Poly. Foam Insulation | 0.0% | 0.0% | 0 |
| Pot. Comp. Sgl-use Food Service | 0.0% | 0.0% | 0 |
| Other Single-use Food Service | 0.7% | 0.1% | 138 |
| Other Rigid Packaging | 0.7% | 0.1% | 155 |
| Shopping/Dry Cleaning Bags | 0.4% | 0.1% | 80 |
| Clean PE Film | 0.2% | 0.1% | 33 |
| Other Film | 4.2% | 0.3% | 876 |
| Plastic Pipe | 0.0% | 0.0% | 3 |
| Foam Carpet Padding | 0.4% | 0.4% | 86 |
| Durable Plastic Products | 1.1% | 0.2% | 234 |
| Plastic/Other Materials | 0.8% | 0.2% | 165 |
| **Glass** | **1.8%** | | **385** |
| Clear Bottles | 0.5% | 0.1% | 99 |
| Green Bottles | 0.4% | 0.1% | 77 |
| Brown Bottles | 0.3% | 0.1% | 71 |
| Container Glass | 0.3% | 0.1% | 65 |
| Fluorescent Tubes | 0.0% | 0.0% | 0 |
| CFLs | 0.0% | 0.0% | 1 |
| Flat Glass | 0.0% | 0.0% | 1 |
| Other Glass | 0.3% | 0.1% | 71 |
| **Metal** | **4.9%** | | **1,027** |
| Alum. Beverage Cans | 0.4% | 0.3% | 90 |
| Alum. Foil/Containers | 0.3% | 0.1% | 69 |
| Other Aluminum | 0.0% | 0.0% | 4 |
| Other Nonferrous | 0.0% | 0.0% | 3 |
| Tin Food Cans | 0.6% | 0.1% | 137 |
| Empty Aerosol Cans | 0.2% | 0.0% | 32 |
| Other Ferrous | 1.6% | 0.4% | 335 |
| Oil filters | 0.0% | 0.0% | 9 |
| Mixed Metals/Material | 1.7% | 0.4% | 349 |
| **Organics** | **53.4%** | | **11,240** |
| Leaves and Grass | 1.7% | 1.2% | 351 |
| Prunings | 0.6% | 0.5% | 119 |
| Food | 26.8% | 2.1% | 5,643 |
| Fats, Oils, Grease | 0.9% | 0.3% | 198 |
| Textiles/Clothing | 3.1% | 0.5% | 657 |
| Mixed Textiles | 1.1% | 0.3% | 232 |
| Carpet | 0.5% | 0.3% | 112 |
| Disposable Diapers | 7.7% | 1.0% | 1,625 |
| Animal By-products | 10.4% | 1.5% | 2,177 |
| Rubber Products | 0.3% | 0.1% | 61 |
| Tires | 0.3% | 0.3% | 64 |

| Material | Est. Percent | + / - | Est. Tons |
|---|---|---|---|
| **Appliances and Electronics** | **1.6%** | | **331** |
| Furniture | 0.4% | 0.7% | 83 |
| Mattresses | 0.3% | 0.4% | 64 |
| Small Appliances | 0.3% | 0.5% | 63 |
| Cell Phones | 0.0% | 0.0% | 0 |
| Audio/Visual Equipment | 0.3% | 0.2% | 56 |
| CRT Monitors | 0.0% | 0.0% | 0 |
| CRT Televisions | 0.0% | 0.0% | 0 |
| Other Electronics | 0.3% | 0.2% | 64 |
| **CDL Wastes** | **5.8%** | | **1,211** |
| Clean Dimension Lumber | 0.4% | 0.2% | 79 |
| Clean Engineered Wood | 0.2% | 0.1% | 43 |
| Pallets | 0.0% | 0.0% | 0 |
| Crates | 0.0% | 0.0% | 4 |
| Other Untreated Wood | 0.2% | 0.1% | 37 |
| New Painted Wood | 1.0% | 0.4% | 214 |
| Old Painted Wood | 0.1% | 0.1% | 26 |
| Creosote-treated Wood | 0.0% | 0.0% | 0 |
| Other Treated Wood | 0.8% | 0.8% | 169 |
| Contaminated Wood | 0.4% | 0.2% | 87 |
| New Gypsum Scrap | 0.0% | 0.0% | 2 |
| Demo Gypsum Scrap | 0.4% | 0.3% | 86 |
| Fiberglass Insulation | 0.0% | 0.0% | 4 |
| Rock/Concrete/Bricks | 0.5% | 0.4% | 113 |
| Asphalt Shingles | 0.0% | 0.0% | 2 |
| Other Asphaltic Roofing | 0.1% | 0.1% | 13 |
| Ceramics | 0.8% | 0.6% | 167 |
| Cement Fiber Board | 0.0% | 0.0% | 0 |
| Other Construction | 0.8% | 0.6% | 166 |
| **Hazardous** | **0.9%** | | **198** |
| Liquid Latex Paint | 0.1% | 0.1% | 26 |
| Dried Latex Paint | 0.0% | 0.0% | 5 |
| Solvent-based Adhesives | 0.0% | 0.0% | 2 |
| Water-based Adhesives | 0.0% | 0.0% | 0 |
| Oil-based Paint/Thinners | 0.0% | 0.0% | 0 |
| Caustic Cleaners | 0.0% | 0.0% | 8 |
| Pesticides/Herbicides | 0.0% | 0.0% | 2 |
| Dry-cell Batteries | 0.1% | 0.0% | 11 |
| Wet-cell Batteries | 0.0% | 0.0% | 2 |
| Gasoline/Kerosene | 0.0% | 0.0% | 2 |
| Motor Oil/Diesel Oil | 0.0% | 0.0% | 1 |
| Asbestos | 0.0% | 0.0% | 0 |
| Explosives | 0.0% | 0.0% | 0 |
| Medical Wastes | 0.6% | 0.4% | 134 |
| Other Chemicals | 0.0% | 0.0% | 5 |
| Other Potentially Toxic | 0.0% | 0.0% | 1 |
| **Fines and Misc Materials** | **1.8%** | | **375** |
| Sand/Soil/Dirt | 0.4% | 0.2% | 74 |
| Non-distinct Fines | 0.1% | 0.2% | 29 |
| Misc. Organics | 0.7% | 0.2% | 154 |
| Misc. Inorganics | 0.6% | 0.3% | 117 |
| **Totals** | **100.0%** | | **21,032** |
| Sample Count | 90 | | |

*Confidence intervals calculated at the 90% confidence level. Percentages for material types may not total 100% due to rounding.*

## Table 4-12: Composition by Weight – Zone 3
### (January – December 2010)

| Material | Est. Percent | + / - | Est. Tons |
|---|---|---|---|
| **Paper** | **18.8%** | | **6,826** |
| Newspaper | 1.2% | 0.3% | 430 |
| Plain OCC/Kraft | 2.4% | 0.5% | 883 |
| Waxed OCC/Kraft | 0.1% | 0.1% | 22 |
| High Grade | 1.1% | 0.7% | 399 |
| Mixed Low Grade | 5.9% | 0.8% | 2,157 |
| Compostable/Soiled | 6.0% | 0.7% | 2,199 |
| Pot. Comp. Sgl-use Food Service | 0.0% | 0.0% | 9 |
| Sgl-use Food Service | 0.3% | 0.1% | 115 |
| Mixed/Other Paper | 1.7% | 0.4% | 611 |
| **Plastic** | **9.5%** | | **3,454** |
| #1 PET Bottles | 0.5% | 0.1% | 194 |
| #2 HDPE Natural Bottles | 0.2% | 0.0% | 64 |
| #2 HDPE Colored Bottles | 0.3% | 0.1% | 102 |
| Other Bottles | 0.0% | 0.0% | 16 |
| Tubs | 0.5% | 0.1% | 171 |
| Expanded Poly. Nonfood | 0.2% | 0.1% | 71 |
| Expanded Poly. Food grade | 0.4% | 0.2% | 148 |
| Rigid Poly. Foam Insulation | 0.0% | 0.0% | 0 |
| Pot. Comp. Sgl-use Food Service | 0.0% | 0.0% | 7 |
| Other Single-use Food Service | 0.6% | 0.1% | 210 |
| Other Rigid Packaging | 0.6% | 0.1% | 212 |
| Shopping/Dry Cleaning Bags | 0.4% | 0.1% | 134 |
| Clean PE Film | 0.2% | 0.2% | 76 |
| Other Film | 3.6% | 0.3% | 1,295 |
| Plastic Pipe | 0.0% | 0.0% | 2 |
| Foam Carpet Padding | 0.0% | 0.0% | 4 |
| Durable Plastic Products | 1.4% | 0.4% | 514 |
| Plastic/Other Materials | 0.6% | 0.2% | 234 |
| **Glass** | **2.7%** | | **965** |
| Clear Bottles | 0.6% | 0.2% | 218 |
| Green Bottles | 0.9% | 0.3% | 314 |
| Brown Bottles | 0.5% | 0.1% | 193 |
| Container Glass | 0.3% | 0.1% | 123 |
| Fluorescent Tubes | 0.0% | 0.0% | 1 |
| CFLs | 0.0% | 0.0% | 1 |
| Flat Glass | 0.0% | 0.1% | 18 |
| Other Glass | 0.3% | 0.1% | 98 |
| **Metal** | **4.6%** | | **1,688** |
| Alum. Beverage Cans | 0.3% | 0.1% | 96 |
| Alum. Foil/Containers | 0.3% | 0.1% | 97 |
| Other Aluminum | 0.0% | 0.0% | 10 |
| Other Nonferrous | 0.0% | 0.1% | 17 |
| Tin Food Cans | 0.5% | 0.1% | 174 |
| Empty Aerosol Cans | 0.2% | 0.1% | 67 |
| Other Ferrous | 1.9% | 0.7% | 698 |
| Oil filters | 0.0% | 0.0% | 1 |
| Mixed Metals/Material | 1.4% | 0.5% | 527 |
| **Organics** | **54.3%** | | **19,751** |
| Leaves and Grass | 2.2% | 1.2% | 808 |
| Prunings | 0.7% | 0.7% | 269 |
| Food | 29.0% | 2.4% | 10,526 |
| Fats, Oils, Grease | 0.5% | 0.3% | 198 |
| Textiles/Clothing | 3.8% | 1.0% | 1,377 |
| Mixed Textiles | 1.5% | 0.5% | 544 |
| Carpet | 0.7% | 0.3% | 248 |
| Disposable Diapers | 5.0% | 1.0% | 1,828 |
| Animal By-products | 10.5% | 1.7% | 3,816 |
| Rubber Products | 0.4% | 0.3% | 137 |
| Tires | 0.0% | 0.0% | 1 |

| Material | Est. Percent | + / - | Est. Tons |
|---|---|---|---|
| **Appliances and Electronics** | **1.5%** | | **560** |
| Furniture | 0.6% | 0.9% | 227 |
| Mattresses | 0.0% | 0.0% | 0 |
| Small Appliances | 0.5% | 0.8% | 198 |
| Cell Phones | 0.0% | 0.0% | 0 |
| Audio/Visual Equipment | 0.1% | 0.1% | 41 |
| CRT Monitors | 0.0% | 0.0% | 3 |
| CRT Televisions | 0.0% | 0.0% | 0 |
| Other Electronics | 0.3% | 0.1% | 92 |
| **CDL Wastes** | **3.7%** | | **1,361** |
| Clean Dimension Lumber | 0.4% | 0.4% | 151 |
| Clean Engineered Wood | 0.5% | 0.6% | 190 |
| Pallets | 0.0% | 0.0% | 2 |
| Crates | 0.1% | 0.1% | 19 |
| Other Untreated Wood | 0.2% | 0.1% | 82 |
| New Painted Wood | 0.6% | 0.4% | 216 |
| Old Painted Wood | 0.0% | 0.0% | 2 |
| Creosote-treated Wood | 0.0% | 0.0% | 1 |
| Other Treated Wood | 0.1% | 0.1% | 31 |
| Contaminated Wood | 0.6% | 0.6% | 231 |
| New Gypsum Scrap | 0.1% | 0.1% | 35 |
| Demo Gypsum Scrap | 0.2% | 0.3% | 67 |
| Fiberglass Insulation | 0.0% | 0.1% | 13 |
| Rock/Concrete/Bricks | 0.1% | 0.1% | 36 |
| Asphalt Shingles | 0.0% | 0.0% | 0 |
| Other Asphaltic Roofing | 0.2% | 0.2% | 64 |
| Ceramics | 0.2% | 0.1% | 82 |
| Cement Fiber Board | 0.0% | 0.0% | 0 |
| Other Construction | 0.4% | 0.2% | 140 |
| **Hazardous** | **1.9%** | | **679** |
| Liquid Latex Paint | 0.9% | 0.9% | 322 |
| Dried Latex Paint | 0.4% | 0.6% | 157 |
| Solvent-based Adhesives | 0.0% | 0.0% | 1 |
| Water-based Adhesives | 0.0% | 0.0% | 0 |
| Oil-based Paint/Thinners | 0.2% | 0.2% | 57 |
| Caustic Cleaners | 0.2% | 0.2% | 57 |
| Pesticides/Herbicides | 0.0% | 0.0% | 9 |
| Dry-cell Batteries | 0.0% | 0.0% | 7 |
| Wet-cell Batteries | 0.0% | 0.0% | 0 |
| Gasoline/Kerosene | 0.0% | 0.0% | 0 |
| Motor Oil/Diesel Oil | 0.0% | 0.0% | 0 |
| Asbestos | 0.0% | 0.0% | 0 |
| Explosives | 0.0% | 0.0% | 1 |
| Medical Wastes | 0.2% | 0.1% | 64 |
| Other Chemicals | 0.0% | 0.0% | 4 |
| Other Potentially Toxic | 0.0% | 0.0% | 0 |
| **Fines and Misc Materials** | **2.9%** | | **1,071** |
| Sand/Soil/Dirt | 0.6% | 0.5% | 214 |
| Non-distinct Fines | 0.1% | 0.2% | 42 |
| Misc. Organics | 1.8% | 1.1% | 658 |
| Misc. Inorganics | 0.4% | 0.2% | 157 |
| **Totals** | **100.0%** | | **36,354** |
| Sample Count | 90 | | |

*Confidence intervals calculated at the 90% confidence level. Percentages for material types may not total 100% due to rounding.*

## Table 4-13: Composition by Weight – Zone 4
### (January – December 2010)

| Material | Est. Percent | + / - | Est. Tons |
|---|---|---|---|
| **Paper** | **17.4%** | | **5,831** |
| Newspaper | 1.0% | 0.2% | 328 |
| Plain OCC/Kraft | 1.3% | 0.3% | 430 |
| Waxed OCC/Kraft | 0.0% | 0.0% | 13 |
| High Grade | 0.7% | 0.2% | 219 |
| Mixed Low Grade | 5.3% | 0.5% | 1,789 |
| Compostable/Soiled | 7.2% | 0.7% | 2,427 |
| Pot. Comp. Sgl-use Food Service | 0.0% | 0.0% | 3 |
| Sgl-use Food Service | 0.5% | 0.2% | 182 |
| Mixed/Other Paper | 1.3% | 0.2% | 440 |
| **Plastic** | **10.1%** | | **3,380** |
| #1 PET Bottles | 0.6% | 0.1% | 185 |
| #2 HDPE Natural Bottles | 0.2% | 0.1% | 83 |
| #2 HDPE Colored Bottles | 0.3% | 0.1% | 103 |
| Other Bottles | 0.0% | 0.0% | 16 |
| Tubs | 0.4% | 0.1% | 148 |
| Expanded Poly. Nonfood | 0.2% | 0.1% | 55 |
| Expanded Poly. Food grade | 0.5% | 0.1% | 166 |
| Rigid Poly. Foam Insulation | 0.0% | 0.0% | 0 |
| Pot. Comp. Sgl-use Food Service | 0.0% | 0.0% | 4 |
| Other Single-use Food Service | 0.6% | 0.1% | 193 |
| Other Rigid Packaging | 0.6% | 0.1% | 193 |
| Shopping/Dry Cleaning Bags | 0.4% | 0.1% | 139 |
| Clean PE Film | 0.1% | 0.1% | 39 |
| Other Film | 3.8% | 0.3% | 1,283 |
| Plastic Pipe | 0.0% | 0.1% | 16 |
| Foam Carpet Padding | 0.1% | 0.1% | 23 |
| Durable Plastic Products | 1.6% | 0.4% | 533 |
| Plastic/Other Materials | 0.6% | 0.1% | 202 |
| **Glass** | **2.0%** | | **675** |
| Clear Bottles | 0.6% | 0.2% | 211 |
| Green Bottles | 0.4% | 0.2% | 124 |
| Brown Bottles | 0.3% | 0.1% | 95 |
| Container Glass | 0.3% | 0.1% | 117 |
| Fluorescent Tubes | 0.0% | 0.0% | 0 |
| CFLs | 0.0% | 0.0% | 1 |
| Flat Glass | 0.1% | 0.1% | 20 |
| Other Glass | 0.3% | 0.1% | 108 |
| **Metal** | **2.9%** | | **972** |
| Alum. Beverage Cans | 0.2% | 0.1% | 79 |
| Alum. Foil/Containers | 0.3% | 0.1% | 109 |
| Other Aluminum | 0.0% | 0.0% | 3 |
| Other Nonferrous | 0.0% | 0.0% | 0 |
| Tin Food Cans | 0.6% | 0.1% | 185 |
| Empty Aerosol Cans | 0.2% | 0.0% | 67 |
| Other Ferrous | 0.7% | 0.2% | 234 |
| Oil filters | 0.0% | 0.0% | 6 |
| Mixed Metals/Material | 0.9% | 0.3% | 287 |
| **Organics** | **56.9%** | | **19,051** |
| Leaves and Grass | 1.2% | 0.6% | 407 |
| Prunings | 0.7% | 0.9% | 241 |
| Food | 31.4% | 2.3% | 10,529 |
| Fats, Oils, Grease | 0.6% | 0.4% | 194 |
| Textiles/Clothing | 3.8% | 0.7% | 1,268 |
| Mixed Textiles | 1.2% | 0.5% | 415 |
| Carpet | 0.9% | 0.6% | 295 |
| Disposable Diapers | 8.3% | 1.1% | 2,765 |
| Animal By-products | 8.5% | 1.2% | 2,838 |
| Rubber Products | 0.3% | 0.2% | 99 |
| Tires | 0.0% | 0.0% | 0 |

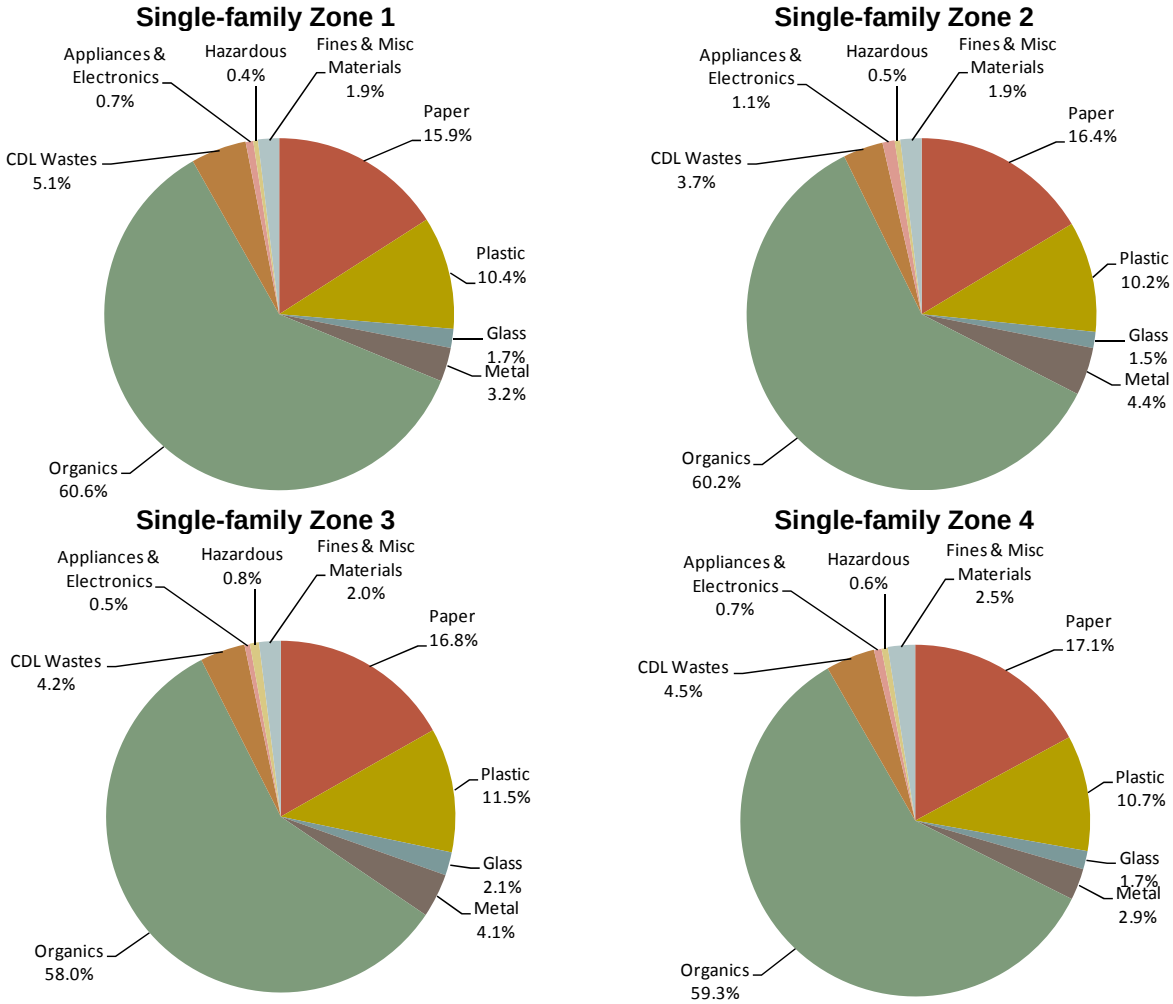
| Material | Est. Percent | + / - | Est. Tons |
|---|---|---|---|
| **Appliances and Electronics** | **0.7%** | | **243** |
| Furniture | 0.0% | 0.1% | 14 |
| Mattresses | 0.0% | 0.0% | 0 |
| Small Appliances | 0.1% | 0.1% | 40 |
| Cell Phones | 0.0% | 0.0% | 1 |
| Audio/Visual Equipment | 0.1% | 0.1% | 30 |
| CRT Monitors | 0.0% | 0.0% | 0 |
| CRT Televisions | 0.0% | 0.1% | 16 |
| Other Electronics | 0.4% | 0.3% | 143 |
| **CDL Wastes** | **7.1%** | | **2,385** |
| Clean Dimension Lumber | 0.4% | 0.2% | 135 |
| Clean Engineered Wood | 0.7% | 0.5% | 230 |
| Pallets | 0.2% | 0.3% | 69 |
| Crates | 0.0% | 0.0% | 6 |
| Other Untreated Wood | 0.2% | 0.1% | 63 |
| New Painted Wood | 0.8% | 0.4% | 276 |
| Old Painted Wood | 0.0% | 0.0% | 5 |
| Creosote-treated Wood | 0.0% | 0.0% | 0 |
| Other Treated Wood | 0.6% | 0.3% | 189 |
| Contaminated Wood | 0.4% | 0.2% | 119 |
| New Gypsum Scrap | 0.0% | 0.0% | 9 |
| Demo Gypsum Scrap | 0.8% | 1.0% | 269 |
| Fiberglass Insulation | 0.0% | 0.0% | 13 |
| Rock/Concrete/Bricks | 0.5% | 0.4% | 182 |
| Asphalt Shingles | 0.0% | 0.0% | 7 |
| Other Asphaltic Roofing | 0.0% | 0.0% | 10 |
| Ceramics | 0.3% | 0.1% | 99 |
| Cement Fiber Board | 0.2% | 0.3% | 61 |
| Other Construction | 1.9% | 0.9% | 643 |
| **Hazardous** | **0.7%** | | **245** |
| Liquid Latex Paint | 0.3% | 0.3% | 98 |
| Dried Latex Paint | 0.0% | 0.0% | 3 |
| Solvent-based Adhesives | 0.0% | 0.0% | 0 |
| Water-based Adhesives | 0.0% | 0.0% | 0 |
| Oil-based Paint/Thinners | 0.0% | 0.0% | 1 |
| Caustic Cleaners | 0.1% | 0.0% | 19 |
| Pesticides/Herbicides | 0.0% | 0.0% | 0 |
| Dry-cell Batteries | 0.1% | 0.0% | 20 |
| Wet-cell Batteries | 0.0% | 0.0% | 0 |
| Gasoline/Kerosene | 0.0% | 0.0% | 0 |
| Motor Oil/Diesel Oil | 0.0% | 0.0% | 3 |
| Asbestos | 0.0% | 0.0% | 0 |
| Explosives | 0.0% | 0.0% | 0 |
| Medical Wastes | 0.3% | 0.2% | 88 |
| Other Chemicals | 0.0% | 0.0% | 8 |
| Other Potentially Toxic | 0.0% | 0.0% | 3 |
| **Fines and Misc Materials** | **2.1%** | | **709** |
| Sand/Soil/Dirt | 0.6% | 0.5% | 206 |
| Non-distinct Fines | 0.0% | 0.0% | 0 |
| Misc. Organics | 1.1% | 0.3% | 374 |
| Misc. Inorganics | 0.4% | 0.2% | 129 |
| **Totals** | **100.0%** | | **33,492** |
| Sample Count | 91 | | |

*Confidence intervals calculated at the 90% confidence level. Percentages for material types may not total 100% due to rounding.*

## 4.4 By Collection Zone and Residence Type: Single-family

Waste composition results were examined for differences for single-family waste across collection zones. Broad material categories (as shown in Figure 4-3) were compared across single-family waste from Zones 1 through 4. In all four collection zones, **organics** made up around 60% of the total. Other predominant categories included **paper** ranging from about 16% to 17% in each collection zone and **plastic** at between 10% and 12% in all four collection zones.

**Figure 4-3: Composition Summary, Single-family**
**(January – December 2010)**



### 4.4.1 Single-family Zone 1

A total of 60 samples were sorted from single-family Zone 1 waste loads. This subpopulation disposed of approximately 15,591 tons during the calendar year 2010. The top ten components for the single-family Zone 1 subpopulation accounted for about 76%, or 11,870 tons, of the annual waste disposed. *Food* was the largest component, at about 27% of the waste stream. *Animal by-products* (14.7%)*, disposable diapers* (10.9%), and *compostable/soiled paper* (7.5%), and were also large components. Table 4-18 details the full composition results for the single-family Zone 1 subpopulation.

**Table 4-14: Top Ten Components – Single-family Zone 1**
**(January – December 2010)**

| Material | Est. Percent | Cum. Percent | Est. Tons |
|---|---|---|---|
| Food | 27.1% | 27.1% | 4,226 |
| Animal By-products | 14.7% | 41.8% | 2,299 |
| Disposable Diapers | 10.9% | 52.8% | 1,700 |
| Compostable/Soiled Paper | 7.5% | 60.3% | 1,172 |
| Mixed Low-grade Paper | 4.6% | 64.9% | 718 |
| Other Plastic Film | 4.4% | 69.3% | 688 |
| Textiles/Clothing | 2.7% | 72.0% | 421 |
| Leaves and Grass | 1.8% | 73.7% | 274 |
| Mixed Textiles | 1.3% | 75.0% | 202 |
| Mixed/Other Paper | 1.1% | 76.1% | 171 |
| **Total** | **76.1%** | | **11,870** |

### 4.4.2 Single-family Zone 2

A total of 60 samples of waste were sorted from single-family Zone 2 loads. This subpopulation disposed of 11,961 tons of waste between January and December 2010. The top ten components for the single-family Zone 1 subpopulation accounted for 76%, or 9,123 tons, of the annual waste disposed. *Food* accounted for nearly 28%. *Animal by-products* (14.2%), *disposable diapers* (10.6%), and *compostable/soiled paper* (7.2%), were also large components. Detailed composition results for the single-family Zone 2 subpopulation are listed in Table 4-19.

**Table 4-15: Top Ten Components – Single-family Zone 2**
**(January – December 2010)**

| Material | Est. Percent | Cum. Percent | Est. Tons |
|---|---|---|---|
| Food | 27.9% | 27.9% | 3,341 |
| Animal By-products | 14.2% | 42.1% | 1,699 |
| Disposable Diapers | 10.6% | 52.8% | 1,270 |
| Compostable/Soiled Paper | 7.2% | 60.0% | 865 |
| Mixed Low-grade Paper | 4.7% | 64.7% | 560 |
| Other Plastic Film | 4.2% | 68.9% | 501 |
| Textiles/Clothing | 3.0% | 71.8% | 355 |
| Mixed Metals/Material | 1.5% | 73.4% | 185 |
| Mixed/Other Paper | 1.5% | 74.9% | 183 |
| Other Ferrous Metal | 1.4% | 76.3% | 163 |
| **Total** | **76.3%** | | **9,123** |

### 4.4.3 Single-family Zone 3

A total of 60 samples were sorted from single-family Zone 3 loads. This subpopulation disposed of 13,431 tons of waste between January and December 2010. The top ten components for the single-family Zone 3 accounted for 73%, or 9,802 tons, of the annual waste disposed. *Food* accounted for approximately 28%. *Animal by-products* (13.5%), *disposable diapers* (7.9%), and *compostable/soiled paper* (6.2%) were also large components. The detailed composition results for single-family Zone 3 are listed in Table 4-20.

**Table 4-16: Top Ten Components – Single-family Zone 3**
**(January – December 2010)**

| Material | Est. Percent | Cum. Percent | Est. Tons |
|---|---|---|---|
| Food | 27.7% | 27.7% | 3,714 |
| Animal By-products | 13.5% | 41.2% | 1,815 |
| Disposable Diapers | 7.9% | 49.0% | 1,055 |
| Compostable/Soiled Paper | 6.2% | 55.2% | 829 |
| Mixed Low-grade Paper | 4.8% | 60.0% | 648 |
| Other Plastic Film | 4.8% | 64.8% | 644 |
| Textiles/Clothing | 3.3% | 68.1% | 443 |
| Durable Plastic Products | 1.6% | 69.7% | 219 |
| Plain OCC/Kraft | 1.6% | 71.4% | 218 |
| Mixed/Other Paper | 1.6% | 73.0% | 218 |
| **Total** | **73.0%** | | **9,802** |

### 4.4.4 Single-family Zone 4

A total of 60 samples were taken from single-family Zone 4 loads. This subpopulation disposed of 23,332 tons of waste between January and December 2010. The top ten components for the single-family Zone 4 subpopulation accounted for about 77%, or 17,846 tons, of the annual waste disposed. *Food* accounted about 31%, by weight. *Animal by-products* (10.3%), *disposable diapers* (10.0%), and *compostable/soiled paper* (7.7%) were also large components. The detailed composition results for the single-family Zone 4 subpopulation are listed in Table 4-21.

**Table 4-17: Top Ten Components – Single-family Zone 4**
**(January – December 2010)**

| Material | Est. Percent | Cum. Percent | Est. Tons |
|---|---|---|---|
| Food | 31.1% | 31.1% | 7,245 |
| Animal By-products | 10.3% | 41.3% | 2,396 |
| Disposable Diapers | 10.0% | 51.3% | 2,333 |
| Compostable/Soiled Paper | 7.7% | 59.0% | 1,802 |
| Mixed Low-grade Paper | 5.1% | 64.2% | 1,199 |
| Other Plastic Film | 4.3% | 68.5% | 1,009 |
| Textiles/Clothing | 3.7% | 72.2% | 863 |
| Durable Plastic Products | 1.6% | 73.8% | 368 |
| Other Construction Wastes | 1.4% | 75.2% | 324 |
| Mixed/Other Paper | 1.3% | 76.5% | 307 |
| **Total** | **76.5%** | | **17,846** |

### 4.4.5 Comparisons among Single-family Zones 1 Through 4

At around 30%, *food was* the largest component of waste from all four zones, followed by *animal by-products, disposable diapers*, and *compostable/soiled paper*. Eight of the top ten components are common to all four top ten lists: *food, animal by-products, disposable diapers, compostable/soiled paper, mixed low-grade paper, other plastic film, textiles/clothing,* and *mixed/other paper.* Components unique to the top ten list of individual subpopulations included *leaves and grass* and *mixed textiles (*Zone 1), *mixed metals/materials* and *other ferrous metal (*Zone 2), *plain OCC/Kraft* (Zone 3), and *other construction wastes* (Zone 4).

