

The Revelations of Rubbish: Monitoring and Improving the University of Canterbury's Waste System

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1. Introduction

The University of Canterbury has had a comprehensive recycling system that was initiated by the UC Sustainability Office since 2009, and it has been operating with an encouraging degree of success. Given that the recycling system was designed to encourage all users to make an effort to take responsibility for their rubbish and place it in the correct bins, culturally, this shows a significant shift in attitude, and many students and staff take pride in using the bins correctly.

The waste statistics from Mastagard show that for the year 2010 the total Recycling collections account for around 25% of the total of Landfill and Recycling being picked up from the UC.¹ However, whilst these monthly statistics reveal the weight and cost of waste disposal at the UC, and previous random sampling of bins showed the initial need for recycling and was a basic indication of how the scheme was working, this waste report is based on a detailed analysis of the campus bins that shows the number and type of items being disposed of across the university. From that data, a comprehensive proposal has been written for a long term project designed to induce both staff and students to use the current recycling system correctly *and* to significantly reduce the amount of waste being created, thereby reducing not only the tonnes of landfill and recycling being produced by the UC per year, but also the cost of its removal and transport off campus, all of which contributes to our carbon footprint.

The first part of this report is a brief explanation of how the waste system currently operates. The second part is based on a seven-week waste audit undertaken from November 2010 to January 2011 of a selection of the UC's recycling and landfill bins. Given that this period is the quietest of the year, the sample is only a fraction of the waste generated at the UC during term time, but it was partly for this reason that this time frame was chosen to undertake the audit. The time and fortitude required to carry out a more comprehensive audit would have been too much for a sole auditor, but that the sample used has generally been created by staff and post-graduate students gives an overview of how the message to reduce and recycle waste is getting across to the UC's long-term residents.

The third part of this report is an analysis of some of the trends noted in the audit, with suggestions made as to how the UC can remove or mitigate the barriers to reusing, reducing, and recycling and begin enjoying the greater environmental, fiscal, and community benefits that significantly reducing waste at the UC would enact. Lastly, I have included an A-Z of common waste items and the problems associated with them, along with possible individual solutions towards the overall goal of minimising our waste output.

This report has also been informed by a number of informal conversations that occurred as part of the interest generated in this project, particularly by cleaning and maintenance staff, many of whom have a long association with the UC and care deeply about the future of the campus. Many of these conversations took place in the recycling area where the audits took place and they indicated that a number of the UC community are concerned about the current state of the UC waste stream and that many staff and students have some good ideas about how to improve it. In particular, concern was expressed about the amount of large reusable items such as furniture that are being put in skips rather than given another life either within the university environment or beyond.

Where possible, I have included these ideas, with the hope that together we can make the UC Recycling and Waste System an innovative and successful waste minimisation scheme that is in keeping with the University's position as a world class learning environment.

Key: GR (General Recycling); **LF** (Landfill – bins labelled Rubbish); **ORG** (Organics); **PAP** (Paper Recycling)

2. How the UC Recycling System Currently Operates

The UC Recycling System operates at all levels throughout the university, with all students and staff expected to take responsibility for their own waste by sorting recyclables from general waste, and Cleaning Services staff employed to take care of collection and disposal.

¹ The total tonnage for all the recycling collections (paper, document destruction, cardboard, glass, plastic, organics/food, polystyrene, bulbs/tubes, and mechanical/civil) for January to November 2010 was 76.97 tonnes. The total tonnage for the Landfill collection was 226.6 tonnes. *Summary Report 2010 University of Canterbury*

2.1 General Campus Rubbish and Recycling Stations

Office Bins:

When the Recycling System was rolled out in 2008-9, all traditional metal cylindrical bins were replaced with small 2L containers designed to sit on the desk-top and therefore remind staff to empty their containers regularly. Given the importance of self-responsibility to the operation of recycling systems, cleaners were advised not to empty these containers as part of their regular duties. Instead, office users are required to take their rubbish to the nearest recycling bins, usually positioned near the stairwell of each floor and empty into the LF, or other appropriate bins. The smallness of the containers is also designed to encourage users to separate recycling before it goes into the LF waste stream.



Stackable Bins:

These sets of small stackable bins for GR, LF (Rubbish), ORG and PAP are placed inside the buildings on each level at exit and entrance points, and in staff rooms etc. To ensure that the contents of each bin end up in the appropriate section of the waste stream, bins are lined with black bags for landfill, clear bags for the paper and general recycling (so that cleaners can more easily identify whether they are contaminated), and compostable bags for food and organic waste.



Cleaners check and empty these bins daily or when necessary and replace bags. The smaller bags from each building are then placed in the larger bins located at key points throughout campus.

Paper Recycling Bins – Crimson General Paper bins and Blue Document Destruction Bins:

In addition to the smaller paper recycling bins included in the departmental recycling areas, most departments are also allocated crimson wheelie bins, and/or blue lockable document destruction bins if required. Full bins are collected daily by cleaning staff and deposited at the waste depot where they are emptied into large enclosed skips.



Campus Bin Sets:

Large sets of bins for GR, LF (Rubbish), ORG and PAP are located in busy areas around campus and at entrances to buildings and departments. The bins collect the general waste generated by passers-by during the day, and are then added to by the cleaners who place all smaller bags from the stackable bins located in buildings nearby into these bins after their shifts finish at around 7am.



Cardboard Recycling:

Cardboard boxes should be broken down by the person putting them out and then left stacked neatly next to the Campus Bin Sets where they are collected along with the contents of the bins.

2.2 Transferral to UC Waste Depot and On-site Sorting

Bags are collected from the large bins during the day by 1-2 cleaning staff using a large, diesel powered truck. Bags and cardboard are then taken to the waste depot located in Facilities Management where they are placed by the collection staff into the appropriate skips and bins.

Organics - Green Wheelie Bins:

5 standard sized wheelie bins coloured dark green are set aside in the waste depot for the contents of the biodegradable organics bags. These are collected by Mastagard twice a week.



General Recycling - Yellow Lidded Wheelie Bin:

20 yellow-lidded bins are located in the waste depot as receptacles for GR. Rubbish collections staff place the clear plastic bags of GR into these bins, and they are collected four times a week by Mastagard.

Paper Recycling – Yellow Enclosed Skips:

2 paper recycling skips are located in the waste depot and rubbish collections staff place the clear plastic PAP bags from the general collections into these skips. Once a day, another staff member empties the crimson wheelie bins into the skip using a specially designed machine. The skips are emptied by Mastagard daily.



Cardboard Recycling – Yellow Caged Skip:

All cardboard is placed in the skip by rubbish collections staff and other maintenance staff, and the skip is emptied twice a week by Mastagard.



General Waste (LF) – Yellow Enclosed Skips:

All black LF bags and other items designated for landfill (from maintenance staff etc.) are placed in one of two General Waste skips, which are emptied by Mastagard daily.



General Recycling Skip – Open:

Large recyclable items generated by maintenance staff are placed in this skip. Reusable items placed in this skip are sometimes set aside as part of an informal waste exchange programme operating amongst some staff, including the Sustainability Office. Metal and wood recycling skips are also located in the Facilities Management depot outside the appropriate workshops. These skips are emptied as required.



Polystyrene:

Large bags of polystyrene packaging etc. are stacked up in the back of the vehicle shed at the waste depot. When a sufficient amount has been collected these are collected by Mastagard.

E-Waste:

At present, there is no e-waste receptacle in the Waste Depot, but cleaning staff remove any e-waste they find in the waste stream and set it aside for appropriate collection and recycling.

2.3 Transferral to Off-Site Waste Depot

At present, the transferral of waste from campus is contracted to Mastagard who collect the waste from skips and bins kept at the Waste depot as above. For the purposes of this report, there has not been further investigation into what happens once the waste is transferred to the Mastagard depot, but if the resources were to be made available for a more thorough research project, it would be necessary to investigate this further.

3. Waste Audit – completed from November 2010 to January 2011.

3.1 Limitations of the Audit:

The main limitation to the information gained through the auditing process is that it represents only a very small sample of the University's waste stream. Time constraints due to other duties meant that I could dedicate around 4-5 hours a day to the process of going through the bags, removing and logging each individual recyclable and contaminant, and writing up the results. However, the overall sample is large enough that I believe it gives a fair indication of what some of the barriers are to effective recycling, how they can be removed, and how an effective information and education programme around waste reduction might work.

The bags containing organic waste were not sorted as I was concerned about the health risks of opening bags that had been left out for a day or more during summer months. General observation however would suggest that these bins are being used correctly.

3.2 Bin Locations and Dates Audited:

Note: Aside from the bags taken from the Central location, all the large bags taken from each area included smaller bags from nearby departments placed there by cleaning staff.

