



Multi-residential Recycling: Implementing Best Practices

City of Barrie

Final Report

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Continuous Improvement Fund

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1. Executive summary

This is the final report of a project implemented by the City of Barrie (Barrie) between May and December 2011. The project goal was to increase recycling rates by implementing best practices in the municipal multi-residential recycling program. Waste Diversion Ontario - Continuous Improvement Fund (WDO – CIF) provided financial and technical assistance. The work was completed by Barrie staff and 2cg Inc. Consulting Services.

Barrie currently provides blue box recycling to approximately 54,000 households, including approximately 9,720 units in multi-residential buildings of which 7,940 use 95-gallon carts. The best practices that were implemented during this project include: updating a database of multi-residential properties, completing site visits at buildings, evaluating and estimating the recycling performance of individual properties, increasing/replacing recycling carts at some buildings and distributing new promotion and education materials. Additional work included in this project was the distribution of in-unit containers along with the P&E material to increase recycling convenience for residents of multi-residential buildings. The following project deliverables were achieved:

- Increased recycling space: added 65 95-gallon carts to achieve the recommended best practice ratio of 1 cart for every 7 units (50 litre/unit)
- In-unit containers: door-to-door distribution of 7,670 hard-shell recycling containers to: 1) promote recycling, 2) increase in-unit storage capacity and 3) make recycling more convenient to residents
- New Promotion & Education materials: resident flyers, posters and superintendent handbooks hand-delivered by municipal staff.

Between January and October 2012, which represents the post project implementation period, there was an 18 percent increase in tonnes collected when compared with the average for the previous three year period.

Table 1.0 Blue Box Materials Collected: Kilograms per unit per year, 2009 – 2012

	2009	2010	2011	2012 Projection based on first 10 months
Kg/unit/year	87	80	88	103

The projected cost to complete the project budget was \$74,580. Barrie was approved up to \$37,290 funding from the Continuous Improvement Fund, based on 50% of the project costs.

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2. Introduction

The City of Barrie is a community of approximately 140,000 people located approximately 90 km north of Toronto surrounding the west end of Kempenfelt Bay.

The City currently has an estimated 44,000 total single households and approximately 9,720 multi-residential units of which 7,940 units use 95-gallon recycling carts. The remainder use curbside recycling boxes, hire a private contractor or have no recycling.

The City is responsible for one operating landfill/depot site. The city has established waste reduction and diversion programs that have helped to divert waste from the City Landfill Site including:

- One bag weekly limit for single family residential households;
- Additional garbage bags require \$3 tags
- Two stream Blue and Grey Box program for single family households;
- Cart based and Blue/Grey Box recycling for multi-residential households;
- Green Bin program weekly collection for single family residential households;
- Unlimited Leaf and Yard Waste program for single family households; and
- MHSW and recycling depot at Landfill.
- Aggressive public space bin and special event recycling program

As with other municipalities, municipal recycling efforts have been focused on single-family residences more so than on multi-residential recycling. As a result there is often little quantitative data available on current collection capacity, tonnes collected, capture rate and overall current system costs.

The City applied for and received funding from the Continuous Improvement Fund (CIF) to upgrade its multi-residential recycling program.

This project had 4 main phases:

1. Develop and maintain a database of buildings and a recycling program review, including an inventory of infrastructure and assessment of recycling performance and barriers;
2. Benchmark and post-implementation monitoring;
3. Increase recycling cart capacity and delivering in-unit containers; and
4. Develop & distribute promotion and education materials.

3. Background: Multi-residential recycling program overview

Barrie has a total of 54,000 households: approximately 44,000 are single-family households, and 9,720 (18%) are multi-residential households. There are approximately 250 multi-residential properties (6 plus units).

Garbage from multi-residential buildings is collected using a combination of front-end bins (dumpsters) and curbside collection (2 bag limit per unit). Building owners have the option to participate in the landfill tipping-fee exemption program, which allows them to tip their garbage at the landfill for free. However, properties must be actively participating in the recycling program to take advantage of this tipping fee exemption. There is a limit on the garbage dumpster size to encourage waste diversion and mirror a two bag limit. All 250 multi-residential properties in Barrie are provided with some type of recycling system, whether cart service or curbside collection. Only one building has refused to participate in the recycling program because the tenants refuse to sort the materials. They have forfeited their Landfill Tipping fee exemption and utilize a private hauler for garbage and recycling.