## Table 4-18: Composition by Weight – Single-family Zone 1
## (January – December 2010)

| Material | Est. Percent | + / - | Est. Tons |
|---|---|---|---|
| **Paper** | **15.9%** | | **2,484** |
| Newspaper | 0.6% | 0.2% | 99 |
| Plain OCC/Kraft | 0.9% | 0.2% | 147 |
| Waxed OCC/Kraft | 0.0% | 0.0% | 0 |
| High Grade | 0.7% | 0.3% | 110 |
| Mixed Low Grade | 4.6% | 0.6% | 718 |
| Compostable/Soiled | 7.5% | 0.8% | 1,172 |
| Pot. Comp. Sgl-use Food Service | 0.0% | 0.0% | 6 |
| Sgl-use Food Service | 0.4% | 0.1% | 62 |
| Mixed/Other Paper | 1.1% | 0.3% | 171 |
| **Plastic** | **10.4%** | | **1,623** |
| #1 PET Bottles | 0.5% | 0.1% | 74 |
| #2 HDPE Natural Bottles | 0.2% | 0.0% | 31 |
| #2 HDPE Colored Bottles | 0.3% | 0.0% | 43 |
| Other Bottles | 0.1% | 0.0% | 8 |
| Tubs | 0.5% | 0.1% | 82 |
| Expanded Poly. Nonfood | 0.2% | 0.2% | 37 |
| Expanded Poly. Food grade | 0.5% | 0.1% | 73 |
| Rigid Poly. Foam Insulation | 0.0% | 0.0% | 0 |
| Pot. Comp. Sgl-use Food Service | 0.0% | 0.0% | 0 |
| Other Single-use Food Service | 0.6% | 0.1% | 100 |
| Other Rigid Packaging | 0.7% | 0.1% | 115 |
| Shopping/Dry Cleaning Bags | 0.5% | 0.1% | 70 |
| Clean PE Film | 0.1% | 0.0% | 9 |
| Other Film | 4.4% | 0.3% | 688 |
| Plastic Pipe | 0.0% | 0.0% | 2 |
| Foam Carpet Padding | 0.1% | 0.1% | 12 |
| Durable Plastic Products | 0.9% | 0.2% | 142 |
| Plastic/Other Materials | 0.9% | 0.3% | 135 |
| **Glass** | **1.7%** | | **270** |
| Clear Bottles | 0.3% | 0.1% | 44 |
| Green Bottles | 0.4% | 0.2% | 67 |
| Brown Bottles | 0.3% | 0.1% | 48 |
| Container Glass | 0.4% | 0.1% | 61 |
| Fluorescent Tubes | 0.0% | 0.0% | 0 |
| CFLs | 0.0% | 0.0% | 2 |
| Flat Glass | 0.0% | 0.0% | 6 |
| Other Glass | 0.3% | 0.1% | 42 |
| **Metal** | **3.2%** | | **492** |
| Alum. Beverage Cans | 0.2% | 0.1% | 27 |
| Alum. Foil/Containers | 0.4% | 0.1% | 63 |
| Other Aluminum | 0.0% | 0.0% | 2 |
| Other Nonferrous | 0.0% | 0.0% | 3 |
| Tin Food Cans | 0.5% | 0.1% | 76 |
| Empty Aerosol Cans | 0.2% | 0.0% | 27 |
| Other Ferrous | 0.9% | 0.3% | 134 |
| Oil filters | 0.0% | 0.0% | 4 |
| Mixed Metals/Material | 1.0% | 0.3% | 157 |
| **Organics** | **60.6%** | | **9,446** |
| Leaves and Grass | 1.8% | 1.0% | 274 |
| Prunings | 0.2% | 0.2% | 37 |
| Food | 27.1% | 1.9% | 4,226 |
| Fats, Oils, Grease | 1.1% | 0.6% | 170 |
| Textiles/Clothing | 2.7% | 0.5% | 421 |
| Mixed Textiles | 1.3% | 0.6% | 202 |
| Carpet | 0.4% | 0.2% | 68 |
| Disposable Diapers | 10.9% | 1.5% | 1,700 |
| Animal By-products | 14.7% | 1.7% | 2,299 |
| Rubber Products | 0.3% | 0.1% | 48 |
| Tires | 0.0% | 0.0% | 2 |

| Material | Est. Percent | + / - | Est. Tons |
|---|---|---|---|
| **Appliances and Electronics** | **0.7%** | | **109** |
| Furniture | 0.0% | 0.0% | 0 |
| Mattresses | 0.0% | 0.0% | 0 |
| Small Appliances | 0.4% | 0.3% | 62 |
| Cell Phones | 0.0% | 0.0% | 1 |
| Audio/Visual Equipment | 0.1% | 0.1% | 16 |
| CRT Monitors | 0.0% | 0.0% | 0 |
| CRT Televisions | 0.0% | 0.0% | 0 |
| Other Electronics | 0.2% | 0.1% | 31 |
| **CDL Wastes** | **5.1%** | | **797** |
| Clean Dimension Lumber | 0.6% | 0.2% | 87 |
| Clean Engineered Wood | 0.1% | 0.1% | 10 |
| Pallets | 0.0% | 0.0% | 0 |
| Crates | 0.0% | 0.0% | 0 |
| Other Untreated Wood | 0.3% | 0.3% | 47 |
| New Painted Wood | 0.7% | 0.4% | 108 |
| Old Painted Wood | 0.0% | 0.0% | 0 |
| Creosote-treated Wood | 0.0% | 0.0% | 2 |
| Other Treated Wood | 0.4% | 0.2% | 59 |
| Contaminated Wood | 0.3% | 0.2% | 54 |
| New Gypsum Scrap | 0.0% | 0.0% | 3 |
| Demo Gypsum Scrap | 0.7% | 0.7% | 110 |
| Fiberglass Insulation | 0.0% | 0.0% | 4 |
| Rock/Concrete/Bricks | 0.5% | 0.7% | 77 |
| Asphalt Shingles | 0.1% | 0.1% | 17 |
| Other Asphaltic Roofing | 0.0% | 0.0% | 0 |
| Ceramics | 0.8% | 0.3% | 129 |
| Cement Fiber Board | 0.0% | 0.0% | 5 |
| Other Construction | 0.6% | 0.4% | 87 |
| **Hazardous** | **0.4%** | | **68** |
| Liquid Latex Paint | 0.1% | 0.1% | 14 |
| Dried Latex Paint | 0.1% | 0.2% | 19 |
| Solvent-based Adhesives | 0.0% | 0.0% | 0 |
| Water-based Adhesives | 0.0% | 0.0% | 0 |
| Oil-based Paint/Thinners | 0.0% | 0.0% | 1 |
| Caustic Cleaners | 0.0% | 0.0% | 5 |
| Pesticides/Herbicides | 0.0% | 0.0% | 2 |
| Dry-cell Batteries | 0.0% | 0.0% | 7 |
| Wet-cell Batteries | 0.0% | 0.0% | 0 |
| Gasoline/Kerosene | 0.0% | 0.0% | 0 |
| Motor Oil/Diesel Oil | 0.0% | 0.0% | 0 |
| Asbestos | 0.0% | 0.0% | 0 |
| Explosives | 0.0% | 0.1% | 5 |
| Medical Wastes | 0.1% | 0.1% | 13 |
| Other Chemicals | 0.0% | 0.0% | 0 |
| Other Potentially Toxic | 0.0% | 0.0% | 1 |
| **Fines and Misc Materials** | **1.9%** | | **302** |
| Sand/Soil/Dirt | 0.0% | 0.0% | 4 |
| Non-distinct Fines | 0.2% | 0.2% | 34 |
| Misc. Organics | 1.4% | 0.3% | 213 |
| Misc. Inorganics | 0.3% | 0.1% | 51 |
| **Totals** | **100.0%** | | **15,591** |
| Sample Count | 60 | | |

*Confidence intervals calculated at the 90% confidence level. Percentages for material types may not total 100% due to rounding.*

## Table 4-19: Composition by Weight – Single-family Zone 2
## (January – December 2010)

| Material | Est. Percent | + / - | Est. Tons |
|---|---|---|---|
| **Paper** | **16.4%** | | **1,961** |
| Newspaper | 0.6% | 0.2% | 70 |
| Plain OCC/Kraft | 1.2% | 0.3% | 145 |
| Waxed OCC/Kraft | 0.0% | 0.0% | 1 |
| High Grade | 0.6% | 0.3% | 77 |
| Mixed Low Grade | 4.7% | 0.5% | 560 |
| Compostable/Soiled | 7.2% | 0.7% | 865 |
| Pot. Comp. Sgl-use Food Service | 0.1% | 0.1% | 13 |
| Sgl-use Food Service | 0.4% | 0.1% | 47 |
| Mixed/Other Paper | 1.5% | 0.4% | 183 |
| **Plastic** | **10.2%** | | **1,221** |
| #1 PET Bottles | 0.4% | 0.1% | 53 |
| #2 HDPE Natural Bottles | 0.2% | 0.0% | 20 |
| #2 HDPE Colored Bottles | 0.5% | 0.1% | 54 |
| Other Bottles | 0.1% | 0.0% | 8 |
| Tubs | 0.5% | 0.1% | 62 |
| Expanded Poly. Nonfood | 0.1% | 0.0% | 16 |
| Expanded Poly. Food grade | 0.5% | 0.1% | 57 |
| Rigid Poly. Foam Insulation | 0.0% | 0.0% | 0 |
| Pot. Comp. Sgl-use Food Service | 0.0% | 0.0% | 0 |
| Other Single-use Food Service | 0.6% | 0.1% | 74 |
| Other Rigid Packaging | 0.9% | 0.2% | 102 |
| Shopping/Dry Cleaning Bags | 0.3% | 0.1% | 38 |
| Clean PE Film | 0.1% | 0.1% | 14 |
| Other Film | 4.2% | 0.4% | 501 |
| Plastic Pipe | 0.0% | 0.0% | 0 |
| Foam Carpet Padding | 0.1% | 0.1% | 13 |
| Durable Plastic Products | 1.0% | 0.2% | 121 |
| Plastic/Other Materials | 0.7% | 0.2% | 87 |
| **Glass** | **1.5%** | | **177** |
| Clear Bottles | 0.4% | 0.1% | 47 |
| Green Bottles | 0.3% | 0.1% | 36 |
| Brown Bottles | 0.2% | 0.1% | 27 |
| Container Glass | 0.3% | 0.1% | 33 |
| Fluorescent Tubes | 0.0% | 0.0% | 0 |
| CFLs | 0.0% | 0.0% | 1 |
| Flat Glass | 0.0% | 0.0% | 1 |
| Other Glass | 0.3% | 0.1% | 33 |
| **Metal** | **4.4%** | | **529** |
| Alum. Beverage Cans | 0.2% | 0.0% | 20 |
| Alum. Foil/Containers | 0.4% | 0.1% | 47 |
| Other Aluminum | 0.0% | 0.0% | 2 |
| Other Nonferrous | 0.0% | 0.0% | 2 |
| Tin Food Cans | 0.7% | 0.2% | 82 |
| Empty Aerosol Cans | 0.2% | 0.0% | 20 |
| Other Ferrous | 1.4% | 0.5% | 163 |
| Oil filters | 0.1% | 0.1% | 8 |
| Mixed Metals/Material | 1.5% | 0.5% | 185 |
| **Organics** | **60.2%** | | **7,202** |
| Leaves and Grass | 0.4% | 0.2% | 46 |
| Prunings | 0.4% | 0.4% | 47 |
| Food | 27.9% | 2.8% | 3,341 |
| Fats, Oils, Grease | 1.1% | 0.5% | 134 |
| Textiles/Clothing | 3.0% | 0.6% | 355 |
| Mixed Textiles | 1.2% | 0.4% | 139 |
| Carpet | 0.7% | 0.5% | 80 |
| Disposable Diapers | 10.6% | 1.4% | 1,270 |
| Animal By-products | 14.2% | 2.1% | 1,699 |
| Rubber Products | 0.4% | 0.2% | 45 |
| Tires | 0.4% | 0.6% | 46 |

| Material | Est. Percent | + / - | Est. Tons |
|---|---|---|---|
| **Appliances and Electronics** | **1.1%** | | **134** |
| Furniture | 0.7% | 1.1% | 83 |
| Mattresses | 0.0% | 0.1% | 4 |
| Small Appliances | 0.0% | 0.0% | 3 |
| Cell Phones | 0.0% | 0.0% | 0 |
| Audio/Visual Equipment | 0.2% | 0.2% | 23 |
| CRT Monitors | 0.0% | 0.0% | 0 |
| CRT Televisions | 0.0% | 0.0% | 0 |
| Other Electronics | 0.2% | 0.1% | 21 |
| **CDL Wastes** | **3.7%** | | **442** |
| Clean Dimension Lumber | 0.2% | 0.1% | 28 |
| Clean Engineered Wood | 0.3% | 0.2% | 40 |
| Pallets | 0.0% | 0.0% | 0 |
| Crates | 0.0% | 0.0% | 0 |
| Other Untreated Wood | 0.2% | 0.2% | 25 |
| New Painted Wood | 0.7% | 0.3% | 84 |
| Old Painted Wood | 0.1% | 0.2% | 15 |
| Creosote-treated Wood | 0.0% | 0.0% | 0 |
| Other Treated Wood | 0.1% | 0.1% | 8 |
| Contaminated Wood | 0.3% | 0.1% | 31 |
| New Gypsum Scrap | 0.0% | 0.0% | 1 |
| Demo Gypsum Scrap | 0.6% | 0.6% | 67 |
| Fiberglass Insulation | 0.0% | 0.0% | 3 |
| Rock/Concrete/Bricks | 0.2% | 0.1% | 20 |
| Asphalt Shingles | 0.0% | 0.0% | 2 |
| Other Asphaltic Roofing | 0.1% | 0.1% | 13 |
| Ceramics | 0.2% | 0.1% | 28 |
| Cement Fiber Board | 0.0% | 0.0% | 0 |
| Other Construction | 0.6% | 0.5% | 77 |
| **Hazardous** | **0.5%** | | **62** |
| Liquid Latex Paint | 0.1% | 0.1% | 11 |
| Dried Latex Paint | 0.0% | 0.0% | 3 |
| Solvent-based Adhesives | 0.0% | 0.0% | 2 |
| Water-based Adhesives | 0.0% | 0.0% | 0 |
| Oil-based Paint/Thinners | 0.0% | 0.0% | 0 |
| Caustic Cleaners | 0.0% | 0.0% | 4 |
| Pesticides/Herbicides | 0.0% | 0.0% | 0 |
| Dry-cell Batteries | 0.1% | 0.0% | 9 |
| Wet-cell Batteries | 0.0% | 0.0% | 0 |
| Gasoline/Kerosene | 0.0% | 0.0% | 2 |
| Motor Oil/Diesel Oil | 0.0% | 0.0% | 0 |
| Asbestos | 0.0% | 0.0% | 0 |
| Explosives | 0.0% | 0.0% | 0 |
| Medical Wastes | 0.3% | 0.2% | 30 |
| Other Chemicals | 0.0% | 0.0% | 2 |
| Other Potentially Toxic | 0.0% | 0.0% | 0 |
| **Fines and Misc Materials** | **1.9%** | | **232** |
| Sand/Soil/Dirt | 0.3% | 0.2% | 32 |
| Non-distinct Fines | 0.0% | 0.0% | 0 |
| Misc. Organics | 1.0% | 0.3% | 114 |
| Misc. Inorganics | 0.7% | 0.4% | 86 |
| **Totals** | **100.0%** | | **11,961** |
| Sample Count | 60 | | |

*Confidence intervals calculated at the 90% confidence level. Percentages for material types may not total 100% due to rounding.*

## Table 4-20: Composition by Weight – Single-family Zone 3
## (January – December 2010)

| Material | Est. Percent | + / - | Est. Tons |
|---|---|---|---|
| **Paper** | **16.8%** | | **2,255** |
| Newspaper | 0.9% | 0.2% | 122 |
| Plain OCC/Kraft | 1.6% | 0.3% | 218 |
| Waxed OCC/Kraft | 0.1% | 0.1% | 14 |
| High Grade | 1.1% | 0.5% | 150 |
| Mixed Low Grade | 4.8% | 0.5% | 648 |
| Compostable/Soiled | 6.2% | 0.7% | 829 |
| Pot. Comp. Sgl-use Food Service | 0.0% | 0.0% | 6 |
| Sgl-use Food Service | 0.4% | 0.1% | 52 |
| Mixed/Other Paper | 1.6% | 0.5% | 218 |
| **Plastic** | **11.5%** | | **1,542** |
| #1 PET Bottles | 0.5% | 0.1% | 68 |
| #2 HDPE Natural Bottles | 0.2% | 0.0% | 22 |
| #2 HDPE Colored Bottles | 0.3% | 0.1% | 45 |
| Other Bottles | 0.0% | 0.0% | 5 |
| Tubs | 0.5% | 0.1% | 68 |
| Expanded Poly. Nonfood | 0.3% | 0.1% | 37 |
| Expanded Poly. Food grade | 0.4% | 0.1% | 57 |
| Rigid Poly. Foam Insulation | 0.0% | 0.0% | 0 |
| Pot. Comp. Sgl-use Food Service | 0.0% | 0.0% | 0 |
| Other Single-use Food Service | 0.6% | 0.1% | 85 |
| Other Rigid Packaging | 0.7% | 0.1% | 100 |
| Shopping/Dry Cleaning Bags | 0.4% | 0.0% | 47 |
| Clean PE Film | 0.2% | 0.1% | 25 |
| Other Film | 4.8% | 0.4% | 644 |
| Plastic Pipe | 0.0% | 0.0% | 1 |
| Foam Carpet Padding | 0.0% | 0.0% | 4 |
| Durable Plastic Products | 1.6% | 0.7% | 219 |
| Plastic/Other Materials | 0.9% | 0.3% | 114 |
| **Glass** | **2.1%** | | **288** |
| Clear Bottles | 0.6% | 0.2% | 75 |
| Green Bottles | 0.5% | 0.2% | 61 |
| Brown Bottles | 0.4% | 0.1% | 48 |
| Container Glass | 0.4% | 0.1% | 47 |
| Fluorescent Tubes | 0.0% | 0.0% | 1 |
| CFLs | 0.0% | 0.0% | 0 |
| Flat Glass | 0.1% | 0.2% | 18 |
| Other Glass | 0.3% | 0.1% | 39 |
| **Metal** | **4.1%** | | **545** |
| Alum. Beverage Cans | 0.3% | 0.2% | 43 |
| Alum. Foil/Containers | 0.3% | 0.1% | 44 |
| Other Aluminum | 0.0% | 0.0% | 6 |
| Other Nonferrous | 0.0% | 0.0% | 5 |
| Tin Food Cans | 0.4% | 0.1% | 60 |
| Empty Aerosol Cans | 0.2% | 0.0% | 25 |
| Other Ferrous | 1.3% | 0.5% | 177 |
| Oil filters | 0.0% | 0.0% | 1 |
| Mixed Metals/Material | 1.4% | 0.5% | 184 |
| **Organics** | **58.0%** | | **7,795** |
| Leaves and Grass | 1.6% | 1.2% | 210 |
| Prunings | 0.7% | 0.9% | 94 |
| Food | 27.7% | 2.3% | 3,714 |
| Fats, Oils, Grease | 1.1% | 0.5% | 147 |
| Textiles/Clothing | 3.3% | 0.5% | 443 |
| Mixed Textiles | 1.3% | 0.4% | 180 |
| Carpet | 0.8% | 0.5% | 111 |
| Disposable Diapers | 7.9% | 1.4% | 1,055 |
| Animal By-products | 13.5% | 1.9% | 1,815 |
| Rubber Products | 0.2% | 0.1% | 25 |
| Tires | 0.0% | 0.0% | 1 |

| Material | Est. Percent | + / - | Est. Tons |
|---|---|---|---|
| **Appliances and Electronics** | **0.5%** | | **67** |
| Furniture | 0.0% | 0.1% | 5 |
| Mattresses | 0.0% | 0.0% | 0 |
| Small Appliances | 0.1% | 0.1% | 13 |
| Cell Phones | 0.0% | 0.0% | 0 |
| Audio/Visual Equipment | 0.1% | 0.1% | 11 |
| CRT Monitors | 0.0% | 0.0% | 3 |
| CRT Televisions | 0.0% | 0.0% | 0 |
| Other Electronics | 0.3% | 0.2% | 35 |
| **CDL Wastes** | **4.2%** | | **558** |
| Clean Dimension Lumber | 0.3% | 0.2% | 38 |
| Clean Engineered Wood | 0.1% | 0.1% | 17 |
| Pallets | 0.0% | 0.0% | 2 |
| Crates | 0.0% | 0.0% | 0 |
| Other Untreated Wood | 0.1% | 0.1% | 18 |
| New Painted Wood | 0.5% | 0.3% | 73 |
| Old Painted Wood | 0.0% | 0.0% | 2 |
| Creosote-treated Wood | 0.0% | 0.0% | 0 |
| Other Treated Wood | 0.1% | 0.1% | 18 |
| Contaminated Wood | 0.3% | 0.2% | 43 |
| New Gypsum Scrap | 0.0% | 0.0% | 0 |
| Demo Gypsum Scrap | 0.5% | 0.7% | 67 |
| Fiberglass Insulation | 0.1% | 0.2% | 13 |
| Rock/Concrete/Bricks | 0.3% | 0.2% | 36 |
| Asphalt Shingles | 0.0% | 0.0% | 0 |
| Other Asphaltic Roofing | 0.5% | 0.6% | 64 |
| Ceramics | 0.3% | 0.2% | 45 |
| Cement Fiber Board | 0.0% | 0.0% | 0 |
| Other Construction | 0.9% | 0.5% | 123 |
| **Hazardous** | **0.8%** | | **112** |
| Liquid Latex Paint | 0.4% | 0.2% | 50 |
| Dried Latex Paint | 0.2% | 0.2% | 23 |
| Solvent-based Adhesives | 0.0% | 0.0% | 1 |
| Water-based Adhesives | 0.0% | 0.0% | 0 |
| Oil-based Paint/Thinners | 0.0% | 0.0% | 0 |
| Caustic Cleaners | 0.0% | 0.0% | 2 |
| Pesticides/Herbicides | 0.0% | 0.0% | 0 |
| Dry-cell Batteries | 0.0% | 0.0% | 5 |
| Wet-cell Batteries | 0.0% | 0.0% | 0 |
| Gasoline/Kerosene | 0.0% | 0.0% | 0 |
| Motor Oil/Diesel Oil | 0.0% | 0.0% | 0 |
| Asbestos | 0.0% | 0.0% | 0 |
| Explosives | 0.0% | 0.0% | 1 |
| Medical Wastes | 0.2% | 0.2% | 31 |
| Other Chemicals | 0.0% | 0.0% | 0 |
| Other Potentially Toxic | 0.0% | 0.0% | 0 |
| **Fines and Misc Materials** | **2.0%** | | **267** |
| Sand/Soil/Dirt | 0.3% | 0.2% | 37 |
| Non-distinct Fines | 0.0% | 0.1% | 5 |
| Misc. Organics | 1.1% | 0.3% | 151 |
| Misc. Inorganics | 0.6% | 0.2% | 75 |
| **Totals** | **100.0%** | | **13,431** |
| Sample Count | 60 | | |

*Confidence intervals calculated at the 90% confidence level. Percentages for material types may not total 100% due to rounding.*

## Table 4-21: Composition by Weight – Single-family Zone 4
## (January – December 2010)

| Material | Est. Percent | + / - | Est. Tons |
|---|---|---|---|
| **Paper** | **17.1%** | | **3,990** |
| Newspaper | 0.8% | 0.2% | 183 |
| Plain OCC/Kraft | 1.0% | 0.2% | 225 |
| Waxed OCC/Kraft | 0.0% | 0.0% | 0 |
| High Grade | 0.7% | 0.2% | 169 |
| Mixed Low Grade | 5.1% | 0.5% | 1,199 |
| Compostable/Soiled | 7.7% | 0.8% | 1,802 |
| Pot. Comp. Sgl-use Food Service | 0.0% | 0.0% | 2 |
| Sgl-use Food Service | 0.4% | 0.1% | 102 |
| Mixed/Other Paper | 1.3% | 0.3% | 307 |
| **Plastic** | **10.7%** | | **2,493** |
| #1 PET Bottles | 0.5% | 0.1% | 118 |
| #2 HDPE Natural Bottles | 0.2% | 0.0% | 40 |
| #2 HDPE Colored Bottles | 0.3% | 0.1% | 76 |
| Other Bottles | 0.1% | 0.0% | 12 |
| Tubs | 0.5% | 0.1% | 114 |
| Expanded Poly. Nonfood | 0.2% | 0.1% | 37 |
| Expanded Poly. Food grade | 0.6% | 0.1% | 132 |
| Rigid Poly. Foam Insulation | 0.0% | 0.0% | 0 |
| Pot. Comp. Sgl-use Food Service | 0.0% | 0.0% | 2 |
| Other Single-use Food Service | 0.6% | 0.1% | 136 |
| Other Rigid Packaging | 0.7% | 0.1% | 153 |
| Shopping/Dry Cleaning Bags | 0.5% | 0.1% | 107 |
| Clean PE Film | 0.1% | 0.1% | 26 |
| Other Film | 4.3% | 0.4% | 1,009 |
| Plastic Pipe | 0.0% | 0.0% | 1 |
| Foam Carpet Padding | 0.1% | 0.1% | 12 |
| Durable Plastic Products | 1.6% | 0.4% | 368 |
| Plastic/Other Materials | 0.6% | 0.2% | 151 |
| **Glass** | **1.7%** | | **396** |
| Clear Bottles | 0.5% | 0.2% | 119 |
| Green Bottles | 0.3% | 0.2% | 77 |
| Brown Bottles | 0.2% | 0.1% | 54 |
| Container Glass | 0.4% | 0.1% | 87 |
| Fluorescent Tubes | 0.0% | 0.0% | 0 |
| CFLs | 0.0% | 0.0% | 1 |
| Flat Glass | 0.0% | 0.0% | 0 |
| Other Glass | 0.2% | 0.1% | 58 |
| **Metal** | **2.9%** | | **677** |
| Alum. Beverage Cans | 0.2% | 0.0% | 37 |
| Alum. Foil/Containers | 0.4% | 0.1% | 86 |
| Other Aluminum | 0.0% | 0.0% | 3 |
| Other Nonferrous | 0.0% | 0.0% | 0 |
| Tin Food Cans | 0.6% | 0.1% | 138 |
| Empty Aerosol Cans | 0.2% | 0.1% | 53 |
| Other Ferrous | 0.6% | 0.2% | 148 |
| Oil filters | 0.0% | 0.0% | 3 |
| Mixed Metals/Material | 0.9% | 0.4% | 208 |
| **Organics** | **59.3%** | | **13,834** |
| Leaves and Grass | 0.8% | 0.5% | 197 |
| Prunings | 1.0% | 1.2% | 230 |
| Food | 31.1% | 2.5% | 7,245 |
| Fats, Oils, Grease | 0.5% | 0.5% | 127 |
| Textiles/Clothing | 3.7% | 0.8% | 863 |
| Mixed Textiles | 1.1% | 0.4% | 265 |
| Carpet | 0.4% | 0.2% | 96 |
| Disposable Diapers | 10.0% | 1.4% | 2,333 |
| Animal By-products | 10.3% | 1.5% | 2,396 |
| Rubber Products | 0.4% | 0.2% | 83 |
| Tires | 0.0% | 0.0% | 0 |

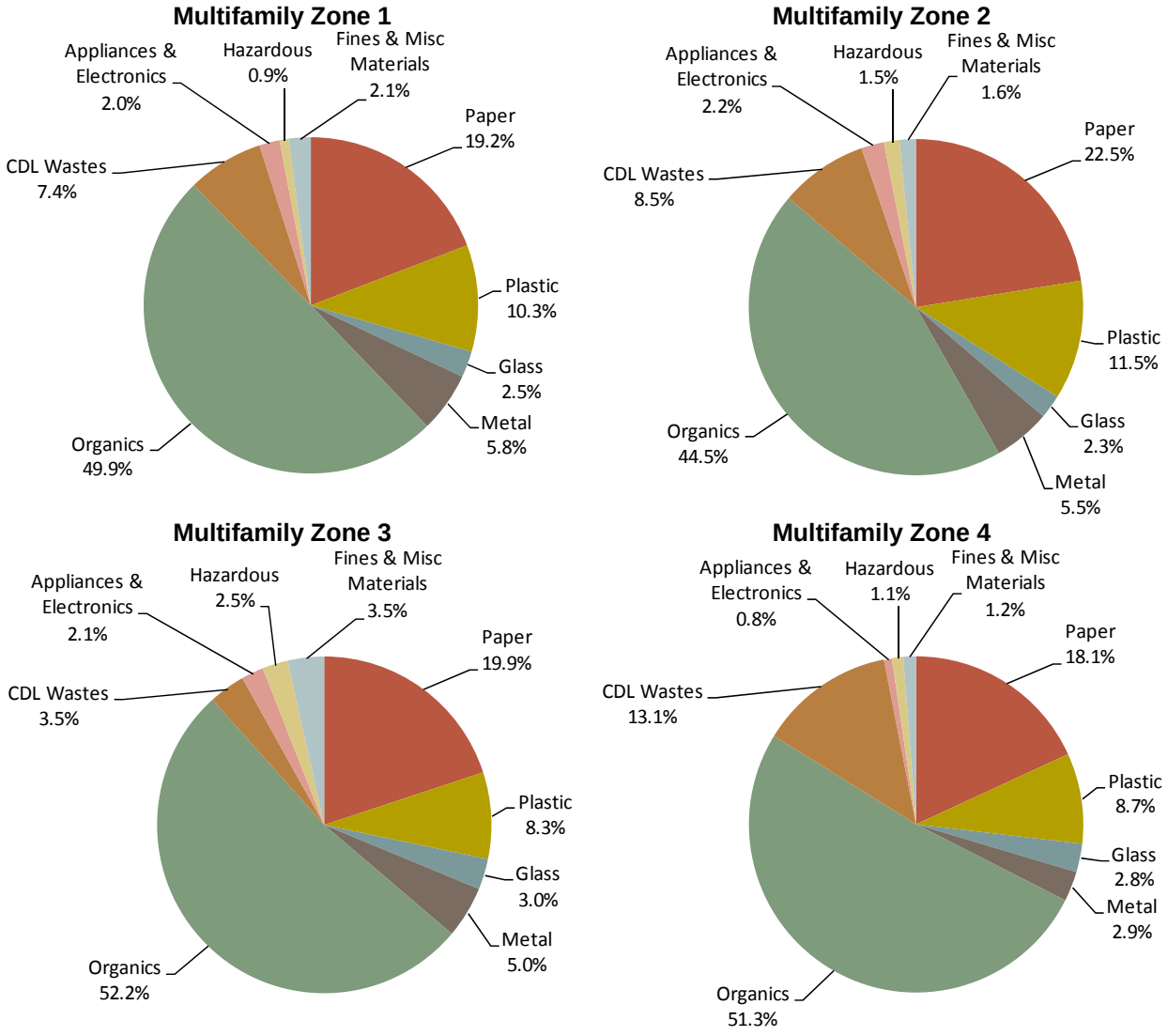
| Material | Est. Percent | + / - | Est. Tons |
|---|---|---|---|
| **Appliances and Electronics** | **0.7%** | | **164** |
| Furniture | 0.0% | 0.0% | 0 |
| Mattresses | 0.0% | 0.0% | 0 |
| Small Appliances | 0.2% | 0.1% | 38 |
| Cell Phones | 0.0% | 0.0% | 1 |
| Audio/Visual Equipment | 0.1% | 0.1% | 28 |
| CRT Monitors | 0.0% | 0.0% | 0 |
| CRT Televisions | 0.0% | 0.0% | 0 |
| Other Electronics | 0.4% | 0.3% | 97 |
| **CDL Wastes** | **4.5%** | | **1,057** |
| Clean Dimension Lumber | 0.2% | 0.2% | 53 |
| Clean Engineered Wood | 0.2% | 0.2% | 45 |
| Pallets | 0.0% | 0.0% | 0 |
| Crates | 0.0% | 0.0% | 0 |
| Other Untreated Wood | 0.3% | 0.2% | 62 |
| New Painted Wood | 0.7% | 0.4% | 173 |
| Old Painted Wood | 0.0% | 0.0% | 5 |
| Creosote-treated Wood | 0.0% | 0.0% | 0 |
| Other Treated Wood | 0.2% | 0.3% | 51 |
| Contaminated Wood | 0.2% | 0.1% | 57 |
| New Gypsum Scrap | 0.0% | 0.0% | 0 |
| Demo Gypsum Scrap | 0.2% | 0.2% | 37 |
| Fiberglass Insulation | 0.1% | 0.1% | 13 |
| Rock/Concrete/Bricks | 0.3% | 0.3% | 69 |
| Asphalt Shingles | 0.0% | 0.0% | 7 |
| Other Asphaltic Roofing | 0.0% | 0.1% | 10 |
| Ceramics | 0.4% | 0.2% | 92 |
| Cement Fiber Board | 0.3% | 0.4% | 61 |
| Other Construction | 1.4% | 1.0% | 324 |
| **Hazardous** | **0.6%** | | **136** |
| Liquid Latex Paint | 0.2% | 0.2% | 51 |
| Dried Latex Paint | 0.0% | 0.0% | 3 |
| Solvent-based Adhesives | 0.0% | 0.0% | 0 |
| Water-based Adhesives | 0.0% | 0.0% | 0 |
| Oil-based Paint/Thinners | 0.0% | 0.0% | 1 |
| Caustic Cleaners | 0.1% | 0.1% | 17 |
| Pesticides/Herbicides | 0.0% | 0.0% | 0 |
| Dry-cell Batteries | 0.1% | 0.1% | 18 |
| Wet-cell Batteries | 0.0% | 0.0% | 0 |
| Gasoline/Kerosene | 0.0% | 0.0% | 0 |
| Motor Oil/Diesel Oil | 0.0% | 0.0% | 2 |
| Asbestos | 0.0% | 0.0% | 0 |
| Explosives | 0.0% | 0.0% | 0 |
| Medical Wastes | 0.2% | 0.2% | 41 |
| Other Chemicals | 0.0% | 0.0% | 1 |
| Other Potentially Toxic | 0.0% | 0.0% | 1 |
| **Fines and Misc Materials** | **2.5%** | | **584** |
| Sand/Soil/Dirt | 0.6% | 0.6% | 136 |
| Non-distinct Fines | 0.0% | 0.0% | 0 |
| Misc. Organics | 1.4% | 0.4% | 337 |
| Misc. Inorganics | 0.5% | 0.2% | 111 |
| **Totals** | **100.0%** | | **23,332** |
| Sample Count | 60 | | |

*Confidence intervals calculated at the 90% confidence level. Percentages for material types may not total 100% due to rounding.*

## 4.5 By Collection Zone and Residence Type: Multifamily

Waste composition results were examined for differences for multifamily waste across collection zones. As shown in Figure 4-4, **organics** and **paper** together compose about 70% of the waste from multifamily residences in all four collection zones. **Plastic** was another large component, accounting for between about 8% and 12% in all zones. The percentage of **CDL wastes** in Zone 4 (13.1%) was four times as large as in Zone 3 (3.5%) and almost twice as large as in Zone 1 (7.4%) and Zone 2 (8.5%). **Metal** in Zone 4 was around 3% of the total, while metal in Zones 1 through 3 was between 5% and 6%.

**Figure 4-4: Composition Summary, Multifamily**
**(January – December 2010)**



### 4.5.1 Multifamily Zone 1

A total of 30 loads were sampled for the multifamily Zone 1 subpopulation. Approximately 7,666 tons of waste were disposed by this subpopulation for calendar year 2010. Almost 30% of the waste was composed of *food*. *Compostable/soiled paper, disposable diapers,* and *animal by-products* each accounted for at least 6%, by weight. The full composition results for the multifamily Zone 1 subpopulation are listed in Table 4-26.

**Table 4-22: Top Ten Components – Multifamily Zone 1**
**(January – December 2010)**

| Material | Est. Percent | Cum. Percent | Est. Tons |
|---|---|---|---|
| Food | 28.7% | 28.7% | 2,199 |
| Compostable/Soiled Paper | 7.8% | 36.5% | 601 |
| Disposable Diapers | 7.0% | 43.5% | 537 |
| Animal By-products | 6.1% | 49.6% | 467 |
| Mixed Low-grade Paper | 5.4% | 55.0% | 412 |
| Other Plastic Film | 3.7% | 58.7% | 286 |
| Other Ferrous Metal | 3.1% | 61.9% | 241 |
| Textiles/Clothing | 2.3% | 64.2% | 179 |
| Rock/Concrete/Bricks | 2.1% | 66.3% | 164 |
| Plain OCC/Kraft | 2.0% | 68.4% | 155 |
| **Total** | **68.4%** | | **5,240** |

### 4.5.2 Multifamily Zone 2

To characterize waste from the multifamily Zone 2 subpopulation, 30 samples were sorted. It is estimated that multifamily residents in Zone 2 disposed about 9,071 tons in 2010. The top ten components for this subpopulation accounted for 65%, or 5,891 tons. Approximately 25% of the waste was composed of *food*. *Compostable/soiled paper* and *mixed low-grade paper* each accounted for at least 6%. Table 4-27 lists detailed composition results for waste from multifamily residences in Zone 2.

**Table 4-23: Top Ten Components – Multifamily Zone 2**
**(January – December 2010)**

| Material | Est. Percent | Cum. Percent | Est. Tons |
|---|---|---|---|
| Food | 25.4% | 25.4% | 2,302 |
| Compostable/Soiled Paper | 7.6% | 33.0% | 688 |
| Mixed Low-grade Paper | 6.6% | 39.5% | 594 |
| Animal By-products | 5.3% | 44.8% | 478 |
| Other Plastic Film | 4.1% | 48.9% | 375 |
| Disposable Diapers | 3.9% | 52.8% | 355 |
| Plain OCC/Kraft | 3.5% | 56.3% | 318 |
| Leaves and Grass | 3.4% | 59.7% | 305 |
| Textiles/Clothing | 3.3% | 63.0% | 303 |
| Other Ferrous Metal | 1.9% | 64.9% | 173 |
| **Total** | **64.9%** | | **5,891** |

### 4.5.3 Multifamily Zone 3

A total of 30 samples were sorted to characterize waste from the multifamily Zone 3 subpopulation. It is estimated that multifamily residents in Zone 3 disposed about 22,923 tons in 2010. The top ten components for this subpopulation accounted for 69%, or 15,835 tons. Approximately 30% of the waste was composed of *food*. *Animal by-products*, *mixed low-grade paper*, and *compostable/soiled paper* each accounted for at least 6%. Table 4-28 lists detailed composition results for waste from multifamily residences in Zone 3.

