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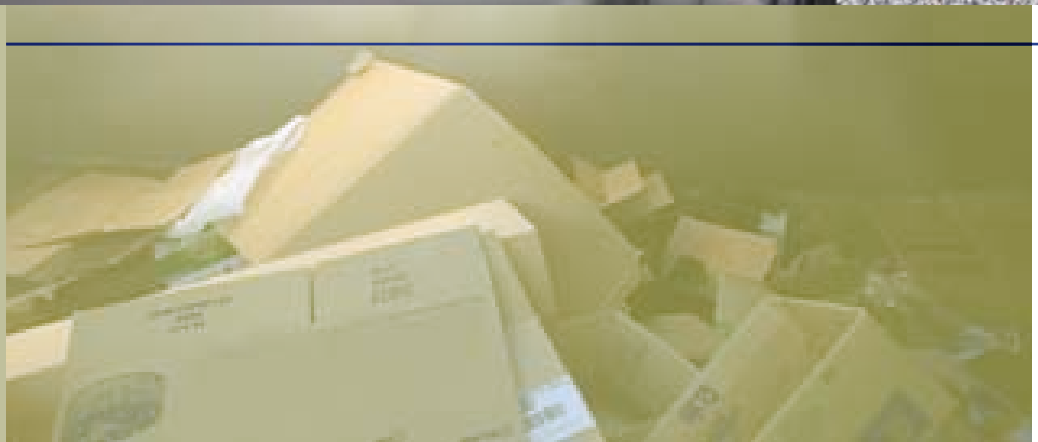
The Guide to Efficient Waste Characterization



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Committee Report

This document was drafted by the BOMA Quebec task force on waste management.

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A Guide to Understand our Waste

Improving the performance of waste management in a building requires knowledge regarding the nature and quantity of waste collected on-site. While it is possible to have a rough idea of the diversion rate based on data provided by waste recovery companies in regards to ultimate waste, organics and recyclables, these companies do not always transmit weighted data. This means that a reliable analysis of a building's performance is not always possible.

That is why regular characterization of the waste generated on a site is recommended, which should ideally be carried out every 3 years. Characterization is a scientific approach aimed at collecting precise data about the characteristics of waste, including composition, quantity and disposal. To be credible, characterization should be conducted using a sound methodology. In addition, it should clearly establish the different criteria and methods of evaluation, as outlined in an initial protocol.

This document was drafted by the BOMA Quebec Task Force on Waste Management in order to establish the minimum standards required in a waste characterization. Minimum requirements will lead to meaningful data that can be used in applications for BOMA BESt certification. This methodology can also be used by anyone who wants to evaluate the performance of a building in terms of waste management.

What is Waste Characterization?

The characterization process involves collecting, sorting and categorizing waste in order to obtain a statistical portrait of the quantities of waste and their disposal methods. The process is carried out for a number of representative days, and the results are extrapolated over a year in order to arrive at a portrait of the building or site being evaluated.

What is the Purpose of Waste Characterization?

Characterization aims to establish the particular characteristics of a building and its occupants in terms of waste quantity, composition, means of collection and methods of disposal. It serves not only to evaluate a particular building, but also to compare it with other buildings using equivalent criteria.

Characterization provides managers with a statistical portrait regarding the nature and quantity of waste generated by the building.

It helps them verify the building's performance and identify potential measures to increase the diversion of waste from landfills. Characterization also serves to establish the contamination rate for different waste streams so that they can target and resolve specific problems. The building manager will then be able to optimize waste management and thus reduce operating costs, improve the diversion rate and reduce contamination.

General characterization can be conducted to determine the overall performance of a building, whereas detailed characterization evaluates the specific performance of each department or section of a building.

Defining Waste to be evaluated

Categories:

Defining what constitutes waste is the first step in preparing a characterization protocol. Categories must be established to classify waste generated by the usual activities of the building's occupants.

Waste can be separated into four distinct categories :

1 **Consumer Products**

These materials come from everyday single-use or limited consumer products and include paper, packaging, food waste, plastics, containers, etc.

2 **Durable Goods**

This category consists of tools and objects that last a long time, such as furniture, appliances, electrical equipment, computers, electronics, etc. They are often disposed of separately from everyday consumer products, but can nonetheless introduce a bias into the characterization as they are placed in the trash sporadically, not on a regular basis.

3 **Construction/Renovation/Demolition (CRD)**

CRD waste results from building projects, and cannot be included in consumer products waste.

4 **Hazardous Materials (HM)**

These are wastes that, depending on the applicable rules and regulations, are subject to special methods of disposal. Hazardous materials include batteries, fluorescent tubes, ballasts and chemical products, paints and solvents containers, refrigerants, cleaning agents, motor oil and propane cylinders. Hazardous materials should never be placed into the regular trash, but instead recovered by specialized firms that will recycle or properly dispose of the material.

Distinguishing between these four categories of waste is essential. Durable goods and CRD wastes are generated sporadically, and should not be disposed of in the same fashion as everyday waste. Generally speaking, characterization of waste focuses only on everyday consumer products.