22-26 November - Erskine/Rutherford: Bags collected from Bins at North entrance to Erskine (closest to Reboot Café), and from Bins between Rutherford and the Student Services Centre.

29 November to 3 December – Central: Bags collected from Bins at East and West ends of pathway between C Block Lawn and James Hight (closest to 360 Café).

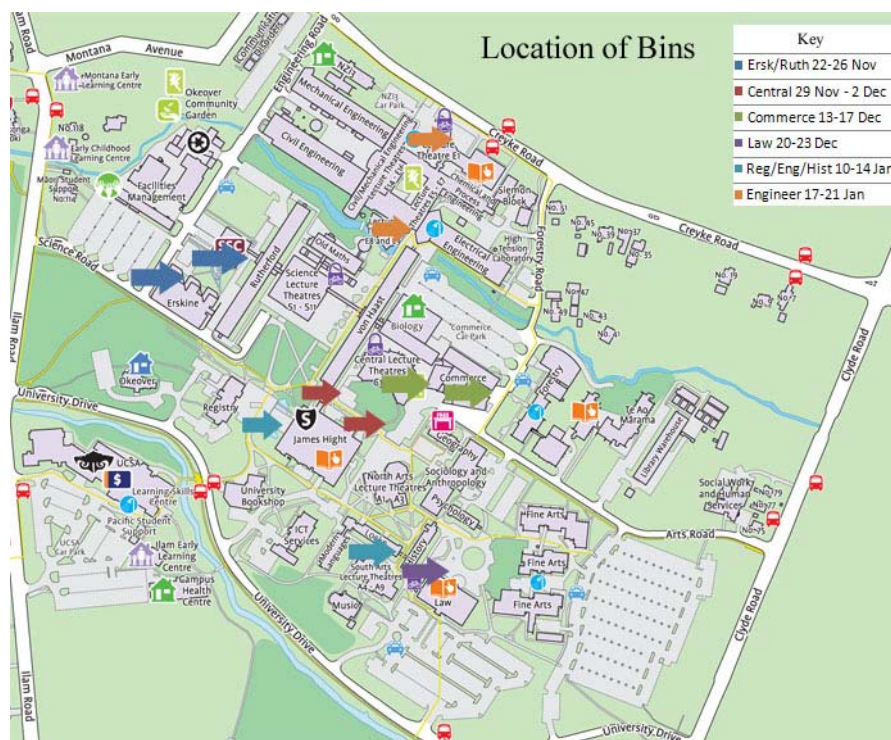
13-17 December – Commerce: Bags Collected from Bins at East and West entrances to Commerce building.

20-23 December – Law: Bags Collected from two sets of Bins positioned both outside and inside the North entrance to the Law building.

11-14 January – Locke/History/Registry: Bags Collected from Bins at South entrance to the History and Locke buildings and from Bins opposite Registry at South-West of James Hight.

17-21 January – Engineering: Bags Collected from Bins at South and North entrances to Engineering complex.

24-28 January – College of Education: Bags Collected from three sets of Bins outside the Wheki, Henry Field and Waimairi buildings.



3.3 Health and Safety Precautions Taken During Waste Audit

Having had over seven years experience picking up rubbish and sorting it as part of my doctoral research into outdoor dance events in Aotearoa, I have always exercised extreme care in this area, and have never sustained any injuries or illnesses due to this endeavour. As such I feel fully confident in carrying out audits at the UC.

The safety precautions taken for the waste audit were as follows:

- *Clothing*: overalls, rubber gloves and closed toed shoes.
- *Opening the bags*: check bag first for any leakage, or sharp objects etc. On opening check again for any potential hazards.
- *Going through the bags*: carefully remove larger items such as bottles, food containers, cans, coffee cups etc.; followed by paper, plastic bags and smaller recyclables for counting and removal to appropriate recycling bin. With the contents left over check carefully again for any potential hazards, before removing smaller recyclable and organic items.
- *Tying up bags*: For GR bags, all contents are put into GR recycling bins. For LF bags, once recyclables have been removed, bags are carefully retied and placed into LF skip.

- *Hazards:* Hazards such as broken glass or other sharp objects were left as it was and the bag carefully placed in the landfill skip. Any bag smelling strongly of chemicals was left unsorted. Other potential hazards such as medical supplies were retied in original bag and if required placed in a second bag before being placed in landfill skip.
- *Post sorting:* check gloves for any nicks etc., and replace if necessary. Wash hands thoroughly.

3.4 How the Audit was Carried Out

The LF, GR and PAP bags from the sets of bins chosen for that week's audit were set aside daily in an undercover area of the waste depot where I had access to the various bins for disposal once the audit had been carried out. As each bag was opened I would carefully remove any recyclables and contaminants and log them by type and quantity, before placing them in the correct bin. The contents of some bags were photographed in order to demonstrate common trends or unusual occurrences.

Most daily audits took between two to four hours, depending on the number of both the bags, and the contaminants.

The large bags for each category usually contained the smaller bags from the buildings placed there by cleaning staff, and each of these bags was opened and logged individually in order to give a clear idea of the differences between departmental and general campus waste.

Collection of data:

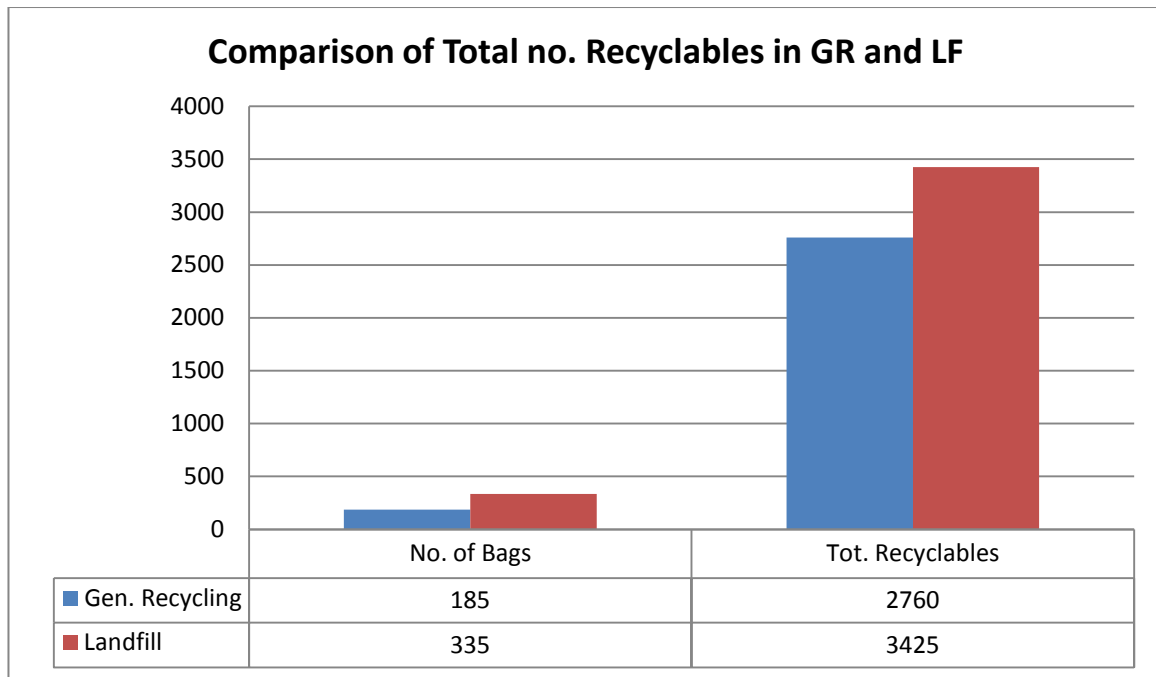
All data was collected numerically by item type, rather than by weight. Whether occurring in the GR or LF bags, all recyclables were logged according to their type in the following categories: plastic bottle, glass bottle, can/tin, coffee cups, coffee cup lids, plastic supermarket bags, food containers, yoghurt containers, UCSA sandwich packs, plastic plates, plastic cups, sushi containers, cleaning containers, tetrapaks, and shrinkwrap/balewrap. The advantages of this method of data collection are that exact comparisons can be made as to whether one particular item type is more likely to be placed in the GR or LF bags.

In addition, non-recyclable contaminants in the GR bags were also logged by type so as to give an indication of where any confusion may be arising as to which bins should be used. The most commonly occurring contaminants were: paper, napkins, polystyrene, organics, cutlery, straws, coffee stirrers, and chocolate bar/ice cream wrappers. Other less frequently occurring contaminants were recorded either as 'non recyclable plastic', or 'other'.