**Table 4-24: Top Ten Components – Multifamily Zone 3**
**(January – December 2010)**

| Material | Est. Percent | Cum. Percent | Est. Tons |
|---|---|---|---|
| Food | 29.7% | 29.7% | 6,812 |
| Animal By-products | 8.7% | 38.4% | 2,001 |
| Mixed Low-grade Paper | 6.6% | 45.0% | 1,509 |
| Compostable/Soiled Paper | 6.0% | 51.0% | 1,370 |
| Textiles/Clothing | 4.1% | 55.1% | 934 |
| Disposable Diapers | 3.4% | 58.5% | 773 |
| Plain OCC/Kraft | 2.9% | 61.4% | 666 |
| Other Plastic Film | 2.8% | 64.2% | 651 |
| Leaves and Grass | 2.6% | 66.8% | 598 |
| Other Ferrous Metal | 2.3% | 69.1% | 521 |
| **Total** | **69.1%** | | **15,835** |

### 4.5.4 Multifamily Zone 4

To characterize waste from the multifamily Zone 4 subpopulation, 31 samples were sorted. It is estimated that multifamily residents in the south collection zone disposed about 10,160 tons in 2010. The top ten components for this subpopulation accounted for 67%, or 6,814 tons. About 32% of the waste was composed of *food*. *Compostable/soiled paper* and *mixed low-grade paper* accounted for about 6%. Table 4-29 lists detailed composition results for waste from multifamily residences in Zone 4.

**Table 4-25: Top Ten Components – Multifamily Zone 4**
**(January – December 2010)**

| Material | Est. Percent | Cum. Percent | Est. Tons |
|---|---|---|---|
| Food | 32.3% | 32.3% | 3,284 |
| Compostable/Soiled Paper | 6.2% | 38.5% | 626 |
| Mixed Low-grade Paper | 5.8% | 44.3% | 589 |
| Animal By-products | 4.4% | 48.6% | 442 |
| Disposable Diapers | 4.3% | 52.9% | 433 |
| Textiles/Clothing | 4.0% | 56.9% | 406 |
| Other Construction Wastes | 3.1% | 60.0% | 319 |
| Other Plastic Film | 2.7% | 62.7% | 274 |
| Demo Gypsum Scrap | 2.3% | 65.0% | 232 |
| Leaves and Grass | 2.1% | 67.1% | 210 |
| **Total** | **67.1%** | | **6,814** |

### 4.5.5 Comparisons Between Multifamily Zones 1 through 4

For Zones 1 through 4, *food* was the largest material component, composing about 30% of waste disposed. Although the second and third largest material components varied across zones, c*ompostable/soiled paper* was common to Zones 1, 2, and 4 while *mixed low-grade paper* was common to Zone 2, 3, and 4. Only in Zone 3 was *animal by-products* one of the top three components, and only in Zone 1 was *disposable diapers* one of the top three.

Seven of the top ten components were the same across all four zones: *food, compostable/soiled paper, mixed low-grade paper, animal by-products, disposable diapers, textiles/clothing*, and *other plastic film*. *Other construction wastes* and *demo gypsum scrap* were top ten components only in multifamily Zone 4, while *rock/concrete/bricks* was a top ten component only in multifamily Zone 1.

## Table 4-26: Composition by Weight – Multifamily Zone 1
### (January – December 2010)

| Material | Est. Percent | + / - | Est. Tons |
|---|---|---|---|
| **Paper** | **19.2%** | | **1,469** |
| Newspaper | 1.2% | 0.5% | 91 |
| Plain OCC/Kraft | 2.0% | 0.6% | 155 |
| Waxed OCC/Kraft | 0.1% | 0.1% | 5 |
| High Grade | 0.9% | 0.2% | 70 |
| Mixed Low Grade | 5.4% | 0.9% | 412 |
| Compostable/Soiled | 7.8% | 1.4% | 601 |
| Pot. Comp. Sgl-use Food Service | 0.0% | 0.0% | 1 |
| Sgl-use Food Service | 0.5% | 0.2% | 38 |
| Mixed/Other Paper | 1.3% | 0.6% | 96 |
| **Plastic** | **10.3%** | | **789** |
| #1 PET Bottles | 0.6% | 0.1% | 45 |
| #2 HDPE Natural Bottles | 0.3% | 0.1% | 22 |
| #2 HDPE Colored Bottles | 0.4% | 0.2% | 32 |
| Other Bottles | 0.1% | 0.1% | 5 |
| Tubs | 0.5% | 0.1% | 37 |
| Expanded Poly. Nonfood | 0.1% | 0.1% | 10 |
| Expanded Poly. Food grade | 0.3% | 0.1% | 19 |
| Rigid Poly. Foam Insulation | 0.0% | 0.0% | 0 |
| Pot. Comp. Sgl-use Food Service | 0.0% | 0.0% | 0 |
| Other Single-use Food Service | 0.8% | 0.2% | 61 |
| Other Rigid Packaging | 0.5% | 0.2% | 38 |
| Shopping/Dry Cleaning Bags | 0.4% | 0.2% | 29 |
| Clean PE Film | 0.1% | 0.0% | 6 |
| Other Film | 3.7% | 0.7% | 286 |
| Plastic Pipe | 0.0% | 0.0% | 0 |
| Foam Carpet Padding | 0.5% | 0.5% | 37 |
| Durable Plastic Products | 1.3% | 0.5% | 101 |
| Plastic/Other Materials | 0.8% | 0.4% | 59 |
| **Glass** | **2.5%** | | **194** |
| Clear Bottles | 0.8% | 0.4% | 61 |
| Green Bottles | 0.5% | 0.2% | 40 |
| Brown Bottles | 0.5% | 0.3% | 39 |
| Container Glass | 0.5% | 0.2% | 36 |
| Fluorescent Tubes | 0.0% | 0.0% | 0 |
| CFLs | 0.0% | 0.0% | 1 |
| Flat Glass | 0.0% | 0.0% | 0 |
| Other Glass | 0.2% | 0.1% | 17 |
| **Metal** | **5.8%** | | **444** |
| Alum. Beverage Cans | 0.3% | 0.1% | 25 |
| Alum. Foil/Containers | 0.3% | 0.1% | 26 |
| Other Aluminum | 0.1% | 0.1% | 4 |
| Other Nonferrous | 0.0% | 0.0% | 0 |
| Tin Food Cans | 0.5% | 0.1% | 40 |
| Empty Aerosol Cans | 0.2% | 0.1% | 13 |
| Other Ferrous | 3.1% | 2.3% | 241 |
| Oil filters | 0.0% | 0.0% | 0 |
| Mixed Metals/Material | 1.2% | 0.6% | 95 |
| **Organics** | **49.9%** | | **3,824** |
| Leaves and Grass | 1.0% | 0.8% | 79 |
| Prunings | 1.2% | 1.3% | 92 |
| Food | 28.7% | 3.5% | 2,199 |
| Fats, Oils, Grease | 0.5% | 0.3% | 42 |
| Textiles/Clothing | 2.3% | 1.0% | 179 |
| Mixed Textiles | 1.0% | 0.5% | 73 |
| Carpet | 1.8% | 1.4% | 135 |
| Disposable Diapers | 7.0% | 3.1% | 537 |
| Animal By-products | 6.1% | 1.7% | 467 |
| Rubber Products | 0.3% | 0.3% | 21 |
| Tires | 0.0% | 0.0% | 0 |

| Material | Est. Percent | + / - | Est. Tons |
|---|---|---|---|
| **Appliances and Electronics** | **2.0%** | | **150** |
| Furniture | 1.3% | 1.2% | 99 |
| Mattresses | 0.4% | 0.6% | 29 |
| Small Appliances | 0.1% | 0.1% | 6 |
| Cell Phones | 0.0% | 0.0% | 0 |
| Audio/Visual Equipment | 0.2% | 0.2% | 14 |
| CRT Monitors | 0.0% | 0.0% | 0 |
| CRT Televisions | 0.0% | 0.0% | 0 |
| Other Electronics | 0.0% | 0.0% | 2 |
| **CDL Wastes** | **7.4%** | | **565** |
| Clean Dimension Lumber | 0.7% | 0.5% | 55 |
| Clean Engineered Wood | 0.0% | 0.0% | 3 |
| Pallets | 2.0% | 2.7% | 151 |
| Crates | 0.0% | 0.0% | 0 |
| Other Untreated Wood | 0.1% | 0.1% | 5 |
| New Painted Wood | 0.5% | 0.3% | 39 |
| Old Painted Wood | 0.0% | 0.0% | 0 |
| Creosote-treated Wood | 0.0% | 0.0% | 0 |
| Other Treated Wood | 0.4% | 0.3% | 29 |
| Contaminated Wood | 0.6% | 0.5% | 45 |
| New Gypsum Scrap | 0.0% | 0.0% | 0 |
| Demo Gypsum Scrap | 0.3% | 0.2% | 21 |
| Fiberglass Insulation | 0.0% | 0.0% | 0 |
| Rock/Concrete/Bricks | 2.1% | 3.5% | 164 |
| Asphalt Shingles | 0.0% | 0.0% | 0 |
| Other Asphaltic Roofing | 0.0% | 0.0% | 0 |
| Ceramics | 0.3% | 0.2% | 26 |
| Cement Fiber Board | 0.0% | 0.0% | 0 |
| Other Construction | 0.4% | 0.6% | 27 |
| **Hazardous** | **0.9%** | | **66** |
| Liquid Latex Paint | 0.5% | 0.7% | 42 |
| Dried Latex Paint | 0.0% | 0.1% | 2 |
| Solvent-based Adhesives | 0.0% | 0.0% | 0 |
| Water-based Adhesives | 0.0% | 0.0% | 0 |
| Oil-based Paint/Thinners | 0.0% | 0.0% | 0 |
| Caustic Cleaners | 0.0% | 0.0% | 2 |
| Pesticides/Herbicides | 0.0% | 0.0% | 0 |
| Dry-cell Batteries | 0.1% | 0.1% | 4 |
| Wet-cell Batteries | 0.0% | 0.0% | 0 |
| Gasoline/Kerosene | 0.0% | 0.0% | 0 |
| Motor Oil/Diesel Oil | 0.0% | 0.0% | 0 |
| Asbestos | 0.0% | 0.0% | 0 |
| Explosives | 0.0% | 0.0% | 0 |
| Medical Wastes | 0.2% | 0.3% | 14 |
| Other Chemicals | 0.0% | 0.0% | 2 |
| Other Potentially Toxic | 0.0% | 0.0% | 0 |
| **Fines and Misc Materials** | **2.1%** | | **163** |
| Sand/Soil/Dirt | 0.2% | 0.1% | 12 |
| Non-distinct Fines | 0.1% | 0.2% | 11 |
| Misc. Organics | 1.2% | 0.6% | 93 |
| Misc. Inorganics | 0.6% | 0.3% | 48 |
| **Totals** | **100.0%** | | **7,666** |
| Sample Count | 30 | | |

*Confidence intervals calculated at the 90% confidence level. Percentages for material types may not total 100% due to rounding.*

## Table 4-27: Composition by Weight – Multifamily Zone 2
### (January – December 2010)

| Material | Est. Percent | + / - | Est. Tons |
|---|---|---|---|
| **Paper** | **22.5%** | | **2,037** |
| Newspaper | 1.7% | 0.4% | 156 |
| Plain OCC/Kraft | 3.5% | 0.9% | 318 |
| Waxed OCC/Kraft | 0.0% | 0.0% | 0 |
| High Grade | 1.2% | 0.5% | 107 |
| Mixed Low Grade | 6.6% | 1.0% | 594 |
| Compostable/Soiled | 7.6% | 1.2% | 688 |
| Pot. Comp. Sgl-use Food Service | 0.0% | 0.0% | 3 |
| Sgl-use Food Service | 0.5% | 0.2% | 49 |
| Mixed/Other Paper | 1.3% | 0.5% | 122 |
| **Plastic** | **11.5%** | | **1,045** |
| #1 PET Bottles | 0.8% | 0.1% | 75 |
| #2 HDPE Natural Bottles | 0.3% | 0.1% | 28 |
| #2 HDPE Colored Bottles | 0.4% | 0.1% | 33 |
| Other Bottles | 0.1% | 0.0% | 7 |
| Tubs | 0.4% | 0.1% | 39 |
| Expanded Poly. Nonfood | 0.1% | 0.1% | 13 |
| Expanded Poly. Food grade | 0.3% | 0.1% | 32 |
| Rigid Poly. Foam Insulation | 0.0% | 0.0% | 0 |
| Pot. Comp. Sgl-use Food Service | 0.0% | 0.0% | 0 |
| Other Single-use Food Service | 0.7% | 0.2% | 64 |
| Other Rigid Packaging | 0.6% | 0.1% | 53 |
| Shopping/Dry Cleaning Bags | 0.5% | 0.1% | 42 |
| Clean PE Film | 0.2% | 0.2% | 18 |
| Other Film | 4.1% | 0.5% | 375 |
| Plastic Pipe | 0.0% | 0.0% | 3 |
| Foam Carpet Padding | 0.8% | 0.9% | 73 |
| Durable Plastic Products | 1.2% | 0.5% | 113 |
| Plastic/Other Materials | 0.9% | 0.4% | 78 |
| **Glass** | **2.3%** | | **208** |
| Clear Bottles | 0.6% | 0.2% | 52 |
| Green Bottles | 0.4% | 0.2% | 41 |
| Brown Bottles | 0.5% | 0.2% | 44 |
| Container Glass | 0.4% | 0.1% | 32 |
| Fluorescent Tubes | 0.0% | 0.0% | 0 |
| CFLs | 0.0% | 0.0% | 1 |
| Flat Glass | 0.0% | 0.0% | 0 |
| Other Glass | 0.4% | 0.3% | 39 |
| **Metal** | **5.5%** | | **498** |
| Alum. Beverage Cans | 0.8% | 0.6% | 70 |
| Alum. Foil/Containers | 0.2% | 0.1% | 22 |
| Other Aluminum | 0.0% | 0.0% | 2 |
| Other Nonferrous | 0.0% | 0.0% | 1 |
| Tin Food Cans | 0.6% | 0.2% | 55 |
| Empty Aerosol Cans | 0.1% | 0.1% | 12 |
| Other Ferrous | 1.9% | 0.7% | 173 |
| Oil filters | 0.0% | 0.0% | 0 |
| Mixed Metals/Material | 1.8% | 0.8% | 164 |
| **Organics** | **44.5%** | | **4,037** |
| Leaves and Grass | 3.4% | 2.9% | 305 |
| Prunings | 0.8% | 0.9% | 72 |
| Food | 25.4% | 3.3% | 2,302 |
| Fats, Oils, Grease | 0.7% | 0.5% | 63 |
| Textiles/Clothing | 3.3% | 0.8% | 303 |
| Mixed Textiles | 1.0% | 0.5% | 94 |
| Carpet | 0.4% | 0.3% | 32 |
| Disposable Diapers | 3.9% | 1.4% | 355 |
| Animal By-products | 5.3% | 2.1% | 478 |
| Rubber Products | 0.2% | 0.1% | 16 |
| Tires | 0.2% | 0.3% | 18 |

| Material | Est. Percent | + / - | Est. Tons |
|---|---|---|---|
| **Appliances and Electronics** | **2.2%** | | **198** |
| Furniture | 0.0% | 0.0% | 0 |
| Mattresses | 0.7% | 0.8% | 61 |
| Small Appliances | 0.7% | 1.1% | 60 |
| Cell Phones | 0.0% | 0.0% | 0 |
| Audio/Visual Equipment | 0.4% | 0.4% | 34 |
| CRT Monitors | 0.0% | 0.0% | 0 |
| CRT Televisions | 0.0% | 0.0% | 0 |
| Other Electronics | 0.5% | 0.5% | 43 |
| **CDL Wastes** | **8.5%** | | **770** |
| Clean Dimension Lumber | 0.6% | 0.4% | 51 |
| Clean Engineered Wood | 0.0% | 0.1% | 3 |
| Pallets | 0.0% | 0.0% | 0 |
| Crates | 0.0% | 0.1% | 4 |
| Other Untreated Wood | 0.1% | 0.2% | 12 |
| New Painted Wood | 1.4% | 0.9% | 130 |
| Old Painted Wood | 0.1% | 0.2% | 11 |
| Creosote-treated Wood | 0.0% | 0.0% | 0 |
| Other Treated Wood | 1.8% | 1.7% | 161 |
| Contaminated Wood | 0.6% | 0.4% | 57 |
| New Gypsum Scrap | 0.0% | 0.0% | 1 |
| Demo Gypsum Scrap | 0.2% | 0.2% | 19 |
| Fiberglass Insulation | 0.0% | 0.0% | 1 |
| Rock/Concrete/Bricks | 1.0% | 1.0% | 92 |
| Asphalt Shingles | 0.0% | 0.0% | 0 |
| Other Asphaltic Roofing | 0.0% | 0.0% | 0 |
| Ceramics | 1.5% | 1.4% | 139 |
| Cement Fiber Board | 0.0% | 0.0% | 0 |
| Other Construction | 1.0% | 1.2% | 89 |
| **Hazardous** | **1.5%** | | **135** |
| Liquid Latex Paint | 0.2% | 0.2% | 15 |
| Dried Latex Paint | 0.0% | 0.0% | 2 |
| Solvent-based Adhesives | 0.0% | 0.0% | 0 |
| Water-based Adhesives | 0.0% | 0.0% | 0 |
| Oil-based Paint/Thinners | 0.0% | 0.0% | 0 |
| Caustic Cleaners | 0.0% | 0.1% | 4 |
| Pesticides/Herbicides | 0.0% | 0.0% | 2 |
| Dry-cell Batteries | 0.0% | 0.0% | 2 |
| Wet-cell Batteries | 0.0% | 0.0% | 2 |
| Gasoline/Kerosene | 0.0% | 0.0% | 0 |
| Motor Oil/Diesel Oil | 0.0% | 0.0% | 1 |
| Asbestos | 0.0% | 0.0% | 0 |
| Explosives | 0.0% | 0.0% | 0 |
| Medical Wastes | 1.1% | 0.9% | 103 |
| Other Chemicals | 0.0% | 0.0% | 3 |
| Other Potentially Toxic | 0.0% | 0.0% | 1 |
| **Fines and Misc Materials** | **1.6%** | | **143** |
| Sand/Soil/Dirt | 0.5% | 0.4% | 43 |
| Non-distinct Fines | 0.3% | 0.4% | 29 |
| Misc. Organics | 0.4% | 0.2% | 40 |
| Misc. Inorganics | 0.3% | 0.3% | 31 |
| **Totals** | **100.0%** | | **9,071** |
| Sample Count | 30 | | |

*Confidence intervals calculated at the 90% confidence level. Percentages for material types may not total 100% due to rounding.*

## Table 4-28: Composition by Weight – Multifamily Zone 3
### (January – December 2010)

| Material | Est. Percent | + / - | Est. Tons |
|---|---|---|---|
| **Paper** | **19.9%** | | **4,570** |
| Newspaper | 1.3% | 0.5% | 308 |
| Plain OCC/Kraft | 2.9% | 0.8% | 666 |
| Waxed OCC/Kraft | 0.0% | 0.1% | 9 |
| High Grade | 1.1% | 1.0% | 249 |
| Mixed Low Grade | 6.6% | 1.2% | 1,509 |
| Compostable/Soiled | 6.0% | 1.0% | 1,370 |
| Pot. Comp. Sgl-use Food Service | 0.0% | 0.0% | 3 |
| Sgl-use Food Service | 0.3% | 0.1% | 63 |
| Mixed/Other Paper | 1.7% | 0.6% | 393 |
| **Plastic** | **8.3%** | | **1,912** |
| #1 PET Bottles | 0.5% | 0.1% | 126 |
| #2 HDPE Natural Bottles | 0.2% | 0.1% | 42 |
| #2 HDPE Colored Bottles | 0.2% | 0.1% | 57 |
| Other Bottles | 0.0% | 0.0% | 10 |
| Tubs | 0.4% | 0.2% | 103 |
| Expanded Poly. Nonfood | 0.1% | 0.1% | 34 |
| Expanded Poly. Food grade | 0.4% | 0.2% | 91 |
| Rigid Poly. Foam Insulation | 0.0% | 0.0% | 0 |
| Pot. Comp. Sgl-use Food Service | 0.0% | 0.1% | 7 |
| Other Single-use Food Service | 0.5% | 0.1% | 125 |
| Other Rigid Packaging | 0.5% | 0.1% | 112 |
| Shopping/Dry Cleaning Bags | 0.4% | 0.1% | 86 |
| Clean PE Film | 0.2% | 0.3% | 52 |
| Other Film | 2.8% | 0.5% | 651 |
| Plastic Pipe | 0.0% | 0.0% | 1 |
| Foam Carpet Padding | 0.0% | 0.0% | 0 |
| Durable Plastic Products | 1.3% | 0.5% | 295 |
| Plastic/Other Materials | 0.5% | 0.2% | 120 |
| **Glass** | **3.0%** | | **677** |
| Clear Bottles | 0.6% | 0.2% | 143 |
| Green Bottles | 1.1% | 0.4% | 253 |
| Brown Bottles | 0.6% | 0.2% | 145 |
| Container Glass | 0.3% | 0.2% | 76 |
| Fluorescent Tubes | 0.0% | 0.0% | 0 |
| CFLs | 0.0% | 0.0% | 0 |
| Flat Glass | 0.0% | 0.0% | 0 |
| Other Glass | 0.3% | 0.1% | 60 |
| **Metal** | **5.0%** | | **1,143** |
| Alum. Beverage Cans | 0.2% | 0.1% | 53 |
| Alum. Foil/Containers | 0.2% | 0.1% | 53 |
| Other Aluminum | 0.0% | 0.0% | 4 |
| Other Nonferrous | 0.1% | 0.1% | 13 |
| Tin Food Cans | 0.5% | 0.1% | 114 |
| Empty Aerosol Cans | 0.2% | 0.1% | 42 |
| Other Ferrous | 2.3% | 1.1% | 521 |
| Oil filters | 0.0% | 0.0% | 1 |
| Mixed Metals/Material | 1.5% | 0.8% | 343 |
| **Organics** | **52.2%** | | **11,956** |
| Leaves and Grass | 2.6% | 1.8% | 598 |
| Prunings | 0.8% | 1.0% | 174 |
| Food | 29.7% | 3.6% | 6,812 |
| Fats, Oils, Grease | 0.2% | 0.4% | 52 |
| Textiles/Clothing | 4.1% | 1.5% | 934 |
| Mixed Textiles | 1.6% | 0.7% | 364 |
| Carpet | 0.6% | 0.4% | 137 |
| Disposable Diapers | 3.4% | 1.3% | 773 |
| Animal By-products | 8.7% | 2.5% | 2,001 |
| Rubber Products | 0.5% | 0.5% | 112 |
| Tires | 0.0% | 0.0% | 0 |

| Material | Est. Percent | + / - | Est. Tons |
|---|---|---|---|
| **Appliances and Electronics** | **2.1%** | | **492** |
| Furniture | 1.0% | 1.5% | 222 |
| Mattresses | 0.0% | 0.0% | 0 |
| Small Appliances | 0.8% | 1.2% | 185 |
| Cell Phones | 0.0% | 0.0% | 0 |
| Audio/Visual Equipment | 0.1% | 0.1% | 29 |
| CRT Monitors | 0.0% | 0.0% | 0 |
| CRT Televisions | 0.0% | 0.0% | 0 |
| Other Electronics | 0.2% | 0.2% | 57 |
| **CDL Wastes** | **3.5%** | | **803** |
| Clean Dimension Lumber | 0.5% | 0.6% | 113 |
| Clean Engineered Wood | 0.8% | 1.0% | 173 |
| Pallets | 0.0% | 0.0% | 0 |
| Crates | 0.1% | 0.1% | 19 |
| Other Untreated Wood | 0.3% | 0.2% | 64 |
| New Painted Wood | 0.6% | 0.7% | 144 |
| Old Painted Wood | 0.0% | 0.0% | 0 |
| Creosote-treated Wood | 0.0% | 0.0% | 1 |
| Other Treated Wood | 0.1% | 0.1% | 12 |
| Contaminated Wood | 0.8% | 0.9% | 188 |
| New Gypsum Scrap | 0.2% | 0.2% | 35 |
| Demo Gypsum Scrap | 0.0% | 0.0% | 0 |
| Fiberglass Insulation | 0.0% | 0.0% | 0 |
| Rock/Concrete/Bricks | 0.0% | 0.0% | 0 |
| Asphalt Shingles | 0.0% | 0.0% | 0 |
| Other Asphaltic Roofing | 0.0% | 0.0% | 0 |
| Ceramics | 0.2% | 0.1% | 38 |
| Cement Fiber Board | 0.0% | 0.0% | 0 |
| Other Construction | 0.1% | 0.1% | 17 |
| **Hazardous** | **2.5%** | | **566** |
| Liquid Latex Paint | 1.2% | 1.5% | 272 |
| Dried Latex Paint | 0.6% | 1.0% | 134 |
| Solvent-based Adhesives | 0.0% | 0.0% | 0 |
| Water-based Adhesives | 0.0% | 0.0% | 0 |
| Oil-based Paint/Thinners | 0.2% | 0.4% | 57 |
| Caustic Cleaners | 0.2% | 0.3% | 56 |
| Pesticides/Herbicides | 0.0% | 0.1% | 9 |
| Dry-cell Batteries | 0.0% | 0.0% | 2 |
| Wet-cell Batteries | 0.0% | 0.0% | 0 |
| Gasoline/Kerosene | 0.0% | 0.0% | 0 |
| Motor Oil/Diesel Oil | 0.0% | 0.0% | 0 |
| Asbestos | 0.0% | 0.0% | 0 |
| Explosives | 0.0% | 0.0% | 0 |
| Medical Wastes | 0.1% | 0.2% | 33 |
| Other Chemicals | 0.0% | 0.0% | 4 |
| Other Potentially Toxic | 0.0% | 0.0% | 0 |
| **Fines and Misc Materials** | **3.5%** | | **803** |
| Sand/Soil/Dirt | 0.8% | 0.8% | 177 |
| Non-distinct Fines | 0.2% | 0.3% | 37 |
| Misc. Organics | 2.2% | 1.8% | 508 |
| Misc. Inorganics | 0.4% | 0.3% | 82 |
| **Totals** | **100.0%** | | **22,923** |
| Sample Count | 30 | | |

*Confidence intervals calculated at the 90% confidence level. Percentages for material types may not total 100% due to rounding.*

## Table 4-29: Composition by Weight – Multifamily Zone 4
## (January – December 2010)

| Material | Est. Percent | + / - | Est. Tons |
|---|---|---|---|
| **Paper** | **18.1%** | | **1,841** |
| Newspaper | 1.4% | 0.5% | 146 |
| Plain OCC/Kraft | 2.0% | 0.6% | 205 |
| Waxed OCC/Kraft | 0.1% | 0.1% | 13 |
| High Grade | 0.5% | 0.2% | 50 |
| Mixed Low Grade | 5.8% | 1.3% | 589 |
| Compostable/Soiled | 6.2% | 1.4% | 626 |
| Pot. Comp. Sgl-use Food Service | 0.0% | 0.0% | 1 |
| Sgl-use Food Service | 0.8% | 0.6% | 79 |
| Mixed/Other Paper | 1.3% | 0.4% | 132 |
| **Plastic** | **8.7%** | | **887** |
| #1 PET Bottles | 0.7% | 0.2% | 67 |
| #2 HDPE Natural Bottles | 0.4% | 0.2% | 43 |
| #2 HDPE Colored Bottles | 0.3% | 0.1% | 27 |
| Other Bottles | 0.0% | 0.0% | 4 |
| Tubs | 0.3% | 0.1% | 34 |
| Expanded Poly. Nonfood | 0.2% | 0.1% | 19 |
| Expanded Poly. Food grade | 0.3% | 0.1% | 34 |
| Rigid Poly. Foam Insulation | 0.0% | 0.0% | 0 |
| Pot. Comp. Sgl-use Food Service | 0.0% | 0.0% | 2 |
| Other Single-use Food Service | 0.6% | 0.1% | 57 |
| Other Rigid Packaging | 0.4% | 0.1% | 40 |
| Shopping/Dry Cleaning Bags | 0.3% | 0.1% | 32 |
| Clean PE Film | 0.1% | 0.1% | 13 |
| Other Film | 2.7% | 0.4% | 274 |
| Plastic Pipe | 0.1% | 0.2% | 14 |
| Foam Carpet Padding | 0.1% | 0.1% | 10 |
| Durable Plastic Products | 1.6% | 1.0% | 166 |
| Plastic/Other Materials | 0.5% | 0.2% | 51 |
| **Glass** | **2.8%** | | **280** |
| Clear Bottles | 0.9% | 0.4% | 92 |
| Green Bottles | 0.5% | 0.2% | 47 |
| Brown Bottles | 0.4% | 0.2% | 40 |
| Container Glass | 0.3% | 0.1% | 30 |
| Fluorescent Tubes | 0.0% | 0.0% | 0 |
| CFLs | 0.0% | 0.0% | 0 |
| Flat Glass | 0.2% | 0.2% | 19 |
| Other Glass | 0.5% | 0.2% | 50 |
| **Metal** | **2.9%** | | **294** |
| Alum. Beverage Cans | 0.4% | 0.2% | 42 |
| Alum. Foil/Containers | 0.2% | 0.1% | 23 |
| Other Aluminum | 0.0% | 0.0% | 1 |
| Other Nonferrous | 0.0% | 0.0% | 0 |
| Tin Food Cans | 0.5% | 0.2% | 46 |
| Empty Aerosol Cans | 0.1% | 0.1% | 14 |
| Other Ferrous | 0.8% | 0.5% | 86 |
| Oil filters | 0.0% | 0.0% | 3 |
| Mixed Metals/Material | 0.8% | 0.5% | 80 |
| **Organics** | **51.3%** | | **5,217** |
| Leaves and Grass | 2.1% | 1.5% | 210 |
| Prunings | 0.1% | 0.1% | 12 |
| Food | 32.3% | 4.8% | 3,284 |
| Fats, Oils, Grease | 0.7% | 0.8% | 67 |
| Textiles/Clothing | 4.0% | 1.3% | 406 |
| Mixed Textiles | 1.5% | 1.4% | 150 |
| Carpet | 2.0% | 1.9% | 199 |
| Disposable Diapers | 4.3% | 1.7% | 433 |
| Animal By-products | 4.4% | 2.1% | 442 |
| Rubber Products | 0.2% | 0.1% | 16 |
| Tires | 0.0% | 0.0% | 0 |

| Material | Est. Percent | + / - | Est. Tons |
|---|---|---|---|
| **Appliances and Electronics** | **0.8%** | | **79** |
| Furniture | 0.1% | 0.2% | 14 |
| Mattresses | 0.0% | 0.0% | 0 |
| Small Appliances | 0.0% | 0.0% | 2 |
| Cell Phones | 0.0% | 0.0% | 0 |
| Audio/Visual Equipment | 0.0% | 0.0% | 2 |
| CRT Monitors | 0.0% | 0.0% | 0 |
| CRT Televisions | 0.2% | 0.3% | 16 |
| Other Electronics | 0.4% | 0.4% | 46 |
| **CDL Wastes** | **13.1%** | | **1,327** |
| Clean Dimension Lumber | 0.8% | 0.6% | 82 |
| Clean Engineered Wood | 1.8% | 1.7% | 186 |
| Pallets | 0.7% | 1.1% | 69 |
| Crates | 0.1% | 0.1% | 6 |
| Other Untreated Wood | 0.0% | 0.0% | 2 |
| New Painted Wood | 1.0% | 0.8% | 103 |
| Old Painted Wood | 0.0% | 0.0% | 0 |
| Creosote-treated Wood | 0.0% | 0.0% | 0 |
| Other Treated Wood | 1.4% | 0.8% | 138 |
| Contaminated Wood | 0.6% | 0.7% | 63 |
| New Gypsum Scrap | 0.1% | 0.1% | 9 |
| Demo Gypsum Scrap | 2.3% | 3.4% | 232 |
| Fiberglass Insulation | 0.0% | 0.0% | 0 |
| Rock/Concrete/Bricks | 1.1% | 1.2% | 113 |
| Asphalt Shingles | 0.0% | 0.0% | 0 |
| Other Asphaltic Roofing | 0.0% | 0.0% | 0 |
| Ceramics | 0.1% | 0.1% | 7 |
| Cement Fiber Board | 0.0% | 0.0% | 0 |
| Other Construction | 3.1% | 1.8% | 319 |
| **Hazardous** | **1.1%** | | **109** |
| Liquid Latex Paint | 0.5% | 0.8% | 47 |
| Dried Latex Paint | 0.0% | 0.0% | 0 |
| Solvent-based Adhesives | 0.0% | 0.0% | 0 |
| Water-based Adhesives | 0.0% | 0.0% | 0 |
| Oil-based Paint/Thinners | 0.0% | 0.0% | 0 |
| Caustic Cleaners | 0.0% | 0.0% | 2 |
| Pesticides/Herbicides | 0.0% | 0.0% | 0 |
| Dry-cell Batteries | 0.0% | 0.0% | 2 |
| Wet-cell Batteries | 0.0% | 0.0% | 0 |
| Gasoline/Kerosene | 0.0% | 0.0% | 0 |
| Motor Oil/Diesel Oil | 0.0% | 0.0% | 1 |
| Asbestos | 0.0% | 0.0% | 0 |
| Explosives | 0.0% | 0.0% | 0 |
| Medical Wastes | 0.5% | 0.6% | 47 |
| Other Chemicals | 0.1% | 0.1% | 8 |
| Other Potentially Toxic | 0.0% | 0.0% | 2 |
| **Fines and Misc Materials** | **1.2%** | | **125** |
| Sand/Soil/Dirt | 0.7% | 0.7% | 70 |
| Non-distinct Fines | 0.0% | 0.0% | 0 |
| Misc. Organics | 0.4% | 0.2% | 37 |
| Misc. Inorganics | 0.2% | 0.1% | 18 |
| **Totals** | **100.0%** | | **10,160** |
| Sample Count | 31 | | |

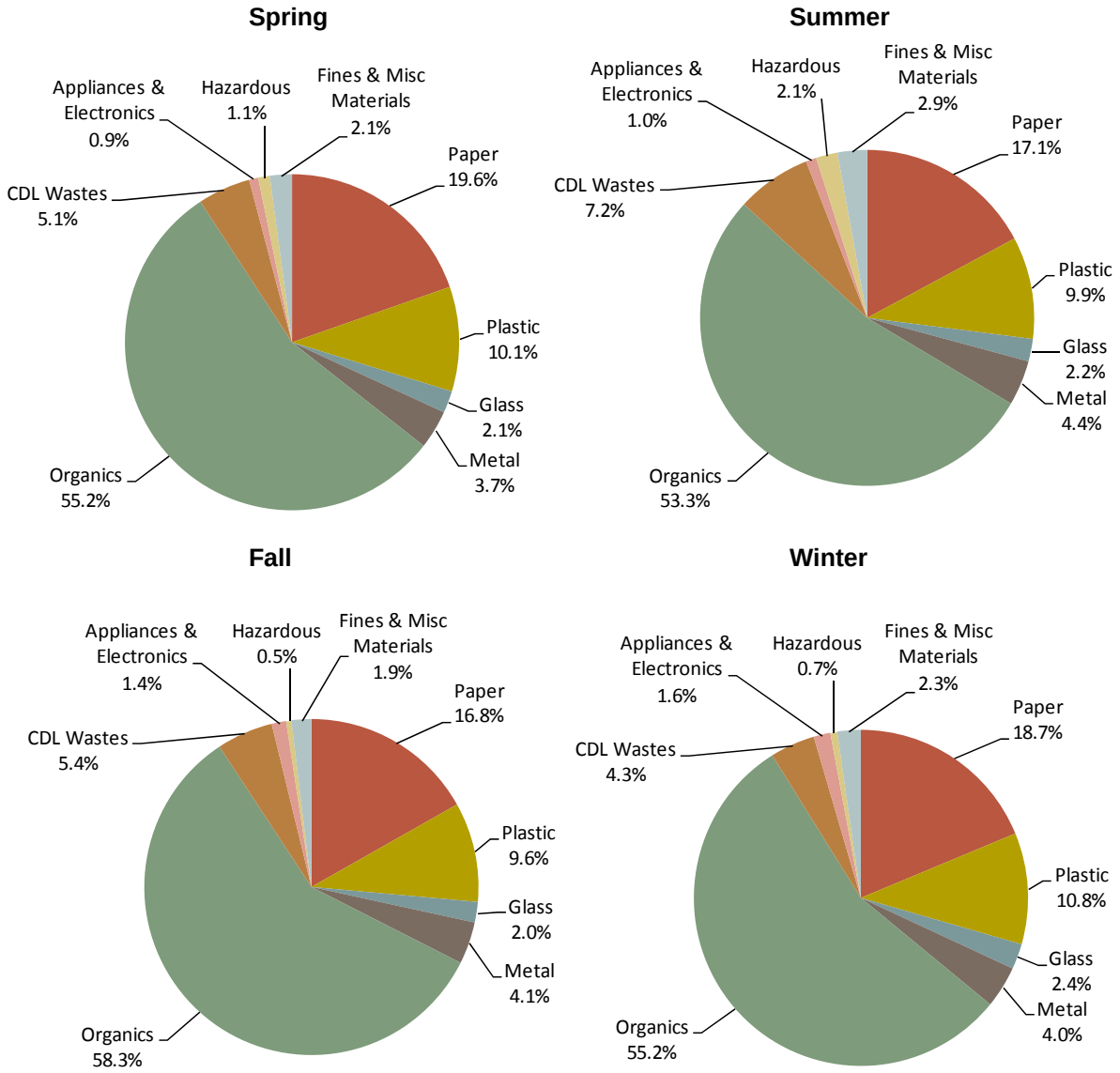
*Confidence intervals calculated at the 90% confidence level. Percentages for material types may not total 100% due to rounding.*

## 4.6 By Season

Waste composition results were examined for seasonal variations. Samples were classified into four seasons according to the month in which they were sorted: Spring (March, April, May), Summer (June, July, August), Fall (September, October, November), and Winter (January, February, December).

