



ICBD Recycling Audit Report

Prepared for Auckland Council

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1. INTRODUCTION

In August 2022, Molly Coombes, Waste Planning Advisor, Waste Solutions, Auckland Council, requested a proposal to undertake an audit of recycling from the Inner City Business District (ICBD) of Auckland.

Council provides a specific collection service for waste and recycling generated in the ICBD. It is understood that every rateable property in the ICBD is supplied with 104 orange rubbish bags and 156 clear recycling bags annually. Council provides 13 kerbside collections of official council rubbish bags and recycling bags per week. Two collections occur daily, from 04:30-07:30 hrs and from 17:00-19:30 hrs, except on Sunday, when only the 04:30-07:30 hrs collection occurs.

Cardboard is collected in the same truck as the bagged recycling. Cardboard is not required to be bagged and is collected loose.

Council has requested this research be undertaken as there is concern that the contamination levels in the bagged recycling has increased. Council requires an analysis of these materials to verify contamination levels.

Previously, Waste Not Consulting undertook audits of ICBD rubbish, recycling bags and cardboard from the ICBD in December 2001, March 2002, August 2002, April 2004, July 2010 and March/April and May 2015.

This proposal is based on a similar methodology as the previous audits, with some differences in the collection methodology. This audit includes the mixed recycling and cardboard collected from the ICBD on the 18 October 2022.

2. WASTE AUDIT METHODOLOGY

2.1. Collection

In previous years the sample was collected by Waste Not Consulting from a pre-selected area of the ICBD, and this sample was sorted the next day. Collecting materials from the kerbside with a box truck during peak hour traffic is, however, considered to be a high-risk activity. Therefore, for this audit the materials were collected by the council collection contractor and delivered directly to the transfer station.

On Tuesday 18 October an entire truck load of recycling bags and cardboard collected between 04:30 and 07:30 that morning, was delivered to the Waitakere Transfer Station. Late on the 18 October, a second truck load of recycling bags and cardboard were delivered. These were collected from the same area between 17:00-19:30 hrs.



Truck load of materials from the morning collection

2.2. Auditing

Auditing was undertaken at Waitakere Transfer Station over two days (18 and 19 October 2022). The sorting was supervised by a SYCL staff member and four casual staff were engaged to assist. Auditing took place for seven hours per day. Two tables were set up with two auditors at each table. The fifth auditor prepared the sample and did the data recording.

A skip bin was set up alongside the audit area for the disposal of the recyclable materials. Cardboard was disposed of separately through the Waitakere Transfer Station, due to its bulk. Non-recyclable materials were disposed of to the disposal pit.



Audit set up

As the bagged recyclable materials and cardboard were collected in a compactor truck, much of the material was no longer contained in a bag once it had been compacted, transported to the transfer station and emptied onto the ground by the audit area.

Therefore, the recyclable materials that were still bagged were sorted in lots of five bags, and the remaining, unbagged, materials were sorted in samples of approximately 10 kg.

The cardboard was not audited but was separated from the other recyclable materials and weighed at the start of the audit. While the cardboard collection accepts paper as well, it was not clear once the materials were mixed, whether the paper in the pile was from the bagged materials or had been set out separately with the cardboard. Therefore, paper was included with the bagged materials.

The bagged materials were weighed in, in samples of five bags. Each of the five bags was weighed, they were then opened, and the contents were spread on a table and sorted. When all five bags had been sorted, the individual categories were weighed out, the data recorded, and the process repeated until all bags had been sorted.

Once all of the bags had been sorted, the remaining, unbagged materials were collected into samples of approximately 10 kg, and sorted into the same categories.



Pile of recycling with cardboard being removed for weighing



Pile of bagged recycling separated from loose materials

The recyclable materials were sorted into the categories shown in Appendix A. These categories captured detail on the recyclable materials present as well as the composition of the contamination.

3. AUDIT RESULTS

The following sections provide the results of the audit of recyclable materials collected by council's contractor from the ICBD on the 18 October 2022. The results of the truck load of materials collected in the morning and those collected in the evening are presented separately.

3.1. ICBD kerbside recycling

The audit of the morning collection of ICBD recycling included 915 kg of materials. The evening collection included 884 kg of material.

The proportion of cardboard and of bagged recycling in each of these truck loads is shown in Table 3.1. The term bagged recycling refers to both the materials that were audited in bags, and the materials that had been in bags but were loose by the time they were audited.

