WasteNot Consulting

Survey of Solid Waste in Hawke's Bay

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Hastings District Council and
Napier City Council
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1 Introduction

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

In line with these responsibilities, in 2012 Hastings District Council and Napier City Council adopted *2012 -2018 Joint Waste Management and Minimisation Plan for Hastings District Council and Napier City Council*. As per section 50 of the Act, the WMMP must be reviewed by 1 July 2018.

To provide baseline data for waste assessments and WMMPs, identify waste minimisation initiatives, and monitor changes in the waste stream, the Councils have regularly commissioned waste composition audits based on the Ministry for the Environment's *Solid Waste Analysis Protocols 2002* (SWAP). The most recent audits were contracted to Waste Not Consulting in 2007, 2009, and 2012.

This report provides the results of a SWAP audit undertaken in February and April 2016. As well as providing information for the mandatory review of the 2012 WMMP, it is understood that the purpose of the audit is to update and augment existing data for use by the Waste Futures Project, a joint initiative of Hastings District Council and Napier City Council. The purpose of the Waste Futures Project is to investigate how the Councils, joint owners of Omarunui Landfill, should manage the long-term disposal of residual wastes.

As in 2007, 2009, and 2012, the SWAP auditing programme comprised two separate elements. Nine days of visual surveying of vehicle loads of waste were conducted at the major disposal facilities in the region, with three days of surveying each at Redclyffe Refuse Transfer Station, Henderson Rd Refuse Transfer Station, and Omarunui Landfill. These visual surveys were augmented with a five-day sort and weigh audit that analysed domestic kerbside bagged refuse and the contents of a private waste collector's 240-litre mobile garbage bins (MGB) from Hastings and Napier.

1.1 Waste management services in Hawke's Bay[1]

1.1.1 Services for the residential sector

Both Hastings District and Napier City Councils provide kerbside refuse collections for residential and commercial properties. Both Councils also operate refuse transfer stations for use by the public and commercial waste collectors and the Councils jointly own Omarunui Landfill.

The Napier residential kerbside refuse collection is funded through a Uniform Annual Charge and does not use an official refuse bag. The collection is for domestic refuse only and is not intended for the disposal of garden waste. A maximum of two bags per household are collected from outside each property on a weekly basis. Bags may be plastic or paper, no

[1] Information taken from Councils' joint Waste Assessment, June 2011

more than 60 litres in volume, and not weigh more than 10 kg. The collection services are currently contracted to Waste Management NZ Ltd. Council staff collect a small amount of kerbside refuse from rural areas.

Hastings District Council operates a user-pays system for the residential kerbside collection of domestic waste, using an official orange refuse bag. Two sizes of bags are available – 60-litre bags retail for $2.40 each, smaller 40-litre bags for $1.60 each. There is no limit to the number of official bags a property may set out for collection, but bags are not to weigh more than 10 kg. The bags are not to be used for the disposal of garden waste. The kerbside refuse collection is currently contracted to Waste Management NZ Ltd. Collection from a small number of households in southern coastal communities is contracted to DJ Monty Holdings Ltd, trading as Bin Hire Co. The contractor collects private subscription MGBs at the same time as Council orange bags.

Both Councils provide a kerbside recycling service for residential properties. Hastings' collection is weekly; Napier City's is fortnightly. Residents may set the following materials out in either plastic bags or cardboard boxes:

- plastic bottles and jars with recycling symbols #1-7
- glass bottles and jars
- steel and aluminium cans
- paper and cardboard.

The kerbside recycling collection and the processing of materials is jointly contracted by the Councils to Green Sky Waste Solutions Ltd.

Kerbside collections of domestic refuse or greenwaste, using mobile garbage bins (MGBs), are available throughout the region from private waste operators on a user-pays subscription basis. The proportion of households that make use of these services has been investigated by the Councils. Several sizes of MGBs are available for residential use, ranging from 80-litres to 240-litres.

For occasional removal of large quantities of refuse, residents have the option of using the services of a large number of private waste operators. Some of the waste operators provide gantry bins, of various sizes, for the householder to load themselves. Other waste operators both load and remove waste from residential premises.

1.1.2 Services for the commercial sector

Hastings District Council operates a twice-weekly collection of bagged refuse, using the official Council user-pays orange bags, from the central business areas of Hastings and Havelock North. Napier City Council also operates a commercial bagged refuse collection in the Napier central business district three times per week. Neither Council collects bagged refuse from industrial areas.

Outside of the central business districts, the Councils' kerbside recycling collection services are available to those businesses that are eligible for the Council's kerbside refuse services. For businesses that are not eligible for the Council service or that generate large quantities of recycling, recycling collections are available from private service providers.

Most trade waste generated by the commercial sector is removed by private waste operators or transported to a disposal facility by the business itself. A wide range of collection systems

are offered to meet the requirements of each business. MGBs, front-loader bins, gantry skips, hook bins, and roll-on/roll-off hook bins are all available.

Commercial waste collected by private waste operators is disposed of at one of the three main waste disposal facilities – Henderson Rd Refuse Transfer Station, Redclyffe Refuse Transfer Station, or taken directly to Omarunui Landfill.

1.1.3 Waste disposal facilities

There are three refuse transfer stations (RTS) operating in the region. Henderson Rd and Blackbridge RTS are owned by Hastings District Council. Henderson Rd is the main transfer station for Hastings, and accepts both domestic and commercial waste seven days per week. Most of the Hastings kerbside collection is taken to Henderson Rd RTS for consolidation and transport to landfill. A small amount from coastal communities is taken directly to Omarunui Landfill.

All waste loads at Henderson Rd RTS are weighed and charges are based on the weight of waste disposed of. Rubbish is charged at a rate of $161/tonne, and greenwaste at a rate of $86.25/tonne. A minimum charge of $12 applies to loads of rubbish, and $8 to greenwaste. Cartage and aspects of the site operation are contracted to Phoenix Contracting Ltd.

Photo 1.1 - Henderson Rd RTS

Blackbridge RTS is open three days per week and accepts only domestic waste. The charges for Blackbridge RTS are shown in the table below. The facility is managed and operated under contract by Phoenix Contracting Ltd.

Table 1.1 – Blackbridge RTS disposal charges

Vehicle type	Normal charge	Discounted charge for greenwaste
Car, Wagon	$15	$10
Small Trailer, Ute, Van	$40	$20
Medium Trailer, Ute, Van	$60	$35
Large Trailer, Ute, Van	$85	$45

Both Henderson Rd and Blackbridge RTS have separate drop-off points for scrap metals, engine oil, car batteries, and greenwaste. Henderson Rd RTS includes a resource recovery centre that provides a drop-off area for recyclable materials and Council orange refuse bags and accepts and sells recovered household goods. Staff at Henderson Rd RTS recover waste materials, primarily scrap metal, from loads of waste dumped on the tipping floor.

Redclyffe RTS is the only transfer station in Napier City and accepts both domestic and commercial waste seven days per week. The Napier City Council kerbside refuse collection (other than the rural refuse collected by Council staff) is taken directly to Omarunui Landfill, and does not go through the transfer station.

Redclyffe RTS is owned by Napier City Council, with RTS operation and haulage of waste to Omarunui Landfill being contracted to Doug Gerrard Ltd. Rubbish disposal is charged at a rate of $192/tonne, and greenwaste and untreated wood at a rate of $101/tonne.

Before the weighbridge kiosk, there is a drop-off facility that accepts glass bottles, paper/cardboard, and steel/aluminium cans. The main facility has separate drop-off points for hardfill, greenwaste, scrap metals, engine oil, LPG containers, batteries, computers, and paint. Staff recover scrap metals, tyres, and hard fill from the tipping floor.

Photo 1.2 - Redclyffe RTS

Omarunui Landfill is the principle waste disposal facility for Hawke's Bay. The Class 1 landfill is jointly owned by Napier City and Hastings District Councils. It is closed to the public, and accepts waste from the three transfer stations and the commercial sector. All vehicles are weighed and charged on a per tonne basis. The notified gate charge is $83/tonne for municipal waste. A minimum charge for municipal waste is currently $148/load. Special wastes are charged at $117.50/tonne, with a minimum charge of $176/load.

2 Methodologies

2.1 Audit of domestic kerbside refuse

The audit of domestic kerbside refuse was designed to determine the following:

- domestic kerbside refuse bag weight and composition for Hastings
- domestic kerbside refuse bag weight and composition for Napier
- household set out weight of domestic refuse for Hastings and Napier
- domestic kerbside refuse composition and weight for privately-collected 240-litre MGBs.

The audit methodology was based on Procedure One of the Ministry for the Environment's Solid Waste Analysis Protocol 2002 (SWAP). Conducted over a five-day period, the audit included 300 council-collected refuse bags and the contents of 55 privately-collected 240-litre MGBs.

2.1.1 Classification of refuse

Classification of the bagged refuse was into the 12 primary categories identified in the SWAP and 25 secondary categories. The categories are detailed in Appendix 7. The classifications were chosen to identify the different types of recyclable and potentially recyclable materials present in the refuse.

2.1.2 Sample size

The audit was undertaken over a five-day period and designed to include:

- 150 bags of domestic kerbside refuse each from both Napier and Hastings
- approximately 1200 kg of refuse from 240-litre MGBs (approximately 60 MGBs).

2.1.3 Sampling strategy

The composition and quantity of domestic refuse varies according to a number of factors, including the socio-economic status and ethnicity of the householder, the nature of the housing stock, and the range of disposal and recycling services available. To obtain a representative sample of domestic refuse from Hastings and Napier, it was considered necessary to sample from as wide a geographic area as possible. Accordingly, the kerbside refuse sample was collected in a different area of Hastings and Napier each day for five days.

Only dwellings to which a distinct quantity of refuse bags could be attributed were chosen for the refuse bag sample collection. Refuse bags were not taken, for example, from beside shared driveways as it may have represented the refuse output of several households. When refuse bags were taken from a dwelling, the total number of bags set out by that dwelling was recorded. This allowed the calculation of the average number of bags set out per household, which, when combined with an average bag weight, allowed the calculation of the average weight of refuse set out per household. Note that this does not necessarily equate to an average weekly household waste generation, as not all households set out refuse each week.

2.1.4 Audit execution

The sample collection was undertaken each morning by a Waste Not staff member, accompanied by a contract worker, in a truck rented and driven from Auckland for the purpose. The collected sample was transported to Omarunui Landfill each day for sorting. A six-by-six metre marquee was erected at the landfill for the purpose.

A team comprising the Waste Not supervisor and three contract staff was used for the sorting process. All contract staff had received the requisite training on the requirements of the audit process and on health and safety procedures. All personal protective equipment was provided to contract staff.

Photo 2.1 – Sorting bagged refuse

Refuse bag samples from Hastings and Napier and the contents of 240-litre MGBs were sorted separately. The collected bags were sorted in sampling units of five bags. Each of the five bags in the unit was weighed in, the weight recorded, and then the bags were opened, the contents spread on a sorting table, and the individual items sorted into the appropriate categories. When all of the items were sorted, the individual classifications were weighed out and the material disposed of. The contents of two 240-litre MGBs were sorted together in the same manner. These sorting techniques are consistent with Section 4.5 of the SWAP.

2.2 Surveys of transfer stations and landfill

As 25% of the waste being disposed of at Omarunui Landfill comes from the two main refuse transfer stations, Henderson Rd and Redclyffe, three days were spent surveying at each of the main transfer stations and three days at the landfill. As the tonnage being disposed of at Blackbridge RTS is markedly lower by comparison, no surveying was undertaken at the facility.

Visual surveying, as undertaken by Waste Not Consulting, provides information on vehicle loads of waste entering a disposal facility in terms of composition of the waste load and the "activity source" of the waste load - the activity that generated the waste. The composition of waste is based on the 12 primary categories (e.g. paper, plastics etc) recommended by

SWAP. Further secondary categories were decided upon in conjunction with the Councils. A description of the categories is provided in Appendix 8.

2.2.1 Visual assessment of waste composition

While each vehicle was being unloaded at a disposal facility, the surveyor assessed the relative weight of each constituent present in the load on the basis of volume and density. Absolute weights were not estimated; rather, the proportion of weight represented by each material was estimated. These data were recorded as a proportion, by weight, for each constituent present in the load.

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 and were adjusted according to the materials that were visible.

At both of the transfer stations, some recoverable materials are removed from the waste stream by facility staff. In such instances, the recovered materials were *not* recorded as being a constituent of the waste and an estimate was made of the proportion, by weight, of the load that has been recovered.

Survey data were then combined with weighbridge records of the weight of the load, and a weight for each of the individual materials was calculated. For small loads that were not weighed at a weighbridge, an estimate of the load weight was made based on known averages for the specific vehicle and load activity source.

The surveyor undertook visual assessments of vehicles for nine hours per day (including breaks) for three days in each facility. Except during very busy periods, the surveyor was able to gather data on all vehicles disposing of waste during the survey hours at the facility.

2.2.2 Activity sources of waste loads entering disposal facilities

During the survey, the activity source of each waste load was assessed and recorded by the surveyor at the same time as the composition was being assessed and recorded. The activity source categories that were included in the recently-completed National Waste Data Framework were used. These are defined as follows:

1. **Domestic kerbside** – Domestic-type waste collected from residential premises by the local council (or by a contractor on behalf of the council), or by private waste collections (through kerbside or similar collection). The split between residential and commercial kerbside refuse was made during the data analysis phase.
2. **Residential** – All waste originating from residential premises, other than that covered by any of the other activity source categories. For example, a person arriving with a trailer load after cleaning out the garage would classify as residential waste.
3. **Industrial/commercial/institutional (ICI)** – Waste from industrial, commercial and institutional sources (i.e. supermarkets, shops, schools, hospitals, offices). For the purposes of the protocols illegal dumping and litter should be classified under ICI.
4. **Construction and demolition (C&D)** – Waste produced directly or incidentally by the construction and demolition industries. This includes building materials such as insulation, nails, plasterboard and timber, roofing materials, as well as waste originating from site preparation, such as dredging materials, tree stumps, and rubble.

5. **Landscaping** – Waste from landscaping activity and garden maintenance (including public gardens), both domestic and commercial, as well as from earthworks activity, unless the waste contains only VENM, or unless the earthworks are for purposes of construction or demolition of a structure.
6. **Special wastes** – Waste that fits into significant, identifiable waste streams, usually from a single generator. Special wastes are those that cause particular management and/or disposal problems and need special care. This includes, but is not restricted, to hazardous and medical wastes (including e-wastes). It also includes any substantial waste stream (such as biosolids, infrastructure fill or industrial waste) that significantly affects the overall composition of the waste stream, and may be markedly different from waste streams at other disposal facilities.
7. **Virgin excavated natural materials (VENM)** – Material that when discharged to the environment will not have a detectable effect relative to the background and comprising virgin excavated natural materials, such as clay, soil, and rock that are free of:
   - manufactured materials such as concrete and brick, even though these may be inert
   - combustible, putrescible, degradable, or leachable components
   - hazardous substances or materials (such as municipal solid waste) likely to create leachate by means of biological breakdown
   - any products or materials derived from hazardous waste treatment, stabilisation or disposal practices
   - materials such as medical and veterinary waste, asbestos, or radioactive substances that may present a risk to human health if excavated
   - contaminated soil and other contaminated materials
   - liquid waste.

Using the weighbridge records for each load, the data collected during the survey was analysed to quantify the proportion of the waste stream in terms of each activity source of load and the composition of the waste originating from each activity source.

As it was not possible for a visual surveyor to differentiate between domestic and commercial kerbside refuse (most truckloads contain a mixture of both), additional sources of data were required. To source this data, the private kerbside refuse collectors operating in Hastings and Napier were approached directly and asked for this information.

At Omarunui Landfill, spoil from site excavations is used as a daily cover over the exposed waste mass. This cover material has not been considered to be a waste material, as the waste levy is not paid on this material, and has ***not*** been included in the survey.

2.2.3 Identification of vehicle types

As loads carried by different vehicle types are not affected in similar ways by waste reduction initiatives, all vehicles carrying refuse were identified as being one of the following types:

- cars
- trailers
- front-loader trucks
- gantry trucks
- hook trucks
- compactor trucks
- other trucks.

A description of these truck types is provided in Appendix 9.

2.3 Assumptions made regarding data and analysis

As not all householders set out rubbish each week, it can not be assumed that the refuse collected from each household correlates to the weekly refuse generation for that household. To determine a weekly refuse generation figure, it is necessary to know how frequently, on average, households set out refuse.

Refuse generation is seasonal in terms of both quantity and composition. This is of particular significance for greenwaste. The current audit occurred in late summer, a time of relatively high vegetative growth and increased gardening activity. Care must be taken when comparing audit results from different seasons of the year.

All samples were collected between 7:00 a.m. and 9:30 a.m. In areas where the refuse is collected later in the day, some householders do not set out their rubbish until closer to collection time. It has been assumed that the refuse set out early in the day is the same as the refuse set out later.

The need to only collect refuse that is "clearly attributable" to a single residence resulted in samples not being collected from flats or units. This may have introduced a bias into the results as flats and units may tend to have fewer residents than houses, resulting in less refuse being generated, and are less likely to have significant quantities of greenwaste.

Domestic refuse generation and waste management behaviour may be related in an unquantified manner to the socio-economic status, property type, and ethnicity of the household. It is assumed that the sample that was collected in each area was representative of the overall population of the area.

Occurring as it did in late summer, the composition and quantity of refuse entering the refuse transfer stations and landfill can not be considered to be representative of the refuse at other times of the year. This is particularly relevant to waste generated by the primary industries in the area. Seasonal effects are also relevant to C&D waste and landscaping waste.

The disposal facility audits were undertaken for three days at each of the three main facilities in the region. The two transfer stations were both surveyed for two weekdays and one day on the weekend; the landfill was surveyed for three weekdays. It has been assumed that the results of these three days of surveying are representative of the waste entering the facility over an entire week.

3 Hastings District waste streams

3.1 Hastings domestic kerbside bagged refuse collection

3.1.1 Sampling schedule

The sample of Hastings domestic kerbside bagged refuse comprised 150 bags collected from 150 households. When the sample was being collected, the number of bags set out by each household was recorded. The sample was collected from Monday 18 April to Friday 22 April from the streets shown in Table 3.1.

Table 3.1 — Streets sampled for Hastings domestic kerbside bagged refuse audit

Date	Street	Suburb	Date	Street	Suburb
18 April	Columbus Cres.	Flaxmere	20 April	Pedersen Road	Haumoana
18 April	Berwick St.	Flaxmere	20 April	Shrimpton Rd	Haumoana
18 April	Caernarvon	Flaxmere	20 April	Beach Road	Haumoana
18 April	Dundee Drive	Flaxmere	21 April	McLean St	St Leonards
19 April	Gordon Road	Raureka	21 April	Allerton St	St Leonards
19 April	Kennedy Road	Raureka	21 April	Maddison	Akina
19 April	Puriri Street	Raureka	22 April	Lucknow Rd	Havelock Nth
19 April	Matai Street	Raureka	22 April	Palmerston Rd	Havelock Nth
19 April	Francis Hicks Ave	Raureka	22 April	Given Street	Havelock Nth
19 April	Pepper Street	Raureka	22 April	Ngarimu Street	Havelock Nth
19 April	Cook Place	Raureka			

Only dwellings to which a distinct quantity of refuse bags could be attributed were chosen for the sample collection. Refuse was not taken, for example, from beside shared driveways or from multi-unit dwellings as it may have represented the refuse output of several households.