Figure 4-5 summarizes the results by broad material category for each season. When summed together, **organics** and **paper** accounted for more than 70% of the total tonnage in each of the four seasons. The relative proportions of the broad material categories remained relatively consistent across the seasons; however, **organics** increased slightly in the fall to about 58% compared to about 55% or less in the other three seasons.

**Figure 4-5: Composition Summary, by Season**



### 4.6.1 Spring

A total of 93 samples were sorted from the 28,164 tons of residential waste disposed between the months of March and May 2010. The top ten components, which are listed in Table 4-30, sum to 74% of the total. *Food* accounted for 27% of the total waste disposed in the spring. *Animal by-products* (11.7%), *compostable/soiled paper* (8.4%), and *disposable diapers* (7.0%) each accounted for at least 7% of the total. Table 4-34 lists the full composition results for residential waste disposed during the spring of 2010.

**Table 4-30: Top Ten Components – Spring**
**(March – May 2010)**

| Material | Est. Percent | Cum. Percent | Est. Tons |
|---|---|---|---|
| Food | 27.0% | 27.0% | 7,611 |
| Animal By-products | 11.7% | 38.8% | 3,304 |
| Compostable/Soiled Paper | 8.4% | 47.1% | 2,361 |
| Disposable Diapers | 7.0% | 54.1% | 1,967 |
| Mixed Low-grade Paper | 5.8% | 59.9% | 1,626 |
| Other Plastic Film | 4.2% | 64.1% | 1,182 |
| Textiles/Clothing | 3.9% | 68.0% | 1,107 |
| Leaves and Grass | 2.3% | 70.4% | 659 |
| Plain OCC/Kraft | 1.9% | 72.3% | 536 |
| Mixed Textiles | 1.5% | 73.8% | 434 |
| **Total** | **73.8%** | | **20,787** |

### 4.6.2 Summer

A total of 82 samples were captured and sorted from the 29,476 tons of residential waste disposed between June and August 2010. As shown in Table 4-31, *food* was the largest component at almost 29%. *Animal by-products* (9.2%) and *disposable diapers* (7.1%) accounted for more than 7% of the total, by weight. See Table 4-35 for a complete list of the composition results for residential waste disposed in summer.

**Table 4-31: Top Ten Components – Summer**
**(June – August 2010)**

| Material | Est. Percent | Cum. Percent | Est. Tons |
|---|---|---|---|
| Food | 28.5% | 28.5% | 8,394 |
| Animal By-products | 9.2% | 37.7% | 2,709 |
| Disposable Diapers | 7.1% | 44.8% | 2,102 |
| Compostable/Soiled Paper | 6.6% | 51.4% | 1,959 |
| Mixed Low-grade Paper | 5.0% | 56.4% | 1,461 |
| Textiles/Clothing | 3.6% | 60.0% | 1,071 |
| Other Plastic Film | 3.4% | 63.5% | 1,008 |
| Other Ferrous Metal | 1.9% | 65.4% | 559 |
| Plain OCC/Kraft | 1.8% | 67.1% | 518 |
| Leaves and Grass | 1.6% | 68.7% | 477 |
| **Total** | **68.7%** | | **20,259** |

### 4.6.3 Fall

A total of 95 samples were sorted from the 28,586 tons of residential waste dispose between September and November 2010. Table 4-32 lists the top ten components of waste disposed in the fall. *Food* composed almost 35% of the total, the highest food percentage of any season. *Animal by-products* and *disposable diapers* each made up more than 7% of the total. When summed together, the top ten components made up nearly 74% of the total waste disposed in fall 2010. Table 4-36 lists the composition results for this season in detail.

**Table 4-32: Top Ten Components – Fall**
**(September – November 2010)**

| Material | Est. Percent | Cum. Percent | Est. Tons |
|---|---|---|---|
| Food | 34.6% | 34.6% | 9,891 |
| Animal By-products | 9.5% | 44.1% | 2,727 |
| Disposable Diapers | 7.3% | 51.5% | 2,095 |
| Compostable/Soiled Paper | 5.6% | 57.1% | 1,614 |
| Mixed Low-grade Paper | 5.4% | 62.5% | 1,534 |
| Other Plastic Film | 3.7% | 66.2% | 1,063 |
| Textiles/Clothing | 2.9% | 69.1% | 816 |
| Plain OCC/Kraft | 2.0% | 71.0% | 566 |
| Mixed Metals/Material | 1.6% | 72.6% | 446 |
| New Painted Wood | 1.3% | 73.9% | 368 |
| **Total** | **73.9%** | | **21,119** |

### 4.6.4 Winter

This study sorted waste during the calendar year 2010, so winter samples were split between January and February at the beginning of the study year and December at the end of the study year. A total of 91 samples were sorted from the 27,908 tons of residential waste disposed during these months. The top ten components are listed in Table 4-33 and sum to 71% of the total. As in the other seasons, *food* was the top waste component and represented over a quarter of the waste stream at nearly 26%. A*nimal by-products* (10.2%), *disposable diapers* (8.2%), and *compostable/soiled paper* (7.2%) were each more than 7% of the waste disposed during December, January, and February 2010. Table 4-37 details the full composition results of this season's waste.

**Table 4-33: Top Ten Components – Winter**
**(January, February, and December 2010)**

| Material | Est. Percent | Cum. Percent | Est. Tons |
|---|---|---|---|
| Food | 25.9% | 25.9% | 7,228 |
| Animal By-products | 10.2% | 36.1% | 2,857 |
| Disposable Diapers | 8.2% | 44.3% | 2,292 |
| Compostable/Soiled Paper | 7.2% | 51.6% | 2,018 |
| Mixed Low-grade Paper | 5.8% | 57.3% | 1,608 |
| Other Plastic Film | 4.2% | 61.6% | 1,175 |
| Textiles/Clothing | 3.3% | 64.8% | 909 |
| Fats, Oils, Grease | 2.7% | 67.6% | 766 |
| Mixed/Other Paper | 1.6% | 69.2% | 458 |
| Plain OCC/Kraft | 1.6% | 70.8% | 458 |
| **Total** | **70.8%** | | **19,769** |

### 4.6.5 Comparisons between Seasons

*Food* was the largest component for each of the four seasons. The percentage of *food waste* was highest in fall (34.6%) and lowest in winter (25.9%). Spring and summer had one differing component each, while fall and winter had two differing components each. Spring had *mixed textiles*, summer had *other ferrous metal*, fall had *mixed metals/material* and *new painted wood*, and winter had *fats, oils, and grease* and *mixed/other paper.* In all, the four seasons shared a very similar profile, sharing 8 of the top 10 components.

## Table 4-34: Composition by Weight – Spring
## (March – May 2010)

| Material | Est. Percent | + / - | Est. Tons |
|---|---|---|---|
| **Paper** | **19.6%** | | **5,529** |
| Newspaper | 1.2% | 0.4% | 329 |
| Plain OCC/Kraft | 1.9% | 0.4% | 536 |
| Waxed OCC/Kraft | 0.1% | 0.1% | 20 |
| High Grade | 0.5% | 0.2% | 150 |
| Mixed Low Grade | 5.8% | 0.5% | 1,626 |
| Compostable/Soiled | 8.4% | 0.7% | 2,361 |
| Pot. Comp. Sgl-use Food Service | 0.0% | 0.0% | 3 |
| Sgl-use Food Service | 0.3% | 0.1% | 79 |
| Mixed/Other Paper | 1.5% | 0.3% | 425 |
| **Plastic** | **10.1%** | | **2,850** |
| #1 PET Bottles | 0.6% | 0.1% | 159 |
| #2 HDPE Natural Bottles | 0.2% | 0.1% | 68 |
| #2 HDPE Colored Bottles | 0.3% | 0.1% | 93 |
| Other Bottles | 0.0% | 0.0% | 11 |
| Tubs | 0.5% | 0.1% | 130 |
| Expanded Poly. Nonfood | 0.2% | 0.1% | 59 |
| Expanded Poly. Food grade | 0.4% | 0.0% | 111 |
| Rigid Poly. Foam Insulation | 0.0% | 0.0% | 0 |
| Pot. Comp. Sgl-use Food Service | 0.0% | 0.0% | 0 |
| Other Single-use Food Service | 0.7% | 0.1% | 190 |
| Other Rigid Packaging | 0.6% | 0.1% | 162 |
| Shopping/Dry Cleaning Bags | 0.3% | 0.1% | 71 |
| Clean PE Film | 0.0% | 0.0% | 3 |
| Other Film | 4.2% | 0.3% | 1,182 |
| Plastic Pipe | 0.0% | 0.0% | 1 |
| Foam Carpet Padding | 0.1% | 0.1% | 33 |
| Durable Plastic Products | 1.5% | 0.4% | 413 |
| Plastic/Other Materials | 0.6% | 0.1% | 165 |
| **Glass** | **2.1%** | | **598** |
| Clear Bottles | 0.6% | 0.1% | 165 |
| Green Bottles | 0.5% | 0.1% | 146 |
| Brown Bottles | 0.5% | 0.1% | 131 |
| Container Glass | 0.3% | 0.1% | 95 |
| Fluorescent Tubes | 0.0% | 0.0% | 0 |
| CFLs | 0.0% | 0.0% | 1 |
| Flat Glass | 0.0% | 0.0% | 0 |
| Other Glass | 0.2% | 0.1% | 59 |
| **Metal** | **3.7%** | | **1,051** |
| Alum. Beverage Cans | 0.3% | 0.2% | 95 |
| Alum. Foil/Containers | 0.3% | 0.0% | 80 |
| Other Aluminum | 0.0% | 0.0% | 3 |
| Other Nonferrous | 0.1% | 0.1% | 15 |
| Tin Food Cans | 0.6% | 0.1% | 164 |
| Empty Aerosol Cans | 0.2% | 0.0% | 44 |
| Other Ferrous | 1.4% | 0.4% | 390 |
| Oil filters | 0.0% | 0.0% | 8 |
| Mixed Metals/Material | 0.9% | 0.2% | 252 |
| **Organics** | **55.2%** | | **15,543** |
| Leaves and Grass | 2.3% | 1.0% | 659 |
| Prunings | 0.4% | 0.3% | 103 |
| Food | 27.0% | 1.8% | 7,611 |
| Fats, Oils, Grease | 0.0% | 0.0% | 0 |
| Textiles/Clothing | 3.9% | 1.0% | 1,107 |
| Mixed Textiles | 1.5% | 0.4% | 434 |
| Carpet | 0.8% | 0.4% | 216 |
| Disposable Diapers | 7.0% | 1.0% | 1,967 |
| Animal By-products | 11.7% | 1.5% | 3,304 |
| Rubber Products | 0.3% | 0.2% | 80 |
| Tires | 0.2% | 0.3% | 63 |

| Material | Est. Percent | + / - | Est. Tons |
|---|---|---|---|
| **Appliances and Electronics** | **0.9%** | | **245** |
| Furniture | 0.1% | 0.2% | 31 |
| Mattresses | 0.0% | 0.0% | 0 |
| Small Appliances | 0.2% | 0.1% | 53 |
| Cell Phones | 0.0% | 0.0% | 0 |
| Audio/Visual Equipment | 0.3% | 0.2% | 72 |
| CRT Monitors | 0.0% | 0.0% | 0 |
| CRT Televisions | 0.0% | 0.0% | 0 |
| Other Electronics | 0.3% | 0.2% | 89 |
| **CDL Wastes** | **5.1%** | | **1,432** |
| Clean Dimension Lumber | 0.2% | 0.1% | 49 |
| Clean Engineered Wood | 0.0% | 0.0% | 6 |
| Pallets | 0.0% | 0.0% | 0 |
| Crates | 0.0% | 0.0% | 9 |
| Other Untreated Wood | 0.6% | 0.2% | 170 |
| New Painted Wood | 0.9% | 0.4% | 265 |
| Old Painted Wood | 0.0% | 0.0% | 2 |
| Creosote-treated Wood | 0.0% | 0.0% | 1 |
| Other Treated Wood | 1.2% | 0.6% | 337 |
| Contaminated Wood | 0.3% | 0.2% | 75 |
| New Gypsum Scrap | 0.0% | 0.1% | 12 |
| Demo Gypsum Scrap | 0.2% | 0.1% | 62 |
| Fiberglass Insulation | 0.0% | 0.0% | 1 |
| Rock/Concrete/Bricks | 0.4% | 0.2% | 105 |
| Asphalt Shingles | 0.0% | 0.1% | 11 |
| Other Asphaltic Roofing | 0.0% | 0.0% | 5 |
| Ceramics | 0.4% | 0.3% | 118 |
| Cement Fiber Board | 0.0% | 0.0% | 1 |
| Other Construction | 0.7% | 0.4% | 203 |
| **Hazardous** | **1.1%** | | **315** |
| Liquid Latex Paint | 0.2% | 0.2% | 56 |
| Dried Latex Paint | 0.5% | 0.8% | 138 |
| Solvent-based Adhesives | 0.0% | 0.0% | 1 |
| Water-based Adhesives | 0.0% | 0.0% | 0 |
| Oil-based Paint/Thinners | 0.2% | 0.3% | 57 |
| Caustic Cleaners | 0.0% | 0.0% | 4 |
| Pesticides/Herbicides | 0.0% | 0.0% | 0 |
| Dry-cell Batteries | 0.0% | 0.0% | 10 |
| Wet-cell Batteries | 0.0% | 0.0% | 0 |
| Gasoline/Kerosene | 0.0% | 0.0% | 0 |
| Motor Oil/Diesel Oil | 0.0% | 0.0% | 2 |
| Asbestos | 0.0% | 0.0% | 0 |
| Explosives | 0.0% | 0.0% | 0 |
| Medical Wastes | 0.1% | 0.1% | 42 |
| Other Chemicals | 0.0% | 0.0% | 4 |
| Other Potentially Toxic | 0.0% | 0.0% | 1 |
| **Fines and Misc Materials** | **2.1%** | | **601** |
| Sand/Soil/Dirt | 0.6% | 0.4% | 160 |
| Non-distinct Fines | 0.2% | 0.1% | 43 |
| Misc. Organics | 0.7% | 0.2% | 195 |
| Misc. Inorganics | 0.7% | 0.3% | 204 |
| **Totals** | **100.0%** | | **28,164** |
| Sample Count | 93 | | |

*Confidence intervals calculated at the 90% confidence level. Percentages for material types may not total 100% due to rounding.*

## Table 4-35: Composition by Weight – Summer
### (June – August 2010)

| Material | Est. Percent | + / - | Est. Tons |
|---|---|---|---|
| **Paper** | **17.1%** | | **5,054** |
| Newspaper | 0.9% | 0.1% | 260 |
| Plain OCC/Kraft | 1.8% | 0.5% | 518 |
| Waxed OCC/Kraft | 0.0% | 0.0% | 5 |
| High Grade | 1.1% | 0.8% | 326 |
| Mixed Low Grade | 5.0% | 0.6% | 1,461 |
| Compostable/Soiled | 6.6% | 0.7% | 1,959 |
| Pot. Comp. Sgl-use Food Service | 0.0% | 0.0% | 0 |
| Sgl-use Food Service | 0.4% | 0.1% | 128 |
| Mixed/Other Paper | 1.3% | 0.2% | 398 |
| **Plastic** | **9.9%** | | **2,909** |
| #1 PET Bottles | 0.5% | 0.1% | 150 |
| #2 HDPE Natural Bottles | 0.2% | 0.1% | 56 |
| #2 HDPE Colored Bottles | 0.4% | 0.1% | 109 |
| Other Bottles | 0.0% | 0.0% | 7 |
| Tubs | 0.4% | 0.1% | 120 |
| Expanded Poly. Nonfood | 0.1% | 0.1% | 40 |
| Expanded Poly. Food grade | 0.4% | 0.1% | 111 |
| Rigid Poly. Foam Insulation | 0.0% | 0.0% | 0 |
| Pot. Comp. Sgl-use Food Service | 0.0% | 0.0% | 0 |
| Other Single-use Food Service | 0.8% | 0.1% | 225 |
| Other Rigid Packaging | 0.6% | 0.1% | 182 |
| Shopping/Dry Cleaning Bags | 0.5% | 0.1% | 136 |
| Clean PE Film | 0.3% | 0.3% | 102 |
| Other Film | 3.4% | 0.4% | 1,008 |
| Plastic Pipe | 0.1% | 0.1% | 17 |
| Foam Carpet Padding | 0.2% | 0.3% | 64 |
| Durable Plastic Products | 1.3% | 0.3% | 376 |
| Plastic/Other Materials | 0.7% | 0.2% | 207 |
| **Glass** | **2.2%** | | **640** |
| Clear Bottles | 0.6% | 0.2% | 172 |
| Green Bottles | 0.5% | 0.2% | 143 |
| Brown Bottles | 0.3% | 0.1% | 89 |
| Container Glass | 0.4% | 0.1% | 105 |
| Fluorescent Tubes | 0.0% | 0.0% | 0 |
| CFLs | 0.0% | 0.0% | 1 |
| Flat Glass | 0.1% | 0.1% | 20 |
| Other Glass | 0.4% | 0.1% | 110 |
| **Metal** | **4.4%** | | **1,285** |
| Alum. Beverage Cans | 0.1% | 0.0% | 42 |
| Alum. Foil/Containers | 0.3% | 0.1% | 99 |
| Other Aluminum | 0.0% | 0.0% | 5 |
| Other Nonferrous | 0.0% | 0.0% | 1 |
| Tin Food Cans | 0.5% | 0.1% | 136 |
| Empty Aerosol Cans | 0.2% | 0.0% | 48 |
| Other Ferrous | 1.9% | 0.7% | 559 |
| Oil filters | 0.0% | 0.0% | 0 |
| Mixed Metals/Material | 1.3% | 0.4% | 395 |
| **Organics** | **53.3%** | | **15,710** |
| Leaves and Grass | 1.6% | 1.3% | 477 |
| Prunings | 1.1% | 1.0% | 320 |
| Food | 28.5% | 2.3% | 8,394 |
| Fats, Oils, Grease | 0.1% | 0.2% | 37 |
| Textiles/Clothing | 3.6% | 0.6% | 1,071 |
| Mixed Textiles | 1.3% | 0.5% | 383 |
| Carpet | 0.3% | 0.1% | 101 |
| Disposable Diapers | 7.1% | 1.1% | 2,102 |
| Animal By-products | 9.2% | 1.7% | 2,709 |
| Rubber Products | 0.4% | 0.2% | 113 |
| Tires | 0.0% | 0.0% | 4 |

| Material | Est. Percent | + / - | Est. Tons |
|---|---|---|---|
| **Appliances and Electronics** | **1.0%** | | **302** |
| Furniture | 0.3% | 0.5% | 83 |
| Mattresses | 0.0% | 0.0% | 0 |
| Small Appliances | 0.3% | 0.3% | 99 |
| Cell Phones | 0.0% | 0.0% | 1 |
| Audio/Visual Equipment | 0.1% | 0.1% | 44 |
| CRT Monitors | 0.0% | 0.0% | 0 |
| CRT Televisions | 0.1% | 0.1% | 16 |
| Other Electronics | 0.2% | 0.2% | 60 |
| **CDL Wastes** | **7.2%** | | **2,127** |
| Clean Dimension Lumber | 0.6% | 0.2% | 180 |
| Clean Engineered Wood | 1.0% | 0.9% | 289 |
| Pallets | 0.2% | 0.4% | 71 |
| Crates | 0.1% | 0.1% | 19 |
| Other Untreated Wood | 0.2% | 0.2% | 50 |
| New Painted Wood | 0.6% | 0.2% | 164 |
| Old Painted Wood | 0.0% | 0.1% | 11 |
| Creosote-treated Wood | 0.0% | 0.0% | 2 |
| Other Treated Wood | 0.3% | 0.2% | 100 |
| Contaminated Wood | 0.5% | 0.2% | 147 |
| New Gypsum Scrap | 0.0% | 0.1% | 9 |
| Demo Gypsum Scrap | 0.8% | 0.5% | 234 |
| Fiberglass Insulation | 0.0% | 0.0% | 8 |
| Rock/Concrete/Bricks | 0.8% | 0.6% | 233 |
| Asphalt Shingles | 0.0% | 0.0% | 2 |
| Other Asphaltic Roofing | 0.2% | 0.3% | 47 |
| Ceramics | 0.3% | 0.1% | 79 |
| Cement Fiber Board | 0.2% | 0.3% | 61 |
| Other Construction | 1.4% | 0.8% | 423 |
| **Hazardous** | **2.1%** | | **607** |
| Liquid Latex Paint | 1.1% | 1.1% | 312 |
| Dried Latex Paint | 0.2% | 0.1% | 44 |
| Solvent-based Adhesives | 0.0% | 0.0% | 1 |
| Water-based Adhesives | 0.0% | 0.0% | 0 |
| Oil-based Paint/Thinners | 0.0% | 0.0% | 1 |
| Caustic Cleaners | 0.2% | 0.3% | 63 |
| Pesticides/Herbicides | 0.0% | 0.1% | 11 |
| Dry-cell Batteries | 0.0% | 0.0% | 12 |
| Wet-cell Batteries | 0.0% | 0.0% | 0 |
| Gasoline/Kerosene | 0.0% | 0.0% | 2 |
| Motor Oil/Diesel Oil | 0.0% | 0.0% | 1 |
| Asbestos | 0.0% | 0.0% | 0 |
| Explosives | 0.0% | 0.0% | 0 |
| Medical Wastes | 0.5% | 0.3% | 157 |
| Other Chemicals | 0.0% | 0.0% | 3 |
| Other Potentially Toxic | 0.0% | 0.0% | 0 |
| **Fines and Misc Materials** | **2.9%** | | **841** |
| Sand/Soil/Dirt | 0.5% | 0.6% | 156 |
| Non-distinct Fines | 0.1% | 0.1% | 34 |
| Misc. Organics | 1.8% | 0.9% | 528 |
| Misc. Inorganics | 0.4% | 0.2% | 124 |
| **Totals** | **100.0%** | | **29,476** |
| Sample Count | 82 | | |

*Confidence intervals calculated at the 90% confidence level. Percentages for material types may not total 100% due to rounding.*

## Table 4-36: Composition by Weight – Fall
### (September – November 2010)

| Material | Est. Percent | + / - | Est. Tons |
|---|---|---|---|
| **Paper** | **16.8%** | | **4,803** |
| Newspaper | 1.1% | 0.3% | 318 |
| Plain OCC/Kraft | 2.0% | 0.4% | 566 |
| Waxed OCC/Kraft | 0.0% | 0.0% | 7 |
| High Grade | 0.9% | 0.3% | 249 |
| Mixed Low Grade | 5.4% | 0.6% | 1,534 |
| Compostable/Soiled | 5.6% | 0.7% | 1,614 |
| Pot. Comp. Sgl-use Food Service | 0.1% | 0.0% | 22 |
| Sgl-use Food Service | 0.5% | 0.1% | 150 |
| Mixed/Other Paper | 1.2% | 0.2% | 343 |
| **Plastic** | **9.6%** | | **2,751** |
| #1 PET Bottles | 0.5% | 0.1% | 145 |
| #2 HDPE Natural Bottles | 0.2% | 0.0% | 56 |
| #2 HDPE Colored Bottles | 0.3% | 0.0% | 84 |
| Other Bottles | 0.1% | 0.0% | 18 |
| Tubs | 0.5% | 0.1% | 136 |
| Expanded Poly. Nonfood | 0.2% | 0.1% | 57 |
| Expanded Poly. Food grade | 0.5% | 0.2% | 150 |
| Rigid Poly. Foam Insulation | 0.0% | 0.0% | 0 |
| Pot. Comp. Sgl-use Food Service | 0.0% | 0.0% | 0 |
| Other Single-use Food Service | 0.6% | 0.1% | 162 |
| Other Rigid Packaging | 0.5% | 0.1% | 145 |
| Shopping/Dry Cleaning Bags | 0.3% | 0.0% | 91 |
| Clean PE Film | 0.1% | 0.1% | 32 |
| Other Film | 3.7% | 0.3% | 1,063 |
| Plastic Pipe | 0.0% | 0.0% | 0 |
| Foam Carpet Padding | 0.2% | 0.2% | 50 |
| Durable Plastic Products | 1.1% | 0.3% | 322 |
| Plastic/Other Materials | 0.8% | 0.2% | 238 |
| **Glass** | **2.0%** | | **568** |
| Clear Bottles | 0.5% | 0.1% | 133 |
| Green Bottles | 0.4% | 0.1% | 114 |
| Brown Bottles | 0.4% | 0.1% | 122 |
| Container Glass | 0.4% | 0.1% | 109 |
| Fluorescent Tubes | 0.0% | 0.0% | 1 |
| CFLs | 0.0% | 0.0% | 1 |
| Flat Glass | 0.1% | 0.1% | 17 |
| Other Glass | 0.2% | 0.1% | 71 |
| **Metal** | **4.1%** | | **1,162** |
| Alum. Beverage Cans | 0.3% | 0.1% | 77 |
| Alum. Foil/Containers | 0.2% | 0.0% | 67 |
| Other Aluminum | 0.0% | 0.0% | 13 |
| Other Nonferrous | 0.0% | 0.0% | 4 |
| Tin Food Cans | 0.5% | 0.1% | 149 |
| Empty Aerosol Cans | 0.1% | 0.0% | 39 |
| Other Ferrous | 1.2% | 0.6% | 357 |
| Oil filters | 0.0% | 0.0% | 11 |
| Mixed Metals/Material | 1.6% | 0.6% | 446 |
| **Organics** | **58.3%** | | **16,661** |
| Leaves and Grass | 1.2% | 0.5% | 355 |
| Prunings | 0.5% | 0.4% | 130 |
| Food | 34.6% | 2.8% | 9,891 |
| Fats, Oils, Grease | 0.0% | 0.0% | 1 |
| Textiles/Clothing | 2.9% | 0.5% | 816 |
| Mixed Textiles | 0.9% | 0.3% | 252 |
| Carpet | 1.0% | 0.7% | 283 |
| Disposable Diapers | 7.3% | 1.0% | 2,095 |
| Animal By-products | 9.5% | 1.5% | 2,727 |
| Rubber Products | 0.4% | 0.3% | 113 |
| Tires | 0.0% | 0.0% | 0 |

| Material | Est. Percent | + / - | Est. Tons |
|---|---|---|---|
| **Appliances and Electronics** | **1.4%** | | **396** |
| Furniture | 0.1% | 0.1% | 35 |
| Mattresses | 0.3% | 0.3% | 89 |
| Small Appliances | 0.6% | 0.9% | 171 |
| Cell Phones | 0.0% | 0.0% | 0 |
| Audio/Visual Equipment | 0.1% | 0.1% | 21 |
| CRT Monitors | 0.0% | 0.0% | 3 |
| CRT Televisions | 0.0% | 0.0% | 0 |
| Other Electronics | 0.3% | 0.2% | 76 |
| **CDL Wastes** | **5.4%** | | **1,552** |
| Clean Dimension Lumber | 0.5% | 0.2% | 157 |
| Clean Engineered Wood | 0.1% | 0.1% | 36 |
| Pallets | 0.1% | 0.1% | 16 |
| Crates | 0.0% | 0.0% | 0 |
| Other Untreated Wood | 0.0% | 0.0% | 9 |
| New Painted Wood | 1.3% | 0.6% | 368 |
| Old Painted Wood | 0.0% | 0.1% | 12 |
| Creosote-treated Wood | 0.0% | 0.0% | 0 |
| Other Treated Wood | 0.0% | 0.0% | 3 |
| Contaminated Wood | 0.5% | 0.3% | 139 |
| New Gypsum Scrap | 0.1% | 0.1% | 26 |
| Demo Gypsum Scrap | 0.1% | 0.1% | 36 |
| Fiberglass Insulation | 0.1% | 0.1% | 21 |
| Rock/Concrete/Bricks | 0.6% | 0.9% | 181 |
| Asphalt Shingles | 0.0% | 0.0% | 8 |
| Other Asphaltic Roofing | 0.1% | 0.1% | 35 |
| Ceramics | 0.5% | 0.2% | 142 |
| Cement Fiber Board | 0.0% | 0.0% | 4 |
| Other Construction | 1.3% | 0.8% | 358 |
| **Hazardous** | **0.5%** | | **147** |
| Liquid Latex Paint | 0.2% | 0.2% | 50 |
| Dried Latex Paint | 0.0% | 0.0% | 2 |
| Solvent-based Adhesives | 0.0% | 0.0% | 0 |
| Water-based Adhesives | 0.0% | 0.0% | 0 |
| Oil-based Paint/Thinners | 0.0% | 0.0% | 1 |
| Caustic Cleaners | 0.1% | 0.1% | 21 |
| Pesticides/Herbicides | 0.0% | 0.0% | 0 |
| Dry-cell Batteries | 0.0% | 0.0% | 10 |
| Wet-cell Batteries | 0.0% | 0.0% | 2 |
| Gasoline/Kerosene | 0.0% | 0.0% | 0 |
| Motor Oil/Diesel Oil | 0.0% | 0.0% | 0 |
| Asbestos | 0.0% | 0.0% | 0 |
| Explosives | 0.0% | 0.0% | 0 |
| Medical Wastes | 0.2% | 0.2% | 57 |
| Other Chemicals | 0.0% | 0.0% | 1 |
| Other Potentially Toxic | 0.0% | 0.0% | 3 |
| **Fines and Misc Materials** | **1.9%** | | **547** |
| Sand/Soil/Dirt | 0.2% | 0.2% | 70 |
| Non-distinct Fines | 0.1% | 0.2% | 38 |
| Misc. Organics | 1.3% | 0.3% | 375 |
| Misc. Inorganics | 0.2% | 0.1% | 63 |
| **Totals** | **100.0%** | | **28,586** |
| Sample Count | 95 | | |

*Confidence intervals calculated at the 90% confidence level. Percentages for material types may not total 100% due to rounding.*

## Table 4-37: Composition by Weight – Winter
### (January, February, and December 2010)

| Material | Est. Percent | + / - | Est. Tons |
|---|---|---|---|
| **Paper** | **18.7%** | | **5,223** |
| Newspaper | 1.0% | 0.2% | 268 |
| Plain OCC/Kraft | 1.6% | 0.3% | 458 |
| Waxed OCC/Kraft | 0.0% | 0.1% | 10 |
| High Grade | 0.9% | 0.3% | 257 |
| Mixed Low Grade | 5.8% | 0.8% | 1,608 |
| Compostable/Soiled | 7.2% | 0.7% | 2,018 |
| Pot. Comp. Sgl-use Food Service | 0.0% | 0.0% | 9 |
| Sgl-use Food Service | 0.5% | 0.2% | 136 |
| Mixed/Other Paper | 1.6% | 0.5% | 458 |
| **Plastic** | **10.8%** | | **3,002** |
| #1 PET Bottles | 0.6% | 0.1% | 172 |
| #2 HDPE Natural Bottles | 0.2% | 0.0% | 68 |
| #2 HDPE Colored Bottles | 0.3% | 0.0% | 80 |
| Other Bottles | 0.1% | 0.0% | 23 |
| Tubs | 0.5% | 0.1% | 153 |
| Expanded Poly. Nonfood | 0.2% | 0.1% | 48 |
| Expanded Poly. Food grade | 0.4% | 0.0% | 123 |
| Rigid Poly. Foam Insulation | 0.0% | 0.0% | 0 |
| Pot. Comp. Sgl-use Food Service | 0.0% | 0.0% | 11 |
| Other Single-use Food Service | 0.5% | 0.1% | 127 |
| Other Rigid Packaging | 0.8% | 0.1% | 226 |
| Shopping/Dry Cleaning Bags | 0.6% | 0.1% | 155 |
| Clean PE Film | 0.1% | 0.1% | 25 |
| Other Film | 4.2% | 0.3% | 1,175 |
| Plastic Pipe | 0.0% | 0.0% | 5 |
| Foam Carpet Padding | 0.1% | 0.1% | 15 |
| Durable Plastic Products | 1.5% | 0.6% | 413 |
| Plastic/Other Materials | 0.7% | 0.2% | 185 |
| **Glass** | **2.4%** | | **683** |
| Clear Bottles | 0.6% | 0.1% | 163 |
| Green Bottles | 0.8% | 0.3% | 220 |
| Brown Bottles | 0.4% | 0.1% | 103 |
| Container Glass | 0.3% | 0.1% | 92 |
| Fluorescent Tubes | 0.0% | 0.0% | 0 |
| CFLs | 0.0% | 0.0% | 2 |
| Flat Glass | 0.0% | 0.0% | 7 |
| Other Glass | 0.3% | 0.1% | 97 |
| **Metal** | **4.0%** | | **1,126** |
| Alum. Beverage Cans | 0.4% | 0.1% | 103 |
| Alum. Foil/Containers | 0.4% | 0.1% | 118 |
| Other Aluminum | 0.0% | 0.0% | 3 |
| Other Nonferrous | 0.0% | 0.0% | 4 |
| Tin Food Cans | 0.6% | 0.1% | 162 |
| Empty Aerosol Cans | 0.3% | 0.1% | 76 |
| Other Ferrous | 1.2% | 0.6% | 336 |
| Oil filters | 0.0% | 0.0% | 1 |
| Mixed Metals/Material | 1.2% | 0.5% | 323 |
| **Organics** | **55.2%** | | **15,397** |
| Leaves and Grass | 1.5% | 0.9% | 426 |
| Prunings | 0.7% | 0.8% | 204 |
| Food | 25.9% | 2.1% | 7,228 |
| Fats, Oils, Grease | 2.7% | 0.7% | 766 |
| Textiles/Clothing | 3.3% | 0.9% | 909 |
| Mixed Textiles | 1.4% | 0.6% | 397 |
| Carpet | 0.9% | 0.4% | 258 |
| Disposable Diapers | 8.2% | 1.4% | 2,292 |
| Animal By-products | 10.2% | 1.2% | 2,857 |
| Rubber Products | 0.2% | 0.1% | 61 |
| Tires | 0.0% | 0.0% | 0 |

| Material | Est. Percent | + / - | Est. Tons |
|---|---|---|---|
| **Appliances and Electronics** | **1.6%** | | **451** |
| Furniture | 1.0% | 1.3% | 274 |
| Mattresses | 0.0% | 0.0% | 4 |
| Small Appliances | 0.2% | 0.2% | 45 |
| Cell Phones | 0.0% | 0.0% | 1 |
| Audio/Visual Equipment | 0.1% | 0.1% | 20 |
| CRT Monitors | 0.0% | 0.0% | 0 |
| CRT Televisions | 0.0% | 0.0% | 0 |
| Other Electronics | 0.4% | 0.2% | 106 |
| **CDL Wastes** | **4.3%** | | **1,208** |
| Clean Dimension Lumber | 0.4% | 0.5% | 121 |
| Clean Engineered Wood | 0.5% | 0.6% | 145 |
| Pallets | 0.5% | 0.7% | 135 |
| Crates | 0.0% | 0.0% | 0 |
| Other Untreated Wood | 0.0% | 0.0% | 6 |
| New Painted Wood | 0.2% | 0.1% | 56 |
| Old Painted Wood | 0.0% | 0.0% | 8 |
| Creosote-treated Wood | 0.0% | 0.0% | 0 |
| Other Treated Wood | 0.1% | 0.1% | 39 |
| Contaminated Wood | 0.6% | 0.8% | 175 |
| New Gypsum Scrap | 0.0% | 0.0% | 0 |
| Demo Gypsum Scrap | 0.8% | 1.2% | 221 |
| Fiberglass Insulation | 0.0% | 0.0% | 4 |
| Rock/Concrete/Bricks | 0.2% | 0.2% | 53 |
| Asphalt Shingles | 0.0% | 0.0% | 4 |
| Other Asphaltic Roofing | 0.0% | 0.0% | 0 |
| Ceramics | 0.6% | 0.4% | 163 |
| Cement Fiber Board | 0.0% | 0.0% | 0 |
| Other Construction | 0.3% | 0.2% | 79 |
| **Hazardous** | **0.7%** | | **186** |
| Liquid Latex Paint | 0.3% | 0.3% | 84 |
| Dried Latex Paint | 0.0% | 0.0% | 3 |
| Solvent-based Adhesives | 0.0% | 0.0% | 1 |
| Water-based Adhesives | 0.0% | 0.0% | 0 |
| Oil-based Paint/Thinners | 0.0% | 0.0% | 0 |
| Caustic Cleaners | 0.0% | 0.0% | 3 |
| Pesticides/Herbicides | 0.0% | 0.0% | 2 |
| Dry-cell Batteries | 0.1% | 0.0% | 17 |
| Wet-cell Batteries | 0.0% | 0.0% | 0 |
| Gasoline/Kerosene | 0.0% | 0.0% | 0 |
| Motor Oil/Diesel Oil | 0.0% | 0.0% | 1 |
| Asbestos | 0.0% | 0.0% | 0 |
| Explosives | 0.0% | 0.0% | 6 |
| Medical Wastes | 0.2% | 0.2% | 58 |
| Other Chemicals | 0.0% | 0.0% | 10 |
| Other Potentially Toxic | 0.0% | 0.0% | 0 |
| **Fines and Misc Materials** | **2.3%** | | **631** |
| Sand/Soil/Dirt | 0.4% | 0.4% | 125 |
| Non-distinct Fines | 0.0% | 0.0% | 0 |
| Misc. Organics | 1.4% | 1.2% | 395 |
| Misc. Inorganics | 0.4% | 0.1% | 111 |
| **Totals** | **100.0%** | | **27,908** |
| Sample Count | 91 | | |

