***Final Report***

# CIF 250

# Multi-residential Recycling: Implementing Best Practices
## *Region of Waterloo*

Region of Waterloo

**July 2014**

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## *Acknowledgement:*



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# 1. Executive summary

This is the final report of a project implemented by the Region of Waterloo between April 2010 and July 2014. The goal of the project was to increase recycling rates in the Region of Waterloo's multi-residential cart program and to increase the number of buildings that meet Waste Diversion Ontario's Best Practices. Waste Diversion Ontario - Continuous Improvement Fund (WDO – CIF) provided financial and technical assistance. All work was conducted by Regional staff.

At the beginning of the project, there were approximately 199,540 households in Waterloo Region *(Region of Waterloo, March 2011).* Approximately one-third of the households were in multi-residential buildings. The Region of Waterloo provided recycling cart service to more than 1,000 multi-residential sites (over 45,000 units) *(Region of Waterloo, 2010)*.

The project involved implementing the following best practices:

- conducting site visits to assess the recycling performance of individual buildings (benchmark performance),
- providing adequate recycling bin capacity, when possible,
- estimating the overall program recycling rate, and
- distributing new promotion and education materials to residents and building staff.

At the start of the project, the average recycling rate at buildings was estimated at 112 kg per unit; the total amount recycled for all buildings was estimated at 5,137 tonnes per year.

1,078 sites visits were completed (or partially completed) and more than 45,000 units directly received promotion and education materials.

270 recycling containers were added to the program to meet best practices, increasing the recycling capacity from 51 litres per unit to 55 litres per unit. These carts were delivered immediately following a site visit by Regional staff. An additional 488 carts were delivered within six to eight months following the completion of the site visits. By July 2014 the remaining 442 carts specifically purchased for the CIF project had been distributed to various sites to maintain or increase capacity.

By implementing best practices, it is estimated that recycling increased by approximately 6 per cent, or from 112 kg per unit to 119 kg per unit.

The total cost to complete this project was $227,960.00 (not including staff time).

To obtain more information about this report please call the Region of Waterloo Waste Management Division at 519-575-4400.

## 2. Introduction

Waterloo Region is comprised of three cities – Cambridge, Kitchener, and Waterloo – and four townships – North Dumfries, Wellesley, Wilmot, and Woolwich. There are approximately 199,540 households in Waterloo Region and over 543,700 residents (*Region of Waterloo, March 2011*).

Established January 1, 1973, the Region of Waterloo (Region) delivers programs and services to its residents through seven departments. The Waste Management Division operates under the Transportation and Environmental Services department, and is responsible for planning, implementing, monitoring and operating all waste collection and diversion programs and facilities. This includes five closed landfills and one engineered landfill, six small vehicle transfer stations, a materials recycling facility, a yard waste composting pad, a household hazardous waste depot, all curbside collection programs, and all marketing, promotion and education.

With more than 1,000 sites and over 45,000 units on the Region's Multi-Residential Cart Recycling Program, the Region was interested in the opportunity to increase recycling rates by making use of the funding and resources made available by the CIF.

The objectives of the project included:

a) developing and distributing new promotional and educational materials and in-unit containers to each unit/building on the program,
b) increasing the number of sites adhering to best practices as defined by Waste Diversion Ontario *(Waste Diversion Ontario, CIF, November 2009)*, and
c) decreasing contamination.

The project was implemented over a period of approximately three years from April 2010 to July 2014. Unless otherwise stated, 2010 data and/or statistics were used during this project.

The scope of the project was focused on multi-residential sites that were already participating in the Region's multi-residential recycling program. It did not focus on adding new sites to the program. Sites not participating in the Region's recycling program were not examined and could be participating in a private recycling program.

## 3. Background: multi-residential recycling program overview

The Region was one of the first municipalities in Ontario to offer cart recycling programs to multi-residential buildings (including townhouse complexes, apartment buildings and nursing homes, with six or more units). The program was launched in the cities of Cambridge, Kitchener and Waterloo in 1990. In the late 1990s, the Region assumed responsibility for all waste management programs from the area municipalities.

The Cart Recycling Program collects the same materials as the Blue Box Program. Carts, promotional materials and weekly collection have always been provided at no charge to the owners, property managers, superintendents or tenants.

In 1994, Regional Council approved a level of service for multi-residential recycling (E21-70) which:

- limited one cart for old corrugated cardboard (OCC) per collection location,
- streamlined the cart pick up location to either street curb or parking lot (rather than the driver entering garbage rooms) and
- established a protocol for withdrawing service as part of recycling requirements set by municipality.

**Photo 1 - Example of colour coded recycling carts provided to multi-residential sites. Blue for containers and grey for mixed fibres and cardboard.**

In addition, carts were colour-coded for the two-stream recycling system: blue carts for containers, and grey carts for mixed fibres such as paper, magazines and cardboard. (Note that single, designated cart for OCC effectively makes 3-stream.)

In 2010, over 53,000 units in the Waterloo Region were designated multi-residential, of which approximately 87 per cent (45,853 units) received municipal collection *(Region of Waterloo, 2010)*. The cost per tonne for recycled material, per the 2013 WDO datacall, is approximately $198.15 *(Region of Waterloo, 2014).*

Prior to collection, each site is required to sign and date a "Terms and Conditions of Service" Agreement. In addition, a Regional employee completes a site profile to determine, amongst other items, owner information, cart storage location, collection location and number of carts.

Once service has been approved, a building official (e.g. Owner, Property Manager, Superintendent) is provided with a supply of promotional items for distribution to the entire building. Items are restocked as required and as budget permits.

The Region does not provide garbage collection for multi-residential sites/buildings, with the exception of a few grandfathered locations. Garbage rebates are provided to those multi-residential sites that qualify. There is currently a 10 garbage bag limit in the cities of Cambridge, Kitchener and Waterloo however this limit is not strictly enforced.

Five collection vehicles currently service the cart recycling program in the Waterloo Region. Four contractor vehicles service the cities of Cambridge, Kitchener and Waterloo: three vehicles provide daily collection Monday to Friday, with an additional vehicle used only on Tuesday due to high volume. In the townships of North Dumfries, Wellesley, Wilmot and Woolwich, a contractor uses one vehicle two and a half days per week: Monday, Friday and a half day on Wednesday.

**Table 3.1** - Number of households in Waterloo Region *(Region of Waterloo, December 2011)*

| Type of Household | Households in Waterloo Region (both on and off Region's Recycling Program) | Percent |
|---|---|---|
| Curbside (single-family) | 148,427[1] | 74% |
| Multi-res (Apt, Townhouse, etc.) | 53,089[1] | 26% |
| Total | 201,516[2] | 100% |

Note:

1 – The total number of curbside and multi-residential households was obtained from data in the Region of Waterloo Database, December 2011.

2 - Total number of households in Region of Waterloo was obtained from the Region of Waterloo Planning Department Staff, Chris Rumig by email December 8, 2011 to Kathleen Sidaway.

**Table 3.2** - Number of households with municipal blue box/cart recycling program *(Region of Waterloo, December 2011)*

| | Curbside | Multi-res | Total |
|---|---|---|---|
| All households in Region | 148,427 | 53,089 | 201,516 |
| Households with municipal blue box/cart program | 148,427 | 45,853 | 194,280 |
| % receiving municipal recycling program | 100% | 86% | 96% |

**Table 3.3** - Average number of multi-residential buildings and units with municipal blue box/cart service *(Region of Waterloo, December 2011)*

| | Buildings | Units | Average # of units per building |
|---|---|---|---|
| Total | 1245 | 53,089 | 43 |
| With Regional recycling program | 1080 | 45,853 | 42 |
| Without Regional recycling program[1] | 165 | 7236 | 44 |
| % recycling on Regional Program | 87% | 86% | -- |

Note:

1 – Adding additional buildings to the Region's Cart Recycling Program was not part of the project scope. Buildings not participating in the Region's recycling program could be participating in a private collection system. There are various reasons for owners to decline the Region's service. See the Conclusions/Recommendations section for more information.

# 4. The project scope

The project scope included four main phases:

- Phase 1: Review and update the existing database of buildings
- Phase 2: Benchmark recycling performance
- Phase 3: Increase recycling container capacity
- Phase 4: Provide promotion & education materials

Each phase is discussed in the following sub-sections.

## 4.1 Phase 1: Review / update the existing database of buildings

Over a decade ago, the Waste Management Division established an Access database as a comprehensive database for the multi-residential recycling program. The database contains important information to manage the curbside collection contract and is actively used as a contract management tool.

The development of the Access database was contracted to an external consultant who remains active in the maintenance of the database along with municipal staff. No major changes were made to the existing database as a result of this CIF project; however, any outdated and/or incorrect information pertaining to the sites was recorded by staff as site assessments were completed.

Several recommendations related to the Access database are noted at the end of this report. Refer to Section 6 for more information.

### 4.1.1 Sources & collection methodology

In order to complete this project, the following sources were used by staff:

- Existing Waste Management Access Database (Access), which contained approximately 75 percent of the required information,
- Region's Geographic Information System (GIS),
- Municipal Property Assessment Corporation (MPAC), and
- On-site assessments.

The Access database (Figure 1) contains, but is not limited to, the following information regarding the multi-residential recycling program:

- Carts (inventory, activity, agreements, etc.)
- Garbage collection (type, start/end dates)
- Recycling information (start/end dates, pick up day, location, etc.)
- Promotion and education (history, inventory)
- Communication history (missed collection, education, communications)
- Owner and Property Manager information

As part of the CIF project, a site profile form was developed by staff with input from the WDO CIF project coordinator (Appendix 1). Where possible, this form used standard responses, check boxes, and defined fields to ensure consistency and standardization. All staff conducting site assessments were properly trained by the project lead to ensure consistency.

