Final Report

CIF 616.8

Town of Cochrane

Curbside Recycling Implementation

Final Project Report

August 14, 2015

Town of Cochrane

CIF Project number 616.8

Acknowledgement:

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EXECUTIVE SUMMARY

The Town of Cochrane (Town) and communities along HWY 11 north situated in the northeastern region of Ontario are confronted with unique waste management challenges such as small population bases over which to share-out program costs and high transportation expenses due to the long distance to haul recyclable material to recovery facilities (MRFs) and markets. The Town had a long standing service arrangement with the Cochrane Temiskaming Waste Management Board (CTWMB) which provided residents with depot recycling services. Town residents and staff were dissatisfied with the level of service this provided as diversion performance was poor, residents were limited with what they could recycle, and garbage services were more convenient which encouraged landfilling behaviors. Following recommendations from a study conducted by the Continuous Improvement Fund (CIF# 170), the Town ended the arrangement with the CTWMB and implemented an automated collection program. The primary goals of this project work were to: increase diversion of Blue Box materials from landfill by providing Town residents with a single stream curbside recycling program and construction of a local transfer station to allow for cost efficient shipping of materials to distant MRFs.

Implementation of this work included:

- Automated side loading arm (ASL) install on collection vehicle
- Recycling cart purchase and distribution (3,000 - 96 gallon carts)
- Transfer station (TS) design and construction
- Promotion and Education (P&E) campaign for the new program rollout

The actual total costs to implement the new program were approximately $325,000. The TS represents a cost effective solution for implementation of the new program, achieved by innovations in the TS wall structure (5 intermodal shipping containers) roof (a semi-transparent membrane cover), and loading platform (which allowed for loading of 53' shipping containers). The ASL install, cart distribution, and TS construction were all completed on time and the new program began August 20 2012.

Town staff overcame several obstacles in the rollout of the new program, including: not all addresses had been accounted for in preparation of cart distribution, staff had to develop new routes and schedules for vehicle operators, the tracking system for the RFID enabled carts worked ineffectively, issues with rolling stock breakdown (collection vehicle and TS loader tire flats), hauling inefficiencies, and the shutdown of the contracted recyclables processor (MRF).

Staff deem the project a success, as diversion has increased remarkably: from 108 metric tonnes (2010) to 502 metric tonnes (2014). The new program provides residents with a level of service that encourages participation and staff are able to report that the efficiency of the Blue Box program (in terms of cost per tonne) is as efficient as the previous depot service. In 2010 the cost per tonne for Blue Box service was $452.41 and in 2014 was $472.28. To continue this success, the Town is exploring opportunities to partner with surrounding municipalities and act as a hub for the transfer of recyclable material to distant MRFs.

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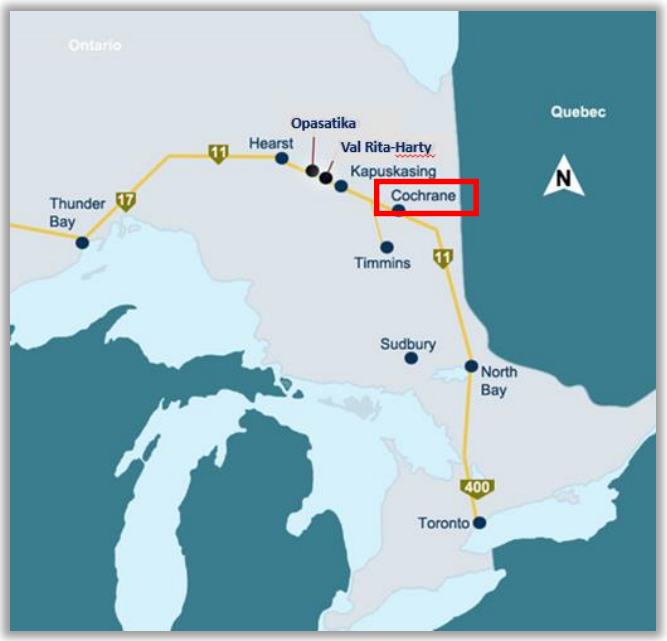
1 BACKGROUND INFORMATION

1.1 Municipal demographics

The Town of Cochrane (Town) is located in Northern Ontario at the junction of Hwy 11 North and Hwy 11 West. The town has a population of 5, 073 with a total of 2, 677 households; 2, 577 of which are considered single family. The total land area of the municipality is 539.2 km^2

Figure 1: Map of Northeastern Ontario



1.2 Previous recycling program: Cochrane Temiskaming Waste Management Board

Recycling services for the Town, prior to the implementation of this project, were provided by the Cochrane Temiskaming Waste Management Board (CTWMB). The CTWMB established in 1995 by 16 member municipalities along the Northeastern Highway 11 corridor. The CTWMB managed all aspects of Blue Box recycling in the area and provided services to municipalities through a depot collection system. The on-site recycling bins at the Recycling Depot were collected on a regular schedule with each on-site container being manually dumped into a larger segregated chamber of a collection vehicle and transported to a CTWMB Material Recovery Facility in Kapuskasing, ON (figure 2 below).

