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2019

SSROC Kerbside Waste Audit

Regional Report

including all participating councils

(Individual councils not identified by name)

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Document status

Rev. no.	Document purpose	Author	Peer Review	Date
1	Draft	E. Cooney C. Griffith	M.Cumming	October 2019
2	Final	C. Griffith M. Cumming	A. Prince	December 2019

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EXECUTIVE SUMMARY

A.Prince Consulting (APC) undertook a regional kerbside domestic waste audit of 10 councils with a total of 13 separate audits[1] for members of the Southern Sydney Regional Organisation of Councils (SSROC) between February and July 2019.

The 2019 audit was based on the *Guidelines for Conducting Kerbside Residual Waste, Recycling and Garden Organics Audits in NSW Local Government Areas 2008* and *Addendum 2010*. Samples were selected from both single dwellings (SDs) and multi-unit dwellings (MUDs) in proportion to housing stock to provide a representative sample of each dwelling type in each council.

Councils entire domestic waste stream was audited including general waste, recycling, organics and food and garden organics (FOGO) streams. Bin configurations of two, three and four streams were audited.

This was the seventh regional audit undertaken over a time span of 20 years, providing the most comprehensive longitudinal data set in Australia.

In total 4,978 bins were audited, representing 2,930 households and amounting to 56,609 kg of material, over 56 tonnes. This comprised 25,281 kg of general waste, 18,168 kg of commingled recycling and 13,160 kg of garden organics which were collected and delivered for sorting. Over 159 individual loads were collected in an aggregated manner and sorted into 73 categories.

A separate count of beverage containers eligible under the NSW Container Deposit Scheme (CDS) and wine/spirit bottles, was undertaken. In total 19,053 eligible containers and 4,565 wine/spirit bottles were counted. Individual hazardous items were also counted with 2017 individual hazardous items presented.

Each council has been provided a report detailing their individual results. This report summarises the findings for the SSROC region, outlining individual council results against the regional average. Findings from previous regional audits have been used as a basis for longitudinal comparison.

The key findings of the 2019 audit, as well as trends, are summarised below.

[1] Two of the participating councils comprise five former councils which have now merged. As separate audits were required for the former council areas, more audits were undertaken than the number of participating councils.

About the audit

- An audit of kerbside domestic waste in 10 SSROC councils was undertaken from February to July 2019.
- General waste, commingled recycling and organics bins, representing 2,930 households, were collected and sorted into 73 waste categories.
- The audit included single dwellings (SDs) and multi-unit dwellings (MUDs) in proportion to the housing stock of the council area as defined by the Australian Bureau of Statistics.
- This is 7th regional waste audit conducted by APC for the Southern Sydney Regional Organisation of Councils (SSROC), providing the most comprehensive longitudinal waste data set in Australia.

Bin presentation rates

- 82% of SD and 100% of MUD households present a general waste bin for collection.
- 81% of SD and 100% of MUD households present a commingled recycling bin for collection.
- 27% of SD and 47% of MUD households present a garden organics bin for collection.
- In councils with separate paper/cardboard and container recycling bins, presentation rates are 78% for SD containers and 60% for SD paper/cardboard. MUDs present 100% for both bin types.

Total waste and recycling

- The average SSROC household generates a total of 15.1 kg of general waste, commingled recycling and garden organics per week.
- The average single dwelling produces more than the average multi-unit dwelling: 19.2 kg per week for SDs and 9.5 kg per week for MUDs.

General waste generation

- The average SSROC household produces 8.8 kg of general waste per household per week.
- Generation ranges from 6.8 kg to 11.9 kg per household per week.
- SDs produce more per week (10.6 kg) than MUDs (6.3 kg).
- The largest difference in generation between the housing types is loose food waste. SDs generate 3.7 kg per household per week compared to 2.0 kg at MUDs.

General waste composition

- The largest individual category is loose food waste at 34%, followed by non-recyclable paper (11%), containerised food and liquid (7%), soft plastics (7%), nappies (6%) and textiles (5%).
- Over ten per cent (10.5%) of general waste is material that should be in the commingled recycling bins (or paper/containers bins at councils that have separate bins for these). This material comprises recyclable containers (6.9%) and recyclable paper/cardboard (3.6%).
- 4.3% of general waste is vegetation that should be in the garden organics bin.
- 1.7% of general waste is items that should be in the e-waste or hazardous waste services provided. By weight, hese items are mainly electrical items, and paint.
- Over half (52.3%) of general waste is material that could go into a combined food and garden organics (FOGO) bin. These materials are predominantly food and non-recyclable (soiled) paper.
- 77% of general waste is presented in bags.

General waste bin usage

- SDs use an average of 64% of their general waste bin. MUDs average 73%.
- At SDs, 25% of general waste bins are full or overflowing.
- At MUDs, 28% of general waste bins are full or overflowing.

Commingled recycling generation

- The average SSROC household produces 3.6 kg of commingled recycling per week.
- SDs produce 4.6 kg per week, MUDs produce 2.5 kg per week.
- The generation ranges from 2.0 to 5.1 kg per household per week.

Commingled recycling composition

- The main components are recyclable paper (41.6%) and recyclable containers (37.8%).
- Contaminants in the commingled recycling make up 20.5% of which the largest contaminant is bagged material (4.2%). All bagged material is considered as contamination as it is not opened or separated at the MRF, regardless of whether the material in the bags is recyclable or not.
- The next largest contaminants are non-recyclable (soiled) paper (3.8%), non-recyclable hard plastics (1.6%), containerised food and liquid (1.6%), textile/carpet (1.2%) and composite materials that are mostly paper (1.1% - these are usually brochures wrapped in plastic).
- Contamination ranged from 9.3% to 32.7%.
- MUDs have a higher proportion of contamination in the recycling (25.9%) compared to SDs (17.3%).
- In terms of the amount of contamination generated per household per week, MUDs generate less loose contamination per household per week than SDs and only slightly more bagged material.
- Bagged material, non-recyclable (soiled) paper and containerised food and liquid are in the top five contaminants at both SDs and MUDs, with the proportion of bagged material significantly higher at MUDs than SDs.

Commingled recycling bin usage

- SDs use an average of 71% of their commingled recycling bin and MUDs use 77%.
- At SDs, 26% of commingled bins are full or overflowing.
- At MUDs, 29% of commingled bins are full or overflowing.

Garden organics generation

- The average SSROC household produces 2.6 kilograms per week of garden organics.
- The majority of this is from SDs at 4.1 kg, with MUDs generating 0.7 kg per household per week.
- Generation ranges from zero to 5.6 kg per household per week.

Garden organics composition

- The majority of the organics stream is recyclable vegetation (97.2%).
- Contamination in the garden organics stream is reasonably low, at 2.8%.
- Contamination ranges from 0.7% to 5.9%. Bagged material was only found at one Council audited.
- The main contaminant is food, followed by wood/timber and ceramics/dirt/dust/rock/inert, building materials and plastic bags.
- The contamination in the garden organics stream was 3.2% at SDs and 2.4% at MUDs.

Garden organics bin usage

- Both SDs and MUDs use an average of 68% of their organics bin capacity.
- 24% of SD organics bins are full or overflowing, and 20% of MUD organics bins are full or overflowing.

Hazardous materials, including batteries

- On average, 0.6 hazardous items are produced per household per week.
- The majority (88%) of hazardous items were found in the general waste bins, with 11% in the recycling and 1% in garden organics bins.
- The most numerous hazardous items found were non-rechargeable batteries and electrical items/peripherals. A smaller amount of clinical (medical) waste, toner cartridges, household chemicals, fluorescent tubes, mobile phones, paint and other batteries were also found.
- The results range from 0.3 to 0.8 items items per household per week.

Recovery of recyclable materials

- The overall recovery rate is 76%.
- SDs achieve 80% and MUDs 67%.
- Paper and glass are well recovered, particularly at SDs. Vegetation is well recovered at SDs.
- Liquid paperboard, plastic, steel and aluminium recovery rates are under 55% at both housing types.

Diversion from landfill

- Current diversion from landfill from SSROC's municipal waste and recycling is 37%. This comprises 20% diversion achieved from the commingled recycling and 17% from garden organics recycling.
- SDs achieve 37% diversion and MUDs 28%.
- If all commingled recycling material was put into the recycling bins, an extra 6% diversion would be achieved, lifting overall diversion to 43%.
- Maximum recovery of garden organics and full utilisation of the hazardous and e-waste disposal services would contribute a further 3% diversion.
- Replacement of the garden organics bin with a FOGO bin for loose food waste and other organics (contaminated paper and dog poo/cat litter could potentially achieve an additional 29% diversion (20% loose food and 9% other organic), raising the maximum diversion potential to 76%.

Calorific value of general waste

- The general waste generated by the average SSROC household has a CV of between 12 (wet) and 22 (dry) megajoules per kilogram. This equates to a CV of between 105 and 192 megajoules per household per week.
- The calorific value of the total general waste generated by all households in SSROC each year is estimated at a maximum of 5,485 terajoules per year (this is the upper, or dry, value). Theoretically, this is enough energy to supply electricity to approximately 88,900 homes for one year, which is approximately 16% of the households in SSROC.

Beverage containers

- The average SSROC household puts 5.6 CDS-eligible containers into their kerbside bins each week.
- The average SSROC household puts 3.4 CDS-eligible containers per week into the recycling bin and 2.2 CDS-eligible containers per week into the general waste bin.
- Single dwellings average 7.0 containers per week (4.7 in the recycling and 2.3 in the general waste).
- Multi-unit dwellings average 3.9 containers per week (2.0 in the recycling and 1.9 in the general waste).
- Single dwellings generate more eligible containers per week than multi-unit dwellings, in all but one council area.
- Three councils have more CDS-eligible containers in the general waste than in the recycling.
- The average SSROC household puts 1.1 wine/spirit bottles per week into the domestic bins. Almost all of these are in the recycling bins. SDs average 1.4 bottles per week and MUDs 0.7 bottles per week.

Trends

- Overall domestic waste generation is lower than previous years. The 2019 generation of general waste and recycling is lower than previous years at both SDs and MUDs.
- For general waste, the time series shows a reduction in the amount of food waste in the general waste. The amount of recyclable paper and containers in the general waste in 2019 is also lower than previous years. The amount of non-recyclable paper and containerised food and liquid have increased over time. These trends are consistent at both SDs and MUDs.
- The overall generation of commingled recycling in 2019 is lower than previous years. The generation of recyclable paper has reduced over time at both SDs and MUDs. This could be due to residents moving to on-line news, bills and magazines. The amount of recyclable containers in the recycling is lower in 2019 than previous years – this could be due to the introduction of the Container Deposit Scheme.
- As the amount of CDS eligible containers and newspapers has reduced in the commingled recycling, the contamination as a proportion has increased. Contamination, as a proportion of recycling, has risen over time. Overall, the generation of both loose contamination and bagged material has increased over time. At MUDs, both loose and bagged material have increased over time. At SUDs, the 2019 contamination generated per household per week was slightly lower than in 2015 but higher than 2011.
- Electrical items and batteries have consistently been the most common hazardous items found in the domestic waste streams, with e-waste representing a larger proportion, and batteries a lower proportion, in 2015 and 2019 compared with 2011.
- The overall recovery of recyclable materials is slightly lower than 2015, and the same as 2011. Glass, paper and cardboard continue to be well recovered. Garden organics recovery has dropped slightly. The recovery of other materials remains below 70%.
- Landfill diversion from SSROC municipal waste is shown to be declining. This is most likely due to a reduction in the amount of recoverable material in the domestic waste stream, most notably paper and more recently used beverage containers. The potential landfill diversion has also decreased as the amount of paper, containers and food waste available for recovery has declined over time.
- At SDs, use of general waste and recycling bins has declined and garden organics are slightly higher, though garden organics generation is heavily influenced by seasonal variation.
- At MUDs, bin usage remains high for recycling and garden organics and has decreased for general waste compared with 2015.

Discussion of key findings

- The general waste stream still contains over 10% of materials that should be in the commingled recycling (predominantly cardboard and glass drink containers), and 4% garden organics (slightly lower if Rockdale is excluded, as they don't have an organics service). An education campaign, for both MUDs and SDs, could help to divert these materials from the general waste into the recycling and organics streams, and result in a lift in recovery rates.
- 1.7% of general waste is items that should be in the e-waste or hazardous waste services provided. By weight these items are mainly electrical items, and paint; by number they are predominantly batteries. Further education on the options for disposing of household hazardous waste may help in removing these from the general waste stream.
- At 34% of general waste, food waste is SSROC's single largest opportunity for increasing landfill diversion. For the eight councils currently sending general waste to mechanical-biological processing facilities, the recovery of organics will be dependent on the future of these facilities, which are currently awaiting regulatory certainty regarding allowable uses of the organic product produced from general waste. Other options for organics diversion from landfill are through a combined food and garden organics (FOGO) service or further encouraging home composting and/or worm farming. Over half (52.3%) of general waste is suitable for a FOGO bin, including food, non-recyclable paper and dog poo/kitty litter.
- Contamination in the commingled recycling stream has continued to increase, particularly at multi-unit dwellings, and requires continued education. Focus could be placed on the main contaminants: bagged material, non-recyclable (soiled) paper, non-recyclable hard plastics and containerised food and liquid. Different contaminants could be targeted at single and multi-unit dwellings based on the 'top five' contaminants listed in this report.
- Understanding the changing composition of recycling, including the removal of beverage containers from kerbside recycling into the Container Deposit Scheme, will help councils in future re-negotiations or new tenders for recyclables collection and processing.

1. INTRODUCTION

1.1 The SSROC

The Southern Sydney Regional Organisation of Councils (SSROC) represents 11 councils in the Southern Sydney metropolitan area, with approximately 1.7 million residents. The region is characterised by high population density with cultural and socio-economic diversity. The Southern Sydney Regional Organisation of Councils (SSROC) awarded A.Prince Consulting Pty Ltd (APC) a contract to conduct a regional domestic waste audit with 10 of its member councils in 2018.

The waste audit conducted in 2019 is the most recent in a series of regional audits conducted by A.Prince Consulting (APC) for SSROC councils. Previous audits were undertaken in 1999, 2001, 2005, 2008, 2011 and 2015. Ten councils have participated in the 2019 regional waste audit as detailed below with a total of 13 separate audits conducted including two councils auditing five former council areas.

1.2 The project

SSROC awarded A.Prince Consulting Pty Ltd (APC) a contract to conduct domestic waste audits of 11 of its member councils commencing 17 February 2019. The agreed methodology for the domestic waste audits is the *Guidelines for Conducting Kerbside Residual Waste, Recycling and Garden Organics Audits in NSW Local Government Areas 2008* including the audit *Guidelines Addendum 2010.*

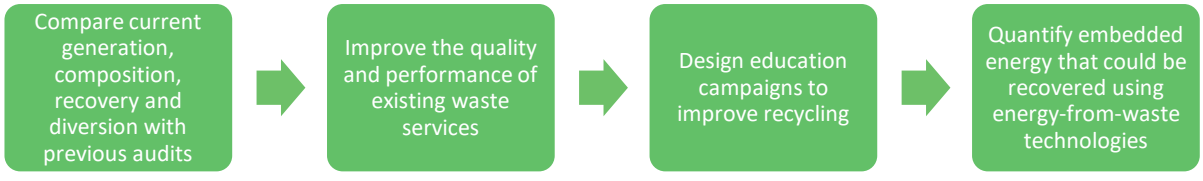
The project also requires reporting on calorific values of eligible material as specified under the Commonwealth's Office of Renewable Energy (ORER) *Guideline for Determining the Renewable Components in Waste for Electricity Generation* (2001).

Additional auditing was undertaken for hazardous items and beverage containers.

1.3 Project objectives

The audit aims to establish the following information:

SSROC can use the audit results to:



1.4 Current collection systems

Table 1 (single dwellings) and Table 2 (multi-unit dwellings) show the details of the general waste, recycling, and organics collection systems in place at each council.

Table 1 SSROC waste collection systems: single dwellings

Council	General waste		Recyclables		Garden organics	
	Bin size	Frequency	Bin size	Frequency	Bin size	Frequency
Council 1	120 L / 240 L	Weekly	240 L	Fortnightly	240 L	Fortnightly
Council 2	240 L	Weekly	240 L	Fortnightly	240 L	Fortnightly
Council 3	120 L	Weekly	240 L	Fortnightly	240 L	Fortnightly
Council 4	120 L	Weekly	240 L	Fortnightly	240 L	Fortnightly
Council 5	140 L	Weekly	240 L	Fortnightly	240 L	Fortnightly
Council 6	50 L / 70 L / 80 L / 120 L / 240 L	Weekly / Twice weekly / Daily	50 L / 70 L / 80 L / 120 L / 240 L	Weekly	240 L	Opt-in fortnightly
Council 7	120 L / 240 L	Weekly	240 L	Fortnightly	240 L	Fortnightly
Council 8	240 L	Weekly	55 L / 80 L / 120 L paper / containers	Alternate containers / paper fortnightly	55 L / 120 L / 240 L	Fortnightly
Council 9	240 L	Weekly	240 L	Fortnightly	140 L / 240 L	Fortnightly
Council 10	140 L	Weekly	240 L	Fortnightly	240 L	Fortnightly
Council 11	240 L	Weekly	240 L	Fortnightly	No service	–
Council 12	120 L	Weekly	240 L	Fortnightly	240 L	Fortnightly
Council 13	55 L / 120 L	Weekly	120 L / 240 L	Weekly	60 L / 120 L / 240 L	Weekly combined food and garden

Table 2 SSROC waste collection systems: multi-unit dwellings

Council	General waste		Recyclables		Garden organics	
	Bin size	Frequency	Bin size	Frequency	Bin size	Frequency
Council 1	240 L / 2 units	Weekly	240 L / 2 units	Fortnightly	240 L / 2 units	Fortnightly opt in
Council 2	240 L/ 1 or 2 units	Weekly	240 L / 1 or 2 units	Weekly	Opt-in 240 L	Fortnightly
Council 3	240 L/ 2 units	Weekly	240 L / 2 units	Fortnightly	240 L / 2 units	Fortnightly
Council 4	240 L, 660 L, 1100L	Weekly	240 L, 660 L, 1100 L	Weekly	240 L	Weekly
Council 5	240 L, 660 L, 1000 L	Weekly	240 L, 660 L, 1000 L	Weekly	240 L per 5 units	Fortnightly
Council 6	80 L, 120 L, 240 L, 660 L, 1100 L, 2000 L	Weekly / Twice weekly / Daily	80 L, 120 L, 240 L, 660 L, 1100 L	Weekly	80 L, 120 L, 240 L, 660 L, 1100 L	Fortnightly
Council 7	240 L / 4 units 120 L / 240 L 2 units	Weekly	240 L / 3 units	Weekly	240 L	Fortnightly
Council 8	240 L / 2-4 units	Weekly	240 L / 2-4 units	Fortnightly	240 L	Fortnightly
Council 9	240 L / 2 units	Weekly	240 L per 2 units	Fortnightly	140 L or 240 L per 2 units	Fortnightly
Council 10	240 L / 2 units	Weekly	240 L / 2 units	Fortnightly	240 L	Fortnightly
Council 11	240L / 4 units	Twice weekly	240 L / 4 units	Weekly	No service	–
Council 12	240L / 2 units	Weekly	240 L / 2 units	Fortnightly	240 L / 2 units	Weekly
Council 13	240 L shared (120 L if required)	Weekly	120 L / 240 L	Weekly	60 L / 120 L / 240 L	Weekly includes food

1.5 Previous waste audits

APC has conducted multiple previous kerbside waste audits for SSROC and member councils. The number of households sampled in each of the audits is shown below.

Table 3 Sample numbers in previous audits

Council	1999	2001	2005	2008	2011	2015	2019	Total
Former Ashfield	107			260	220	235	**231**	**1,053**
Bankstown (CB)*				537	220	227	**224**	**2,188**
Canterbury (CB)*	104	158	152	260	220	238		
Former Botany Bay	100	150		260		231	**228**	**969**
Burwood				260	220	236	**227**	**943**
Canada Bay							**221**	**221**
City of Sydney	100		150	260		225	**227**	**812**
Hurstville (GR)**	108	147	154	260	220	226	**220**	**2,187**
Kogarah (GR)**	152	148	156	260	220	226		
Former Leichhardt	122			260	220	225	**241**	**1,068**
Former Marrickville	120	168	152	260	220	233	**221**	**1,222**
Randwick	104	160	162	260	220	225	**224**	**1,193**
Former Rockdale	116	153	154	260	220	224	**223**	**1,196**
Sutherland	91	174	150	260	220	223	**221**	**1,189**
Waverley	103	153	150	260	220	223		**959**
Woollahra	104	158	152	260	220	236	**222**	**1,200**
Region	**1431**	**1569**	**1532**	**4177**	**3300**	**3433**	**2930**	**16,840**

*Councils 5a and 5b are former councils that have merged to form Council 5
** Councils 7a and 7b are former councils that have merged to form Council 7
***Audited in 2015 but not included in 2019

The table above is provided for historical information. Historical trend analysis used later in this report is drawn from previous regional datasets.

1.6 Reporting

This report shows the method used and results for all councils that participated in the 2019 audit. Each council has also received an individual report detailing their individual results, comparisons with previous audits and specific recommendations. The results from 2019 audit have been compared with previous audit data for the region as a whole. Waste terms used in the audit report have been defined at Appendix A.

2. METHOD

The methodology for the kerbside waste audits, including the container deposit scheme (CDS) sub-audit, is based on the *Guidelines for Conducting Kerbside Residual Waste, Recycling and Garden Organics Audits in NSW Local Government Areas 2008,* including the audit Guideline *Addendum 2010.* The methodology for the sample selection and measurement of calorific values is based on the Commonwealth's Office of Renewable Energy (ORER) *Guideline for Determining the Renewable Components in Waste for Electricity Generation* (2001). A sub audit of eligible CDS containers was undertaken based on the NSW EPA and Exchange for Change sampling protocol by count and weight.

2.1 Project inception

APC representatives met with the SSROC and council waste managers to confirm and clarify the operational and logistical aspects of the audit including scheduling, sample selection, sample collection; and CDS data collection. It was agreed that an aggregated collection methodology would be followed, and all councils would have new street and MUD selections. Acceptable materials would be based on what can be recovered at Material Recovery Facilities (MRFs) and be common to all councils. Following confirmation of the audit logistics, APC's project manager then liaised directly with each council to confirm the specific operational requirements for the audit.

2.2 Sample size

The *NSW Guidelines* and *Addendum 2010* require that 'matched pair' data from 220 households (i.e. general waste and recycling bins from the same household) be used to measure household behaviour, including waste generation, composition, recovery and diversion. In the 2019 audit general waste and recycling bins constituted the matched pair in all councils except Council 13 where the matched pair was general waste and food and organics (FOGO).

In those councils where co-mingled recycling is collected on an alternate fortnightly cycle, the audit was conducted in the recycling collection zone that coincided with the first audit week along with the weekly general waste. In the one council where paper and container recycling is collected on alternate fortnights, the audit was conducted in the container collection zone along with the matched general waste. The paper stream was then collected in the second audit week to capture the entire recycling stream. In the one council where general waste and FOGO were the matched pair the co-mingled recycling stream was collected the following week. In accordance with the *NSW Guidelines,* garden/food organics bins were only collected from those households and MUDs presenting a matched general waste and recycling bin collected in the first audit week. This provided whole-system data for those households included in the daily sample collection.

2.3 Sample selection

When selecting streets for sampling, the Guidelines specify that:
'at the street level within each collection zone, the recommended number of households should be selected randomly. Any appropriate random sampling regime will be acceptable for this purpose.[2]'

[2] Guidelines for Conducting Household Kerbside Residual Waste, Recycling and Garden Organics Audits in NSW Local Government Areas 2008, 4.3, p. 9

For multi-unit dwellings (MUDs) the *Guidelines* recommend that:
'for those areas where a high proportion (greater than 10%) of MUDs exist, that stratified sampling is used as opposed to simple random sampling alone. This will involve identifying the ratio of SUDs to MUDs and altering sample sizes accordingly to accommodate these proportions'.[3] The *Addendum 2010* also recommends that:

- At least 10 individual MUD properties should make up the entire sample;
- High-rise (more than three storeys) should be avoided.

The reason for avoiding high-rise is to prevent any one or two large MUD properties skewing the overall MUD results. It also allows for a larger number of MUD samples to be taken as part of the sampling regime. A separate high-rise MUD audit was undertaken for 9 council's that participated in this audit.

The streets and MUDs for the 2019 audit had been randomly selected previously from a database provided by SSROC. As the 2019 audit is based on an aggregated collection, and for the purpose of reporting results for both MUDs and single dwellings (SDs), the collection was split between MUDs and SDs by collection day. Over the SSROC region, the sample was made up of 54% SD households and 46% MUD households. In total, 1,587 SDs and 1,343 MUD households were sampled, as shown in Table 4.

Table 4 Proportion of SDs and MUDs sampled

Waste stream	Dwelling Type	Council													Total
		1	2	3	4	5	6	7	8	9	10	11	12	13	
General waste	SD	129	103	125	107	164	50	145	146	129	95	125	172	97	1587
	MUD	102	125	102	114	60	177	75	95	92	129	98	49	125	1343
	Overall	231	228	227	221	224	227	220	241	221	224	223	221	222	2930
Commingled recycling	SD	129	103	125	107	164	50	145		129	95	125	172	97	1441
	MUD	102	125	102	114	60	177	75		92	129	98	49	125	1248
	Overall	231	228	227	221	224	227	220		221	224	223	221	222	2689
Containers	SD								146						
	MUD								95						
	Overall								241						
Paper and cardboard	SD								92						
	MUD								95						
	Overall								187						
Garden organics	SD	129	103	125	107	164	50	145	0	129	95		172		1219
	MUD	102	125	102	114	60	177	75	0	92	129		49		1025
	Overall	231	228	227	221	224	227	220	0	221	224		221		2244
Food and garden organics (FOGO)	SD													97	
	MUD													125	
	Overall													222	

[3] Addendum 2010 to Guidelines for Conducting Household Kerbside Residual Waste, Recycling and Garden Organics Audits in NSW Local Government Areas section 8, p. 5

2.4 Sample collection

The *Addendum 2010* allows for aggregated sampling[4] to provide statistical analysis of variability where:

- At least one in four consecutive audits uses household-by-household auditing;
- Aggregated sampling is conducted using at least five and preferably 10 separate sub-samples (for example, if 220 households are to be audited, sub-samples of 22 or 44 households are taken separately).

The Guidelines also specify that '*every second to fifth bin is selected from the start address*'. This allows for non-presentation of bins by some households and the next household being used as the replacement sample. It also reduces results being affected by households that put material in their neighbours' bins. For this audit, to comply with both the NSW Guidelines and with approval from the Commonwealth's Office of Renewable Energy (ORER) every second household was selected.

Where every second household did not present a bin, the following procedure was followed, as specified in the Guidelines:

'(i) Record non-presented MGBs as "non presenters" on the recording sheets
(ii) Where a bin is not presented at a household which has been included in the sample, data collectors should move to the neighbouring household ...'

APC hired a rear loader collection vehicle from Garwood International to collect all samples. Because the vehicle was not a familiar collection truck, it was agreed to provide additional signage for the community's information.

Image 1 - Garwood truck with signage

[4] Addendum 2010 to Guidelines for Conducting Household Kerbside Residual Waste, Recycling and Garden Organics Audits in NSW Local Government Areas section 2 p. 2

APC's collection crew consisted of a driver and an APC supervisor. The APC supervisor was responsible for recording all the sample collection data and assisted in collecting and emptying the bins and returning them to the nature strip.

APC's crew collected bins only from those SDs and MUDs presenting a 'matched pair' of general waste and a commingled recycling bin. In Council 8 the matched pair was general waste and containers, and in Council 13 the matched pair was general waste and FOGO. APC commenced collection of general waste and the commingled recycling (or containers/FOGO) stream on the night prior to Council's scheduled day of service. APC returned to those same streets and those same households sampled in week 1 during the following week to collect the garden organics bin if presented. If the bin was not presented, no substitute bin was collected.

A data-collection sheet and the daily sample number required for each collection day was used to record each individual sample, including the date of collection, dwelling type, waste stream, bin size, capacity used (bin fullness percentage), address presentation and confirmation of number of MUD households at each MUD property and the daily sample number required for each collection day.

In order to maintain positive public relations with the community, Council provided a letter on Council letterhead explaining the audit rationale. The letter included a contact name and number for specific enquiries. This letter was provided to any resident that enquired about the audit process during the sample collections.

2.5 Sorting

Sorting was conducted at APC's dedicated sorting facility at Chullora on the former SUEZ waste facility site.

2.5.1 Kerbside material

Following the sample collection, the collection vehicle was weighed at a public weighbridge before and after discharge of the load and the weights were recorded for data-checking and data-quality purposes.

Image 2 - APC sorting facility at Chullora

Each collected stream, i.e. general waste, recycling and garden organics, was sorted using a list of 73 sorting categories and definitions for each stream (as specified and agreed between SSROC and APC) are provided at Appendix B. To match the ORER categories, food is separated into 'kitchen – vegetable' and 'kitchen – meat'. Images of some key categories are provided in Appendix C.

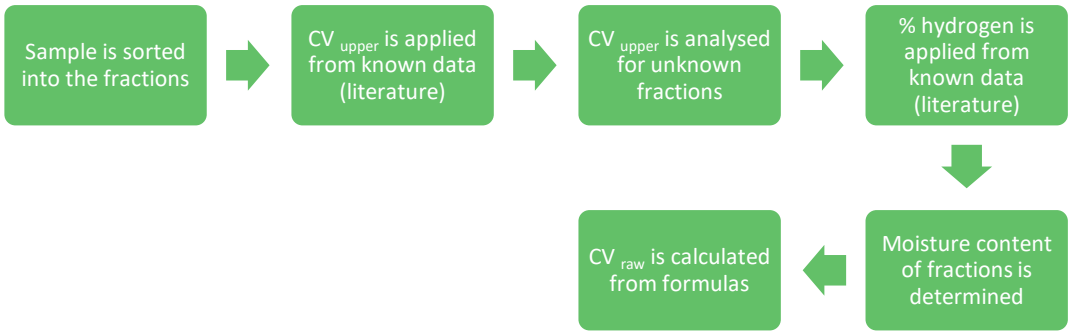
The methodology requires a preliminary sort of 'bagged' material from loose waste. The purpose of this step is to determine the proportion of material contained in bags and therefore not available for recovery at a materials recovery facility (MRF) or advanced waste treatment (AWT) facility without added equipment (for example, bag breakers or shredders to access the waste or recyclables). For each of the recycling and garden organics streams, any material in household shopping or garbage bags was weighed separately. The bagged waste was then placed on the sort table, opened, and the contents added in with the remainder of the material to be sorted by category. For the general waste stream, the unbagged material was weighed separately and deducted from the truck weight to provide the weight of the bagged material.

Separated materials were placed in appropriate containers labelled by category, weighed on a set of electronic scales and the weight recorded. All electronic scales were calibrated just prior to commencing the SSROC audit.

Sorted material was placed into a general waste, recycling and organics skip for disposal or recycling by SUEZ.

2.5.2 **Calorific value assessment**

The ORER Guideline states that in order to determine the calorific value of a waste stream, the following steps should be carried out:

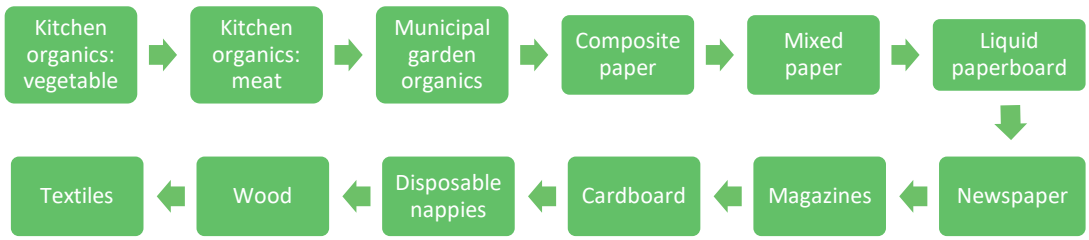


The Guideline also provides a methodology for the collection of samples, which includes collecting from every fifth to twentieth bin. Following discussion with the ORER during the previous SSROC audit in 2015, APC received written confirmation from ORER on varying the collection methodology to sample every second SD household as per the *NSW Guidelines Addendum 2010*. All bins at each MUD property were collected.

Following the sorting of the general waste samples into the required categories a sub-sample of representative sample material was then selected from each of the ORER categories, placed in a foil tray and weighed. To record the moisture content of each sample, the net weight of the material was

recorded on a data-recording sheet. The sample was then placed in an oven (specifically purchased for determining moisture content) for a period of 24 hours set to 105 degrees Celsius, as per the ORER Guideline. At the expiration of the 24-hour period, the sample was removed, and the dry weight recorded on the data- recording sheet. The moisture content of each sample was then calculated.

APC sampled the moisture content of 12 material categories per day over four sample collection days representing Monday through Thursday. Note that in the previous (2015) audit, only 11 categories were tested for moisture content. Textiles were added to the moisture-testing regimen for this (2019) audit. The ORER default moisture content values were used for the remaining categories, as these represent smaller proportions of the waste stream and are less subject to variations in moisture content. The 12 material categories are shown below.



In 2015, APC calculated the calorific value of the renewable component of the general waste stream (i.e. calorific value of the materials within the waste that are considered renewable), whereas in this audit, APC has calculated the calorific value of the whole general waste stream. The calorific calculations are provided in Appendix G.

2.5.3 **Beverage containers**

The beverage container audit was undertaken as a sub-audit of each council's kerbside waste audit of both the general waste and recycling stream.

The audit aimed to obtain data on the number of Container Deposit Scheme (CDS) eligible beverage containers present in the kerbside bins by counting the:

After the initial sort of the kerbside waste, the beverage containers eligible for a refund under the CDS were sorted by material type and then counted and weighed. In addition, wine/spirit bottles were counted and weighed to accumulate baseline data should the CDS be extended to include these products in the future. A summary of what categories are deemed eligible is provided at Appendix E.

Image 3 - Beverage containers sorted by material type

2.6 Quality assurance and data verification

A number of techniques and procedures were used to check and verify data. All collection vehicles are checked prior to leaving the APC depot to ensure that they are clean of any residual waste from previous collections. All collection vehicles are recorded on a weighbridge before and after discharging the sample so that the net weight of the sample is recorded.

At the data-entry stage, each coded sheet on which sorting data is recorded is checked against the data collection sheets for that sample. The net weight of the sample, as recorded at the weighbridge, is matched against the total weight of the sorted material for each sample load. APC's analysis tool flags any difference between the sample load weight and the total weight of the sorted material categories, and any significant differences are investigated. An independent staff member not involved in the data-entry process randomly checks all data for accuracy.

APC has invested in a computer model to assist with the analysis of audits. This allows systematic error checking at the data-entry stage and ensures consistency in the layout and the design of charts and tables.

A summary of the classification and consolidation of all waste categories of materials deemed contamination is provided in Appendix F. It was agreed at the project inception meeting that all SSROC councils would be analysed in the same way based on the material recovery at the MRF to enable direct comparison and aggregation for regional reporting.

3. STUDY LIMITATIONS

The data for this study was collected and analysed using the best and most accurate methods available within the constraints of available time and budget. This study is a survey, which means that a relatively small amount of data has been collected and then treated as representative of the total. As in any survey, there are limitations to the accuracy of the data, as described below.

Time frame

- This audit was carried out over 6 months, taking samples randomly distributed over the recycling zone coinciding with the audit week. The data was then used as being representative of the whole council.
- Seasonal trends (e.g. warmer weather leading to increased consumption of beverages) and weather events (e.g. high rainfall leading to grass growth) may change waste generation over time.
- The results of this audit should be treated with caution when comparing with reports based on data taken at different times of year.

Representative sample

- The sample for this audit is necessarily small due to the high per-capita cost and resource-intensive nature of waste auditing.
- There is always a small probability of inadvertently collecting waste from atypical households, resulting in non-representative data. APC audits are carried out using strict random sampling, stratified by geographic area, to minimise the chance of this situation occurring.
- Slightly different sampling methods are used for SDs than for MUDs. In accordance with the *Guidelines*, SDs sampling requires the matched pair approach which distorts waste generation data in favour of households presenting both recycling and garbage bins. As MUD households are sampled by block, waste generation is calculated as an averge per number of households in the block, regardless of occupancy and use of the bins provided. MUD generation therefore tends to be calculated as being lower than SD generation and the two average estimates are not strictly comparable.

Sample size limitations

- All surveys carry an element of sampling error, which is the mathematical error associated with using a sample to represent a total population.
- Sampling error can be reduced by taking larger samples. The sampling error involved in waste audits is usually small and can be tabulated by producing estimates augmented by upper and lower confidence intervals.

Weight-based analysis

- The collection of data for this audit was recorded by weight.
- This data may cause some materials to appear to be present in quite small proportions due to their comparatively low densities (e.g. plastic beverage containers). They can, however, consume large amounts of volume.
- Weight-based analysis has been used in this audit because it is a standard procedure and is the most accurate way to collect data on a number of different types of materials.

4. RESULTS

All data in this section is weight-based unless otherwise stated. Some percentages have been rounded to the nearest whole number and therefore some figures and descriptions may not add up to 100%.

The main findings and analysis have been summarised in the section 'Key Findings'. The raw data used in composition charts are available at Appendix D.

