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Waste Audit Results

for University of Canterbury, Sept/Oct 2022

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Contents

1. EXECUTIVE SUMMARY

This report differs from previous audit reports provided by Our Daily Waste in 2017 and 2021, because it was undertaken at the Envirowaste sites where the UC's landfill and divertible streams go after leaving campus. As such, a more randomised sample was taken from across campus, giving us a clearer picture of the system overall. Yet the data did not vary significantly from the previous audits, proving that despite the improvements made by Envirowaste, UC Property Services, and the UC Sustainability Office waste diversion has not greatly improved over the past decade, although it is not getting dramatically worse either. However, as waste levies and operational costs increase, that in 2022 a full 62% of the landfill could be diverted to recyclable, organic, and compostable streams, reinforces the value in striving to improve these outcomes. The proposed upgrading of the current waste diversion system is urgent, but it should be treated as a starting point towards achieving meaningful waste minimisation.

The UC has a campus-wide culture of single-use packaging that was encouraged post-earthquake when expediency and convenience took precedence over waste minimisation, but with a range of app-based reusable solutions now available, this culture is badly outdated. Unless the UC is prepared to properly futureproof the campus by shifting to reusable solutions (and investing in the dishwashing infrastructure required to support them) it risks losing its position in the tertiary sector as a leader in waste minimisation. The student cohort known as Generation Z are well versed in recycling and waste minimisation. They are reaching tertiary age now, and they will expect their campuses to deliver on environmental pledges and mission statements. This report outlines a template for how to streamline the waste diversion system already in place, and at the same time transition into a reusable campus, the best solution for the long term. Below is a summary of the sections that follow:

<u>Sections 2-3: Introduction, and UC Waste Profile</u>

- Section 2 is an introduction to the waste audit in general, outlining the theme of the report, along with some differences from previous audits.
- Section 3 examines the UC's waste tonnage profile, and discusses the economic and environmental costs of such a high landfill output.

<u>Sections 4-6: Audit H&S and Methodology</u>

- Sections 4 and 5 cover ODW's audit H&S and methodology.
- Section 6 outlines the sample size and how it relates to previous audits, and includes a list of the streams and categories waste was sorted into.

<u>Section 7: Audit Overview</u>

- Section 7 gives an overview of the audit findings, and explains how the data categories differ from previous years.
- It also identifies how the results have been affected by the disposal systems used by the property services staff tasked with emptying the bins.

<u>Sections 8-11: Audit Results for Individual Streams</u>

- Sections 8 (Comingled Recycling), 9 (Landfill), 10 (Organics), and 11 (Compostables/PLA) include data and discussion on the contents of the respective bins audited, along with analysis of the spread of the items across the other streams.

<u>Section 12-13: Recommendations and Conclusion</u>

- Section 12 covers recommendations pertaining to the UC's onsite waste collection system, waste prevention through procurement, and becoming a reusable campus.
- The report concludes with a wero (challenge) to invest in greater waste minimisation and prevention systems and practices at the UC to avoid exponentially increasing waste disposal costs, along with increased scrutiny over such a high landfill output by a new generation of students who will expect their education providers to take waste minimisation seriously.

2. INTRODUCTION

Our Daily Waste specialises in comprehensive waste audits that analyse the data, but also examine the bin user behaviour behind the outcomes. They include recommendations for maximising waste diversion through system and signage upgrades, along with simple measures tuned towards waste *prevention,* where the packaging that becomes waste is prevented from being brought onto campus in the first place. This report builds on the 2017 and 2021 audit reports, along with two other reports provided to the UC this year by ODW (UC Composting Options 2022, and UC Recycling Signage Options 2022).

In recent years, there have been significant changes to the waste infrastructure at the UC. Previously, UC Property Services were responsible for providing a truck and employee to collect the waste from around campus, and dispose of it into various skips and bins in the waste yard for collection by a different Envirowaste truck for each stream. This process was time intensive and came with increased H&S risks in the Facilities Management yard, and to pedestrians and traffic using Engineering Rd. Fortunately, a more sustainable solution has been implemented whereby the campus truck and driver are now supplied as part of Envirowaste's services. The driver empties the outdoor bins for all streams before delivering the landfill bags to the Cass Street transfer station, and the divertible streams (comingled recycling, organics, paper, compostables) to Envirowaste's Francella Street premises, where the contamination in each is removed prior to disposal. As such, we were required to audit the landfill at the transfer station, and the divertible streams at Francella Street. The new venues were undercover, spacious, and safer to work in for ODW staff (Fig. 1).

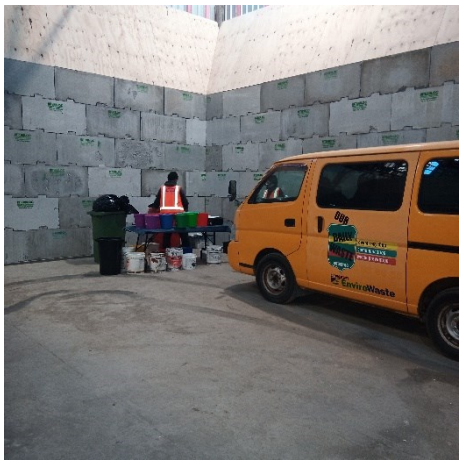


Figure 1: Cass St Transfer Station

The audit was undertaken in the first term of the second semester between 14th September to 19th October, 2022. The driver was asked to provide a randomised sample of bags so that we could get a better overview of campus waste that was not limited to the three key areas that previous audits have focussed on. The streams audited were the comingled recycling, landfill, organics, and the compostables/PLA stream, although there are only a few bins on campus for the latter, and they were so underused that during the entire audit we found only four bags that were clearly from that stream, none of which were full.

The UC is to be commended for undertaking regular waste audits, and actioning some of the recommendations made in the reports. However, as the reports from the 2017, 2021, and this audit indicate the current waste diversion system is not working well enough to reduce the landfill output significantly. Even before the environmental costs are factored in, with landfill fees due to rise exponentially as levies, fuel, and staff costs increase it is now crucial that more effort is made to divert the half of the landfill bins that can go to other streams. Yet even diverting the compostables and other organics-based items is problematic; as outlined in ODW's 2022 report on composting solutions, the Ministry for the Environment has concerns about the effects that PLA and other 'compostable' products have on the end product (at best negligible, at worst harmful). Diverting more of these products is a solution for now, but not for the long term.

However, in the decade since the last major upgrade of the system, the real solution to waste minimisation – reuse – has become increasingly popular with the general public. This desire to go reusable has coincided with the advent of technology that can help solve many of the blocks towards

finding a workable system that early reusable adapters such as Wash Against Waste and ODW came up against. Food and beverage providers and their customers now have a range of app-based programmes they can sign up to for reusable takeaway cups and containers. As such, any upgrade of the UC's waste diversion system should be made in conjunction with a corresponding shift towards becoming a reusable campus.

3. UC WASTE PROFILE

A waste audit can only ever offer a snapshot of the contents of a section of an organisation's waste, so it is beneficial before moving onto the audit results to examine the annual output of the UC's waste. Fig. 2 shows the annual tonnages for each stream from 2013–2020 as supplied by Envirowaste to Dr Matt Morris. Between 2017 and 2019 the yearly landfill output was just over 300 tonnes, before Covid restrictions caused it to drop in 2020.

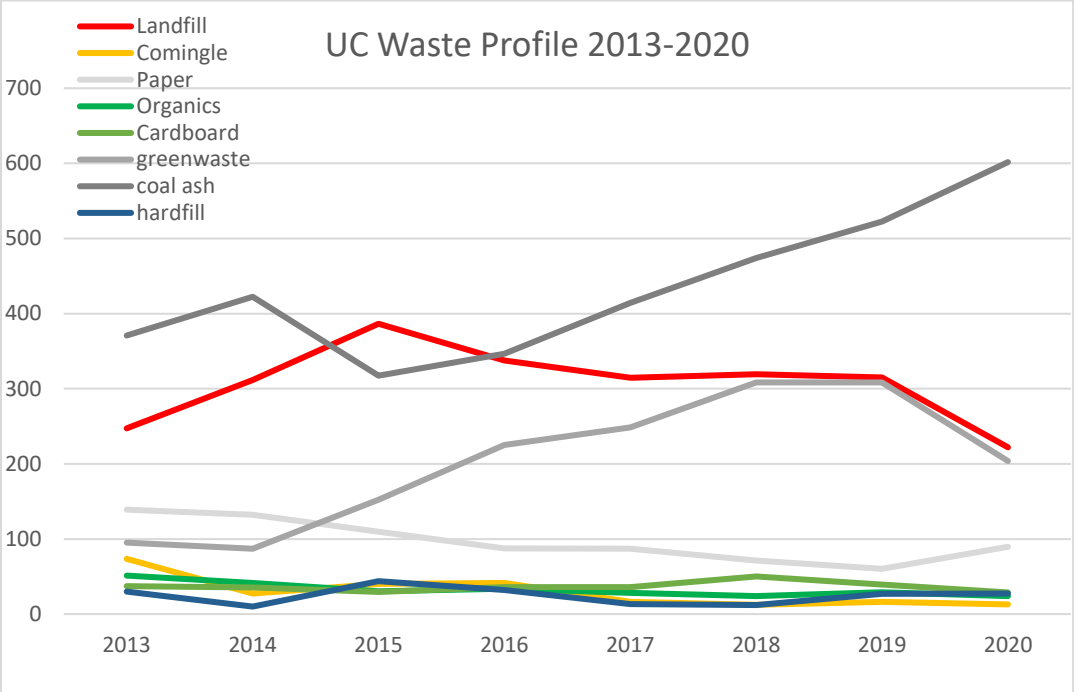


Figure 2 UC Waste Profile 2013-2020 (Absolute figures, Tonnes) - Dr Matt Morris

If the tonnages for greenwaste, coal ash, and hardfill are removed, and only the 'consumer' streams considered, then even at the lower rate of 221 tonnes in 2020, the landfill bins are clearly the most used across campus, with that stream weighing 50 tonnes more than the combined tonnage of the divertible streams: Cardboard, 29; Paper, 93; Organics, 34, and Comingled Recycling, 13.

Fig. 3 gives a breakdown of these figures as a percentage of the total consumer waste.