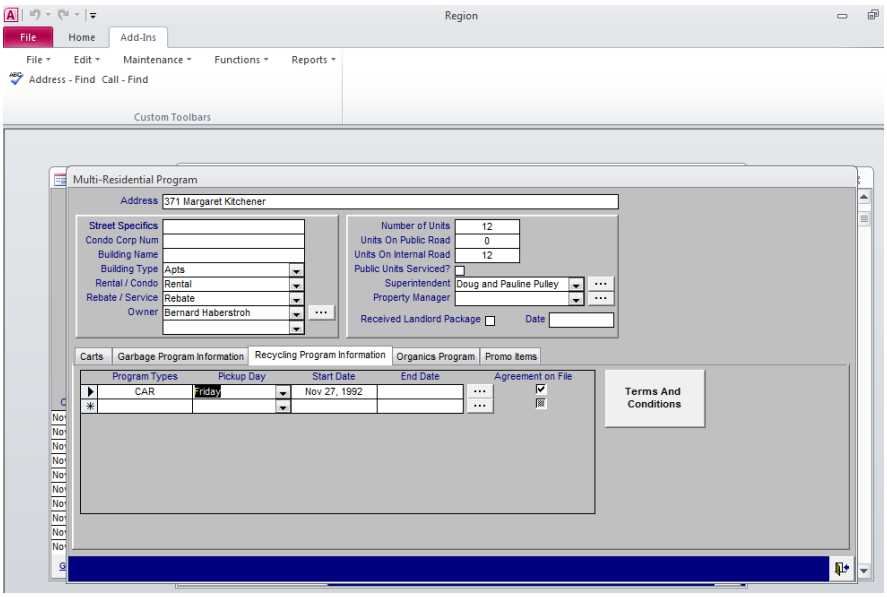



**Figure 1** – Screen capture of the Region's Access Database

The information contained in the Access database is updated annually by municipal staff through the garbage rebate process and on an as-needed basis as a result of communication from collection crews, inspectors, tenants/residents and/or owners/property managers.

The existing Access database provided approximately 75 per cent of the required information. This initial information was used to populate the profile form prior to conducting site assessments, which decreased the amount of time required to collect and verify the data while on-site.

Staff generally completed site assessments on the day prior to collection. A small portion of sites required an appointment in order to access the recycling program and/or building to deliver the promotion and education materials.

Two or three staff conducted each site assessment by breaking the task into two distinct parts: one staff member verified the profile information and evaluated the cart performances, while one or two other members delivered the promotional and educational materials door-to-door, to each unit. This approach was particularly successful when conducting site assessments for larger complexes.

Staff experienced a number of challenges while conducting site assessments.

These included:

- Controlled entrances to buildings. A separate appointment was required if staff could not find an on-site contact.
- Unsuccessful contact with owners/property managers. Despite multiple attempts to contact off-site owners/property managers, staff were unable to conduct 50 site assessments. This number represents approximately 5 per cent of the entire multi-residential recycling program (Appendix 2).
- Extreme heat in the summer of 2012. High temperatures resulted in a decrease in the number of site assessments that could be completed during any one day.

### 4.1.2 Database and completeness of data

During the implementation of the CIF project, it should be noted that the Region transitioned to a new Citizen Service Call Centre and adopted a new database, Lagan. At that time, the impact on the existing Access database was unknown.

When the Citizen Service Call Centre began operating in February 2013, data collection, which was previously entered in the Access database, became divided between the two programs. Specific site information remained within the Access database; however, collection issues (new and historical) are now entered in the Lagan system. Citizen Service Call Centre staff now maintain the Lagan system and Waste Management staff maintain the Access program.

In order to move ahead with the CIF project, a decision was made by senior management to enter and manipulate data for the CIF project in an Excel spreadsheet.

Excel was chosen as a viable program to contain the additional CIF information because of its compatibility with the Waste Management Access database. If deemed necessary, future information can be readily imported from the Excel spreadsheet into the existing Access database.

Information collected during the CIF project was partially recorded in the existing Access database, in addition to the new comprehensive Excel spreadsheet (Figure 2). The Excel document is approximately 3 megabytes in size and it includes 11 separate spreadsheets. The file is saved in the corporate Electronic Document Management System (eDOCS) and is backed up regularly.

In order to ensure accuracy, two staff members were responsible for inputting the data into the Excel spreadsheet, while one staff member was dedicated to writing the report.

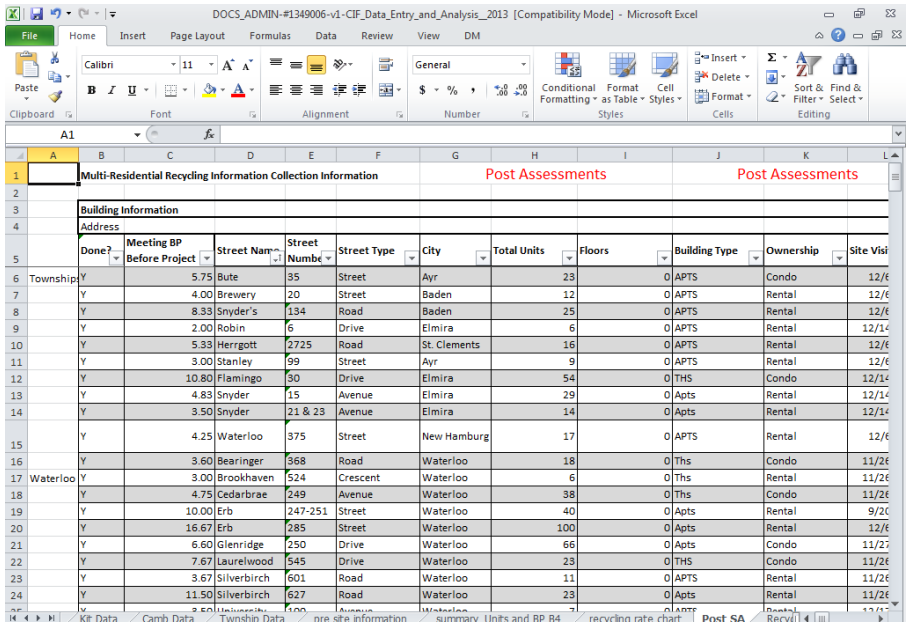



**Figure 2** – Screen capture of the Excel spreadsheet. (Note: It would be difficult to print and submit the entire document with this report).

**Table 4.1** - Database Summary

| | Total Multi-residential Buildings in Region of Waterloo[1] (Includes public, private and no service) | Buildings that receive recycling provided by Region of Waterloo | Site visits completed[2] |
|---|---|---|---|
| Number of buildings | 1245 | 1078 | 1028 |
| % of all buildings | 100% | 87% | 95.36% |

Note:

1 - Total number of buildings of six or more residential units. The number of multi-residential sites was obtained from MPAC / GIS.

2 - Site visits were only attempted at sites participating in the Region's Multi-residential recycling program.

### 4.1.3 Data maintenance

The Access database is currently updated by regional staff on an on-going basis. Information is obtained through communication with residents/tenants, owners, superintendents, property managers, collection contractor in addition to site inspections completed by staff. Full-time staff has been assigned to the maintenance of this program, and it is a part of their required tasks.

Major changes to the framework of the current Access database are maintained by an outside consultant. Ongoing budget commitments to fund this maintenance are identified in the Waste Management Operating Budget.

### 4.1.4 Summary and recommendation

As a result of the work completed, approximately 1,028 building profiles are now updated in the Access database. The Region will continue to update information annually as part of the existing garbage rebate process. In addition, information will be updated on an on-going basis based on communication with owners, property managers and tenants and on feedback provided by the recycling drivers.

## 4.2 Phase 2: Benchmarking recycling performance

A key step in implementing program improvements is to benchmark current performance. Benchmarking establishes desired targets and measures program improvements while working towards achieving these targets.

Evaluating program performance is a quantitative assessment that measures:

1) How much each building is recycling (kg/unit), and

2) How much is being collectively recycled by all buildings.

Performance indicators, such as container fullness and contamination, were monitored during site visits. Performance data collected during site visits were used only as an estimate, as it was not based on precise weights.

### 4.2.1 Procedure for estimating recycling rates

The Region used the following procedure to estimate recycling rates at multi-residential buildings:

1. Conduct a site assessment at each building the day before collection. Perform a visual inspection and create a 'snap shot' representing cart fullness to estimate the weekly generation of recyclable material at each building.

2. Multiply the fullness of the carts by the weight of the corresponding cart type (COM, ONP, and OCC—carts weigh different total amounts when full) to determine an estimate of the tonnage of recyclable material captured weekly. Refer to CIF 201: Container Density Factors, *(WDO, 2011)* for more information.

3. Multiply the weekly amount by 52 to calculate the tonnage of recycling captured annually (on a weekly collection basis).

4. Divide the annual total by the number of units in each respective building, providing the recycling rate in terms of kg per unit per year.

