UniversU

Single-Stream Contamination RateXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXϕʜᴏ
Multi-Stream Contamination RateXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXϕϕXXXXXXXXʜᴏ

: Campus Sustainability Office

1.

During the week of March 4, 2018, the University of Winnipeg conducted an internal waste audit to gauge our landfill diversion rates and identify areas for improvement. Such audits are conducted roughly every three years as part of an ongoing commitment to improve environmental performance throughout our institution.. The audit was coordinated by the UWinnipeg Campus Sustainability Office (CSO) with support from the Canadian Beverage Container Recycling Association (CRCBA), and was conducted by twenty-five students who sortied and weighed nearly all of the waste generated on campus during the five day auditing period. This report outlines the methodology used during of the 2018 waste audit, analyses the audit findings. It also discusses challenges and opportunities for improving landfill diversion at UWinnipeg. The following introductory section provides an overvie ø 2Ŧ ¦ ² ƛyƴƛLJŜƎΩă ŎdzℕℕŜyű ø l·ăűŜ Y l·yl·ƎŜY ŜyűŭăëăűŜY l·yŘ ŎfI·ℕΛŦΛŜă űKŜ Y l·ƛƴLJdzℕLJ2ăŜ l·yŘ 2ō?ŜŎűΛØŜă 2Ŧ űKŜ l·dzŘƛűΦ

A waste stream refers to all of the infrastructure and human activities involved in the disposal, collection and transpiration of a given type of waste. It also refers to the aggregate amount of waste of a specific type generated within a waste management system, including how that waste it generated, transported treated and disposed of by that system. The primary waste streams examined during this audit were compost, recycling and landfill.

The organic or compostable waste is identified as plant and animal products that recycles organic material through decomposition under certain conditions, thus being diverted from landfill. This audit considered two categories of organics, food product and packaging products made of organic materials.

Recycling refers to all materials generated within a waste management system that can be transformed into useable products or otherwise re-purposed and diverted from landfill. Recycling is a broad waste stream that contains sever other streams including, e-waste, paper, and co-mingled recycling.

Landfill waste is waste that is best disposed of at in landfill locations. This includes all items that are not recyclable, compostable or otherwise diverted by some element of a waste management system.

Single-stream waste bins are containers for collecting waste that accommodate only one primary waste stream. They are typically marked to symbolize the stream that are designed to collect (i.e. blue bins are Recycling)

Multi-stream waste bins are containers for collecting garbage that accommodate three or four waste streams.

The capture rate is the percentage of recyclable and compostable materials that were properly disposed of out of the total amount of these materials generated. It is an excellent indicator of how well a recycling or composting program is working for an institution.

The diversion rate is the percentage of the total waste generated that is diverted from landfill disposal into the various reuse and recycling programs available at the facility.

The percentage of waste material in the Recycling and Compost streams that should not be there, as it is not accepted in the program. This includes landfill materials in either stream, as well as compostables in the Recycling and recyclables in the Compost. A high contamination rate may lead to the hauler not accepting the material and redirecting the material for landfill disposal.

A waste profile is the description of a given amount of waste as described by the weights and percentages of specific categories of waste found within, including landfill, compost, recycling, e-waste and hazardous waste. It is possible to determine waste profiles for b

The 2018 waste audit involved the physical examination of non-hazardous wastes, recyclables, and organics collected in standard receptacles (including stand-alone and multi-stream units) or dropped off directly at large centralized collections bins for most buildings oy ¦ ² ʎyÿÿ⁄ŁJŜƎ⍰ă

complete picture of landfill diversion rates among different buildings and different types of collection bins, the CSO designed a sampling schedule to look at different data subsets as defined by three factors: bin location, bin type, and stream type. The schedule ensured that similar amounts of time were devoted to examining different bin type and stream combinations ς such as recycling from single-stream bins and compost from tri-stream bins.

