CONDUCTING A WASTE AUDIT AT CONCORDIA

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OVERVIEW

Waste audits are a critical tool for assessing the waste impacts of events or of your office space. A waste audit evaluates the contents and proportions of trash, recycling, and/or compost bins in detail. This document provides guidelines for conducting a waste audit of your own event or space at Concordia, including information on the tools needed, permissions needed from Concordia's custodial services and security departments, auditing procedures, and sorting information.

Figure 1: 2008 University-wide Concordia Waste Audit

ESTABLISHING YOUR OBJECTIVES

Before committing to the audit, you should **carefully consider your goals.** Planning and executing a waste audit can be a significant time investment. A quick visual inspection of bins can give you a very good idea of **key problems** you may need to address, such as:

- too many disposable coffee cups (instead of using reusable containers)
- too many organics in the trash (which could be consumed, donated, or composted instead)
- non-recyclables in the recycling bin(which creates contamination)

Figure 2: Coffee cups at the 2014 GM office waste audit

Some of these issues can be addressed without the need for a waste audit. For example, you can instantly begin to remedy these issues with the following actions:

- providing reusable mugs to the occupants of your space
- requesting a compost bin for your space or event
- ensuring that bins are set up for success (no trash bins without recycling and/or composting bins next to them, using updated posters, etc.)
- informing event attendees or space users about proper recycling procedures for key problem items

Waste auditing is useful for:

- providing a baseline of data to measure the effectiveness of your waste-reduction tactics against
- assessing waste diversion at your event or space to contribute to a clearer picture of overall waste diversion at Concordia
- making a case to set up a compost bin in your space by demonstrating that a significant quantity of organics are disposed of

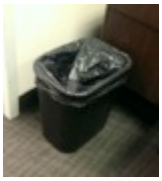
ESTABLISHING WHAT TO MEASURE

Once you have established your objectives and have determined that an audit will be useful, you need to set the scope of what you will be measuring. Use this checklist as well as the examples below to guide you.

- ❑ Determine the **number of locations** and **amount of days** in which you'd like to measure the waste impact of.

- ❑ Determine the **number and types of waste stations and bins** present in those spaces. Here are some common bin types at Concordia:


4 stream slim bins


Office trash bin


Office paper bin

- ❑ Determine the **number of samples** that will provide an adequate representation of your waste diversion. Try to get at least 30 samples or as many as possible if your event has fewer than 30 samples to pick from.

- ❑ Determine whether you need to conduct the audit on multiple days (if possible) to provide an adequate representation of your waste diversion. Avoid auditing on days with unusual activity in your locations, unless that is the event you are trying to assess.

- ❑ Determine what **types of waste items** to expect and what **general categories** to sort waste into by conducting a visual inspection of bins or by listing items being served/distributed at the event.

- ❑ Determine if there are any **special items** you'd like to sort and weigh (coffee cups, compostable packaging, refundable bottles, etc.)

You will often be limited by the amount of time it takes to sort and weigh samples. A typical waste auditing session with 5 people conducting the audit for 2 hours can sort 10-30 bags, depending on the contents.

EXAMPLE 1

Type of audit: Event (10-50 people)
Duration: 1 day
Number of rooms: 1
Number of waste stations: 3
Streams in each waste stations: Trash, Paper, Containers, Organics
Total number of possible samples: 1 day x 3 stations x 4 streams = 12 samples
General categories: Trash, Recyclable Paper, Recyclable Containers, Compostable, Reusable, Liquids

Special categories: Compostable cups, compostable containers

Given that the total number of samples to select from is a low number, you would likely be able to sort and weigh the contents of all the bins. You are serving food and drinks in compostable cups and containers. You would like to know how well people sorted them so you decide to specifically separate those and weigh them.

EXAMPLE 2

Type of audit: Large Event (>50 people)
Duration: 3 days
Number of rooms: 4
Number of waste stations: 1 in 3 rooms and 3 in the 4th room, used for lunch.
Streams in each waste stations: 3 streams in the 3 rooms and 4 streams in the 4th room
Total number of possible samples: 3 rooms x 1 station x 3 streams + 1 room x 3 stations x 4 streams= 3 days x (21)= 21 samples / day
General categories: Trash, Recyclable Paper, Recyclable Containers, Compostable, Reusable, Liquids
Special categories: Non-recyclable conference merchandise

You may also be able to audit all the samples in this example but you may only be interested in auditing the samples from the lunchroom. You decide to separate and weigh conference merchandise since you would like to know if conference attendees immediately disposed of the pens, bags, etc. that you hand out.