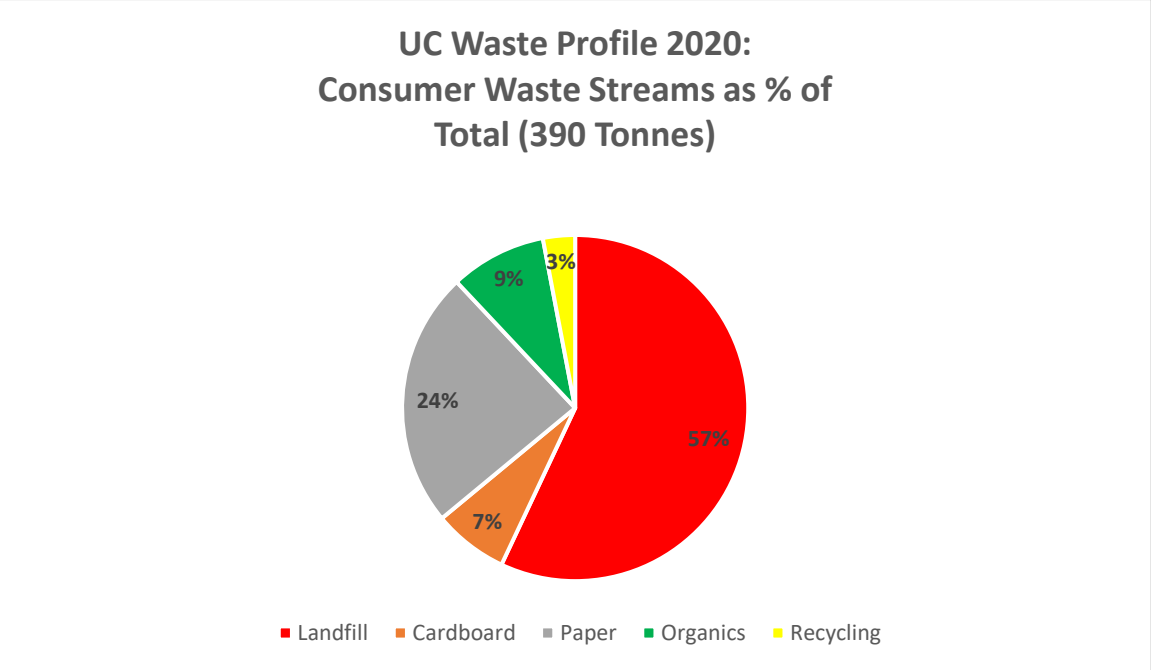


Figure 3 UC annual tonnage of consumer waste streams as percentage of total

Observations include:

- The 3% of comingled recycling is not indicative of the larger volume of landfill being diverted to these bins.
- Conversely, the 9% of organics being diverted is not indicative of the lower volume of this stream as discussed in Section 10.
- At 24% of the total consumer waste, it is excellent that so much paper is being diverted, but given the rise of electronic systems, this figure indicates that more education around paper reduction is required. Currently, the UC only pays transport costs for paper, but this rate is likely to change as the demand for Paper drops again, and transport and processing costs rise.
- There are myriad reasons as to why the landfill bins get used more than the other bins (Section 9), yet the audit data suggests that around half the landfill making the 65km trip to Kate Valley could be diverted.
- Having climbed steadily since 2021, the landfill levies will be set at $60 per tonne in 2024, so in levies alone pre-Covid levels of landfill production (300 tonnes) will cost $18,000 per annum, money that could be invested in better waste diversion and prevention systems.

4. AUDIT HEALTH & SAFETY

ODW takes Health & Safety seriously; all staff were fully briefed in both ODW and Envirowaste policies and practices, which were complied with at all times. All PPE requirements (apron, hi-vis, gloves, hearing protection, hand sanitiser, first aid kit, etc.) were provided by ODW. Audit times were chosen so that we would be onsite during the times of lowest activity to reduce the risk of traffic incidents. These included:

- Cass St: Sundays/Wednesdays, 16:00-20:00
- Francella St: Mondays/Wednesdays, 16:00-20:00

There were no significant injuries or incidents incurred during the audit at either site.

5. AUDIT METHODOLOGY

The following methodology was used for each stream:

5.1 Landfill (Cass St)

Figure 4 Audit set-up at Cass St

- A random selection of landfill bags was left at the Cass St transfer station by the driver before the agreed audit days.
- A total of 36 x 240l liner bags (including smaller indoor bags) were sorted over 6 audit days (6 bags per day) by three ODW staff.
- Individual bags were opened separately, and staff sorted each category of waste into buckets and bins according to volume (Fig. 4).
- Once all waste from each stream was sorted, all categories were weighed and recorded, and disposed of.

5.2 Comingled Recycling (Francella St)

Figure 5 All the comingled recycling bags for one day

- A random selection of bags from the comingled recycling, was left by the driver at Francella St before the agreed audit days.
- A total of 36 x 240l liner bags (including smaller indoor bags) of comingled recycling were sorted over 4 audit days (9 bags per day) by three ODW staff.
- Individual bags were opened separately, and staff sorted each category of waste into buckets and bins according to volume.
- Once all waste from each stream was sorted, all categories were weighed and recorded, and disposed of to the appropriate stream.
- On the last day of auditing at Francella St, all the bags from one day of comingled recycling were left (Fig. 5) so that we could undertake a plastic liner bag count as outlined in Section 8.4.

5.3 Organics (Francella St)

- All of the organics bags collected on the agreed audit days were left by the driver at Francella St.
- The volumes varied so it was difficult to get a similar volume to the recycling and landfill bags audited, but all contamination was removed and then both the organics and the contamination were weighed, recorded, and disposed of into the appropriate stream.

5.4 Compostables (Francella St)

- These bins are not included in all bin sets across campus, and there were only four bags were clearly identifiable as being from the compostables bins for the whole of the audit.
- That waste was sorted into categories, which were weighed and recorded, and then disposed of to the appropriate stream.

6. WASTE CATEGORIES and SAMPLE SIZE

Due to the new auditing sites and the randomised samples, a larger sample size was audited than previously. As per all ODW audits, waste was sorted into stream categories, and then into sub-categories for any items found in bulk quantities, in order to better analyse problem areas.

6.1 Sample Size

Fig. 6 shows the weights of the total contents of each stream we sorted (i.e.: landfill includes any recyclable or organics items in the landfill bags; recycling includes landfill, organics, and compostable contamination), with the 2017 and 2021 figures included for comparison and context.

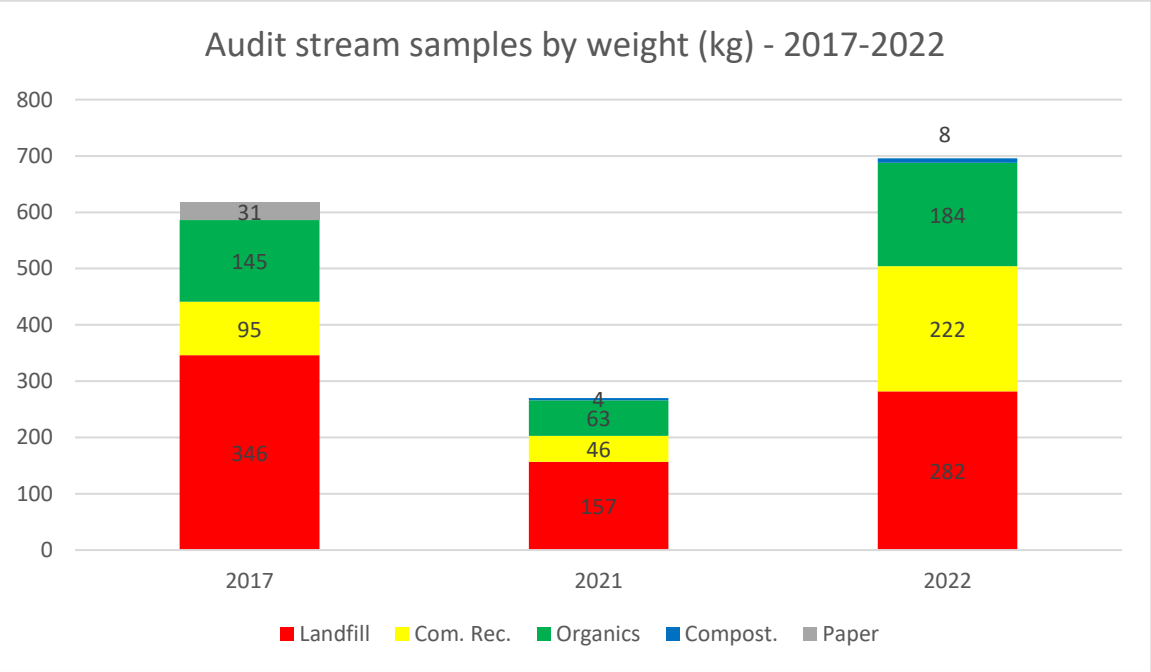


Figure 6 Stream samples in kgs for waste audits 2017-22

Whereas the 2017 and 2021 audits took waste only from one sample area per week for three weeks, this year the randomised approach has resulted in a more even spread across the streams, and we were able to process a larger sample of both the organics and comingled recycling. With a total of 696kg of waste audited in 2022, the sample size is closer to that of 2017 (617kg), than the far smaller figure recorded in 2021 (which can be attributed to the auditing of only two sets of bins per week, and the combined effects of Covid and flooding during the audit time of May 2021 resulting in less people on campus).

6.2 Waste Categories/Types

ODW audits do not just audit into major categories, but into sub-categories within each stream which appear consistently. Table 1 is a list of categories used, what items each included, and what waste stream we classified them under.

Table 1 Categories waste was sorted into – all streams.

Landfill Category	**Includes**	**Comments**
Bottle/Container Lids	Plastic/metal bottle tops, Plastic/metal container lids	Many still going to recycling
Cups & Lids	Plastic lined cardboard cups, Plastic cups (juice, bubble tea) Waxed cups (McDonald's, etc.) All plastic cup lids	Any cups & lids that could not go to the compostable stream
Drink Cartons	Milk/juice cartons Tetrapaks	High café waste
Food Packaging	Non-compostable cartons & tubs Fast food (KFC, McDonalds etc.)	Most came from Ancestral Cafe, or off campus takeaways
Medical	Sample jars Medical packaging	A large sample collected for this audit
Paper – non-recyclable	Receipts Small pieces Waxed	All paper that can't go to recyclable or organics streams, including torn up office paper now too small for recycling
Plastic Containers	Sandwich packs Sushi Takeaway 1 & 2 (mostly dirty)	Despite a few containers being potentially recyclable (clean 1&2), it is recommended that all of these items be treated as landfill to avoid confusion
Plastic Packaging	Soft plastics/plastic foil Biscuit trays, etc.	Includes any plastic that can be squashed by hand
PPE	Gloves Masks	A high number of these high-risk items were also found in comingled recycling
Single Use Packaging	Sauces Tea bag wraps Coffee pods Lolly wrappers	Could be eliminated/banned
Usable	Tampons & other sanitary items Hats Bags	A special category for a large number of unused items thrown out in error by a student services department
Wipes	Fabric wipes	Can be mistaken for napkins but are not compostable
Miscellaneous	Yoghurt Pottles & Squeeze packs, Polystyrene Tin foil Plastic straws, cutlery & strapping Stationery Vacuum Waste	Includes all categories with total weights registering too low for graphs.
Recycling Category	**Includes**	**Comments**
Bottles – Plastic	Plastic bottles under 3l in size Milk bottles under 3l in size	Most had lids on
Cans – Aluminium	All drink cans	

Cardboard	Boxes Packaging etc.	Often wet from liquid contamination in recycling
Glass Bottles	All glass bottles – not broken	Very few collected
Glass Jars	Glass jars - clean	Very few collected
Paper – recyclable	Office Magazines/newspapers	Often wet from liquid contamination in recycling
Tins - metal	All metal food tins under 3l in size	Most were too dirty to recycle
PLA/Compostable Category	**Includes**	**Comments**
Cups – PLA	PLA lined cups labelled as compostable PLA clear cups labelled as compostable	Several different types, can be difficult to tell apart from plastic
Cup Lids – PLA	All lids labelled as PLA or compostable	Several different types, can be difficult to tell apart from plastic
Cutlery – Wooden	Wooden/bamboo cutlery Chopsticks Stirrers Skewers	
Food Containers	PLA lined Cardboard Potato/sugarcane	PLA lined cardboard containers can be difficult to tell apart from plastic lined
Organics Category	**Includes**	**Comments**
Food	Food – cooked and uncooked Coffee grounds Tea bags	Due to difficulty of separating organics this stream was not categorised further
Napkins	Napkins/serviettes Paper towels	Can potentially go to organics stream, but are not currently included in signage
Paper Bags	All plain paper bags - unwaxed	
Pizza Boxes	Pizza boxes	

7. AUDIT OVERVIEW

This section provides an overview of the pre-disposal make-up of the waste audited, i.e. what waste streams the items belong to, regardless of the bin stream they ended up in. Using previous audit data for comparison, Section 7.2 shows that across all areas and bin streams, that by weight the food and other items that can go to the organics stream continues to be the biggest challenge the UC faces with regards to waste minimisation. With only 1% contamination the organics bins are the cleanest stream, but many of the items that can now go to that stream are going to the landfill bins, and others are contaminating the comingled recycling. As such, Section 7.3 outlines the rationale for including some items that were previously categorised as landfill (such as paper bags, and napkins) in the organics data with a view to diverting them in the future. Due to the randomised selection of waste this year, there was also a better overview of the effects that some property services practices had on the data as discussed in Section 7.4.