However, as the method of categorising the data was established based on what was in the first week's bags, over time the method was updated to include items commonly found in other locations. As such, some items such as yoghurt and sushi containers collected in the Erskine and Central areas were not differentiated and were included in the general 'food containers' data.

3.5 Results and Analysis of the Audit – Overall Comments

Whilst the organics and paper recycling system is generally working well, there is some evidence to suggest that the LF bins are still being used more than the GR bins for items that are recyclable. This is borne out by the fact that there were far more LF bags collected than GR bags (to cut down on unnecessary bag use cleaners do not collect bags every day unless they require it), and that the total amount of recyclables found in the GR bags was less than those found in LF:



Per bag this works out at 15 recyclable items per GR bag (correct) and 10 per LF bag (incorrect) which indicates that there is still a great deal of work to be done with regards to the correct placement of recyclable items.

In addition to these statistics, a number of GR bins and bags are contaminated by landfill, reusables, paper and organic items that have been placed in the wrong bin.

The breakdown of the contents of the PAP, GR, and LF bins is as follows. To identify the behaviours which are to be encouraged or discouraged, the term 'correct' has been used to indicate where correct recycling practices are occurring, with 'incorrect' used to indicate where a behavioural change in practices is required.

3.6 Paper Recycling (PAP)

Whilst the initial plan was to include the contents of the grey PAP bins from the recycling bin sets as part of the audit, in general most office waste was placed in the crimson paper bins and there were very few smaller bags collected during the duration of the audit, so a complete overview of the PAP bins in relation to the rest of the audit is not available at this time. Of those bags that were audited most were relatively free of contaminants, which suggests that the paper recycling system is currently operating with a high level of success.

However, the PAP bags from the **Central Bins** were audited and in this area, there was a high level of contamination which suggests that there is still quite a lot of confusion about what goes in to the large grey outdoor recycling bins, especially around food waste. From these two sets of bins the totals are:

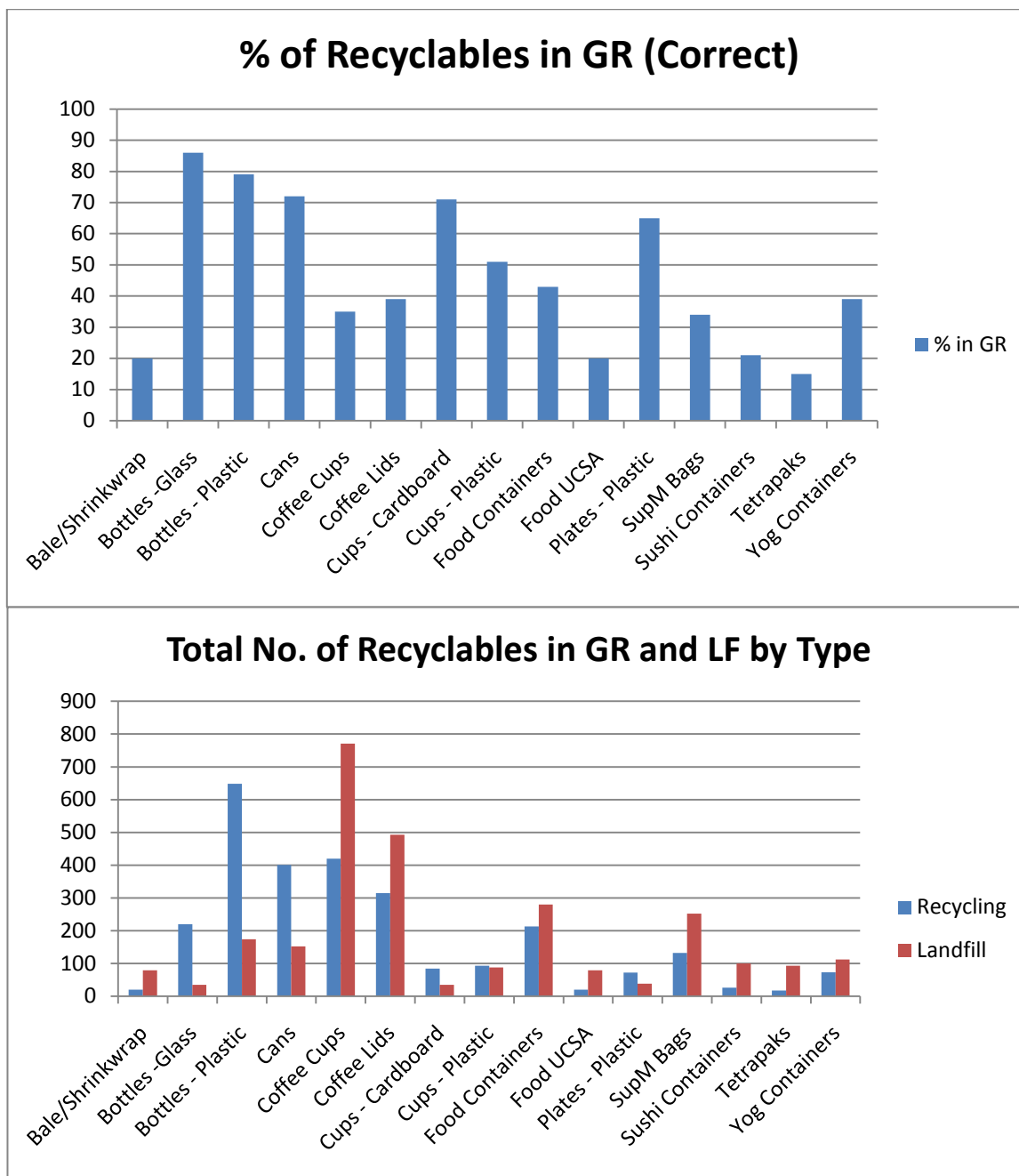
- Bags Counted (Central): **9**
- Total no. of Contaminants found: **227**
- Average. no. per bag: **25**
- Commonalities: coffee cups, plastic bags, UCSA sandwich packs, shrinkwrap, soiled paper food bags, napkins

Of the above items the paper based products are likely to have ended up in these bins due to confusion over where they belong. The shrinkwrap however was usually inside a paper bag, and can be directly sourced to 360 Café, where most food items are wrapped in shrinkwrap and are then placed in paper bags by the purchaser. A more comprehensive audit of these bins during term time would establish whether this is a trend identifiable over the entire campus, in which case more education would need to take place around the correct placement of these non-paper recycling items.

3.7 General Recycling (GR)

General Recyclables in GR bags (correct):

Of the larger, more obvious recyclables such as plastic bottles, glass, and cans/tins the statistics are excellent with over 70% ending up in the GR bins. Of the smaller items such as coffee cups and lids, sushi containers, tetrapaks and yoghurt containers, there were far less of these found in the GR bags (correct) than in the LF (incorrect), suggesting that these items are less well known as being recyclable and that there is room for improvement in the labelling of bins and posters, along with the need for general education in this regard.

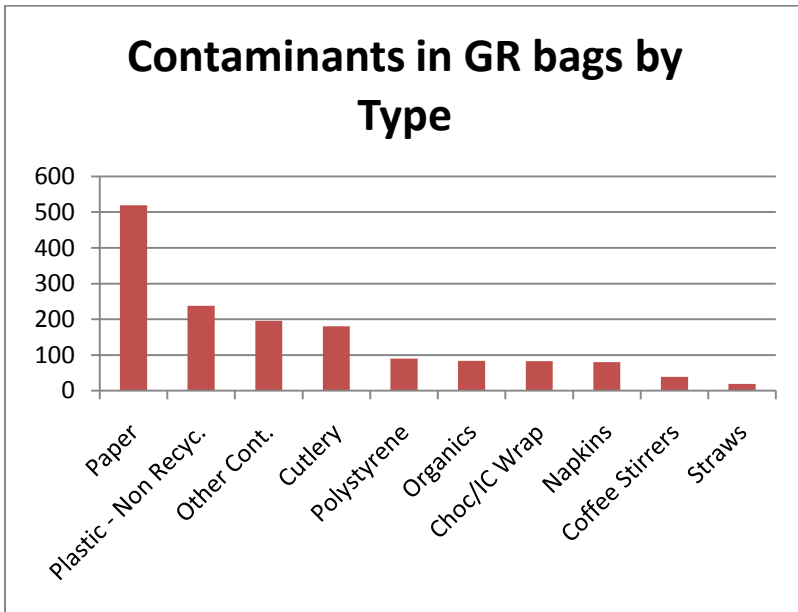


Contaminants in GR bags (incorrect):

In addition, there were also a number of LF, ORG and PAP contaminants in the GR bags:

- Bags Counted: **185**
- Total no. of Contaminants found: **1528** (less 519 pieces paper: 1009)
- Average. no. per bag: **8.3**
- % of GR bags containing contaminants: **82%** % of paper, organic and landfill contaminants to all items in recycling: **35%** (less paper: 24% - Both of these figures are far higher than the 15-20% contamination)

commonly found in wheelie bins (MRB's)² Commonalities: paper goods, plastic food wrapping, polystyrene cups (non-recyclable), plastic cutlery, wooden coffee stirrers, chopsticks, straws, paper food bags, napkins, receipts, tea bags, apple cores, sushi, bread



A recycling bag containing a number of non-recyclable items including a dialysis bag.

