REGIONAL DISTRICT OF EAST KOOTENAY
Waste Composition Study

PREPARED FOR: REGIONAL DISTRICT OF EAST KOOTENAY

PREPARED BY: SPERLING HANSEN ASSOCIATES

PRJ18037

October 2018

SPERLING HANSEN ASSOCIATES

Regional District of East Kootenay

- Landfill Engineering
- Solid Waste Planning
- Environmental Monitoring
- Landfill Fire Control

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- Landfill Gas Management
- Solid Waste Planning
- Environmental Monitoring
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Mr. Kevin Paterson.
Manager of Environmental Services
Regional District of East Kootenay
19 - 24th Avenue South
Cranbrook B.C.
V1C 3H8

October 19th 2018

RE: Regional District of East Kootenay Waste Composition Study

Dear Mr. Paterson,

We are pleased to present the results of Sperling Hansen Associates' 2018 Waste Composition Study completed at the Central Subregion Landfill. The purpose of this study is to characterize the general composition of the residual waste stream in the Regional District of East Kootenay (RDEK). In addition, we have compared and discussed the differences and similarities of the waste composition found in each of the three subregions and between waste sectors. The report is organized into five sections, including General Background, Methodology, Results, Observations and Conclusions, and Limitations.

We have enjoyed working with the RDEK in conducting this study and we believe that the information provided in this report will help the RDEK in its efforts to improve recycling and waste diversion programs in the Region.

Yours truly,
SPERLING HANSEN ASSOCIATES

Mairi Dalgleish
Environmental Technologist

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EXECUTIVE SUMMARY

The Regional District of East Kootenay (RDEK) retained Sperling Hansen Associates (SHA) to design and conduct a waste composition study in 2018. The study took place during four weeks between July and August 2018. Over this period, 78 loads were targeted, sampled, and sorted.

Target loads were chosen based on the proportion of waste disposed (landfilled) in the RDEK each year. The loads were identified based on region of origin (Central subregion, Columbia Valley subregion, and Elk Valley subregion) as well as the waste sector (rural transfer station, urban transfer station, commercial, and construction and demolition). Incoming loads to the landfill were visually inspected for bulky and oversized materials, and manual sorting took place on a 100 - 125 kilogram sub-sample. The samples were sorted into 13 primary categories and 89 secondary categories. In total, 78 loads were targeted, resulting in a total sample weight of 602,500 kg; a total weight of 9,772 kg of material was extracted from the loads and manually sorted into the sampling categories. The average sorted weight of each sub-sample was 132 kilograms.

The results of the study show the overall waste composition for the entire region is represented as follows: Compostable Organics (29%), followed by Plastics (14%), Paper and Paperboard (13%), Construction and Demolition (11%), Non-compostable Organics (8%), Textiles (5%), Household Hygiene (5%), Metals (4%), Glass (3%), Household Hazardous Waste (2%), Electronics (2%), Bulky Waste (2%) and Fines (2%).

The overall waste stream's Compostable Organics consisted of Kitchen Waste (11%), Yard and Garden Waste (9%), Backyard Compostable Food Waste (7%), Clean Lumber (1.8%), Clean Pallets and Skids (0.7%), followed by Other Organic Waste (0.1%). In addition to the Compostable Organics, the waste stream consisted of 8% Non-Compostable Organics (Treated Lumber, Rubber etc.). The study showed that, in total, nearly 50% of the waste stream consist of organic wastes (38%) and construction materials (11%).

1. GENERAL BACKGROUND

Sperling Hansen Associates (SHA) was retained by the Regional District of East Kootenay (RDEK) in 2017 to develop an updated Solid Waste Management Plan (SWMP) for the Regional District. As part of this SWMP update, SHA recommended the RDEK conduct a waste composition study. The goal of this study is to provide the RDEK with valuable information regarding the composition of the waste stream to assist in developing diversion initiatives for the region.

The waste composition study was completed at the Central Subregion Landfill over a four-week period in July and August 2018. Waste from each of the three subregions within the RDEK was sampled during this period. This is the first waste composition study that has ever been completed in the RDEK.

1.1 Current RDEK Solid Waste Management System

The RDEK is divided into three subregions: the Columbia Valley Subregion (CV), the Central Subregion (CE), and the Elk Valley Subregion (EV). Each subregion manages solid waste in similar ways, with the entire system consisting of:

- Rural transfer stations: unattended (unsupervised) sites that provide bin(s) for waste disposal and single-stream recycling open 24 hours per day 7 days per week. Three rural transfer stations also offer marshalling areas for wood waste and scrap metal diversion. Rural transfer stations are located in the CE and CV subregion;
- Urban transfer stations: attended (supervised) sites that provide waste disposal opportunities for municipal solid waste (MSW), construction and demolition waste (C&D) as well as diversion opportunities for single-stream recycling, metal, wood waste, yard waste, large appliances, tires, propane tanks and share sheds. These sites service members of the public as well as municipal garbage trucks (curbside waste);
- Landfills: the RDEK operates three landfills: the Central Subregion Landfill, the Sparwood Landfill (for C&D waste only), and the Columbia Valley Landfill.
- Commercial: commercial waste is currently being serviced by South East Disposal and Waste Management via front-load garbage trucks.
- Residential Curbside: curbside garbage pick-up is provided by the major communities in the RDEK, including Cranbrook, Kimberley, Invermere, Fernie, Sparwood and Elkford.
- Single Stream Recycling: single stream recycling bins (yellow-bins) are provided in each community, at transfer stations, and at major businesses throughout the RDEK.

The Central Subregion's waste system consists of two attended transfer stations, 11 unattended transfer stations and one landfill; two of the unattended transfer stations offer marshalling areas for wood waste and scrap metal (Wasa and Tie Lake). The Columbia Valley subregion's waste system consists of four unattended transfer stations and one landfill; one of the unattended transfer stations has a marshalling area (Canal Flats). The only attended transfer station in the Columbia Valley is at the Columbia Valley Subregion Landfill (residential drop-off). The Elk Valley subregion's waste system consists of three attended transfer stations and one C&D landfill; there are no unattended transfer stations in the Elk Valley.

1.2 Objectives

The goals of the 2018 waste composition study are as follows:

- To determine the overall composition of the residual solid waste stream being generated in the RDEK;
- To compare the waste composition of the three subregions within the RDEK;
- To examine the portion of residual solid waste being received from each of the main waste streams; including: residential waste (rural and urban transfer stations), Industrial, Commercial and Institutional (ICI), and construction and demolition (C&D) waste;
- To characterize the residual waste composition by primary and secondary category; and,
- To compare the RDEK's waste composition with other neighboring and similar regional districts.

2. METHODOLOGY

The study was conducted at the Central Subregion Landfill, in Fort Steele, B.C. The Central Subregion Landfill accepts waste from both the Central Subregion and the Elk Valley Subregion. For the purpose of this study, selected loads of waste from the Columbia Valley subregion were transferred directly from rural transfer stations in the Columbia Valley or from the Columbia Valley Landfill and brought to the sorting area at the Central Subregion Landfill for processing.

2.1 Staff, Equipment and Work Days

The sorting team consisted of a five-person team made up of SHA staff, RDEK staff and RDEK temporary staff/contract workers.

Photo 2-1: Sorting Team at Central Subregion Landfill

Sorting staff orientation and training was held on the first day of the sampling period. A senior environmental staff person from Sperling Hansen Associates was present for the first two days of the sampling session to assist with project set-up, provide general methodology guidance, and to conduct health and safety training. After the second sampling day, the sampling session was supervised by one of SHA's environmental technologists.

Equipment that was utilized during the sorting program included:

- Safety Equipment (first aid kit, portable CB radio on the Central Subregion Landfill frequency, portable eyewash, fire extinguisher).
- Personal Protective Equipment (safety boots, Tyvek® overalls, rubber aprons, inner nitril gloves, outer puncture resistant rubber gloves, dust masks, safety glasses, high visibility vests).
- High-resolution electronic scales (2).
- Sorting tables (4).
- Tent to cover work area.
- Various sorting containers (120 L plastic totes, 70 L garbage cans, 10 L plastic bins).
- Rakes, brooms, shovels, scoops, tongs, utility knifes for opening bags and sorting through materials.
- Bobcat and Loader.

Sample sorting was conducted from Monday to Friday between 7:30 am and 3:30 pm at the Central Subregion Landfill. The set-up of the sorting tent is shown in Photo 2-2.

Photo 2-2: Sorting Tent Set-up at the Central Subregion Landfill

2.2 Sample Design

The aim of the study was to produce solid waste stream composition profiles for the entire RDEK, and for each of the main waste streams (rural transfer, urban transfer, commercial and C&D). The chosen waste stream sorting categories aim to give a general profile of the RDEK's waste stream, and aid in identifying opportunities for increased diversion in the future. In total, samples were sorted into 89 categories, as shown in Appendix A (Sample Data Sheet). SHA's experience from previous waste composition studies indicated that with a four-person sorting crew, it would be possible to complete approximately 75-100 samples during a four-week period; the target was identified at 80 samples.

Prior to conducting the study, SHA reviewed waste tonnage data for the RDEK to develop a sample design for the project. The tonnage data was separated by subregion and was divided into each waste generation sector; including: attended transfer stations, rural transfer stations, residential curbside (as applicable), commercial haulers, self-haulers and C&D haulers. The total number of samples targeted from each of the waste generation sectors was based on the proportion of total waste received at RDEK landfills annually from each of the sectors. Table 2-1 below shows the target sample numbers from each waste generation sector and subregion (based on 2016 disposal data).

Table 2-1. Target Distribution of samples.

	Waste Buried / Transfer (MT)	% of Total Waste	Target Sample No.
Central Subregion			
Residential Cranbrook	6,875	16%	13
Residential Kimberley	2,388	5%	4
Rural Transfer	4,896	11%	9
Commercial	8,736	20%	16
C&D + Other	1,498	3%	3
Total Central	**24,394**	**56%**	**45**
Columbia Valley Subregion			
Rural Transfer	3,093	7%	6
Residential	1,084	2%	2
Commercial	3,690	8%	7
C&D + Other	2,649	6%	5
Total Columbia Valley	**10,516**	**24%**	**19**
Elk Valley Subregion			
Total Transfer	**8,767**	**20%**	**16**
Total RDEK			
Total Disposed (MT)	**43,677**	**100%**	**80**

As shown, approximately 56% of waste generated in the RDEK originates from the Central subregion; followed by 24% generated in the Columbia Valley and 20% generated in the Elk Valley.

In order to obtain the desired number of samples from each of the service areas and generation sectors, a schedule of targeted samples was prepared prior to commencement of the sampling period; this was periodically updated by SHA staff when new information was obtained throughout the course of the project.

2.3 Sample Collection

Target vehicles were identified by the team leader (SHA) based on the incoming landfill traffic that was observed during that day. The team leader would then radio to the Landfill Operator to identify the target vehicle so that the vehicle could be directed to unload at a designated area to the side of the active face where the waste would not be compacted until a sample was obtained. The scale operator would also be contacted to provide the net weight of the target load.