Sub-categories:

Once the waste categories have been established, they are to be divided into sub-categories. Appendix 2 presents a detailed list of those categories. Appendix 5 presents a sample form for evaluating needs. It can be used to plan a characterization.

The sub-categories serve to classify waste collected in terms of type. By classifying the waste according to sub-category and collection method, a precise portrait of the wastes in the building can be drawn up. The number of sub-categories may vary depending on the type of activity and the desired level of precision.

For proper characterization, employ the services of a specialized firm or a professional consultant to oversee the process and provide the resources necessary. The professional must be able to guide the client in determining which sub-categories are relevant, depending on the type of characterization desired.

The sub-categories can be used to distinguish between materials that are generated by the building occupants and waste related to specific activities. For example, an archival centre prefers the creation of two separate sub-categories for paper, one for paper generated by regular activities and the other for paper generated by extracting files.

Precise and informed identification of waste categories and sub-categories is essential in order to be able to compare the performance of different buildings.

Methodological Criteria

Different criteria must be respected so that the data gathered can be used, compared, analyzed and disseminated. The methodology must be developed before characterization is underway, and must be adhered to throughout the process. Keep in mind that inadequate methodology leads to bias that distorts results.

Every waste characterization professional has his or her own methodology, developed over the years. The methodology selected must always be adapted to the needs and particular characteristics of each client and each site. Good methodology takes into account the specific nature of the site evaluated in order to obtain precise, consistent results that respond to the client's requirements.

The methodological criteria must cover the minimum following points:

- Period and duration of sampling
- Identification of sample waste
- Evaluation and characterization
- Data collection
- Statistical analysis

Period and Duration of Sampling

Sampling must cover a normal period of the year that allows for extrapolation of data. Avoid vacation periods such as July and December, statutory holidays and special events.

In general, characterization should be undertaken over a period of one week of continuous work. A normal work week consists of 5 workdays but in some workplaces, the week may consist of a variable number of days or several shifts per day. Any statistical analysis must be taken into consideration.

It is also possible to limit the evaluation period to only a few days. Make sure, however, to collect all the waste generated during that short period, so as to avoid sampling waste from the day before or forgetting to collect waste generated at the end of the day. The results of the characterization will be less precise than for a one-week period, but will nonetheless allow for a rough portrait of the building's performance.

Detailed Characterization – Value Added to Analysis

If the goal is a profile of the building based on a general characterization, all the waste generated will be analyzed at the collection site, regardless of the material's point of origin in the building.

If the goal is a precise profile of the occupants and the different sections of the building based on a detailed characterization, a tracing method must be implemented to determine the point of origin of the waste collected.

In both types of characterization, means of collection (trash cans, composting bins, recycling bins, etc.) must always be recorded.

Identification used in Detailed Characterization

One of the most important tasks in waste characterization is identification of the waste collected, in order to be able to conduct follow-up on the origins of waste and to obtain a precise idea of the situation. The most common method for tracing waste is to label garbage bags. Each bag collected thus has a unique profile, and the waste can be analyzed in terms of means of collection, collection site and periods of the day/week. Labelling must contain the following minimum information:

- day and time of waste collection;
- collection site;
- the means of collection (garbage bag, recycling bin [and its category, if applicable], spoilable waste, etc.); and
- the name of the person responsible for waste collection.

This stage is generally carried out by building maintenance employees. It is important to ensure with the maintenance team and the supervisors that all employees involved in waste collection understand their task. A lack of rigour among maintenance personnel can compromise the characterization. Labels can also be placed in advance at the various collection points so that employees collecting waste can affix them to garbage bags and bins.

An effective way of validating the work of employees charged with waste collection is to place "markers" in certain bags. These markers (easily identifiable coloured objects) can then be readily retrieved during sorting. Proper identification of garbage bags can thus be verified, and adjustments quickly made if there are any shortcomings in that regard.

Identification used in General Characterization

If the option is to select general characterization rather than a detailed one, identification during the collection process will be more succinct. General characterization aims to establish an overall picture of the building being studied. There is no need to identify the origin of each bag of trash. Identification must, however, specify the means of collection.

Collecting, Categorizing and Evaluating Data

The waste collected is brought to a specific site to be weighed and sorted. That site could be the waste storage site, or an area protected from the elements, a sorting centre or even a mobile unit, depending on the dictates of the building and the particular needs and context. Make sure that odours and sorting activities do not interfere with normal building operations. The site must be equipped with a minimum number of work tables, electronic scales (+/- 0.005 kg) and mobile containers for weighing the waste. Employees doing the sorting must also wear appropriate protective equipment (gloves, safety glasses, steel-toed footwear, face mask and a first aid kit within reach).

The professional consultant must specify, in the proposal for services and the final report, the proportion of waste to be weighed.

In order to obtain precise data, the waste must be weighed according to means of collection, site, time and the day the waste was disposed of, with that information entered in the data register. An example of a data register page is presented in Appendix 3.

Statistical Analysis

Analysis must evaluate the performance of the building based on various criteria. The number of evaluation criteria depends on whether it is a general characterization or a detailed one.