3.1.2 Primary composition of Hastings domestic kerbside bagged refuse

The primary composition of the Hastings domestic kerbside bagged refuse is presented in Table 3.2 and Figure 3.1 on the following page. The secondary composition, which includes all 25 categories, is given in Appendix 1.

The mean weight per household set out in the table has been calculated by combining the average bag weight with the average number of bags set out per household. The average set out weight of domestic refuse is related to the frequency with which households put refuse out for collection. As not all households put refuse out every week, the average household set out weight can not be regarded as equivalent to an average weekly refuse generation.

Table 3.2 – Primary composition of Hastings domestic kerbside bagged refuse

Primary category (margins of error for 95% confidence level)	**Proportion of total**	**Mean wt. per bag**	**Mean wt. per household set out**
Paper	7.5% (±1.4%)	0.40 kg (±0.07 kg)	0.51 kg (±0.09 kg)
Plastics	12.8% (±1.3%)	0.69 kg (±0.07 kg)	0.87 kg (±0.09 kg)
Organics	52.6% (±6.9%)	2.84 kg (±0.37 kg)	3.57 kg (±0.47 kg)
Ferrous metals	1.4% (±0.7%)	0.07 kg (±0.04 kg)	0.09 kg (±0.04 kg)
Non-ferrous metals	1.8% (±0.9%)	0.10 kg (±0.05 kg)	0.12 kg (±0.06 kg)
Glass	1.3% (±0.5%)	0.07 kg (±0.03 kg)	0.09 kg (±0.03 kg)
Textiles	3.3% (±1.1%)	0.18 kg (±0.06 kg)	0.22 kg (±0.08 kg)
Sanitary paper	16.1% (±7.3%)	0.87 kg (±0.40 kg)	1.09 kg (±0.50 kg)
Rubble	1.8% (±1.3%)	0.10 kg (±0.07 kg)	0.12 kg (±0.09 kg)
Timber	0.5% (±0.4%)	0.03 kg (±0.02 kg)	0.03 kg (±0.03 kg)
Rubber	0.0% (±0.0%)	0.00 kg (±0.00 kg)	0.00 kg (±0.00 kg)
Potentially hazardous	0.9% (±0.3%)	0.05 kg (±0.01 kg)	0.06 kg (±0.02 kg)
TOTAL	**100.0%**	**5.40 kg (±0.61 kg)**	**6.79 kg (±0.76 kg)**

Organic material, primarily kitchen waste, was the largest single component of the domestic bagged refuse, comprising 52.6% of the total. Sanitary paper, 16.1%, was the second largest component and plastics, 12.8%, the third.

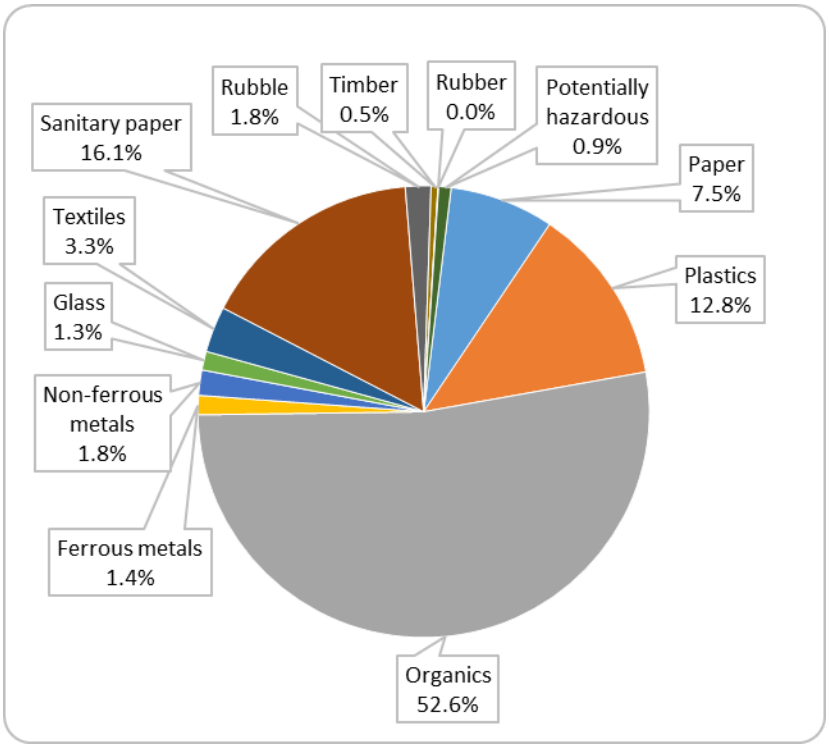

Figure 3.1 – Primary composition of Hastings domestic kerbside bagged refuse

3.1.3 Distribution of bag weights

The average Hastings domestic bag weight was 5.40 kg (±0.61 kg at the 95% confidence level). The distribution of the bag weights is shown in Figure 3.2 below.

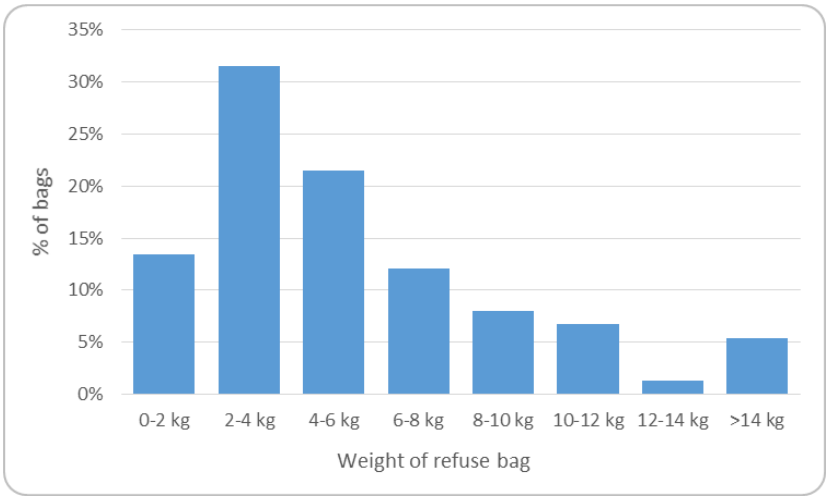

Figure 3.2 – Distribution of bag weights in Hastings domestic kerbside bagged refuse

Sixty-five percent of all bags weighed between 2 and 8 kg. Thirteen percent of bags weighed over the official limit of 10 kg.

3.1.4 Distribution of bag set outs

The sample of domestic refuse bags was collected from 150 households, and the total number of bags set out by each household was recorded. The average household bag set out was 1.26 bags. Figure 3.3 below shows the distribution of the bag set outs.

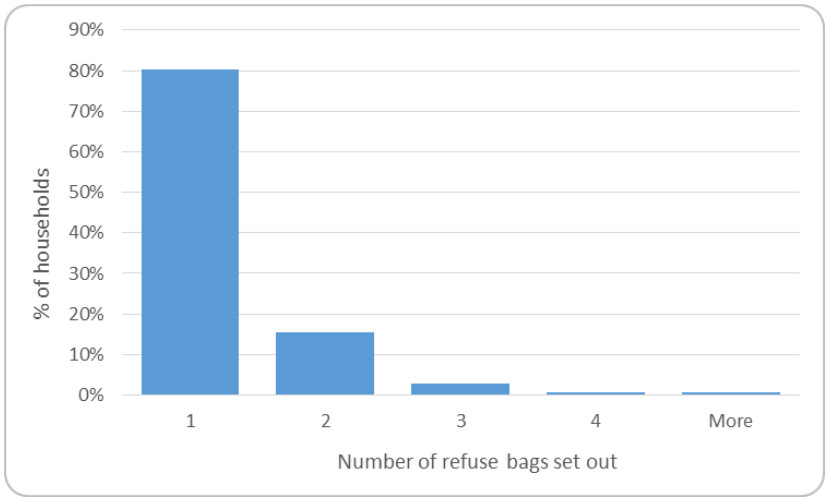

Figure 3.3 – Distribution of bag set out of Hastings domestic bagged refuse

Eighty percent of all households set out a single refuse bag. Five percent of households set out more than two bags.

3.1.5 Diversion potential of Hastings domestic kerbside bagged refuse

A common means for local government to divert domestic refuse from landfill disposal is by providing systems for the collection of recyclable and compostable materials. Hastings District Council provides a kerbside recycling service to households in the District. While there is no Council-provided kerbside organics collection, private greenwaste collections are available and kitchen waste and garden waste can be composted by residents. Home composting and worm farming is actively encouraged by Council through a contract with Hawke's Bay Environment Centre.

Table 3.3 shows the proportion of the Hastings domestic kerbside bagged refuse that could have been diverted using these methods. The table also shows the weight of materials per average household set out that could have been diverted.

Table 3.3 – Diversion potential of Hastings domestic kerbside bagged refuse

Kerbside recyclable materials	% of total	Kg household set out
Paper - Recyclable	4.9%	0.33 kg
Paper - Junk mail	0.5%	0.03 kg
Plastics - # 1-7 containers	2.4%	0.17 kg
Ferrous metals - Steel cans	1.0%	0.07 kg
Non-ferrous metals - Aluminium cans	0.9%	0.06 kg
Glass - Bottles/jars	0.9%	0.06 kg
Subtotal	**10.6%**	**0.72 kg**
Compostable materials		
Organics - Kitchen waste	42.7%	2.90 kg
Organics - Green waste	4.8%	0.32 kg
Subtotal	**47.5%**	**3.23 kg**
TOTAL – Potentially divertable	**58.1%**	**3.95 kg**

Over 10% of the materials in the Hastings domestic kerbside bagged refuse could have been recycled through the existing kerbside recycling collection. Paper comprised nearly half of the recyclable materials. A further 47% could have been composted. In total, 58% of the Hastings domestic bagged refuse could have been diverted from landfill disposal by either recycling or composting. This equates to almost 4 kg of refuse per average household set out.

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

3.2 Henderson Rd Refuse Transfer Station

Henderson Rd Refuse Transfer Station was surveyed on Friday 19 February, Wednesday 6 April, and Saturday 9 April 2016. During this period, data was collected on 271 vehicle loads of waste, excluding kerbside collections. The data from these vehicle loads was used to determine the composition of the 'general' waste (i.e. excluding kerbside refuse collections) disposed of at the facility.

The overall tonnage to landfill from Henderson Rd RTS was taken from Omarunui Landfill disposal records for the periods 15-28 February and 4-17 April 2016. These records, which covered four weeks in total, showed an average of 197 tonnes per week of waste from the transfer station was disposed of at Omarunui Landfill.

During the survey, all vehicles disposing of kerbside refuse collections were identified and registration details recorded. Using the Henderson Rd RTS weighbridge records, the total tonnage of kerbside collections was calculated. This total was deducted from the tonnage disposed of at Omarunui Landfill to determine the tonnage of 'general' waste disposed of at the transfer station.

3.2.1 Activity source of waste loads in overall waste stream

As every vehicle load of waste was unloaded, the surveyor made an assessment of the activity source of the waste load. The proportion of these is shown in Table 3.4. "Kerbside collections" includes both Hastings District Council kerbside refuse collections and Council orange bags that were dropped off at the resource recovery centre.

Table 3.4 – Activity sources of waste load entering Henderson Rd RTS - February & April 2016

Activity source of waste load	% of loads surveyed	% of total weight	Tonnes/week
Construction & demolition	19%	21%	40.8 T/week
Industrial/commercial/institutional	20%	31%	61.7 T/week
Kerbside collections	1%	20%	39.4 T/week
Landscaping & earthworks	6%	5%	9.3 T/week
Residential	53%	23%	45.3 T/week
Special wastes	0%	0%	0.0 T/week
TOTAL	**100%**	**100%**	**196.5 T/week**

ICI waste comprised 31% of the total waste, by weight; C&D waste 21%, and landscaping and earthworks 5%. Residential loads comprised over half of all loads, but only represented 23% of the total weight. Kerbside collections comprised only 1% of vehicle loads, but represented 20% of all refuse, by weight.

3.2.2 Primary composition of general and overall waste streams

The primary compositions of the general waste stream at Henderson Rd RTS, which excludes kerbside collections (both Council and private), and the overall waste stream, which includes kerbside collections, are presented in Table 3.5 and Figure 3.4 and Figure 3.5 on the following page. The secondary compositions, which include all 25 categories, are given in Appendix 3. The survey does not include material removed by transfer station staff from waste loads prior to landfill disposal of the waste.

Table 3.5 – Primary composition of Henderson Rd RTS waste - February & April 2016

Primary category	General waste (excludes kerbside collections)		Overall waste (includes kerbside collections)	
	% of total	Tonnes per week	% of total	Tonnes per week
Paper	9.1%	14.3 T/week	8.8%	17.2 T/week
Plastics	14.5%	22.8 T/week	14.1%	27.8 T/week
Organics	15.0%	23.5 T/week	22.5%	44.3 T/week
Ferrous metals	3.7%	5.8 T/week	3.2%	6.4 T/week
Non-ferrous metals	0.4%	0.7 T/week	0.7%	1.4 T/week
Glass	1.4%	2.2 T/week	1.4%	2.7 T/week
Textiles	13.0%	20.5 T/week	11.1%	21.8 T/week
Sanitary paper	2.5%	4.0 T/week	5.3%	10.3 T/week
Rubble	7.2%	11.3 T/week	6.1%	12.0 T/week
Timber	32.5%	51.1 T/week	26.1%	51.3 T/week
Rubber	0.4%	0.7 T/week	0.4%	0.7 T/week
Potentially hazardous	0.2%	0.3 T/week	0.4%	0.7 T/week
TOTAL	**100.0%**	**157.2 T/week**	**100.0%**	**196.5 T/week**

Timber was the largest component of both the general waste stream and the overall waste stream, comprising 32% of the former and 26% of the latter. Organic material was the second largest component of both waste streams, comprising 15% of the general waste stream and 22% of the overall waste stream. Plastic was the third largest component of both waste streams.

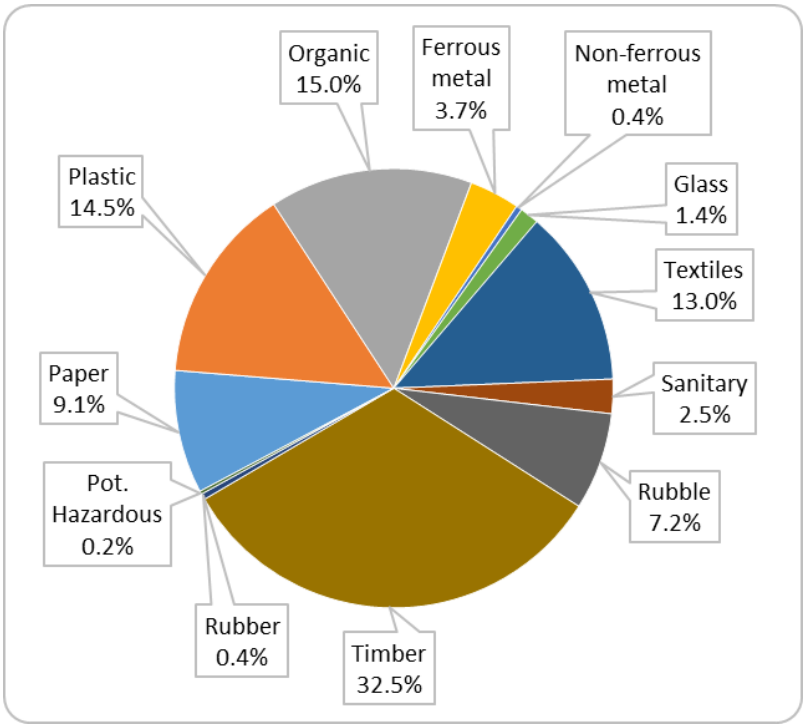

Figure 3.4 – Primary composition of Henderson Rd RTS general waste – February & April 2016

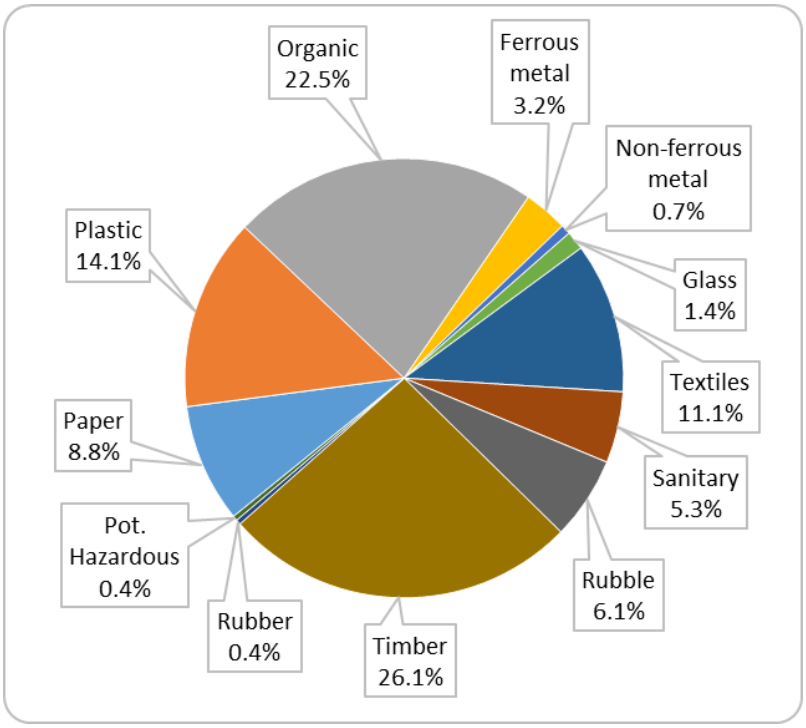

Figure 3.5 – Primary composition of Henderson Rd RTS overall waste – February & April 2016

3.2.3 Primary composition – by activity source of waste load

The compositions of the four activity sources of waste loads that make up the general waste stream are shown in Table 3.6. Secondary compositions, including tonnes per week, are given in Appendix 3.

Table 3.6 – Composition of Henderson Rd RTS general waste – by activity source of waste load – February & April 2016

Primary category	C&D	ICI	Landscaping	Residential
Paper	6.2%	12.7%	2.2%	8.1%
Plastics	3.0%	27.6%	1.4%	9.7%
Organics	3.2%	12.3%	79.2%	16.1%
Ferrous metals	2.4%	3.8%	0.5%	5.4%
Non-ferrous metals	0.0%	0.6%	0.1%	0.6%
Glass	0.1%	1.1%	1.4%	2.9%
Textiles	1.8%	16.6%	2.7%	20.4%
Sanitary paper	0.0%	5.1%	0.6%	1.7%
Rubble	21.4%	2.3%	4.3%	1.6%
Timber	61.7%	16.8%	7.4%	32.9%
Rubber	0.2%	0.8%	0.0%	0.3%
Potentially hazardous	0.1%	0.3%	0.0%	0.3%

3.2.4 Overall waste stream – by vehicle type

As every vehicle load of waste was unloaded at the Henderson Rd RTS, the vehicle type was recorded. Table 3.7 shows the percentage of loads transported by each of the vehicle types, the percentage of total weight carried by each vehicle type, and the tonnes per week. The tonnes per week for compactors and gantry trucks have been taken directly from the weighbridge records. The tonnes per week for cars, other trucks, and trailers are based on the survey results, using a total combined weight for those vehicle types taken from the weighbridge records.