The 73 categories to which materials were sorted (74 including bagged material as a separate category) have been consolidated in many of the charts and tables in this section. Refer to Appendix F for full details on how each material has been consolidated for reporting.

It should be noted that sample numbers are based on households included in the audit and are not representative of the actual bins collected. This is because some single-dwelling (SD) households may present more than one bin per stream. Multi-unit dwelling (MUD) household bins are shared and do not equate to the number of households per MUD property but rather the allocation of bins per household per stream.

4.1 Samples collected

In total, 4,978 bins were sampled representing 2,930 households. Please refer to Table 4 in the Method section for further detail.

4.2 Presentation rates

Presentation rates are calculated as follows:

The total number of households passes during the collection is divided by the number of households recorded as presenting bins.

The *Guidelines* specify that only matched-pair bins (garbage and recycling) are collected from a household, so if a household presented no bins or only one bin, the bin/s were recorded as presented but not collected.

As per the *Guidelines* there are no substitute bins included in the audit outside the matched-pair household sample. However, non-matched bins are recorded to calculate the participation rate for each stream.

It should be noted that the accurate calculation of participation rates should be made by sampling a large number of households over several weeks of the general waste, recycling and organics collection cycles. The presentation rates in this report are based on bins presented at the time of sample collection for each stream and may not reflect the true presentation or participation rates.

Presentation rates for general waste bins, commingled recycling and garden organics bins are shown below.

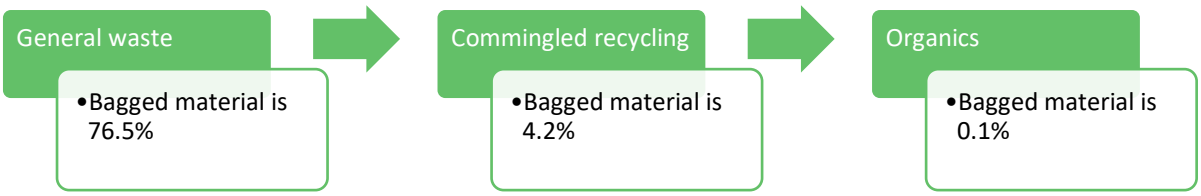
Table 5 Proportion of households presenting a bin for collection

Stream	SD	MUD
General waste	82%	100%
Commingled recycling	81%	100%
Garden organics	37%	47%
Containers	78%	100%
Paper and cardboard	60%	100%
FOGO	98%	100%

4.3 Amount of bagged material

Figure 1 shows the proportion of material in each waste stream that is presented in bags. As expected, most general waste is bagged. A percentage of the material in the commingled recycling bins is presented in bags and is deemed as contamination. A very small amount of bagged material was found in the organics stream.

Figure 1 Proportion of bagged material in each waste stream



The reason and method for measuring the amount of bagged material is shown below:

The *Guidelines* require that bagged material is pre-sorted to determine the weight of items in each stream that are bagged.

Bagged material is defined as any items that are in a tied shopping bag or garbage bag. It does not include items in plastic wrap, bread bags or other smaller bags.

The purpose of pre-sorting bagged waste is to determine the component of each waste stream that would need pre-treatment in a waste processing facility. For example, in an advanced waste treatment (AWT) facility, bagged material may need to be processed through a bag opener. In an organics composting operation or MRF, bagged material would be treated as a contaminant and removed.

4.4 Weekly waste generation

The average SSROC weekly household generation of all waste streams (garbage, recycling and organics combined) is shown in Figure 2.

Figure 2 Waste generation total of all waste streams

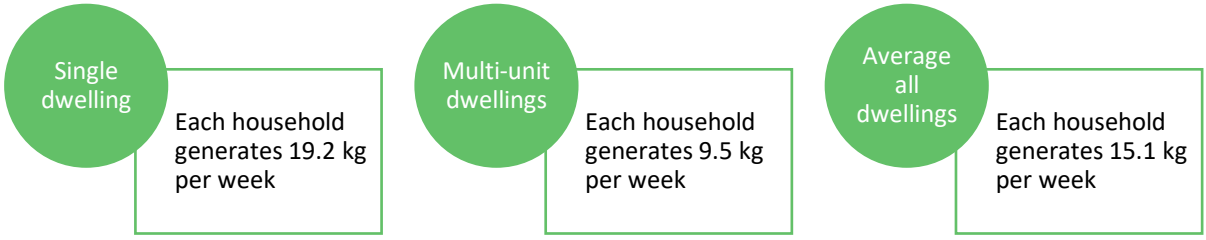


Figure 3 shows the amount of each waste type generated by the different housing types. Each SD household generates more of each waste stream per week than each MUD household.

Figure 3 Overall waste generated by housing type

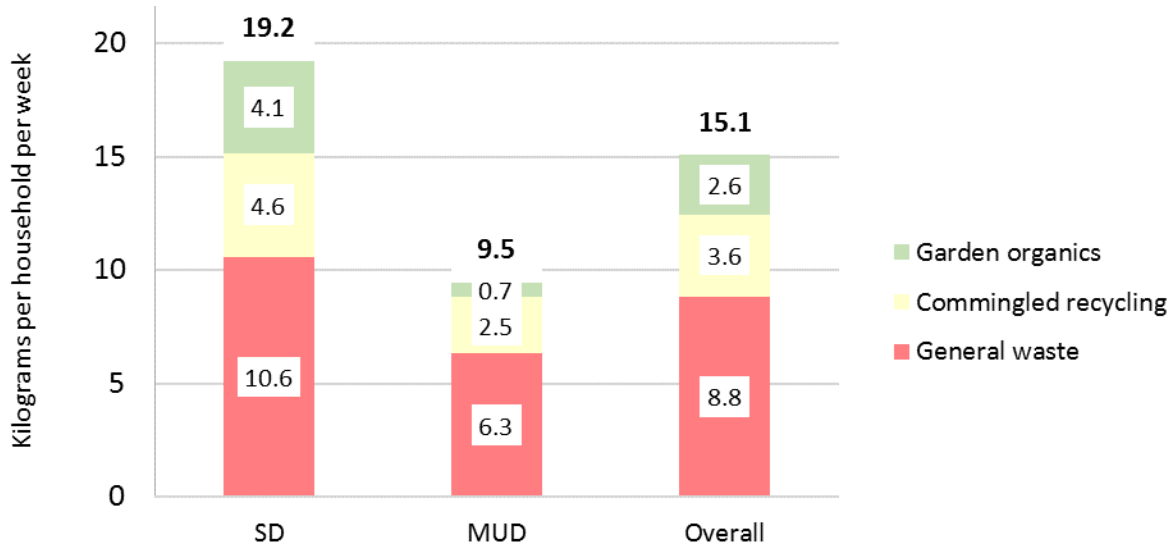


Figure 4 shows the generation of waste per household per week for each council, for all dwelling types combined. Generation ranges from 8.9 to 19.6 kg per household per week.

Figure 4 Overall waste generation by council, all dwelling types

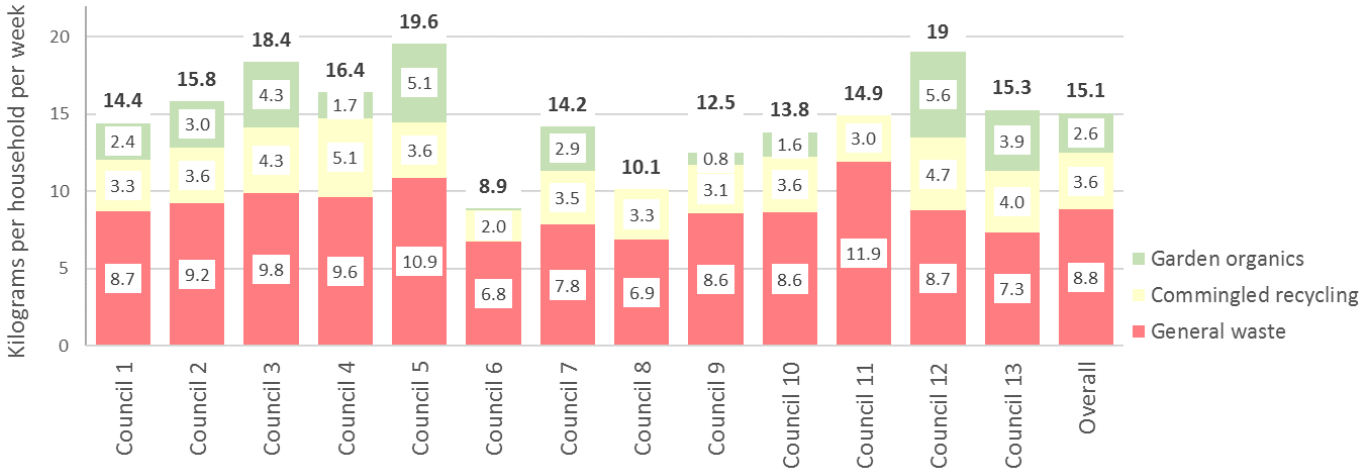


Figure 5 shows the generation of waste per SD household per week for each council. Generation ranges from 12.0 to 23.5 kg per household per week.

Figure 5 Overall waste generation in SDs by council

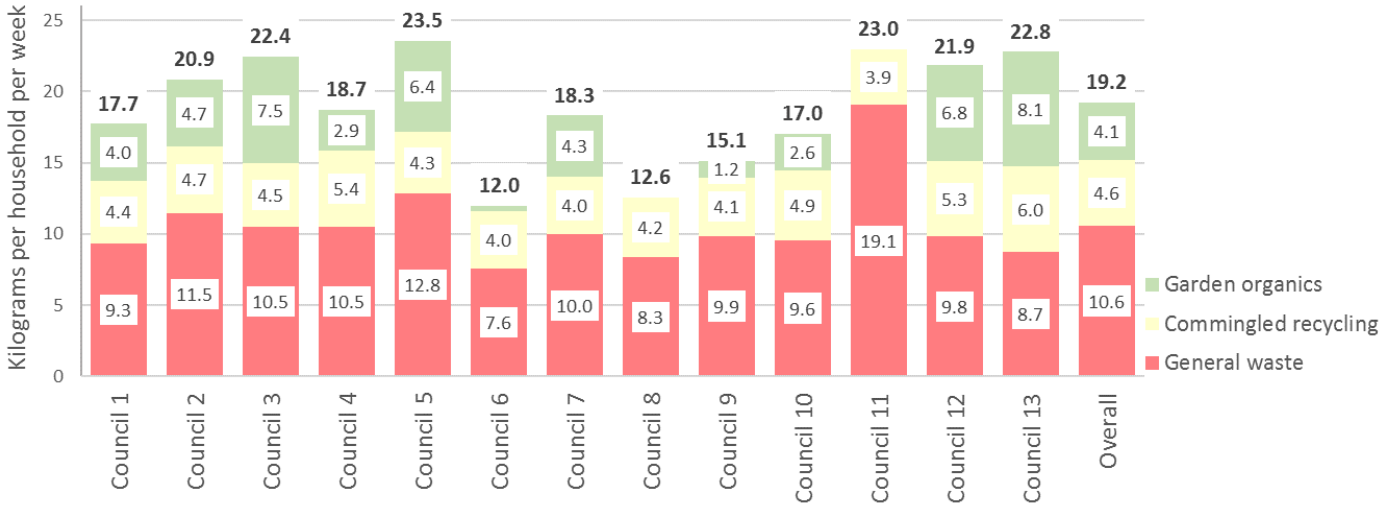
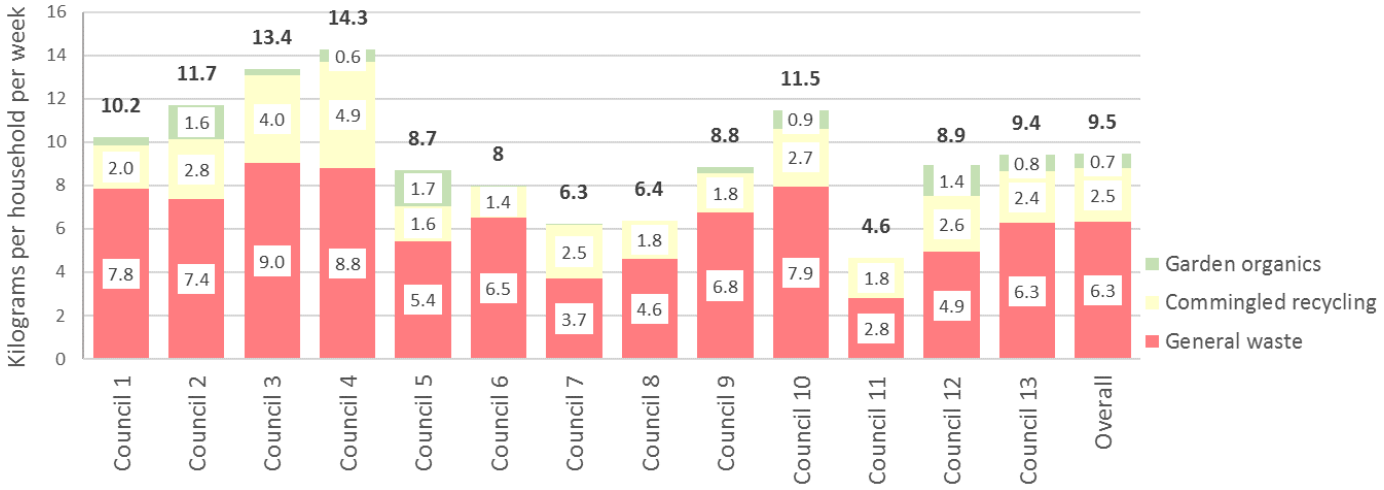


Figure 6 shows the generation of waste per MUD household per week for each council. Generation ranges from 4.6 to 14.3 kg per household per week.

Figure 6 Overall waste generation in MUDs by council



4.5 The general waste stream

Refer to Appendix F for details on which materials are included in each consolidation category.

4.5.1 General waste composition

Figure 7 shows the composition of the general waste. The largest individual category is loose food waste at 34%, followed by non-recyclable paper (11%), containerised food and liquid (7%), soft plastics (7%), nappies (6%) and textiles (5%).

The 'other' category is predominantly ceramics/dust/dirt/rock/inert, non-recyclable hard plastics, building materials and composite materials. A detailed composition list is provided in Table 6.

Over ten per cent (10.5%) of general waste is material that should be in the commingled recycling bins (or paper/containers bins at councils that have separate bins for these). This material comprises recyclable containers (6.9%) and recyclable paper/cardboard (3.6%).

Figure 7 Overall generation waste composition

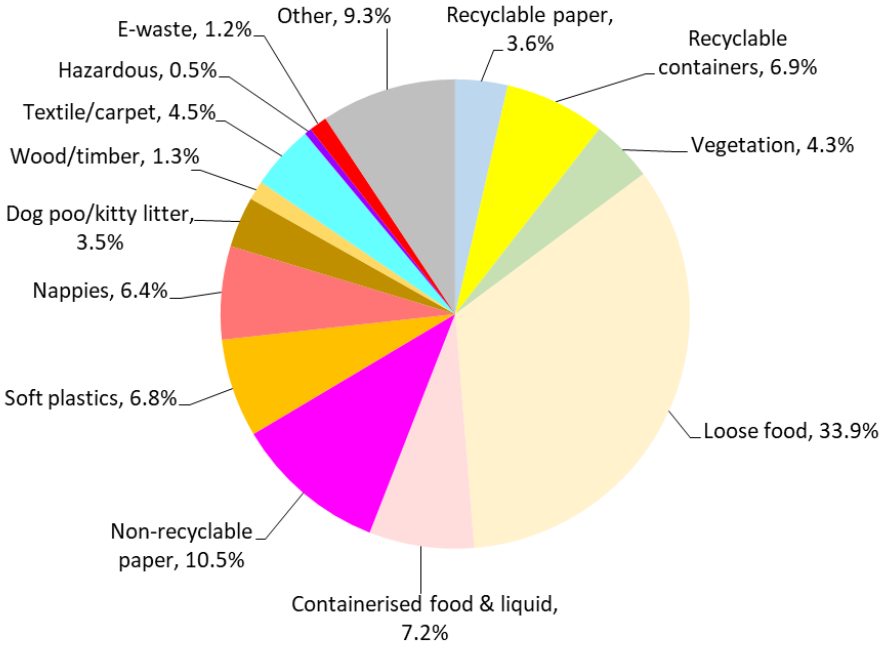
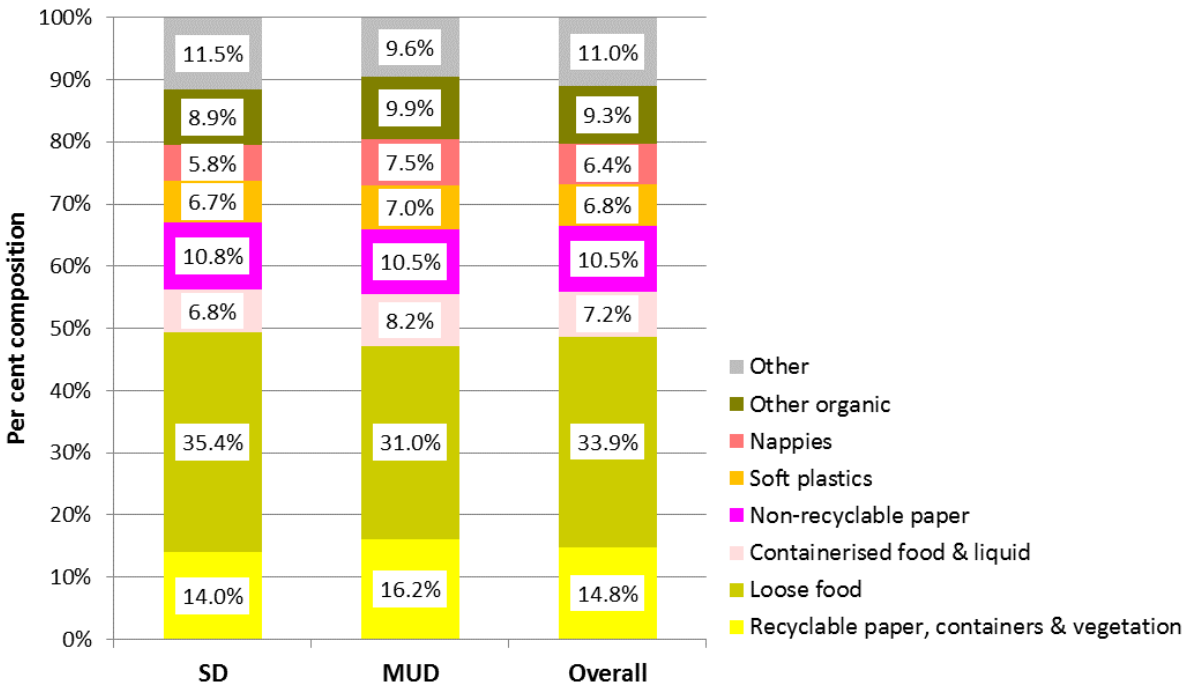


Figure 8 compares the composition of the general waste stream between dwelling types. For ease of reading, small categories have been further consolidated (from those shown in Figure 7). The proportions of each material in the general waste is similar at SDs and MUDs. A more detailed breakdown is provided in the following section and all data is provided in Appendix D.

Figure 8 General waste composition by housing type



*The category **Other organic** above combines the categories Dog poo/kitty litter, Wood/timber and Textile/carpet which are shown separately in Figure 7. The category Other in this chart combines the categories Hazardous, E-waste and Other, also shown separately in Figure 7. The category **Recyclable paper, containers and vegetation** combines all material that should be in the commingled recycling and garden organics bins.

4.5.2 General waste generation

As summarised in Figure 9, the average SSROC household produces 8.8 kilograms per week of general waste. The average SD generation is 10.6 kilograms per week while average MUDs generate 6.3 kilograms per week.

Figure 9 General waste generation

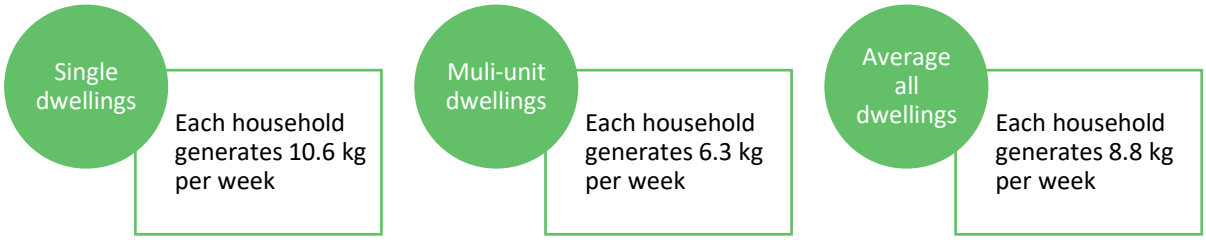
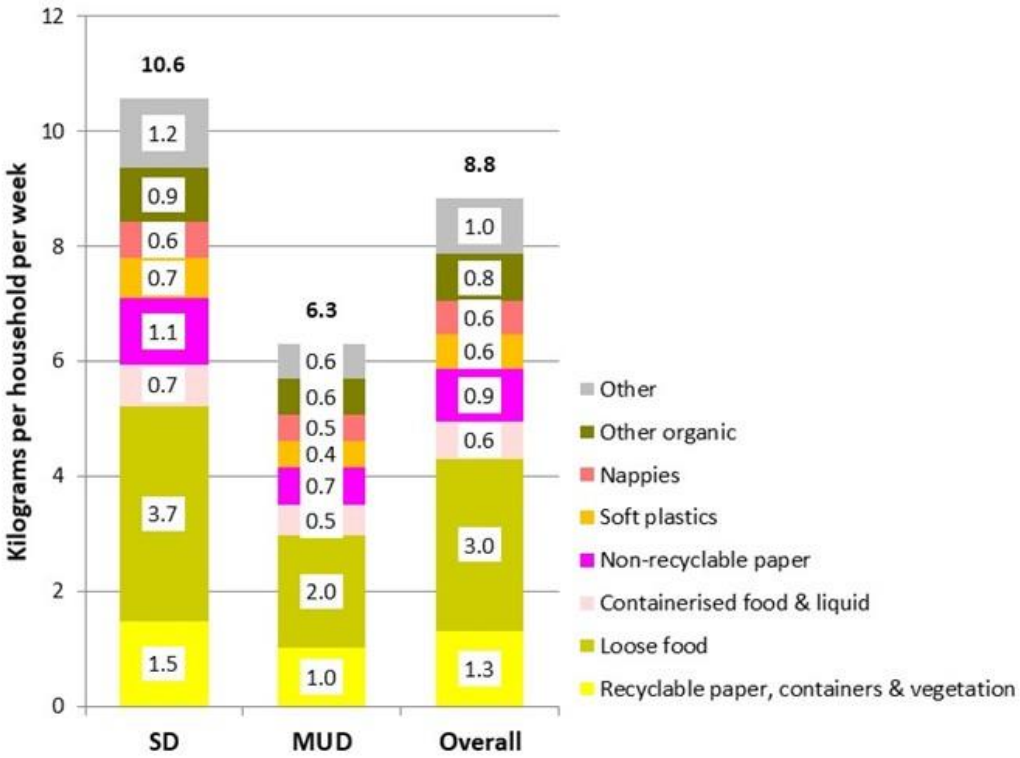


Figure 10 compares the amount of each material category generated by the different housing types. SDs produce a higher amount per household per week of each category than MUDs.

The largest difference between the housing types is loose food waste. SDs generate 3.7 kg per household per week compared to 2.0 kg at MUDs.

Figure 10 General waste generation by housing type



Note: "Other organic" combines dog poo/kitty litter, wood/timber and textile/carpet. "Other" combines bagged material, composites, leather, rubber, oils, non-recyclable plastic/glass/metal, inert, e-waste and hazardous materials.

Detailed sorting category data is provided at Appendix D and is summarised below in Table 6.

Table 6 General waste generated and composition details

Material	Kilograms per household per week	Percentage of general waste
Food (non-meat)	2.7	31.0%
Non-recyclable paper (soiled)	0.9	10.2%
Containerised food & liquid	0.6	7.2%
Nappies and feminine hygiene	0.6	6.4%
Textile/carpet	0.4	4.5%
Vegetation	0.4	4.3%
Plastic film	0.4	4.2%
Dog poo/kitty litter	0.3	3.5%
Food (meat)	0.3	2.9%
Plastic bags	0.2	2.5%
Cardboard	0.2	2.1%
Ceramics, dust, dirt, rock, inert	0.2	1.8%
Non-recyclable hard plastics	0.1	1.6%
Glass drink containers	0.1	1.6%
Building materials	0.1	1.5%
Wood/timber	0.1	1.3%
PP packaging	0.1	1.2%
Electrical items & peripherals	0.1	1.2%
Composite (mostly plastic)	0.1	1.1%
Other recyclable glass packaging	0.1	1.0%
Less than 1%	0.8	8.9%
Total	8.8	100.0%

4.5.3 Material that should or could be in another service

This section details materials in general waste that should be in a recycling bin or could be disposed to an alternative service (hazardous and e-waste drop-off services and a potential combined food and garden organics (FOGO) service). An overview is provided in Figure 11 below.

Figure 11 Material that should or could be in another bin or service

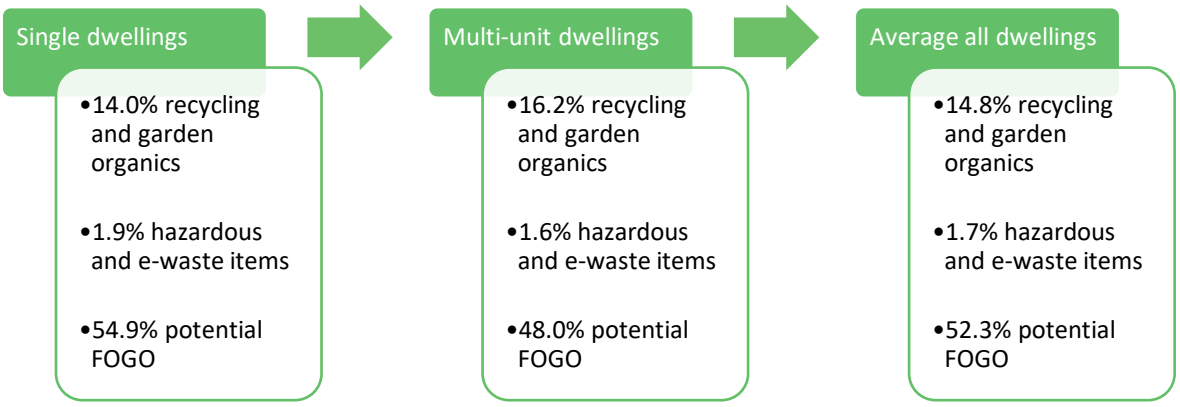


Table 7 lists materials that should be in the commingled recycling bin or garden organics bin. One Council does not have an organics service and the general waste stream comprised 15% garden organics. If this Council is excluded from the average, there is 3% vegetation in the general waste. Cardboard and glass drink containers comprise the highest percentages of the dry recyclables that should be in the commingled recycling bin.

Table 7 General waste that should be in a recycling bin

Material	Kilograms per household per week	Percentage of general waste
Vegetation	0.4	4.3%
Cardboard	0.2	2.1%
Glass drink containers	0.1	1.6%
PP packaging	0.1	1.2%
Other recyclable glass packaging	0.1	1.0%
Less than 1%	0.4	4.6%
Total	**1.3**	**14.8%**

Table 8 lists materials that would ideally be disposed of via the council e-waste or hazardous collection services. Section 4.8 contains more detail on hazardous waste items in the waste.

Table 8 General waste that should be in the e-waste or hazardous services

Material	Kilograms per household per week	Percentage of general waste
Electrical items & peripherals	0.10	1.17%
Paint	0.02	0.23%
Less than 0.1% - includes batteries	0.03	0.3%
Total	**0.15**	**1.7%**

Table 9 lists materials that could potentially be diverted to a FOGO service, which in total comprises over half (52%) of the general waste stream.

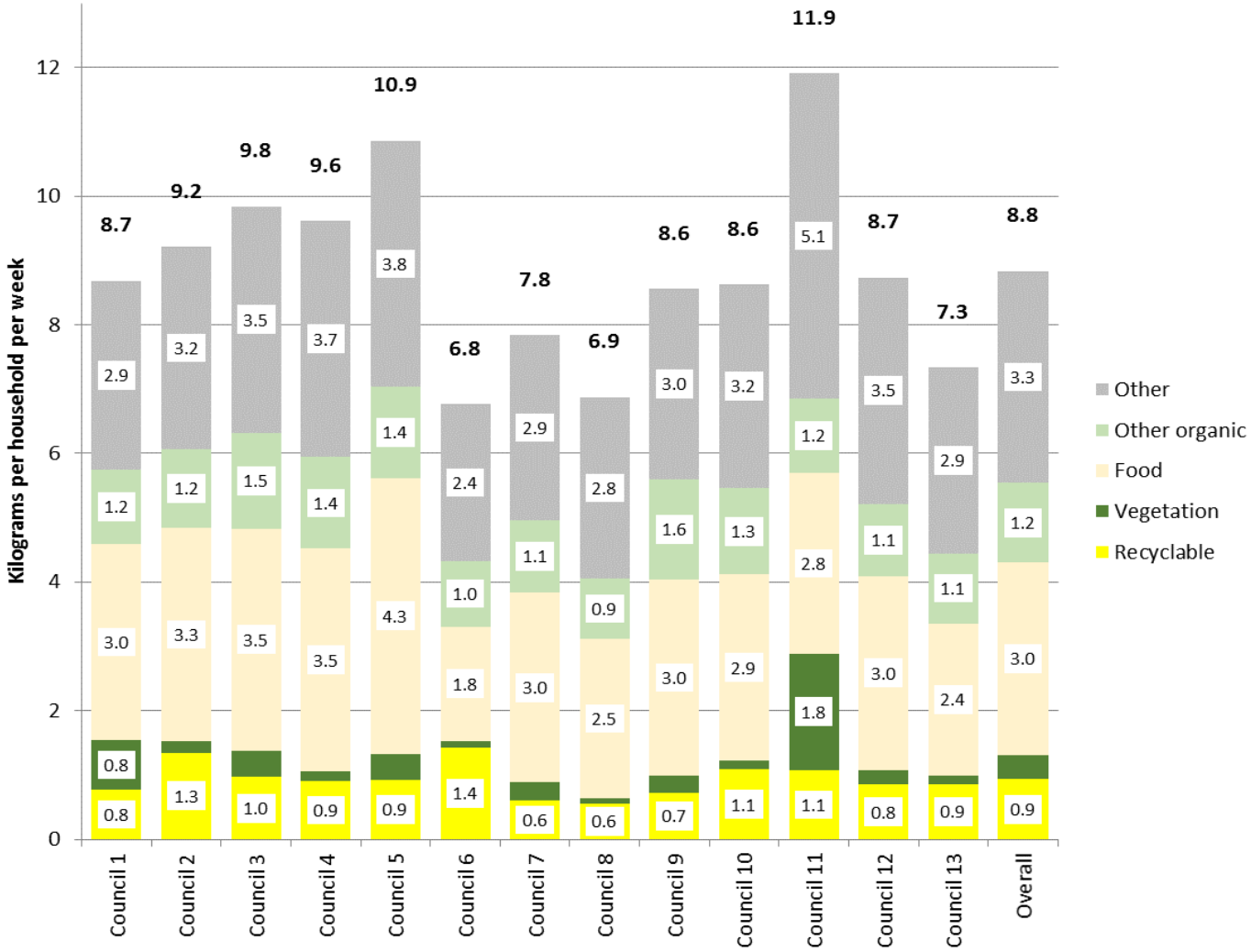
Table 9 General waste that could be in a FOGO bin

Material	Kilograms per household per week	Percentage of general waste
Food (non-meat)	2.74	31.0%
Non-recyclable paper (soiled)	0.90	10.2%
Vegetation	0.38	4.3%
Dog poo/kitty litter	0.31	3.5%
Food (meat)	0.25	2.9%
Less than 1%	0.05	0.5%
Total	**4.63**	**52.3%**

4.5.4 General waste generation by council

Figure 12 shows the generation of general waste per household per week, for all dwelling types. Generation ranges from 6.8 to 11.9 kg per household per week.

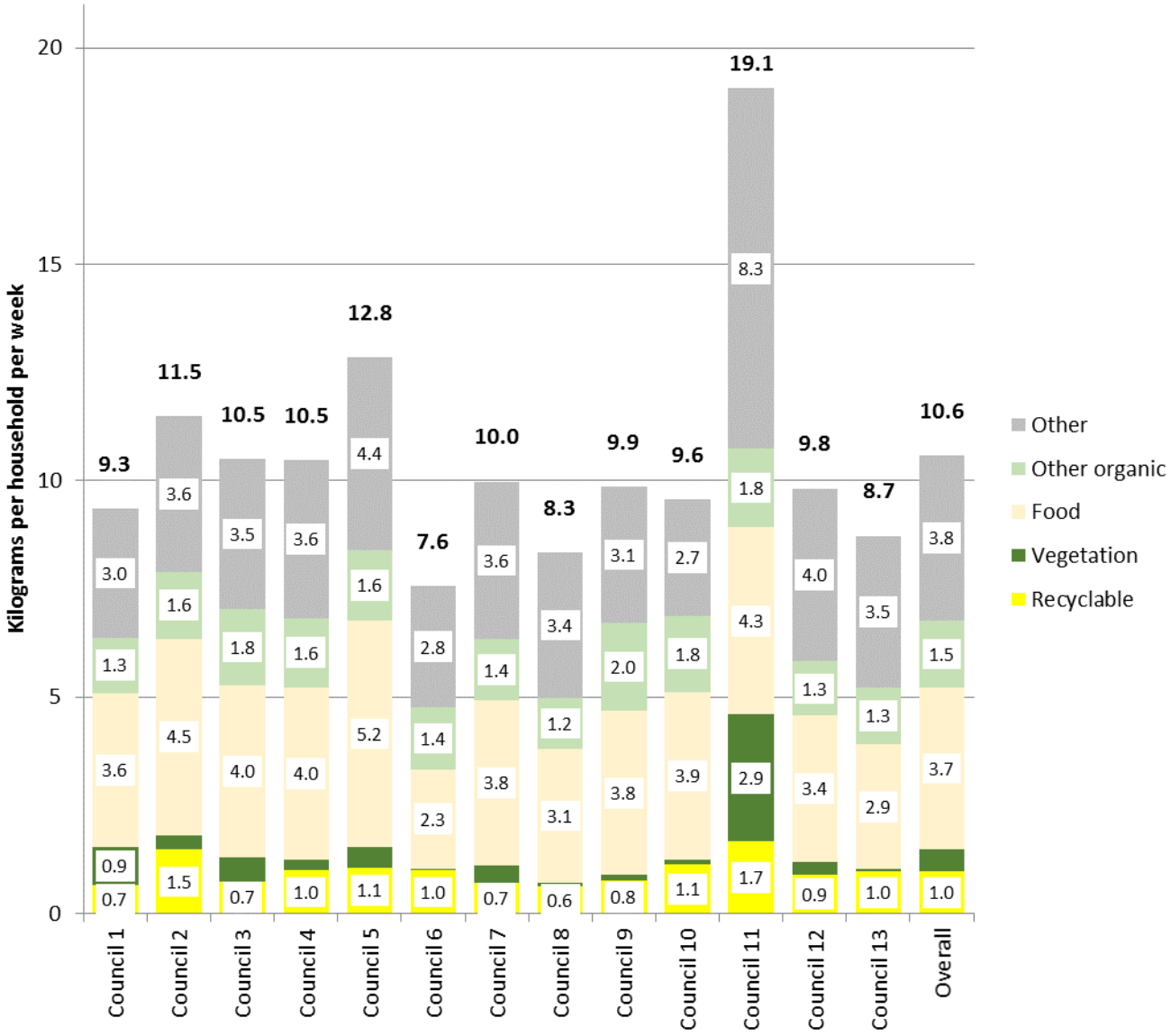
Figure 12 General waste generation by council – all dwellings



Note: "Other organic" combines dog poo/kitty litter, wood/timber and textile/carpet. "Other" combines bagged material, composites, leather, rubber, oils, non-recyclable plastic/glass/metal, inert, e-waste and hazardous materials.

Figure 13 shows the generation of general waste at SDs by council. Generation ranges from 7.6 to 19.1 kg per household per week.