Table 3.1 – Weight of cardboard and bagged recycling – October 2022

	Morning collection		Evening collection	
	% of total	Total kg	% of total	Total kg
Cardboard	59%	539.7 kg	76%	674.7 kg
Bagged recycling	41%	375.0 kg	24%	209.3 kg
Total	100%	914.7 kg	100%	884.0 kg

Contamination set out with cardboard was not able to be measured, as it was mixed with the loose bagged materials, and some materials inside cardboard boxes may have fallen into the box during transport to the transfer station. However, some cardboard boxes did contain contamination that was obviously there on collection. A selection of photos of this contamination is provided in Appendix B.

Most of the bags of recycling were ripped during the collection, compacting and truck emptying. While samples of five bags were audited, many of these bags were missing materials, and therefore the average bag weights presented in this report are likely to be lower than they would be if weighed at the kerbside. The average bag weight for the morning collection was 2.09 kg, while the average bag weight for the evening collection was 1.45 kg.

Table 3.2 provides the composition of the bagged recycling. This composition includes the materials that were still bagged and the materials that were no longer bagged (loose). The highlighted rows are the materials that are accepted for recycling through council's kerbside recycling collection.

As bagged recycling was audited in samples of five bags, data was not gathered on the proportion of bags that did and did not contain contamination. However, a rough estimated based on the auditors experience, is that that about a third of bags contained little to no contamination, a third contained some contamination, and a third contained a lot of contamination.

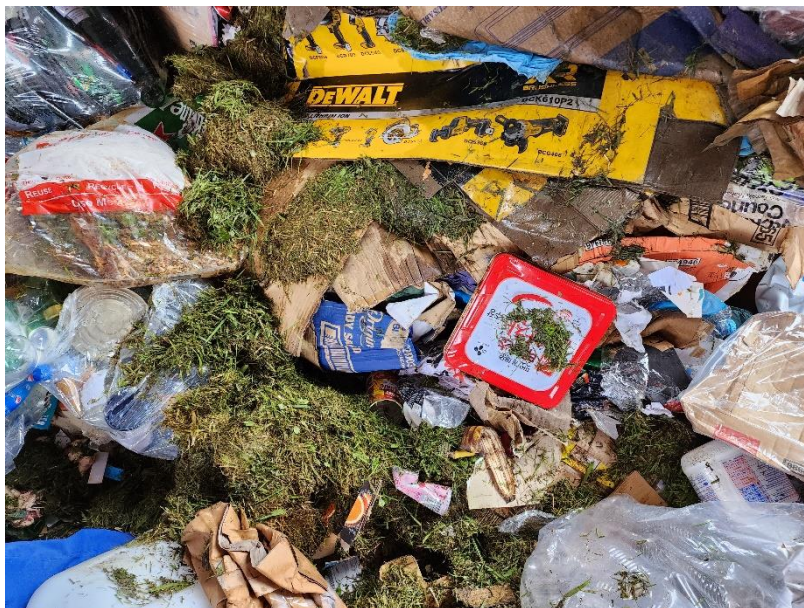
Table 3.2 – ICBD kerbside recycling bags – October 2022

ICBD recycling bags - October 2022		Morning collection		Evening collection	
		% of total	Mean wt. per bag	% of total	Mean wt. per bag
Paper	Recyclable paper	21.8%	0.46 kg	27.2%	0.40 kg
	Non-recyclable paper	1.6%	0.03 kg	4.9%	0.07 kg
	Subtotal	23.4%	0.49 kg	32.1%	0.47 kg
Plastics	#1, 2 & 5 containers	6.4%	0.13 kg	8.9%	0.13 kg
	#3, 4, 6, 7 containers	0.5%	0.01 kg	0.4%	0.01 kg
	Plastic bags and film	3.2%	0.07 kg	5.1%	0.07 kg
	Non-recyclable plastic	5.0%	0.10 kg	4.8%	0.07 kg
	Subtotal	15.1%	0.32 kg	19.2%	0.28 kg
Organics	Kitchen waste	9.6%	0.20 kg	4.1%	0.06 kg
	Greenwaste	10.2%	0.21 kg	0.1%	0.00 kg
	Organic other	0.0%	0.00 kg	0.0%	0.00 kg
	Subtotal	19.8%	0.42 kg	4.3%	0.06 kg
Ferrous metals	Steel cans	2.1%	0.05 kg	3.1%	0.05 kg
	Multimaterial/other	0.5%	0.01 kg	1.7%	0.02 kg
	Subtotal	2.6%	0.06 kg	4.8%	0.07 kg
Non-ferrous metals	Aluminium cans	2.3%	0.05 kg	1.9%	0.03 kg
	Multimaterial/other	0.1%	0.00 kg	0.1%	0.00 kg
	Subtotal	2.4%	0.05 kg	2.1%	0.03 kg
Glass	Bottles/jars	31.2%	0.65 kg	29.9%	0.43 kg
	Multimaterial/other	0.0%	0.00 kg	0.0%	0.00 kg
	Subtotal	31.2%	0.65 kg	29.9%	0.43 kg
Textiles	Clothing/textiles	0.2%	0.00 kg	0.2%	0.00 kg
	Multimaterial/other	0.5%	0.01 kg	0.5%	0.01 kg
	Subtotal	0.7%	0.01 kg	0.8%	0.01 kg
Nappies and sanitary		3.4%	0.07 kg	5.4%	0.08 kg
Rubble		0.2%	0.00 kg	0.7%	0.01 kg
Timber		0.9%	0.02 kg	0.6%	0.01 kg
Rubber		0.1%	0.00 kg	0.1%	0.00 kg
Potentially hazardous	Household	0.1%	0.00 kg	0.2%	0.00 kg
	Other	0.0%	0.00 kg	0.0%	0.00 kg
	Subtotal	0.1%	0.00 kg	0.2%	0.00 kg
TOTAL		100.0%	2.09 kg	100.0%	1.45 kg

