Clutha District Council

Waste Assessment 2018

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Part A - Introduction

1. Purpose and Scope

The Waste Minimisation Act 2008 (WMA) strengthens local authorities' responsibilities regarding waste minimisation and management by giving responsibility for promoting effective and efficient waste minimisation and management across their districts.

It also requires Council to prepare a Waste Minimisation and Management Plan (WMMP) that is supported by a Waste Assessment, to be carried out every six years. The 2012 WMMP superseded the Solid Waste Management Plan (SWMP) that was adopted by Council in 1999 and was adopted through the special consultative procedure in 2012. The WMMP 2012 is due for review by 1 July 2018

1.1. Purpose of a Waste Assessment

The Clutha District Council, as a territorial authority, has responsibility for promoting effective and efficient waste management and minimisation in the Clutha District. This role has been strengthened by the WMA. The WMA requires that territorial authorities (TA's) conduct a Waste Assessment and review their current waste management plans for their district.

This document constitutes the Waste Assessment, and feeds into the review of the 2012 WMMP, which must be adopted through a special consultative procedure, by 1 July 2018. Following this, subsequent reviews shall be undertaken every six years.

Per section 51(1) of the WMA, a Waste Assessment must contain:

(a) a description of the collection, recycling, recovery, treatment, and disposal services provided within the territorial authority's district (whether by the territorial authority or otherwise); and,

(b) a forecast of future demands for collection, recycling, recovery, treatment, and disposal services within the district; and,

(c) a statement of options available to meet the forecast demands of the district with an assessment of the suitability of each option; and,

(d) a statement of the territorial authority's intended role in meeting the forecast demands; and

(e) a statement of the territorial authority's proposals for meeting the forecast demands, including proposals for new or replacement infrastructure; and,

(f) a statement about the extent to which the proposals will—

  (i) ensure that public health is adequately protected:
  (ii) promote effective and efficient waste management and minimisation.

1.2. Scope

This document is intended to build a solid foundation that will enable Council to make progress on waste issues in an informed and effective manner. Under the WMA, the waste assessment must go beyond waste streams managed directly by the Council.

Council therefore has a responsibility to plan for all waste generated in the district when considering waste infrastructure and services. This includes the waste managed within and outside of Council's services and infrastructure.

The WMA defines “waste” as

a) anything disposed of or discarded; and,
b) includes a type of waste that is defined by its composition or source (for example, organic waste, electronic waste, or construction or demolition waste); and,
c) to avoid doubt, includes any component or element of diverted material, if the component or element is disposed of or discarded.

This waste assessment focuses on solid waste and excludes liquid or gaseous wastes, except where these are considered to have implications for solid waste management; for example biosolids from wastewater treatment facilities, or gas from landfills and some liquid hazardous or special wastes. Most liquid and gaseous wastes are managed through other means (e.g. Asset Management Plans for wastewater, sanitary assessments).

2. Legislative & Planning Context

This section provides an overview of the key legislation and policies that shape waste management and minimisation in New Zealand.

2.1. Waste Minimisation Act (2008)

The Waste Minimisation Act 2008 (WMA) is the primary guiding legislation for waste minimisation and management in New Zealand. This replaces many of the requirements under the Local Government Act 1974. The WMA;

- Provides definitions of waste and diverted material
- Establishes product stewardship schemes
- Determines the Waste Minimisation Levy, currently $10 per tonne disposed to landfill
- Prescribes Territorial Local Authority responsibilities including requirements to;
    - Undertake a Waste Assessment prior to the development and review of WMMP
    - Consider all material in the District including privately controlled waste
    - Increase their focus on waste minimisation
- Outlines offences and enforcement – greater scope for bylaws
- Prescribes reporting requirements
- Introduces a Waste Advisory Board and a contestable fund for waste minimisation

2.2. New Zealand Waste Strategy (2010)

While not a statutory document, the New Zealand Waste Strategy sets out the Government's long-term priorities for waste management and minimisation. The WMA requires Councils to take the strategy into consideration when preparing a WMMP.

The national strategy was reviewed in 2010 and the resulting document moves away from prescriptive targets and towards high level goals. These are:

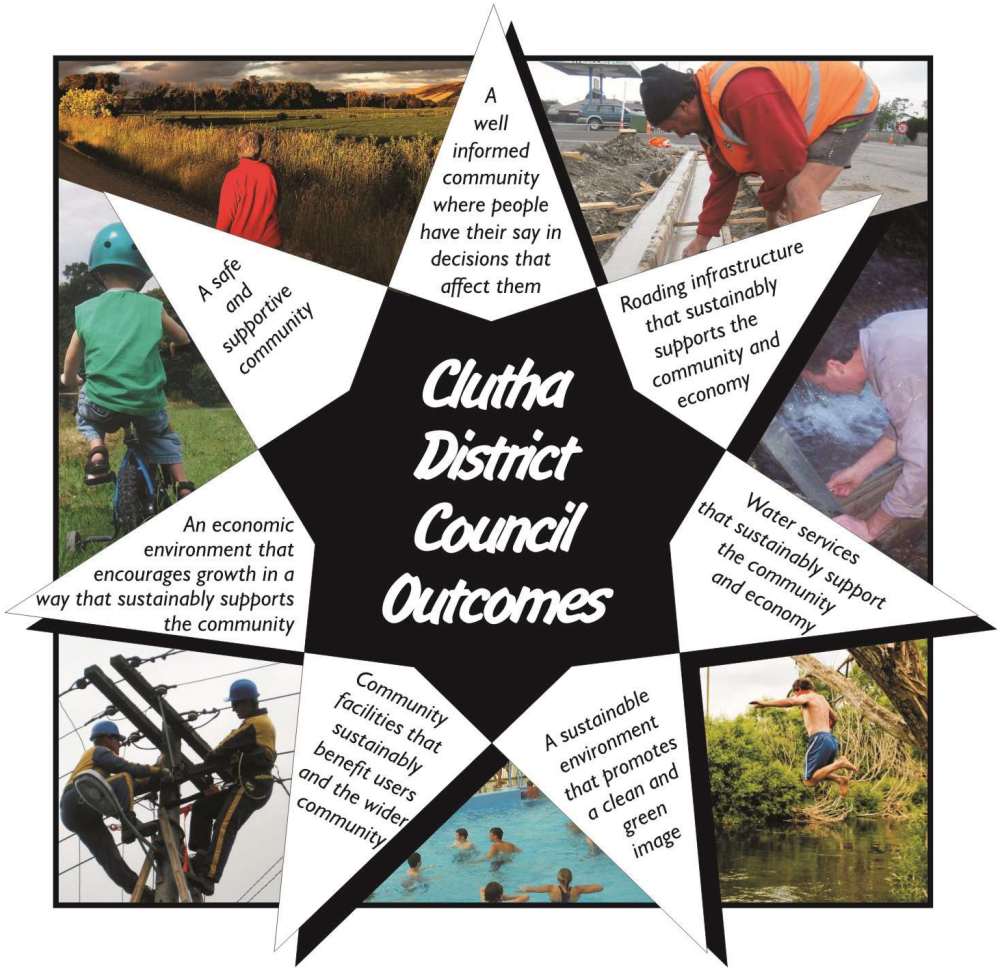
- Reducing the harmful effects of waste, and;
- Improving the efficiency of resource use.

2.3. Local Government Act (2002)

The Local Government Act 2002 (LGA) includes a number of provisions relevant to waste management. These include provisions providing for waste bylaws and since a 2010 amendment, the classification of waste collection and disposal services a 'core service' of local authorities.

The LGA requires Council to develop 'community outcomes' which outline what goals the Council will work towards for the benefit of the community. The community outcomes included in Council's Draft Long Term Plan 2018/28 are shown below. Of these, the outcome that Council's waste management activities primarily contribute to is "a sustainable environment that promotes a clean and green image."

Image 2.1: *Clutha District Council's Community Outcomes*



2.4. Climate Change Response Act 2002

This legislation required landfill operators to pay for the emissions created by decomposing landfill material from January 2013.

2.5. Regional Plan: Waste

The Otago Regional Council Regional Plan: Waste Plan has been in force since April 1997. This plan provides objectives, policies and methods of implementation in order to address the region's waste management issues.

2.6. Clutha District Solid Waste By Law

Council's Solid Waste Bylaw 2008 was replaced with Water and Sanitary Services Bylaw. Part 2 of this bylaw is specific to Solid Waste. The purpose of the bylaw is to regulate waste management facilities and the collections, transportation and disposal of waste. General issues relating to Council's solid waste services and infrastructure are also covered by the by law.

Section 58(2) of the WMA requires the Solid Waste Bylaw to be reviewed at intervals of not more than 10 years after the last review.

2.7. Health Act (1956)

The Health Act requires local authorities to provide for the collection and disposal of refuse if required by the Minister of Health for the purpose of protection of public health. It also defines nuisance practices and offensive trades related to wastes.

2.8. Resource Management Act (1991)

The Resource Management Act 1991 (RMA) provides the framework for the sustainable management of natural and physical resources, particularly as it relates to land use. It also requires local authorities, to be responsible for managing the adverse effects of storing, using, disposing and transporting hazardous wastes.