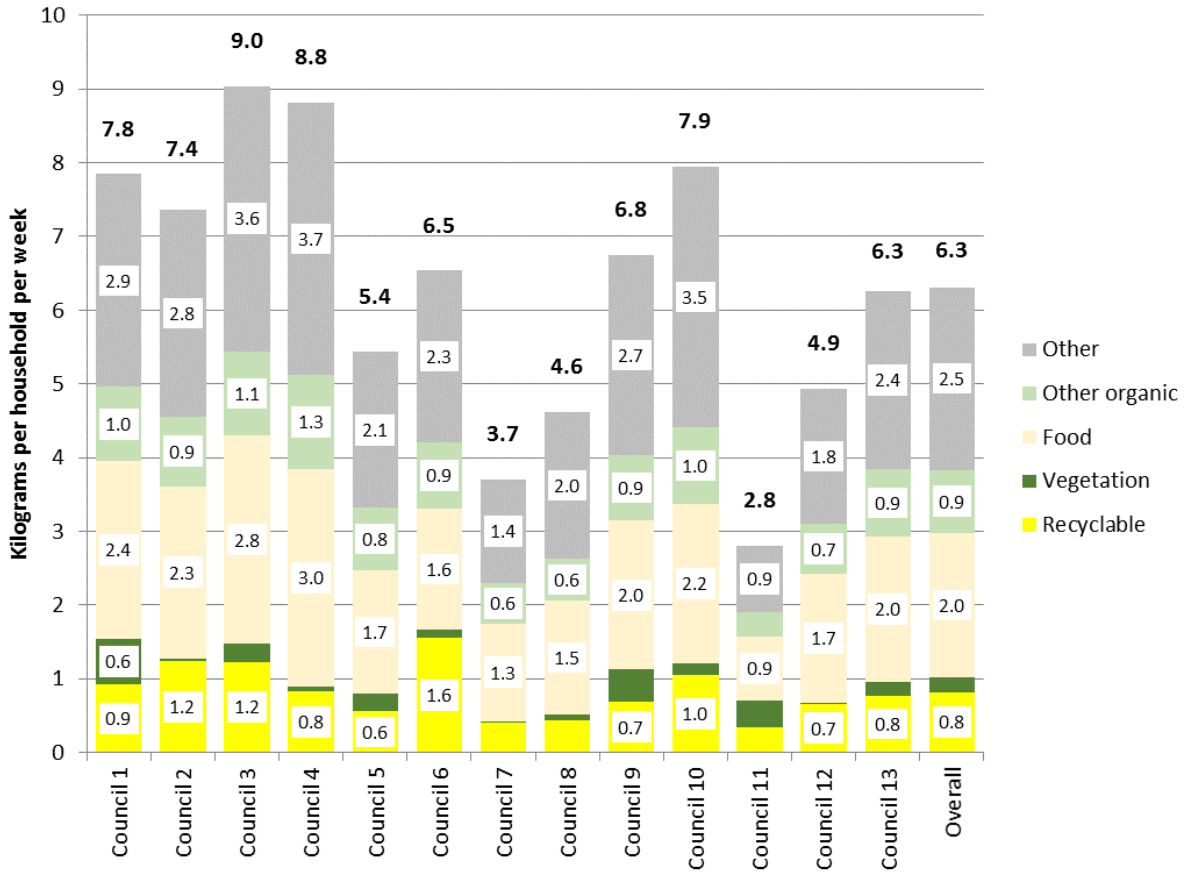
Figure 13 General waste generation by council - SDs



Note: “Other organic” combines dog poo/kitty litter, wood/timber and textile/carpet. “Other” combines bagged material, composites, leather, rubber, oils, non-recyclable plastic/glass/metal, inert, e-waste and hazardous materials.

Figure 14 shows the generation of general waste at MUDs by council. Generation ranges from 2.8 kg to 9.0 kg per household per week.

Figure 14 General waste generation by council – MUDs



Note: "Other organic" combines dog poo/kitty litter, wood/timber and textile/carpet. "Other" combines bagged material, composites, leather, rubber, oils, non-recyclable plastic/glass/metal, inert, e-waste and hazardous materials.

Image 4 - General waste sample ready to be sorted

4.6 The commingled recycling stream

4.6.1 Composition of commingled recycling

Figure 15 shows the composition of the commingled recycling stream. The main components are recyclable paper (41.6%) and recyclable containers (37.8%).

Contaminants in the commingled recycling make up 20.5% of which the largest single category is bagged material (4.2%). All bagged material is considered as contamination as it cannot be opened or separated at the MRF, regardless of whether the material in the bags is recyclable or not.

The next largest contaminants are non-recyclable (soiled) paper (3.8%), non-recyclable hard plastics (1.6%), containerised food and liquid (1.6%), textile/carpet (1.2%) and composite materials that are mostly paper (1.1% - these are usually brochures wrapped in plastic). Contaminant materials that individually comprise less than 1% of the commingled recycling stream collectively comprise 7.1% of the commingled recycling stream.

Detailed data is available in Appendix D.

Figure 15 Composition of commingled recycling

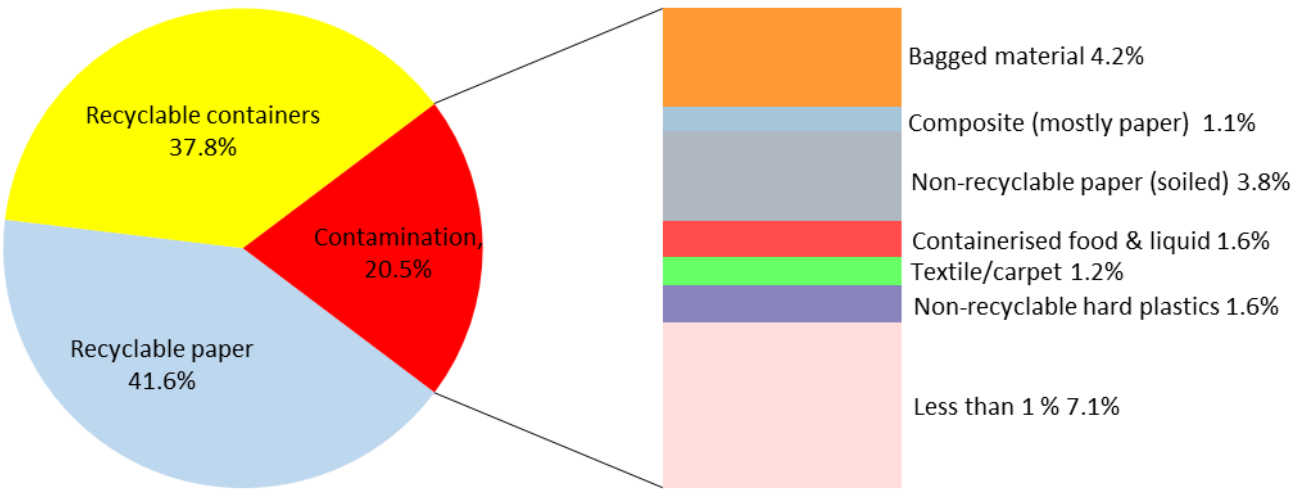


Figure 16 compares the composition of commingled recycling across all housing types and shows a higher proportion of both loose contamination and bagged material at MUDs than SDs.

Figure 16 Commingled recycling composition by housing type

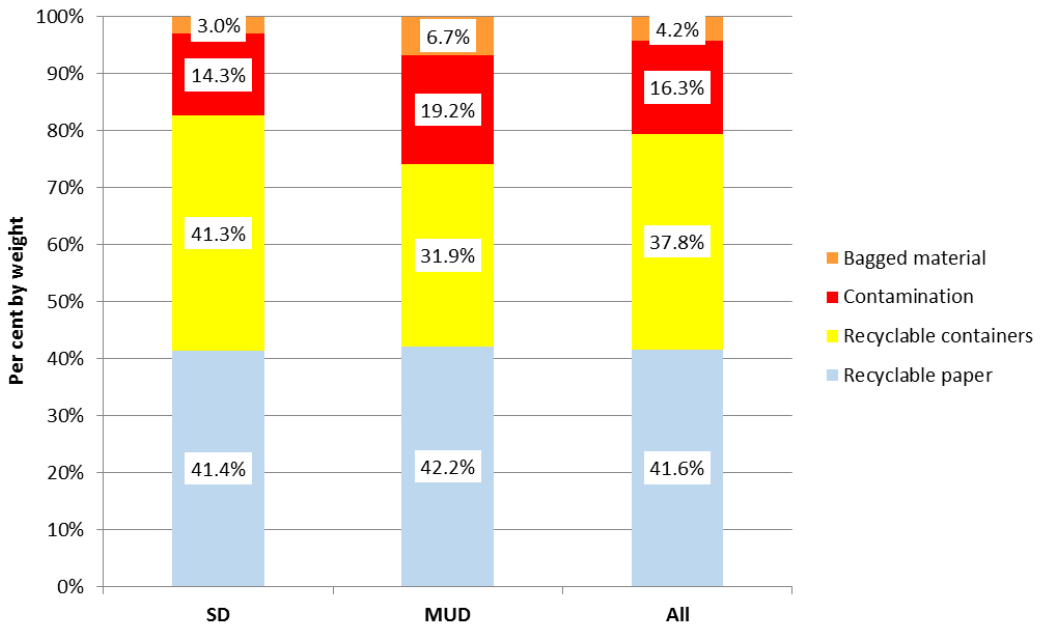


Table 10 below lists the commingled recycling generation and composition by individual material. The main materials in the commingled recycling are cardboard (20.7%), glass drink containers (20.1%), magazines (7.6%), newspaper (6.8%), other recyclable paper (6.0%) and other recyclable glass packaging (5.0%). Detailed data is available by housing stock at Appendix D.

Table 10 Commingled recycling generation and composition details

Material	Kilograms per household per week	Percentage of commingled recycling
Cardboard	0.7	20.7%
Glass drink containers	0.7	20.1%
Magazines	0.3	7.6%
Newspapers	0.2	6.8%
Other recyclable paper	0.2	6.0%
Other recyclable glass packaging	0.2	5.0%
Bagged material	0.2	4.2%
Non-recyclable paper (soiled)	0.1	3.8%
Glass fines	0.1	3.2%
Steel packaging	0.1	1.9%
PET drink containers	0.1	1.7%
Non-recyclable hard plastics	0.1	1.6%
Containerised food & liquid	0.1	1.6%
HDPE drink containers	0.06	1.5%
PET packaging	0.05	1.4%
Textile/carpet	0.04	1.2%
HDPE packaging	0.0	1.2%
PP packaging	0.0	1.2%
Composite (mostly paper)	0.0	1.1%
Less than 1%	0.3	8.3%
Total	**3.6**	**100.0%**

4.6.2 Commingled recycling generation by housing type

Note that in councils with separate paper/cardboard and container recycling bins, these have been combined to represent 'commingled recycling'.

Figure 17 shows that the average SSROC household produces 3.6 kilograms per week of commingled recycling. SD households produce much more much commingled recycling than MUDs (4.6 kilograms per week at SDs compared to 2.5 kg at MUDs).

Figure 17 Commingled recycling generation

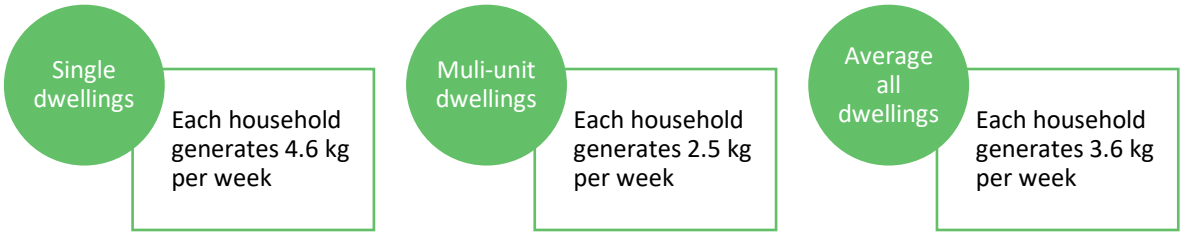
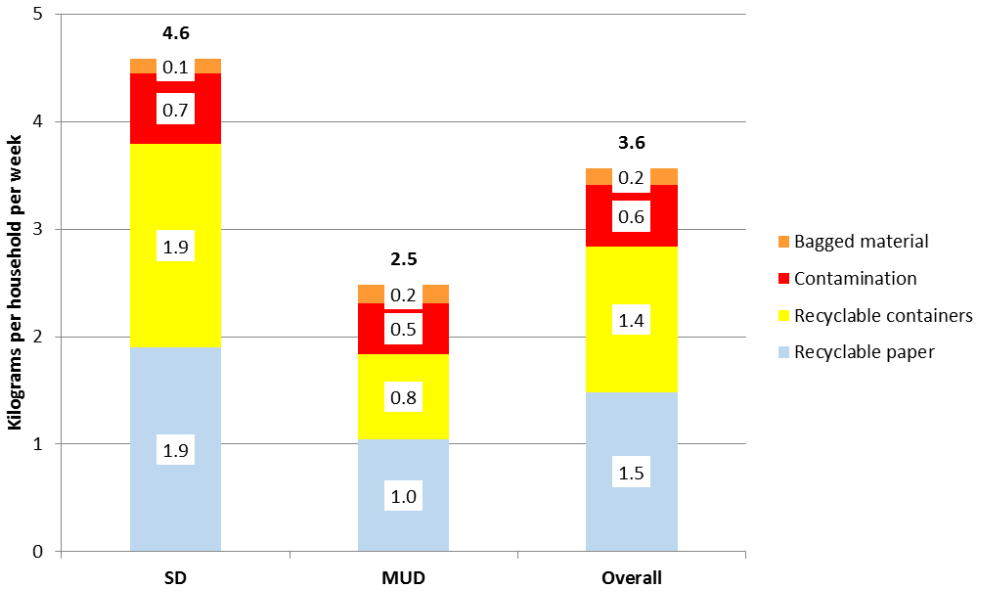


Image 5 - Sample of commingled recycling being sorted

Figure 18 shows the amount of each category produced by the different housing types. Slight differences in reported totals are due to rounding.

Figure 18 Commingled recycling generation by housing type



4.6.3 Commingled recycling generation by council

Figure 19 shows the generation of commingled recycling per household per week for all councils, for all dwelling types combined. The generation ranges from 2.0 to 5.1 kg per household per week.

Figure 19 Commingled recycling generation by council - all dwellings

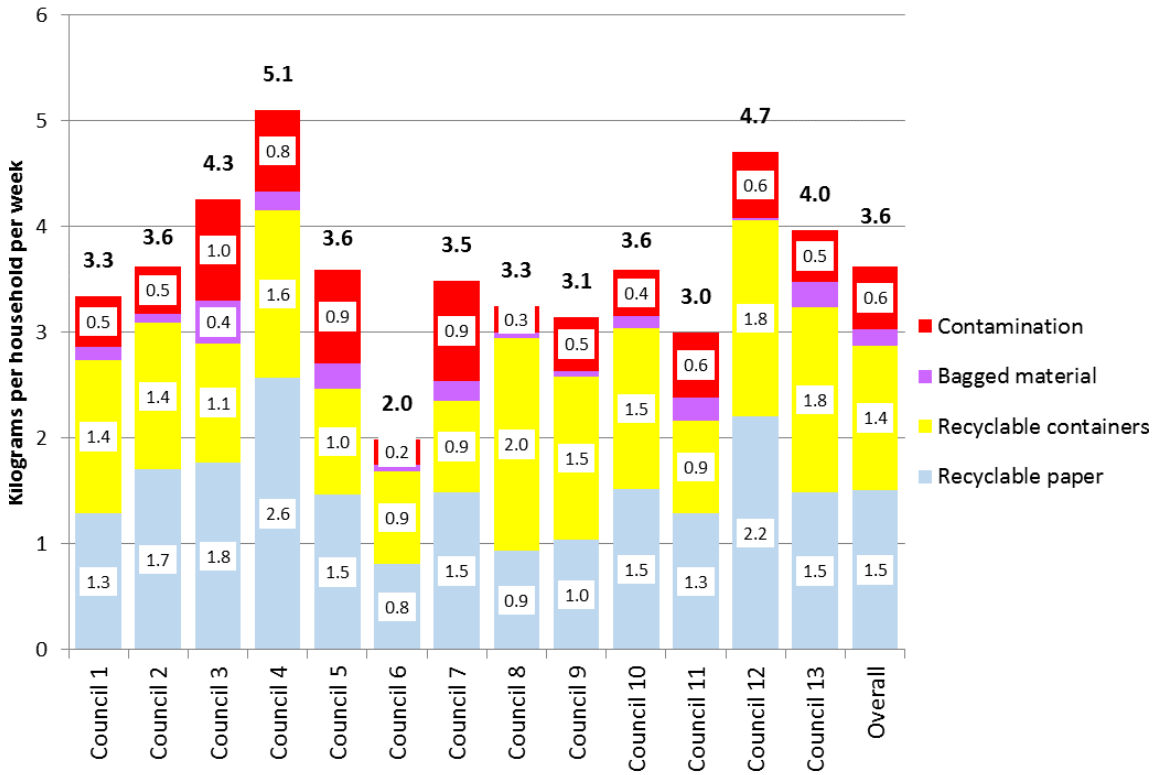


Figure 20 shows the generation of commingled recycling at SDs for all councils. The results are reasonably consistent, ranging from 3.9 to 6.0 kg per household per week.

Figure 20 Commingled recycling generation by council - SDs

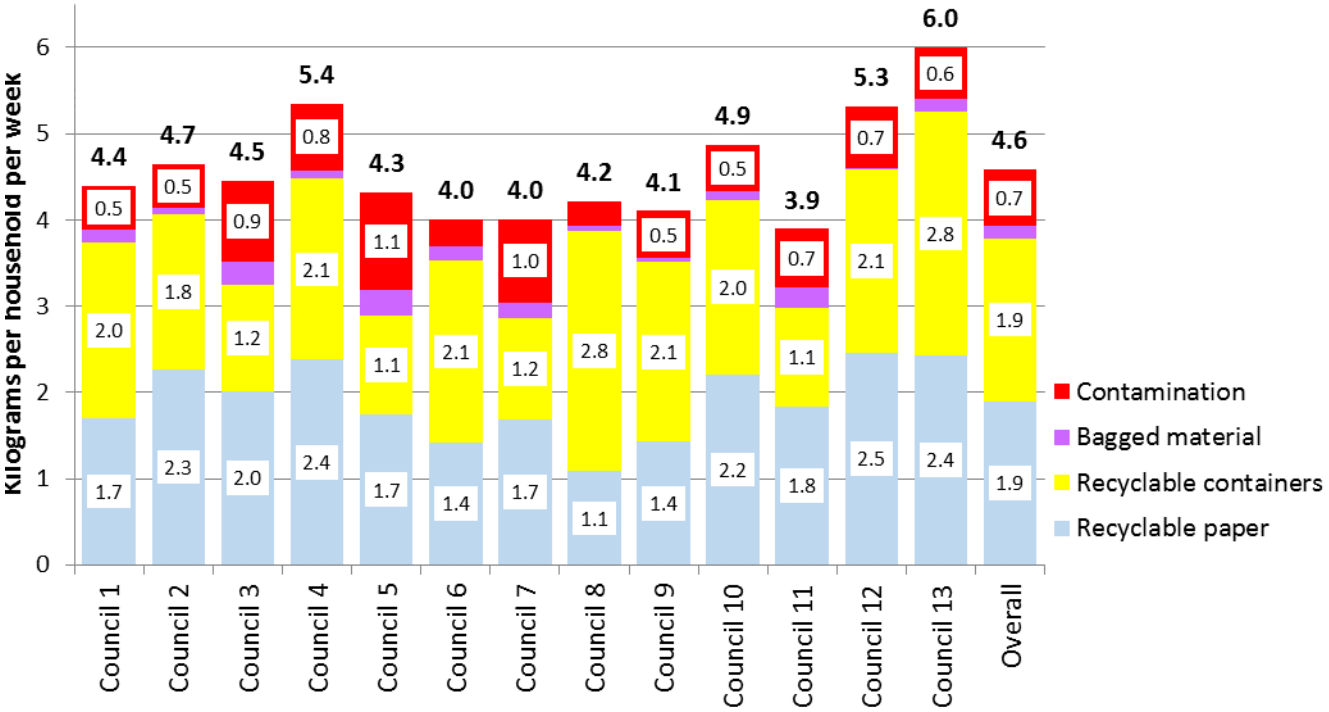
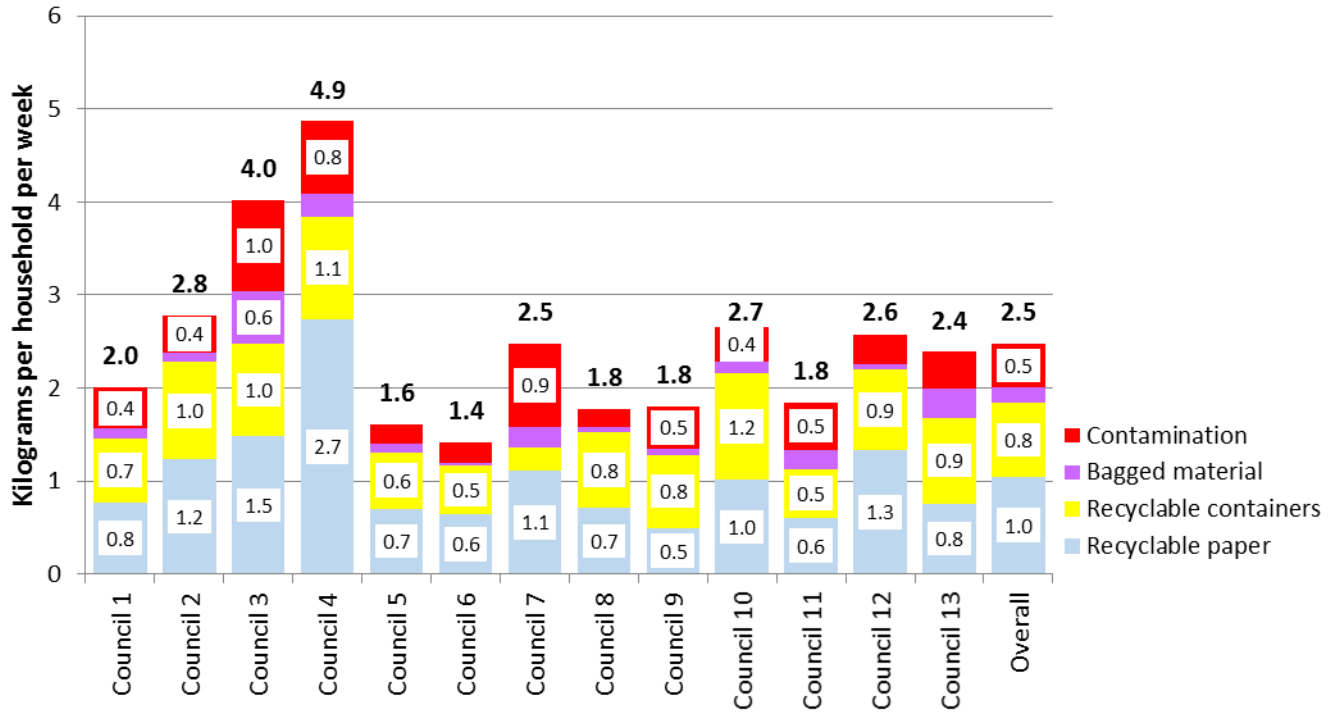


Figure 21 shows the generation of commingled recycling at MUDs for each Council. The results vary widely, ranging from 1.45 to 4.9 kg per household per week.

Figure 21 Commingled recycling generation by council - MUDs



4.6.4 Commingled recycling contamination by housing type

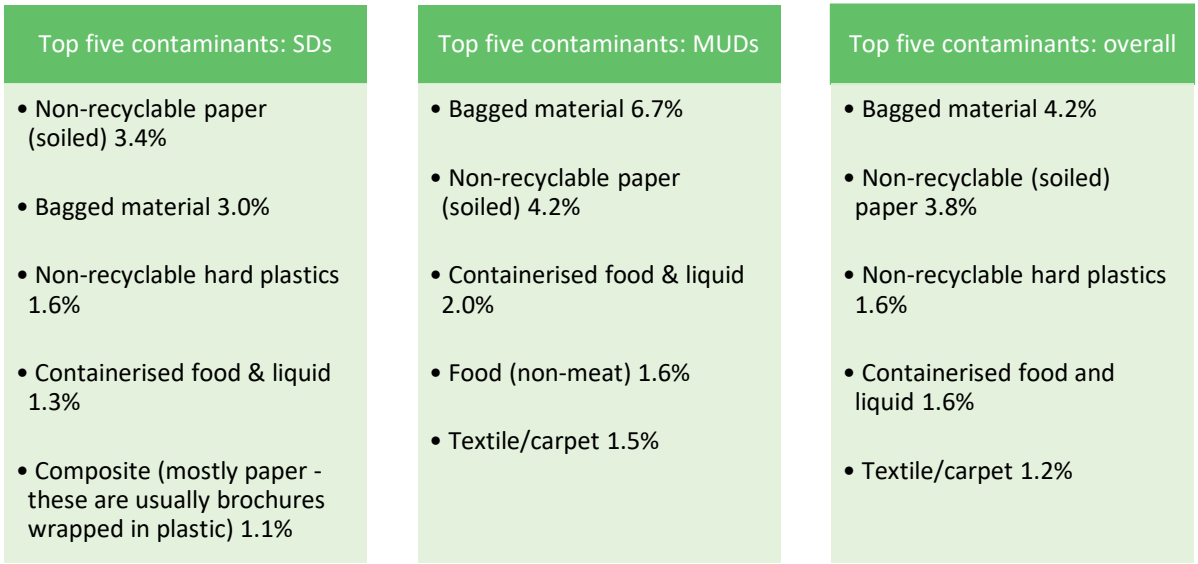
Table 11 shows that MUDs have a higher proportion of contamination in the recycling compared to SDs. Bagged material is present in both housing types, with a higher proportion at MUDs. In terms of the amount of contamination generated however, MUDs generate less loose contamination per household per week than SDs and only slightly more bagged material.

Table 11 Commingled recycling contamination by housing type and day

Bagged content scenario	Statistic	SD		MUD		Overall	
		%	kg/hhld/ week	%	kg/hhld/ week	%	kg/hhld/ week
Bagged material as a separate category and considered as a contaminant	Loose contamination	14.3%	0.66	19.2%	0.48	16.3%	0.59
	Bagged material	3.0%	0.14	6.7%	0.17	4.2%	0.15
	Total contamination	17.3%	0.79	25.9%	0.64	20.5%	0.74

Figure 22 shows the top five contaminants in the recycling (from highest to lowest percentage) for single and multi-unit dwellings, and overall. Bagged material, non-recyclable (soiled) paper and containerised food and liquid are in the top five contaminants at both SDs and MUDs, with the proportion of bagged material significantly higher at MUDs than SDs.

Figure 22 Top five commingled recycling contaminants – SDs and MUDs



4.6.5 Commingled recycling contamination by council

Figure 23 shows the contamination recorded in the commingled recycling for each council, for all dwelling types. Contamination ranged from 9.3% to 32.7%.

Figure 23 Commingled recycling contamination by council, all dwellings

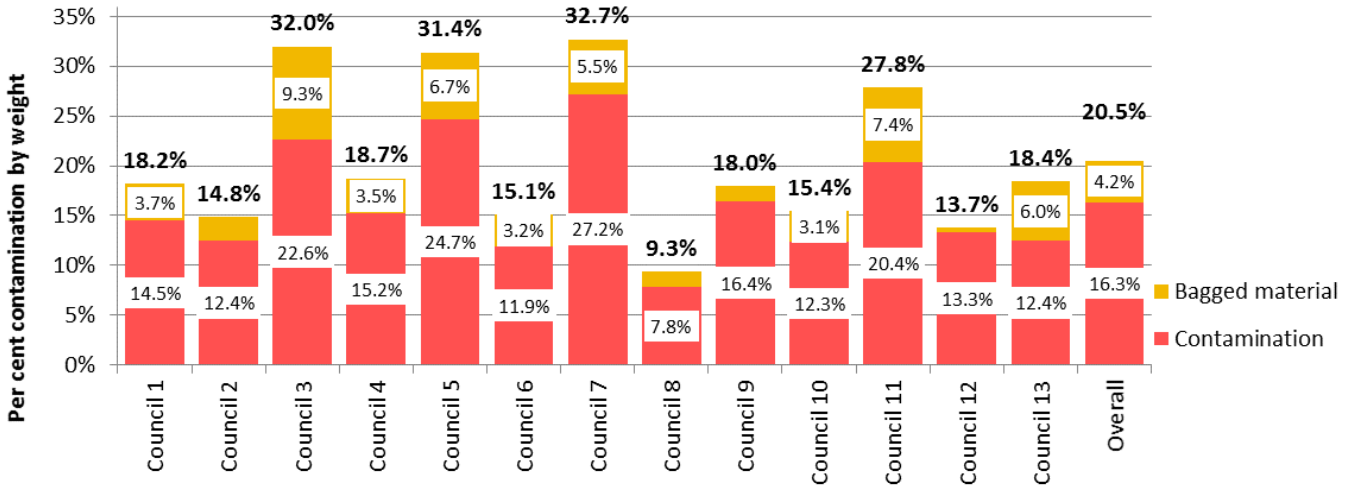


Figure 24 shows the contamination recorded in the commingled recycling for each council, for SDs. contamination ranged from 8.0% to 33.1%.

Figure 24 Commingled recycling contamination by council – SDs

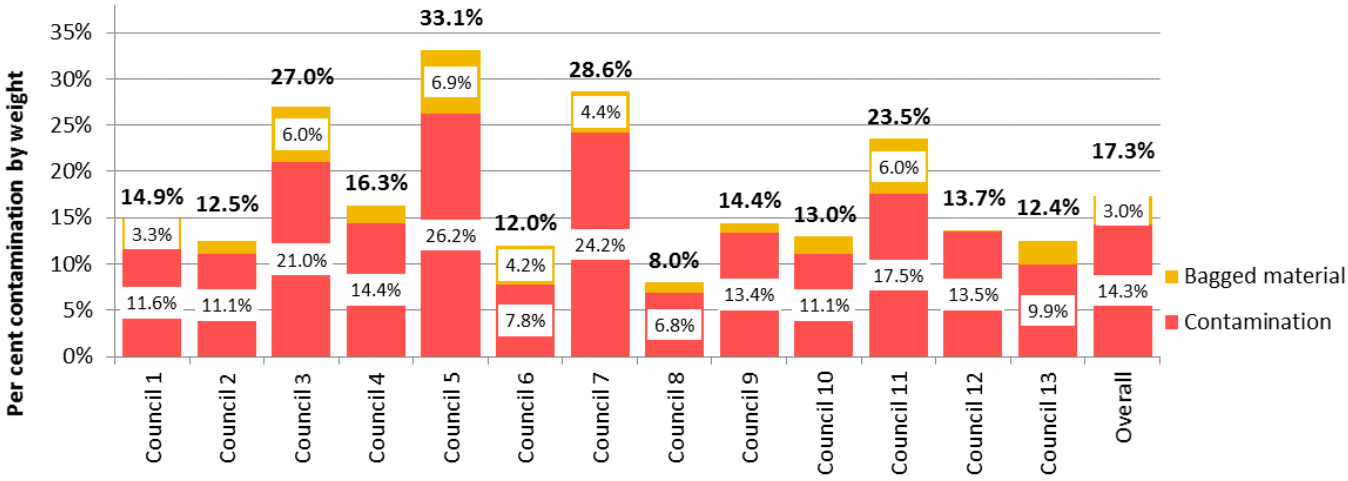
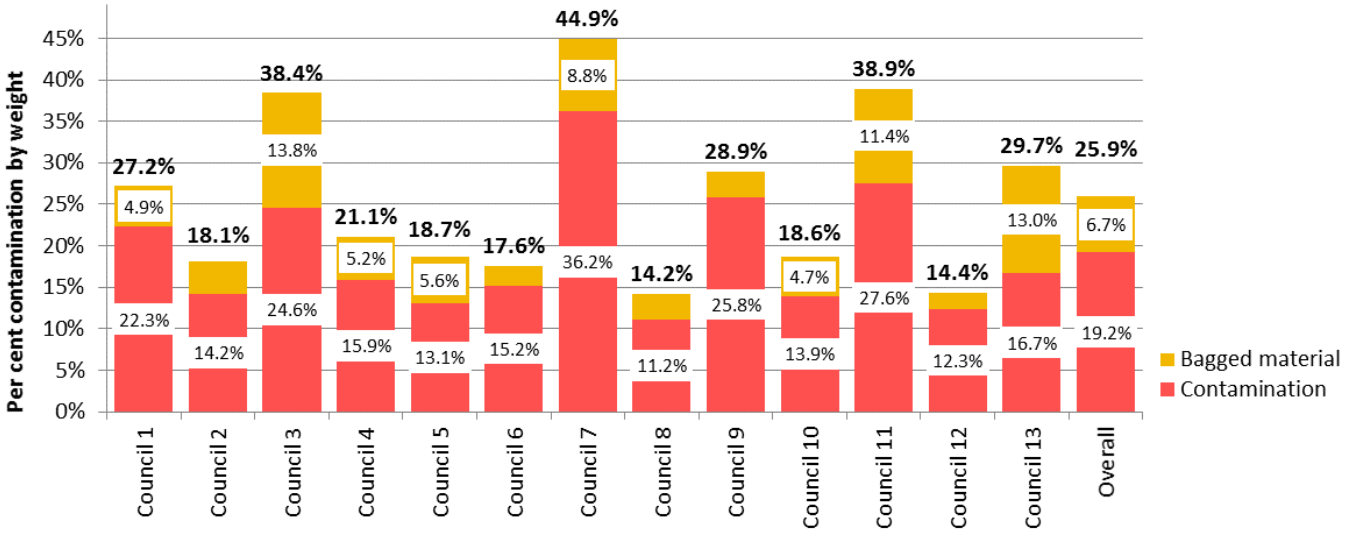


Figure 25 shows the contamination recorded in the commingled recycling for each council, for MUDs. Contamination ranged from 14.2% to 44.9%.

Figure 25 Commingled recycling contamination by day – MUDs



4.7 The garden organics stream

One Council in the region does not have a garden organics service and one council accepts food waste into the garden organics stream.

4.7.1 Composition of garden organics

Figure 26 shows the composition of the garden organics stream. Vegetation makes up 97.2%. Contamination in the organics stream is 2.8%. The contamination comprises small amounts of different materials, each less than 1%. The main contaminants were food, wood/timber and ceramics/dust/dirt/rock/inert. Detailed data is available at Appendix D.

Figure 26 Composition of garden organics

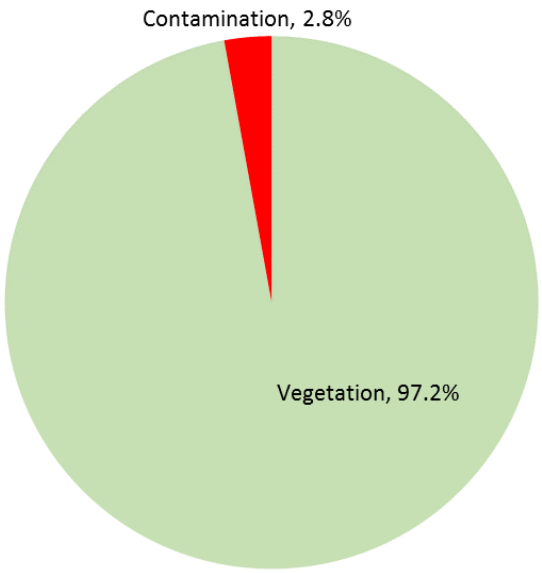


Table 12 shows detail of the garden organics generation and composition for all dwelling types combined.

Table 12 Garden organics generation and composition details

Material	Kilograms per household per week	Percentage of garden organics
Vegetation	2.5	97.2%
Food (non-meat)	0.02	0.9%
Wood/timber	0.01	0.4%
Ceramics, dust, dirt, rock, inert	0.01	0.4%
Building materials	0.01	0.2%
Plastic bags	0.01	0.2%
Non-recyclable paper (soiled)	0.004	0.1%
Household chemicals	0.003	0.1%
Less than 0.1%	0.01	0.5%
Total	**2.6**	**100.0%**

4.7.2 Garden organics generation by council

Figure 27 shows the generation of garden organics per household per week at all dwelling types. Generation ranges from zero, where no bins were presented during the audit period, to 5.6 kg per household per week. Council 13 recorded some 'other FOGO' material due to accepting food waste into the garden organics.

Figure 27 Garden organics generation by council, all dwelling types

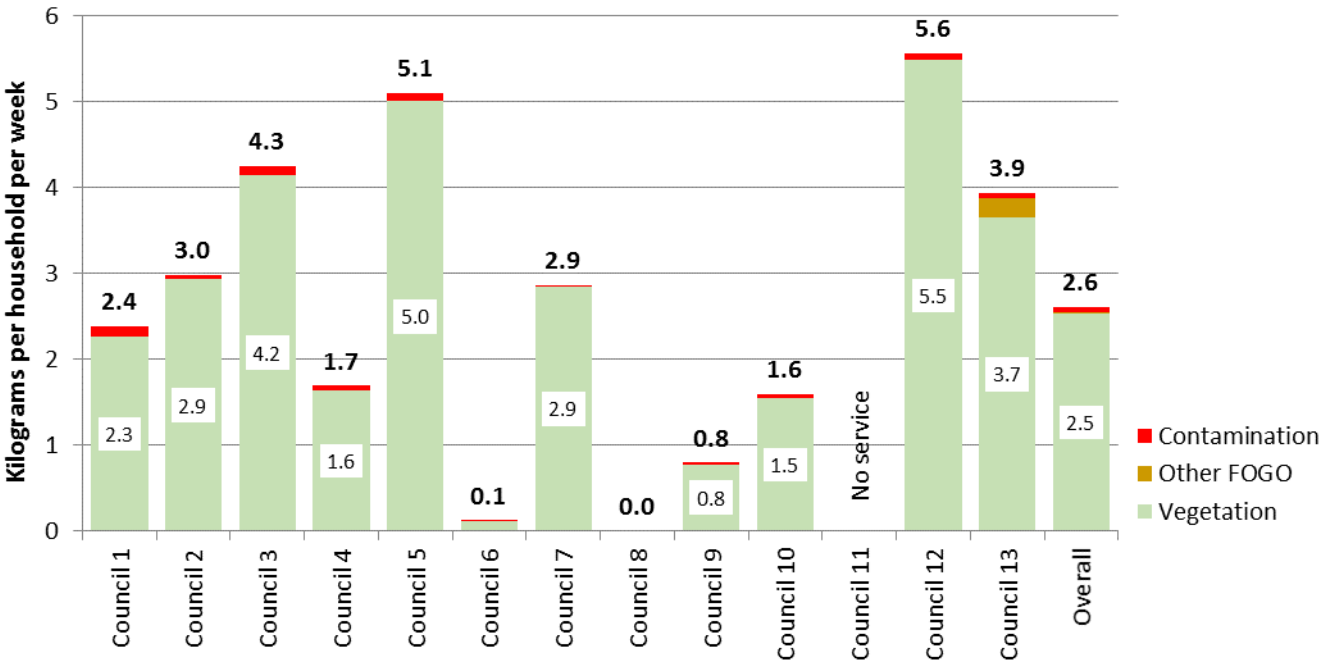


Figure 28 shows the generation of garden organics at single dwellings, by council. values range from zero to 8.1 kg per household per week.