Table 3.7 – Henderson Rd RTS overall waste – by vehicle type – February & April 2016

Vehicle type	% of loads surveyed	% of weight	Tonnes/week
Cars	26.9%	5.0%	9.8 T/week
Compactors	1.5%	19.4%	38.2 T/week
Front loader	0.0%	0.0%	0.0 T/week
Gantry	8.4%	21.0%	41.2 T/week
Hook truck	0.0%	0.0%	0.0 T/week
Other truck	5.8%	14.9%	29.2 T/week
Trailer	57.5%	39.7%	78.1 T/week
TOTAL	**100.0%**	**100.0%**	**196.5 T/week**

While 27% of all loads were car-sized, these loads represented only 5% of the total weight of waste. Nearly 60% of the loads surveyed were trailer-sized loads, and these loads represented 40% of the total weight. Kerbside compactors transported 19% of the total weight, but represented only 1% of the loads surveyed.

3.2.5 Primary composition by vehicle type

The compositions of the four main vehicle types (compactors are excluded and no front-loaders used the facility during the survey) transporting general waste are shown in Table 3.8. Secondary compositions are given in Appendix 3. The analysis does not include kerbside refuse collections.

Table 3.8 – Primary composition of Henderson Rd RTS general waste – by vehicle type – February & April 2016

Primary category	Cars	Gantry trucks	Other trucks	Trailers
Paper	10.3%	6.9%	14.5%	8.4%
Plastics	13.4%	20.0%	25.6%	6.6%
Organics	30.8%	17.7%	7.1%	14.0%
Ferrous metals	10.0%	3.8%	2.5%	3.3%
Non-ferrous metals	0.6%	0.3%	0.8%	0.4%
Glass	4.1%	0.3%	0.9%	2.0%
Textiles	8.7%	6.5%	23.1%	14.4%
Sanitary paper	4.4%	5.5%	0.8%	0.9%
Rubble	3.5%	5.8%	2.3%	10.4%
Timber	13.0%	32.1%	22.2%	39.2%
Rubber	0.4%	0.8%	0.1%	0.3%
Potentially hazardous	0.7%	0.3%	0.1%	0.2%

3.2.6 Diversion potential

A range of materials are commonly separated and recovered at disposal facilities. Systems have been established at Henderson Rd RTS for the separation and recovery of many of these recyclable and compostable materials. The facility has separate drop-off points for greenwaste, scrap metals, hardfill, and other recoverable materials. Staff also manually separate recoverable materials, mainly scrap metal, from the tipping floor.

Table 3.9 shows the proportion of the general waste entering Henderson Rd RTS that could potentially be diverted from landfill disposal using existing systems. Kerbside refuse collections are not included in the general waste stream. The listed materials include food waste (which is present in ICI and residential waste). BioRich Composting Ltd is able to process food waste and is actively looking to attract this material.

Table 3.9 – Diversion potential of Henderson Rd RTS general waste – February & April 2016

Recyclable materials	% of total	Tonnes per week
Paper - Recyclable	5.4%	8.6 T/week
Plastic - Recyclable	0.4%	0.7 T/week
Ferrous metals	3.7%	5.8 T/week
Non-ferrous metals	0.4%	0.7 T/week
Glass - Recyclable	0.4%	0.7 T/week
Subtotal	**10.4%**	**16.4 T/week**
Compostable materials		
Organics - Kitchen waste	3.7%	5.9 T/week
Organics - Compostable greenwaste	7.7%	12.1 T/week
Subtotal	**11.4%**	**17.9 T/week**
TOTAL – Potentially divertable	**21.8%**	**34.3 T/week**

Overall, approximately 22% of the general waste stream entering Henderson Rd RTS could have been diverted from landfill disposal. The largest single divertable component was compostable greenwaste, which comprised 8% of the general waste stream.

Other materials, such as clothing, resalable items, plasterboard, and untreated timber are also recyclable or recoverable, but these have not been included in this analysis.

4 Napier City waste streams

4.1 Napier domestic kerbside bagged refuse collection

4.1.1 Sampling schedule

The sample of Napier domestic kerbside bagged refuse comprised 150 bags collected from 150 households. When the sample was being collected, the number of bags set out by each household was recorded. The sample was collected from Monday 18 April to Friday 22 April from the streets shown in Table 4.1.

Table 4.1 – Streets sampled for Napier domestic bagged refuse audit

Date	Street	Suburb	Date	Street	Suburb
18 April	McDonald Street	Napier Sth.	21 April	Lamason St	Greenmeadows
18 April	Carnell Street	Marewa	21 April	Tair Drive	Greenmeadows
18 April	Herrick Street	Marewa	21 April	Harris Street	Greenmeadows
18 April	Sanders Avenue	Marewa	21 April	Ryan Crescent	Greenmeadows
18 April	McKenzie Ave.	Marewa	21 April	Perry Crescent	Greenmeadows
18 April	Higgins Street	Marewa	21 April	Spriggs Cres.	Greenmeadows
19 April	McGrath Street	Napier Sth.	22 April	Auckland Road	Greenmeadows
19 April	Geddis Ave	Napier Sth.	22 April	Bowling Road	Greenmeadows
19 April	Lister Crescent	Maraenui	22 April	Avenue Road	Greenmeadows
20 April	Wyatt Avenue	Onekawa	22 April	Avondale	Taradale
20 April	Foster	Onekawa			
20 April	Morris Spence	Onekawa			

Only dwellings to which a distinct quantity of refuse bags could be attributed were chosen for the sample collection. Refuse was not taken, for example, from beside shared driveways or from multi-unit dwellings as it may have represented the refuse output of several households.

4.1.2 Primary composition of Napier domestic kerbside bagged refuse

The primary composition of the Napier domestic kerbside bagged refuse is presented in Table 4.2 and Figure 4.1 on the following page. The secondary composition, which includes all 25 categories, is given in Appendix 2.

The mean weight per household set out in the table has been calculated by combining the average bag weight with the average number of bags set out per household. The average set out weight of domestic refuse is related to the frequency with which households put refuse out for collection. As not all households put refuse out every week, the average household set out weight can not be regarded as equivalent to an average weekly refuse generation.

Table 4.2 – Primary composition of Napier domestic kerbside bagged refuse

Primary category (margins of error for 95% confidence level)	**Proportion of total**	**Mean wt. per bag**	**Mean wt. per household set out**
Paper	12.8% (±2.6%)	0.74 kg (±0.15 kg)	1.11 kg (±0.23 kg)
Plastics	13.2% (±1.0%)	0.77 kg (±0.06 kg)	1.14 kg (±0.09 kg)
Organics	49.3% (±5.8%)	2.86 kg (±0.34 kg)	4.27 kg (±0.50 kg)
Ferrous metals	2.0% (±0.6%)	0.12 kg (±0.03 kg)	0.18 kg (±0.05 kg)
Non-ferrous metals	1.2% (±0.5%)	0.07 kg (±0.03 kg)	0.10 kg (±0.04 kg)
Glass	3.2% (±1.0%)	0.19 kg (±0.06 kg)	0.28 kg (±0.09 kg)
Textiles	5.3% (±2.6%)	0.31 kg (±0.15 kg)	0.46 kg (±0.22 kg)
Sanitary paper	9.5% (±3.2%)	0.55 kg (±0.19 kg)	0.82 kg (±0.28 kg)
Rubble	1.7% (±1.4%)	0.10 kg (±0.08 kg)	0.15 kg (±0.12 kg)
Timber	0.3% (±0.2%)	0.02 kg (±0.01 kg)	0.02 kg (±0.02 kg)
Rubber	0.6% (±0.9%)	0.03 kg (±0.05 kg)	0.05 kg (±0.08 kg)
Potentially hazardous	1.0% (±0.5%)	0.06 kg (±0.03 kg)	0.09 kg (±0.04 kg)
TOTAL	**100.0%**	**5.81 kg (±0.50 kg)**	**8.66 kg (±0.75 kg)**

Organic material, primarily kitchen waste, was the largest single component of the domestic bagged refuse, comprising 49% of the total. Plastic was the second largest component, 13%, and paper, 13%, was the third largest component.

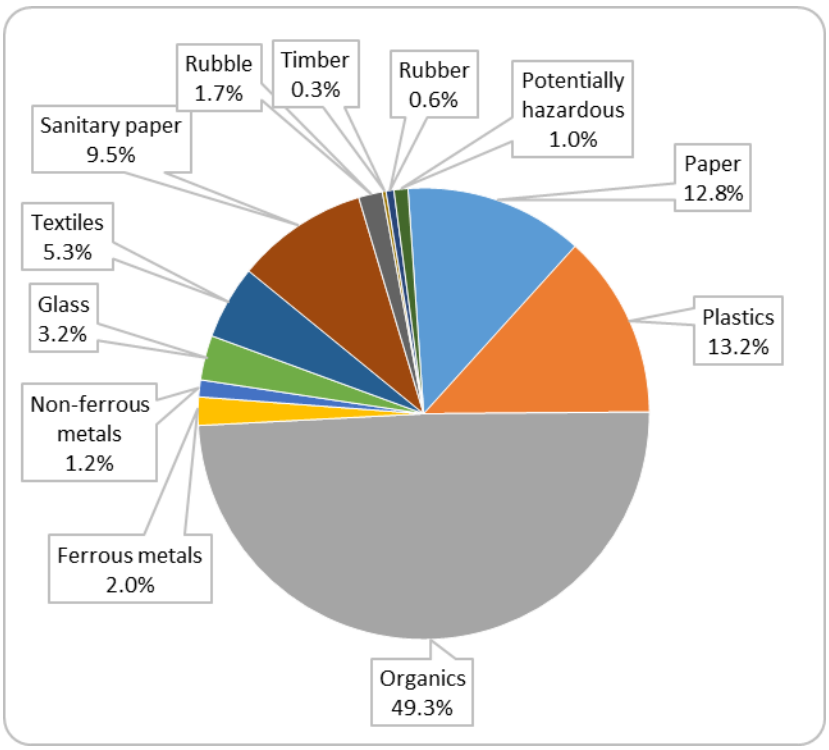

Figure 4.1 – Primary composition of Napier domestic kerbside bagged refuse

4.1.3 Distribution of bag weights

The average Napier domestic bag weight was 5.81 kg (± 0.50 kg at the 95% confidence interval). The distribution of the bag weights is shown in Figure 4.2 below.

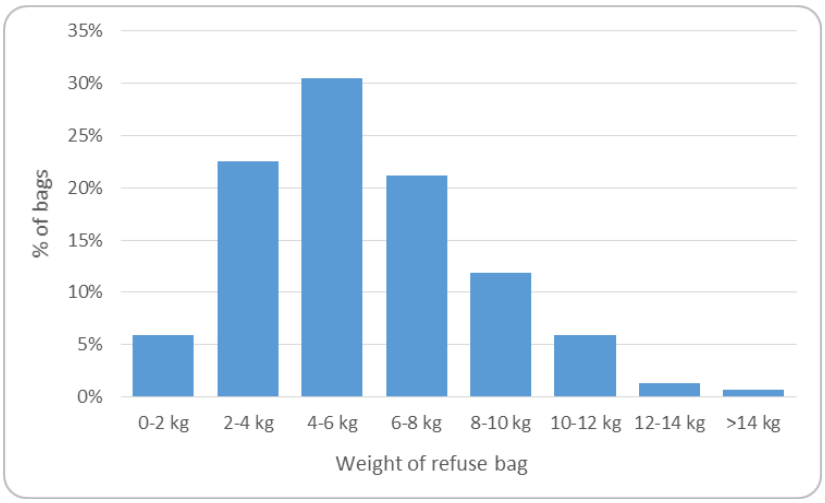

Figure 4.2 – Distribution of bag weights in Napier domestic bagged refuse

Over 74% of all bags weighed between 2 and 8 kg. Nearly 8% of bags weighed over the official limit of 10 kg.

4.1.4 Distribution of bag set outs

The sample of domestic refuse bags was collected from 150 households, and the total number of bags set out by each household was recorded. The average household bag set out was 1.49 bags. Figure 4.3 below shows the distribution of the bag set outs.

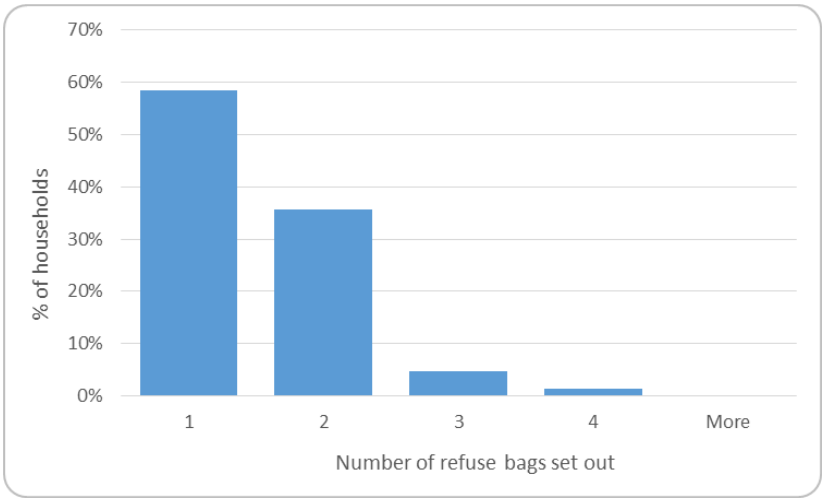

Figure 4.3 – Distribution of bag set out of Napier domestic bagged refuse

Nearly sixty percent of all households set out a single refuse bag. Six percent of households set out more than the official maximum of two bags.

4.1.5 Diversion potential of Napier domestic bagged refuse

Common means used by local government to divert domestic refuse materials from landfill disposal are by providing systems for the collection of recyclable and compostable materials. Napier City Council provides a kerbside recycling service to households in the district. While there is no Council-provided kerbside organics collection, private greenwaste collections are available and kitchen waste and garden waste can be composted by residents.

Table 4.3 shows the proportion of the Napier domestic bagged refuse that could have been diverted using these methods. The table also shows the weight of materials per average household set out that could have been diverted.

Table 4.3 – Diversion potential of Napier domestic bagged refuse

Kerbside recyclable materials	% of total	Kg household set out
Paper - Recyclable	8.6%	0.75 kg
Paper - Junk mail	1.8%	0.16 kg
Plastics - # 1-7 containers	3.1%	0.27 kg
Ferrous metals - Steel cans	1.6%	0.14 kg
Non-ferrous metals - Aluminium cans	0.4%	0.04 kg
Glass - Bottles/jars	2.8%	0.24 kg
Subtotal	**18.4%**	**1.59 kg**
Compostable materials		
Organics - Kitchen waste	39.5%	3.42 kg
Organics - Green waste	7.6%	0.66 kg
Subtotal	**47.1%**	**4.07 kg**
TOTAL – Potentially divertable	**65.4%**	**5.66 kg**

Approximately 18% of the materials in the Napier domestic kerbside bagged refuse could have been recycled through the kerbside recycling collection. Paper comprised 47% of the recyclable materials. A further 47% of the bagged refuse could have been composted. In total, 65%, of the Napier domestic kerbside bagged refuse could have been diverted from landfill disposal by either recycling or composting. This equates to 5.66 kg per average household set out.

Other materials, such as clothing and other metals, are also recoverable, but have not been included in these calculations.

4.2 Redclyffe Refuse Transfer Station

Redclyffe Refuse Transfer Station was surveyed on Saturday 20 February, Tuesday 5 April, and Thursday 7 April 2016. During this period, data were collected on 271 vehicle loads of refuse. The data from these vehicle loads were used to determine the composition of the overall waste disposed of at the facility. As the proportion of Napier City Council's rural kerbside collections disposed of at the facility is small (2% of the total), a separate breakdown of the 'general' waste stream (i.e. excluding kerbside collections) is not presented.

Average weekly tonnage to landfill, determined to be 164 tonnes, was calculated from Omarunui Landfill disposal records for the periods 15-28 February and 4-17 April 2016.

4.2.1 Activity sources of waste loads in overall waste stream

As every vehicle load of waste was unloaded, the surveyor assessed and recorded the activity source of the waste load. The proportion of these is shown in Table 4.4.

Table 4.4 – Activity sources of waste loads entering Redclyffe RTS – February & April 2016

Activity source of waste loads	% of loads	% of total weight	Tonnes/week
Construction & demolition	16%	26%	42.7 T/week
Industrial/commercial/institutional	17%	35%	56.7 T/week
Kerbside collections	1%	2%	3.3 T/week
Landscaping & earthworks	6%	14%	22.8 T/week
Residential	60%	23%	38.5 T/week
Special waste	0%	0%	0.0 T/week
TOTAL	**100%**	**100%**	**164.1 T/week**

Industrial/commercial/institutional loads comprised 35% of the total weight of waste. C&D and residential waste represented similar proportions of the refuse, comprising 26% and 23%of the total, respectively. Landscaping represented 14% of the total weight of waste during the survey.

4.2.2 Primary composition of overall waste stream

The primary composition of the 164 tonnes/week overall waste stream entering Redclyffe RTS has been calculated as outlined in section 4.2. The primary composition, by proportion of total and tonnes per week, is presented in Table 4.5 and Figure 4.4 below. The secondary composition, which includes all 25 categories, is given in Appendix 4. The survey does not include material removed from the tipping floor by transfer station staff.