The target load was observed at the active face of the landfill and photos were taken of each load. Large or bulky items contained in the load were identified and estimates for the volume of oversized material in the load were recorded on the sample data sheet (see Appendix A). Once details of the entire load were recorded, a bobcat was used to collect a representative sample of the waste, weighing approximately 125 kilograms, and deliver the sample to the sorting table (see Photo 2-3).

Photo 2-3: Crew at work at the sorting table.

The sample was delivered from the active face to the sorting area using a bobcat or loader, and placed on the sorting table. Bulky items such as small appliances and housewares were sorted first, prior to opening any bags of garbage. Bags were then opened using utility knives or scissors and tongs were used to sort the waste by hand (see Photo 2-4). For each sample, items in the waste were identified and sorted into their respective secondary categories and placed in corresponding bins. For items that were

constructed with multiple materials, the material category with the highest weight content was selected; for example: umbrellas were sorted into the metal category.

Photo 2-4: Sorting items into their appropriate secondary class

When the sort was completed, the material in each secondary class was weighed and recorded. Household hazardous waste items, electronic items, and easily recycled materials were placed beside the sampling tent (see Photo 2-5) for diversion from the landfill. The contents of the remaining sorting bins were discarded into a 40-yard bin for future disposal at the active face.

Once the sorted samples were discarded, sorting bins and containers were carefully cleaned and reorganized in preparation for the next sample.

Typically, four samples were processed each working day. Visual sorts were conducted on loads that consisted of primarily one material (e.g. asphalt/wood shingles), or of a series of oversized (easily discernable) materials.

Photo 2-5: Sorted materials set-aside for diversion

Data from the study was entered into the master form for each sample on the evening following the sorting by the team leader (Appendix A). This form incorporates the estimated weight of visually observed bulky and oversized items, as well as physically sorted samples, for a total adjusted load weight. Bulky and oversized material estimates were made based on unit weights of observed items (example: large appliances) or SHA's data base of material densities and observed volumes (example: asphalt shingles).

3. RESULTS

3.1 Sorting Targets vs. Actuals

As outlined previously, the target sample population for the study was 80 samples weighing between 100 to 125 kg each. Waste deliveries to the landfill were not always consistent day-to-day, and often the time of delivery was varied; with that said, SHA made every effort to obtain the targeted number of samples. In total, 78 samples were sorted during the four-week study. The average sorted weight for each sample was 132 kg.

Table 3-1 below outlines the targeted and actual samples sorted during the study period.

Table 3-1. Targeted and obtained number of samples

	Target No.	%	Actual No.	%
Central Subregion				
Residential Cranbrook	13	16%	13	17%
Residential Kimberley	4	5%	6	8%
Rural Transfer	9	11%	13	17%
Commercial	16	20%	12	15%
Construction and Demolition	3	3%	2	3%
Total Central	**45**	**56%**	**46**	**59%**
Columbia Valley Subregion				
Rural Transfer	6	7%	7	9%
Residential	2	2%	6	8%
Commercial	7	8%	5	6%
Construction and Demolition	5	6%	0	0%
Total Columbia Valley	**19**	**24%**	**18**	**23%**
Elk Valley Subregion				
Elk Valley Transfer (all)	16	20%	14	18%
Total Elk Valley	**16**	**20%**	**14**	**18%**
Total Study (All Regions)	**80**		**78**	

3.2 Total Sample and Sorted Weights

There are two ways of reporting the extent of the waste sort program, based on sample weight and based on sorted weight. The sample weight is a measure of the quantity of material that was dumped at the specified location near the active face and was visually inspected by the sorting crew. The sorted weight is a measure of the quantity of material that was extracted from the sample material by the backhoe and sorted into the secondary categories.

During the sampling period, 78 sample loads were diverted to the designated tipping area with a total sample weight of 602,500 kg; this represents 2% of the total waste accepted at the landfill in 2017. From the total sample weight, 9,772 kg of material was extracted from the loads and manually sorted into the sampling categories, while the remaining 592,728 kg of material was visually inspected.

3.3 Data Analysis and Statistics

Prior to applying the study results to the entire waste stream, a statistical analysis was completed to determine the normalcy of said results. Normalcy is determined through a comparison of the actual distribution of the data to an ideal Gaussian distribution.

When conducting a statistical analysis, the first three parameters that are traditionally calculated are the mean, the standard deviation (SD), and the coefficient of variation (COV). These are the base values

from which normalcy is determined, but do not actually prove normalcy. The mean is the average of the data. The SD is a measure of variability subject to the value of the mean; the significance of the SD is that if the data follows a bell-shaped Gaussian distribution, then 68% of the values lie within one SD of the mean (on either side) and 95% of the values lie within two SD of the mean. The problem with the SD is that, because it is subject to the value of the mean, the larger the mean the larger the possible SD (which can ultimately be misleading). The COV is simply the standard deviation divided by the mean; what the COV provides is a clear indication of the degree of variability expressed as a percent. The mean, SD, and COV are shown for each of the primary categories in Table 3-2.

To assess the actual normalcy, the D'Agostino & Pearson (DP) test was used. The DP test quantifies the skewness and kurtosis of the sample data to quantify how far from Gaussian the distribution the data is in terms of asymmetry and shape. It then calculates how far each of these values differs from the value expected with a Gaussian distribution, and computes a single P value from the sum of these discrepancies. Due to the small sample size, statistical analysis was not completed on the C&D results.

Normalcy testing was completed on the entire data set (RDEK All), on each subregion as a whole (EV, CE, CV) and on each waste generation sector (Commercial, Rural, Urban). The results of the Normalcy testing for each of the primary and secondary categories are summarized in Table 3-3. The primary waste categories that met normalcy requirements are as follows:

- RDEK (overall): Plastics and Compostable Organics;
- Central: Plastics, Compostable Organics, Household Hygiene;
- Columbia Valley: Plastics, Glass, Compostable Organics, Non-compostable Organics, Textiles, Household Hygiene, Other;
- Elk Valley: Paper, Plastics, Glass, Compostable Organics, Non-compostable Organics, Construction and Demolition, Household Hygiene;
- Commercial: Plastics, Compostable Organics;
- Rural: Plastics, Glass, Metals, Compostable Organics, Non-compostable Organics, Household Hygiene;
- Urban: Plastics, Compostable Organics.

A number of the secondary categories in each waste sectors (Commercial, Rural, and Urban) also met the normalcy requirements. The results of the testing mean that for all of the categories that did not meet the requirements, care should be taken when inferring the study results to the entire waste stream, especially if the data is to be compared to historic or future results to map trends (i.e. used as an indication of effectiveness of recycling programs, etc.). The occurrence of the other waste components in the waste stream were too inconsistent for those categories to meet normality requirements. "Abnormal" or odd samples (for example commercial samples with large amounts of paint or construction materials (i.e. Granite countertops)) have the potential to skew the waste composition and result in the categories not meeting normalcy requirements.

3.4 Waste Composition

Table 3-4 (attached) displays the results of the waste composition study for the overall RDEK, each of the three subregions, and for commercial, rural, urban and C&D samples that were sorted during the 2018 study.

3.4.1 Waste Composition by Region

3.4.1.1 Overall Waste Composition Results

The overall waste composition results are shown in Figure 3-1 below. As shown, the study results show that the largest component of the waste stream is Compostable Organics (29%), followed by Plastics (14%), Paper and Paperboard (13%), Construction and Demolition (11%), Non-compostable Organics (8%), Textiles (5%), Household Hygiene (5%), Metals (4%), Glass (3%), Household Hazardous Waste (2%), Electronics (2%), Bulky Waste (2%) and Fines (2%).

The Compostable Organics consisted of Kitchen Waste (11%), Yard and Garden Waste (9%), Backyard Compostable Food Waste (7%), Clean Lumber (1.8%), Clean Pallets and Skids (0.7%), followed by Other Organic Waste (0.1%). In addition to the Compostable Organics, the waste stream consisted of 8% Non-Compostable Organics (Treated Lumber, Rubber etc.). The study showed that, in total, nearly 50% of the waste stream consist of organic wastes (38%) and construction materials (11%).

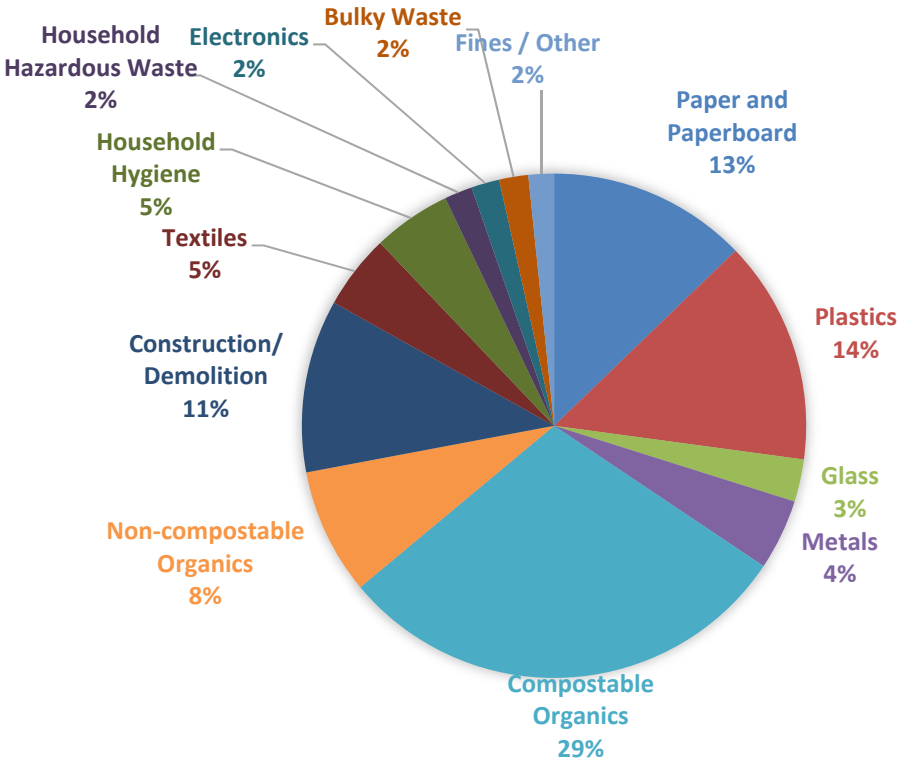


Figure 3-1 - Overall Waste Composition Results (all sectors)

3.4.1.2 Central Waste Composition Results

The results of the Central subregion waste samples are shown in Figure 3-2 below. As shown, the largest component of the Central Subregion's waste stream is Compostable Organics (31.4%), followed by Plastics (13%), Paper and Paperboard (13%), Construction / Demolition (12%), Non-compostable Organics (10%), Household Hygiene (4%), Textiles (4%), Metals (4%), Glass (2%), Household Hazardous Waste (2%), Bulky Waste (2%), Fines / Other (2%), Electronics (1%).