Figure 28 Generation of garden organics at SDs, by council

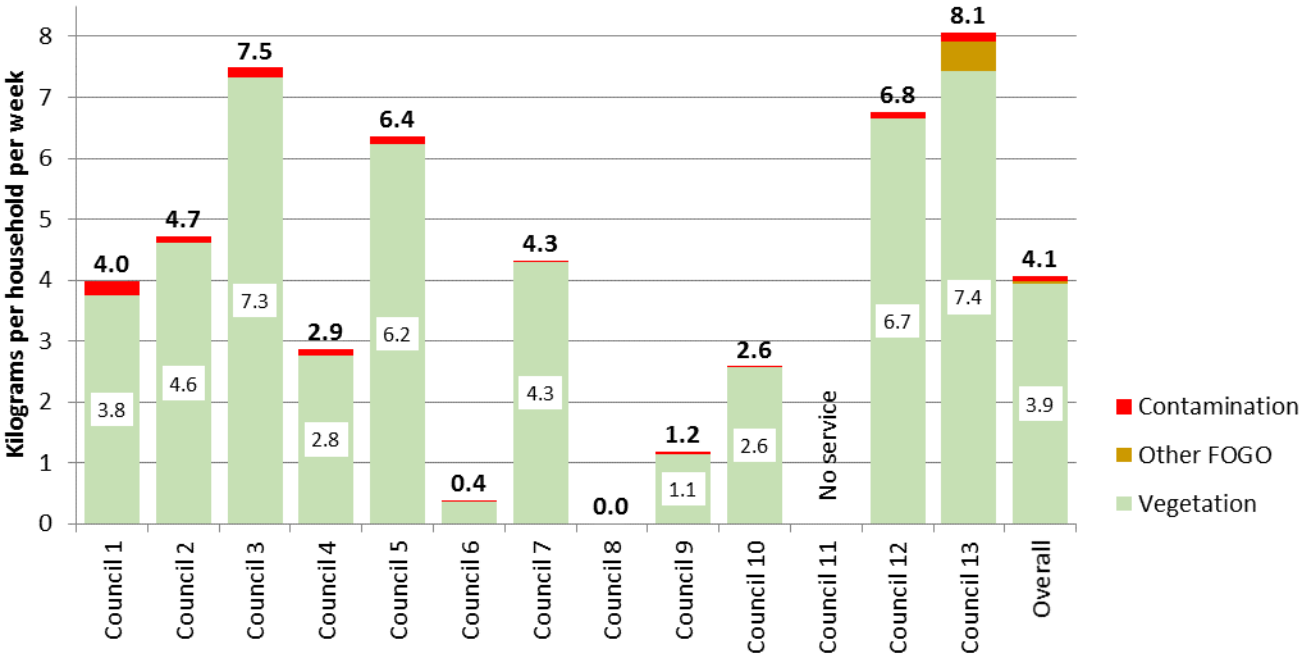
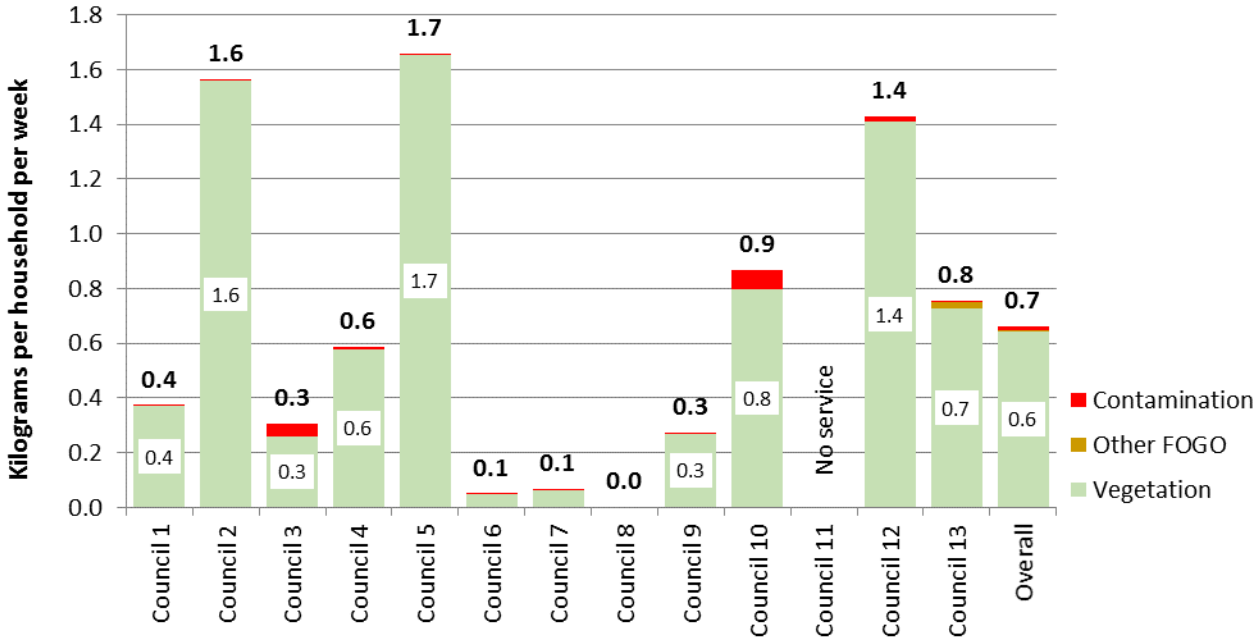


Figure 29 shows the generation of garden organics at MUDs, by council. Values range from zero to 1.7 kg per household per week.

Figure 29 Generation of garden organics at MUDs, by council



4.7.3 Garden organics contamination by housing type

Table 13 shows the contamination calculations for garden organics. SDs had higher contamination than MUDs.

Table 13 Garden organics contamination by housing type

Bagged content scenario	Statistic	SD		MUD		Overall	
		%	kg/hhld /week	%	kg/hhld /week	%	kg/hhld /week
Bagged material as a separate category and considered as a contaminant	Loose contamination	3.1%	0.13	2.4%	0.02	2.8%	0.07
	Bagged material	0.1%	0.0	0.0%	0.0	0.1%	0.0
	Total contamination	3.2%	0.13	2.4%	0.02	2.8%	0.07

Figure 30 lists the top five contaminants at each housing type. Food, wood/timber and ceramics/dirt/dust/rock/inert are in the top five at both housing types.

Figure 30 Top five garden organics contamination by housing type

Top five contaminants: SDs	Top five contaminants: MUDs	Top five contaminants: overall
•Food (non-meat)	•Wood/timber	•Food (non-meat)
•Ceramics, dust, dirt, rock, inert	•Food (non-meat)	•Wood/timber
•Wood/timber	•Non-recyclable paper (soiled)	•Ceramics, dust, dirt, rock, inert
•Plastic bags	•Ceramics, dust, dirt, rock, inert	•Building materials
•Building materials	•Glass fines	•Plastic bags

Image 6 - Garden organics sample being separated for sorting

4.7.4 Garden organics contamination by council

Figure 31 shows the contamination in the garden organics stream by council, for all dwelling types. Contamination ranges from 0.7% to 5.9%. Bagged material was only found at Council 2.

Figure 31 Garden organics contamination by council, all dwelling types

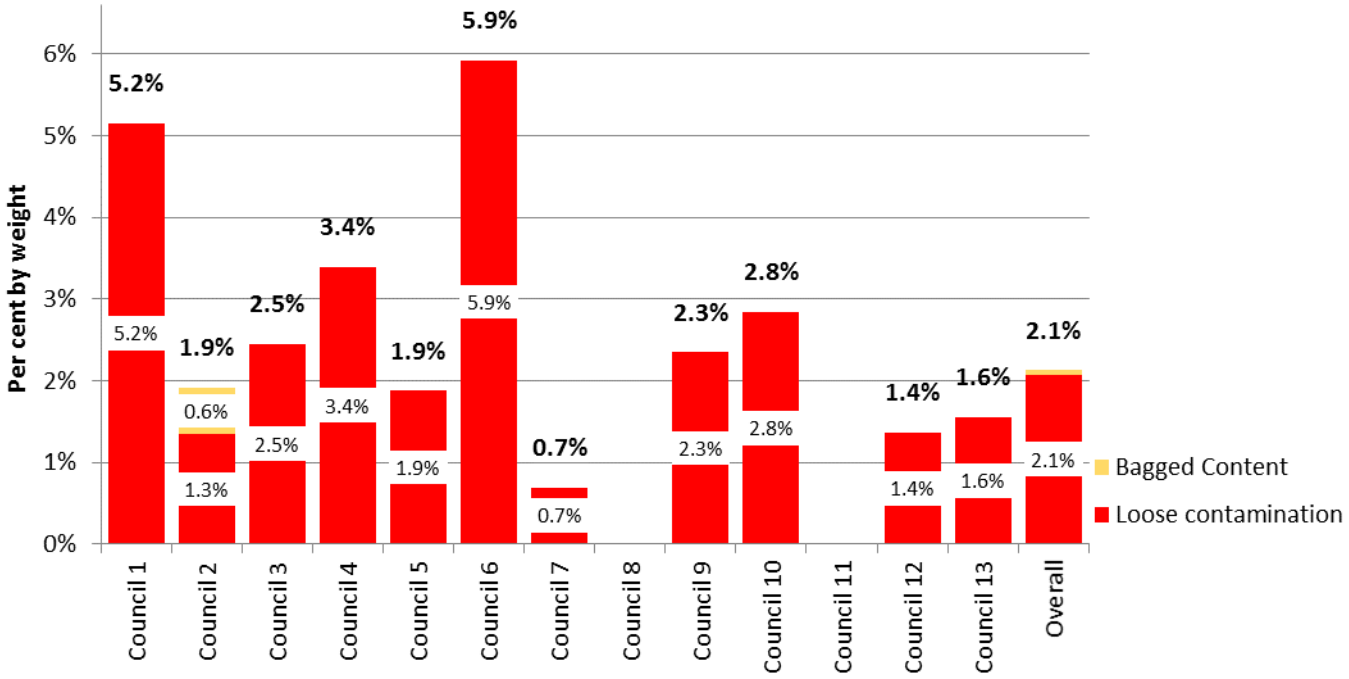


Figure 32 shows the contamination in the garden organics stream by council, for SDs. Contamination ranges from 0.5% to 5.7%. Bagged material was only found at Council 2.

Figure 32 Garden organics contamination by council, SDs

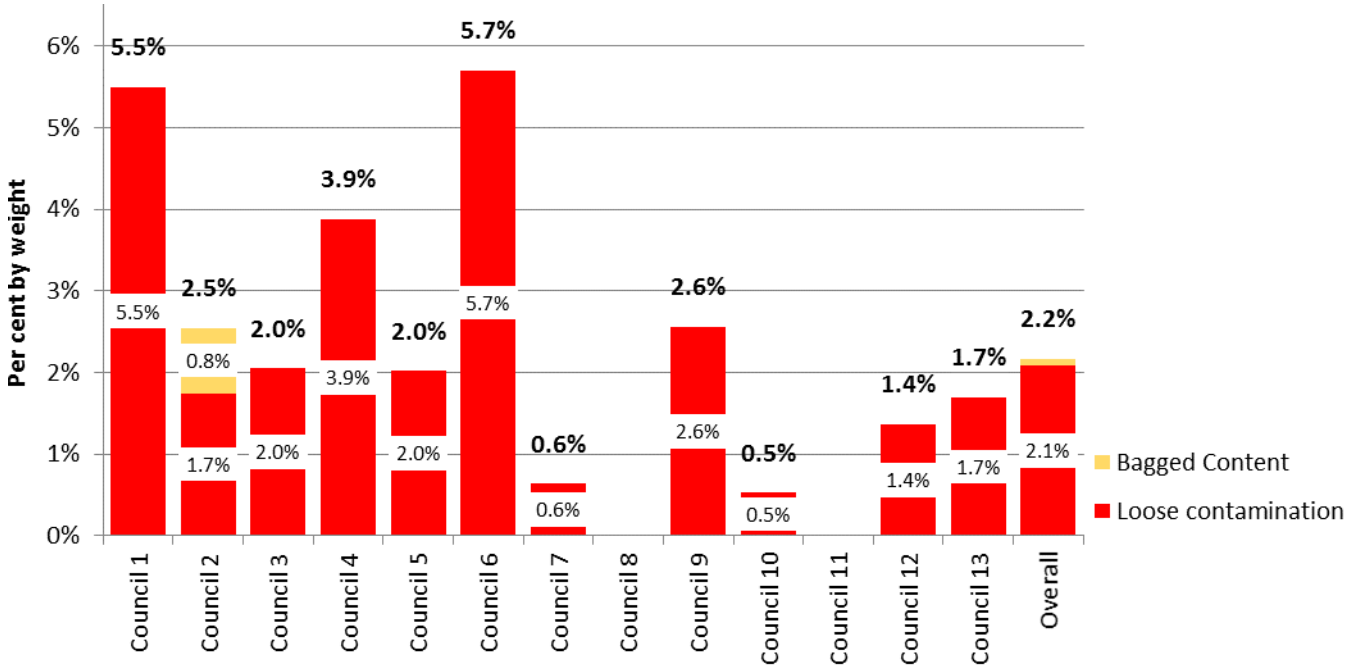
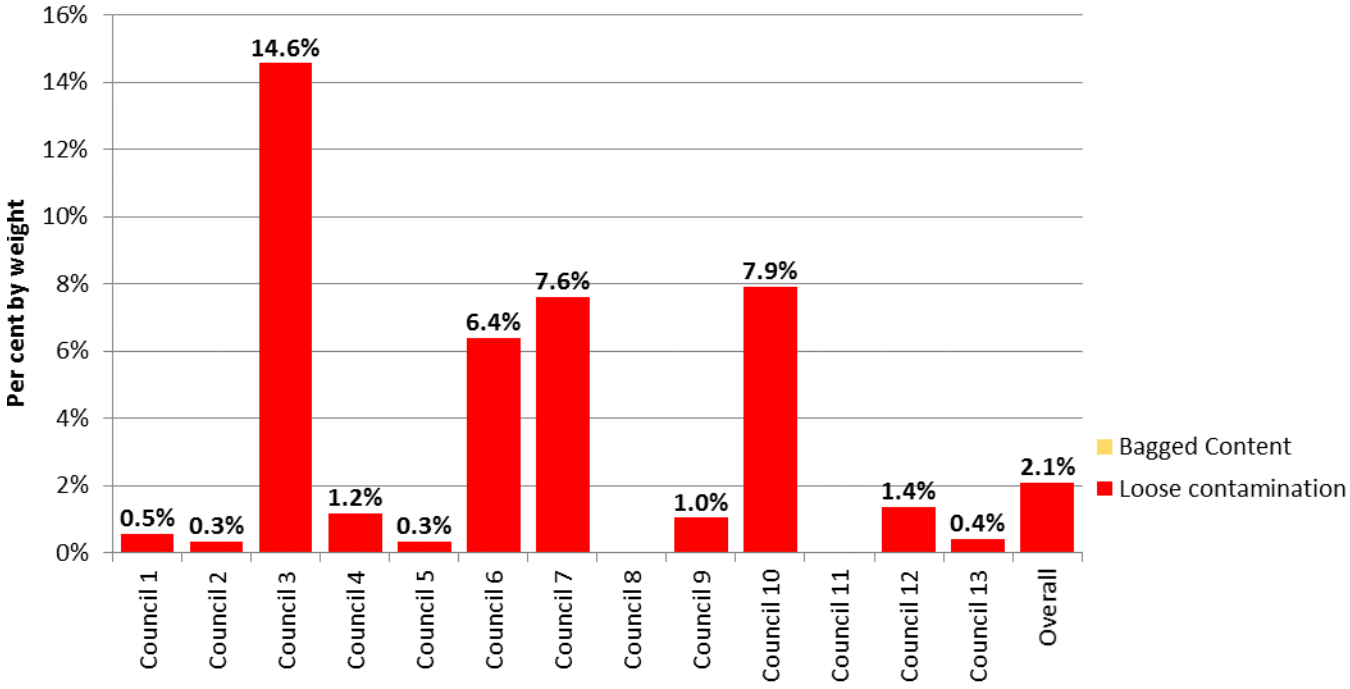


Figure 33 shows the contamination in the garden organics stream by council, for MUDs. Contamination ranges from 0.3% to 14.6%. No bagged material was found.

Figure 33 Garden organics contamination by council, MUDs



4.8 Hazardous materials

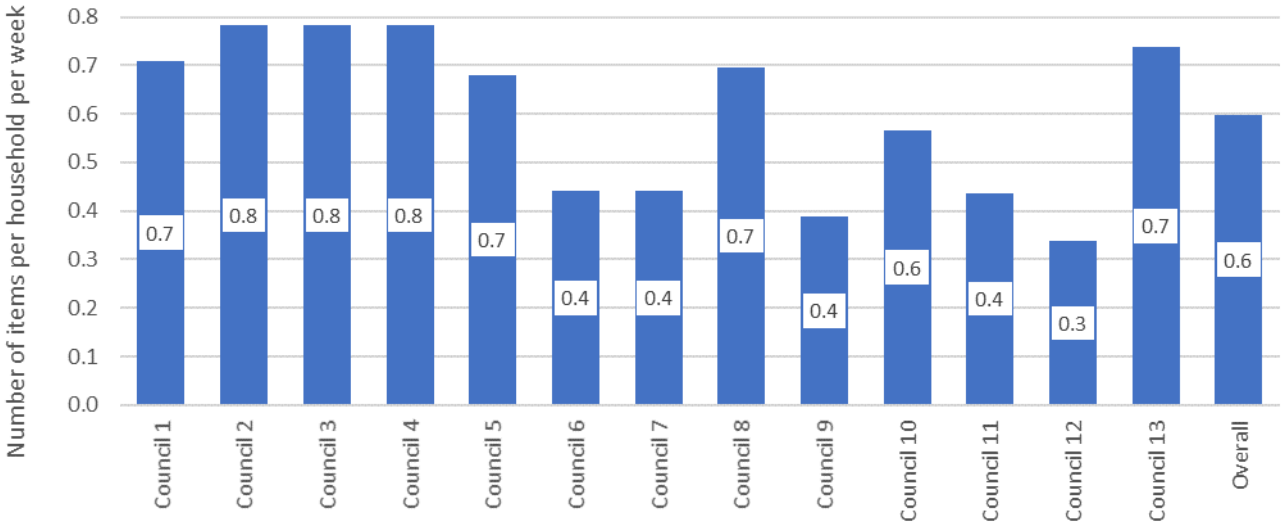
Table 14 identifies the quantity of hazardous items found per household. On average, 0.6 hazardous items were produced per household per week. The majority (88%) of hazardous items were found in the general waste bins, with 11% in the recycling and 1% in garden organics bins. The most common hazardous items found were non-rechargeable batteries and electrical items/peripherals. A smaller amount of clinical (medical) waste, toner cartridges, household chemicals, fluorescent tubes, mobile phones, paint and other batteries were also found.

Table 14 Hazardous materials per household

Item	Items per household per week
Non rechargeable batteries	0.24
Electrical items & peripherals	0.22
Clinical (medical)	0.08
Toner cartridges	0.02
Household chemicals	0.01
Fluorescent tubes	0.01
Mobile phones	0.01
Paint	<0.01
Other	<0.01
Computer equipment	<0.01
Asbestos	<0.01
Mobile phone batteries	<0.01
Rechargeable batteries	<0.01
Total	**0.60**

Figure 34 shows the average number of hazardous items found in the domestic waste bins per council. The results range from 0.3 to 0.8 items per household per week.

Figure 34 Hazardous items per household per week, by council



4.9 Recovery rates

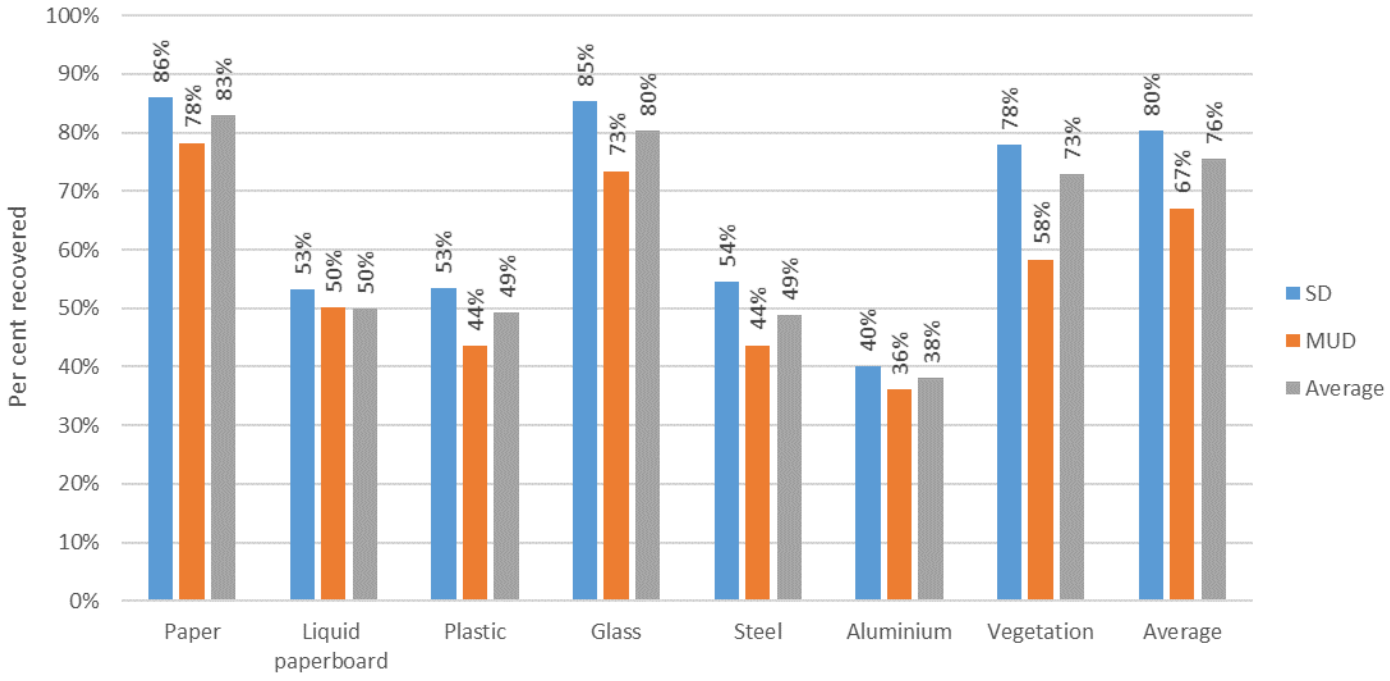
Recovery rates can by calculated by specific material, as well as overall — for example the number of aluminium cans found in the recycling bin, divided by the total amount of aluminium cans found in both the general waste and recycling bins. Recovery rates are useful for determining performance by material and which materials warrant increased focus for education initiatives. Recovery rates are calculated as follows:

$$\text{Recovery rate} = \frac{\text{Weight of recyclables in recycling bin + organics in the organics bin}}{\text{(Weight of recyclables in recycling bins + weight of organics in organics bin + weight of recyclables \& organics in general waste bin)}} \times 100$$

Recovery rates over 90% are considered good performance. Rates of 60-90% have room for improvement, and recovery rates below 60% are considered low and in need of further resident education.

Figure 35 shows the SSROC recovery rates for each dwelling type and all dwellings combined. The overall recovery rate is 76%. SDs achieve 80% and MUDs 67%. Paper and glass are well recovered, particularly at SDs. Vegetation is well recovered at SDs. Liquid paperboard, plastic, steel and aluminium recovery rates are under 55% at both housing types.

Figure 35 Recovery rates



4.10 Landfill diversion – current and potential

Diversion rates are helpful for understanding the total amount of waste diverted from landfill. This is calculated as follows:

$$\text{Diversion rate (proportion of waste diverted from landfill)} = \frac{\text{Weight of recyclables in the recycling bins + vegetation in the organics bin minus contaminants}}{\text{(Weight of the contents of the general waste bins + weight of the contents of the recycling bins + weight of contents of the organics bins)}} \times 100$$

The diversion rate may be slightly different to that calculated by Council using the overall general waste, recycling and organics tonnages generated during the year. This is because the audit is conducted as a snapshot of that particular time period and it does not factor in seasonal fluctuations or other annual trends.

The analysis provides an indication of overall system performance and highlights the additional diversion potential through either modified collection or processing systems and/or changing household behaviour. It should be noted, however, that maximum diversion rates are based on 100% participation rates, 100% correct presentation of materials and 100% recovery of the materials at the processing facilities. Therefore, these are maximum theoretical diversion rates. Councils may realistically aim to achieve 60% of the additional potential diversion for any of the targeted streams.
The *NSW Waste Avoidance and Resource Recovery Strategy 2014–21* sets a 70% diversion target for recycling of municipal solid waste (MSW).

Current diversion from landfill from SSROC's municipal waste and recycling is 37%. This comprises 20% diversion achieved from the commingled recycling and 17% from garden organics recycling.
SDs perform better than MUDs, due mainly to the amount of garden organics recycled by SDs.

Figure 36 2019 landfill diversion rates

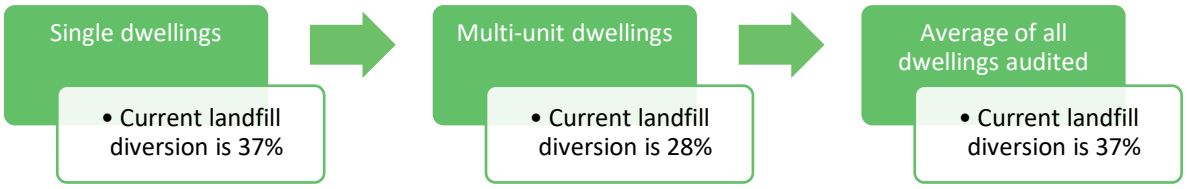
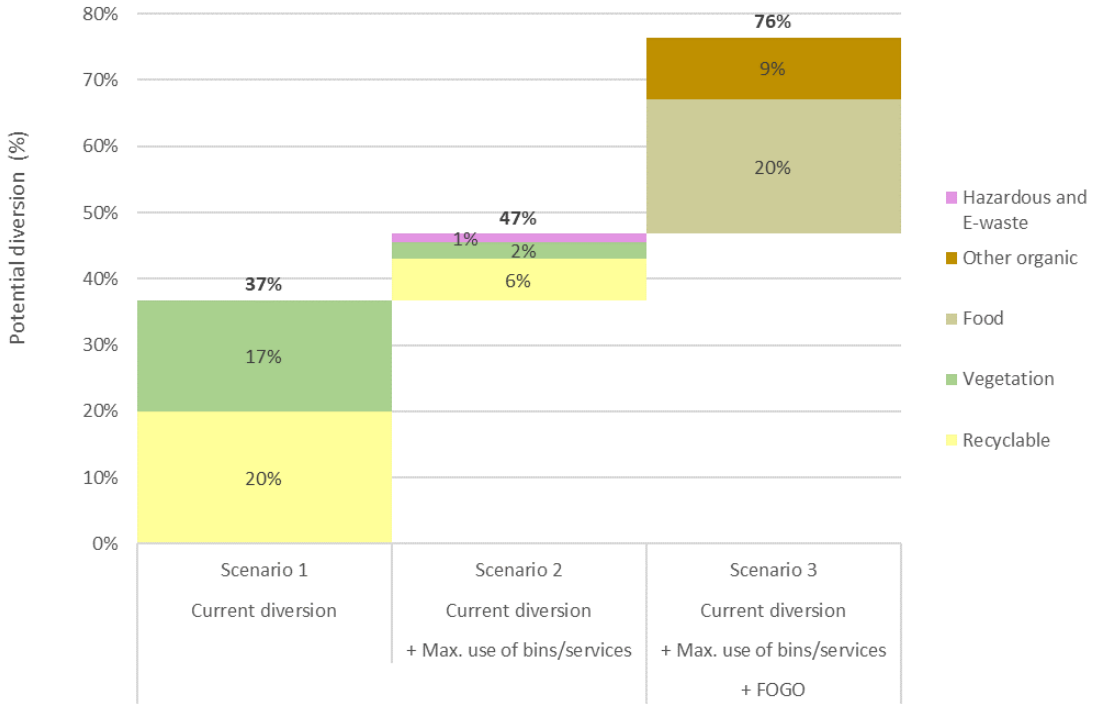


Figure 37 examines current and potential additional diversion rates under two further scenarios:

- Maximum use of bin services, i.e. 100% recovery of commingled recycling and garden organics and all hazardous waste and e-waste disposed via dedicated services; landfill diversion would increase to 47%. Maximum recovery of commingled recycling would result in an additional 6%, with maximum recovery of garden organics and full utilisation of the hazardous and e-waste disposal services each contributing a further 3% diversion.

- Replacement of the garden organics bin with a FOGO bin for loose food waste and other organics (contaminated paper and dog poo/cat litter). The full recovery of these materials would achieve an additional 29% diversion (20% loose food and 9% other organic), raising the maximum diversion potential to 76%.

Figure 37 Overall potential diversion for different recovery scenarios



Given the recent NSW EPA announcement in relation to AWT and mixed waste organic outputs (MWOO) processing and the regulatory uncertainty, no consideration of AWT processing has been included in this analysis.

4.11 Bin capacity utilised

The audit measured the fullness of the bins at each housing type for each waste stream. Table 15 and Table 16 show detail of bin utilisation at each housing type.

Table 15 Bin utilisation at single dwelling households

Statistic	General waste	Commingled recycling	Garden organics
Average per cent full	64%	71%	68%
Percentage of bins that are full or over-full	25%	26%	24%
Percentage of bins that are less than half full	36%	36%	37%

Table 16 Bin utilisation at multi dwelling households

Statistic	General waste	Commingled recycling	Garden organics
Average per cent full	73%	77%	68%
Percentage of bins that are full or over-full	28%	29%	20%
Percentage of bins that are less than half full	21%	20%	31%

Image 7 - Example of overfull general waste bins

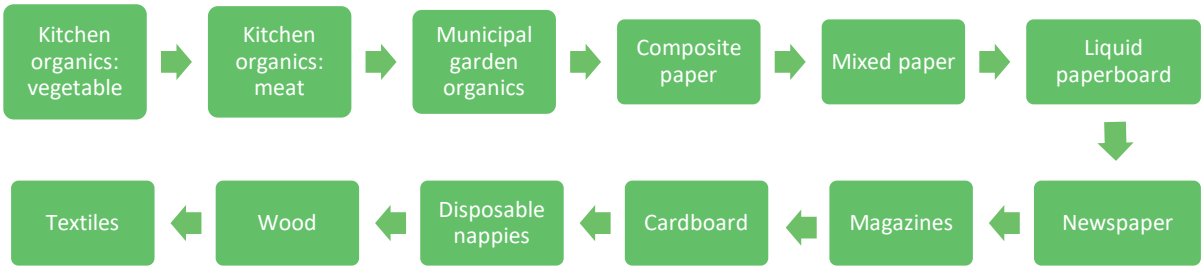
4.12 Calorific value of the general waste stream

To assist in assessing the potential for future energy-from-waste solutions for domestic waste, calorific values (CV) were calculated as per the Office of Renewable Energy Regulator *Guideline for Determining the Renewable Components in Waste for Electricity Generation,* 2001 (ORER Guideline).

The ORER categories match the existing NSW EPA categories as per the *NSW Guidelines Addendum 2010,* with the exception of the 'food' which has been divided into 'vegetation' and 'meat'. The NSW EPA category 'vegetation' has been renamed to 'municipal garden organics'.

Moisture content affects calorific value. The wetter the waste, the more energy is required to dry the material before it combusts to create energy. Therefore, the wetter the waste, the lower the raw calorific value. Hydrogen has a very high calorific value, so the hydrogen content of a waste type also influences its calorific value.

APC conducted moisture testing for the following categories of waste sorted during the audit:



The calorific value was calculated using the following formula:

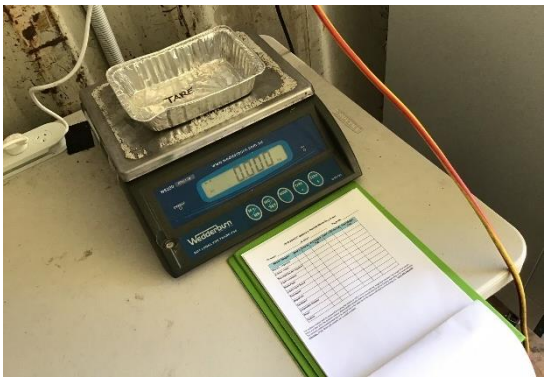
$$CVraw = ((1-w) \times (CVupper - (2441^* \times 9) \times H)) - 2441 \times w$$

Where:
CV = calorific value ('raw' is real 'as delivered' value, 'upper' is value for dried material) in kJ/kg
w = % moisture content (by weight)
H = % hydrogen content (from literature values)
* vaporisation enthalpy of water (2441 kJ/kg at 250°C)

Image 8 provides a photographic record of the moisture testing process.

Image 8 - Moisture-testing process

Empty foil trays for samples

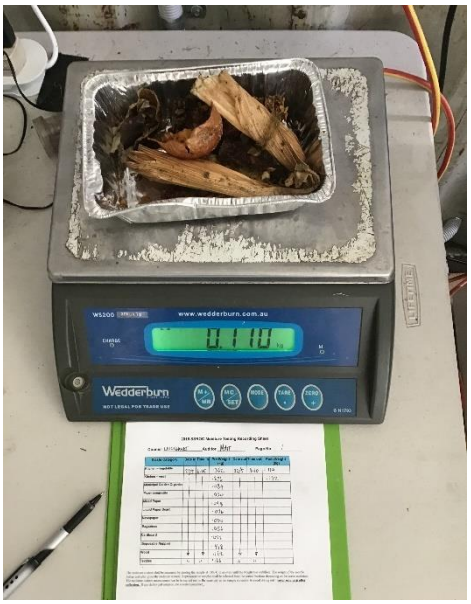


Scales are tared prior to weighing

Raw samples

Oven permanently set to 105°C

Raw samples in oven



Post drying, re-weighing samples

Data was entered into an Excel spreadsheet using the values and formulae as per the ORER *Guideline.*

The values are presented in two ways:

Raw	Dry
• 'As received'	• This is the 'upper' value
• Includes moisture content that is present when the material is collected from the kerb	• Assumes the moisture has been removed from the material following processing in the oven

Table 17 provides a summary of CV by dwelling type. The general waste generated by the average SSROC household has a CV of between 12 (wet) and 22 (dry) megajoules per kilogram. This equates to a CV of between 105 and 192 megajoules per household per week.

Table 17 Calorific values

	Calorific value per kg of general waste (MJ)			Calorific value per household per week (MJ)		
	SD	MUD	All dwellings	SD	MUD	All dwellings
Raw	11	12	12	119	77	105
Dry	21	22	22	227	137	192

The calorific value of the total general waste generated by all households in SSROC each year is estimated at a maximum of 5,485 terajoules per year (this is the upper, or dry, value). Theoretically, this is enough energy to supply electricity to approximately 88,900 homes for one year[5], which is approximately 16% of the households in SSROC.

Appendix G provides the CV detail by housing type and material category. The main contributors to CV in SSROC's general waste are food waste, plastics, plastic film, garden organics and nappies.

4.13 Beverage containers in the kerbside bins

This section shows the results of the beverage container audit for kerbside residual waste and recycling bins. Results in this section are by count of eligible beverage containers. Refer to Appendix E for a list of eligible beverage containers by product size and material.

Figure 38 shows that the average SSROC household puts 5.6 CDS-eligible beverage containers per week into their kerbside bins. Should wine and spirit containers be added at some future time a further 1.1 containers per week would be included.

