

# Composition of Solid Waste in Clutha District

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Clutha District Council  
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# Contents

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<b>1</b>	<b>INTRODUCTION.....</b>	<b>1</b>
1.1	WASTE MANAGEMENT SERVICES IN CLUTHA DISTRICT .....	1
1.1.1	Overview .....	1
1.1.2	Waste services for the residential sector .....	1
1.1.3	Waste services for the commercial sector .....	2
1.1.4	Mt Cooee landfill .....	2
1.2	STRUCTURE OF REPORT .....	4
<b>2</b>	<b>METHODOLOGIES .....</b>	<b>5</b>
2.1	OVERVIEW .....	5
2.2	DOMESTIC KERBSIDE WASTE AUDIT.....	5
2.2.1	Sampling strategy .....	5
2.2.2	Audit execution .....	5
2.2.3	Staff training and OSH issues.....	7
2.3	MT COOEE LANDFILL VISUAL SURVEY.....	7
2.3.1	Types of waste.....	7
2.3.2	Visual assessment of waste composition .....	7
2.3.3	Activity sources of waste.....	8
2.3.4	Identification of vehicle types.....	8
2.3.5	Data analysis and reporting.....	9
<b>3</b>	<b>DOMESTIC KERBSIDE WASTE SORT-AND-WEIGH AUDIT .....</b>	<b>10</b>
3.1	SAMPLING SCHEDULE .....	10
3.2	PRIMARY COMPOSITION OF COUNCIL KERBSIDE WASTE 240-LITRE WHEELIE BINS.....	11
3.3	DISTRIBUTION OF COUNCIL KERBSIDE WASTE 240-LITRE WHEELIE BIN WEIGHTS.....	12
3.4	DIVERSION POTENTIAL OF COUNCIL KERBSIDE WASTE 240-LITRE WHEELIE BINS.....	13
<b>4</b>	<b>GENERAL WASTE AT MT COOEE LANDFILL .....</b>	<b>14</b>
4.1	DEFINITION OF 'GENERAL WASTE' .....	14
4.2	ACTIVITY SOURCES OF GENERAL WASTE .....	15
4.3	PRIMARY COMPOSITION OF GENERAL WASTE .....	16
4.4	PRIMARY COMPOSITION OF GENERAL WASTE - BY ACTIVITY SOURCE OF WASTE .....	17
4.5	VEHICLE TYPE ANALYSIS .....	18
4.6	PRIMARY COMPOSITION OF GENERAL WASTE - BY VEHICLE TYPE.....	19
<b>5</b>	<b>OVERALL WASTE TO TIP FACE.....</b>	<b>20</b>
5.1	ACTIVITY SOURCES OF OVERALL WASTE TO TIP FACE .....	20
5.2	PRIMARY COMPOSITION OF OVERALL WASTE STREAM TO TIP FACE.....	21
5.3	DIVERSION POTENTIAL OF OVERALL WASTE STREAM TO TIP FACE .....	23
<b>6</b>	<b>LEVIED WASTE TO MT COOEE LANDFILL .....</b>	<b>25</b>
6.1	PRIMARY COMPOSITION OF LEVIED WASTE AT MT COOEE LANDFILL .....	25
<b>7</b>	<b>DISCUSSION AND ANALYSIS.....</b>	<b>27</b>
7.1	COMPARISON OF SURVEY PERIOD TO ANNUAL TONNAGE .....	27
7.2	PER CAPITA DISPOSAL OF KERBSIDE WASTE .....	28
7.3	PER CAPITA DISPOSAL OF LEVIED WASTE TO LANDFILL .....	29
7.4	ACTIVITY SOURCE OF WASTE - COMPARISON WITH OTHER AREAS .....	31
7.5	DIVERSION POTENTIAL OF KERBSIDE WASTE COMPARED WITH OTHER LOCAL AUTHORITIES.....	32
7.6	COMPARISON TO RESULTS OF 2008 AND 2011 SWAP AUDITS.....	33
7.7	PHOTOS OF WASTE WITH RESOURCE RECOVERY POTENTIAL .....	34
	<b>APPENDIX 1 - WASTE CLASSIFICATIONS .....</b>	<b>35</b>

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<b>APPENDIX 2 - TYPES OF WASTE DISPOSAL VEHICLES.....</b>	<b>37</b>
<b>APPENDIX 3 - COUNCIL'S 240-LITRE WHEELIE BINS .....</b>	<b>40</b>
<b>APPENDIX 4 - GENERAL WASTE COMPOSITION.....</b>	<b>41</b>
<b>APPENDIX 5 - GENERAL WASTE BY ACTIVITY SOURCE .....</b>	<b>42</b>
<b>APPENDIX 6 - GENERAL WASTE BY VEHICLE TYPE .....</b>	<b>44</b>
<b>APPENDIX 7 - OVERALL WASTE COMPOSITION .....</b>	<b>45</b>
<b>APPENDIX 8 - LEVIED WASTE COMPOSITION .....</b>	<b>46</b>
<b>APPENDIX 9 - KERBSIDE RECYCLABLE MATERIALS.....</b>	<b>47</b>

# 1 Introduction

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Section 42 of the Waste Minimisation Act 2008 requires a territorial authority to adopt a waste management and minimisation plan (WMMP) that promotes effective and efficient waste management and minimisation within its district. Section 50 of the Act requires that WMMPs be reviewed at intervals of not more than six years after the last review and that each review be preceded by a waste assessment, as prescribed in section 51.

In June 2012, Clutha District Council (Council) adopted the *Clutha District Council Waste Management and Minimisation Plan 2012*. As per section 50 of the Act, the WMMP must be reviewed by June 2018.

To provide baseline data for the waste assessment, inform the 2018 WMMP, identify waste minimisation initiatives, and monitor changes in the waste stream, Council has commissioned Waste Not Consulting Ltd to undertake waste composition analyses based on the Ministry for the Environment's *Solid Waste Analysis Protocols 2002* (SWAP).

This document presents the results of the May 2017 research into waste composition in Clutha District. The research into waste composition comprised:

- a four-day sort-and-weigh audit of the composition of domestic waste from Council's kerbside waste 240-litre wheelie bins
- a visual survey of waste disposed of at Mt Cooee landfill tip face over a six-day period
- analysis of weighbridge records from Mt Cooee landfill.

Previous surveys of the composition of waste disposed of at the Mt Cooee landfill tip face were commissioned by Council in 2008 and 2011. The results of the 2017 survey are compared to those of the earlier surveys in section 7.6.

## 1.1 Waste management services in Clutha District

### 1.1.1 Overview

Mt Cooee landfill in Balclutha is the only Class 1 landfill that accepts municipal solid waste in Clutha District. The landfill receives waste from Council's kerbside waste collections, commercial waste from private waste operators, and waste from the public. Council also operates a network of rural transfer stations throughout the District. Waste from these transfer stations is disposed of at Mt Cooee landfill.

Clutha District is, to a relatively high degree, a self-contained waste catchment. That is, a high proportion of the waste that is generated within the District is disposed of within the District (at Mt Cooee landfill) and only a small amount, if any, of the waste disposed of within the District is generated outside of the district.

### 1.1.2 Waste services for the residential sector

Clutha District Council provides a kerbside waste collection service to approximately 6,000 properties (based on data provided by Council). This represents approximately 48% of the 12,500 rateable properties in the District<sup>1</sup>. The service is provided to residential properties in

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<sup>1</sup> <http://www.cluthadc.govt.nz/your-district/living-and-working/Pages/default.aspx>

most urban areas and to some commercial premises and rural households along service routes.

The waste collection is a rates-funded service, with all properties in the service areas being provided with a 240-litre wheelie bin for waste and a 240-litre wheelie bin for recyclable containers. The wheelie bins are emptied fortnightly, in alternate weeks, by Council's contractor, Delta Utility Services Ltd. Materials that are accepted in the recycling wheelie bins is described in Appendix 9. Glass bottles and jars are not accepted for recycling in the Council recycling collection.

Residents of the District are able to dispose of waste and recyclable materials at Mt Cooee landfill. Council also provides waste transfer stations at Beaumont, Clinton, Clydevale, Lawrence, Maclennan, Milton, Owaka, Papatowai, Tapanui, and Taieri Mouth. These facilities open at least monthly.

Free drop-off facilities for recyclables are provided at Mt Cooee landfill and the Clinton, Milton, Lawrence, Owaka, and Tapanui transfer stations. Plastics (#1-7), steel and aluminium cans, paper, cardboard, and glass can be dropped off at these facilities.

Greenwaste may be disposed of by residents at a separate drop-off area at Mt Cooee landfill. Greenwaste is not accepted for separate disposal at the transfer stations.

For one-off removal of large quantities of waste from residential properties, a private waste operator offers gantry bin services. The same operator offers front-loader bin collection services to residential and farm properties in some rural areas.

### **1.1.3 Waste services for the commercial sector**

Council does not provide waste or recycling collection services for the commercial sector, other than for those properties eligible for the Council's kerbside collection services. All other waste from the commercial sector is either self-hauled to Mt Cooee landfill or transfer stations or collected by a private waste operator.

Two private waste operators offer waste collection services to the commercial sector. Services using wheelie bins, gantry skips, and front-loader bins are available from JD Souness Ltd. EnviroWaste Services Ltd offers front-loader bins to the commercial sector.

Commercial cardboard recycling services are available from EnviroWaste Services Ltd and Fullcircle Recycling, a division of Oji Fibre Solutions.

### **1.1.4 Mt Cooee landfill**

Mt Cooee landfill is situated on Kaitangata Highway, on the eastern edge of Balclutha. The facility is owned by Clutha District Council and operated, under contract, by Delta Utility Services Ltd.

All vehicles entering the facility are weighed over the weighbridge and are directed to the appropriate drop-off point, depending on the types of waste material that is being carried. Vehicles, other than those carrying a small number of rubbish bags, are weighed again when leaving the facility and charged for the weight of the load. There are separate disposal points for greenwaste, E-waste, scrap metal, cleanfill, whiteware, ash, glass bottles/jars, cardboard, batteries, LPG cylinders, and recyclable containers.

Greenwaste that is disposed of at the separate drop-off point is currently stockpiled for future use as intermediate and final cover of the landfill

Current charges for disposing of waste materials at Mt Cooe landfill are shown below.<sup>2</sup>

All other general refuse (minimum \$12.00	119.00/tonne
Green waste Discount**	50%
Refuse Bag (Max 70L)	3.00 / bag
Note: Council reserves the right to weigh any vehicle and charge by weight.	
Household Recycling (as specified)	Free
Batteries	Free
Scrap Metal (Including Whiteware)	Free
LPG Cylinders	5.00/each
Notes: ** This discount will apply to all loads of greenwaste as defined below and assessed by landfill staff. Any loads that are found to be contaminated as they are unloaded will be charged at the full refuse rate as estimated by the Landfill staff.	
Approved greenwaste includes: lawn clippings, hedge clippings, tree trimmings with branches less than 150mm diameter, and garden weeds. Small amounts of soil associated with plant roots etc. is acceptable.	



Tip face at Mt Cooe landfill



Weighbridge



Recyclable container drop-off



Whiteware drop-off

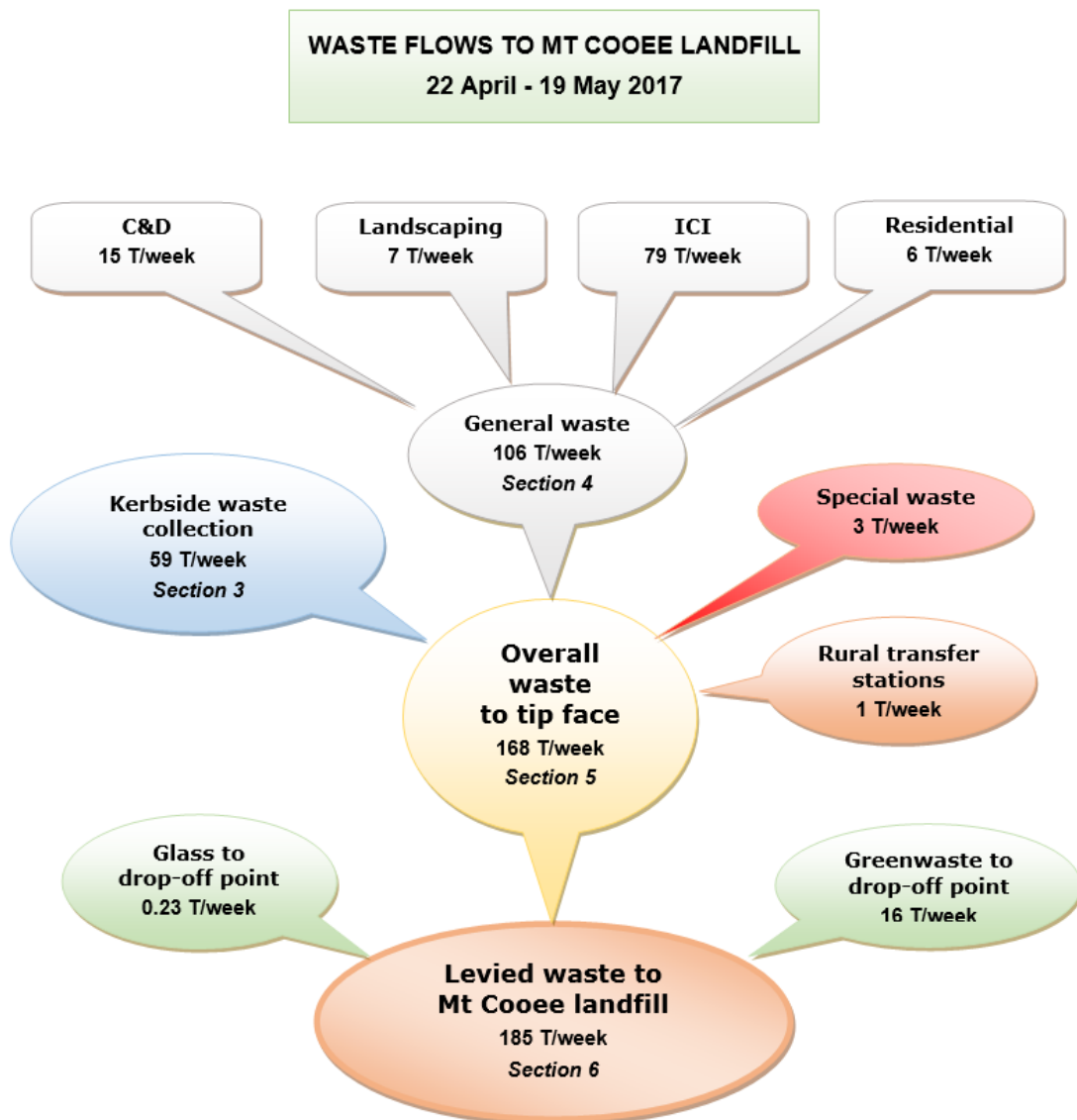
<sup>2</sup> <http://www.cluthadc.govt.nz/your-services/fees-and-charges/Pages/default.aspx#wastefeescharges>

## 1.2 Structure of report

This report is structured as follows:

- Section 2 describes the methodologies used for the sort-and-weigh audit of domestic kerbside waste and for the visual survey of vehicle loads of waste disposed at the Mt Cooe landfill tip face.
- Section 3 presents the results of the sort-and-weigh audit of domestic kerbside waste
- Section 4 presents the results of the visual survey of vehicle loads of general waste disposed of at the landfill tip face
- Section 5 combines the results of the sort-and-weigh audit of domestic kerbside waste with the results of the visual survey of vehicle loads of waste
- Section 6 presents the composition of all levied waste disposed of at Mt Cooe landfill, which includes greenwaste and glass that have been disposed of at the separate drop-off points.