7.1 Breakdown of Waste per Stream by Percentage After Categorisation

After the various items have been categorised and weighed it is possible to deduce what percentage each separate stream makes up of the total waste audited (i.e.: landfill includes all landfillable items found in the landfill, comingled recycling, organics, and compostable bins, etc.). Fig. 7 shows this data as a percentage of the total waste audited in 2022, whilst Fig. 8 includes the data from the 2021 audit for comparison.

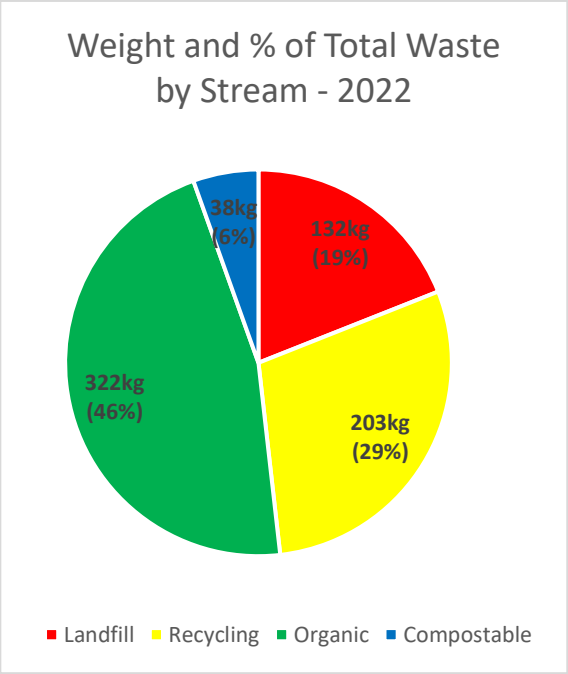


Figure 7 Weight and percentage of total waste by stream if all waste went to correct bins - 2022

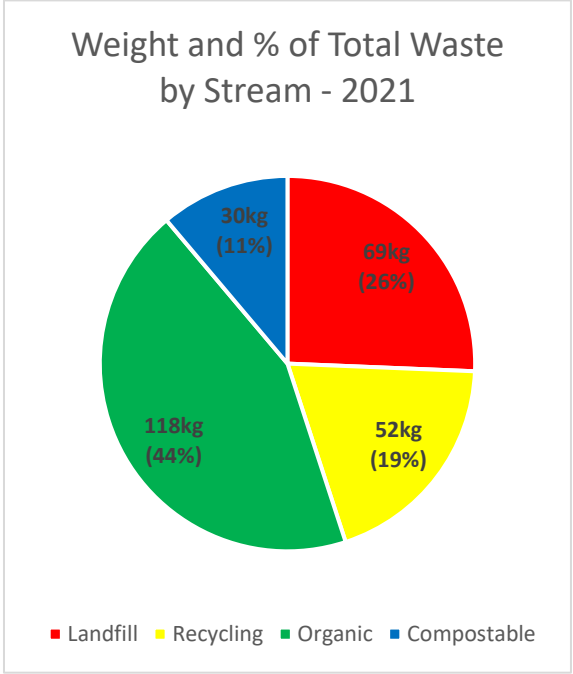


Figure 8 Weight and percentage of total waste by stream if all waste went to correct bins - 2021

Observations include:

- As noted in Section 6.1, in 2022 more comingled recycling was audited overall, and in equal volume to landfill, whereas in 2021 all the bags from one area were audited per week, so this explains the increase in recycling.
- The 2022 graph includes paper bags, napkins etc. in the organics stream, thereby reducing the landfill from 2021.
- For both the 2021 and 2022 audits landfillable items make up less than 30% of the total waste, but they are spread across all streams, creating contamination.
- Food and other organics items are naturally heavier, so they contribute a higher percentage, but because they were found across all streams, a greater focus on reducing food waste in general would be beneficial.
- Due to the vastly different weight to volume ratios of each stream, this outcome can only offer an indication of the make-up of the UC's overall waste. A more accurate measure would include taking volume and weight data for all bags from all streams for a day or week.

7.2 Comparison with Previous UC Audits – 2012-2022

Fig. 9 offers a snapshot of how this audit compares to the others that have been carried out since 2014. Based on the percentages of the contents of each stream audited, 2022's figures do not differ significantly from previous years.

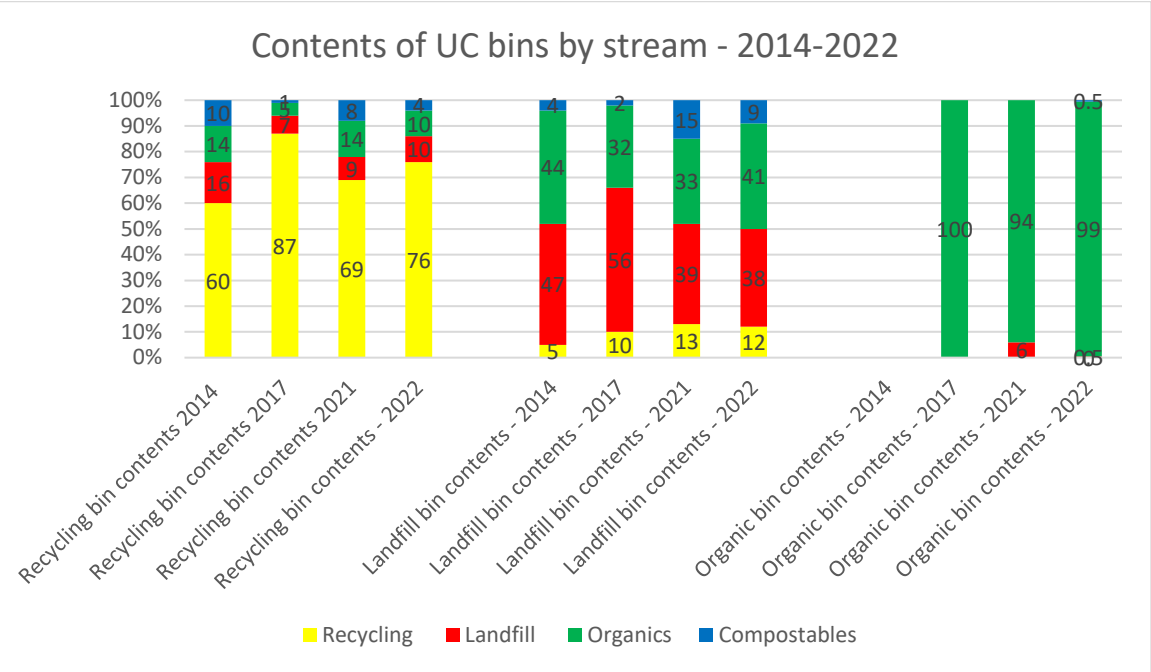


Figure 9 Contents of UC bins by stream from audit data taken 2014-2022

Observations include:

- The organics stream continues to be the least contaminated with 99% of the contents of the organics bins either food or pizza boxes.
- That outcome is tempered however, by the 41% of landfill and 10% of comingled recycling that is food waste and other items that can now go to the organics stream (section 3.2).
- That 76% of the contents of the comingled recycling stream was legitimate recycling is also encouraging, but the other 24% included a wide range of items that should have gone to the landfill, organics, or compostable streams.
- Currently, decontamination of the recycling stream is provided by Envirowaste, but there is room for improvement at the 'point of entry' that could be addressed with better signage and education.
- The comingled recycling bins are still not capturing all the recyclables, and 12% of the landfill contents could have been diverted, a figure that hides the volume that the much lighter recycling items are contributing to unnecessary landfill fees.
- With only four bags identified as compostable bags over the course of the audit, the data for the 2021 and 2022 audits is so minimal it is not included in this graph (Fig. 10).
- The PLA cups, compostable food containers, and wooden cutlery continue to be disposed of elsewhere, making up 4% of the comingled recycling, and 9% of the landfill, so there is an urgent need to find a solution for these items.

Figure 10 Three compostable bags prior to sorting

7.3 Changes to Organics Stream

In previous audit reports the data has been analysed in keeping with the signage currently in place at the UC as shown in Fig. 11: the organics shows only food items, tea bags, coffee grounds, and flowers; soiled paper bags are included in the landfill.

Figure 11 Current UC signage with paper bags in landfill

However, in the decade since that signage was originally designed Living Earth (where the UC's organics stream goes) can now accept pizza boxes, paper bags, paper towels, and napkins. As such, the data has been analysed to highlight the current opportunities for greater diversion of these paper items to the organics stream – provided the signage is updated to include them.

Potentially, 41% of the landfill bins could be diverted to an organics stream, and if the PLA and compostables are likewise diverted that figure goes up to 50%. Removing confusion about where those items should go would also help reduce the comingled recycling contamination, where food, and the paper items listed above make up 10% of the recycling bags audited; a messy contaminant that often causes entire bags of recycling to be rejected and sent to landfill.

7.4 Café Food Packaging

If the UC wishes to divert eligible food packaging to the compostable stream, then a more streamlined approach for both independent cafés and UCSA food outlets is required. As outlined in the Composting Options 2022 report, a uniform approach to the packaging used for food purchased on campus (including visible branding to show what bin it goes to) would assist greatly in getting the compostable items into the correct stream, and also make them easier to identify for sorting at the Envirowaste premises.

Currently, the UCSA organisations are mostly using the compostable items, but there was some plastic cutlery included in the packages thrown into the bins. However, independent outlet Ancestral café were notable for having a lot of packaging (some of it unnecessary) which was mixed compostable and landfill, and Fig. 12 shows some of the Ancestral packaging found as contamination in the comingled recycling:

- Paper package of wooden cutlery marked as 'compostable' that included wooden cutlery, chopsticks, toothpick (in a paper packet), and a spork (presumably plastic and not PLA).
- Large plastic drink cup, lid, and straw.
- Sealed plastic cup, lid, and straw.
- Waxed cardboard food container and plastic lid.
- Plastic spork.

Figure 12 Ancestral packaging contaminating the comingled recycling

The cutlery package is particularly wasteful and many of the chopsticks and toothpicks included in them were unused. The drink cups were filled with liquids and residue, which contaminated the recycling even further.

Working with all the food outlets to find reusable and compostable solutions to landfillable items should be part of any long-term waste minimisation plan, but if the system is to include a greater focus on composting, then cafés such as Ancestral will require assistance to overhaul their packaging in the short term.

7.5 Property Services Practices

Unfortunately, the audit also revealed that the property services staff tasked with emptying the stackable indoor bins and disposing of the bags into the outdoor wheelie bins are not always disposing of the bags in the right streams. Streams were mingled together, and we found many small green organics bags (none of which were contaminated) in the landfill and recycling bags (Figs. 13, 14).

Figure 13 Clean food bags in 1 x landfill bag

In the comingled recycling stream, clear plastic bin liners had been tied off and discarded with only one item in them, creating unnecessary plastic waste, and increasing the time required for the driver/sorter to open all bags at the Envirowaste yard. The overuse of bags was so high that on the last day of the audit we undertook a tally, the results of which are included in Section 8.4.

Given the difficulties of finding staff when all industries are struggling to fill positions, these outcomes are hardly surprising, and I do not wish to tax an already stretched department with changing their current practices. However, as included in the recommendations (Section 12.1) there is scope for creating a separate role whereby the emptying, sorting, and disposal of the indoor bins is undertaken by staff designated and trained specifically for that role.

Figure 14 Clean food bag in recycling

8. COMINGLED RECYCLING

Due to the larger sample, in 2022 the combined weight of the comingled recyclables found across all streams was 203kg or 29% of the total waste audited, although by volume this figure is closer to 50%. Of all the streams, the recyclables were the most likely to be put in the correct bins, and we found no recyclable items in the organics or compostables bags, which is a highly positive outcome. However, the comingled recycling continues to be contaminated with items from all the other streams.