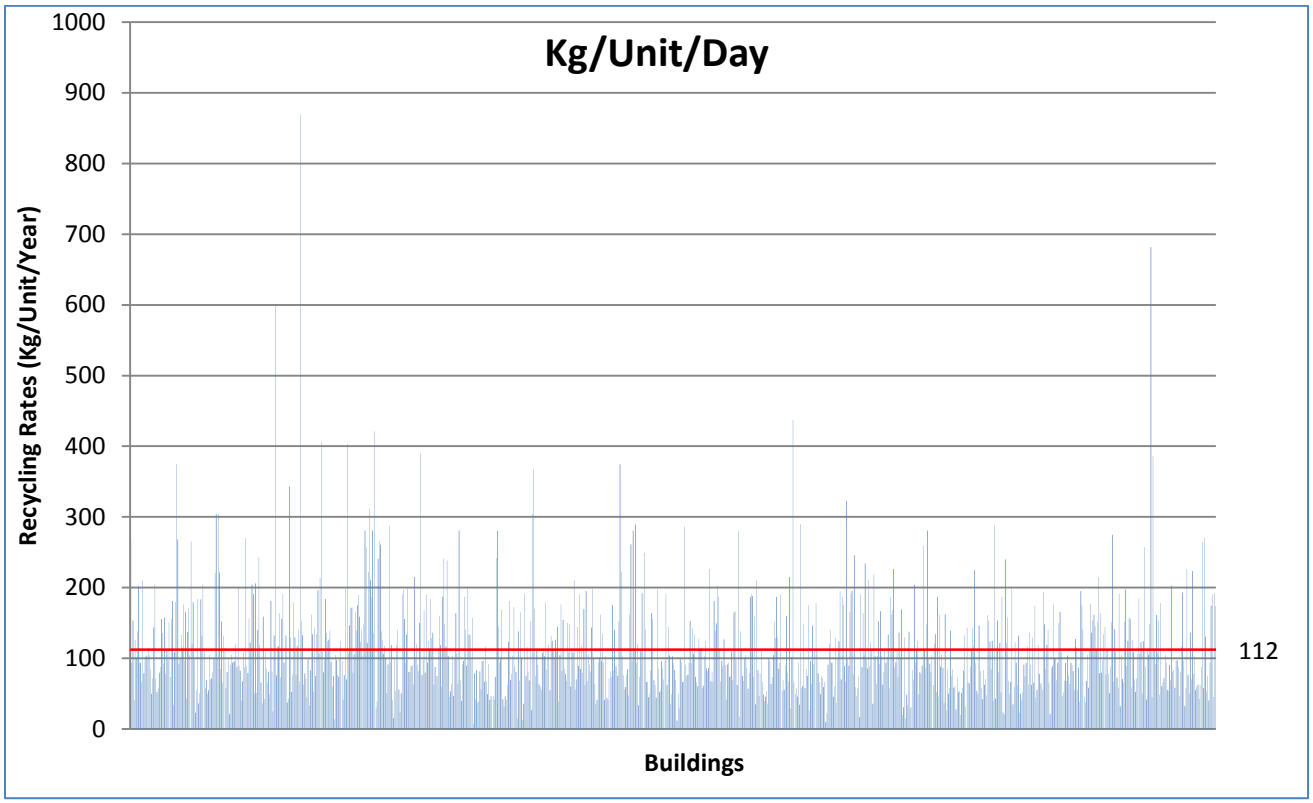
### 4.2.2 Recycling rate estimates

Table 4.2 shows the distribution of recycling rates (kg/unit/year) based on estimates completed at visual site inspections at 1,028 buildings. The average recycling rate for all buildings was 112 kg per unit per year. The site assessments were completed from March 2011 and December 2013 by full-time employees and co-op students. Assessments were based on visual inspections and they represent a 'snap-shot' of the multi-residential program at that time.

Graph 4.2 shows the estimated recycling rates (kg/unit/year) based on a one-time visual site inspection at 1028 buildings within the Region.

The average recycling rate of all the buildings participating in the Region of Waterloo's recycling program is 112 kg/unit/year, as illustrated by the red horizontal line. This average recycling rate is based on estimates from completing visual audits of the recycling carts located at multi-residential buildings in Waterloo Region between June 2011 and December 2012.

**Graph 4.2** - Building Recycling Rates[1]



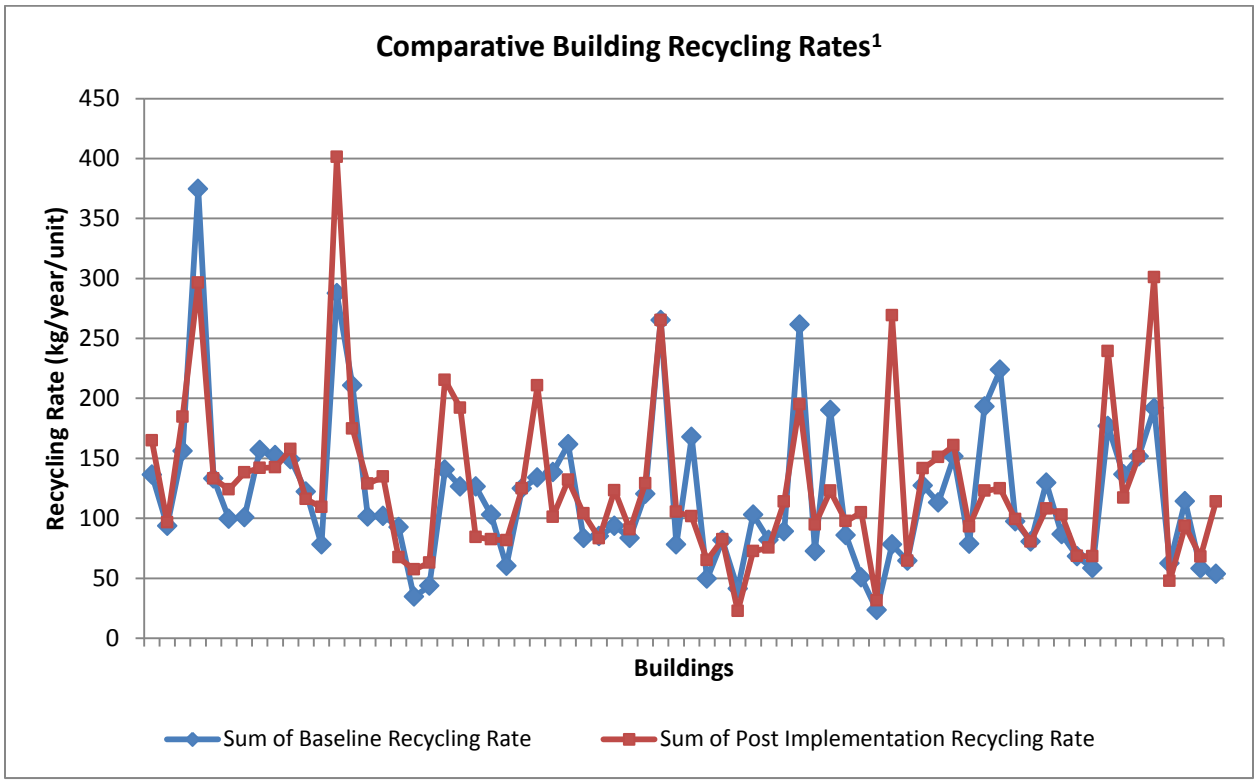

Note:

1 - This information was taken from the CIF Data Entry and Analysis spreadsheet (Doc #13490006) under the Capacity and Recovery Tab.

In order to assess the effectiveness of the implementation of best practices, a select group of sites was chosen to be a part of a pre and post site assessment. This group was titled the "Sample Group".

Graph 4.3 compares the recycling rates of 70 buildings between two sets of visual inspections (baseline and post implementation), that were chosen to represent a wide variety of building types in different neighbourhoods across the three cities and one township in Waterloo Region. These buildings were selected with input from staff members who are involved in the daily operation of the Multi-Residential Recycling Program.

**Graph 4.3:** Comparative Building Recycling Rates for all 70 Sites (Baseline / Post)




Note:

1 - This information was taken from the CIF Data Entry and Analysis spreadsheet (Doc #13490006) under the Recycling Rate Chart

Graph 4.4 compares the average recycling rates of 70 buildings that had two visual inspections completed: baseline and post implementation. The average time lapse between the two inspections was 111 days (Appendix 3).

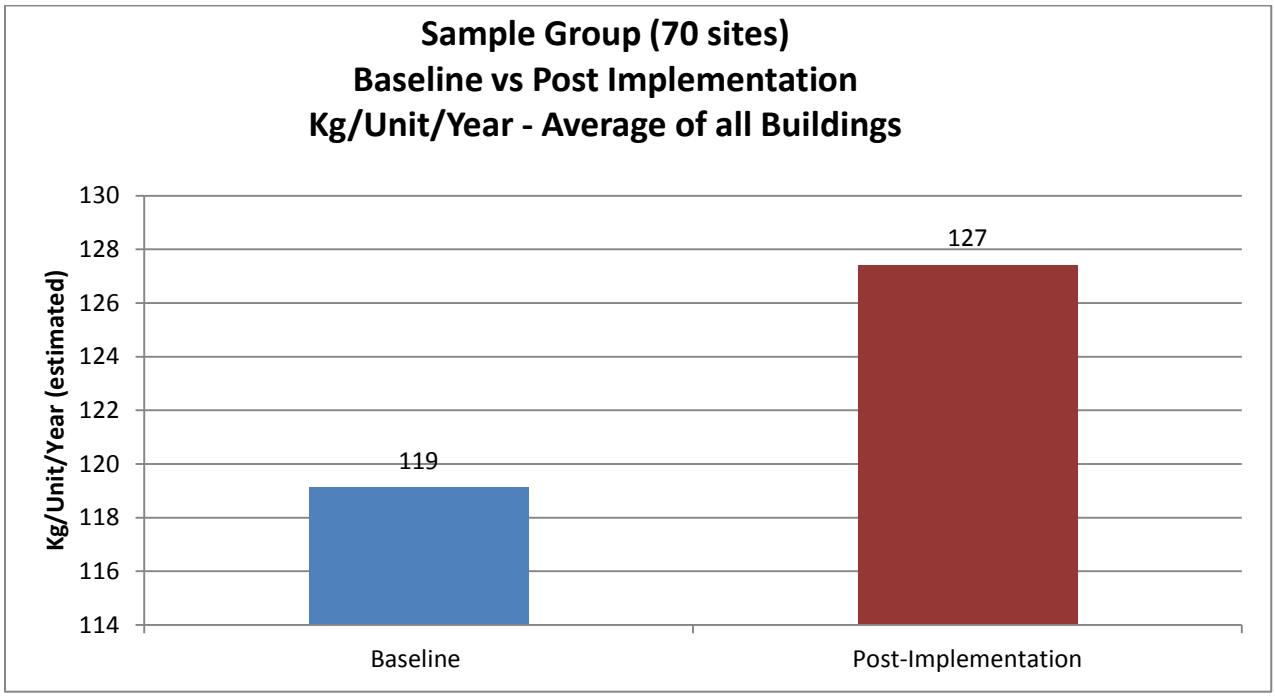
It should be noted that both inspections were completed in the same season (Fall) by the same group of staff, in order to try to limit variances that may occur from these two variables.

The average recycling rate (kg/unit/year) of the 70 buildings increased from 119 to 127 kg/year/unit based on the "snap-shot" inspections completed during the project.

