

**E&E Fund Project #201  
Improving the Consistency of  
Multi-Residential  
Diversion and Cost Analysis and  
Reporting**

## Table of Contents

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1.0 Executive Summary	2
2.0 Introduction	2
3.0 Research methodology	3
3.1 Program variables	3
3.2 Completion of the Template	4
3.3 Findings	4
3.4 Verification of Diversion Rates	7
4.0 Discussion and Recommendations	7
5.0 Conclusion	9

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## 1.0 Executive Summary

The AMRC's Multi-residential (MR) working group identified the need to develop detailed baseline MR program cost information. Using a standardised cost template to ensure consistency, eight of the MR programs that had originally provided information in the *Multi-residential Baseline Study* were requested to complete this template. Data were provided by five of the eight programs, and the template was revised based on their feedback. Unit costs (per tonne, per dwelling unit and per building) and diversion rates were derived for these five programs. Options and recommendations for deriving MR program cost information for the remaining programs are identified in this report.

## 2.0 Introduction

The Multi-residential Working Group completed the *Multi-residential Baseline Study* (E&E #18) in order to develop baseline information on the larger multi-residential programs in Ontario. Among the baseline data requested were program costs and diversion rates.

Although these data were provided by some of the study respondents, there was insufficient confidence in the consistency of the information to support meaningful conclusions about such overall program parameters as: unit costs (e.g., per tonne, per dwelling unit, per building) program diversion rates, and contamination rates. Without these important baseline data, it will be difficult to gauge the progress of multi-residential recycling, either with respect to individual program successes, or with respect to overall gains in multi-residential program efficiencies.

E&E Project #201 is an analysis of the multi-residential program cost information provided by five of the programs in the original data set (the 19 municipalities who participated in the *Multi-residential Baseline Study*) using a standardised template developed to report cost, diversion and contamination rate information. The goal had been to then use the template with some of the non-reporting programs in the original data set to ensure its applicability.

The end result was intended to be detailed cost, diversion and contamination information for the originally surveyed multi-residential programs as well as a template for use in future multi-residential program analysis.

The programs detailed in the original *Multi-residential Baseline Study* were:

- Barrie, City
- Cornwall, City
- Essex Windsor Solid Waste Authority
- Guelph, City
- Halton, Region
- Hamilton, City
- Kingston, City
- London, City
- Niagara, Region
- Ottawa, City
- Peel, Region
- Peterborough, City
- Quinte Waste Solutions
- Sarnia, City
- Simcoe, County
- Greater Sudbury, City
- Thunder Bay, City
- Toronto, City
- Waterloo, Region

The eight programs selected for the initial detailed analysis in this study were:

- Barrie, City
- Halton, Region
- Hamilton, City
- London, City
- Ottawa, City
- Peel, Region
- Quinte Waste Solutions
- Waterloo, Region

These programs were selected for the initial analysis as their data in the baseline study were more complete than those from the remaining municipalities. A further key rationale for using them was their ability to quantify multi-residential program tonnage.

### **3.0 Research methodology**

A draft cost template was prepared and reviewed by the MR Working Group. At its June 23<sup>rd</sup>, 2006 meeting in London, the Working Group recommended that this template be piloted by one program before circulating it to the remaining seven. Accordingly, the City of Hamilton volunteered to complete the template with its own 2005 program data. This process revealed:

- Some program costs, e.g., the unit price charged by the contractor for collection and processing were considered confidential and could not be provided.
- The total number of multi-residential buildings in the program may be different from the total number of stops per week/cycle if some buildings receive more than one collection per week (this had been a single question, consequently broken out to two).
- It was necessary to estimate municipal staff costs specific to the multi-residential program, and the agreed upon default was to apportion costs based on the relative tonnage of multi-residential tonnage to curbside tonnage.
- It was also necessary to estimate promotion and education costs for the multi-residential program, apportioning as above.
- Similarly, processing costs and MRF residue attributable to the multi-residential recycling program were apportioned based on relative tonnage.