The Town's Depot system included 6 bins that were contained on site. Residents could drop off materials including: old corrugated cardboard (OCC), old boxboard (OBB), aluminum and steel cans and PETE & HDPE plastic containers (pictured in Figure 2). The cost of services provided by the CTWMB were shared equitably among municipalities on a per household basis. In 2012, the cost per household for this service was $21.00 per household and the Town's share amounted to $51,744 (2,464 households).

Figure 2: Interior of Kapuskasing MRF

While the CTWMB operated Blue Box services, the Town operated a weekly curbside garbage collection service for residential and commercial properties, with a rear packing vehicle which was complemented by smaller 5 and half tonne vehicles during peak times. The Town of Cochrane allowed residents to put out 4 bags of garbage to the curb. There is a one dollar charge for "bag tags" which could be purchased at Town Hall if a resident was in need of extra pick-up. There was also an assortment of tipping fees that were allocated at the town Landfill site for residents, non-residents or businesses who chose to haul their own garbage to the landfill site.

In 2010, the Continuous Improvement Fund (CIF), at the request of the Town of Cochrane, conducted a review of operations to increase the effectiveness of their depot based program (CIF #170). Using 2009 data from the CTWMB, the study identified the Town's share of recyclable materials diverted from landfill at 108 metric tonnes. The levy paid by the Town in 2009 was $47,580 or a net cost of $441 per tonne.

The results of this study indicated:

1. A curbside recycling program would be cost effective
2. Diversion of recyclable material from landfill would improve significantly
3. Ability to expand the list of targeted recyclable materials to include Glass, Aseptic and Polycoat containers, Empty and dry paint cans, Metal, Aerosol containers and Aluminum foils, plates and trays

This conclusion was predicated on purchase of a new 60/40 split collection vehicle which Town staff would operate to collect Blue Box recycling and garbage using an automated cart system. The Town applied for funding from the CIF to implement the automated curbside collection program and build a transfer station for managing the Blue Box materials (CIF #616.8).

Figure 3: Previous Town depot program under CTWMB

1.3 Project Description

1.3.1 Collection vehicle

The proposed waste management system consists of weekly curbside collection of both garbage and recyclable materials. Collection is offered to single and multi-family households. The Town made the decision to purchase a side loading collection vehicle rather than a rear packing vehicle. An Automated Side Loading (ASL) collection vehicle would facilitate pick-up, reduce the amount of town employees working collection each day and help prevent injuries to employees. The collection vehicle was a 2012 Labrie Expert 2000T Helping Handle Comingle from Joe Johnson Equipment.

Recycling and Garbage was to be collected on the same day by side loading fully automated collection vehicles. 60% of the load is dedicated to garbage and 40% to recycling. This allocation is optimal to the Town as the distance to the town landfill site is significantly further than the distance to the recycling transfer station. The allocation minimizes time spent on the road hauling material to drop off locations and maximizes time spent actually collecting.

1.3.2 Collection containers

Under a cart collection program, each household would receive their own 360 L Recycling bin with Multi Family residences receiving an amount of carts based on the needs of the location. The municipality chose to select a bin that was roughly twice the size of the waste carts available to residents. Residents are permitted to place one 180 L garbage cart at curbside on their collection day with the recycling cart. The belief was that the larger sized carts would further encourage residents to participate in the recycling program, at the same time they allow for bulkier items like cardboard and polystyrene foam to easily be included in the load.

The size of the recycling carts also made it possible for the largest families to participate as they have enough space to place all of their recycling. At the same time people living in smaller households or seniors can fill their cans over time and only place them to the curb when full. Any resident who has extra garbage bags that will not fit into the green waste cart may still purchase “bag-tags” at the Town Hall, which identifies to the Operator that he must leave the vehicle in order to collect the garbage.

1.3.3 List of targeted materials

As an advantage of the new system, the Town expanded the list of acceptable recyclable materials Whereas the depot system only allowed for the collection of OCC, OBB, aluminum and steel cans, and PETE & HDPE, the new system would accept Glass, Aseptic and Polycoat containers, Empty and dry paint cans, Metal, Aerosol containers and Aluminum foils, plates and trays.