Recyclable materials account for 64.3% of the bagged recyclable materials collected in the morning collection, and 71.5% of the bagged recyclable materials collected in the evening collection, as shown in Table 3.3.

Table 3.3 – Recyclable materials in ICBD kerbside recycling bags – October 2022

ICBD recycling bags - October 2022		Morning collection		Evening collection	
		% of total	Mean wt. per bag	% of total	Mean wt. per bag
Paper	Recyclable paper	21.8%	0.46 kg	27.2%	0.40 kg
Plastics	#1, 2 & 5 containers	6.4%	0.13 kg	8.9%	0.13 kg
	#3, 4, 6, 7 containers	0.5%	0.01 kg	0.4%	0.01 kg
Ferrous metal	Steel cans	2.1%	0.05 kg	3.1%	0.05 kg
Non-ferrous metal	Aluminium cans	2.3%	0.05 kg	1.9%	0.03 kg
Glass	Bottles/jars	31.2%	0.65 kg	29.9%	0.43 kg
TOTAL – ALL RECYCLABLE MATERIALS		64.3%	1.35 kg	71.5%	1.04 kg
TOTAL – ALL NON-RECYCLABLE MATERIALS		35.7%	0.75 kg	28.5%	0.41 kg



Lawn clippings in morning collection

There was a large quantity of lawn clippings in the morning collection. These weighed approximately 38 kg and represented 10% of the materials (excluding cardboard). It is expected that these lawn clippings were from one single source. There were no lawn clippings in the evening collection.

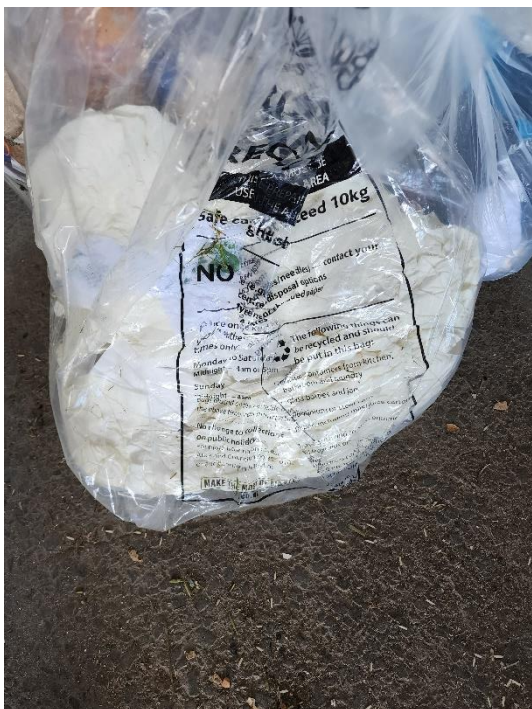
As these lawn clippings are unlikely to be a regular addition to the kerbside collection, the proportion of recyclable materials in the morning ICBD kerbside recycling bags is presented, minus the lawn clippings, in Appendix C.



Example of bag containing some contamination



Example of bag containing some contamination



Example of bag containing mostly contamination



Example of bag containing mostly contamination



Example of bag containing mostly contamination Example of bag containing mostly contamination

4. COMPARISON WITH PREVIOUS AUDITS

Table 4.1 provides a comparison of the results of this audit with the results of two audits undertaken in 2015. These audits were undertaken in March/April 2015 and May 2015, before and after a council recycling education project aimed at reducing contamination in ICBD recycling.

