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DILLON CONSULTING

Prepared for:
Metro Vancouver
Prepared by:
Dillon Consulting Limited

METRO VANCOUVER

2022 Construction & Demolition Waste Composition Study

October 2023 – 21-2946

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October 5, 2023

Metro Vancouver
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Attention: Terry Fulton
Senior Project Engineer – Solid Waste Services, Metro Vancouver

Metro Vancouver Waste Composition Study – Construction and Demolition Audit

Dear Terry:

Dillon Consulting Limited (Dillon) is pleased to submit this final report to Metro Vancouver for the Metro Vancouver Waste Composition Study – Construction and Demolition Audit (Project D, 2022) completed at the Vancouver Landfill (VLF) and Ecowaste Landfill (Ecowaste). As outlined in our work plan, this report presents the waste composition study results, an analysis by sector, and a comparison of previous composition data acquired through Waste Composition Monitoring Program reports from previous years. The audit data containing composition for all categories for samples assessed at VLF, Ecowaste, and out-of-region is included as **Appendix D**.

Sincerely,

DILLON CONSULTING LIMITED

Heidi Gerlach, EP, Associate
Project Manager

KH:tjs

Our file: 21-2946

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Executive Summary

Dillon was retained by Metro Vancouver to conduct the 2022 Construction & Demolition Waste Composition Study. Sampling was completed at the Vancouver Landfill (VLF) and Ecowaste Landfill (Ecowaste) over two weeks from September to October 2022. The purpose of the study was to characterize the composition of construction and demolition (C&D) waste disposed in the region in order to develop a better understanding of the C&D waste sector. C&D waste loads entering the VLF and Ecowaste were visually assessed to determine the material composition by volume. Percent volumes recorded during the visual composition assessment were multiplied by the densities provided by Metro Vancouver to produce estimates of the weight percentages for each material category.

In 2021, approximately 372,000 tonnes of C&D waste were disposed in Metro Vancouver. C&D waste accounts for approximately one-third of the waste disposed in the region. The results presented in this study are a snapshot of the C&D waste sector in 2022.

In addition to assessments of C&D waste samples, short interviews were completed with the haulers of selected samples to determine the C&D activity source and municipality of origin of the C&D waste load. C&D waste loads were sampled and visually assessed from the following C&D activity sources:

- Transfer station reloads;
- Residential demolition;
- Residential construction;
- Land clearing;
- Manufacturing; and
- Other (including mixed source loads).

Overall, 147 samples with a total weight of 2,048 tonnes of C&D waste were visually assessed to determine the C&D waste composition. One hundred and fifty (150) samples were assessed; however, it was determined that three samples of fill material from Ecowaste were misidentified as C&D loads, and subsequently removed from the results. The average C&D waste sample weighed 19,475 kg at VLF, and 10,614 kg at Ecowaste. C&D waste was visually assessed into 18 primary material categories and a total of 59 subcategories. **Executive Summary Table 1** presents the combined C&D waste composition for the region.

Executive Summary Table 1: Combined Regional C&D Waste Composition

Material Category	Average % by Volume[1]	Average % by Weight[1]	Estimated Annual Weight (tonnage)
Wood	44%	48%	177,011
Land Clearing	7%	4%	14,944
Paper	5%	2%	6,168
Plastics	14%	10%	35,674
Concrete	2%	2%	7,593
Metals	3%	4%	13,044
Masonry	0%	2%	7,316
Asphalt	3%	6%	21,407
Miscellaneous Building Material[2]	9%	6%	22,880
Glass and Ceramics	1%	2%	6,674
Rubble/Soil	2%	6%	22,779
Fines	0%	0%	0
Household Garbage	7%	5%	19,956
Textiles	1%	1%	3,529
Bulky Items	2%	1%	5,005
Rubber	1%	2%	6,244
Miscellaneous	1%	<1%	1,757
Total[1]	**100%**	**100%**	**371,972**

[1]Percentages may not sum to 100% due to rounding.

2 Miscellaneous Building Materials included items that could not be identified within the other material categories (carpet, insulation, drywall) of this study.

Overall, wood, plastics and asphalt comprised the largest proportion of all disposed material in the region by weight;

- **Wood** comprised 48% of the estimated C&D waste disposed by weight;
- **Plastics** comprised 10% of the estimated C&D waste disposed by weight;
- **Asphalt** (primarily tar and gravel roofing) comprised 6% of the estimated C&D waste disposed by weight;
- **Rubble/Soil** comprised 6% of the sample by weight; and
- **Miscellaneous Building Materials** comprised 6% of the sample by weight.

1.0 Introduction

1.1 Background

Metro Vancouver provides essential services and planning for British Columbia's lower mainland region, including solid waste management for approximately 2.8 million people across 21 municipalities, one electoral area, and one treaty First Nation.

In 2021, approximately 372,000 tonnes of construction and demolition (C&D) waste was disposed in Metro Vancouver. It is estimated that C&D waste accounts for one-third of the waste generated in the region. Waste material generated from C&D activities that cannot be recovered or recycled is disposed at the Vancouver Landfill (VLF), Ecowaste Landfill (Ecowaste), and other solid waste facilities that are licensed to handle C&D waste. This study aims to provide current data on the C&D waste sector, and to develop a better understanding of the composition and disposal rates of C&D waste within Metro Vancouver.

Metro Vancouver has previously completed three C&D waste composition studies, in 2011, 2015, and 2018. This study uses a similar methodology to the studies performed in 2015 and 2018. The sampling plan was based on previous studies and developed with Metro Vancouver. The sampling set was expanded by 50 samples compared to studies completed in 2015 and 2018; however, data collection was limited by availability of inbound C&D waste loads at the sampling locations assessed, resulting in more samples being collected at Ecowaste.

1.2 Scope of Work

The study involved the visual assessment of 150 samples of C&D waste between two sampling locations, the VLF and the Ecowaste, over a 2-week period in September and October 2022. Three samples of fill material from Ecowaste were removed from the sample set as they were misidentified as C&D loads; therefore, the results of 147 samples are included in this study. The assessment schedule was decided by Metro Vancouver and is summarized in **Table 1**.

Table 1: Sampling Locations and Dates

Location	Sample Dates
VLF	September 26 to 29
Ecowaste	October 3 to 10

Fifty-five (55) C&D waste loads from VFL and ninety-two (92) C&D waste loads from Ecowaste were sampled and analyzed. The sample distribution and total sample tonnages for each sampling location is summarized in **Table 2**. This study also reviewed tonnages associated with out of region waste. Out of Region refers to C&D waste that is disposed outside of the geographical boundaries of Metro Vancouver Regional District. It should be noted that these loads were not visually assessed.

Table 2: Sample Distribution

Location	Number of Samples	Total Sample Weight (tonnes)	Average Sample Weight (tonnes)
VLF	55	1,071	19
Ecowaste	92	977	11

2.0 Methodology and Work Plan

The study methodology was developed with the objective of representing the current state of the C&D waste sector through the data collection of each sample's source and waste composition. Additionally, the visual assessments were conducted to effectively determine the waste composition of large volumes of C&D waste that would be impractical to manually sort and weigh.

2.1 Sampling Plan and Approach

The sampling plan was developed in conjunction with Metro Vancouver to capture an up-to-date snapshot of the diversity of C&D waste occurring throughout the region in an unbiased manner. Samples were collected on site at VLF and Ecowaste as these facilities receive all C&D material within the region; therefore, the inbound waste at these facilities would provide the most representative waste samples of the C&D waste sector in Metro Vancouver. During the audit every second C&D hauler that arrived at each facility was selected for sample collection and assessment. For every C&D hauler that was selected for sample collection, the drivers were interviewed by field staff to determine the source of the C&D activity related to their waste load. They were additionally asked for the municipality of origin, vehicle license plate, truck ID, total bin capacity, and estimated percent fullness of the vehicle. The C&D activity for each sample obtained from C&D hauler interviews are summarized in
Table 3.

After the interview, haulers were instructed to drive forward while tipping the C&D load to spread the material as much as possible. When possible, the waste loads were further spread by a loader or excavator, operated by facility staff, to maximize the visibility of the materials disposed. The additional spreading of assessed loads was limited to the availability of facility staff. All material within each load was considered part of the sample and audited. The scale tickets of each hauler selected for sample selection was obtained to determine the weight of the waste load.

2.2 Visual Composition Assessment

For each sampled C&D waste load, the waste composition audit was visually assessed according to a material category list developed by Metro Vancouver. The material category list was structured into primary categories, representing the materials within C&D waste, and secondary categories, representing the items or products within each primary category. Each of the secondary categories were assigned a functional group which represented the end fate, management paradigm, or potential for salvage for the material category. The material category list is included in **Appendix A**.

The visual composition assessment was performed by two auditors that identified and estimated percent material composition, working independently before combining their results by consensus to determine the primary category and secondary category data recorded. The visual assessment process

began with identifying the primary categories present in the sample, followed by estimating the percent volume of the sample that consisted of each identified primary category. In a similar manner, the secondary categories were determined by examining each of the identified primary categories and estimating the percent volume of each identified secondary category. Auditors practiced this process through training sessions and on-site, prior to collecting data, to ensure the procedure was performed consistently. The duration of the visual composition assessment process was 30 minutes per sample on average.