8.1 Weights and Distribution of Recyclable Items by Type

Fig. 15 shows the weights of the groups of items that can be recycled, along with their distribution between the comingled recycling and landfill streams.

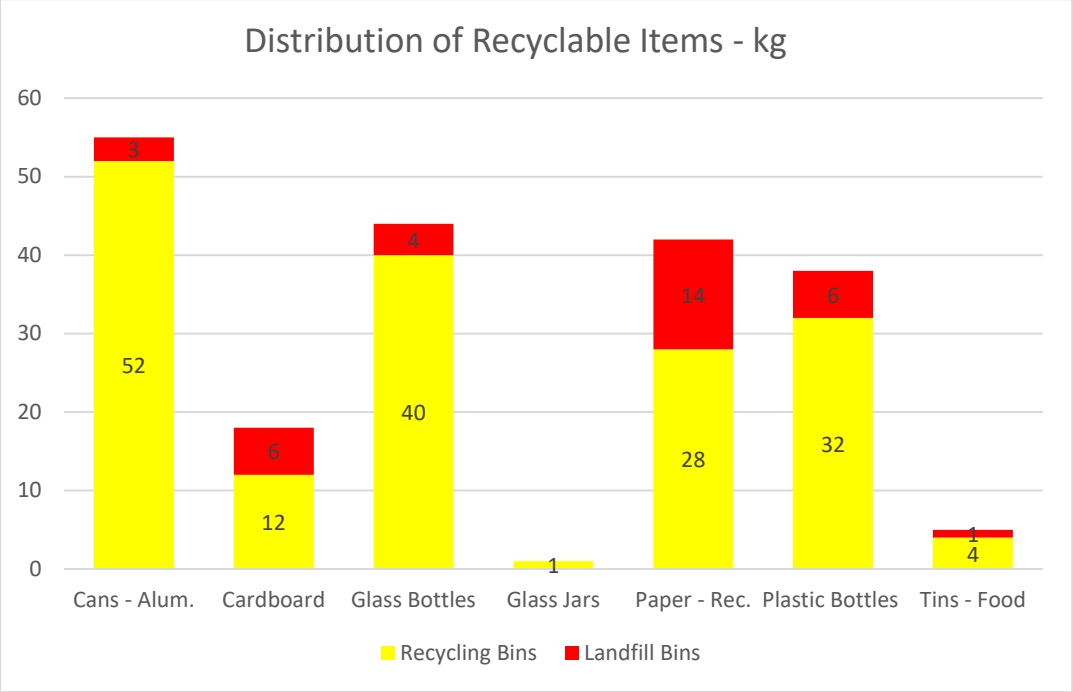


Figure 15 Total weights of recyclable items showing distribution between recycling and landfill streams

Observations include:

- At the end of each day of auditing the comingled recycling we had approximately two and a half 240l wheelie bins of aluminium cans from 9 x 240l bins (Fig. 16).
- Aluminium cans are considered the best recyclable item in terms of resale value, recyclability, transportation, and cleanliness so that the total weight and volume of cans is now higher than the heavier plastic bottles, is an excellent outcome.
- In contrast the plastic bottles only filled 1 x 240l bin, an excellent outcome that will help support the planned phasing out of plastic bottles.
- However, the weight of the aluminium cans was skewed by the inclusion of Boss beverage cans (Fig. 17) which are weighted at the bottom, making them more than three times heavier than an average can (Average: 13g/250ml; Boss: 42g/237ml), presumably to fool the consumer into thinking they are getting better value for money.
- That the majority of the plastic bottles going to landfill were unrinsed milk bottles is an excellent result.
- Higher percentages of cardboard and recyclable paper continue to be disposed of in landfill than the other items.
- Some of the clean paper had been ruined by coffee dregs and liquids etc.
- Almost all the food tins were contaminated with food, suggesting that this item should be removed altogether from recycling signage.

Figure 16 2.5 bins of aluminium cans from 9 bins' recycling

Figure 17 Weighted Boss cans 42g each

- Although rigid plastic containers numbered 1 & 2 (as long as they are under 3l, clean, and lidless) can still be accepted at Eco Sort, very few met the criteria. As such, they have not been included as viable recyclables in this audit, but instead as part of the landfillable contamination.

8.2. Breakdown of Comingled Recycling Bins by Stream

With a larger, randomised sample of 222kg of comingled recycling audited in 2022, Fig. 18 shows encouraging results with 76% of all the items found in the comingled recycling bags to be recyclable, up from 69% from the 2021 audit (Fig. 19).

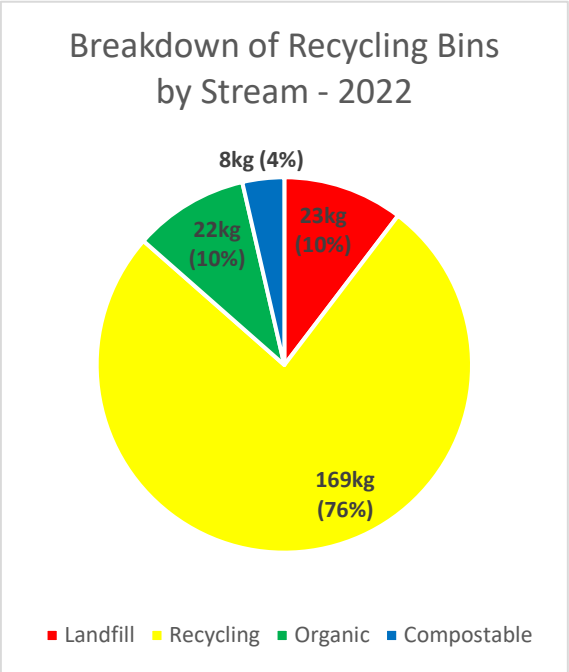


Figure 18 Contents of recycling bins by stream - 2022

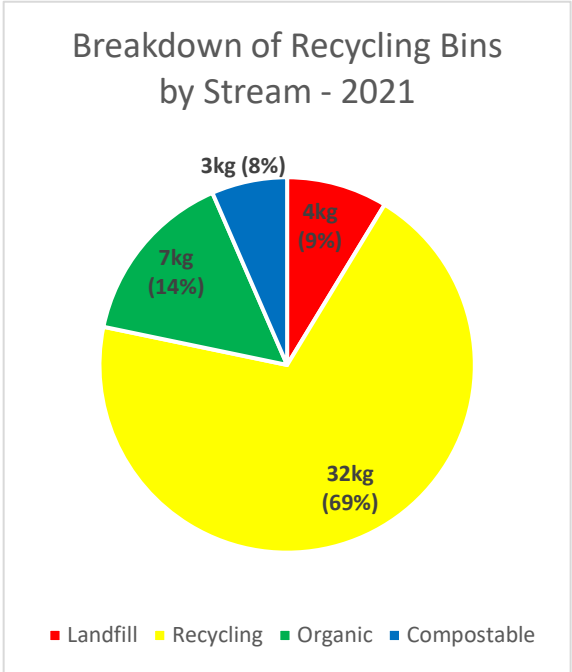


Figure 19 Contents of recycling bins by stream - 2021

Observations include:

- Even with the increased weights audited in 2022, the recycling items continue to be made up of around 10% of landfill.
- The reduction of the organics and compostables found in the recycling is most likely attributable to the larger, more randomised sample in 2022. Previous years have focussed on areas where food is more likely to be consumed.
- Food, liquids, paper bags, and napkins that should go to the organics stream continue to be highly problematic contaminants, and are difficult to remove during the decontamination process.
- The 4% of compostables also found contributes to the likelihood that the bags may be considered too contaminated to sort, and therefore all the contents become landfill (Fig. 20).

Figure 20 The compostable containers from one day's auditing of comingled recycling

8.3 Contamination in Comingled Recycling by Type

The combined 24% of contamination in the comingled recycling can be broken down further into items that should have gone to the landfill, organics, or compostables streams as shown by Fig. 21.

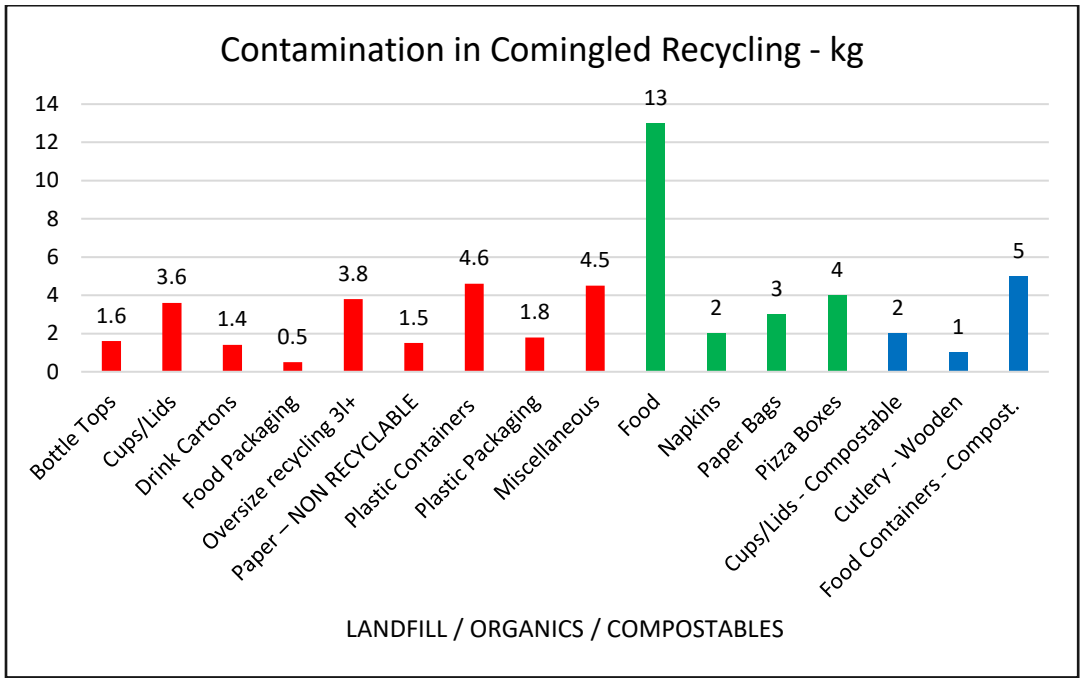


Figure 21 Contamination in comingled recycling by item and stream

Observations include:

- Given how light bottle tops are, that combined they weighed 1.6kg indicates that the 'topless' messaging is still not getting through.
- Both compostable cups and lids (2kg) and non-compostable cups and lids (3.6kg) continue to contaminate the comingled recycling. The dregs do further damage by soiling clean recyclables in the same bag (Fig. 22).
- Oversize (larger than 3l) bottles, containers, and tins continue to be put in recycling by the campus cafés. In addition, most were also unrinsed (tomato sauce etc.).
- The 1.5kg of landfillable paper shown here includes receipts, and office paper that has been torn into pieces too small to recycle (Fig. 23).
- Plastic containers are still shown as recyclable in the UC signage, but the majority were unrinsed and had lids on, so they have been classified as landfill. In addition, their current status in Canterbury as 'recyclable' risks being reversed in the future, due to the difficulty of getting clean product, and finding recyclers prepared to take them.
- The miscellaneous landfill category included disposable gloves and masks that combined did not weigh enough to be included separately, but were found on all days when the comingled recycling was audited. When this waste is being sorted daily by an Envirowaste employee, these are high risk items that should only go to landfill bins.

Figure 22 Cup and liquid in recycling bag

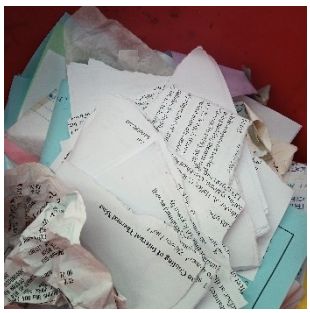


Figure 23 Ripped up paper too small to recycle

- That a total of 13kg of food was found in the comingled recycling bins is of the greatest concern, reinforcing that more work needs to be done to divert this stream to the organics bins, and reduce food waste overall.
- A lot of the food was wrapped in the paper bags and napkins that could go to the organics stream in future.
- At 5kg, the compostable food containers made up the second heaviest contaminant after food, and the food left in them caused greater contamination.