[5]http://www.ipart.nsw.gov.au/Home/For_Consumers/Compare_Energy_Offers/Typical_household_energy_use

Figure 38 Generation of eligible beverage containers

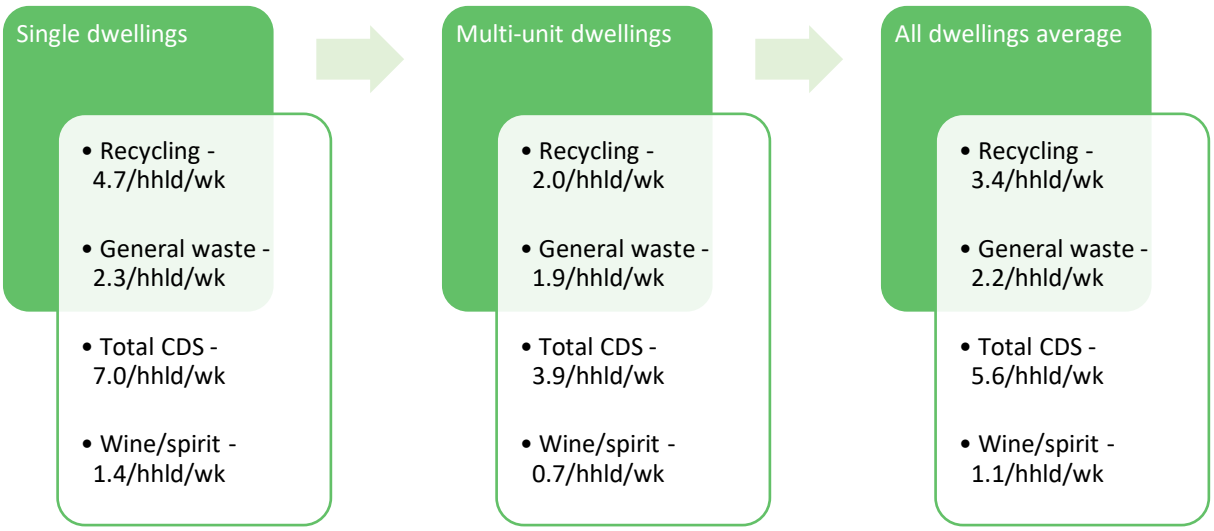


Figure 39, Figure 40, and Figure 41 show the number of CDS-eligible containers in the general waste and recycling bins at each council, per household per week, for the various housing types. Slight differences in reported totals are due to rounding.

Three councils have more CDS-eligible containers in the general waste than in the recycling.

Single dwellings generate more eligible containers per week than multi-unit dwellings, in all councils except one.

Figure 39 CDS-eligible containers in domestic bins, by council, all dwelling types

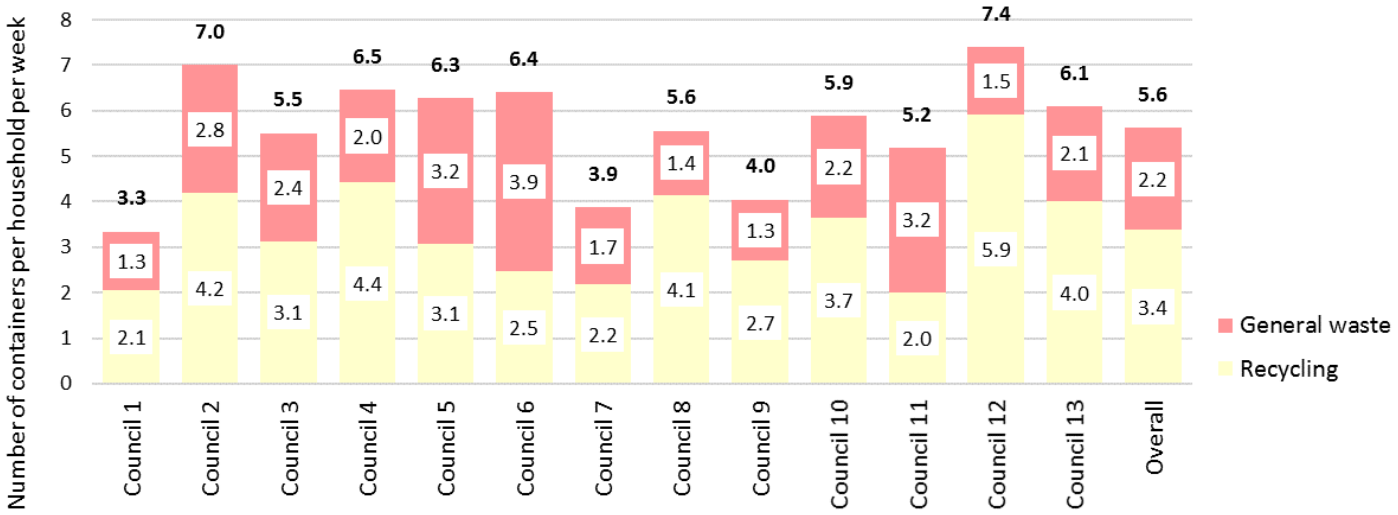


Figure 40 CDS-eligible containers in domestic bins, by council, single dwellings

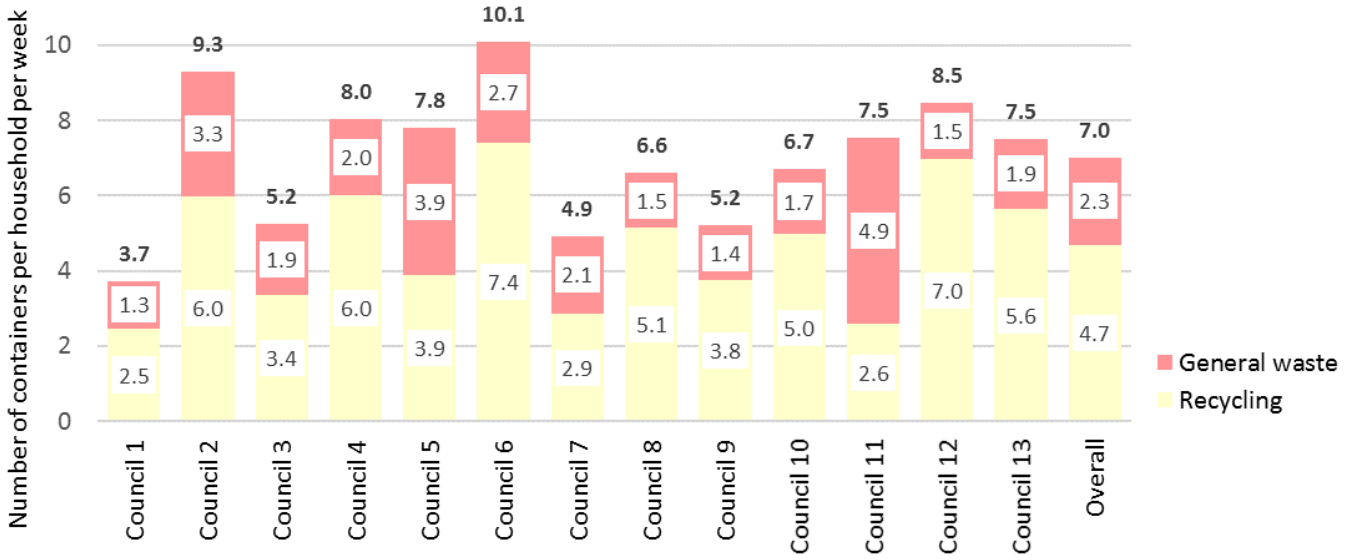
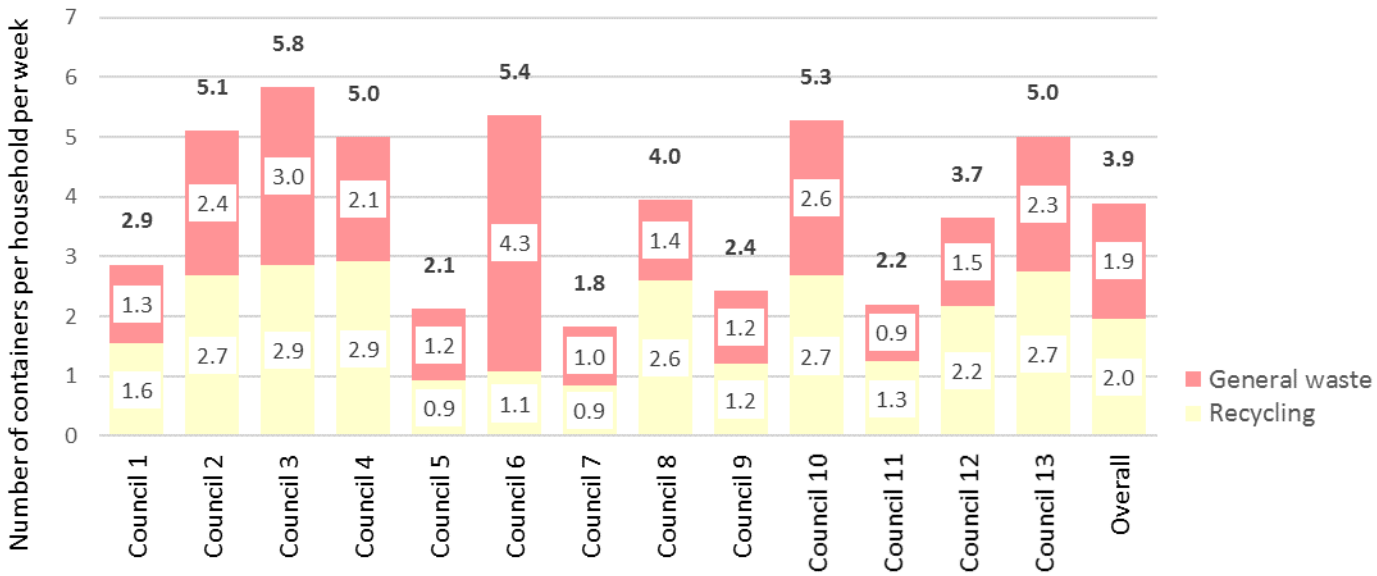


Figure 41 CDS-eligible containers in domestic bins, by council, multi-unit dwellings



Currently, wine and spirit bottles are not eligible for a rebate under the NSW CDS. However, these bottles may become eligible in the future.

Figure 42 shows that the average SSROC household generates 1.1 wine/spirit bottles per week in the domestic bins; almost all are in the recycling. SUDs average 1.4 wine/spirit bottles per household per week and MUDs average 0.7 bottles.

Figure 42 Wine and spirit bottles in the domestic bins

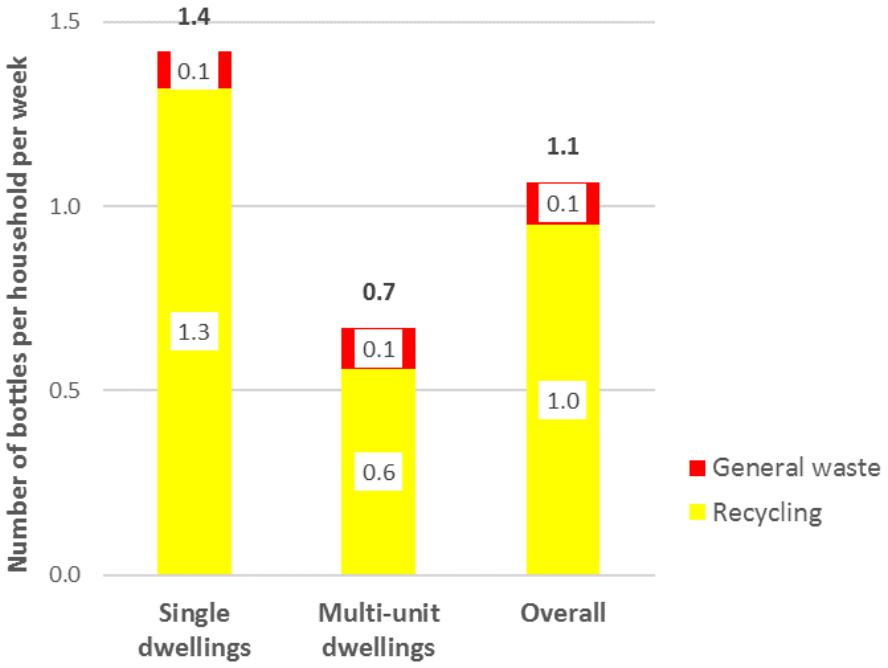
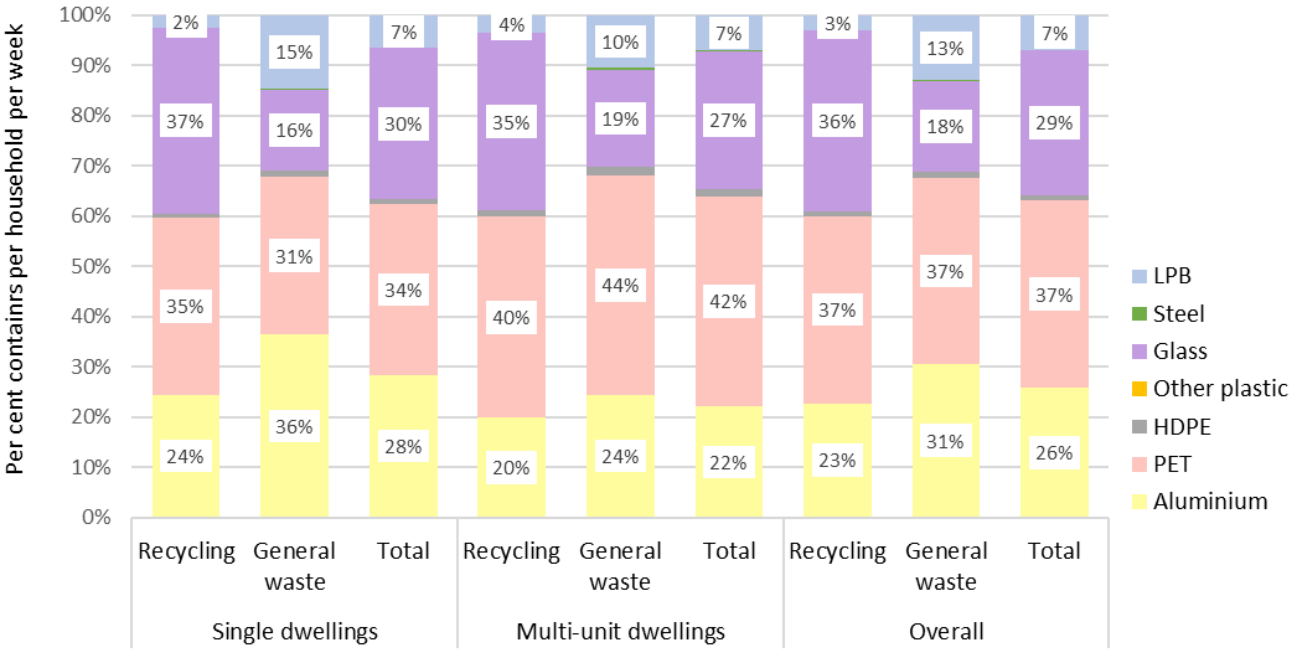


Image 9 - CDS eligible containers found in general waste and recycling

Figure 43 shows the percentage, by material type, of the total CDS eligible beverage containers in the general waste and commingled recycling. Overall PET is the most common eligible container material (37%), followed by glass (29%), and aluminium (26%) and liquid paperboard (7%).

Figure 43 CDS eligible beverage containers by material



5. COMPARISON WITH PREVIOUS AUDIT DATA

Data in this section has been compared with previous audit results where relevant data was available. Slightly different methodologies and times of year of the audit have occurred over time that may account for some of the differences in the results. This audit was undertaken at the end of a particularly hot and dry summer, whereas the previous 2015 audit was conducted in winter/spring.

In 2015 and 2019 APC used an aggregated collection method where all SDs and MUDs were collected together on different days, previously a 'bag and tag' method by household or MUD property was used. 2019 is most similar to 2011 overall results.

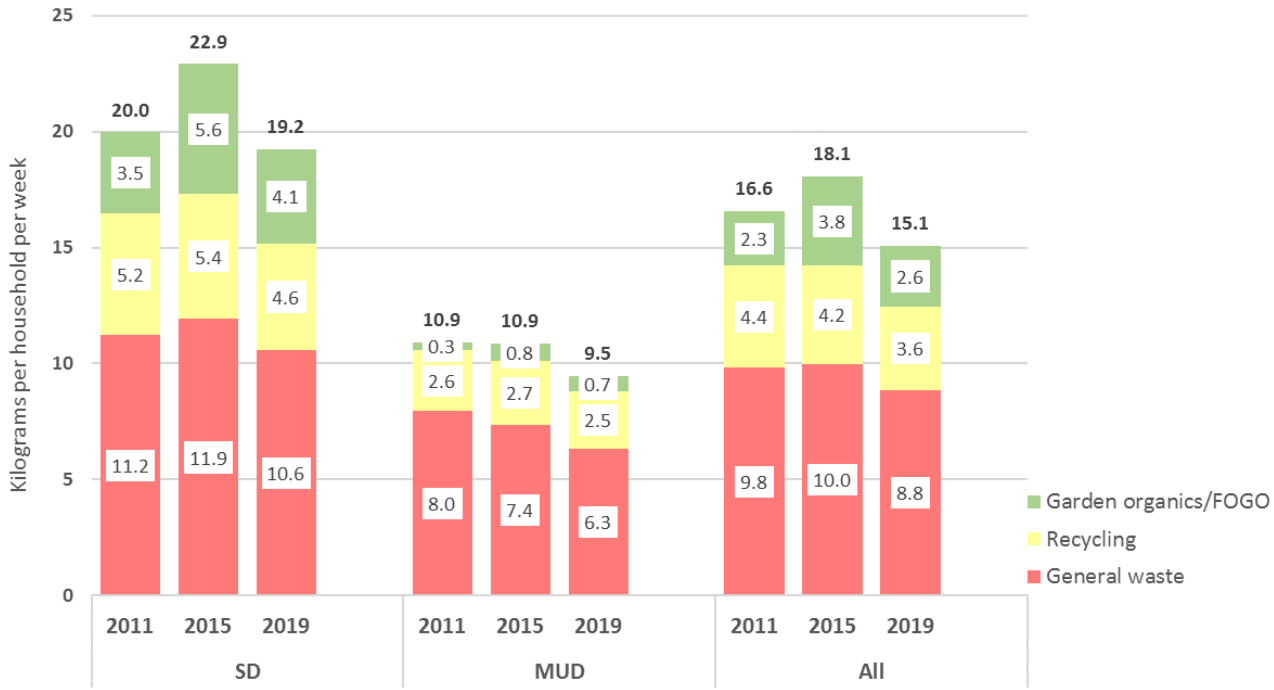
The 2019 averages excludes Council 4, as it has not participated in previous SSROC regional audits.

5.1 Overall waste generation - trends

Figure 44 shows the weight of general waste, recycling and organics generated per household per week for all dwelling types.

Overall domestic waste generation is lower than previous years. The 2019 generation of general waste and recycling is lower than previous years at both SDs and MUDs.

Figure 44 Weekly weight of waste stream by household – trends



5.2 General waste generation and composition – trends

Figure 45 shows the generation of the general waste stream in 2019 compared with previous audits. The time series shows a reduction in the amount of food waste in the general waste. The amount of recyclable paper and containers in the general waste in 2019 is also lower than previous years.

The amount of non-recyclable paper and containerised food and liquid have increased over time.

These trends are consistent at both SDs and MUDs.

Figure 45 General waste generation – trends

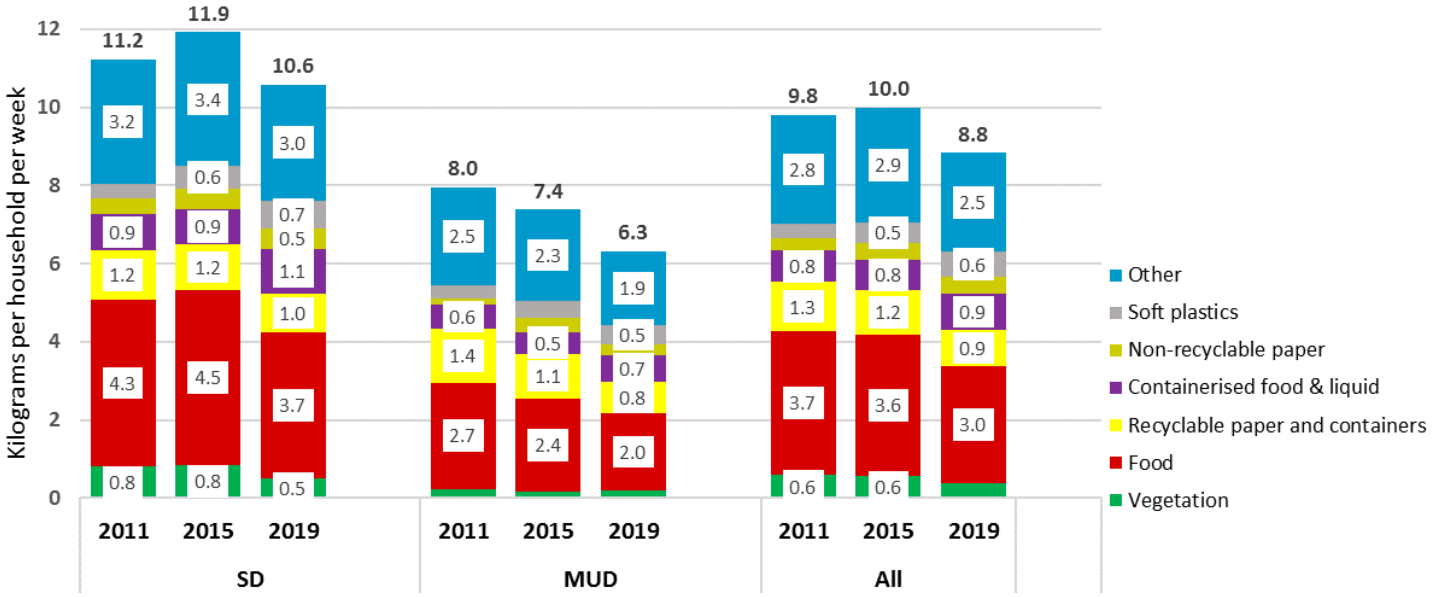
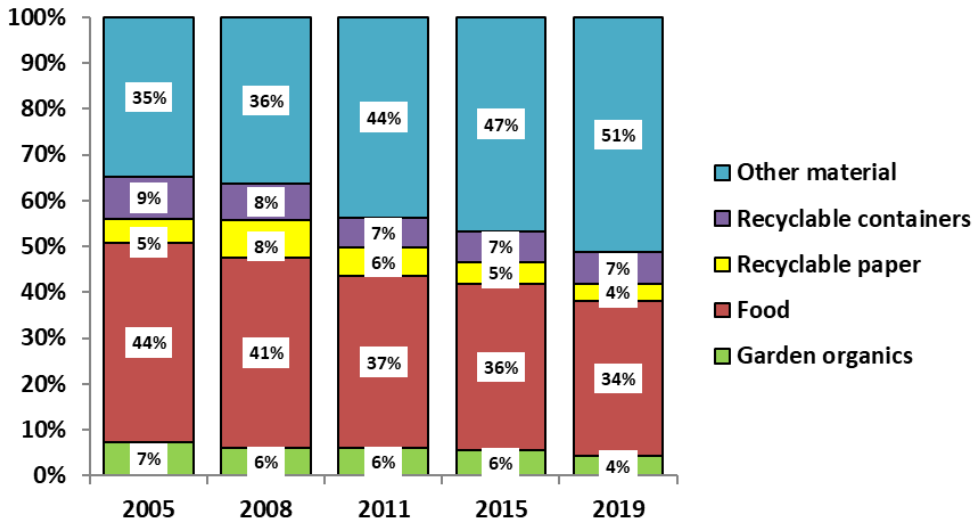


Figure 46 shows the proportion of the components of general waste over time. The proportion of food waste has reduced over time, as has the proportion of recyclables.

Figure 46 General waste composition – trends



5.3 Commingled recycling generation and composition - trends

Figure 47 shows the times series for the consolidated generation of the recycling stream in 2019 compared with previous audits.

The overall generation of commingled recycling in 2019 is lower than previous years. The generation of recyclable paper has reduced over time at both SDs and MUDs. This could be due to residents moving to on-line news, bills and magazines. The generation of recyclable containers in the recycling is lower in 2019 than previous years – this could be due to the introduction of the Container Deposit Scheme.

Figure 47 Commingled recycling generation – trends

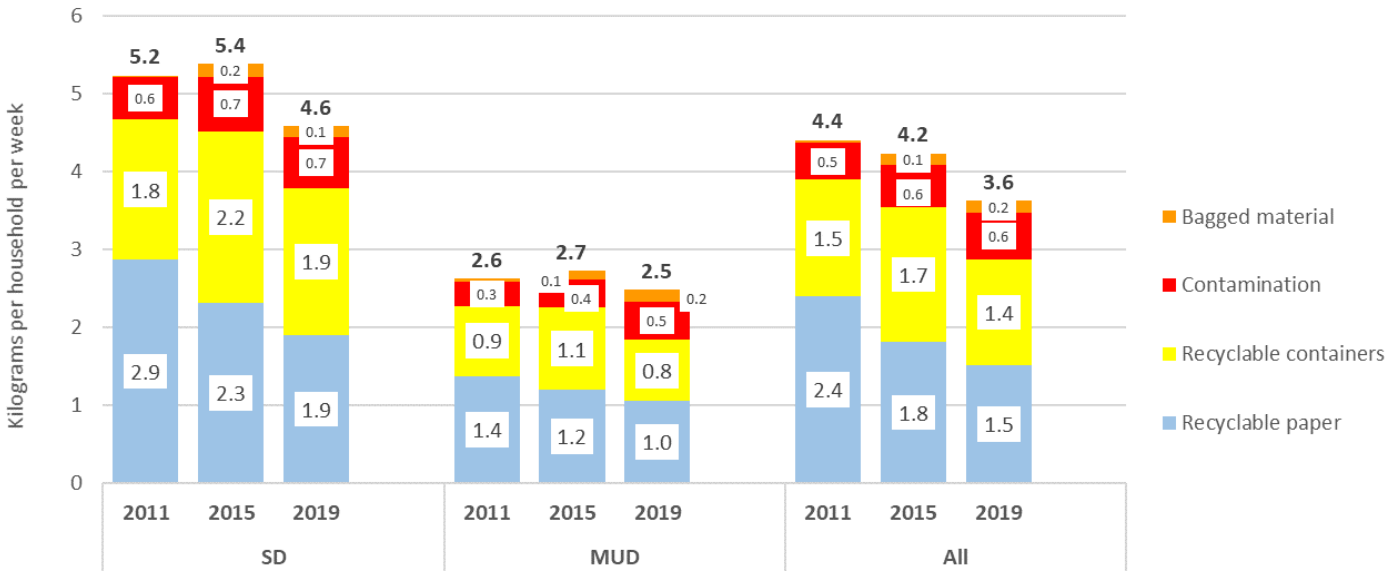


Figure 48 shows the proportions of materials in commingled recycling over time. The proportion of recyclable paper has reduced over time. Contamination, as a proportion, has risen over time.

Figure 48 Commingled recycling composition - trends

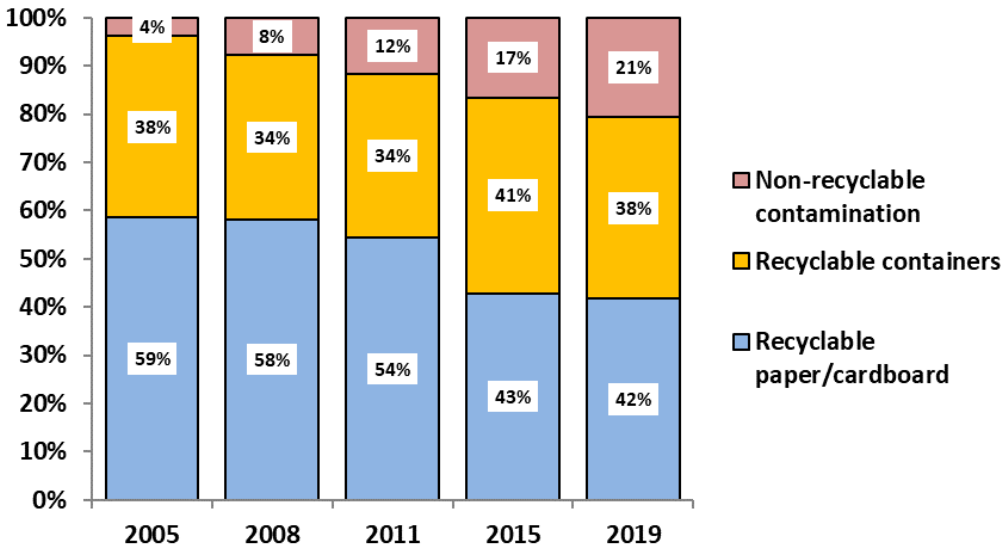


Figure 49 shows the proportion of contamination in the commingled recycling over time. The proportion of both loose contamination and bagged material has increased over time, at both SDs and MUDs.

Figure 49 Proportion of contamination in the commingled recycling - trends

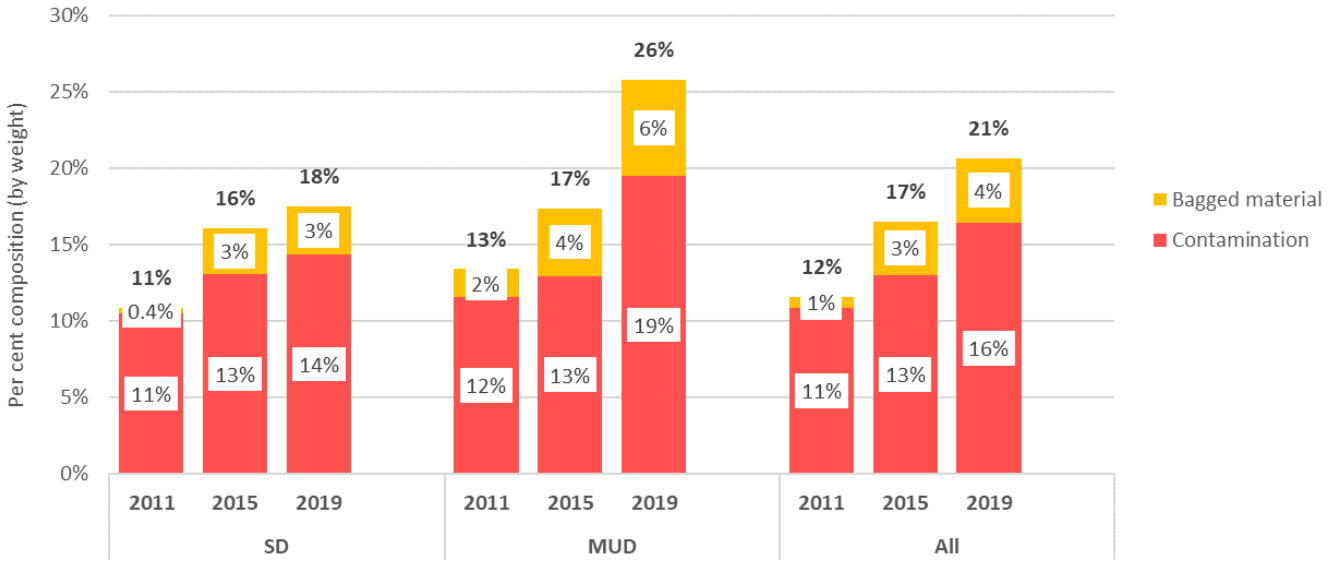
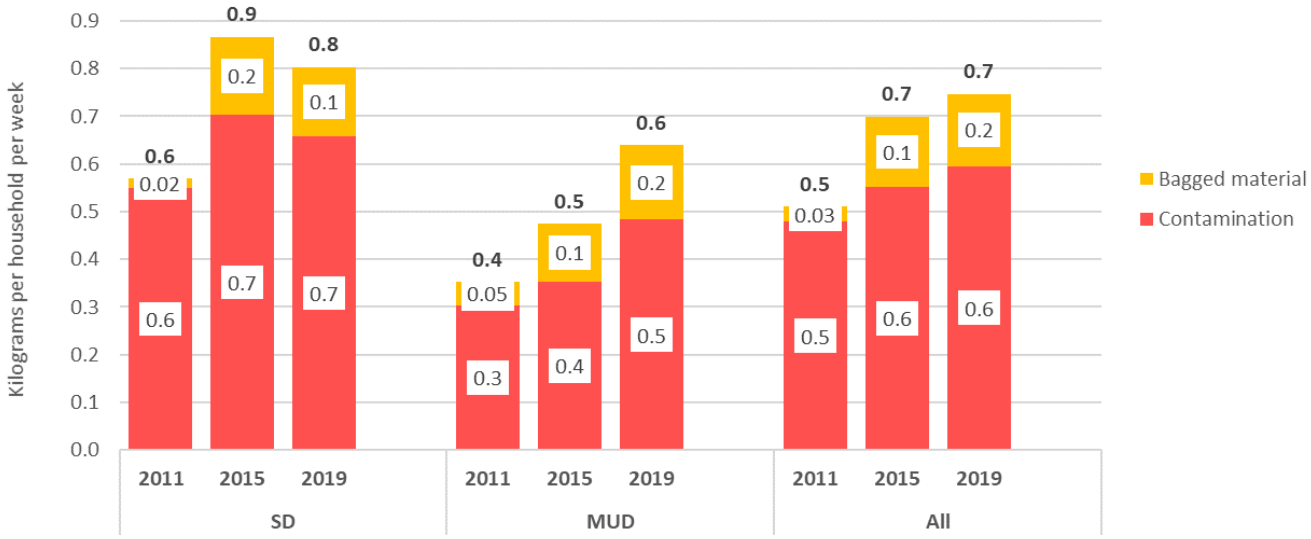


Figure 50 shows the generation of contamination in the commingled recycling over time. Overall, the generation of both loose contamination and bagged material has increased over time. At MUDs, both loose and bagged material have increased over time. At SUDs, the 2019 contamination generated was slightly lower than in 2015 but higher than 2011.

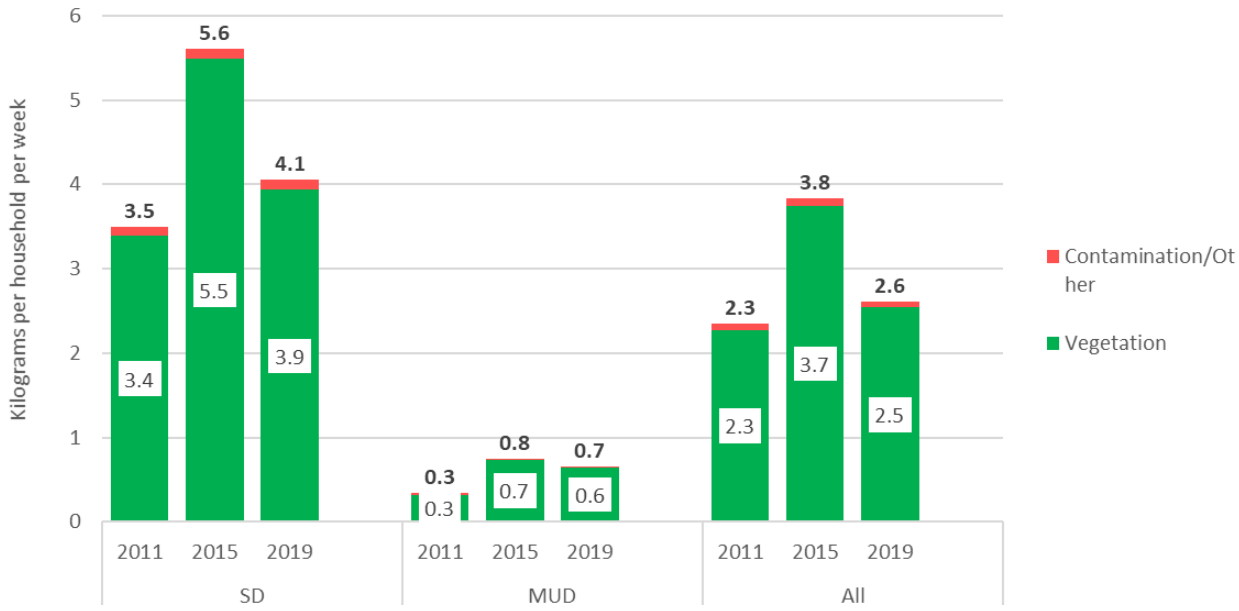
Figure 50 Commingled recycling contamination generation – trends



5.4 Organics recycling generation– trends

Figure 51 shows the generation of organics recycling over time. Organics generation varies significantly with seasonal and climatic changes, and generation has fluctuated over time. Only Council 13 currently allows food waste in the organics bin. Contamination has remained consistently low over time.