The dimensions (length, width, and height) of the sample were estimated by counting the paces required to walk along the length and width of the sample and converting the number of paces into meters, while the height of the sample was visually estimated. Notes were made on the compaction of any material in a sample, and density values were adjusted accordingly for that material category during data analysis.

Photographs of each waste load collected for sampling were captured. Selected site photographs can be found in **Appendix B**.

2.3 Data Analysis and Statistical Evaluation

Data from the visual composition assessment was recorded on paper data sheets and later digitized into spreadsheets for analysis. Waste hauler interviews were recorded digitally. Each sample was assigned a sample number to link the visual composition assessment and waste hauler interview data into a common spreadsheet for analysis.

The densities for each of the material categories assessed was determined by Metro Vancouver based on collected data and calculated densities reported in previous C&D studies, with the application of published US EPA volume-to-weight conversion factors[1]. The list of densities of the material categories can be found in **Appendix C**. Percent volumes recorded during the visual composition assessment were multiplied by the densities provided by Metro Vancouver to produce estimates of the weight percentages for each material category. The out-of-region waste results were calculated by isolating transfer station reload samples from VLF, and Ecowaste, and following the steps described above. Thirty-one (31) transfer station reload samples (15 from VLF, and 16 from Ecowaste) were used to determine out-of region waste results. This method of calculating out-of-region waste results is new in 2022 and was adopted because transfer station reloads are better representation of out-of-region waste. Since they are visually audited, actual sample information is used. In previous years, out-of-region waste results were calculated based on weight percentages estimated from sample data collected at Ecowaste to represent the waste composition of C&D waste disposed at other private facilities. The estimated annual weights for each category were calculated by multiplying the percent

[1] U.S. EPA, Volume-to-Weight Conversion Factors. (Office of Resource Conservation and Recovery, 2016)

weights for each category with the 2021 annual tonnages at VLF, Ecowaste, and out-of-region landfill data provided by Metro Vancouver.

The visibility of material in a sample waste load was represented by a volume-to-surface area (VSA) ratio calculated from the estimated dimensions of each sample. This required each sample to be treated as rectangular-shaped; however, non-rectangular-shaped waste loads were noted during data collection. Due to the rectangular shape of vehicle bins and waste unloading methods, which varied by vehicle type, the majority of waste loads were, in fact, rectangular. The visibility of material was analyzed to account for the impacts of the varying sizes of the waste loads, in addition to the spreading of loads by loaders or excavators on the amount of material accessible for the visual composition assessment.

The estimated weights for each sample, calculated from the material densities and estimated volumes, were compared to load weights recorded from the scale tickets to assess the accuracy of the method used to collect the visual composition assessment data. The 90% confidence interval was calculated for each material category across the entire dataset.

3.0 C&D Waste Results

The C&D waste composition results are presented in the following sections as weighted average percentages by primary material categories and functional group. The primary material categories represent the constituent contents of the C&D waste samples. Functional group categories were assigned to each material category to describe the end fate, management paradigm, or salvage potential of the material. Results were weighted by combining all sample data. All percentages in the following sections are the percentage of material categories or functional group of the sample contents in relation to the total weight of sampled C&D waste. In this section, the primary category of household garbage includes waste that was contained within opaque black garbage bags that could not be further identified.

Table 3 is a summary of the C&D activity source for the samples audited at each sorting location. The C&D activity sources were obtained through on-site interviews, conducted by auditors with waste hauler drivers (See Section 2.1).

Table 3: C&D Activity Sources of Samples

C&D Activity Source	VLF	Ecowaste	Total	Net Weight (tonnes)
Transfer Station Reload	15	16	31	588
Residential Demolition	40	24	64	1,076
Residential Construction	-	12	12	86
Land Clearing	-	9	9	40
Manufacturing[1]	-	2	2	7
Other	-	29	29	239
Total	**55**	**92**	**147**	**2,064**

[2]C&D materials generated within the manufacturing sector.

Table 4 is a summary of the total C&D waste disposed in 2021 at VLF, Ecowaste, and out-of-region. The annual tonnages at each landfill, provided by Metro Vancouver, were used to calculate the estimated annual waste generated and per capita disposal rates for C&D waste from the estimated percent weight composition for each material category.

Table 4: Total C&D Waste Disposed (2021)

Location	Weight (tonnes)
VLF	118,046[1]
Ecowaste	178,504
Out-of-Region[2]	75,422
Total	**371,972**

[1] The Vancouver Landfill reported 29,635 tonnes of C&D material in its 2021 Annual Report. The tonnage reported in this table also includes 88,411 tonnes of material considered "demo garbage".

[2] Out of Region refers to C&D waste that is disposed outside of the geographical boundaries of Metro Vancouver Regional District.

The visibility of material for visual composition assessment was represented by a volume-to-surface area ratio (VSA). As a ratio, the VSA values for each sample ranged from 0.1: good material visibility, to 1.0: poor material visibility; consequently, samples can be grouped and ranked by VSA ratio value in increments of 0.1. The sample set contained 22 out of 147 sampled C&D waste loads (<15%) with a VSA ratio above 0.5 (indicates less than moderate visibility). **Figure 1** presents the overall sample distribution by VSA ratios. **Table 5** summarizes the VSA ratios of the samples collected.

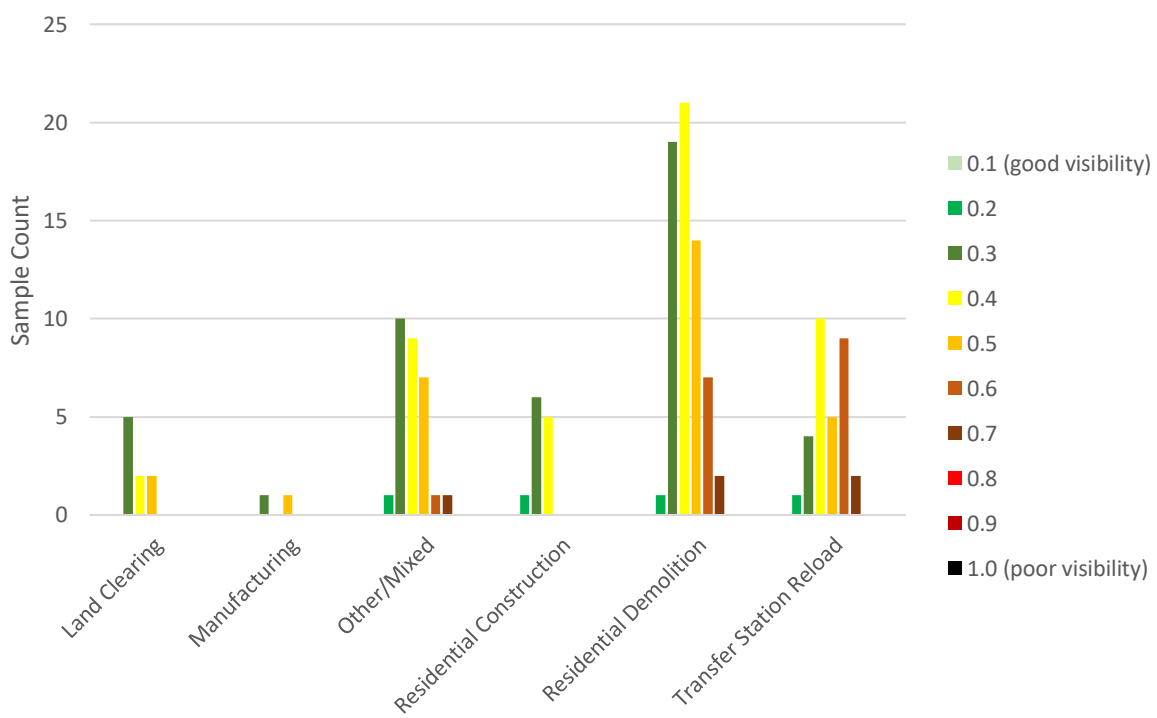

Figure 1: Sample Distribution of Volume-to-Surface Area Ratios

Table 5: Distribution of Volume-to-Surface Area Ratios

	Volume-to-Surface Area Ratio Increments						
	0.2	**0.3**	**0.4**	**0.5**	**0.6**	**0.7**	**Total**
Land Clearing		5	2	2			**9**
Manufacturing		1		1			**2**
Other/Mixed	1	10	9	7	1	1	**29**
Residential Construction	1	6	5				**12**
Residential Demolition	1	19	21	14	7	2	**64**
Transfer Station Reload	1	4	10	5	9	2	**31**
Total	**4**	**45**	**47**	**29**	**17**	**5**	**147**

3.1 Vancouver Landfill C&D Waste Composition Results

Figure 2 presents the C&D waste composition by primary category for waste loads sampled at VLF. The largest component within the C&D waste was wood (65%), followed by plastics (6%) and the following 4 materials (all at 4%): metals, asphalt, rubble/soil, and miscellaneous building material, such as carpet, linoleum and laminate flooring, and insulation.