2.9. Other

There are a number of pieces of legislation pertinent to waste management and minimisation. These include:

- Litter Act (1979)
- Radiation Protection Act (2016)
- Ozone Layer Protection Act (1996)
- Biosecurity Act (1993)
- Health and Safety at Work Act (2015)

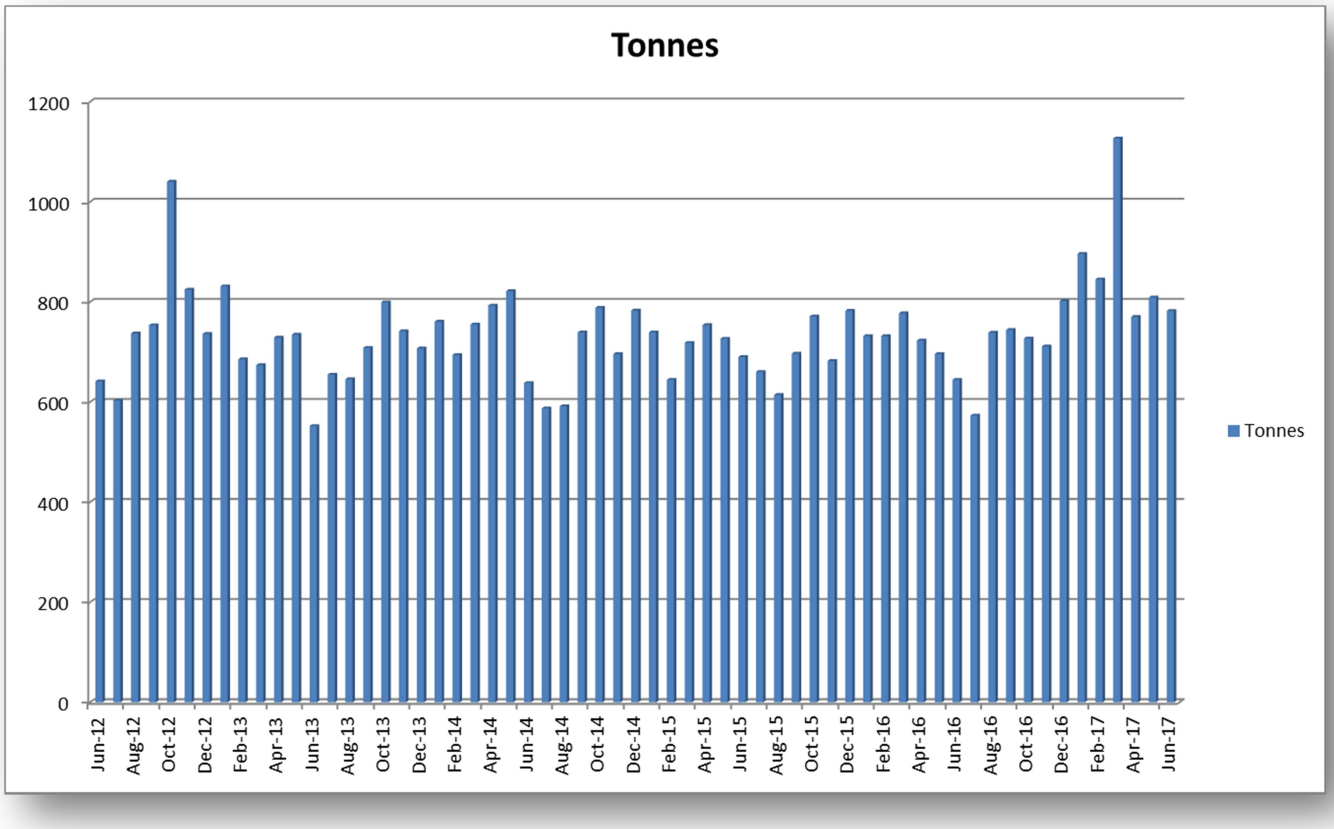
Part B – The Present

3. Waste Generated

This section provides information about what is known about the solid waste currently generated within the Clutha District. This includes historic and current waste quantities, waste composition, and the sources and destination of waste materials. The information included in this section contributes to the forecasting of the future demands.

3.1. Waste Quantities

A weighbridge was installed at Mt Cooee late 2011. This has enabled council to accurately measure the weight of waste entering the landfill. Graph 3.1.1 below shows the amount of waste in tonnes over the last 6 years. Of note is the seasonal increases and decreases.



Graph 3.1.1: Waste managed by Council from June 2012 to June 2017

Waste per capita is a commonly used indicator for waste generation that looks at the total amount of waste produced within an area over a year divided by the population of the area. It is an indicator of average waste production on a per person basis, but it is not directly equivalent to the amount of waste an individual throws away each year, as it includes the waste generated from commercial and industrial sources.

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

Table 3.1.2: *Per Capita Disposal of Waste to Landfill - 2016/17*

The 9,253 tonnes of levied waste disposed of at Mt Cooee 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 in Table 3.1.3. The national average in Table 3.1.3 has been calculated using tonnage figures from MfE's waste levy data [1] and Stats NZ usually resident population estimates[2].

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

Table 3.1.3 - *Per capita disposal rate compared to other local authorities*

The per capita rate of levied waste disposed at Mt Cooee 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

[1] http://www.mfe.govt.nz/waste/waste-disposal-levy/monthly-levy-graph
[2] http://www.stats.govt.nz/browse_for_stats/population/estimates_and_projections/NationalPopulationEstimates_HOTPAt30Jun16.aspx

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.

3.2. Waste Composition

Council commissioned a Solid Waste Analysis Protocol (SWAP) survey of the waste landfilled at Mt Cooee and waste Wheelie Bins in May 2017.

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.

4. Domestic Kerbside Waste Audit

The domestic kerbside waste audit methodology used was based on Procedure One of the Ministry for the Environment's Solid Waste Analysis Protocol 2002 (SWAP).

4.1. Sampling Strategy

During the week of the 8th May 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.

4.2. 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 Table 4.2.1. 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.

Primary category	Secondary category	Description
Paper	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
Plastic	#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-	All other non-recyclable items made primarily of

	recyclable	plastic, meat trays, expanded polystyrene
Organics	Kitchen waste	All kitchen waste
	Greenwaste	All greenwaste (lawn clippings, plants, tree branches, etc.)
	Organic other	Includes cat tray litter, hair, vacuum cleaner bags
Steel	Steel cans	All steel cans including aerosols
	Steel other	All non-packaging items made primarily of ferrous metal
Nonferrous	Aluminium cans	All aluminium cans, clean foil trays, clean foil, aerosols
metal	Non-ferrous other	Items such as aluminium frying pans, pots, electrical wire
Glass	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
Textiles	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
Sanitary paper	-	Includes disposable nappies, paper towels, tissues
Rubble	-	All concrete, ceramics, fibreglass, rubble, and soil
Timber	-	All items made primarily of timber
Rubber	-	All items made primarily of rubber (e.g. kitchen gloves)
Potentially hazardous	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.

Table 4.2.1 *Kerbside Waste Audit Classifications*.

***Photo 4.2.1**: Sort and Weigh Audit of Kerbside Waste*

***Photo 4.2.2 :** One day's sample for Sort and Weigh Audit of Kerbside Waste*

4.3. Primary Composition of Council Kerbside Waste 240-litre Wheelie Bins

As shown in Figure 4.3.3 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.

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

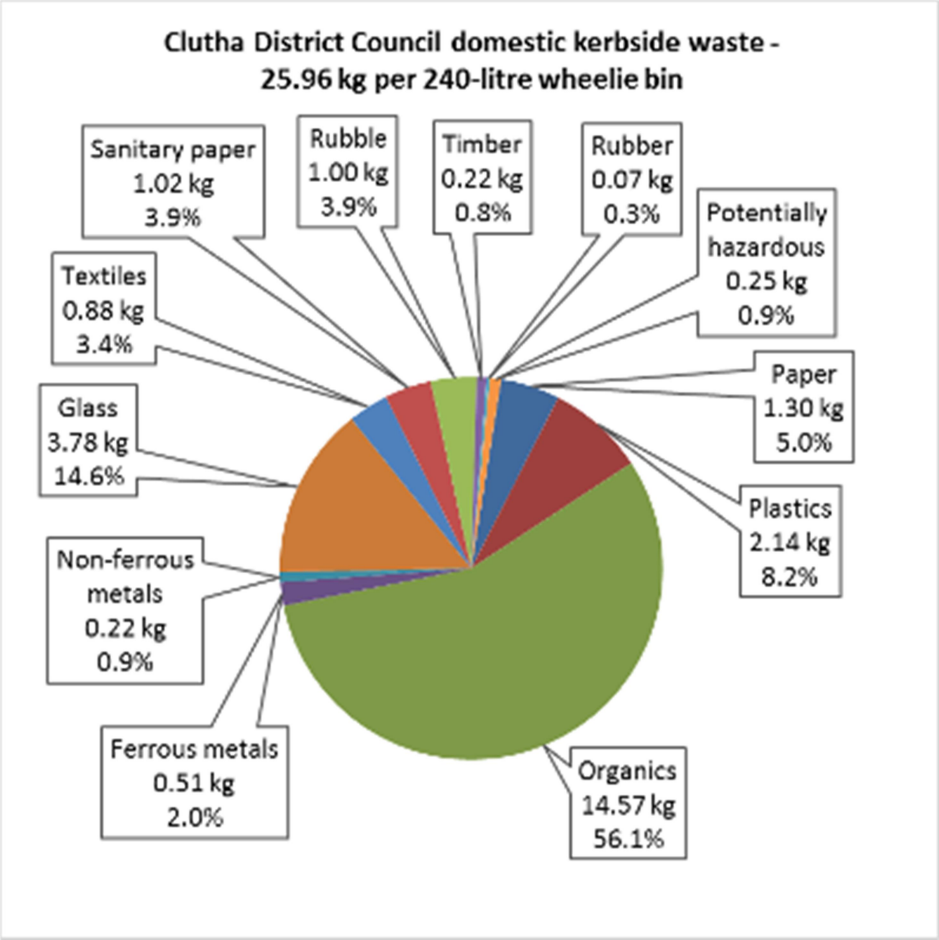


***Figure 4.3.3** - Primary composition of Council kerbside waste 240-litre wheelie bins - May 2017*

4.4. 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 Cooee 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 Cooee landfill or residents can compost greenwaste and kitchen waste at home.

4.4.2 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.