It should be noted that the sites selected by staff to be a part of the baseline/post sample had a higher base recycling rate (119 kg/year/unit) than the overall average (112 kg/year/unit) of the 1,028 buildings assessed. Several factors could be investigated to explain the higher than average recycling rate including:

- The average number of units per building (46 units in the sample group; 42 units in the overall program)
- The timeframe (the fall season coincided with the return of post-secondary students that have a significant impact on the three cities)

**Graph 4.4:** Summary of baseline and post-implementation average recycling rates




The recycling percentage of buildings ranked in the medium and high recycling rate categories increased for the 70 sites that were monitored post-implementation (Table 4.6). Prior to implementing best practices, 12.86 per cent of buildings ranked "low"; however, after implementing best practices, only 5.71 per cent of the buildings ranked "low".

Building rankings for all buildings in Waterloo Region (baseline: all sites) are positively represented by the 70 buildings which were post-monitored, since ranking percentages were similar: "medium" recycling rates represent the highest percentage, and "low" recycling rates represent the least.

**Table 4.6:** Distribution of buildings by recycling rates

| Recycling Rate Kg/unit/year | | Baseline (All Sites) | | Sample Selection (70 sites across the Region) | | | |
|---|---|---|---|---|---|---|---|
| | | | | **Baseline** | | **Post Implementation** | |
| Low | <60 | 277 | 22.08% | 9 | 12.86% | 4 | 5.71% |
| Med | 60 to 120 | 468 | 45.53% | 30 | 42.86% | 34 | 48.57% |
| High | >120 | 333 | 32.39% | 31 | 44.29% | 32 | 45.71% |
| Total | | 1028 | | 70 | | 70 | |

## Anomalies

While conducting site inspections, staff discovered an anomaly in calculating the number of units in certain buildings. Some buildings that were classified as lower unit (having fewer than 10 units) actually had 50 or 60 units. This anomaly arose as certain units contained of 4 – 6 individual locked bedrooms in each main unit, increasing the total number of units to 36 or more.

**Table 4.6** – Example of Building Anomalies

| Number of units identified in database | Number of "bedrooms" or individual units tied to the main units | Revised or Actual Number of Units |
|---|---|---|
| 6 | 5 | 30 |

These buildings had extremely high recycling rates because of the municipal building classifications. These buildings typically represent student housing.

### 4.2.3 Weigh scale data

The Region has a separate system that tracks and records weigh scale data from the entire cart recycling program, which includes schools, nursing homes, municipal facilities and a small number of businesses in addition to multi-residential units. The Region does not record tonnage information specifically from the Multi-Residential Recycling program.

The contractor responsible for curbside collection completes a route sheet for all multi-residential sites. This route sheet tracks contamination issues, capacity and education issues. The contractor will continue to perform this task on a daily basis.

In 2010, 4,405.34 metric tonnes were received from the tri-city area from all cart recycling participants as recorded by the Geoware scale reporting system. Refer to Appendix 4 for more information.

### 4.2.4 Barriers to recycling

Adequate recycling facilities are essential to a successful recycling program in multi-residential buildings. Three criteria were used to assess the barriers to recycling during this project:

- Access
- Cleanliness, and
- Lighting/safety

The majority of buildings participating in the Region's recycling program were ranked "ok" or "excellent" in all three of the criteria.


Photo 2 - Multi-residential collection site located in Cambridge ranked 1 under access. The site is hidden behind garbage dumpster and blocked by vehicles which likely contributed to low volumes.

**Table 4.7** - Cart Performance Evaluation Criteria

| Definitions | | | |
|---|---|---|---|
| **Category** | **Ranking 1 – Requires Attention** | **Ranking 2 – OK / Adequate** | **Ranking 3 – Excellent** |
| **Access** | Located far away / Snowed in / Can't get to it | Located inside or close to an entrance | Located inside building / Easy access / Near garbage collection |
| **Cleanliness** | Area surrounded by large garbage items / Disorganized | Small amount of loose material usually due to overflow | Very clean and organized |
| **Lighting / Safety** | Outdoor area completely away from any source of light / Indoor in a dark room | Lighting is nearby / Dimly lit | Lighting directly above / Passage to depot is lit |

Staff noted that access was a barrier to residents participating in the Cart Recycling Program when carts were:

- Located a long distance away from residents of the building (e.g. outside in a parking lot). Some buildings share carts meaning the carts are far from one building so they can be easily accessible for collection by another building.
- Extremely unclean

Table 4.8 summarizes cart performance according to the three criteria. This evaluation was completed during the site assessment; thus, it represents a 'snap-shot' evaluation of building's recycling areas.

**Table 4.8** - Barriers to recycling noted at site visits completed at 1,028 buildings[1]

| Barrier to increased Recycling (Criteria) | City | Requires Attention | Ok | Excellent |
|---|---|---|---|---|
| Access | Waterloo | 12 | 88 | 166 |
| | Kitchener | 12 | 156 | 348 |
| | Cambridge | 11 | 85 | 98 |
| | Townships | 0 | 3 | 21 |
| | **Total in Region** | **35** | **332** | **633** |
| Cleanliness | Waterloo | 6 | 32 | 228 |
| | Kitchener | 14 | 93 | 409 |
| | Cambridge | 6 | 30 | 158 |
| | Townships | 0 | 0 | 24 |
| | **Total in Region** | **26** | **155** | **819** |
| Lighting/ Safety | Waterloo | 14 | 52 | 200 |
| | Kitchener | 20 | 128 | 368 |
| | Cambridge | 35 | 57 | 102 |
| | Townships | 0 | 3 | 21 |
| | **Total in Region** | **69** | **240** | **691** |

Note:

1 - This information was taken from the CIF Data Entry and Analysis spreadsheet (Doc #13490006) under the Summary Units and BP B4 tab.

### 4.2.5 **Featured building:** 125 Champlain Boulevard, Cambridge, Ontario

The photo on the right shows a townhouse rental complex in Cambridge with 58 units, each located on an internal roadway.

Although all three collection locations were twinned with garbage collection and scored "excellent" under the cleanliness category, they scored "OK" under "Lighting / Safety" and "Access".

Photo 3 – 125 Champlain Boulevard, Cambridge, Ontario

This site met the standard for best practices with respect to volume availability. Many of the carts were empty and those that contained material had high levels of contamination, particularly cross-contamination. This site was using the maximum three OCC carts allowed under our program. Excess cardboard was noted at all three collection locations. Other factors may also be influencing the low participation rate at this site.

This site recycled approximately four full carts spread out across all material types on collection day.

Across all the sites, excess cardboard was noted as a general observation (Photo 4). Larger complexes offered a bin for cardboard collection; however, small and medium sized sites often provided only the level of service available to them under our contract. Extra cardboard often resulted in increased litter and higher cross contamination.


Photo 4 – Excess cardboard typically found loose beside the cart storage location.

## 4.3 Phase 3: Increase recycling container capacity

One of the most critical factors in the success of a recycling program is having enough storage space for recyclables. It is important to address this issue prior to implementing any program programs.

During site visits, baseline container quantities were recorded and information was collected about where containers could be relocated within the building, in order to provide greater convenience to residents. Site visits also served as an opportunity to determine if additional containers were required and where they could be stored and used.

### 4.3.1 Type of recycling containers

Recycling storage space is referred to as "capacity" and is the shared recycling containers used by building residents to deposit their recyclables.

370 litre carts are provided to multi-residential sites at no charge. Participation in the recycling program can be requested by the owner, property manager, superintendent or a tenant.

Waste Management staff would determine the number of carts appropriate for the site based on knowledge and experience. Additional carts cart be requested as the program matures but must stay within the restrictions (i.e. limit one OCC cart) of the current program.

### 4.3.2 How much recycling capacity is being provided?

Based on the provincial target of recycling 70 per cent 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 guideline is recommended by CIF and is considered a best practice for the Region of Waterloo:

- 360 litre carts (95 gallon) – one cart for every 7 residential units

Continuous Improvement Funding is provided on the basis that municipalities implement this best practice ratio. The guidelines represent average requirements and it is assumed that at the building level there will be ranges depending on the demographics.

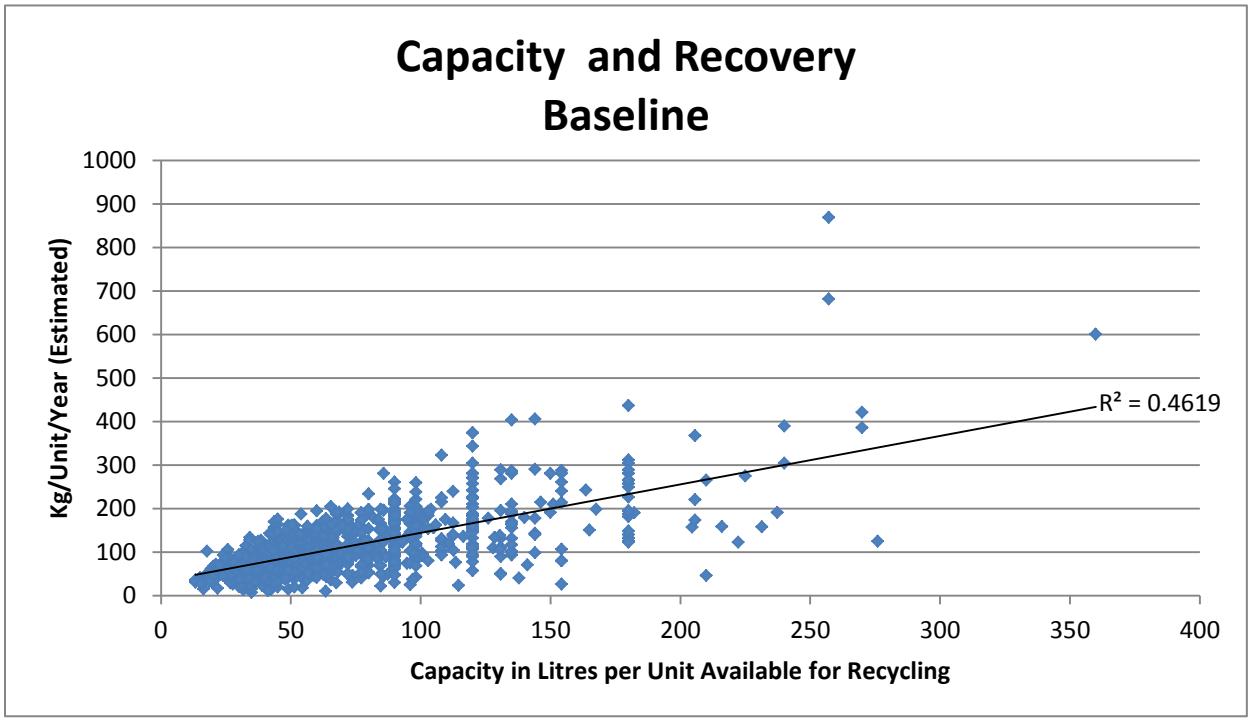
**Table 4.9** - Total number of recycling containers

| | Baseline | Post implementation |
|---|---|---|
| Units with recycling service | 45,853 | 45,853 |
| 95 gallon carts | 2,145 | + 270 |
| Total program capacity in litres | 112 | 119 |
| Capacity per unit (L/unit) | 51 | 55 |