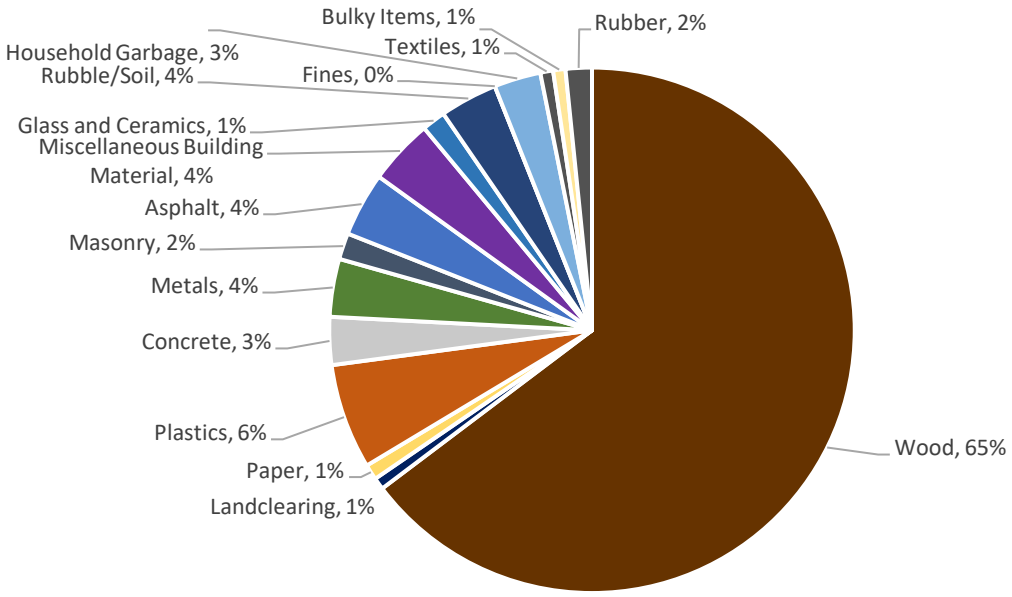

Figure 2: C&D Waste Composition at VLF

Table 6 is a summary of the results for the C&D waste composition at VLF. Results for all 59 material categories are included in **Appendix D**.

Table 6: C&D Waste Composition at VLF

Material Category	Average % by Volume	Average % by Weight	Estimated Annual Weight (tonnage)
Wood	63%	65%	76,395
Land Clearing	2%	1%	858
Paper	3%	1%	1,123
Plastics	8%%	6%%	7,656
Concrete	2%	3%	3,473
Metals	3%	4%	4,205
Masonry	1%	2%	1,908
Asphalt	2%	4%	4,652
Miscellaneous Building Material	7%	4%	4,758
Glass and Ceramics	1%	1%	1,714
Rubble/Soil	1%	4%	4,186
Fines	0%	0%	0
Household Garbage	4%	3%	3,391
Textiles	1%	1%	930
Bulky Items	1%	1%	890
Rubber	1%	2%	1,906
Miscellaneous	0%	0%	0
Total[1]	**100%**	**100%**	**118,046**

[1]Percentages may not sum to 100% due to rounding.

Given that wood is the largest primary category of C&D waste disposed by volume and weight, a secondary waste category analysis was completed on this material category (**Figure 3**). The majority of wood waste at VLF was dimensional lumber (32%) and composite plywood (21%).

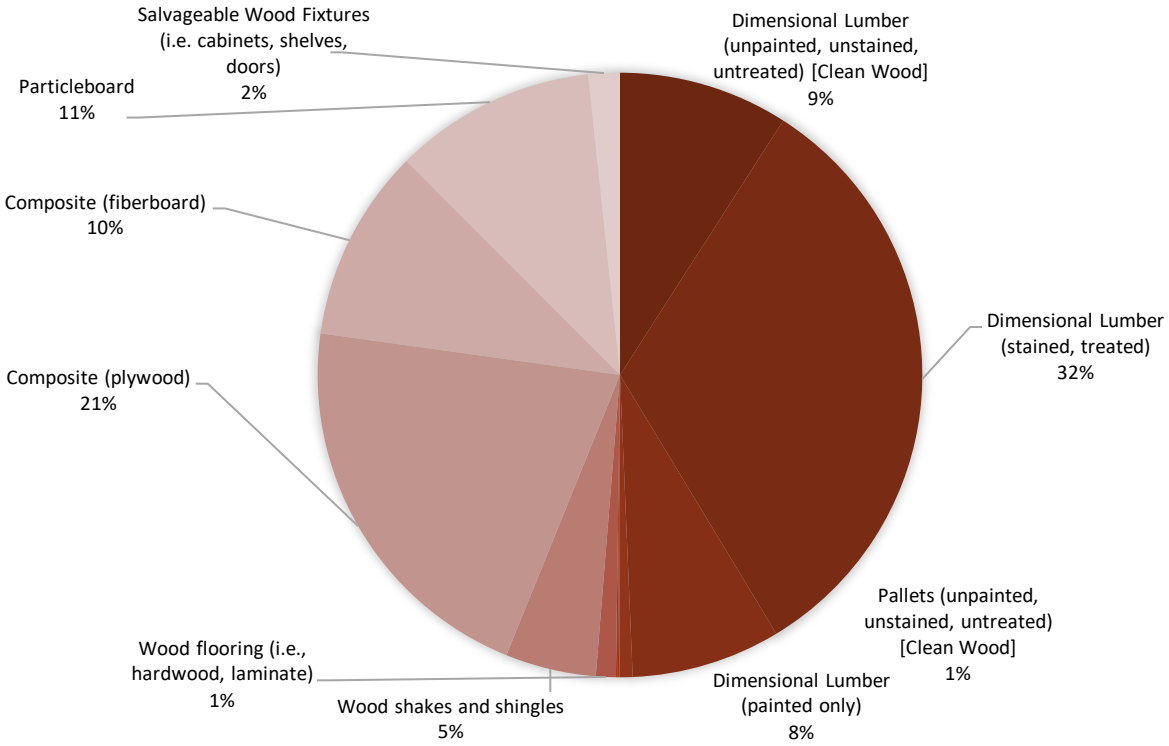

Figure 3: Woodwaste Composition at VFL

Figure 4 presents the C&D waste composition by functional group for waste loads sampled at VLF. By functional groups, C&D waste materials were found to be limited recycling (66%), recycling (30%), or salvage (4%). The limited recycling functional group refers to materials that may not be commonly recyclable at local facilities, such as plastic construction materials.

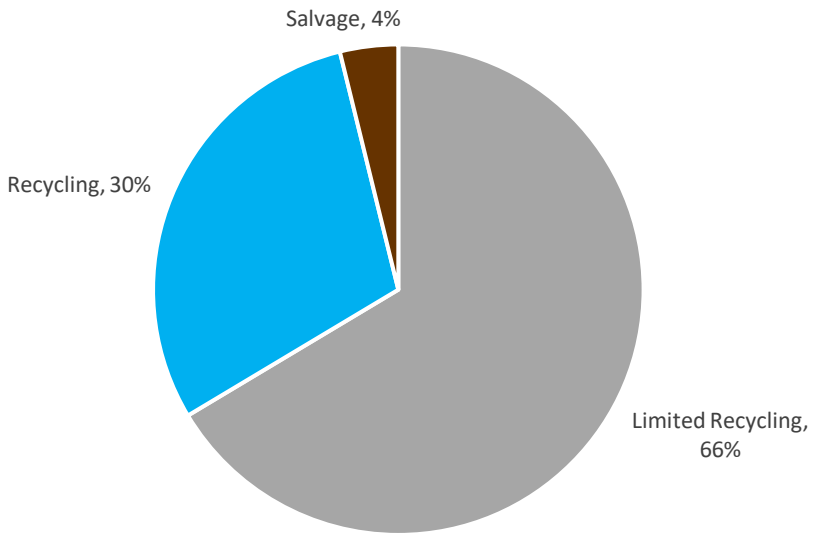

Figure 4: C&D Waste Composition at VLF by Functional Group

3.1.1 Vancouver Landfill Historical Results Comparison

Table 7 is a summary of the results for the C&D waste composition from 2011, 2015, 2018, and 2022 at VLF.