Diversion potential of Council kerbside waste 240-litre wheelie bins - 22 April - 19 May 2017	**% of total weight**	**Kg per wheelie bin**	**Tonnes per week**
RECYCLABLE MATERIALS			
Paper - Recyclable	4.2%	1.09 kg	2.5 T/week
Plastics - # 1-2 containers	1.8%	0.46 kg	1.0 T/week
Plastics - # 3-7 containers	0.6%	0.14 kg	0.3 T/week
Steel cans	1.0%	0.26 kg	0.6 T/week
Aluminium cans	0.4%	0.11 kg	0.2 T/week

Glass - Bottles/jars	13.8%	3.58 kg	8.1 T/week
Subtotal	**21.7%**	**5.64 kg**	**12.8 T/week**
COMPOSTABLE MATERIALS			
Organics - Kitchen waste	20.5%	5.32 kg	12.0 T/week
Organics - Greenwaste	24.0%	6.23 kg	14.1 T/week
Subtotal	**44.5%**	**11.55 kg**	26.1 T/week
TOTAL – POTENTIALLY DIVERTABLE	**66.2%**	**17.19 kg**	**38.9 T/week**

***Table 4.4.2** - Diversion potential of Council kerbside waste 240-litre wheelie bins*

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 Cooee 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.

5. 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 the surveyor.

5.1. Types of Waste

For the purpose of analysing waste streams, the SWAP 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 from both residential and commercial/industrial properties. There is no precise definition for 'special waste', as these wastes vary between disposal facilities.

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.

5.2. 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 cannot 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.

5.3. Data Analysis and Reporting

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

(a) the proportion and composition of each activity source of waste

(b) the proportion and composition of waste being carried by each vehicle type

(c) 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.

5.4. Primary Composition of General Waste

The primary composition of the general waste is presented in Table 5.1

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
TOTAL	**100.0%**	**106 T/week**

***Table 5.1** - Primary Composition of General Waste*

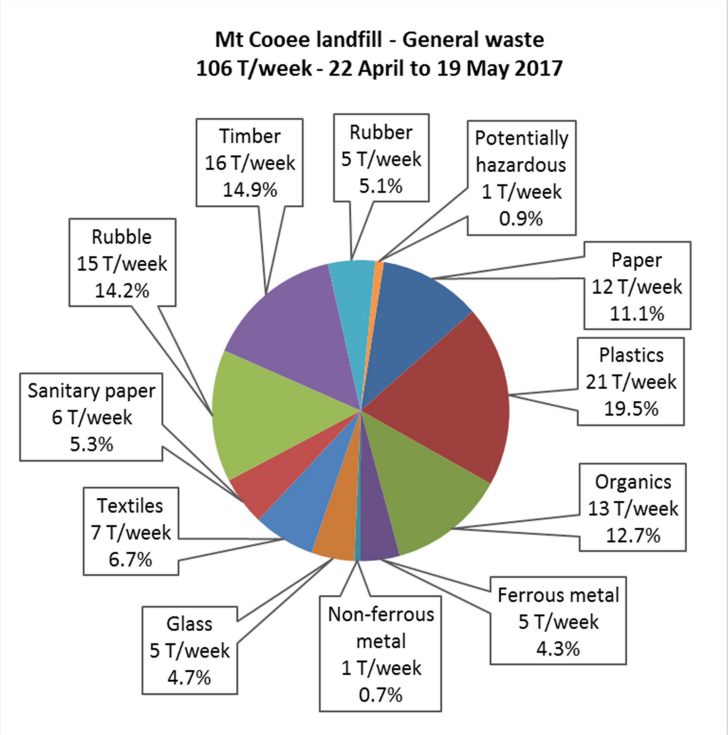


***Figure 5.1** - Primary composition of general waste*

5.5 Activity Sources of Waste

The "activity source" of waste 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:

(a) **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.

(b) **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)

(c) **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.

(d) **Construction and demolition (C&D)** – waste materials from the construction or demolition of a building

(e) **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

(f) **Transfer station** –waste entering a facility from another transfer station – waste from rural transfer stations is disposed of at Mt Cooee landfill but is aggregated with other ICI waste and cannot be separately quantified from weighbridge records.

(g) **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.

Mt Cooee landfill - General waste composition - By activity source Excludes kerbside waste and Special wastes 22 April - 19 May 2017	**C&D**	**ICI**	**Landscaping**	**Residential**
Paper	1.2%	14.2%	0.0%	5.4%
Plastics	2.0%	25.4%	0.0%	5.3%
Organics	1.8%	13.8%	30.4%	4.8%
Ferrous metals	1.4%	4.5%	0.0%	13.0%
Non-ferrous metals	0.3%	0.8%	0.0%	0.5%
Glass	1.3%	5.7%	0.0%	4.7%

Textiles	1.0%	6.6%	0.2%	30.4%
Sanitary paper	0.0%	7.0%	0.0%	0.4%
Rubble	37.2%	5.9%	69.4%	6.6%
Timber	53.7%	8.3%	0.0%	24.9%
Rubber	0.0%	6.6%	0.0%	3.8%
Potentially hazardous	0.0%	1.2%	0.0%	0.3%
TOTAL	**100.0%**	**100.0%**	**100.0%**	**100.0%**

***Table 5.5.1** - Composition of General Waste - by Activity Source*

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.

6. Overall Waste to Tip Face

6.1. Activity Sources of Overall Waste to Tip Face

An analysis of the activity sources of waste loads that were surveyed is given in Table 6.1 and Figure 6.1 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.

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

***Table 6.1** - Activity sources of overall waste to tip face - 22 April - 19 May 2017*

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.

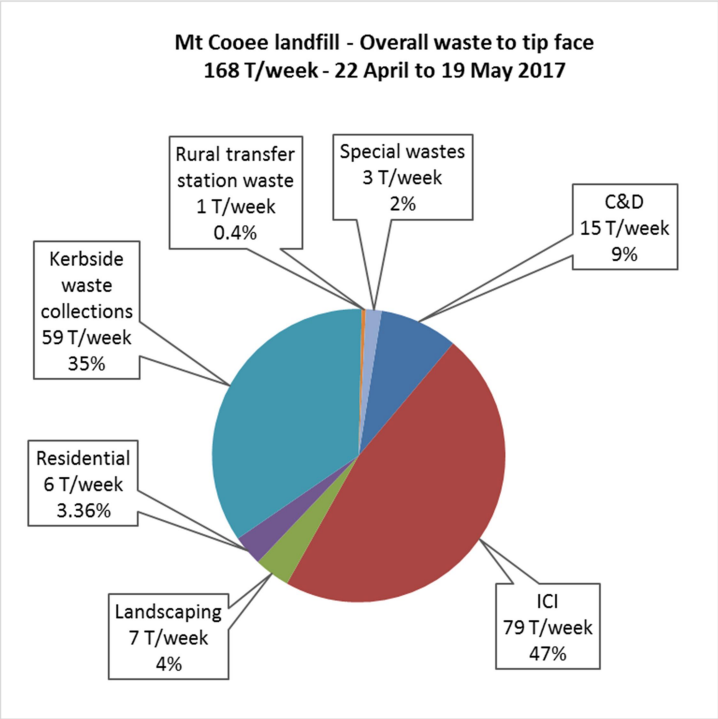


***Figure 6.1** - Overall waste to tip face - by activity source - 22 April - 19 May 2017*

6.2. Primary Composition of Overall Waste Stream to Tip Face

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

1. Council kerbside waste collections - composition as analysed in section 4.3.3
2. General waste - composition as analysed in section 5.4 (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 primary composition of the overall waste stream is presented in Table 6. and Figure 6.2. 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 indicates that 8,892 tonnes of waste were disposed of from Mt Cooee 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.

Note that in Table 6.1 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 Cooee landfill weighbridge records for 1 May 2016 to 30 April 2017.

Mt Cooee 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
TOTAL	**100.0%**	**168 T/week**	**8,892 T/annum**

***Table 6.1** - Primary composition of overall waste to tip face - 22 April - 19 May 2017*

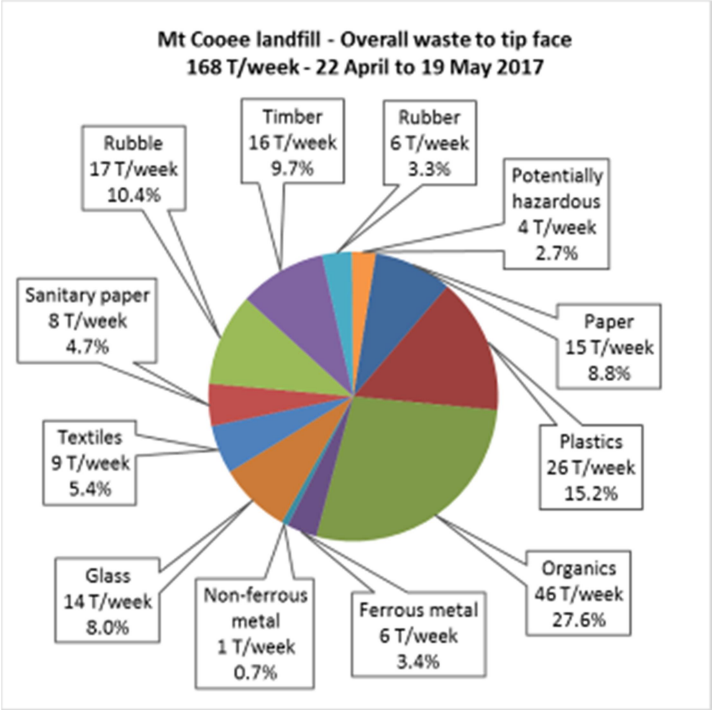


***Figure 6.2** - Primary composition of overall waste to tip face - 22 April - 19 May 2017*

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.

7. Diversion Potential of Waste

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 Cooee 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.

7.1. Diversion Potential of Kerbside Waste 240-litre Wheelie Bins

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 Cooee 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 Cooee landfill or residents can compost greenwaste and kitchen waste at home.

7.1 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.

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

***Table 7.1** - Diversion Potential of Council Kerbside Waste 240-litre Wheelie Bins*

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 Cooee 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.

7.2. Diversion Potential of Overall Waste Stream to Mt Cooee Landfill Tip face

The table below shows the proportion of the overall waste stream currently being disposed of at Mt Cooee landfill tip face that could potentially be diverted using these existing systems and available options.

