



# Waste Audit Manual

For Schools, Households and  
Small to Medium Enterprises

August 2008

## Acknowledgements

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- The Ministry for the Environment
- Zero Waste New Zealand Trust
- Far North District Council
- Northland Regional Council
- Community Business and Environment Centre

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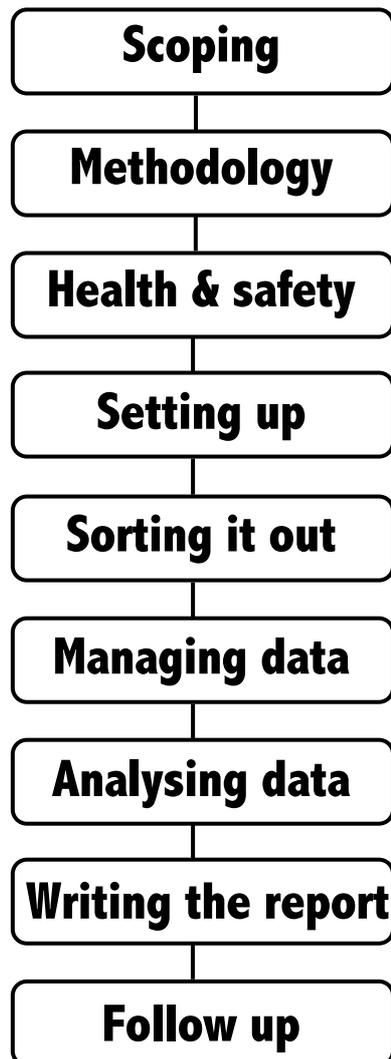
# 1 Introduction

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A solid waste audit is a useful tool to help find out what waste an organisation is producing so that they can find ways to reduce the waste or find ways to recycle or reuse it.

This manual is designed to help someone to conduct a simple yet useful solid waste audit. The steps are set out below. As you will see from the manual, actually sorting the rubbish is quite easy. What needs a bit more attention however is deciding how much you are going to sort, when you are going to do it, and what kind of method you will use.

## 1.1 Steps in a Waste Audit



## 2 Scoping

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Once someone has indicated that they wish to have an audit, the first thing is to work out what needs to be done. Arrange to visit the site to talk to the people who work there and have a quick look in the bins for yourself.

### 2.1 Questions to ask

How many bins are there on site? Where are they sited?

When are they emptied? This affects your timetable and the methodology you end up using.

Are there different bins for different activities? (If so you may want to audit these separately.)

Is there a good place for you to sort the rubbish? (See the chapter on setting up)

### 2.2 What to look for

How full are the bins?

What is in the bins? This will help give you an idea of the categories that you may use to sort the waste into. Also try to notice if there are chemicals or anything like sharp objects that could be dangerous to handle. Is there food or liquids or things that will be unpleasant, or a Health and Safety risk? This will help you work out what gear you might need and how to carry out the audit to minimise the impact of these factors.

### 2.3 Talk to the client/management

Arrange a suitable time for the audit to take place.

Let them know how long it will take.

Let them know any special requirements you have such as making sure the waste is not collected just before you are about to do the audit.

Ensure you understand why they want an audit. Their aim will affect what methodology you use. Ask them if there are particular things they want to find out from the audit.

## 3 Methodology

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Methodology means the method you use or way you decide to do the audit. From what you learnt in your scoping exercise you need to decide how you are going to do the audit. It is usually just common sense, but there are a few things you need to think about.

- What to Sample
- Which bins to look at
- Production variations
- Seasonality
- When to do the audit
- How many days to sample
- How much to sample
- Types of Audits

### 3.1 What to Sample

In most cases it is too hard to audit everything that a company or organisation produces so you have to take a sample of it. That means that the sample you take needs to be representative of what the organisation would normally produce.

### 3.2 Which bins to look at

Some organisations may have more than one 'stream' of rubbish (e.g. they may have office waste and manufacturing waste). You may want to look only at the biggest stream or maybe the one that is most expensive for them to get rid of, or where there is the biggest potential for them to reduce or recycle.

### 3.3 Production variations

Maybe a business is busier on some days of the week than others or they do different production runs on different weeks. Make sure you pick a typical time period to sample.

### 3.4 Seasonality

Sometimes there are more or different types of rubbish produced at different times of the year. For example houses with gardens generate a lot of grass clippings, hedge trimmings etc in the spring and early summer, or a food processing factory might work on different crops in different seasons. When is a typical time of year for the organisation you are looking at?

### 3.5 When to do the audit

When you do the audit can have a big influence on the results. It has to suit the company you are doing the work for and not disrupt their production, but it has to be at a time that is typical of what you would find in that company.

### 3.6 How many days to sample

The more samples you take the better, because you are less likely to have the results affected by unusual variations. It is good to sample at least three days worth of waste, but even two is helpful.

### 3.7 How much to sample

Depending on how much is generated you can either sample everything that happens in one day or you can just do a small proportion. Obviously the more waste there is the smaller the proportion of it you will be able to take. The main thing is that you try and make your sample as random as possible.