*Confidence intervals calculated at the 90% confidence level. Percentages for material types may not total 100% due to rounding.*

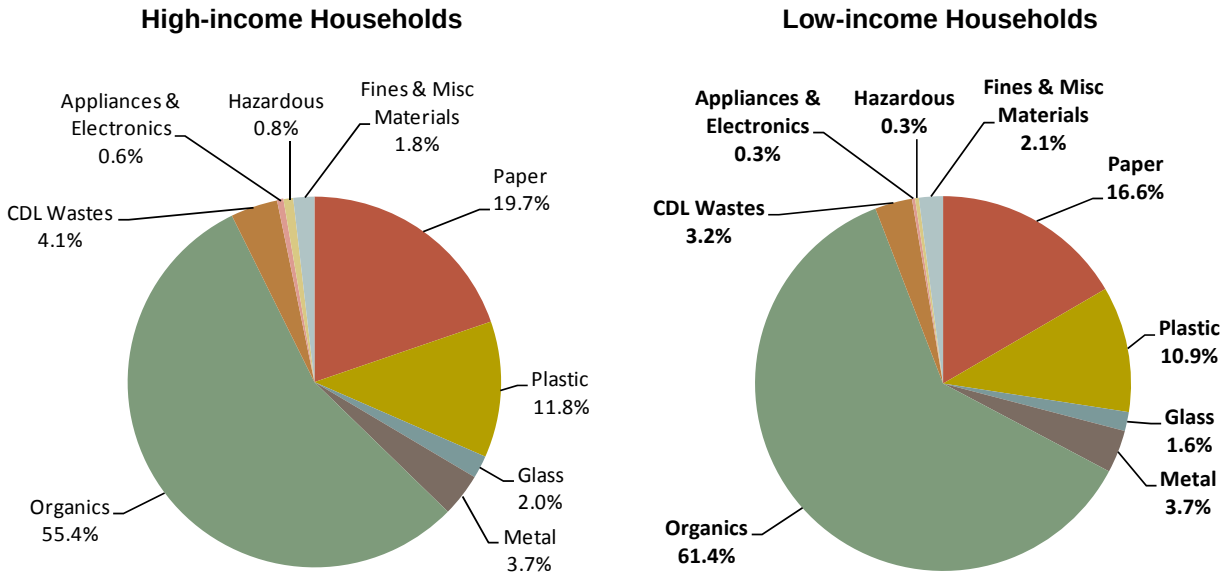
## 4.7 By Demographics

Waste compositions for various demographic groups were calculated by considering the median household income and mean household size of each sampled garbage route. Median household income for each route was calculated based on information from the 2005-2009 American Community Survey 5-year estimates, at the Census Block Group level of geography.[20] The total population and number of households for each route were calculated using information from the 2010 Census, at the Census Block level of geography. Sampled routes were divided into quartiles based on the median income and mean household size of each garbage route. Waste samples from the first (0 - 25%) quartile of routes were used to calculate waste compositions for low-income and small households (separately). Samples from the top quartile (75% - 100%) were used to calculate composition profiles for high-income and large households. See Appendix D for more details on demographic calculations.

### 4.7.1 By Household Income

Figure 4-6 summarizes the composition by broad material category for each household income type. **Organics** accounted for a higher percentage of disposed waste for low-income (61.4%) than for high-income households (55.4%). **Paper** was the second largest broad material category in both income groups, making up almost 20% of high-income household waste compared to almost 17% for low-income households.

**Figure 4-6: Composition Summary, by Household Income**
**(January – December 2010)**




[20] A Census Block is generally equivalent to a city block. A Block Group is a collection of Blocks. For reference, a Tract is a collection of Block Groups. There are approximately 9,200 blocks; 570 block groups; and 126 tracts in Seattle.

#### 4.7.1.1 High-income Households

A total of 41 waste samples from routes classified as high-income were collected and sorted in 2010. Table 4-38 lists the top ten components, which sum to approximately 73% of the total. The largest component, *food*, accounted for approximately 25% of the waste stream. *Animal by-products* (12.5%) and *disposable diapers* (9.5%) were the next largest components. The detailed composition results for high-income routes are listed in Table 4-40.

**Table 4-38: Top Ten Components – High-income Households**
**(January – December 2010)**

| Material | Est. Percent | Cum. Percent |
|---|---|---|
| Food | 25.1% | 25.1% |
| Animal By-products | 12.5% | 37.6% |
| Disposable Diapers | 9.5% | 47.1% |
| Compostable/Soiled Paper | 8.0% | 55.1% |
| Mixed Low-grade Paper | 5.7% | 60.8% |
| Other Plastic Film | 5.1% | 65.9% |
| Textiles/Clothing | 2.8% | 68.7% |
| Mixed/Other Paper | 1.7% | 70.4% |
| High-grade Paper | 1.5% | 71.9% |
| Fats, Oils, Grease | 1.5% | 73.4% |
| **Total** | **73.4%** | |

#### 4.7.1.2 Low-income Households

A total of 58 samples from routes classified as low-income were collected and sorted in 2010. The top ten components of these samples are listed in Table 4-39. *Food* made up about 30% of the total waste. *Animal by-products* and *disposable diapers*, together, accounted for another 23%. The top ten components amounted to approximately 77% of this waste. Table 4-41 details the waste composition results for low-income routes.

**Table 4-39: Top Ten Components – Low-income Households**
**(January – December 2010)**

| Material | Est. Percent | Cum. Percent |
|---|---|---|
| Food | 30.3% | 30.3% |
| Animal By-products | 12.4% | 42.7% |
| Disposable Diapers | 10.5% | 53.2% |
| Compostable/Soiled Paper | 7.6% | 60.8% |
| Mixed Low-grade Paper | 5.0% | 65.9% |
| Other Plastic Film | 4.4% | 70.2% |
| Textiles/Clothing | 2.8% | 73.1% |
| Fats, Oils, Grease | 1.5% | 74.6% |
| Durable Plastic Products | 1.4% | 76.0% |
| Mixed Metals/Material | 1.3% | 77.2% |
| **Total** | **77.2%** | |

#### 4.7.1.3 Comparisons between High- and Low-income Households

The seven most prevalent components were the same for both income groups: *food*, *animal by-products*, *disposable diapers*, *compostable/soiled paper*, *mixed low-grade paper*, *other plastic film*, and *textiles/clothing*. In addition, the category *fats, oils, grease* appears in both lists. *Mixed/other paper* and *high-grade paper* were unique for high-income household waste and *durable plastic products* and *mixed metals/materials* were unique for low-income household waste.

## Table 4-40: Composition by Weight – High-income Households
### (January – December 2010)

| Material | Est. Percent | + / - |
|---|---|---|
| **Paper** | **19.7%** | |
| Newspaper | 0.7% | 0.2% |
| Plain OCC/Kraft | 1.4% | 0.3% |
| Waxed OCC/Kraft | 0.1% | 0.2% |
| High-grade Paper | 1.5% | 0.8% |
| Mixed Low-grade Paper | 5.7% | 0.7% |
| Compostable/Soiled | 8.0% | 1.0% |
| Pot. Comp. Sgl-use Food Service | 0.1% | 0.1% |
| Sgl-use Food Service | 0.5% | 0.1% |
| Mixed/Other Paper | 1.7% | 0.7% |
| **Plastic** | **11.8%** | |
| #1 PET Bottles | 0.5% | 0.1% |
| #2 HDPE Natural Bottles | 0.2% | 0.0% |
| #2 HDPE Colored Bottles | 0.4% | 0.2% |
| Other Bottles | 0.1% | 0.0% |
| Tubs | 0.6% | 0.2% |
| Expanded Poly. Non-food | 0.4% | 0.3% |
| Expanded Poly. Food-grade | 0.5% | 0.1% |
| Rigid Poly. Foam Insulation | 0.0% | 0.0% |
| Pot. Comp. Sgl-use Food Service | 0.0% | 0.0% |
| Other Single-use Food Service | 0.7% | 0.1% |
| Other Rigid Packaging | 0.8% | 0.1% |
| Shopping/Dry Cleaning Bags | 0.4% | 0.1% |
| Clean Polyethylene Film | 0.1% | 0.0% |
| Other Film | 5.1% | 0.5% |
| Plastic Pipe | 0.0% | 0.0% |
| Foam Carpet Padding | 0.0% | 0.0% |
| Durable Plastic Products | 1.1% | 0.3% |
| Plastic/Other Materials | 0.9% | 0.3% |
| **Glass** | **2.0%** | |
| Clear Bottles | 0.5% | 0.2% |
| Green Bottles | 0.4% | 0.2% |
| Brown Bottles | 0.3% | 0.1% |
| Container Glass | 0.4% | 0.1% |
| Fluorescent Tubes | 0.0% | 0.0% |
| CFLs | 0.0% | 0.0% |
| Flat Glass | 0.0% | 0.0% |
| Other Glass | 0.3% | 0.1% |
| **Metal** | **3.7%** | |
| Aluminum Beverage Cans | 0.2% | 0.0% |
| Aluminum Foil/Containers | 0.4% | 0.1% |
| Other Aluminum | 0.0% | 0.0% |
| Other Nonferrous | 0.1% | 0.1% |
| Tin Food Cans | 0.7% | 0.3% |
| Empty Aerosol Cans | 0.2% | 0.1% |
| Other Ferrous | 1.1% | 0.6% |
| Oil filters | 0.0% | 0.0% |
| Mixed Metals/Material | 1.2% | 0.4% |
| **Organics** | **55.4%** | |
| Leaves and Grass | 0.8% | 0.5% |
| Prunings | 1.2% | 1.4% |
| Food | 25.1% | 3.0% |
| Fats, Oils, Grease | 1.5% | 0.9% |
| Textiles/Clothing | 2.8% | 0.6% |
| Mixed Textiles | 1.4% | 0.7% |
| Carpet | 0.3% | 0.2% |
| Disposable Diapers | 9.5% | 1.6% |
| Animal By-products | 12.5% | 1.9% |
| Rubber Products | 0.2% | 0.1% |
| Tires | 0.0% | 0.0% |

| Material | Est. Percent | + / - |
|---|---|---|
| **Appliances and Electronics** | **0.6%** | |
| Furniture | 0.0% | 0.0% |
| Mattresses | 0.0% | 0.0% |
| Small Appliances | 0.1% | 0.1% |
| Cell Phones | 0.0% | 0.0% |
| Audio/Visual Equipment | 0.1% | 0.1% |
| CRT Monitors | 0.0% | 0.1% |
| CRT Televisions | 0.0% | 0.0% |
| Other Electronics | 0.3% | 0.3% |
| **CDL Wastes** | **4.1%** | |
| Clean Dimension Lumber | 0.4% | 0.2% |
| Clean Engineered Wood | 0.2% | 0.1% |
| Pallets | 0.0% | 0.0% |
| Crates | 0.0% | 0.0% |
| Other Untreated Wood | 0.1% | 0.2% |
| New Painted Wood | 0.5% | 0.3% |
| Old Painted Wood | 0.2% | 0.3% |
| Creosote-treated Wood | 0.0% | 0.0% |
| Other Treated Wood | 0.2% | 0.2% |
| Contaminated Wood | 0.4% | 0.2% |
| New Gypsum Scrap | 0.0% | 0.0% |
| Demo Gypsum Scrap | 0.7% | 1.0% |
| Fiberglass Insulation | 0.0% | 0.0% |
| Rock/Concrete/Bricks | 0.1% | 0.1% |
| Asphalt Shingles | 0.0% | 0.0% |
| Other Asphaltic Roofing | 0.1% | 0.1% |
| Ceramics | 0.4% | 0.3% |
| Cement Fiber Board | 0.0% | 0.0% |
| Other Construction | 0.9% | 0.7% |
| **Hazardous** | **0.8%** | |
| Liquid Latex Paint | 0.1% | 0.2% |
| Dried Latex Paint | 0.2% | 0.3% |
| Solvent-based Adhesives | 0.0% | 0.0% |
| Water-based Adhesives | 0.0% | 0.0% |
| Oil-based Paint/Thinners | 0.0% | 0.0% |
| Caustic Cleaners | 0.0% | 0.0% |
| Pesticides/Herbicides | 0.0% | 0.0% |
| Dry-cell Batteries | 0.0% | 0.0% |
| Wet-cell Batteries | 0.0% | 0.0% |
| Gasoline/Kerosene | 0.0% | 0.0% |
| Motor Oil/Diesel Oil | 0.0% | 0.0% |
| Asbestos | 0.0% | 0.0% |
| Explosives | 0.0% | 0.0% |
| Medical Wastes | 0.4% | 0.3% |
| Other Chemicals | 0.0% | 0.0% |
| Other Potentially Toxic | 0.0% | 0.0% |
| **Fines and Misc Materials** | **1.8%** | |
| Sand/Soil/Dirt | 0.0% | 0.0% |
| Non-distinct Fines | 0.0% | 0.0% |
| Misc. Organics | 1.1% | 0.3% |
| Misc. Inorganics | 0.7% | 0.3% |
| **Totals** | **100.0%** | |
| Sample Count | 41 | |

*Confidence intervals calculated at the 90% confidence level. Percentages for material types may not total 100% due to rounding.*

## Table 4-41: Composition by Weight – Low-income Households
### (January – December 2010)

| Material | Est. Percent | + / - |
|---|---|---|
| **Paper** | **16.6%** | |
| Newspaper | 0.7% | 0.2% |
| Plain OCC/Kraft | 1.0% | 0.2% |
| Waxed OCC/Kraft | 0.0% | 0.0% |
| High-grade Paper | 0.7% | 0.3% |
| Mixed Low-grade Paper | 5.0% | 0.6% |
| Compostable/Soiled | 7.6% | 0.8% |
| Pot. Comp. Sgl-use Food Service | 0.0% | 0.0% |
| Sgl-use Food Service | 0.5% | 0.1% |
| Mixed/Other Paper | 1.0% | 0.2% |
| **Plastic** | **10.9%** | |
| #1 PET Bottles | 0.5% | 0.1% |
| #2 HDPE Natural Bottles | 0.2% | 0.0% |
| #2 HDPE Colored Bottles | 0.3% | 0.1% |
| Other Bottles | 0.1% | 0.0% |
| Tubs | 0.6% | 0.1% |
| Expanded Poly. Non-food | 0.1% | 0.0% |
| Expanded Poly. Food-grade | 0.5% | 0.1% |
| Rigid Poly. Foam Insulation | 0.0% | 0.0% |
| Pot. Comp. Sgl-use Food Service | 0.0% | 0.0% |
| Other Single-use Food Service | 0.6% | 0.1% |
| Other Rigid Packaging | 0.8% | 0.2% |
| Shopping/Dry Cleaning Bags | 0.4% | 0.1% |
| Clean Polyethylene Film | 0.1% | 0.1% |
| Other Film | 4.4% | 0.4% |
| Plastic Pipe | 0.0% | 0.0% |
| Foam Carpet Padding | 0.1% | 0.1% |
| Durable Plastic Products | 1.4% | 0.7% |
| Plastic/Other Materials | 0.9% | 0.3% |
| **Glass** | **1.6%** | |
| Clear Bottles | 0.4% | 0.1% |
| Green Bottles | 0.2% | 0.1% |
| Brown Bottles | 0.3% | 0.1% |
| Container Glass | 0.3% | 0.1% |
| Fluorescent Tubes | 0.0% | 0.0% |
| CFLs | 0.0% | 0.0% |
| Flat Glass | 0.0% | 0.0% |
| Other Glass | 0.3% | 0.1% |
| **Metal** | **3.7%** | |
| Aluminum Beverage Cans | 0.3% | 0.2% |
| Aluminum Foil/Containers | 0.4% | 0.1% |
| Other Aluminum | 0.0% | 0.0% |
| Other Nonferrous | 0.0% | 0.0% |
| Tin Food Cans | 0.7% | 0.2% |
| Empty Aerosol Cans | 0.2% | 0.0% |
| Other Ferrous | 0.7% | 0.3% |
| Oil filters | 0.1% | 0.0% |
| Mixed Metals/Material | 1.3% | 0.4% |
| **Organics** | **61.4%** | |
| Leaves and Grass | 1.1% | 0.7% |
| Prunings | 0.2% | 0.2% |
| Food | 30.3% | 2.3% |
| Fats, Oils, Grease | 1.5% | 0.8% |
| Textiles/Clothing | 2.8% | 0.5% |
| Mixed Textiles | 0.8% | 0.3% |
| Carpet | 1.1% | 0.5% |
| Disposable Diapers | 10.5% | 1.5% |
| Animal By-products | 12.4% | 1.6% |
| Rubber Products | 0.3% | 0.2% |
| Tires | 0.3% | 0.5% |

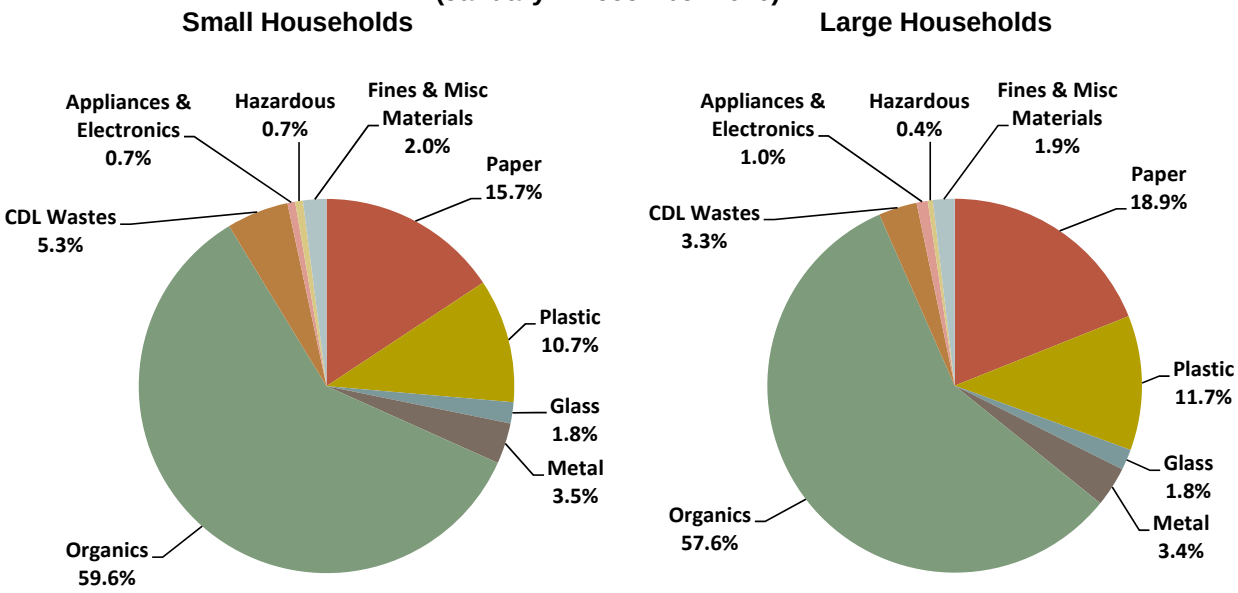
| Material | Est. Percent | + / - |
|---|---|---|
| **Appliances and Electronics** | **0.3%** | |
| Furniture | 0.0% | 0.1% |
| Mattresses | 0.0% | 0.0% |
| Small Appliances | 0.1% | 0.1% |
| Cell Phones | 0.0% | 0.0% |
| Audio/Visual Equipment | 0.1% | 0.1% |
| CRT Monitors | 0.0% | 0.0% |
| CRT Televisions | 0.0% | 0.0% |
| Other Electronics | 0.1% | 0.1% |
| **CDL Wastes** | **3.2%** | |
| Clean Dimension Lumber | 0.1% | 0.1% |
| Clean Engineered Wood | 0.1% | 0.1% |
| Pallets | 0.0% | 0.0% |
| Crates | 0.0% | 0.0% |
| Other Untreated Wood | 0.4% | 0.4% |
| New Painted Wood | 0.3% | 0.3% |
| Old Painted Wood | 0.0% | 0.0% |
| Creosote-treated Wood | 0.0% | 0.0% |
| Other Treated Wood | 0.2% | 0.1% |
| Contaminated Wood | 0.2% | 0.1% |
| New Gypsum Scrap | 0.0% | 0.0% |
| Demo Gypsum Scrap | 0.1% | 0.1% |
| Fiberglass Insulation | 0.0% | 0.0% |
| Rock/Concrete/Bricks | 0.1% | 0.1% |
| Asphalt Shingles | 0.0% | 0.0% |
| Other Asphaltic Roofing | 0.0% | 0.0% |
| Ceramics | 0.6% | 0.3% |
| Cement Fiber Board | 0.0% | 0.0% |
| Other Construction | 1.1% | 0.8% |
| **Hazardous** | **0.3%** | |
| Liquid Latex Paint | 0.2% | 0.2% |
| Dried Latex Paint | 0.0% | 0.0% |
| Solvent-based Adhesives | 0.0% | 0.0% |
| Water-based Adhesives | 0.0% | 0.0% |
| Oil-based Paint/Thinners | 0.0% | 0.0% |
| Caustic Cleaners | 0.0% | 0.0% |
| Pesticides/Herbicides | 0.0% | 0.0% |
| Dry-cell Batteries | 0.0% | 0.0% |
| Wet-cell Batteries | 0.0% | 0.0% |
| Gasoline/Kerosene | 0.0% | 0.0% |
| Motor Oil/Diesel Oil | 0.0% | 0.0% |
| Asbestos | 0.0% | 0.0% |
| Explosives | 0.0% | 0.1% |
| Medical Wastes | 0.0% | 0.0% |
| Other Chemicals | 0.0% | 0.0% |
| Other Potentially Toxic | 0.0% | 0.0% |
| **Fines and Misc Materials** | **2.1%** | |
| Sand/Soil/Dirt | 0.3% | 0.3% |
| Non-distinct Fines | 0.0% | 0.0% |
| Misc. Organics | 1.2% | 0.3% |
| Misc. Inorganics | 0.5% | 0.3% |
| **Totals** | **100.0%** | |
| Sample Count | 58 | |

*Confidence intervals calculated at the 90% confidence level. Percentages for material types may not total 100% due to rounding.*

### 4.7.2 By Household Size

Figure 4-7 presents a waste composition summary by broad material category for waste disposed by small and large households. For both residence types, **organics**, **paper**, and **plastic**, together, made up almost 90% of the total. Waste percentages by broad material categories are very similar for both household types. **CDL wastes** accounted for a slightly larger percentage from small households (5.3%) than from large households (3.3%), while **paper** contributed a higher percentage for large households (18.9%) than for small households (15.7%).

**Figure 4-7: Composition Summary, by Household Size**
**(January – December 2010)**



#### 4.7.2.1 Small Households

A total of 56 samples were collected and sorted from small household routes. Table 4-42 lists the top ten components for small households. The most prevalent component, *food* (28.3%), accounted for over twice as much as the second most prevalent component (*animal by-products,* 14.1%). The top ten components, together, accounted for approximately 75% of the total waste. The full composition results for waste from small households are listed in Table 4-44.

**Table 4-42: Top Ten Components – Small Households**
**(January – December 2010)**

| Material | Est. Percent | Cum. Percent |
|---|---|---|
| Food | 28.3% | 28.3% |
| Animal By-products | 14.1% | 42.4% |
| Disposable Diapers | 9.2% | 51.6% |
| Compostable/Soiled Paper | 6.5% | 58.2% |
| Mixed Low-grade Paper | 4.7% | 62.9% |
| Other Plastic Film | 4.5% | 67.4% |
| Textiles/Clothing | 3.2% | 70.7% |
| Mixed/Other Paper | 1.3% | 72.0% |
| Mixed Textiles | 1.3% | 73.2% |
| Durable Plastic Products | 1.2% | 74.5% |
| **Total** | **74.5%** | |

#### 4.7.2.2 Large Households

A total of 51 samples were captured and sorted from large household routes. As shown in Table 4-43, *food* accounted for about 30% of the waste. *Animal by-products, disposable diapers*, and *compostable/soiled paper* each accounted for between 8% and 11% of the total. Table 4-45 lists the detailed composition results for waste from large households.

**Table 4-43: Top Ten Components – Large Households**
**(January – December 2010)**

| Material | Est. Percent | Cum. Percent |
|---|---|---|
| Food | 29.6% | 29.6% |
| Animal By-products | 10.5% | 40.1% |
| Disposable Diapers | 10.4% | 50.5% |
| Compostable/Soiled Paper | 8.1% | 58.7% |
| Mixed Low-grade Paper | 5.7% | 64.4% |
| Other Plastic Film | 5.1% | 69.5% |
| Textiles/Clothing | 2.6% | 72.1% |
| Mixed Textiles | 1.4% | 73.5% |
| Mixed/Other Paper | 1.3% | 74.7% |
| High-grade Paper | 1.2% | 76.0% |
| **Total** | **76.0%** | |

### 4.7.3 Comparisons between Small and Large Households

The seven most prevalent components were the same for small and large households: *food*; *animal by-products*; *disposable diapers*; *compostable/soiled paper*; *mixed low-grade paper*; *other plastic film*; and *textiles/clothing*. Two other components, *mixed textiles* and *mixed/other paper*, also appear in both lists, though in different orders. *Durable plastic products* was a top ten component of waste from small households, while *high-grade paper* was a top ten component from large households.

## Table 4-44: Composition by Weight – Small Households
### (January – December 2010)

| Material | Est. Percent | + / - |
|---|---|---|
| **Paper** | **15.7%** | |
| Newspaper | 0.9% | 0.2% |
| Plain OCC/Kraft | 1.1% | 0.2% |
| Waxed OCC/Kraft | 0.0% | 0.0% |
| High-grade Paper | 0.7% | 0.2% |
| Mixed Low-grade Paper | 4.7% | 0.5% |
| Compostable/Soiled | 6.5% | 0.6% |
| Pot. Comp. Sgl-use Food Service | 0.0% | 0.0% |
| Sgl-use Food Service | 0.4% | 0.1% |
| Mixed/Other Paper | 1.3% | 0.3% |
| **Plastic** | **10.7%** | |
| #1 PET Bottles | 0.4% | 0.1% |
| #2 HDPE Natural Bottles | 0.2% | 0.0% |
| #2 HDPE Colored Bottles | 0.4% | 0.1% |
| Other Bottles | 0.0% | 0.0% |
| Tubs | 0.4% | 0.1% |
| Expanded Poly. Non-food | 0.2% | 0.0% |
| Expanded Poly. Food-grade | 0.4% | 0.1% |
| Rigid Poly. Foam Insulation | 0.0% | 0.0% |
| Pot. Comp. Sgl-use Food Service | 0.0% | 0.0% |
| Other Single-use Food Service | 0.6% | 0.1% |
| Other Rigid Packaging | 0.8% | 0.1% |
| Shopping/Dry Cleaning Bags | 0.4% | 0.1% |
| Clean Polyethylene Film | 0.2% | 0.1% |
| Other Film | 4.5% | 0.3% |
| Plastic Pipe | 0.0% | 0.0% |
| Foam Carpet Padding | 0.0% | 0.0% |
| Durable Plastic Products | 1.2% | 0.3% |
| Plastic/Other Materials | 0.9% | 0.4% |
| **Glass** | **1.8%** | |
| Clear Bottles | 0.5% | 0.2% |
| Green Bottles | 0.4% | 0.2% |
| Brown Bottles | 0.3% | 0.1% |
| Container Glass | 0.4% | 0.1% |
| Fluorescent Tubes | 0.0% | 0.0% |
| CFLs | 0.0% | 0.0% |
| Flat Glass | 0.0% | 0.1% |
| Other Glass | 0.2% | 0.1% |
| **Metal** | **3.5%** | |
| Aluminum Beverage Cans | 0.2% | 0.1% |
| Aluminum Foil/Containers | 0.4% | 0.1% |
| Other Aluminum | 0.0% | 0.0% |
| Other Nonferrous | 0.0% | 0.0% |
| Tin Food Cans | 0.6% | 0.2% |
| Empty Aerosol Cans | 0.2% | 0.0% |
| Other Ferrous | 1.2% | 0.4% |
| Oil filters | 0.0% | 0.0% |
| Mixed Metals/Material | 0.9% | 0.2% |
| **Organics** | **59.6%** | |
| Leaves and Grass | 0.9% | 0.4% |
| Prunings | 0.3% | 0.2% |
| Food | 28.3% | 1.9% |
| Fats, Oils, Grease | 0.8% | 0.6% |
| Textiles/Clothing | 3.2% | 0.5% |
| Mixed Textiles | 1.3% | 0.4% |
| Carpet | 0.7% | 0.4% |
| Disposable Diapers | 9.2% | 1.3% |
| Animal By-products | 14.1% | 1.7% |
| Rubber Products | 0.4% | 0.3% |
| Tires | 0.3% | 0.6% |

| Material | Est. Percent | + / - |
|---|---|---|
| **Appliances and Electronics** | **0.7%** | |
| Furniture | 0.0% | 0.0% |
| Mattresses | 0.0% | 0.0% |
| Small Appliances | 0.2% | 0.2% |
| Cell Phones | 0.0% | 0.0% |
| Audio/Visual Equipment | 0.1% | 0.2% |
| CRT Monitors | 0.0% | 0.0% |
| CRT Televisions | 0.0% | 0.0% |
| Other Electronics | 0.3% | 0.2% |
| **CDL Wastes** | **5.3%** | |
| Clean Dimension Lumber | 0.5% | 0.2% |
| Clean Engineered Wood | 0.2% | 0.1% |
| Pallets | 0.0% | 0.0% |
| Crates | 0.0% | 0.0% |
| Other Untreated Wood | 0.2% | 0.2% |
| New Painted Wood | 0.6% | 0.4% |
| Old Painted Wood | 0.0% | 0.0% |
| Creosote-treated Wood | 0.0% | 0.0% |
| Other Treated Wood | 0.4% | 0.4% |
| Contaminated Wood | 0.5% | 0.3% |
| New Gypsum Scrap | 0.0% | 0.0% |
| Demo Gypsum Scrap | 0.6% | 0.9% |
| Fiberglass Insulation | 0.0% | 0.0% |
| Rock/Concrete/Bricks | 0.3% | 0.3% |
| Asphalt Shingles | 0.0% | 0.0% |
| Other Asphaltic Roofing | 0.4% | 0.6% |
| Ceramics | 0.4% | 0.2% |
| Cement Fiber Board | 0.0% | 0.0% |
| Other Construction | 1.0% | 0.6% |
| **Hazardous** | **0.7%** | |
| Liquid Latex Paint | 0.2% | 0.2% |
| Dried Latex Paint | 0.2% | 0.2% |
| Solvent-based Adhesives | 0.0% | 0.0% |
| Water-based Adhesives | 0.0% | 0.0% |
| Oil-based Paint/Thinners | 0.0% | 0.0% |
| Caustic Cleaners | 0.0% | 0.0% |
| Pesticides/Herbicides | 0.0% | 0.0% |
| Dry-cell Batteries | 0.1% | 0.0% |
| Wet-cell Batteries | 0.0% | 0.0% |
| Gasoline/Kerosene | 0.0% | 0.0% |
| Motor Oil/Diesel Oil | 0.0% | 0.0% |
| Asbestos | 0.0% | 0.0% |
| Explosives | 0.0% | 0.0% |
| Medical Wastes | 0.2% | 0.2% |
| Other Chemicals | 0.0% | 0.0% |
| Other Potentially Toxic | 0.0% | 0.0% |
| **Fines and Misc Materials** | **2.0%** | |
| Sand/Soil/Dirt | 0.1% | 0.1% |
| Non-distinct Fines | 0.2% | 0.2% |
| Misc. Organics | 1.3% | 0.3% |
| Misc. Inorganics | 0.3% | 0.1% |
| **Totals** | **100.0%** | |
| Sample Count | 56 | |

*Confidence intervals calculated at the 90% confidence level. Percentages for material types may not total 100% due to rounding.*