This structure is represented in the diagram below, which includes weekly tonnages of each of the waste streams analysed.





## 2 Methodologies

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### 2.1 Overview

The composition of waste disposed of to landfill from Clutha District was determined by combining data from several separate sources, including:

- a four-day sort-and-weigh audit of the composition of domestic waste from Council's kerbside waste 240-litre wheelie bins
- a visual survey of waste disposed of at Mt Cooee landfill tip face over a six-day period
- weighbridge records from Mt Cooee landfill
- an annual summary of weighbridge records provided by Council

The methodologies are outlined in detail in the sections that follow.

### 2.2 Domestic kerbside waste audit

The domestic kerbside waste audit methodology used by Waste Not Consulting was based on Procedure One of the Ministry for the Environment's Solid Waste Analysis Protocol 2002 (SWAP).

#### 2.2.1 Sampling strategy

From Monday 8 May to Thursday 11 May 2017, the contents of 100 Council 240-litre kerbside waste bins were sampled from the kerbside in Balclutha, Clinton, and Milton. All waste was transported to Mt Cooee landfill for sorting. Only waste from residential properties was included in the samples.

The composition and quantity of kerbside waste from residential properties varies according to a number of factors, including the socio-economic status of the household, the nature of the housing stock, and the range of disposal and recycling services available. To obtain a representative sample of the kerbside collections, the sample was collected from a wide geographic area and included a range of housing and property types.

The contents of the wheelie bins were emptied into large plastic bags for the sampling. The streets from which the sample was collected are listed in section 3.1.

#### 2.2.2 Audit execution

At Mt Cooee landfill, the sample of kerbside waste from Council wheelie bins was sorted in units which corresponded to the contents of two wheelie bins.

Each of the bags in the sample unit was weighed in, one bag at a time, and then opened. The contents of all bags were spread on a sorting table, and the individual items sorted into the appropriate categories. When all of the items in the sample unit were sorted, the individual classifications were weighed out and the material disposed of.

The waste was sorted into the 23 secondary categories described in Appendix 1. These categories are based on the 12 primary categories recommended by the SWAP. The

classifications have been chosen to identify the different types of recoverable materials present in the waste.



**Photo 2.1 - Sort-and-weigh audit of kerbside waste**



**Photo 2.2 - One day's sample for sort-and-weigh audit of kerbside waste**

### **2.2.3 Staff training and OSH issues**

The waste was sorted by a team of four, supervised by a Waste Not subcontractor. Prior to the start of the audit, all team members received the requisite training on the requirements of the audit process and on occupational health and safety procedures. As sensitive documents are occasionally present in domestic waste, the importance of confidentiality was emphasised to all team members.

## **2.3 Mt Cooee landfill visual survey**

The visual survey at Mt Cooee landfill tip face took place over a six-day period from Monday 8 May to Saturday 13 May. Both weekdays and a weekend day were included in order to capture weekly variations in the waste stream.

Visual surveying provides information on vehicle loads of waste entering a disposal facility in terms of composition of the waste load and the activity source of waste (for example, landscaping, residential, and construction and demolition). The composition of waste is based on the 12 primary categories (e.g. paper, plastics etc.) recommended by Ministry for the Environment's Solid Waste Analysis Protocol 2002 (SWAP). Further secondary categories were decided upon in conjunction with Council. A description of the categories is provided in Appendix 1.

### **2.3.1 Types of waste**

For the purpose of analysing waste streams, Waste Not differentiates between kerbside waste collections, 'special' waste, and general waste. Different methods are used for determining the composition of each waste stream.

Kerbside collections are generally taken to include both council and private collections (where applicable) from both residential and commercial/industrial properties. The composition of kerbside collections is most accurately determined by sort-and-weigh auditing, rather than by visual surveying techniques. The results of the sort-and-weigh audits described in section 2.2 are assumed to be the composition of all kerbside waste collected in Clutha District.

There is no precise definition for 'special waste', as these wastes vary between disposal facilities. The category is described further in section 2.3.3.

General waste, with a few exceptions, is considered to be all wastes other than kerbside waste collections and special wastes. Visual surveying is used primarily for determining the composition of the general waste stream.

### **2.3.2 Visual assessment of waste composition**

While each vehicle was being unloaded at Mt Cooee landfill tip face, the surveyor assessed the relative weight of each constituent present in the load on the basis of volume and density. Absolute weights of each material were not estimated; rather, the proportion of weight represented by each material was estimated. This data was recorded as a proportion, by weight, for each constituent present in the load. For small loads, total weights were estimated as these can not always be identified from weighbridge records.

For vehicle loads in which it was difficult to distinguish the individual constituents, a generic composition, based on previous surveys of that type of vehicle load, were used as a template for the composition. The generic composition was then adjusted according to the materials and types of waste that were visible.

### 2.3.3 Activity sources of waste

Waste Not has developed categories for the “activity source” of waste that are designed to provide the information that is most useful to councils for monitoring waste streams and effectively targeting waste minimisation initiatives. These activity source categories have been incorporated within the New Zealand Waste Data Framework. The categories that were used are:

1. **Domestic kerbside waste collection** – waste collected from residential premises by private and council kerbside waste collections (*Note: in the 2017 survey, this activity source also includes waste from any commercial properties serviced by the Council collection*). In Clutha District, kerbside compactors also collect a portion of waste from the rural transfer stations.
2. **Residential** – all waste originating from residential premises other than that covered by one of the other, more specific classifications (includes drop-offs of domestic rubbish bags)
3. **Industrial/commercial/institutional (ICI)** – waste from industrial, commercial, and institutional sources. In Clutha District, front-loaders collecting ICI waste also transport a portion of the waste from the rural transfer stations.
4. **Construction and demolition (C&D)** – waste materials from the construction or demolition of a building
5. **Landscaping and earthworks** – waste from landscaping activity and garden maintenance, both domestic and commercial, and from earthworks, other than that related to the construction of a building
6. **Transfer station** – waste entering a facility from another transfer station – waste from rural transfer stations is disposed of at Mt Cooe landfill but is aggregated with other ICI waste and can not be separately quantified from weighbridge records.
7. **Special wastes** – a subjective classification that includes any substantial waste stream (such as biosolids, infrastructural cleanfill, or industrial wastes), that either requires special handling or significantly affects the overall composition of the waste stream and is markedly different from waste streams at other disposal facilities.

The activity source of each load of waste was assessed and recorded by the surveyor at the same time that the composition was being assessed and recorded. If a load contained materials from more than one activity source, a judgement was made as to which activity was the primary reason for the load being taken to the landfill.

### 2.3.4 Identification of vehicle types

As loads carried by different vehicle types are not affected in similar ways by waste reduction initiatives, vehicles carrying waste were classified according to the system shown in Table 2.1 on the next page. Photos and more detailed explanations are provided in Appendix 2.

**Table 2.1 - Vehicle classification system**

Vehicle type	Uses
<b>Car-sized loads</b>	Small loads, generally from a single source, can be of either commercial or residential origin. Includes any vehicle carrying a very small loads, such as a van carrying a few rubbish bags.
<b>Trailer-sized loads – including vans, small trucks, and utes</b>	Small-medium sized loads, usually from a single source, either commercial or residential, some may be from multiple sources (i.e. a garden contractor)
<b>Front-loader trucks</b>	Large loads, from multiple regular commercial customers. In Clutha District, front-loader trucks are also used for the collection of farm waste.
<b>Gantry trucks</b>	Medium-large loads, usually from a single source, may be one-off disposal for residential or commercial waste, or regularly used by a commercial waste generator
<b>Hook truck</b>	Large loads, usually from a single source, may be one-off loads or regularly used by a large-scale waste generator.
<b>Kerbside collection vehicles</b>	Large load usually from multiple regular sources, either residential or commercial or both combined
<b>Other trucks – including tip, box, and flat-deck</b>	Medium to large loads, usually commercial, may be one off -loads or regular waste generators

### 2.3.5 Data analysis and reporting

From the data collected by the visual survey, it was possible to generate information on:

- the proportion and composition of each activity source of waste
- the proportion and composition of waste being carried by each vehicle type
- the composition of the general waste stream.

The data analysis started with obtaining the complete weighbridge records for a four-week period, including the period of the audit. The weighbridge data was used to obtain the net load weights of the vehicles that were surveyed. These were used to calculate the weight of the different materials included in each load. The weighbridge records were also used to determine the average weekly weight of specific waste streams, such as Council’s kerbside waste collection.

The data from the survey at Mt Cooe landfill tip face and the composition of Council’s kerbside waste collection from the sort-and-weigh audit were combined with the weighbridge data to calculate a composition of the overall residual waste stream. This was done by combining the compositions of the separate, component waste streams (general waste, special wastes, and kerbside collections) in proportion to their presence in the overall waste stream.

### 3 Domestic kerbside waste sort-and-weigh audit

#### 3.1 Sampling schedule

The sort-and-weigh audit of Clutha District kerbside waste took place from 8-11 May 2017. During this period, the contents of a total of 100 Council 240-litre kerbside waste wheelie bins were sampled and sorted. The sample was collected from Balclutha, Clinton, and Milton. The collection schedule is shown in Table 3.1.

**Table 3.1 - Streets sampled for domestic kerbside waste audit**

Date/Town	Street	Date/Town	Street
8 May 2017 Balclutha	James Street	10 May 2017 Clinton	Hawthorn Street
	Argyle Street		Halsey Street
	Clyde Street		Bard Street
	Charlotte Street		Church Street
	Naish Street		Side Street
	Frances Street		Merrie Creek Road
	Armstrong Street		George Street
	Christie Street	11 May 2017 Milton	High Street
	Keithmore Road		Ossian Street
	Wilson Road		Johnson Street
Harvey Terrace	Abercrombie Street		
9 May 2017 Balclutha	Yare Lane	Chaucer Street	
	Ipswich Street	Springfield Road	
	Henley Drive	Keinan Avenue	
	Arthur Terrace	Stewart Road	
	Stamford Street	Duthie Street	
	Pakefield Street		
	Cromer Street		
	Cambridge Street		
	Suffolk Place		
	Smith Street		
	Keach Lane		
	Athol Place		

### 3.2 Primary composition of Council kerbside waste 240-litre wheelie bins

The sample of Council's 240-litre wheelie bins comprised 100 wheelie bins containing a total of 2,596 kg of domestic kerbside waste. The primary composition of waste in the 240-litre wheelie bins is presented in Table 3.2 below and Figure 3.1 on the next page. The secondary composition, which includes all 23 categories, is given in Appendix 3.

Analysis of weighbridge data for the period 22 April - 19 May 2017 showed that the Council kerbside waste collection averaged 58.7 T/week (see section 5.1). The composition of Council's 240-litre wheelie bins is applied to this tonnage in the table below.

**Table 3.2 - Primary composition of Council kerbside waste 240-litre wheelie bins**

<b>Council kerbside waste 240-litre wheelie bins 22 April - 19 May 2017 (Margins of error for 95% confidence interval)</b>	<b>% of total weight</b>	<b>Mean wt. per wheelie bin</b>	<b>Tonnes per week</b>
<b>Paper</b>	5.0% (±1.2%)	1.30 kg (±0.32 kg)	2.9 T/week
<b>Plastics</b>	8.2% (±1.1%)	2.14 kg (±0.28 kg)	4.8 T/week
<b>Organics</b>	56.1% (±9.3%)	14.57 kg (±2.41 kg)	32.9 T/week
<b>Ferrous metals</b>	2.0% (±0.9%)	0.51 kg (±0.24 kg)	1.2 T/week
<b>Non-ferrous metals</b>	0.9% (±0.4%)	0.22 kg (±0.11 kg)	0.5 T/week
<b>Glass</b>	14.6% (±4.4%)	3.78 kg (±1.14 kg)	8.5 T/week
<b>Textiles</b>	3.4% (±1.3%)	0.88 kg (±0.34 kg)	2.0 T/week
<b>Sanitary paper</b>	3.9% (±1.5%)	1.02 kg (±0.40 kg)	2.3 T/week
<b>Rubble</b>	3.9% (±3.6%)	1.00 kg (±0.93 kg)	2.3 T/week
<b>Timber</b>	0.8% (±0.5%)	0.22 kg (±0.14 kg)	0.5 T/week
<b>Rubber</b>	0.3% (±0.2%)	0.07 kg (±0.06 kg)	0.2 T/week
<b>Potentially hazardous</b>	0.9% (±0.7%)	0.25 kg (±0.19 kg)	0.6 T/week
<b>TOTAL</b>	<b>100.0%</b>	<b>25.96 kg (±2.49 kg)</b>	<b>58.7 T/week</b>

The contents of Council's domestic kerbside waste 240-litre wheelie bins weighed an average of 25.96 kg. Organic material was the largest single component, comprising 56.1% of the total weight. Greenwaste was 43% of the organic material. Glass, 14.6%, was the second largest component and plastics, 8.2%, the third.

As shown in Appendix 3, "Organics multimaterial/other" comprises 11.6% of the total weight. In comparison to kerbside waste in other areas, this is a high percentage. Most of the weight was ash from domestic fireplaces and duck carcasses. The duck shooting season had started the weekend before the audit began.

The relatively high proportion of glass compared to other areas is associated with this material not being accepted in Council's kerbside recycling collection.