Switching between different waste samples required easy identification for all bags arriving at the auditing room. This is why the CSO trained cleaning staff to apply the label seen in

materials end up in the correct stream. Sub-

On some sort days, auditors did not get to sort all the waste for a given building. In these cases, team leads the percentage of weight in a sort category was calculated based on the total waste for the day in question. That percentage was applied to the unsorted waste and added to the sorted waste weights on the raw data sheets. For example, on Tuesday, there was 20.082 kg of unsorted waste left at the end of the day for sample type MC-1-L. The following calculation was used to determine ά ! Ŏűdzl·f ǿŜƛ∃Kű including ¦ yãƨ₪ŭŜŘέ Ŧƨ₪ űKŜ Kƨű ŎdzLJăϒ

Hot cup actual weight including Unsorted = [(total MC hot cup actual weight /total weight all waste for MC) x total weight of MC unsorted waste] + hot cup actual weight

Or

[(5.321 kg / 137.060 kg) x 20.820 kg] + 5.321 kg = 6.129 kg Hot Cups

Averages were calculated based on number of days data was actually collected for. For instance, if there were data for Tuesday and Thursday only for a given Sort Category, we divided the sum of these days by 2, not 5 for the week.

Any building that did not have data for l·ff ŦλØŜ Řl·èă ǿl·ă άl·Řƨdzăú$ŘΦέ For adjusted containers, the number of containers for any given category was augmented with the average daily number of containers for that category. For example, there was no container data available for MC-4-R on Thursday or Friday. The following calculation was used to determine the adjusted hot cup container value:

Adjusted hot cup container value = (daily average hot cup value x number of days without data) + number of hot cups for days with data

or

(36 cups x 2 days) + 108 cups = 180 Adjusted Hot Cups

If there was unsorted waste for a given building on days when sorted weights were not recorded, the percentage of weight in a category based on the total waste for the building on days when data was available was calculated, and that percentage was applied to the unsorted waste weights. For example, there was no sorted weight data available for MC-4-R on Thursday or Friday, but waste was weighed unsorted. In these cases, the following calculation was used to determine the adjusted hot cup container value:

Adjusted hot cup container value =

	It is likely that bags from three and four stream bins were regularly marked as being from a single stream bin or not given a bin-type indication at all.	
Language barriers among cleaning workforce made up of primarily new Canadians likely resulted in mislabeling of tags.	This point is supported by the fact that the Richardson produced a much higher number of single-stream bags, and a smaller number of four-stream bags, than expected based on the number single- vs- three 77 reW*nBT/F2 9.96 Tf1 7.54 141n	

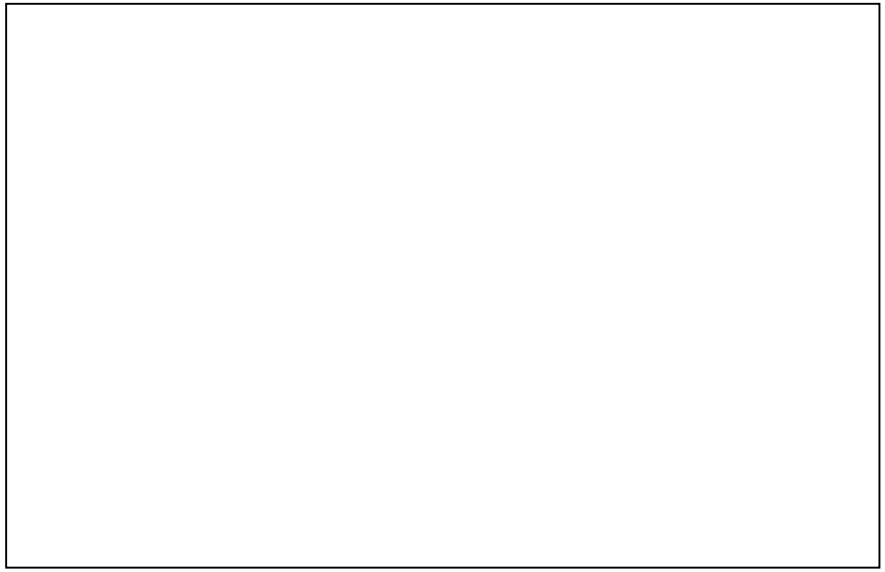
		More effort will also go toward training crew leaders on how to execute these schedules.

3.

The following section presents the findings of the 2018 waste audit through a series of charts. Key takeaways include:

Glass (42 kg), metals (77 kg) and E-waste (76 kg) showed the smallest portion of waste materials within the University.