Most multi-residential buildings (approximately 7,940 units) use 95-gallon carts to collect their recyclables. Prior to this project, carts were provided to buildings based on the number requested by building managers. All recycling carts are provided free of charge to multi-residential buildings. Historically recycling capacity in multi-residential buildings was approximately 10 units per cart. The City has increased this capacity to 7 units per cart as recommended by the CIF best practices guideline.

The recycling system in Barrie consists of a two-stream 95-gallon cart-based system (blue carts for containers, grey carts for fibres). Collection is weekly. The City does not have specific recycling requirements set by the municipality (e.g. by-laws). There are guidelines to follow, however, and collection can be refused if recycling is not done properly (e.g. not sorted, improper containers, contamination etc.).

One dedicated recycling truck collects all multi-residential cart-based recycling on Tuesdays and Wednesdays.

Approximately 47 multi-res properties (1,700 units) receive curbside Blue Box collection (i.e., not Blue 'Cart' collection). These are collected on single-family collection routes and multi-residential tonnages cannot be identified separately.

The following program performance measures in Table 3.1 are provided based on the collection of multi-residential properties with recycling cart service.

Table 3.1: Recycling program performance measures (2010)

	Effectiveness	Efficiency
Quantity	639 tonnes	\$103,690
Multi-res units	7,940	7,940
Per unit	80 kg per unit	\$13 per unit

4. The project scope

This project had four main phases:

- Phase 1: Develop and maintain a database of buildings;
- Phase 2: Benchmark/Post-implementation recycling performance;
- Phase 3: Provide promotion & education materials; and
- Phase 4: Increase recycling container capacity.

Each of the phases is discussed in the following sections

4.1 Phase 1: Develop and maintain a database of buildings

Creating and maintaining a database of all multi-residential properties is an important step towards implementing best practices.

4.1.1 Sources & collection methodology

Barrie already had a very detailed Excel database and this project allowed the City to update the information.

In-person site visits to each building using 95 gallon recycling carts were completed to distribute in-unit recycling bins and literature as well as confirm existing information and collect detailed information. Information collected included recycling performance, building characteristics that may create recycling barriers (e.g. room for recycling bins, convenience of recycling depot location, number of recycling carts, the proportion of blue to grey carts), contact information for the on-site representative (e.g. superintendent) and the role that the on-site staff play in managing the building's recycling program.

Co-op students contacted property managers and property owners during the project rollout to arrange for in-unit container delivery. This allowed them to collect

current contact information. As they visited each building, one student would deliver the in-unit containers and the other student would meet with the building superintendent to collect the following information:

- Waste hauler, bin size and dumpster collection frequency;
- Number and location of recycling carts; and
- Superintendent unit number, phone number and email.

Site visit challenges included making contact with building superintendents or property managers, building access and access to garbage and recycling rooms. Eventually the student team made unannounced “cold calls” to the buildings where appointments could not be arranged. This resulted in access being gained to a number of buildings through interested tenants and on site supers.

4.1.2 Database and completeness of data

Data was collected and recorded into the existing Excel database. The database was completed for all multi-residential properties.

For analysis purposes, 2cg Inc. transferred data from the City’s database into a CIF Excel database, which is set up to help facilitate data analysis. Table 4.1 presents a database summary.

Table 4.1: Database summary

Properties	Total in municipality ¹	Recycling offered by municipality ²	Number of intended visits completed ³	Data updated in 2010
Number of properties	250	249 ⁴	19 ⁵	204 ⁶
% Of all properties	100%	99%	97%	82%

¹ Total number of properties with buildings of six or more residential units.

² Remainder of buildings have private recycling collection or no recycling program.

³ Only properties with 95-gallon carts visited because purpose of visit was to distribute in-unit bins. Therefore 97% of 95-gallon properties were visited, but only 79% of all multi-res buildings

⁴ See Section 4.1.4

⁵ Number of buildings with 95 gallon carts, (because curbside buildings did not receive bins therefore were not visited) plus 6 that were not visited/information is unknown

⁶ 250-46 that needed updates in 2011 Multi-residential property information spreadsheet

4.1.3 Data maintenance

Every time there is a change in collection the Waste Reduction Co-ordinator will update the spreadsheet or delegate this task to a co-op student.