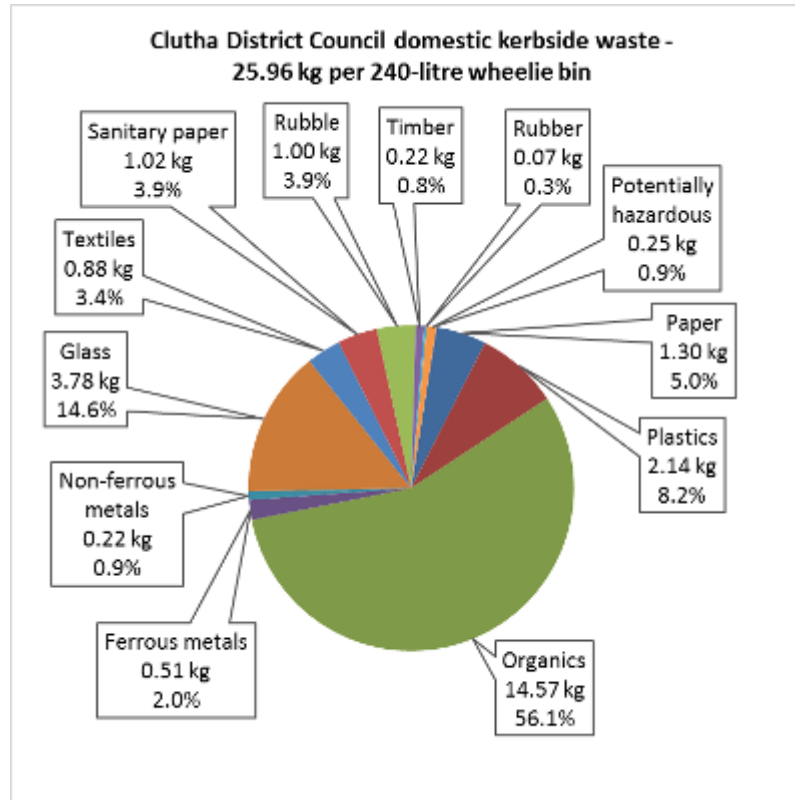


Figure 3.1 - Primary composition of Council kerbside waste 240-litre wheelie bins - May 2017

### 3.3 Distribution of Council kerbside waste 240-litre wheelie bin weights

The average weight of the contents of Council 240-litre wheelie bins was 25.96 kg ( $\pm 2.49$  kg at the 95% confidence level). The distribution of the bin weights is shown in Figure 3.2 below.

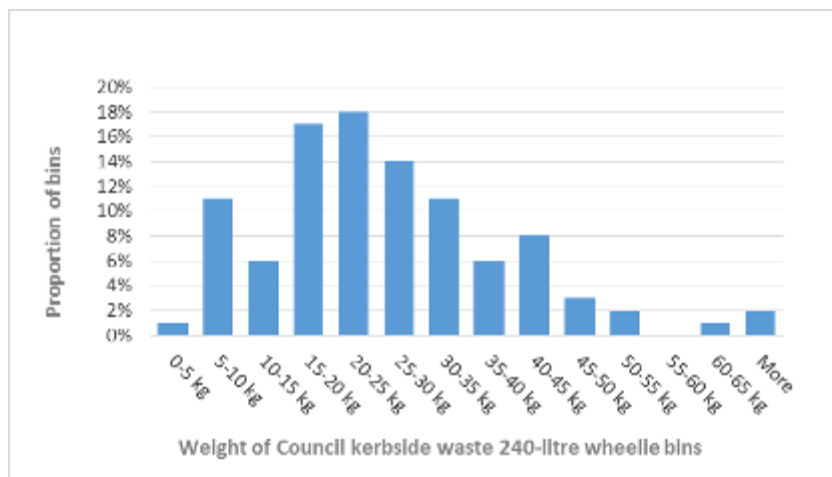


Figure 3.2 - Distribution of Council kerbside waste 240-litre wheelie bin weights

Nearly half (49%) of wheelie bins weighed between 15-30 kg. Twelve percent weighed less than 10 kg. The Council’s educational material on its website states that 30 kg is maximum allowable weight for wheelie bins. The contents of 33% of wheelie bins weighed more than 30 kg.



### 3.4 Diversion potential of Council kerbside waste 240-litre wheelie bins

Common means for councils to divert domestic waste materials from landfill disposal are by providing residents with systems for the separation of recyclable and compostable materials. In Clutha District, Council provides a kerbside container and paper recycling collection service. While glass bottles/jars are not accepted in the kerbside recycling collection, residents may take them to Mt Cooe landfill, where they may be used for site engineering purposes. Recyclable containers, paper and cardboard, and glass bottles/jars are also accepted for recycling at several of the rural transfer stations. Greenwaste is accepted for composting at Mt Cooe landfill or residents can compost greenwaste and kitchen waste at home.

Table 3.3 shows the proportion of the Council 240-litre wheelie bins that could have been diverted using these diversion methods. The table also shows the weight of materials per bin that could have been diverted.

**Table 3.3 - Diversion potential of Council kerbside waste 240-litre wheelie bins**

<b>Diversion potential of Council kerbside waste 240-litre wheelie bins - 22 April - 19 May 2017</b>	<b>% of total weight</b>	<b>Kg per wheelie bin</b>	<b>Tonnes per week</b>
<b>RECYCLABLE MATERIALS</b>			
<b>Paper - Recyclable</b>	4.2%	1.09 kg	2.5 T/week
<b>Plastics - # 1-2 containers</b>	1.8%	0.46 kg	1.0 T/week
<b>Plastics - # 3-7 containers</b>	0.6%	0.14 kg	0.3 T/week
<b>Steel cans</b>	1.0%	0.26 kg	0.6 T/week
<b>Aluminium cans</b>	0.4%	0.11 kg	0.2 T/week
<b>Glass - Bottles/jars</b>	13.8%	3.58 kg	8.1 T/week
<b>Subtotal</b>	<b>21.7%</b>	<b>5.64 kg</b>	<b>12.8 T/week</b>
<b>COMPOSTABLE MATERIALS</b>			
<b>Organics - Kitchen waste</b>	20.5%	5.32 kg	12.0 T/week
<b>Organics - Greenwaste</b>	24.0%	6.23 kg	14.1 T/week
<b>Subtotal</b>	<b>44.5%</b>	<b>11.55 kg</b>	<b>26.1 T/week</b>
<b>TOTAL – POTENTIALLY DIVERTABLE</b>	<b>66.2%</b>	<b>17.19 kg</b>	<b>38.9 T/week</b>

Approximately 21.7% of the materials in Council 240-litre wheelie bins could have been recycled through Council's existing kerbside recycling collection or at Mt Cooe landfill or a transfer station. A further 44.5% of all materials could have been composted.

In total, 66.2% of waste contained in Council 240-litre kerbside waste wheelie bins could have been diverted from landfill disposal by either recycling or composting. This equates to 17.19 kg of divertable material in each wheelie bin or 38.9 tonnes per week.

Other materials, such as clothing and other types of metal, are also recyclable but have not been included in these calculations.

## 4 General waste at Mt Cooee landfill

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Mt Cooee landfill is situated on Kaitangata Highway. A description of the facility and its operation is presented in section 1.1.4.

Residual waste disposed of at the Mt Cooee landfill tip face was surveyed from 8-13 May 2017. The visual survey collected data on 124 vehicle loads of waste.

The data from the visual survey at Mt Cooee landfill was matched with weighbridge records for a 28-day period including the survey period. The weighbridge records include the load weights and vehicle registration numbers for most vehicles, and the load weights from the weighbridge records were matched with the data collected during the survey, determining the weight for each weighed vehicle load. For small vehicle loads that were not weighed, the estimates of load weights that had been made during the survey were applied.

Using weighbridge records for the 28-day period 22 April - 19 May 2017, the results of the survey were then extrapolated to represent the four-week period, with the results presented in terms of tonnes/week. The weighbridge records showed an average of 168 tonnes per week of waste was disposed of at the tip face. This figure of 168 tonnes per week is used as the basis for the analyses in section 5. The average weekly tonnage from this period is compared to the annual weekly average in section 7.1.

During four days of the six-day survey, large amounts of waste, primarily cleanfill, from a site clean-up at a local meat processing plant were disposed of at the landfill. Subsequent analysis of weighbridge records showed this site clean-up represented 45% of all waste during the 28-day survey period. As the site clean-up was a one-off, anomalous event, the data collected on the single vehicle disposing of the waste was excluded from further analyses. Including the data would have resulted in the analyses not being representative of waste composition at the facility over a longer-term.

### 4.1 Definition of 'general waste'

As waste minimisation initiatives do not affect all activity sources of waste in the same manner, it is useful to analyse these sources separately. The following sections analyse what is referred to as the 'general' waste stream. The general waste stream comprises residential waste, ICI waste, C&D waste, and landscaping waste. General waste excludes Council kerbside waste collections, rural transfer stations, and special wastes.

In section 2.3.3, the activity sources of waste that comprise the overall waste stream are described. The activity sources included in the general waste stream are repeated below.

1. **Residential** – all waste originating from residential premises other than that covered by one of the other, more specific classifications (includes drop-offs of bagged waste)
2. **Construction and demolition (C&D)** – waste materials from the construction or demolition of a building or site works for a building
3. **Industrial/commercial/institutional (ICI)** – waste from industrial, commercial, and institutional sources. Includes Council's litter, and illegal dumping collections. In Clutha District, waste from the rural transfer stations is transported mixed with ICI waste.
4. **Landscaping** – waste from landscaping activity and garden maintenance, both domestic and commercial

## 4.2 Activity sources of general waste

The data from the six-day survey has been extrapolated and then standardised to represent the entire residual waste flow for a one-week period. This extrapolation was based on Mt Cooe landfill weighbridge records for a four-week period from 22 April - 19 May 2017. From the Mt Cooe landfill weighbridge records, an average residual waste flow to landfill of 168 tonnes per week has been calculated.

The analysis further shows that, when kerbside waste collections, rural transfer stations, and special wastes are excluded, 106 tonnes/week were general waste. In Table 4.1 below, the percentage of loads and the percentage of weight from each activity source of waste that comprises the general waste stream are shown.

**Table 4.1 - General waste activity source analysis - 22 April - 19 May 2017**

<b>Mt Cooe landfill - General waste activity source - Excludes kerbside waste and Special wastes 22 April - 19 May 2017</b>	<b># of loads surveyed</b>	<b>% of loads</b>	<b>% of total weight</b>	<b>Tonnes per week</b>
<b>Construction and demolition</b>	20	19%	14%	15 T/week
<b>Industrial/commercial/institutional</b>	37	34%	75%	79 T/week
<b>Landscaping</b>	2	2%	6%	7 T/week
<b>Residential</b>	49	45%	5%	6 T/week
<b>TOTAL</b>	<b>108</b>	<b>100%</b>	<b>100%</b>	<b>106 T/week</b>

Industrial/commercial/institutional waste was the largest component of general waste, accounting for 75%, by weight, of all general waste. ICI waste disposed of at Mt Cooe landfill includes a small quantity of waste (approx. 0.25 T/week) collected from the rural transfer stations, which is not weighed separately to other loads.

Construction and demolition waste accounted for 14% of the total weight of general waste. The largest proportion of general waste loads (45%) were of residential waste but, as the average load weight was smaller than that of the other components, residential waste, which includes drop-offs of a small number of rubbish bags, accounted for only 5% of the total weight of waste.

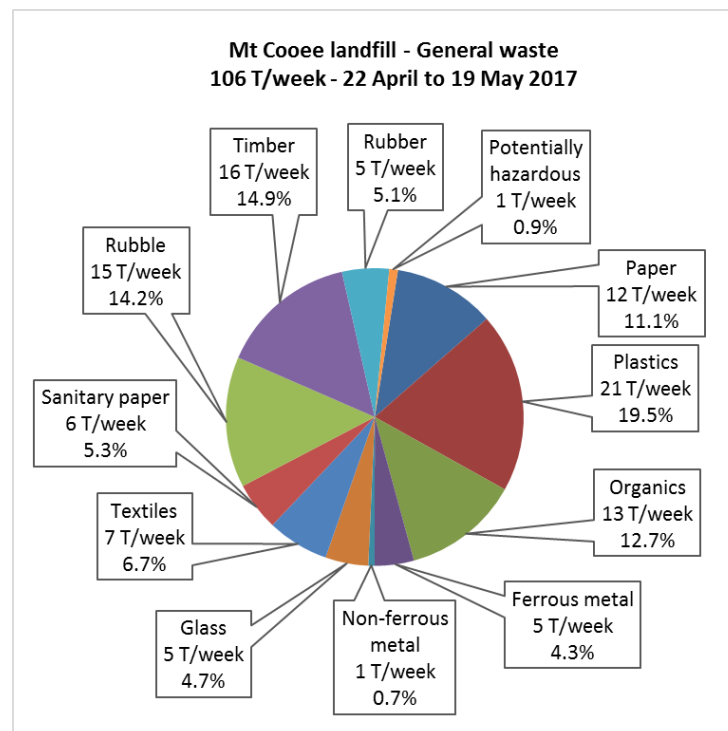
Only two loads of landscaping waste was disposed of at the tip face during the six-day survey period. One of these loads was a tip truck with a large load of soil and greenwaste, classified as 'Cleanfill' at the weighbridge. These two loads comprised 6% of the total weight of waste.

### 4.3 Primary composition of general waste

The primary composition of the general waste is presented in Table 4.2 and Figure 4.1. The secondary composition, which includes all 24 categories, is given in Appendix 4.

**Table 4.2 - Primary composition of general waste - 22 April - 19 May 2017  
(excludes kerbside waste and special wastes)**

Mt Cooee landfill - General waste composition - Excludes kerbside waste and Special wastes 22 April - 19 May 2017	% of total weight	Tonnes per week
Paper	11.1%	12 T/week
Plastics	19.5%	21 T/week
Organics	12.7%	13 T/week
Ferrous metals	4.3%	5 T/week
Non-ferrous metals	0.7%	1 T/week
Glass	4.7%	5 T/week
Textiles	6.7%	7 T/week
Sanitary paper	5.3%	6 T/week
Rubble	14.2%	15 T/week
Timber	14.9%	16 T/week
Rubber	5.1%	5 T/week
Potentially hazardous	0.9%	1 T/week
<b>TOTAL</b>	<b>100.0%</b>	<b>106 T/week</b>



**Figure 4.1 - Primary composition of general waste - 22 April - 19 May 2017  
(excludes kerbside waste and special wastes)**

Plastics was the largest component of the general waste, comprising 19.5% of the total weight. Ninety-seven percent of plastics in the general waste stream were in ICI waste. Timber was the second largest category of the general waste stream, comprising 14.9%, followed by rubble (14.2%), and organics (12.7%).

#### 4.4 Primary composition of general waste - by activity source of waste

The primary compositions of the four activity sources of general waste are shown in Table 4.3. The secondary compositions are given in Appendix 5 in separate tables that provide the data in terms of percentage composition and tonnes/week.