Analysis must at the very least establish an overall portrait of the building, which should include a summary of the waste generated for each of the different sub-categories analyzed. That summary will allow for an estimate of the total production of waste to be disposed of. An example of the presentation and analysis of the results can be found in Appendix 4.

The summary should then be subdivided according to the different means of collection for the building in question. The subdivision will give an indication not only of the overall diversion rate for the waste (quantity discarded versus quantity diverted), but also the contamination rate (proportion of waste per each means of collection and inappropriately disposed of). Thus for each sub-category, it is possible to determine the proportion of waste that is properly disposed of. The diversion rate for the building is the waste mass diverted* from burial in a landfill site divided by the total waste mass.

ATTENTION :

*Diverted waste mass must excludes contaminants.

Finally, based on the raw data on the quantity of waste generated in the building, the real and absolute potential diversion rates can be determined. The real potential diversion rate represents the percentage of waste that can be diverted from landfill burial through use of existing equipment. The absolute potential diversion rate represents the percentage of waste that can be diverted if all possible means of recovery and reuse are put into place.

Detailed Characterization – Value Added to Analysis

In the case of a detailed characterization, analysis will differentiate between the different sections of the building, either according to use (workspace, rest and relaxation, cafeteria, machine rooms, toilets, etc.) or occupants, thus providing a detailed portrait of the building, its users and its sectors of activity. Comprehensive and/or pinpointed measures can then be established to correct any shortcomings observed.

The diversion rate, rate of contamination and potential diversion rate can be established for each of the different sections evaluated. Analysis of the results can then be presented in simplified fashion, in the form of a graph for example. It is important to attach the raw data used in the characterization in an appendix, so as to eventually conduct further analysis or compare results with other sites or other characterization periods.

Validity of Data

Given that the data collected during characterization are precise, the analysis conducted must also be precise. The validity of the data collected can be established in two ways: statistical validity and qualitative validity.

- Statistical validity is expressed by a margin of error, determined by simple statistical tests.
- Qualitative validity depends on a rigorous approach on the part of the work team carrying out the characterization, and in compliance with the established methodology. Incidents or events that occur during characterization, and that might distort results, must appear in the report, as well as the measures taken to remedy the situation.

For example, integration of a margin of error allows for qualification of differences or deviations observed between characterizations over a period of time. If the differences observed do not exceed the margin of error, that variation can be taken as an indicator of orientation rather than as an absolute result.

What Information Should be Included in the Report?

Characterization results must be presented in the form of a report containing all relevant information, including the strengths and weaknesses of the site and its occupants. That information must include:

- a summary of the characterization mandate;
- a profile of the building, the immediate environment and the occupants;
- a description of the waste management program currently in place;
- details about the methodology and sampling protocol used;
- a summary of the characterization procedure, including particular events in the building that might influence the data;
- a description of the different sections of the building and the waste categories that were used to classify the data and to produce a summary;
- the characterization results in the form of a summary;
- all relevant analyses, graphs and tables;
- the annualized waste projections per zone, occupant, department or any other relevant section, as well as the method and data used in making projections;
- any uncertainties, bias or sources of error that might affect results;
- recommendations;
- the raw data in an appendix, in the form of a chart;
- photographs with relevant commentary; and
- a grid evaluating needs.

The recommendations should focus on specific measures that could improve performance, such as:

- the type of containers or bins best suited to the specific needs of the building;
- the optimal placement and number of recovery containers;
- establishment of a collection program for organics;
- elimination or replacement of sources of waste (e.g. disposable dishes and coffee cups);
- information documents on recyclable materials (if any) distributed to building occupants;
- an economic analysis of the proposed recommendations.

What to remember

Building managers must cope with ever higher standards in regards to management of waste, which includes managing the costs of collection and processing, complying with regulations and sorting waste. Better knowledge about the waste generated is increasingly necessary. Unfortunately, existing waste collection systems make it difficult to obtain precise data.

The reliability of characterization data depends mainly on the methodology employed and its application throughout the process all the way to the drafting of the final report. The building manager must be especially vigilant regarding the characterization, whether created in-house or by an outside firm.

By applying the recommendations in this guide, the commercial building manager will be able to produce a characterization report that will facilitate decision-making, and that will also meet the requirements of BOMA BESt certification.

APPENDIX 1 : GLOSSARY

Absolute potential diversion rate

Mass of waste that could be diverted from disposal in relation to the total mass of waste, if all the waste produced were placed in the appropriate means of collection, and if there is no contamination and also a means of collection for each category of waste that could technically be diverted from disposal.

Characterization

Characterization is a scientific method involving the collection of precise data on waste characteristics including composition, quantity, collection method and means of disposal. Characterization is generally carried out by a professional hired by the owner or manager of a building or a specific site. The results of the characterization are presented in the form of a report.

Composition

Composition is the type (e.g. #6 plastic) and the nature (e.g. yogurt container) of each waste. Appendix 2 summarizes the different categories and sub-categories of composition described in the characterization.