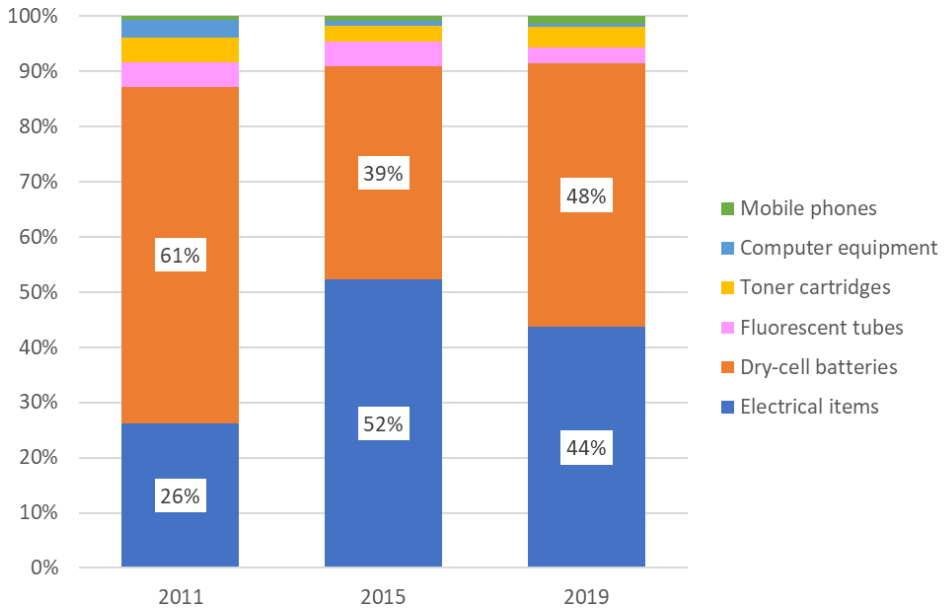
Figure 51 Organics recycling generation and composition - trends



5.5 Hazardous materials – trends

Figure 52 shows the composition of the hazardous items counted in the audits over time, by number of items. Electrical items and batteries are consistently the most common items found, with e-waste representing a larger proportion, and batteries a lower proportion, in 2015 and 2019 compared with 2011.

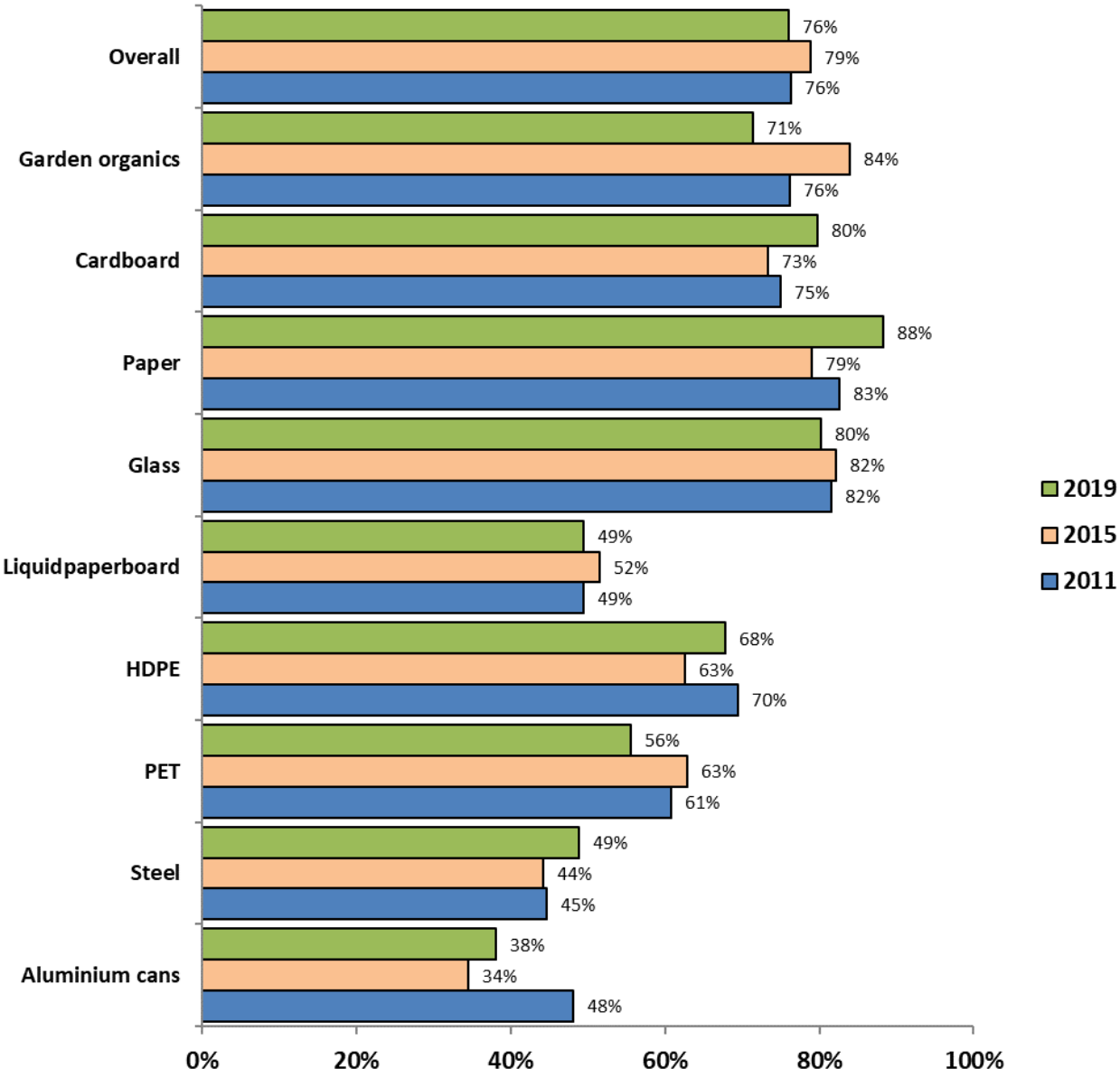
Figure 52 Hazardous materials - trends



5.6 Recovery of recyclables - trends

Figure 53 shows the recovery rates from all dwellings in previous audits. The overall recovery of recyclable materials is slightly lower than 2015 and the same as 2011. Glass, paper and cardboard continue to be well recovered. Garden organics recovery has dropped slightly. The recovery of other materials remains below 70%.

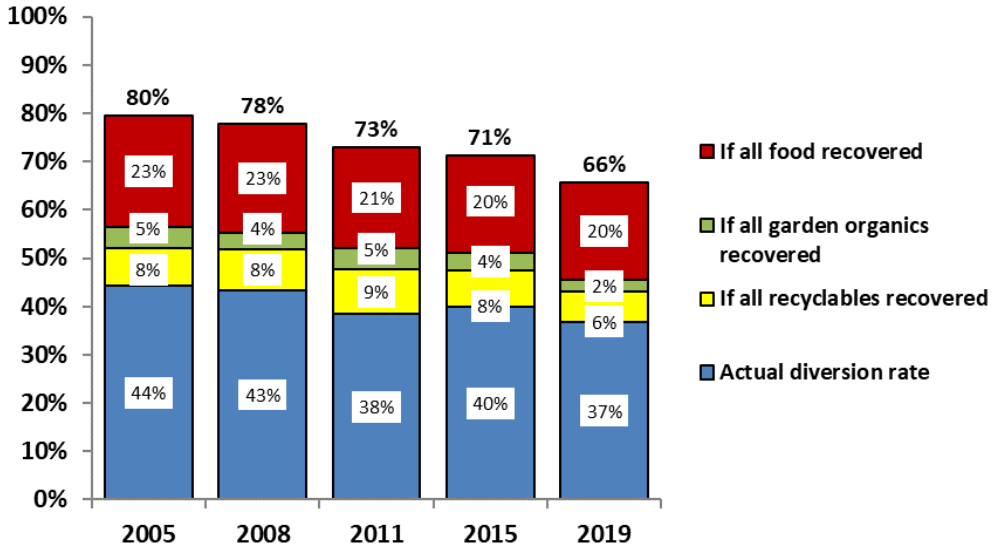
Figure 53 Recovery rates – trends



5.7 Landfill diversion - trends

Landfill diversion from SSROC municipal waste is shown to be declining. This is most likely due to a reduction of recoverable material, most notably paper and more recently containers. The potential diversion has also decreased as the amount of paper, containers and food waste available for recovery has declined over time.

Figure 54 Current and potential diversion rates – all dwellings – previous audits

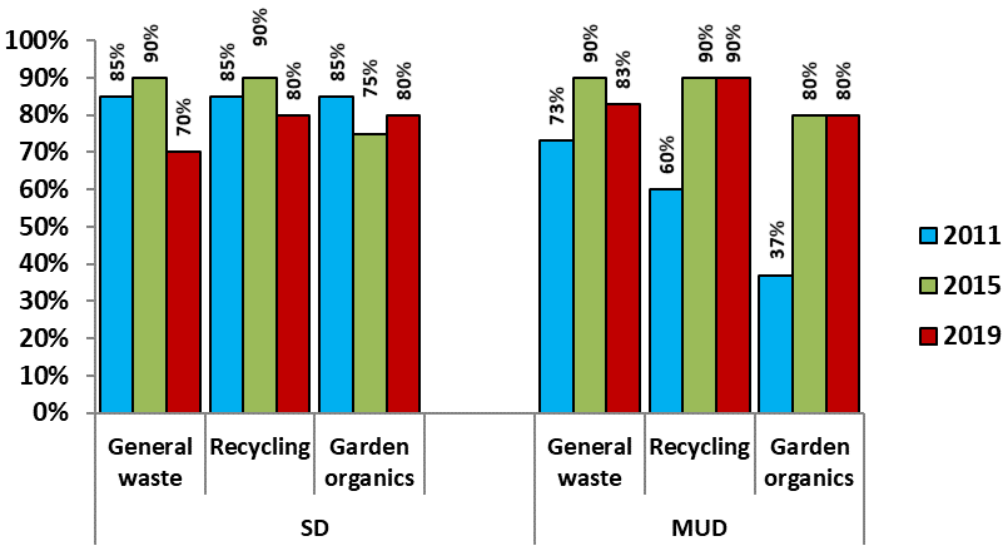


5.8 Bin usage - trends

Figure 55 shows the median bin utilisation for 2019 compared with previous years. At SDs, use of general waste and recycling bins has declined and garden organics are slightly higher, though garden organics generation is heavily influenced by seasonal variation.

At MUDs, bin usage remains high for recycling and garden organics and has decreased for general waste compared with 2015.

Figure 55 Median volume of bins used – previous audits



6. KEY FINDINGS

6.1 Bin presentation rates

- 82% of SD and 100% of MUD households present a general waste bin for collection.
- 81% of SD and 100% of MUD households present a commingled recycling bin for collection.
- 27% of SD and 47% of MUD households present a garden organics bin for collection.
- In councils with separate paper/cardboard and container recycling bins, presentation rates are 78% for SD containers and 60% for SD paper/cardboard. MUDs present 100% for both bin types.

6.2 Total waste and recycling generation

- The average SSROC household generates a total of 15.1 kg of general waste, commingled recycling and garden organics per week.
- The average single dwelling produces more than the average multi-unit dwelling: 19.2 kg per week for SDs and 9.5 kg per week for MUDs.

6.3 General waste generation

- The average SSROC household produces 8.8 kg of general waste per household per week.
- Generation ranges from 6.8 to 11.9 kg per household per week.
- SDs produce more per week (10.6 kg) than MUDs (6.3 kg).
- The largest difference in generation between the housing types is loose food waste. SDs generate 3.7 kg per household per week compared to 2.0 kg at MUDs.

6.4 Composition of the general waste stream

- The largest individual category is loose food waste at 34%, followed by non-recyclable paper (11%), containerised food and liquid (7%), soft plastics (7%), nappies (6%) and textiles (5%).
- Over ten per cent (10.5%) of general waste is material that should be in the commingled recycling bins (or paper/containers bins at councils that have separate bins for these). This material comprises recyclable containers (6.9%) and recyclable paper/cardboard (3.6%).
- 4.3% of general waste is vegetation that should be in the garden organics bin. If Council 11 is excluded (which doesn't have an organics service and has 15% garden organics in the general waste), there is 3% average garden organics in the general waste.
- 1.7% of general waste is items that should be in the e-waste or hazardous waste services provided. By weight, these items are mainly electrical items, and paint.
- Over half (52.3%) of general waste is material that could go into a combined food and garden organics (FOGO) bin. These materials are predominantly food and non-recyclable (soiled) paper.
- 77% of general waste is presented in bags.

6.5 General waste bin usage

- SDs use an average of 64% of their general waste bin. MUDs average 73%.
- At SDs, 25% of general waste bins are full or overflowing.
- At MUDs, 28% of general waste bins are full or overflowing.

6.6 Commingled recycling generation

- The average SSROC household produces 3.6 kg of commingled recycling per week.
- SDs produce 4.6 kg per week, MUDs produce 2.5 kg a week.
- The generation ranges from 2.0 to 5.1 kg per household per week.

6.7 Composition of the commingled recycling stream

- The main components are recyclable paper (41.6%) and recyclable containers (37.8%).
- Contaminants in the commingled recycling make up 20.5% of which the largest proportion of single material is bagged material (4.2%). All bagged material is considered as contamination as it cannot be opened or separated at the MRF, regardless of whether the material in the bags is recyclable or not.
- The next largest contaminants are non-recyclable (soiled) paper (3.8%), non-recyclable hard plastics (1.6%), containerised food and liquid (1.6%), textile/carpet (1.2%) and composite materials that are mostly paper (1.1% - these are usually brochures wrapped in plastic).
- Contamination ranged from 9.3% to 32.7%.
- MUDs have a higher proportion of contamination in the recycling (25.9%) compared to SDs (17.3%).
- In terms of the amount of contamination generated however, MUDs generate less loose contamination per household per week than SDs and only slightly more bagged material.
- Bagged material, non-recyclable (soiled) paper and containerised food and liquid are in the top five contaminants at both SDs and MUDs, with the proportion of bagged material significantly higher at MUDs than SDs.

6.8 Commingled recycling bin usage

- SDs use an average of 71% of their commingled recycling bin and MUDs use 77%.
- At SDs, 26% of commingled bins are full or overflowing.
- At MUDs, 29% of commingled bins are full or overflowing.

6.9 Garden organics generation

- The average SSROC household produces 2.6 kg per week of garden organics.
- The majority of this is from SDs at 4.1 kg, with MUDs generating 0.7 kg per household per week.
- Generation ranges from zero to 5.6 kg per household per week.

6.10 Composition of the garden organics stream

- The majority of the organics stream is recyclable vegetation (97.2%).
- Contamination in the garden organics stream is reasonably low, at 2.8%.
- Contamination ranges from 0.7% to 5.9%. Bagged material was only found at Council 2.
- The main contaminant is food, followed by wood/timber and ceramics/dirt/dust/rock/inert, building materials and plastic bags.
- The contamination in the garden organics stream was 3.2% at SDs and 2.4% at MUDs.

6.11 Garden organics bin usage

- Both SDs and MUDs use an average of 68% of their organics bin capacity.
- 24% of SD organics bins are full or overflowing, and 20% of MUD organics bins are full or overflowing.

6.12 Hazardous materials, including batteries

- On average, 0.6 hazardous items were produced per household per week.
- The majority (88%) of hazardous items were found in the general waste bins, with 11% in the recycling and 1% in garden organics bins.
- The most common hazardous items found were non-rechargeable batteries and electrical items/peripherals. A smaller amount of clinical (medical) waste, toner cartridges, household chemicals, fluorescent tubes, mobile phones, paint and other batteries were also found.
- The results range from 0.3 to 0.8 items per household per week.

6.13 Recovery of recyclable materials

- The overall recovery rate is 76%.
- SDs achieve 80% and MUDs 67%.
- Paper and glass are well recovered, particularly at SDs. Vegetation is well recovered at SDs.
- Liquid paperboard, plastic, steel and aluminium recovery rates are under 55% at both housing types.

6.14 Diversion from landfill

- Current diversion from landfill from SSROC's municipal waste and recycling is 37%. This comprises 20% diversion achieved from the commingled recycling and 17% from garden organics recycling.
- SDs achieve 37% diversion and MUDs 28%.
- If all commingled recycling material was put into the recycling bins, an extra 6% diversion would be achieved, lifting overall diversion to 43%.
- Maximum recovery of garden organics and full utilisation of the hazardous and e-waste disposal services would contribute a further 3% diversion.
- Replacement of the garden organics bin with a FOGO bin for loose food waste and other organics (contaminated paper and dog poo/cat litter would achieve potential additional 29% diversion could be achieved (20% loose food and 9% other organic), raising the maximum diversion potential to 76%.

6.15 Calorific value of the general waste stream

- The general waste generated by the average SSROC household has a CV of between 12 (wet) and 22 (dry) megajoules per kilogram. This equates to a CV of between 105 and 192 megajoules per household per week.
- The calorific value of the total general waste generated by all households in SSROC each year is estimated at a maximum of 5,485 terajoules per year (this is the upper, or dry, value).

Theoretically, this is enough energy to supply electricity to approximately 88,900 homes for one year[6], which is approximately 16% of the households in SSROC.

6.16 Beverage containers in the kerbside bins

- The average SSROC household puts 5.6 CDS-eligible containers into their kerbside bins each week.
- The average SSROC household puts 3.4 CDS-eligible containers per week into the recycling bin and 2.2 CDS-eligible containers per week into the general waste bin.
- Single dwellings average 7.0 containers per week (4.7 in the recycling and 2.3 in the general waste).
- Multi-unit dwellings average 3.9 containers per week (2.0 in the recycling and 1.9 in the general waste)
- Single dwellings generate more eligible containers per week than multi-unit dwellings, in all councils except for Council 3.
- Council 5, Council 6 and Council 11 have more CDS-eligible containers in the general waste than in the recycling.
- The average SSROC household puts 1.1 wine/spirit bottles per week into the domestic bins. Almost all of these are in the recycling bins. SDs average 1.4 bottles per week and MUDs 0.7 bottles per week.

6.17 Trends

- Overall domestic waste generation is lower than previous years. The 2019 generation of general waste and recycling is lower than previous years at both SDs and MUDs.

- For general waste, the time series shows a reduction in the amount of food waste in the general waste. The amount of recyclable paper and containers in the general waste in 2019 is also lower than previous years. The amount of non-recyclable paper and containerised food and liquid have increased over time. These trends are consistent at both SDs and MUDs.

- The overall generation of commingled recycling in 2019 is lower than previous years. The generation of recyclable paper has reduced over time at both SDs and MUDs. This could be due to residents moving to on-line news, bills and magazines. The amount of recyclable containers in the recycling is lower in 2019 than previous years – this could be due to the introduction of the Container Deposit Scheme.

- Contamination, as a proportion of recycling, has risen over time. Overall, the generation of both loose contamination and bagged material has increased over time. At MUDs, both loose and bagged material have increased over time. At SUDs, the 2019 contamination generated per household per week was slightly lower than in 2015 but higher than 2011.

[6]http://www.ipart.nsw.gov.au/Home/For_Consumers/Compare_Energy_Offers/Typical_household_energy_use

- Electrical items and batteries have consistently been the most common hazardous items found in the domestic waste streams, with e-waste representing a larger proportion, and batteries a lower proportion, in 2015 and 2019 compared with 2011.

- The overall recovery of recyclable materials is slightly lower than 2015, and the same as 2011. Glass, paper and cardboard continue to be well recovered. Garden organics recovery has dropped slightly. The recovery of other materials remains below 70%.

- Landfill diversion from SSROC municipal waste is shown to be declining. This is most likely due to a reduction in the amount of recoverable material in the domestic waste, most notably paper and more recently containers. The potential landfill diversion has also decreased as the amount of paper, containers and food waste available for recovery has declined over time.

- At SDs, use of general waste and recycling bins has declined and garden organics are slightly higher, though garden organics generation is heavily influenced by seasonal variation.

- At MUDs, bin usage remains high for recycling and garden organics and has decreased for general waste compared with 2015.

7. DISCUSSION OF KEY FINDINGS

- The general waste stream still contains over 10% of materials that should be in the commingled recycling (predominantly cardboard and glass drink containers), and 4% garden organics (slightly lower if Council 11 is excluded, as they don't have an organics service). An education campaign, for both MUDs and SDs, could help to divert these materials from the general waste into the recycling and organics streams, and result in a lift in recovery rates.

- 1.7% of general waste is items that should be in the e-waste or hazardous waste services provided. By weight these items are mainly electrical items, and paint; by number they are predominantly batteries. Further education on the options for disposing of household hazardous waste may help in removing these from the general waste stream.

- At 34% of general waste, food waste is SSROC's single largest opportunity for increasing landfill diversion. For the eight councils currently sending general waste to mechanical-biological processing facilities, the recovery of organics will be dependent on the future of these facilities, which are currently awaiting regulatory certainty regarding allowable uses of the organic product produced from general waste. Other options for organics diversion from landfill are through a combined food and garden organics (FOGO) service or further encouraging home composting and/or worm farming. Over half (52.3%) of general waste is suitable for a FOGO bin, including food, non-recyclable paper and dog poo/kitty litter.

- Contamination in the commingled recycling stream has continued to increase, particularly at multi-unit dwellings and requires continued education. Focus could be placed on the main contaminants: bagged material, non-recyclable (soiled) paper, non-recyclable hard plastics and containerised food and liquid. Different contaminants could be targeted at single and multi-unit dwellings based on the 'top five' contaminants listed in this report.

- Understanding the changing composition of recycling, including the removal of beverage containers from kerbside recycling into the Container Deposit Scheme, will help councils in future re-negotiations or new tenders for recyclables collection and processing.

APPENDIX

Appendix A Waste Term Definitions

Containerised food and liquid: Bottle or takeaway container with residual food and liquid that would be considered a contaminant in a recycling or waste treatment facility.

Contaminant*:* Item that is not accepted for processing in the bin it is placed in.

Commingled collection*: Pick up and transportation of mixed dry recyclable materials.

Diversion rate*:* The percentage of the total kerbside waste stream diverted from disposal not including clean-up collections, loose vegetation collections and drop-off systems.

$$\text{Diversion rate (proportion of waste diverted from landfill)} = \frac{\text{Weight of recyclables in the recycling bins and garden organics in the garden organics bin – contaminants}}{\text{(Weight of the contents of the general waste bins + weight of the contents of the recycling bins + weight of garden organics in the garden organics bins)}} \times 100$$

Recyclable*:* Able to be recovered, processed and used as a raw material for the manufacture of useful new products through a commercial process.

Recycling stream*:* Material source-separated for the purposes of recycling.

Recovery rate*:* The amount of material recovered from a product group as a percentage of overall consumption.

$$\text{Recovery rate} = \frac{\text{Weight of recyclables in recycling bin + garden organics in the garden organics bin}}{\text{(Weight of recyclables in recycling bin + weight of garden organics in garden organics bin + weight of recyclables \& garden organics in general waste bin)}} \times 100$$

Segregation*:* Keeping the components of an assorted waste stream separated.

Source separation*: Physical sorting of the waste stream into its components at the point of generation.

Stringy materials: Rope, string, hose, electrical cable, carpet, textiles, cords, strips of bubble wrap and other plastic film, electrical lead, electrical wiring.

Problem waste: Hazardous waste and batteries, as noted in the sorting categories and definitions list at **Appendix D**.

Total waste stream*:* The combined waste, recycling and garden organics streams.

Waste composition*: Component material types by proportion of weight or volume.

*** Source: AS/NZS 3831:1998**

Appendix B Sorting Categories and Definitions

Materials are listed by EPA name, as defined in Guidelines for Conducting Kerbside Residual Waste, Recycling and Garden Organics Audits in NSW Local Government Areas 2008, including the audit Guideline Addendum 2010. Australian Waste Database (AWD) codes are listed where applicable.
To assist interpretation, this report uses alternative descriptive names for some materials which is provided in italics beneath the EPA name.

Table 18 Material sorting categories definitions

AWD Code	Material Name	Material items
	PAPER	
A01	Newspapers	Newspapers, newspaper-like pamphlets
A02	Magazines	Magazines (glossy and non-glossy), pamphlets, brochures
A04	Cardboard	Cardboard with corrugation, cardboard without corrugation (glossy and non-glossy), cereal boxes, business cards
A06	Liquid paperboard	Soy milk cartons, some fruit juice cartons, UHT/long-life milk
A07	Disposable paper products	Hand towels, coffee cups, paper napkins, paper food bags (unsoiled)
A08	Recyclable paper *Other recyclable paper	A4 document paper, writing pads, letters, envelopes, books, wrapping paper, labels, paper packaging (no plastic or wax coatings)
A09	Composite (mostly paper)	Composite paper items for which the weight of the paper is estimated to be greater than the weight of the other materials
A90	Nappies *Nappies and feminine hygiene	Used disposable nappies
A092	Contaminated paper *Non-recyclable paper (soiled)	Paper not suitable for recycling, mixed and other paper, used tissues, soiled paper
	ORGANIC (COMPOSTABLES)	
B01	Non-meat *Food (non-meat)	Vegetable scraps, leftover food
	Meat *Food (meat)	Meat scraps, animal food
	Containerised/packaged food & liquid * Containerised food & liquid	Any rigid container including food & liquid heavier than the container, i.e. drink bottle containing water, takeaway container with food, vegetable oils, shampoo, liquid soaps
B02	Garden organics * Vegetation	Grass clippings, tree trimmings/prunings, flowers, tree wood (< 20 mm diameter) (Alternative name provided to distinguish material from the Garden organics stream)
B03	Other putrescible *Dog poo/kitty litter	Animal excrement, mixed compostable items, cellophane, kitty litter
	OTHER ORGANIC	
C01	Wood/timber	Milled wood/timber, children's wooden toys, wooden skewers, garden trees (> 20 mm diameter)
C02	Textile/carpet	Wool, cotton and natural fibre materials
C03	Leather	Leather clothing, craft leather, some shoes, belts with belt buckle
C04	Rubber	Rubber bands, rubber toys, shoes, latex gloves
C05	Oils	Used car oil, motor

AWD Code	Material Name	Material items
	GLASS	
D012	Glass drink containers	Recyclable (all colours) – beer bottles, wine bottles, spirit, cider/fruit-based, flavoured water, fruit juice, sports drinks, plain water
D012	Other packaging glass *Other recyclable glass packaging	Non-beverage containers (all colours) – sauce bottles, jam jars, vegetable oils, other food containers
D02	Other glass *Non-recyclable glass	Plate glass (window and windscreen), Pyrex, mirror glass, Corningware, light globes, laboratory and medical glass, white opaque glass
D050	Glass fines	Mixed glass or glass fines < 4.75 mm
	PLASTIC	
E01	PET drink containers	(Polyethylene) – soft drink, flavoured water, fruit juice, sports drinks, plain water (carbonated/non-carb)
E01	PET packaging	Food containers, mouthwash containers, detergent bottles
E01	PET other *Non-recyclable PET	Pillow and sleeping-bag filler, laminated sheets, carpet fibres
E02	HDPE drink containers	(High-density polyethylene) milk and flavoured milk bottles
E02	HDPE packaging	Bleach bottles, oil containers, food containers
E02	HDPE other *Non-recyclable HDPE	Buckets, rigid ag pipe, crates, pallets, bins, rigid moulded products
E03	PVC drink containers	(Polyvinyl chloride) – clear cordial and juice bottles
E03	PVC packaging	Detergent bottles
E03	PVC other *Non-recyclable PVC	Electrical conduit, plumbing pipes and fittings, garden hose, shoe sole, tubing, rain wear
E04	LDPE packaging	(Low-density polyethylene) – squeeze bottles
E04	LDPE other *Non-recyclable LDPE	General waste bags, general waste bins
E05	PP packaging	Bottles and containers
E05	PP other *Non-recyclable PP	Appliance parts, crates and boxes, toys, houseware/kitchenware, furniture, plant pots, mouldings, irrigation fittings
E06	EPS packaging *Expanded polystyrene packaging	Meat and poultry trays, vending cups, fragile item packaging
E06	PS & EPS other *Non-recyclable polystyrene	Panel insulation, refrigerator bins and crispers, moulded products, office accessories, spools, rulers, video cases, building and picture frame mouldings
E06	PS packaging *Polystyrene packaging	Yoghurt and dairy containers, vending cups, clam shells
E08	Composite (mostly plastic)	Cigarette butts, composite plastic items for which the weight of the plastic is estimated to be greater than the other material items
E073	Plastic film	Plastic film
	Plastic bags	
	Other plastics *Non-recyclable hard plastics	
	FERROUS	
F01	Steel drink containers	Alcoholic sodas and spirit-based mixers, beer, soft drink
F01	Steel packaging	Food cans, pet food cans, aerosols, industrial cans, clean/empty paint cans
F02	Steel other *Non-recyclable steel	100% ferrous items that are not cans/tins/packaging materials, any other steel
F03	Composite (mostly ferrous)	Beer bottle tops, jar lids, composite ferrous items for which the weight of the ferrous metal is estimated to be greater than the other material items

AWD Code	Material Name	Material items
	NON-FERROUS	
G01	Aluminium drink cans	Alcoholic sodas and spirit-based mixers, beer and soft drinks
	Aluminium packaging	Food cans, pet food cans, aerosols, industrial cans, foils
	Aluminium other *Non-recyclable aluminium	100% aluminium items that are not cans/tins/or packaging materials, any other aluminium
G02	Other non-ferrous (specify)	Copper/brass/bronze items, other metals (not ferrous/aluminium)
G03	Composite (mostly non-ferrous)	Composite non-ferrous metal items for which the weight of the metal is estimated to be greater than the other material items
	HAZARDOUS	
H01	Paint	Containers containing paint (dry or wet)
H02	Fluorescent tubes	Fluorescent tubes, compact fluorescent lamps (CFLs)
	Batteries	
H03	Non-rechargeable batteries	Common batteries – AAA, AA etc., single-use
H03	Chargeable batteries	Common batteries (rechargeable) – AAA, AA etc., rechargeable
H04	Vehicle batteries	Large batteries used in vehicles or other machinery
	Mobile phone batteries	
	Power tool batteries	
	Other batteries	
H05	Household chemicals	Containers containing bleach, cleaning products, unused medical pills
H061	Asbestos	Asbestos and asbestos-containing products or building materials
H07	Clinical (medical)	Sharps, human tissue, bulk bodily fluids and blood, any blood-stained disposable material or equipment.
H08	Gas bottles	Gas bottles
H00	Hazardous other	Any other hazardous material
	BUILDING WASTE	
I50	Building materials	Building materials (not included in other material categories), includes plasterboard, composite fittings, etc.
	EARTH-BASED	
10	Ceramics, dust, dirt, rock, inert	Ceramic cups, bowls, pottery items, vacuum bag contents, soil, rocks, dirt, concrete, ash, other inorganic non-reactive materials
	E-WASTE	
	Computer equipment	Keyboard, monitor, hard drives, printers, etc.
	TVs	TVs
	Mobile phones	Mobile phones, phones, iPads (tablets), chargers, car kits, Bluetooth devices
	Electrical items & peripherals	Radio, iPod, Gameboys, stereos, speakers, VCR, DVD players, power tools, wiring and cables, small electrical items (toaster, blender, etc.), computer discs, cassettes, DVDs, CDs
Y571	Toner cartridges	Printer and toner cartridges
	MISCELLANEOUS	
XX00	Other	Other, please specify

Appendix C Examples of specific materials

Image 10 - Visual examples of material categories

Bagged material

Disposable paper products

Composite (mostly paper)

Non-recyclable paper (soiled)

Containerised food & liquid

Rubber

Leather

Other recyclable glass packaging

Non-recyclable glass

PET packaging

Non-recyclable HDPE

PVC packaging

Non-recyclable PVC

Non-recyclable LDPE

LDPE packaging

Composite (mostly plastic)

Composite (mostly ferrous)

Composite (mostly non-ferrous)

Clinical (medical) waste

Clinical (medical) waste

Appendix D Detailed Waste Composition

Table 19 General waste composition all dwellings

Material	Bagged material dispersed				Bagged material separate		
	Amount audited (kg)	Amount per week (kg/wk)	Average (kg/hhld/wk)	Per cent	Amount per week (kg/wk)	Average (kg/hhld/wk)	Per cent
Bagged material					19,789.5	6.76	76.53%
Newspapers	41.0	41.9	0.01	0.16%	9.9	0.00	0.04%
Magazines	123.4	130.7	0.04	0.51%	30.7	0.01	0.12%
Cardboard	520.5	546.9	0.19	2.11%	128.2	0.04	0.50%
Liquid paperboard	65.7	70.8	0.02	0.27%	16.6	0.01	0.06%
Disposable paper products	91.1	93.1	0.03	0.36%	21.8	0.01	0.08%
Other recyclable paper	140.9	143.2	0.05	0.55%	33.5	0.01	0.13%
Composite (mostly paper)	226.7	232.7	0.08	0.90%	54.7	0.02	0.21%
Nappies and feminine hygiene	1,651.2	1,665.8	0.57	6.43%	390.5	0.13	1.51%
Non-recyclable paper (soiled)	2,567.2	2,627.0	0.90	10.16%	616.9	0.21	2.39%
Food (non-meat)	7,883.9	8,017.5	2.74	30.99%	1,881.3	0.64	7.28%
Food (meat)	733.8	745.4	0.25	2.89%	175.1	0.06	0.68%
Containerised food & liquid	1,831.3	1,874.0	0.64	7.23%	439.2	0.15	1.70%
Vegetation	1,098.5	1,108.2	0.38	4.29%	260.5	0.09	1.01%
Dog poo/kitty litter	884.0	902.3	0.31	3.49%	211.9	0.07	0.82%
Wood/timber	341.7	342.2	0.12	1.33%	80.7	0.03	0.31%
Textile/carpet	1,112.4	1,153.2	0.39	4.45%	270.4	0.09	1.05%
Leather	45.0	45.0	0.02	0.18%	10.8	0.00	0.04%
Rubber	29.9	30.2	0.01	0.12%	7.1	0.00	0.03%
Oils	3.9	3.9	0.00	0.02%	0.9	0.00	0.00%
Glass drink containers	364.9	407.5	0.14	1.57%	95.5	0.03	0.37%
Other recyclable glass packaging	257.0	269.5	0.09	1.04%	63.3	0.02	0.24%
Non-recyclable glass	66.8	71.5	0.02	0.28%	16.8	0.01	0.06%
Glass fines	24.0	25.4	0.01	0.10%	5.9	0.00	0.02%
PET drink containers	80.6	85.6	0.03	0.33%	20.1	0.01	0.08%
PET packaging	174.1	178.3	0.06	0.69%	41.8	0.01	0.16%
Non-recyclable PET	6.9	6.9	0.00	0.03%	1.7	0.00	0.01%
HDPE drink containers	37.5	42.8	0.01	0.17%	10.0	0.00	0.04%
HDPE packaging	91.9	92.7	0.03	0.36%	21.8	0.01	0.08%
Non-recyclable HDPE	2.7	2.7	0.00	0.01%	0.6	0.00	0.00%
PVC drink containers	1.5	1.6	0.00	0.01%	0.4	0.00	0.00%
PVC packaging	0.5	0.5	0.00	0.00%	0.1	0.00	0.00%
Non-recyclable PVC	8.9	8.9	0.00	0.03%	2.1	0.00	0.01%
LDPE packaging	5.7	5.8	0.00	0.02%	1.3	0.00	0.01%
Non-recyclable LDPE	4.1	4.1	0.00	0.02%	1.0	0.00	0.00%
PP packaging	306.6	315.6	0.11	1.22%	74.1	0.03	0.29%
Non-recyclable PP	11.2	11.4	0.00	0.04%	2.7	0.00	0.01%
Expanded polystyrene packaging	41.4	42.4	0.01	0.16%	10.0	0.00	0.04%
Non-recyclable polystyrene	26.8	27.6	0.01	0.11%	6.4	0.00	0.02%
Polystyrene packaging	32.7	33.1	0.01	0.13%	7.7	0.00	0.03%
Non-recyclable hard plastics	388.7	410.8	0.14	1.59%	96.4	0.03	0.37%
Composite (mostly plastic)	284.6	287.2	0.10	1.11%	67.6	0.02	0.26%

Material	Bagged material dispersed				Bagged material separate		
	Amount audited (kg)	Amount per week (kg/wk)	Average (kg/hhld/wk)	Per cent	Amount per week (kg/wk)	Average (kg/hhld/wk)	Per cent
Plastic bags	636.0	658.1	0.22	2.54%	154.5	0.05	0.60%
Plastic film	1,082.4	1,096.9	0.38	4.24%	257.6	0.09	1.00%
Steel drink containers	4.4	4.4	0.00	0.02%	1.0	0.00	0.00%
Steel packaging	203.2	214.0	0.07	0.83%	50.2	0.02	0.19%
Non-recyclable steel	164.1	167.9	0.06	0.65%	39.6	0.01	0.15%
Composite (mostly ferrous)	50.1	58.7	0.02	0.23%	13.8	0.00	0.05%
Aluminium drink cans	41.0	42.3	0.01	0.16%	9.9	0.00	0.04%
Aluminium packaging	25.4	26.2	0.01	0.10%	6.1	0.00	0.02%
Non-recyclable aluminium	70.3	71.2	0.02	0.28%	16.8	0.01	0.06%
Other non-ferrous (specify)	0.0	0.0	0.00	0.00%	0.0	0.00	0.00%
Composite (mostly non-ferrous)	0.2	0.2	0.00	0.00%	0.1	0.00	0.00%
Paint	59.7	59.7	0.02	0.23%	13.9	0.00	0.05%
Fluorescent tubes	1.7	1.7	0.00	0.01%	0.4	0.00	0.00%
Non rechargeable batteries	22.1	22.4	0.01	0.09%	5.2	0.00	0.02%
Rechargeable batteries	0.0	0.0	0.00	0.00%	0.0	0.00	0.00%
Vehicle batteries	0.0	0.0	0.00	0.00%	0.0	0.00	0.00%
Mobile phone batteries	0.1	0.1	0.00	0.00%	0.0	0.00	0.00%
Power tool batteries	0.0	0.0	0.00	0.00%	0.0	0.00	0.00%
Other batteries	0.0	0.0	0.00	0.00%	0.0	0.00	0.00%
Household chemicals	21.9	21.9	0.01	0.09%	5.2	0.00	0.02%
Asbestos	1.6	1.6	0.00	0.01%	0.4	0.00	0.00%
Clinical (medical)	17.7	18.4	0.01	0.07%	4.3	0.00	0.02%
Gas bottles	0.0	0.0	0.00	0.00%	0.0	0.00	0.00%
Hazardous other	0.0	0.0	0.00	0.00%	0.0	0.00	0.00%
Building materials	372.9	372.9	0.13	1.45%	88.0	0.03	0.34%
Ceramics, dust, dirt, rock, inert	445.9	453.2	0.16	1.75%	106.5	0.04	0.41%
Computer equipment	10.3	10.3	0.00	0.04%	2.4	0.00	0.01%
TVs	0.0	0.0	0.00	0.00%	0.0	0.00	0.00%
Mobile phones	2.4	2.4	0.00	0.01%	0.6	0.00	0.00%
Electrical items & peripherals	292.7	302.4	0.10	1.17%	71.0	0.02	0.27%
Toner cartridges	3.5	3.5	0.00	0.01%	0.8	0.00	0.00%
Other	140.7	143.3	0.05	0.55%	33.7	0.01	0.13%
Total	**25,281.0**	**25,859.6**	**8.84**	**100.00%**	**25,859.6**	**8.84**	**100.00%**