**Table 4.3 - Primary composition of general waste - by activity source - 22 April - 19 May 2017 (excludes kerbside waste and special wastes)**

<b>Mt Cooee landfill - General waste composition - By activity source Excludes kerbside waste and Special wastes 22 April - 19 May 2017</b>	<b>C&amp;D</b>	<b>ICI</b>	<b>Landscaping</b>	<b>Residential</b>
<b>Paper</b>	1.2%	14.2%	0.0%	5.4%
<b>Plastics</b>	2.0%	25.4%	0.0%	5.3%
<b>Organics</b>	1.8%	13.8%	30.4%	4.8%
<b>Ferrous metals</b>	1.4%	4.5%	0.0%	13.0%
<b>Non-ferrous metals</b>	0.3%	0.8%	0.0%	0.5%
<b>Glass</b>	1.3%	5.7%	0.0%	4.7%
<b>Textiles</b>	1.0%	6.6%	0.2%	30.4%
<b>Sanitary paper</b>	0.0%	7.0%	0.0%	0.4%
<b>Rubble</b>	37.2%	5.9%	69.4%	6.6%
<b>Timber</b>	53.7%	8.3%	0.0%	24.9%
<b>Rubber</b>	0.0%	6.6%	0.0%	3.8%
<b>Potentially hazardous</b>	0.0%	1.2%	0.0%	0.3%
<b>TOTAL</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>

Construction and demolition waste was largely composed of rubble (37.2%) and timber (53.7%). Industrial/commercial/institutional waste was more heterogeneous, with plastics comprising the largest proportion (25.4%), paper comprising 14.2%, and organics 13.8%.

Only two loads of landscaping waste were included in the survey, so the composition should be considered to be indicative only.

Residential waste often includes waste from several activities, including landscaping and construction. Textiles, primarily carpeting, soft furnishings, and clothing, made up 30.4% of the residential waste. Timber, which comprised 24.9% of residential waste, included both furniture and wood from construction and demolition.

#### 4.5 Vehicle type analysis

As data was collected on each vehicle load of waste disposed of at Mt Cooe landfill during the survey, the vehicle type was recorded, using the classifications described in Appendix 2. Table 4.4 shows the number and percentage of loads transported by each of the vehicle types during the survey period, the percentage of total weight carried by each vehicle type, and the tonnes per week. The vehicle type analysis includes general waste, kerbside waste, and special wastes.

The average weekly tonnages for compactors, gantry trucks, and front-loader trucks have been taken directly from weighbridge records for a four-week period. The weekly tonnages for the other vehicle types have been calculated from survey results.

**Table 4.4 - Vehicle type analysis - 22 April - 19 May 2017**

<b>Mt Cooe landfill - Vehicle type analysis 22 April - 19 May 2017</b>	<b># of loads surveyed</b>	<b>% of loads</b>	<b>% of total weight</b>	<b>Tonnes/week</b>
<b>Car-sized loads</b>	18	15%	0.4%	1 T/week
<b>Compactors</b>	16	13%	35%	59 T/week
<b>Front-loader trucks</b>	19	15%	36%	61 T/week
<b>Gantry trucks</b>	8	6%	8%	14 T/week
<b>Other trucks</b>	3	2%	6%	11 T/week
<b>Trailer-sized loads</b>	60	48%	14%	23 T/week
<b>TOTAL</b>	<b>124</b>	<b>100%</b>	<b>100%</b>	<b>168 T/week</b>

While 48% of waste loads were delivered to Mt Cooe landfill in trailer-sized loads, these loads accounted for only 14% of the total weight of waste.

Front-loader trucks and compactors represented 15% and 13% of loads, respectively. As both types of vehicles carry larger than average loads, each disposed of 35-36% of the total weight of waste.

Gantry trucks comprised 6% of loads in total, and accounted for 8% of the total weight of waste. Car-sized loads comprised 15% of loads but delivered less than 1% of the waste, by weight. Other trucks delivered 6% of all waste.

#### 4.6 Primary composition of general waste - by vehicle type

The primary compositions of loads carried by vehicles that disposed of general waste are shown in Table 4.5. The secondary compositions are shown in Appendix 6.

**Table 4.5 - Primary composition of general waste - by vehicle type - 22 April - 19 May 2017 (excludes kerbside waste and special wastes)**

<b>Mt Cooee landfill - General waste composition - By vehicle type Excludes kerbside waste and Special wastes 22 April - 19 May 2017</b>	<b>Cars</b>	<b>Front-loaders</b>	<b>Gantry trucks</b>	<b>Other trucks</b>	<b>Trailers</b>
<b>Paper</b>	10.8%	14.5%	8.9%	0.2%	3.4%
<b>Plastics</b>	11.7%	27.2%	11.4%	0.2%	3.6%
<b>Organics</b>	19.5%	15.8%	1.9%	27.5%	2.9%
<b>Ferrous metals</b>	3.7%	3.5%	8.0%	0.0%	5.7%
<b>Non-ferrous metals</b>	0.3%	0.9%	0.4%	0.0%	0.2%
<b>Glass</b>	10.0%	3.6%	11.1%	0.0%	4.9%
<b>Textiles</b>	25.5%	7.5%	2.1%	0.0%	10.5%
<b>Sanitary paper</b>	2.6%	8.0%	1.0%	0.0%	0.3%
<b>Rubble</b>	0.8%	5.5%	22.7%	64.2%	21.1%
<b>Timber</b>	13.9%	7.8%	32.3%	8.0%	31.8%
<b>Rubber</b>	0.7%	4.5%	0.0%	0.0%	15.5%
<b>Potentially hazardous</b>	0.4%	1.4%	0.3%	0.0%	0.2%
<b>TOTAL</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>

## 5 Overall waste to tip face

### 5.1 Activity sources of overall waste to tip face

An analysis of the activity sources of waste loads that were surveyed is given in Table 5.1 below and Figure 5.1 on the next page. The analysis includes both the four activity sources that make up the general waste stream (C&D, ICI, landscaping, and residential) and the three activity sources that are not classified as general waste - kerbside waste, rural transfer stations, and special wastes.

The final column in the table shows the average weight per week of each activity source of waste. The tonnages for kerbside waste and special wastes have been taken directly from the analysis of the weighbridge records. The tonnage for rural transfer stations is based on estimates provided to Council by the collectors. The tonnage for the remainder of the categories was based on the percentages of the general waste stream as determined from the survey. The tonnage for the general waste stream was calculated by deducting the weight of kerbside collections, rural transfer stations, and special wastes from the total tonnage disposed of at the tip face.

The analysis does not include greenwaste disposed of at the separate drop-off point or glass or recyclables disposed of in the recycling area bins.

**Table 5.1 - Activity sources of overall waste to tip face - 22 April - 19 May 2017**

Mt Cooee landfill - Overall waste to tip face - By activity source - 22 April - 19 May 2017	% of loads	% of total weight	Tonnes per week
<i>Construction and demolition</i>	16%	9%	15 T/week
<i>Industrial/commercial/institutional</i>	30%	47%	79 T/week
<i>Landscaping</i>	2%	4%	7 T/week
<i>Residential</i>	40%	3%	6 T/week
<b>General waste - subtotal</b>	<b>87%</b>	<b>63%</b>	<b>106 T/week</b>
<b>Kerbside waste collections</b>	13%	35%	59 T/week
<b>Rural transfer stations</b>	NA	0.4%	1 T/week
<b>Special wastes</b>	0	2%	3 T/week
<b>TOTAL</b>	<b>100%</b>	<b>100%</b>	<b>168 T/week</b>

Industrial/commercial/institutional activity was the largest single source of waste disposed of at the Mt Cooee landfill tip face, comprising 47% of the total weight. Seventy-eight percent of ICI waste was transported by front-loader trucks. Council's kerbside waste collection was the second largest activity source, comprising 35% of the total weight.

Although 40% of loads surveyed were residential waste, residential waste comprised only 3% of the total weight. Residential loads included many vehicles disposing of a small number of rubbish bags.



Rural transfer station waste is collected by both front-loader vehicles and kerbside collection compactors. Estimates of tonnages provided to Council by the collection contractors indicate that rural transfer station waste comprises about 0.4% of waste.

No loads of special waste were disposed of during the survey period, but vehicles classified as 'Special waste' by the weighbridge comprised 2% of the total weight. Special wastes disposed of at Mt Cooe landfill include sludges, grease trap and mud sump, wool and animal skins, meat processing putrescible waste, and small animal carcasses.

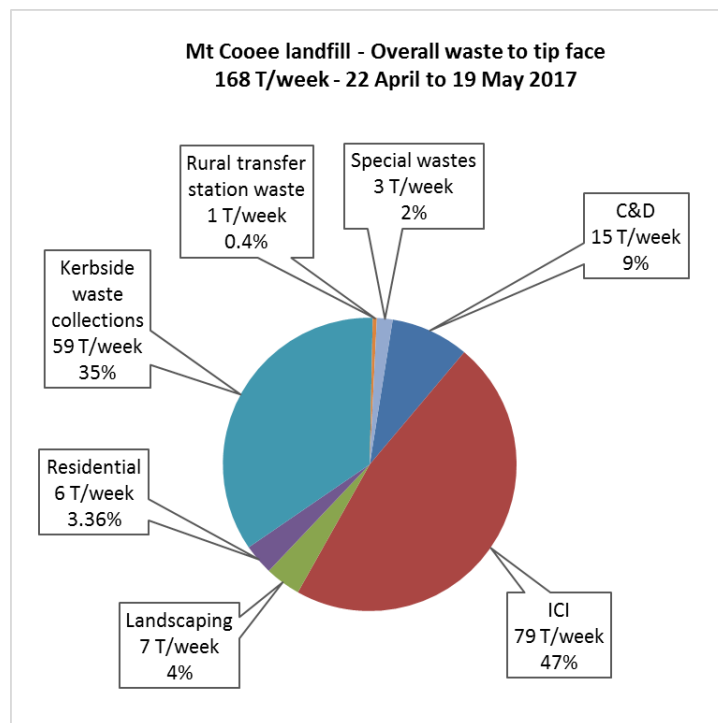


Figure 5.1 - Overall waste to tip face - by activity source - 22 April - 19 May 2017

## 5.2 Primary composition of overall waste stream to tip face

The composition of the overall waste stream being disposed of at Mt Cooe landfill tip face is calculated by combining three separate waste streams:

1. Council kerbside waste collections - composition as analysed in section 3.2
2. General waste - composition as analysed in section 4.3 (assumed to be the same as rural transfer station waste)
3. Special wastes - an assumption has been made that all hazardous wastes are potentially hazardous materials.

The composition of the overall waste stream being disposed of at Mt Cooe landfill tip face was calculated by combining the compositions of the four waste streams in the proportions shown in Table 5.1. The primary composition of the overall waste stream is presented in Table 5.2 and Figure 5.2. The secondary composition is presented in Appendix 7. The analysis does not include greenwaste disposed of at the separate drop-off point or glass or recyclables disposed of in the recycling area bins

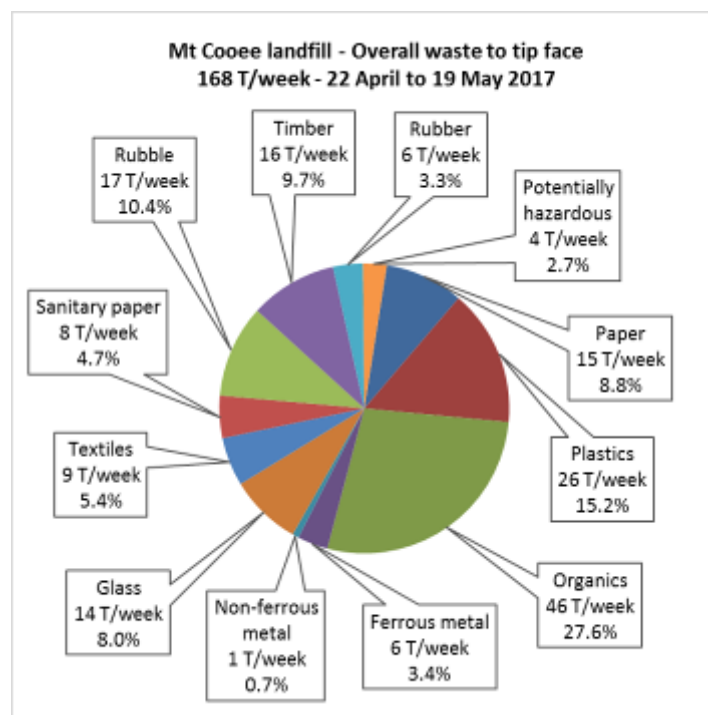
Weighbridge data provided by Council indicates that 8,892 tonnes of waste were disposed of from Mt Cooe landfill tip face from 1 May 2016 to 30 April 2017. This figure has been used to extrapolate the composition data to an annual basis. **The reliability of this extrapolation is**

*uncertain, however, as it does not take seasonal variations in waste composition into account.*

Note that in Table 5.1 the weekly total (168 T/week) is based on the 28-day period 22 April - 19 May 2017 while the annual total (8,892 T/annum) is based on Mt Cooe landfill weighbridge records for 1 May 2016 to 30 April 2017.

**Table 5.2 - Primary composition of overall waste to tip face - 22 April - 19 May 2017**

Mt Cooe landfill tip face - Overall waste composition - 22 April - 19 May 2017	% of total weight	Tonnes per week	Tonnes per annum (indicative only)
Paper	8.8%	15 T/week	778 T/annum
Plastics	15.2%	26 T/week	1,356 T/annum
Organics	27.6%	46 T/week	2,456 T/annum
Ferrous metals	3.4%	6 T/week	301 T/annum
Non-ferrous metals	0.7%	1 T/week	65 T/annum
Glass	8.0%	14 T/week	715 T/annum
Textiles	5.4%	9 T/week	483 T/annum
Sanitary paper	4.7%	8 T/week	419 T/annum
Rubble	10.4%	17 T/week	921 T/annum
Timber	9.7%	16 T/week	866 T/annum
Rubber	3.3%	6 T/week	296 T/annum
Potentially hazardous	2.7%	4 T/week	236 T/annum
<b>TOTAL</b>	<b>100.0%</b>	<b>168 T/week</b>	<b>8,892 T/annum</b>



**Figure 5.2 - Primary composition of overall waste to tip face - 22 April - 19 May 2017**

Organic material comprised the largest primary classification of the overall waste stream, representing 27.6% of the total. Over three-quarters of all organics was in kerbside waste. Plastics was the second largest classification, comprising 15.2%. Over three-quarters of all plastics was in ICI waste. Paper, glass, rubble, and timber each represented from 7-10% of the total weight.

### 5.3 Diversion potential of overall waste stream to tip face

Systems have been established in Clutha District for the separation and recovery of many recyclable and compostable materials. Council provides residents with a fortnightly kerbside collection of recyclable paper and containers. Mt Cooe landfill has separate drop-off points for greenwaste, scrap metals, glass, and recyclable paper and containers. Cleanfill is accepted separately at the landfill and used, on occasion, for site engineering purposes. Householders have the option to dispose of their kitchen waste and greenwaste by home composting. Clothing can be donated to charity shops or clothing bins. Some types of timber can be either re-used or used for firewood.