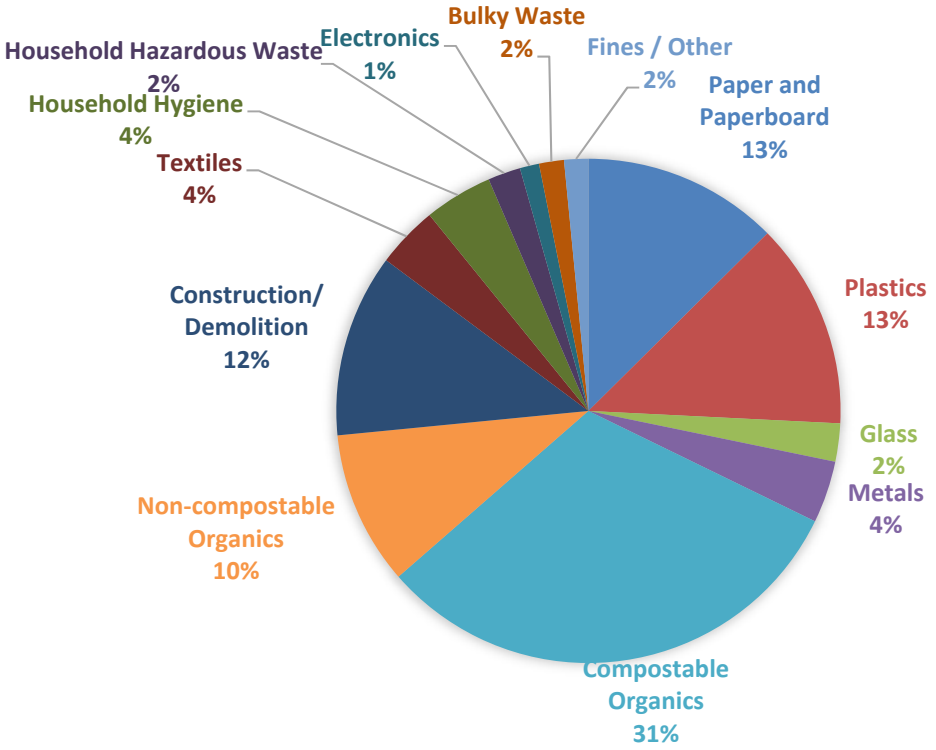


Figure 3-2 - Central Waste Composition Results

The Central subregion's waste system consists of a mixture of attended and unattended transfer stations.

3.4.1.3 Columbia Valley Waste Composition Results

The results of the Columbia Valley subregion waste samples are shown in Figure 3-3 below. As shown, the largest component of the waste stream in the Columbia Valley is Compostable Organics (33%), followed by Plastics (13%), Paper and Paperboard (11%), Construction / Demolition (11%), Non-compostable Organics (6%), Textiles (6%), Household Hygiene (6%), Metals (5%), Glass (3%), Bulky Waste (3%), Electronics (2%), Household Hazardous Waste (1%), Fines / Other (1%).

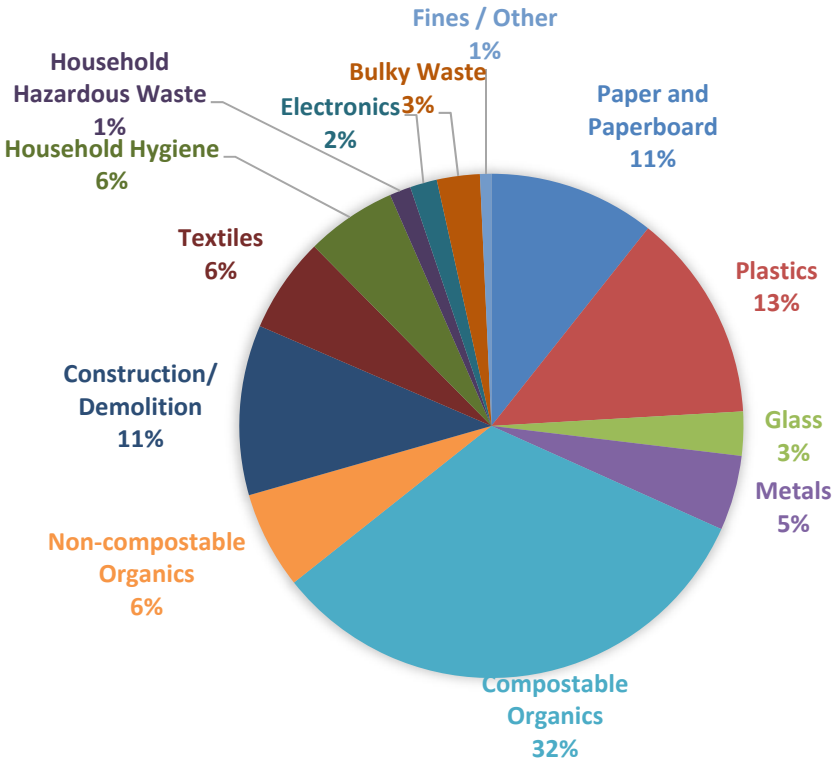


Figure 3-3 - Columbia Valley Waste Composition Results

The Columbia Valley subregion's waste system consists of mostly unattended transfer stations, with one attended residential drop-off provided at the Columbia Valley Landfill (located in Windermere)

3.4.1.4 Elk Valley Waste Composition Results

The results of the Elk Valley subregion waste samples are shown in Figure 3-4 below. As shown, the largest component of the waste stream is Compostable Organics (20%), followed by Plastics (19%), Paper and Paperboard (16%), Construction / Demolition (9%), Household Hygiene (6%), Metals (6%), Textiles (6%), Non-compostable Organics (5%), Electronics (4%), Glass (4%), Fines / Other (3%), Bulky Waste (2%), Household Hazardous (1%).

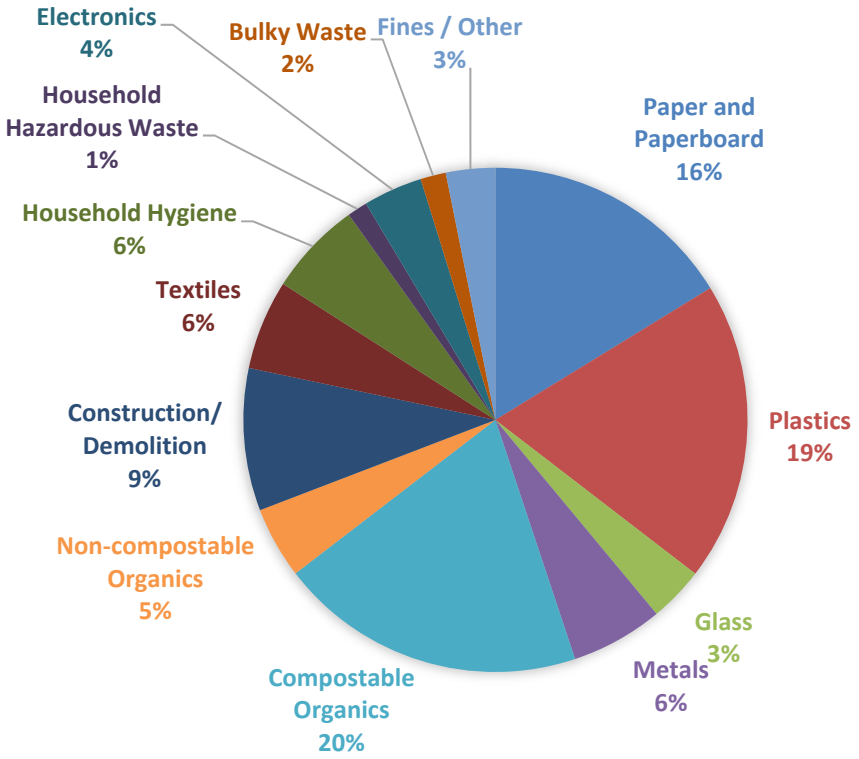


Figure 3-4 - Elk Valley Waste Composition Results

The Elk Valley subregion represents the only fully attended transfer station system in the RDEK. Sparwood, Elkford and Fernie provide curbside garbage pick-up to residents, and yellow-bin recycling is available in all communities.

3.4.2 Waste Composition by Generating Sector

3.4.2.1 Commercial Waste Composition Results

The results of the commercial waste samples are shown in Figure 3-5 below. As shown, the results indicate that the largest component of the waste stream is Compostable Organics (30%), Paper and Paperboard (16%), Plastics (15%), Construction and Demolition (13%), Non-compostable organics (10%), Metals (3%), Household Hazardous Waste (3%), Glass (2%), Textiles (2%), Electronics (1%), Bulky Waste (1%), and Fines / Other (1%).

The commercial samples that were sorted consisted of mostly front-load trucks servicing the Cranbrook and Kimberley areas; samples from these trucks were observed to have large amounts of wood wastes, food wastes, and construction waste (from cabinet and counter shops) as well as a mixture of what appeared to be residential/multifamily waste.

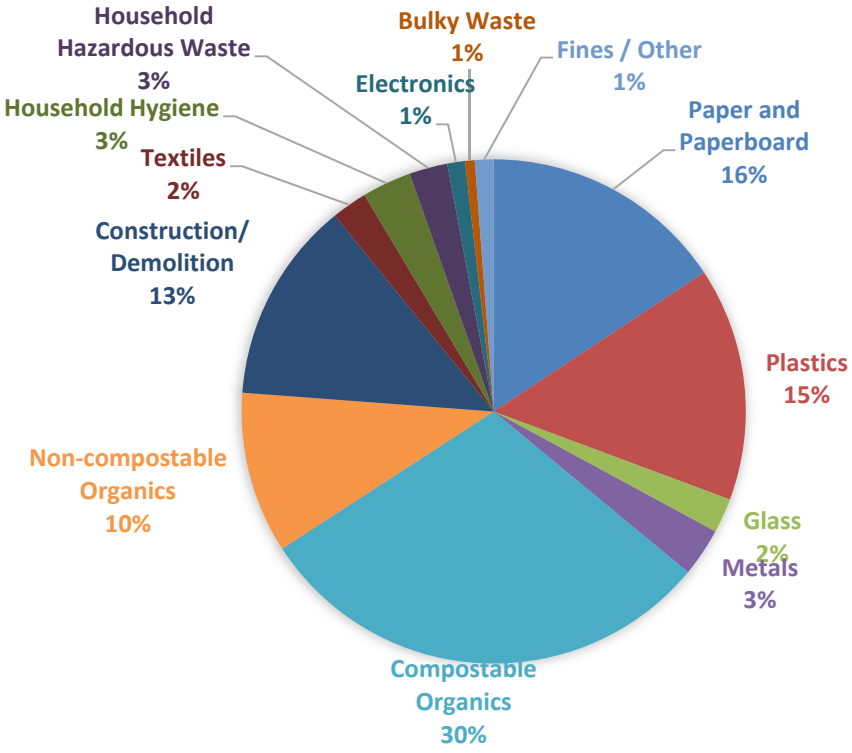


Figure 3-5 - Commercial Waste Composition Results

3.4.2.2 Rural Waste Composition Results

The waste composition results for the rural samples are shown in Figure 3-6 below. As shown, Compostable Organics make up the largest portion of the rural waste stream as well (at 30%), followed by Non-Compostable organics (12%), Plastics (12%), Construction and Demolition (11%), Paper and Paperboard (10%), Textiles (5%), Metals (5%), Household Hygiene (5%), Glass (3%), Household Hazardous Waste (2%), Electronics (2%), Bulky Waste (2%), Fines and Other (1%).