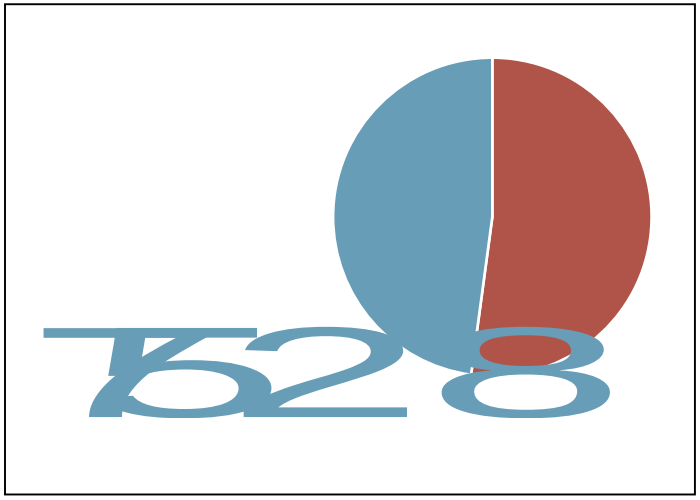
The recyclable paper category, which included bags, plates, mixed, boxboard and cardboard, generated the highest portion of waste, with a total of 817 kg accounted for during the waste audit.

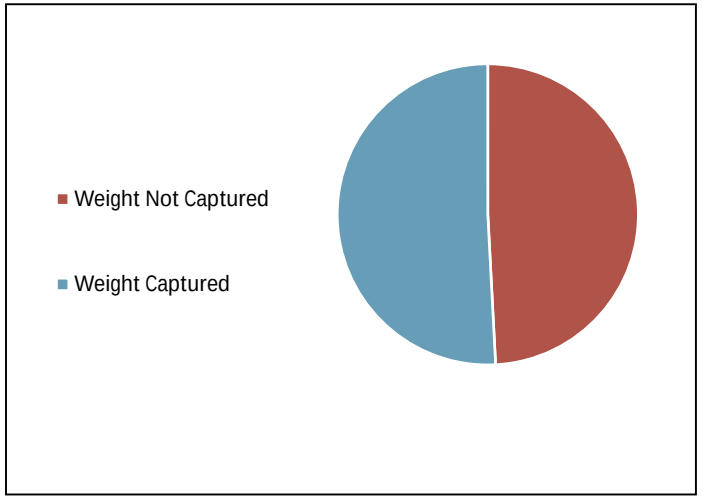


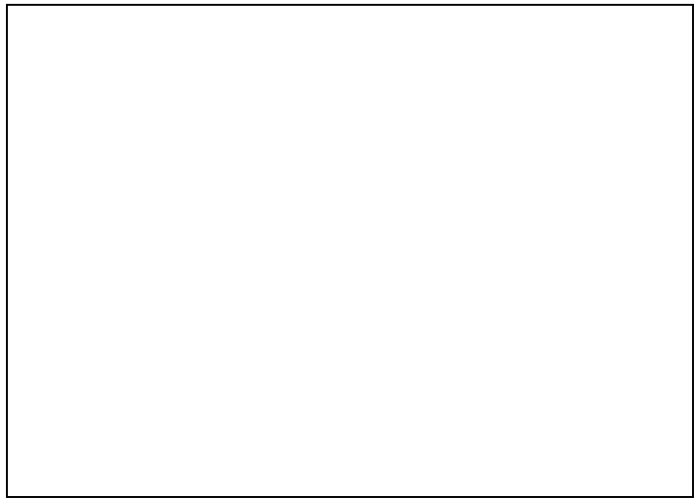
Multi-stream bins were more effective at diverting waste from landfills (77% diversion rate) than single-stream bins (51%). That said, a high

Capture rates reflect the percentage of recyclable and compostable materials that are disposed of in the appropriate waste stream. Thus, graphs reflect the weight of recycling and compost materials in waste, recycling, and landfill streams; no landfill materials are accounted for in capture calculations. The overall campus capture rate for the 2018 waste audit was 48%. There is significant room for further gains on the part of the University as regards proper disposal of recycling and compostable waste.

Main Campus and the Richardson Building exhibited similar capture rates, at 48% and 51% respectively. The Buhler Centre had a slightly lower rate (41%). Again, the need for increased signage around waste bins in the Buhler Centre is indicated.