Each of the remaining seven programs were then contacted and the revised template was discussed, prior to being sent to each. The program contacts understood that they were being requested to provide initial MR program costs, and through an iterative process, the 'robustness' of the numbers would be queried so that a full understanding and justification for each could be confirmed.

Each program contact was assured of the confidentiality of their data; the purpose of the exercise was not to compare costs across programs but to test a means of reporting consistent multi-residential recycling program cost information.

### **3.1 Program variables**

At the same time, and through the input of the MR Working Group, it was understood that there were a number of variables across all of the programs that would mean that not all the questions/costs in the template would be applicable to all programs.

Variables included:

1. Collection contract:
  - The collection contract may be based on a cost per building, a cost per stop or a cost per unit, with or without an additional per tonne fee. This cost may be all inclusive (e.g., trucks, labour, fuel, maintenance, etc.) or
  - The municipality may, for example, own, fuel and/or maintain the collection vehicles.
2. Processing:
  - The municipality may own the processing facility and some of the equipment and contract the operation, or
  - Processing may be entirely contracted out
3. Provision of collection containers:
  - The municipality may or may not provide in-unit and/or bulk collection containers or carts, with associated costs.

These variables were documented for each program, and are provided in Appendix 1, a separate Word file, *MR program profiles.doc*.

### **3.2 Completion of the Template**

The template was completed and verified by five programs. These are: Hamilton, Peel, Quinte Waste Solutions, London and Ottawa. The remaining programs (Waterloo, Barrie and Halton) were unable to complete the template, due primarily to staff resource constraints.

### **3.3 Findings**

1. Completion of the template was necessarily a collaborative process both within the municipality and with the AMRC. Larger programs were required to obtain data from a number of sources or departmental budgets. To ensure a measure of consistency across programs, review of each iteration by AMRC was necessary, particularly to come to agreement on 'defaults' for certain cost allocations.
2. Collection contract costs are straightforward, as billed by contractor. However, no program typically segregates its own administrative/supervisory, etc. staff costs specifically for its multi-residential program. One program based its reported cost on estimation of staff time dedicated to the multi-residential program, the remainder used the agreed upon default estimate of apportioning costs based on tonnage ratio (multi-residential to curbside). The latter is not necessarily a true representation of actual staff costs and would be more rigorous if detailed in terms of staff time.
3. Promotion and education (P&E) costs: Some programs may be able to report specific MR program-related P&E costs<sup>1</sup> but there is often the need to default to allocating a portion of the total recycling program P&E costs. This was done using the relative tonnage ratio.
4. Processing costs: Cost allocations based on relative tonnage (MR to total tonnage) were made in all cases.
5. Contamination: Estimates of the MRF residue attributable to the multi-residential program were also made based on relative tonnage, using overall the MRF residue rate. However, given that MR material is known to be generally more contaminated than curbside material, the derived cost is likely too low.

The multi-residential recycling program cost template on the following pages details the assumptions and defaults used.

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<sup>1</sup> For example, costing a flyer or poster specific to the multi-residential program