Overall waste to Mt Cooee landfill tip face - Diversion potential 22 April - 19 May 2017	% of total weight	Tonnes per week
Recyclable and recoverable materials		
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
Subtotal	**27.0%**	**45 T/week**
Compostable materials		
Organics - Kitchen waste	11.0%	19 T/week
Organics - Compostable greenwaste	10.2%	17 T/week
Subtotal	**21.2%**	**36 T/week**
TOTAL – Potentially divertable	**48.2%**	**81 T/week**

***Table 7.2** - Diversion Potential of Overall Waste Stream to Mt Cooee Landfill Tip Face*

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.

8. Services and Infrastructure

This section outlines the known waste management and minimisation services and infrastructure in the Clutha District. This inventory is not exhaustive, particularly with respect to the private waste industry which operates independent of Council. Where there has been information readily available, this has been included.

Council plays a lead role in the provision of waste minimisation and management services and infrastructure throughout the district. Private operators have access to these facilities and offer additional services as demand from the community requires. Given the small population base and the large geographic spread of this population, there are not a large number of commercially viable private operations in the district.

Infrastructure and Services		Scale of Service	Provided by
Reduction	School Education Programme	Council funds Enviroschools facilitator to work with schools that have signed up to the programme within the District. There are currently 9 schools participating in the programme throughout the district.	Council
	Waste Minimisation Officer	Council employs a Waste Minimisation Officer to coordinate waste minimisation initiatives within the district including public awareness campaigns and provision of information.	Council
Collection	Kerbside collection	Approximately 6,200 properties are serviced by Council's popular kerbside waste collection service. The majority of these are residential properties within the district's townships but some commercial properties and rural properties along collection routes are also serviced. In April 2012 Council introduced a new kerbside collection service for recyclables alongside the existing residual waste collection. This means the existing bin for residual waste is now collected fortnightly, alternating with a new 'yellow-lidded' wheelie bin for recyclables (excluding glass).	Council
	Transfer stations/facilities	Council provides waste transfer stations at Beaumont, Clinton, Clydevale, Lawrence, Maclennan, Milton, Owaka, Papatowai, Tapanui and Taieri Mouth. These facilities open at least monthly for residents to dispose of their waste which is then transferred to and landfilled at Mt Cooee. A coin-operated 'Jack Trash' bin is provided at Papatowai.	Council
	Drop off facilities for recyclables	Free drop-off facilities for recyclables are provided at Mt Cooee landfill and the Clinton, Milton, Lawrence, Owaka and Tapanui transfer. Plastics (1-7), steel and aluminium tins and cans, paper, cardboard and glass can be dropped off for collection during normal operating hours.	Council
	Private waste collections	Various private operators provide waste collection services to businesses and commercial operators within the district. The largest of these has approximately 550-600 skips varying in size from 1.5m^3 to 3m^3.	Private operators (incl. JD Souness)
Reuse	Second hand trading	There are several second hand stores throughout the district which provide as drop off facilities for unwanted reusable items which may otherwise go to landfill. There are also various garage sales, car boot sales and community markets held throughout the year which allow second had items to be sold/swapped by the community	Independently owned (incl. Salvation Army, Red Cross, Drifters Emporium)
Reuse (cont.)	Internet Services	With the introduction of the internet there are now many sites which are available to the public to sell/exchange/give away unwanted items which may have otherwise gone to landfill.	Non-Council organisations (incl. TradeMe, Freecycle)
	Glass Reuse	Glass collected at Mt Cooee Landfill and transfer stations is currently being stockpiled for the use in the maintaining and making of roads at the landfill.	Council

Infrastructure and Services		Scale of Service	Provided by
Recycling	Recycling of material collected through Council's collection services and infrastructure	Council's contractor takes ownership of the recyclables collected through Council's kerbside collections and transfer stations. It then on-sells to recyclers. The contractor has a responsibility to ensure that the materials are disposed of in a socially and environmentally responsible manner.	Council
	Private Recyclers	A number of private operators collect and recycle recyclables from within the district. These customers served are primarily commercial and rural in nature. These include; Full Circle which collects paper and cardboard from a number of businesses for recycling, Beta Antifreeze which collects and recycles used automotive coolant and contaminated glycol from industry and individual users, The Agrecovery Rural Recycling programme which operates throughout the district providing the primary sector with responsible and sustainable systems for the recovery and recycling of 'on-farm' plastics and the disposal of unwanted chemicals. Agrecovery provides on farm collections for silage wrap and unwanted/expired chemicals as well as collection sites in Balclutha and Tapanui for empty agrichemical containers.	Private (incl. Full Circle, Beta Antifreeze, Agrecovery)
	Special Wastes	E-waste is collected at Mt Cooee for a fee and sent to Dunedin for recycling The separation of whiteware and scrap metal is encouraged at Mt Cooee landfill, these materials are stockpiled until there is a sufficient amount for collection and recycling.	Council & Other
Recovery	Green Waste Diversion	Council provides an area at Mt Cooee for separation/drop off of green waste. The material is stockpiled for future use including, at present, intermediate and final cover of the landfill.	Council
	On Property Composting	Home composting recovers material that might otherwise have been landfilled. No estimates are available of the amounts of organic waste handled in this way, although over two-thirds of residents report that they compost.	Householders
Treatment	Special and Hazardous Wastes	Special Waste and Hazardous Waste or Difficult Wastes are categorised within Council's Solid Waste by-law. While categories C and D are accepted at Mt Cooee, categories A and B are prohibited. These wastes are managed independently of Council's infrastructure. Interwaste is a New Zealand owned Company, and operates nationwide, specialising in safe and efficient methods to dispose and recycle dental amalgam, medical and pharmaceutical wastes. As Mt Cooee landfill is not consented to take hazardous wastes, any commercial operator within the district will have to dispose of their waste through the likes of Interwaste. Interwaste ensures medical and related wastes are segregated, containerized, transported, treated, and disposed of by a team of fully trained professionals and a nationwide network of specialised vehicles. The nationwide operation includes a range of steam sterilisation units, providing environmentally responsible solutions.	Council/ private operators including Interwaste
Disposal	Mt Cooee Landfill	The Mount Cooee landfill, near Balclutha, is the only operational municipal landfill accepting general waste in the Clutha District. The landfill accepts waste from the public, commercial operators and the Council contracted wheelie bin service and transfer stations.	Council
	Cleanfill	While there are a number of cleanfill facilities across the District, little is known about the quantities or types of material being deposited at these sites. Any cleanfill received at Mt Cooee landfill, is used as cover or for the formation of embankments, and stockpiled where indicated on the drawings in the Contractors Operations and Procedures Plan. Cleanfill	Other Council

Infrastructure and Services		Scale of Service	Provided by
		shall not be disposed of mixed in together with refuse in the sanitary landfill. Only such quantities of clean fill necessary to augment the supply of clean fill cover material borrowed on the site shall be accepted.	
	Private landfills	It should be noted that the Otago Regional Council's Waste Plan allows for the disposal to land material generated on private property. As the Clutha District contains a large number of rural properties, the scale of on-site disposal is difficult to assess. There is also the potential for 'private landfills' to be developed on rural properties where cost and transport distances make it less desirable to access the Council facilities.	Other/Private Householder
Closed Landfills	Management of Closed Landfills	There are 19 closed landfills in the district which were progressively closed over a number of years, the last 7 being closed in 1998. Council monitors these sites for compliance with resource consents and manages and negative impacts on the environment.	Council

Table 8.1: *Existing waste management and minimisation services within the Clutha District*

Part C – The future

9. Waste Generated

Looking forward there are a wide range of factors that could potentially impact the quantities and composition of waste generated within the district. The major factors include;

- Population trends
- Trends in our rural economy
- Wider economic trends
- Waste minimisation trends

Much of the following information is based on 'Growth Projections to 2048' report prepared by Rationale as part of the Long Term Plan 2018/28'. Refer to this report for more detailed assumptions.

9.1. Population Trends

As a high level district overview of historical growth, the usually resident population of the district on 30 June 2013 was estimated to be 17,250 people. This has decreased by 300 people (-0.4% per year) in the last 12 years, although the later stage has seen a slight increase in population. In the same period over 445 new dwellings have been built, increasing the total number to over 8,340 dwellings. This is an increase of around 0.5% or 37 dwellings per year.

Regarding population structure, the district has a growing elderly population which has increased the average age in the district. In 2013 the proportion of people aged 65+ made up around 16% of the total population in the district. This is higher than the national average of 14%. This trend is projected to continue, with the proportion of people aged 65+ in the district increasing to over 33% by 2048. The number of people aged between 15 and 64 years of age is projected to decrease. This may have a flow-on effect to the make-up of the work force in the district. The number of occupied dwellings in the district decreases in the long term from 84% of total dwellings in 2013 to 77% in 2048.