1.3.4 Transfer Station upgrades

The decision was made to build a transfer station to store the recyclable materials prior to shipping to SANITRI in Rouyn-Noranda Quebec. Excavation of entire site which was built on municipally owned land was completed by Ray & Sons Excavating. The Transfer Station was built by ADUVO STUDIOS Inc.; whom installed 5 used 40 foot shipping containers that became the wall structure. Also installed was a 20 ft. wide by 16 ft. steel roll up door where the collection vehicle enters to empty recycling. Finally installed is a BMEC certified 12.1 ounce poly weave XL membrane for structure on top and ends. Concrete walls surround the drive up ramp which was built to facilitate loading of 53’ trailer. A drive up ramp was constructed of fine grading prep and asphalt pavement supplied by Miller Paving Northern. The Site was built in the summer of 2012 and took roughly one month to complete.

The facility is unlike a traditional transfer station as there are no utilities on site and is exempt from costly reporting requirements. The Town consulted with the local Ministry of the Environment District Office

with respect to approvals required for the facility and, specifically, to determine if the site required an Environmental Compliance Approval (ECA) under the Ontario Environmental Protection Act; Appendix A contains the decision flow diagram for Waste Disposal Site exemption from Regulation 101/94. In accordance with Ontario Regulation 101/94 (O. Reg. 101/94), Recycling and Composting of Municipal Waste, this site was exempt from requiring an ECA. With exemption, the Town was able to save costs on application and reporting work for the build and thereafter.

Figure 4: Town of Cochrane recyclables transfer station

The construction of the transfer station was completed in July, 2012 and has been in operation since that time. The transfer station only accepts source separated recyclables from the Town's curbside collection fleet and the occasional load of source separated recyclables from the commercial sector (i.e. cardboard). The site does not have a weigh scale and tonnages are reported to the Town by their contracted Material Recovery Facility (MRF) following shipment from the transfer station.

1.3.5 Transfer of recyclables

The recycling generated curbside is deposited at the transfer station where a loader can pack the materials while they are being stored in anticipation of hauling. On a by-weekly basis a 53' foot trailer arrives at the Cochrane Public works department which is then filled by loader. The recyclable materials are then hauled from Cochrane to the MRF for processing.

1.3.6 Selection of a MRF for Recyclables Processing

The Town made the decision to end their contract with the Cochrane Temiskaming Waste Management Board depot system and begin a curbside program run by the municipality and initially recycling was sent to SANITRI in Rouyn-Noranda, Quebec.

1.3.7 Promotion & Education to support new program roll out

The Town created a communication plan for Blue Box P&E to support the new program rollout. The P&E plan included:

- setting up booths at public events in order to discuss the program directly to residents
- newspaper and radio advertisements to give further information on the impending program
- information packages delivered with each bin

The program's start date was August 20th 2013. The results of this project were are contained in the report for CIF project #616.12 and samples of this material are contained in Appendix B – F.

1.3.8 Staff Training

Employees were trained on the ASL vehicle prior to the program's beginning. Carts were placed in the back of the public works yard and employees drove to each bin in preparation of the beginning of the program. Ample training time for the employees was scheduled; on average each operator had 3 shifts to learn to properly operate the vehicle. A total of approximately 80 hours of training on the new recycling program, system operations and equipment was given to each employee involved in the program.

Figure 6: Municipal collection vehicle. Driver training day

2 IMPLEMENTATION

2.1 Project Budget

Table 1: Project budget, actual expenditures, and differences between budget and actual

Item	Budget	Actual	Variation
Automation of collection vehicle	$46,000	$20,360	-$25,640
Recycling carts – 3,000 carts @ $50.90 / cart	$156,200	$152,700	-$3,500
Transfer station upgrades	$152,700	$147,203	-$5,497
Compactor unit at Transfer Station	$105,000	0	-$105,000
Promotion & Education	$10,000	$4,765	-$5,235
Contingency	$25,000	0	-$25,000
Total project costs	**$494,900**	**325,028**	**-$169,872**

2.2 Discussion of Variations from Budget

2.2.1 Why was automation of truck cheaper than expected?

The automation of the truck was less than expected since the municipality applied for the funding anticipating adding the automation to our existing rear packer truck. The Town budgeted for a new dual stream automated truck with the cart tipping automation added to the RFP. As this was then included in the building of the truck versus a retrofit the cost was less.

2.2.2 Why were recycling carts cheaper than expected?

The carts cost was more than expected but the number required were less as we went with the 95gallon recycling bin size due to the automated arm being added to the dual stream truck. This allowed to handle the material with automation and not manually.