Table 4.5 – Primary composition of overall Redclyffe RTS waste – February & April 2016

Primary category	% of total	Tonnes per week
Paper	7.9%	13.0 T/week
Plastics	6.5%	10.6 T/week
Organics	21.4%	35.0 T/week
Ferrous metals	3.6%	6.0 T/week
Non-ferrous metals	0.4%	0.7 T/week
Glass	3.1%	5.1 T/week
Textiles	9.6%	15.8 T/week
Sanitary paper	1.8%	2.9 T/week
Rubble	10.5%	17.3 T/week
Timber	34.2%	56.1 T/week
Rubber	0.7%	1.1 T/week
Potentially hazardous	0.3%	0.4 T/week
TOTAL	**100.0%**	**164.1 T/week**

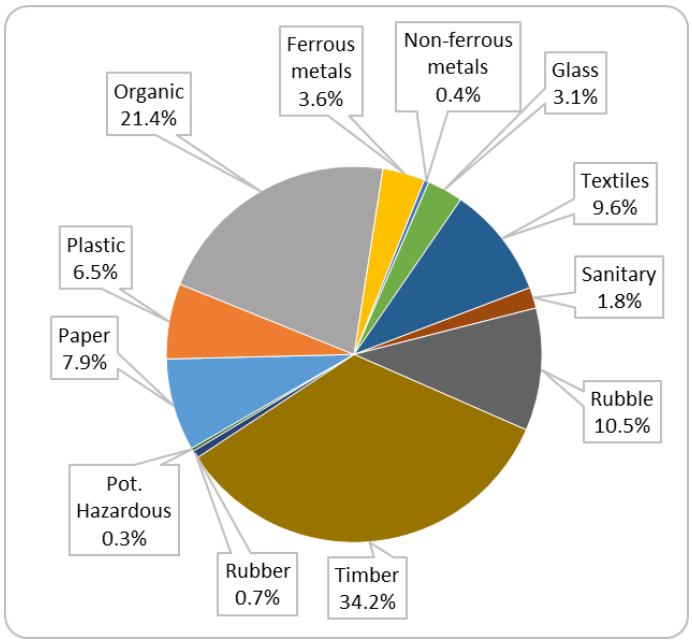

Figure 4.4 – Primary composition of overall Redclyffe RTS waste – February & April 2016

Timber was the largest primary component of waste entering the Redclyffe RTS, comprising 34% of the total. Organic material was the second largest component, comprising 21%.

4.2.3 Primary composition by activity source of waste load

The primary compositions of the four different activity sources of waste loads are shown in Table 4.6. Secondary composition, including tonnes per week, is given in Appendix 4. Kerbside collections are excluded from this analysis.

Table 4.6 – Primary composition of overall Redclyffe RTS waste – by activity source of waste load - February & April 2016

Primary category	C&D	ICI	Landscaping	Residential
Paper	1.2%	16.6%	0.9%	6.4%
Plastics	1.6%	9.8%	1.0%	9.6%
Organics	1.0%	11.2%	93.3%	13.9%
Ferrous metals	3.2%	2.9%	1.1%	6.8%
Non-ferrous metals	0.1%	0.6%	0.0%	0.7%
Glass	1.7%	4.4%	0.1%	4.4%
Textiles	7.6%	7.0%	0.3%	21.6%
Sanitary paper	0.1%	3.0%	0.4%	2.2%
Rubble	23.3%	9.7%	0.4%	4.4%
Timber	60.0%	33.1%	2.3%	28.8%
Rubber	0.1%	1.2%	0.0%	1.0%
Potentially hazardous	0.1%	0.4%	0.0%	0.3%

4.2.4 Overall waste stream – by vehicle type

As every vehicle load of waste was unloaded at the Redclyffe RTS, the vehicle type was recorded. Table 4.7 shows the percentage of loads transported by each of the vehicle types, the percentage of total weight carried by each vehicle type, and the tonnes per week. The tonnes per week for compactors, front loaders, and gantries are taken directly from weighbridge records. The weights for the other vehicle types are calculated from the survey results.

Table 4.7 – Redclyffe RTS overall waste – by vehicle type – February & April 2016

Vehicle type	% of loads surveyed	% of weight	Tonnes/week
Cars	44.6%	8.7%	14.3 T/week
Compactors	1.8%	6.6%	10.9 T/week
Front loaders	0.4%	2.2%	3.5 T/week
Gantry trucks	3.3%	17.5%	28.7 T/week
Hook trucks	0.0%	0.0%	0.0 T/week
Other trucks	7.0%	23.3%	38.2 T/week
Trailer	42.8%	41.8%	68.5 T/week
TOTAL	**100.0%**	**100.0%**	**164.1 T/week**

While nearly 45% of all loads were car-sized, these loads represented only 9% of the total weight of waste. Forty-three percent of the loads surveyed were trailer-sized loads, and these loads represented 42% of the total weight. Gantry trucks transported 17% of the total weight.

4.2.5 Primary composition by vehicle type

The primary composition of the five different vehicle types is shown in Table 4.8. Secondary composition is given in Appendix 4. Compactors transporting kerbside collections and litter are excluded from this analysis.

Table 4.8 – Primary composition of overall Redclyffe RTS waste – by vehicle type - February & April 2016

Primary category	Cars	Front-loaders	Gantry trucks	Other trucks	Trailers
Paper	9.2%	12.1%	15.2%	3.9%	4.7%
Plastics	14.1%	17.6%	4.4%	2.3%	4.4%
Organics	22.8%	30.8%	4.0%	42.3%	12.0%
Ferrous metals	6.2%	5.5%	4.3%	0.9%	4.3%
Non-ferrous metals	0.8%	1.1%	0.1%	0.0%	0.3%
Glass	4.6%	7.7%	3.2%	0.2%	2.5%
Textiles	11.8%	6.6%	13.1%	0.7%	14.3%
Sanitary paper	4.5%	6.6%	0.0%	0.2%	0.6%
Rubble	2.2%	3.3%	16.9%	11.9%	12.2%
Timber	23.0%	6.6%	36.6%	37.4%	44.0%
Rubber	0.5%	1.1%	2.2%	0.0%	0.5%
Potentially hazardous	0.5%	1.1%	0.2%	0.0%	0.2%

4.2.6 Diversion potential

A range of materials are commonly separated and recovered at transfer stations. Systems have been established at Redclyffe RTS for the separation and recovery of many of these recyclable and compostable materials. These systems include separate drop-off points for a range of materials and the recovery of scrap metal and tyres from the tipping floor.

Table 4.9 on the next page shows the proportion of the waste entering Redclyffe RTS that could potentially be diverted from landfill disposal. The listed materials include food waste, although it is recognised there is currently no suitable food-waste composting facility in the region.

Table 4.9 – Diversion potential of Redclyffe RTS overall waste stream - February & April 2016

Recyclable materials	% of total	Tonnes per week
Paper - Recyclable	7.5%	12.2 T/week
Plastic – Recyclable	0.4%	0.7 T/week
Ferrous metals	3.6%	6.0 T/week
Non-ferrous metals	0.4%	0.7 T/week
Glass - Recyclable	1.7%	2.9 T/week
Subtotal	**13.7%**	**22.4 T/week**
Compostable materials		
Organics - Kitchen waste	6.1%	10.0 T/week
Organics - Compostable greenwaste	13.7%	22.5 T/week
Subtotal	**19.8%**	**32.5 T/week**
TOTAL – Potentially divertable	**33.5%**	**54.9 T/week**

Over a third of the overall waste stream disposed of from Redclyffe RTS could have been diverted from landfill disposal. The largest single divertable component was greenwaste, which comprised 14% of the overall waste stream. Recyclable paper, primarily cardboard packaging, was the second largest divertable material, comprising 7% of the total weight.

Other materials, such as clothing, resalable items, cleanfill, and untreated timber, are also recyclable or recoverable, but have not been included in these calculations.

Nearly all of the compostable greenwaste, the largest single divertable component of the waste, was disposed of by Napier City Council's parks operations contractor.

5 240-litre MGB domestic kerbside refuse

5.1 Sampling schedule

The sample of MGB domestic kerbside refuse comprised the contents of 55 Waste Management NZ Ltd 240-litre MGBs. As the uptake of subscription MGB services is higher in Hastings than Napier, the sample was collected primarily from the same streets in Hastings from which the kerbside refuse bag samples were taken. About a quarter of the MGB sample was collected from Napier.

Permission to sample the MGBs was obtained from Waste Management before the sampling. Waste Management was asked to co-operate with the survey as the company collects its MGBs in the same areas as Council refuse bags every day. An explanatory note was left in the letterbox of every property from which an MGB was sampled. The contents of the MGBs were tipped into large plastic bags for transport to Omarunui Landfill for sorting.

5.2 Primary composition

The primary composition of domestic kerbside refuse from 240-litre MGBs is presented in Table 5.1 and Figure 5.1 on the following page. The secondary composition, which includes all 25 categories, is given in Appendix 5.

Table 5.1 – Primary composition of 240-litre MGB domestic kerbside refuse

Primary category (margins of error for 95% confidence level)	**Proportion of total**	**Mean wt. per MGB**
Paper	6.0% (±1.6%)	1.63 kg (±0.45 kg)
Plastics	5.1% (±0.9%)	1.39 kg (±0.25 kg)
Organics	75.6% (±12.6%)	20.64 kg (±3.44 kg)
Ferrous metals	0.9% (±0.3%)	0.24 kg (±0.08 kg)
Non-ferrous metals	0.7% (±0.4%)	0.18 kg (±0.11 kg)
Glass	3.1% (±1.5%)	0.86 kg (±0.42 kg)
Textiles	2.0% (±0.7%)	0.54 kg (±0.20 kg)
Sanitary paper	2.0% (±1.1%)	0.55 kg (±0.31 kg)
Rubble	2.6% (±2.7%)	0.71 kg (±0.73 kg)
Timber	1.5% (±1.4%)	0.41 kg (±0.37 kg)
Rubber	0.0% (±0.0%)	0.01 kg (±0.01 kg)
Potentially hazardous	0.5% (±0.3%)	0.14 kg (±0.08 kg)
TOTAL	**100.0%**	**27.28 kg (±3.73 kg)**

Organic material, primarily kitchen waste, was the largest single component of domestic kerbside refuse from 240-litre MGBs, comprising 76% of the total. Paper was the second largest component, 6%, and plastic, 5%, was the third largest component.

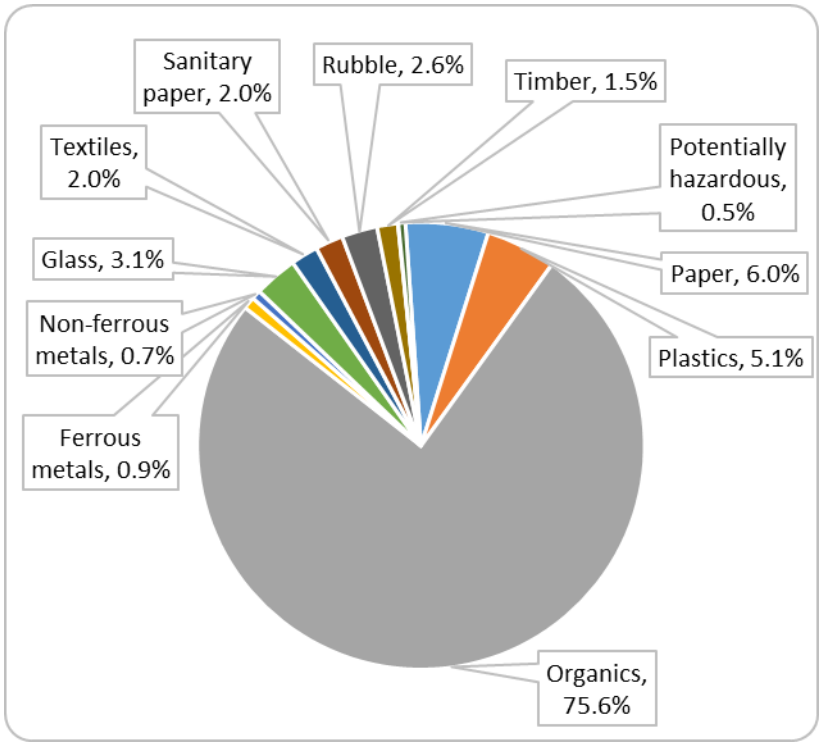

Figure 5.1 – Primary composition of 240-litre MGB domestic kerbside refuse

5.3 Distribution of 240-litre MGB weights

The average weight of a 240-litre MGB of domestic kerbside refuse was 27.28 kg (± 3.73 kg at the 95% confidence interval). The distribution of the MGB weights is shown in Figure 4.2 below.

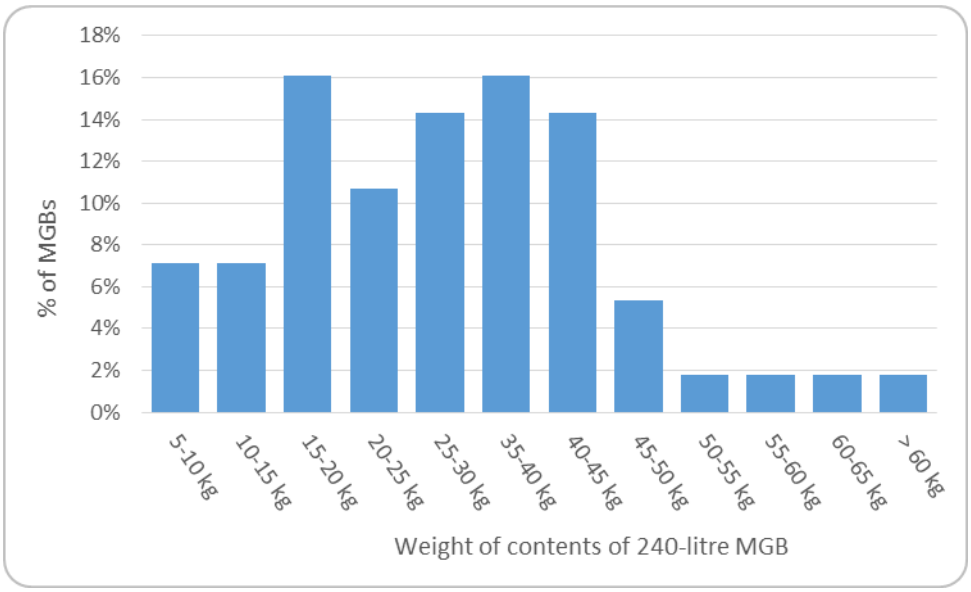

Figure 5.2 – Distribution of weight of 240-litre MGB domestic kerbside refuse

Over two-thirds of 240-litre MGBs (67.9%) contained more than 20 kg of domestic kerbside refuse. More than a quarter (26.8%) contained more than 40 kg of refuse.

Photo 5.1 - Contents of 240-litre MGB

Photo 5.2 - Compactor load of MGB refuse

5.4 Diversion potential of 240-litre MGB domestic kerbside refuse

Common means for local government to divert domestic refuse materials from landfill disposal are by providing systems for the collection of recyclable and compostable materials. Both Napier City and Hastings District Councils provide kerbside recycling services to households. While there is no Council-provided kerbside organics collection, private greenwaste collections are available and kitchen waste and garden waste can be composted by residents. Table 5.2 shows the proportion of the 240-litre MGB domestic kerbside refuse that could have been diverted using these methods.

Table 5.2 – Diversion potential of 240-litre MGB domestic kerbside refuse

Kerbside recyclable materials	% of total	Kg household set out
Paper - Recyclable	4.2%	1.14 kg
Paper - Junk mail	0.7%	0.18 kg
Plastics - # 1-7 containers	1.5%	0.42 kg
Ferrous metals - Steel cans	0.6%	0.17 kg
Non-ferrous metals - Aluminium cans	0.3%	0.08 kg
Glass - Bottles/jars	3.0%	0.81 kg
Subtotal	**10.2%**	**2.80 kg**
Compostable materials		
Organics - Kitchen waste	15.4%	4.21 kg
Organics - Green waste	59.2%	16.14 kg
Subtotal	**74.6%**	**20.35 kg**
TOTAL – Potentially divertable	**84.8%**	**23.15 kg**

Approximately 10% of the materials in the 240-litre MGB domestic kerbside refuse could have been recycled through a kerbside recycling collection. A further 75% of the 240-litre MGB domestic kerbside refuse could have been composted. In total, 85%, of the 240-litre MGB domestic kerbside refuse could have been diverted from landfill disposal by either recycling or composting. This equates to 23 kg per MGB.

6 Omarunui Landfill

6.1 Source of waste to landfill

Waste entering Omarunui Landfill is composed of waste from three transfer stations (Blackbridge, Henderson Rd, and Redclyffe), Napier City Council kerbside collections, private kerbside collections, a small quantity of Hastings District Council kerbside collections (from coastal communities), and waste transported to landfill by commercial operators. The landfill was surveyed on Wednesday 17 February, Thursday 18 February, and Friday 8 April 2016. Data was gathered on 163 loads of refuse, 60 of which were general or special waste. The other 103 loads were kerbside collections or from transfer stations.

Cover material, which is used to regularly cover the exposed waste face to reduce stormwater infiltration and bird and rodent problems, is sourced from within the landfill complex. Internally-sourced cover material has *not* been included in this analysis.

As the composition of the kerbside collections and waste from the two major transfer stations has been determined directly by survey, the following sections initially analyse the other waste that is transported directly to landfill. In the final sections, the overall waste stream, which includes the kerbside collections and transfer station waste, is analysed. Table 6.1 below and Figure 6.1 on the next page show the proportions of the different waste streams that were disposed of at Omarunui Landfill during the February and April 2016 survey periods.

Table 6.1 – Source of waste to Omarunui Landfill - February & April 2016

Source	% of total	Tonnes/week
Napier CC kerbside collections	8.9%	135 T/week
Hastings DC kerbside collections	0.3%	4 T/week
Private kerbside collections	27.1%	409 T/week
Redclyffe RTS	10.8%	164 T/week
Blackbridge RTS	1.3%	19 T/week
Henderson Rd RTS	13.0%	197 T/week
General direct to landfill	29.5%	446 T/week
Special direct to landfill	9.1%	138 T/week
TOTAL	**100.0%**	**1,513 T/week**

During the 2016 survey periods (four weeks of weighbridge records were analysed), an average of 1,513 tonnes of refuse were disposed of per week at Omarunui Landfill. General waste disposed of directly to landfill was the single largest source of the waste, comprising 29% of the total.

Private kerbside collections were the second largest source of waste, representing 27% of the total. Henderson Road RTS represented 13% of the total and Redclyffe RTS represented 11% of the total. Special wastes comprised 9% of the total waste disposed of directly to landfill.

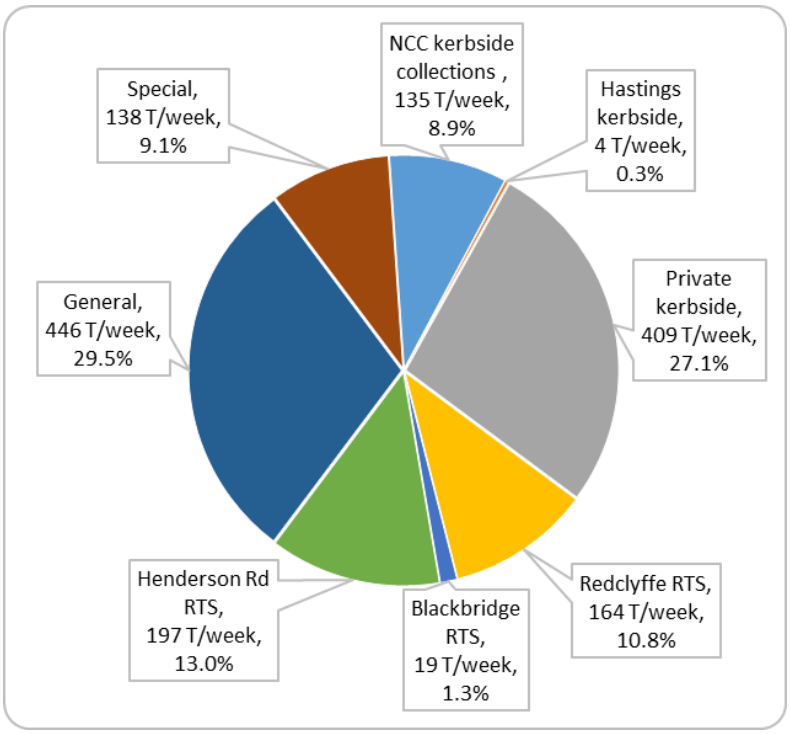

Figure 6.1 – Source of waste to Omarunui Landfill - February & April 2016

6.2 General waste direct to landfill

The general waste stream entering Omarunui Landfill excludes kerbside collections (both Councils' and private), special wastes, and transfer station waste.