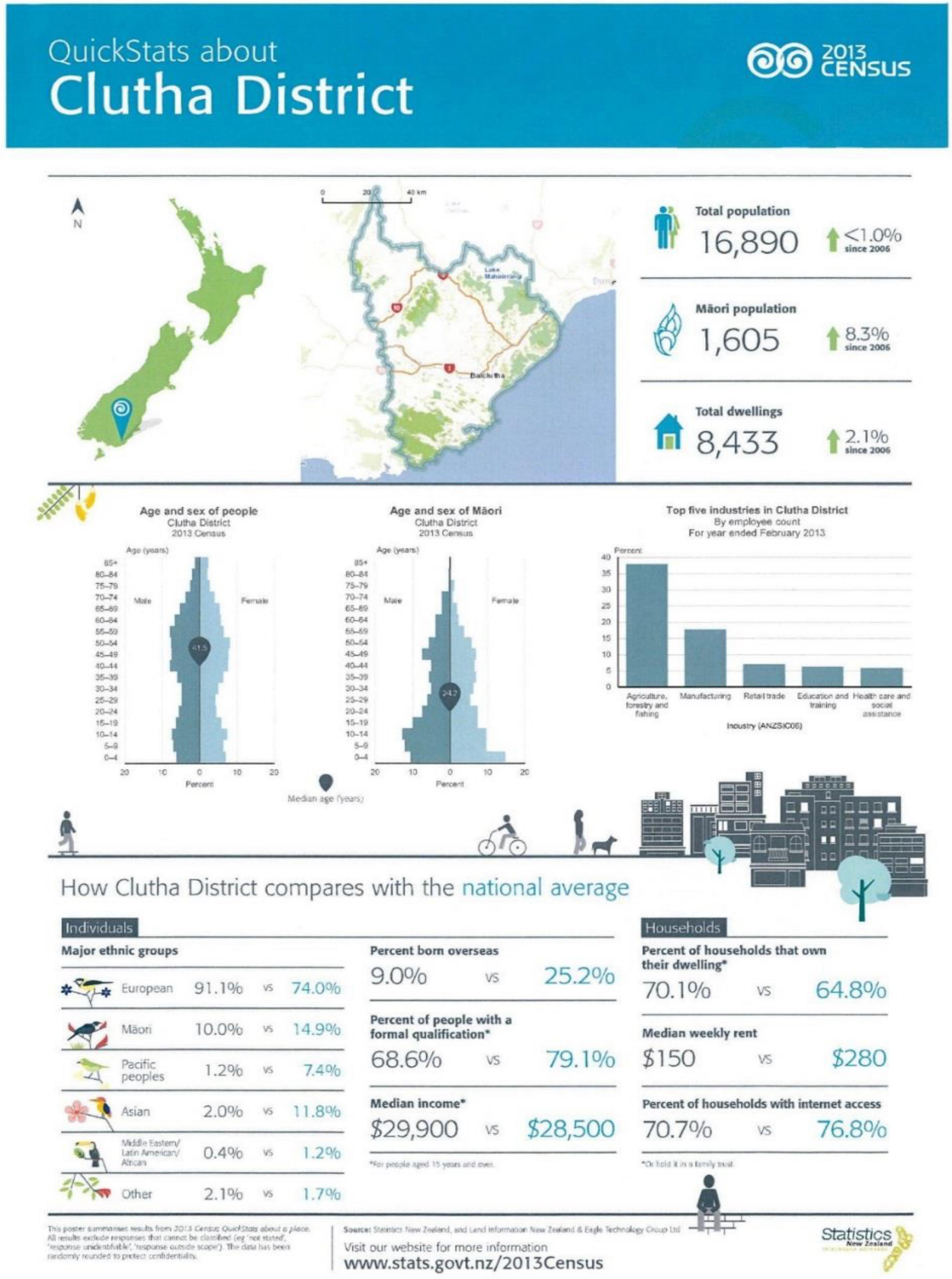
Factors such as the ageing population contribute to a decline in the average household size, decreasing from around 2.46 residents per household in 2013 to around 2.21 in 2048.

The total visitor population on both the average and peak day is projected to increase at a similar rate. The visitors in all eight wards are projected to increase.

Population, visitor and dwelling growth flows through to rating units. The majority of the district rating units are residential based, with almost three quarters of all rating units falling under the Residential or Rural Industry categories. Therefore, any rating unit growth is heavily dependent on dwelling growth. However the business related rating unit category (Non-residential) is also projected to increase.

The projections model and outputs for the medium growth scenario are considered appropriate for providing a sound basis for Council's long term planning.

9.2. Quick Stats



9.3. Medium Growth Scenario

Under a medium growth scenario, fertility and mortality rates result in a net increase in population. This scenario also assumes a net migration of people out of the district. The combined impact is a slight decrease in usually resident population overall. This flows through to relatively steady growth in dwellings and rating units. The key outputs for the medium scenario are summarised in the table below.

Variable	2013	2018	2028	2038	2048	Change to 2048	Avg annual change	Avg annual growth rate
Usually Resident Population	17,250	17,575	17,490	16,950	16,113	-1,137	-32	-0.2%
Total Visitors (average day)	2,358	3,366	4,267	4,818	5,318	2,960	85	2.4%
Total Visitors (peak day)	6,616	8,148	9,793	10,852	11,824	5,208	149	1.7%
Total Dwellings	8,341	8,787	9,244	9,389	9,525	1,184	34	0.4%
Total Rating Units		13,386	13,908	14,119	14,320	934	31	0.2%

Table 9.3.1: *Medium Growth Scenario*

9.4. Trends in our Rural Economy

The primary sector is the backbone of the district's economy. Dairy conversions have remained strong in recent years. The forestry sector is also a key part of our economy, with the area in plantation forestry having increased by nearly 50 percent in the past 20 years (CADB, 2010).

It is important to note that the performance of the primary sector will be highly affected by the exchange rate, climate, rapidly increasing fuel costs and wider global economy, so will be more volatile than can be predicted here.

Minimal information is known about the waste management practices of rural businesses and residents. Although some do use Council wheelie bin collection service, many rural properties do not have access to this collection. A commercial waste collection service is available and used by various rural residents. It is also assumed they are the main users of Council transfer stations and recycling drop-offs; however anecdotal evidence also suggests that there may be some self-management of waste on farms.

National experience suggests there may be issues specific to farming that includes agricultural chemical containers, silage wrap, and on-site disposal or burning of wastes. The lack of reliable information on rural waste in the Clutha District and its potential impacts is an area for future consideration to ascertain any significant issues and what responses, if any, are appropriate.

9.5. Wider Economic Trends

Overall, the outlook for the district's economy looks positive. Clutha Developments 2017 Business Confidence Survey was reflective of the challenges posed by the recession but also indicated some positive signs. A key indicator is that more businesses expect the economic situation to improve than decline.

9.6. Tourism Forecast

Tourism in the Clutha District is forecasted to rise, particularly in The Catlins and West Otago areas. This growth is predicted based on recent media exposure related to production filming of feature films and print media articles on ravel in the district. The Catlins in particular is proving as popular destination for independent Asian travellers with the Southern scenic route and its outdoor activities being the major attraction.

9.7. Waste Minimisation Trends

The introduction of the kerbside recycling collection in 2012 has seen consistent trends in regards to time of year however there has been a decline in tonnes p/a in 2015-16.

This could be attributed to apathy in using the recycling bin after a good uptake. The waste wheelie bin is 240l and perhaps is more convenient option then separating out recyclables. This would indicate that information and education about the service is required.