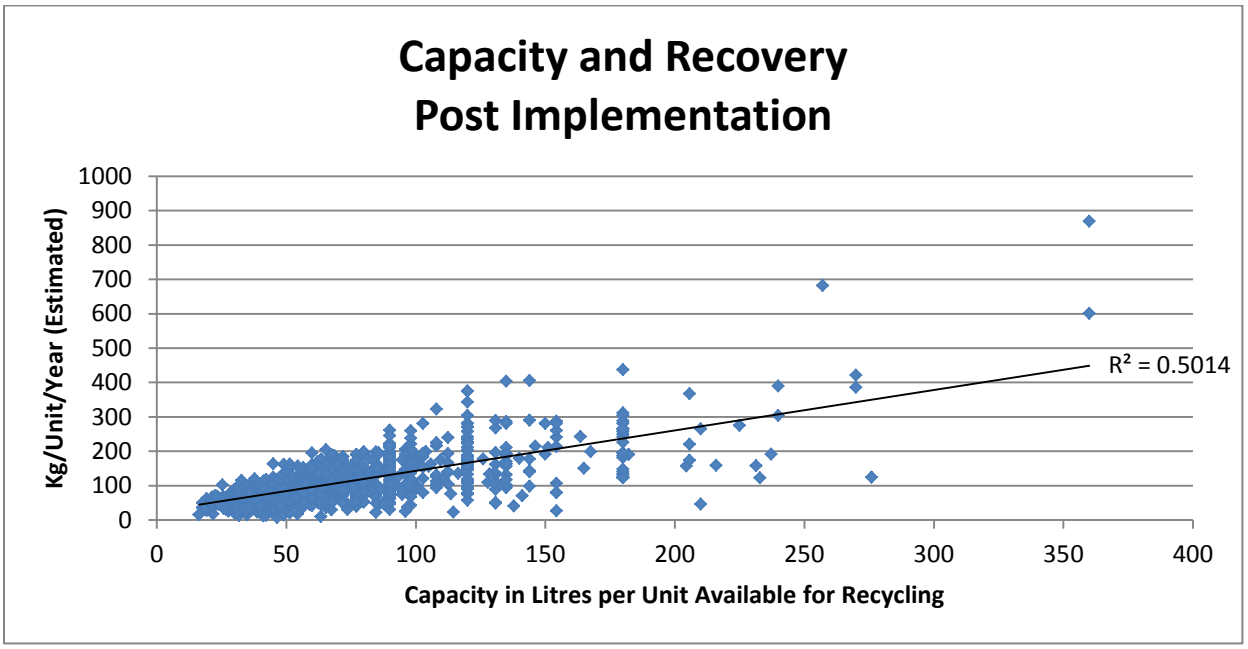
Note:

Buildings that provide more capacity for recycling will see an increase in recycling activity (up to an optimum level). This relationship is illustrated in Graph 4.11(a). The R value in the graph indicates the degree of correlation between the two variables, with a maximum of 1.0.

**Graph 4.11(a)** - Baseline (Pre) Best Practices Relationship between number of containers and recycling.



**Graph 4.11(b)** - Post Implementation of Best Practices Relationship between number of containers and recycling.




The post-implementation graph resulted in a greater degree of correlation between capacity available for recycling and recycling recovery, as shown by a higher "R value" than the baseline graph. Graph 11(b) shows that an increased recovery rate resulted from increasing the number of buildings in the Waterloo Region that were meeting best practices (one recycling cart per 7 units) which provides a capacity of at least 51.42 litres per unit.

**Table 4.11** - All Sites - Best Practice Capacity Ratio

| Municipality | Baseline | | Post-Implementation | | |
|---|---|---|---|---|---|
| | # buildings | % buildings | # buildings | % buildings | Total Buildings |
| **Waterloo** | 187 | 65.16% | 208 | 75.09% | 277 |
| **Kitchener** | 297 | 53.42% | 330 | 62.26% | 530 |
| **Cambridge** | 106 | 50.24% | 120 | 60.91% | 197 |
| **Townships** | 14 | 58.33% | 15 | 62.50% | 24 |
| **Total in Region** | **604** | **58.75%** | **673** | **65.47%** | **1028** |

Table 4.11 shows the increase in the total number of buildings and percentage of buildings within the Waterloo Region that are meeting the Best Practice Capacity Ratio as a result of the project implementation. There is a 7 per cent increase of buildings meeting the capacity ratio.

Implementing the best practices capacity ratio was not practical at all buildings within the Region of Waterloo. Recycling capacities at some buildings could not be increased to meet the ratio of 51 litres per unit for the follow reasons:

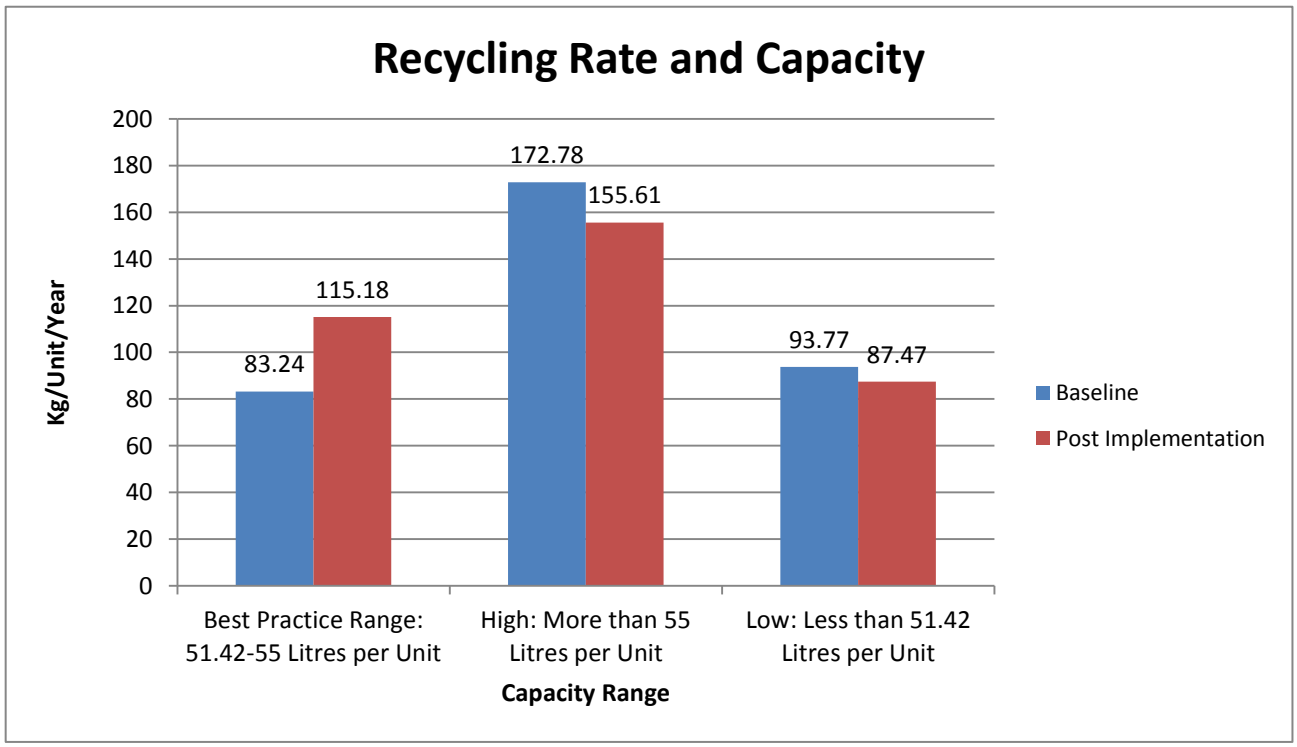
- Buildings in downtown areas did not have enough space to store more recycling containers.
- Building superintendents did not accept more recycling carts at the building because the extra resources would not aid in an increased capture rate.
- The Region of Waterloo limits multi-residential buildings to one OCC cart per building because the 360L do not efficiently capture OCC material. If buildings are producing significant amounts of this material they are encouraged to order private collection.
- Contamination in the carts was ranked too high to successfully capture materials as defined by the three stream collection. Therefore, adding additional carts to collect more contamination was not justified.
- Recycling rates were not filling the supplied carts at a building; thus, providing additional capacity would be an inefficient use of resources.

**Table 4.12** - Recycling capacity and recycling rate, baseline and post-implementation

| Capacity Range | Baseline | | Post-implementation | |
|---|---|---|---|---|
| | Number of Buildings | Average Kg/unit | Number of Buildings | Average Kg/unit |
| Best Practice Range: 51.42-55 litres/unit | 3 | 83.24 | 5 | 115.18 |
| High: More than 55 litres/unit | 35 | 172.78 | 39 | 155.61 |
| Low: Less than 51.42 litres/unit | 32 | 93.77 | 26 | 87.47 |

Table 4.12 shows that buildings meeting or exceeding the best practice capacity ratio generate a higher average recycling rate than buildings under the capacity ratio. In addition, fewer buildings post-implementation are in the "low" capacity range as a result of providing buildings with increased recycling capacities during the project.

**Graph 4.12** - Recycling capacity and recycling rate, baseline and post-implementation




Graph 4.12 represents the information from Table 4.12. It shows that the average recycling rate for buildings that provide 51 to 55 litres per unit capacity is 115 kg per unit per year (compared to 83 kg per unit per year prior to project implementation). Buildings with more or less than the recommended capacity are shown to have higher and lower recycling rates.