Organics and Construction Waste appear to make up over 50% of the rural waste stream, consisting of mostly food waste (17%), Yard and garden waste (9%), wood wastes (16%), and drywall (5%).

Household Hygiene products made up 5% of the waste stream, consisting of diapers (3%) and pet waste (2%).

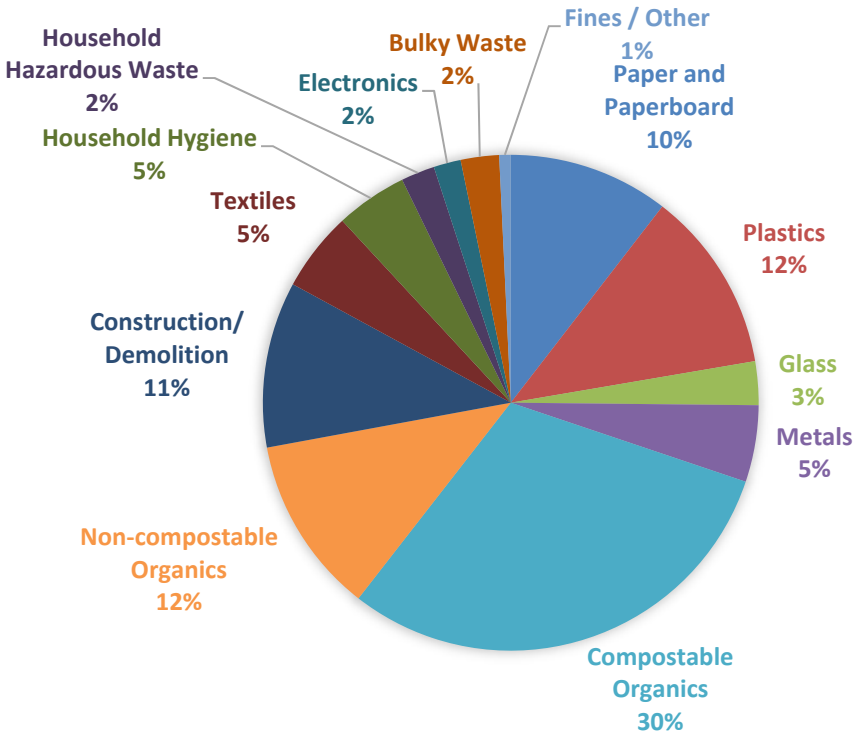


Figure 3-6 - Rural Waste Composition Results

3.4.2.3 Urban Waste Composition Results

The results of the urban transfer station composition are shown in Figure 3-7 below. These samples represent samples from Cranbrook Transfer Station, Kimberley Transfer Station, Kimberley Curbside, Elk Valley Transfer Stations, Windermere Landfill Residential drop-off, and Curbside pick-up received at the Columbia Valley Landfill.

As shown, the results indicate that the largest component of the waste stream appears to be Compostable organics (29%), followed by Plastics (16%), Paper and Paper Board (13%), Construction and Demolition (8%), Non-compostable Organics (6%), Textiles (6%), Household Hygiene (6%), Metals (5%), Glass (3%), Electronics (2%), Bulky Waste (2%), Household Hazardous Waste (1%), and Fines / Other (3%).

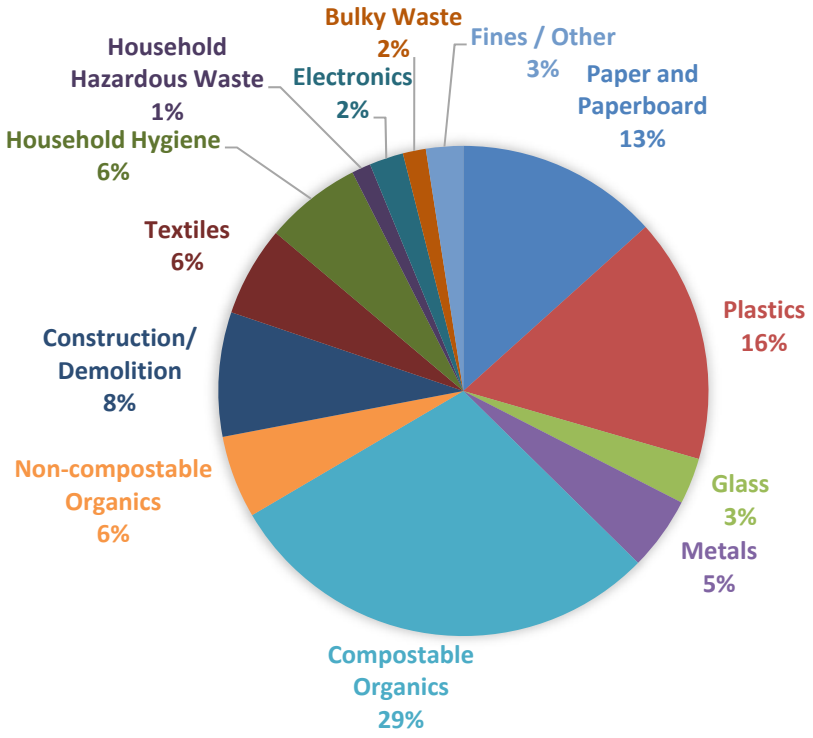


Figure 3-7 - Urban Waste Composition Results

3.4.2.4 Construction and Demolition Composition Results

Only two Construction and Demolition samples were visually sorted during the study; the results of which are shown in Figure 3-8 below. Although only two samples were visually sorted, SHA's observation of construction and demolition waste entering the landfill appeared to consistently be either roofing materials or wood waste.

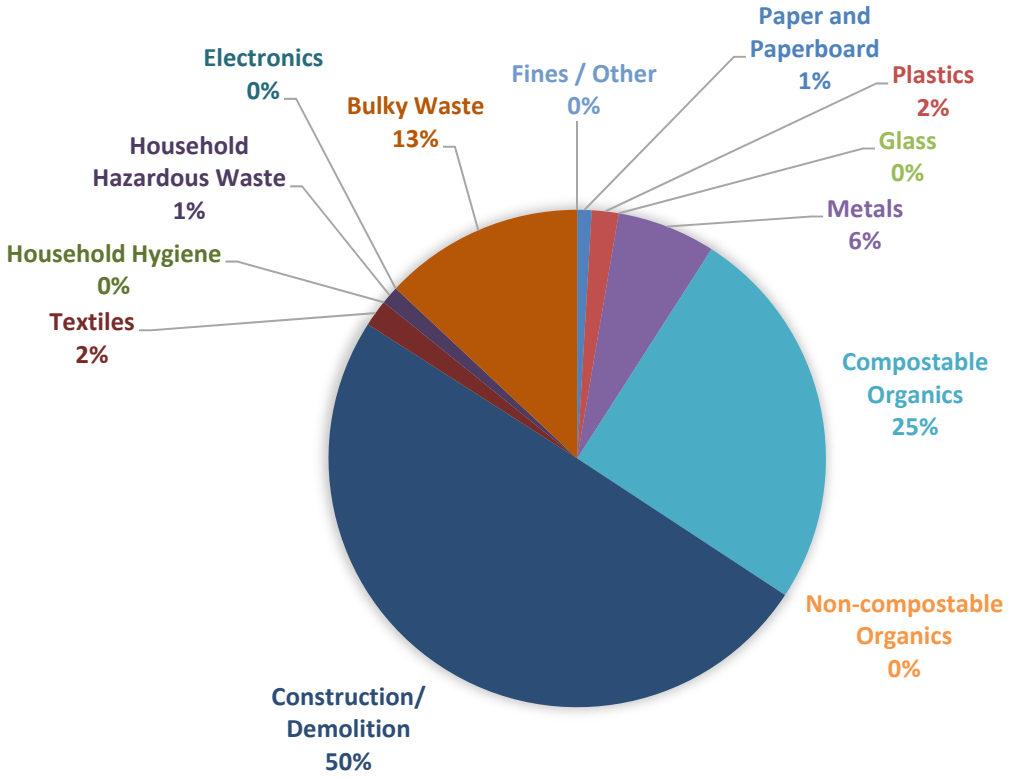


Figure 3-8 - C&D Waste Composition Results

3.5 Per Capita Waste Composition

The British Columbia Environmental Reporting BC website tracks Municipal Solid Waste Disposal in BC between 1990 through 2016 (http://www.env.gov.bc.ca/soe/indicators/sustainability/municipal-solid-waste.html). The webpage displays per person waste disposal rates as well as available waste composition data for Regional Districts. The per person disposal rate is an estimate of the amount of waste sent to landfill by each person over one year.

As outlined on the Environmental Reporting BC website, based on the estimated population and the waste disposed, the per capita disposal rate for the RDEK is estimated to be 561 kilograms per capita (as of 2016). According to the webpage, the population data reported for the RDEK has been estimated by BC Stats and adjusted based on data submitted by the Regional District; it is assumed that these adjustments are intended to account for increased tourist populations. As such, the estimated contributing population for the RDEK is 74,975. In 2017, 42,796 metric tonnes of waste was disposed (buried) at RDEK Landfills, resulting in an estimated waste disposal rate of 571 kilograms per capita.

Available comparison data has been compiled in Figure 3-9 and Table 3-5, which show the per capita waste disposal rate for the RDEK, Regional District of Nanaimo, Metro Vancouver, Regional District of North Okanagan, Columbia-Shuswap Regional District, Regional District of Okanagan-Similkameen, Thompson-Nicola Regional District, and Regional District of Kitimat Stikine. Additionally, Figure 3-9 illustrates the per capita disposal rate of each primary category based on available waste composition information. For comparison purposes, the disposal rates are displayed for the year the waste composition study was completed, and not the current year, as SHA is not aware of system changes that may have affected the waste composition since the data was published. No waste composition studies could be found for the Regional District of Central Kootenay or Regional District of Kootenay Boundary.

The waste disposal rates and waste compositions displayed in Figure3-9 were chosen based on perceived similarity to the RDEK; two exceptions are for Metro Vancouver, which presents a contrast as a large metropolitan centre, and Regional District of Nanaimo, which offers a large variety of diversion programs and could be considered for long-term regional goals and targets.