6.2.1 Activity source of general and special waste loads

Each load of general waste transported directly to Omarunui Landfill was categorised as one of four different activity sources. The proportions of the four activity sources that comprise the general waste stream are shown in Table 6.2 below.

Table 6.2 – General waste direct to landfill – by activity source of waste load - February & April 2016

Activity source of waste load	% of loads	% of weight	Tonnes/week
Construction and demolition	4%	3%	14 T/week
Industrial/commercial/institutional	96%	97%	432 T/week
Landscaping	0%	0%	0 T/week
Residential	0%	0%	0 T/week
TOTAL	**100%**	**100%**	**446 T/week**

Industrial/commercial/institutional waste comprised 97% by weight of general waste taken directly to landfill. The only other activity source of waste during the survey period was C&D waste, which comprised 3%, by weight, of general waste. There were no landscaping waste or loads of residential waste recorded during the survey.

6.2.2 Primary composition of general waste direct to landfill

The primary composition of the general waste stream taken directly to Omarunui Landfill is shown in Table 6.3 below and Figure 6.2 on the next page. The secondary composition of the general waste is given in Appendix 6.

Table 6.3 – Primary composition of general waste direct to landfill - February & April 2016

General waste direct to landfill - February & April 2016	% of total	Tonnes per week
Paper	14.5%	65 T/week
Plastics	21.4%	95 T/week
Organics	23.9%	107 T/week
Ferrous metals	7.1%	32 T/week
Non-ferrous metals	0.7%	3 T/week
Glass	4.0%	18 T/week
Textiles	4.5%	20 T/week
Sanitary paper	4.9%	22 T/week
Rubble	11.7%	52 T/week
Timber	6.0%	27 T/week
Rubber	0.7%	3 T/week
Potentially hazardous	0.7%	3 T/week
TOTAL	**100.0%**	**446 T/week**

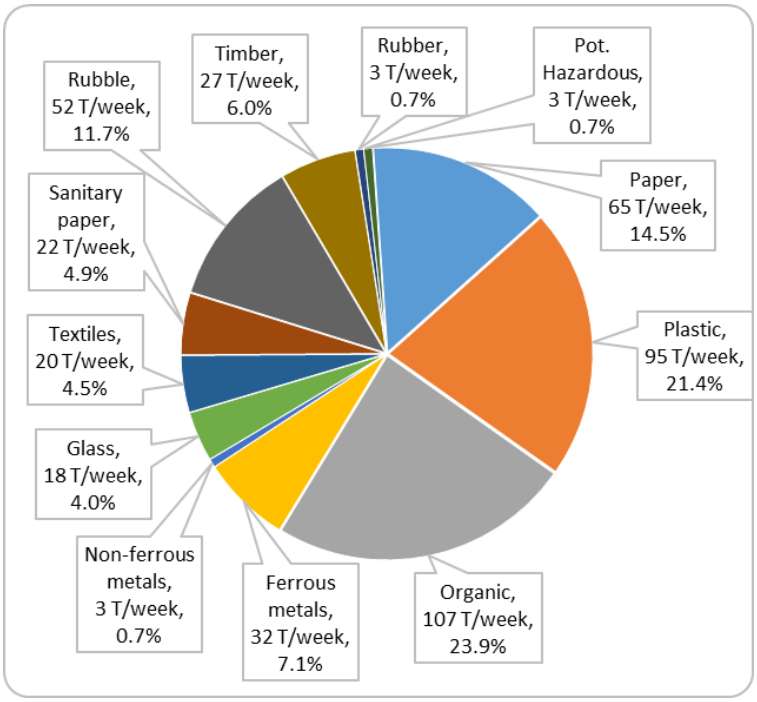

Figure 6.2 – Primary composition of general waste direct to landfill - February & April 2016

Organic material was the largest component of the general waste stream to landfill, comprising 24% of the total. Plastics was the second largest component, comprising approximately 21% of the total.

6.3 Special wastes

Special wastes comprised those in the following weighbridge material classifications:

- Chrome Waste (tannery waste)
- HDC Animal Disposal
- Food Waste (mainly canned food from a cannery)
- Spoil - Contaminated Soil
- NCC Milliscreen
- HDC Milliscreen
- Special Waste
- Asbestos
- NCC Animal Disposal
- HDC Road Sweepings
- Chemicals & Baits.

Based on an assumed, homogeneous composition for each of these materials classifications, the primary composition has been calculated as shown in Table 6.4.

Table 6.4 – Primary composition of special waste direct to landfill - February & April 2016

Special waste to landfill - February & April 2016	% of total	Tonnes per week
Paper	0.0%	0 T/week
Plastics	0.0%	0 T/week
Organics	35.0%	48 T/week
Ferrous metals	0.0%	0 T/week
Non-ferrous metals	0.0%	0 T/week
Glass	0.0%	0 T/week
Textiles	0.0%	0 T/week
Sanitary paper	0.0%	0 T/week
Rubble	0.0%	0 T/week
Timber	0.0%	0 T/week
Rubber	0.0%	0 T/week
Potentially hazardous	65.0%	90 T/week
TOTAL	**100.0%**	**138 T/week**

Special wastes comprised 9% of the overall waste stream, or 138 tonnes/week, disposed of at Omarunui Landfill during the period analysed. Potentially hazardous materials comprised 65% of the special wastes and organic material, primarily from food processing, the other 35%. These proportions may change on a seasonal basis and when other factors, such as the clearing of contaminated sites, occur.

6.4 Overall waste stream to landfill

The composition of the overall waste stream is based on the proportions of the different waste streams given in Table 6.1. The composition for each waste source is combined in the proportions shown in that table. The following assumptions were made for the calculations:

- The annual tonnage to 30 June 2016 of all levied waste disposed of at Omarunui Landfill is 75,200 tonnes, as estimated by Hastings District Council
- Domestic kerbside refuse in 240-litre MGBs has the composition given in Appendix 5
- Domestic kerbside refuse from other sizes of MGBs has the same composition as Napier Council domestic kerbside refuse bags
- Blackbridge RTS waste composition is the same as general waste from Henderson Rd RTS.

Based on these assumptions, the primary composition of the overall waste stream to Omarunui Landfill is presented in Table 6.5 below. The secondary composition is given in Appendix 6.

Table 6.5 – Primary composition of overall waste to Omarunui Landfill – February & April 2016

Overall waste to Omarunui Landfill – February & April 2016	% of total	Tonnes per week	Tonnes per annum
Paper	9.5%	144 T/week	7,134 T/annum
Plastics	12.0%	181 T/week	9,015 T/annum
Organics	39.6%	599 T/week	29,767 T/annum
Ferrous metals	3.4%	52 T/week	2,569 T/annum
Non-ferrous metals	0.7%	10 T/week	497 T/annum
Glass	2.8%	43 T/week	2,134 T/annum
Textiles	5.1%	78 T/week	3,854 T/annum
Sanitary paper	4.2%	63 T/week	3,130 T/annum
Rubble	6.3%	95 T/week	4,730 T/annum
Timber	9.6%	145 T/week	7,199 T/annum
Rubber	0.4%	6 T/week	305 T/annum
Potentially hazardous	6.5%	98 T/week	4,866 T/annum
TOTAL	**100.0%**	**1,513 T/week**	**75,200 T/annum**

Organic material was the largest single component of the overall waste stream being disposed of at Omarunui Landfill, comprising 40% of the total. Paper, plastics, and timber were all present in similar proportions in the overall waste, ranging from 9-12% of the total, by weight. All other components of the overall waste stream comprised less than 6% of the total. The primary composition is shown in Figure 6.3 on the following page.

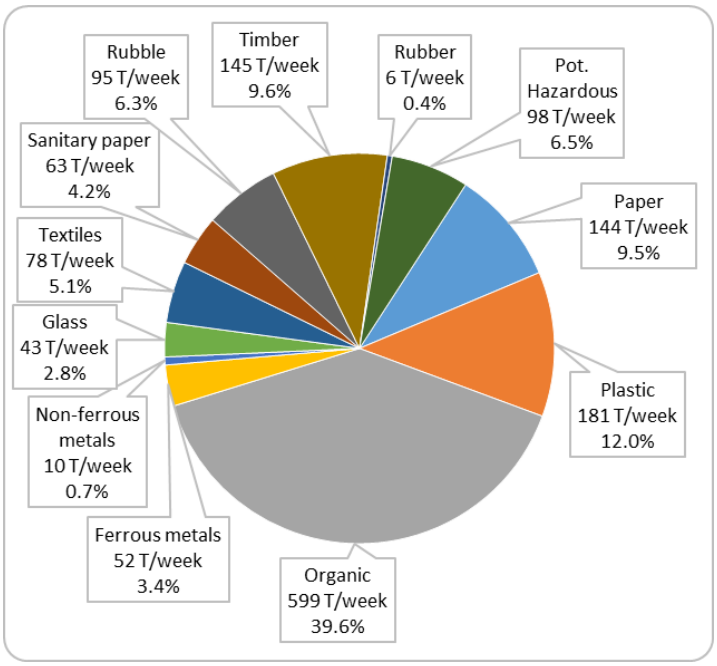

Figure 6.3 - Primary composition of overall waste to Omarunui Landfill - February & April 2016

6.4.1 Diversion potential

There are no facilities for the recovery of materials at Omarunui Landfill. Table 6.6 below shows the theoretical diversion potential of the overall waste stream, based on recovery of the same materials as assumed for the refuse transfer stations. A range of other materials are also recoverable, but these have not been included in this analysis.

Table 6.6 – Diversion potential of Omarunui overall waste stream – February & April 2016

Recyclable materials	% of total	Tonnes per week
Paper - Recyclable	7.6%	116 T/week
Plastic – Recyclable	1.2%	18 T/week
Ferrous metals	3.4%	52 T/week
Non-ferrous metals	0.7%	10 T/week
Glass - Recyclable	2.2%	34 T/week
Subtotal	**15.2%**	**229 T/week**
Compostable materials		
Organics - Kitchen waste	16.0%	242 T/week
Organics - Compostable greenwaste	18.0%	272 T/week
Subtotal	**34.0%**	**514 T/week**
TOTAL – Potentially divertable	**49.1%**	**743 T/week**

Approximately 15% of waste being disposed of at Omarunui Landfill was recyclable and 34% was compostable. In total, 49% of the waste could have been diverted from landfill disposal.

Photo 6.1 - Canned food at Omarunui Landfill

Photo 6.2 - Cardboard packaging at Omarunui Landfill

Photo 6.3 - Greenwaste in MGB compactor load

7 Discussion and analysis

7.1 Regional waste flows

Using data from the analyses presented in the previous sections, Figure 7.1 shows the major waste flows in the Hawke's Bay region. The tonnages are based on the survey results and weighbridge records from Omarunui Landfill, Henderson Rd RTS, and Redclyffe RTS for a four-week period in February and April 2016.

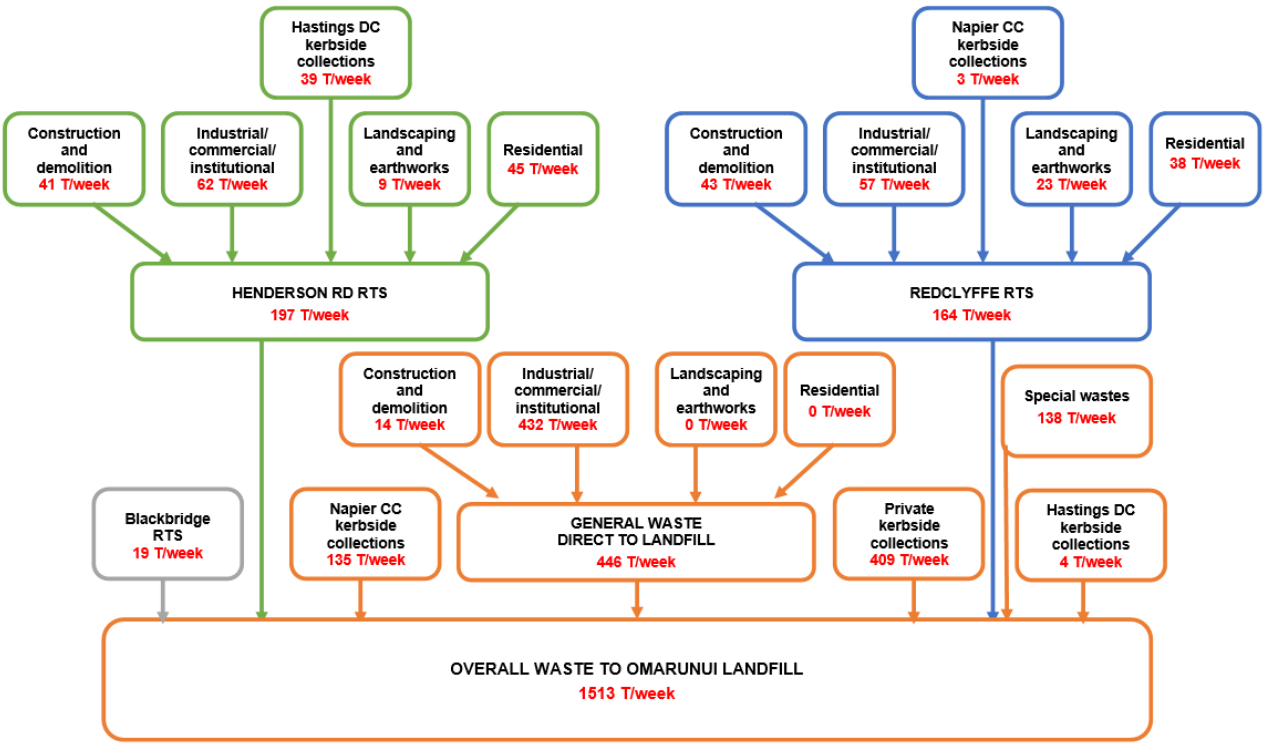

Figure 7.1 – Overall waste flows in Hawke's Bay region - February & April 2016

7.2 Per capita disposal of kerbside refuse

The per capita disposal of kerbside refuse (i.e. MGBs and refuse bags) for combined residents of Hastings District and Napier City is calculated in Table 7.1 below, using data provided previously in this report. The totals for kerbside refuse include both private and Council collections of both domestic and commercial refuse. To provide data that is compatible with the National Waste Data Framework, an estimate is also made of the quantity of kerbside refuse that is from domestic, rather than commercial sources. Based on information provided by waste collectors, it is estimated that 10% of kerbside refuse is from commercial properties.

Table 7.1 – Per capita disposal of kerbside refuse

Combined population Hastings District and Napier City (Stats NZ 2013 medium estimate)	**137,351**
Kerbside refuse direct to Omarunui Landfill	549 T/week
Kerbside refuse direct to Henderson Rd RTS	39 T/week
Rural kerbside refuse direct to Redclyffe RTS	3 T/week
Total kerbside refuse per week	**591 T/week**
Total kerbside refuse per annum	**30,839 T/annum**
Per capita disposal of kerbside refuse	**0.225 T/capita/annum**
Proportion of kerbside refuse from commercial properties	10% (estimate)
Total domestic kerbside refuse per annum	**27,755 T/annum**
Per capita disposal of domestic kerbside refuse	**0.202 T/capita/annum**

By extrapolating the tonnage figures from the survey weighbridge analysis to an annual total, it is calculated that approximately 30,839 tonnes of kerbside refuse are disposed of to landfill from Hastings District and Napier City. This equates to 225 kg per person per annum for all kerbside refuse, or 202 kg per person per annum for domestic kerbside refuse. The figure for all kerbside refuse is compared to the disposal rates from other areas previously surveyed by Waste Not Consulting in Table 7.2 below.

Table 7.2 – Comparison of per capita disposal of kerbside refuse

Domestic and commercial kerbside collections combined	Kg/capita/annum
Christchurch City 2011	110
Auckland Council 2012	160
Hamilton City 2013	182
Tauranga City and Western Bay of Plenty District 2010	183
Taupo District 2013	212
Hastings District/Napier City 2012	***214***
Rotorua District 2009	216
Hastings District/Napier City 2016	***225***
Hastings District/Napier City 2009	***227***
Southland District 2011	250

7.3 Per capita disposal of levied waste to landfill

The per capita disposal of waste to the Omarunui Class 1 landfill by residents of Napier City and Hastings District is calculated as shown in Table 7.3 below. This figure is compared to disposal figures from other local authorities previously surveyed by Waste Not Consulting in Table 7.4. It is noted that the annual tonnage of 75,200 tonnes (including special waste) is a council estimate. The annual tonnage of special waste, however, has been extrapolated from the survey results and so may be less reliable. For practical purposes, the waste levy is paid on all waste included in the annual tonnage.

Table 7.3 – Per capita disposal of levied waste to landfill

Combined population Hastings and Napier (Stats NZ 2013 estimate)	**137,351**
Levied waste to landfill per annum including special waste	75,200 T/annum
Per capita disposal of refuse to landfill including special waste	**0.548 T/capita/annum**
Refuse to landfill per annum excluding special waste	67,998 T/annum
Per capita disposal of refuse to landfill excluding special waste	**0.495 T/capita/annum**

Table 7.4 – Disposal rates compared to other local authorities

Overall waste (excluding cover materials and special waste)	**Tonnes per capita per annum**
Westland District 2011	0.331
Waimakariri District 2012	0.311
Southland District 2011	0.343
Ashburton District 2015	0.366
Kāpiti Coast District 2013	0.441
Tauranga and WBoP District 2010	0.452
Napier/Hastings 2012	***0.483***
Napier/Hastings 2016	***0.495***
Taupo District 2013	0.513
Christchurch City 2012	0.524
Invercargill City 2011	0.580
Napier/Hastings 2009	***0.581***
New Plymouth District 2010	0.664
Hamilton City 2013	0.668
Napier/Hastings 2007	***0.743***
Auckland Council 2012	0.803

The per capita disposal rate for Napier/Hastings decreased 35% between the 2007 and 2012 surveys, then increased 2% to 2016. The earlier decrease was associated with the global financial crisis. Other factors, such as improved resource efficiency, changes in economic activity, and increased resource recovery activity may also have contributed to the decrease in waste to landfill.

7.4 Precision of bagged refuse audit results

The SWAP defines a precision level of ±20% as being a "reasonable level of accuracy". For paper, which comprises in the region of 15% of domestic waste, a precision level of ±20% at the 95% confidence interval means that the sample average for 95% of samples would lie within about 3% (the margin of error) of the "actual" proportion of paper.