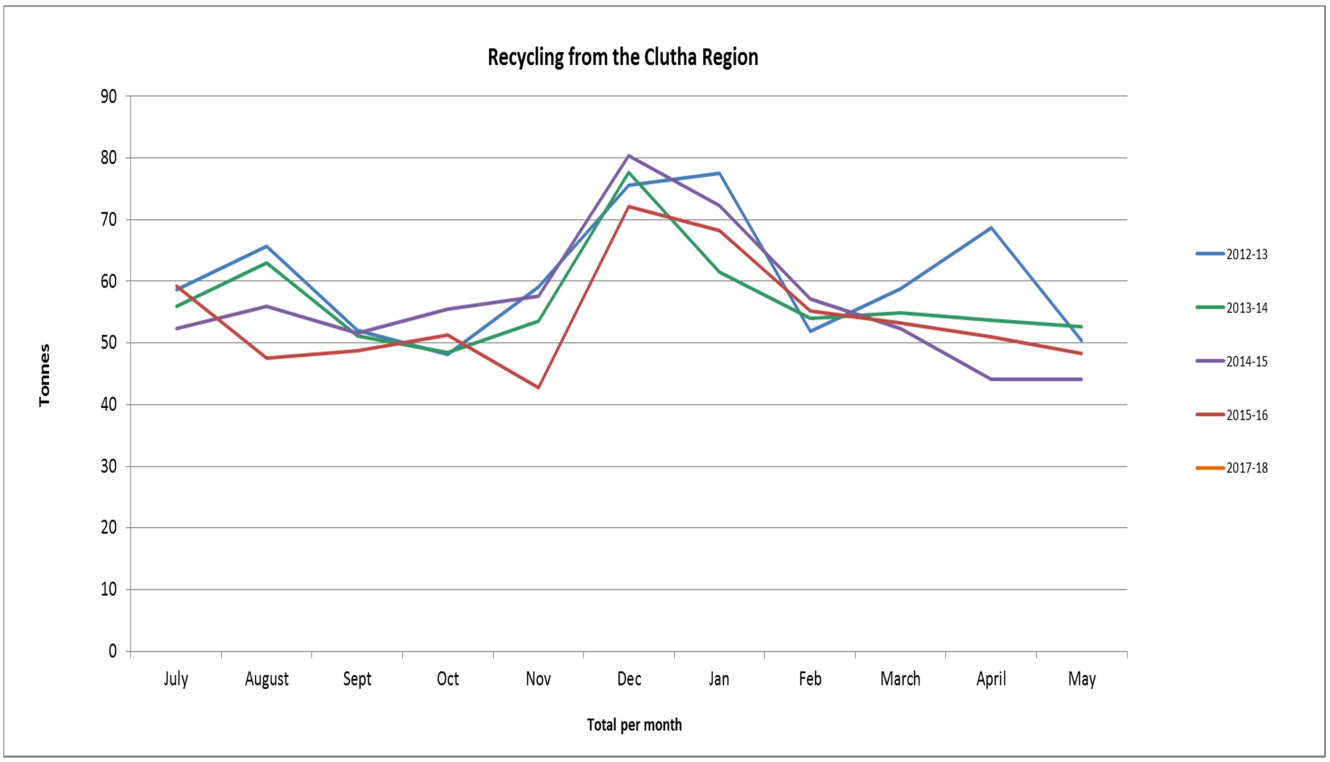


Table 9.5.1: *Monthly Recycling Figures trends*

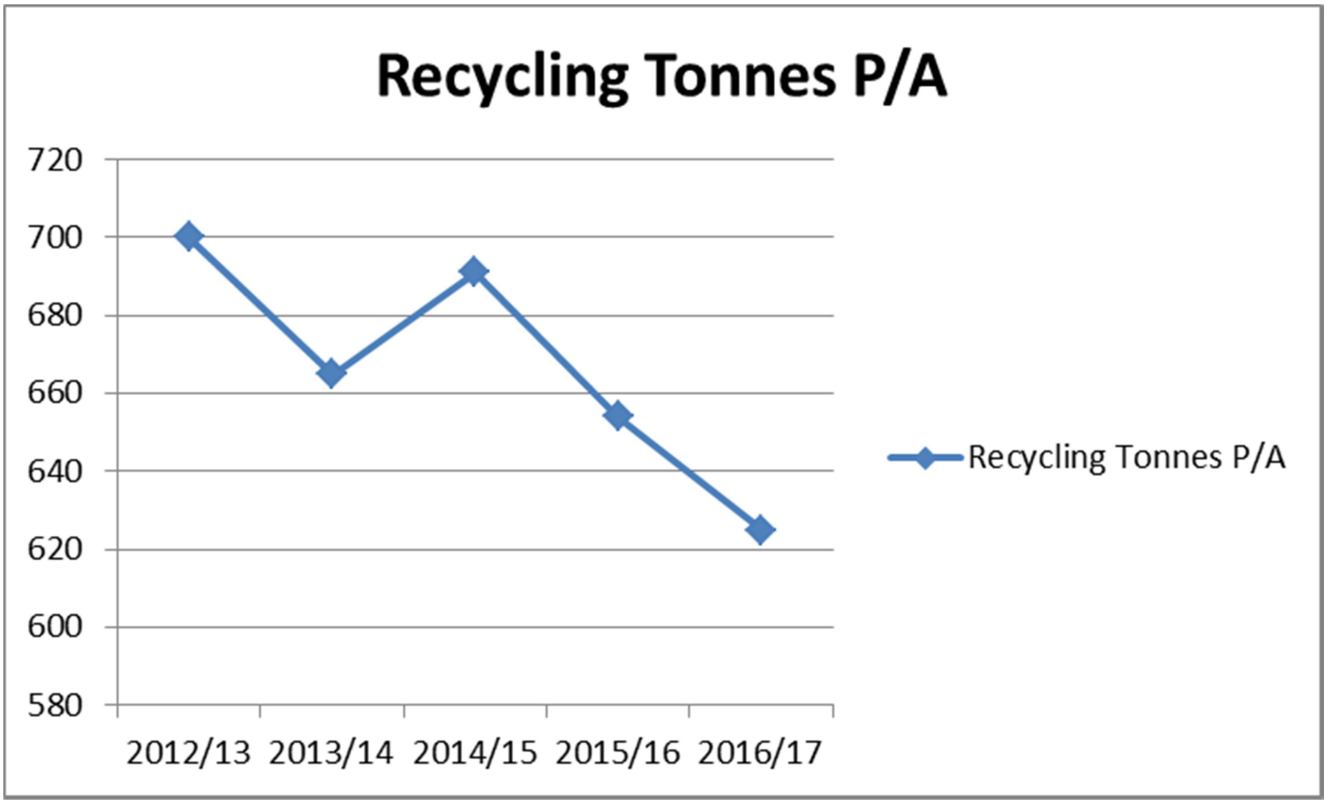


Table 9.5.2: *Annual Recycling Tonnage*

10. Demand for Services and Infrastructure

Some of the main factors that will affect demand for waste management and minimisation services and infrastructure in the Clutha District include:

- Mt Cooee capacity
- Impact of the Emissions Trading Scheme
- Community expectations
- Increased environmental awareness
- Population shifts within the district
- Recycling markets

10.1. Mt Cooee Capacity

6 monthly surveys are done to confirm the volume of waste deposited at Mt Cooee. These surveys are also used to predict the remaining volume and its impact on the ability of the landfill to accept waste until its closure date. As at 2 May 17 there were 6.9 years of volume remaining. This exceeds the proposed closing date of 30th Sep 2023 by approximately 10 months or 7,000m³. This allows for up to a 13% increase in waste forecasted for the next 6 years.

10.2. Impact of the Emissions Trading Scheme

Landfill fees and charges have not increased as a result of the landfill's participation in the Emission Trading Scheme as carbon credits have been available from council's forestry activities. However from the 2018/19 financial year these carbon credits used to offset the landfill liability will be accounted for. This will see an increase in costs for the wheelie bin service and landfill operations. Therefore an anticipated increase in tip fees is expected to have a number of impacts on demand for services and infrastructure including;

- Reduced use of Mt Cooee landfill. In turn this is likely to create additional upward pressure on fees and charges as the increased costs will have to be spread across lower tonnages.
- Increased fly-tipping as people avoid paying the fees and charges. This is likely to increase demands on Council's regulatory functions to deal with such events.
- Increased demand for information on waste minimisation and diversion.

10.3. Increased Environmental Awareness

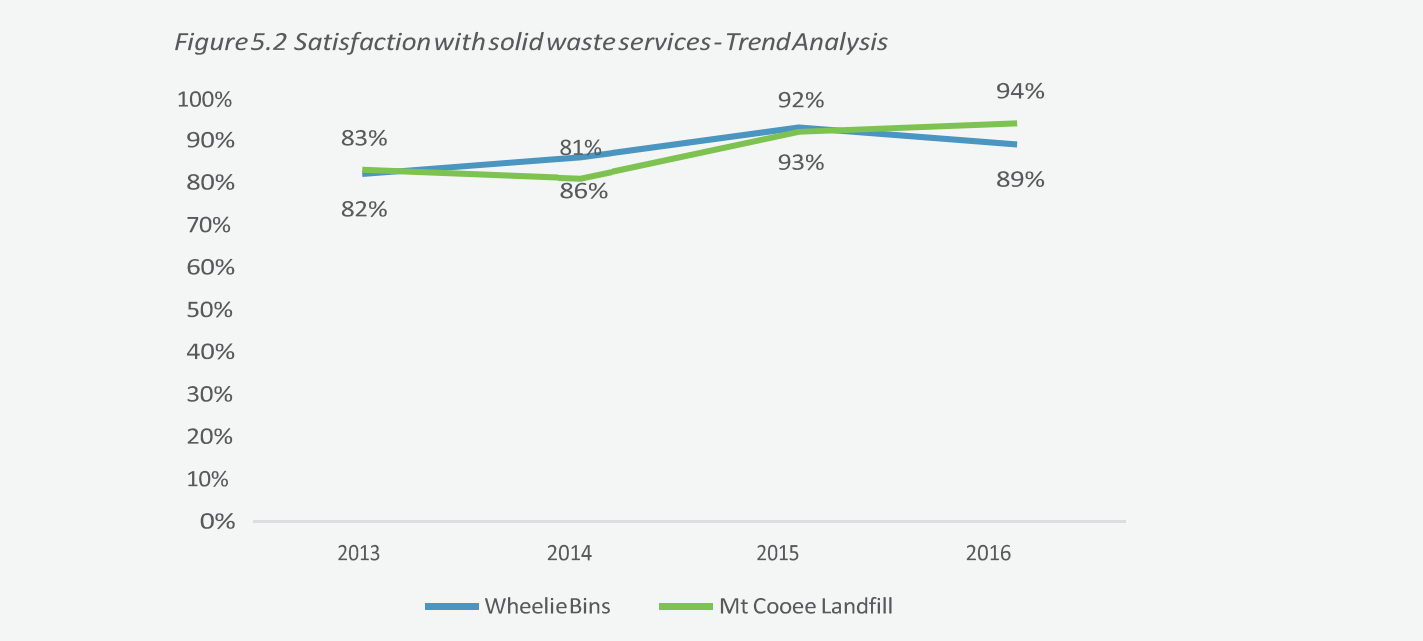
An increase in environmental awareness across society is likely to increase demand for waste minimisation information and recycling services and infrastructure. This is also likely to reduce demand for waste disposal services and infrastructure.

A number of initiatives supporting waste minimisation and diversion within existing budgets have been included in the assessment of options. Additional support is constrained by financial resources and staff availability.

10.4. Community Expectations

A primary indicator of community expectations is resident perceptions, as measured and reported via annual resident satisfaction surveys. Over the past six years resident satisfaction levels with Council's solid waste services have been very favourable. This is particularly the case for the wheelie

bin service, which has been the highest or second highest rating Council service since surveying began in 2006.



Graph 10.1: *Resident Satisfaction for Council's Solid Waste Services 20013-2016*

Satisfaction levels are forecast to remain constant in the long term.

10.5. Recycling markets

Recovery of materials from the waste stream for recycling and reuse is heavily dependent on the recovered materials having an economic value. This particularly holds true for recovery of materials in the private sector. Markets for recycled commodities are influenced by prevailing economic conditions and most significantly by commodity prices for the equivalent virgin materials.

Council's current contractor has elected to cover the risk of fluctuating commodity prices for the recycling market by sorting and processing of recyclables at no direct cost to Council and marketing any recyclables collected to with no rebate to Council.

Contamination risk is covered by the contractor and will become more important with the tightening up of international recycling markets indications of stricter controls on contamination.

10.6. Summary of projected demand for waste minimisation and management services and infrastructure

Assumptions made regarding the demand for services and infrastructure are summarised in the table below.

Service/ Infrastructure	Expected demand			
	2017/18	2018/19	2019/20	2020/28
Waste minimisation programmes	Increase in demand for information about minimising waste created and diverting waste from landfill.			
Kerbside collection services	Minimal change (small increase) in demand anticipated from the current ~6100 services provided.			

Waste transfer stations	130 tonnes +/- 20%	125 tonnes +/- 20%	120 tonnes +/- 20%	100 tonnes +/- 20%
Recycling drop-off facilities	Decrease overall (due to kerbside collection) but an increase in demand for glass drop-off facilities.			
Waste disposal facility (landfill)	9200 tonnes	9000 tonnes	8770 tonnes	8400 tonnes
Commercial collections of residual waste	Demand is likely to decrease as the cost of disposal to landfill increases and options for diversion from landfill increase.			
Commercial collections of recyclables	Demand is likely to increase as the cost of disposal to landfill increases.			

Table 10.1: *Summary of projected demand for waste minimisation and management services and infrastructure*

11. Options to meet demand for services and infrastructure

This section contains a summary of the reasonably practicable options available for the management and minimisation of waste within the district. These options have been investigated or considered by Council over the past six years.