Table 7: Historical Estimated C&D Waste Composition at VLF

Material Category	2011	2015	2018	2022[1]	2011	2015	2018	2022[1]	2011	2015	2018	2022[1]
	% by Weight				% by Volume				Estimated Annual Weight (tonnes)			
Wood	61%	90%	87%	65%	66%	88%	87%	63%	117,915	112,292	110,096	76,395
Land Clearing	2%	1%	<1%	1%	3%	2%	<1%	2%	3,567	1,538	308	858
Paper	<1%	<1%	<1%	1%	<1%	<1%	<1%	3%	24	48	89	1,123
Plastics	1%	<1%	4%	6%	2%	2%	3%	8%	2,625	1,892	5,190	7,656
Concrete	5%	<1%	1%	3%	<1%	4%	<1%	2%	9,147	332	1,079	3,473
Metals	2%	2%	2%	4%	2%	2%	3%	3%	2,962	506	3,075	4,205
Masonry	2%	<1%	<1%	2%	2%	<1%	<1%	1%	2,962	506	540	1,908
Asphalt	6%	3%	2%	4%	5%	2%	1%	2%	12,300	3,128	2,077	4,652

Material Category	2011	2015	2018	2022[1]	2011	2015	2018	2022[1]	2011	2015	2018	2022[1]
	% by Weight				% by Volume				Estimated Annual Weight (tonnes)			
Misc. Building Material	<1%	2%	1%	4%	<1%	3%	4%	7%	4,360	1,840	1,335	4,758
Glass and Ceramics	<1%	0%	<1%	1%	<1%	0%	0%	1%	821	62	75	1,714
Rubble/Soil	18%	1%	2%	4%	11%	<1%	1%	1%	3,567	1,538	1,945	4,186
Household Garbage	<1%	<1%	<1%	3%	<1%	<1%	<1%	4%	80	201	109	3,391
Textiles	<1%	<1%	<1%	1%	<1%	<1%	<1%	1%	98	173	161	931
Bulky Items	<1%	<1%	0%	1%	<1%	<1%	<1%	1%	98	168	53	890
Rubber	<1%	<1%	<1%	2%	<1%	0%	<1%	2%	127	106	286	1,906
Miscellaneous	<1%	0%	<1%	0%	<1%	0%	<1%	0%	141	0	95	0
Total[2]	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**160,794**	**124,330**	**126,513**	**118,046**

[1]In 2022, sampling locations changed to include more a higher proportion of transfer station reload samples compared to previous years, resulting in a lower overall percentage of wood and more household garbage.

[2]Percentages may not sum to 100% due to rounding.

The largest component of disposed waste by weight was wood, at 76,395 tonnes estimated to be disposed in 2022. The greatest change in proportion of C&D waste composition was also wood, decreasing from 87% by weight in 2018 to 65% in 2022.

3.2 Ecowaste Landfill C&D Waste Composition Results

Figure 5 presents the C&D waste composition by primary category for waste loads sampled at Ecowaste. The largest components within the C&D waste were wood (42%), followed by plastics (9%), asphalt (primarily tar and gravel roofing) (8%), rubble/soil (7%), and land clearing (7%).

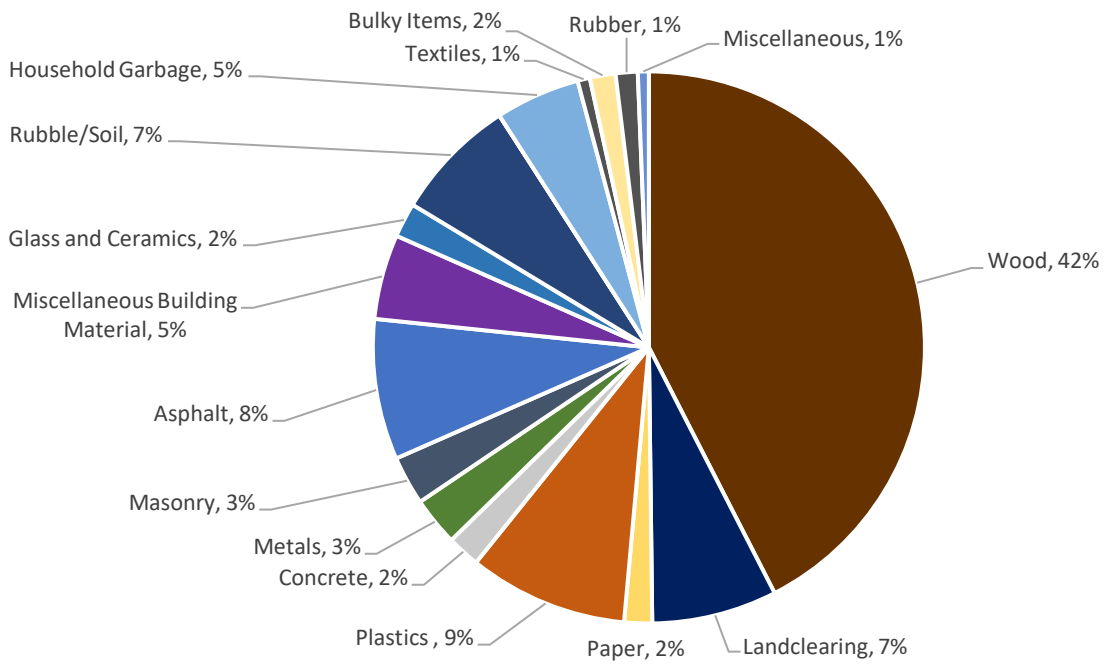

Figure 5: C&D Waste Composition at Ecowaste

Table 8 is a summary of the results for the C&D waste composition at Ecowaste. Results for all 59 material categories are included in **Appendix D**.

Table 8: C&D Waste Composition at Ecowaste

Material Category	Average % by Volume	Average % by Weight	Estimated Annual Weight (tonnage)
Wood	38%	42%	75,807
Land Clearing	12%	7%	13,098
Paper	6%	2%	2,912
Plastics	14	9	16,671
Concrete	2%	2%	3,434
Metals	3%	3%	5,093
Masonry	<1%	3%	5,103

Material Category	Average % by Volume	Average % by Weight	Estimated Annual Weight (tonnage)
Asphalt	4%	8%	14,717
Miscellaneous Building Material	8%	5%	8,877
Glass and Ceramics	1%	2%	3,210
Rubble/Soil	2%	7%	12,919
Fines	0%	0%	0
Household Garbage	7%	4%	8,844
Textiles	1%	1%	1,285
Bulky Items	2%	2%	2,686
Rubber	1%	1%	2,304
Miscellaneous	1%	1%	1,146
Total[1]	**100%**	**100%**	**178,504**

[1]Percentages may not sum to 100% due to rounding.

Given that wood is the largest primary category of C&D waste disposed by volume and weight, a secondary waste category analysis was completed on this material category (**Figure 6**). Woodwaste at Ecowaste was comprised largely of salvageable wood fixtures (20%) and stained and/or treated dimensional lumber (stained/treated) (15%).

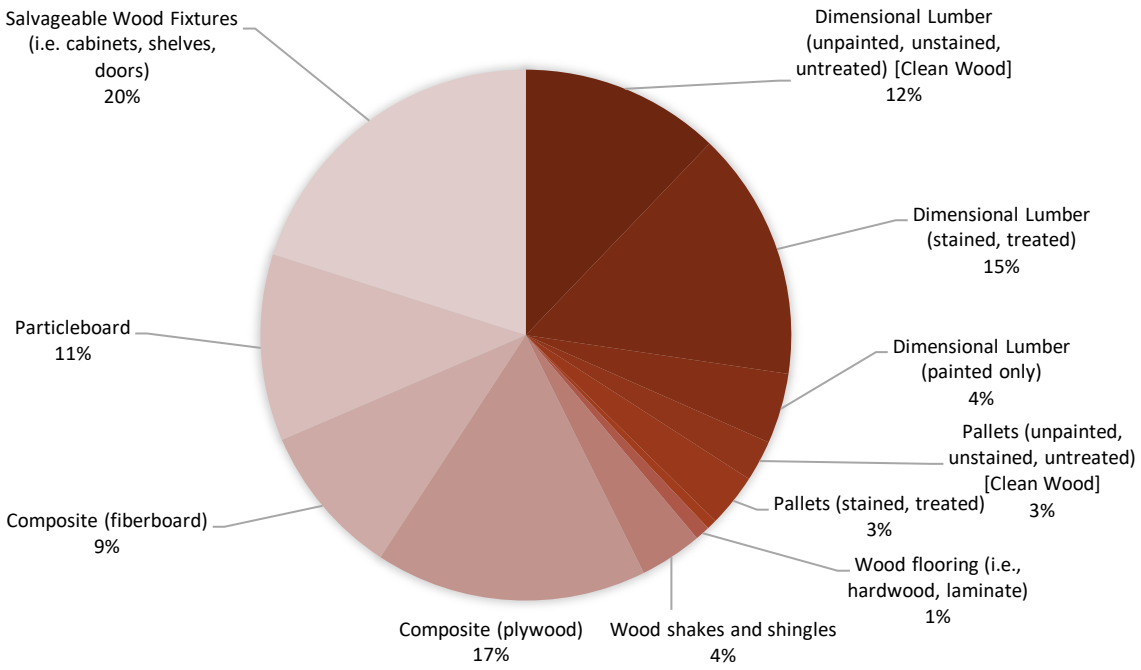

Figure 6: Woodwaste Composition Ecowaste

Figure 7 presents the C&D waste composition by functional group for waste loads sampled at Ecowaste. By functional groups, C&D waste materials were found to be: recycling (45%), limited recycling (44%), or salvage (12%).