EXAMPLE 3

Type of audit: Office space
Duration: 3 days
Number of rooms: 10 offices, 1 kitchenette, 1 lounge
Number of waste stations: 1 trash and blue bin per office, 1 in the kitchenette, 1 in the lounge
Streams in each waste stations: 2 streams in offices, 4 streams in the kitchenette, 3 streams in the lounge
Total number of possible samples: 10 offices x 2 streams + 1 kitchenette x 4 streams + 1 lounge x 3 streams = 20 + 4 + 3 = 27 samples / day
General categories: Trash, Recyclable Paper, Recyclable Containers, Compostable, Liquids
Special categories: Coffee cups, coffee cup lids, paper towels

In this case, again, the total number of samples is not so high that you couldn't sort and weigh them all. However, for efficiency, you combine all of the samples of trash and paper waste from the offices into two large batches for each day, You create three special categories: coffee cups and lids, because you notice many of them in the wrong bin, and paper towels, because you notice people are not composting them.

PLANNING FOR THE AUDIT

BOOKING THE AUDIT ROOM

Audits must take place in a well ventilated, easy to clean area. At Concordia, audits take place in compactor rooms for ease of delivery and disposal of waste. You may also be able to conduct your audit outdoors with permission from the space manager. You should plan to spend no more than 2 hours conducting the audits so participants don't get exhausted.

- ❑ Contact the custodial supervisor at x3840 or at cleaning@concordia.ca to book the compactor room and cc' sustainability@concordia.ca so that we can meet to help guide your audit.
- ❑ Provide a list of names of audit participants to the custodial supervisor. This list will be provided to security to ensure that everyone has clearance(since the compactor rooms are not a public space)
- ❑ Order 1 or 2 folding tables for your audit by calling the service center at x2400. Indicate the dates that you will need the tables for.

Figure 3: Volunteers in the EV Compactor Room.

COLLECTION OF SAMPLES

Unless you are only sampling a very small number of bins, you will likely need the assistance of the Concordia cleaning team to collect, label, and store your samples until the auditing event.

- ❑ Provide a list of sample locations, bin types, and dates to the custodial supervisor.
- ❑ Provide stickers with this information on them to the supervisor so that cleaners can label the sample bags.
- ❑ If you require that cleaners not collect waste during your sampling period, mark bins with stickers and indicate this to the custodial supervisor.

PREPARING THE AUDITING TEAM

You will need between 3 to 7 people on site during the audit to ensure an efficient experience. Any more people is overcrowded; any fewer can be overly exhausting. Here are some tips for getting a team together:

- ❑ Get firm commitments from your team for attendance of auditing shifts.
- ❑ Send a reminder email to team members a day before their audit shift including instructions on where to meet. Let them know that they should dress appropriately. Footwear can get dripped on so boots, washable, or scrappy shoes are best.
- ❑ Send waste categories and items to team members ahead of time so that they become familiar with them

MATERIALS

Ensure that you have access to all of the following equipment for your auditing sessions. Safety equipment and scale can be requested at sustainability@concordia.ca while liners and 240L bins can be requested from cleaning@concordia.ca

- ❑ Safety equipment
  - ❑ Lab coats
  - ❑ Masks
  - ❑ Goggles
  - ❑ Protective Gloves
- ❑ Printed spreadsheets and clipboard for tracking results
- ❑ Pencil or Pen
- ❑ Pails for sorting waste
- ❑ Tape and scissors (for mounting category labels to pails)
- ❑ Category labels for pails
- ❑ Plastic bags to line pails
- ❑ Scale of sufficient accuracy for sample weights
- ❑ Box to support sorted bags on scale
- ❑ Clean-up equipment
  - ❑ Paper-towels to wipe off hands and face during the audit
  - ❑ broom and dustpan to sweep the floor
  - ❑ rags, soap and warm water to wash the buckets after each work day
- ❑ 240L bins and liners for disposing of sorted waste
  - ❑ Trash
  - ❑ Paper Recycling
  - ❑ Container Recycling
  - ❑ Organics