### 3.8 Types of Audits

You have to decide which of the different ways of auditing you are going to use. Chose an option from each of the three steps:

- Step 1. **Disposal Point** or **At Source**: Where to sample from
- Step 2. Sort by **Materials** or by **Object**
- Step 3. Sort by **Weight** and/or **Volume** or conduct **Visual estimates**

An explanation of these different audit types and when to use them follows:

#### Step 1. Disposal Point or At Source

You can either take your sample from a common disposal point - say the skip out the back - where things from every part of the organisation will be thrown out (**Disposal Point**), or you can take your sample from where the waste is initially generated – say the wastebaskets near everyone’s desk or workstation (**At Source**). It is more complicated to take things from the individual areas but it may help identify more easily where everything is coming from.

You could also ask the cleaners to label the bags of waste they collect before they put them into the skip, so that you can tell where in the business or organisation each bag of waste came from.

#### Step 2. Sort by Materials and/or by Object

Next you have to decide on the types of categories you will use to sort the rubbish into. You could sort things by **Material** – e.g. plastic, paper, metal etc and/or by the types of **Objects** e.g.: disposable cup, stirring sticks, sugar sachets. What you decide to use will depend on what the data is going to be used for and how practical is to use the categories. Sorting by materials makes sense if you want to work out what can be recycled, while sorting by objects makes more sense if you want to see what things you can reduce.

A common technique is to have primary and secondary categories. E.g.:

Primary	Secondary
Paper	Office paper
	Cardboard
	Newspaper
	Multi material paper

#### Step 3. Weight and/or Volume or Visual estimates

This involves sorting the material into the categories you want to look at and then either weighing each category to get an idea of their relative **Weights**, and/or estimating the **Volume** of the material. Once the rubbish is sorted it is often a good idea to weigh it and estimate its volume. **Weighing** is the most reliable method because weights can be determined accurately using a consistent scale and compared with each other. Waste is usually paid for by weight when it goes to landfill so it often makes sense to use this method.

**Volume** estimates involve sorting the rubbish into different categories and then estimating its volume either as a percentage or as litres or cubic metres. Some materials like plastic can take up a lot of volume and so fill up the rubbish bins quickly, but they don't weigh very much and so will only look like a small part of the rubbish by weight.

Alternatively a quick and easy way to analyse what is in a load of waste is a Visual Estimate. This involves simply estimating the percentages of different components without sorting it – a good idea is to spread it out so you can see what is in there. The problem with this method is it is less accurate as there is a lot of guesswork involved.

## 4 Health and Safety

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**Before you start you need to take steps to stop anyone from getting injured while you are doing the audit.**

This involves 3 basic things –

- identifying what the risks are that could cause injury.
- Working out what you can do to eliminate, isolate, or minimise the risks (ie. Make a plan).
- putting the plan into action.

**NB. Your Health & Safety plan needs to be put in place as part of your organisations Health & Safety procedures.**

### 4.1 Identifying what the risks are that could cause injury

This is going to be different for each place you work at, but there are some common things that you will find:

- Injuries from the rubbish such as needles, broken glass or sharp objects, chemicals or infectious waste.
- Injuries from lifting and carrying heavy waste bags or items.
- Failure of equipment e.g. Tables, lighting etc.
- On site hazards such as vehicles, machinery etc.

### 4.2 Working out a Plan

A plan should normally include the following things:

- Identification of each hazard and the steps taken to reduce the hazard.
- Provision of safety equipment. This may include: protective gloves, overalls, breathing masks, safety goggles, fluoro vests etc.
- First aid kit.
- Training of everyone doing the audit so they know what the hazards are.
- Checking equipment regularly to make sure it is safe to use.
- Identifying procedures for getting medical assistance if necessary (eg. location of phones, first aid officers, medical rooms, showers etc).
- Identifying what particular hazards there may be on site such as vehicles or processing machinery.
- Vaccination. Everyone doing audits needs to be vaccinated against Tetanus, and if there is a danger of any infectious waste then Hepatitis B as well.
- Accident reporting procedures. If there is an accident you need to have a process for making sure the right people (OSH, Insurance company, Management, Site owners etc.) are told about it in a timely manner.

## 5 Setting up

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### 5.1 Equipment needed

- Electronic platform scales (at least 50kg capacity in 50gm increments is recommended)
  - Sorting table
  - Protective gear e.g.:
    - Gloves
    - Overalls
    - Fluoro vests
- and if necessary:
- Masks
  - Goggles
  - Hard hats
- Polythene sheeting
  - Bins to sort into (at least as many as the main categories of waste you will use – about 20 is usually plenty)
  - Knife
  - Pen and clipboard
  - Audit sheets
  - First aid kit
  - Cleaning gear broom/shovel/dustpan/ disinfectant/bleach
  - Tape

### 5.2 Site requirements

- Dry
- Out of the wind
- Ventilated
- Adequate lighting
- At least 4m x 5m
- Near the disposal point
- Away from hazards and traffic areas
- Away from food preparation or eating areas

### 5.3 Setting up your site

Put the sorting table in the middle of the space with bins arranged around it. The table should ideally be waist high so no one has to bend over while sorting. Put polythene over the table and tape it down. You may need to put polythene on the floor underneath the table and bins depending on how precious the floor is and the type of material you are sorting. Place the scales near the rubbish bin where you will be disposing of items once you have weighed and classified them.