The RDEK's waste disposal rate (571 kg/person/year) is higher than the provincial average disposal rate which is 472 kg/person/year. As shown, the RDEK has the fourth lowest per capita waste disposal rate of the eight Regional Districts represented in Figure 3-9.

Caution should be used when comparing the results shown in Figure 3-9, as the study designs, results, and statistics are likely varied between studies; however, SHA has made a few comparative observations. Table 3-5 outlines a comparison of the per-capita waste composition in table form; conditional formatting has been applied to show categories where the RDEK is performing better (green) or worse (red) than other Regional Districts.

For example, when compared to the neighboring CSRD (Golden 2013), the study results indicate the RDEK disposes **more** Glass, Metals, Non-compostable Organics, Construction and Demolition, Textiles, Household Hygiene, Bulky waste and Fines per capita than the CSRD; and **less** Paper and Paperboard, Plastics, Metals, Compostable Organics, Household Hazardous Waste and Electronics. When compared to the RDOS (2008), the RDEK disposes **more** Paper and Paperboard, Plastics, Metals, Textiles,

Household Hazardous Waste, and Electronics per capita; and **less** Metals, Compostable Organics, Construction and Demolition, Bulky waste and Fines.

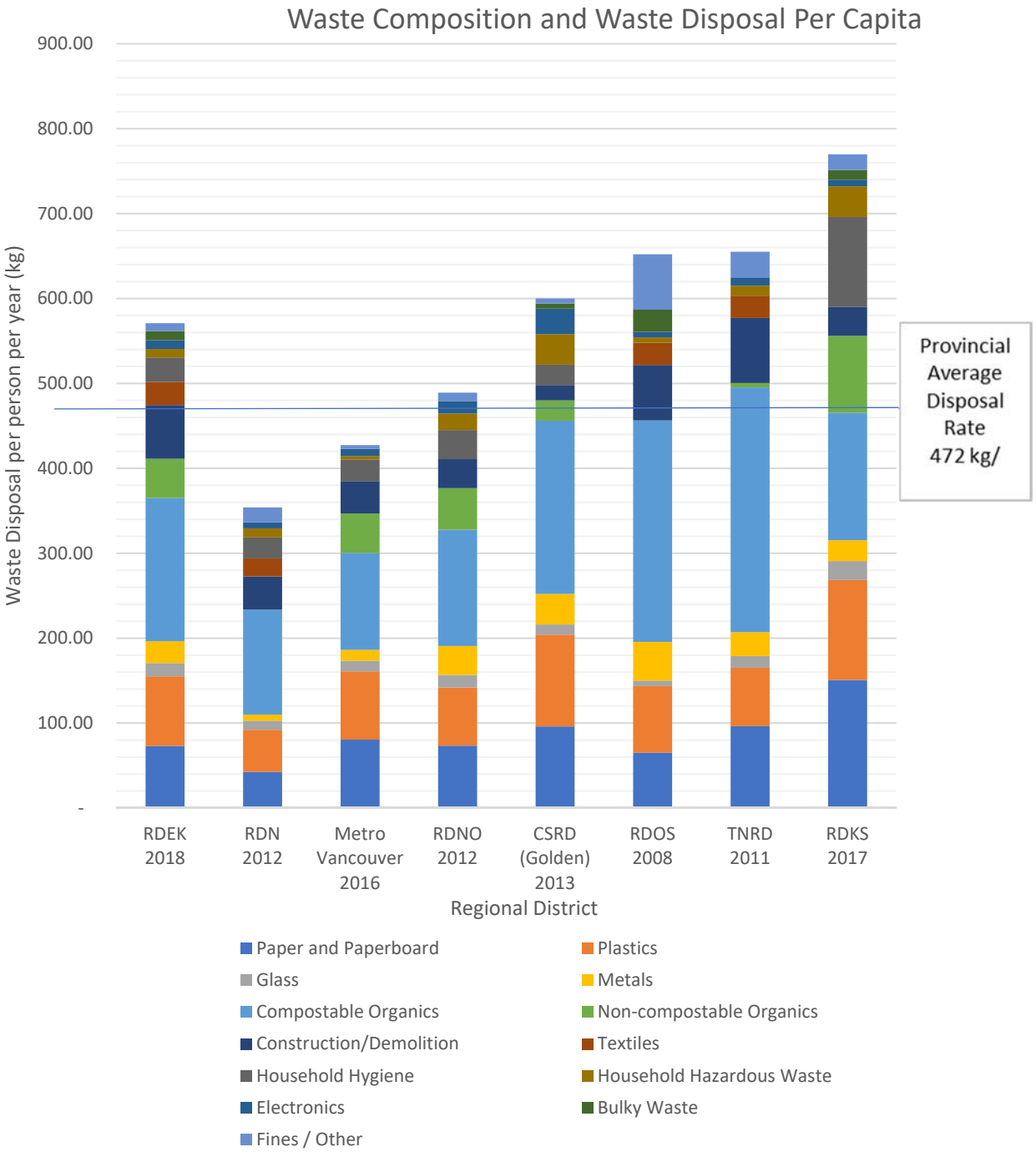


Figure 3-9 - Waste Composition and Disposal Rates for Regional Districts in BC

Table 3-5 - Per Capita Waste Disposal

	Per Capita Disposal (kg)							
	RDEK 2018	RDN 2012	Metro Vancouver 2016	RDNO 2012	CSRD (Golden) 2013	RDOS 2008	TNRD 2011	RDKS 2017
Paper and Paperboard	73.04	42.48	80.37	73.35	96.00	65.20	96.29	150.72
Plastics	81.90	49.56	80.37	68.46	108.00	78.24	68.78	117.66
Glass	15.56	10.62	12.69	14.67	12.00	6.52	13.76	22.30
Metals	25.83	7.08	12.69	34.23	36.00	45.64	28.17	24.61
Compostable Organics	168.69	123.90	114.21	136.92	204.00	260.80	288.20	149.96
Non-compostable Organics	46.18		46.53	48.90	24.00	-	5.24	90.74
Construction/Demolition	63.24	38.94	38.07	34.23	18.00	65.20	76.64	33.84
Textiles	27.31	21.24	-	-	-	26.08	26.20	-
Household Hygiene	28.62	24.78	25.38	34.23	24.00	-	-	106.12
Household Hazardous Waste	10.18	10.62	4.23	19.56	36.00	6.52	11.79	36.14
Electronics	10.33	7.08	8.46	14.67	30.00	6.52	9.83	7.69
Bulky Waste	10.65		-	-	6.00	26.08	-	11.54
Fines / Other	9.32	17.70	4.23	9.78	6.00	65.20	30.13	18.46
Total Waste Disposed per Capita (kg)	**570.85**	**354.00**	**427.23**	**489.00**	**600.00**	**652.00**	**655.00**	**769.77**

4. OBSERVATIONS AND CONCLUSIONS

The 2018 waste composition study was completed over a four-week period between July and August. Although the study does not account for seasonal variation, a review of incoming tonnage rates for the RDEK landfill sites suggests that the busiest months for waste disposal in the RDEK are March through October.

Based on the 2018 study, Compostable Organics make up the majority of the waste composition for all waste sectors and subregions (with the exception for the Construction and Demolition sector), averaging 30% of the overall waste stream. Overall food waste percentages (backyard compostable and kitchen waste) were relatively similar between all waste generating sectors, representing approximately 17% of commercial waste, 17% of Rural waste and 19% Urban waste. Of this, approximately 7% was considered Backyard Compostable; which includes fruits, vegetables, egg shells, coffee grounds etc. that could be composted in a backyard compost bin. Other food scraps, such as meat, dairy and baked goods, were sorted as Kitchen Waste and account for approximately 11% of the waste in the RDEK; this type of organic waste would be difficult to compost in a traditional “black-bin” backyard composter.

A notable difference in Compostable Organics was observed between the Elk Valley and the other two subregions. Compostable Organics make up 20% of the waste stream for the Elk Valley, compared to 31-33% in CE and CV subregions respectively. This can be partially attributed to the low percentage of yard and garden waste observed in the EV waste stream (2% compared to 11% and 10% for CE and CV). It is interesting to note that when broken down into waste sectors (Commercial, Rural, and ICI), yard and garden waste appeared to be fairly constant, making up an average of 9% of the waste stream regardless of the waste source; this was fairly unexpected as all of the urban transfer stations offer yard and garden waste diversion opportunities.

Based on the samples sorted, the results show the amount of wood waste (clean and contaminated) in the waste stream is 3 times greater at rural transfer stations than at urban transfer stations (16% compared to

5% sorted respectively). This is possibly due to the opportunity to divert wood waste at most of the attended/urban transfer stations, and minimal opportunities to divert wood waste at rural transfer stations. This is further supported by the low percentage of wood waste (clean and contaminated) observed in the Elk Valley (4%) where every transfer station is attended and offers a diversion opportunity for wood waste; thus, keeping wood out of the landfill.

A typical rural transfer station load is shown in Photo 4-1 below.

Photo 4-1 Typical Rural Transfer Load

Construction and Demolition waste was observed to be slightly higher in the commercial waste sampled (13%) when compared to rural transfer station (11%) and urban transfer stations (8%); however, this may be due to the high density and weight of granite counter tops received in some of the commercial loads. A photo of a commercial load containing a large volume of wood waste is shown in Photo 4-2.

Photo 4-2 Wood Waste in a CE Commercial Load

Textiles, including clothing and footwear, made up approximately 5% of the sorted materials. Observations made by the sorting crew suggested much of this material was donatable or reusable, as shown in Photo 4-3. The Canadian Diabetes Foundation operates a donation bin program that funds $5,000,000 dollars per year annually in diabetes research from clothing donations (declutter.diabetes.ca). According to the Canadian Diabetes website, there are multiple donation bins already in place in the RDEK that could be utilized by residents.

Photo 4-3 Footwear in a CV Rural Sample

An observation that was noted during sorting was that several bags were sorted that contained only single-stream recycling (no waste), an example of this is shown in Photo 4-4. This was unexpected as the RDEK provides yellow recycling bins (for single stream recycling) at all transfer stations and landfills.

Photo 4-4 Bag containing only recyclable materials

Based on the materials accepted in the RDEK's single stream recycling program (paper, tin/aluminum cans, grocery bags and plastics #1-6), it appears that up to 19% of the overall waste stream could be

diverted through existing recycling programs (assuming the materials are clean). When separated into waste streams, this amounts to up to 21% of Commercial waste, 21% of Urban wastes, and 17% of Rural wastes. It is interesting to note that the Rural samples had the least percentage of single stream recycling compared to Commercial and Urban waste sectors. When compared by subregion, the Elk Valley had the highest percentage of single stream recyclable materials (25%), followed by the Columbia Valley (19%), and the Central subregion (18%).
A large number of refundable bottles and cans were sorted during the four-week study; the quantity of which is estimated to be between 4,000 to 6,000 bottles/cans.