For the audit of Napier and Hastings domestic kerbside bagged refuse, sample sizes smaller than that recommended by the SWAP were used. For the audit, 150 refuse bags were collected from both Hastings and Napier. For the 240-litre MGB audit, the contents of 55 MGBs were collected.

The precision levels for the primary categories for the three audits are shown in Table 7.5 below. Those levels that are ±20% or less at the 95% confidence interval are in bold.

Table 7.5 – Precision level of kerbside refuse audit results

Precision level of kerbside refuse audit results	Hastings domestic bags	Napier domestic bags	240-litre MGBs
Paper	**18%**	**20%**	28%
Plastics	**10%**	**8%**	**18%**
Organics	**13%**	**12%**	**17%**
Ferrous metals	48%	29%	35%
Non-ferrous metals	49%	40%	59%
Glass	38%	32%	49%
Textiles	34%	49%	37%
Sanitary paper	46%	34%	57%
Rubble	73%	83%	103%
Timber	79%	70%	91%
Rubber	79%	155%	113%
Potentially hazardous	29%	45%	58%

Both the Napier and Hastings domestic bagged refuse audits achieved precision levels of less than ±20% for the three major primary categories (paper, plastic, and organic waste). Plastics and organics achieved a precision level of less than ±20% for the 240-litre MGB audit. The reduced precision for the 240-litre MGB audit is associated with the smaller sample.

Given the sample sizes, the precision level of the results are satisfactory. In Waste Not's experience, in an audit of 500 refuse bags, it is uncommon to obtain "reasonable levels of accuracy" for more than four of the primary categories.

7.5 Councils' share of kerbside refuse market

A model of the shares of the kerbside refuse market held by Napier City and Hastings District Councils and the private waste operators has been developed using:

- the visual surveys at Omarunui Landfill, Redclyffe RTS, Henderson RD RTS
- weighbridge records from Omarunui Landfill, Redclyffe RTS, Henderson RD RTS
- Hastings District Council records of refuse bag sales
- estimates of the average weekly set out weight of properties using the different sizes of MGBs available
- a survey of participation in kerbside refuse services conducted by Napier City and Hastings District Councils.

The results of the analysis are shown in Table 7.6. It should be noted that:

- the tonnage for Hastings refuse bag collection has been adjusted to account for a high proportion of the collection from coastal communities comprising private MGBs
- the tonnage of Hastings refuse bags disposed of at Henderson Rd RTS includes orange bags disposed of at the resource recovery drop-off area
- the Napier bag collection includes both kerbside refuse taken directly to Omarunui Landfill and rural refuse disposed of at Redclyffe RTS
- the tonnages of kerbside refuse include refuse collected from both residential and commercial properties. Some of the refuse collected in MGBs from commercial properties is likely to be collected from private property rather than the kerbside.
- the total quantity of kerbside refuse (318 + 273 = 591 tonnes) is the same as that shown in Table 7.1 and Table 7.11.

Table 7.6 – Councils' market share of kerbside refuse collection services

Councils' shares of kerbside refuse market	Hastings		Napier	
	T/week	% of total	T/week	% of total
Council bag collection	40 T/week	13%	139 T/week	51%
Private 240-litre MGBs	221 T/week	70%	121 T/week	44%
Other private MGBs	57 T/week	18%	13 T/week	5%
Total	**318 T/week**	**100%**	**273 T/week**	**100%**

It is estimated that the Hastings District Council kerbside refuse collection comprises 13% of all kerbside refuse collected in the District. A high proportion of the kerbside refuse (70%) from Hastings District is collected in 240-litre MGBs.

It is estimated that the Napier City Council kerbside refuse collection comprises 51% of all kerbside refuse collected in the city. A smaller proportion of the kerbside refuse (44%) from Napier City is collected in 240-litre MGBs.

As the audit results show (section 3.1, 4.1, and 5), the composition and quantity of domestic refuse in 240-litre MGBs is markedly different to bagged refuse. In general terms, a higher usage of 240-litre MGBs by residents results in higher per capita disposal of kerbside refuse and a higher proportion of divertable greenwaste and recyclable materials.

7.6 Comparison to previous audit results

In July 2007, November 2009, and March 2012, audits of Hastings and Napier waste streams were undertaken by Waste Not Consulting, using methodologies very similar to those used for the 2016 project. Comparisons between the results of the four survey programmes are presented in the following sections.

7.6.1 Bagged refuse comparison

In this section, the results of the four bagged refuse audit are compared. In all four surveys, Hastings' kerbside refuse collection was based on a user-pays bag system, while the Napier kerbside collection was rates-funded, with households being limited to two bags per week. In Table 7.7, the primary composition of the domestic bagged refuse from the four surveys is compared. The mean bag weight from each audit is also shown.

Table 7.7 – Comparison of domestic kerbside bagged refuse audits

Comparison of domestic kerbside bagged refuse audits	Hastings				Napier			
	2007	2009	2012	2016	2007	2009	2012	2016
Paper	10.6%	10.8%	10.5%	7.5%	14.4%	13.2%	13.3%	12.8%
Plastics	12.5%	11.6%	13.5%	12.8%	14.4%	12.3%	14.4%	13.2%
Organics	51.7%	51.2%	51.3%	52.6%	47.7%	44.9%	47.6%	49.3%
Ferrous metals	2.2%	1.7%	2.5%	1.4%	2.7%	2.4%	2.9%	2.0%
Non-ferrous metals	0.5%	0.6%	1.4%	1.8%	0.6%	0.6%	1.4%	1.2%
Glass	3.4%	3.0%	2.2%	1.3%	6.2%	5.7%	5.4%	3.2%
Textiles	3.6%	3.4%	3.0%	3.3%	2.1%	5.2%	3.2%	5.3%
Sanitary paper	14.2%	15.3%	13.2%	16.1%	8.8%	11.6%	7.6%	9.5%
Rubble	0.5%	0.3%	1.0%	1.8%	1.9%	1.3%	1.9%	1.7%
Timber	0.0%	0.2%	0.2%	0.5%	0.5%	0.5%	0.5%	0.3%
Rubber	0.3%	0.1%	0.2%	0.0%	0.1%	0.3%	0.2%	0.6%
Potentially hazardous	0.6%	1.8%	1.0%	0.9%	0.8%	2.1%	1.6%	1.0%
Mean bag weight	5.73 kg	5.37 kg	6.04 kg	5.40 kg	5.85 kg	5.85 kg	5.37 kg	5.81 kg

The compositions of the two waste streams have remained relatively constant through the nine-year period during which the audits have been conducted. The relative differences between the Hastings domestic bagged refuse and the Napier domestic bagged refuse have also remained relatively consistent:

- Napier bagged refuse contains a higher proportion of paper, plastics, ferrous metals, glass, rubble, and potentially hazardous materials than Hastings
- Hastings bagged refuse contains a higher proportion of organics and sanitary paper than Napier.

The differences relate to the proportion of materials that are recycled in each area and the demographics of the population (e.g. more sanitary paper is associated with a higher proportion of young children).

7.6.2 Activity source of waste loads at Henderson Rd RTS

Table 7.8 compares the activity sources of all waste loads, by tonnes per week, disposed of at Henderson Rd RTS in the four surveys.

Table 7.8 - Activity sources of waste loads - Henderson Rd RTS - 2007, 2009, 2012, and 2016

Comparison of activity sources of waste loads - Henderson Rd RTS	2007	2009	2012	2016
Construction & demolition	58 T/week	52 T/week	16 T/week	41 T/week
Industrial/commercial/institutional	101 T/week	40 T/week	68 T/week	62 T/week
Kerbside collections	178 T/week	181 T/week	169 T/week	39 T/week
Landscaping & earthworks	37 T/week	29 T/week	9 T/week	9 T/week
Residential	98 T/week	52 T/week	37 T/week	45 T/week
TOTAL	**473 T/week**	**355 T/week**	**299 T/week**	**197 T/week**

Since 2007, the weekly tonnage disposed to landfill from Henderson Rd RTS has declined from 473 tonnes to 197 tonnes, a decrease of 55%. Most of the decrease is likely to be associated with pricing differentials between the transfer station and Omarunui Landfill, with many commercial waste collectors now transporting waste directly to the landfill. The substantial post-2007 decrease in landscaping & earthworks waste, though, may be associated with more rigorous separation of greenwaste loads at the facility.

7.6.3 Activity source of waste loads at Redclyffe RTS

Table 7.9 compares the activity sources of waste loads, by tonnes per week, disposed of at Redclyffe RTS in 2007, 2009, 2012 and 2016.

Table 7.9 – Activity sources of waste loads – Redclyffe RTS – 2007, 2009, 2012, and 2016

Comparison of activity sources of waste loads - Redclyffe RTS	2007	2009	2012	2016
Construction & demolition	112 T/week	67 T/week	48 T/week	43 T/week
Industrial/commercial/institutional	82 T/week	50 T/week	27 T/week	57 T/week
Kerbside collections	0 T/week	16 T/week	3 T/week	3 T/week
Landscaping & earthworks	42 T/week	73 T/week	15 T/week	23 T/week
Residential	54 T/week	63 T/week	44 T/week	39 T/week
TOTAL	**291 T/week**	**269 T/week**	**136 T/week**	**164 T/week**

Between 2007 and 2016, the weekly tonnage of waste disposed of to landfill from Redclyffe RTS declined from 291 tonnes to 136 tonnes, a decrease of 44%.

As with Henderson Rd RTS, much of the change in tonnages may be associated with pricing differentials between the disposal facilities in the region. Changes in economic activity, particularly construction, will have had some effect on the variation, but the effect of this can not be estimated when looking at each facility individually.

7.6.4 Sources of waste loads at Omarunui Landfill

Table 7.10 compares the sources of waste loads, by tonnes per week, disposed of at Omarunui Landfill in 2007, 2009, 2012, and 2016.

Table 7.10 - Sources of waste loads - Omarunui Landfill - 2007, 2009, 2012, and 2016

Comparison of sources of waste loads - Omarunui Landfill	2007	2009	2012	2016
Hastings kerbside collections	0 T/week	0 T/week	4 T/week	4 T/week
Napier kerbside collections	175 T/week	134 T/week	131 T/week	135 T/week
Private kerbside collections	163 T/week (1)	242 T/week	239 T/week	409 T/week
Subtotal kerbside collections	**338 T/week (1)**	**376 T/week**	**374 T/week**	**549 T/week**
Redclyffe RTS	292 T/week	269 T/week	136 T/week	164 T/week
Blackbridge RTS	55 T/week	30 T/week	19 T/week	19 T/week
Henderson Rd RTS	473 T/week	355 T/week	299 T/week	197 T/week
General direct to landfill	646 T/week (1)	441 T/week	408 T/week	446 T/week
Special direct to landfill	162 T/week	180 T/week	272 T/week	138 T/week
TOTAL	**1,966 T/week**	**1,651 T/week**	**1,508 T/week**	**1,513 T/week**

(1) Differs from figures in 2007 report

During the 2016 survey period, an average of 1,513 tonnes of refuse were disposed of per week at Omarunui Landfill. This was virtually the same as 2012 but a decrease of 23% from the 2007 survey and a decrease of 8% from the 2009 survey. General waste, the largest single source of waste to landfill, increased by 14% over the 2012 figure but was very close to the 2009 figure.

Kerbside collections taken directly to landfill, which were relatively constant between 2007 and 2012, increased 47% between 2012 and 2016. This increase is associated both with a decrease in kerbside collections taken to the Henderson Rd RTS and an increase in the overall quantity of kerbside refuse (see Table 7.11).

Special wastes decreased between 2012 and 2016 but this was largely caused by a one-off disposal of fire debris during the 2012 survey period.

7.6.5 Activity source of waste generated in Hawke's Bay

Table 7.11 compares the activity sources of waste loads, by tonnes per week, disposed of at all three transfer stations and Omarunui Landfill for the four surveys. As no direct data was available on the small amount disposed of at Blackbridge transfer station, the activity source of waste disposed there has been assumed to be the average of the other three facilities.

It should be noted that "Kerbside collections" includes both the Council and private kerbside collections from both residential and commercial properties.

Table 7.11 – Activity sources of waste loads – all facilities combined

Comparison of activity sources of waste loads - all facilities combined	2007	2009	2012	2016
Construction & demolition	208 T/week	164 T/week	66 T/week	100 T/week
Industrial/commercial/institutional	808 T/week	506 T/week	496 T/week	565 T/week
Kerbside collections	516 T/week	573 T/week	546 T/week	591 T/week
Landscaping & earthworks	94 T/week	106 T/week	25 T/week	33 T/week
Residential	179 T/week	122 T/week	103 T/week	86 T/week
Special waste	162 T/week	180 T/week	272 T/week	138 T/week
TOTAL	**1,966 T/week**	**1,651 T/week**	**1,508 T/week**	**1,513 T/week**

Between 2007 and 2012, the weekly tonnage of C&D waste decreased but then increased again in 2016. The marked decrease in 2012 could be associated with a slowdown in construction activity following the global financial crisis of 2008. ICI waste has followed the same pattern, with the 2016 tonnage being the highest since 2007. This could be related to both the GFC and changes in activity levels in the primary industries.

The sharp reduction in landscaping waste over the nine-year period is likely to be associated with improved greenwaste recovery efforts at the transfer stations and the increase in refuse disposal charges. The quantity of landscaping waste can also be influenced by weather conditions during the survey period.

Appendix 1 – Hastings bagged refuse

Hastings District Council domestic kerbside bagged refuse (margins of error for 95% confidence interval)		**% of total**		**Weight per household set out**	
Paper	Recyclable	4.9%	(±1.1%)	0.33 kg	(±0.07 kg)
	Junk mail	0.5%	(±0.3%)	0.03 kg	(±0.02 kg)
	Non-recyclable	2.1%	(±0.4%)	0.14 kg	(±0.03 kg)
	Subtotal	**7.5%**	**(±1.4%)**	**0.51 kg**	**(±0.09 kg)**
Plastics	# 1-7 containers	2.4%	(±0.4%)	0.17 kg	(±0.03 kg)
	Non-recyclable containers	1.1%	(±0.3%)	0.08 kg	(±0.02 kg)
	Soft plastic bags	3.2%	(±0.3%)	0.22 kg	(±0.02 kg)
	Plastic bags & film	4.2%	(±0.5%)	0.29 kg	(±0.03 kg)
	Other non-recyclable	1.8%	(±0.6%)	0.12 kg	(±0.04 kg)
	Subtotal	**12.8%**	**(±1.3%)**	**0.87 kg**	**(±0.09 kg)**
Organics	Kitchen waste	42.7%	(±5.4%)	2.90 kg	(±0.37 kg)
	Greenwaste	4.8%	(±3.0%)	0.32 kg	(±0.20 kg)
	Multimaterial/other	5.1%	(±5.7%)	0.35 kg	(±0.39 kg)
	Subtotal	**52.6%**	**(±6.9%)**	**3.57 kg**	**(±0.47 kg)**
Ferrous metals	Steel cans	1.0%	(±0.4%)	0.07 kg	(±0.02 kg)
	Non-recyclable	0.4%	(±0.5%)	0.03 kg	(±0.03 kg)
	Subtotal	**1.4%**	**(±0.7%)**	**0.09 kg**	**(±0.04 kg)**
Non ferrous metals	Aluminium cans	0.9%	(±0.8%)	0.06 kg	(±0.06 kg)
	Non-recyclable	0.9%	(±0.4%)	0.06 kg	(±0.03 kg)
	Subtotal	**1.8%**	**(±0.9%)**	**0.12 kg**	**(±0.06 kg)**
Glass	Bottles/jars	0.9%	(±0.4%)	0.06 kg	(±0.03 kg)
	Non-recyclable	0.4%	(±0.3%)	0.03 kg	(±0.02 kg)
	Subtotal	**1.3%**	**(±0.5%)**	**0.09 kg**	**(±0.03 kg)**
Textiles	Clothing/textiles	1.9%	(±0.7%)	0.13 kg	(±0.05 kg)
	Multimaterial/other	1.4%	(±0.9%)	0.09 kg	(±0.06 kg)
	Subtotal	**3.3%**	**(±1.1%)**	**0.22 kg**	**(±0.08 kg)**
Sanitary paper		**16.1%**	**(±7.3%)**	**1.09 kg**	**(±0.50 kg)**
Rubble		**1.8%**	**(±1.3%)**	**0.12 kg**	**(±0.09 kg)**
Timber		**0.5%**	**(±0.4%)**	**0.03 kg**	**(±0.03 kg)**
Rubber		**0.0%**	**(±0.0%)**	**0.00 kg**	**(±0.00 kg)**
Potentially hazardous	Household	0.7%	(±0.2%)	0.05 kg	(±0.01 kg)
	Other	0.2%	(±0.2%)	0.01 kg	(±0.01 kg)
	Subtotal	**0.9%**	**(±0.3%)**	**0.06 kg**	**(±0.02 kg)**
TOTAL		**100.0%**		**6.79 kg**	**(±0.76 kg)**

Hastings District Council domestic kerbside bagged refuse (margins of error for 95% confidence level)		**Weight per bag**
Paper	Recyclable	0.26 kg (±0.06 kg)
	Junk mail	0.03 kg (±0.02 kg)
	Non-recyclable	0.11 kg (±0.02 kg)
	Subtotal	**0.40 kg (±0.07 kg)**
Plastics	# 1-7 containers	0.13 kg (±0.02 kg)
	Non-recyclable containers	0.06 kg (±0.01 kg)
	Soft plastic bags	0.17 kg (±0.02 kg)
	Plastic bags & film	0.23 kg (±0.03 kg)
	Other non-recyclable	0.09 kg (±0.03 kg)
	Subtotal	**0.69 kg (±0.07 kg)**
Organics	Kitchen waste	2.31 kg (±0.29 kg)
	Greenwaste	0.26 kg (±0.16 kg)
	Multimaterial/other	0.28 kg (±0.31 kg)
	Subtotal	**2.84 kg (±0.37 kg)**
Ferrous metals	Steel cans	0.05 kg (±0.02 kg)
	Non-recyclable	0.02 kg (±0.03 kg)
	Subtotal	**0.07 kg (±0.04 kg)**
Non ferrous metals	Aluminium cans	0.05 kg (±0.04 kg)
	Non-recyclable	0.05 kg (±0.02 kg)
	Subtotal	**0.10 kg (±0.05 kg)**
Glass	Bottles/jars	0.05 kg (±0.02 kg)
	Non-recyclable	0.02 kg (±0.01 kg)
	Subtotal	**0.07 kg (±0.03 kg)**
Textiles	Clothing/textiles	0.10 kg (±0.04 kg)
	Multimaterial/other	0.07 kg (±0.05 kg)
	Subtotal	**0.18 kg (±0.06 kg)**
Sanitary paper		**0.87 kg (±0.40 kg)**
Rubble		**0.10 kg (±0.07 kg)**
Timber		**0.03 kg (±0.02 kg)**
Rubber		**0.00 kg (±0.00 kg)**
Potentially hazardous	Household	0.04 kg (±0.01 kg)
	Other	0.01 kg (±0.01 kg)
	Subtotal	**0.05 kg (±0.01 kg)**
TOTAL		**5.40 kg (±0.61 kg)**