Table 11.1: *Key to effects on wellbeing*

Wellbeing	Positive (✔)	Neutral (-)	Negative (✖)
Economic (Ec)	Helps minimise costs to ratepayers in the long term	No effect	Increases costs to ratepayers in the long term
Social (S)	Improves levels of service and/or promotes health and safety	No effect	Decreases levels of service and/or increases risks to health and safety
Cultural (C)	Avoids adverse effects on cultural beliefs and practices	No effect	Increases adverse effects on cultural beliefs and practices
Environmental (En)	Reduces adverse effects on the environment	No effect	Increases adverse effects on the environment

Table 11.2: *Summary of reasonably practicable options*

	Option	Wellbeing				Assessment	Council's intention
		Ec	S	C	En		
Council's overall approach to waste services and infrastructure	Council continues to remain a key provider of waste services and infrastructure in addition to its regulatory and advocacy roles	✔	✔	✔	✔	Our sparsely populated district makes the collection and disposal of waste more expensive than other more densely populated areas. This means that commercially operated services are unlikely to be viable at the end-user costs that Council can provide them for. Having waste management services provided by Council means that we can serve a larger number of people, and spread the costs wider.	Continue
	Council leaves the provision of waste services and infrastructure to the private sector and focusses on its regulatory and advocacy roles	✖	✖	✖	✖	Although it would be possible for Council to cease providing collection and disposal services and infrastructure, overall efficiencies and desired waste management and minimisation objectives would likely be compromised.	Not to implement
	Maintain and enforce a solid waste bylaw	✖	✔	✔	✔	Ensures Council's solid waste services and infrastructure can be operated in an efficient and effective manner.	Continue
	Develop our understanding of waste managed outside of Council's infrastructure	✔	✔	✔	✔	Would ensure that Council can better plan and facilitate waste management and minimisation services and infrastructure within the district.	Continue
Waste Minimisation	Continue to facilitate the Enviroschools programme at schools throughout the district	✔	✔	✔	✔	The Enviroschools programme helps place environmental awareness throughout school curriculums ensuring that waste minimisation ethics are instilled in younger generations. This is a cost-effective way of providing waste minimisation education as the earlier people develop waste minimisation and management habits the better.	Continue
	Continue to provide waste minimisation information to the public	✔	✔	✔	✔	Providing easily accessible and localised information about waste minimisation is one of most effective ways that Council can help reduce the amount of waste generated within the district.	Continue
	Provide funding for independently run waste minimisation programmes	?	?	?	?	There has been minimal demand for funding for waste minimisation initiatives within the district meaning that a formal funding scheme using waste levy funds is not required. Council should assess any requests for funding through its Annual and Long Term Plan submission process.	Determine on a case-by-case basis
Kerbside collection services	Continue the two-bin kerbside collection service with no changes	✔	✔	✔	✔	The existing kerbside collection service is very popular with customers.	Continue
	Council cease its kerbside waste collection and leave kerbside collection services to	✖	✖	✖	✖	The wheelie bin service is consistently rated as one of Council's most liked services. Although it is possible for Council to cease the service, overall efficiencies and desired waste management and minimisation objectives would likely be compromised.	Not to implement

	Option	Wellbeing				Assessment	Council's intention
		Ec	S	C	En		
	private operators						
Kerbside collection services (cont.)	Supplement the existing kerbside collection service by collecting glass for recycling	✖	✔	✔	✔	Co-mingling of recyclables (collecting glass with other recyclables) leads to contamination of recyclables with broken glass, meaning that previously-recyclable materials cannot be recycled and end up being landfilled. Ideally, glass also needs to be separated by colour. This means kerbside collection of glass would require an additional collection. Even if a high level of participation across the district was achieved in such a service it would be expensive.	Not to implement
	Supplement the existing kerbside collection service with an additional collection of organic waste	✖	✔	✔	✔	Collecting organic waste from the kerbside requires an additional collection and even if a high level of participation across the district was achieved it would be expensive.	Not to implement
	Expansion of the service area for kerbside collections	✖	✔	✔	✔	Continue to review the extension of the service as requested.	Implement
	Provide free recycling collections for schools and non-profit early childcare facilities on existing collection routes	✔	✔	✔	✔	This would promote recycling and ensure younger generations establish good waste management habits at a young age.	Continue
	Continue with existing transfer and drop-off facilities	✖	✔	✔	✔	The existing transfer stations (in various forms) ensure that everyone in the district has relatively easy access to waste disposal facilities. The long term viability of transfer stations will be monitored for usage and quantity of waste collected to see they should continue.	Monitor longer term viability
Waste transfer and recycling drop-off facilities	Extend levels of service for waste transfer facilities (hours, locations)	✖	✔	✔	✔	As the transfer stations are not high-use facilities at present, it would be uneconomic to extend locations and/or hours. This is especially so considering demand for waste disposal is expected to decrease as the cost increases.	Not to implement
	Extend levels of service for recycling drop-off facilities	✖	✔	✔	✔	Demand for glass drop-off facilities is expected to increase as this is excluded from the kerbside service. New drop-off facilities for glass would improve levels of service, however, there is currently no viable use of glass recyclables meaning that glass is stockpiled.	Not to implement
	Close transfer facilities altogether	✔	✖	✖	✖	Although this would save costs, it would reduce levels of service and could potentially increase fly-tipping. Would increase environmental and public health risks.	Not to implement

	Option	Wellbeing				Assessment	Council's intention
		Ec	S	C	En		
Waste transfer and recycling drop-off facilities (cont.)	Commercial operators collect recyclables and residual waste within the district	✔	✔	✔	✔	Commercial collections are encouraged by Council where the market thinks it is feasible and where benefits to the district's wellbeing are proven.	Encourage and ensure compliance with bylaw
Commercial collections	Council continue to provide waste bins in public areas to be emptied as per various contracts	✖	✔	✔	✔	Ensures that waste in public areas is properly disposed of and that our public areas remain clean and tidy.	Continue
Waste bins in public areas (shopping areas, parks and reserves)	Provide recycling bins alongside litter bins in the district where appropriate	✔	✔	✔	✔	Would reduce waste to landfill and promote a positive public image and perception of recycling. There would be a cost to installing and emptying the bins. However, external funding may be available through the likes of LoveNZ for the initial cost of the bins, and the cost of emptying the bins may be offset by reduction in disposal fees.	Investigate
	Council remove waste bins and leave waste disposal up to individuals	✖	✖	✖	✖	Removing waste bins from public areas (as done recently in Waitaki) would mean that people would have to take responsibility for their own waste. It would reduce the cost of maintaining and emptying bins and paying for disposal of the waste. However overall costs may be higher in the long term as increased resources have to go into responding to littering.	Not to implement
Waste diversion (re-use, recycling and composting etc)	Council retains ownership of recyclable materials collected by Council's collection services and manages their disposal	✖	✔	✔	✔	Would expose Council to the risks involved in the recyclables market and reduce the likelihood that the contractor would provide a commercial service.	Not recommended
	Promote home-composting	✔	✔	✔	✔	The prevalence of at-home composting is higher than originally assumed, with around two-thirds of households reporting at-home composting in recent residents' surveys.	Continue
Waste diversion (re-use, recycling and composting etc) (cont.)	Investigate options to further reduce the amount of organic waste disposed to landfill	✖	✔	✔	✔	Previous options investigated (kerbside collection with a central composting facility) have proven too expensive. Other measures or options may reduce organic waste to landfill at a lower cost.	Investigate
	Investigate options for beneficial use of glass	✔	✔	✔	✔	Council's contractor does not currently want ownership of the glass collected through recycling drop-off facilities as it has no commercially viable method of recycling these. Glass is currently stockpiled and used as engineering material at the landfill. Further investigations may find further beneficial use of the glass collected.	Implement

	Option	Wellbeing				Assessment	Council's intention
		Ec	S	C	En		
	Provide a database of waste diversion resources for use by the community	✔	✔	✔	✔	A web-based database would be an efficient method of providing information to the community, enabling them to divert their waste from landfill through re-use.	Implement
	Facilitate waste exchange between businesses, non-profit organisations and the community	✔	✔	✔	✔	A waste exchange gives life to the adage "one man's trash is another man's treasure". Although it could take a number of forms, a web-based database would be a cost-effective method of facilitating exchange of materials between those who want rid of something and those who want a resource.	Implement
	Drop-off facility for e-waste at Mt Cooee	✖	✔	✔	✔	Electronic equipment is made from a range of materials, many of which are hazardous and are a threat if not disposed properly. There is also potentially some value in unwanted e-waste materials. There is a very small uptake in the service as the costs to recycle are expensive. Investigate ways to bring the cost down.	Investigate
	Continue to use Mt Cooee landfill until existing consents expire in 2023	✔	✔	✔	✔	Mt Cooee has enough capacity to meet foreseeable demands until beyond 2023. This is the status quo and most affordable option at present.	Continue
Waste disposal	Undertake required work to ensure Mt Cooee can obtain new resource consents and remain an operational landfill after 2023	✔	✔	✔	✔	Mt Cooee has enough capacity (space-wise) to continue as an operational landfill for many years, it is likely that conditions on any resource consents required post 2023 would require costly additional action, practices or infrastructure for Mt Cooee. These need to be further investigated and compared to options for sending residual waste to an out-of-district landfill post 2023.	Investigate
	Send residual waste to an out-of-district landfill facility	✖	✔	✔	✔	Closing the Mt Cooee landfill and sending waste to an out-of-district landfill is likely to be socially and culturally more acceptable to residents and ratepayers and will reduce adverse effects on the environment within our district. However, this would simply be shifting the adverse social, cultural and environmental effects and the cost is likely to be much higher than at present.	Investigate as an option should the consents for Mt Cooee not be renewed
	Investigate options for collecting and flaring landfill gas	✔	✔	✔	✔	Collecting landfill gas from the Mt Cooee landfill and flaring it (or potentially generating electricity from it) would reduce costs under the Emissions Trading Scheme (ETS). Further investigations would be required to determine the cost-effectiveness of doing so.	Investigate
Waste disposal (cont.)	Leave private sector to provide cleanfills	✔	✔	✔	✔	Compared with most other waste types, cleanfill material poses minimal risks to the environment and public health. Using landfill capacity at Mt Cooee for cleanfill would not be cost-effective long term as it would reduce the life of Mt Cooee.	Implement

	Option	Wellbeing				Assessment	Council's intention
		Ec	S	C	En		
Closed landfills	Continue to monitor and manage closed landfills to ensure compliance with resource consents	✖	✔	✔	✔	Compulsory. Ensures that the impact of closed landfills on the environment are minimised and mitigated.	Continue

12. Proposals To Meet Demand For Services and Infrastructure

12.1. Council's Proposed Role

A key part of Council's approach to waste is to remain the lead provider of waste management and minimisation services and infrastructure within the district.