Construction/Renovation/ Demolition (CRD) waste

Any non-contaminated material in a solid state that is the result of the construction, renovation or demolition of buildings, bridges, roads or other structures. This category does not include: waste that has become unrecognizable due to burning, grinding, shredding or other processes; paints, solvents, sealers, glues or other similar materials; household rubbish; treated wood; plant and vegetable waste or any waste whose asbestos concentration is equal to or greater than 1% of its weight and likely to be dispersed in the air.

Detailed Characterization

Characterization that distinguishes the different sections of a building or site from which waste originates.

Diversion rate

Mass of waste diverted from disposal (excluding contaminants) divided by the total mass of waste.

General Characterization

Characterization that establishes the general profile of the building or site regardless of where the waste originates.

Means of collection

Means by which waste is placed in the trash by an occupant, i.e. trash can, recycling bag, composting bin or specialized collection container.

Method of disposal

Means by which the collected waste is disposed (landfill site, incineration, recycling centre, composting, bio-methane production, etc.)

Professional

A person, consultant or firm with the knowledge and training required for conducting a characterization.

Quantity

The mass of waste expressed in kilograms or tonnes.

Rate of contamination:

Proportion of waste found in a means of collection not suitable for the waste in question.

Real potential diversion rate

Mass of waste that could be diverted from disposal in relation to the total mass of waste, if all the waste produced were placed in the appropriate means of collection and if there is no contamination.

Recovery rate

Proportion of each waste category evaluated that is collected via appropriate means.

Qualitative validity

Evaluation of the quality of results based on reliability indicators, audits or random verifications (e.g. sampling that is then recounted by a supervisor, use of markers at certain collection points). It confirms the level of rigour in the work done by the characterization team and compliance with the methodology.

Statistical validity

Calculation that allows for determination of a margin of error for data, and to determine whether any discrepancy or difference between data is significant or not.

Ultimate Waste

Waste that cannot be realistically diverted from disposal with the available recycling facility deserving the region.

Waste

Any solid or liquid waste resulting from a process of production, transformation or use; any material, substance or product that has been abandoned or slated for disposal.

APPENDIX 2: SUB-CATEGORIES OF WASTE

Different categories and sub-categories of waste can be used in the characterization, such as the following:

- **Refundable aluminum containers**
- **Non-refundable aluminum containers**
- **Other recyclable materials**
- **Wood**
  - Engineered wood
  - Lumber
- **Cardboard boxes and cartons**
  - Shipping boxes
  - Corrugated cardboard
- **Aseptic packaging (laminated containers)**
- **Ultimate waste**
- **CRD Waste**
  - Plasterboard
  - Brick
  - Stone
  - Cement
  - Metal
  - Cables and wiring
  - Asphalt
  - Asphalt shingles
  - Construction lumber
  - Carpeting and floor coverings
- **Durable goods waste**
  - Office furniture
  - Furniture
  - Appliances
  - Television sets
  - Computers
  - Monitors and screens
  - Partitions
  - Shelving, filing cabinets, bookcases
  - Air conditioners, ventilators, auxiliary heaters
  - Cell phones
- **Ferrous metals**
- **Compostable material**
  - Paper towels
  - Starch-based biodegradable containers and bags
- **Hazardous Material**
  - Unwashed containers of dangerous products
  - Chemical products
  - Pressurized containers (propane, butane, etc.)
  - Explosive material
  - Combustive material
  - Oil and gas products
  - Products containing asbestos or PCBs
- **Spoilable waste**
  - Table scraps
  - Green waste /Gardening waste
- **Objects composed of many recyclable materials**
- **Paper towels/hand towels**
- **Recyclable paper**
  - Office stationery
  - Wrapping paper /Kraft paper
  - Newspapers
  - Paper cups for water and coffee
  - Shredded paper
- **Plastic film, bubble wrap**
  - Plastic bags
  - Food wrapping paper.
- **Packaging wrap**
- **Hazardous material**
  - Batteries
  - Electronics
  - Fluorescents/fluocompact bulbs
  - Ink cartridges
- **Refundable plastic containers**
  - PET #1
- **Non-refundable plastic containers**
  - PET #1
  - HDPE #2
  - PVC #3
  - PEbd #4
  - PP #5
  - Others #7
- **Non-recyclable plastic**
  - Polystyrene for food products (#6 plastic)
  - Protective polystyrene (#6 plastic)
- **Refundable glass containers**
- **Non-refundable glass containers**