8.4 Plastic Liner Bag use

Current waste practices at the UC require all comingled recycling bins (indoor and outdoor) to be lined with clear plastic bags so that contamination can be easily identified. The stackable indoor bins are emptied by the property services cleaning staff who tie off the bags, replace them, and then deposit the smaller bags into the outdoor wheelie bins for collection by the Envirowaste driver. However, more education is required about ensuring that each stream's bags end up in the correct wheelie bin for disposal.

Figure 24 Recycling bag with 1 item in it

The current system is also creating a lot of unnecessary bag waste, as Fig. 24 indicates where a tied off bag was found with only a bottle top in it (not even recyclable), whilst Fig. 25 shows a typical large outdoor sized bag with the smaller bags inside. The high occurrence of tied-off clear liner bags (both large and small) with very little in them (Fig. 26) warranted a bag count, which we undertook on the last day of auditing the comingled recycling. I asked the driver to leave all the recycling bags from that day's run and in order to get an equal volume of recycling to landfill (where 240l bags were usually filled to capacity) we filled up 9 x 240l wheelie bins with bags from the pile (starting with the highest volumes first), then weighed each bin before auditing it. Afterwards we counted up the bags from each separate bin.

Figure 25 Recycling liner bags inside bags

Figure 26 One piece of paper in recycling bag

Table 2 records the results of the liner bag count, and indicates the high number of bags being used and the low weight of the contents.

Table 2 Results of plastic liner bag count for comingled recycling stream

Bin No.	Pre-sort weight (incl. bags/cont.)	No. Lg Bags	No. Sm Bags	Total Bags	Average Weight to Bag Ratio
1	7.0kg	6	11	17	0.4kg
2	8.0kg	3	9	12	0.7kg
3	9.0kg	4	9	13	0.7kg
4	9.0kg	4	9	13	0.7kg
5	9.0kg	2	13	15	0.6kg
6	11.0kg	1	7	8	1.4kg
7	9.0kg	4	15	19	0.5kg
8	10.0kg	2	10	12	0.8kg
9	6.0kg	4	2	6	1.0kg
Total	**78.0kg**	**30**	**85**	**115**	
Average	**9.0kg**	**3**	**9**	**12**	**0.7kg**

With an average of 12 liner bags per 240l bin, and the items in each bag usually weighing less than a kilogram (including recyclables, contamination, *and* the liner bag), bin liner use seems unnecessarily high, until you factor in that the staff tasked with emptying them will be following guidelines that they remove and replace the bag for every bin, every day, regardless of how much waste is in it.

In addition to the cost of the bags (70c+ each), and the extra landfill waste they create (the clean recycling must be emptied out of the bags before being put into the collection bins at Francella Street, such high bag use comes with a lot of time wastage for UC property services staff as bags are tied off, removed, replaced, then transported and disposed of to an outdoor bin. From there the Envirowaste driver performs the same tie-off, remove, replace functions, then transports the bags to the depot where they are all removed and untied before the waste in them is sorted and disposed of. Suggestions for how this process could be streamlined to reduce both bag use and handling time are included in Section 12.1.

9. LANDFILL

The volume of waste the UC disposes to landfill annually, has not significantly reduced in the last decade, and is instead expected to increase in line with student enrolments. This reinforces the fact that waste diversion systems alone cannot significantly reduce waste overall. Landfill continues to be filled up by single use packaging (cups, clamshells, soft plastics, individual sachets etc.), some of which could be diverted if it was put in the correct bins. However, a high proportion of these items could also be eliminated entirely through the implementation of the following: reusable initiatives, low-waste procurement guidelines, education drives, and outright bans of particular items such as disposable cups and coffee pods.

9.1 Weights and Distribution of Landfill Items by Type

Fig. 27 shows the distribution of landfillable items across the landfill and comingled recycling streams. Of the landfill found in the organics and compostable streams there was not a large enough sample to categorise it further.

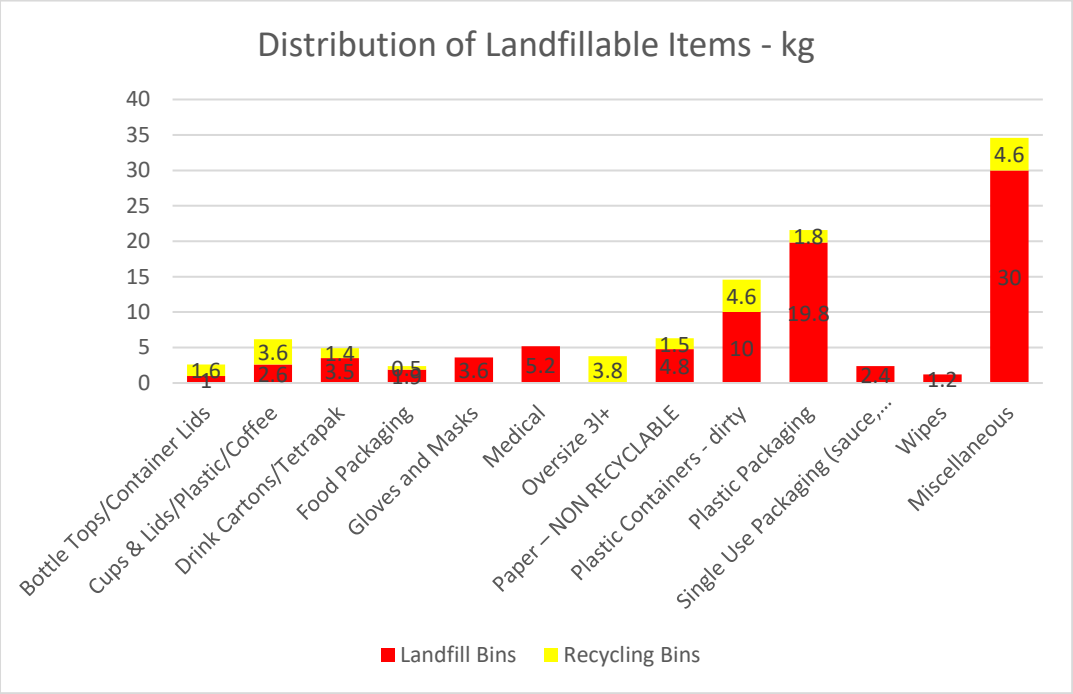


Figure 27 Total weights of landfill items showing distribution between recycling and landfill streams

Observations include:

- At 1.6kg there were more bottle tops going to recycling than landfill.
- At 3.6kg there were more non-compostable cups and lids going to recycling than landfill.
- Drink cartons are one of the items people are most confused about, so that there are more in the landfill than the recycling is a positive trend.
- Many of the drink cartons came from cafés. One café owner (Reboot, Café 101) is very keen to find a solution for these items, and is even flattening them so they take up less space in the landfill (Fig. 28). Finding a solution for all cafés would help reduce this bulky item considerably.

Figure 28 Flattened drink cartons

- The food packaging category refers to fast food packaging brought from outside the UC, but also the non-compostable tubs etc. that come from the Ancestral café (Section 7.4).
- Although gloves and masks, single use packaging, and wipes were found in the recycling bins the weight data was too small to log separately, so they have been included in the 4.6kg of miscellaneous landfillable items found in the comingled recycling.
- There was a high incidence of medical waste found (sample jars, packaging etc.), warranting a separate category.
- There were not enough oversized recycling bottles and containers found in the landfill to log as a separate category.

- The non-recyclable paper included receipts and office paper torn into pieces too small to recycle so that there is more going to landfill than recycling is a positive trend.
- That there are more contaminated plastic containers going to landfill than comingled recycling is an excellent outcome, and reinforces the necessity of removing these items from the recycling signage.
- At 21.6kg lightweight plastic packaging is the biggest single category by weight, and for every six 240l bags of landfill audited, after classification the (compressed) soft plastics filled one bag (Fig. 29).
- Given that the category 'single use packaging' includes very small and light packaging (eg: lolly wrappers, coffee pods, tea bag wraps, butter and condiment wraps) that combined they weighed a total of 2.4kg shows the high incidence of these items.
- As another lightweight item, at 1kg in total, synthetic fabric wipes took up significant volume in the landfill. Because they look like napkins/tissues, they will become highly problematic if the UC decides to divert the paper items to the organics stream.

Figure 29 Plastic packaging from 6 x 240l bins of landfill

9.2 Breakdown of Landfill Bins by Stream

With 282kg of landfill audited, Fig. 30 shows that less than a third of it was made up of items that cannot be diverted to any other stream, and Fig. 31 shows the 2021 figures for comparison.

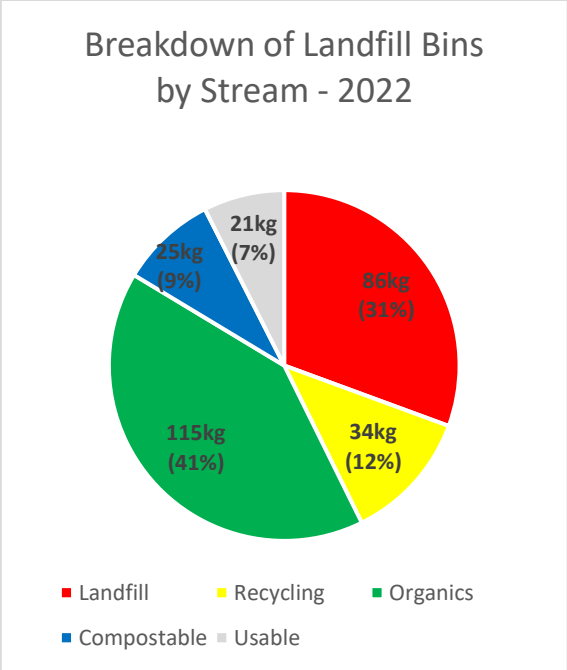


Figure 30 Contents of landfill bins by stream - 2022

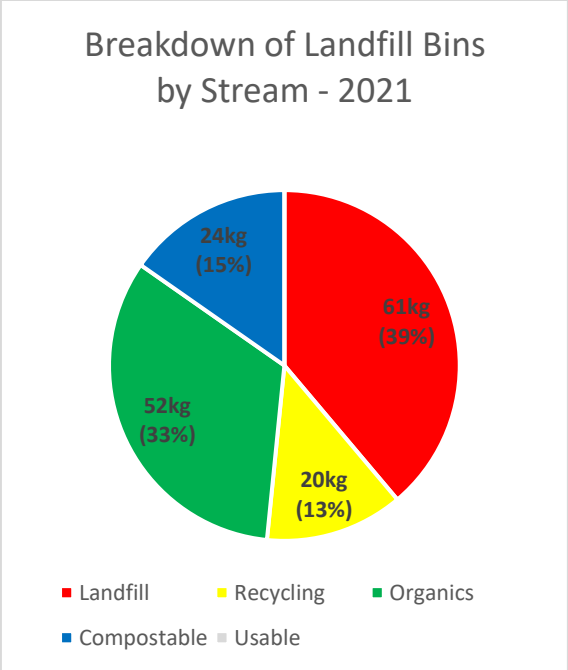


Figure 31 Contents of landfill bins by stream - 2021

Observations include:

- Even with the increased weights audited in 2022, the 12% of recyclable items found in the landfill remained consistent, which is encouraging, but these items add significant volume to the landfill, and they are easily diverted.
- The 7% of 'usables' in the 2022 graph refers to 13kg of unused, undamaged tampons, and 8kg of Covid branded giveaways such as soap, hats and hand sanitiser thrown out in error (Section 9.4).
- The 8% increase in organics exactly corresponds to the 8% decrease in landfill from the 2021 figures, an outcome that can be attributed to the reclassification of the paper items (napkins, paper bags, etc.).
- For the 2021 audit, the weight of organics in the landfill was boosted by a café that only used the landfill bins for coffee grounds, and they were visited before the 2022 audit and asked to use the organics bins. At least some of the randomised bags came from them, but there were no incidences of bulk café coffee grounds found in any landfill bags over the entire audit.
- However, kitchen food waste is still being put in the landfill bins by more than one outlet (Fig. 32).
- At 41% of the total weight, the amount of organics found in the landfill continues to be a major block towards reducing the volume and cost of disposal.
- The lower incidence of compostables in the landfill in 2022 can be attributed to the waste being taken from across campus and not just from food areas as per previous audits.