Our sparsely populated district makes the collection and disposal of waste more expensive than other more densely populated areas. This means that commercial services are unlikely to be viable at the same end-user costs that Council can provide them for. Having our waste management and minimisation services provided by Council means that we serve a larger number of people, and spread the costs wider.

Council also has other roles including regulator and advocate. These roles are summarised below.

Table 12.1: *Council's roles within waste management and minimisation*

Council's role	Activity
Service and infrastructure provider	Provide (via a contractor) collection and disposal services and infrastructure
Governance	Oversee waste management and minimisation within the district through the WMMP
Regulator	Enforce a Solid Waste Bylaw which ensures waste is effectively managed
Community leader	Leading by example through Council's activities and operations
Advocate	Advocate for the district's best interests at central and regional government level and within the commercial and non-government sectors where appropriate

12.2. Council's Proposed Actions

The methods of waste minimisation and management that Council intends to provide or facilitate within our district include;

- Collection of residual waste
- Collection of recyclables
- Management and operation of a sanitary landfill
- Promotion of waste minimisation and responsible waste management
- Monitoring and management of closed landfills

Action plans for how these services and infrastructure will be provided will be included in Council's WMMP.

12.3. Protection of Public Health

In determining its overall approach to waste and in assessing and choosing which methods of service and infrastructure delivery are appropriate for our district, Council has taken into account and balanced economic, social, cultural and environmental aspects of our community's well-being, including public health concerns.

It is considered that the proposals would adequately protect public health, and meet Council's requirements under the Health Act 1956 to ensure that solid waste collection services are available for residents.

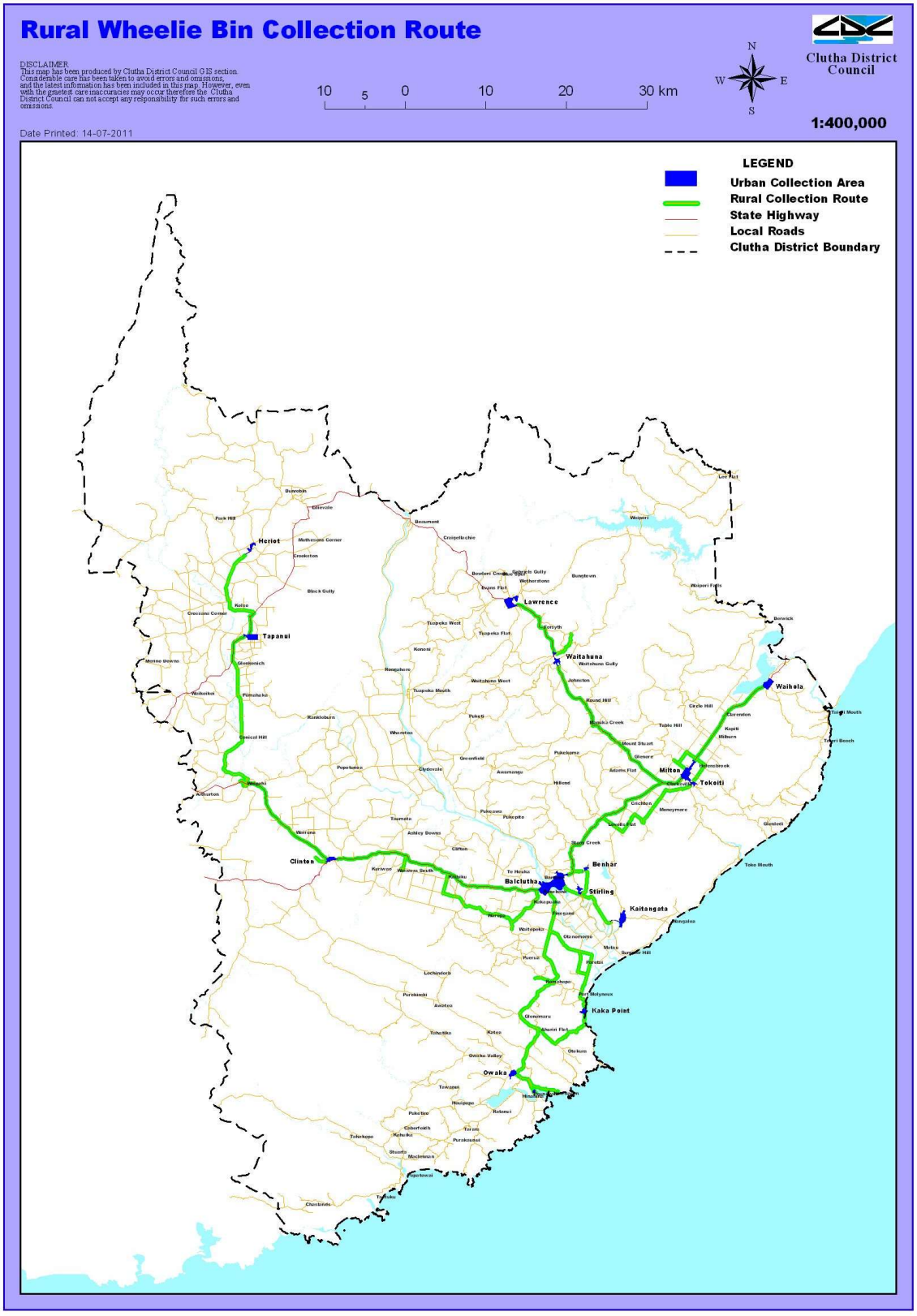
12.4. Promotion of Effective and Efficient Waste Management and Minimisation

In determining its overall approach to waste and in assessing and choosing which methods of service and infrastructure delivery are appropriate for our district, Council has taken into account and balanced economic, social, cultural and environmental aspects of our community's well-being.

It is considered that the proposals are the most appropriate available to promote effective and efficient waste management and minimisation within our district.

Part D – Appendices

13. Appendix A: Kerbside Collection Route



14. Appendix B: Planning Assumptions from Draft Long Term Plan 2018/28

Uncertainty	Assumption	Level of uncertainty	Consequence of error in assumption
Amount of solid waste generated in the district.	9,300 tonnes of solid waste is produced in the district a year . This is assumed to reduce slowly in the long term as waste minimisation uptake increases, the district experiences an ageing population and a potential fee increase due to ETS levies see a drop in waste to landfill.	Medium	As the landfill is a user pays service (unless there are major reductions in usage) there is a low consequence with regard to the quantity of waste assumption. Further decreases in usage will mean increased user charges.
Levels of Service	There are currently no plans to implement a collection of organic waste or glass.	High	Both are significant in the weight and composition of kerbside rubbish collection. Increases in the dumping of these would impact on wheelie bin weight
Regional Cooperation	It is assumed that regional facilities for the sorting and disposal of our district's recyclables will continue to be available.	Medium	Potential for recycling costs to increase if regional facilities are not available.
Changes in volume/ revenue from Mt Cooee	Mt Cooee is already considered a low volume landfill. There is a risk that operating the landfill at the current levels of service may become uneconomic. At this stage Council is assuming it will continue with the current level of service and opening hours for Mt Cooee.	High	A reduction in opening hours/access to Mt Cooee may be needed in order to reduce operating costs
Increased fees and charges for Mt Cooee users	Waste minimisation initiatives, imposition of the waste minimisation levy and ETS levies has resulted in reduced usage at Mt Cooee. It is assumed there will be significant upwards pressure on user charges as a result. Another consequence may be increased 'fly-tipping' in the district. In the past there is anecdotal support that there is a direct relationship between increases in Mt Cooee charges and incidence of 'fly-tipping'. No additional resources have been included for Council's Regulatory Department in the budgets for dealing with potential increases in fly-tipping at this point.	Medium	Upward pressure on user charges may not result in additional income due to continued declines in usage. If additional resources are required to deal with 'fly-tipping', this would result in increased costs to ratepayers.
Climate Change, Emissions Trading Scheme	That the ETS liability will decrease with the reduction in waste to landfill. However council currently uses accumulated Carbon Credits from its forestry activities to pay for the ETS liability of the landfill. From 18/19 forestry carbon credits used will need to be accounted for at market rates and allocated to the Solid Waste accounts so as to have a true cost of the Solid Waste service.	Medium	ETS Costs may increase if the cost of buying carbon credits is greater than assumed. ETS Costs may increase if the quantity of waste is greater than assumed. Liabilities associated with the ETS may be less if gas recovery or reuse is viable for Mount Cooee. Liabilities associated with the ETS may be less if a Unique Emissions Factor is secured for

Uncertainty	Assumption	Level of uncertainty	Consequence of error in assumption
	Options to reduce the emissions liability of Mt Cooee will be explored including gas flaring or gas capture and reuse.		Mount Cooee. This requires an evaluation of the type of waste to landfill as different waste streams have different impacts on emissions. Liabilities associated with the ETS may be less if green waste diversion is introduced at Mount Cooee.
Post closure costs	For accounting purposes, it is assumed that for Mt Cooee Landfill will be in operation until its consent expiry date of 2023. It is assumed that post closure reserves will be sufficient for Mount Cooee.	High	Capital forecasts may be higher than required. A shorter period of operation may result in less income collected for post-closure costs. This may result in alternative sources of funding being required.