The table below shows the proportion of the overall waste stream currently being disposed of at Mt Cooe landfill tip face that could potentially be diverted using these existing systems and available options. The figures for each material are taken from the secondary composition in Appendix 7.

**Table 5.3 - Diversion potential of overall waste stream to Mt Cooe landfill tip face**

Overall waste to Mt Cooe landfill tip face - Diversion potential 22 April - 19 May 2017	% of total weight	Tonnes per week
<b>Recyclable and recoverable materials</b>		
Paper - Recyclable	3.7%	6 T/week
Paper - Cardboard	4.3%	7 T/week
Plastic - Recyclable	1.3%	2 T/week
Ferrous metals	3.4%	6 T/week
Non-ferrous metals	0.7%	1 T/week
Glass - Recyclable	6.6%	11 T/week
Textiles - Clothing	1.9%	3 T/week
Rubble - Cleanfill	3.5%	6 T/week
Timber - Reusable	0.3%	1 T/week
Timber - Untreated/unpainted	1.4%	2 T/week
<b>Subtotal</b>	<b>27.0%</b>	<b>45 T/week</b>
<b>Compostable materials</b>		
Organics - Kitchen waste	11.0%	19 T/week
Organics - Compostable greenwaste	10.2%	17 T/week
<b>Subtotal</b>	<b>21.2%</b>	<b>36 T/week</b>
<b>TOTAL – Potentially divertable</b>	<b>48.2%</b>	<b>81 T/week</b>

Recyclable and recoverable materials comprised 27.0% of overall waste to landfill. Compostable materials comprised 21.2%. Overall, approximately 48.2%, or 81 T/week, of the overall waste could have been diverted from landfill disposal.

The largest single divertable component was kitchen waste, which comprised 11.0% of the overall waste stream. Of the 19 T/week of kitchen waste disposed of to landfill, 65% was in Council's kerbside waste collection.

The second largest divertable component was compostable greenwaste, which comprised 10.2% of the overall waste stream. Of the 17 T/week of greenwaste disposed of to landfill, 74% was in Council's kerbside waste collection.

The diversion figures represent theoretical maximums only, as no recovery system is capable of diverting 100% of a material from landfill disposals.

Photos of vehicle loads of waste with significant resource recovery potential are shown in section 7.7.

## 6 Levied waste to Mt Cooee landfill

The Waste Minimisation Act 2008 imposes a levy on all waste disposed of at a disposal facility (as defined by the Act). Section 26(3) of the Acts states that the levy does not apply to disposal of a waste material if,

- not later than 6 months after its deposit (or any later time that the Secretary has agreed to in writing), the waste is —*
- (a) reused or recycled; or*
  - (b) recovered or treated on the land and removed from the land for deposit elsewhere; or*
  - (c) removed from the land for any other reason.*

This section of the Act is of particular relevance to two waste streams disposed of at Mt Cooee landfill - greenwaste and glass - which have not been included in previous analyses.

The weight of greenwaste disposed of at the separate drop-off point is recorded under a separate classification at the weighbridge. The greenwaste is stockpiled on the site and eventually either disposed of as waste or used for cover material. Council has indicated that the waste levy is paid on loads of greenwaste classified as such at the weighbridge.

Glass is not weighed or classified separately at the weighbridge. The weight of glass that is disposed of into the drop-off bins in the recycling area is estimated and recorded when the bins are emptied. Some of the glass is used for site engineering purposes, such as roading fill, but the majority is disposed of at the tip face. Council has indicated that the waste levy is paid on all glass disposed of into the drop-off bins.

In Table 6.1, the annual tonnages of greenwaste and glass, taken from data provided by Council, are added to the annual tonnage for waste disposed of directly to the tip face.

**Table 6.1 - Levied waste to Mt Cooee landfill - 1 May 2016 - 30 April 2017**

<b>Mt Cooee landfill - Levied waste - 1 May 2016 - 30 April 2017</b>	<b>% of total weight</b>	<b>Tonnes per annum</b>
<b>Waste direct to tip face</b>	96.1%	8,892 T/annum
<b>Greenwaste to drop-off area</b>	3.8%	352 T/annum
<b>Glass to drop-off bins</b>	0.1%	9 T/annum
<b>TOTAL</b>	<b>100%</b>	<b>9,253 T/annum</b>

In total, 9,253 tonnes of levied waste was disposed of at Mt Cooee landfill for the period 1 May 2016 to 30 April 2017. Ninety-six percent of this waste was disposed of directly to the tip face. Four percent was disposed of at the separate drop-off points for glass and greenwaste.

### 6.1 Primary composition of levied waste at Mt Cooee landfill

The composition of the levied waste being disposed of at Mt Cooee landfill tip face is calculated by combining the overall waste stream to the tip face, from section 5.2, and the tonnages of glass and greenwaste shown in Table 6.1. The primary composition is shown in Table 6.2 and Figure 6.1 on the next page. Secondary categories are shown in Appendix 8.

Table 6.2 - Primary composition of levied waste - 1 May 2016 - 30 April 2017

Mt Cooee landfill - Levied waste composition - 1 May 2016 - 30 April 2017	% of total weight	Tonnes per annum (indicative only)
Paper	8.4%	778 T/annum
Plastics	14.7%	1,356 T/annum
Organics	30.3%	2,807 T/annum
Ferrous metals	3.3%	301 T/annum
Non-ferrous metals	0.7%	65 T/annum
Glass	7.8%	724 T/annum
Textiles	5.2%	483 T/annum
Sanitary paper	4.5%	419 T/annum
Rubble	10.0%	921 T/annum
Timber	9.4%	866 T/annum
Rubber	3.2%	296 T/annum
Potentially hazardous	2.5%	236 T/annum
<b>TOTAL</b>	<b>100.0%</b>	<b>9,253 T/annum</b>

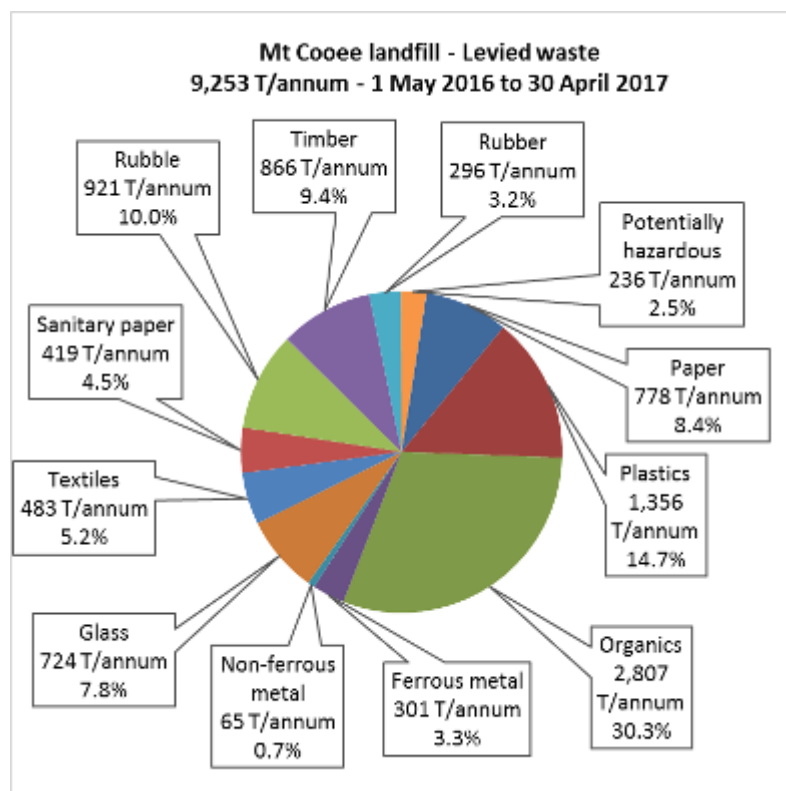


Figure 6.1 - Primary composition of levied waste - 1 May 2016 - 30 April 2017

## 7 Discussion and analysis

### 7.1 Comparison of survey period to annual tonnage

The figure for the overall tonnage of waste being disposed of at Mt Cooe landfill tip face that has been used in this report is based on weighbridge records for 22 April - 19 May 2017. These records showed an average of 168 tonnes per week of residual waste being disposed of at the Mt Cooe landfill tip face. This figure does not include greenwaste or glass disposed of at the separate drop-off points.

In the period 22 April - 19 May 2017, an average of 16.1 T/week of greenwaste was disposed of at the separate drop-off point. Based on the weighbridge monthly summary provided by Council, approximately 0.23 T/week of glass was disposed of at the separate drop-off point in April 2017. In total, it is estimated that 185 T/week of levied waste was disposed of at Mt Cooe landfill from 22 April - 19 May 2017.

Figure 7.1 below shows the weekly tonnage of levied waste to landfill on a month-by-month basis for the period May 2016 to April 2017. The weekly tonnages have been calculated from monthly weighbridge summaries provided by Council. Both greenwaste and glass disposed of at the separate drop-off points are included in this total.

The estimated figure of 185 T/week of levied waste for the period 22 April - 19 May 2017, as applied to the SWAP survey results in section 6, is 4% higher than the annual average of 177 T/week of levied waste shown in the graph.

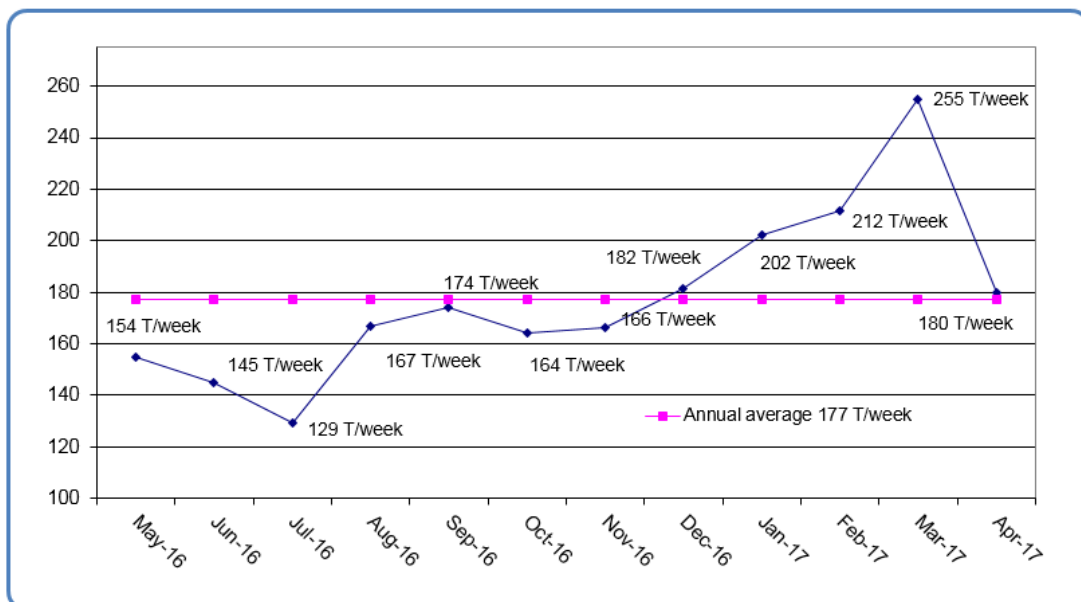


Figure 7.1 - Average weekly tonnage of levied waste to Mt Cooe landfill - by month

## 7.2 Per capita disposal of kerbside waste

The per capita per annum disposal of kerbside waste for residents of Clutha District is calculated in Table 7.1. The annual tonnage for kerbside waste is taken from weighbridge summaries provided by Council for the period May 2016 - April 2017. There is not sufficient data available to calculate a disposal rate solely for domestic kerbside waste (i.e. kerbside waste solely from residential, not commercial, properties). Some commercial properties are serviced by Council's kerbside collections. Commercial kerbside waste typically constitutes approximately 5-10% of kerbside waste.

**Table 7.1 - Per capita disposal of kerbside waste - May 2016 - April 2017**

<b>Population Clutha District (Stats NZ subnational population estimates 2013-2043)</b>	17,400
<b>Council kerbside waste collection</b>	3,577 T/annum
<b>Per capita disposal of kerbside waste</b>	<b>0.206 T/capita/annum</b>

The 3,577 tonnes of kerbside waste collected in 2016/17 in Clutha District equated to 206 kg per capita per annum. This figure is compared to that of other districts in Table 7.2.

**Table 7.2 - Comparison of kerbside waste disposal rate with other districts**

District and year of survey	Kg/capita/ annum	Comment
<b>Gisborne District 2010</b>	103	Rates-funded rubbish bag stickers
<b>Christchurch City 2011</b>	110	Fortnightly 140-litre refuse MGB. Weekly organic collection
<b>Hauraki District 2011</b>	145	User-pays rubbish bags
<b>South Taranaki District 2010</b>	149	Rates-funded weekly 120-litre MGB
<b>Auckland Council 2012</b>	160	Range of legacy council services.
<b>Waimakariri District 2012</b>	165	User-pays rubbish bags + private MGBs
<b>Selwyn District 2013</b>	165	User-pays rubbish bags and MGBs
<b>Gore District 2011</b>	180	User-pays rubbish bags, no kerbside recycling
<b>Hamilton City 2013</b>	182	Rates-funded rubbish bags, max. 2 per week
<b>Clutha District 2017</b>	206	Rates-funded 240-litre wheelie bin fortnightly
<b>Wellington region 2014/15</b>	206	User-pays rubbish bags + private MGBs
<b>Tauranga City and Western Bay of Plenty District 2014/15</b>	212	User-pays rubbish bags + private MGBs in Tauranga. Private MGBs + bags in WBoP.
<b>Taupō District 2013</b>	212	User-pays rubbish bags + privately collected MGBs
<b>Hastings District / Napier City 2016</b>	225	User-pays rubbish bags (Hastings) & rates-funded bags max. 2 bags/week(Napier) + private MGBs

The rates of kerbside waste disposal in different areas are associated with the types of waste collection services available and their rate of uptake, the type and usage of kerbside recycling



services, and the usage of wheelie bin services by the commercial sector relative to other waste services, such as gantry bins and front-loader bins. Other factors are the use of burning and burying of domestic waste, particularly on rural properties, and the proportion of households that dispose of domestic rubbish bags at transfer stations.

Clutha District's kerbside waste disposal rate of 206 kg/capita/annum is relatively high compared to other areas. Of particular relevance to Clutha District is the use of 240-litre wheelie bins for the collection of kerbside waste. The use of large wheelie bins generally results in householders disposing of materials such as greenwaste and ash in the kerbside waste collection rather than using alternative disposal methods. Households that use plastic rubbish bags for their kerbside waste dispose of much less greenwaste and ash than users of wheelie bins.