With 519 paper items found in the GR bags, there is some confusion over the separation of paper into a separate recycling bin that may be due to the current CCC system requiring that paper be placed in the recycling bins along with general recyclables. However, the UC does operate a separate stream for paper and there is room for improvement here.

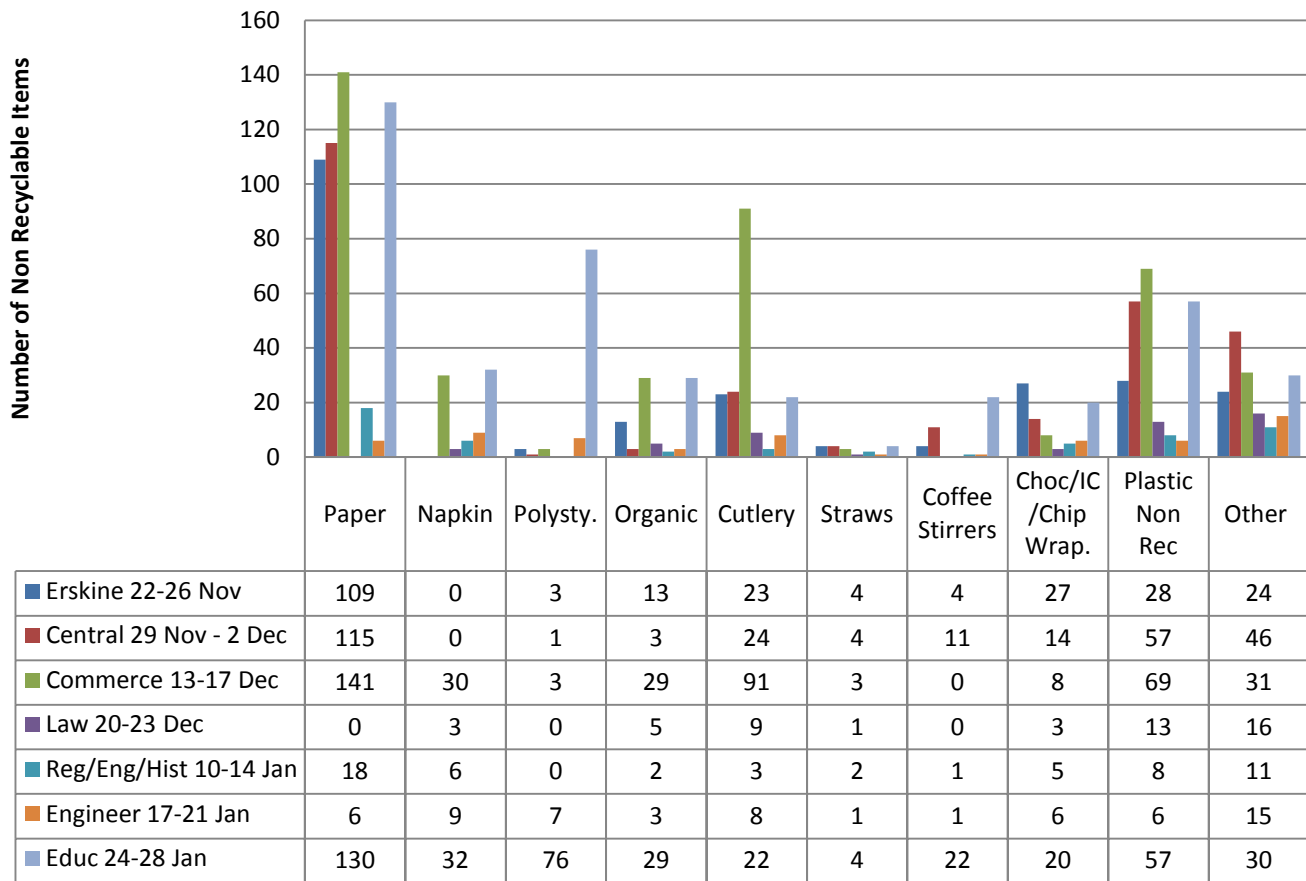
Other items such as plastic cutlery, polystyrene cups and plastic food wrapping are items that might commonly be mistaken as being recyclable. A number of these non-recyclable items were included with recyclable packaging such as: sushi and other takeaway food containers (chopsticks, cutlery, napkins), tetrapaks (straws), and coffee cups (tea bags, stirrers).

Many of the contaminants found in the GR bags were also due to people placing napkins, pie wrappers and other small pieces of food packaging inside coffee cups, or food containers. A campaign based around emptying coffee cups and other containers before placing in GR bins could help remedy this situation. The relatively small amount of organic pieces that were found in the GR bags is highly encouraging, and given that these were mostly placed in coffee cups and food containers, the above mentioned campaign may be a solution here.

Below is a comparison of non-recyclable contaminants found in the GR bags by location.

² In the Ministry of the Environment's *Guidance Principles: Best Practice for Recycling and Waste Management Contracts: Working Draft* it is stated under heading 3.3 that Contamination rates are commonly in the region of 2-8% for crates and between 15 and 20% (this includes contamination as well as process loss) for co-mingled MRBs [Mobile Recycling Bins].. <http://www.mfe.govt.nz/publications/waste/best-practice-recycling-waste-mgmt-jul07/html/page6.html>

Recycling - Non Recyclable Contaminants by Area



3.8 Landfill (LF)

Overall totals and comments:

- Bags counted: **335**
- Total number of recyclables found in LF bags: **8801** (PAP: 4009; ORG: 1367; GR: 3425)
- Average number of recyclables per bag: **26.3**
- Commonalities: all recyclables but in particular paper, coffee cups/lids and organics

At almost half the total of recyclables found in the LF bags, pieces of paper made up the biggest group followed by coffee cups, suggesting that campaigns around the correct disposal of these items are required.

There were variations between the types of recyclables found in the large black bags from the general campus bins (larger single use beverage and food packaging such as coffee cups, sushi containers, yoghurt pottles etc), and the smaller bags from the departmental bins which also contained the above items, but tended to have a greater number of paper pieces, organics and kitchen waste such as tea bags, tetrapaks and milk bottles.

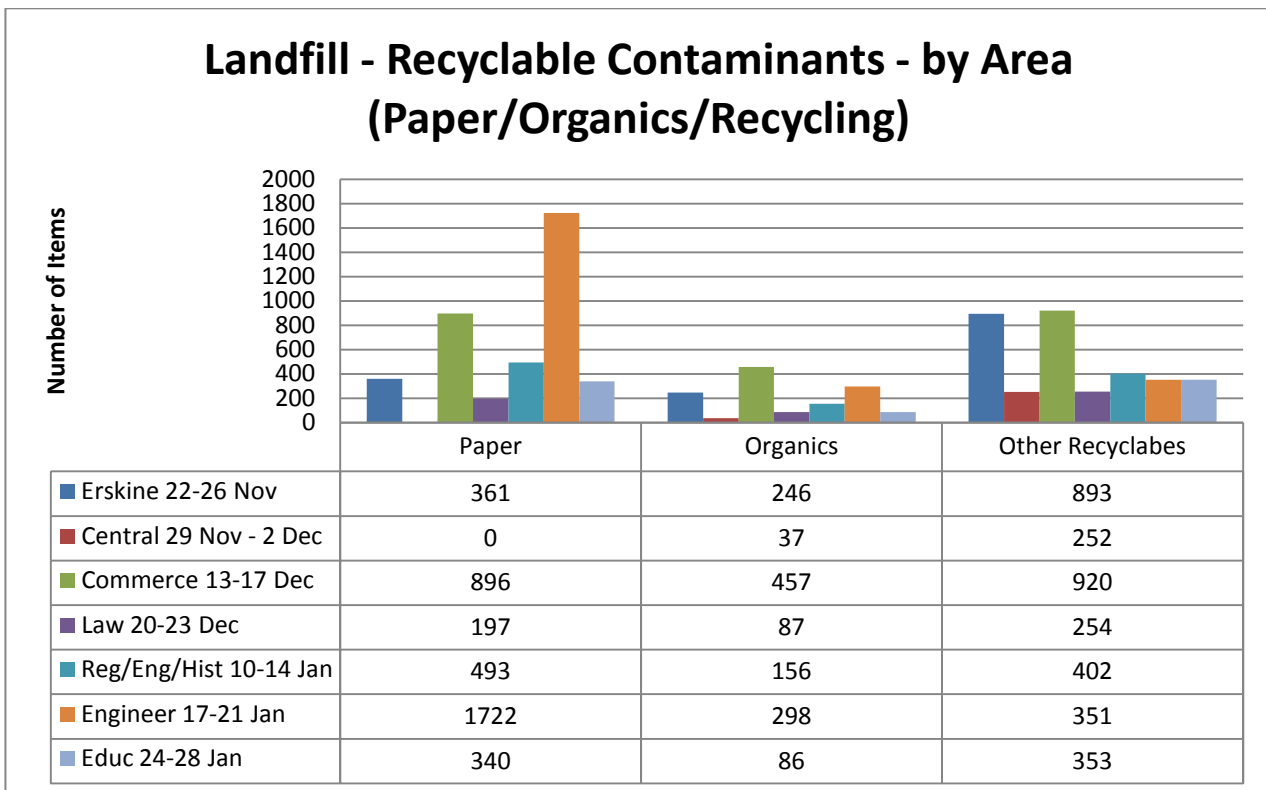
A breakdown of the items that could have been diverted to the three recycling categories is as follows:

Paper Recycling in LF bags (incorrect):

- Total no. of paper pieces: **4009**
- Average no. per bag: **12**
- % of LF bags containing paper: **55%**

- Commonalities: A4 (loose and stapled), newspapers, receipts, instruction booklets

Most of the paper found in the LF bags came from the smaller departmental bags located in stairwells etc. Here, there were significant differences between the areas as shown below.



That there were several LF bags with over 100 pieces of paper in them is of particular concern, and one bag from the Engineering bins contained a total of 460 pieces.

Organics in LF bags (incorrect):

- Total no. of pieces: **1467**
- Average no. per bag: **4.37**
- % of LF bags containing organics: **65%**
- Commonalities: banana skins, orange peel, apple cores, nut shells, strawberry tops, bread, sushi, cherry pips, flower stalks

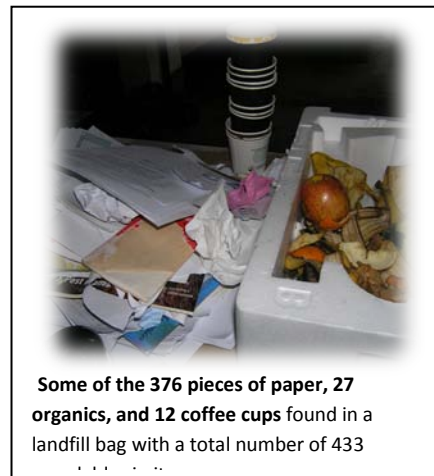
Despite every set of recycling bins including an ORG bin, the small black departmental bags in particular contained a significant amount of organic waste, much of which was difficult to count as individual pieces. As such, the above totals include the items being counted by the originating consumable rather than by pieces (eg: several pieces of orange peel, or a number of nut shells or cherry stones were counted as 1 organic item). Whilst the small amount per bag may seem insignificant, over a year, the amount of organic material going to the landfill (where it contributes to the release of methane gas) rather than being converted to a composting unit would make a significant contribution to the university's carbon footprint.



General Recycling in LF bags (incorrect):

- Total no. of GR items: **3425**
- Average no. per bag: **10**
- % of LF bags containing GR: **98%**
- Commonalities: coffee cups and lids, food containers, yoghurt pottles

Of the general recyclables found in the LF bags, most were smaller items that are less obvious as being recyclable than the larger food and beverage containers. However, that such a high percentage of LF bags contained items that should have been placed in the GR bags suggests that this is another area where there is a lot of work to be done with regards to an education programme.



Some of the 376 pieces of paper, 27 organics, and 12 coffee cups found in a landfill bag with a total number of 433

Supermarket/plastic bags containing unsorted rubbish in LF bags:

- Total no. of unsorted individual bags: **188**
- Av. no. per bag: **0.56**
- Commonalities: these bags contained a mixture of recycling, organics, paper and landfill

One trend identifiable in the small LF bags from departments was the number of separate supermarket bags containing mixed waste. One reason for this may be that not all offices have the 2L plastic containers provided for office waste, and an audit of offices may need to be carried out as part of the Eco Office Programme.

It is probable however, that some office users prefer to use these bags rather than use the small bins provided, as they may find it easier to dump a whole bag of rubbish into the LF bins, rather than sorting it into the departmental recycling bins, as is UC policy. A campaign in conjunction with the Eco Office Programme may help rectify this situation.

Hazardous Waste in LF bags:

There were a few instances of hazardous waste (such as empty chemical containers) found in the LF bags, but in general this was not noted as a particular problem.

One notable example however, warrants inclusion in this report: the discovery of four orange juice bottles filled with urine samples that were included in two separate bags of waste pertaining to what looked to be a medical trial. The two pink bags (which were in fact bags issued to households for the depositing at the gate of reusable clothing and goods for a Cancer charity) were tied up and placed inside a black LF bag. From the outside it was evident that they were filled with hundreds of used medical skin patches, along with the small flattened boxes in which they had once been packaged. Initially, these bags were separated to go immediately into the General Waste skip, but they also contained four full orange juice bottles. Acting on the assumption that someone had accidentally put recycling in the wrong bag, the bottles were carefully removed and were about to be emptied when it was discovered that the contents were in fact urine. The label on one of the packaging boxes was Androderm, a type of testosterone patch, so the urine was presumably a mixture of samples from these trials.

It must be stressed that this was an accidental discovery, but it is one that raises serious concerns about the disposal of such waste. That this waste was also inside non-UC standard rubbish bags that were originally for the collection of reusable goods is also of concern. Had the plastic bottles burst or leaked during the removal process, the cleaning staff handling that bag could have been at risk.

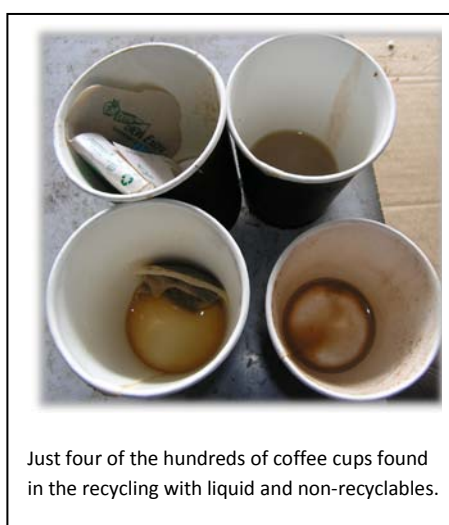
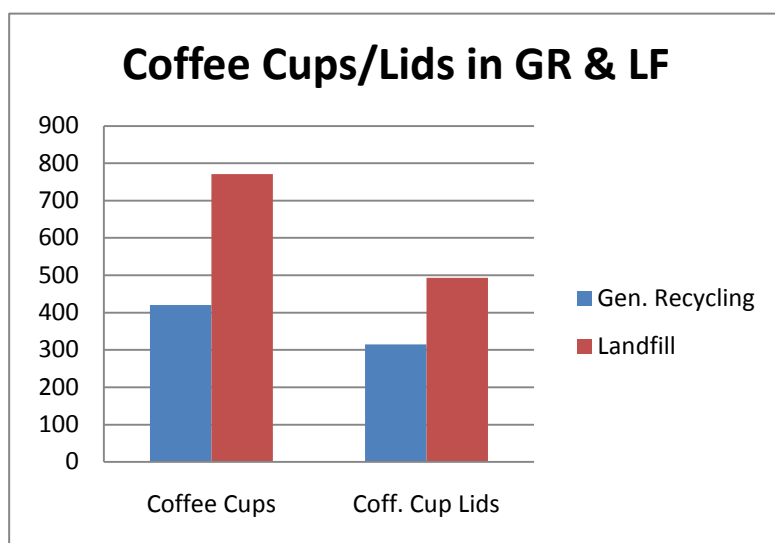
So far no evidence has emerged as to how this medical waste got into the general waste stream. The bins from which it was collected were the ones outside Commerce which are used as receptacles for a number of departments including Biological Sciences and Psychology. Having discussed this issue with several staff members from Biological Sciences and been shown their stringent system for the disposal of hazardous waste I am satisfied that this waste was not generated from there. I asked the administrator of Psychology whether she knew of such a trial being undertaken, and was told that she did not. Whilst I believe that this matter warrants further investigation, I do not currently feel that I am in a position in which to contact relevant HOD to inquire as to how such a situation would arise.