4.1.4 Summary and recommendation:

A database was completed with updated information for 204 of the 250 multi-residential properties in Barrie (i.e. contact, waste and recycling information). No access was available for 6 properties utilizing 95-gallon carts, and 40 properties had incorrect or unavailable contact information. Some of these 40 properties were determined to be curbside through drive-by investigations, but are lacking contact information due to lack of on-site superintendents on-site or marked or vague property ownership information. Data is stored in an Excel spreadsheet that can be amended to add new buildings as they are constructed.

It is **recommended** that the database be updated every time recycling carts are delivered to increase capacity or as replacements for broken carts. This will ensure a running total of recycling carts in the multi-residential recycling program. It is also **recommended** that new buildings be added to the database as they are constructed and receive recycling services.

It is **recommended** that phone calls should be made annually to all building contacts to update the database.

4.2 Phase 2: Benchmarking recycling performance

A key step in implementing program improvements is to benchmark current performance. This ensures that future recycling targets are established and program improvements can be easily measured.

Evaluating performance is a quantitative assessment that measures the following:

- 1) How much each building is recycling (kg/unit), and
- 2) How much is being recycled by all the buildings collectively.

Performance indicators such as container fullness and contamination were monitored during site visits. Performance data completed during site visits is only an estimate as it is not based on precise weights but provides Barrie with useful information on individual building performance. Because Barrie has accurate

weight data for the multi-residential program based on data from the designated collection routes this data is used in this report instead of the estimated data.

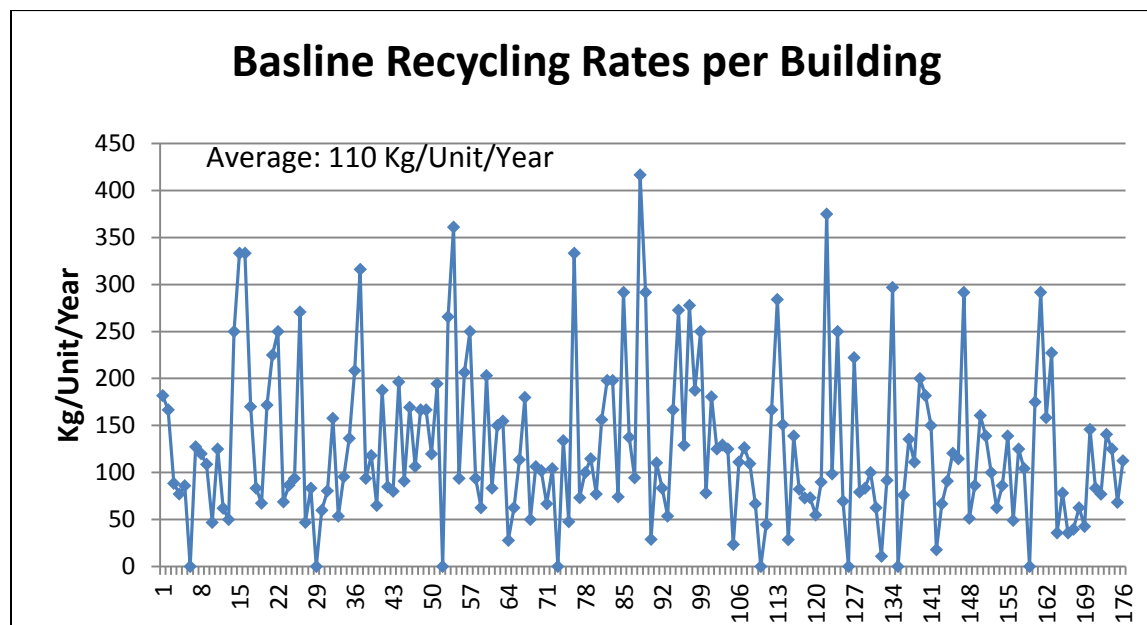
4.2.1 Procedure for estimating recycling rates

The following procedure was used for estimating recycling rates at individual buildings. In mid-June 2010, Barrie staff collected data during a ride-a-long with the recycling hauler for a large percentage of multi-residential buildings with cart-based recycling. At each location, carts were checked for fullness, contamination and cross contamination. Once checked, the results were entered into the Excel spreadsheet. Buildings that were missed, due to construction or collection from collectors on different routes, were monitored the following week to ensure most buildings were checked. Estimates were based on visual inspections and represent a 'snap-shot' of the multi-residential program at that time. The data used to evaluate overall impact of project best practices in this report is the monthly weight-scale data, which represents the actual tonnes collected.