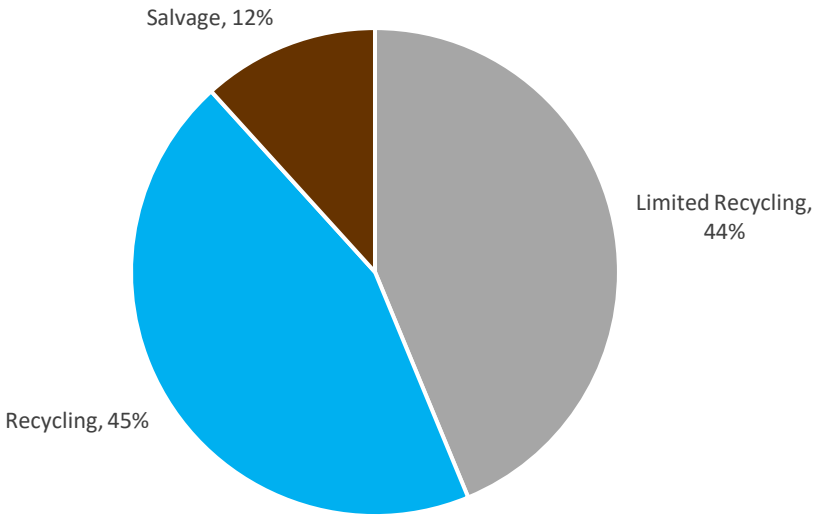

Figure 7: C&D Waste Composition at Ecowaste by Functional Group

3.2.1 Ecowaste Landfill Historical Results Comparison

Table 9 is a summary of the results for the C&D waste composition from 2011, 2015, 2018, and 2022 at Ecowaste.

Table 9: Historical Estimated C&D Waste Composition at Ecowaste

Material Category	2011	2015	2018	2022[1]	2011	2015	2018	2022[1]	2011	2015	2018	2022[1]
	% by Weight				% by Volume				Estimated Annual Weight (tonnes)			
Wood	37%	41%	47%	42%	37%	34%	45%	38%	32,038	77,726	97,322	75,807
Land Clearing	1.0%	2.4%	0.7%	7%	2%	4.1%	1.6%	12%	924	4,558	1,443	13,098
Paper	<1%	2%	2%	2%	<1%	6%	6%	6%	330	4,442	4,949	2,912
Plastics	10%	9%	9%	9%	16%	18%	13%	14%	8,554	16,305	31,753	16,671
Concrete	4%	<1%	<1%	2%	4%	<1%	<1%	2%	3,744	155	206	3,434
Metals	1%	2%	5%	3%	2%	3%	3%	3%	1,093	4,230	10,722	5,093
Masonry	<1%	<1%	1%	3%	<1%	<1%	1%	<1%	67	546	2,680	5,103
Asphalt	12%	13%	7%	8%	9%	9%	4%	4%	10,423	25,319	13,609	14,717
Misc. Building Material	6%	10%	5%	5%	13%	12%	13%	8%	5,266	18,747	11,134	8,877

Material Category	2011	2015	2018	2022[1]	2011	2015	2018	2022[1]	2011	2015	2018	2022[1]
	% by Weight				% by Volume				Estimated Annual Weight (tonnes)			
Glass and Ceramics	1%	1%	3%	2%	1%	<1%	4%	1%	1,280	2,466	5,567	3,608
Rubble/Soil	20%	9%	9%	7%	11%	3%	4%	2%	17,442	17,510	18,557	12,919
Household Garbage	2%	2%	2%	5%	2%	2%	3%	7%	1,415	3,667	4,536	8,844
Textiles	<1%	2%	<1%	1%	<1%	2%	1%	1%	561	4,129	825	1,285
Bulky Items	<1%	3%	1%	2%	<1%	3%	1%	2%	325	4,684	1,856	2,686
Rubber	<1%	1%	<1%	1%	<1%	1%	<1%	1%	291	1,803	825	2,304
Miscellaneous	3%	2%	<1%	1%	3%	3%	<1%	1%	2,565	4,192	206	1,146
Total[2]	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**86,318**	**190,479**	**206,191**	**178,504**

[1] In 2022, sampling locations changed to include a higher proportion of transfer station reload samples compared to previous years, resulting in a lower overall percentage of wood and more household garbage

[2]Percentages may not sum to 100% due to rounding.

The largest component of disposed waste by weight was wood, at 75,807 tonnes estimated to be disposed in 2022. The greatest change in proportion of C&D waste composition was:

- land clearing, increasing from 0.7% in 2018 to 7% in 2022,
- wood, decreasing from 47% in 2018 to 42% in 2022, and
- household garbage, increasing from 2% in 2018 to 5% in 2022.

3.3 Regional C&D Waste Composition Results

The results presented in this section includes the C&D waste composition from out-of-region disposal. The out-of-region percent weight results were calculated using the same method for VLF and Ecowaste after identifying and isolating transfer station reload samples from VLF and Ecowaste. Annual weights were calculated from 2021 tonnage data provided by Metro Vancouver. The regional average results presented in this section were calculated by weighting the C&D tonnages from VLF, Ecowaste, and out-of-region to represent the C&D waste disposed across the region.

Figure 8 presents the C&D waste composition by primary category for waste loads in the region. The largest components calculated for a regional C&D waste outlook were wood (48%), followed by plastic (10%) and miscellaneous building material (6%).

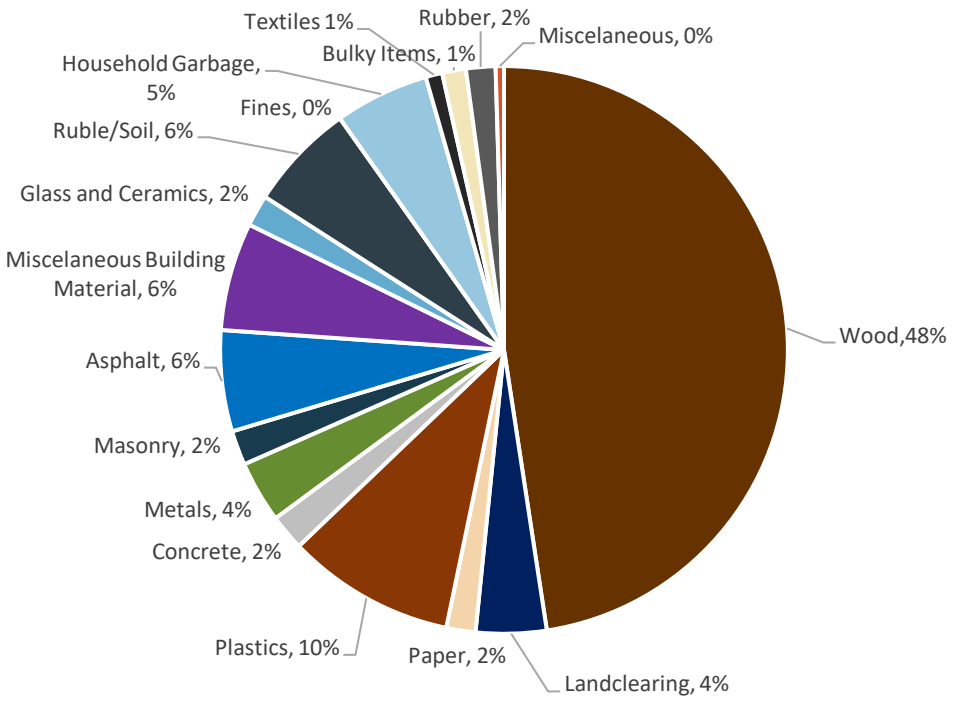

Figure 8: Regional C&D Waste Composition

Table 10 is a summary of the results for the C&D waste composition in the region.

Table 10: Regional C&D Waste Composition

Material Category	VLF		Ecowaste		Out-of-Region		Regional Average	
	% by Weight	Annual Weight (tonnes)	% by Weight	Annual Weight (tonnes)	% by Weight	Annual Weight (tonnes)	% by Weight	Annual Weight (tonnes)
Wood	65%	76,395	42%	75,807	33%	24,809	48%	177,011
Land Clearing	1%	858	7%	13,098	1%	988	4%	14,944
Paper	1%	1,123	2%	2,912	3%	2,133	2%	6,168
Plastics	6%	7,656	9%	16,671	15%	11,346	10%	35,674
Concrete	3%	3,473	2%	3,434	1%	686	2%	7,593
Metals	4%	4,205	3%	5,093	5%	3,746	4%	13,044
Masonry	2%	1,908	3%	5,103	0%	304	2%	7,316
Asphalt	4%	4,652	8%	14,717	3%	2,038	6%	21,407
Misc. Building Material	4%	4,758	5%	8,877	12%	9,245	6%	22,880
Glass and Ceramics	1%	1,714	2%	3,608	2%	1,352	2%	6,674
Rubble/Soil	4%	4,186	7%	12,919	8%	5,665	6%	22,779
Fines	0%	0	0%	0	0%	0	0%	0
Household Garbage	3%	3,391	5%	8,844	10%	7,721	5%	19,956
Textiles	1%	930	1%	1,285	2%	1,314	1%	3,529
Bulky Items	1%	890	2%	2,686	2%	1,429	1%	5,005
Rubber	2%	1,906	1%	2,304	3%	2,034	2%	6,244
Miscellaneous	0%	0	1%	1,146	<1%	611	<1%	1,757
Total[1]	**100%**	**118,046**	**100%**	**178,504**	**100%**	**75,422**	**100%**	**371,972**

[1]Percentages may not sum to 100% due to rounding.