## 4.4 Phase 4: Provide promotion & education materials

### 4.4.1 Print materials

Phase four of the project included the packaging and delivery of various promotional materials (Appendix 5) for the multi-residential recycling program.

Please note that the development and re-design of the improved promotional and educational materials fell under a previously completed CIF project; Project 166.

The target audiences identified for the materials were:

- residents / tenants,
- superintendents / property managers, and
- owners.

The following promotional and educational materials were created (See CIF Project 166) to help educate the target audiences:

- cart labels
    - corrugated cardboard
    - paper products
    - containers
    - safety
- cart magnet
- cart recycling brochure
- recycling handbook for superintendents
- recycling cart poster
- blue and grey recycling bags (in-unit containers)

A project goal was to distribute new print materials in order 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, and container labels and a guidebook for superintendents, property managers and building owners) through the CIF website. The template materials were customized with specific municipal information.

The *CIF Best Practice Guidelines* recommends strategies for distribution of print materials, including that municipalities take responsibility for:

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

These materials should not be left with building staff for distribution. Past experience has found that stacks of flyers and posters left with superintendents may not get handed out to residents and posters will not be displayed. If time permits, a good practice is to handout the superintendents' handbook and display posters and signs at the time when recycling containers are being delivered to the building.

**Table 4.13** - Summary of Promotion & Education materials used

| Promotion & Education component | Number distributed | Method of distribution |
|---|---|---|
| Resident flyers | 10,500<br>1 per residential unit | By municipal staff to each unit |
| Posters | 1,500<br>5 to 10 per building, depending on bldg size | Posted by municipal staff on each floor (chute room), laundry room, lobby, mail room, etc. |
| Signs | 500<br>2 per buildings – one for each stream | By municipal staff |
| Containers labels | 3,000 – 2 per cart (top and front) | By municipal staff |
| Recycling guidebook | 400<br>For each superintendent, property manager and property owners | By mail or provided during site visits |

All deliveries were completed by Regional Staff to ensure accurate and consistent site assessment and delivery to the two target groups: residents and superintendents / property managers.

Staff used both Regional and personal vehicles to travel to and from sites. During inclement weather, vans (rather than trucks) were the preferred option since the promotion and education material delivered door-to-door were not weather resistant.

The multi-residential packages were distributed between June 2011 and December 2012 by full time staff and co-op students.

The residential packages consisted of the following items:

- Blue recycling bag (for containers)
- Grey recycling bag (for paper)
- Magnet
- Brochure

Each building also received a superintendent package at the time of the site inspection.

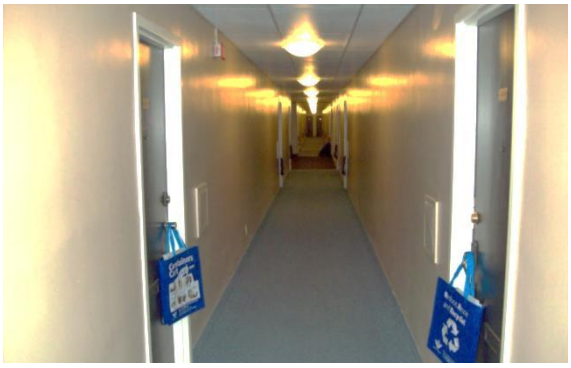


Photo 5 - In-unit containers were delivered to each unit in the building.

The purpose of the superintendent package was to allow building officials to educate new residents with information at the beginning of their lease. Some buildings that were larger in size (eg. greater number of units) were given two superintendent packages.

The superintendent package consisted of the following items:

- blue and grey recycling bags (7 ea.)
- magnet (7 ea.)
- brochure (7 ea.)
- recycling handbook (1 ea.)
- posters (2 ea.)

Despite repeated attempts to contact the superintendent/owner, a limited number of sites could not be accessed (Appendix 1). This occurred when building management did not reside at the site address. In addition, other addresses were extremely difficult to contact and required multiple attempts in order to complete the assessment.

### 4.4.2 – Outreach activities and timing

The project was implemented over a period of three and one half years from April 2010 to March 2014. Unless otherwise stated, 2010 data and / or statistics were used during this project.

**Table 4.4.2** - Timing of Promotion & Education campaign

| Date | Communication Channel | Details | Target Audience |
|---|---|---|---|
| April 2010 – Project Start | **WRAMA trade show display** | Display– announced new tools | Property owners (350 attendees) |
| May 28, 2010 | **Formal Agreement** | RMOW, Stewardship Ontario and Waste Diversion Ontario enter into agreement to implement best practices. | RMOW Multi-Residential Sites (more than six units) |
| May 2010 | **Promotional Materials Developed** | New materials will be available and insert for all owner distributed by mail. | Property owners, managers (approx. 550) |

| Date | Communication Channel | Details | Target Audience |
|---|---|---|---|
| June 2011 to December 2012 | **Site visit for each address** | Conducted by municipal staff to capture baseline information, meet with on-site contact, deliver promotional materials to each unit, and replace cart labels when possible/needed. | On-site contact / Tenants / Residents |
| January 2013 to July 2014 | **Data Entry / Report Writing** | Develop spreadsheet, enter and analyse data and write report. | Municipal Staff / CIF staff |

- 1,078 site visits were partially or fully completed and all associated records were updated in the Access database by staff.
- 45,000 in-unit containers were distributed directly to the tenants and a supply of replacement bags and promotion and education materials were distributed to property managers and/or superintendents. This included one blue bag for containers and one grey bag for paper fibres.
- Refer to Graph 4.11 a and b for recycling estimates pre and post best practice implementation.
- 270 recycling containers were added to the program to meet best practices, increasing the recycling capacity from 51 litres per unit to 55 litres per unit.
- An additional 488 carts were delivered within six to eight months following the completion of the site visits.
- By July 2014 the remaining 442 carts specifically purchased for the CIF project had been distributed to various sites to maintain or increase capacity.
- Refer to Table 4.13 for a list of promotional materials distributed.
- No additional outreach activities were associated with this project.

# 5. Project budget and schedule

**Table 5.1 -** Project budget, planned and actual (current section)

| Description | Unit | Quantity (est.) | Unit Cost (est.) | CIF Approved (upset limit) | Quantity (actual) | Unit Cost | Cost |
|---|---|---|---|---|---|---|---|
| Site Visits | 1 | 1200 | $35.00 | $42,000 | 1078 | $35.00 | $37,730 |
| Report | 1 | 1 | 2,000 | 2,000 | 1 | 1 | $2,000 |
| **Total** | | | | **$44,000** | | | **$39,730** |

This project was completed in two major sections due to a change in project lead. Part 1 included the initial research, feasibility and contract signing and the development and production of the new promotion and education material. Part 2 included the database updates, conducting site visits, door-to-door delivery, spreadsheet development, data entry and analysis and report writing. This change in leadership resulted in the addition of significant time to the project due in part to the learning curve associated with the transition.

**Table 5.2** Project budget, planned and actual

| Description | Unit | Quantity (est.) | Unit Cost (est.) | CIF Approved (upset limit ) | Quantity (actual) | Unit Cost | Cost |
|---|---|---|---|---|---|---|---|
| Staff support | Building (site visits) | 1,200 | $35 | $42,000 | 1078 | $35 | $37,730.00 |
| Increase capacity | 360 l Carts | 1,100 | $65.00 | $39,000 | 1,100 | $65.00 | $31,549.51 |
| Final report | Report | 1 | $2,000 | $2,000 | 1 | $2,000 | $2,000.00 |
| In –Unit containers | Blue Bags | 27,500 | $0.78 | $67,500.00 | 27,500 | $0.78 | $45,650.00 |
| | Grey Bags | 27,500 | $0.88 | | 27,500 | $0.88 | |
| Print costs | Cart labels | 3,700 | LS | $6,938.38 | LS | LS | $6,938.38 |
| | Handbooks | 1,500 | LS | $1,134.00 | 1,500 | LS | $1,134.00 |
| | Brochures | 45,000 | LS | $1,512.00 | 45,000 | LS | $1,512.00 |
| | Magnets | 43,050 | LS | $4,804.33 | 43,050 | LS | $4,804.33 |
| | Magnets | 4,000 | LS | $1,263.78 | 4,000 | LS | $1,263,78 |
| | Posters | 1,500 | LS | $ 446.25 | 1,500 | LS | $ 446.25 |
| Other P & E materials / Costs | None | | | | | | -- |
| **Total** | | | | | | | $133,028.25 |

# 6. Concluding comments

The following 11 recommendations should be considered and warrant more investigation for the multi-residential recycling program in the Region of Waterloo:

**Operational recommendations**:

- If fibre processing contract allows, consider removing the ONP and OCC limit and/or offer additional OCC cart collection. Additional collection could be offered to those sites that produce little or no contamination. Additional OCC collection could also be available if site is successfully participating in the Green Cart program.

- Investigate the possibility of increasing collection days by providing twice a week collection to those sites that have limited space. This approach would be especially beneficial to buildings built prior to the implementation of the cart program that did not design specific areas for all waste disposal options.

- Investigate a separate OCC bin collection service to capture potential revenue and tonnage.

- Investigate the possibility of altering collection from two-stream to one-stream collection.

- Investigate the possibility of implementing more sites to curbside blue box collection beyond the current level. Review the program requirements and remove some of the barriers to curbside collection before the next collection contract.

- Investigate the possibility of linking recycling service collection to only those sites that use the Region's landfill for waste disposal.

**Administrative/Educational recommendations**:

- Include best practice requirements into the site profile document and the Terms and Conditions Agreement. For example, owners must agree to the number of carts to meet best practice and must agree to door to door delivery of educational material.

- Investigate implementing an education program for residents/tenants and superintendents/property manager/owners, focusing on buildings that demonstrate a low to very low turnover rate.

- Investigate offering rewards to buildings with low or zero contamination.

- Investigate the option of using only one database to record all of the multi-residential information. Currently the Region is using two separate databases (Lagan / Access database).