As not all rural properties are service by Council's collection, the actual per capita disposal rate for serviced properties is markedly higher. At an average of 2.4 people per dwelling (Stats NZ 2013 census), the 5,500 properties that receive Council's kerbside waste collection service would have a population of 13,200 people. The per capita disposal rate for service properties equates to 271 kg/capita/annum.

### 7.3 Per capita disposal of levied waste to landfill

The per capita disposal of waste to Mt Cooe landfill from Clutha District for the period May 2016 - April 2017 is calculated as shown in Table 7.3 below.

**Table 7.3 - Per capita disposal of waste to landfill - 2016/17**

<b>Population Clutha District (Stats NZ subnational population estimates 2013-2043)</b>	17,400
<b>Levied waste to Mt Cooe landfill</b>	9,253 T/annum
<b>Per capita disposal of waste</b>	<b>0.532 T/capita/annum</b>

The 9,253 tonnes of levied waste disposed of at Mt Cooe landfill tip face from Clutha District for the period May 2016 - April 2017 equates to 532 kg per capita per annum. Clutha District's disposal rate is compared to disposal figures from other local authorities previously surveyed by Waste Not Consulting in Table 7.4. The national average in Table 7.4 has been calculated using tonnage figures from MfE's waste levy data <sup>3</sup> and Stats NZ usually resident population estimates<sup>4</sup>.

<sup>3</sup> <http://www.mfe.govt.nz/waste/waste-disposal-levy/monthly-levy-graph>

<sup>4</sup> [http://www.stats.govt.nz/browse\\_for\\_stats/population/estimates\\_and\\_projections/NationalPopulationEstimates\\_HOTPA30Jun16.aspx](http://www.stats.govt.nz/browse_for_stats/population/estimates_and_projections/NationalPopulationEstimates_HOTPA30Jun16.aspx)

**Table 7.4 - Per capita disposal rate compared to other local authorities**

Overall waste to landfill including special wastes (excluding unlevied cover materials)	Tonnes per capita per annum
Gisborne District 2010	0.305
Waimakariri District 2012	0.311
Westland District 2011	0.331
Ashburton District 2015	0.366
Southland region 2011	0.500
Tauranga and WBOP District 2014/15	0.524
Christchurch City 2012	0.524
Taupō District 2013	0.528
Clutha District 2017	0.532
Napier/Hastings 2016	0.548
Wellington region 2016	0.608
Hamilton City 2013	0.668
New Zealand 2016	0.713
Queenstown Lakes District 2012	0.735
Rotorua District 2009	0.736
Auckland region 2012	0.803

The per capita rate of levied waste disposed at Mt Coovee landfill from Clutha District is close to the average of the areas shown. The areas included in the table, however, are not necessarily representative of all districts in New Zealand. Per capita disposal rates are affected by a number of factors, including the level economic activity, particularly manufacturing and construction activity, landfill gate charges, and other disposal options.

The per capita disposal rate for Clutha District may be slightly higher than other similar areas as a result of the availability of rural farm waste collections. A local waste operator provides front-loader bin services to many of the rural areas in Clutha District. The service appears, anecdotally, to be relatively well-utilised. Such services are relatively uncommon. The uptake of this service would result in more farm waste being disposed of to landfill rather than being burned or buried, the traditional rural methods of disposing of waste.

## 7.4 Activity source of waste - comparison with other areas

Using the methodology described in section 2.3.3 for determining the activity sources of residual waste, Waste Not Consulting has conducted surveys for a large number of territorial authorities. This allows for a comparison to be made between the overall waste streams in these districts.

Table 7.5 compares the proportions of the different activity sources of waste from four other districts with Clutha District in 2017. The 2017 Mt Cooe landfill data has been taken from Table 5.1, but has been re-calculated to remove special wastes. Special wastes disposed of to landfill have been excluded from the analysis to provide a more meaningful comparison.

**Table 7.5 - Comparison of activity sources of waste with other districts**

Activity sources of waste to landfill - excludes special wastes	Christchurch City	Ashburton District	Taranaki Region	Waimakariri District	Clutha District
Year of audit	2012	2015	2016	2012	2017
<i>C&amp;D</i>	28%	17%	15%	17%	9%
<i>ICI</i>	31%	46%	43%	20%	47%
<i>Landscaping</i>	4%	0.2%	3%	5%	4%
<i>Residential</i>	7%	6%	9%	14%	3%
<b>Subtotal - General waste</b>	<b>71%</b>	<b>70%</b>	<b>70%</b>	<b>57%</b>	<b>63%</b>
<b>Kerbside waste collections</b>	29%	28%	30%	41%	35%
<b>Transfer station waste</b>	NA	2%	NA	2%	0.4%
<b>TOTAL</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

The relative proportions of the activity sources of waste in each district reflect the nature and level of economic activity in the area and other factors, such as earthquake reconstruction in Christchurch and Waimakariri. Relative to the other areas, Clutha District has low levels of both C&D waste and residential waste. The low level of residential waste being disposed of at the landfill during the visual survey may have been related to other events in Clutha, particularly the opening of the duck season.

## 7.5 Diversion potential of kerbside waste compared with other local authorities

Table 7.6 compares the diversion potential of Clutha District Council domestic kerbside waste 240-litre wheelie bins with that of 240-litre wheelie bins in four other districts.

**Table 7.6 - Comparison of diversion potential of kerbside waste with other districts**

Comparison of diversion potential of kerbside waste 240-litre wheelie bins	New Plymouth March 2012	Upper Hutt July 2015	Napier/ Hastings April 2016	Selwyn April 2014	Clutha May 2017
<b>RECYCLABLE MATERIALS</b>					
Paper - Recyclable	9.6%	9.6%	4.9%	7.6%	4.2%
Plastics - # 1 to 7	1.7%	3.8%	1.5%	1.3%	2.3%
Steel cans	1.0%	1.2%	0.6%	1.2%	1.0%
Aluminium cans	0.3%	0.3%	0.3%	0.2%	0.4%
Glass bottles/jars	6.3%	9.7%	3.0%	3.2%	13.8%
<b>Subtotal</b>	<b>18.9%</b>	<b>24.5%</b>	<b>10.2%</b>	<b>14.7%</b>	<b>21.7%</b>
<b>COMPOSTABLE MATERIALS</b>					
Kitchen waste	12.9%	23.5%	15.4%	25.4%	20.5%
Greenwaste	46.5%	10.1%	59.2%	25.3%	24.0%
<b>Subtotal</b>	<b>59.4%</b>	<b>33.6%</b>	<b>74.6%</b>	<b>50.7%</b>	<b>44.5%</b>
<b>TOTAL – POTENTIALLY DIVERTABLE</b>	<b>78.3%</b>	<b>58.1%</b>	<b>84.8%</b>	<b>65.4%</b>	<b>66.2%</b>
<b>Total kg per wheelie bin</b>	<b>21.01 kg</b>	<b>17.89 kg</b>	<b>23.15 kg</b>	<b>18.97 kg</b>	<b>25.96 kg</b>
<b>Divertable kg per household set out</b>	<b>16.45 kg</b>	<b>10.40 kg</b>	<b>19.63 kg</b>	<b>12.40 kg</b>	<b>17.19 kg</b>

The diversion potentials of the five 240-litre wheelie bin kerbside waste collection services shown vary to a considerable extent, ranging from 58.1% in Upper Hutt to 84.8% in Napier/Hastings. Clutha District is in the middle of the range. The greatest variation between the areas is in the proportion of greenwaste. While the Upper Hutt wheelie bins contained 10.1% greenwaste, those in Napier/Hastings contained 59.2% greenwaste. Some of this difference in the proportion of greenwaste is seasonally-related, with the Upper Hutt audit taking place in winter.

Clutha District wheelie bins contained the second highest proportion of recyclable materials, primarily due to the high proportion of glass bottles/jars, which are not accepted in the Clutha kerbside recycling collection. The highest proportion of recyclable materials is in Upper Hutt, where the kerbside recycling services are provided privately, not by council.

The average weight per wheelie bin is higher in Clutha District than the other areas. However, it needs to be taken into account that Clutha District bins are collected fortnightly. Bins in the other areas, which, other than Selwyn District, are those of private waste operators, are generally on a weekly collection schedule.

## 7.6 Comparison to results of 2008 and 2011 SWAP audits

Council commissioned seven-day sort-and-weigh SWAP audits of the waste landfilled at Mt Cooee in December 2008 and again in August 2011.

The 2011 audit used the eight categories stipulated under the Climate Change (Unique Emissions Factors) Regulations 2009, rather than being based on the 12 primary SWAP categories that were used in the 2008 and 2017 audits. There is enough similarity between the two classification systems that the results of the 2008 and 2017 audits can be aggregated to match the categories used in the 2011 audit.

Table 7.7 compares the results of the 2008, 2011, and 2017 audits at Mt Cooee landfill in terms of the eight categories used for the 2011 audit.

**Table 7.7 - Comparison of 2008, 2011, and 2017 SWAP audits at Mt Cooee landfill**

<b>Comparison of 2008, 2011, and 2017 SWAP audits at Mt Cooee landfill</b>	<b>2008</b>	<b>2011</b>	<b>2017</b>
<b>Garden waste</b>	14%	13%	15%
<b>Nappy/sanitary waste</b>	2%	5%	5%
<b>Putrescible waste other than Garden Waste</b>	10%	23%	16%
<b>Paper waste</b>	21%	12%	8%
<b>Sewage sludge</b>	7%	7%	0%
<b>Timber waste</b>	9%	6%	9%
<b>Textile waste</b>	3%	2%	5%
<b>All other waste</b>	35%	31%	42%
<b>TOTAL</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

7.7 Photos of waste with resource recovery potential



Cardboard in a commercial load



Steel in a residential load



Untreated timber



Concrete from a tip truck load



Greenwaste in kerbside waste



Cardboard in a commercial load

## Appendix 1 - Waste classifications

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### KERBSIDE WASTE AUDIT CLASSIFICATIONS

Primary category	Secondary category	Description
<b>Paper</b>	Paper recyclable	Newspapers, magazines, junk mail, envelopes, flattened cardboard boxes, shoe boxes, cartons, old phone books
	Paper non-recyclable	Heavily food-contaminated pizza boxes etc., gabletop beverage packaging, Tetra Pak, photographic paper, playing cards, laminated paper, plastic coated paper and card
<b>Plastic</b>	#1-2 container	Clean, rigid household plastic containers numbered 1-2.
	#3-7 containers	Clean, rigid household plastic containers numbered 3-7.
	Plastic bags & film	Plastic shopping bags, bread bags, non-rigid plastic packaging and film
	Plastic non-recyclable	All other non-recyclable items made primarily of plastic, meat trays, expanded polystyrene
<b>Organics</b>	Kitchen waste	All kitchen waste
	Greenwaste	All greenwaste (lawn clippings, plants, tree branches, etc.)
	Organic other	Includes cat tray litter, hair, vacuum cleaner bags
<b>Steel</b>	Steel cans	All steel cans including aerosols
	Steel other	All non-packaging items made primarily of ferrous metal
<b>Nonferrous metal</b>	Aluminium cans	All aluminium cans, clean foil trays, clean foil, aerosols
	Non-ferrous other	Items such as aluminium frying pans, pots, electrical wire
<b>Glass</b>	Glass bottles/jars	Whole bottles and jars, with the lids and contents removed
	Glass other	All other items made primarily of glass, includes light bulbs, drinking glasses, and window pane
<b>Textiles</b>	Clothing & rags	All items primarily made of a fabric, such as clothes, curtains, that are suitable for rags
	Textile other	Includes shoes, backpacks, handbags, rugs
<b>Sanitary paper</b>	-	Includes disposable nappies, paper towels, tissues
<b>Rubble</b>	-	All concrete, ceramics, fibreglass, rubble, and soil
<b>Timber</b>	-	All items made primarily of timber
<b>Rubber</b>	-	All items made primarily of rubber (e.g. kitchen gloves)
<b>Potentially hazardous</b>	Household hazardous	Batteries, aerosol cans, containers of medicines and cosmetics, cleaning agents, and smoke detectors
	Hazardous other	Potentially hazardous items not associated with domestic activity, such as used oil and garden chemicals.

## VISUAL SURVEY CLASSIFICATIONS

Primary category	Secondary category	Description
<b>Paper</b>	Recyclable	Newspapers, magazines, office paper, etc.
	Cardboard	Kraft cartons
	Paper non-recyclable	Multimaterials, building paper, contaminated paper
<b>Plastics</b>	Recyclable	Containers with recycling logo 1-7
	Plastics non-recyclable	Other types of plastic and primarily plastic multimaterials
<b>Organic</b>	Kitchen/food	Food and food preparation waste
	Compostable greenwaste	Lawn clippings, hedge clippings, leaves, tree trimmings with branches less than 150mm diameter, and garden weeds
	Non-compostable greenwaste	Flax, cabbage tree, palm fronds, branches over 150mm
	Organic other	Organic matter such as meat processing waste
<b>Ferrous metals</b>	Primarily ferrous	Items made primarily of steel
	Multimaterials	Ferrous items containing a sizable proportion of other materials
<b>Nonferrous metals</b>	Primarily nonferrous	Items made primarily of nonferrous metal
<b>Glass</b>	Recyclable	Bottles and jars
	Other glass	Includes glass pane, CRT TVs, and computer monitors
<b>Textiles</b>	Clothing/textile	Items made primarily of cloth or textiles
	Multimaterial/other	Items containing some textile and other materials, such as carpets, shoes, backpacks, suitcases
<b>Sanitary paper</b>	None	Sanitary materials such as nappies, paper towels, feminine hygiene products
<b>Rubble</b>	Cleanfill	All materials suitable for cleanfill disposal
	Other	Other materials such as soil, ceramics, plasterboard
<b>Timber</b>	Reusable	Lengths of timber and pieces of sheet suitable for reuse
	Unpainted & untreated	Unpainted and untreated lengths of timber
	Multimaterial/other	Sawdust, construction and demolition debris, CCA-treated wood, MDF
<b>Rubber</b>	-	All items made primarily of rubber such as tyres, latex foam mattresses
<b>Potentially hazardous</b>	-	Material with potentially toxic or ecotoxic properties or having properties requiring special disposal techniques.



## Appendix 2 - Types of waste disposal vehicles

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### FRONT-LOADER TRUCKS

“Front-loaders” are top-loading compactors that use forks mounted to the front of the vehicle to lift bins over the cab and tip the contents of the bin into the compactor unit at the rear. Front-loaders work primarily in urban areas, regularly servicing medium to large-scale industrial, commercial, and institutional customers. In general, a business using front-loader bins would be serviced at least weekly, but can be serviced several times a day for a business like a large supermarket. Front-loaders vary in size, and may carry loads from 4 to 10 tonnes. A single load may contain waste from ten to fifty customers.