3.3.1 Regional Historical Results Comparison

Figure 9 and **Table 11** present the C&D waste composition of regional annual per-capita disposal rate in 2011, 2015, 2018, and 2022. The out-of-region 2022 data was revised to use transfer station reload information to calculate percentages of materials and estimated annual weights. The per-capita annual disposal of wood in the construction & demolition waste stream in 2022 has significantly decreased from the increasing trend seen in disposal rates from 2011, to 2018. In the C&D waste sector, the wood disposal rate has decreased by more than 20% (from 95 to 67 kg/capita) compared to 2018. The disposal rate of plastics also decreased in 2022, reversing an increasing trend observed from 2011 to 2018. The estimated disposal of plastics in C&D waste has decreased by 32% (from 18 to 11 kg/capita) compared to 2018.

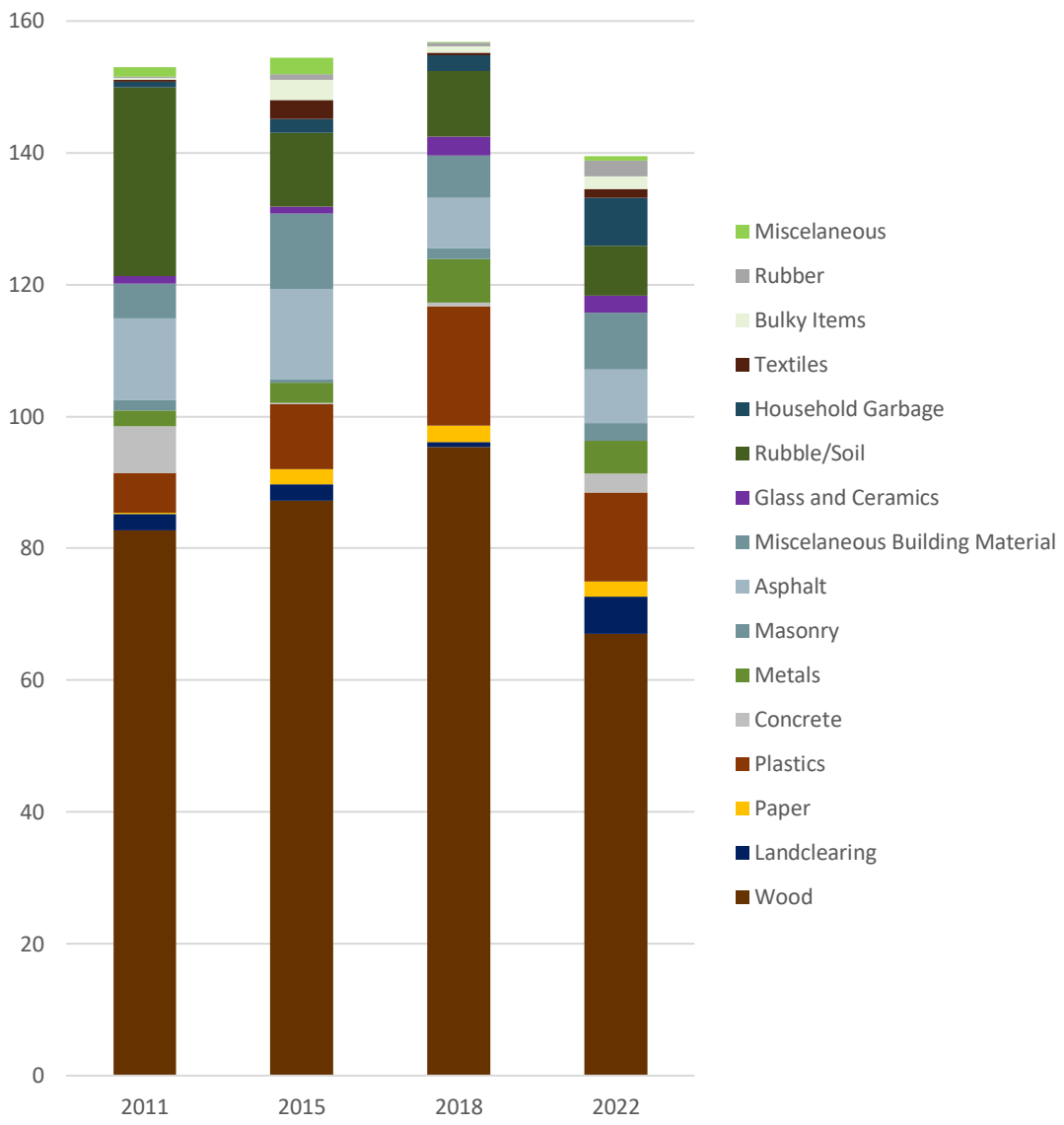

Figure 9: Regional Estimated Annual C&D Waste Per-Capita Disposal Rate

Table 11 shows the regional C&D waste composition results from 2011, 2015, 2018, and 2022. The largest component by percentage weight continues to be wood. However, the proportion of wood in C&D waste sampled within the region has decreased from 61% in 2018 to 48% in 2022, while household garbage has increased from 2% to 5% in the same period.

Table 11: Historical Estimated Regional C&D Waste Composition

Material Category	2011	2015	2018	2022	2011	2015	2018	2022	2011	2015	2018	2022
	% by Weight				Estimated Annual Weight (tonnes)				Estimated Disposal Rate (kg/capita)			
Population									**2,395,520**	**2,497,052**	**2,550,047**	**2,642,825**
Wood	54%	57%	61%	48%	198,263	217,739	243,179	177,011	83	87	95	67
Land Clearing	2%	2%	1%	4%	5,939	6,226	2,000	14,944	2	2	1	6
Paper	<1%	2%	2%	2%	448	5,888	6,399	6,168	0	2	3	2
Plastics	4%	6%	12%	10%	14,290	24,465	45,996	35,674	6	10	18	13
Concrete	5%	<1%	<1%	2%	16,965	486	1,600	7,593	7	0	1	3
Metals	2%	2%	4%	4%	5,754	7,804	16,799	13,044	2	3	7	5
Masonry	1%	<1%	1%	2%	4,050	1,052	4,000	7,316	2	0	2	3
Asphalt	8%	9%	5%	6%	29,602	34,314	19,598	21,407	12	14	8	8
Misc. Building Material	3%	7%	4%	6%	12,472	28,551	16,399	22,880	5	11	6	9
Glass and Ceramics	<1%	1%	2%	2%	2,712	2,602	7,199	6,674	1	1	3	3
Rubble/Soil	19%	7%	6%	6%	68,736	27,947	25,598	22,770	29	11	10	8
Household Garbage	<1%	1%	2%	0%	1,890	5,441	5,999	0	1	2	2	7
Textiles	<1%	2%	<1%	5%	839	7,106	1,000	19,956	0	3	0	1
Bulky Items	<1%	2%	1%	1%	540	7,518	2,400	3,529	0	3	1	2
Rubber	<1%	1%	<1%	1%	538	2,261	1,600	5,005	0	1	1	2
Miscellaneous	<1%	2%	<1%	<1%	3419	6,256	200	6,224	1	3	0	1
Total[1]	**100%**	**100%**	**100%**	**100%**	**366,459**	**358,656**	**399,965**	**371,972**	**153**	**144**	**157**	**139**

[1]Percentages may not sum to 100% due to rounding.

4.0 Limitations and Sources of Error

Limitations and potential sources of error for the study include:

- The variety of C&D activity sources of samples was limited by the availability of inbound waste haulers during the sample collection phase at both sorting sites and results in an uncertainty in results being representative of the C&D waste in the region;
- Three samples from Ecowaste were misidentified as inbound C&D loads, and subsequently were not included in the results.
- The accuracy of the visual composition assessment is limited by visibility, which is influenced by various factors including the availability of landfill staff to spread samples with a loader or excavator, and how waste is tipped onto the disposal area by different hauler vehicle types;
- A visual assessment to determine waste composition is limited by what is visible which poses an upper limit on the accuracy of the methodology as samples cannot be flattened to the point where all contents of a waste load is completely uncovered;
- The densities of material categories used to calculate weights are generalized and will not be able to fully capture the wide range of densities of all materials within a waste load;
- The compaction of material during transport of C&D waste loads and the spreading of the sample by loaders and excavators will cause the material densities to deviate from the standard densities of materials; and
- Measuring the dimensions of a sample is limited by the large size of C&D waste loads sampled, preventing the use of more accurate measuring methods.

5.0 Closure and Professional Statement

This report was prepared exclusively for the purposes, project and location outlined in this report. The report is based on the composition of the inbound material over a specific period of time as indicated in the report. Although a reasonable analysis was conducted by Dillon, Dillon's analysis was by no means exhaustive. Rather, Dillon's report represents a reasonable review of the audit results as a "snapshot" in time. These results only reflect the conditions of the period of time in which they were collected. The audit results for the assessments that took place September to October 2022 are those reflected in this report.