APPENDIX 3: EXAMPLE OF DATA REGISTER PAGE

Detailed Characterization

Source			Recyclable							Ultimate Waste					Contamination					
Containers Means of collection	Origin	Collector	Cardboard	Paper	Metal	Glass	Plastic #1-5, 7	Refund-ables (Metal, Plastic, Glass)	Paper cup	Plastic #6	Multi matter abjects	Ultimate waste	Organic	Paper towel	Batteries	HazMat	CFL	Ewaste	Furniture	CRD Waste
Recycling Bin	1st East	Robert Johnson	3,25	4,85	1,55	0,50	7,50	-	-	2,54	1,50	-	-	-	-	-	-	-	-	-
Recycling Bin	3rd West	Robert Johnson	5,50	5,49	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Recycling Bin	1st West	Lynda Martin	12,50	4,65	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Recycling Bin	4th West	Lynda Martin	5,98	5,74	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Waste Bin	3rd East	Lynda Martin	1,50	2,68	0,69	-	2,68	-	1,40	2,70	2,10	7,95	6,80	1,50	0,79	2,40	-	-	-	-
Waste Bin	1st East	Roger Gagné	-	-	-	-	1,50	-	-	2,70	1,72	5,01	4,37	1,50	-	-	-	-	-	-
Waste Bin	4th East	Felipe Diaz	-	-	-	-	-	-	-	2,06	1,51	3,36	3,00	1,38	0,54	-	-	5,50	-	-
Waste Bin	5th East	Felipe Diaz	2,50	-	-	-	2,34	-	-	1,70	1,39	2,43	2,22	1,32	0,84	-	-	-	-	-
Waste Bin	6th East	Robert Johnson	-	-	1,69	-	2,54	-	-	1,50	1,32	1,91	1,79	1,28	1,01	-	-	-	-	-
Waste Bin	7th West	Robert Johnson	-	5,80	-	1,50	-	-	-	1,38	1,28	1,61	1,55	1,26	1,11	-	-	-	-	-
Recycling Bin	10th West	Felipe Diaz	1,50	2,68	0,69	-	2,68	-	-	-	-	-	-	-	-	-	-	-	-	-
Recycling Bin	1st East	Felipe Diaz	1,38	2,05	0,93	0,54	2,05	0,54	-	-	-	-	-	-	-	-	-	-	-	-
Recycling Bin	4th East	Felipe Diaz	1,32	1,69	1,06	0,84	1,69	0,84	-	-	-	-	-	-	-	-	-	-	-	-
Recycling Bin	5th East	Robert Johnson	1,28	1,49	1,14	1,01	1,49	1,01	-	-	-	-	-	-	-	-	-	-	-	-
Recycling Bin	6th East	Lynda Martin	1,26	1,38	1,18	1,11	1,38	1,11	-	-	-	-	-	-	-	-	-	-	-	-
Waste Bin	7th West	Lynda Martin	-	-	-	-	-	-	-	8,51	7,15	4,51	6,84	2,40	-	-	-	-	-	-
Waste Bin	10th West	Lynda Martin	-	-	1,05	1,50	-	-	-	5,33	4,56	3,08	4,39	1,89	-	-	0,65	-	-	-
Waste Bin	3rd East	Robert Johnson	-	2,64	-	3,51	-	-	-	3,54	3,11	2,27	3,01	1,60	-	-	-	-	-	-

General Characterization

Profil général des voies de collectes (% et kg)

Source	Recyclable							Ultimate Waste					Contamination					
Containers Means of collection	Card-board	Paper	Metal	Glass	Plastic #1-5, 7	Refund-ables (Metal, Plastic, Glass)	Paper cup	Plastic #6	Multi matter abjects	Ultimate waste	Organic	Paper towel	Batter-ies	HazMat	CFL	Ewaste	Furniture	CRD Waste
Recycling Bin	19,50	29,10	9,30	3,00	45,00	-	-	15,24	9,00	-	-	-	-	-	-	-	-	-
Recycling Bin	33,00	32,94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Recycling Bin	75,00	27,90	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Recycling Bin	35,88	34,44	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Waste Bin	9,00	16,08	4,14	-	16,08	-	8,40	16,20	12,60	47,70	40,80	9,00	4,74	14,40	-	-	-	-
Waste Bin	-	-	-	-	9,00	-	-	16,20	10,33	30,07	26,19	9,00	-	-	-	-	-	-
Waste Bin	-	-	-	-	-	-	-	12,35	9,05	20,16	17,97	8,30	3,24	-	-	33,00	-	-
Waste Bin	15,00	-	-	-	14,04	-	-	10,19	8,33	14,58	13,35	7,91	5,06	-	-	-	-	-
Waste Bin	-	-	10,14	-	15,24	-	-	8,97	7,93	11,44	10,75	7,69	6,09	-	-	-	-	-
Waste Bin	-	34,80	-	9,00	-	-	-	8,29	7,70	9,67	9,29	7,57	6,66	-	-	-	-	-
Recycling Bin	9,00	16,08	4,14	-	16,08	-	-	-	-	-	-	-	-	-	-	-	-	-
Recycling Bin	8,30	12,29	5,57	3,24	12,29	3,24	-	-	-	-	-	-	-	-	-	-	-	-
Recycling Bin	7,91	10,15	6,37	5,06	10,15	5,06	-	-	-	-	-	-	-	-	-	-	-	-
Recycling Bin	7,69	8,95	6,82	6,09	8,95	6,09	-	-	-	-	-	-	-	-	-	-	-	-
Recycling Bin	7,57	8,27	7,08	6,66	8,27	6,66	-	-	-	-	-	-	-	-	-	-	-	-
Waste Bin	-	-	-	-	-	-	-	51,06	42,90	27,08	41,04	14,40	-	-	-	-	-	-
Waste Bin	-	-	6,30	9,00	-	-	-	31,96	27,37	18,47	26,33	11,34	-	-	3,90	-	-	-
Bac poubelle	-	15,84	-	21,06	-	-	-	21,22	18,64	13,63	18,05	9,62	-	-	-	-	-	-

APPENDIX 4: EXAMPLE OF BASIC STATISTICAL ANALYSIS

A company carries out a basic characterization of waste over a 5-day period. The waste is collected in three ways: in trash cans, in multi-material bins (plastic, glass, metal - PGM) and in containers for paper and cardboard only.