3.9 Coffee Cups

With a total of 1230 cups and 822 lids counted coffee cups are the single biggest waste item (aside from paper) counted in this audit (by absolute number, but not by volume or weight), and were also the non-paper recyclable item most often placed in the LF bins. Coffee cups and their lids were also highly problematic in that even when they were placed in the GR bags (correct), or PAP (incorrect) often the contents were not emptied, which contaminated otherwise clean bags. In addition, the cups were often used as 'mini rubbish bins' in which napkins, organics, and plastic food packaging were concealed before being put into the bags, which in the case of GR and PAP added to the contamination. As such, there is much work to be done around the reduction of use and the correct disposal of coffee cups. *See coffee cups in A-Z of Waste*

Coffee Cups in LF bags (incorrect):

- Total no. of coffee cups: **771**
- Total no. of coffee cup lids: **493**
- Average no. of cups and lids per bag: **3.7**
- % of LF bags containing coffee cups: **59%**



4. UC Waste Watchers – Working towards greater minimisation of waste

Introduction

Whilst the current recycling system shows that in some areas, the message is getting through I believe that the University of Canterbury is in a unique position to implement a truly inspiring waste system and education programme that is in keeping with the goal of becoming a world class learning environment.

With over 80 hectares of land there is the space for initiatives such as a waste exchange, on-site composting, and campus gardens to supply the needs of the Halls of Residence, the cafes, caterers and other food requirements of the university, all of which would significantly reduce the mountains of waste leaving the campus, along with the truck-loads of fresh packaging coming in. A recent report by UC Sustainability Summer Scholarship student Mario Fichtner on Sustainable Food Systems entitled "Food Matters: Researching Viability of a Sustainable Food System at the University of Canterbury" tackles these issues in more details but there have been precedents set by universities such as the University of Bradford in the UK where a comprehensive 'Ecoversity' programme includes on-site composting and a Growing Spaces initiative called 'Grow Your Own Grub' (see <http://www.brad.ac.uk/admin/ecoversity/>).

Such initiatives would have great economic benefits for the UC, especially if a comprehensive approach to waste reduction were embraced where all staff and students were encouraged to commit to a 'rubbish-free' campus. The following is a breakdown of some of the steps that could be implemented to make this long-term vision a reality.

4.1 Implement a Waste Reduction Working Group and create and maintain relationships between principal operators

- ✓ Develop and Coordinate a Waste Reduction Working Group including members of cleaning, facilities management, registry, office administration, general and academic staff with an interest in waste minimisation.
- ✓ Maintain an overview of the onsite waste system and ensure that principal operators are kept informed of developments.

4.2 Monitor and report on current waste practices

- ✓ Research examples of effective waste reduction at other universities.
- ✓ Carry out monthly audits of rubbish bags concentrating on one area of the university at a time.
- ✓ As part of the above process encourage campus groups to volunteer to go through bags by turning the audits into events, using music, food, refreshments etc. as an enticement. Such an initiative would also highlight to a wide range of people the need to be more vigilant about our waste.
- ✓ Carry out unobtrusive observation of bin use at sets of bins shown to have higher contamination rates.
- ✓ Carry out departmental audits of green practices that include waste.
- ✓ Monitor and analyse quarterly waste disposal reports from Mastagard.
- ✓ Provide annual reports of UC waste stream to campus community.

4.3 Identify improvements to physical infrastructure of current waste system and develop solutions

- ✓ Design, implement and manage a resource exchange for reusable goods on campus. Such an exchange would have a physical and cyber component, with goods stored at an easily accessible site on campus (preferably on the same site as the Sustainability Office for ease of management), and be advertised as being available through current web networks. An example of an on-line free resource exchange operating at the University of Bradford in the UK is at: <http://reuse.scim.brad.ac.uk/db>.
- ✓ As part of the above initiative, work with departments to reduce the requirement for skip hire when disposing of large volumes of unwanted furniture and other materials.
- ✓ Work with Warehouse staff to divert un-saleable, but reusable goods to the resource exchange, or to organisations outside of the UC.
- ✓ Identify opportunities for departments to host their own 'free tables'. This is already being practiced in many parts of the university as indicated on the UC Sustainability Map, with many departments leaving books and journals etc. on the tables.
- ✓ Establish an e-waste repository in the Waste depot so that any e-waste can be diverted from landfill at this critical point of waste collection.
- ✓ Work with IT on developing a more streamlined and robust system for e-waste collection and disposal.

4.4 Develop and improve education resources to encourage better use of the current recycling system

- ✓ Source and purchase coloured hoods for large outdoor bins that are in keeping with the 'traffic light' message used by the Christchurch City Council's curb-side collection system: green = organic; yellow = recycling; red = landfill; and with a white hood added for the UC paper recycling bins. The CCC's scheme has less than 10% contamination of Recycling³ (compared to the 35% contamination rate suggested by this study), and by aligning the main campus bins to these colours, there would be less confusion about which bin to use. An

³ "Christchurch seeks Best City title: Kerbside Collection Success". *Our Christchurch* 17 November 2010.

<http://resources.ccc.govt.nz/files/OurChch/TheMail20101117.pdf>

education campaign (for the purposes of this report entitled 'Waste Watchers') around waste reduction would also benefit from the work already done by the Council in promoting this system.

- ✓ Redesign current recycling posters, pamphlets, and website information to make identification of individual items more visible. Hold focus groups to assess designs before making any permanent changes.
- ✓ Distribute posters in high use areas using permanent display materials: eg. staff rooms, elevators, stairwells, etc. A more controversial position for such material, but one that would potentially have the greatest impact on getting the message across, is to place permanent posters on the backs of toilet doors and above urinals (which contravenes the current rules about placement of posters). However, I believe that it is only through repeat exposure to information that one would not usually seek out voluntarily that the message gets through, and no matter how mundane the information most people will read material presented in these high-use areas.
- ✓ Update bin signage to make correct streaming of waste more visible, and in keeping with an updated poster design. Change colours of signs to reflect the 'traffic light' system used by the CCC (red: LF; yellow: GR; green: ORG, white: PAP). Include the words 'coffee cups' with the current 'glass, plastic etc' on GR bin stickers.
- ✓ Find innovative solutions and opportunities for information dissemination including: short presentations in lecture theatres, visits to departments, presentation of material at staff inductions, implementing staff training programmes, attending functions for clubs and other groups on campus.
- ✓ Use existing campus media outlets such as UC Screens and UCTV, RDU, Youtube, Facebook etc. to 'advertise' correct recycling practices.
- ✓ Continue monitoring effectiveness of written resources and improving them as necessary.

4.5 Develop and implement a behaviour change programme around waste reduction

- ✓ Work with current sustainability groups (Eco-Office, Eco-my-flat, Change Agents, and Simplicity Network) to find and implement solutions towards minimising waste.
- ✓ Include waste reduction as part of existing Professional Development courses.
- ✓ Encourage all departments to offer electronic marking as an alternative to printed essays, or if hard copies are required make it a university wide requirement that they be printed double-sided.
- ✓ Work in conjunction with the Eco Office Programme to design and implement a departmental challenge with prizes geared towards encouraging staff to reduce waste and recycling contamination rates. Run in a similar fashion to Eco-my-flat with before and after audits, blogs, and workshops with winning departments receiving prizes that will boost the morale of the department (eg: a one year increase of budget as a reward for money saved on waste disposal). The money saved by a university wide reduction of waste could finance such a competition.
- ✓ Work with student groups such as the Student Volunteer Army, Kakariki, Love Your Coast and other student groups to hold litter collection days. The effect of identifying and picking up the litter that most often collects in the green spaces of campus where it has been windblown and is often harder to remove can have a profound effect on volunteers and subsequently prompt change around their own consumer practices.
- ✓ Introduce a UC Waste Watchers Week to highlight waste issues and encourage greater reduction of waste.

4.6 Reduce the waste coming into campus by working with staff, students and vendors to minimise packaging

- ✓ Work with vendors and purchasers to identify and implement best practical solutions to non-recyclable packaging.
- ✓ Source or Design a range of 'UC Waste Watchers' reusable food and beverage containers (takeaway container, water bottle, coffee cup, cutlery) and distribute free or at cost to staff and students. Ensure that the range is made from sturdy, long-lasting materials and is functional (similar to tramping kits), and decorate with a range of attractive designs that also function as marketing for the initiative. Sponsorship for such a scheme may be available from interested parties such as the CCC and Keep NZ Beautiful.