Figure 3.1 Multi-residential cost template

<b>Multi-residential (MR) Program Cost Template: E&amp;E project #201</b>					
<b>MR Program Background</b>					
<b>Municipality</b>		2005	2005 Unit		
1	<b>MR Recycling Program Background Info</b>	Total number of MR buildings on program (2005)			
2		Total number of MR units on program (2005)			
3		Total number of collection points or stops on MR recycling collection routes (2005 program)	Can differ from total # of buildings depending on collection frequency		
4		Total tonnes collected from MR in 2005	Essential for apportioning some costs		
5		Total number of single family dwellings on curbside recycling program (2005, for reference)			
6		Total tonnes collected in single family curbside recycling program (2005, for reference)			
7		Do you pay your contractor a \$ per unit rate to collect MR recyclables?			
8		If yes, what is that rate and unit (i.e., per stop, per unit, per tonne, etc.)?	1. Municipality may not be able to release this number (confidentiality) 2. May be reported as range depending on service area (distance to MRF) 3. May vary depending on contract terms (e.g., meeting minimum monthly tonnage), 4. May be set fee with \$\$/unit cost for incremental MR units.		
9		Do you pay your contractor a \$ per unit rate to process MR recyclables?			
10		If yes, what is that rate and unit (i.e., per stop, per unit, per tonne, etc.)?	1. Municipality may not be able to release this number (confidentiality), 2. May be reported as range depending on material stream, 3. May vary depending on contract terms (e.g., meeting minimum monthly tonnage), 4. May be set fee with \$\$/unit cost for incremental MR units		
11	<b>MR Waste Program</b>	Total number of MR buildings that receive (municipally-contracted) waste collection (2005)			
12		Total number of collection points or stops on MR waste collection routes (2005 program)			
13		Total tonnes of waste collected from MR in 2005			
<b>MR Program Costs</b>					
	<b>MR Collection</b>	<b>A/ MR Recyclables collection cost: (itemise or account for all line items)</b>	Total	Per tonne	Per unit
14		MR Collection Contract cost			
15		MR collection contract administration cost (includes all municipal staff costs: administration, supervisors, managers, overhead, etc.)			
16		Is this an actual cost or derived cost? If derived, please indicate how using comment box	1. May be calculated by municipality based on % of staff time + dedicated staff, or 2. Default was to apportion this cost from the total recycling budget based on ratio of MR tonnage to curbside tonnage		
17		Other MR recyclables collection costs: please describe using comment box	4 of the 5 programs put all costs into Line 15		
18		Is this an actual cost or derived cost? If derived, please indicate how using comment box in next column	Was reported as actual (itemised) cost		
19		<b>Total (A)</b>			
20		<b>B/ P&amp;E – portion of P&amp;E costs directly related to MR recyclables collection</b>			
21		Is this an actual cost or derived cost? If derived, please indicate how using comment box in next column	1. May be reported as actual costs related to MR-specific P&E (3 of 5 programs), or 2. Derived from total		

			P&E budget based on ratio of MR tonnage to curbside tonnage.			
22		<b>C/ Capital depreciation costs (amortisation period taken from data call)</b>				
23		Curbside - Vehicles if your municipality owns the vehicles (7years)				
24		In-unit containers (2 years)				
25		Carts (10 years)				
26		Bins (front end) (5 years)				
27		<b>Total collection costs</b>				
28	<b>MR Processing</b>	<b>A/ MR Recyclables processing costs:</b>	Total	Per tonne	Per unit	
29		MR Processing Contract cost				
30		MR Processing Contract administration cost (includes all staff costs: administration, supervisors, managers, overhead)				
31		Is this an actual cost or derived cost? If derived, please indicate how using comment box in next column			1. May be calculated by municipality based on % of staff time (as calculated by one program), or 2. Default used by the remaining programs was to apportion this cost from the total recycling budget based on ratio of MR tonnage to curbside tonnage	
32		Other MR recyclables processing costs				
33		Is this an actual cost or derived cost? If derived, please indicate how using comment box in next column				
34		MRF residue attributed to MR program			All reported tonnage or % but it appears this is based on overall residue rate and then apportioned based on ratio of MR to curbside tonnage	
35		MRF residue disposal cost				
36		<b>Total</b>				
			<b>B/ Operating costs for municipally-owned MRFs - apportioned for MR tonnage</b>			
37		Equipment repairs and maintenance				
38		Equipment - fuel				
39		Equipment - insurance				
40		Equipment - leases				
41		Equipment - rentals				
42		Misc. supplies				
43		Utilities				
44		Taxes				
45		Misc.				
46		<b>Total</b>				
		<b>C/ Capital depreciation costs for municipally owned MRFs - apportioned for MR tonnage</b>				
47	Building (20)			Applies to 2 of 5 programs, one of which was unable to complete as capital cost data were not available		
48	Equipment, major expansions, retrofits, weigh scales (10)					
49	Minor expansions, retrofits (5)					
50	Other - indicate amortisation					
51	<b>Total</b>					
52	<b>Total processing costs</b>					
53	<b>Total MR program costs</b>					