Figure 32 Kitchen food waste in landfill

The UC's annual landfill output continues to fall between 200-300 tonnes per annum, yet consecutive audits suggest that at least half the weight could be diverted to recycling, organics, and compostable streams for reduced disposal fees. Maintaining the system to the current standard and outputs will only result in long-term increases in waste fees, and the staff and transport costs of handling it, an outcome that is both financially and environmentally irresponsible.

9.3 Breakdown of Divertible Items in Landfill

The combined 62% of landfill that could have been diverted to comingled recycling, organics, and compostable streams can be broken down further into sub-categories as shown in Fig. 33.

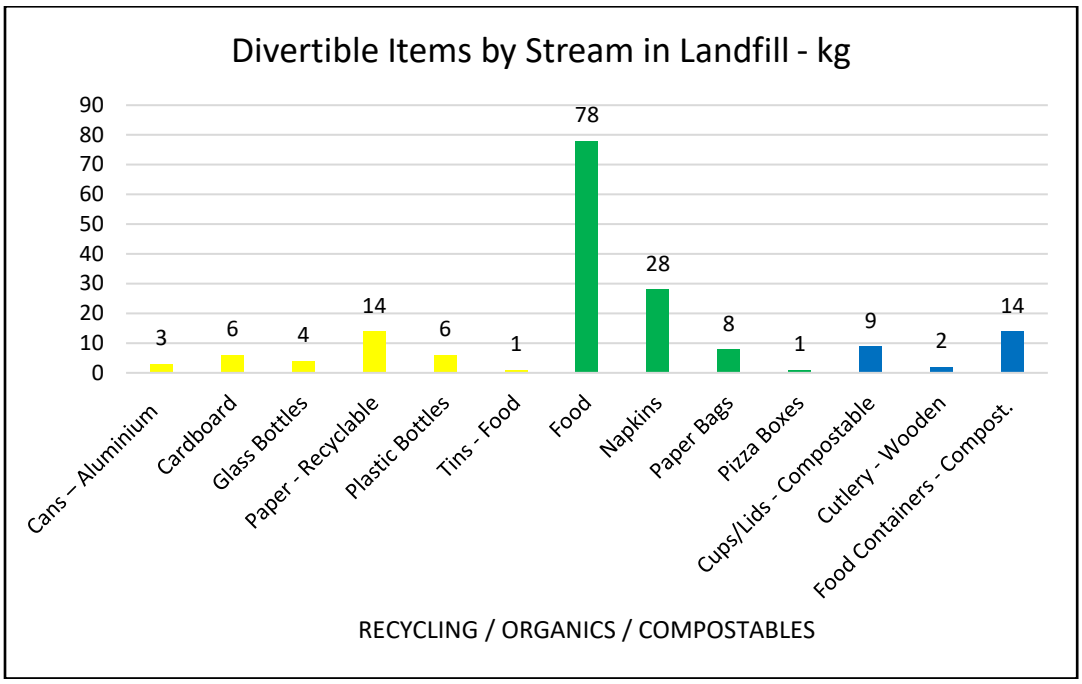


Figure 33 Divertible items in landfill by item and stream

Observations include:

- The low incidence of recyclables (other than paper) in the landfill corresponds to the 76% of recyclables found in the comingled recycling stream, and is proof that in addition to campus education, long-term, ongoing education programmes in schools, and by local governments is gradually filtering through for the comingled recycling stream at least.
- That there were only 3kg of aluminium cans (also heavier due to the weighted Boss cans) in the landfill is an excellent result.
- Cardboard is another easy recyclable to divert, but the 6kg found in the landfill bins was still half the weight of the 12kg audited in comingled recycling, and it included both cardboard food packaging, and larger cartons that had been stuffed in the bins (Fig. 34).
- At 78kg the weight of the food waste was double the next heaviest category in the landfill bags, the miscellaneous at 30kg.
- On days when landfill bags from cafés were audited, there were bags of unsorted café waste found (Fig. 35).
- Post-consumer food waste was nearly always discarded of as part of a package, including packaging, cutlery, and serviettes etc. all binned as one item. This has been the case for every waste audit at the UC, so bin users clearly remain reluctant to separate these items.
- That a further 36kg of paper bags and napkins could potentially be diverted to the organics stream reinforces

Figure 34 Crate of cardboard per day in landfill

Figure 35 Unsorted cafe waste

the case to find a long-term solution for both the organics and compostable streams. Volume wise this equated to 1 x 240l liner bag per landfill audit day, or a sixth of the volume audited.

- Totalling 26kg, the compostable cups, cutlery, and food containers are another bulky stream in the landfill, and these items also filled around 1 x 240l liner bag per landfill audit day.

9.4 Usable Items in Landfill

With the more randomised nature of the audit there was greater diversity in what was found in the bags, but one 240l landfill bag stood out for including 13kg of unused tampons, and a further 8kg of items that were clearly meant to have been given away to students. Fortunately, there was very little actual rubbish in the bag, so we were able to quickly isolate the items and keep them clean.

Included in the bag were several envelopes with the department's name, which was passed on to the UC Sustainability office (along with pictures of the items so that they could be contacted for an explanation. The items were thrown out in error by a casual staff member asked to clean out a cupboard. Given that this is not the only incidence of such occurrences highlighted by the audits, to name this one team would be unfair, but this incident stands out because virtually all the items were clean and usable, and included government supplies (the tampons and Covid related giveaways), along with catering items (Fig. 36) that would have been bought with departmental budget.

Figure 36 Catering items including: Nescafe drink sachets; napkins, plates, and spoons; and cups.

The quantities of the items found in the bag, and the likely supplier are listed in Table 3.

Table 3 List and quantities of usable items thrown out in error

Item – Likely government supplied	No.	Item – Likely UC supplied	No.
Covid Magnets	83	Cups	125
Covid Sanitiser	20	Cutlery	42
Covid Soaps	28	Napkins	50
Covid Sunhats	12	Nescafe drink sachets	31
Covid Tissue Packs	7	Plates	9
Tampons	4480	Tea Bags	20

Tampons

The tampons were all wrapped and in perfect condition, so they were quickly separated and placed into a clean bag which was sealed off, weighed, and removed from the transfer station (Fig. 37). Later a sample was taken to calculate the total number, so that an approximate value could be ascertained, as follows:

- 100 grams = 35 tampons
- 12.8kg is approximately 4480 tampons
- Cheapest tampons online are $8 for 32 tampons
- 4480 tampons = 140 packs
- 140 packs x $8 = $1120
- 4480 tampons are approximately enough for 180 cycles (15 years) for one woman

Figure 37 Approximately 13kg, or 4480 wrapped tampons

That these items were thrown out when many students and staff may be experiencing period poverty, or are unable to afford Covid safety items such as hand soap and sanitiser, reinforces evidence taken from other audits: that many departments at the UC have a workplace culture that is not interested in reducing waste, even when the items could be gifted to those in need. Yet what makes this audit find perhaps the most distressing of all the audits undertaken at the UC by ODW, are the social justice implications of the items having originally been donated by the government to be distributed to students and those who needed them. Instead, those tasked with the distribution kept them in a cupboard away from the intended recipients, before throwing them out entirely, thereby adding to the financial and environmental costs of landfill.

Rehoming and Education

Fortunately, these items were stopped from going to landfill, but only because they were part of a randomised audit sample, and the bag had not been contaminated with legitimate rubbish. In this case, the tampons, Covid items (Fig. 38), and drink sachets have been sent to a contact of ODW who makes up 'bags of joy' for homeless women. Some of the tampons will also go to women's refuge centres for distribution there.

Figure 38 The Covid giveaways rehomed to a charity for the homeless

It is a positive outcome for a mistake that could have been prevented with better education and distribution networks. It also reinforces the need to highlight the systems already in place to rehouse usable items, and to find other opportunities (Section 12.3).

10. ORGANICS

The organics stream itself continues to be the least contaminated and the work done with the cafés and food production kitchens is clearly paying off with more clean coffee grounds and pre-consumer food waste going to organics than in previous audits. However, not all of that waste is being captured as shown by the large amount of kitchen waste that continues to be in the landfill, the variety of which indicates it is not just one outlet (Fig. 39). The small green bags taken from the indoor food caddies are also clean and filled with the kind of food waste most likely to come from packed lunches: sandwiches, banana peels, apples etc., but as shown in Section 7.5 these do not always end up in the organics bins (Fig. 40). What the organics bins are failing to capture is the bulk of the post-consumer food waste from the food outlets, and investment in both system changes and education is required to ensure that all the items that can go to the organics stream are put into those bins.

Figure 39 Kitchen waste in landfill bag

Figure 40 Clean food caddy bag in landfill

10.1 Organics Stream as Percentage of Total Waste Audited

Because the organics stream is dense and heavy it is time consuming to separate, so the only data taken was the weight of food waste, pizza boxes, and contamination. Volume wise there was not a big enough sample to match the 36 x landfill bags and 36 x comingled recycling bags audited over the whole audit, but the following is made up of data from weighing all of the organics bags left for us during the audit. Weighing in at 182kg the organics stream accounted for 27% of all waste audited and weighed, but this figure is clearly inflated when compared to the 2020 waste profile in Section 3 where the organics stream's annual tonnage is only 9% of the total of the combined post-consumer streams (cardboard, paper, organics, and comingled recycling). A more accurate sample could be attained by doing a volume/weight count of all streams, but the audit data is useful in that it shows the spread of the non-food items in the recycling and landfill streams, reinforcing the value of diverting those items to the organics stream.

10.2 Weights and Distribution of Organic Items by Type

Fig. 41 is included for consistency, but with the high weight/low volume density of the organics stream it does not provide an accurate depiction of the portion of the weight of the food that would be found in the landfill bins were all the bags across all streams to be audited (for a day) instead of just a small sample. Yet the data is useful in ascertaining the value of diverting the paper items found in the landfill and recycling to the organics stream.