Dillon prepared this report for the sole benefit of the Metro Vancouver. The material in the report reflects Dillon's best judgement in light of the information available at the time of preparation. Any use which a third party makes of this report, or any reliance on or decision based on it, are the responsibilities of such third parties.

Appendix A

Waste Category List

Primary	Secondary	Category Number	Functional Group
Wood	Dimensional Lumber (unpainted, unstained, untreated) [Clean Wood]	1	Recycling
	Dimensional Lumber (stained, treated)	2	Limited Recycling
	Dimensional Lumber (painted only)	3	Limited Recycling
	Pallets (unpainted, unstained, untreated) [Clean Wood]	4	Recycling
	Pallets (stained, treated)	5	Limited Recycling
	Pallets (painted only)	6	Limited Recycling
	Wood flooring (i.e., hardwood, laminate)	7	Salvage
	Wood shakes and shingles	8	Recycling
	Composite (plywood)	9	Limited Recycling
	Composite (fiberboard)	10	Limited Recycling
	Particleboard	11	Limited Recycling
	Salvageable Wood Fixtures (i.e. cabinets, shelves, doors)	12	Salvage
Land clearing	Large Yard Waste (i.e. branches over 15cm diameter or 1m long)	13	Recycling
	Small Yard Waste, Green Waste	14	Recycling
Paper	Cardboard	15	Recycling
	Miscellaneous Paper (Office, Kraft, etc.)	16	Recycling
Plastics (Not expected to contain Chlorine)	Sheet or Film Plastic	17	Limited Recycling
	Polystyrene/Styrofoam Packaging	18	Limited Recycling
	Miscellaneous Plastics (Not expected to contain Chlorine)	19	Limited Recycling
Plastics (Expected to contain Chlorine)	PVC Pipes, Hoses, Cable Coatings, and Plumbing	20	Limited Recycling
	Window Assemblies	21	Salvage
	Vinyl Siding and Flooring	22	Limited Recycling
	Miscellaneous Plastics (Expected to contain Chlorine)	23	Limited Recycling

Primary	Secondary	Category Number	Functional Group
Concrete	Poured with Rebar	24	Limited Recycling
	Poured without Rebar	25	Recycling
	Preformed Blocks	26	Salvage
	Residuals	27	Limited Recycling
Metals	Ferrous	28	Recycling
	Non-ferrous	29	Recycling
	Mixed Metals (i.e., Plumbing, Electrical, Flashing, Siding, Furniture)	30	Limited Recycling
Masonry	Brick	31	Recycling
	Stone	32	Recycling
	Cinderblocks	33	Recycling
	Marble/Granite Slabs	34	Recycling
Asphalt	Pavement	35	Recycling
	Asphalt Shingles and Tarpaper	36	Recycling
	Tar and Gravel Roofing	37	Recycling
Miscellaneous Building Material	Carpet	38	Recycling
	Underlay	39	Limited Recycling
	Linoleum Flooring	40	Limited Recycling
	Drywall	41	Recycling
	Lath and Plaster	42	Limited Recycling
	Stucco Wall Finishing	43	Limited Recycling
	Ceiling Tiles	44	Recycling
	Insulation (i.e., Fiberglass, Cellulose, Foam)	45	Limited Recycling
	Laminate Flooring	46	Salvage
Glass and Ceramics	Glass	47	Recycling
	Mirror Glass	48	Recycling
	Porcelain (i.e., Bathroom Fixtures)	49	Salvage
	Indoor Tile (i.e., Wall Finishing, Flooring)	50	Recycling
	Outdoor Tile (i.e., Roofing)	51	Recycling
Rubble/Soil		52	Recycling
Fines		53	Limited Recycling
Household Garbage		54	Recycling

Primary	Secondary	Category Number	Functional Group
Textiles		55	Recycling
Bulky Items		56	Recycling
Rubber	Tires, Tubing	57	Recycling
	Rubber Roofing	58	Recycling
Miscellaneous		59	Recycling

Appendix B

Selected Site and Sample Photographs

Photo 1: VLF Sample 009: Residential Demolition

Photo 2: VLF Sample 018: Transfer Station Reload

Photo 3: VLF Sample 022: Residential Demolition

Photo 4: VLF Sample 035: Transfer Station Reload

Photo 5: Ecowaste Sample 066 - Land Clearing

Photo 6: Ecowaste Sample 113: Manufacturing

Photo 7: Ecowaste Sample 068: Residential Construction

Photo 8: Ecowaste Sample 080: Residential Demolition

Photo 9: Ecowaste Sample 137: Transfer Station Reload

Photo 10: Ecowaste C&D Hauler Disposing Waste for Sampling

Photo 11: Example of Auditors Performing Visual Composition Assessment

Photo 12: Example of Auditors Performing Visual Composition Assessment

Photo 13: Excavator Spreading Sample Material

Appendix C

Material Category Densities

Primary	Secondary	Category Number	Density Value (kg/yd^3)
Wood	Dimensional Lumber (unpainted, unstained, untreated) [Clean Wood]	1	181-227
	Dimensional Lumber (stained, treated)	2	181-227
	Dimensional Lumber (painted only)	3	181-227
	Pallets (unpainted, unstained, untreated) [Clean Wood]	4	227
	Pallets (stained, treated)	5	227
	Pallets (painted only)	6	227
	Wood flooring (i.e., hardwood, laminate)	7	227
	Wood shakes and shingles	8	198
	Composite (plywood)	9	318
	Composite (fiberboard)	10	318
	Particleboard	11	318
	Salvageable Wood Fixtures (i.e., cabinets, shelves, doors)	12	656. 350-900[1]
Land clearing	Large Yard Waste (i.e., branches over 15cm diameter or 1m long)	13	204
	Small Yard Waste, Green Waste	14	91
Paper	Cardboard	15	45
	Miscellaneous Paper (Office, Kraft, etc.)	16	165
Plastics (Not expected to contain Chlorine)	Sheet or Film Plastic	17	10
	Polystyrene/Styrofoam Packaging	18	10
	Miscellaneous Plastics (Not expected to contain Chlorine)	19	382
Plastics (Expected to contain Chlorine)	PVC Pipes, Hoses, Cable Coatings, and Plumbing	20	382
	Window Assemblies	21	160
	Vinyl Siding and Flooring	22	621
	Miscellaneous Plastics (Expected to contain Chlorine)	23	382
Concrete	Poured with Rebar	24	318
	Poured without Rebar	25	318
	Preformed Blocks	26	318
	Residuals	27	318
Metals	Ferrous	28	363
	Non-ferrous	29	363
	Mixed Metals (i.e., Plumbing, Electrical, Flashing, Siding, Furniture)	30	153
Masonry	Brick	31	227

Primary	Secondary	Category Number	Density Value (kg/yd^3)
	Stone	32	1949
	Cinderblocks	33	1223
	Marble/Granite Slabs	34	2064
Asphalt	Pavement	35	499
	Asphalt Shingles and Tarpaper	36	363
	Tar and Gravel Roofing	37	613
Miscellaneous Building Material	Carpet	38	182
	Underlay	39	182
	Linoleum Flooring	40	382
	Drywall	41	182
	Lath and Plaster	42	182
	Stucco Wall Finishing	43	182
	Ceiling Tiles	44	195
	Insulation (i.e., Fiberglass, Cellulose, Foam)	45	14
	Laminate Flooring	46	650
Glass and Ceramics	Glass	47	136
	Mirror Glass	48	136
	Porcelain (i.e., Bathroom Fixtures)	49	837
	Indoor Tile (i.e., Wall Finishing, Flooring)	50	837
	Outdoor Tile (i.e., Roofing)	51	837
Rubble/Soil		52	454-1000[1]
Fines		53	
Household Garbage		54	182
Textiles		55	182
Bulky Items		56	182
Rubber	Tires, Tubing	57	454
	Rubber Roofing	58	454
Miscellaneous		59	227

[1]Density value used based on field conditions of material compaction in a sample.