4.2.2 Recycling rate estimates

Graph 4.2 shows the distribution of recycling rates (estimated kg/unit/year) based on estimates completed through visual site inspections at approximately 175 properties during baseline data collection in 2010. The average recycling rate, based on the visual audits was found to be approximately 110 kg per unit per year. The actual capture rate, based on weighted tonnes collected for 2010 is 80 kg per unit per year. As noted, the visual audits are useful in estimating performance at individual buildings or for municipalities that do not have actual tonnage data.

Graph 4.2: Building Baseline Recycling Rates, July 2010



From Graph 4.2, it is evident that there are a few properties with very high recycling rates, but most had rates of around 110 Kg/Unit/Year.

4.2.3 Weigh scale data

Barrie has a dedicated truck that collects recyclables from multi-residential properties on Tuesdays and Wednesdays. Table 4.3 shows weigh scale data for December 2009 to August 2012. Graphs 4.4 and 4.5 depict a graphical representation of the data presented in Table 4.3.

Total tonnes were down for 2010 compared to other years. This may be due to severe winter storm conditions during late 2010.

The tonnes reported for 2012 shows an increase in tonnes collected. Between January and October, 2012 there is a 17% increase in tonnes compared to the average of the previous three years. For example, the average total tonnes for August is 52 tonnes. In 2012, 63 tonnes were collected, representing a 21% increase compared to the average of the same month in the previous three years.

It is projected that the total tonnes collected for 2012 will be approximately 800 tonnes (an increase in the range of 20% over the previous three year average)

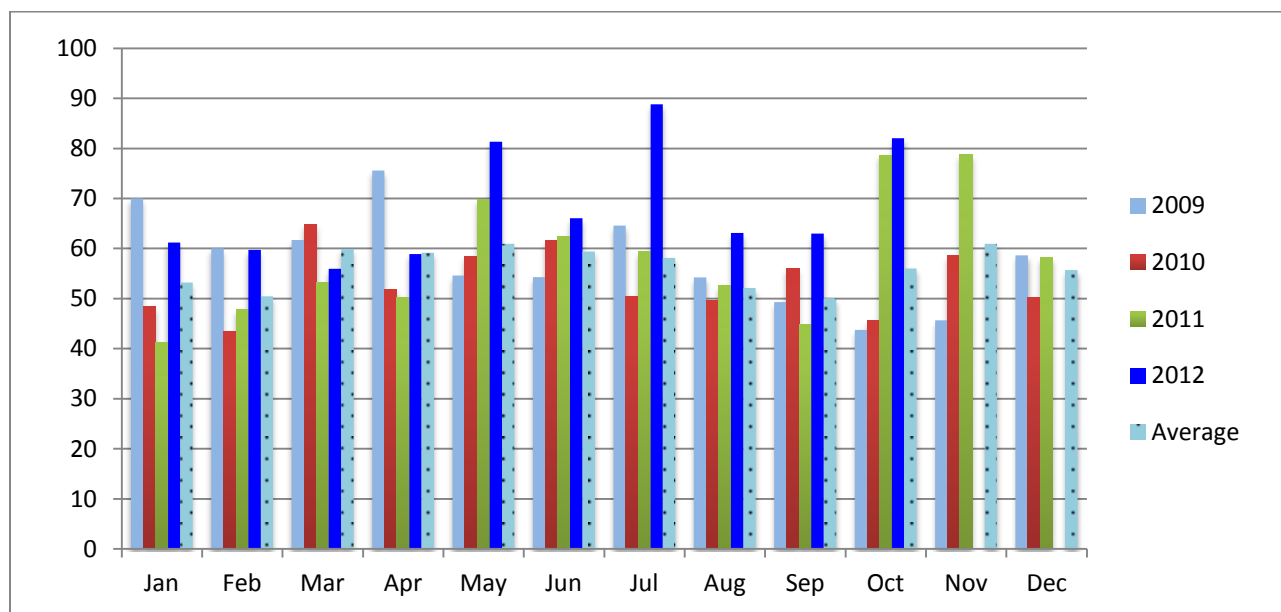
Table 4.3: Weight scale data for monthly tonnes collected, showing averages and 2012 compared to average