Cost results from the five municipalities who completed the template are as follows:

	Total MR costs per tonne (\$)	Total MR costs per building (\$)	Total MR cost per unit (\$)
Cost range	\$156 -\$249	\$727 - \$2392	\$10 - \$26

### 3.4 Verification of Diversion Rates

As illustrated by Table 3.1 below, the results from the 2005 Baseline Study indicated that, like program costs, there was not a consistent method used to calculate a given multi-residential program's recycling diversion rate. However, the diversion rates calculated using the E&E audit results for each program are all based on consistent audit methodology. Of note is the fact that these rates are generally in good agreement with the Baseline Study rates. It would therefore be advisable to use the E&E audit results as a default diversion rate, particularly as more and more data become available on individual MR programs.

**Table 3.1 Reported and calculated multi-residential program diversion rates**

Program	Diversion rate reported for 2005 MR Baseline Study; how rate derived, estimated	Diversion rate calculated from E&E MR Audit results
Hamilton, City	No diversion rate reported	15.5%
London, City	18%, derived as follows: i) blue box material as determined by what is collected in London's program, and ii) total waste stream as determined by waste audits of MR in London and other municipalities and WDO information (Recycling rate is 28%)	2007 audit results not yet available
Ottawa, City	18-20% based on recycling tonnage vs: total tonnage. Note that waste tonnage is for subsidised waste collection only and does not include the waste in the extra pick-ups required by approx. 30% of MR. (MR buildings are allocated a specific number of waste containers collected per week at no cost – this is the subsidised service.)	21.9%
Peel, Region	11-13%; measured tonnage over scales using cart tipper (recycling truck) vs. front end (waste) truck weights	13.2%
Quinte Waste Solutions	26% - derived from "snapshot" waste audits completed in Belleville in Fall, 2005	24.1%

### 4.0 Discussion and Recommendations

One of the goals of this project was to apply the MR program cost template to the remaining programs in the original *Multi-residential Baseline Study*. However, the MR cost template can only be completed for multi-residential programs that have the ability to isolate or segregate multi-residential program costs from their curbside program costs. This would be the case if their multi-residential recycling program is tendered separately or the contractor is required to segregate MR program pricing from curbside. Failing this, an approximation of these costs could be made by apportioning them, based on proportion of multi-residential tonnage to curbside tonnage – provided this tonnage is tracked.

For those programs that have 'all inclusive' collection and processing contracts (i.e., one price for all recyclables irrespective of source), or that cannot presently segregate curbside tonnes from MR tonnes, the following options are suggested:

1. Identify/isolate MR tonnage: this could be done by on-board weighing at all MR stops. This information could identify tonnage collected and tonnage processed.

2. Isolate MRF residue attributable to multi-residential materials. This would require at-MRF auditing of MR samples, specific to each program. A less direct approach would be to identify potential MRF residue through audits at MR sites, but this would likely be less accurate than 'real world' data generated at the MRF.
3. For non-contracted programs, isolate on-route costs. This would include time per MR stop, with total costs taking into account vehicle/collection type (rear vs. side), crew, fuel, etc.

Table 4.1 details parameters for the remaining programs in the data set in light of what is required to document or derive MR recycling program costs and diversion. Potential options for dealing with the cited issues are provided.