## Table 4-45: Composition by Weight – Large Households
### (January – December 2010)

| Material | Est. Percent | + / - |
|---|---|---|
| **Paper** | **18.9%** | |
| Newspaper | 0.8% | 0.2% |
| Plain OCC/Kraft | 1.2% | 0.2% |
| Waxed OCC/Kraft | 0.0% | 0.0% |
| High-grade Paper | 1.2% | 0.6% |
| Mixed Low-grade Paper | 5.7% | 0.7% |
| Compostable/Soiled | 8.1% | 1.0% |
| Pot. Comp. Sgl-use Food Service | 0.1% | 0.1% |
| Sgl-use Food Service | 0.5% | 0.1% |
| Mixed/Other Paper | 1.3% | 0.5% |
| **Plastic** | **11.7%** | |
| #1 PET Bottles | 0.5% | 0.1% |
| #2 HDPE Natural Bottles | 0.1% | 0.0% |
| #2 HDPE Colored Bottles | 0.4% | 0.1% |
| Other Bottles | 0.1% | 0.0% |
| Tubs | 0.6% | 0.1% |
| Expanded Poly. Non-food | 0.3% | 0.2% |
| Expanded Poly. Food-grade | 0.6% | 0.1% |
| Rigid Poly. Foam Insulation | 0.0% | 0.0% |
| Pot. Comp. Sgl-use Food Service | 0.0% | 0.0% |
| Other Single-use Food Service | 0.6% | 0.1% |
| Other Rigid Packaging | 0.8% | 0.1% |
| Shopping/Dry Cleaning Bags | 0.5% | 0.1% |
| Clean Polyethylene Film | 0.0% | 0.0% |
| Other Film | 5.1% | 0.4% |
| Plastic Pipe | 0.0% | 0.0% |
| Foam Carpet Padding | 0.1% | 0.1% |
| Durable Plastic Products | 1.0% | 0.3% |
| Plastic/Other Materials | 0.8% | 0.2% |
| **Glass** | **1.8%** | |
| Clear Bottles | 0.5% | 0.2% |
| Green Bottles | 0.2% | 0.1% |
| Brown Bottles | 0.4% | 0.1% |
| Container Glass | 0.4% | 0.1% |
| Fluorescent Tubes | 0.0% | 0.0% |
| CFLs | 0.0% | 0.0% |
| Flat Glass | 0.0% | 0.0% |
| Other Glass | 0.3% | 0.1% |
| **Metal** | **3.4%** | |
| Aluminum Beverage Cans | 0.2% | 0.0% |
| Aluminum Foil/Containers | 0.4% | 0.1% |
| Other Aluminum | 0.0% | 0.0% |
| Other Nonferrous | 0.0% | 0.1% |
| Tin Food Cans | 0.6% | 0.2% |
| Empty Aerosol Cans | 0.2% | 0.1% |
| Other Ferrous | 1.1% | 0.6% |
| Oil filters | 0.0% | 0.0% |
| Mixed Metals/Material | 0.8% | 0.2% |
| **Organics** | **57.6%** | |
| Leaves and Grass | 1.0% | 0.5% |
| Prunings | 0.4% | 0.5% |
| Food | 29.6% | 3.0% |
| Fats, Oils, Grease | 1.0% | 0.8% |
| Textiles/Clothing | 2.6% | 0.5% |
| Mixed Textiles | 1.4% | 0.7% |
| Carpet | 0.5% | 0.2% |
| Disposable Diapers | 10.4% | 1.6% |
| Animal By-products | 10.5% | 1.7% |
| Rubber Products | 0.2% | 0.1% |
| Tires | 0.0% | 0.0% |

| Material | Est. Percent | + / - |
|---|---|---|
| **Appliances and Electronics** | **1.0%** | |
| Furniture | 0.6% | 1.0% |
| Mattresses | 0.0% | 0.0% |
| Small Appliances | 0.1% | 0.1% |
| Cell Phones | 0.0% | 0.0% |
| Audio/Visual Equipment | 0.1% | 0.0% |
| CRT Monitors | 0.0% | 0.0% |
| CRT Televisions | 0.0% | 0.0% |
| Other Electronics | 0.1% | 0.1% |
| **CDL Wastes** | **3.3%** | |
| Clean Dimension Lumber | 0.2% | 0.1% |
| Clean Engineered Wood | 0.0% | 0.1% |
| Pallets | 0.0% | 0.0% |
| Crates | 0.0% | 0.0% |
| Other Untreated Wood | 0.5% | 0.5% |
| New Painted Wood | 0.6% | 0.4% |
| Old Painted Wood | 0.2% | 0.2% |
| Creosote-treated Wood | 0.0% | 0.0% |
| Other Treated Wood | 0.1% | 0.1% |
| Contaminated Wood | 0.2% | 0.1% |
| New Gypsum Scrap | 0.0% | 0.0% |
| Demo Gypsum Scrap | 0.0% | 0.0% |
| Fiberglass Insulation | 0.1% | 0.1% |
| Rock/Concrete/Bricks | 0.0% | 0.0% |
| Asphalt Shingles | 0.0% | 0.0% |
| Other Asphaltic Roofing | 0.2% | 0.3% |
| Ceramics | 0.3% | 0.1% |
| Cement Fiber Board | 0.0% | 0.0% |
| Other Construction | 0.8% | 0.8% |
| **Hazardous** | **0.4%** | |
| Liquid Latex Paint | 0.1% | 0.1% |
| Dried Latex Paint | 0.0% | 0.1% |
| Solvent-based Adhesives | 0.0% | 0.0% |
| Water-based Adhesives | 0.0% | 0.0% |
| Oil-based Paint/Thinners | 0.0% | 0.0% |
| Caustic Cleaners | 0.1% | 0.0% |
| Pesticides/Herbicides | 0.0% | 0.0% |
| Dry-cell Batteries | 0.0% | 0.0% |
| Wet-cell Batteries | 0.0% | 0.0% |
| Gasoline/Kerosene | 0.0% | 0.0% |
| Motor Oil/Diesel Oil | 0.0% | 0.0% |
| Asbestos | 0.0% | 0.0% |
| Explosives | 0.0% | 0.0% |
| Medical Wastes | 0.2% | 0.2% |
| Other Chemicals | 0.0% | 0.0% |
| Other Potentially Toxic | 0.0% | 0.0% |
| **Fines and Misc Materials** | **1.9%** | |
| Sand/Soil/Dirt | 0.0% | 0.0% |
| Non-distinct Fines | 0.0% | 0.0% |
| Misc. Organics | 1.4% | 0.4% |
| Misc. Inorganics | 0.4% | 0.3% |
| **Totals** | **100.0%** | |
| Sample Count | 51 | |

*Confidence intervals calculated at the 90% confidence level. Percentages for material types may not total 100% due to rounding.*

# Appendix A. Material Components

Waste samples were sorted by hand into 102 material components, which are grouped into nine broad material categories. Refer to Table A-2 for additional details regarding the changes in components and categories.

Medical wastes were excluded from sorting; everything else was weighed and recorded. A list of component categories and definitions follows.

**Paper**

1. *NEWSPAPER*: Printed ground wood newsprint. Includes advertising "slicks" (glossy paper), if found mixed with newspaper; otherwise, ad slicks are included with mixed low grade.

2. *PLAIN OCC/KRAFT PAPER*: Old unwaxed/uncoated corrugated container boxes and Kraft paper and brown paper bags.

3. *WAXED OCC/KRAFT PAPER*: Old waxed/coated corrugated container boxes and Kraft paper, and brown paper bags.

4. *HIGH-GRADE PAPER*: White and lightly colored bond, rag, or stationary grade paper. This includes white or lightly colored sulfite/sulfate bond, copy papers, notebook paper, envelopes, continuous-feed sulfite/sulfate computer printouts and forms of all types, excluding carbonless paper.

5. *MIXED LOW-GRADE PAPER*: Mixed paper acceptable in Seattle's residential curbside program. This includes junk mail; magazines; colored papers; bleached Kraft; boxboard; mailing tubes; carbonless copy paper; ground wood computer printouts; paperback books; telephone directories; polycoated milk, ice cream, and aseptic juice containers, including those with plastic spouts attached; and frozen/refrigerator packaging. Excludes juice concentrate cans.

6. *COMPOSTABLE/SOILED PAPER*: Paper towels, waxed paper, tissues, and other papers that were soiled with food during use (e.g., pizza box inserts).

7. *POTENTIALLY COMPOSTABLE SINGLE-USE FOOD SERVICE PAPER:* Paper plates, bowls, and cups, including wax-coated paper plates, bowls and cups and items labeled "compostable." Excludes items with visible plastic coating or lining.

8. *OTHER SINGLE-USE FOOD SERVICE PAPER*: Paper plates, bowls, and cups not labeled "compostable" and that appear to have a plastic lining or coating.

9. *MIXED/OTHER PAPER*: Predominantly paper with other materials attached (e.g. orange juice cans and spiral notebooks), and other non-recyclable papers such as carbon copy paper, hardcover books, and photographs.

**Plastic**

10. *PET BOTTLES*: Blow-molded polyethylene terephthalate (#1) bottles and jars excluding toxic product containers.

11. *HDPE NATURAL BOTTLES*: Blow-molded high-density translucent polyethylene (#2) bottles and jars excluding toxic product containers. Examples include milk, juice, beverage, oil, vinegar, and distilled water.

12. *HDPE COLORED BOTTLES*: Blow-molded high-density colored polyethylene (#2) bottles and jars excluding toxic product containers. Examples include liquid detergent bottles and some hair care bottles.

13. *OTHER PLASTIC BOTTLES*: Blow-molded #3-#7 plastic bottles and jars and unknown bottles. Excludes toxic product containers.

14. *TUBS:* #1-#7 tubs such as yogurt, cottage cheese, prescription vials, and margarine. Excludes toxic product containers.

*15. EXPANDED POLYSTYRENE NON-FOOD GRADE: Includes non-food packaging and finished products made of expanded polystyrene. Excludes Styrofoam products such as cups, plates, and bowls and rigid foam insulation.*

16. *EXPANDED POLYSTYRENE FOOD-GRADE:* "Styrofoam" products used to contain food such as "clamshells," cups, plates, and bowls.

17. *RIGID POLYSTYRENE FOAM INSULATION*: rigid panels of expanded polystyrene used to insulate walls and roofs. Excludes non-polystyrene rigid foam insulation.

18. *POTENTIALLY COMPOSTABLE SINGLE-USE FOOD SERVICE PLASTICS:* Includes forks and spoons, clamshells, cups, cup lids, and salad trays labeled “compostable.” Excludes clamshells, cups plates and bowls and other food service items made of Styrofoam.

19. *OTHER SINGLE-USE FOOD SERVICE PLASTICS:* Includes forks and spoons, clamshells, cups, cup lids, and salad trays not labeled “compostable.” Excludes clamshells, cups plates and bowls and other food service items made of Styrofoam.

20. *OTHER RIGID PACKAGING*: #1-#7 and unmarked rigid plastic packaging (excluding expanded polystyrene -- Styrofoam), such as cookie tray inserts, plastic spools, plastic frozen food trays, plastic toothpaste tubes, and disposable plant pots. Also includes toxic product containers, such as for motor oil or antifreeze.

21. *CLEAN SHOPPING/DRY CLEANER BAGS*: Labeled grocery and merchandise, dry cleaner, and newspaper polyethylene film bags that were not contaminated with food, liquid or grit during use.

22. *OTHER CLEAN POLYETHYLENE FILM*: Polyethylene film and bags, other than those identified above, which were not contaminated with food, liquid, or grit during use. Includes clean plastic sheeting, clean trash bags, mattress packaging, shrink wrap.

23. *OTHER FILM*: Film packaging not defined above, or: was contaminated with food, liquid or grit during use; is woven together (e.g., grain bags); or that contains multiple layers of film or other materials that have been fused together (e.g., potato chip bags). This category also includes contaminated plastic sheeting, photographic negatives, shower curtains, any bags used to contain food or liquid (e.g., produce), contaminated trash bags, used garbage bags, and shopping bags used as garbage bags.

*24. PLASTIC PIPE:* pipes and fittings made of PVC (polyvinyl chloride), ABS (acrylonitrile butadiene styrene), or other rigid plastics.

*25. FOAM CARPET PADDING:* foam material used under carpet to provide insulation and padding. Most commonly made of urethane foam. Can be solid-colored or have a marbled appearance.

26. *DURABLE PLASTIC PRODUCTS*: Finished plastic products made entirely of plastic such as toys, toothbrushes, vinyl hose, plastic lawn furniture, and foam mattresses. Includes fiberglass resin products and materials, and durable plastic pots.

27. *PLASTIC/OTHER MATERIALS*: Items that are predominately plastic with other materials attached such as disposable razors, pens, lighters, toys, and 3-ring binders.

**Glass**

28. *CLEAR BEVERAGE*: Bottles that are clear in color, including pop, liquor, wine, juice, beer, and vinegar bottles.

29. *GREEN BEVERAGE*: Bottles that are green in color, including green pop, liquor, wine, beer, and lemon juice bottles.

30. *BROWN BEVERAGE*: Bottles that are brown in color, including brown pop, beer, liquor, juice, and extract bottles.

31. *CONTAINER GLASS*: Glass containers of all colors, holding solid materials such as mayonnaise, non-dairy creamer, and facial cream.

32. FLUORESCENT TUBES: Fluorescent light tubes.

33. COMPACT FLUORESCENT LIGHTS (CFL): small, fluorescent bulbs similar in appearance to incandescent bulbs. These bulbs typically have a spiral or tubular design.

34. *FLAT GLASS:* Clear or tinted glass that is flat. Examples include glass window panes, doors and table tops, flat automotive window glass (side windows), safety glass, and architectural glass. Excludes windshields, laminated glass, or any curved glass.

35. *OTHER GLASS*: Mirrors, windshields, light bulbs (except fluorescent tubes), glassware, and blue glass bottles.

**Metal**

36. *ALUMINUM CANS*: Aluminum beverage cans (UBC) and bi-metal cans made mostly of aluminum.

37. *ALUMINUM FOIL/CONTAINERS*: Aluminum food containers, trays, and foil.

38. *OTHER ALUMINUM*: Aluminum products and scrap such as window frames, cookware.

39. *OTHER NONFERROUS*: Metals not derived from iron, to which a magnet will not adhere, and which are not significantly contaminated with other metals or materials.

40. *TIN FOOD CANS*: Tinned steel food containers, including bi-metal cans made mostly of steel.

41. *EMPTY AEROSOL CANS:* Empty, mixed material/metal aerosol cans. (Aerosols that still contain product are sorted according to that material—for instance, solvent-based paint.)

42. *OTHER FERROUS*: Ferrous and alloyed ferrous scrap metals to which a magnet adheres and which are not significantly contaminated with other metals or materials.

43. *OIL FILTERS:* Metal oil filters used in cars and other automobiles.

44. *MIXED METALS/MATERIALS*: Items that are predominately metal with other materials attached such as motors, insulated wire, and finished products containing a mixture of metals, or metals and other materials. White goods are banned from Seattle's disposal. However, segments of large appliances are occasionally found; they are included in this category.

**Organic**

45. *LEAVES AND GRASS*: Non-woody plant materials from a yard or garden area, including grass clippings, leaves, weeds, and garden wastes.

46. *PRUNINGS*: Cut prunings, 6" or less in diameter, from bushes, shrubs, and trees.

47. *FOOD*: Food wastes and scraps, including bone, rinds, etc. Excludes the weight of food containers, except when container weight is not appreciable compared to the food inside. Biodegradable packaging peanuts (made from corn starch) are also included in this category. Excludes fats, oils, and grease.

48. *FATS, OILS, AND GREASE:* fatty by-products of food preparation. Includes cooking oil, butter, lard, and gravy. Can be in liquid or solid form.

49. *TEXTILES*: Rag stock fabric materials including natural and synthetic textiles such as cotton, wool, silk, woven nylon, rayon, and polyester.

50. *MIXED TEXTILES*: Non-rag stock grade textiles such as upholstered items, non-leather shoes and handbags, heavy linens, and draperies.

51. *CARPET*: General category of flooring applications and non-rag stock textiles consisting of various natural or synthetic fibers bonded to some type of backing material. Also includes felt fabric carpet padding.

52. *DISPOSABLE DIAPERS*: Diapers made from a combination of fibers, synthetic, and/or natural, and made for the purpose of single use. This includes disposable baby diapers and adult protective undergarments.

53. *ANIMAL BY-PRODUCTS*: Animal carcasses not resulting from food storage or preparation, animal wastes, and kitty litter.

54. *RUBBER PRODUCTS*: Finished products and scrap materials made of natural and synthetic rubber, such as bath mats, inner tubes, rubber hoses, rubber carpet padding, and foam rubber.

55. *TIRES*: Vehicle tires of all types. Tubes are put into the rubber category.

**Furniture, Appliances, and Electronics**

56. *FURNITURE*: Mixed-material furniture such as upholstered chairs. Furniture that is made purely of one material, such as plastic or metal, would be categorized according to that material (e.g., plastic products or other ferrous metal).

57. *MATTRESSES*: Mattresses and box springs.

58. *SMALL APPLIANCES*: Small electric appliances such as toasters, microwave ovens, power tools, curling irons, and light fixtures.

*59. CELL PHONES:* Personal digital assistants (PDA) and cell phones.

60. *AUDIO/VISUAL EQUIPMENT*: Examples include stereos, radios, tape decks, VCRs, camcorders, and digital cameras.

61. *COMPUTER MONITORS:* Computer monitors containing a cathode ray tube (CRT).

62. *TELEVISIONS:* Television sets containing a cathode ray tube (CRT).

63. *OTHER ELECTRONICS:* Computer items not containing CRTs such as processors, mice and mouse pads, keyboards, disk drives, laptops, and other video display without cathode ray tubes (CRT).

**Construction Debris**

64. *CLEAN DIMENSION LUMBER:* Milled lumber commonly used in construction for framing and related uses, including 2 x 4's, 2 x 6's,that is clean (only including trace amounts of paint, nails, and other contaminants)Includes 2 x 4's with painted ends.

65. *CLEAN ENGINEERED WOOD*: Sheets of plywood, strandboard, particleboard, and other wood created using glue that are clean (only including trace amounts of paint, nails, and other contaminants).

66. *PALLETS*: Untreated wood pallets, whole and broken.

67. *CRATES*: Untreated crates, pieces of crates, and other packaging lumber/panelboard.

68. *OTHER UNTREATED WOOD*: Compostable prunings or stumps 6" or greater in diameter.

69. *NEW PAINTED WOOD:* Lumber and wood products from new construction that have been painted so as to render them difficult to compost.

70. *OLD PAINTED WOOD*: Painted wood from demolition jobs. May be flaky and oxidized. Includes lead-based painted wood

71. *CREOSOTE-TREATED WOOD*: Lumber and wood products that have been treated with creosote so as to render them difficult to compost (with generally 50% or more of the surface area treated).

72. *OTHER TREATED WOOD*: Lumber and wood products that have been treated (other than painted or treated with creosote) so as to render them difficult to compost. This includes chemically treated lumber.

73. *CONTAMINATED WOOD:* Predominantly wood and lumber products that are mixed with other materials in such a way that they cannot easily be separated. This includes wood with metal, gypsum, concrete, or other contaminants that would not compost easily.

74. *NEW GYPSUM SCRAP*: Calcium sulfate dehydrate sandwiched between heavy layers of Kraft-type paper. Also known as drywall. This category includes new drywall that has not been painted or treated in other ways. Excludes GP DensGlass (and other brands) of exterior or roof paneling which is gypsum sandwiched between a fiberglass-reinforced coating.

75. *DEMO GYPSUM SCRAP*: Used or demolition gypsum wallboard scrap that has been painted or treated.

76. *FIBERGLASS INSULATION*: Fiberglass building and mechanical insulation, batt or rigid.

77. *ROCK/CONCRETE/BRICKS*: Rock gravel larger than 2" diameter, Portland cement mixtures (set or unset), and fired-clay bricks.

78. *ASPHALT SHINGLES*: Roofing material composed of fiberglass or organic felts saturated with asphalt and covered with inert aggregates as well as attached roofing tar and tar paper. Commonly known as three-tab roofing shingles but including older designs as well.

79. *OTHER ASPHALTIC ROOFING*: Other roofing material made with layers of felt, asphalt, aggregates, and attached roofing tar and tar paper normally used on flat/low pitched roofs usually on commercial buildings. Includes torch-down and hot-tar roofs.

80. *CERAMICS*: Finished ceramic or porcelain products such as toilets, sinks, and some dishware.

81. *CEMENT FIBER BOARD*: a composite building material containing cement and wood fiber. Includes Hardiplank, Hardiboard, tile backer board, and other similar products.

82. *OTHER CONSTRUCTION DEBRIS*: Construction debris (other than wood) that cannot be classified elsewhere and mixed fine building material scraps. For example, floor sweepings from construction activities containing sawdust, nails, wire, etc. Includes GP DensGlass (and other brands) of exterior or roof paneling which is gypsum sandwiched between a fiberglass-reinforced coating.

**Potentially Harmful Wastes**

83. *LIQUID LATEX PAINTS*: Water-based paints and similar products in liquid form. Excludes empty paint containers and paint that is outweighed by that of the container.

84. DRIED LATEX PAINTS: Water-based paints and similar products that have dried. Excludes empty paint containers and paint that is outweighed by that of the container

85. *SOLVENT-BASED ADHESIVES/GLUES*: Oil/resin/volatile solvent-based glues and adhesives, including epoxy, rubber cement, two-part glues and sealers, and auto body fillers.

86. *WATER-BASED ADHESIVES/GLUES*: Water-based glues, caulking compounds, grouts, and Spackle.

87. *OIL-BASED PAINT/SOLVENT*: Solvent-based paints, varnishes, and similar products. Various solvents, including chlorinated and flammable solvents, paint strippers, solvents contaminated with other products such as paints, degreasers and some other cleaners if the primary ingredient is (or was) a solvent, or alcohol such as methanol and isopropanol.

88. *CAUSTIC CLEANERS:* Caustic acids and bases whose primary purpose is to clean surfaces, unclog drains, or perform other actions.

89. *PESTICIDES/HERBICIDES*: Variety of poisons with the purpose of discouraging or killing insects, weeds, or microorganisms. Fungicides and wood preservatives, such as pentachlorophenol, are also included.

90. *DRY-CELL BATTERIES*: Dry-cell batteries of various sizes and types as commonly used in households. Includes cell phone and button cell batteries.

91. *WET-CELL BATTERIES*: Wet-cell batteries of various sizes and types as commonly used in automobiles.

92. *GASOLINE/KEROSENE*: Gasoline, diesel fuel, and fuel oils.

93. *MOTOR OIL/DIESEL OIL*: Lubricating oils, primarily used in vehicles but including other types with similar characteristics.

94. *ASBESTOS*: Asbestos and asbestos-containing wastes (if this is the primary hazard associated with these wastes).

95. *EXPLOSIVES*: Gunpowder, unspent ammunition, picric acid, and other potentially explosive chemicals.

96. *MEDICAL WASTES*: Materials typically discarded in a health care setting such as I.V. tubing and patient drapes, specimen containers, and Petri dishes. Medical wastes that could be considered a biohazard are weighed, but not further sorted.

97. *OTHER CLEANERS/CHEMICALS*: Soaps, non-caustic cleaners, medicines, cosmetics, and other household chemicals.

98. *OTHER POTENTIALLY HARMFUL WASTES*: Other chemicals or potentially harmful wastes that do not fit into the above categories, including unidentifiable materials.

**Fines and Miscellaneous Materials**

*99. SAND/SOIL/DIRT*: Sand, soil, dirt, and gravel smaller than 2" in diameter.

100. *NONDISTINCT FINES*: Mixed MSW fines smaller than 2” in diameter.

101. *MISCELLANEOUS ORGANICS*: Combustible materials including wax; bar soap; cigarette butts; scraps of leather and leather products including shoes and belts; feminine hygiene products; briquettes; fireplace, burn barrel and fire pit ash; and other organic materials not classified elsewhere.

102. *MISCELLANEOUS INORGANICS*: Other inorganic, non-combustible materials not classified elsewhere.

## Changes to Waste Component Categories

The material types used to categorize Seattle's waste stream have been refined over the years. The component categories for 2010 were updated and divided into 102 material components to provide more detail about specific materials in the waste stream. The material categories in the 2010 study are based on those used in Seattle's 2008 commercial and self-haul waste study.

Table A-1 provides an explanation of changes shown in Table A-2. Table A-2 tracks how the component categories have changed since 1988/1989. An "X" signifies that the component remained the same from the previous study period. If a component was split into two or more component categories (e.g., *compostable/soiled paper* into *compostable/soiled paper* and *OCC/Kraft, waxed*), then the rows will look like the example highlighted below in 1994 and 1996. If the two or more materials are combined into one material component category (e.g., *mixed low grade* and *polycoated paper* into *mixed low grade*), the rows will look like the example highlighted below in 2004 and 2006.

**Table A-1: Explanation of Track Changes**

| *1994* | 1996 | 1998/99 | 2000 | 2002 | 2004 | 2006 |
|---|---|---|---|---|---|---|
| **PAPER** | | | | | | |
| New spaper | x | x | x | x | x | New spaper |
| OCC/Kraft | OCC/Kraft, Unw axed | x | x | x | x | Plain OCC/Kraft |
| Office Paper | x | x | x | x | High Grade Paper | High Grade Paper |
| Computer Paper | x | x | x | x | | |
| Mixed Low Grade | x | x | x | x | Mixed Low Grade | Mixed Low Grade |
| Phone Books | x | x | x | x | | |
| Milk/Juice Polycoats | x | x | x | x | Polycoated Paper | |
| Frozen Food Polycoats | x | x | x | x | | |
| Compostable/Soiled | x | x | x | Compostable Paper | x | Compostable Paper |
| | OCC/Kraft, Waxed | x | x | x | x | Waxed OCC/Kraft |
| Paper/Other Materials | x | x | x | x | Mixed/Other Paper | Mixed/Other Paper |
| Other Paper | x | x | x | x | | |

## Table A-2: Changes to Waste Component Categories, 1988 to present

| *1988-89* | *1990* | *1992* | *1994* | 1996 | 1998/99 | 2000 | 2002 | 2004 | 2006 | 2008 | 2010 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PAPER | | | | | | | | | | | |
| Newspaper | x | x | x | x | x | x | x | x | x | x | x |
| Corrugated Paper | x | x | OCC/Kraft | OCC/Kraft, Unwaxed | x | x | x | x | x | x | x |
| Office Paper | x | x | x | x | x | x | x | High Grade Paper | x | x | x |
| Computer Paper | x | x | x | x | x | x | x | | | | |
| Mixed Scrap Paper | x | x | Mixed Low Grade | x | x | x | x | Mixed Low Grade | Mixed Low-Grade | x | x |
| | | | Phone Books | x | x | x | x | | | | |
| Other Paper | x | x | Milk/Juice Polycoats | x | x | x | x | Polycoated Paper | | | |
| | | | Frozen Food Polycoats | x | x | x | x | | | | |
| | | | Compostable/Soiled | Compostable/Soiled | x | x | x | x | x | x | x |
| | | | | | | | | | | Single-use Food Service | Potentially Compostable Single-use Food Service |
| | | | | | | | | | | | x |
| | | | | OCC/Kraft, Waxed | x | x | x | x | x | x | x |
| | | | Paper/Other Materials | x | x | x | x | Mixed/Other Paper | x | x | x |
| | | | Other Paper | x | x | x | x | | | | |
| PLASTIC | | | | | | | | | | | |
| PET Bottles | x | x | PET Pop & Liquor | x | x | x | x | #1 PET Bottles | #1 PET Bottles | x | x |
| | | | Other PET Bottles | x | x | x | x | *Moved to component "Other plastic bottles"* | | | |
| HDPE Bottles | x | x | HDPE Milk & Juice | x | x | x | x | #2 HDPE Natural Bottles | x | x | x |
| | | | | | | | | #2 HDPE Colored Bottles | x | x | x |
| | | | Other HDPE Bottles | x | x | x | x | *Toxic product bottles moved to component "Other plastic bottles"* | *Moved to component "Other rigid packaging"* | | |
| Plastic Packaging | Other Plastic Bottles | x | x | x | x | x | x | x | x | x | x |
| | x | x | Other Rigid Containers | Jars & Tubs | x | x | x | x | x | x | x |

| *1988-89* | *1990* | *1992* | *1994* | 1996 | 1998/99 | 2000 | 2002 | 2004 | 2006 | 2008 | 2010 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Other Rigid Packaging | x | x | x | x | x | x | Single-use Food Service | Potentially Compostable Single-use Food Service |
| | | | | | | | | | | | x |
| | | | | | | | | | | x | x |
| | | | Grocery/Bread Bags | x | x | x | x | Clean Shopping/Dry Cleaner Bags | x | x | x |
| | | | Other Film | Garbage Bags | x | x | x | Other Film | x | x | x |
| | | | | x | x | x | x | | | | |
| | | | | | | | | Other Clean PE Film | x | x | x |
| Expanded Polystyrene | x | x | x | x | x | x | x | x | x | Expanded Poly. Food-grade | x |
| | | | | | | | | | | x | Rigid Poly. Foam Insulation |
| | | | | | | | | | | | x |
| Other Plastic Products | x | x | Plastic Products | x | x | x | x | x | x | x | Plastic Pipe |
| | | | | | | | | | | | Foam Carpet Padding |
| | | | | | | | | | | | x |
| | | | Plastic/Other Materials | x | x | x | x | x | x | x | x |
| GLASS | | | | | | | | | | | |
| Non-refillable Pop | x | x | Clear Beverage | x | x | x | x | x | x | x | x |
| Refillable Pop | x | x | Green Beverage | x | x | x | x | x | x | x | x |
| Non-refillable Beer | x | x | Brown Beverage | x | x | x | x | x | x | x | x |
| Refillable Beer | x | x | *(After 1994, characterized according to color)* | | | | | | | | |
| Container Glass | x | x | x | x | x | x | x | x | x | x | x |
| Non-recyclable Glass | x | x | x | Fluorescent Tubes | x | x | x | x | x | x | CFLs |
| | | | | | | | | | | | x |
| | | | | Other Glass | Other Glass | Other Glass | Other Glass | Other Glass | Other Glass | Flat Glass | x |
| | | | | | | | | | | x | x |
| METAL | | | | | | | | | | | |
| Aluminum Cans | x | x | x | x | x | x | x | x | x | x | x |
| Aluminum Foil/Containers | x | x | x | x | x | x | x | x | x | x | x |
| Nonferrous | x | x | x | Other Nonferrous | x | x | x | x | x | x | x |
| | | | Other Aluminum | x | x | x | x | x | x | x | x |

| *1988-89* | *1990* | *1992* | *1994* | 1996 | 1998/99 | 2000 | 2002 | 2004 | 2006 | 2008 | 2010 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Empty Aerosol Cans | x | x | x | x | x | x | x |
| Tinned Cans | x | x | x | x | x | x | x | x | x | x | x |
| Bi-metal Cans | x | x | *(After 1994, characterized according to predominant metal)* | | | | | | | | |
| Ferrous | x | x | x | x | x | x | x | x | x | x | x |
| Mixed Metals/Materials | x | x | x | x | x | x | x | x | x | x | x |
| *(Before 1998/99, was not characterized)* | | | | | Metal Oil Filters | x | x | x | x | x | x |
| White Goods | x | x | *(After 1994, banned from disposal. Parts show up in "Mixed Metals")* | | | | | | | | |
| ORGANICS (including rubber) | | | | | | | | | | | |
| Leaves and Grass | x | x | x | x | x | x | x | x | x | x | x |
| Prunings | x | x | x | x | x | x | x | x | x | x | x |
| Food | | | x | x | x | x | x | x | x | x | Fats, Oils, Grease |
| | x | x | | | | | | | | | x |
| Textiles | x | x | x | Textiles/Clothing | x | x | x | *Moved to "Organics"* | Textiles | x | x |
| | | | Carpet/Upholstery | x | x | x | x | | Mixed Textiles | x | x |
| | | | | | | | | | Carpet | x | x |
| Disposable Diapers | x | x | x | x | x | x | x | | Disposable Diapers | x | x |
| *(Discarded from samples prior to 1994)* | | | Animal By-Products | x | x | x | x | | Animal By-products | x | x |
| Rubber Products | x | x | *moved to "Other Materials"* | x | x | x | x | *Moved to "Organics"* | Rubber Products | x | x |
| Tires | x | x | *moved to "Other Materials"* | x | x | x | x | *Moved to "Organics"* | Tires | x | x |
| FURNITURE, APPLIANCES, AND ELECTRONICS | | | | | | | | | | | |
| *(Prior to 1994, split among various materials; Mixed Metal, Textiles, Other Plastics, etc.)* | | | Furniture | x | x | x | x | *Moved to component "Miscellaneous Organics"* | Furniture | x | x |
| *(Prior to 1994, split among various materials; Mixed Metal, Textiles, Other Plastics, etc.)* | | | Mattresses | x | x | x | x | | Mattresses | x | x |
| *(Prior to 1994, split among various materials; Mixed Metal, Textiles, Other Plastics, etc.)* | | | Small Appliances | x | x | x | x | | Small Appliances | x | x |
| *(Prior to 1994, split among various materials; Mixed Metal, Textiles, Other Plastics, etc.)* | | | A/V Equipment | x | x | x | x | | Audio/Visual Equipment | x | Cell Phones |
| | | | | | | | | | | | x |

| *1988-89* | *1990* | *1992* | *1994* | 1996 | 1998/99 | 2000 | 2002 | 2004 | 2006 | 2008 | 2010 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Televisions & Computer Monitors | Television Sets | | Televisions | x | x |
| | | | | | | | Computer Monitors | | Computer Monitors | x | x |
| | | | | | | Other Computer Equipment | x | | Other Computer Equipment | x | Renamed "Other Electronics" |
| CONSTRUCTION DEBRIS | | | | | | | | | | | |
| Wood | x | Untreated Wood | x | Dimension Lumber; *new category "CDL Wastes"* | x | x | x | x | x | Clean Dimension Lumber | x |
| | | | | | | | | | | Clean Engineered Wood | x |
| | | | Crates/Pallets | Other Untreated Wood; *new category "CDL Wastes"* | x | x | x | x | x | x | x |
| | | | | Pallets | x | x | x | *Moved to "CDL Wastes"* | Pallets | x | x |
| | | | | Crates/Boxes | x | x | x | *Moved to "CDL Wastes"; renamed "Crates"* | Crates/Boxes | x | x |
| | | Treated Wood | x | *Moved to new category "CDL Wastes"* | *x* | *x* | *x* | *x* | *x* | New Painted Wood | x |
| | | | | | | | | | | Old Painted Wood | x |
| | | | | | | | | | | Creosote-treated Wood | x |
| | | | | | | | | | | Other Treated Wood | x |
| | | | | Contaminated Wood; *new category "CDL Wastes"* | x | x | x | x | x | x | x |

| *1988-89* | *1990* | *1992* | *1994* | 1996 | 1998/99 | 2000 | 2002 | 2004 | 2006 | 2008 | 2010 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Gypsum Drywall | x | x | x | New Gypsum Scrap; *new category CDL Wastes* | x | x | x | x | x | x | x |
| | | | | Demo Gypsum Scrap; *new category CDL Wastes* | x | x | x | x | x | x | x |
| Fiberglass Insulation | x | x | x | *Moved to new category CDL Wastes* | *x* | *x* | *x* | *x* | x | x | x |
| Rock/Concrete/ Brick | x | x | x | *Moved to new category CDL Wastes* | *x* | *x* | *x* | *x* | x | x | x |
| Other Construction Debris | x | x | x | Asphaltic Roofing; *new category CDL Wastes* | x | x | x | x | x | Asphalt Shingles | x |
| | | | | | | | | | | Other Asphaltic Roofing | x |
| | | | | *Moved to new category CDL Wastes* | x | x | x | x | x | x | Cement Fiber Board |
| | | | | | | | | | | | x |
| Ceramics, Porcelain, China | x | x | x | x | x | x | x | *Moved to "CDL Wastes"; renamed "Ceramics"* | Ceramics | x | x |
| POTENTIALLY HARMFUL WASTE | | | | | | | | | | | |
| Latex Paints | x | x | x | x | x | x | x | x | x | x | Liquid Latex Paint |
| | | | | | | | | | | | Dried Latex Paint |
| Adhesives/Glues | x | x | x | Hazardous Glue/Adhesives | x | x | x | Renamed "Solvent-based Adhesives/Glues" | x | x | x |
| | | | | Non-hazardous Glue/Adhesives | x | x | x | Renamed "Water-based Adhesives/Glues" | x | x | x |
| Oil-based Paints/Solvents | x | x | x | x | x | x | x | x | x | x | x |
| Cleaners | x | x | x | x | x | x | x | Renamed "Caustic Cleaners" | x | x | x |
| Pesticides & Herbicides | x | x | x | x | x | x | x | x | x | x | x |

| *1988-89* | *1990* | *1992* | *1994* | 1996 | 1998/99 | 2000 | 2002 | 2004 | 2006 | 2008 | 2010 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Batteries | x | x | Dry-Cell Batteries | x | x | x | x | x | x | x | x |
| | | | Wet-Cell Batteries | x | x | x | x | x | x | x | x |
| Gasoline/Kerosene | x | x | x | x | x | x | x | x | x | x | x |
| Motor Oil/Diesel Oil | x | x | x | x | x | x | x | x | x | x | x |
| Asbestos | x | x | x | x | x | x | x | x | x | x | x |
| Explosives | x | x | x | x | x | x | x | x | x | x | x |
| Other Chemicals | x | x | x | Other Hazardous Chemicals | x | x | x | Medical Waste | x | x | x |
| | | | | | | | | Other Potentially Harmful Wastes | x | x | x |
| | | | | Other Non-hazardous Chemicals | x | x | x | Renamed "Other Cleaners/Chemicals" | x | x | x |
| OTHER MATERIALS | | | | | | | | | | | |
| Sand, Dirt, Non-distinct Fines | x | x | Sand/Soil/Dirt | *Moved to new category CDL Wastes* | *x* | *x* | *x* | *Moved to new category "Fines & Miscellaneous Materials"* | Sand/Soil/Dirt | x | x |
| | | | Non-distinct Fines | x | x | x | x | *Moved to new category "Fines & Miscellaneous Materials"* | Non-distinct Fines | x | x |
| Ash | x | x | x | x | x | x | x | *Moved to component "Miscellaneous Organics"* | Miscellaneous Organics | x | x |
| Leather | x | x | x | x | x | x | x | | | | |
| *(Prior to 1994, mostly in "Sand, Dirt, Non-distinct Fines; also in various "Mixed" and "Other" categories)* | | | Misc. Organics | x | *x* | *x* | *x* | | | | |
| *(Prior to 1994, mostly in "Sand, Dirt, Non-distinct Fines; also in various "Mixed" and "Other" categories)* | | | Misc. Inorganics | x | *x* | *x* | *x* | *Moved to new category "Fines & Miscellaneous Materials"* | Miscellaneous Inorganic | x | x |

# Appendix B. Sampling Methodology

## Overview

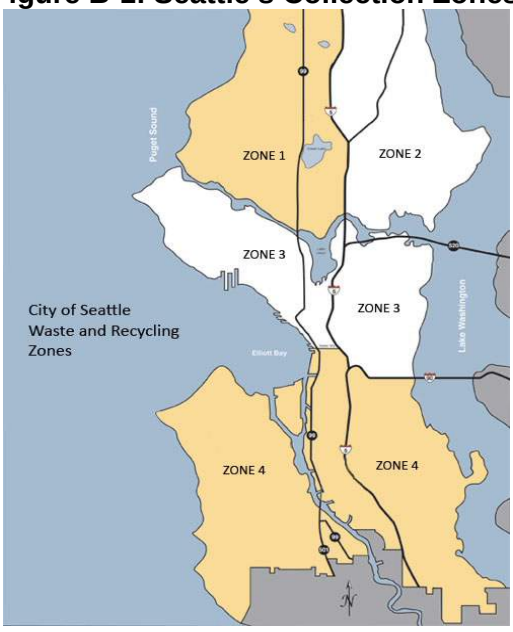
The objective of the 2010 Seattle Waste Composition Study was to provide statistically significant data on the composition of residential wastes from single-family and multifamily households in the City of Seattle. The residential waste stream was last sampled in 2006. The current project followed the same basic methodology as the previous study.