- ✓ Ensure that staff and students have access to dishwashing facilities to encourage the use of the reusable containers and cups. Such facilities could also operate a grey-water system in order to divert waste water to the gardens.
- ✓ Work with cafés to pass on the cost of non-reusable packaging to customers using the Waste Watchers kits in the form of direct discounts or incentive cards.
- ✓ Encourage cafés and other vendors to find alternatives to non-recyclable packaging.
- ✓ Encourage departments to use reusable crockery for staff functions rather than purchasing disposable varieties. Here, the Sustainability Office could source, store and lend out extra items when required as part of the Waste Exchange programme.
- ✓ Implement a campaign around buying consumables with reusable and recyclable packaging.
- ✓ Introduce 'Nude Food' days to encourage staff and students to eat only food that does not require non-reusable packaging.

4.7 Revolutionise food practices on campus

- ✓ Implement an on-site composting plant for all food and garden waste. Such an initiative, although requiring a substantial outlay for initial set-up, would have ongoing financial benefits for the university, including the reduction of waste disposal expenditure, and providing compost for university use and sale. With the CCC currently unable to process biodegradable cups and plates etc., such an initiative would also provide a solution for those vendors wishing to use this packaging as an alternative to plastic and cardboard (under the current system, such items should go in the LF bins which contributes to the release of methane gases). For an example of a 'Rocket Composter' operating at the University of Bradford see <http://www.brad.ac.uk/admin/ecoversity/resources/bp-rocket-composter.pdf>.
- ✓ Convert suitable green spaces on campus to vegetable gardens and orchards and grow organic produce that can be sold to vendors, students, staff and local residents at reduced prices. By utilising the compost produced on campus, and reducing the food miles accumulated with current practices, the UC would fill some of its commitment to the CEMARS project.
- ✓ Employ students to work in the composting plant and gardens and contribute to their knowledge base by teaching them permaculture methods of food production. Current and future courses based around sustainability would also benefit from such an initiative.

4.8 Circulate findings and successes to a wider audience

- ✓ At all stages of the waste reduction process, utilise current academic, trade and mainstream media outlets and conferences to publish and circulate results. A major overhaul of both the waste stream and attitudes towards waste at the UC would result in excellent marketing opportunities for the UC.
- ✓ Once a degree of success in waste reduction can be established, implement a course based around the minimisation of waste at the UC. Such a course would also contribute to the ongoing monitoring and updating of the waste system.

4.9 Continuous monitoring and upgrading of the UC waste system

- ✓ Review academic and trade publications and attend conferences to keep up with latest developments in the waste field.
- ✓ Liaise with the Christchurch City Council and other relevant organisations and businesses to ensure that waste practices are not hindering processes used in the wider community.
- ✓ Review all changes made to the UC waste system to ensure that they are working and update as necessary.

5. An A-Z of Waste – statistics, problems and solutions to common disposable items

Balewrap/Shrinkwrap (GR):

Correct bin: GR

Total counted: 99

Percentage disposed in GR: 20%

Key Strategies:

Recycling:

- ✓ Use the Eco Office network to campaign about recycling the plastic bale and shrinkwrap used to wrap paper and other office products

Reduction:

- ✓ Work with bulk suppliers of the UC to find alternative sustainable packaging

Batteries:

Correct bin: Separate departmental battery collection boxes. Once boxes are full, cleaning services are contacted for collection.

Total counted (LF): 15

Key Strategies:

Correct Disposal:

- ✓ Use the Eco Office network to campaign about the correct disposal system for batteries.

Reduction:

- ✓ Encourage the use of rechargeable batteries over the single use varieties.

Bottles (glass and plastic):

Correct bin: GR

Total counted (glass): 220

Percentage in GR: 86%

Total counted (plastic): 822

Percentage in GR: 79%

Issues to be addressed:

- Bulky and in the case of glass, heavy items thereby requiring greater use of recycling and rubbish bags and adding to disposal costs.
- Broken glass bottles pose health and safety risks for cleaners
- Often left unrinsed so that beverage waste contaminates GR bags
- Commonly littered, especially during events, and often end up in one of the campus waterways

Key Strategies:

Recycling:

- ✓ Make the link between bottles and recycling more obvious as part of the overall education campaign to make recycling practices clearer

Reduction:

- ✓ Source and give away/sell metal (preferable) or plastic reusable water bottles as part of the UC Waste Watchers scheme
- ✓ Encourage people to buy beverage bottles that can be reused a number of times before disposal
- ✓ Reinstall drinking fountains
- ✓ Install water coolers (without cups) in key indoor areas
- ✓ Encourage the bars on campus to promote tap beers

Cans (tin food and aluminium beverage):

Correct bin: GR

Total counted: 552

Percentage in GR: 72%

Issues to be addressed:

- Bulky, heavy items requiring greater use of recycling and rubbish bags and adding to disposal costs
- Often left unrinsed so that food and beverage waste contaminates GR bags
- Commonly littered, especially during events, and often end up in one of the campus waterways

Key Strategies:

Recycling:

- ✓ Make the link between cans and recycling more obvious as part of the overall education campaign to make recycling practices clearer
- ✓ Encourage emptying and rinsing of cans, especially tuna

Reduction:

- ✓ Encourage people to buy beverage bottles over cans that can be reused a number of times before disposal
- ✓ Encourage the bars on campus to promote tap beers

Coffee Cups/Lids (cardboard/plastic):

Correct bin: GR

Total counted (cups): 1230

Percentage in GR: 35%

Total counted (lids): 822

Percentage in GR: 39%

Coffee cups and their lids are the single use item that was second only to paper in the amount counted. Both cups and lids are recyclable, but the message is definitely not getting through and this will be a key area to focus on in the drive to reduce the university's waste stream.

Issues to be addressed:

- Bulky items requiring greater use of recycling and rubbish bags and adding to disposal costs
- Used as mini-rubbish bins so that non-recyclable waste contaminates GR bags
- Often left unrinsed so that beverage waste contaminates GR bags
- If used by consumers without a lid, spillage often occurs requiring extra cleaning resources

Key Strategies:

Recycling:

- ✓ Create a major campaign solely around the reduction of and correct disposal of takeaway coffee cups
- ✓ Encourage emptying and rinsing of cups

Reduction:

- ✓ Source and give away/sell reusable thermal coffee cups as part of the UC Waste Watchers scheme
- ✓ Encourage cafes to offer a reduction for use of reusable cups or add surcharges for non-reusable takeaway cups
- ✓ Work with cafes on a campaign around 'sit and drink', reducing the necessity for takeaway coffees
- ✓ Once these strategies are in place, ban takeaway coffee cups on campus

Cups – Recyclable (Cardboard, Plastic):

Correct bin: GR

Total counted (cardboard): 119 Percentage in GR: 71%

Total counted (plastic): 181 Percentage in GR: 51%

Cups – Non Recyclable Other (Polystyrene):

Correct bin: LF

Total counted: 196 Percentage in LF (Correct): 54%

Cups – biodegradable:

Correct bin: LF

Whilst separate statistics were not taken for the biodegradable cups being used on campus, it is notable that Café 101 and Reboot cafes had taken the initiative to use these cups. Whilst this is to be applauded, the current situation with the CCC is that these cups are not suitable to the machine used to separate recycling and should therefore be placed in the LF, and as such these cafés have reverted to using standard recyclable cups. Were the university to set up its own on-site composting system this issue could be addressed, with beneficial results both financially and environmentally.

Cups – General comments

Many of the cardboard and polystyrene cups found are traceable to water coolers in staff rooms, outside lecture theatres etc. Unfortunately, polystyrene is not currently recyclable, and should be put in the LF bins

Issues to be addressed:

- Bulky items requiring greater use of recycling and rubbish bags and adding to disposal costs
- Used as mini-rubbish bins so that non-recyclable waste contaminates GR bags
- Often left unrinsed so that beverage waste contaminates GR bags
- Often used for water where reusable water bottles could be used instead
- Often used for functions when reusable glasses/cups could be used

Key Strategies:

Recycling:

- ✓ Make the link between takeaway cups and recycling more obvious as part of the overall education campaign to make recycling practices clearer
- ✓ Encourage emptying and rinsing of cups

Reducing:

- ✓ Ask water cooler service providers to remove cups and cup holders from coolers
- ✓ Source and give away/sell metal (preferable) or plastic reusable water bottles as part of the UC Waste Watchers scheme
- ✓ Reinstall drinking fountains
- ✓ Work with offices through the **Eco-Office Certification Programme** to find alternatives to disposable cups for departmental functions

Cutlery (plastic/wooden):

Correct bin: LF

Total found in GR bags (incorrect): 180

Although both plastic and wooden cutlery might seem to be recyclable, currently this is not the case. As such, these items should be removed from food containers etc and placed in LF.