Month	2009	2010	2011	Average	2012	2012 compared to average
Jan	70 ¹	48	41	53	61	15%
Feb	60	43	48	50	60	18%
Mar	62	65	53	60	56	-7%
Apr	76	52	50	59	59	0%
May	55	58	70	61	81	33%
Jun	54	62	62	59	66	11%
Jul	65	51	59	58	89	53%
Aug	54	50	53	52	63	21%
Sep	49	56	45	50	82	64%
Oct	44	46	79	56	63	13%
Nov	46	59	79	61	-	-
Dec	59	50	58	56	-	-
Totals	692	639	697	676	680 (Jan-Oct) approx 800 2012 Projected ²	18% (Jan-Oct)

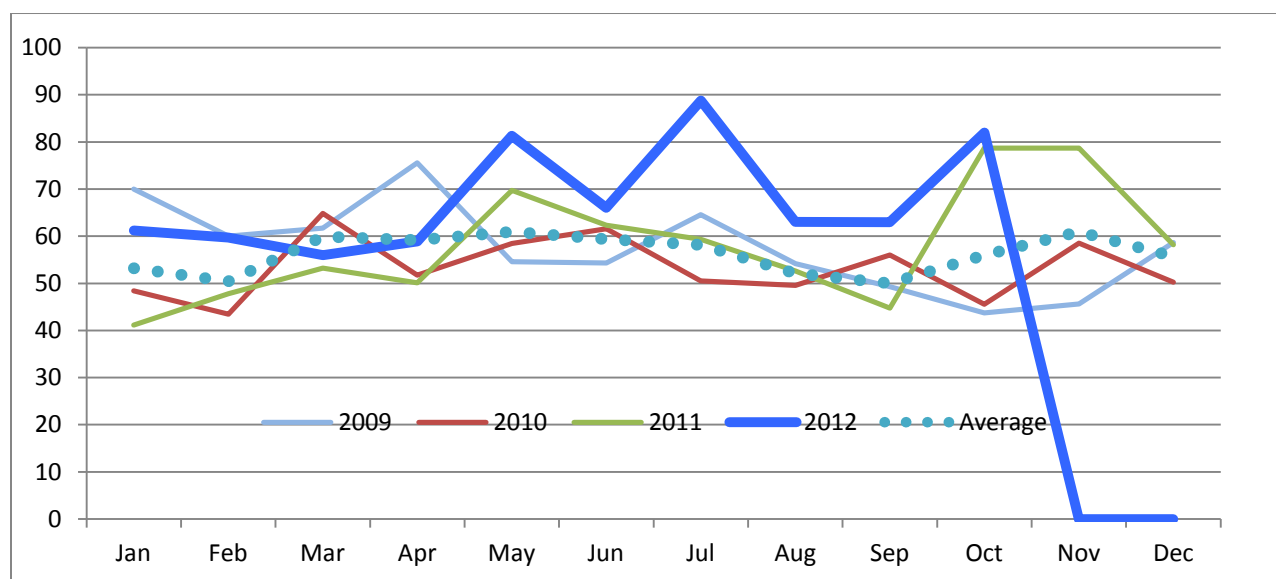
¹ January 2009 is adjusted, due to expected reporting error.

² Based on year-to-date tonnes it is projected that the total tonnes for 2012 will be approximately 800 tonnes.

Graph 4.4: Monthly Weigh Scale Data for 2009 to October 2012 (Tonnes)



Graph 4.5: Monthly Tonnes Collected: December 2009 to October 2012



4.2.4 Barriers to Recycling

Information was collected on the following barriers to recycling:

- Contamination;
- Overflow; and
- Labels on carts
- Lack of “on site” superintendent ¹
- Distance of carts from buildings

Table 4.6 summarizes the findings of these barriers.

¹ This data was not collected, but from Multi-res property info spreadsheet, there are 74 locations with no known on-site contact

Since carts are provided free of charge and buildings may request as many carts as they wish, another barrier to recycling becomes limited space for the recycling carts. Several buildings have requested an additional weekly collection; however the current collection contract specifies one collection per week for multi-residential routes. This presents another barrier, one that cannot be immediately rectified but will be considered in the development of the next collection contract in 2014.