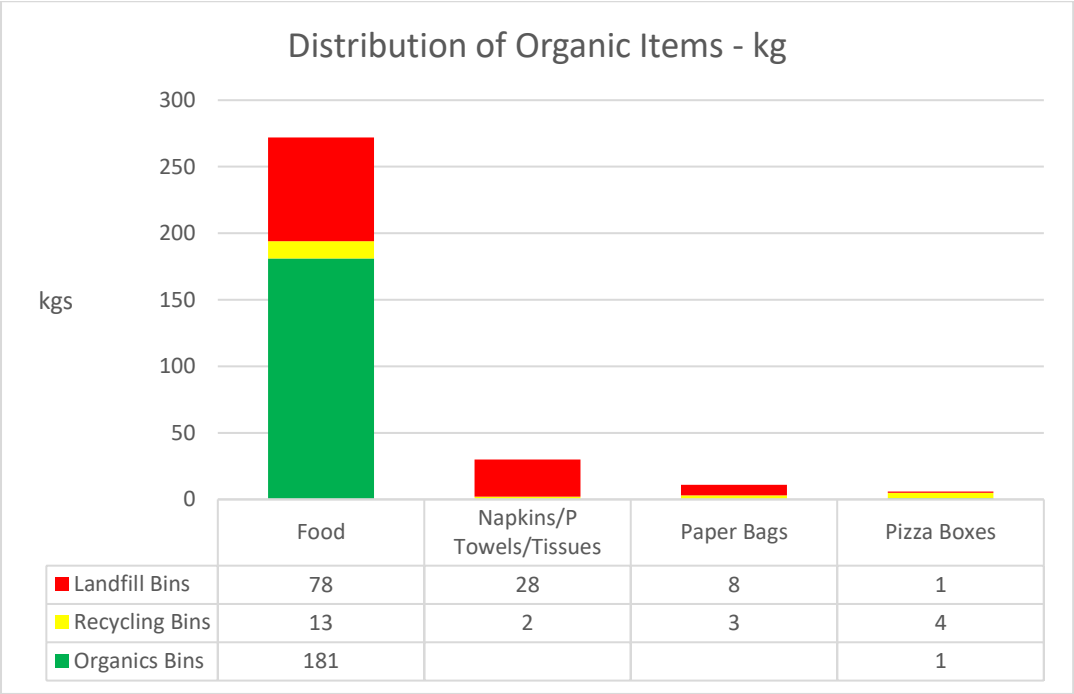


Figure 41 Total weights of organics items showing distribution between organics, recycling, and landfill

10.3 Breakdown of Organics Bins by Stream

On a positive note, the organics steam continues to be the least contaminated, and with a higher sample taken overall, Fig. 42 shows an improvement on the 2021 figures (Fig. 43) with 99% of organics made up of food and pizza boxes, and only 0.5% landfill, and 0.5% compostables.

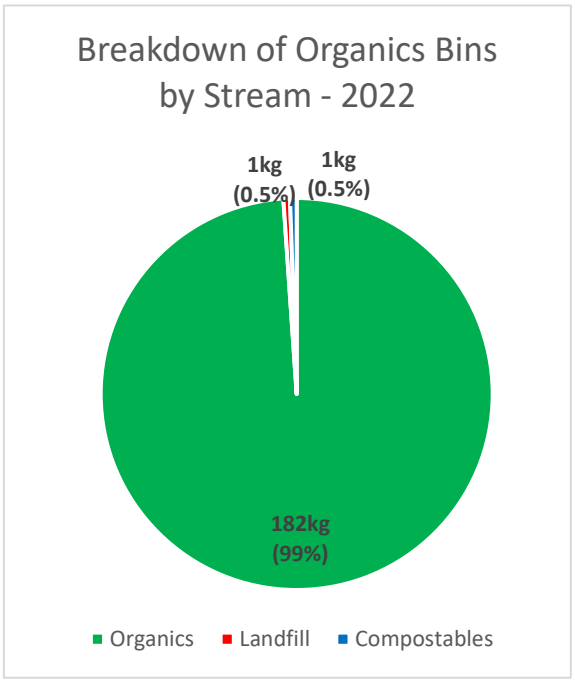


Figure 42 Contents of organics bins by stream - 2022

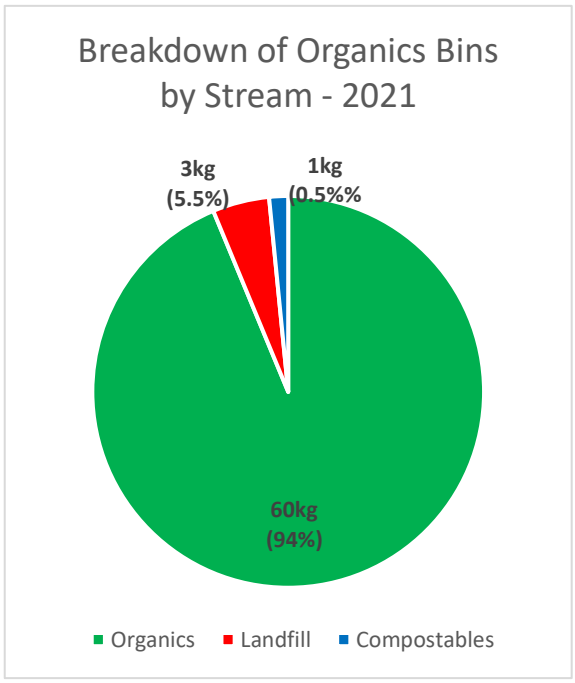


Figure 43 Contents of organics bins by stream - 2021

Observations include:

- This result can almost entirely be attributed to the cafés and production kitchens that have vastly reduced the contamination in the coffee grounds and pre-consumer food waste they are diverting. This has been achieved through education and monitoring, an approach that is clearly working.
- New signage and greater promotion of the organics stream overall would improve the rates of diversion for both leftovers and the paper items (they are often wrapped in) to the organics bins, but it may come at the risk of greater contamination to an otherwise clean stream.

10.4 National Food Waste Initiatives

At a recent Wasteminz summit on food waste (the 2022 Te Hui Taumata Moumou Kai o Aotearoa - NZ Food Waste Summit), experts and waste educators from around Aotearoa/NZ gathered in Wellington to address the urgent need for food waste initiatives that stop food waste from a) going to landfill; and b) happening in the first place.[i] Keynote speakers included Dame Juliet Gerrard (Prime Minister's Chief Science Advisor Office) and Francesca Goodman-Smith (Fight Food Waste Centre Research), and both indicated that that there is very little data on food waste in New Zealand, and that they would like to garner more. As such, there may be a unique opportunity for the UC to share the food waste data taken from these audits, and perhaps secure funding to gather more, especially around the options for processing it into compost.

What was clear from the summit was that there are a number of NGO's and Social Enterprises working in these fields with systems, apps, and networks to assist organisations in reducing their food waste. Tapping into these resources makes sense when the current system of sending the organics stream to Living Earth in Bromley and the compostables to Canterbury Landscape Supplies (Kaiapoi) is unwieldly and time consuming. In addition, Living Earth are due to shift away from their Bromley premises (close to Envirowaste) to the other side of Christchurch, so transport costs are likely to increase. Section 12.3 outlines some of the ways in which the UC could benefit from working with these networks.

11. COMPOSTABLES/PLA

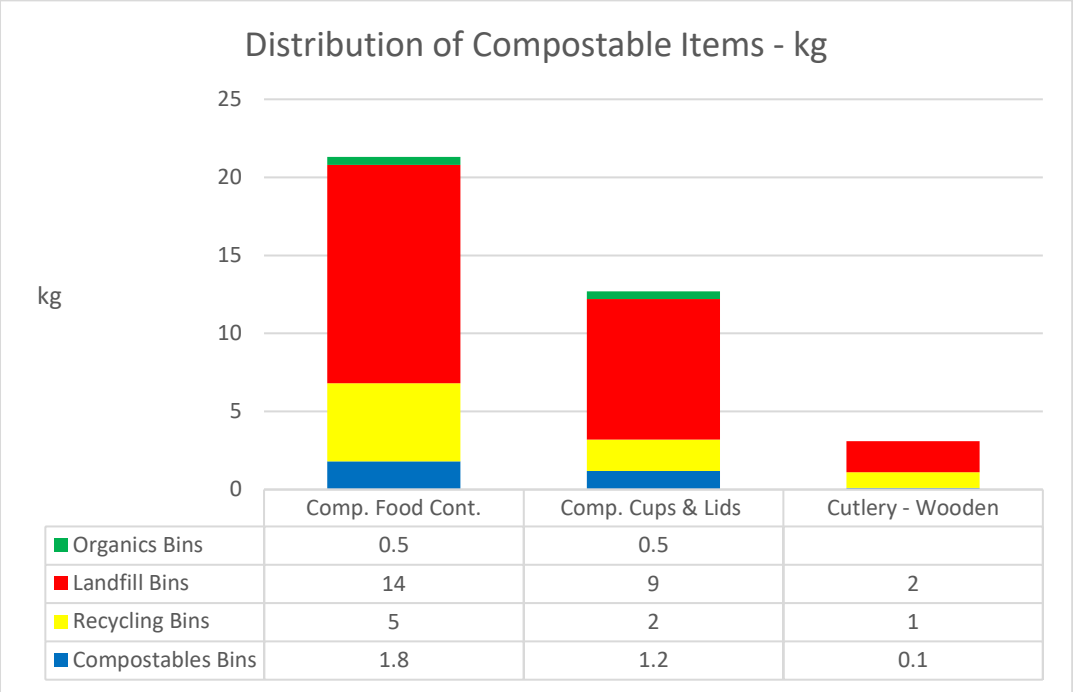
The switch to compostable/PLA foodware in the UCSA cafés was driven by students, and the UC responded by installing bins with blue lids in areas with food outlets. After the compostables bags have been collected by Envirowaste, they are taken to Francella St where the contents are sorted, shredded, and compacted, before being sent to a private commercial composter.

The driver was asked to leave all bags of compostables for auditing, but – with so few bins on campus – across all four audit days at Francella Street, only four bags were found that were clearly from that stream, and another that had been put into a recycling bin by cleaners (Fig. 44). As such (and as per the 2021 audit) there was too small a sample to provide any real insight on the waste being collected in the blue compostables bins, but overall, the data does show what streams the items *are* going to.

Figure 44 Bag of compostables found in with comingled recycling

11.1 Weights and Distribution of Compostable Items by Type

Fig. 45 shows the weights of the groups of items that can be composted, along with their distribution between all four streams.



	Comp. Food Cont.	Comp. Cups & Lids	Cutlery - Wooden
Organics Bins	0.5	0.5	
Landfill Bins	14	9	2
Recycling Bins	5	2	1
Compostables Bins	1.8	1.2	0.1

Figure 45 Total weights of compostable items showing distribution between compostables, organics, recycling, and landfill

Observations include:

- The only bins being used less for the compostable items are the organics bins, a positive indication that people at least know they cannot go to that stream.
- As bulky items, the compostables take up a lot of volume in the landfill, but it is still better that they go to that stream than the comingled recycling or organics streams.
- The combined 8kg of compostable food containers, cups, and cutlery in the comingled recycling are also likely to contain food and liquids (Fig. 46).

Figure 46 Compostable cups in recycling bag

11.2 Breakdown of Compostables Bins by Stream

Although the contents of the compostable bags totalled less than 8kg (including items belonging in the landfill and comingled recycling) Fig. 47 indicates that even with such a low sample rate only 53% of the items even being put into those bins belonged there, worse than the 2021 figure of 82% (Fig. 48). Clearly this stream is not working as it is, but as part of a full system upgrade and an education programme to support that, there is the potential to divert more of these items to those bins.

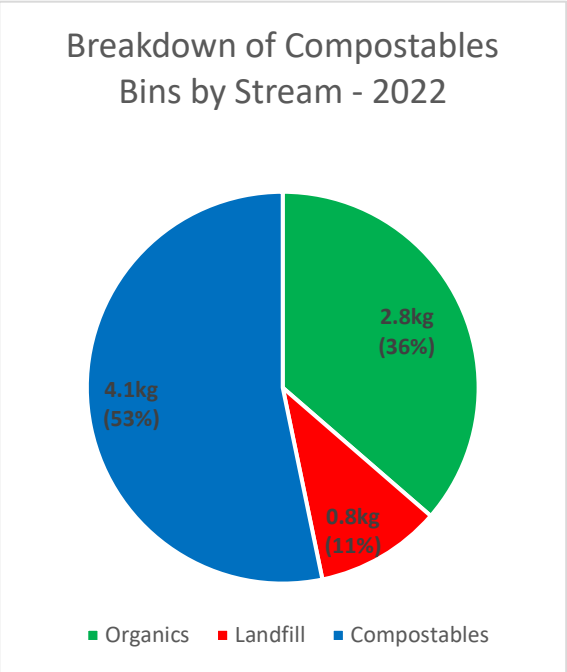


Figure 47 Contents of compostables bins by stream - 2022

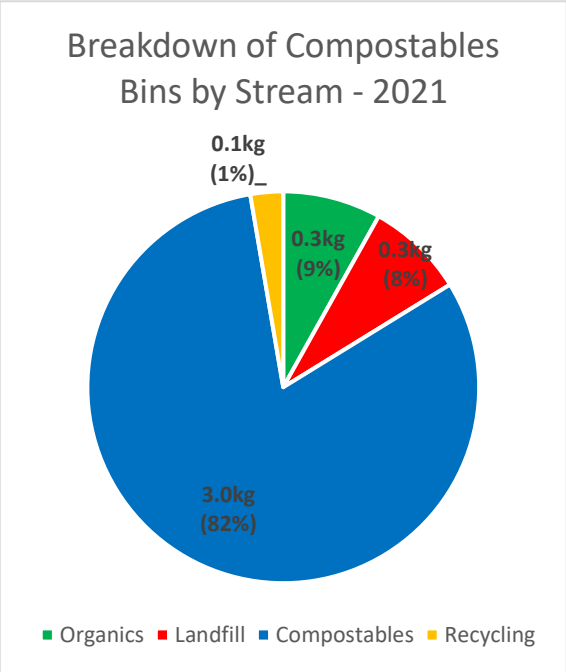


Figure 48 Contents of compostables bins by stream - 2021

Observations include:

- Although the compostable bags we did find looked relatively uncontaminated (Fig. 49), the containers and cups often had food and other waste items inside.
- That there were no recyclables found in the compostables bags this audit is an excellent outcome.