The potential for the recovery of materials from waste transported by front-loaders is limited. The waste load is compacted by the truck, and the loads tend to be large and heterogeneous. This restricts significantly the potential for manually separating recoverable materials when the load is discharged on a tipping floor. There are usually not significant quantities of easily-separable materials other than cardboard packaging in front-loader waste.

### GANTRY TRUCK

“Gantry trucks” are used to transport gantry bins (skip bins) from customers’ premises to a disposal facility. Gantry truck services are used by industrial, commercial, institutional, and residential customers. Some large-scale commercial waste generators use gantry bins as their regular disposal system. Residential customers and business customers both use gantry bins for one-off large-scale waste removal. Some commercial customers, such as hotels and supermarkets, use portable, stationary waste compactors that are transported for disposal by gantry trucks. Gantry bins are often used for special wastes, such as sludges, asbestos, and animal by-products



Typical gantry truck loads weigh from 0.5-3 tonnes. As most waste transported in gantry bins is not compacted, there is often opportunity for manually recovering materials from gantry bins when discharged onto a tipping floor. Gantry bins often contain significant quantities of recoverable materials, such as timber and packaging and reusable items can be recovered intact from residential loads.

### HOOK TRUCK

Hook trucks (or “huka”trucks) transport bins that can be loaded and unloaded from the rear of the truck for transport and that can be emptied quickly like a tip truck. Hook bins are used by large-scale waste generators, either for regular waste disposal or one-off waste removal. Hook trucks are often used for transporting 25 or 30-cubic metre bins from transfer stations to landfills or large stationary compactors. Hook bins are also used for large-scale transport of recovered materials, such as cardboard and metal. Hook bins are rarely used for residential waste disposal. SmartSkip trucks load bins in a different manner than hook trucks, but are used for the same purposes.



The potential for material recovery from hook bins is similar to that for gantry bins.

### KERBSIDE COLLECTION VEHICLES

Side-loading and rear-loading compactors are commonly used for the kerbside collection of residential and small business waste. They can be designed to service bagged waste collections, wheelie bin waste collections, or both. Side-loading compactors can be used for bag collections or fitted with hydraulic arms for emptying wheelie bins without the driver leaving the vehicle. Rear-loading compactors can also be used for bag collections or fitted with hydraulic arms for emptying bins. Non-compacting trucks are also used for kerbside collections, but are less common, as the economics of transporting uncompacted waste are less favourable.



As kerbside collection vehicles collect small quantities of waste from a large number of customers and the waste is heavily compacted, there is little opportunity for manually recovering materials from the waste.

### OTHER TRUCKS

Other truck types commonly used for the transport of waste include tip trucks, box trucks, and flat decks. Tip trucks are most commonly used for the transport of waste from landscaping, earthworks, and construction and demolition activity. Box trucks are rarely used as dedicated waste transport vehicles, but are often used for waste transport by businesses that also use them for goods pick-up and delivery. Flat decks are used for the transport of bulky waste items, or by general carriers for the disposal of stackable items, such as pallets.

## Appendix 3 - Council's 240-litre waste wheelie bins

Clutha District Council - Domestic kerbside waste in 240-litre wheelie bins 22 April - 19 May 2017 <small>(Margins of error for 95% confidence level)</small>		% of total weight	Mean wt. per wheelie bin	Tonnes per week
Paper	Recyclable	4.2% (±1.2%)	1.09 kg (±0.31 kg)	2.5 T/week
	Non-recyclable	0.8% (±0.2%)	0.21 kg (±0.04 kg)	0.5 T/week
	<b>Subtotal</b>	<b>5.0% (±1.2%)</b>	<b>1.30 kg (±0.32 kg)</b>	<b>2.9 T/week</b>
Plastics	# 1-2 containers	1.8% (±0.3%)	0.46 kg (±0.09 kg)	1.0 T/week
	# 3-7 containers	0.6% (±0.1%)	0.14 kg (±0.04 kg)	0.3 T/week
	Plastic bags/ film	3.7% (±0.5%)	0.95 kg (±0.12 kg)	2.1 T/week
	Other non-recyclable	2.3% (±0.7%)	0.59 kg (±0.18 kg)	1.3 T/week
	<b>Subtotal</b>	<b>8.2% (±1.1%)</b>	<b>2.14 kg (±0.28 kg)</b>	<b>4.8 T/week</b>
Organics	Kitchen waste	20.5% (±3.6%)	5.32 kg (±0.94 kg)	12.0 T/week
	Greenwaste	24.0% (±8.2%)	6.23 kg (±2.12 kg)	14.1 T/week
	Organic other	11.6% (±4.7%)	3.02 kg (±1.22 kg)	6.8 T/week
	<b>Subtotal</b>	<b>56.1% (±9.3%)</b>	<b>14.57 kg (±2.41 kg)</b>	<b>32.9 T/week</b>
Ferrous metals	Steel cans	1.0% (±0.2%)	0.26 kg (±0.06 kg)	0.6 T/week
	Other steel	1.0% (±0.9%)	0.25 kg (±0.22 kg)	0.6 T/week
	<b>Subtotal</b>	<b>2.0% (±0.9%)</b>	<b>0.51 kg (±0.24 kg)</b>	<b>1.2 T/week</b>
Non-ferrous metals	Aluminium cans	0.4% (±0.1%)	0.11 kg (±0.03 kg)	0.2 T/week
	Other non-ferrous	0.4% (±0.4%)	0.11 kg (±0.10 kg)	0.3 T/week
	<b>Subtotal</b>	<b>0.9% (±0.4%)</b>	<b>0.22 kg (±0.11 kg)</b>	<b>0.5 T/week</b>
Glass	Bottles/jars	13.8% (±4.3%)	3.58 kg (±1.11 kg)	8.1 T/week
	Non-recyclable glass	0.8% (±0.6%)	0.20 kg (±0.16 kg)	0.4 T/week
	<b>Subtotal</b>	<b>14.6% (±4.4%)</b>	<b>3.78 kg (±1.14 kg)</b>	<b>8.5 T/week</b>
Textiles	Clothing/textiles	1.9% (±0.8%)	0.50 kg (±0.22 kg)	1.1 T/week
	Multimaterial/other	1.5% (±0.6%)	0.38 kg (±0.15 kg)	0.9 T/week
	<b>Subtotal</b>	<b>3.4% (±1.3%)</b>	<b>0.88 kg (±0.34 kg)</b>	<b>2.0 T/week</b>
Sanitary paper		<b>3.9% (±1.5%)</b>	<b>1.02 kg (±0.40 kg)</b>	<b>2.3 T/week</b>
Rubble		<b>3.9% (±3.6%)</b>	<b>1.00 kg (±0.93 kg)</b>	<b>2.3 T/week</b>
Timber		<b>0.8% (±0.5%)</b>	<b>0.22 kg (±0.14 kg)</b>	<b>0.5 T/week</b>
Rubber		<b>0.3% (±0.2%)</b>	<b>0.07 kg (±0.06 kg)</b>	<b>0.2 T/week</b>
Potentially hazardous	Household	0.5% (±0.5%)	0.14 kg (±0.13 kg)	0.3 T/week
	Other	0.4% (±0.5%)	0.11 kg (±0.14 kg)	0.2 T/week
	<b>Subtotal</b>	<b>0.9% (±0.7%)</b>	<b>0.25 kg (±0.19 kg)</b>	<b>0.6 T/week</b>
<b>TOTAL</b>		<b>100.0%</b>	<b>25.96 kg (±2.49 kg)</b>	<b>58.7 T/week</b>

## Appendix 4 - General waste composition

Mt Cooe landfill – General waste (excludes kerbside waste and special wastes) 22 April - 19 May 2017		% of total weight	Tonnes per week
<b>Paper</b>	Recyclable	3.8%	4 T/week
	Cardboard	6.5%	7 T/week
	Non-recyclable	0.8%	1 T/week
	<b>Subtotal</b>	<b>11.1%</b>	<b>12 T/week</b>
<b>Plastics</b>	Recyclable	0.8%	1 T/week
	Non-recyclable	18.7%	20 T/week
	<b>Subtotal</b>	<b>19.5%</b>	<b>21 T/week</b>
<b>Organics</b>	Kitchen/food	6.1%	6 T/week
	Compostable greenwaste	4.2%	4 T/week
	Non-compostable greenwaste	0.6%	1 T/week
	Other organic	1.8%	2 T/week
	<b>Subtotal</b>	<b>12.7%</b>	<b>13 T/week</b>
<b>Ferrous metals</b>	Primarily ferrous	2.0%	2 T/week
	Multi/other	2.2%	2 T/week
	<b>Subtotal</b>	<b>4.3%</b>	<b>5 T/week</b>
<b>Non-ferrous metals</b>		<b>0.7%</b>	<b>1 T/week</b>
<b>Glass</b>	Recyclable	2.8%	3 T/week
	Non-recyclable	1.9%	2 T/week
	<b>Subtotal</b>	<b>4.7%</b>	<b>5 T/week</b>
<b>Textiles</b>	Clothing/textile	1.9%	2 T/week
	Multimaterial/other	4.8%	5 T/week
	<b>Subtotal</b>	<b>6.7%</b>	<b>7 T/week</b>
<b>Sanitary paper</b>		<b>5.3%</b>	<b>6 T/week</b>
<b>Rubble</b>	Cleanfill	5.5%	6 T/week
	Other	8.7%	9 T/week
	<b>Subtotal</b>	<b>14.2%</b>	<b>15 T/week</b>
<b>Timber</b>	Reusable	0.5%	1 T/week
	Unpainted & untreated	2.2%	2 T/week
	Non-recoverable	12.2%	13 T/week
	<b>Subtotal</b>	<b>14.9%</b>	<b>16 T/week</b>
<b>Rubber</b>		<b>5.1%</b>	<b>5 T/week</b>
<b>Potentially hazardous</b>		<b>0.9%</b>	<b>1 T/week</b>
<b>TOTAL</b>		<b>100.0%</b>	<b>106 T/week</b>

## Appendix 5 - General waste by activity source

Mt Cooe landfill – General waste by activity source - (excludes kerbside waste and special wastes) 22 April - 19 May 2017		C&D	ICI	Landscaping	Residential
<b>Paper</b>	Recyclable	0.1%	4.9%	0.0%	1.2%
	Cardboard	1.1%	8.2%	0.0%	4.2%
	Non-recyclable	0.0%	1.1%	0.0%	0.0%
	<b>Subtotal</b>	<b>1.2%</b>	<b>14.2%</b>	<b>0.0%</b>	<b>5.4%</b>
<b>Plastics</b>	Recyclable	0.0%	1.0%	0.0%	0.0%
	Non-recyclable	2.0%	24.4%	0.0%	5.2%
	<b>Subtotal</b>	<b>2.0%</b>	<b>25.4%</b>	<b>0.0%</b>	<b>5.3%</b>
<b>Organics</b>	Kitchen/food	0.0%	8.1%	0.0%	1.4%
	Compostable greenwaste	1.2%	2.7%	30.2%	2.0%
	Non-compostable greenwaste	0.3%	0.6%	0.3%	0.9%
	Other organic	0.3%	2.4%	0.0%	0.5%
	<b>Subtotal</b>	<b>1.8%</b>	<b>13.8%</b>	<b>30.4%</b>	<b>4.8%</b>
<b>Ferrous metals</b>	Primarily ferrous	1.4%	2.2%	0.0%	3.1%
	Multi/other	0.1%	2.3%	0.0%	9.9%
	<b>Subtotal</b>	<b>1.4%</b>	<b>4.5%</b>	<b>0.0%</b>	<b>13.0%</b>
<b>Non-ferrous metals</b>		<b>0.3%</b>	<b>0.8%</b>	<b>0.0%</b>	<b>0.5%</b>
<b>Glass</b>	Recyclable	0.0%	3.7%	0.0%	1.2%
	Non-recyclable	1.3%	2.0%	0.0%	3.4%
	<b>Subtotal</b>	<b>1.3%</b>	<b>5.7%</b>	<b>0.0%</b>	<b>4.7%</b>
<b>Textiles</b>	Clothing/textile	0.0%	2.3%	0.0%	3.2%
	Multimaterial/other	1.0%	4.3%	0.2%	27.2%
	<b>Subtotal</b>	<b>1.0%</b>	<b>6.6%</b>	<b>0.2%</b>	<b>30.4%</b>
<b>Sanitary paper</b>		<b>0.0%</b>	<b>7.0%</b>	<b>0.0%</b>	<b>0.4%</b>
<b>Rubble</b>	Cleanfill	2.8%	0.7%	69.4%	5.4%
	Other	34.4%	5.2%	0.0%	1.1%
	<b>Subtotal</b>	<b>37.2%</b>	<b>5.9%</b>	<b>69.4%</b>	<b>6.6%</b>
<b>Timber</b>	Reusable	2.2%	0.2%	0.0%	1.2%
	Unpainted & untreated	12.8%	0.5%	0.0%	1.2%
	Non-recoverable	38.7%	7.6%	0.0%	22.5%
	<b>Subtotal</b>	<b>53.7%</b>	<b>8.3%</b>	<b>0.0%</b>	<b>24.9%</b>
<b>Rubber</b>		<b>0.0%</b>	<b>6.6%</b>	<b>0.0%</b>	<b>3.8%</b>
<b>Potentially hazardous</b>		<b>0.0%</b>	<b>1.2%</b>	<b>0.0%</b>	<b>0.3%</b>
<b>TOTAL</b>		<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>