These results provide a comparison of the proportion of the materials in each audit that were recyclable and non-recyclable (contamination). The mean weight per bag in each audit is not presented, as many of the 2022 bags were ripped and, in some instances, had lost part of their contents, thus making them lighter than the bags collected from the kerbside in 2015.

Table 4.1 – Comparison of contamination levels in ICBD kerbside recycling bags – 2022 and 2015

ICBD recycling bags – 2022 and 2015		Morning collection 2022	Evening collection 2022	March/April 2015	May 2015
		% of total	% of total	% of total	% of total
Paper	Recyclable paper	21.8%	27.2%	16.2%	30.8%
Plastics	#1, 2 & 5 containers	6.4%	8.9%	12.2%	13.3%
	#3, 4, 6, 7 containers	0.5%	0.4%		
Ferrous metal	Steel cans	2.1%	3.1%	2.9%	2.8%
Non-ferrous metal	Aluminium cans	2.3%	1.9%	1.3%	1.1%
Glass	Bottles/jars	31.2%	29.9%	41.2%	39.2%
TOTAL – ALL RECYCLABLE MATERIALS		64.3%	71.5%	73.8%	87.1%
TOTAL – ALL NON-RECYCLABLE MATERIALS		35.7%	28.5%	26.2%	12.9%

The proportion of non-recyclable materials is higher in 2022 than it was before or after the recycling education undertaken in 2015.

APPENDIX A – AUDIT CLASSIFICATIONS

Primary classification	Secondary classification	Examples
Paper	Recyclable paper	Office paper, newspaper, Tetra Pak, gable tops, cardboard
	Non-recyclable paper	Food-contaminated paper, coffee cups, laminated paper etc.
Plastics	#1, 2 & 5 containers	All containers with a #1, 2 or 5 symbol
	#3, 4, 6, 7 containers	All containers with a #3, 4, 6 or 7 symbol
	Plastic bags and film	All non-rigid plastics
	Non-recyclable plastic	Rigid, non-recyclable plastics
Organics	Kitchen waste	Cooking scraps, left-overs
	Greenwaste	Leaves, lawn clippings, shrub cuttings
	Multimaterial/other	Hair, animal faeces, vacuum cleaner dust
Ferrous metals	Steel cans	Steel food and drink cans and aerosols
	Multimaterial/other	Any other steel object
Non-ferrous metals	Aluminium cans	Beer and juice cans
	Multimaterial/other	Any other non-ferrous object
Glass	Bottles/jars	Food jars, beer bottles
	Multimaterial/other	Window pane, light bulbs, mirrors
Textiles	Clothing/textiles	Any textile that could be used for a rag
	Multimaterial/other	Other textiles such as shoes and bags
Nappies and sanitary	No secondary classification	Nappies, paper towels, tissues
Rubble	No secondary classification	Stones, ceramics, fibreglass
Timber	No secondary classification	Any item made of wood
Rubber	No secondary classification	Rubber gloves, tyres
Potentially hazardous	Household	Cosmetics, cleaners, batteries
	Other	Oil, garden chemicals

APPENDIX B – CONTAMINATION IN CARDBOARD



Cardboard box full of empty Tetrapak containers



Cardboard box full of beer bottles



Cardboard box containing soft plastic



Cardboard box containing soft plastic

APPENDIX C – RECYCLABLE MATERIALS IN RECYCLING BAGS – EXCLUDING LAWN CLIPPINGS

Recyclable materials in ICBD kerbside recycling bags – October 2022 – excluding lawn clippings

ICBD recycling bags - October 2022 (excluding lawn clippings)		Morning collection		Evening collection	
		% of total	Mean wt. per bag	% of total	Mean wt. per bag
Paper	Recyclable paper	24.3%	0.51 kg	27.2%	0.40 kg
Plastics	#1, 2 & 5 containers	7.1%	0.15 kg	8.9%	0.13 kg
	#3, 4, 6, 7 containers	0.5%	0.01 kg	0.4%	0.01 kg
Ferrous metal	Steel cans	2.4%	0.05 kg	3.1%	0.05 kg
Non-ferrous metal	Aluminium cans	2.5%	0.05 kg	1.9%	0.03 kg
Glass	Bottles/jars	34.7%	0.73 kg	29.9%	0.43 kg
TOTAL – ALL RECYCLABLE MATERIALS		71.6%	1.50 kg	71.5%	1.04 kg
TOTAL – ALL NON-RECYCLABLE MATERIALS		28.4%	0.59 kg	28.5%	0.41 kg