Curbside Waste Audits

Considerations for Small Communities

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1.0 Overview of the Process

Waste Audits involve a four-part process:

1. Planning
2. Collection
3. Sorting
4. Analysis

Table 1 details the various aspects of each part of the process.

Table 1: The Four Parts of Waste Auditing

1. PLANNING	
a) Establish study objectives and scope	• Set audit objectives • Determine data collection needs • Determine sample size
b) Establish methodology	• Visual Audit • Physical Audit
c) Define the study area	• Determine location(s) to be audited • Determine the number of houses in each area
d) Collect background information	• Record: – types of collection services offered – collection frequency – types of bins used by residents – collection crew (municipal or private)
e) Prepare for the audit	• Secure a collection vehicle • Secure a location for sorting activities • Create a collection procedure • Create data collection forms • Collect auditing equipment • Create a health and safety plan • Brief/train audit crew • Create and implement a communications plan
2. COLLECTION	
a) Collect the waste	• Collect all waste on designated days • Label bags showing location and day • Record relevant collection details
b) Transport the waste to the sorting area	• Transport to the designated sorting location

3. SORTING	
a) Prepare the sorting area	• Set up tables and scales (if applicable) • Collect buckets, bins, brooms, etc. • Have water and first aid kit on hand
b) Sort the waste	• Carefully open bag and spread waste on table • Sort into different material categories • Weigh individual materials (if applicable) • Record findings on data sheet • Dispose of sorted waste • Repeat for all bags
c) Final clean up and decontamination	• Dispose of sorted waste • Clean off tables • Clean buckets and other equipment • Sweep and disinfect floor
4. ANALYSIS	
a) Enter and analyze the data	• Enter data sheets onto spreadsheet • Carry out analysis (e.g. tonnes per household)
b) Prepare an audit report	• Prepare audit report, including findings and recommendations

Reference: The Solid Waste District of LaPorte County, How to Contact Waste Audit (www.solidwastedistrict.com/projects/waste_audit.htm)

2.0 Essential Reading

As part of its 2005-2007 curbside audit program, Stewardship Ontario worked with Ontario municipalities, WDO, contractors and the University of Toronto Statistical Consulting Service to develop a single-family waste audit sampling methodology that generates accurate and reliable waste generation and composition data.

Based on this work, Stewardship Ontario created a waste audit guide which can be found online at:

- www.stewardshipontario.ca/sites/default/files/waste_audit_guide2005_sf.pdf

In 2012, CIF announced another round of municipal waste audits. Detailed considerations for curbside waste composition audits can be found in the two documents related to their announcement:

- www.wdo.ca/cif/pdf/reports/reoi_march6_2012_002.pdf
- www.wdo.ca/cif/pdf/reports/rfq_audit_observation_2012.pdf

To assist municipalities in understanding the level of effort required to undertake an audit, a sample Single Family Curbside Audit Worksheet is also available on their website at:

- www.wdo.ca/cif/pdf/reports/worksheet_sf_audit_2012.pdf

3.0 Customization

For smaller communities who wish to undertake an audit, the resource materials listed above must be reviewed. The materials outline all of the considerations and detailed steps to complete an audit.

For communities who may not have the resources or the budget to carry out a waste audit using the methodology outlined in Section 2.0, the municipality may consider adjustments to four key areas:

1. Sample size (number of houses from which materials are collected)
2. Data collection approach (visual inspection vs. physical sort and weigh)
3. Data collection categories
4. The number of audits scheduled for the entire study

4.0 Sample Size

Ideally the study area would be comprised of 10 homes in 10 sample areas within the municipality (i.e. 100 homes in total) that together represent the single-family housing in the community.

An experienced three person audit crew can collect and sort a week's worth of garbage and recyclables from 100 homes over a five day period, working six to eight hours per day.

Communities working with limited staffing resources may consider scaling back these requirements. If only one staffing resource is available (one-third of the recommended sorting team size), the municipality might consider targeting only one-third of the recommended number of houses (roughly 33 houses). This means that six to seven houses per day, five days per week, for six to eight hours per day.

Characteristics of a suitable sample area apply regardless of the size of the community. For the best results, consider:

- housing types (detached, semi-detached, row houses, townhouses with curbside collection, large/medium and small homes)
- lot sizes
- property values
- the age of the homes
- demographics

Select homes in groups of six to seven in a row and located on the same side of the street. Choose a route whose waste is typically picked up in the morning (to help reduce the chance that material may be missed if it is set out after the waste audit crew's collection time). Avoid homes at the beginning of a collection route to gain more leeway before the regular pick-up occurs.