Mt Cooe landfill – General waste by activity source - (excludes kerbside waste and special wastes) 22 April - 19 May 2017		C&D	ICI	Landscaping	Residential
<b>Paper</b>	Recyclable	0.0 T/week	3.9 T/week	0.0 T/week	0.1 T/week
	Cardboard	0.2 T/week	6.5 T/week	0.0 T/week	0.2 T/week
	Non-recyclable	0.0 T/week	0.9 T/week	0.0 T/week	0.0 T/week
	<b>Subtotal</b>	<b>0.2 T/week</b>	<b>11.2 T/week</b>	<b>0.0 T/week</b>	<b>0.3 T/week</b>
<b>Plastics</b>	Recyclable	0.0 T/week	0.8 T/week	0.0 T/week	0.0 T/week
	Non-recyclable	0.3 T/week	19.3 T/week	0.0 T/week	0.3 T/week
	<b>Subtotal</b>	<b>0.3 T/week</b>	<b>20.1 T/week</b>	<b>0.0 T/week</b>	<b>0.3 T/week</b>
<b>Organics</b>	Kitchen/food	0.0 T/week	6.4 T/week	0.0 T/week	0.1 T/week
	Compostable greenwaste	0.2 T/week	2.2 T/week	2.0 T/week	0.1 T/week
	Non-compostable greenwaste	0.0 T/week	0.5 T/week	0.0 T/week	0.1 T/week
	Other organic	0.0 T/week	1.9 T/week	0.0 T/week	0.0 T/week
	<b>Subtotal</b>	<b>0.3 T/week</b>	<b>10.9 T/week</b>	<b>2.0 T/week</b>	<b>0.3 T/week</b>
<b>Ferrous metals</b>	Primarily ferrous	0.2 T/week	1.8 T/week	0.0 T/week	0.2 T/week
	Multi/other	0.0 T/week	1.8 T/week	0.0 T/week	0.6 T/week
	<b>Subtotal</b>	<b>0.2 T/week</b>	<b>3.6 T/week</b>	<b>0.0 T/week</b>	<b>0.7 T/week</b>
<b>Non-ferrous metals</b>		<b>0.0 T/week</b>	<b>0.6 T/week</b>	<b>0.0 T/week</b>	<b>0.0 T/week</b>
<b>Glass</b>	Recyclable	0.0 T/week	2.9 T/week	0.0 T/week	0.1 T/week
	Non-recyclable	0.2 T/week	1.6 T/week	0.0 T/week	0.2 T/week
	<b>Subtotal</b>	<b>0.2 T/week</b>	<b>4.5 T/week</b>	<b>0.0 T/week</b>	<b>0.3 T/week</b>
<b>Textiles</b>	Clothing/textile	0.0 T/week	1.8 T/week	0.0 T/week	0.2 T/week
	Multimaterial/other	0.1 T/week	3.4 T/week	0.0 T/week	1.5 T/week
	<b>Subtotal</b>	<b>0.1 T/week</b>	<b>5.2 T/week</b>	<b>0.0 T/week</b>	<b>1.7 T/week</b>
<b>Sanitary paper</b>		<b>0.0 T/week</b>	<b>5.6 T/week</b>	<b>0.0 T/week</b>	<b>0.0 T/week</b>
<b>Rubble</b>	Cleanfill	0.4 T/week	0.6 T/week	4.6 T/week	0.3 T/week
	Other	5.0 T/week	4.1 T/week	0.0 T/week	0.1 T/week
	<b>Subtotal</b>	<b>5.4 T/week</b>	<b>4.7 T/week</b>	<b>4.6 T/week</b>	<b>0.4 T/week</b>
<b>Timber</b>	Reusable	0.3 T/week	0.2 T/week	0.0 T/week	0.1 T/week
	Unpainted & untreated	1.9 T/week	0.4 T/week	0.0 T/week	0.1 T/week
	Non-recoverable	5.6 T/week	6.0 T/week	0.0 T/week	1.3 T/week
	<b>Subtotal</b>	<b>7.8 T/week</b>	<b>6.6 T/week</b>	<b>0.0 T/week</b>	<b>1.4 T/week</b>
<b>Rubber</b>		<b>0.0 T/week</b>	<b>5.2 T/week</b>	<b>0.0 T/week</b>	<b>0.2 T/week</b>
<b>Potentially hazardous</b>		<b>0.0 T/week</b>	<b>1.0 T/week</b>	<b>0.0 T/week</b>	<b>0.0 T/week</b>
<b>TOTAL</b>		<b>14.5 T/week</b>	<b>79.1 T/week</b>	<b>6.6 T/week</b>	<b>5.7 T/week</b>

## Appendix 6 - General waste by vehicle type

Mt Cooe landfill – General waste - by vehicle type (excludes kerbside waste and special wastes) 22 April - 19 May 2017		Cars	Front- loaders	Gantry trucks	Other truck	Trailer
<b>Paper</b>	Recyclable	3.8%	5.0%	3.1%	0.0%	0.6%
	Cardboard	6.7%	8.4%	5.0%	0.2%	2.6%
	Non-recyclable	0.3%	1.1%	0.8%	0.0%	0.2%
	<b>Subtotal</b>	<b>10.8%</b>	<b>14.5%</b>	<b>8.9%</b>	<b>0.2%</b>	<b>3.4%</b>
<b>Plastics</b>	Recyclable	0.3%	1.0%	0.7%	0.0%	0.1%
	Non-recyclable	11.4%	26.1%	10.7%	0.2%	3.4%
	<b>Subtotal</b>	<b>11.7%</b>	<b>27.2%</b>	<b>11.4%</b>	<b>0.2%</b>	<b>3.6%</b>
<b>Organics</b>	Kitchen/food	9.3%	9.2%	0.5%	0.0%	0.7%
	Compostable greenwaste	9.3%	3.1%	1.1%	27.5%	1.3%
	Non-compostable greenwaste	0.3%	0.7%	0.0%	0.0%	0.7%
	Other organic	0.5%	2.8%	0.3%	0.0%	0.2%
	<b>Subtotal</b>	<b>19.5%</b>	<b>15.8%</b>	<b>1.9%</b>	<b>27.5%</b>	<b>2.9%</b>
<b>Ferrous metals</b>	Primarily ferrous	1.1%	1.1%	6.6%	0.0%	2.2%
	Multi/other	2.6%	2.4%	1.4%	0.0%	3.5%
	<b>Subtotal</b>	<b>3.7%</b>	<b>3.5%</b>	<b>8.0%</b>	<b>0.0%</b>	<b>5.7%</b>
<b>Non-ferrous metals</b>		<b>0.3%</b>	<b>0.9%</b>	<b>0.4%</b>	<b>0.0%</b>	<b>0.2%</b>
<b>Glass</b>	Recyclable	3.6%	1.9%	10.0%	0.0%	0.6%
	Non-recyclable	6.4%	1.7%	1.0%	0.0%	4.4%
	<b>Subtotal</b>	<b>10.0%</b>	<b>3.6%</b>	<b>11.1%</b>	<b>0.0%</b>	<b>4.9%</b>
<b>Textiles</b>	Clothing/textile	12.8%	2.6%	0.1%	0.0%	1.0%
	Multimaterial/other	12.7%	4.9%	2.0%	0.0%	9.6%
	<b>Subtotal</b>	<b>25.5%</b>	<b>7.5%</b>	<b>2.1%</b>	<b>0.0%</b>	<b>10.5%</b>
<b>Sanitary paper</b>		<b>2.6%</b>	<b>8.0%</b>	<b>1.0%</b>	<b>0.0%</b>	<b>0.3%</b>
<b>Rubble</b>	Cleanfill	0.1%	0.1%	3.9%	64.2%	3.8%
	Other	0.6%	5.3%	18.8%	0.0%	17.3%
	<b>Subtotal</b>	<b>0.8%</b>	<b>5.5%</b>	<b>22.7%</b>	<b>64.2%</b>	<b>21.1%</b>
<b>Timber</b>	Reusable	0.3%	0.3%	1.9%	0.0%	0.6%
	Unpainted & untreated	0.6%	0.6%	9.1%	0.0%	3.3%
	Non-recoverable	13.1%	6.9%	21.4%	8.0%	27.8%
	<b>Subtotal</b>	<b>13.9%</b>	<b>7.8%</b>	<b>32.3%</b>	<b>8.0%</b>	<b>31.8%</b>
<b>Rubber</b>		<b>0.7%</b>	<b>4.5%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>15.5%</b>
<b>Potentially hazardous</b>		<b>0.4%</b>	<b>1.4%</b>	<b>0.3%</b>	<b>0.0%</b>	<b>0.2%</b>
<b>TOTAL</b>		<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>



## Appendix 7 - Overall waste composition

Mt Cooe landfill - Overall waste to landfill - 22 April - 19 May 2017		% of total weight	Tonnes per week	Tonnes per annum (indicative only)
<b>Paper</b>	Recyclable	3.7%	6 T/week	329 T/annum
	Cardboard	4.3%	7 T/week	378 T/annum
	Non-recyclable	0.8%	1 T/week	71 T/annum
	<b>Subtotal</b>	<b>8.8%</b>	<b>15 T/week</b>	<b>778 T/annum</b>
<b>Plastics</b>	Recyclable	1.3%	2 T/week	116 T/annum
	Non-recyclable	13.9%	23 T/week	1,240 T/annum
	<b>Subtotal</b>	<b>15.2%</b>	<b>26 T/week</b>	<b>1,356 T/annum</b>
<b>Organics</b>	Kitchen/food	11.0%	19 T/week	980 T/annum
	Compostable greenwaste	10.2%	17 T/week	906 T/annum
	Non-compostable greenwaste	1.2%	2 T/week	106 T/annum
	Other organic	5.2%	9 T/week	464 T/annum
	<b>Subtotal</b>	<b>27.6%</b>	<b>46 T/week</b>	<b>2,456 T/annum</b>
<b>Ferrous metals</b>	Primarily ferrous	1.6%	3 T/week	145 T/annum
	Multi/other	1.8%	3 T/week	156 T/annum
	<b>Subtotal</b>	<b>3.4%</b>	<b>6 T/week</b>	<b>301 T/annum</b>
<b>Non-ferrous metals</b>		<b>0.7%</b>	<b>1 T/week</b>	<b>65 T/annum</b>
<b>Glass</b>	Recyclable	6.6%	11 T/week	586 T/annum
	Non-recyclable	1.4%	2 T/week	129 T/annum
	<b>Subtotal</b>	<b>8.0%</b>	<b>14 T/week</b>	<b>715 T/annum</b>
<b>Textiles</b>	Clothing/textile	1.9%	3 T/week	165 T/annum
	Multimaterial/other	3.6%	6 T/week	318 T/annum
	<b>Subtotal</b>	<b>5.4%</b>	<b>9 T/week</b>	<b>483 T/annum</b>
<b>Sanitary paper</b>		<b>4.7%</b>	<b>8 T/week</b>	<b>419 T/annum</b>
<b>Rubble</b>	Cleanfill	3.5%	6 T/week	312 T/annum
	Other	6.8%	12 T/week	609 T/annum
	<b>Subtotal</b>	<b>10.4%</b>	<b>17 T/week</b>	<b>921 T/annum</b>
<b>Timber</b>	Reusable	0.3%	1 T/week	30 T/annum
	Unpainted & untreated	1.4%	2 T/week	122 T/annum
	Non-recoverable	8.0%	14 T/week	714 T/annum
	<b>Subtotal</b>	<b>9.7%</b>	<b>16 T/week</b>	<b>866 T/annum</b>
<b>Rubber</b>		<b>3.3%</b>	<b>6 T/week</b>	<b>296 T/annum</b>
<b>Potentially hazardous</b>		<b>2.7%</b>	<b>4 T/week</b>	<b>236 T/annum</b>
<b>TOTAL</b>		<b>100.0%</b>	<b>168 T/week</b>	<b>8,892 T/annum</b>

## Appendix 8 - Levied waste composition

Mt Cooe landfill - Levied waste to landfill - 1 May 2016 - 30 April 2017		% of total weight	Tonnes per annum (indicative only)
<b>Paper</b>	Recyclable	4%	329 T/annum
	Cardboard	4.1%	378 T/annum
	Non-recyclable	0.8%	71 T/annum
	<b>Subtotal</b>	<b>8.4%</b>	<b>778 T/annum</b>
<b>Plastics</b>	Recyclable	1.3%	116 T/annum
	Non-recyclable	13.4%	1,240 T/annum
	<b>Subtotal</b>	<b>14.7%</b>	<b>1,356 T/annum</b>
<b>Organics</b>	Kitchen/food	10.6%	980 T/annum
	Compostable greenwaste	13.6%	1,258 T/annum
	Non-compostable greenwaste	1.1%	106 T/annum
	Other organic	5.0%	464 T/annum
	<b>Subtotal</b>	<b>30.3%</b>	<b>2,807 T/annum</b>
<b>Ferrous metals</b>	Primarily ferrous	1.6%	145 T/annum
	Multi/other	1.7%	156 T/annum
	<b>Subtotal</b>	<b>3.3%</b>	<b>301 T/annum</b>
<b>Non-ferrous metals</b>		<b>0.7%</b>	<b>65 T/annum</b>
<b>Glass</b>	Recyclable	6.4%	595 T/annum
	Non-recyclable	1.4%	129 T/annum
	<b>Subtotal</b>	<b>7.8%</b>	<b>724 T/annum</b>
<b>Textiles</b>	Clothing/textile	1.8%	165 T/annum
	Multimaterial/other	3.4%	318 T/annum
	<b>Subtotal</b>	<b>5.2%</b>	<b>483 T/annum</b>
<b>Sanitary paper</b>		<b>4.5%</b>	<b>419 T/annum</b>
<b>Rubble</b>	Cleanfill	3.4%	312 T/annum
	Other	6.6%	609 T/annum
	<b>Subtotal</b>	<b>10.0%</b>	<b>921 T/annum</b>
<b>Timber</b>	Reusable	0.3%	30 T/annum
	Unpainted & untreated	1.3%	122 T/annum
	Non-recoverable	7.7%	714 T/annum
	<b>Subtotal</b>	<b>9.4%</b>	<b>866 T/annum</b>
<b>Rubber</b>		<b>3.2%</b>	<b>296 T/annum</b>
<b>Potentially hazardous</b>		<b>2.5%</b>	<b>236 T/annum</b>
<b>TOTAL</b>		<b>100.0%</b>	<b>9,253 T/annum</b>

## Appendix 9 - Kerbside recyclable materials

### What can go in my yellow-lidded bin?

Think about the staff that have to sort the recycling before you place anything in your recycling bin. Would you want to touch this item again? If not, neither would they!

#### Rigid plastics

- Clean, rigid household plastic containers numbered 1-7.
- Hint: look for the number on the bottom of the plastic container - if it's not numbered 1-7 then don't put it in.
- Wash before placing loose in your bin. Please don't squash.



#### Paper and cardboard

- All clean paper, newspaper, magazines, letters, envelopes, egg trays, telephone books, wrapping paper, boxes and cartons, junk mail, cardboard boxes and tubes.
- Flatten cardboard before placing loose in your bin.

#### Aluminium and steel

- All clean household tins and cans, aerosols, aluminum trays and foil (including food tins and beer and soft drink cans)
- Wash tins & cans before placing loose in your bin. Please don't squash.



### What can't go in my yellow-lidded bin? ✘

#### ✘ Ash

- ✘ Bubble wrap
- ✘ Ceramics, crockery
- ✘ Clothing & material
- ✘ Concrete, bricks & timber
- ✘ Cutlery
- ✘ Electrical/Electronic goods

#### ✘ Glass

- ✘ Engine oil containers
- ✘ Food/garden waste
- ✘ Gas bottles
- ✘ General waste
- ✘ Liquids, fats & oils
- ✘ Medical waste
- ✘ Nappies

#### ✘ Paint & chemicals

- ✘ Plastic bags & film
- ✘ Plastic ties & tubing
- ✘ Polystyrene (incl. meat trays)
- ✘ Sharp objects
- ✘ Tyres, rubber & garden hoses