Table 20 General waste composition: single dwellings

Material	Bagged material dispersed				Bagged material separate		
	Amount audited (kg)	Amount per week (kg/wk)	Average (kg/hhld/wk)	Per cent	Amount per week (kg/wk)	Average (kg/hhld/wk)	Per cent
Bagged material					12,872.0	7.98	75.42%
Newspapers	21.6	21.6	0.01	0.14%	5.7	0.00	0.03%
Magazines	72.3	72.3	0.04	0.42%	17.8	0.01	0.10%
Cardboard	293.4	293.4	0.19	1.77%	74.4	0.05	0.44%
Liquid paperboard	38.8	38.8	0.02	0.23%	9.7	0.01	0.06%
Disposable paper products	53.1	53.1	0.03	0.32%	13.6	0.01	0.08%
Other recyclable paper	84.8	84.8	0.06	0.57%	24.1	0.01	0.14%
Composite (mostly paper)	149.9	149.9	0.10	0.98%	41.1	0.03	0.24%
Nappies and feminine hygiene	1,057.1	1,057.1	0.62	5.82%	244.1	0.15	1.43%
Non-recyclable paper (soiled)	1,755.9	1,755.9	1.11	10.49%	440.0	0.27	2.58%
Food (non-meat)	5,556.4	5,556.4	3.42	32.36%	1,357.6	0.84	7.95%
Food (meat)	525.4	525.4	0.32	3.06%	128.4	0.08	0.75%
Containerised food & liquid	1,164.8	1,164.8	0.72	6.83%	286.7	0.18	1.68%
Vegetation	842.8	842.8	0.50	4.75%	199.2	0.12	1.17%
Dog poo/kitty litter	628.2	628.2	0.40	3.77%	158.2	0.10	0.93%
Wood/timber	218.6	218.6	0.13	1.23%	51.6	0.03	0.30%
Textile/carpet	638.9	638.9	0.41	3.90%	163.8	0.10	0.96%
Leather	43.5	43.5	0.02	0.22%	9.2	0.01	0.05%
Rubber	16.9	16.9	0.01	0.11%	4.5	0.00	0.03%
Oils	2.6	2.6	0.00	0.01%	0.6	0.00	0.00%
Glass drink containers	179.1	179.1	0.12	1.12%	46.9	0.03	0.27%
Other recyclable glass packaging	145.5	145.5	0.09	0.88%	37.1	0.02	0.22%
Non-recyclable glass	36.7	36.7	0.02	0.22%	9.2	0.01	0.05%
Glass fines	16.0	16.0	0.01	0.09%	3.9	0.00	0.02%
PET drink containers	44.5	44.5	0.03	0.27%	11.3	0.01	0.07%
PET packaging	106.9	106.9	0.07	0.65%	27.3	0.02	0.16%
Non-recyclable PET	6.9	6.9	0.00	0.04%	1.6	0.00	0.01%
HDPE drink containers	11.7	11.7	0.01	0.07%	2.8	0.00	0.02%
HDPE packaging	62.4	62.4	0.04	0.38%	15.8	0.01	0.09%
Non-recyclable HDPE	2.7	2.7	0.00	0.01%	0.6	0.00	0.00%
PVC drink containers	0.1	0.1	0.00	0.00%	0.0	0.00	0.00%
PVC packaging	0.0	0.0	0.00	0.00%	0.0	0.00	0.00%
Non-recyclable PVC	7.8	7.8	0.01	0.05%	2.0	0.00	0.01%
LDPE packaging	3.9	3.9	0.00	0.02%	1.0	0.00	0.01%
Non-recyclable LDPE	4.1	4.1	0.00	0.03%	1.2	0.00	0.01%
PP packaging	201.1	201.1	0.13	1.20%	50.3	0.03	0.29%
Non-recyclable PP	9.3	9.3	0.01	0.05%	2.2	0.00	0.01%
Expanded polystyrene packaging	29.4	29.4	0.02	0.17%	7.1	0.00	0.04%
Non-recyclable polystyrene	16.4	16.4	0.01	0.10%	4.1	0.00	0.02%
Polystyrene packaging	22.5	22.5	0.01	0.14%	5.7	0.00	0.03%
Non-recyclable hard plastics	238.2	238.2	0.15	1.38%	58.1	0.04	0.34%
Composite (mostly plastic)	176.1	176.1	0.11	1.04%	43.5	0.03	0.25%
Plastic bags	410.2	410.2	0.26	2.43%	101.8	0.06	0.60%
Plastic film	740.4	740.4	0.45	4.28%	179.4	0.11	1.05%
Steel drink containers	3.5	3.5	0.00	0.02%	0.9	0.00	0.01%
Steel packaging	131.9	131.9	0.08	0.78%	32.6	0.02	0.19%
Non-recyclable steel	102.5	102.5	0.06	0.58%	24.3	0.02	0.14%

Material	Bagged material dispersed				Bagged material separate		
	Amount audited (kg)	Amount per week (kg/wk)	Average (kg/hhld/wk)	Per cent	Amount per week (kg/wk)	Average (kg/hhld/wk)	Per cent
Composite (mostly ferrous)	19.8	19.8	0.01	0.12%	5.2	0.00	0.03%
Aluminium drink cans	26.6	26.6	0.02	0.16%	6.9	0.00	0.04%
Aluminium packaging	17.1	17.1	0.01	0.11%	4.5	0.00	0.03%
Non-recyclable aluminium	52.1	52.1	0.03	0.30%	12.5	0.01	0.07%
Other non-ferrous (specify)	0.0	0.0	0.00	0.00%	0.0	0.00	0.00%
Composite (mostly non-ferrous)	0.2	0.2	0.00	0.00%	0.1	0.00	0.00%
Paint	54.1	54.1	0.04	0.34%	14.1	0.01	0.08%
Fluorescent tubes	0.7	0.7	0.00	0.01%	0.3	0.00	0.00%
Non rechargeable batteries	16.7	16.7	0.01	0.09%	3.9	0.00	0.02%
Rechargeable batteries	0.0	0.0	0.00	0.00%	0.0	0.00	0.00%
Vehicle batteries	0.0	0.0	0.00	0.00%	0.0	0.00	0.00%
Mobile phone batteries	0.0	0.0	0.00	0.00%	0.0	0.00	0.00%
Power tool batteries	0.0	0.0	0.00	0.00%	0.0	0.00	0.00%
Other batteries	0.0	0.0	0.00	0.00%	0.0	0.00	0.00%
Household chemicals	17.8	17.8	0.01	0.11%	4.6	0.00	0.03%
Asbestos	1.6	1.6	0.00	0.01%	0.3	0.00	0.00%
Clinical (medical)	13.8	13.8	0.01	0.08%	3.4	0.00	0.02%
Gas bottles	0.0	0.0	0.00	0.00%	0.0	0.00	0.00%
Hazardous other	0.0	0.0	0.00	0.00%	0.0	0.00	0.00%
Building materials	355.9	355.9	0.20	1.91%	80.2	0.05	0.47%
Ceramics, dust, dirt, rock, inert	360.2	360.2	0.22	2.12%	89.0	0.06	0.52%
Computer equipment	9.8	9.8	0.01	0.06%	2.7	0.00	0.02%
TVs	0.0	0.0	0.00	0.00%	0.0	0.00	0.00%
Mobile phones	1.3	1.3	0.00	0.01%	0.3	0.00	0.00%
Electrical items & peripherals	179.3	179.3	0.13	1.20%	50.3	0.03	0.29%
Toner cartridges	2.7	2.7	0.00	0.01%	0.6	0.00	0.00%
Other	62.6	62.6	0.04	0.36%	15.1	0.01	0.09%
Total	**17,067.1**	**17,067.1**	**10.58**	**100.00%**	**17,067.1**	**10.58**	**100.00%**

Table 21 General waste composition multi-unit dwellings

Material	Bagged material dispersed				Bagged material separate		
	Amount audited (kg)	Amount per week (kg/wk)	Average (kg/hhld/wk)	Per cent	Amount per week (kg/wk)	Average (kg/hhld/wk)	Per cent
Bagged material				0.00%	6,967.8	5.00	79.25%
Newspapers	19.4	20.3	0.02	0.26%	4.8	0.00	0.05%
Magazines	51.1	58.4	0.04	0.62%	11.3	0.01	0.13%
Cardboard	227.1	253.5	0.17	2.75%	50.2	0.04	0.57%
Liquid paperboard	27.0	32.1	0.02	0.33%	6.1	0.00	0.07%
Disposable paper products	38.1	40.1	0.03	0.46%	8.4	0.01	0.09%
Other recyclable paper	56.1	58.4	0.04	0.65%	11.9	0.01	0.14%
Composite (mostly paper)	76.8	82.8	0.05	0.87%	15.8	0.01	0.18%
Nappies and feminine hygiene	594.1	608.7	0.47	7.52%	137.2	0.10	1.56%
Non-recyclable paper (soiled)	811.3	871.1	0.64	10.07%	183.7	0.13	2.09%
Food (non-meat)	2,327.4	2,461.0	1.80	28.52%	520.4	0.37	5.92%
Food (meat)	208.4	220.0	0.16	2.52%	46.0	0.03	0.52%
Containerised food & liquid	666.5	709.2	0.52	8.23%	150.1	0.11	1.71%
Vegetation	255.8	265.4	0.20	3.16%	57.7	0.04	0.66%
Dog poo/kitty litter	255.8	274.1	0.19	3.00%	54.7	0.04	0.62%
Wood/timber	123.1	123.6	0.09	1.37%	25.1	0.02	0.29%
Textile/carpet	473.5	514.3	0.35	5.54%	101.0	0.07	1.15%
Leather	1.5	1.5	0.00	0.02%	0.3	0.00	0.00%
Rubber	13.0	13.3	0.01	0.15%	2.7	0.00	0.03%
Oils	1.4	1.4	0.00	0.01%	0.2	0.00	0.00%
Glass drink containers	185.8	228.4	0.14	2.19%	40.0	0.03	0.45%
Other recyclable glass packaging	111.6	124.0	0.09	1.37%	25.0	0.02	0.28%
Non-recyclable glass	30.1	34.8	0.02	0.36%	6.6	0.00	0.08%
Glass fines	8.0	9.4	0.01	0.10%	1.7	0.00	0.02%
PET drink containers	36.1	41.1	0.03	0.44%	8.0	0.01	0.09%
PET packaging	67.2	71.4	0.05	0.81%	14.8	0.01	0.17%
Non-recyclable PET	0.0	0.0	0.00	0.00%	0.0	0.00	0.00%
HDPE drink containers	25.9	31.1	0.02	0.31%	5.7	0.00	0.06%
HDPE packaging	29.5	30.3	0.02	0.38%	6.9	0.00	0.08%
Non-recyclable HDPE	0.0	0.0	0.00	0.00%	0.0	0.00	0.00%
PVC drink containers	1.4	1.5	0.00	0.02%	0.3	0.00	0.00%
PVC packaging	0.5	0.5	0.00	0.01%	0.1	0.00	0.00%
Non-recyclable PVC	1.1	1.1	0.00	0.01%	0.2	0.00	0.00%
LDPE packaging	1.8	1.9	0.00	0.02%	0.4	0.00	0.00%
Non-recyclable LDPE	0.0	0.0	0.00	0.00%	0.0	0.00	0.00%
PP packaging	105.5	114.6	0.08	1.32%	24.0	0.02	0.27%
Non-recyclable PP	1.9	2.1	0.00	0.02%	0.4	0.00	0.00%
Expanded polystyrene packaging	11.9	12.9	0.01	0.15%	2.7	0.00	0.03%
Non-recyclable polystyrene	10.4	11.2	0.01	0.14%	2.5	0.00	0.03%
Polystyrene packaging	10.2	10.5	0.01	0.12%	2.2	0.00	0.02%
Non-recyclable hard plastics	150.5	172.6	0.11	1.81%	33.0	0.02	0.38%
Composite (mostly plastic)	108.5	111.1	0.08	1.21%	22.1	0.02	0.25%
Plastic bags	225.8	247.9	0.17	2.72%	49.6	0.04	0.56%
Plastic film	342.0	356.5	0.27	4.29%	78.3	0.06	0.89%

Material	Bagged material dispersed				Bagged material separate		
	Amount audited (kg)	Amount per week (kg/wk)	Average (kg/hhld/wk)	Per cent	Amount per week (kg/wk)	Average (kg/hhld/wk)	Per cent
Steel drink containers	0.9	0.9	0.00	0.01%	0.2	0.00	0.00%
Steel packaging	71.2	82.1	0.06	0.88%	16.1	0.01	0.18%
Non-recyclable steel	61.6	65.4	0.05	0.74%	13.5	0.01	0.15%
Composite (mostly ferrous)	30.2	38.9	0.02	0.35%	6.3	0.00	0.07%
Aluminium drink cans	14.5	15.8	0.01	0.17%	3.1	0.00	0.03%
Aluminium packaging	8.3	9.2	0.01	0.10%	1.8	0.00	0.02%
Non-recyclable aluminium	18.1	19.1	0.01	0.22%	4.0	0.00	0.05%
Other non-ferrous (specify)	0.0	0.0	0.00	0.00%	0.0	0.00	0.00%
Composite (mostly non-ferrous)	0.0	0.0	0.00	0.00%	0.0	0.00	0.00%
Paint	5.6	5.6	0.01	0.10%	1.7	0.00	0.02%
Fluorescent tubes	1.0	1.0	0.00	0.01%	0.2	0.00	0.00%
Non rechargeable batteries	5.4	5.6	0.00	0.07%	1.2	0.00	0.01%
Rechargeable batteries	0.0	0.0	0.00	0.00%	0.0	0.00	0.00%
Vehicle batteries	0.0	0.0	0.00	0.00%	0.0	0.00	0.00%
Mobile phone batteries	0.1	0.1	0.00	0.00%	0.0	0.00	0.00%
Power tool batteries	0.0	0.0	0.00	0.00%	0.0	0.00	0.00%
Other batteries	0.0	0.0	0.00	0.00%	0.0	0.00	0.00%
Household chemicals	4.1	4.1	0.00	0.05%	0.9	0.00	0.01%
Asbestos	0.0	0.0	0.00	0.00%	0.0	0.00	0.00%
Clinical (medical)	3.9	4.6	0.00	0.04%	0.8	0.00	0.01%
Gas bottles	0.0	0.0	0.00	0.00%	0.0	0.00	0.00%
Hazardous other	0.0	0.0	0.00	0.00%	0.0	0.00	0.00%
Building materials	17.0	17.0	0.02	0.25%	4.6	0.00	0.05%
Ceramics, dust, dirt, rock, inert	85.7	93.0	0.06	1.01%	18.5	0.01	0.21%
Computer equipment	0.5	0.5	0.00	0.01%	0.1	0.00	0.00%
TVs	0.0	0.0	0.00	0.00%	0.0	0.00	0.00%
Mobile phones	1.1	1.1	0.00	0.01%	0.2	0.00	0.00%
Electrical items & peripherals	113.4	123.1	0.08	1.32%	24.0	0.02	0.27%
Toner cartridges	0.8	0.8	0.00	0.01%	0.2	0.00	0.00%
Other	78.1	80.7	0.05	0.83%	15.2	0.01	0.17%
Total	**8,213.9**	**8,792.5**	**6.31**	**100.00%**	**8,792.5**	**6.31**	**100.00%**

Table 22 Commingled recycling composition all dwellings

Material	Bagged material dispersed				Bagged material separate		
	Amount audited (kg)	Amount per week (kg/wk)	Average (kg/hhld/wk)	Per cent	Amount per week (kg/wk)	Average (kg/hhld/wk)	Per cent
Bagged material					444.4	0.15	4.20%
Newspapers	1,300.0	747.0	0.26	7.07%	717.7	0.25	6.78%
Magazines	1,461.8	834.4	0.29	7.92%	803.4	0.27	7.59%
Cardboard	3,889.8	2,289.2	0.78	21.60%	2,191.9	0.75	20.70%
Liquid paperboard	118.2	68.6	0.02	0.65%	65.8	0.02	0.62%
Disposable paper products	99.0	61.4	0.02	0.58%	58.8	0.02	0.56%
Other recyclable paper	1,058.2	657.9	0.22	6.21%	630.3	0.22	5.95%
Composite (mostly paper)	197.2	116.1	0.04	1.10%	111.2	0.04	1.05%
Nappies and feminine hygiene	52.9	31.2	0.01	0.29%	29.3	0.01	0.28%
Non-recyclable paper (soiled)	717.3	424.0	0.14	4.00%	406.3	0.14	3.84%
Food (non-meat)	148.5	91.7	0.03	0.85%	86.3	0.03	0.81%
Food (meat)	8.4	6.3	0.00	0.06%	6.0	0.00	0.06%
Containerised food & liquid	281.1	173.9	0.06	1.63%	165.7	0.06	1.56%
Vegetation	17.3	9.8	0.00	0.09%	9.3	0.00	0.09%
Dog poo/kitty litter	5.9	2.9	0.00	0.03%	2.7	0.00	0.03%
Wood/timber	112.3	59.7	0.02	0.57%	57.8	0.02	0.55%
Textile/carpet	216.1	136.8	0.05	1.28%	129.6	0.04	1.22%
Leather	0.2	0.1	0.00	0.00%	0.1	0.00	0.00%
Rubber	8.4	4.4	0.00	0.04%	4.2	0.00	0.04%
Oils	0.0	0.0	0.00	0.00%	0.0	0.00	0.00%
Glass drink containers	3,833.4	2,221.6	0.76	21.03%	2,133.7	0.73	20.15%
Other recyclable glass packaging	986.2	557.2	0.19	5.25%	532.6	0.18	5.03%
Non-recyclable glass	60.2	36.0	0.01	0.34%	34.8	0.01	0.33%
Glass fines	630.3	358.5	0.12	3.38%	342.8	0.12	3.24%
PET drink containers	317.6	184.9	0.06	1.74%	176.6	0.06	1.67%
PET packaging	270.0	153.9	0.05	1.45%	146.9	0.05	1.39%
Non-recyclable PET	3.2	3.1	0.00	0.03%	3.0	0.00	0.03%
HDPE drink containers	304.6	169.9	0.06	1.60%	162.6	0.06	1.54%
HDPE packaging	229.3	132.4	0.05	1.25%	126.4	0.04	1.19%
Non-recyclable HDPE	0.0	0.0	0.00	0.00%	0.0	0.00	0.00%
PVC drink containers	4.5	2.6	0.00	0.02%	2.5	0.00	0.02%
PVC packaging	0.7	0.4	0.00	0.00%	0.4	0.00	0.00%
Non-recyclable PVC	3.1	1.7	0.00	0.02%	1.6	0.00	0.01%
LDPE packaging	7.3	4.4	0.00	0.04%	4.2	0.00	0.04%
Non-recyclable LDPE	0.4	2.9	0.00	0.03%	2.9	0.00	0.03%
PP packaging	226.3	128.8	0.04	1.21%	123.2	0.04	1.16%
Non-recyclable PP	10.3	5.6	0.00	0.05%	5.2	0.00	0.05%
Expanded polystyrene packaging	6.0	3.6	0.00	0.03%	3.4	0.00	0.03%
Non-recyclable polystyrene	22.6	12.8	0.00	0.12%	12.2	0.00	0.11%
Polystyrene packaging	8.6	7.4	0.00	0.07%	7.2	0.00	0.07%
Non-recyclable hard plastics	310.5	174.6	0.06	1.64%	166.8	0.06	1.57%
Composite (mostly plastic)	62.5	36.2	0.01	0.34%	34.4	0.01	0.32%
Plastic bags	47.9	29.3	0.01	0.27%	27.6	0.01	0.26%
Plastic film	138.9	82.7	0.03	0.78%	78.9	0.03	0.75%

Material	Bagged material dispersed				Bagged material separate		
	Amount audited (kg)	Amount per week (kg/wk)	Average (kg/hhld/wk)	Per cent	Amount per week (kg/wk)	Average (kg/hhld/wk)	Per cent
Steel drink containers	2.2	1.1	0.00	0.01%	1.1	0.00	0.01%
Steel packaging	370.0	208.0	0.07	1.96%	198.7	0.07	1.88%
Non-recyclable steel	163.6	94.1	0.03	0.89%	90.1	0.03	0.85%
Composite (mostly ferrous)	14.4	8.8	0.00	0.08%	8.1	0.00	0.08%
Aluminium drink cans	60.8	33.7	0.01	0.32%	32.3	0.01	0.31%
Aluminium packaging	15.7	9.3	0.00	0.09%	8.8	0.00	0.08%
Non-recyclable aluminium	7.8	4.3	0.00	0.04%	4.1	0.00	0.04%
Other non-ferrous (specify)	0.4	0.2	0.00	0.00%	0.2	0.00	0.00%
Composite (mostly non-ferrous)	0.6	0.3	0.00	0.00%	0.3	0.00	0.00%
Paint	4.4	2.9	0.00	0.03%	2.8	0.00	0.03%
Fluorescent tubes	1.3	0.9	0.00	0.01%	0.8	0.00	0.01%
Non rechargeable batteries	4.9	2.6	0.00	0.02%	2.5	0.00	0.02%
Rechargeable batteries	0.0	0.0	0.00	0.00%	0.0	0.00	0.00%
Vehicle batteries	0.0	0.0	0.00	0.00%	0.0	0.00	0.00%
Mobile phone batteries	0.0	0.0	0.00	0.00%	0.0	0.00	0.00%
Power tool batteries	0.0	0.0	0.00	0.00%	0.0	0.00	0.00%
Other batteries	0.0	0.0	0.00	0.00%	0.0	0.00	0.00%
Household chemicals	17.1	9.5	0.00	0.09%	8.8	0.00	0.08%
Asbestos	0.0	0.0	0.00	0.00%	0.0	0.00	0.00%
Clinical (medical)	5.8	2.9	0.00	0.03%	2.8	0.00	0.03%
Gas bottles	0.0	0.0	0.00	0.00%	0.0	0.00	0.00%
Hazardous other	0.2	0.1	0.00	0.00%	0.1	0.00	0.00%
Building materials	15.0	8.3	0.00	0.08%	7.9	0.00	0.07%
Ceramics, dust, dirt, rock, inert	79.0	54.9	0.02	0.51%	51.9	0.02	0.49%
Computer equipment	2.5	1.3	0.00	0.01%	1.2	0.00	0.01%
TVs	7.7	3.8	0.00	0.04%	3.9	0.00	0.04%
Mobile phones	0.0	0.0	0.00	0.00%	0.0	0.00	0.00%
Electrical items & peripherals	151.5	80.7	0.03	0.77%	77.9	0.03	0.74%
Toner cartridges	3.7	2.1	0.00	0.02%	2.0	0.00	0.02%
Other	62.2	34.5	0.01	0.32%	32.5	0.01	0.31%
Total	**18,167.5**	**10,589.6**	**3.62**	**100.00%**	**10,589.6**	**3.62**	**100.00%**

Table 23 Commingled recycling composition single dwellings

Material	Bagged material dispersed				Bagged material separate		
	Amount audited (kg)	Amount per week (kg/wk)	Average (kg/hhld/wk)	Per cent	Amount per week (kg/wk)	Average (kg/hhld/wk)	Per cent
Bagged material					219.4	0.14	3.02%
Newspapers	1,057.0	568.5	0.36	7.95%	559.2	0.35	7.71%
Magazines	1,159.0	606.6	0.37	8.04%	565.4	0.36	7.79%
Cardboard	2,821.4	1,478.4	0.94	20.50%	1,442.0	0.91	19.88%
Liquid paperboard	81.2	42.3	0.03	0.58%	40.7	0.03	0.56%
Disposable paper products	66.6	37.5	0.03	0.56%	39.5	0.02	0.54%
Other recyclable paper	764.8	403.9	0.26	5.64%	396.5	0.25	5.46%
Composite (mostly paper)	157.1	83.7	0.05	1.16%	81.4	0.05	1.12%
Nappies and feminine hygiene	31.6	15.8	0.01	0.19%	13.4	0.01	0.18%
Non-recyclable paper (soiled)	529.1	271.1	0.16	3.52%	247.6	0.16	3.41%
Food (non-meat)	84.8	42.6	0.02	0.51%	36.0	0.02	0.50%
Food (meat)	3.3	1.7	0.00	0.02%	1.5	0.00	0.02%
Containerised food & liquid	197.5	102.8	0.06	1.37%	96.7	0.06	1.33%
Vegetation	9.0	4.5	0.00	0.06%	4.1	0.00	0.06%
Dog poo/kitty litter	5.9	2.9	0.00	0.04%	2.7	0.00	0.04%
Wood/timber	84.9	43.0	0.03	0.56%	39.1	0.02	0.54%
Textile/carpet	154.1	79.8	0.05	1.01%	71.2	0.04	0.98%
Leather	0.0	0.0	0.00	0.00%	0.0	0.00	0.00%
Rubber	7.5	3.8	0.00	0.05%	3.9	0.00	0.05%
Oils	0.0	0.0	0.00	0.00%	0.0	0.00	0.00%
Glass drink containers	2,962.8	1,606.8	1.06	23.05%	1,622.0	1.02	22.36%
Other recyclable glass packaging	758.5	399.6	0.25	5.53%	388.9	0.25	5.36%
Non-recyclable glass	47.9	25.4	0.02	0.33%	23.1	0.01	0.32%
Glass fines	505.8	269.2	0.17	3.78%	266.2	0.17	3.67%
PET drink containers	244.8	128.2	0.08	1.72%	120.8	0.08	1.67%
PET packaging	212.8	112.8	0.07	1.56%	110.0	0.07	1.52%
Non-recyclable PET	0.3	0.1	0.00	0.00%	0.1	0.00	0.00%
HDPE drink containers	241.3	123.5	0.08	1.65%	116.2	0.07	1.60%
HDPE packaging	176.4	92.1	0.06	1.24%	87.4	0.06	1.20%
Non-recyclable HDPE	0.0	0.0	0.00	0.00%	0.0	0.00	0.00%
PVC drink containers	3.2	1.6	0.00	0.02%	1.4	0.00	0.02%
PVC packaging	0.3	0.1	0.00	0.00%	0.1	0.00	0.00%
Non-recyclable PVC	2.9	1.5	0.00	0.02%	1.1	0.00	0.02%
LDPE packaging	5.0	2.5	0.00	0.03%	2.3	0.00	0.03%
Non-recyclable LDPE	0.4	2.9	0.00	0.03%	2.0	0.00	0.03%
PP packaging	171.4	89.1	0.06	1.26%	88.5	0.06	1.22%
Non-recyclable PP	8.9	4.5	0.00	0.05%	3.7	0.00	0.05%
Expanded polystyrene packaging	4.4	2.2	0.00	0.03%	2.0	0.00	0.03%
Non-recyclable polystyrene	14.7	7.4	0.00	0.09%	6.4	0.00	0.09%
Polystyrene packaging	6.2	5.7	0.00	0.07%	5.1	0.00	0.07%
Non-recyclable hard plastics	247.3	125.1	0.07	1.62%	114.2	0.07	1.57%
Composite (mostly plastic)	51.4	26.4	0.02	0.33%	23.1	0.01	0.32%
Plastic bags	33.5	17.1	0.01	0.21%	14.9	0.01	0.20%
Plastic film	105.9	56.1	0.04	0.77%	54.4	0.03	0.75%

Material	Bagged material dispersed				Bagged material separate		
	Amount audited (kg)	Amount per week (kg/wk)	Average (kg/hhld/wk)	Per cent	Amount per week (kg/wk)	Average (kg/hhld/wk)	Per cent
Steel drink containers	2.2	1.1	0.00	0.01%	0.8	0.00	0.01%
Steel packaging	293.2	153.4	0.10	2.15%	151.3	0.10	2.09%
Non-recyclable steel	120.0	61.0	0.04	0.77%	54.2	0.03	0.75%
Composite (mostly ferrous)	8.9	4.5	0.00	0.06%	4.0	0.00	0.06%
Aluminium drink cans	48.6	24.9	0.01	0.32%	22.5	0.01	0.31%
Aluminium packaging	12.0	6.7	0.00	0.10%	7.1	0.00	0.10%
Non-recyclable aluminium	6.4	3.2	0.00	0.04%	2.7	0.00	0.04%
Other non-ferrous (specify)	0.4	0.2	0.00	0.00%	0.2	0.00	0.00%
Composite (mostly non-ferrous)	0.6	0.3	0.00	0.00%	0.3	0.00	0.00%
Paint	4.4	2.9	0.00	0.07%	4.6	0.00	0.06%
Fluorescent tubes	0.8	0.5	0.00	0.01%	0.4	0.00	0.01%
Non rechargeable batteries	4.0	2.0	0.00	0.03%	2.0	0.00	0.03%
Rechargeable batteries	0.0	0.0	0.00	0.00%	0.0	0.00	0.00%
Vehicle batteries	0.0	0.0	0.00	0.00%	0.0	0.00	0.00%
Mobile phone batteries	0.0	0.0	0.00	0.00%	0.0	0.00	0.00%
Power tool batteries	0.0	0.0	0.00	0.00%	0.0	0.00	0.00%
Other batteries	0.0	0.0	0.00	0.00%	0.0	0.00	0.00%
Household chemicals	3.0	1.5	0.00	0.02%	1.3	0.00	0.02%
Asbestos	0.0	0.0	0.00	0.00%	0.0	0.00	0.00%
Clinical (medical)	5.7	2.9	0.00	0.04%	3.2	0.00	0.04%
Gas bottles	0.0	0.0	0.00	0.00%	0.0	0.00	0.00%
Hazardous other	0.2	0.1	0.00	0.00%	0.1	0.00	0.00%
Building materials	15.0	8.3	0.00	0.10%	7.1	0.00	0.10%
Ceramics, dust, dirt, rock, inert	46.1	24.7	0.01	0.31%	21.8	0.01	0.30%
Computer equipment	0.7	0.3	0.00	0.00%	0.2	0.00	0.00%
TVs	7.7	3.8	0.00	0.04%	2.7	0.00	0.04%
Mobile phones	0.0	0.0	0.00	0.00%	0.0	0.00	0.00%
Electrical items & peripherals	75.0	37.6	0.02	0.46%	32.1	0.02	0.44%
Toner cartridges	3.2	1.6	0.00	0.02%	1.6	0.00	0.02%
Other	49.3	25.0	0.01	0.29%	20.5	0.01	0.28%
Total	**13,728.3**	**7,255.4**	**4.58**	**100.00%**	**7,255.4**	**4.58**	**100.00%**

Table 24 Commingled recycling composition multi-until dwellings

Material	Bagged material dispersed				Bagged material separate		
	Amount audited (kg)	Amount per week (kg/wk)	Average (kg/hhld/wk)	Per cent	Amount per week (kg/wk)	Average (kg/hhld/wk)	Per cent
Bagged material				0.00%	223.9	0.17	6.72%
Newspapers	243.0	178.5	0.15	5.93%	184.5	0.14	5.53%
Magazines	302.8	227.8	0.19	7.65%	238.0	0.18	7.14%
Cardboard	1,068.4	810.8	0.59	23.84%	741.6	0.55	22.24%
Liquid paperboard	37.0	26.3	0.02	0.80%	25.0	0.02	0.75%
Disposable paper products	32.4	23.9	0.02	0.67%	20.8	0.02	0.62%
Other recyclable paper	293.4	254.0	0.17	6.99%	217.5	0.16	6.52%
Composite (mostly paper)	40.0	32.5	0.02	0.93%	29.1	0.02	0.87%
Nappies and feminine hygiene	21.3	15.4	0.01	0.51%	16.0	0.01	0.48%
Non-recyclable paper (soiled)	188.2	152.9	0.11	4.51%	140.3	0.10	4.21%
Food (non-meat)	63.7	49.0	0.04	1.67%	52.1	0.04	1.56%
Food (meat)	5.1	4.5	0.00	0.09%	2.8	0.00	0.08%
Containerised food & liquid	83.6	71.1	0.05	2.13%	66.2	0.05	1.98%
Vegetation	8.3	5.3	0.00	0.15%	4.6	0.00	0.14%
Dog poo/kitty litter	0.0	0.0	0.00	0.00%	0.0	0.00	0.00%
Wood/timber	27.4	16.7	0.01	0.51%	15.9	0.01	0.48%
Textile/carpet	62.0	57.0	0.04	1.62%	50.4	0.04	1.51%
Leather	0.2	0.1	0.00	0.00%	0.1	0.00	0.00%
Rubber	0.9	0.7	0.00	0.01%	0.4	0.00	0.01%
Oils	0.0	0.0	0.00	0.00%	0.0	0.00	0.00%
Glass drink containers	870.6	614.8	0.44	17.88%	556.3	0.41	16.68%
Other recyclable glass packaging	227.7	157.6	0.12	4.74%	147.4	0.11	4.42%
Non-recyclable glass	12.2	10.6	0.01	0.24%	7.5	0.01	0.23%
Glass fines	124.6	89.2	0.07	2.65%	82.4	0.06	2.47%
PET drink containers	72.8	56.7	0.04	1.68%	52.4	0.04	1.57%
PET packaging	57.2	41.1	0.03	1.23%	38.4	0.03	1.15%
Non-recyclable PET	3.0	3.0	0.00	0.12%	3.7	0.00	0.11%
HDPE drink containers	63.3	46.4	0.04	1.43%	44.4	0.03	1.33%
HDPE packaging	52.8	40.3	0.03	1.20%	37.4	0.03	1.12%
Non-recyclable HDPE	0.0	0.0	0.00	0.00%	0.0	0.00	0.00%
PVC drink containers	1.3	1.0	0.00	0.03%	1.0	0.00	0.03%
PVC packaging	0.4	0.3	0.00	0.01%	0.2	0.00	0.01%
Non-recyclable PVC	0.2	0.2	0.00	0.01%	0.2	0.00	0.01%
LDPE packaging	2.3	1.8	0.00	0.06%	1.7	0.00	0.05%
Non-recyclable LDPE	0.0	0.0	0.00	0.00%	0.0	0.00	0.00%
PP packaging	54.9	39.8	0.03	1.18%	36.8	0.03	1.10%
Non-recyclable PP	1.4	1.1	0.00	0.04%	1.4	0.00	0.04%
Expanded polystyrene packaging	1.6	1.4	0.00	0.04%	1.2	0.00	0.04%
Non-recyclable polystyrene	8.0	5.3	0.00	0.18%	5.7	0.00	0.17%
Polystyrene packaging	2.4	1.7	0.00	0.05%	1.5	0.00	0.04%
Non-recyclable hard plastics	63.2	49.4	0.04	1.61%	50.0	0.04	1.50%
Composite (mostly plastic)	11.2	9.8	0.01	0.32%	9.8	0.01	0.29%
Plastic bags	14.4	12.2	0.01	0.36%	11.2	0.01	0.34%
Plastic film	33.0	26.5	0.02	0.77%	24.0	0.02	0.72%