If possible, choose sample areas that receive a consistent level of service. For instance, if some areas receive bi-weekly recycling collection and others receive weekly, select homes in areas with weekly recycling collection.

5.0 Data Collection Approach

There are generally two types of waste audits:

- Visual Waste Audits
- Physical Waste Audits

Visual Audits

- The materials are sorted into designated categories and the amount of material in each category is recorded as a percentage of the total waste stream (e.g. 50% of the waste was paper).
- The percentage of the total waste stream is assessed by looking at the material (i.e. the material is not weighed).
- A series of bins, all of equal size and shape (such as Blue Boxes) are used for each category so that materials can be separated and set aside until the all of the waste from the day's audit is sorted.
- Once the sorting is complete, the total number of bins is recorded. Next, the total number of bins in each category is recorded. The crew can then calculate the percentage of the total waste stream for each category (e.g.10 of 50 bins contain paper; therefore 20% of the waste stream is comprised of paper).
- Alternatively, the crew may create a grid system using large tarps and a marker or masking tape to demark equal sized squares. Squares should measure 12 inches by 12 inches. The number of squares corresponds to the number sorting categories. Materials from the Blue Box are then sorted by placing individual items onto the grid.
- A waste composition analysis is then completed by counting the total number of number of squares filled by paper based products, the total number of squares with containers, and the total number filled with landfill materials. For example, if there are 30 boxes total on the grid, and 10 of the boxes are filled with paper based products, 15 are filled with containers, and 5 are filled with landfill materials: you can report the waste stream is 33% paper based, 50% container based and 17% is landfill.
- Repeat this same process for the materials in the black garbage bags.

- Be sure to take photos of the materials once it is sorted onto the grids. This will aide in the report writing as it allows for additional documentation and potentially other key observations and learnings.

Physical Audits

- The materials are sorted into a predetermined number of waste categories and weighed. The advantage of a physical audit is improved accuracy.

The type of audit you undertake and its scale will be based the objectives you have set (i.e. what you need to learn) and your budget.

6.0 Data Collection Categories

The sort sheet found on the CIF website is from the recent CIF RFQ at:

- www.wdo.ca/cif/pdf/reports/worksheet_sf_audit_2012.pdf

It defines the various types of waste and lists the ideal number of categories to be examined. As the time required to sort the waste into the many categories is extensive, a small municipality may consider reducing the level of detail. At a minimum, however, the materials should be sorted into the broad categories identified below:

- Paper
- Paper Packaging
- Plastics
- Metals
- Glass
- Municipal Hazardous and Special Waste
- Other Materials

7.0 Number of Audits

Ideally an audit should be scheduled for each season to determine where material volume fluctuations take place and where changes in material composition can be expected. These factors can affect collection and processing activities and costs. Municipalities conducting only one audit should give careful consideration to the changing activities in their community throughout the year (e.g. gardening or seasonal celebrations), and note in their final report where they would expect to see variations. Summer, for example, can bring an increase in plastic gardening trays. Similarly, discarded packaging during the Christmas holiday season can bring more cardboard.

Once a municipality has worked through the steps in Table 1 and confirmed all the details for each aspect of their study, they are ready to begin.

8.0 Data Analysis

When the study is complete and data tallied, review the results and isolate areas of the program that can be adjusted to improve its performance. For example, if 17% of the material in the Blue Box is garbage, consider a promotional campaign to better educate residents about what is/is not recyclable. Repeat a visual audit again after the campaign has ended to determine its effectiveness in helping increase recycling rates and decrease contaminants.

9.0 Reports

A sample report detailing waste audit outcomes can be found on CIF's website at:

- www.wdo.ca/cif/pdf/reports/176/176_report.pdf

The report is a Recycling Collection Operations Review for Bluewater Recycling Association (BRA). The intent was to convert the remainder of their recycling collection operations from manual to fully automated cart collection. While waste audits were only part of the work undertaken as part of the BRA review, the report illustrates how a waste audit can be interpreted and used. It also demonstrates one of the ways in which waste audit studies can be used to develop a case for waste management system improvements.

Stewardship Ontario - through the Effectiveness & Efficiency Fund (E&E Fund) - completed a series of residential waste audits in single family and multi-residential households in 2005, 2006 and 2007. The completed audit worksheets from these studies are available on the Stewardship Ontario website at:

- www.stewardshipontario.ca/stewards/library/single-family-waste-audit-program

Reports from other waste audit initiatives supported through the E&E Fund can be found at:

- www.stewardshipontario.ca/stewards/library/ee-fund-approved-projects#c4