In this example, paper and cardboard placed in multi-material bins creates contamination, as do recyclable materials (PGM) placed in a paper recycling bin, for those refundable materials can be refunded by the recycling company. No program for collecting spoilable waste is in place, and very little promotion of recycling awareness has been done as regards separating waste. The company wants to have an idea of its general profile, to target shortcomings and set up a recycling awareness program, and to reduce its waste collecting and management costs.

Waste is separated into the following sub-categories for the purposes of an audit:

- Paper and cardboard
- Recyclable plastic (1,2,3,4,5,7,8)
- Metals and aluminum
- Glass
- Non-recyclable plastic (#6, materials composed of several plastics)
- Organic materials
- Paper towels
- Other materials – Ultimate Waste
- Hazardous waste.

The overall results can be presented in the form of a simple graph that allows the company to make various calculations and to achieve a profile of the building. The presentation format (shape, colour, arrangement, graphics) is specific to each auditor.

Here is a basic example:

		Method of Collection																	
		Monday			Tuesday			Wednesday			Thursday			Friday			Sum			Sum (Kg)
		Trash can	Recycling of paper and cardboard	Recycling of composite materials	Trash can	Recycling of paper and cardboard	Recycling of composite materials	Trash can	Recycling of paper and cardboard	Recycling of composite materials	Trash can	Recycling of paper and cardboard	Recycling of composite materials	Trash can	Recycling of paper and cardboard	Recycling of composite materials	Trash can	Recycling of paper and cardboard	Recycling of composite materials	
WM (Kg)	Paper and cardboard	8,7	84,6	15,2	8,3	65,4	10,5	6,1	54,2	15,3	10,4	56,4	6,4	8,4	61,1	7,4	**41,9**	**321,7**	**54,8**	**418,4**
	Recyclable plastic (1,2,3,4,5,7,8)	32,4	0,5	15,4	24,5	0,0	20,4	20,8	0,5	26,4	25,4	0,7	30,1	21,4	0,0	26,4	**124,5**	**1,7**	**118,7**	**244,9**
	Metals and aluminum	3,2	0,0	4,8	2,1	0,0	5,4	1,1	0,0	4,8	0,5	0,0	8,4	1,9	0,5	12,4	**8,8**	**0,5**	**35,8**	**45,1**
	Glass	2,3	0,0	8,7	1,4	0,0	4,5	2,0	0,0	5,4	0,0	0,0	6,5	0,5	0,0	8,4	**6,2**	**0,0**	**33,5**	**39,7**
	Non-recyclable plastic (6, composites)	5,4	0,5	12,4	4,1	0,5	8,4	5,4	1,2	4,7	5,4	0,0	2,4	8,4	0,0	3,4	**28,7**	**2,2**	**31,3**	**62,2**
	Organic matter	54,6	0,0	0,5	61,4	0,0	0,0	87,4	0,0	0,0	64,1	0,0	0,0	34,1	0,0	0,0	**301,6**	**0,0**	**0,5**	**302,1**
	Paper towels	35,4	1,2	0,0	41,4	0,5	0,5	39,4	0,0	0,7	40,8	1,2	0,3	39,1	2,0	1,4	**196,1**	**4,9**	**2,9**	**203,9**
	Other materials	34,1	5,4	4,5	54,2	2,4	1,8	34,5	0,4	2,5	39,4	0,0	2,3	42,4	3,2	4,5	**204,6**	**11,4**	**15,5**	**231,5**
	Dangerous waste materials (batteries, fluocompacts, harmful chemicals)	2,5	0,0	1,2	3,6	0,0	0,5	4,5	0,0	0,6	3,5	0,0	0,0	4,1	0,0	0,5	**18,2**	**0,0**	**2,8**	**21,0**
	Sum (Kg)	**178,6**	**92,2**	**62,7**	**201**	**68,8**	**52**	**201**	**56,3**	**60,4**	**190**	**58,3**	**56,4**	**160**	**66,8**	**64,4**	**930,6**	**342,4**	**295,8**	**1568,8**