Table 4.6: Barriers to recycling noted during data collection at 178 buildings

Barrier to increased recycling	Require corrective action	% of total	Set high standard 'model building' ⁴	% of total ¹
Contamination ¹	32	18%	146	82
Carts overflowing ²	1	<1%	177	99
Improvement in labelling required ³	16	9%	162	91
Distance from building ⁵	23	13%	155	87
Mixing	31	17	155	87

Notes:

¹ Includes bag contamination

² All bins overflowing

³ Buildings needing 5 or more yellow stickers (original ones)

⁴ Number of buildings of total with better than average practices/no issues recorded

⁵ From observation table (26/200=13%)

4.3 Phase 3: Increase recycling container capacity

Having enough storage space for recyclables is one of the most critical factors in a successful recycling program. It is important to address this first before other program improvements are put in place. To increase convenience for residents, baseline container quantities were recorded during site visits. Suggestions were then made regarding container locations. Visits also provided the opportunity to determine if additional containers were required and where they would be stored and used.

4.3.1 Type of recycling containers

Recycling storage space is referred to as 'capacity,' and is the total number of recycling containers shared by building residents for recyclables.

Historically recycling capacity in multi-residential buildings was approximately 10 units per cart. The City has increased this capacity to 7 units per cart. Much of this work was done prior or concurrently with the implementation of this project.

4.3.2 How much recycling capacity is being provided?

Based on the provincial target of recycling 70% of all recyclables, it is recommended that each residential unit be provided with a minimum of 50 litres of storage capacity. This is equivalent in size to a standard 14-gallon blue box. In terms of multi-residential containers, the following guidelines are recommended by CIF and are considered best practices:

- 360 litre carts – one cart for every 7 residential units
- Bulk bins - one cubic meter for every 15 units (e.g. a 4-yd bin for 60 units)

Funding from CIF is provided on the basis that municipalities implement these best practice ratios. The guidelines represent average requirements and it is assumed that at the building level there will be ranges depending on the demographics.

Cart delivery began in May 2010. Since then, 65 carts have been delivered to increase capacity. During baseline data collection, Barrie's multi-residential recycling capacity was 47 litres per unit. Post-implementation monitoring shows an increase in recycling capacity to 50 litres per unit. This is at the CIF recommendation of 50 litres per unit of recycling capacity.

Table 4.7: Total number of recycling containers

	Baseline Spring 2010	Post implementation July 2011
Units with 95 gallon carts	7,940	7,940
95 gallon carts (360 litres)	1,032	1097 ¹
Total program capacity in litres (360 l/cart)	371,520	394,920 ²
Capacity per unit (l/unit)	47	50

¹1032+65 carts added from May 2010-present

²(371520)+(65*360)

4.3.3 In-unit Containers



Another aspect of this CIF funded project was to increase recycling convenience by distributing in-unit recycling containers to all multi-residential units.

Barrie purchased hard-shell 6-gallon in-unit containers equipped with a handle to distribute to multi-residential units. From July 2010 to August 2011, Barrie staff delivered approximately 7,670 in-unit containers along with P&E flyers to promote the recycling program. This includes 158 in-unit containers and flyers delivered as supplementary material following initial distribution.

4.4 Phase 4: Provide promotion & education materials

4.4.1 Print materials

A project goal was to distribute new print materials to promote recycling and educate building residents and staff about what can and cannot be recycled. Municipalities have access to print templates (resident flyers, posters and signs for buildings, container labels and a guidebook for superintendents, property managers and building owners) through the CIF website. The template materials were customized with municipal specific information. Four retractable banner stands branded similarly to the literature were also developed for the open house,

community outreach events and lobby displays. Recycling cart key chains were also developed as give away items at lobby displays and recycling presentations.

The CIF Best Practice Guidelines recommends strategies for distribution of print materials which suggests municipalities take responsibility for:

- Distributing print materials directly to residents;
- Distributing and displaying posters at multi-residential properties; and
- Applying labels to recycling containers.

Along with the in-unit containers, recycling flyers were distributed to each apartment. At the same time posters, superintendent handbooks and cart stickers were also delivered. Posters were put up in mailrooms, and front lobbies, and garbage / recycling room signs were displayed in garbage rooms where possible. Some posters were left with superintendents. Cart stickers were attached to recycling carts by municipal staff.