Figure 49 Compostables bag with hidden contamination

12. RECOMMENDATIONS

The recommendations here extend on those made in the 2022 reports on composting options and recycling signage, which in turn, were an extension of the recommendations made in the 2021 waste audit report. As such, they do not focus heavily on a major waste diversion upgrade because plans for that are already underway, although Section 12.1 considers the options for changing how waste is collected at an internal level.

Most waste minimisation experts agree that recycling is not truly sustainable, and is merely a better option than landfilling valuable resources. The industry-accepted standard for contamination in recycling used to be 5%, but despite decades of education campaigns, that target is rarely met, and even kerbside collections (where often one household member takes responsibility for the task) are now subject to ongoing audits and spot checks. The ODW team has hand sorted waste both at events, and during waste audits for clients from a range of industries, and it is our experience that despite the best efforts at customised signage, non-household recycling systems do not work because the majority of bin users do not engage in the system in an informed and responsible way. This position is backed up by a decade of waste audits at the UC that show that even when the system is regularly monitored and tweaked, the bulk of the landfill is still made up of items that could be diverted. In addition, the

comingled recycling is 24% contaminated, although this is actually an acceptable outcome when compared to other recycling systems.

Investment in the waste diversion system is critical in the short term, but as emphasised in all the audit reports, recycling is *not* a sustainable method of minimising waste. Hence, the focus in this section is on tapping into the wider educational and IT resources now available for organisations wishing to significantly reduce their waste through: food waste reduction; reusable diversion schemes; reusable solutions to disposable products; and working waste prevention requirements into procurement procedures.

12 Recommendations for Improving the Waste Diversion System

As discussed in Sections 7.5 and 8.4, the current system whereby the property services staff tasked with cleaning are also responsible for emptying the indoor bins is causing bags of clean recyclables and organics to be landfilled (or to cause contamination) because they are put in the wrong outdoor bins. The best recycling system will always fail if those tasked with disposing the various streams are not committed to ensuring they go to the right place, assuming they have been taught what that is. It has always been ODW's policy to consider the impact of these outcomes; we seek to engage with custodial staff and identify their observations and concerns in our reports for clients. During consultations and discussions with various custodians from across the industry, we have found that most want to do their best, but often do not have the time, resources, or knowledge to properly separate waste. Given the low pay, early hours, high turnover, and minimal education that most of this sector experience, it is unfair to put the onus for making the waste diversion system work onto those who are least supported to do so.

Changing rubbish bins – whatever the stream – is heavy, messy work, and should be undertaken by someone trained in the specific H&S practices required for handling waste. Ideally, they would also be trained in recycling and composting practices so that they understood the importance of ensuring that each stream is uncontaminated etc.

Were Envirowaste or the UC to invest in property services staff for the specific task of emptying the indoor bins the advantages would include:

- The bags from the indoor bins are currently taken by staff to the outdoor bins, but this could be streamlined so that the collection point is mobile (with equipment for liner bags, spillages etc.).
- Bag use could be reduced with indoor bags being emptied into the collection bins and reused if clean.
- Basic sorting could occur during the process with recycling items being easily diverted from landfill bins etc.
- The H&S risks would reduce with fewer staff (fully trained in safe waste handling processes and wearing cut-proof gloves etc) responsible for emptying the bins.
- A dedicated collector would free up time for the staff tasked with cleaning the rest of the campus.
- The time taken by the Envirowaste driver to untie bags and remove contamination before disposal would be reduced with less bags to open etc.
- The waste custodians could report back to UC Property Services and the UC Sustainability Office about any problematic areas, reusable streams, etc.

In order to ascertain whether this proposal would stack up in practical terms, ODW could undertake a time/motion study for a building whereby the current system and the proposed one are compared in terms of efficiency, clean recycling, bag reduction, H&S, etc.

12.2 Recommendations for Encouraging Reusable Initiatives on Campus

In the immediate aftermath of the 2010-11 earthquakes, the campus became fully reliant on disposable foodware, because in the rush to get cafés open, dishwashers were not installed in the kitchens. Whether your meal was takeaway or eaten at the establishment, unless you brought your own, your plate, cup, and cutlery were single use. Currently, some of the cafés now have the option of using crockery when dining in but for takeaways the norm is still very much disposable. Others offer discounts for customers bringing in a reusable cup.

However, the reliance on takeaway packaging has created a culture where everyone is used to disposable cups and plateware, but in recent years there has been greater consumer demand for reusable options, with the result that there are now several organisations set up to assist with widespread culture change. Some of the app-based reusable cup and bowl options now available include Again Again[ii], Swappacup[iii], and Reuseabowl[iv], and most have systems designed to be used on campuses. Takeaway Throwaways[v] is an umbrella organisation set up by waste educator Hannah Blumhard (The Rubbish Trip) to assist organisations in transitioning to a reusable model, and they have written a submission to the Environment Select Committee (supported by a petition) for these items to be banned entirely, no matter what they are made from.[vi]

With so many apps and support networks available it has never been easier for an organisation to go fully (or even partially) reusable, and it is time for the UC to begin the transition before it becomes a legal requirement. Recommendations on how to achieve this include:

- Further encourage the use of reusable cups, takeaway containers, and cutlery, by including them as giveaways during orientation etc.
- If they are not already doing so, make it a requirement for cafés to offer discounts to customers bringing reusable cups, takeaway containers, and cutlery.
- Reinstall dishwashing facilities in cafés, so that can make the switch to crockery and reusable takeaway vessels.
- Take a campus wide audit of where the dishwashers are and whether they are available for student use. Map those that are.
- Consider installing more dishwashers and sterilisers in staffrooms and student hubs.
- Consider hosting an event for campus food outlet management whereby representatives from the organisations listed above introduce their products, so that food outlets can choose what's right for them, and have more agency in the process.
- Once the schemes are in place, add to UC Sustainability website and promote them with a PR drive.
- Assist people in using reusables by indicating on maps and other media where there are student hubs with kitchen sinks to rinse them.
- Monitor the pick-up of the reusable apps, and when there is a significant number of students and staff using them, consider banning items such as disposable cups (the low hanging fruit of reusability), followed by all disposable plateware.
- If bans take place ensure that there are options available for those who do not have access to the apps, or still require disposable items due to disability.

12.3 Recommendations for Waste Minimisation

As successive audits have shown there is a lot of unnecessary waste across all streams that could be minimised. Recommendations for minimising waste include:

- Work with milk suppliers to take back empty milk bottles for all cafés on campus. Removing these items from the waste stream altogether will reduce volumes and contamination.

- Make it a requirement that all UC and UCSA businesses provide receipts only on request.
- Make it a requirement that departments have plans in place to divert leftover function food to attendees or others who can take it.
- Work with Love Food Hate Waste NZ[vii], and Christchurch based group NZ Food Waste Champions 12.3[viii] to find contacts, and educational resources to help reduce consumer food waste.
- Work with kai rescue apps such as Foodprint, whereby food outlets list leftover food, customers buy it online at a reduced rate, and then collect it.[ix]
- Work with food outlets to ensure that portions size is appropriate.
- Consider setting up an online hub for staff to register any reusable items that could be rehoused to another department, or students etc. Include links to charities that specialise in taking industrial waste including All Heart[x], and those taking e-waste such as Recycling Group[xi] and Recycle a Device[xii]

12.4 Recommendations for Waste Prevention

As successive audits have shown there is a lot of unnecessary waste across all streams that could be prevented through better procurement processes.

Figure 50 Single use mayo and sauce containers

Recommendations for preventing waste include:

- Ban single-serve sauces and condiments across campus, and work with cafés to provide alternatives such as sauce bottles and sugar bowls on counters and tables (Fig. 50).
- Work with departments to find more sustainable options than individually wrapped tea bags and sugar sachets for tea rooms. Consider removing these items from the procurement options.
- Ban capsule style coffee machines on campus, or at least ensure that the capsules are being sent back to Nespresso as part of their take back scheme.
- Encourage more departments to switch to electronic marking systems etc. to reduce paper use. Make it mandatory that all printers are set to duplex by default.

13. CONCLUSION

The UC is to be commended for its continued investment in the waste diversion system. From the first rollout in the mid-2000s, through the upgrade in 2012, it has been a flagship example of a multi-stream system, and it remains one of the few public recycling systems in Canterbury to operate relatively effectively. However, as the decade since the last major overhaul has shown, keeping up to date with current requirements such as the phasing out of plastic recycling, and the introduction of the PLA/compostables stream, requires a significant investment in dedication and resources so it is essential that the system works as effectively as possible.

Yet a system upgrade should merely be the 'band-aid' response to waste minimisation. Reduce, reuse, rethink, and prevent are the only truly responsible options available now, and each should be engaged in immediately. Unless everyone embarks on that journey, the campus will continue to produce and pay for an annual tonnage of landfill that is likely to come under scrutiny by students, staff, and the general public as the effects of the climate crisis take hold.

Of particular note with regards to the landfilling of waste, is the current high food wastage across campus, something that is somewhat reprehensible at a time of high food poverty. As such, research into portion size and procurement practices, along with linking in with the government, council, and community programmes listed in Section 12.3 should be priorities for the UC, UCSA, and various halls of residence.

The group of young adults known as Generation Z are the first group to have been exposed to regular sustainability education since pre-school, and as the school strikes and Extinction Rebellion protest movements show the savvier among them are very much aware that humans are at risk of extinction, and they are not afraid to make a fuss about it. The first members of their generation are enrolled at the UC now, and as their ranks grow (and learn about the climate crisis in lectures) they are going to expect more in terms of real sustainable change on campus. By making those changes before they (or the government) demand them, the UC and UCSA can ensure that any media coverage is tuned in their favour.

Our Daily Waste strives for true waste minimisation of the kind that these students will demand, and we hope that the UC will continue to work with us to meet those expectations and significantly reduce not just the annual landfill output, but any item that only gets used once, no matter what stream it goes to.

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[i] https://wasteminz.zohobackstage.com/2022TeHuiTaumataMoumouKaioAotearoa-NZFoodWasteSummit?lang=en#/speakers?lang=en
[ii] https://www.againagain.co/
[iii] https://www.swappanz.nz/
[iv] https://www.reusabowl.nz/
[v] https://takeawaythrowaways.nz/alternatives-for-hospo
[vi] https://www.parliament.nz/resource/en-NZ/53SCEN_EVI_123801_EN10082/735f4635d316940b2519c8787a910a8c9f7d4593
[vii] https://lovefoodhatewaste.co.nz/
[viii] https://www.nzchampions123.org/
[ix] https://foodprint.app/
[x] https://allheartnz.org.nz/
[xi] https://www.recyclinggroup.co.nz/
[xii] https://www.recycleadevice.nz/