It is also interesting to note that SHA observed several mattresses in waste loads from the Cranbrook Transfer Station; as this transfer station offers a mattress diversion program at no charge. This could suggest that the incentive to divert waste from the landfill is too low; or, it is possible that the mattresses that were observed could have been disposed at a time when the diversion area at the transfer station was at capacity. Photo 4-5 shows a load from the Cranbrook Transfer station containing multiple mattresses and box-springs.

Photo 4-5 Mattresses in Cranbrook Transfer Station Load

5. LIMITATIONS

This report has been prepared by Sperling Hansen Associates. (SHA) on behalf of the Regional District of East Kootenay (RDEK) in accordance with generally accepted engineering practices to a level of care and skill normally exercised by other members of the engineering and science professions currently practicing under similar conditions in British Columbia.

The report is based on site visits, project experience, and analysis by SHA staff of data compiled during the preparation of this report from a number of sources. Except where specifically stated to the contrary, the information on which this study is based has been obtained from external sources. This external information has not been independently verified or otherwise examined by SHA to determine its accuracy and completeness. SHA has relied in good faith on this information and does not accept responsibility of any deficiency, misstatements or inaccuracies contained in the reports as a result of omissions, misinterpretation and/or fraudulent acts of the persons interviewed or contacted, or errors or omissions in the reviewed documentation.

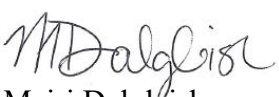
The report is intended solely for the use of the RDEK. Any use which other parties makes of this report, or any reliance on, or decisions to be made based on it, are the responsibilities of such other parties. SHA does not accept any responsibility for other uses of the material contained herein nor for damages, if any, suffered by any third party because of decisions made or actions based on this report. Copying of this intellectual property for other purposes is not permitted.

The findings and conclusions of this report are valid only as of the date of this report. The interpretations presented in this report and the conclusions and recommendations that are drawn are based on information that was made available to SHA during the course of this project. Should additional new data become available in the future, SHA should be requested to re-evaluate the findings of this report and modify the conclusions and recommendations drawn, as required.

It has been a pleasure working with the RDEK on the RDEK Waste Composition Study. Should you have any questions on this report or require further assistance or information, please feel free to contact the undersigned at 778-471-7088 or 604-986-7723.

Kind Regards,
Sperling Hansen Associates

Report by,



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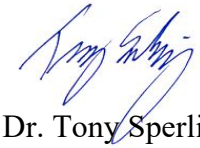

Dr. Tony Sperling, P.Eng

Table 3-2: Mean, Standard Deviation, and Coefficint of Variation for RDEK All, Commercial, Rural and Urban Samples

	Central			Columbia Valley			Elk Valley			RDEK ALL			COMMERCIAL			RURAL			URBAN		
	Mean	Std. Dev	Coefficient of variation	Mean	Std. Dev	Coefficient of variation	Mean	Std. Dev	Coefficient of variation	Mean	Std. Dev	Coefficient of variation	Mean	Std. Deviation	Coefficient of variation	Mean	Std. Deviation	Coefficient of variation	Mean	Std. Deviation	Coefficient of variation
Total Paper and Paperboard (%)	9%	1%	74	11%	3%	28	16%	4%	27	13%	8%	60	16%	13%	80	10%	4%	42	13%	5%	38
Total Plastics (%)	6%	0%	45	13%	5%	35	19%	5%	28	14%	6%	42	15%	7%	47	12%	5%	38	16%	5%	32
Total Glass (%)	2%	1%	90	3%	2%	56	4%	2%	51	3%	2%	74	2%	2%	113	3%	2%	54	3%	2%	64
Total Metals (%)	4%	1%	95	5%	3%	65	6%	5%	88	5%	4%	87	3%	4%	124	5%	3%	63	5%	4%	85
Total Compostable Organics (%)	16%	1%	51	33%	12%	37	20%	7%	37	30%	15%	50	30%	18%	60	30%	12%	41	29%	14%	47
Total Non-compostable Organics (%)	19%	2%	190	6%	4%	70	5%	3%	75	8%	15%	182	10%	19%	185	12%	21%	180	5%	5%	98
Total Construction and Demolition (%)	19%	2%	158	11%	13%	122	9%	7%	80	11%	16%	143	13%	17%	135	11%	13%	121	8%	8%	97
Total Textiles (%)	4%	1%	108	6%	4%	66	6%	5%	92	5%	4%	94	2%	2%	100	5%	5%	101	6%	4%	75
Total Household Hygiene (%)	4%	1%	95	6%	4%	63	6%	5%	81	5%	4%	84	3%	3%	103	5%	3%	59	6%	5%	77
Total Household Hazardous (%)	5%	2%	219	1%	2%	126	1%	1%	107	2%	4%	206	2%	7%	291	2%	2%	101	1%	1%	92
Total Electronics (%)	2%	2%	156	2%	2%	129	4%	4%	109	2%	3%	147	1%	2%	196	2%	2%	128	2%	3%	135
Total Bulky Waste (%)	4%	3%	255	3%	6%	209	2%	3%	161	2%	4%	230	1%	2%	348	2%	4%	150	2%	3%	227
Fines / Other(%)	3%	2%	207	1%	1%	84	3%	4%	143	2%	3%	193	1%	2%	195	1%	1%	161	2%	4%	167

Table 3-3: Normalcy Test Results

	Central	Columbia Valley	Elk Valley	RDEK ALL	RDEK Commercial	RDEK Rural	RDEK Urban
Category 1 - Paper and Paperboard							
Newsprint	No	No	Yes	No	No	Yes	No
Mixed Recycling Paper	No	No	No	No	No	No	No
Old Corrugated Cardboard (OCC)	No	Yes	No	No	No	Yes	No
Old Corrugated Cardboard (OCC)	No	Yes	Yes	No	No	No	No
Boxboard	No	No	No	No	No	No	No
Bound Paper Products	No	No	No	No	No	No	No
Fine Paper	No	No	No	No	No	No	No
Tissue Paper	No	Yes	Yes	No	Yes	Yes	Yes
Beverage containers - Drink Box / Aseptic Containers (Tetra) / Gable Top Containers	No	Yes	No	No	No	Yes	No
Beverage containers - Drink Box / Aseptic Containers (Tetra) / Gable Top Containers	No	Yes	No	No	No	No	No
Paper Cups	No	No	No	No	No	Yes	No
Other Paper	No	No	Yes	No	No	No	No
Total Paper and Paperboard (%)	**No**	**No**	**Yes**	**No**	**No**	**Yes**	**No**
Category 2 - Plastics							
Rigid Beverage Containers - Deposit	No	Yes	Yes	No	No	Yes	No
Rigid Beverage ContainersNon-Deposit	No	No	No	No	No	No	No
Other Rigid Containers (blister packaging, plant pots, toothpaste)	No	Yes	Yes	No	Yes	Yes	Yes
Film Packaging	No	Yes	No	No	No	Yes	No
Styrofoam	No	No	Yes	No	Yes	No	Yes
Durable Plastic Products	No	No	Yes	No	No	Yes	No
Other	No	No	No	No	No	No	No
Total Plastics (%)	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
Category 3 - Glass							
Beverage Containers - alcoholic	No	No	Yes	No	No	No	No
Beverage Containers - non alcoholic	No	No	No	No	No	No	No
Beverage Containers - non refundable	No	No	No	No	No	No	No
Food Containers	No	No	Yes	No	No	No	No
Other glass and ceramics (plate, mirrors, light bulbs, ceramics)	No	No	No	No	No	No	No
Total Glass (%)	**No**	**Yes**	**Yes**	**No**	**No**	**Yes**	**No**
Category 4 - Metals							
Beverage Containers - alcoholic	No		No	No	No	No	No
Beverage Containers - non alcoholic	No		No	No	No		No
Food Containers	No	Yes	Yes	No	No	No	No
Other ferrous metals	No	No	No	No	No	Yes	No
Non-ferrous Beverage Containers - alcoholic	No	No	Yes	No	No	No	No
Non-ferrous Beverage Containers - non alcoholic	No	No	Yes	No	Yes	Yes	Yes
Non-ferrous Food Containers	No	No	No	No	No	No	No
Non-ferrous Aluminum trays & foil	No	No	Yes	No	No	Yes	No
Other non-ferrous metals	No	No	No	No	No	No	No
Total Metals (%)	**No**	**No**	**No**	**No**	**No**	**Yes**	**No**
Category 5 - Compostable Organics							
Food waste - Backyard Compostable	No	Yes	Yes	No	No	Yes	No
Food Waste - Kitchen Waste	No	No	Yes	No	Yes	Yes	Yes
Yard and Garden	No	No	No	No	No	Yes	No
Other organic waste	No		No	No	No	No	No
Clean, Pallets/skids	No	No		No	No	No	No
Clean, other (lumber, unpainted/untreated)	No	No	No	No	No	Yes	No
Total Compostable Organics (%)	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
Category 6 - Non-compostable Organics							
Vehicle tires	No		No	No	No	No	No
Other rubber products	No	Yes	No	No	No	No	No
Contaminated wood, Treated lumber etc.	No	Yes	Yes	No	No	No	No
Contamianted wood, Furniture	No	No	No	No	No	No	No
Other wood - Contaminated	No	No	No	No	No	No	No
Total Non-compostable Organics (%)	**No**	**Yes**	**Yes**	**No**	**No**	**No**	**No**