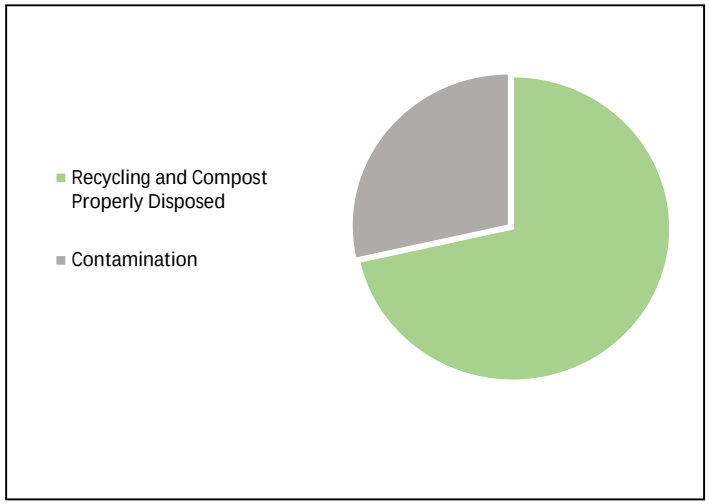


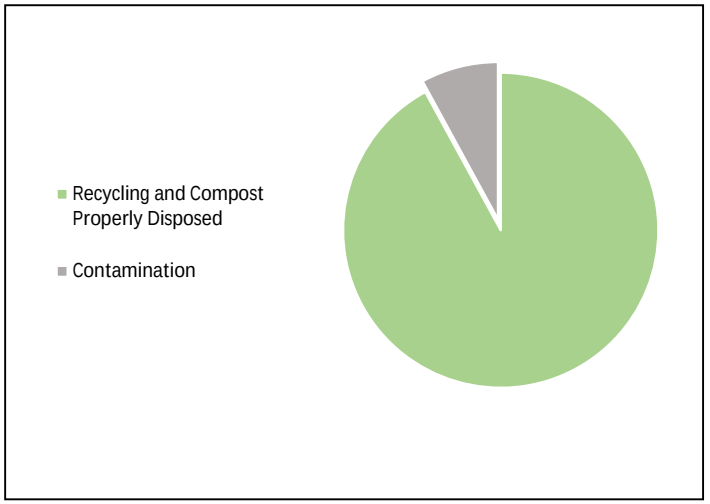


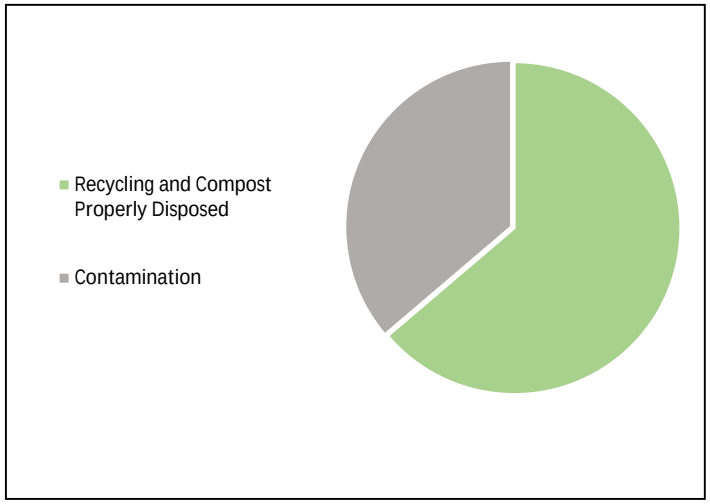
Single and multi-stream capture rates were the same, at 48%. However, single-stream bins account for almost twice as much captured weight as multi-stream bins.

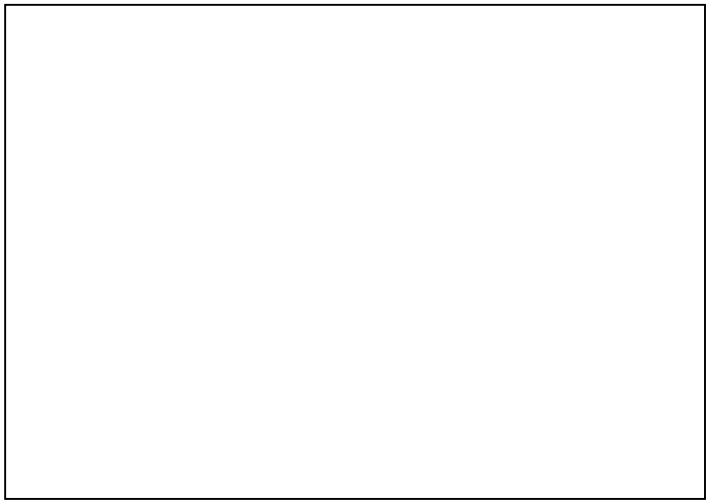
Contamination rates reflect the percentage of contents of recycling/compost bins that are not actually recycling/compost materials. This includes compost improperly disposed of in recycling streams and vice versa, as well as contamination by landfill materials. The overall campus contamination rate was 26% in the 2018 waste audit.