This appendix outlines the sampling methodology for the current study.

## Sampling Populations

This study examined waste disposed by two generators: single-family and multifamily residences. All materials were collected from Seattle's two contracted haulers, each serving two of the four collection zones located throughout the City (Figure B-1). Self-hauled residential waste loads were not included in this study.

**Figure B-1: Seattle's Collection Zones**




In Seattle, single-family and multifamily generators are defined as follows:

- ***Single-family:*** Primarily detached single-family, duplex, triplex, and four-plex homes. Waste is collected from garbage cans.

- ***Multifamily:*** Primarily apartments and condominiums with five or more units. Waste is collected from dumpsters.

The single-family and multifamily samples were evenly distributed across the four waste collection zones to ensure comparability of data across all four zones. Table B-1 shows the eight residential subpopulations, according to residence type and collection zones.

**Table B-1: Subpopulations, by Residence Type and Collection Zones**

| | | **Generator Type** *(Single-family)* | *(Multifamily)* |
|---|---|---|---|
| **Waste Collection Zones** | *One* | Single-family Zone 1 | Multifamily Zone 1 |
| | *Two* | Single-family Zone 2 | Multifamily Zone 2 |
| | *Three* | Single-family Zone 3 | Multifamily Zone 3 |
| | *Four* | Single-family Zone 4 | Multifamily Zone 4 |

## Sample Allocation

Samples for the 2010 study were apportioned between single-family and multifamily samples using the same ratio used in the 2006 study. Approximately two-thirds (240 of 361) of the samples were allocated to the single-family residence type, while the remaining one-third (121 of 361) was allocated to the multifamily residence type. Keeping these allocations consistent allows comparability between studies while ensuring that multifamily waste was sufficiently represented. Table B-2 outlines the total number of waste samples that were planned for the 2010 study and the actual number of samples sorted, by residence type and service area.

**Table B-2: Planned versus Actual Number of Samples**

| | **Planned Number of Samples** | **Actual Number of Samples** |
|---|---|---|
| **Single-family** | | |
| **Zone 1** | 60 | 60 |
| **Zone 2** | 60 | 60 |
| **Zone 3** | 60 | 60 |
| **Zone 4** | 60 | 60 |
| **Multifamily** | | |
| **Zone 1** | 30 | 30 |
| **Zone 2** | 30 | 30 |
| **Zone 3** | 30 | 30 |
| **Zone 4** | 30 | 31 |
| **Total** | 360 | 361 |

## Sampling Calendar

To reflect seasonal variation in the amounts and types of waste disposed by Seattle residents, the samples were distributed across the 12-month study period. Since the field crew can sort approximately 12 samples of waste per day, 30 days of sampling were initially scheduled. Monthly sampling events each consisted of two or three days of sampling.

Sampling dates at each facility were selected using a random process and then adjusted in several instances for the following reasons: to avoid one holiday, accommodate the sorting crew's availability, and improve the distribution across days of the week and weeks of the month. The 2010 residential recycling study occurred concurrently with the waste study and, as a result, each sampling week included one or two days of recycling sampling. The sampling calendar was designed using the following steps.

- **Step 1: Selected weeks for sampling events.** Initially, weeks were randomly selected within each month, with the exception of January, when the sorting crew was available only during the last week of the month. Three weeks were then moved to achieve a better distribution across weeks of the month and the December sampling event was moved to avoid the week of Christmas, when residential recycling collection schedules are modified and the sampling crew was not available. Finally, the calendar was revised when the sorting crew's schedule was examined and showed conflicts in February through May. While only one week was available in February, alternate weeks in March, April, and May were randomly selected from the available weeks.

- **Step 2: Selected days within each sampling week.** The six months that would include three instead of two days of waste sampling were randomly selected. Next, either waste or recycling was randomly assigned to the start of each sampling week. In two instances, waste and recycling days were switched to achieve a better distribution across days of the week for both studies. In six instances, a Tuesday, Wednesday, or Thursday was replaced with a Monday or Friday to avoid oversampling the middle of the week, even though this change required adding non-sampling days in the middle of those weeks.

- **Step 3: Assigned sampling days to transfer stations.** Waste sampling days were randomly assigned to a transfer station so that the same number of sampling days was planned at each station and sampling days at each station were distributed well across days of the week.[1] Starting in January, which had three waste sampling days, either the North Recycling Disposal Station (NRDS) or the South Recycling Disposal Station (SRDS) was selected for the first two days. A random selection process was also used to select which facility to begin sampling at in February, a two-day waste sampling month. Subsequent sampling events alternated starting at NRDS or SRDS. After the initial schedule was drafted, sampling days in January and March were altered to evenly distribute sampling days at each facility across days of the week.

Table B-3 presents the waste sampling calendar, as well as the planned and actual samples sorted on each day.

[1] In an effort to try to meet the trucks at the station where the drivers normally hauled their loads, the sampling schedule was revised mid-year. The resulting schedule, shown in Table B-3, included 18 days at NRDS and 13 days at SRDS.

**Table B-3: Waste Sampling Calendar**

| Date | Facility | Day of the Week | Week of the Month | Planned Samples | Actual Samples | Difference |
|---|---|---|---|---|---|---|
| 1/26/2010 | SRDS | Tuesday | 4 | 12 | 11 | -1 |
| 1/28/2010 | NRDS | Thursday | 4 | 12 | 12 | 0 |
| 1/29/2010 | NRDS | Friday | 4 | 12 | 12 | 0 |
| 2/10/2010 | NRDS | Wednesday | 2 | 12 | 12 | 0 |
| 2/12/2010 | SRDS | Friday | 2 | 12 | 9 | -3 |
| 3/24/2010 | SRDS | Wednesday | 4 | 12 | 13 | 1 |
| 3/25/2010 | NRDS | Thursday | 4 | 12 | 12 | 0 |
| 3/26/2010 | SRDS | Friday | 4 | 12 | 9 | -3 |
| 4/29/2010 | SRDS | Thursday | 4 | 12 | 13 | 1 |
| 4/30/2010 | NRDS | Friday | 4 | 12 | 10 | -2 |
| 5/17/2010 | SRDS | Monday | 3 | 12 | 11 | -1 |
| 5/18/2010 | SRDS | Tuesday | 3 | 12 | 13 | 1 |
| 5/21/2010 | NRDS | Friday | 3 | 12 | 12 | 0 |
| 6/21/2010 | NRDS | Monday | 4 | 12 | 12 | 0 |
| 6/23/2010 | SRDS | Wednesday | 4 | 12 | 13 | 1 |
| 7/6/2010 | NRDS | Tuesday | 1 | 12 | 12 | 0 |
| 7/7/2010 | NRDS | Wednesday | 1 | 12 | 7 | -5 |
| 7/8/2010 | SRDS | Thursday | 1 | 12 | 13 | 1 |
| 8/2/2010 | SRDS | Monday | 1 | 12 | 13 | 1 |
| 8/3/2010 | NRDS | Tuesday | 1 | 12 | 12 | 0 |
| 9/7/2010 | NRDS | Tuesday | 2 | 12 | 12 | 0 |
| 9/8/2010 | NRDS | Wednesday | 2 | 12 | 12 | 0 |
| 9/10/2010 | SRDS | Friday | 2 | 12 | 10 | -2 |
| 10/18/2010 | NRDS | Monday | 3 | 12 | 7 | -5 |
| 10/22/2010 | SRDS | Friday | 3 | 12 | 16 | 4 |
| 11/8/2010 | NRDS | Monday | 2 | 12 | 11 | -1 |
| 11/9/2010 | NRDS | Tuesday | 2 | 12 | 14 | 2 |
| 11/11/2010 | NRDS | Thursday | 2 | 12 | 13 | 1 |
| 12/15/2010 | SRDS | Wednesday | 3 | 12 | 15 | 3 |
| 12/16/2010 | NRDS | Thursday | 2 | 12 | 13 | 1 |
| 12/17/2010[2] | NRDS | Friday | 2 | 0 | 7 | 7 |
| **Total** | | | | **360** | **361** | **1** |

The distribution of sampling events across weeks of the month is shown in Table B-4 and the distribution across days of the week is shown in Table B-5.

[2] December 17, 2010 was added to the schedule to make up for prior shortfalls.

**Table B-4: Distribution of Waste Sampling Days by Weeks of the Month**

| Facility | Week of the Month | | | | Overall |
|---|---|---|---|---|---|
| | First | Second | Third | Fourth | |
| NRDS | 3 | 8 | 2 | 5 | 18 |
| SRDS | 2 | 2 | 4 | 5 | 13 |
| **Overall** | **5** | **10** | **6** | **10** | **31** |

**Table B-5: Distribution of Waste Sampling Days by Season and Day of the Week**

| Facility (Season) | Day of the Week | | | | | Overall |
|---|---|---|---|---|---|---|
| | Monday | Tuesday | Wednesday | Thursday | Friday | |
| **NRDS** | | | | | | |
| Winter | | | 1 | 2 | 2 | **6** |
| Spring | | | | 1 | 2 | **3** |
| Summer | 1 | 2 | 1 | | | **4** |
| Fall | 2 | 2 | 1 | 1 | | **5** |
| ***NRDS Total*** | *3* | *4* | *3* | *4* | *4* | ***18*** |
| **SRDS** | | | | | | |
| Winter | | 1 | 1 | | 1 | **2** |
| Spring | 1 | 1 | 1 | 1 | 1 | **5** |
| Summer | 1 | | 1 | 1 | | **3** |
| Fall | | | | | 2 | **3** |
| ***SRDS Total*** | *2* | *2* | *3* | *2* | *4* | ***13*** |
| **Overall** | **5** | **6** | **6** | **6** | **8** | **31** |

## Sample Selection

The study's universe of waste loads included all residential waste routes within the City of Seattle. To compile the universe, detailed route information was collected from Seattle Public Utilities (SPU) as well as from CleanScapes and Waste Management. This information included collection zone, route number, collection day, and generator type.

To select which loads would be sampled on a given sampling day, a random number was assigned to every load that was expected to arrive at the sampling facility that day. These random numbers were sorted, and the loads with the lowest random number were selected in sequence until the target number of samples was achieved. For subsequent sampling days, a new random number was assigned to each load, and the process was repeated. An additional single-family route was added to the list of routes scheduled on each sampling day. The additional routes provided "contingency samples" that were obtained and sorted in the event that one of the vehicles for the regularly-planned collection route failed to arrive on time or was not intercepted in time to obtain a sample.

This study was designed to sample "pure" loads of single-family and multifamily waste only. When mixed loads were selected for sampling, drivers were instructed by the contracted haulers to collect multifamily waste separately from commercial waste to deliver a pure multifamily load for sampling.

As the study progressed, the sampling plan was modified to meet the objectives of the study. For example, some months required additional sampling days due to previous months where

sorting crews could not sample an adequate number of loads. Missed sampling days could often be attributed to miscommunication between the drivers and the sampling crews. Appendix C provides more details regarding monthly sampling events.

## Hauler and Transfer Station Participation

The City owns and operates two transfer stations (North and South Recycling and Disposal Stations – NRDS and SRDS). Both of the City's contracted haulers deliver most residential waste loads to the two stations. Depending on several factors that vary daily (i.e. time needed to cover a specified route, traffic at the NRDS and SRDS), loads from the four service areas are typically taken to either transfer station, but may be diverted to a private station if there is a problem at the nearest city station.

At the outset of the study, meetings were held with hauler and transfer station staff to communicate study objectives and explain all sampling procedures. Additionally, hauler and transfer station contacts received a schedule of all the sampling events for the year.

Haulers were sent reminders the week prior to each sampling event. Several days prior to each selected sampling day, the universe of routes believed to be scheduled for the sampling day was sent to each hauler. The hauler verified that route numbers were correct; added truck numbers, driver names, and vehicle arrival times; and returned the list. From the lists of routes, the target numbers of routes were randomly selected to correspond to the number of samples required from each subpopulation on each sampling day. The list of vehicles selected for sampling were forwarded to the hauler and verified verbally. In addition, the haulers were reminded to notify drivers of selected vehicles that they are to participate in the sampling activities and to which transfer station they were expected to deliver their selected load.

Affected transfer station personnel were contacted using a similar process as used with haulers: affected transfer station staff were notified the week and the day prior to sampling to ensure that all staff were aware of the sampling event and that no conflicting circumstances had arisen.

## Field Procedures

The field supervisor coordinated all logistics involving truck selection, sample extraction, sorting area, and disposal of sorted materials with transfer station staff. As the selected truck dumped at the transfer station, a loader operator "nosed" the bucket of the loader into the stream of material falling from the truck and captured about 1 cubic yard (approximately 250 pounds) of garbage.

Each sample was placed on a clean tarp and sorted by hand into 102 component categories as defined in Appendix A. Components were placed in plastic laundry baskets to be weighed and recorded. Each sample was sorted to the greatest reasonable detail, so that no more than 10 pounds of "supermix" (generally consisting of pieces less than two-inches) remained. The field supervisor monitored the homogeneity of the component baskets as material accumulated, rejecting items that may have been improperly classified. Open laundry baskets allowed the field supervisor to see the material at all times. The weights of all materials were recorded on a waste tally sheet (see Appendix B).

## Changes in Methodology from 2006 Study

The sampling methodology for this study differed from 2006 in the following ways:

- The North and South waste generation areas were replaced with four waste collection zones.
- The component categories were updated to provide more detail about specific materials in the waste stream. These category changes are tracked in Appendix A.

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# Appendix C. Comments on Monthly Sampling Events

This section presents monthly sampling progress reports that were sent to the SPU project manager throughout the year. Each summary present days and station(s) where sampling took place, either at the North Recycling Disposal Station (NRDS) or the South Recycling Disposal Station (SRDS); the total number of samples sorted compared to the goal for that sampling event; and whether any samples were missed or replaced by a different zone or sector. Each section also includes a table detailing the number of samples that were actually sorted versus the number originally planned, by sector and zone.

## January

Three days of sampling took place: Tuesday, January 26th at the SRDS, Thursday, January 28th at the NRDS, and Friday, January 29th at the NRDS. Overall, 35 samples were sorted; 36 samples was the goal. Sampling crews missed multifamily samples on Tuesday and Thursday as a result of vehicles that did not arrive. An extra single-family sample was collected on Thursday to account for one of the missed multifamily samples.

| Sector | Zone | 1/26/2010 (Tue) | | | 1/28/2010 (Thu) | | | 1/29/2010 (Fri) | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Actual | Planned | *Difference* | Actual | Planned | *Difference* | Actual | Planned | *Difference* |
| SINGLE-FAMILY | One | 0 | 0 | *0* | 4 | 3 | *1* | 2 | 2 | *0* |
| | Two | 0 | 0 | *0* | 2 | 2 | *0* | 6 | 6 | *0* |
| | Three | 0 | 0 | *0* | 3 | 3 | *0* | 0 | 0 | *0* |
| | Four | 8 | 8 | *0* | 0 | 0 | *0* | 0 | 0 | *0* |
| | Total | 8 | 8 | *0* | 9 | 8 | *1* | 8 | 8 | *0* |
| MULTI-FAMILY | One | 0 | 0 | *0* | 2 | 2 | *0* | 2 | 2 | *0* |
| | Two | 0 | 0 | *0* | 1 | 1 | *0* | 2 | 2 | *0* |
| | Three | 1 | 2 | *-1* | 0 | 1 | *-1* | 0 | 0 | *0* |
| | Four | 2 | 2 | *0* | 0 | 0 | *0* | 0 | 0 | *0* |
| | Total | 3 | 4 | *-1* | 3 | 4 | *-1* | 4 | 4 | *0* |
| Overall | Total | 11 | 12 | *-1* | 12 | 12 | *0* | 12 | 12 | *0* |

## February

Two days of sampling took place: Wednesday, February 10th at the NRDS and Friday, February 12th at the SRDS.

Overall, 21 samples of residential waste were sorted in February; 24 samples was the goal. Twelve samples were sorted on the 10th, meeting the goal for that day, though one of those 12 samples was an extra single-family sample, taken when it became clear that the final multifamily sample could not be collected.

Nine samples were sorted on the 12th, though 12 was the goal. The missed samples on the 12th included a contaminated multifamily sample—it was mixed with commercial waste—and two single-family samples that either failed to arrive or were not identified, upon entry to the tipping floor, by the facility staff or crew.

| Sector | Zone | 2/10/2010 (Wed) | | | 2/12/2010 (Fri) | | |
|---|---|---|---|---|---|---|---|
| | | Actual | Planned | *Difference* | Actual | Planned | *Difference* |
| SINGLE-FAMILY | One | 3 | 3 | *0* | 0 | 0 | *0* |
| | Two | 2 | 2 | *0* | 1 | 2 | *-1* |
| | Three | 4 | 3 | *1* | 2 | 2 | *0* |
| | Four | 0 | 0 | *0* | 3 | 4 | *-1* |
| | Total | 9 | 8 | *1* | 6 | 8 | *-2* |
| MULTI-FAMILY | One | 1 | 2 | *-1* | 0 | 0 | *0* |
| | Two | 2 | 2 | *0* | 0 | 0 | *0* |
| | Three | 0 | 0 | *0* | 1 | 2 | *-1* |
| | Four | 0 | 0 | *0* | 2 | 2 | *0* |
| | Total | 3 | 4 | *-1* | 3 | 4 | *-1* |
| Overall | Total | 12 | 12 | *0* | 9 | 12 | *-3* |

## March

Three days of sampling took place: Wednesday, March 24 at the SRDS, Thursday, March 25 at the NRDS, and Friday, March 26 at the SRDS. Overall, 34 samples of residential waste were sorted in March; we had planned to sort 36 samples.

On the 24th, we sorted two extra multifamily samples, but fell behind by one single-family sample, to sort a total of 13 of our goal of twelve samples for that day. On the 25th, we sorted twelve of our goal of twelve samples, came up one short in the single-family sector, and again made this up in a multifamily sample. On Friday, we sorted only nine of twelve samples after the sorting crew supervisor reported that several selected vehicles did not show up as expected. When it was apparent these vehicles were not going to arrive, it was too late to take any contingency vehicles. Thus, four single-family samples were not sorted, though an extra multifamily sample was collected.

| Sector | Zone | 3/24/2010 (Wed) | | | 3/25/2010 (Thu) | | | 3/26/2010 (Fri) | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Actual | Planned | *Difference* | Actual | Planned | *Difference* | Actual | Planned | *Difference* |
| SINGLE-FAMILY | One | 0 | 0 | *0* | 6 | 6 | *0* | 0 | 0 | *0* |
| | Two | 0 | 0 | *0* | 1 | 1 | *0* | 0 | 3 | *-3* |
| | Three | 0 | 0 | *0* | 0 | 1 | *-1* | 4 | 5 | *-1* |
| | Four | 7 | 8 | *-1* | 0 | 0 | *0* | 0 | 0 | *0* |
| | Total | 7 | 8 | -1 | 7 | 8 | -1 | 4 | 8 | -4 |
| MULTI-FAMILY | One | 0 | 0 | *0* | 2 | 2 | *0* | 0 | 0 | *0* |
| | Two | 0 | 1 | *-1* | 1 | 1 | *0* | 1 | 1 | *0* |
| | Three | 4 | 2 | *2* | 2 | 1 | *1* | 1 | 1 | *0* |
| | Four | 2 | 1 | *1* | 0 | 0 | *0* | 3 | 2 | *1* |
| | Total | 6 | 4 | 2 | 5 | 4 | 1 | 5 | 4 | 1 |
| Overall | Total | 13 | 12 | *1* | 12 | 12 | *0* | 9 | 12 | *-3* |

## April

Two days of sampling took place: Thursday, April 29 at the SRDS and Friday, April 30 at the SRDS. It should be noted that a Waste Management driver's strike took place the week before this sorting event, and while it was short, it did create a situation where communicating with

route supervisors was difficult and may have contributed to the Zone 1 and Zone 4 missed samples.

On the 29th, all planned samples were collected and sorted. On the 30th, we sorted 10 of the 13 planned samples. Only five of the nine planned single-family samples were sorted. Of the multifamily samples for the 30th, four samples were planned yet five were actually captured and sampled.

| Sector | Zone | 4/29/2010 (Thu) | | | 4/30/2010 (Fri) | | |
|---|---|---|---|---|---|---|---|
| | | Actual | Planned | *Difference* | Actual | Planned | *Difference* |
| SINGLE-FAMILY | One | 0 | 0 | *0* | 0 | 3 | *-3* |
| | Two | 4 | 4 | *0* | 5 | 3 | *2* |
| | Three | 4 | 3 | *1* | 0 | 3 | *-3* |
| | Four | 1 | 2 | *-1* | 0 | 0 | *0* |
| | Total | 9 | 9 | 0 | 5 | 9 | -4 |
| MULTI-FAMILY | One | 0 | 0 | *0* | 4 | 3 | *1* |
| | Two | 4 | 3 | *1* | 0 | 0 | *0* |
| | Three | 0 | 0 | *0* | 1 | 1 | *0* |
| | Four | 0 | 1 | *-1* | 0 | 0 | *0* |
| | Total | 4 | 4 | 0 | 5 | 4 | 1 |
| Overall | Total | 13 | 13 | *0* | 10 | 13 | *-3* |

## May

Three days of sampling took place: Monday, May 17 and Tuesday, May 18 at the SRDS and Friday, May 21 at the NRDS.

Overall, 36 samples of residential waste were sorted out of the 36 planned. In the multifamily sector, all planned samples by zone were sorted.

| Sector | Zone | 5/17/2010 (Mon) | | | 5/18/2010 (Tue) | | | 5/21/2010 (Fri) | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Actual | Planned | *Difference* | Actual | Planned | *Difference* | Actual | Planned | *Difference* |
| SINGLE-FAMILY | One | 0 | 0 | *0* | 0 | 0 | *0* | 7 | 7 | *0* |
| | Two | 1 | 2 | *-1* | 0 | 1 | *-1* | 2 | 2 | *0* |
| | Three | 2 | 2 | *0* | 3 | 3 | *0* | 2 | 2 | *0* |
| | Four | 4 | 4 | *0* | 4 | 2 | *2* | 0 | 0 | *0* |
| | Total | 7 | 8 | -1 | 7 | 6 | 1 | 11 | 11 | 0 |
| MULTI-FAMILY | One | 0 | 0 | *0* | 0 | 0 | *0* | 1 | 1 | *0* |
| | Two | 1 | 1 | *0* | 1 | 1 | *0* | 0 | 0 | *0* |
| | Three | 1 | 1 | *0* | 3 | 3 | *0* | 0 | 0 | *0* |
| | Four | 2 | 2 | *0* | 2 | 2 | *0* | 0 | 0 | *0* |
| | Total | 4 | 4 | 0 | 6 | 6 | 0 | 1 | 1 | 0 |
| Overall | Total | 11 | 12 | *-1* | 13 | 12 | *1* | 12 | 12 | *0* |

## June

Two days of sampling took place: Monday June 21 at NRDS and Wednesday June 23 at SRDS.

Overall, 25 samples of residential waste were sorted out of the 24 planned, including an extra single-family sample on Wednesday.

| Sector | Zone | 6/21/2010 (Mon) | | | 6/23/2010 (Wed) | | |
|---|---|---|---|---|---|---|---|
| | | Actual | Planned | *Difference* | Actual | Planned | *Difference* |
| SINGLE-FAMILY | One | 7 | 7 | *0* | 2 | 2 | *0* |
| | Two | 2 | 2 | *0* | 0 | 0 | *0* |
| | Three | 0 | 0 | *0* | 4 | 4 | *0* |
| | Four | 0 | 0 | *0* | 2 | 2 | *0* |
| | Total | 9 | 9 | 0 | 8 | 8 | 0 |
| MULTI-FAMILY | One | 0 | 0 | *0* | 0 | 0 | *0* |
| | Two | 2 | 2 | *0* | 1 | 1 | *0* |
| | Three | 1 | 1 | *0* | 1 | 1 | *0* |
| | Four | 0 | 0 | *0* | 3 | 2 | *1* |
| | Total | 3 | 3 | 0 | 5 | 4 | 1 |
| Overall | Total | 12 | 12 | *0* | 13 | 12 | *1* |

## July

Three days of sampling took place: Tuesday, July 6 and Wednesday, July 7 at the NRDS and Thursday, July 8 at the SRDS. Overall, 32 samples of residential waste were sorted out of the 36 planned.

On the 6th, twelve out of the twelve planned samples were sorted; the crew sorted one extra single-family sample and one fewer multifamily sample than planned. On the 7th, only seven of twelve planned samples were sorted: six of eight planned single-family samples, and one of four planned multifamily samples. The missed samples can be attributed to the following:

1. The haulers did not notify the sampling crew of driver changes therefore the sampling crew could not correctly identify truck numbers.
2. The sorting crew simply failed to identify selected trucks as they drove into the facility for sampling.

On the 8th, 13 samples (one more than the twelve planned) were collected and sorted: ten single-family and three multifamily samples.

| Sector | Zone | 7/6/2010 (Tue) | | | 7/7/2010 (Wed) | | | 7/8/2010 (Thu) | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Actual | Planned | *Difference* | Actual | Planned | *Difference* | Actual | Planned | *Difference* |
| SINGLE-FAMILY | One | 1 | 2 | *-1* | 2 | 2 | *0* | 3 | 0 | *3* |
| | Two | 5 | 4 | *1* | 1 | 3 | *-2* | 0 | 0 | *0* |
| | Three | 3 | 2 | *1* | 3 | 3 | *0* | 4 | 0 | *4* |
| | Four | 0 | 0 | *0* | 0 | 0 | *0* | 3 | 8 | *-5* |
| | Total | 9 | 8 | 1 | 6 | 8 | -2 | 10 | 8 | 2 |
| MULTI-FAMILY | One | 2 | 2 | *0* | 1 | 2 | *-1* | 0 | 0 | *0* |
| | Two | 0 | 1 | *-1* | 0 | 1 | *-1* | 0 | 0 | *0* |
| | Three | 1 | 1 | *0* | 0 | 1 | *-1* | 0 | 0 | *0* |
| | Four | 0 | 0 | *0* | 0 | 0 | *0* | 3 | 4 | *-1* |
| | Total | 3 | 4 | -1 | 1 | 4 | -3 | 3 | 4 | -1 |
| Overall | Total | 12 | 12 | *0* | 7 | 12 | *-5* | 13 | 12 | *1* |

## August

Two days of sampling took place: Monday, August 2 at the SRDS and Tuesday, August 3 at the NRDS. The below table compares the number of samples that were actually sorted to the number originally planned, by sector and zone. Overall, 25 samples of residential waste were sorted out of the 24 planned, a net gain of one overall sample.

On Monday, August 2, twelve samples were planned though a total of 13 samples were collected and sorted—nine single-family and four multifamily— an overall net gain of one single-family sample.

As planned, Tuesday's sampling event resulted in twelve samples collected and sorted: nine single-family and three multifamily samples.

| Sector | Zone | 8/2/2010 (Mon) | | | 8/3/2010 (Tue) | | |
|---|---|---|---|---|---|---|---|
| | | Actual | Planned | *Difference* | Actual | Planned | *Difference* |
| SINGLE-FAMILY | One | 3 | 0 | *3* | 2 | 2 | *0* |
| | Two | 0 | 0 | *0* | 5 | 5 | *0* |
| | Three | 0 | 0 | *0* | 2 | 2 | *0* |
| | Four | 6 | 8 | *-2* | 0 | 0 | *0* |
| | Total | 9 | 8 | 1 | 9 | 9 | 0 |
| MULTI-FAMILY | One | 0 | 0 | *0* | 1 | 1 | *0* |
| | Two | 0 | 0 | *0* | 1 | 1 | *0* |
| | Three | 0 | 0 | *0* | 1 | 1 | *0* |
| | Four | 4 | 4 | *0* | 0 | 0 | *0* |
| | Total | 4 | 4 | 0 | 3 | 3 | 0 |
| Overall | Total | 13 | 12 | *1* | 12 | 12 | *0* |

## September

Three days of sampling took place: Tuesday, September 7 at the NRDS, Wednesday, September 8 at the NRDS, and Friday, September 10 at the SRDS. The below table compares

the number of samples that were actually sorted to the number originally planned, by sector and zone. Overall, 34 samples of residential waste were sorted out of the 34 planned.

On Tuesday, September 7, twelve of the twelve planned samples were sorted—nine single-family and three multifamily—one greater single-family and one fewer multifamily sample than planned. On the 8th, we sorted 12 of 11 planned samples: a net gain of one Zone 1 single-family sample. On the 10th, we sorted ten of eleven planned samples.

| Sector | Zone | 9/7/2010 (Tue) | | | 9/8/2010 (Wed) | | | 9/10/2010 (Fri) | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Actual | Planned | *Difference* | Actual | Planned | *Difference* | Actual | Planned | *Difference* |
| SINGLE-FAMILY | One | 2 | 2 | *0* | 2 | 2 | *0* | 0 | 0 | *0* |
| | Two | 3 | 3 | *0* | 2 | 2 | *0* | 0 | 0 | *0* |
| | Three | 4 | 3 | *1* | 2 | 2 | *0* | 2 | 3 | *-1* |
| | Four | 0 | 0 | *0* | 0 | 0 | *0* | 6 | 5 | *1* |
| | Total | 9 | 8 | 1 | 6 | 6 | 0 | 8 | 8 | 0 |
| MULTI-FAMILY | One | 0 | 1 | *-1* | 3 | 2 | *1* | 0 | 0 | *0* |
| | Two | 2 | 2 | *0* | 2 | 2 | *0* | 0 | 0 | *0* |
| | Three | 1 | 1 | *0* | 1 | 1 | *0* | 0 | 0 | *0* |
| | Four | 0 | 0 | *0* | 0 | 0 | *0* | 2 | 3 | *-1* |
| | Total | 3 | 4 | -1 | 6 | 5 | 1 | 2 | 3 | -1 |
| Overall | Total | 12 | 12 | *0* | 12 | 11 | *1* | 10 | 11 | *-1* |

## October

Two days of sampling took place: Monday, October 18 at the NRDS, and Friday, October 22 at the SRDS. Over two days, 23 samples of residential waste were sorted out of the 24 planned.

On the 18th, seven of twelve planned samples were collected and sorted. The primary issue, we later discovered, was that the single-family samples from Zone 1 were being delivered to the SRDS even though the drivers had been asked to deliver them to the NRDS, where we were sorting.[3]

On the 22nd, we collected and sorted 16 out of twelve samples to make up for Monday's shortage. We collected four samples from Zone 1 single-family, which overcame Monday's deficit. We collected eight of nine Zone 4 single-family samples and collected one extra Zone 4 multifamily sample.

[3] This issue was discovered in November, when we encountered the same problem. The Waste Management route managers resolved the problem following the November sampling event.

| Sector | Zone | 10/18/2010 (Mon) | | | 10/22/2010 (Fri) | | |
|---|---|---|---|---|---|---|---|
| | | Actual | Planned | *Difference* | Actual | Planned | *Difference* |
| SINGLE-FAMILY | One | 1 | 4 | *-3* | 4 | 0 | *4* |
| | Two | 2 | 2 | *0* | 0 | 0 | *0* |
| | Three | 2 | 2 | *0* | 0 | 0 | *0* |
| | Four | 0 | 0 | *0* | 8 | 9 | *-1* |
| | Total | 5 | 8 | -3 | 12 | 9 | 3 |
| MULTI-FAMILY | One | 1 | 2 | *-1* | 0 | 0 | *0* |
| | Two | 1 | 1 | *0* | 0 | 0 | *0* |
| | Three | 0 | 1 | *-1* | 0 | 0 | *0* |
| | Four | 0 | 0 | *0* | 4 | 3 | *1* |
| | Total | 2 | 4 | -2 | 4 | 3 | 1 |
| Overall | Total | 7 | 12 | *-5* | 16 | 12 | *4* |

## November

Three days of sampling took place—November 8, 9, and 11—at the NRDS. Over three days, 38 samples of residential waste, two more than the 36 planned, were sorted.