Table 4.1

Program	MR costs segregated from curbside on collection contract	MR costs segregated on processing contract	MR tonnage tracked / known	Options for approximating MR costs
Cornwall, City	No, Cornwall pays a per tonne rate for all recycling (MR + curbside), no dedicated MR collection routes	No	No	Potentially MR Audits that could allow extrapolation of findings to estimate total MR tonnage.
Essex Windsor Solid Waste Authority (includes Windsor)	Yes, per stop price	No	No	On-board scales (MR collected on specific day), MRF audits for MR residue.
Greater Sudbury, City	Yes, pay a per multi-residential unit price	No	No	On-board scales; MR audits under way for 2007.
Guelph, City	Municipal collection – limited to 40 buildings that conform to 3 stream setout	No	No	Limited: Majority of MR on private collection as City bylaw stipulates that buildings with > 6 units do not receive city collection.
Kingston, City	No	No	No	MR is collected by municipal forces (in old city of Kingston) and private contractor in remainder therefore may be able to approximate MR tonnage for municipal collection route. Cost for processing MR tonnes would be approximate if based only on tonnage ratio.
Peterborough, City	No, Peterborough pays a per tonne rate for all recycling (MR + curbside)	No	No	Potentially MR Audits that could allow extrapolation of findings to estimate total MR tonnage – i.e., once per MR unit generation is documented through audits, this information could be extrapolated using total number of MR units serviced by City. Possible MRF audits for MR residue.
Sarnia, City	No, Sarnia pays a per tonne rate for all recycling (MR + curbside), no dedicated MR collection routes	No	No	Potentially MR Audits that could allow extrapolation of findings to estimate total MR tonnage – i.e., once per MR unit generation (and contamination) is documented through audits, these data could be extrapolated using total number of MR units serviced by City.
Simcoe, County	No, Simcoe pays same rate for all recyclables – curbside and MR	No	No	Possibly none at this time due to the different service levels and program standards in the 16 communities served.
Thunder Bay,	No, Thunder Bay pays	No	No	Although E&E audits are being

Program	MR costs segregated from curbside on collection contract	MR costs segregated on processing contract	MR tonnage tracked / known	Options for approximating MR costs
City	same rate for all recyclables – curbside and MR			conducted at MR sites in 07, these would not necessarily provide a true picture of MR recycling throughout the City as i) only approx. 1/3 of buildings are on the recycling program, ii) MR recycling program is only a year old, and iii) residents have access to and use recycling depots located in the City. It is suggested that financial analysis be delayed until MR program is more fully mature.
Toronto, City	Yes for those districts that have contracted collection; some per tonne pricing, some per unit pricing; other districts have municipal collection	No	Yes	Collection costs would be very difficult to calculate given the in-house collection in the different districts.

## 5.0 Conclusion

Of the 19 multi-residential programs in the original data set, five have completed and verified their MR recycling program costs using the cost template. A further three would be able to, given sufficient time and resources. Of the remaining 10 programs, three (Essex-Windsor, Greater Sudbury and Peterborough) could complete the template if the options in Table 4.1 were pursued. Two programs (Cornwall and Sarnia) could approximate their MR recycling program costs using results from MR audits. Alternatively, or in addition to the options in Table 4.1, exact weights for collected MR tonnage could be tracked using onboard truck scales. These programs have indicated that they would be in a position to complete the template if these measures were pursued, with the proviso that they would not incur costs for audits or other options such as onboard scales. The remainder (Guelph, Simcoe, Kingston, Thunder Bay and Toronto) would not be able to segregate or compile MR recycling program costs for the reasons provided in Table 4.1.

Notwithstanding the above, it has been demonstrated that the cost template can be used to calculate total and unit (per tonne, per dwelling unit) costs for a subset of multi-residential programs. There is sufficient confidence in these reported costs that this information can now be used as a baseline for future reference. For the programs in the present study, the diversion rates reported in the 2005 Baseline Study have been supplanted by the calculated diversion rates taken from the E&E audit results, and indeed are in fairly good agreement with them. As more and more E&E audit data become available, the calculated diversion rates can be used as the baseline for those multi-residential programs that do not have the means to measure or calculate diversion directly.

In considering recommendations for next steps, the Multi-residential Working Group weighed the need for verifiable, standardised multi-residential program baseline information on costs against the level of effort and resources needed to acquire it for the remaining programs. In other words – how important is this cost information to municipalities and Stewardship Ontario? If it is determined that further effort should be made, it is suggested that the necessary work as outlined in the options column in Table 4.1 proceed with the individual municipalities. Consideration would need to be given to how potential costs resulting from some of the options would be managed, as this has been cited as concern by some of the programs.

The cost template could then be used to tabulate their multi-residential program costs.