PREPARING THE ROOM

1. Place tables out of the path of cleaners who may need to roll bins to the compactor
2. Tape labels to the sorting pails, line them with bags, and place them at the edges of the table.
3. Set up the scale with a box so that sorted bags can easily rest on the scale
4. Set up 240L bins in close proximity to the scale for disposing sorted waste

CONDUCTING THE AUDIT

1. Explain auditing procedures to the team. One person should be designated for marking down weighted samples. Highlight the safety procedures to the team. They need to be particularly aware to watch for sharp and hazardous objects (chemical and biological). Gloves should always be worn. Masks and goggles are optional precautions.
2. Weigh one empty bag so that this weight can be subtracted from sample weights.
3. Sort sample bags into categories that will facilitate the audit process for you and the team. *Ex) office trash samples, organic waste samples, etc.*
4. Weigh each sample bag and write down the sample name and weight on your results table. *Ex) office trash, EV 5.004, 0.8 kg*
5. Select the first weighed bag and empty any liquids into a designated pail. Then empty the solid contents onto the table. You will be sorting the bags in the order that you weighed them for ease of data entry.

Figure 4: Sort and weigh samples by bin type. This will make analyzing the data easier.

Figure 5: Pass waste items by hand instead of walking around the table.

6. Visually inspect the bag contents for sharp objects, contaminants or syringes. If contamination is found, discard all the bag contents carefully.
7. Sort waste into categories. This is done most efficiently when team members hand-off items to each other without walking around the table.
8. Encourage volunteers to ask a lot of questions! This way everyone learns quickly. Sorting usually starts slow and gets faster once everyone gets the hang of it.
9. If a category pail gets full before the entire bag is sorted, the current bag can be set aside and replaced with a new bag.
10. Note any interesting findings! These may throw off your results if you don't account for them (e.g. old school bag, shoes, clothes, etc.)
11. When the contents of the sample bag being audited have been entirely sorted, each team member brings a category bag to the scale for weighing.
12. Subtract the weight of the bag being used to carry each category to the scale (usually 12 g). If you don't do this at this stage, remember to do it when you transfer the data to a spreadsheet.
13. Take your time weighing samples and writing them down. Double-check that all bucket contents have been weighed. If you forget any significant categories, your data will not be usable (more on this later)! Don't forget to weigh the liquids!
14. Remember to check that the scale is set to grams or kilograms and is set to zero prior to weighing.
15. After each category is weighed and recorded, dispose of the contents in the appropriate 240L bin. Soiled paper should be placed in the organics bin and not in the paper recycling bin.

ANALYZING THE RESULTS

1. Transfer your data to an excel spreadsheet as soon as you can. This way you won't forget what any special notes your wrote down might have meant. Don't forget to subtract the weight of the small bags for each category you weighed if you didn't already. You can do this automatically here by creating an additional row and using a formula to subtract the bag weight.

2. Once all data has been input, make sure that the total weight of the sample matches up to the summed weights of the contents.

Use excel's sum function to add the cell values of each category automatically. The formula is *=sum('first cell in row':'last cell in row')*

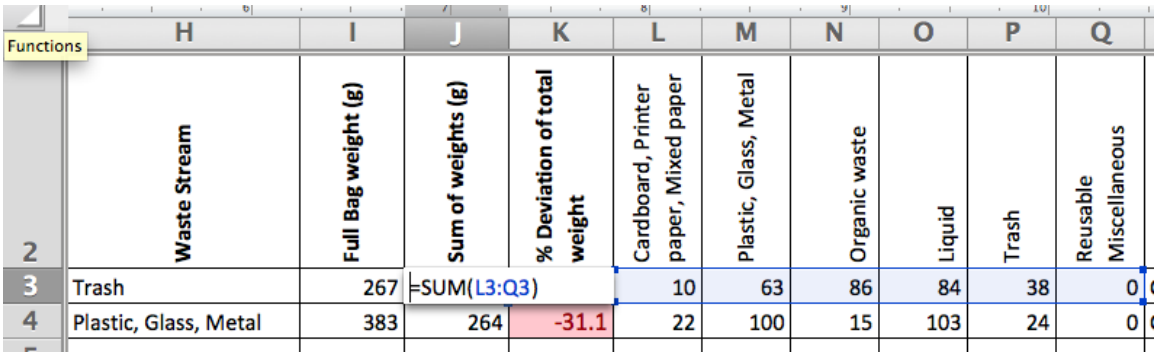


Figure 6: Using excel's SUM function to automatically sum category weights.