Only two of the 36 planned samples were missed: a multifamily Zone 1 sample on Monday and a single-family Zone 1 sample on Tuesday. Additionally, samples were collected for Zone 2 in both the single-family and multifamily sectors as a way to make up for lost Zone 1 samples.

| Sector | Zone | 11/8/2010 (Mon) | | | 11/9/2010 (Tue) | | | 11/11/2010 (Thu) | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Actual | Planned | *Difference* | Actual | Planned | *Difference* | Actual | Planned | *Difference* |
| SINGLE-FAMILY | One | 0 | 0 | *0* | 0 | 1 | *-1* | 3 | 3 | *0* |
| | Two | 4 | 4 | *0* | 5 | 3 | *2* | 1 | 1 | *0* |
| | Three | 1 | 1 | *0* | 3 | 3 | *0* | 2 | 2 | *0* |
| | Four | 0 | 0 | *0* | 0 | 0 | *0* | 0 | 0 | *0* |
| | Total | 5 | 5 | 0 | 8 | 7 | 1 | 6 | 6 | 0 |
| MULTI-FAMILY | One | 2 | 3 | *-1* | 2 | 2 | *0* | 2 | 2 | *0* |
| | Two | 2 | 2 | *0* | 1 | 1 | *0* | 2 | 2 | *0* |
| | Three | 2 | 2 | *0* | 3 | 2 | *1* | 3 | 2 | *1* |
| | Four | 0 | 0 | *0* | 0 | 0 | *0* | 0 | 0 | *0* |
| | Total | 6 | 7 | -1 | 6 | 5 | 1 | 7 | 6 | 1 |
| Overall | Total | 11 | 12 | *-1* | 14 | 12 | *2* | 13 | 12 | *1* |

## December

Three days of sampling took place—December 15th at the SRDS and the 16th and 17th at the NRDS. Over three days, 35 samples of residential waste were sampled.

All samples were collected and sorted as planned on the 15th and 16th. December 17th was not originally scheduled as a sampling day but was added as a supplemental make-up day to capture and sort samples that had been missed throughout the course of the study. Only seven samples were needed on the final day to complete the study.

| Sector | Zone | 12/15/2010 (Wed) | | | 12/16/2010 (Thu) | | | 12/17/2010 (Fri) | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Actual | Planned | *Difference* | Actual | Planned | *Difference* | Actual | Planned | *Difference* |
| SINGLE-FAMILY | One | 1 | 1 | *0* | 3 | 3 | *0* | 2 | 2 | *0* |
| | Two | 0 | 0 | *0* | 3 | 3 | *0* | 2 | 2 | *0* |
| | Three | 2 | 2 | *0* | 3 | 3 | *0* | 0 | 0 | *0* |
| | Four | 8 | 8 | *0* | 0 | 0 | *0* | 0 | 0 | *0* |
| | Total | 11 | 11 | 0 | 9 | 9 | 0 | 4 | 4 | 0 |
| MULTI-FAMILY | One | 0 | 0 | *0* | 2 | 2 | *0* | 2 | 2 | *0* |
| | Two | 0 | 0 | *0* | 2 | 2 | *0* | 1 | 1 | *0* |
| | Three | 2 | 2 | *0* | 0 | 0 | *0* | 0 | 0 | *0* |
| | Four | 2 | 2 | *0* | 0 | 0 | *0* | 0 | 0 | *0* |
| | Total | 4 | 4 | 0 | 4 | 4 | 0 | 3 | 3 | 0 |
| Overall | Total | 15 | 15 | *0* | 13 | 13 | *0* | 7 | 7 | *0* |

Overall, all sampling goals for the 2010 residential study were met, and, in the case of Zone 4 Multifamily, exceeded by one sample. As shown in the below table, 361 samples—240 single-family samples and 121 multifamily—were sorted over the course of the study.

| Sector | Zone | Planned Number of Samples | Actual Number of Samples | *Difference* |
|---|---|---|---|---|
| SINGLE-FAMILY | One | 60 | 60 | *0* |
| | Two | 60 | 60 | *0* |
| | Three | 60 | 60 | *0* |
| | Four | 60 | 60 | *0* |
| | Total | 240 | 240 | *0* |
| MULTIFAMILY | One | 30 | 30 | *0* |
| | Two | 30 | 30 | *0* |
| | Three | 30 | 30 | *0* |
| | Four | 30 | 31 | *1* |
| | Total | 120 | 121 | *1* |
| Total | | 360 | 361 | *1* |

# Appendix D. Waste Composition Calculations

## Composition Calculations

The composition estimates represent the **ratio of the components' weight to the total waste** for each noted subpopulation. They were derived by summing each component's weight across all of the selected records and dividing by the sum of the total weight of waste, as shown in the following equation:

$$r_j = \frac{\sum_i c_{ij}}{\sum_i w_i}$$

where:

c = weight of particular component

w = sum of all component weights

for i 1 to n

where n = number of selected samples

for j 1 to m

where m = number of components

The confidence interval for this estimate was derived in two steps. First, the variance around the estimate was calculated, accounting for the fact that the ratio includes two random variables (the component and total sample weights). The **variance of the ratio estimator** equation follows:

$$\hat{V}_{r_j} = \left(\frac{1}{n}\right) \cdot \left(\frac{1}{\overline{w}^2}\right) \cdot \left(\frac{\sum_i \left(c_{ij} - r_j w_i\right)^2}{n-1}\right)$$

where:

$$\overline{w} = \frac{\sum_i w_i}{n}$$

Second, **precision levels** at the 90% confidence interval were calculated for a component's mean as follows:

$$r_j \pm \left(t \cdot \sqrt{\hat{V}_{r_j}}\right)$$

where:

t = the value of the t-statistic (1.645) corresponding to a 90% confidence level

For more detail, please refer to Chapter 6 "Ratio, Regression and Difference Estimation" of *Elementary Survey Sampling* by R.L. Scheaffer, W. Mendenhall and L. Ott (PWS Publishers, 1986).

## Weighted Averages

Waste composition estimates were calculated by using a weighted average procedure. For example, to develop composition estimates for Seattle's multifamily residential waste, sample data from all four zones were combined, with slightly more importance given to the multifamily Zone 3 samples (contributing approximately 27% of total single-family tons disposed).

Seattle provided the estimate of tonnage disposed by each of the eight subpopulations. The composition estimates were applied to the relevant tonnages to estimate the amount of waste disposed for each component category for each residence type, collection zone, and season.

The **weighted average for an overall composition estimate** was performed as follows:

$$O_j = \left(p_1 * r_{j1}\right) + (p_2 * r_{j2}) + (p_3 * r_{j3}) + \ldots$$

where:

p = the proportion of tonnage contributed by the noted subpopulation

r = ratio of component weight to total waste weight in the noted subpopulation

for j 1 to m

where m = number of components

The **variance of the weighted average** was calculated:

$$VarO_j = (p_1^{\,2} * \hat{V}_{r_{j1}}) + (p_2^{\,2} * \hat{V}_{r_{j2}}) + (p_3^{\,2} * \hat{V}_{r_{j3}}) + \ldots$$

Table D-1 show the weighting percentages that were used to produce the estimates for the overall residential waste stream as well as estimates by generator, zone, and season.

**Table D-1: Weighting Percentages, Overall**

| Generator | Zone | Season | Tons Disposed | Percent of Total |
|---|---|---|---|---|
| | | | | |
| Single-family | Zone 1 | Winter | 3,918 | 3.43% |
| | Zone 1 | Winter | 1,911 | 1.67% |
| | Zone 1 | Spring | 3,888 | 3.41% |
| | Zone 1 | Spring | 1,877 | 1.64% |
| | Zone 1 | Summer | 3,976 | 3.48% |
| | Zone 1 | Summer | 1,982 | 1.74% |
| | Zone 1 | Fall | 3,809 | 3.34% |
| | Zone 1 | Fall | 1,896 | 1.66% |
| | Zone 2 | Winter | 3,003 | 2.63% |
| | Zone 2 | Winter | 2,204 | 1.93% |
| | Zone 2 | Spring | 2,938 | 2.57% |
| | Zone 2 | Spring | 2,282 | 2.00% |
| | Zone 2 | Summer | 3,084 | 2.70% |
| | Zone 2 | Summer | 2,324 | 2.04% |
| | Zone 2 | Fall | 2,935 | 2.57% |
| | Zone 2 | Fall | 2,261 | 1.98% |
| Multifamily | Zone 3 | Winter | 3,409 | 2.99% |
| | Zone 3 | Winter | 5,437 | 4.76% |
| | Zone 3 | Spring | 3,304 | 2.89% |
| | Zone 3 | Spring | 5,601 | 4.91% |
| | Zone 3 | Summer | 3,422 | 3.00% |
| | Zone 3 | Summer | 5,919 | 5.19% |
| | Zone 3 | Fall | 3,296 | 2.89% |
| | Zone 3 | Fall | 5,966 | 5.23% |
| | Zone 4 | Winter | 5,845 | 5.12% |
| | Zone 4 | Winter | 2,180 | 1.91% |
| | Zone 4 | Spring | 5,738 | 5.03% |
| | Zone 4 | Spring | 2,536 | 2.22% |
| | Zone 4 | Summer | 5,995 | 5.25% |
| | Zone 4 | Summer | 2,775 | 2.43% |
| | Zone 4 | Fall | 5,753 | 5.04% |
| | Zone 4 | Fall | 2,669 | 2.34% |
| | | | **114,135** | **100.00%** |

## Comparison Calculations

Identifying statistically significant differences requires a two-step calculation. First, assuming that the two groups to be compared have the same variance, a **pooled sample variance** was calculated:

$$S_{pool}^{\ 2} = \frac{\left[(n1-1)\cdot\left(n1\cdot\hat{V}_{r_j 1}\right)\right]+\left[(n2-1)\cdot\left(n2\cdot\hat{V}_{r_j 2}\right)\right]}{n1+n2-2}$$

Next, the **t-statistic** was constructed:

$$t = \frac{(r1-r2)}{\sqrt{\frac{S_{pool}^{\ 2}}{n1}+\frac{S_{pool}^{\ 2}}{n2}}}$$

The **p-value** of the t-statistic was calculated based on (n1+n2 -2) degrees of freedom.

## Demographic Calculations

## Demographic Calculations

Waste compositions for different demographic groups were calculated by considering the median household income and mean household size of each sampled garbage route. Single-family waste samples were grouped according to whether they were collected from garbage routes with high-income, low-income, large household size, or small household size. Once the waste samples were identified as belonging to one of these four demographic groups, waste composition calculations were performed as described above under "Composition Calculations."

Calculations of each garbage route's **mean household size** were performed as follows:

Population and number of households were obtained for each Census Block in Seattle via the 2010 Census Redistricting Data Summary Files. Geographic locations for Census Blocks in Seattle were obtained in GIS shapefile format from the Census website.[4]

1. Census Blocks were identified by the Seattle single-family garbage route (serviced by Cleanscapes and Waste Management) that covered that Block area. These companies provided GIS shapefiles of their recent garbage routes. The total population and total households for each garbage route were then calculated by summing the population and number of households for all Census Blocks contained within each route.
2. Mean household size was calculated by dividing the total population of each route by the total number of households.

Calculations of each garbage route's **median income** were performed as follows, using information from the 2005-2009 American Community Survey 5-year estimates Summary File.[5]

[4] http://www.census.gov/rdo/data/2010_census_redistricting_data_pl_94-171_summary_files.html
[5] http://www.census.gov/acs/www/data_documentation/summary_file/

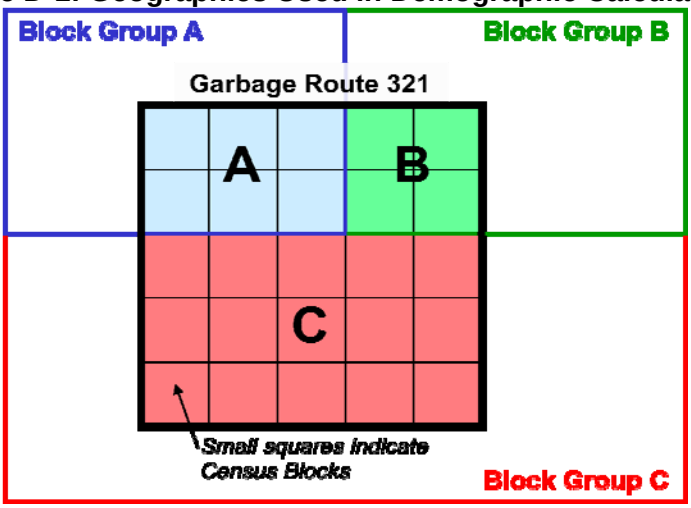
Each Census Block Group was identified by the garbage route that covers that Block Group. Figure D-1 presents an example where Block Groups A, B, and C are identified by one designated garbage route, Garbage Route 321.

The number of households in each Census Block Group was used to calculate a weighted median income for the route. For instance, because Block Group C contains more households than Block Group A and B, the median income of Block Group C would be given more importance than the other two Block Groups in calculating the median income for the designated garbage route, Garbage Route 321. The weighting was carried out as follows, where "Households" refers to the number of households in each Block Group, and "Income" refers to the median income of each Block Group within the designated route.

$$\textbf{Estimated Median Income of Garbage Route 321} = \frac{\textbf{A}\text{ Households} * \textbf{A}\text{ Income} + \textbf{B}\text{ Households} * \textbf{B}\text{ Income} + \textbf{C}\text{ Households} * \textbf{C}\text{ Income}}{\textbf{A}\text{ Households} + \textbf{B}\text{ Households} + \textbf{C}\text{ Households}}$$

1. The result of this weighting is an approximation of the median income for the designated route.

**Figure D-1: Geographies Used in Demographic Calculations**




Sampled routes were then divided into quartiles based on the median income and mean household size of each garbage route. Waste samples from the first (0 - 25%) quartile were used to calculate "low income" and "small household" waste compositions and samples from the top quartile (75% - 100%) were used to calculate "high income" and "large household" waste compositions.

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# Appendix E. Comparison Calculations

The comparison methodology is outlined in the first section of this appendix and the calculations are outlined in Appendix D. For more detail, the remaining sections describe technical issues regarding the statistics.

## Background

In an ongoing effort to monitor the types and amounts of materials disposed locally, Seattle has performed several waste composition studies. Differences are often apparent between project years. In this appendix, detailed results from the following comparisons are presented. The results of these comparisons can be used to indicate trends in the composition data.

- This report presents the below year-to-year comparisons
  - 1988/89 vs. 2010
  - 2006 vs. 2010

Comparisons examined the changes in the in composition percentages for each of the eight broad material categories.[6] In order to control for population changes and other factors that may influence the total amount of waste disposed from year to year, the tests described in this appendix measure waste proportions, not actual tonnage. For example, say that *mixed low-grade* paper accounts for 10% of a particular substream's disposed waste each year, and that a total of 1,000 tons of waste was disposed in one year and 2,000 tons of waste in the next. While the amount of newspaper increased from 100 to 200 tons, the percentage remained the same. Therefore, the tests would indicate that there had been no change.

The purpose of conducting these comparisons is to identify trends within the residential substream, in the percentage of selected types of waste disposed over time. One specific example is stated as follows:

*Hypothesis:* "There is no statistically significant difference, between the 1988/89 and 2010 study periods, in the percentage of paper disposed."

Statistics are then employed to look for evidence disproving the hypothesis. A "significant" result means that there is enough evidence to disprove the hypothesis and it can be concluded that there is a true difference across years. "Insignificant" results indicate that either a) there is no true difference, or b) even though there may be a difference, there is not enough evidence to prove it.[7]

The purpose of these tests is to identify changes across years. However, the study did not attempt to investigate *why* or *how* these changes occurred. The changes may be due to a variety of factors. For example, the decrease in paper could be due to any combination of the following:

[6] The material components for each season have been adjusted to match a uniform material list: (1) the material list has changed from 52 material components in 1988/89 to 102 materials in 2010 and (2) several materials have been moved to different broad material categories to better reflect new policies in recycling and composting.

[7] Please see the "Power Analysis" discussion on page E-3.

- Consumer Preferences—plastic containers might have captured some of the market previously held by corrugated containers.
- Technology—manufacturers might use thinner paperboard than in the past, which would decrease the weight of cardboard, even if the same number of boxes were disposed.
- Recycling—more residents may participate in paper recycling programs due to new education programs or new programs such as commingled recycling.

Future studies could be designed to test the influence of various potential sources of the increase/decrease of specific materials in the disposed waste stream.

## Statistical Considerations

The analyses were based on the component percentages, by weight. As described in Appendix D, these percentages are calculated by dividing the sum of the selected component weights by the sum of the corresponding sample weights. T-tests (modified for ratio estimation) were used to examine the variations from year-to-year and within subpopulations.

### Normality

The distributions of some of the waste categories (particularly the hazardous materials) are skewed and may not follow a normal distribution. Although t-tests assume a normal distribution, they are very robust to departures from this assumption, particularly with large sample sizes. In addition, most of the selected categories are sums of several individual waste components, which improve our ability to meet the assumptions of normality.

### Dependence

There may be dependence between waste types (if a person disposes of material A, they always dispose of material B at the same time).

There is certainly a degree of dependence between the calculated percentages. Because the percentages sum to 100 (in the case of year-to-year comparisons) or near 100 (in the case of subpopulation comparisons), if the percentage of material A increases, the percentage of some other material must decrease.

### Multiple T-Tests

In all statistical tests, there is a chance of incorrectly concluding that a result is significant. The year-to-year comparison required conducting several t-tests (one for each broad material class) **each** of which carries that risk. However, we were willing to accept only a 10% chance, **overall**, of making an incorrect conclusion. Therefore, each test was adjusted by setting the significance threshold to $\frac{0.10}{w}$ ($w$ = the number of t-tests).

*The adjustment can be explained as follows:*

For each test, we set a $1-\frac{0.10}{w}$ chance of not making a mistake, which results in a $\left(1-\frac{0.10}{w}\right)^{w}$ chance of not making a mistake during all *w* tests.

Since one minus the chance of not making a mistake equals the chance of making a mistake, by making this adjustment, we have set the overall risk of making a wrong conclusion during any one of the tests at $\left(1-\left(1-\frac{0.10}{w}\right)^{w}\right)=0.10$.

The chance of a "false positive" for the year-to-year comparisons made in this study is restricted to 10% overall, or 1.25% for each test (10% divided by the eight tests equals 1.25%).

For more detail regarding this issue, please refer to Section 11.2 "The Multiplicity Problem and the Bonferroni Inequality" of *An Introduction to Contemporary Statistics* by L.H. Koopmans (Duxbury Press, 1981).

**Power Analysis**

As the number of samples is increased, so is the ability to detect differences. In the future, an a *priori* power analysis might benefit this research by determining how many samples would be required to detect a particular minimum difference of interest.

## Interpreting the Calculation Results

This section interprets the statistical results for year-to-year comparisons. The key differences between study years are summarized below and shown in detail in Tables E-1 and E-2.

- Between the first residential waste study in 1988/89 and the current study, several material categories show significant variations. **Paper, glass, metal,** and **CDL wastes** show decreasing trends, while **plastic** and **other materials** show increasing trends**. Other materials** includes a variety of materials, such as diapers, carpet, tires, mattresses, A/V equipment, small appliances, miscellaneous organics, and miscellaneous inorganics.
- Between the previous residential waste study in 2006 and the current study, **plastic** and **organics** show decreasing trends, while **other materials** shows an increasing trend.

*For the purposes of this study, only those calculation results with a p-value of less than 1.25% are considered to be statistically significant.* As described above, the threshold for determining statistically significant results (the "alpha-level") is conservative, accounting for the fact that so many individual tests were calculated. An asterisk notes the statistically significant differences.

The t-statistic is calculated from the data. According to statistical theory, the larger the absolute value of the t-statistic the less likely that the two populations have the same mean. The p-value describes the probability of observing the calculated t-statistic if there were no true difference between the population means.

Table E-1 shows that the proportions of **paper**, **glass**, **metal**, and **CDL wastes** show decreasing trends over the last 18 years. **Plastic** and **other materials** show increasing trends. Variations among the proportions of **organics** and **hazardous materials** were not significant.

**Table E-1: Comparison of Residential Composition Results, 1988/89 vs. 2010**

| | Mean Ratio (Material Wt/Total Wt) | | t-Statistic | p-Value (Cut-off for statistically valid difference = 0.0125) | |
|---|---|---|---|---|---|
| | *1988/89* | *2010* | | | |
| Paper | 31.24% | 17.70% | 16.6223 | 0.0000 | * |
| Plastic | 8.06% | 10.37% | 6.8803 | 0.0000 | * |
| Glass | 6.41% | 2.07% | 17.5876 | 0.0000 | * |
| Metal | 5.27% | 3.96% | 3.7550 | 0.0002 | * |
| Organics | 33.42% | 31.42% | 1.6153 | 0.1068 | |
| Other Materials | 6.14% | 27.92% | 23.7247 | 0.0000 | * |
| CDL Wastes | 8.80% | 5.70% | 3.6710 | 0.0003 | * |
| Hazardous | 0.66% | 0.86% | 1.0778 | 0.2816 | |
| *Number of Samples* | *212* | *361* | | | |

As displayed in Table E-, **other materials** proportions shows an increasing trend while **plastic** and **organics** show decreasing trends over the last 4 years. Variations among the remaining comparison groups were not significant.

**Table E-2: Comparison of Residential Composition Results, 2006 vs. 2010**

| | Mean Ratio (Material Wt/Total Wt) | | t-Statistic | p-Value (Cut-off for statistically valid difference = 0.0125) | |
|---|---|---|---|---|---|
| | *2006* | *2010* | | | |
| Paper | 18.1% | 17.7% | 0.8664 | 0.3866 | |
| Plastic | 11.5% | 10.4% | 3.8292 | 0.0001 | * |
| Glass | 2.3% | 2.1% | 1.3721 | 0.1705 | |
| Metal | 3.5% | 4.0% | 1.4222 | 0.1554 | |
| Organics | 36.0% | 31.4% | 5.1553 | 0.0000 | * |
| Other Materials | 23.2% | 27.9% | 5.6516 | 0.0000 | * |
| CDL Wastes | 4.8% | 5.7% | 1.3767 | 0.1690 | |
| Hazardous | 0.7% | 0.9% | 1.3260 | 0.1853 | |
| *Number of Samples* | *356* | *361* | | | |

# Appendix F. Field Forms

The field forms are included in the following order:

- Vehicle Selection Sheet
- Waste Tally Sheet

## Vehicle Selection Sheet

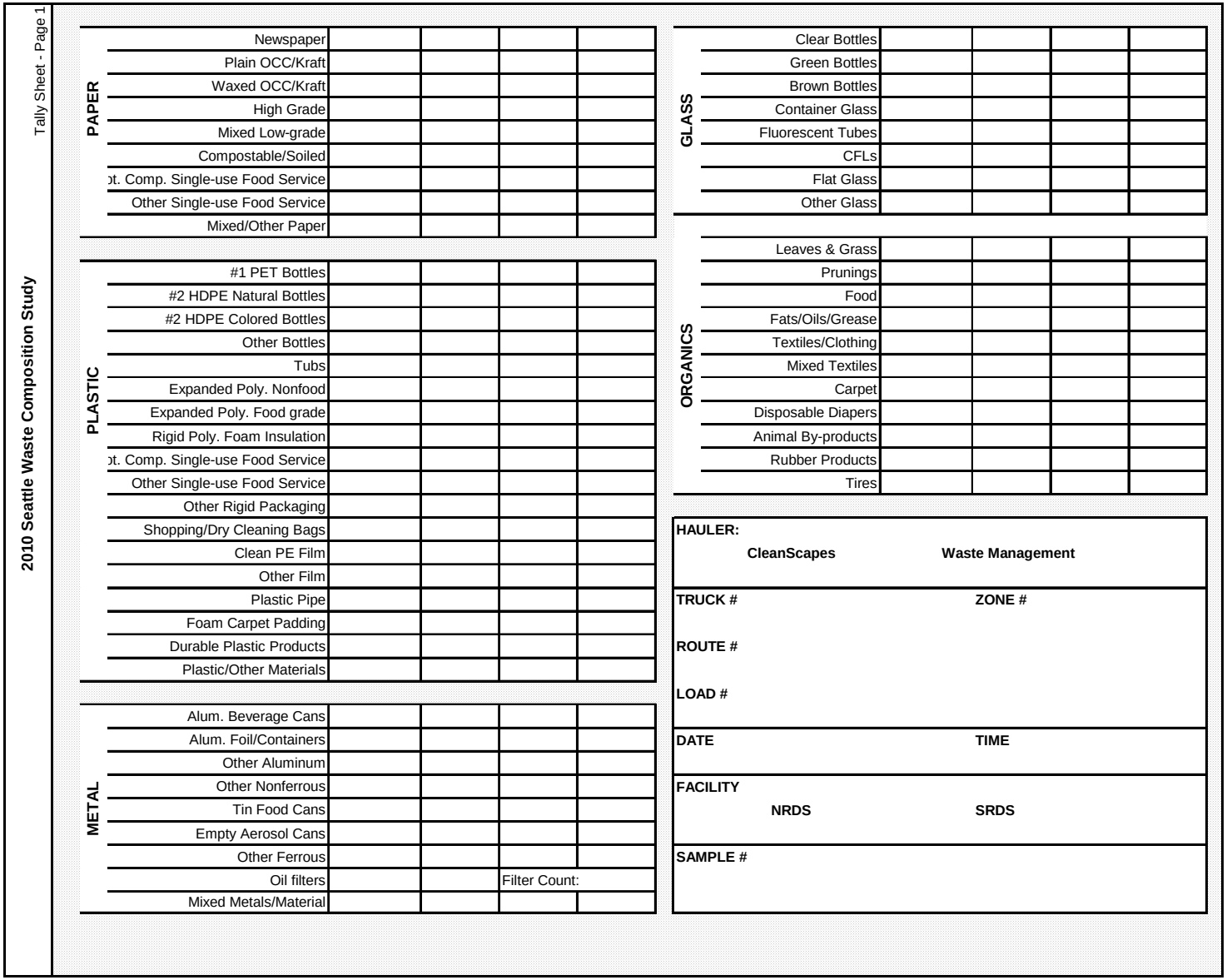
**Vehicle Selection Sheet** Sampling Date: **Monday, October 18, 2010**

**Seattle Residential WASTE Composition Study** Facility: **NRDS**

| Sample ID | SF/MF | Zone | Hauler | Truck No. | Driver | Route | Load | ETA |
|---|---|---|---|---|---|---|---|---|
| | MF | 3 | CS | 2007 | Eric Nelson | 221 | | After 10a |
| | SF | 3 | CS | 3000 | Dickson, John | 140 | | After 10a |
| | SF | 2 | CS | 3018 | Taft, Jake | 122 | | After 10a |
| | SF | 2 | CS | 3021 | Lodrigo, Omar | 125 | | After 10a |
| | SF | 3 | CS | 3036 | Rojas, Elias | 143 | | After 10a |
| | MF | 2 | CS | 3053 | Winchester, Mark | 247 | | After 10a |
| | MF | 1 | WM | 209790 | Mickey Blake | 1Q | | After 10 |
| | SF | 1 | WM | 264771 | KC Saechao | 1306 | | After 10 |
| | SF | 1 | WM | 264775 | Joel Esqueda-Soto | 1310 | | After 10a |
| | SF | 1 | WM | 264777 | Matt Hodson | 1308 | | After 10a |
| | MF | 1 | WM | 305750 | Mike Gonzalez | 343 | | After 10a |
| | SF | 1 | WM | 362977 | Jamie Strub | 1398 | | After 10a |
| | | | | | | | | |
| | | | | | | | | |

**Today's Sampling Plan: 8 SF, 4 MF**

# Waste Tally Sheet, Front



2010 Seattle Waste Composition Study

Tally Sheet - Page 1

| | | | | | |
|---|---|---|---|---|---|
| PAPER | Newspaper | | | | |
| | Plain OCC/Kraft | | | | |
| | Waxed OCC/Kraft | | | | |
| | High Grade | | | | |
| | Mixed Low-grade | | | | |
| | Compostable/Soiled | | | | |
| | ot. Comp. Single-use Food Service | | | | |
| | Other Single-use Food Service | | | | |
| | Mixed/Other Paper | | | | |

| | | | | | |
|---|---|---|---|---|---|
| PLASTIC | #1 PET Bottles | | | | |
| | #2 HDPE Natural Bottles | | | | |
| | #2 HDPE Colored Bottles | | | | |
| | Other Bottles | | | | |
| | Tubs | | | | |
| | Expanded Poly. Nonfood | | | | |
| | Expanded Poly. Food grade | | | | |
| | Rigid Poly. Foam Insulation | | | | |
| | ot. Comp. Single-use Food Service | | | | |
| | Other Single-use Food Service | | | | |
| | Other Rigid Packaging | | | | |
| | Shopping/Dry Cleaning Bags | | | | |
| | Clean PE Film | | | | |
| | Other Film | | | | |
| | Plastic Pipe | | | | |
| | Foam Carpet Padding | | | | |
| | Durable Plastic Products | | | | |
| | Plastic/Other Materials | | | | |

| | | | | | |
|---|---|---|---|---|---|
| METAL | Alum. Beverage Cans | | | | |
| | Alum. Foil/Containers | | | | |
| | Other Aluminum | | | | |
| | Other Nonferrous | | | | |
| | Tin Food Cans | | | | |
| | Empty Aerosol Cans | | | | |
| | Other Ferrous | | | | |
| | Oil filters | | | Filter Count: | |
| | Mixed Metals/Material | | | | |

| | | | | | |
|---|---|---|---|---|---|
| GLASS | Clear Bottles | | | | |
| | Green Bottles | | | | |
| | Brown Bottles | | | | |
| | Container Glass | | | | |
| | Fluorescent Tubes | | | | |
| | CFLs | | | | |
| | Flat Glass | | | | |
| | Other Glass | | | | |

| | | | | | |
|---|---|---|---|---|---|
| ORGANICS | Leaves & Grass | | | | |
| | Prunings | | | | |
| | Food | | | | |
| | Fats/Oils/Grease | | | | |
| | Textiles/Clothing | | | | |
| | Mixed Textiles | | | | |
| | Carpet | | | | |
| | Disposable Diapers | | | | |
| | Animal By-products | | | | |
| | Rubber Products | | | | |
| | Tires | | | | |

**HAULER:**

**CleanScapes** **Waste Management**

**TRUCK #** **ZONE #**

**ROUTE #**

**LOAD #**

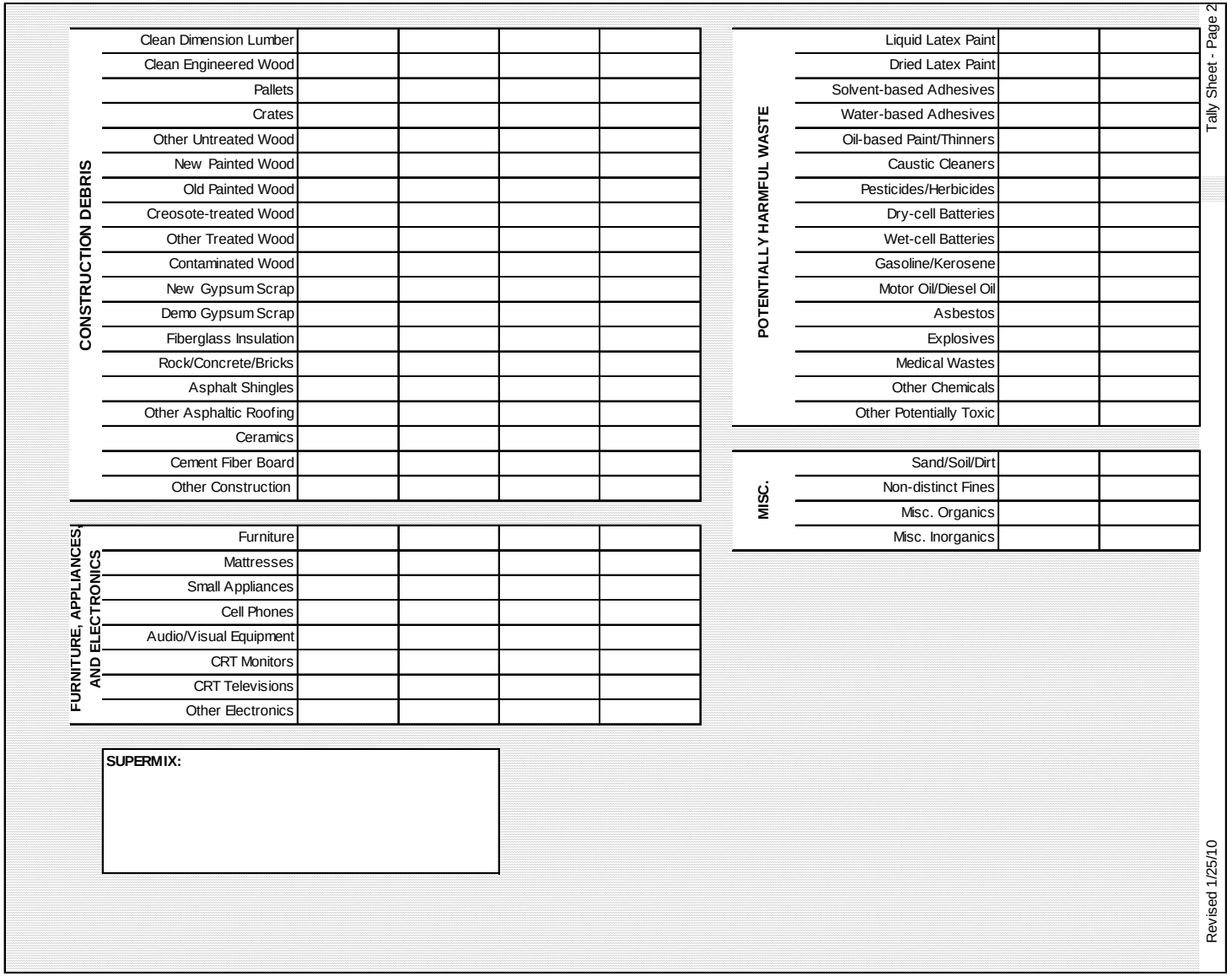
**DATE** **TIME**

**FACILITY**

**NRDS** **SRDS**

**SAMPLE #**

## Waste Tally Sheet, Back



| | | | | | |
|---|---|---|---|---|---|
| CONSTRUCTION DEBRIS | Clean Dimension Lumber | | | | |
| | Clean Engineered Wood | | | | |
| | Pallets | | | | |
| | Crates | | | | |
| | Other Untreated Wood | | | | |
| | New Painted Wood | | | | |
| | Old Painted Wood | | | | |
| | Creosote-treated Wood | | | | |
| | Other Treated Wood | | | | |
| | Contaminated Wood | | | | |
| | New Gypsum Scrap | | | | |
| | Demo Gypsum Scrap | | | | |
| | Fiberglass Insulation | | | | |
| | Rock/Concrete/Bricks | | | | |
| | Asphalt Shingles | | | | |
| | Other Asphaltic Roofing | | | | |
| | Ceramics | | | | |
| | Cement Fiber Board | | | | |
| | Other Construction | | | | |

| | | | | | |
|---|---|---|---|---|---|
| FURNITURE, APPLIANCES AND ELECTRONICS | Furniture | | | | |
| | Mattresses | | | | |
| | Small Appliances | | | | |
| | Cell Phones | | | | |
| | Audio/Visual Equipment | | | | |
| | CRT Monitors | | | | |
| | CRT Televisions | | | | |
| | Other Electronics | | | | |

**SUPERMIX:**

| | | | |
|---|---|---|---|
| POTENTIALLY HARMFUL WASTE | Liquid Latex Paint | | |
| | Dried Latex Paint | | |
| | Solvent-based Adhesives | | |
| | Water-based Adhesives | | |
| | Oil-based Paint/Thinners | | |
| | Caustic Cleaners | | |
| | Pesticides/Herbicides | | |
| | Dry-cell Batteries | | |
| | Wet-cell Batteries | | |
| | Gasoline/Kerosene | | |
| | Motor Oil/Diesel Oil | | |
| | Asbestos | | |
| | Explosives | | |
| | Medical Wastes | | |
| | Other Chemicals | | |
| | Other Potentially Toxic | | |

| | | | |
|---|---|---|---|
| MISC. | Sand/Soil/Dirt | | |
| | Non-distinct Fines | | |
| | Misc. Organics | | |
| | Misc. Inorganics | | |

Tally Sheet - Page 2

Revised 1/25/10