Material	Bagged material dispersed				Bagged material separate		
	Amount audited (kg)	Amount per week (kg/wk)	Average (kg/hhld/wk)	Per cent	Amount per week (kg/wk)	Average (kg/hhld/wk)	Per cent
Steel drink containers	0.0	0.0	0.00	0.00%	0.0	0.00	0.00%
Steel packaging	76.8	54.6	0.04	1.68%	52.2	0.04	1.56%
Non-recyclable steel	43.6	33.2	0.02	0.92%	28.7	0.02	0.86%
Composite (mostly ferrous)	5.5	4.3	0.00	0.13%	4.0	0.00	0.12%
Aluminium drink cans	12.2	8.7	0.01	0.26%	8.1	0.01	0.24%
Aluminium packaging	3.7	2.5	0.00	0.07%	2.3	0.00	0.07%
Non-recyclable aluminium	1.4	1.1	0.00	0.03%	1.0	0.00	0.03%
Other non-ferrous (specify)	0.0	0.0	0.00	0.00%	0.0	0.00	0.00%
Composite (mostly non-ferrous)	0.0	0.0	0.00	0.00%	0.0	0.00	0.00%
Paint	0.0	0.0	0.00	0.00%	0.0	0.00	0.00%
Fluorescent tubes	0.5	0.4	0.00	0.01%	0.4	0.00	0.01%
Non rechargeable batteries	0.9	0.6	0.00	0.02%	0.6	0.00	0.02%
Rechargeable batteries	0.0	0.0	0.00	0.00%	0.0	0.00	0.00%
Vehicle batteries	0.0	0.0	0.00	0.00%	0.0	0.00	0.00%
Mobile phone batteries	0.0	0.0	0.00	0.00%	0.0	0.00	0.00%
Power tool batteries	0.0	0.0	0.00	0.00%	0.0	0.00	0.00%
Other batteries	0.0	0.0	0.00	0.00%	0.0	0.00	0.00%
Household chemicals	14.1	7.9	0.01	0.36%	11.3	0.01	0.34%
Asbestos	0.0	0.0	0.00	0.00%	0.0	0.00	0.00%
Clinical (medical)	0.0	0.0	0.00	0.00%	0.0	0.00	0.00%
Gas bottles	0.0	0.0	0.00	0.00%	0.0	0.00	0.00%
Hazardous other	0.0	0.0	0.00	0.00%	0.0	0.00	0.00%
Building materials	0.0	0.0	0.00	0.00%	0.0	0.00	0.00%
Ceramics, dust, dirt, rock, inert	32.9	30.2	0.02	0.84%	26.2	0.02	0.79%
Computer equipment	1.9	0.9	0.00	0.06%	1.9	0.00	0.06%
TVs	0.0	0.0	0.00	0.00%	0.0	0.00	0.00%
Mobile phones	0.0	0.0	0.00	0.00%	0.0	0.00	0.00%
Electrical items & peripherals	76.5	43.1	0.04	1.42%	44.1	0.03	1.32%
Toner cartridges	0.5	0.5	0.00	0.01%	0.4	0.00	0.01%
Other	12.9	9.4	0.01	0.30%	9.4	0.01	0.28%
Total	**4,439.3**	**3,334.3**	**2.48**	**100.00%**	**3,334.3**	**2.48**	**100.00%**

Table 25 Organics recycling composition: all dwellings

Material	Bagged material dispersed				Bagged material separate		
	Amount audited (kg)	Amount per week (kg/wk)	Average (kg/hhld/wk)	Per cent	Amount per week (kg/wk)	Average (kg/hhld/wk)	Per cent
Bagged material					199.9	0.00	0.05%
Newspapers	2.0	1.6	0.00	0.02%	1.6	0.00	0.02%
Magazines	5.7	4.6	0.00	0.07%	4.5	0.00	0.07%
Cardboard	6.0	3.4	0.00	0.05%	3.3	0.00	0.05%
Liquid paperboard	0.1	0.0	0.00	0.00%	0.0	0.00	0.00%
Disposable paper products	0.3	0.2	0.00	0.00%	0.2	0.00	0.00%
Other recyclable paper	0.3	0.2	0.00	0.00%	0.1	0.00	0.00%
Composite (mostly paper)	1.4	1.0	0.00	0.01%	1.0	0.00	0.01%
Nappies and feminine hygiene	1.1	0.6	0.00	0.01%	0.6	0.00	0.01%
Non-recyclable paper (soiled)	17.5	9.4	0.00	0.13%	9.2	0.00	0.13%
Food (non-meat)	72.2	59.6	0.02	0.85%	58.2	0.02	0.85%
Food (meat)	0.8	0.6	0.00	0.01%	0.6	0.00	0.01%
Containerised food & liquid	4.3	2.4	0.00	0.03%	2.3	0.00	0.03%
Vegetation	12,831.3	6,821.6	2.54	97.21%	6,627.6	2.54	97.15%
Dog poo/kitty litter	1.0	0.5	0.00	0.01%	0.5	0.00	0.01%
Wood/timber	52.4	28.7	0.01	0.41%	27.9	0.01	0.41%
Textile/carpet	3.8	2.0	0.00	0.03%	1.9	0.00	0.03%
Leather	0.0	0.0	0.00	0.00%	0.0	0.00	0.00%
Rubber	0.9	0.5	0.00	0.01%	0.5	0.00	0.01%
Oils	0.0	0.0	0.00	0.00%	0.0	0.00	0.00%
Glass drink containers	2.2	1.1	0.00	0.02%	1.1	0.00	0.02%
Other recyclable glass packaging	0.1	0.1	0.00	0.00%	0.1	0.00	0.00%
Non-recyclable glass	0.6	0.3	0.00	0.00%	0.3	0.00	0.00%
Glass fines	1.4	0.7	0.00	0.01%	0.7	0.00	0.01%
PET drink containers	0.3	0.2	0.00	0.00%	0.2	0.00	0.00%
PET packaging	0.4	0.2	0.00	0.00%	0.2	0.00	0.00%
Non-recyclable PET	0.0	0.0	0.00	0.00%	0.0	0.00	0.00%
HDPE drink containers	0.2	0.1	0.00	0.00%	0.1	0.00	0.00%
HDPE packaging	0.4	0.2	0.00	0.00%	0.2	0.00	0.00%
Non-recyclable HDPE	0.0	0.0	0.00	0.00%	0.0	0.00	0.00%
PVC drink containers	0.0	0.0	0.00	0.00%	0.0	0.00	0.00%
PVC packaging	0.0	0.0	0.00	0.00%	0.0	0.00	0.00%
Non-recyclable PVC	0.2	0.1	0.00	0.00%	0.1	0.00	0.00%
LDPE packaging	0.0	0.0	0.00	0.00%	0.0	0.00	0.00%
Non-recyclable LDPE	0.0	0.0	0.00	0.00%	0.0	0.00	0.00%
PP packaging	0.6	0.3	0.00	0.00%	0.3	0.00	0.00%
Non-recyclable PP	0.5	0.3	0.00	0.00%	0.3	0.00	0.00%
Expanded polystyrene packaging	0.2	0.1	0.00	0.00%	0.1	0.00	0.00%
Non-recyclable polystyrene	0.2	0.1	0.00	0.00%	0.1	0.00	0.00%
Polystyrene packaging	0.1	0.1	0.00	0.00%	0.1	0.00	0.00%
Non-recyclable hard plastics	2.4	1.3	0.00	0.02%	1.3	0.00	0.02%
Composite (mostly plastic)	0.4	0.2	0.00	0.00%	0.2	0.00	0.00%
Plastic bags	28.3	14.3	0.01	0.20%	13.5	0.01	0.20%
Plastic film	4.7	2.5	0.00	0.04%	2.4	0.00	0.04%

Material	Bagged material dispersed				Bagged material separate		
	Amount audited (kg)	Amount per week (kg/wk)	Average (kg/hhld/wk)	Per cent	Amount per week (kg/wk)	Average (kg/hhld/wk)	Per cent
Steel drink containers	0.0	0.0	0.00	0.00%	0.0	0.00	0.00%
Steel packaging	0.1	0.1	0.00	0.00%	0.1	0.00	0.00%
Non-recyclable steel	8.8	4.4	0.00	0.06%	4.2	0.00	0.06%
Composite (mostly ferrous)	0.0	0.0	0.00	0.00%	0.0	0.00	0.00%
Aluminium drink cans	0.2	0.1	0.00	0.00%	0.1	0.00	0.00%
Aluminium packaging	0.0	0.0	0.00	0.00%	0.0	0.00	0.00%
Non-recyclable aluminium	0.2	0.1	0.00	0.00%	0.1	0.00	0.00%
Other non-ferrous (specify)	0.0	0.0	0.00	0.00%	0.0	0.00	0.00%
Composite (mostly non-ferrous)	0.2	0.1	0.00	0.00%	0.1	0.00	0.00%
Paint	0.5	0.2	0.00	0.00%	0.2	0.00	0.00%
Fluorescent tubes	0.1	0.0	0.00	0.00%	0.0	0.00	0.00%
Non rechargeable batteries	0.0	0.0	0.00	0.00%	0.0	0.00	0.00%
Rechargeable batteries	0.7	0.4	0.00	0.01%	0.4	0.00	0.01%
Vehicle batteries	0.0	0.0	0.00	0.00%	0.0	0.00	0.00%
Mobile phone batteries	0.0	0.0	0.00	0.00%	0.0	0.00	0.00%
Power tool batteries	0.0	0.0	0.00	0.00%	0.0	0.00	0.00%
Other batteries	0.0	0.0	0.00	0.00%	0.0	0.00	0.00%
Household chemicals	15.0	7.5	0.00	0.11%	7.2	0.00	0.11%
Asbestos	0.0	0.0	0.00	0.00%	0.0	0.00	0.00%
Clinical (medical)	0.0	0.0	0.00	0.00%	0.0	0.00	0.00%
Gas bottles	0.0	0.0	0.00	0.00%	0.0	0.00	0.00%
Hazardous other	0.0	0.0	0.00	0.00%	0.0	0.00	0.00%
Building materials	30.6	15.3	0.01	0.21%	14.5	0.01	0.21%
Ceramics, dust, dirt, rock, inert	54.9	27.7	0.01	0.40%	27.2	0.01	0.40%
Computer equipment	0.0	0.0	0.00	0.00%	0.0	0.00	0.00%
TVs	0.0	0.0	0.00	0.00%	0.0	0.00	0.00%
Mobile phones	0.0	0.0	0.00	0.00%	0.0	0.00	0.00%
Electrical items & peripherals	1.0	0.5	0.00	0.01%	0.5	0.00	0.01%
Toner cartridges	0.0	0.0	0.00	0.00%	0.0	0.00	0.00%
Other	3.7	2.6	0.00	0.04%	2.5	0.00	0.04%
Total	**13,160.2**	**7,018.0**	**2.61**	**100.00%**	**7,018.0**	**2.61**	**100.00%**

Table 26 Organics recycling composition: single-unit dwellings

Material	Bagged material dispersed				Bagged material separate		
	Amount audited (kg)	Amount per week (kg/wk)	Average (kg/hhld/wk)	Per cent	Amount per week (kg/wk)	Average (kg/hhld/wk)	Per cent
Bagged material				0.00%	4.9	0.003	0.08%
Newspapers	2.0	1.6	0.001	0.03%	2.0	0.001	0.03%
Magazines	4.7	4.0	0.003	0.08%	5.1	0.003	0.08%
Cardboard	5.4	3.1	0.002	0.05%	3.4	0.002	0.05%
Liquid paperboard	0.1	0.0	0.000	0.00%	0.1	0.000	0.00%
Disposable paper products	0.2	0.1	0.000	0.00%	0.2	0.000	0.00%
Other recyclable paper	0.2	0.1	0.000	0.00%	0.1	0.000	0.00%
Composite (mostly paper)	1.3	0.9	0.001	0.02%	1.1	0.001	0.02%
Nappies and feminine hygiene	1.1	0.6	0.001	0.01%	0.9	0.001	0.01%
Non-recyclable paper (soiled)	16.1	8.6	0.005	0.12%	7.8	0.005	0.12%
Food (non-meat)	66.5	55.5	0.046	1.12%	70.4	0.046	1.12%
Food (meat)	0.8	0.6	0.000	0.01%	0.7	0.000	0.01%
Containerised food & liquid	3.9	2.2	0.001	0.04%	2.3	0.001	0.04%
Vegetation	11,472.6	6,096.9	3.933	96.91%	6,073.9	3.930	96.83%
Dog poo/kitty litter	0.7	0.4	0.000	0.01%	0.5	0.000	0.01%
Wood/timber	31.1	18.0	0.012	0.30%	18.8	0.012	0.30%
Textile/carpet	3.3	1.7	0.001	0.03%	1.8	0.001	0.03%
Leather	0.0	0.0	0.000	0.00%	0.0	0.000	0.00%
Rubber	0.8	0.4	0.000	0.01%	0.4	0.000	0.01%
Oils	0.0	0.0	0.000	0.00%	0.0	0.000	0.00%
Glass drink containers	2.0	1.0	0.001	0.02%	1.0	0.001	0.02%
Other recyclable glass packaging	0.0	0.0	0.000	0.00%	0.0	0.000	0.00%
Non-recyclable glass	0.5	0.3	0.000	0.00%	0.2	0.000	0.00%
Glass fines	0.0	0.0	0.000	0.00%	0.0	0.000	0.00%
PET drink containers	0.2	0.1	0.000	0.00%	0.1	0.000	0.00%
PET packaging	0.4	0.2	0.000	0.00%	0.2	0.000	0.00%
Non-recyclable PET	0.0	0.0	0.000	0.00%	0.0	0.000	0.00%
HDPE drink containers	0.1	0.1	0.000	0.00%	0.1	0.000	0.00%
HDPE packaging	0.3	0.2	0.000	0.00%	0.2	0.000	0.00%
Non-recyclable HDPE	0.0	0.0	0.000	0.00%	0.0	0.000	0.00%
PVC drink containers	0.0	0.0	0.000	0.00%	0.0	0.000	0.00%
PVC packaging	0.0	0.0	0.000	0.00%	0.0	0.000	0.00%
Non-recyclable PVC	0.2	0.1	0.000	0.00%	0.1	0.000	0.00%
LDPE packaging	0.0	0.0	0.000	0.00%	0.0	0.000	0.00%
Non-recyclable LDPE	0.0	0.0	0.000	0.00%	0.0	0.000	0.00%
PP packaging	0.5	0.2	0.000	0.00%	0.2	0.000	0.00%
Non-recyclable PP	0.5	0.3	0.000	0.00%	0.3	0.000	0.00%
Expanded polystyrene packaging	0.2	0.1	0.000	0.00%	0.2	0.000	0.00%
Non-recyclable polystyrene	0.2	0.1	0.000	0.00%	0.1	0.000	0.00%
Polystyrene packaging	0.0	0.0	0.000	0.00%	0.0	0.000	0.00%
Non-recyclable hard plastics	2.1	1.2	0.001	0.02%	1.3	0.001	0.02%
Composite (mostly plastic)	0.4	0.2	0.000	0.00%	0.2	0.000	0.00%
Plastic bags	28.3	14.3	0.010	0.24%	15.0	0.010	0.24%
Plastic film	3.9	2.0	0.001	0.03%	2.0	0.001	0.03%

Material	Bagged material dispersed				Bagged material separate		
	Amount audited (kg)	Amount per week (kg/wk)	Average (kg/hhld/wk)	Per cent	Amount per week (kg/wk)	Average (kg/hhld/wk)	Per cent
Steel drink containers	0.0	0.0	0.000	0.00%	0.0	0.000	0.00%
Steel packaging	0.1	0.0	0.000	0.00%	0.0	0.000	0.00%
Non-recyclable steel	8.5	4.2	0.003	0.08%	4.9	0.003	0.08%
Composite (mostly ferrous)	0.0	0.0	0.000	0.00%	0.0	0.000	0.00%
Aluminium drink cans	0.2	0.1	0.000	0.00%	0.1	0.000	0.00%
Aluminium packaging	0.0	0.0	0.000	0.00%	0.0	0.000	0.00%
Non-recyclable aluminium	0.1	0.1	0.000	0.00%	0.1	0.000	0.00%
Other non-ferrous (specify)	0.0	0.0	0.000	0.00%	0.0	0.000	0.00%
Composite (mostly non-ferrous)	0.2	0.1	0.000	0.00%	0.1	0.000	0.00%
Paint	0.5	0.2	0.000	0.00%	0.2	0.000	0.00%
Fluorescent tubes	0.0	0.0	0.000	0.00%	0.0	0.000	0.00%
Non rechargeable batteries	0.0	0.0	0.000	0.00%	0.0	0.000	0.00%
Rechargeable batteries	0.7	0.4	0.000	0.00%	0.3	0.000	0.00%
Vehicle batteries	0.0	0.0	0.000	0.00%	0.0	0.000	0.00%
Mobile phone batteries	0.0	0.0	0.000	0.00%	0.0	0.000	0.00%
Power tool batteries	0.0	0.0	0.000	0.00%	0.0	0.000	0.00%
Other batteries	0.0	0.0	0.000	0.00%	0.0	0.000	0.00%
Household chemicals	15.0	7.5	0.005	0.12%	7.7	0.005	0.12%
Asbestos	0.0	0.0	0.000	0.00%	0.0	0.000	0.00%
Clinical (medical)	0.0	0.0	0.000	0.00%	0.0	0.000	0.00%
Gas bottles	0.0	0.0	0.000	0.00%	0.0	0.000	0.00%
Hazardous other	0.0	0.0	0.000	0.00%	0.0	0.000	0.00%
Building materials	30.5	15.2	0.010	0.24%	14.8	0.010	0.24%
Ceramics, dust, dirt, rock, inert	53.5	27.0	0.017	0.41%	25.8	0.017	0.41%
Computer equipment	0.0	0.0	0.000	0.00%	0.0	0.000	0.00%
TVs	0.0	0.0	0.000	0.00%	0.0	0.000	0.00%
Mobile phones	0.0	0.0	0.000	0.00%	0.0	0.000	0.00%
Electrical items & peripherals	0.0	0.0	0.000	0.00%	0.0	0.000	0.00%
Toner cartridges	0.0	0.0	0.000	0.00%	0.0	0.000	0.00%
Other	3.3	2.4	0.002	0.05%	2.9	0.002	0.05%
Total	**11,763.2**	**6,272.4**	**4.058**	**100.00%**	**6,272.4**	**4.058**	**100.00%**

Table 27 Organic recycling composition: multi-unit dwellings

Material	Bagged material dispersed				Bagged material separate		
	Amount audited (kg)	Amount per week (kg/wk)	Average (kg/hhld/wk)	Per cent	Amount per week (kg/wk)	Average (kg/hhld/wk)	Per cent
Bagged material				0.00%	0.0	0.000	0.00%
Newspapers	0.0	0.0	0.000	0.00%	0.0	0.000	0.00%
Magazines	1.1	0.6	0.000	0.07%	0.5	0.000	0.07%
Cardboard	0.5	0.3	0.000	0.03%	0.2	0.000	0.03%
Liquid paperboard	0.0	0.0	0.000	0.00%	0.0	0.000	0.00%
Disposable paper products	0.0	0.0	0.000	0.00%	0.0	0.000	0.00%
Other recyclable paper	0.1	0.1	0.000	0.01%	0.0	0.000	0.01%
Composite (mostly paper)	0.2	0.1	0.000	0.01%	0.1	0.000	0.01%
Nappies and feminine hygiene	0.0	0.0	0.000	0.00%	0.0	0.000	0.00%
Non-recyclable paper (soiled)	1.4	0.8	0.001	0.10%	0.7	0.001	0.10%
Food (non-meat)	5.7	4.1	0.003	0.43%	3.2	0.003	0.43%
Food (meat)	0.0	0.0	0.000	0.00%	0.0	0.000	0.00%
Containerised food & liquid	0.3	0.2	0.000	0.03%	0.3	0.000	0.03%
Vegetation	1,358.6	724.8	0.644	97.61%	727.7	0.644	97.61%
Dog poo/kitty litter	0.2	0.1	0.000	0.01%	0.1	0.000	0.01%
Wood/timber	21.3	10.7	0.008	1.26%	9.4	0.008	1.26%
Textile/carpet	0.5	0.3	0.000	0.03%	0.2	0.000	0.03%
Leather	0.0	0.0	0.000	0.00%	0.0	0.000	0.00%
Rubber	0.1	0.0	0.000	0.01%	0.0	0.000	0.01%
Oils	0.0	0.0	0.000	0.00%	0.0	0.000	0.00%
Glass drink containers	0.2	0.1	0.000	0.01%	0.1	0.000	0.01%
Other recyclable glass packaging	0.1	0.1	0.000	0.01%	0.1	0.000	0.01%
Non-recyclable glass	0.1	0.0	0.000	0.01%	0.0	0.000	0.01%
Glass fines	1.4	0.7	0.000	0.07%	0.5	0.000	0.07%
PET drink containers	0.1	0.1	0.000	0.01%	0.1	0.000	0.01%
PET packaging	0.0	0.0	0.000	0.00%	0.0	0.000	0.00%
Non-recyclable PET	0.0	0.0	0.000	0.00%	0.0	0.000	0.00%
HDPE drink containers	0.1	0.0	0.000	0.01%	0.0	0.000	0.01%
HDPE packaging	0.0	0.0	0.000	0.00%	0.0	0.000	0.00%
Non-recyclable HDPE	0.0	0.0	0.000	0.00%	0.0	0.000	0.00%
PVC drink containers	0.0	0.0	0.000	0.00%	0.0	0.000	0.00%
PVC packaging	0.0	0.0	0.000	0.00%	0.0	0.000	0.00%
Non-recyclable PVC	0.0	0.0	0.000	0.00%	0.0	0.000	0.00%
LDPE packaging	0.0	0.0	0.000	0.00%	0.0	0.000	0.00%
Non-recyclable LDPE	0.0	0.0	0.000	0.00%	0.0	0.000	0.00%
PP packaging	0.1	0.1	0.000	0.01%	0.0	0.000	0.01%
Non-recyclable PP	0.0	0.0	0.000	0.00%	0.0	0.000	0.00%
Expanded polystyrene packaging	0.0	0.0	0.000	0.00%	0.0	0.000	0.00%
Non-recyclable polystyrene	0.0	0.0	0.000	0.00%	0.0	0.000	0.00%
Polystyrene packaging	0.1	0.0	0.000	0.01%	0.0	0.000	0.01%
Non-recyclable hard plastics	0.3	0.2	0.000	0.02%	0.1	0.000	0.02%
Composite (mostly plastic)	0.0	0.0	0.000	0.00%	0.0	0.000	0.00%
Plastic bags	0.0	0.0	0.000	0.00%	0.0	0.000	0.00%
Plastic film	0.8	0.5	0.000	0.06%	0.4	0.000	0.06%

Material	Bagged material dispersed				Bagged material separate		
	Amount audited (kg)	Amount per week (kg/wk)	Average (kg/hhld/wk)	Per cent	Amount per week (kg/wk)	Average (kg/hhld/wk)	Per cent
Steel drink containers	0.0	0.0	0.000	0.00%	0.0	0.000	0.00%
Steel packaging	0.1	0.0	0.000	0.00%	0.0	0.000	0.00%
Non-recyclable steel	0.3	0.2	0.000	0.02%	0.1	0.000	0.02%
Composite (mostly ferrous)	0.0	0.0	0.000	0.00%	0.0	0.000	0.00%
Aluminium drink cans	0.0	0.0	0.000	0.00%	0.0	0.000	0.00%
Aluminium packaging	0.0	0.0	0.000	0.00%	0.0	0.000	0.00%
Non-recyclable aluminium	0.1	0.0	0.000	0.00%	0.0	0.000	0.00%
Other non-ferrous (specify)	0.0	0.0	0.000	0.00%	0.0	0.000	0.00%
Composite (mostly non-ferrous)	0.0	0.0	0.000	0.00%	0.0	0.000	0.00%
Paint	0.0	0.0	0.000	0.00%	0.0	0.000	0.00%
Fluorescent tubes	0.1	0.0	0.000	0.00%	0.0	0.000	0.00%
Non rechargeable batteries	0.0	0.0	0.000	0.00%	0.0	0.000	0.00%
Rechargeable batteries	0.0	0.0	0.000	0.00%	0.0	0.000	0.00%
Vehicle batteries	0.0	0.0	0.000	0.00%	0.0	0.000	0.00%
Mobile phone batteries	0.0	0.0	0.000	0.00%	0.0	0.000	0.00%
Power tool batteries	0.0	0.0	0.000	0.00%	0.0	0.000	0.00%
Other batteries	0.0	0.0	0.000	0.00%	0.0	0.000	0.00%
Household chemicals	0.0	0.0	0.000	0.00%	0.0	0.000	0.00%
Asbestos	0.0	0.0	0.000	0.00%	0.0	0.000	0.00%
Clinical (medical)	0.0	0.0	0.000	0.00%	0.0	0.000	0.00%
Gas bottles	0.0	0.0	0.000	0.00%	0.0	0.000	0.00%
Hazardous other	0.0	0.0	0.000	0.00%	0.0	0.000	0.00%
Building materials	0.1	0.0	0.000	0.00%	0.0	0.000	0.00%
Ceramics, dust, dirt, rock, inert	1.4	0.7	0.000	0.07%	0.6	0.000	0.07%
Computer equipment	0.0	0.0	0.000	0.00%	0.0	0.000	0.00%
TVs	0.0	0.0	0.000	0.00%	0.0	0.000	0.00%
Mobile phones	0.0	0.0	0.000	0.00%	0.0	0.000	0.00%
Electrical items & peripherals	1.0	0.5	0.000	0.05%	0.4	0.000	0.05%
Toner cartridges	0.0	0.0	0.000	0.00%	0.0	0.000	0.00%
Other	0.4	0.2	0.000	0.03%	0.2	0.000	0.03%
Total	**1,397.0**	**745.6**	**0.660**	**100.0%**	**745.5**	**0.660**	**100.00%**

Appendix E APC summary of CDS eligible beverage containers

	Included in the NSW Container Deposit Scheme
	Excluded from the NSW Container Deposit Scheme

MATERIAL CATEGORY	0 –150ml	>150 –	>500ml –	>1L –1.5L	>1.5L –	>2 – 2.5L	>2.5L –	>3L
Aluminium								
Alcoholic drinks (including mixers, beer cans and ciders)								
Flavoured water and soft drinks (Carbonated/non-carbonated)								
Other								
Steel								
Alcoholic drinks (including mixers, beer cans and ciders)								
Flavoured water and soft drinks (Carbonated/non-carbonated)								
Other								
LPB								
Milk								
Flavoured milk and fruit juice (>90% fruit &/or Veg juice))								
Fruit drink, flav water/sports drink, non carb/carb								
Other								
HDPE								
Milk								
Flavoured milk and fruit juice (>90% fruit &/or Veg juice))								
Flav water/ sports drink etc (non-carb/non carb), plain water, fruit drink								
Drink pouches								
Other								
PET								
Milk								
Flavoured milk and fruit juice (>90% fruit &/or Veg juice))								
Flav water/ sports drink etc (non-carb/non carb), plain water, fruit drink								
Drink pouches								
Other								
Plastic other								
Milk								
Flavoured milk and fruit juice (>90% fruit &/or Veg juice))								

Appendix F Material Consolidation Details

Material	Garbage	Garbage Consolidated	Recycling	Garden Organics	Recovery	Potential Diversion
Bagged material	Other	Other	Contamination	Contamination	Other	Other
Newspapers	Recyclable paper	Recyclable	Recyclable paper	Contamination	Paper	Recyclable
Magazines	Recyclable paper	Recyclable	Recyclable paper	Contamination	Paper	Recyclable
Cardboard	Recyclable paper	Recyclable	Recyclable paper	Contamination	Paper	Recyclable
Liquid paperboard	Recyclable paper	Recyclable	Recyclable paper	Contamination	Liquid paperboard	Recyclable
Disposable paper products	Non-recyclable paper	Non-recyclable paper	Contamination	Contamination	Other	Other organic
Other recyclable paper	Recyclable paper	Recyclable	Recyclable paper	Contamination	Paper	Recyclable
Composite (mostly paper)	Other	Other	Contamination	Contamination	Other	Other
Nappies and feminine hygiene	Nappies	Nappies	Contamination	Contamination	Other	Other
Non-recyclable paper (soiled)	Non-recyclable paper	Non-recyclable paper	Contamination	Contamination	Other	Other organic
Food (non-meat)	Loose food	Loose food	Contamination	Contamination	Other	Food
Food (meat)	Loose food	Loose food	Contamination	Contamination	Other	Food
Containerised food & liquid	Containerised food & liquid	Containerised food & liquid	Contamination	Contamination	Other	Other
Vegetation	Vegetation	Recyclable	Contamination	Vegetation	Vegetation	Vegetation
Dog poo/kitty litter	Dog poo/kitty litter	Other organic	Contamination	Contamination	Other	Other organic
Wood/timber	Wood/timber	Other organic	Contamination	Contamination	Other	Other
Textile/carpet	Textile/carpet	Other organic	Contamination	Contamination	Other	Other
Leather	Other	Other	Contamination	Contamination	Other	Other
Rubber	Other	Other	Contamination	Contamination	Other	Other
Oils	Other	Other	Contamination	Contamination	Other	Other
Glass drink containers	Recyclable containers	Recyclable	Recyclable containers	Contamination	Glass	Recyclable
Other recyclable glass packaging	Recyclable containers	Recyclable	Recyclable containers	Contamination	Glass	Recyclable
Non-recyclable glass	Other	Other	Contamination	Contamination	Other	Other
Glass fines	Recyclable containers	Recyclable	Recyclable containers	Contamination	Glass	Recyclable
PET drink containers	Recyclable containers	Recyclable	Recyclable containers	Contamination	Plastic	Recyclable
PET packaging	Recyclable containers	Recyclable	Recyclable containers	Contamination	Plastic	Recyclable
Non-recyclable PET	Other	Other	Contamination	Contamination	Other	Other
HDPE drink containers	Recyclable containers	Recyclable	Recyclable containers	Contamination	Plastic	Recyclable
HDPE packaging	Recyclable containers	Recyclable	Recyclable containers	Contamination	Plastic	Recyclable
Non-recyclable HDPE	Other	Other	Contamination	Contamination	Other	Other

Material	Garbage	Garbage Consolidated	Recycling	Garden Organics	Recovery	Potential Diversion
PVC drink containers	Recyclable containers	Recyclable	Recyclable containers	Contamination	Plastic	Recyclable
PVC packaging	Recyclable containers	Recyclable	Recyclable containers	Contamination	Plastic	Recyclable
Non-recyclable PVC	Other	Other	Contamination	Contamination	Other	Other
LDPE packaging	Recyclable containers	Recyclable	Recyclable containers	Contamination	Plastic	Recyclable
Non-recyclable LDPE	Recyclable containers	Recyclable	Recyclable containers	Contamination	Plastic	Recyclable
PP packaging	Recyclable containers	Recyclable	Recyclable containers	Contamination	Plastic	Recyclable
Non-recyclable PP	Other	Other	Contamination	Contamination	Other	Other
Expanded polystyrene packaging	Recyclable containers	Recyclable	Recyclable containers	Contamination	Plastic	Recyclable
Non-recyclable polystyrene	Other	Other	Contamination	Contamination	Other	Other
Polystyrene packaging	Recyclable containers	Recyclable	Recyclable containers	Contamination	Plastic	Recyclable
Non-recyclable hard plastics	Other	Other	Contamination	Contamination	Other	Other
Composite (mostly plastic)	Other	Other	Contamination	Contamination	Other	Other
Plastic bags	Soft plastics	Soft plastics	Contamination	Contamination	Other	Other
Plastic film	Soft plastics	Soft plastics	Contamination	Contamination	Other	Other
Steel drink containers	Recyclable containers	Recyclable	Recyclable containers	Contamination	Steel	Recyclable
Steel packaging	Recyclable containers	Recyclable	Recyclable containers	Contamination	Steel	Recyclable
Non-recyclable steel	Other	Other	Contamination	Contamination	Other	Other
Composite (mostly ferrous)	Other	Other	Contamination	Contamination	Other	Other
Aluminium drink cans	Recyclable containers	Recyclable	Recyclable containers	Contamination	Aluminium	Recyclable
Aluminium packaging	Recyclable containers	Recyclable	Recyclable containers	Contamination	Aluminium	Recyclable
Non-recyclable aluminium	Other	Other	Contamination	Contamination	Other	Other
Other non-ferrous (specify)	Other	Other	Contamination	Contamination	Other	Other
Composite (mostly non-ferrous)	Other	Other	Contamination	Contamination	Other	Other
Paint	Hazardous	Other	Contamination	Contamination	Other	Hazardous and E-waste
Fluorescent tubes	Hazardous	Other	Contamination	Contamination	Other	Hazardous and E-waste
Non rechargeable batteries	Hazardous	Other	Contamination	Contamination	Other	Hazardous and E-waste
Rechargeable batteries	Hazardous	Other	Contamination	Contamination	Other	Hazardous and E-waste
Vehicle batteries	Hazardous	Other	Contamination	Contamination	Other	Hazardous and E-waste
Mobile phone batteries	Hazardous	Other	Contamination	Contamination	Other	Hazardous and E-waste
Power tool batteries	Hazardous	Other	Contamination	Contamination	Other	Hazardous and E-waste
Other batteries	Hazardous	Other	Contamination	Contamination	Other	Hazardous and E-waste

Material	Garbage	Garbage Consolidated	Recycling	Garden Organics	Recovery	Potential Diversion
Household chemicals	Hazardous	Other	Contamination	Contamination	Other	Hazardous and E-waste
Asbestos	Hazardous	Other	Contamination	Contamination	Other	Hazardous and E-waste
Clinical (medical)	Hazardous	Other	Contamination	Contamination	Other	Hazardous and E-waste
Gas bottles	Hazardous	Other	Contamination	Contamination	Other	Hazardous and E-waste
Hazardous other	Hazardous	Other	Contamination	Contamination	Other	Hazardous and E-waste
Building materials	Other	Other	Contamination	Contamination	Other	Other
Ceramics, dust, dirt, rock, inert	Other	Other	Contamination	Contamination	Other	Other
Computer equipment	E-waste	Other	Contamination	Contamination	Other	Hazardous and E-waste
TVs	E-waste	Other	Contamination	Contamination	Other	Hazardous and E-waste
Mobile phones	E-waste	Other	Contamination	Contamination	Other	Hazardous and E-waste
Electrical items & peripherals	E-waste	Other	Contamination	Contamination	Other	Hazardous and E-waste
Toner cartridges	E-waste	Other	Contamination	Contamination	Other	Hazardous and E-waste
Other	Other	Other	Contamination	Contamination	Other	Other

Appendix G Detailed Calorific Values

Table 28 Calorific values of general waste by material category

Source of data	See other tab for category inclusions	Kitchen - vegetable	Kitchen - meat	Municipal garden organics	Paper composite	Mixed paper	Liquid paper board	Newspaper	Magazines	Cardboard	Disposable nappies	Wood	Textiles	Compounds (radios etc)	Mixed plastics	Plastic composite	Plastic film	Polystyrene (PS)	Polyethylene (PE)	Polyvinyl chloride (PVC)	Polyethylene terephthalate	Polypropylene (PP)	Rubber	Other	Check total	Total CV (kJ/kg of MSW)	Total CV (MJ/kg of MSW)	CV per household per week (MJ/hhld/week)
ORER default	CV upper (kJ/kg)	19,800	11,900	16,800	21,450	15,150	21,450	17,330	13,500	18,670	22,900	20,630	16,780	12,000	39,000	37,100	40,000	40,000	45,000	25,000	25,000	44,000	23,100	0				
ORER default	Hydrogen content	6.2%	9.4%	6.0%	7.5%	5.8%	7.5%	6.1%	5.1%	5.9%	6.4%	6.0%	6.4%	Use ORER default CV raw for these categories based on ORER hydrogen and moisture contents														
		Enter our own moisture test results for these categories																										
Enter or default	Moisture content	71.1%	51.3%	58.5%	11.5%	17.6%	22.2%	15.7%	13.2%	12.8%	57.3%	16.9%	22.5%															
Calc or default	CV raw (kJ/kg)	3,583	3,542	5,001	17,249	11,003	14,855	13,101	10,427	14,829	7,772	15,639	11,370	9,570	32,880	34,900	37,800	38,150	41,880	23,770	23,680	40,920	16,770	0				
	Single dwellings																											
Enter	% of MSW	42%	2%	10%	1%	1%	0%	0%	1%	2%	5%	1%	4%	1%	12%	1%	6%	1%	1%	0%	1%	1%	0%	9%	*100%*			
Calc	kJ/kg of overall MSW, raw	1,490	87	484	113	129	31	9	54	257	381	224	422	103	3,806	401	2,367	226	226	0	221	397	25	0		11,229	11	119
Calc	kJ/kg of overall MSW, upper	8232	294	1627	140	177	45	12	70	323	1124	296	623	129	4514	426	2505	237	243	0	233	427	35	0		21,416	21	227
	Multi-unit dwellings																											

Source of data	See other tab for category inclusions	Kitchen - vegetable	Kitchen - meat	Municipal garden organics	Paper composite	Mixed paper	Liquid paper board	Newspaper	Magazines	Cardboard	Disposable nappies	Wood	Textiles	Compounds (radios etc)	Mixed plastics	Plastic composite	Plastic film	Polystyrene (PS)	Polyethylene (PE)	Polyvinyl chloride (PVC)	Polyethylene terephthalate	Polypropylene (PP)	Rubber	Other	Check total	Total CV (kJ/kg of MSW)	Total CV (MJ/kg of MSW)	CV per household per week (MJ/hhld/week)
Enter	% of MSW	36%	3%	7%	1%	2%	0%	0%	1%	3%	6%	2%	6%	2%	11%	1%	7%	0%	1%	0%	1%	1%	0%	9%	*100%*			
Calc	kJ/kg of overall MSW, raw	1,283	103	344	137	177	45	35	70	508	451	281	671	218	3,574	305	2,699	129	321	10	305	579	21	0		12,265	12	77
Calc	kJ/kg of overall MSW, upper	7088	346	1154	170	244	65	46	90	639	1330	371	990	274	4240	324	2856	135	345	10	322	622	29	0		21,691	22	137
	Overall																											
Enter	% of MSW	39%	3%	8%	1%	1%	0%	0%	1%	2%	6%	2%	5%	2%	11%	1%	7%	0%	1%	0%	1%	1%	0%	9%	*100%*			
Calc	kJ/kg of overall MSW, raw	1,401	99	412	129	144	38	22	60	347	428	268	518	157	3,715	384	2,520	179	260	5	251	483	26	0		11,844	12	105
Calc	kJ/kg of overall MSW, upper	7740	331	1383	161	198	55	29	78	437	1260	353	765	196	4407	409	2666	187	279	5	265	520	36	0		21,759	22	192