Table 3-3: Normalcy Test Results

	Central	Columbia Valley	Elk Valley	RDEK ALL	RDEK Commercial	RDEK Rural	RDEK Urban
Category 7 - Construction/Demolition Material							
Drywall	No	No	No	No	No	No	No
Asphalt shingles	No	No	Yes	No	No	No	No
Carpet & underlay	No	No	Yes	No	No	No	No
Masonry (bricks, blocks, concrete, ceramic)	No	No	No	No	No	No	No
Rock/sand/dirt	No	No		No	No	No	No
Other C/D wastes	No	No	No	No	No	No	No
Total Construction and Demolition (%)	**No**	**No**	**Yes**	**No**	**No**	**No**	**No**
Category 8 - Textiles							
Clothing	No	No	No	No	No	No	No
Footwear	No	No	No	No	No	No	No
Other textiles	No	Yes	Yes	No	Yes	Yes	Yes
Total Textiles (%)	**No**	**Yes**	**No**	**No**	**No**	**No**	**No**
Category 9 - Household Hygiene							
Hygiene / Sanitary products	No	No		No	No	No	No
Needles & Sharps	No	No	No	No	No	No	No
Pet waste	No	No	No	No	No	No	No
Diapers	No	Yes	Yes	No	Yes	No	Yes
Personal Care	No	No	No	No	No	No	No
Total Household Hygiene (%)	**Yes**	**Yes**	**Yes**	**No**	**No**	**Yes**	**No**
Category 10 - Household Hazardous Waste							
Fluorescent lighting - CFL (Compact Fluorescent Lamps) bulbs	No	No		No	No	No	No
Fluorescent lighting - CFL (Compact Fluorescent Lamps) tubes	No	No	No	No	No	No	No
Batteries - automotive (lead acid)	No	No		No	No	No	No
Batteries - Dry cell, alkaline, button cell, other non rechargable household batt.	No	No	No	No	No	No	No
Antifreeze	No			No	No		No
Oil - Lubricating (motor, transmission) oil, including containers	No	No	No	No	No	No	No
Oil - Empty Lubricating (motor, transmission) oilcontainers	No	No	No	No	No	No	No
Oil Filter - Automotive (include number of units)	No		No	No	No		No
Paint - Latex, including containers, PCA	No	No	No	No	No	No	No
Fertilizer	No	No		No			
Pesticides	No		No	No	No		No
Aerosols	No	Yes	No	No	No	Yes	No
Solvents	No	No	No	No	No	No	No
Pharmaceuticals, including containers	No	No		No	No	No	No
Old thermostats and switches							
Other Mercury containing items							
Other hazardous waste (record description)	No	No		No	No	No	No
Total Household Hazardous (%)	**No**	**No**	**No**	**No**	**No**	**No**	**No**
Category 11 - Electronics							
Computers and peripherals	No	No	No	No	No	No	No
TV and Audio / Video Equipment	No	No	No	No	No	No	No
Telephones and Equipment			No	No	No		No
Cell Phones	No			No	No		No
Small appliances	No	No	No	No	No	No	No
Electronic or electrical tools	No	No	No	No	No	No	No
Electronic Toys	No	No		No	No	No	No
Smoke and CO Detectors	No			No	No		No
Other Misc. Electronic - consumer	No	No	No	No	No	No	No
Other Misc. Electronic - commercial	No	No	No	No	No		No
Total Electronics (%)	**No**	**No**	**No**	**No**	**No**	**No**	**No**
Category 12 - Bulky Waste							
Bulky Waste	No	No	No	No	No	No	No
Large appliances (white goods)	No	No		No		No	
Mattresses	No	No	Yes	No	No	No	No
Total Bulky Waste (%)	**No**	**No**	**No**	**No**	**No**	**No**	**No**
Category 13 - Fines / Other							
Other Wastes	No	Yes	No	No	No	No	No
Fines / Other(%)	**No**	**Yes**	**No**	**No**	**No**	**No**	**No**

Table 3-4: Waste Composition Results

	Central	Columbia Valley	Elk Valley	RDEK (Total)	Commercial	Rural	Urban	C&D
	n = 46	n = 18	n = 14	n = 78	n = 18	n = 21	n = 37	n = 2
Category 1 - Paper and Paperboard								
Newsprint	0%	1%	1%	0.5%	0.5%	0.4%	0.6%	0.0%
Mixed Recycling Paper	0%	1%	2%	0.6%	0.5%	0.5%	0.8%	0.0%
Old Corrugated Cardboard (OCC)	2%	1%	2%	1.7%	3.0%	1.4%	1.4%	0.9%
Old Corrugated Cardboard (OCC)	1%	0%	1%	0.9%	1.6%	0.5%	0.8%	0.0%
Boxboard	2%	2%	2%	1.7%	1.5%	1.9%	1.9%	0.0%
Bound Paper Products	1%	0%	1%	0.8%	0.7%	0.4%	1.0%	0.0%
Fine Paper	1%	1%	1%	0.9%	1.7%	0.6%	0.8%	0.0%
Tissue Paper	4%	4%	4%	3.8%	4.1%	3.3%	4.0%	0.0%
Beverage containers - Drink Box / Aseptic Containers (Tetra) / Gable Top Containers	0%	0%	0%	0.1%	0.1%	0.1%	0.2%	0.0%
Beverage containers - Drink Box / Aseptic Containers (Tetra) / Gable Top Containers	0%	0%	0%	0.1%	0.1%	0.1%	0.1%	0.0%
Paper Cups	0%	0%	1%	0.4%	0.6%	0.3%	0.5%	0.0%
Other Paper	1%	1%	1%	1.2%	1.3%	0.9%	1.3%	0.0%
Total Category	**13%**	**11%**	**16%**	**13%**	**16%**	**10%**	**13%**	**1%**
Category 2 - Plastics								
Rigid Beverage Containers - Deposit	0%	0%	0%	0.4%	0.4%	0.4%	0.5%	0.0%
Rigid Beverage Containers Non-Deposit	0%	0%	0%	0.3%	0.3%	0.3%	0.3%	0.0%
Other Rigid Containers (blister packaging, plant pots, toothpaste)	3%	3%	4%	3.4%	3.1%	3.3%	3.8%	0.0%
Film Packaging	6%	7%	8%	7%	8%	5%	7%	0%
Styrofoam	1%	1%	1%	1%	2%	1%	1%	0%
Durable Plastic Products	2%	2%	3%	2%	2%	2%	2%	2%
Other	0%	0%	3%	1%	0%	0%	1%	0%
Total Category	**13%**	**13%**	**19%**	**14%**	**15%**	**12%**	**16%**	**2%**
Category 3 - Glass								
Beverage Containers - alcoholic	1%	1%	1%	1%	1%	1%	0%	0%
Beverage Containers - non alcoholic	0%	0%	0%	0%	0%	0%	0%	0%
Beverage Containers - non refundable	0%	0%	0%	0%	0%	0%	0%	0%
Food Containers	1%	1%	1%	1%	0%	1%	1%	0%
Other glass and ceramics (plate, mirrors, light bulbs, ceramics)	1%	1%	2%	1%	1%	1%	1%	0%
Total Category	**2%**	**3%**	**4%**	**3%**	**2%**	**3%**	**3%**	**0%**
Category 4 - Metals								
Beverage Containers - alcoholic	0%	0%	0%	0.0%	0.0%	0.0%	0.0%	0.0%
Beverage Containers - non alcoholic	0%	0%	0%	0.0%	0.0%	0.0%	0.0%	0.0%
Food Containers	0%	0%	1%	0.3%	0.2%	0.3%	0.4%	0.0%
Other ferrous metals	2%	3%	4%	2.9%	1.7%	3.2%	3.1%	4.7%
Non-ferrous Beverage Containers - alcoholic	0%	0%	0%	0.2%	0.1%	0.5%	0.2%	0.0%
Non-ferrous Beverage Containers - non alcoholic	0%	0%	0%	0.1%	0.1%	0.2%	0.1%	0.0%
Non-ferrous Food Containers	0%	0%	0%	0.1%	0.0%	0.2%	0.1%	0.0%
Non-ferrous Aluminum trays & foil	0%	0%	0%	0.3%	0.3%	0.2%	0.3%	0.0%
Other non-ferrous metals	1%	0%	0%	0.6%	0.6%	0.4%	0.6%	1.7%
Total Category	**4%**	**5%**	**6%**	**5%**	**3%**	**5%**	**5%**	**6%**
Category 5 - Compostable Organics								
Food waste - Backyard Compostable	7%	8%	6%	7.0%	4.7%	7.8%	8.1%	0.0%
Food Waste - Kitchen Waste	11%	10%	11%	10.7%	12.6%	8.7%	11.4%	0.0%
Yard and Garden	11%	10%	2%	9.3%	9.4%	8.7%	8.8%	25.2%
Other organic waste	0%	0%	0%	0.1%	0.0%	0.0%	0.2%	0.0%
Clean, Pallets/skids	0%	2%	0%	0.7%	1.8%	0.9%	0.0%	0.0%
Clean, other (lumber, unpainted/untreated)	2%	2%	1%	1.8%	1.3%	4.2%	0.7%	0.0%
Total Category	**31%**	**33%**	**20%**	**30%**	**30%**	**30%**	**29%**	**25%**
Category 6 - Non-compostable Organics								
Vehicle tires	0%	0%	0%	0.0%	0.1%	0.1%	0.0%	0.0%
Other rubber products	1%	1%	1%	0.9%	1.1%	0.8%	0.9%	0.0%
Contaminated wood, Treated lumber etc.	8%	3%	3%	6.0%	8.3%	9.1%	3.6%	0.0%
Contamianted wood, Furniture	1%	1%	0%	0.7%	0.5%	1.1%	0.6%	0.0%
Other wood - Contaminated	1%	0%	0%	0.4%	0.4%	0.5%	0.4%	0.0%
Total Category	**10%**	**6%**	**5%**	**8%**	**10%**	**12%**	**5%**	**0%**
Category 7 - Construction/Demolition Material								
Drywall	3%	5%	1%	3.0%	2.4%	5.2%	2.2%	0.0%
Asphalt shingles	3%	1%	2%	2.2%	0.6%	0.7%	1.2%	49.8%
Carpet & underlay	1%	2%	1%	1.5%	2.3%	1.0%	1.5%	0.0%
Masonry (bricks, blocks, concrete, ceramic)	2%	0%	2%	1.6%	3.6%	0.1%	1.6%	0.0%
Rock/sand/dirt	0%	0%	0%	0.1%	0.0%	0.0%	0.1%	0.0%
Other C/D wastes	3%	3%	2%	2.7%	4.0%	3.7%	1.6%	0.0%
Total Category	**12%**	**11%**	**9%**	**11%**	**13%**	**11%**	**8%**	**50%**