Total waste:	**1568,8 Kg**
Total volume sent to trash cans:	**930,6 Kg**
Recyclable material sent to trash cans:	181.4 Kg
Hazardous materials sent to trash cans:	18.2 Kg
Compostable material sent to trash cans:	497.7 Kg
Other materials sent to trash cans:	731 Kg
Contamination rate (trash cans):	21.4%
Recovery rate (trash cans):	**91.4%**
Volume of recycled paper and cardboard:	**321.7 Kg**
Contamination:	20.7 Kg
Contamination rate (paper and cardboard):	6.4%
Recovery rate (paper and cardboard):	**76.8%**
Volume of recycled composite material:	**188 Kg**
Contamination:	107.8 Kg
Contamination rate (composite material):	36.4%
Recovery rate (composite material):	**57.0%**
Total recycled material:	509.7 Kg
Overall diversion rate:	**32.5%**
Total contamination of recyclables:	128.5 Kg
Contamination rate of recycled material:	25.2%
Total recyclable material produced:	748.1 Kg
Real potential diversion rate:	**47.0%**
Material that could be diverted if a recovery program for organic materials were implemented:	506 Kg
Absolute potential diversion rate:	**79.9%**

These results can be used to calculate the different rates and to analyze the building's profile.

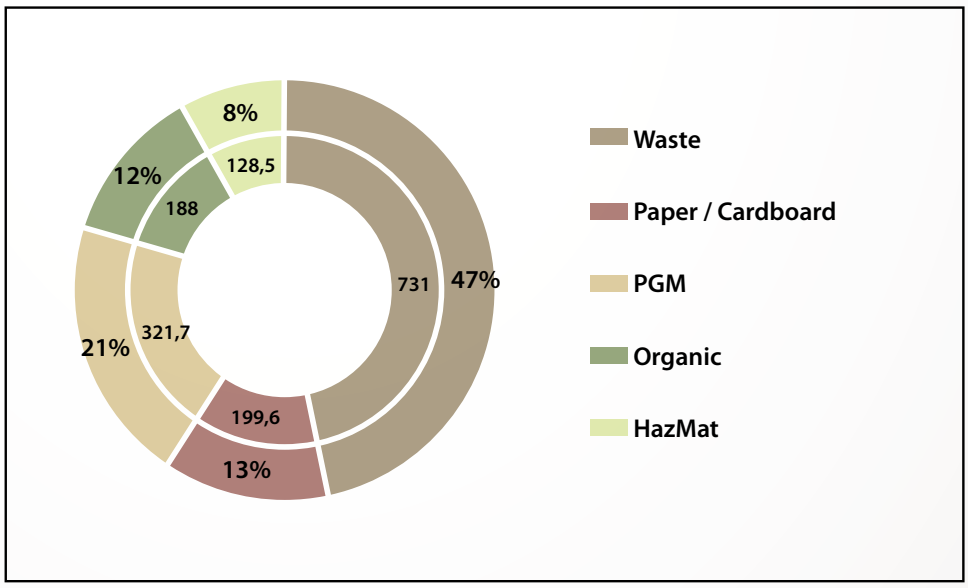
Hazardous materials by definition contaminateMwaste regardless of the means of collection, for they can never be discarded like regular trash.

In light of the analysis, if employees placeMwaste in the appropriate collection bin, the overall diversion rate could go from 32.5% to 47.0%, without establishing new recycling programs.

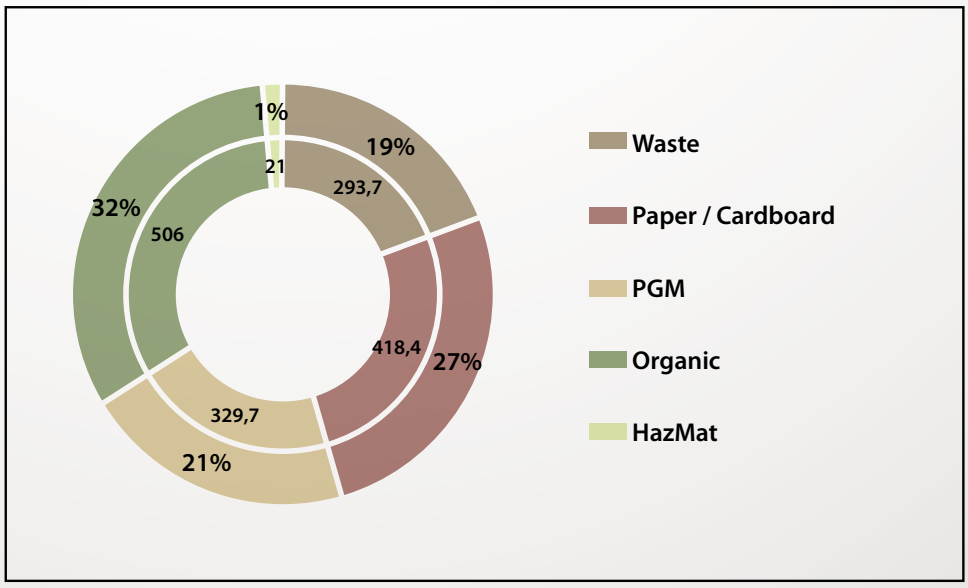
The reason for that is the quantity of recyclable material placed in the trash (181.4 kg), and the inadequate sorting of recyclables found in two different means of collection (54.8 kg of paper and cardboard placed in composite material recycling). A simple program to raise awareness about the different means of collection would correct that shortcoming.