Appendix 2 – Napier bagged refuse

Napier City Council domestic kerbside bagged refuse (margins of error for 95% confidence interval)		**% of total**	**Weight per household set out**
Paper	Recyclable	8.6% (±2.2%)	0.75 kg (±0.19 kg)
	Junk mail	1.8% (±0.7%)	0.16 kg (±0.06 kg)
	Multimaterial/other	2.4% (±0.4%)	0.20 kg (±0.03 kg)
	Subtotal	**12.8% (±2.6%)**	**1.11 kg (±0.23 kg)**
Plastics	# 1-7 containers	3.1% (±0.3%)	0.27 kg (±0.03 kg)
	Non-recyclable containers	1.1% (±0.2%)	0.09 kg (±0.02 kg)
	Soft plastic bags	3.3% (±0.2%)	0.28 kg (±0.02 kg)
	Plastic bags & film	3.7% (±0.4%)	0.32 kg (±0.03 kg)
	Multimaterial/other	2.1% (±0.8%)	0.18 kg (±0.07 kg)
	Subtotal	**13.2% (±1.0%)**	**1.14 kg (±0.09 kg)**
Organics	Kitchen waste	39.5% (±4.6%)	3.42 kg (±0.40 kg)
	Greenwaste	7.6% (±4.4%)	0.66 kg (±0.38 kg)
	Multimaterial/other	2.2% (±0.9%)	0.19 kg (±0.08 kg)
	Subtotal	**49.3% (±5.8%)**	**4.27 kg (±0.50 kg)**
Ferrous metals	Steel cans	1.6% (±0.4%)	0.14 kg (±0.04 kg)
	Non-recyclable	0.4% (±0.4%)	0.04 kg (±0.03 kg)
	Subtotal	**2.0% (±0.6%)**	**0.18 kg (±0.05 kg)**
Non-ferrous metals	Aluminium cans	0.4% (±0.1%)	0.04 kg (±0.01 kg)
	Non-recyclable	0.8% (±0.5%)	0.07 kg (±0.04 kg)
	Subtotal	**1.2% (±0.5%)**	**0.10 kg (±0.04 kg)**
Glass	Bottles/jars	2.8% (±1.0%)	0.24 kg (±0.08 kg)
	Non-recyclable	0.4% (±0.3%)	0.03 kg (±0.02 kg)
	Subtotal	**3.2% (±1.0%)**	**0.28 kg (±0.09 kg)**
Textiles	Clothing/textiles	2.5% (±1.3%)	0.21 kg (±0.11 kg)
	Multimaterial/other	2.8% (±2.2%)	0.24 kg (±0.19 kg)
	Subtotal	**5.3% (±2.6%)**	**0.46 kg (±0.22 kg)**
Sanitary paper		**9.5% (±3.2%)**	**0.82 kg (±0.28 kg)**
Rubble		**1.7% (±1.4%)**	**0.15 kg (±0.12 kg)**
Timber		**0.3% (±0.2%)**	**0.02 kg (±0.02 kg)**
Rubber		**0.6% (±0.9%)**	**0.05 kg (±0.08 kg)**
Potentially hazardous	Household	0.7% (±0.2%)	0.06 kg (±0.02 kg)
	Other	0.3% (±0.3%)	0.03 kg (±0.02 kg)
	Subtotal	**1.0% (±0.5%)**	**0.09 kg (±0.04 kg)**
TOTAL		**100.0%**	**8.66 kg (±0.75 kg)**

Napier City Council domestic kerbside bagged refuse (margins of error for 95% confidence level)		**Weight per bag**	
Paper	Recyclable	0.50 kg	(±0.13 kg)
	Junk mail	0.11 kg	(±0.04 kg)
	Multimaterial/other	0.14 kg	(±0.02 kg)
	Subtotal	**0.74 kg**	**(±0.15 kg)**
Plastics	# 1-7 containers	0.18 kg	(±0.02 kg)
	Non-recyclable containers	0.06 kg	(±0.01 kg)
	Soft plastic bags	0.19 kg	(±0.01 kg)
	Plastic bags & film	0.21 kg	(±0.02 kg)
	Multimaterial/other	0.12 kg	(±0.04 kg)
	Subtotal	**0.77 kg**	**(±0.06 kg)**
Organics	Kitchen waste	2.29 kg	(±0.27 kg)
	Greenwaste	0.44 kg	(±0.25 kg)
	Multimaterial/other	0.13 kg	(±0.05 kg)
	Subtotal	**2.86 kg**	**(±0.34 kg)**
Ferrous metals	Steel cans	0.09 kg	(±0.03 kg)
	Non-recyclable	0.03 kg	(±0.02 kg)
	Subtotal	**0.12 kg**	**(±0.03 kg)**
Non ferrous metals	Aluminium cans	0.03 kg	(±0.01 kg)
	Non-recyclable	0.04 kg	(±0.03 kg)
	Subtotal	**0.07 kg**	**(±0.03 kg)**
Glass	Bottles/jars	0.16 kg	(±0.06 kg)
	Non-recyclable	0.02 kg	(±0.02 kg)
	Subtotal	**0.19 kg**	**(±0.06 kg)**
Textiles	Clothing/textiles	0.14 kg	(±0.07 kg)
	Multimaterial/other	0.16 kg	(±0.13 kg)
	Subtotal	**0.31 kg**	**(±0.15 kg)**
Sanitary paper		**0.55 kg**	**(±0.19 kg)**
Rubble		**0.10 kg**	**(±0.08 kg)**
Timber		**0.02 kg**	**(±0.01 kg)**
Rubber		**0.03 kg**	**(±0.05 kg)**
Potentially hazardous	Household	0.04 kg	(±0.01 kg)
	Other	0.02 kg	(±0.02 kg)
	Subtotal	**0.06 kg**	**(±0.03 kg)**
	TOTAL	**5.81 kg**	**(±0.50 kg)**

Appendix 3 – Henderson Rd RTS

Henderson Rd RTS General and overall waste streams – February & April 2016		General waste (excludes kerbside collections)		Overall waste (includes kerbside collections)	
		% of total	Tonnes per week	% of total	Tonnes per week
Paper	Recyclable	5.4%	8.6 T/week	5.4%	10.7 T/week
	Non-recyclable	3.6%	5.7 T/week	3.3%	6.5 T/week
	Subtotal	**9.1%**	**14.3 T/week**	**8.8%**	**17.2 T/week**
Plastics	Recyclable	0.4%	0.7 T/week	0.8%	1.6 T/week
	Non-recyclable	14.1%	22.1 T/week	13.3%	26.2 T/week
	Subtotal	**14.5%**	**22.8 T/week**	**14.1%**	**27.8 T/week**
Organics	Kitchen waste	3.7%	5.9 T/week	11.5%	22.7 T/week
	Compostable greenwaste	7.7%	12.1 T/week	7.1%	13.9 T/week
	Non-compostable greenwaste	0.6%	0.9 T/week	0.5%	0.9 T/week
	Multimaterial/other	3.0%	4.7 T/week	3.4%	6.7 T/week
	Subtotal	**15.0%**	**23.5 T/week**	**22.5%**	**44.3 T/week**
Ferrous metals	Primarily ferrous	1.6%	2.5 T/week	1.5%	2.9 T/week
	Multimaterial/other	2.1%	3.3 T/week	1.8%	3.4 T/week
	Subtotal	**3.7%**	**5.8 T/week**	**3.2%**	**6.4 T/week**
Non-ferrous metals		**0.4%**	**0.7 T/week**	**0.7%**	**1.4 T/week**
Glass	Recyclable	0.4%	0.7 T/week	0.5%	1.0 T/week
	Window pane	0.5%	0.8 T/week	0.4%	0.8 T/week
	Multimaterial/other	0.4%	0.7 T/week	0.4%	0.9 T/week
	Subtotal	**1.4%**	**2.2 T/week**	**1.4%**	**2.7 T/week**
Textiles	Clothing/textiles	3.9%	6.1 T/week	3.5%	6.9 T/week
	Multimaterial/other	9.1%	14.4 T/week	7.6%	14.9 T/week
	Subtotal	**13.0%**	**20.5 T/week**	**11.1%**	**21.8 T/week**
Sanitary paper		**2.5%**	**4.0 T/week**	**5.3%**	**10.3 T/week**
Rubble	Cleanfill	1.9%	2.9 T/week	1.5%	2.9 T/week
	Plasterboard	2.3%	3.6 T/week	1.9%	3.6 T/week
	Other	3.0%	4.7 T/week	2.8%	5.4 T/week
	Subtotal	**7.2%**	**11.3 T/week**	**6.1%**	**12.0 T/week**
Timber	Unpainted & untreated	6.2%	9.7 T/week	4.9%	9.7 T/week
	Fabricated	6.6%	10.4 T/week	5.3%	10.4 T/week
	Multimaterial/other	19.8%	31.0 T/week	15.9%	31.2 T/week
	Subtotal	**32.5%**	**51.1 T/week**	**26.1%**	**51.3 T/week**
Rubber		**0.4%**	**0.7 T/week**	**0.4%**	**0.7 T/week**
Potentially hazardous		**0.2%**	**0.3 T/week**	**0.4%**	**0.7 T/week**
TOTAL		**100.0%**	**157.2 T/week**	**100.0%**	**196.5 T/week**

Henderson Rd RTS – General waste stream – by activity source of waste load – February & April 2016		**C&D**	**ICI**	**Landscaping**	**Residential**
Paper	Recyclable	3.7%	5.5%	2.1%	7.7%
	Multimaterial/other	2.5%	7.3%	0.1%	0.4%
	Subtotal	**6.2%**	**12.7%**	**2.2%**	**8.1%**
Plastics	Recyclable	0.1%	0.8%	0.1%	0.3%
	Multimaterial/other	2.9%	26.8%	1.3%	9.4%
	Subtotal	**3.0%**	**27.6%**	**1.4%**	**9.7%**
Organics	Kitchen waste	0.0%	3.9%	2.0%	7.1%
	Compostable greenwaste	3.2%	1.1%	69.6%	8.0%
	Non-compostable greenwaste	0.0%	0.0%	7.3%	0.5%
	Multimaterial/other	0.0%	7.2%	0.2%	0.5%
	Subtotal	**3.2%**	**12.3%**	**79.2%**	**16.1%**
Ferrous metals	Primarily ferrous	2.0%	1.5%	0.0%	1.6%
	Multimaterial/other	0.3%	2.3%	0.5%	3.8%
	Subtotal	**2.4%**	**3.8%**	**0.5%**	**5.4%**
Non-ferrous metals		**0.0%**	**0.6%**	**0.1%**	**0.6%**
Glass	Recyclable	0.0%	0.5%	1.4%	0.6%
	Window pane	0.1%	0.3%	0.0%	1.2%
	Multimaterial/other	0.0%	0.3%	0.0%	1.1%
	Subtotal	**0.1%**	**1.1%**	**1.4%**	**2.9%**
Textiles	Clothing/textiles	0.0%	8.0%	0.1%	2.6%
	Multimaterial/other	1.8%	8.6%	2.6%	17.8%
	Subtotal	**1.8%**	**16.6%**	**2.7%**	**20.4%**
Sanitary paper		**0.0%**	**5.1%**	**0.6%**	**1.7%**
Rubble	Cleanfill	6.0%	0.4%	0.0%	0.4%
	Plasterboard	8.8%	0.0%	0.0%	0.1%
	Other	6.6%	1.8%	4.3%	1.0%
	Subtotal	**21.4%**	**2.3%**	**4.3%**	**1.6%**
Timber	Unpainted & untreated	16.6%	4.3%	0.0%	0.6%
	Fabricated	5.1%	1.3%	0.2%	16.5%
	Multimaterial/other	39.9%	11.2%	7.3%	15.8%
	Subtotal	**61.7%**	**16.8%**	**7.4%**	**32.9%**
Rubber		**0.2%**	**0.8%**	**0.0%**	**0.3%**
Potentially hazardous		**0.1%**	**0.3%**	**0.0%**	**0.3%**
TOTAL		**100.0%**	**100.0%**	**100.0%**	**100.0%**

Henderson Rd RTS – General waste stream – by vehicle type - February & April 2016		**Cars**	**Gantry trucks**	**Other trucks**	**Trailers**
Paper	Recyclable	9.5%	5.4%	4.8%	5.2%
	Multimaterial/other	0.8%	1.5%	9.8%	3.2%
	Subtotal	**10.3%**	**6.9%**	**14.5%**	**8.4%**
Plastics	Recyclable	0.5%	1.0%	0.1%	0.2%
	Multimaterial/other	12.9%	19.0%	25.6%	6.4%
	Subtotal	**13.4%**	**20.0%**	**25.6%**	**6.6%**
Organics	Kitchen waste	18.5%	2.5%	3.2%	2.9%
	Compostable greenwaste	9.1%	5.1%	3.7%	10.8%
	Non-compostable greenwaste	1.8%	1.4%	0.1%	0.1%
	Multimaterial/other	1.3%	8.7%	0.2%	0.2%
	Subtotal	**30.8%**	**17.7%**	**7.1%**	**14.0%**
Ferrous metals	Primarily ferrous	0.6%	1.9%	2.0%	1.4%
	Multimaterial/other	9.5%	1.9%	0.5%	1.9%
	Subtotal	**10.0%**	**3.8%**	**2.5%**	**3.3%**
Non-ferrous metals		**0.6%**	**0.3%**	**0.8%**	**0.4%**
Glass	Recyclable	1.1%	0.3%	0.2%	0.6%
	Window pane	2.5%	0.0%	0.0%	0.8%
	Multimaterial/other	0.5%	0.0%	0.7%	0.7%
	Subtotal	**4.1%**	**0.3%**	**0.9%**	**2.0%**
Textiles	Clothing/textiles	2.0%	0.6%	17.7%	1.3%
	Multimaterial/other	**6.7%**	**5.9%**	**5.4%**	13.1%
	Subtotal	**8.7%**	**6.5%**	**23.1%**	**14.4%**
Sanitary paper		**4.4%**	**5.5%**	**0.8%**	**0.9%**
Rubble	Cleanfill	2.9%	3.5%	0.2%	1.2%
	Plasterboard	0.0%	2.0%	0.0%	3.7%
	Other	0.6%	0.3%	2.1%	5.5%
	Subtotal	**3.5%**	**5.8%**	**2.3%**	**10.4%**
Timber	Unpainted & untreated	0.5%	9.4%	4.1%	5.4%
	Fabricated	4.2%	4.1%	6.6%	8.7%
	Multimaterial/other	8.3%	18.6%	11.4%	25.1%
	Subtotal	**13.0%**	**32.1%**	**22.2%**	**39.2%**
Rubber		**0.4%**	**0.8%**	**0.1%**	**0.3%**
Potentially hazardous		**0.7%**	**0.3%**	**0.1%**	**0.2%**
TOTAL		**100.0%**	**100.0%**	**100.0%**	**100.0%**

Appendix 4 – Redclyffe RTS

Redclyffe RTS – Overall waste stream – February & April 2016		**% of total**	**Tonnes per week**
Paper	Recyclable	7.5%	12.2 T/week
	Multimaterial/other	0.5%	0.8 T/week
	Subtotal	**7.9%**	**13.0 T/week**
Plastics	Recyclable	0.4%	0.7 T/week
	Multimaterial/other	6.1%	10.0 T/week
	Subtotal	**6.5%**	**10.6 T/week**
Organics	Kitchen waste	6.1%	10.0 T/week
	Compostable greenwaste	13.7%	22.5 T/week
	Non-compostable greenwaste	0.9%	1.5 T/week
	Multimaterial/other	0.6%	1.1 T/week
	Subtotal	**21.4%**	**35.0 T/week**
Ferrous metals	Primarily ferrous	1.8%	2.9 T/week
	Multimaterial/other	1.9%	3.1 T/week
	Subtotal	**3.6%**	**6.0 T/week**
Non-ferrous metals		**0.4%**	**0.7 T/week**
Glass	Recyclable	1.7%	2.9 T/week
	Window pane	0.3%	0.4 T/week
	Multimaterial/other	1.1%	1.8 T/week
	Subtotal	**3.1%**	**5.1 T/week**
Textiles	Clothing/textiles	0.7%	1.1 T/week
	Multimaterial/other	9.0%	14.7 T/week
	Subtotal	**9.6%**	**15.8 T/week**
Sanitary paper		**1.8%**	**2.9 T/week**
Rubble	Cleanfill	1.3%	2.2 T/week
	Plasterboard	3.5%	5.8 T/week
	Other	5.7%	9.3 T/week
	Subtotal	**10.5%**	**17.3 T/week**
Timber	Unpainted & untreated	6.0%	9.9 T/week
	Fabricated	6.1%	9.9 T/week
	Multimaterial/other	22.1%	36.2 T/week
	Subtotal	**34.2%**	**56.1 T/week**
Rubber		**0.7%**	**1.1 T/week**
Potentially hazardous		**0.3%**	**0.4 T/week**
TOTAL		**100.0%**	**164.1 T/week**

Redclyffe RTS – Overall waste stream – by activity source of waste load - – February & April 2016		**C&D**	**ICI**	**Landscaping**	**Residential**
Paper	Recyclable	1.1%	15.7%	0.9%	6.0%
	Multimaterial/other	0.0%	1.0%	0.0%	0.4%
	Subtotal	**1.2%**	**16.6%**	**0.9%**	**6.4%**
Plastics	Recyclable	0.1%	0.7%	0.2%	0.3%
	Multimaterial/other	1.6%	9.2%	0.9%	9.2%
	Subtotal	**1.6%**	**9.8%**	**1.0%**	**9.6%**
Organics	Kitchen waste	0.2%	8.5%	1.5%	8.9%
	Compostable greenwaste	0.3%	1.1%	89.1%	3.2%
	Non-compostable greenwaste	0.5%	0.3%	2.6%	1.3%
	Multimaterial/other	0.0%	1.2%	0.1%	0.6%
	Subtotal	**1.0%**	**11.2%**	**93.3%**	**13.9%**
Ferrous metals	Primarily ferrous	3.2%	1.3%	0.1%	1.8%
	Multimaterial/other	0.0%	1.6%	1.0%	5.1%
	Subtotal	**3.2%**	**2.9%**	**1.1%**	**6.8%**
Non-ferrous metals		**0.1%**	**0.6%**	**0.0%**	**0.7%**
Glass	Recyclable	0.0%	3.9%	0.1%	1.5%
	Window pane	0.3%	0.2%	0.0%	0.6%
	Multimaterial/other	1.4%	0.4%	0.0%	2.4%
	Subtotal	**1.7%**	**4.4%**	**0.1%**	**4.4%**
Textiles	Clothing/textiles	0.0%	0.9%	0.1%	1.3%
	Multimaterial/other	**7.6%**	**6.2%**	**0.2%**	**20.3%**
	Subtotal	**7.6%**	**7.0%**	**0.3%**	**21.6%**
Sanitary paper		**0.1%**	**3.0%**	**0.4%**	**2.2%**
Rubble	Cleanfill	0.7%	2.2%	0.1%	1.5%
	Plasterboard	11.9%	0.9%	0.0%	0.6%
	Other	10.6%	6.7%	0.3%	2.3%
	Subtotal	**23.3%**	**9.7%**	**0.4%**	**4.4%**
Timber	Unpainted & untreated	6.9%	11.5%	0.0%	1.2%
	Fabricated	3.7%	5.2%	0.1%	13.9%
	Multimaterial/other	49.5%	16.5%	2.2%	13.7%
	Subtotal	**60.0%**	**33.1%**	**2.3%**	**28.8%**
Rubber		**0.1%**	**1.2%**	**0.0%**	**1.0%**
Potentially hazardous		**0.1%**	**0.4%**	**0.0%**	**0.3%**
TOTAL		**100.0%**	**100.0%**	**100.0%**	**100.0%**