Table 3-4: Waste Composition Results

	Central	Columbia Valley	Elk Valley	RDEK (Total)	Commercial	Rural	Urban	C&D
	n = 46	n = 18	n = 14	n = 78	n = 18	n = 21	n = 37	n = 2
Category 8 - Textiles								
Clothing	2%	2%	3%	2.1%	0.7%	1.9%	3.1%	0.0%
Footwear	1%	1%	1%	0.8%	0.2%	1.1%	0.9%	0.0%
Other textiles	2%	3%	2%	1.9%	1.4%	2.1%	2.0%	1.7%
Total Category	**4%**	**6%**	**6%**	**5%**	**2%**	**5%**	**6%**	**2%**
Category 9 - Household Hygiene								
Hygiene / Sanitary products	0%	0%	0%	0.0%	0.0%	0.0%	0.0%	0.0%
Needles & Sharps	0%	0%	0%	0.2%	0.0%	0.2%	0.3%	0.0%
Pet waste	1%	2%	2%	1.7%	0.7%	1.6%	2.3%	0.0%
Diapers	3%	4%	3%	3.0%	2.3%	2.8%	3.5%	0.0%
Personal Care	0%	0%	0%	0.2%	0.0%	0.1%	0.3%	0.0%
Total Category	**4%**	**6%**	**6%**	**5%**	**3%**	**5%**	**6%**	**0%**
Category 10 - Household Hazardous Waste								
Fluorescent lighting - CFL (Compact Fluorescent Lamps) bulbs	0%	0%	0%	0.0%	0.0%	0.0%	0.0%	0.0%
Fluorescent lighting - CFL (Compact Fluorescent Lamps) tubes	0%	0%	0%	0.3%	0.0%	0.4%	0.3%	0.0%
Batteries - automotive (lead acid)	0%	0%	0%	0.1%	0.0%	0.4%	0.0%	0.0%
Batteries - Dry cell, alkaline, button cell, other non rechargable household batt.	0%	0%	0%	0.1%	0.0%	0.0%	0.1%	0.0%
Antifreeze	0%	0%	0%	0.0%	0.0%	0.0%	0.1%	0.0%
Oil - Lubricating (motor, transmission) oil, including containers	0%	0%	0%	0.1%	0.0%	0.2%	0.0%	0.0%
Oil - Empty Lubricating (motor, transmission) oil containers	0%	0%	0%	0.1%	0.0%	0.2%	0.0%	0.0%
Oil Filter - Automotive (include number of units)	0%	0%	0%	0.0%	0.0%	0.0%	0.1%	0.0%
Paint - Latex, including containers, PCA	1%	0%	0%	0.5%	1.1%	0.5%	0.2%	1.2%
Fertilizer	0%	0%	0%	0.1%	0.3%	0.0%	0.0%	0.0%
Pesticides	0%	0%	0%	0.0%	0.0%	0.0%	0.0%	0.0%
Aerosols	0%	0%	0%	0.2%	0.1%	0.2%	0.3%	0.0%
Solvents	0%	0%	0%	0.1%	0.0%	0.1%	0.0%	0.0%
Pharmaceuticals, including containers	0%	0%	0%	0.1%	0.0%	0.1%	0.0%	0.0%
Old thermostats and switches	0%	0%	0%	0.0%	0.0%	0.0%	0.0%	0.0%
Other Mercury containing items	0%	0%	0%	0.0%	0.0%	0.0%	0.0%	0.0%
Other hazardous waste (record description)	0%	0%	0%	0.2%	0.8%	0.1%	0.1%	0.0%
Total Category	**2%**	**1%**	**1%**	**2%**	**2%**	**2%**	**1%**	**1%**
Category 11 - Electronics								
Computers and peripherals	0%	0%	0%	0.0%	0.0%	0.0%	0.1%	0.0%
TV and Audio / Video Equipment	0%	1%	1%	0.4%	0.3%	0.4%	0.5%	0.0%
Telephones and Equipment	0%	0%	0%	0.0%	0.0%	0.0%	0.0%	0.0%
Cell Phones	0%	0%	0%	0.0%	0.0%	0.0%	0.1%	0.0%
Small appliances	1%	1%	2%	0.9%	0.6%	1.0%	1.1%	0.0%
Electronic or electrical tools	0%	0%	0%	0.2%	0.2%	0.3%	0.2%	0.0%
Electronic Toys	0%	0%	0%	0.0%	0.0%	0.0%	0.0%	0.0%
Smoke and CO Detectors	0%	0%	0%	0.0%	0.0%	0.0%	0.0%	0.0%
Other Misc. Electronic - consumer	0%	0%	0%	0.1%	0.0%	0.0%	0.2%	0.0%
Other Misc. Electronic - commercial	0%	0%	0%	0.0%	0.0%	0.0%	0.1%	0.0%
Total Category	**1%**	**2%**	**4%**	**2%**	**1%**	**2%**	**2%**	**0%**
Category 12 - Bulky Waste								
Bulky Waste	1%	1%	1%	1.2%	0.5%	1.5%	0.7%	13.0%
Large appliances (white goods)	0%	0%	0%	0.1%	0.0%	0.5%	0.0%	0.0%
Mattresses	0%	1%	0%	0.5%	0.1%	0.5%	0.8%	0.0%
Total Category	**2%**	**3%**	**2%**	**2%**	**1%**	**2%**	**2%**	**13%**
Category 13 - Fines / Other								
Other Wastes	2%	1%	3%	2%	1%	1%	2%	0%
Total Category	**2%**	**1%**	**3%**	**2%**	**1%**	**1%**	**2%**	**0%**
Total Sample	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

APPENDIX A
Sample Data Sheet

	Over Size Objects:	Estimated WT (kg)
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

Sample ID
Date:
Weather:
Load Source:
Subregion:
Hauling Company:
Waste Type:
Collect Area:
Truck Number:
Load Weight:
Moisture Correction (kg):

NOTES:

Secondary Category number & Descriptor			Tare Weight (kg)	Sample Weight (kg)	Material Weight (kg)
Category 1 - Paper & Paperboard					
1:1	Newsprint	Newspapers, Junk mail, flyers, unaddressed mail etc.			
1:2	Mixed Recycling Paper	Mixed recycling			
1:3	Old Corrugated Cardboard (OCC)	Clean corrugated cardboard (Recyclable)			
1:4	Old Corrugated Cardboard (OCC)	Waxed & other non-recyclable cardboard			
1:5	Boxboard	Cereal boxes etc.			
1:6	Bound Paper Products	Books, magazines, telephone books			
1:7	Fine Paper	Computer, office, etc.			
1:8	Tissue Paper	Paper Towels, Napkins, Food Contaminated Paper			
1:9	Bound Paper Products	Bound Paper Products			
1:10	Beverage containers - Drink Box / Aseptic Containers (Tetra) / Gable Top Containers	Dairy or Dairy Substitute			
1:11	Beverage containers - Drink Box / Aseptic Containers (Tetra) / Gable Top Containers	Non-Dairy / Deposit Drinking Box (Refundable)			
1:12	Paper Cups	Single Serving Drink Cups (coffee, tea, drinks, etc.)			
1:13	Other Paper	Non-Recyclable (wall paper, shiny gift bags, frozen juice containers)			
	Total Category Weight (kg)				
Category 2 - Glass					
2:1	Beverage containers	Refundable Alcoholic			
2:2	Beverage containers	Refundable Non-Alcoholic			
2:3	Beverage containers	Non-Refundable			
2:4	Food Containers	Pickles, olives, canning etc.			
2:5	Other Glass	Includes ceramics, mirrors, fiberglass insulation etc.			
	Total Category Weight (kg)				
Category 3 - Ferrous Metals					
3:1	Beverage containers	Alcoholic			
3:2	Beverage containers	Non Alcoholic			
3:3	Food Containers				
3:4	Large Metal Appliances	White goods			
3:5	Other Ferrous Metals				
	Total Category Weight (kg)				
Category 4 - Non-ferrous Metals (Copper, Aluminum, Brass)					
4:1	Beverage containers	Alcoholic (aluminum cans)			
4:2	Beverage containers	Non Alcoholic (aluminum cans)			
4:3	Food Containers				
4:4	Aluminum trays & foil				
4:5	Other non-ferrous materials	Non-ferrous (copper, aluminum, brass)			
	Total Category Weight (kg)				
Category 5 - Plastics					
5:1	Rigid Beverage Containers	Deposit (Juice, Pop, Alcohol)			
5:2	Rigid Beverage Containers	Non-Deposit (milk/milk substitute)			
5:3	Other Rigid Containers	All Other - (blister packaging, plant pots, toothpaste, deodorant)			
5:4	Film	Plastic bags, stretch wrap etc.			
5:5	Durable Plastic Products	Non-packaging (VCR tapes, CDS, toys, Tupperware, garden hose, lawn furniture			
5:6	Other	Other			
	Total Category Weight (kg)				
Category 6 - Organic Waste					
6:1	Food Waste	Backyard compostable (e.g. fruits, vegetables, egg shells, coffee)			
6:2	Food Waste	Kitchen Waste (cooked food, meat, seafood, dairy, pasta, bread etc.)			
6:3	Yard and Garden	Leaves Branches, Grass Clippings			
6:4	Other Organic Waste				
	Total Category Weight (kg)				
Category 7 - Wood & Wood Products					
7:1	Clean wood	Pallets / Skids (untreated)			
7:2	Clean wood	Other (lumber, rotting wood, unpainted/untreated)			
7:3	Contaminated Wood	Treated Wood (lumber, shingles etc.)			
7:4	Contaminated Wood	Furniture			
7:5	Contaminated Wood	Other			
	Total Category Weight (kg)				
Category 8 - Construction/Demolition Material					
8:1	Gypsum / Drywall				
8:2	Asphalt Shingles				
8:3	Carpet & Underlay				
8:4	Masonry	Bricks, blocks, concrete, ceramics			
8:5	Rock/Sand/Dirt				
8:6	Other Demo				
	Total Category Weight (kg)				
Category 9 - Textiles					
9:1	Textiles	Clothing			
9:2	Textiles	Footwear			
9:3	Textiles	Other Textiles			
	Total Category Weight (kg)				
Category 10 - Rubber					
10:1	Rubber	Vehicle Tires			
10:2	Rubber	Other rubber products			
	Total Category Weight (kg)				
Category 11 - Hazardous Wastes (RECORD UNITS AND VOLUME)					
11:1	Lighting	Compact Fluorescent Lamps - bulbs or tubes			
11:2	Lighting	All electronic or electrical lighting (bulbs, lamps, fixtures and flashlights) but not including fluorescent light bulbs or lamps for residential use			
11:3	Batteries	Automotive (lead acid)			
11:4	Batteries	Dry cell, alkaline, button cell, other non rechargeable household batteries			
11:5	Household Hazardous Waste	Antifreeze			
11:6	Household Hazardous Waste	Lubricating Oil **(with liquid)** Motor, transmission etc., including containers - assess volume			
11:7	Household Hazardous Waste	**EMPTY** Lubricating Oil Motor, transmission etc. include number of units			
11:8	Household Hazardous Waste	Automotive Oil Filters - include number of units			
11:9	Household Hazardous Waste	Paint			
11:10	Household Hazardous Waste	Fertilizer			
11:11	Household Hazardous Waste	Pesticides Incl. container, estimate quantity left in container			
11:12	Household Hazardous Waste	Aerosols			
11:13	Household Hazardous Waste	Solvents			
11:14	Household Hazardous Waste	Pharmaceuticals			
11:15	Medical / Biological	Needles and sharps			
11:16	Mercury Containing Items	Old Thermostats and switches			
11:17	Mercury Containing Items	Household Hygiene			
11:18	Mercury Containing Items	Other Mercury containing items, including Thermometers etc.			
11:19	Other Hazardous Waste	Record Description			
	Total Category Weight (kg)				
Category 12 - Electronics (COUNT UNITS)					
12:1	Computers and peripherals	Desktop computers, laptops, exclude handheld			
12:2	TV and Audio / Video Equipment				
12:3	Telephones and Equipment	Notebook computers (Portable but excludes handheld devices)			
12:4	Cell Phones	Incl. personal digital assistants and pagers			
12:5	Small appliances				
12:6	Electronic or electrical tools				
12:7	Electronic Toys				
12:8	Smoke and CO Detectors				
12:9	Other Misc. Electronic - consumer				
12:10	Other Misc. Electronic - commercial				
	Total Category Weight (kg)				
Category 13 - Other					
13:1	Diapers				
13:2	Pet Waste				
13:3	Bulky Waste	Furniture Etc.			
13:4	Mattresses				
13:5	Cosmetics				
13:6	Other wastes	Fines, dental floss etc.			
	Total Category Weight (kg)				
	Total Sample Weight (kg)				