### 5.4 Bin labels

If you have as many bins as you have categories in your audit, it helps to label each bin with a different category name. Create category labels based on the categories you select for your audit, and tape one to the front of each bin.

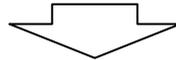
## 6 Sorting it Out

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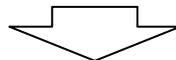
### 6.1 How to do it!

Once your site is set up and all the equipment is ready to go here is what to do:

1. Weigh each labelled sorting bin while it is empty and record the weight on the waste audit sheet.



2. Weigh the bag or bin you are sampling and record the weight on your sheet. You may also want to note where the bag came from and the date and time.



3. Empty the bag or bin onto the sorting table.



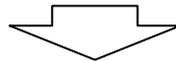
4. Sort into the different category bins you are using.



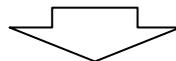
5. Weigh each bin of different category material separately and record the weight before disposing of the material (or recycling it if appropriate).



6. Keep doing this until all the waste has been sorted and the data entered on the sheet. It is a good idea to take photos and make a note of any relevant observations as you sort.



7. Clean up as you go and make sure the place is left as clean as you found it at the end of each day, and at the completion of the audit.



8. Enter the data in a spreadsheet to analyse it. (see the 'Managing Data' section)

## 7 Managing Data

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When you are doing your audit you need to record the data on a sheet that is going to be easy to use and that will help you keep track of which figures relate to which bins. A sample form is included in Appendix A. The form should include all the categories of waste you are using, space to record the weight and volume if necessary and the weight of each empty sorting container (tare weight) so it can be subtracted later. It should have space to note the date and time and where the waste came from.

Once you have designed the form you need to remember that you will want to enter the data into a spreadsheet so you can analyse it. The paper form you use and the spreadsheet should be as similar as possible to make this easy.

You need a system on site to keep track of all the bits of paper. If you lose one bit of paper you have lost all the work that went into gathering that data.

Additionally if you have to gather a certain number of samples from different areas or waste streams it is useful to have a list of these and check them off. This makes sure you get all the data you need without doubling up.

## 8 Analysing Data

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This can either be really simple or very complicated depending on how much data you have gathered and how many different types of things you want to try and find out.

For a simple audit you can just enter it in a spreadsheet and then generate some graphs (pie charts are best) showing what percentages you found of each type of material.

In a more complicated audit you can break up the data to compare different parts of a factory or business and show if things changed on different days or times of the day.

It is important to remember that how you are able to use the data will depend on how you collected it. For example you will not be able to compare the waste from different parts of a factory if you did not keep track of where the waste actually came from when you sorted it.

## 9 Writing the Report

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The main thing about writing reports is to remember who it is actually written for and why the person wants it. Always try and tell the client what they want to know and not much more.

A report should normally have the following sections:

**Summary:** a brief (1 page) outline of what you did, what you found, and recommendations (only necessary if the report is long).

**Contents:** (only necessary if the report is long).

**Introduction:** Why you did the audit, what you were hoping to find.

**Method:** The way you carried the audit out.

**Results:** What your findings were, include lots of graphs and tables and numbers. Photographs are an excellent way of illustrating what the audit shows about what you found.

**Discussion:** What the results mean and why you think they turned out the way they did?

**Conclusions/Recommendations:** What was your overall impression of the company's waste and what can they do to reduce the amount going to landfill?

**Appendices:** You might like to include raw data, copies of forms you have used and any background information that does not fit into the body of the report.

## 10 Follow Up

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In some ways this is the most important bit, because this is when the people you did the audit for are going to decide to do something about reducing their waste or not.

Once you have given them the report, make yourself available to talk about what you found and what you recommend. Answer any questions they may have. If your report shows that they can clearly make savings or improvements you should emphasise this in your follow up.

## Appendix A – Sample waste audit form

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<b>Date:</b>	<b>Site:</b>	<b>Sample #:</b>			
<b>Bag or bin weights:</b>					
Primary categories	Secondary categories	Tare weight	Gross weight	Net weight	Volume
<b>Paper</b>	Recyclable paper				
	Corrugated cardboard				
	Multi/other paper				
<b>Plastics</b>	Recyclable plastics #1-7				
	Multi/other plastics				
<b>Organics</b>	Kitchen/food waste				
	Multi/other organic				
<b>Ferrous metals</b>	Steel cans				
	Multi/other ferrous metal				
<b>Non-ferrous metals</b>	Aluminium cans				
	Multi/other non-ferrous metal				
<b>Glass</b>	Glass bottles/jars				
	Multi/other glass				
<b>Textiles</b>					
<b>Sanitary paper</b>					
<b>Rubble</b>					
<b>Timber</b>					
<b>Rubber</b>					
<b>Potentially Hazardous</b>					