Copies of some of the P&E materials are included in Appendix 1. Table 4.8 presents a summary of P&E materials.

Table 4.8: Summary of Promotion & Education materials used

Promotion & Education component	Number distributed	Method of distribution
Resident flyers	8,000 1 per residential unit plus some extras	By municipal staff to each unit
Posters	550	Posted by municipal staff in garbage and recycling rooms, lobby, mail room, etc.
Cart stickers	1,750 Affixed as needed	By municipal staff
Recycling guidebook	85 For each building that had a superintendent on site	Provided during site visits

4.4.2 Lobby Displays and Presentations



An open house was held on 23 June 2010 to promote the upgrades to the recycling program. Property managers, building owners and superintendents were invited, however, the open house was not very well attended. A power point presentation was given on the recycling program and the goals of the project. Items provided to attendees included sample in-unit containers, a reusable Tim Horton's coffee mug, a compact fluorescent light bulb, literature, and superintendent handbooks. Small give-aways included a small recycling cart key chain and lanyards made from recycled pop bottles. Displays were set up using the banners, in unit recycling boxes and recycling information displays.

To promote the P&E materials, as well as the updated recycling program, lobby displays and presentations were offered to multi-residential buildings. In total 20 locations received a combination of lobby displays and presentations. Recycling pamphlets and giveaways (e.g. lanyards, magnets) were handed out and at most locations residents showed interest and visited the displays.

4.4.3 Timing of Promotion & Education campaign

Barrie's recycling promotion & education campaign ran from July – December 2010.

A database of 250 multi-residential properties was developed and updated. Approximately 197 locations were visited with P&E material and 197 locations received in-unit containers and P&E material (i.e. some locations have curbside instead of cart recycling collection, therefore only got P&E material).

Lobby displays and presentations were conducted at 20 multi-residential locations from September to December with information on the recycling program and giveaways.

5. Project budget and schedule

Table 5.1 Project budget, planned and actual

Description	Unit	Quantity (est.)	Unit Cost (est.)	CIF Approved (upset limit)	Quantity (actual)	Unit Cost	Cost 50%
Staff support	Building	280	\$35	\$9,800	197	70	\$6895
Increase capacity	95 gallon carts	88	\$100	\$4,400	65	\$65	\$2,213
Final report	Report	1	\$4,000	\$2,000	1	\$4,000	\$2000
In-unit containers	In-unit containers hard shell	7,500	\$4	\$15,000	7500	\$2. 64	\$9,900 ¹
In-unit container delivery		7,500	\$1	\$3,750	7,500	\$1	\$3,750
Print costs	Flyers, posters, super handbooks	8,800	5.11 ²	\$0	8,800	\$0.90	\$3,982
Display banners	Banner	4	\$400	\$1,400	4	\$399	\$800
Other costs	Giveaway items	1,500	\$1	\$750	5500	\$1.21	\$3,328
Total				\$37,290			\$32,767

¹7500*2.64 *50% =9,900

²0.96 for flyers, 4.15 for posters and handbooks together

Table 5.2 Project schedule, planned and actual

Project Deliverables	Percent of Work	Expected Completion Date	Completion Date
Phase A and B details	50%	Jul-10	Jul-10
Phase C and D details	25%	Dec-11	Jan-11
Submit final report	25%	Jan-11	Nov 2012
CIF Funds Requested	100%		

¹ Sum of CIF upset limits

6. Concluding comments

The project provided an opportunity for Barrie to re-launch the multi-residential recycling program. Site visits provided valuable detailed information on the range of challenges to recycling in buildings and were useful in highlighting those buildings that had found creative solutions to increase recycling. Barrie has a long tradition of outreach in the multi-residential section, and had achieved a relatively high cart to unit ratio and maintained an updated database. The CIF project funding provided additional resources to reach the best practices ratio of carts and update promotion and education materials for multi-residential recycling. From January to October 2012, there has been a 20% increase in tonnes compared to the average tonnes collected in the previous three years.

The work completed under this project will provide an excellent foundation for exploring further multi-residential waste diversion opportunities and aligning multi-residential initiatives recommended in Barrie's Sustainable Waste Management Strategy.

7. Sample P&E