Redclyffe RTS – Overall waste stream – by vehicle type – February & April 2016		Cars	Front-loaders	Gantry trucks	Other trucks	Trailers
Paper	Recyclable	8.6%	11.0%	15.2%	3.7%	4.5%
	Multimaterial/other	0.5%	1.1%	0.0%	0.2%	0.2%
	Subtotal	**9.2%**	**12.1%**	**15.2%**	**3.9%**	**4.7%**
Plastics	Recyclable	0.7%	1.1%	0.0%	0.1%	0.1%
	Multimaterial/other	13.4%	16.5%	4.4%	2.2%	4.3%
	Subtotal	**14.1%**	**17.6%**	**4.4%**	**2.3%**	**4.4%**
Organics	Kitchen waste	18.6%	22.0%	0.0%	1.0%	2.5%
	Compostable greenwaste	2.5%	3.3%	2.1%	41.2%	8.0%
	Non-compostable greenwaste	0.4%	1.1%	1.9%	0.0%	1.3%
	Multimaterial/other	1.3%	4.4%	0.0%	0.1%	0.2%
	Subtotal	**22.8%**	**30.8%**	**4.0%**	**42.3%**	**12.0%**
Ferrous metals	Primarily ferrous	1.6%	2.2%	4.3%	0.6%	1.5%
	Multimaterial/other	4.6%	3.3%	0.0%	0.3%	2.7%
	Subtotal	**6.2%**	**5.5%**	**4.3%**	**0.9%**	**4.3%**
Non-ferrous metals		**0.8%**	**1.1%**	**0.1%**	**0.0%**	**0.3%**
Glass	Recyclable	2.3%	6.6%	2.2%	0.0%	0.4%
	Windowpane	1.1%	0.0%	0.0%	0.0%	0.4%
	Multimaterial/other	1.1%	1.1%	1.0%	0.1%	1.7%
	Subtotal	**4.6%**	**7.7%**	**3.2%**	**0.2%**	**2.5%**
Textiles	Clothing/textiles	1.9%	2.2%	0.0%	0.0%	0.4%
	Multimaterial/other	**9.9%**	**4.4%**	**13.1%**	0.7%	**13.9%**
	Subtotal	**11.8%**	**6.6%**	**13.1%**	**0.7%**	**14.3%**
Sanitary paper		**4.5%**	**6.6%**	**0.0%**	**0.2%**	**0.6%**
Rubble	Cleanfill	0.9%	1.1%	0.0%	2.4%	1.4%
	Plasterboard	0.6%	0.0%	12.7%	1.2%	3.7%
	Other	0.7%	2.2%	4.2%	8.3%	7.1%
	Subtotal	**2.2%**	**3.3%**	**16.9%**	**11.9%**	**12.2%**
Timber	Unpainted & untreated	0.2%	2.2%	10.6%	14.6%	2.6%
	Fabricated	14.2%	2.2%	0.0%	0.0%	11.2%
	Multimaterial/other	8.5%	2.2%	26.0%	22.8%	30.2%
	Subtotal	**23.0%**	**6.6%**	**36.6%**	**37.4%**	**44.0%**
Rubber		**0.5%**	**1.1%**	**2.2%**	**0.0%**	**0.5%**
Potentially hazardous		**0.5%**	**1.1%**	**0.2%**	**0.0%**	**0.2%**
TOTAL		**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Appendix 5 – 240-litre MGB kerbside refuse

240-litre MGB domestic kerbside refuse (margins of error for 95% confidence interval)		**% of total**		**Weight per MGB**	
Paper	Recyclable	4.2%	(±1.3%)	1.14 kg	(±0.34 kg)
	Junk mail	0.7%	(±0.3%)	0.18 kg	(±0.08 kg)
	Non-recyclable	1.1%	(±0.4%)	0.31 kg	(±0.11 kg)
	Subtotal	**6.0%**	**(±1.6%)**	**1.63 kg**	**(±0.45 kg)**
Plastics	# 1-7 containers	1.5%	(±0.4%)	0.42 kg	(±0.10 kg)
	Non-recyclable containers	0.6%	(±0.2%)	0.16 kg	(±0.04 kg)
	Soft plastic bags	1.1%	(±0.2%)	0.29 kg	(±0.06 kg)
	Plastic bags & film	1.2%	(±0.2%)	0.32 kg	(±0.05 kg)
	Other non-recyclable	0.7%	(±0.4%)	0.19 kg	(±0.12 kg)
	Subtotal	**5.1%**	**(±0.9%)**	**1.39 kg**	**(±0.25 kg)**
Organics	Kitchen waste	15.4%	(±2.7%)	4.21 kg	(±0.74 kg)
	Greenwaste	59.2%	(±12.7%)	16.14 kg	(±3.47 kg)
	Multimaterial/other	1.1%	(±0.7%)	0.29 kg	(±0.19 kg)
	Subtotal	**75.6%**	**(±12.6%)**	**20.64 kg**	**(±3.44 kg)**
Ferrous metals	Steel cans	0.6%	(±0.2%)	0.17 kg	(±0.05 kg)
	Non-recyclable	0.2%	(±0.2%)	0.07 kg	(±0.07 kg)
	Subtotal	**0.9%**	**(±0.3%)**	**0.24 kg**	**(±0.08 kg)**
Non ferrous metals	Aluminium cans	0.3%	(±0.2%)	0.08 kg	(±0.04 kg)
	Non-recyclable	0.4%	(±0.4%)	0.11 kg	(±0.10 kg)
	Subtotal	**0.7%**	**(±0.4%)**	**0.18 kg**	**(±0.11 kg)**
Glass	Bottles/jars	3.0%	(±1.5%)	0.81 kg	(±0.42 kg)
	Non-recyclable	0.2%	(±0.2%)	0.05 kg	(±0.04 kg)
	Subtotal	**3.1%**	**(±1.5%)**	**0.86 kg**	**(±0.42 kg)**
Textiles	Clothing/textiles	1.1%	(±0.5%)	0.31 kg	(±0.13 kg)
	Multimaterial/other	0.9%	(±0.4%)	0.23 kg	(±0.12 kg)
	Subtotal	**2.0%**	**(±0.7%)**	**0.54 kg**	**(±0.20 kg)**
Sanitary paper		**2.0%**	**(±1.1%)**	**0.55 kg**	**(±0.31 kg)**
Rubble		**2.6%**	**(±2.7%)**	**0.71 kg**	**(±0.73 kg)**
Timber		**1.5%**	**(±1.4%)**	**0.41 kg**	**(±0.37 kg)**
Rubber		**0.0%**	**(±0.0%)**	**0.01 kg**	**(±0.01 kg)**
Potentially hazardous	Household	0.3%	(±0.2%)	0.09 kg	(±0.05 kg)
	Other	0.2%	(±0.2%)	0.05 kg	(±0.04 kg)
	Subtotal	**0.5%**	**(±0.3%)**	**0.14 kg**	**(±0.08 kg)**
TOTAL		**100.0%**		**27.28 kg**	**(±3.73 kg)**

Appendix 6 – Omarunui Landfill

Omarunui Landfill – General waste direct to landfill - Excludes transfer station waste, special waste, and kerbside collections – February & April 2016		**% of total**	**Tonnes per week**
Paper	Recyclable	12.0%	53 T/week
	Multimaterial/other	2.5%	11 T/week
	Subtotal	**14.5%**	**65 T/week**
Plastics	Recyclable	1.0%	4 T/week
	Multimaterial/other	20.4%	91 T/week
	Subtotal	**21.4%**	**95 T/week**
Organics	Kitchen waste	16.3%	73 T/week
	Compostable greenwaste	3.8%	17 T/week
	Non-compostable greenwaste	1.0%	4 T/week
	Multimaterial/other	2.9%	13 T/week
	Subtotal	**23.9%**	**107 T/week**
Ferrous metals	Primarily ferrous	5.0%	22 T/week
	Multimaterial/other	2.1%	9 T/week
	Subtotal	**7.1%**	**32 T/week**
Non-ferrous metals		**0.7%**	**3 T/week**
Glass	Recyclable	3.1%	14 T/week
	Window pane	0.0%	0 T/week
	Multimaterial/other	0.8%	4 T/week
	Subtotal	**4.0%**	**18 T/week**
Textiles	Clothing/textiles	1.3%	6 T/week
	Multimaterial/other	3.2%	14 T/week
	Subtotal	**4.5%**	**20 T/week**
Sanitary paper		**4.9%**	**22 T/week**
Rubble	Cleanfill	0.6%	3 T/week
	Plasterboard	0.0%	0 T/week
	Other	11.1%	50 T/week
	Subtotal	**11.7%**	**52 T/week**
Timber	Unpainted & untreated	2.5%	11 T/week
	Fabricated	1.3%	6 T/week
	Multimaterial/other	2.1%	10 T/week
	Subtotal	**6.0%**	**27 T/week**
Rubber		**0.7%**	**3 T/week**
Potentially hazardous		**0.7%**	**3 T/week**
TOTAL		**100.0%**	**446 T/week**

Omarunui Landfill – General and special waste direct to landfill –- by activity source of waste load - February & April 2016		**C&D**	**ICI**	**Special**
Paper	Recyclable	0.0%	12.4%	0.0%
	Multimaterial/other	0.0%	2.6%	0.0%
	Subtotal	**0.0%**	**15.0%**	**0.0%**
Plastics	Recyclable	0.0%	1.0%	0.0%
	Multimaterial/other	0.9%	21.1%	0.0%
	Subtotal	**0.9%**	**22.1%**	**0.0%**
Organics	Kitchen waste	0.0%	16.8%	0.0%
	Compostable greenwaste	0.0%	3.9%	0.0%
	Non-compostable greenwaste	0.0%	1.0%	0.0%
	Multimaterial/other	0.0%	3.0%	35.0%
	Subtotal	**0.0%**	**24.7%**	**35.0%**
Ferrous metals	Primarily ferrous	4.4%	5.0%	0.0%
	Multimaterial/other	0.0%	2.2%	0.0%
	Subtotal	**4.4%**	**7.2%**	**0.0%**
Non-ferrous metals		**0.0%**	**0.7%**	**0.0%**
Glass	Recyclable	0.0%	3.2%	0.0%
	Window pane	0.1%	0.0%	0.0%
	Multimaterial/other	0.0%	0.8%	0.0%
	Subtotal	**0.1%**	**4.1%**	**0.0%**
Textiles	Clothing/textiles	0.0%	1.3%	0.0%
	Multimaterial/other	0.0%	3.3%	0.0%
	Subtotal	**0.0%**	**4.7%**	**0.0%**
Sanitary paper		**0.0%**	**5.1%**	**0.0%**
Rubble	Cleanfill	0.0%	0.6%	0.0%
	Plasterboard	0.0%	0.0%	0.0%
	Other	71.0%	9.2%	0.0%
	Subtotal	**71.0%**	**9.8%**	**0.0%**
Timber	Unpainted & untreated	10.3%	2.3%	0.0%
	Fabricated	0.0%	1.4%	0.0%
	Multimaterial/other	13.2%	1.8%	0.0%
	Subtotal	**23.5%**	**5.4%**	**0.0%**
Rubber		**0.0%**	**0.7%**	**0.0%**
Potentially hazardous		**0.0%**	**0.7%**	**65.0%**
	TOTAL	**100.0%**	**100.0%**	**100.0%**

Omarunui Landfill –Overall waste to landfill – February & April 2016		% of total	Tonnes per week	Tonnes per annum
Paper	Recyclable	7.6%	116 T/week	5,741 T/annum
	Multimaterial/other	1.9%	28 T/week	1,393 T/annum
	Subtotal	**9.5%**	**144 T/week**	**7,134 T/annum**
Plastics	Recyclable	1.2%	18 T/week	910 T/annum
	Multimaterial/other	10.8%	163 T/week	8,105 T/annum
	Subtotal	**12.0%**	**181 T/week**	**9,015 T/annum**
Organics	Kitchen waste	16.0%	242 T/week	12,049 T/annum
	Compostable greenwaste	18.0%	272 T/week	13,499 T/annum
	Non-compostable greenwaste	0.4%	7 T/week	335 T/annum
	Multimaterial/other	5.2%	78 T/week	3,884 T/annum
	Subtotal	**39.6%**	**599 T/week**	**29,767 T/annum**
Ferrous metals	Primarily ferrous	2.2%	34 T/week	1,669 T/annum
	Multimaterial/other	1.2%	18 T/week	901 T/annum
	Subtotal	**3.4%**	**52 T/week**	**2,569 T/annum**
Non-ferrous metals		**0.7%**	**10 T/week**	**497 T/annum**
Glass	Recyclable	2.2%	34 T/week	1,682 T/annum
	Window pane	0.1%	1 T/week	67 T/annum
	Multimaterial/other	0.5%	8 T/week	385 T/annum
	Subtotal	**2.8%**	**43 T/week**	**2,134 T/annum**
Textiles	Clothing/textiles	1.5%	23 T/week	1,159 T/annum
	Multimaterial/other	3.6%	54 T/week	2,695 T/annum
	Subtotal	**5.1%**	**78 T/week**	**3,854 T/annum**
Sanitary paper		**4.2%**	**63 T/week**	**3,130 T/annum**
Rubble	Cleanfill	0.5%	8 T/week	392 T/annum
	Plasterboard	0.7%	10 T/week	497 T/annum
	Other	5.1%	77 T/week	3,841 T/annum
	Subtotal	**6.3%**	**95 T/week**	**4,730 T/annum**
Timber	Unpainted & untreated	2.1%	32 T/week	1,579 T/annum
	Fabricated	1.8%	27 T/week	1,357 T/annum
	Multimaterial/other	5.7%	86 T/week	4,263 T/annum
	Subtotal	**9.6%**	**145 T/week**	**7,199 T/annum**
Rubber		**0.4%**	**6 T/week**	**305 T/annum**
Potentially hazardous		**6.5%**	**98 T/week**	**4,866 T/annum**
	TOTAL	**100.0%**	**1,513 T/week**	**75,200 T/annum**

Appendix 7 – Kerbside refuse classifications

Primary category	Secondary category	Definition
Paper	Recyclable paper	Paper bags, magazines, cardboard boxes
	Junk mail	Unsolicited direct advertising material, excluding community newspapers
	Multimaterial/ other	Non-recyclable paper packaging (e.g. food contaminated), photographic paper, playing cards, laminated paper, etc.
Plastics	#1-7 containers	Drink and janitorial bottles, ice cream containers, milk and cream bottles and other containers with a # 1-7 symbol (excluding meat trays)
	Non-recyclable containers	Expanded polystyrene meat trays, multi-material plastic containers, paint, engine oil and chemical containers
	Soft plastic bags	All soft plastic bags including bread bags, frozen food bags, toilet paper packaging, confectionery and biscuit wrap, chip bags, pasta and rice bags, courier envelopes, shopping bags, sanitary hygiene packaging
	Other plastic bags/film	All other plastic bags and film
	Multimaterial/ other	All other non-packaging materials made of plastic
Organics	Kitchen waste	All kitchen waste
	Green waste	All organic garden waste
	Multimaterial/ other	All other primarily organic items – includes cat tray litter, hair, vacuum cleaner bags
Ferrous metals	Steel cans	All steel cans, including aerosol cans
	Multimaterial/ other	All other items made primarily of ferrous metal
Non-ferrous metals	Aluminium cans	All aluminium cans and foil plates
	Multimaterial/ other	All other items made primarily of non-ferrous metal
Glass	Glass bottles/jars	All bottles and jars, emptied with the lids and contents removed
	Multimaterial/ other	All other items made primarily of glass, includes light bulbs, drinking glasses, and window glass
Textiles	Clothing & textile	All items primarily made of a fabric, such as clothes, curtains
	Multimaterial/other	Includes shoes, backpacks, handbags, rugs
Sanitary paper		Includes disposable nappies, paper towels, tissues
Rubble, concrete		All concrete, rubble and soil
Timber		All items made primarily of timber
Rubber		All items made primarily of rubber (e.g. kitchen gloves)
Potentially hazardous	Household	Batteries, aerosol cans, medicines and cosmetics, cleaning agents
	Other	Potentially hazardous items not associated with domestic activity, such as used oil and garden chemicals.

Appendix 8 – Visual survey waste classifications

Primary category	Secondary category	Description
Paper	**Recyclable**	Newspapers, cardboard, magazines, office paper, etc.
	Multimaterial/other	Multimaterials, liquid containers such as Tetra Pak and gable tops, contaminated paper, label waste
Plastic	**Recyclable**	Containers with a # 1-7 symbol
	Multimaterial/other	Other types of plastic and multimaterials
Organics	**Kitchen/food**	Food and food preparation waste
	Compostable greenwaste	Vegetation, branches, lawn clippings
	Non-compostable greenwaste	Bamboo, flax, toi toi, cabbage tree leaves
	Multimaterial/other	Other organic matter such as meat processing waste, dead animals
Ferrous metal	**Primarily ferrous**	Items made primarily of steel
	Multimaterial/other	Ferrous items containing a sizable proportion of other materials
Non-ferrous metal		Items made primarily of non-ferrous metal
Glass	**Recyclable**	Bottles and jars
	Window pane	Window glass and joinery containing glass
	Multimaterial/other	Includes CRT TVs and computer monitors
Textiles	**Clothing/textile**	Items made primarily of cloth or textiles
	Multimaterial/other	Items containing some textile and other materials
Sanitary paper		Sanitary paper, such as nappies, paper towels
Rubble	**Cleanfill**	Inert materials including concrete, bricks, fibrolite
	Plasterboard	Offcuts of new plasterboard and demolition material
	Other	Other materials such as soil, fibreglass, ceramics, rubble, rocks, plasterboard
Timber	**Unpainted & untreated**	Timber that is neither painted nor treated
	Fabricated	Fabricated items, such as furniture
	Multimaterial/other	Other types of wood, and wooden debris
Rubber		All items made primarily of rubber such as tyres, latex foam mattresses
Potentially hazardous		Material with potentially toxic or ecotoxic properties or requiring special disposal techniques

Appendix 9 – Types of waste disposal vehicles

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 refuse.

GANTRY TRUCKS

"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 refuse removal. Some commercial customers, such as hotels and supermarkets, use portable, stationary refuse 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 refuse 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.

KERBSIDE COLLECTION COMPACTORS

Side-loading and rear-loading compactors are commonly used for the kerbside collection of residential and small business refuse. They can be designed to service bagged refuse collections, wheelie bin refuse 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.

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

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.