- Consider the importance of accurate data collection and reporting:

    - develop a standard protocol / guideline for data entry to ensure consistency
    - develop and implement a training program for the Access database
    - develop a monthly / annual report to track distribution of carts distinguishing between replacement carts and additional carts
    - include a field in the Access database which would calculate / indicate which sites are meeting best practices and identify capacity

# 7. Appendices

## Appendix 1

## Site Profile Form

## Multi-Residential Recycling Information Collection Form

Address: **«Street_Number» «Street_Name» «Street_Type» «Direction», «AddressesCity»**

Total Units: **«Units»** Units Facing Street: **«Road»** Units on Internal Road: **«Internal»**

Floors:_____ Site Visit Date & Day of Week: _____

Building Type: **«Building_Type»** Ownership: **«RentalCondoCode»** Controlled Access: ☐ Yes ☐ No

### Contact Information

**Building Owner/Property Manager**

Company: **«Company_Name»**

Name: **«OwnerFirst_Name» «OwnerLast_Name»**

Phone #: **«OwnerPhone1» «OwnerPhone1Extension»**

Cell #: **«OwnerPhone2»**

E-Mail: **«Email»**

Address: **«OwnerAddress1», «OwnerCity»**

Property Manager: **«PropertyManagerFirst_Name» «PropertyManagerLast_Name»**

**Building Super**

Name: **«SuperintendentFirst_Name» «SuperintendentLast_Name»**

Phone #: **«SuperintendentPhone1»**

Cell #: **«SuperintendentPhone2»**

E-Mail: _____

Address: **«SuperintendentAddress1», «SuperintendentCity»**

### Garbage Area Description – check all that apply

Dumpster: Y / N Number of Dumpsters: _____

Weekly Pickup ☐ Twice/wk ☐

Garbage Enclosure Y / N

Chute: Y / N Number of Streams _____

Molok: Y / N Number and Type of Streams _____

### Cart Recycling

Collection Day: **«PickupDay»** # of Collection Locations: _____

Collection Location: **«CartLocationNote»**

Recycling Area: Outdoor ☐ Outdoor Enclosure ☐ Inside room ☐ Main Fl ☐ Under ground ☐
Collect from each floor ☐

Twinned with garbage ☐ Recycling containers shared with other buildings ☐

Addresses that share _____

Room to add extra carts ☐ Where _____

Meeting Best Practices: **«Meet_BP»**

Document Number: 1075370

| Cart Performance Evaluation – complete the day before collection | | | | | | |
|---|---|---|---|---|---|---|
| Access | | | 1 – Requires Attention (Long Distance Away / Snowed in / Can't get to it) | | 2 – OK (located inside or close to an entrance) | 3 – Excellent (inside building / easy access / by garbage collection) |
| Cleanliness | | | 1 – Requires Attention (Area is surrounded by large garbage items, disorganized) | | 2 – OK (small amount of loose material usually due to overflow) | 3 – Excellent (very clean and organized) |
| Lighting / Safety | | | 1 – Requires Attention (Outdoor area completely away from any source of light, indoor in a dark room) | | 2 – OK (Lighting is close may be dim) | 3 – Excellent (Lighting directly above, passage to depot is lit) |
| Cart Type | # of Carts | | Replace Labels | Fullness/Capacity | Contamination Level | Contamination Type |
| | In Database | On-Site | | | | |
| COM | «COM» | | Y N | E ¼ ½ ¾ F OF | N L M H | Cross Bagged Cont. Garb |
| | | | | E ¼ ½ ¾ F OF | N L M H | Cross Bagged Cont. Garb |
| | | | | E ¼ ½ ¾ F OF | N L M H | Cross Bagged Cont. Garb |
| | | | | E ¼ ½ ¾ F OF | N L M H | Cross Bagged Cont. Garb |
| | | | | E ¼ ½ ¾ F OF | N L M H | Cross Bagged Cont. Garb |
| | | | | E ¼ ½ ¾ F OF | N L M H | Cross Bagged Cont. Garb |
| ONP | «ONP» | | Y N | E ¼ ½ ¾ F OF | N L M H | Cross Bagged Cont. Garb |
| | | | | E ¼ ½ ¾ F OF | N L M H | Cross Bagged Cont. Garb |
| | | | | E ¼ ½ ¾ F OF | N L M H | Cross Bagged Cont. Garb |
| | | | | E ¼ ½ ¾ F OF | N L M H | Cross Bagged Cont. Garb |
| | | | | E ¼ ½ ¾ F OF | N L M H | Cross Bagged Cont. Garb |
| OCC | «OCC» | | Y N | E ¼ ½ ¾ F OF | N L M H | Cross Bagged Cont. Garb |
| | | | | E ¼ ½ ¾ F OF | N L M H | Cross Bagged Cont. Garb |
| | DUMPSTER | | Size: | E ¼ ½ ¾ F OF | N L M H | Frequency of Collection: Weekly ☐ 2x Week ☐ |
| Notes: | | | | | | |

Inspected by: _____ Date Entered Into Spreadsheet: _____

Document Number: 1075370

## Appendix 2
## Incomplete Site Assessments

This table lists the Regional addresses where staff was unable to complete full site assessments despite repeated attempts. Partial site assessments were completed.

| # | Street Name | Street Number | Street Type | City | Number of Units |
|---|---|---|---|---|---|
| 1 | High | 22-24 | Street | Waterloo | 12 |
| 2 | King | 214-216 | Street | Waterloo | 7 |
| 3 | Seagram | 100-108 | Drive | Waterloo | 600 |
| 4 | University | 155-163 | Avenue | Waterloo | 300 |
| 5 | Westmount | 140 | Road | Waterloo | 60 |
| 6 | Westmount | 190 | Road | Waterloo | 80 |
| 7 | Westmount | 196 | Road | Waterloo | 80 |
| 8 | Westmount | 240 | Road | Waterloo | 100 |
| 9 | Westmount | 265 | Road | Waterloo | 75 |
| 10 | Westmount | 290 | Road | Waterloo | 68 |
| 11 | Balfour | 15 | Crescent | Kitchener | 15 |
| 12 | Balfour | 9 | Crescent | Kitchener | 0 |
| 13 | Brybeck | 16 | Crescent | Kitchener | 23 |
| 14 | Brybeck | 76 | Crescent | Kitchener | 16 |
| 15 | Brybeck | 88 | Crescent | Kitchener | 25 |
| 16 | Brybeck | 47 | Crescent | Kitchener | 6 |
| 17 | Brybeck | 6 | Crescent | Kitchener | 23 |
| 18 | Briarmeadow | 345 | Drive | Kitchener | 40 |
| 19 | Chandler | 265 | Drive | Kitchener | 12 |
| 20 | Country Hill | 84 | Drive | Kitchener | 44 |
| 21 | Country Hill | 90 | Drive | Kitchener | 41 |
| 22 | Duke | 350-356 | Street | Kitchener | 10 |
| 23 | Eighth | 100 | Avenue | Kitchener | 107 |
| 24 | Franklin | 122 | Street | Kitchener | 6 |
| 25 | Frederick | 552 | Street | Kitchener | 11 |
| 26 | Greenfield | 512-524 | Avenue | Kitchener | 75 |
| 27 | Holborn | 65 | Drive | Kitchener | 40 |
| 28 | Holborn | 45-53 | Drive | Kitchener | 70 |
| 29 | Montcalm | 40-60 | Drive | Kitchener | 26 |
| 30 | Montgomery | 240 | Road | Kitchener | 6 |
| 31 | Pioneer | 375-399 | Drive | Kitchener | 44 |
| 32 | Queenston | 5-63 | Drive | Kitchener | 28 |
| 33 | Traynor | 301 | Avenue | Kitchener | 70 |
| 34 | Vanier | 37 | Drive | Kitchener | 120 |
| 35 | Weichel | 12 | Street | Kitchener | 15 |
| 36 | Wellington | 105 | Street | Kitchener | 11 |
| 37 | Ainslie | 17-35 | Street | Cambridge | 20 |
| 38 | Chalmers | 135 | Street | Cambridge | 98 |
| 39 | Chalmers | 50 | Street | Cambridge | 63 |
| 40 | Concession | 143 | Street | Cambridge | 42 |
| 41 | Cooper | 10 | Street | Cambridge | 21 |

| # | Street Name | Street Number | Street Type | City | Number of Units |
|---|---|---|---|---|---|
| 42 | Franklin | 101 | Boulevard | Cambridge | 50 |
| 43 | Fraser | 35-45 | Street | Cambridge | 23 |
| 44 | Hespeler | 160 | Road | Cambridge | 15 |
| 45 | Hilltop | 46 | Drive | Cambridge | 9 |
| 46 | Holiday Inn | 175 | Drive | Cambridge | 20 |
| 47 | Salisbury | 220 | Avenue | Cambridge | 29 |
| 48 | Stirling Macgregor | 58 | Drive | Cambridge | 42 |
| 49 | Tannery | 40 | Street | Cambridge | 18 |
| 50 | Tannery | 42 | Street | Cambridge | 24 |

**Appendix 3**
**Geoware Report**

# Transactions By Customer Summary Report

Regional Municipality of Waterloo - Waste Management

For Period: 01-Jan-2012 to 31-Dec-2012

Licenses : 8615XE,8614XE,3661KV,3998NZ

Material Stream : All

Material Direction : All

| Account | Business Name | Loads | Weight (tn) | Fees ($) |
|---|---|---|---|---|
| CHARGE ACCOUNT TRANSACTIONS (CHG) | | | | |
| 3616 | TRI CITY MUNICIPAL COLLECTION | 2,462.00 | 4,405.34 | $0.00 |
| | **Business Type Totals:** | **2,462.00** | **4,405.34** | **$0.00** |
| | **Grand Totals:** | **2,462.00** | **4,405.34** | **$0.00** |