The Richardson Building had the lowest contamination rate, at just 8%. The Richardson Building has few single-stream bins, and the waste from Elements, which is presumably better-ăƶ₥ŭŜŘ ŭKl·y˝ŭKŜ ǿl·ăűŜ ƛy˝LJdzōfƛÕ ōƛyãΣ Y˝l·ʅŜă dzLJ l· fl·₥ΞŜ LJ₥Ƶ2LJƶ₥ŭƛƶy˝ƶŦ ŭKŜ ōdzƛfŘƛyΞ₪ă ǿl·ăűŜ ƶdzűLJdzűΦ a l·ƛy˝ campus had a 29% contamination rate, and Buhler had the highest rate.

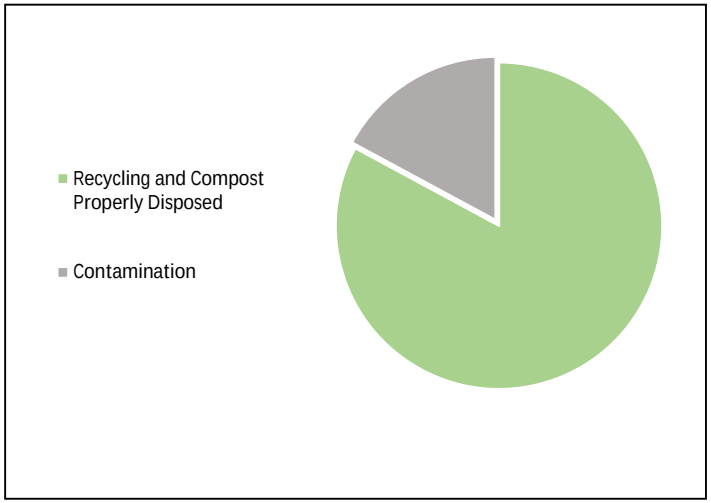


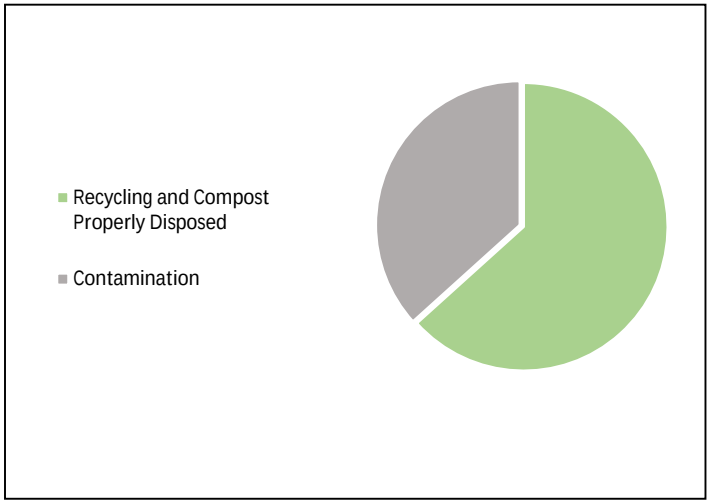






Single-stream contamination rates were markedly lower than those of multi-stream, at 17% and 37% respectively. This is somewhat unexpected, and might be explained by the presence of Diversity kitchen waste recorded as single-stream.





4.

The concluding section of this report outlines a series of recommendations and next steps that will help UWinnipeg address the waste management challenges exposed by the 2018 waste audit. Improvements in a) bin infrastructure, b) outreach and education, and c) policies and procedures, have the potential to reduce the production of waste on site and increase the correct disposal of recyclable and compostable materials.

In order to improve diversion and reduce contamination at UWinnipeg, our institution must continue investing in bin Infrastructure and other improvements to waste collection systems. There are several buildings on campus, including Helen Betty Osborne and the Asper Centre for Theatre and Film, where there are no multi-stream units

of garbage volumes that convey the importance of proper waste management, and bin-side waste volunteer ambassadors who will provide instructions for proper material separation. The CSO hopes to create a new part-time waste management staff position tasked with coordinating education and outreach as well as the monitoring and upkeep of waste collection infrastructure. Our office is also considering conducting a survey in the coming years to identify barriers to proper waste disposal behavior. This information would then help guide future education efforts.