Appendix D

C&D Waste Composition by Location and Material Type

Material Category	VLF			Ecowaste			Out-of-Region			Regional Total		
	% by Volume	% by Weight	Estimated Annual Weight (tonnes)	% by Volume	% by Weight	Estimated Annual Weight (tonnes)	% by Volume	% by Weight	Estimated Annual Weight (tonnes)	% by Volume	% by Weight	Estimated Annual Weight (tonnes)
Dimensional Lumber (unpainted, unstained, untreated) [Clean Wood]	7%	6%	6,937	6%	5%	9,222	3%	3%	2,143	6%	5%	18,302
Dimensional Lumber (stained, treated)	24%	21%	24,649	8%	6%	11,500	9%	8%	6,306	13%	11%	42,455
Dimensional Lumber (painted only)	6%	5%	6,099	2%	2%	3,247	1%	1%	1,027	3%	3%	10,373
Pallets (unpainted, unstained, untreated) [Clean Wood]	0%	0%	533	1%	1%	1,889	0%	0%	-	1%	1%	2,422
Pallets (stained, treated)	0%	0%	66	2%	1%	2,449	1%	1%	668	1%	1%	3,183
Pallets (painted only)	0%	0%	77	0%	0%	464	0%	0%	-	0%	0%	541
Wood flooring (i.e., hardwood, laminate)	1%	1%	812	0%	0%	683	0%	1%	384	1%	1%	1,880
Wood shakes and shingles	4%	3%	3,707	2%	2%	2,895	2%	2%	1,227	3%	2%	7,829
Composite (plywood)	11%	14%	16,096	6%	7%	12,550	5%	7%	5,218	7%	9%	33,863
Composite (fiberboard)	5%	7%	7,878	3%	4%	7,060	2%	3%	2,483	4%	5%	17,422
Particleboard	5%	7%	8,251	4%	5%	8,628	3%	4%	3,345	4%	5%	20,224
Salvageable Wood Fixtures (i.e. cabinets, shelves, doors)	0%	1%	1,290	3%	9%	15,219	1%	3%	2,007	2%	5%	18,516
Total Wood	63%	65%	76,395	38%	42%	75,807	27%	33%	24,809	44%	48%	177,011
Large Yard Waste (i.e. branches over 15cm diameter or 1m long)	0%	0%	311	7%	6%	10,468	0%	0%	248	4%	3%	11,027
Small Yard Waste, Green Waste	1%	0%	548	4%	1%	2,630	2%	1%	740	3%	1%	3,917
Total Landclearing	2%	1%	858	12%	7%	13,098	3%	1%	988	7%	4%	14,944
Cardboard	2%	0%	373	5%	1%	1,594	5%	1%	845	4%	1%	2,812
Miscellaneous Paper (Office, Kraft, etc.)	1%	1%	750	1%	1%	1,318	2%	2%	1,288	1%	1%	3,356
Total Paper	3%	1%	1,123	6%	2%	2,912	8%	3%	2,133	5%	2%	6,168
Sheet or Film Plastic	4%	0%	192	5%	0%	319	8%	0%	259	5%	0%	769
Polystyrene/Styrofoam Packaging	1%	0%	39	3%	0%	233	4%	0%	132	3%	0%	404
Miscellaneous Plastics (Not expected to contain Chlorine)	1%	2%	2,534	3%	5%	8,189	5%	8%	6,380	3%	5%	17,102
Total Plastics (Not expected to contain Chlorine)	6%	2%	2,764	11%	5%	8,741	16%	9%	6,770	11%	5%	18,275
PVC Pipes, Hoses, Cable Coatings, and Plumbing	1%	2%	2,725	1%	2%	3,799	2%	3%	2,362	2%	2%	8,886
Window Assemblies	0%	0%	68	0%	0%	344	0%	0%	64	0%	0%	476
Vinyl Siding and Flooring	1%	2%	1,906	1%	2%	3,625	1%	2%	1,838	1%	2%	7,369
Miscellaneous Plastics (Expected to contain Chlorine)	0%	0%	193	0%	0%	162	0%	0%	312	0%	0%	667
Total Plastics (Expected to contain Chlorine)	2%	4%	4,892	3%	4%	7,930	3%	6%	4,576	3%	5%	17,399
Poured with Rebar	0%	0%	522	0%	0%	198	0%	0%	31	0%	0%	751
Poured without Rebar	0%	1%	649	1%	1%	1,116	0%	0%	247	0%	1%	2,012
Preformed Blocks	1%	1%	1,600	1%	1%	1,641	0%	0%	239	1%	1%	3,480
Residuals	0%	1%	703	0%	0%	478	0%	0%	169	0%	0%	1,349
Total Concrete	2%	3%	3,473	2%	2%	3,434	1%	1%	686	2%	2%	7,593
Ferrous	1%	1%	1,118	0%	0%	567	0%	1%	535	0%	1%	2,220
Non-ferrous	1%	2%	2,026	1%	2%	3,106	2%	3%	2,157	1%	2%	7,289
Mixed Metals (i.e., Plumbing, Electrical, Flashing, Siding, Furniture)	1%	1%	1,061	1%	1%	1,421	2%	1%	1,054	2%	1%	3,536
Total Metals	3%	4%	4,205	3%	3%	5,093	4%	5%	3,746	3%	4%	13,044
Brick	1%	0%	582	0%	0%	222	0%	0%	17	0%	0%	821
Stone	0%	0%	474	0%	2%	4,197	0%	0%	287	0%	1%	4,958
Cinderblocks	0%	1%	852	0%	0%	48	0%	0%	-	0%	0%	900
Marble/Granite Slabs	0%	0%	-	0%	0%	637	0%	0%	-	0%	0%	637

Material Category	VLF			Ecowaste			Out-of-Region			Regional Total		
	% by Volume	% by Weight	Estimated Annual Weight (tonnes)	% by Volume	% by Weight	Estimated Annual Weight (tonnes)	% by Volume	% by Weight	Estimated Annual Weight (tonnes)	% by Volume	% by Weight	Estimated Annual Weight (tonnes)
Total Masonry	1%	2%	1,908	0%	3%	5,103	0%	0%	304	0%	2%	7,316
Pavement	0%	0%	92	0%	0%	29	0%	0%	114	0%	0%	235
Asphalt Shingles and Tarpaper	2%	3%	3,451	1%	1%	2,676	1%	2%	1,233	1%	2%	7,361
Tar and Gravel Roofing	0%	1%	1,109	3%	7%	12,012	0%	1%	691	2%	4%	13,812
Total Asphalt	2%	4%	4,652	4%	8%	14,717	1%	3%	2,038	3%	6%	21,407
Carpet	3%	2%	2,648	2%	2%	2,793	7%	6%	4,174	3%	3%	9,616
Underlay	1%	1%	1,029	1%	1%	1,556	3%	3%	2,025	2%	1%	4,611
Linoleum Flooring	0%	1%	680	0%	0%	661	1%	1%	978	0%	1%	2,319
Drywall	0%	0%	23	0%	0%	11	0%	0%	-	0%	0%	33
Lath and Plaster	0%	0%	151	1%	1%	1,636	2%	1%	1,062	1%	1%	2,849
Stucco Wall Finishing	0%	0%	26	1%	1%	939	1%	1%	540	1%	0%	1,506
Ceiling Tiles	0%	0%	-	0%	0%	30	0%	0%	-	0%	0%	30
Insulation (i.e., Fiberglass, Cellulose, Foam)	2%	0%	140	2%	0%	153	2%	0%	88	2%	0%	381
Laminate Flooring	0%	0%	60	0%	1%	1,097	0%	0%	377	0%	0%	1,533
Total Miscellaneous Building Materials	7%	4%	4,758	8%	5%	8,877	15%	12%	9,245	9%	6%	22,880
Glass	0%	0%	177	0%	0%	395	0%	0%	151	0%	0%	724
Mirror Glass	0%	0%	-	0%	0%	63	0%	0%	19	0%	0%	82
Porcelain (i.e., Bathroom Fixtures)	0%	1%	698	0%	1%	1,932	0%	1%	758	0%	1%	3,388
Indoor Tile (i.e., Wall Finishing, Flooring)	0%	1%	838	0%	1%	930	0%	0%	307	0%	1%	2,075
Outdoor Tile (i.e., Roofing)	0%	0%	-	0%	0%	287	0%	0%	117	0%	0%	405
Total Glass and Ceramics	1%	1%	1,714	1%	2%	3,608	1%	2%	1,352	1%	2%	6,674
Rubble/Soil	1%	4%	4,186	2%	7%	12,919	2%	8%	5,665	2%	6%	22,770
Total Rubble/Soil	1%	4%	4,186	2%	7%	12,919	2%	8%	5,665	2%	6%	22,770
Fines	0%	0%	-	0%	0%	-	0%	0%	-	0%	0%	-
Total Fines	0%	0%	-	0%	0%	-	0%	0%	-	0%	0%	-
Household Garbage	4%	3%	3,391	7%	5%	8,844	12%	10%	7,721	7%	5%	19,956
Total Household Garbage	4%	3%	3,391	7%	5%	8,844	12%	10%	7,721	7%	5%	19,956
Textiles	1%	1%	930	1%	1%	1,285	2%	2%	1,314	1%	1%	3,529
Total Textiles	1%	1%	930	1%	1%	1,285	2%	2%	1,314	1%	1%	3,529
Bulky Items	1%	1%	890	2%	2%	2,686	2%	2%	1,429	2%	1%	5,005
Total Bulky Items	1%	1%	890	2%	2%	2,686	2%	2%	1,429	2%	1%	5,005
Tires, Tubing	0%	0%	539	1%	1%	1,676	1%	1%	1,016	0%	1%	3,231
Rubber Roofing	1%	1%	1,367	0%	0%	628	1%	1%	1,018	0%	1%	3,013
Total Rubber	1%	2%	1,906	1%	1%	2,304	1%	3%	2,034	1%	2%	6,244
Miscellaneous	0%	0%	-	1%	1%	1,146	1%	1%	611	1%	0%	1,757
Total Miscellaneous	0%	0%	-	1%	1%	1,146	1%	1%	2,143	1%	0%	1,757
Total	100%	100%	118,046	100%	100%	178,504	100%	100%	75,422	100%	100%	371,972