Calculate the percent deviation of the sum of weights from the full bag weights using the formula *=('sum of weights'-'full bag weight')/'full bag weight'*100*

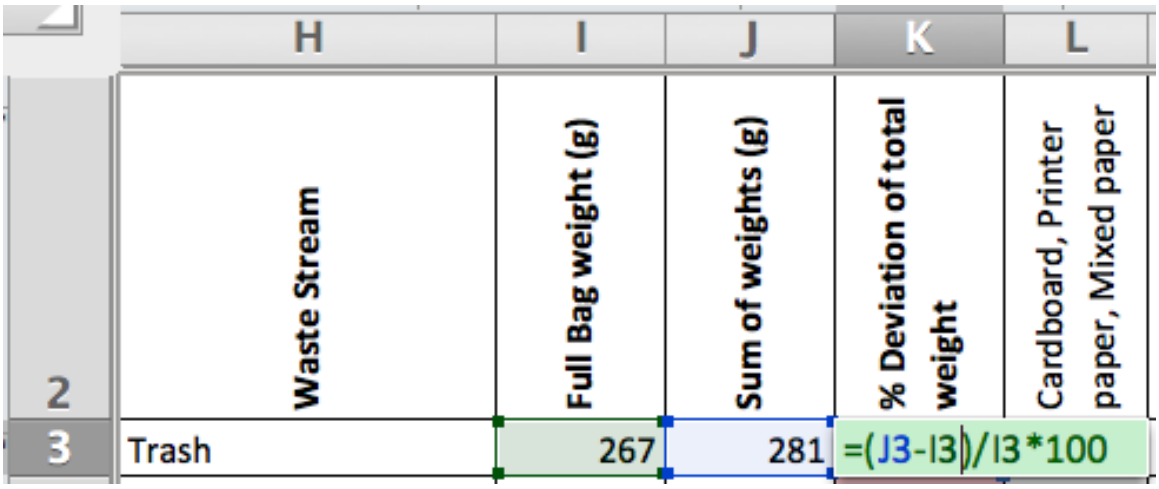


Figure 7: Calculating the % deviation of the sum of weights from the full sample weight.

You won't be able to use any data that does not add up reasonably close to the bag weight (+/-20%). This is why being careful when weighing is of critical importance. In the example below, the data in the second row should not be used.

	H	I	J	K	L	M	N	O	P	Q
2	Waste Stream	Full Bag weight (g)	Sum of weights (g)	% Deviation of total weight	Cardboard, Printer paper, Mixed paper	Plastic, Glass, Metal	Organic waste	Liquid	Trash	Reusable Miscellaneous
3	Trash	267	281	5.2	10	63	86	84	38	0
4	Plastic, Glass, Metal	383	264	-31.1	22	100	15	103	24	0

Figure 8: Example of usable and unusable data.

3. Once you've determined which rows of data can be used, you may want to calculate the average distribution of contents of each type of sample. For example, if you've collected multiple samples from compost bins, you can calculate, on average, how much of the samples are actually compostable material versus trash and recyclable containers.

This can be done by copy-pasting the row for each type of category you want to compare into one list, summing the weights from each category, then calculating what percent each summed category weight contributes to the total weight.

In the example below, averaging the weights of each category in the trash sample showed that 7% was paper recyclable products, 11% was plastic/glass/metal recyclable products, 25% organic compostables, 30% liquid, and 27% non-compostable/non-recyclable trash:

Waste Strear	Full Sample v	Cardboard, P paper	Plastic, Glass,	Organic wast	Liquid	Trash	Reusable Mis	Sum minus bi	Percent devia
Trash	2322	295	190	330	983	445		2183	-6.0
Trash	2500	100	306	847	750	720		2663	6.5
Trash	1274	193	239	471	336	181		1360	6.8
Trash	2530	52	344	651	700	1186		2873	13.6
SUM	8626	640	1079	2299	2769	2532	0	9079	
PCT		7%	11%	25%	30%	27%			

Figure 9: Example of distribution of categories from a sample type, in this case trash bins.

Send your results to sustainability@concordia.ca ! We want to know how your audit went and what you found! If you've identified particular issues, we can help you troubleshoot, provide you educational material, or even help set you up with the waste bins you need.

Good luck!

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