Waste practices intuitively come to mind for most people as an important part of sustainability. Engaging members of the campus community with information on proper waste management

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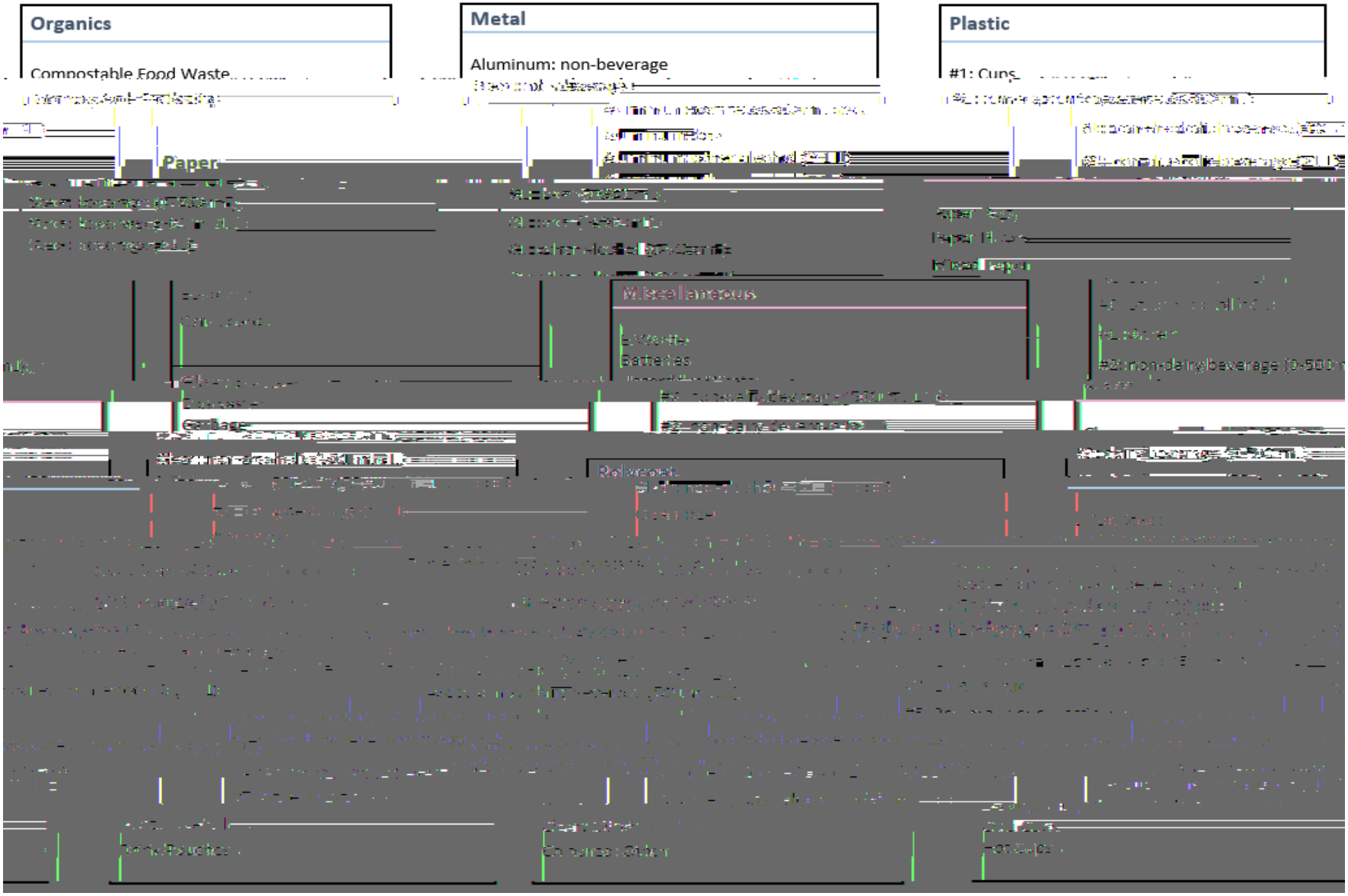
Organics
Compostable Food Waste
Metal
Aluminum: non-beverage
Plastic
#1: Cups
Paper
Miscellaneous
Batteries