**Appendix 4**

Time Duration between Pre and Post Site Assessments

**Appendix 4**

Time Duration between Pre and Post Site Assessments

| Municipality | Street Name | Street Number | Street Type | Total Units | Pre Site visit | Post Site Visit | Time Difference (Days) |
|---|---|---|---|---|---|---|---|
| **Waterloo** | Albert | 651-657 | Street | 56 | 30/07/2012 | 26/11/2012 | 119 |
| | Allen | 100 | Street | 81 | 12/07/2012 | 06/12/2012 | 147 |
| | Amos | 31-45 | Avenue | 40 | 04/04/2012 | 22/11/2012 | 232 |
| | Bearinger | 368 | Road | 18 | 10/09/2012 | 26/11/2012 | 77 |
| | Beechwood | 508 | Drive | 41 | 30/07/2012 | 26/11/2012 | 119 |
| | Bridgeport | 57-59 | Road | 68 | 05/07/2012 | 27/11/2012 | 145 |
| | Brookhaven | 524 | Crescent | 6 | 10/09/2012 | 26/11/2012 | 77 |
| | Cedarbrae | 249 | Avenue | 38 | 10/09/2012 | 26/11/2012 | 77 |
| | Erb | 247-251 | Street | 40 | 20/09/2012 | 20/09/2012 | 0 |
| | Erb | 285 | Street | 100 | 04/10/2012 | 06/12/2012 | 63 |
| | Glenridge | 250 | Drive | 66 | 18/09/2012 | 27/11/2012 | 70 |
| | King | 191 | Street | 157 | 31/05/2012 | 22/11/2012 | 175 |
| | Kingscourt | 476 | Drive | 25 | 25/06/2012 | 27/11/2012 | 155 |
| | Laurelwood | 545 | Drive | 23 | 10/09/2012 | 26/11/2012 | 77 |
| | Moore | 174 | Avenue | 10 | 12/07/2012 | 22/11/2012 | 133 |
| | Northlake | 321-339 | Drive | 110 | 30/07/2012 | 26/11/2012 | 119 |
| | Parkside | 400 | Drive | 108 | 30/07/2012 | 10/12/2012 | 133 |
| | Silverbirch | 601 | Road | 11 | 10/09/2012 | 26/11/2012 | 77 |
| | Silverbirch | 627 | Road | 23 | 10/09/2012 | 26/11/2012 | 77 |
| | University | 100 | Avenue | 7 | 11/10/2012 | 17/12/2012 | 67 |
| **Kitchener** | Ahrens | 157 | Street | 12 | 30/08/2012 | 08/11/2012 | 70 |
| | Ann | 164 | Street | 9 | 26/09/2012 | 14/11/2012 | 49 |
| | Blucher | 67-71 | Street | 14 | 30/08/2012 | 08/11/2012 | 70 |
| | Brybeck | 144 | Crescent | 36 | 08/06/2012 | 09/11/2012 | 154 |
| | Chandler | 175-215 | Drive | 44 | 18/09/2012 | 27/11/2012 | 70 |
| | Elm Ridge | 150 | Drive | 70 | 15/06/2012 | 14/12/2012 | 182 |
| | Fife | 110 & 18 | Avenue | 22 | 03/10/2012 | 14/11/2012 | 42 |
| | Fourth | 210 | Avenue | 50 | 01/08/2012 | 14/11/2012 | 105 |
| | Franklin | 140 | Street | 40 | 28/03/2012 | 12/12/2012 | 259 |
| | Frederick | 780 | Street | 32 | 26/09/2012 | 14/11/2012 | 49 |
| | Frederick | 250 | Street | 107 | 30/05/2012 | 12/12/2012 | 196 |
| | Gage | 103 | Avenue | 30 | 14/06/2012 | 08/11/2012 | 147 |
| | Greenfield | 565 | Avenue | 108 | 08/08/2012 | 12/12/2012 | 126 |
| | Guelph | 1014-1026 | Street | 12 | 13/04/2012 | 08/11/2012 | 209 |
| | Kingsway | 3085 | Drive | 68 | 05/09/2012 | 08/11/2012 | 64 |
| | Midland | 24 | Drive | 74 | 03/10/2012 | 14/11/2012 | 42 |
| | Queen | 310 | Street | 217 | 26/06/2012 | 27/11/2012 | 154 |
| | Queens | 1249-1293 | Boulevard | 95 | 04/10/2012 | 08/11/2012 | 35 |

| Municipality | Street Name | Street Number | Street Type | Total Units | Pre Site visit | Post Site Visit | Time Difference (Days) |
|---|---|---|---|---|---|---|---|
| | Stirling | 772 | Avenue | 24 | 19/04/2012 | 08/11/2012 | 203 |
| | Walton | 25 | Avenue | 12 | 29/08/2012 | 08/11/2012 | 71 |
| **Cambridge** | Bishop | 235 | Street | 32 | 09/07/2012 | 03/12/2012 | 147 |
| | Can-Amera | 290 | Parkway | 50 | 06/11/2012 | 20/11/2012 | 14 |
| | Christopher | 130 | Drive | 42 | 28/09/2012 | 23/11/2012 | 56 |
| | Clyde | 272 | Road | 26 | 13/03/2012 | 20/11/2012 | 252 |
| | Concession | 18 | Street | 12 | 06/11/2012 | 20/11/2012 | 14 |
| | Duke | 1250 | Street | 20 | 16/07/2012 | 19/11/2012 | 126 |
| | Gail | 14 | Street | 45 | 29/08/2012 | 20/11/2012 | 83 |
| | Glamis | 215 | Road | 46 | 06/11/2012 | 20/11/2012 | 14 |
| | Hespeler | 190 | Road | 112 | 02/04/2012 | 19/11/2012 | 231 |
| | Hespeler | 204 | Road | 146 | 09/07/2012 | 19/11/2012 | 133 |
| | Hilltop | 42 | Drive | 9 | 12/06/2012 | 20/11/2012 | 161 |
| | Hilltop | 49 | Drive | 12 | 19/06/2012 | 20/11/2012 | 154 |
| | Holiday Inn | 375 | Drive | 36 | 06/11/2012 | 20/11/2012 | 14 |
| | Holiday Inn | 405 | Drive | 30 | 06/11/2012 | 20/11/2012 | 14 |
| | Jamieson | 200 | Parkway | 169 | 06/11/2012 | 20/11/2012 | 14 |
| | Lang's | 581-595 | Drive | 38 | 02/04/2012 | 19/11/2012 | 231 |
| | Linnwood (CAM) | 5 | Avenue | 21 | 12/06/2012 | 20/11/2012 | 161 |
| | Queenston | 1554 | Road | 16 | 16/07/2012 | 19/11/2012 | 126 |
| | Winston | 36 | Boulevard | 8 | 06/11/2012 | 03/12/2012 | 27 |
| | Winter | 20 | Avenue | 26 | 29/08/2012 | 20/11/2012 | 83 |
| **Townships** | Bute | 35 | Street | 23 | 02/08/2012 | 06/12/2012 | 126 |
| | Brewery | 20 | Street | 12 | 02/08/2012 | 06/12/2012 | 126 |
| | Snyder's | 134 | Road | 25 | 02/08/2012 | 06/12/2012 | 126 |
| | Robin | 6 | Drive | 6 | 24/08/2012 | 14/12/2012 | 112 |
| | Herrgott | 2725 | Road | 16 | 18/10/2012 | 06/12/2012 | 49 |
| | Stanley | 99 | Street | 9 | 02/08/2012 | 06/12/2012 | 126 |
| | Flamingo | 30 | Drive | 54 | 13/07/2012 | 14/12/2012 | 154 |
| | Snyder | 15 | Avenue | 29 | 13/07/2012 | 14/12/2012 | 154 |
| | Snyder | 21 & 23 | Avenue | 14 | 13/07/2012 | 14/12/2012 | 154 |
| | Waterloo | 375 | Street | 17 | 02/08/2012 | 06/12/2012 | 126 |
| **Average** | | | | **46** | | | **111** |

# Appendix 5

## Samples of Promotion and Education Materials

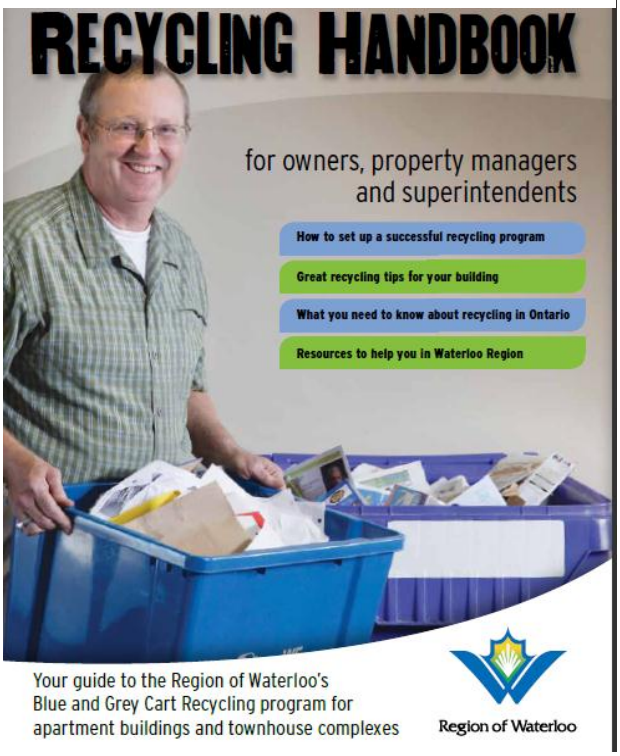
## Recycling Bag – Graphic layouts




## Cart Labels – Graphic layout




## Recycling Handbook for Owner / Property Managers Front Cover




## Magnet for tenants / residents – Graphic layout


## Recycling Brochure for Tenant / Resident

## References


1. Regional Municipality of Waterloo (2011), Planning, Housing and Community Services, Planning Information Bulletin March 2011.

2. Regional Municipality of Waterloo (2010), Transportation and Environmental Services, Waste Management Division,

3. Waste Diversion Ontario, Continuous Improvement Fund, November 2009, Guidelines for Implementing Best Practices in Municipal Multi-Residential Recycling Program, November 2009.

4. Environment Canada (2013), http://www.ec.gc.ca/meteo-weather/default.asp?lang=En&n=51AA6ED5-1 "The Big Heat"

5. Region of Waterloo (January 19, 1994), Engineering Department, Engineering Report E94-005, Multi-Residential Level of Service.

6. Waste Diversion Ontario (2011), CIF 201: Container Density Factors

7. Region of Waterloo, Key Indicator Report (2010), Waste Management Division

8. Region of Waterloo, (2013), Waste Diversion Ontario Datacall Summary of Blue Box Costs.