Issues to be addressed:

- Cutlery left inside food containers that are otherwise recyclable

Key Strategies:

Correct disposal:

- ✓ Include cutlery on the list of items to go into landfill on posters and website etc.

Reduction:

- ✓ Source and give away/sell transportable reusable cutlery kits as part of the UC Waste Watchers scheme
- ✓ Encourage cafes to add surcharges to takeaway cutlery
- ✓ Work with cafes on a campaign around 'sit and eat', reducing the necessity for takeaway meals

Food Packaging – Recyclable (plastic, excluding sushi):

Correct bin: GR

Total counted: 493

Percentage in GR: 43%

Many of these takeaway plastic containers were reusable, but were left unrinsed, which may account for a higher percentage being placed in LF bins than the GR.

Food Packaging – Recyclable (UCSA cardboard sandwich pack):

Correct bin: GR

Total counted: 99

Percentage in GR: 20%

Although these packets are clearly marked as being recyclable, the low rate of recycling may be attributable to a lack of understanding around whether the cardboard packets go in GR or PAP bins.

Food packaging – Recyclable: General comments

Issues to be addressed:

- Bulky items requiring greater use of recycling and rubbish bags and adding to disposal costs
- Items such as cutlery and napkins left in them, contaminating GR bags
- Often left unrinsed so that food waste contaminates GR bags

Key Strategies:

Recycling:

- ✓ Make the link between food containers and recycling more obvious as part of the overall education campaign to make recycling practices clearer
- ✓ Encourage rinsing of containers

Reduction:

- ✓ Source and give away/sell reusable takeaway food containers as part of the UC Waste Watchers scheme.
- ✓ Encourage cafes to offer a reduction for use of reusable containers
- ✓ Encourage cafes to add surcharges to non-reusable takeaway containers
- ✓ Work with cafes on a campaign around 'sit and eat', reducing the necessity for takeaway containers

Food packaging (supermarket/other): chip, chocolate, cling-wrap, ice cream, yoghurt

Food packaging – non Recyclable (chips, chocolate, cling-wrap etc.)

Correct bin: LF

Total found in GR bags (incorrect): 517

Many of these small pieces of plastic packaging are traceable to cafés (especially 360 Café which wraps most food in shrinkwrap) and the vending machines, or are being brought into university by staff and students. As non-recyclable food waste they should be put into the Landfill bins.

Issues to be addressed:

- These items often end up in GR bags because they are stuffed into recyclable packaging such as coffee cups, takeaway containers etc.
- Some items such as pie wrappers also have food left in them.

Key Strategies:

Correct Disposal:

- ✓ Include common items on the list of items to go into LF on posters and website etc.

Reduction:

- ✓ Work with Cafés (especially 360 Café) to eliminate the need for individually wrapped bakery items
- ✓ Discuss with vending contractors the possibility of designing and placing stickers on vending machines indicating that the disposal of packaging should go in LF bins

Paper

Correct bin: PAP

Total pieces found in GR: 519

Percentage of all contaminants in GR: 34%

Total pieces found in LF: 4009

Percentage of all recyclables in LF: 46%

Although the UC has had a comprehensive paper recycling system in place for some years, pieces of paper still make up a high percentage of waste not being placed in the correct bins. Also of concern was the amount that was printed one-sided, along with a large number of blank A4 sheets that had been binned.

Issues to be addressed:

Small polystyrene items are not currently recyclable, and due to the high levels of food contamination on paper plates, these items are not recyclable and should be placed in LF bins.

Plates – Biodegradable:

Correct bin: LF

Whilst separate statistics were not taken for the biodegradable plates being used on campus, it is notable that Café 101 and Reboot cafes have taken the initiative to use these plates. Whilst this is to be applauded, the current situation with the CCC is that these plates are not suitable to the machine used to separate recycling and should therefore be placed in the LF. Were the university to set up its own on-site composting system this issue could be addressed, with beneficial results both financially and environmentally.

Plates – General comments

Issues to be addressed:

- Bulky items requiring greater use of recycling and rubbish bags and adding to disposal costs
- Plastic plates are often left unrinsed so that food waste contaminates GR bags
- Often used for functions when crockery/reusable plates could be used

Key Strategies:

Recycling:

- ✓ Make the link between plastic plates and recycling more obvious as part of the overall education campaign to make recycling practices clearer
- ✓ Encourage the use of recyclable plastic plates rather than non-recyclable types if disposable plates must be used
- ✓ Encourage scraping and rinsing of plates

Reducing:

- ✓ Source and give away/sell reusable takeaway food containers as part of the UC Waste Watchers scheme.
- ✓ Encourage departments to use reusable crockery for staff functions rather than purchasing disposable varieties. Here, the Sustainability Office could source, store and lend out extra items when required as part of the Waste Exchange programme.

Polystyrene (cups, plates, food containers):

Correct bin: LF

Although large pieces of polystyrene packaging are currently picked up by Mastagard for recycling, small items such as cups, plates and food containers should be placed in LF bins.

Issues to be addressed:

- The use of polystyrene food/beverage vessels on campus, in particular in water coolers and from Hang Seng Chinese Takeaway in the UCSA when there are currently no options for recycling

Key Strategies:

Correct disposal:

- ✓ Include polystyrene on the list of items to go into LF on posters and website etc.

Reduction:

- ✓ Make it a requirement that water cooler companies replace polystyrene cups with recyclable cups, or better, remove cups all together

- ✓ Source and give away/sell reusable takeaway food and beverage containers as part of the UC Waste Watchers scheme.
- ✓ Work with cafes on replacing polystyrene packaging with alternatives
- ✓ Put in place an outright ban on polystyrene packaging at the UC

Supermarket Bags (plastic):

Correct bin: GR

Total counted: 384

Percentage in GR: 34%

Issues to be addressed:

- The use of these bags for individual office waste

Key Strategies:

Recycling:

- ✓ Make the link between bags more obvious as part of the overall education campaign to make recycling practices clearer
- ✓ Discourage the use of bags for individual office waste

Reduction:

- ✓ Ensure that all offices have individual 2L waste containers
- ✓ Source and give away/sell transportable reusable bags featuring a UC Waste Watchers logo

Sushi Packaging:

Correct bin: GR

Total sushi containers counted: 126

Percentage in GR: 21%

The low recycling rate of sushi containers can probably be attributed to a number of factors, including a lack of awareness that sushi containers are recyclable. Of more concern however is the amount of mixed waste generated from current sushi packaging processes which use up to six items of packaging including: paper bag, napkin, plastic box, chopsticks, paper chopstick sleeve, and plastic soy bottle/container.

Issues to be addressed:

- Bulky items requiring greater use of recycling and rubbish bags and adding to disposal costs
- Items such as soy sauce containers, chopsticks, napkins, and organics left in them, contaminating GR bags

Key Strategies:

Recycling:

- ✓ Make the link between sushi containers and recycling more obvious as part of the overall education campaign to make recycling practices clearer
- ✓ Encourage emptying of containers before disposing

Reduction:

- ✓ Source and give away/sell reusable takeaway food containers as part of the UC Waste Watchers scheme.
- ✓ Work with sushi providers on providing 'pick and mix' sushi cabinets to cafes to be used with reusable packaging/plates.
- ✓ Encourage cafes to offer a reduction for use of reusable containers

- ✓ Encourage cafes to add surcharges to non-reusable takeaway containers
- ✓ Encourage sushi providers to remove single serve containers of soy sauce, wasabi etc. in favour of bulk condiments at counters

Tetrapaks (1 litre, and single serve)

Correct bin: GR

Total counted: 110

Percentage in GR: 15%

Issues to be addressed:

- Bulky items requiring greater use of recycling and rubbish bags and adding to disposal costs
- Often left unrinsed, contaminating GR bags
- Straws left on, contaminating GR bags

Key Strategies:

Recycling:

- ✓ Make the link between tetrapaks and recycling more obvious as part of the overall education campaign to make recycling practices clearer
- ✓ Encourage emptying of containers and removal of straws

Reduction:

- ✓ Encourage staff/post-grad students to find bulk alternatives to single serve juices etc.

Yoghurt Containers

Correct bin: GR

Total counted: 185

Percentage in GR: 39%

Issues to be addressed:

- Often left un-rinsed, contaminating GR bags

Key Strategies:

Recycling:

- ✓ Make the link between yoghurt containers and recycling more obvious as part of the overall education campaign to make recycling practices clearer
- ✓ Encourage emptying and rinsing of containers

Reduction:

- ✓ Encourage and assist people to make their own yoghurt through the Eco-my-flat, Eco Office, and UC Sustainability networks
- ✓ Encourage staff/post-grad students to buy large reusable containers of yoghurt and place in fridges rather than bringing single serve containers.