Spoilablelwaste (organic materials and paper towels) could then be collected separately to be used as compost or to be collected by a specialized company. That would allow the absolute potential diversion rate to climb up to 79.9%.

General Profile of Waste Collection (% and kg)



Composition of Waste Collected (% and kg)



However, some objects such as objects made of composite materials and #6 plastics are often placed in the trash because no local recycling program exists. If that is the case, the best approach is to reduce their use or reuse.

APPENDIX 5: FORM FOR EVALUATING NEEDS – Characterization of Waste

Evaluation Grid Form
Waste Characterization

Summary

Building:	
Address :	
Gross area :	Number of floors :
Occupation period :	Number of occupants :
Main activities and occupation summary :	

Type of Characterization

☐ General Characterization Only a general profile of the building is required.	Number of waste collection location :

OR

☐ Detailed characterization
A detailed survey of the building is required. Complete following information.

Detailed Characterization: define locations, spaces and areas that need to be characterized. Provide their specifications.
Add lines if needed

Locations	Gross area	Number of occupants	Number of waste collection location	Main activities

Duration of Characterization Define the duration (in days) required to obtain a representative building survey. Specify the period desired (avoid Holydays, vacation, special events).	Number of days : Period : From to

Means of collection

☐ Ultimate Waste	☐ Multi Matters Recycling	☐ Paper Recycling	☐ Organics
Other :	Other :	Other :	Other :

Categories of Waste

☐ Consumer Products	☐ Durable Goods
☐ Construction/Renovation/Demolition	☐ Hazardous Materials

Sub-Categories of Waste

Establish pertinent waste sub-categories for your specific building. This list contains suggestions; it is recommended to define your needs with the help of professional consultants.

Consumer Products Waste

☐ Metals (general)	☐ Refundable plastic	☐ Cardboard
☐ Refundable aluminium	☐ Non-refundable plastic	☐ Packing cardboard
☐ Non-Refundable aluminum	☐ PET #1	☐ Corrugated cardboard
☐ Ferrous metal	☐ HDPE #2	☐ Aseptic containers
☐ Kitchen organic waste	☐ PVC #3	☐ Paper towels/hand towels
☐ Table organic waste	☐ PEbd #4	☐ Recyclable papers
☐ Landscaping green waste	☐ PP #5	☐ Office white paper
☐ Compostable papers	☐ Others #7	☐ Packing paper/Kraft paper
☐ Compostable containers/plastics	☐ Non-recyclable plastic	☐ Newspaper
☐ Glass (general)	☐ Plastic film (plastic #6)	☐ Paper cups
☐ Refundable glass	☐ Polystyrene (plastic #6)	☐ Shredded paper
☐ Non-Refundable glass	☐ Food wrapping plastic wrap	☐ Others
☐ Ultimate waste	☐ Shipping plastic wrap	☐ Others
☐ Objects composed of many materials	☐ Plastic wrap	☐ Others
☐ Others	☐ Others	☐ Others
☐ Others	☐ Others	☐ Others

Durable Goods Waste

☐ Office furniture	☐ Computer	☐ Air conditioning/ventilators/heaters
☐ Furniture	☐ Monitors and screen	☐ Others
☐ Appliances	☐ Partitions	☐ Others
☐ Television sets	☐ Shelving, cabinets, bookcases	☐ Others
☐ Others	☐ Others	☐ Others

Hazardous Materials Wastes

☐ Unwashed containers of dangerous products	☐ Products containing asbestos or PCBs	☐ Ink cartridges
☐ Chemical products	☐ Batteries	☐ Others
☐ Pressurized containers	☐ Electronic waste	☐ Others
☐ Oil and gas products	☐ Fluorescents/CFL	☐ Others
☐ Others	☐ Others	☐ Others

Construction/Renovation/Demolition Wastes

☐ Plasterboard	☐ Metal	☐ Construction lumber
☐ Brick	☐ Cables and wires	☐ Carpeting and floor coverings
☐ Stone	☐ Asphalt	☐ Others
☐ Others	☐ Others	☐ Others

Information included in the report		
Define various sections that should be included in the report. Definitions of each sections can be found in the guide.		
Sections	Essential	Optional
Summary of characterization mandate	X	
Profile of the building, the immediate environment and the occupants	X	
Description of the waste management program currently in place	X	
Details about the methodology and sampling protocol used	X	
Summary of the characterization procedure, including particular events in the building that might influence the data	X	
Description of the different sections of the building and the waste categories that were used to classify the data and to produce a summary	X	
Description and summary of different waste categories and sub-categories sorted during the characterization	X	
Characterization results in the form of a summary	X	
Relevant analyses, graphs and tables	X	
Annualized waste projections per zone, occupant, department or any other relevant section, as well as the method and data used in making projections	X	
Uncertainties, bias or sources of error that might affect results	X	
Recommendations		☐
Raw data in an appendix, in the form of a chart	X	
Photographs with relevant commentary		☐
Evaluation Grid Form	X	
Economic projection and analysis		☐
Other		☐
Other		☐
Other		☐