2.2.3 Why didn't a compactor get put in? Why it was not needed?

The cost of the compactor and the annual maintenance was a deterrent. A review was conducted with the City of Timmins and in our discussions they informed us they were averaging 14 tonnes with a compaction trailer. When we started the project it was more cost effective to hire a transport with an open walking floor trailer to haul the material. Town staff are able to compact the recycling, by driving the loader over the material repeatedly, and then load the material in to the trailer and achieve an average of 18+tonnes compacted per load; see Table 2 for 2014 average transfer haul load weight statistics.

2.3 Implementation Challenges

2.3.1 Cart rollout

The list of addresses given before the delivery of the carts was not complete and therefore there has been a lot of adjusting and adding of carts to certain locations. This has been accomplished mostly by residents who call into the public works department and request that carts be delivered to them.

2.3.1.1 How many addresses were missed?

The amount of addresses that missed were not registered as multi-residential dwellings approximately 25.

2.3.1.2 How did you get carts out to these addresses?

Once the rate payer changed the assessment to multi-residence. The tax department sent notification of the change and we assigned the carts to the tenants. The route driven by the operator has therefore also been altered and also expanded upon as the weeks go on and the program progresses.

2.3.2 Scheduling vehicle operators

There have been deviations from the original work schedules for employees. Under the former program the work week would consist of Monday-Friday from 7am-3pm for 3 employees. Cochrane has a long rural route, prior to the implantation of the new waste management system the rural route would be completed by not only the rear packing vehicle but also with a half-tonne for the more secluded residents (adding a 4th employee to Mondays and Tuesdays).

Due to the greater distances being travelled by a single vehicle and to ensure proper maintenance of the equipment, the shifts on Monday-Thursday had to be extended to a 10 hour shift with Friday remaining an 8 hour shift. Shift and route alterations have been a constant work in progress since the implementation of the program.

2.3.3 RFID monitoring issues

It has been more difficult to monitor the output of residential and commercial properties. The Town of Cochrane purchased a computer software program from Lateral Innovations which was intended to be the main source of monitoring for the new cart system. The carts delivered to each address have been fitted with a RFID tag which gives out an account number and GPS location attributed to each address and bin. These tags were scanned and added to a program when the carts were delivered. With this new program the operator of the collection vehicle should be able to view (via the camera on the truck) what is collected in the recycling bin at each address. If the driver notices an issue of contamination, poor bin placement, or damaged bin, he/she should be able to simply use the touch screen computer mounted in the vehicle to select the address and identify the issue. This message should then be immediately transferred to the Public Works office where a notice can be delivered to the resident explaining the issue.

Unfortunately, throughout the first year of the program the software has worked sporadically at best and therefore the operators have had to rely on visual inspections of the carts and manual record noncompliance issues. Then staff can deliver notifications as per attached Appendix H. This computer system has not yet worked properly and the tags have not been continually read which has forced the municipality to use manual inspections by employees to properly monitor the effectiveness of the recycling program.

2.3.4 Compaction and hauling inefficiencies

Loader Operators were not loading enough recycling into 53’ trailer at beginning of program. The weights per loads at the start of the program was approximately 14 tonnes. To better the compaction efforts when the collection vehicle dumps a load of recycling, the loader operator now compacts the materials prior to pushing the material into the holding area. This has increased the compaction 18 to 20 tonnes per load. This has significantly improved the amount of material, per haul, that the Town is able to ship for processing as indicated in Table 2 on the next page.

Table 2: Transfer hauls of blue box recyclables during 2014 operations

DATE	Material Recovery Facility	Tonnes
January 13/14	Northern Environmental Solutions, Timmins ON	20.36
January 22/14	Northern Environmental Solutions, Timmins ON	17.77
February 2/14	Northern Environmental Solutions, Timmins ON	18.44
February 14/14	Northern Environmental Solutions, Timmins ON	17.31
February 26/14	Northern Environmental Solutions, Timmins ON	17.96
March 18/14	Northern Environmental Solutions, Timmins ON	20.67
March 18/14	City of Guelph, Guelph ON	18.00
April 8/14	Northern Environmental Solutions, Timmins ON	20.66
April 28/14	City of Guelph, Guelph ON	17.90
May 12/14	City of Guelph, Guelph ON	20.24
May 27/14	City of Guelph, Guelph ON	17.66
June 13/14	City of Guelph, Guelph ON	17.80
June 26/14	City of Guelph, Guelph ON	18.12
July 9/14	City of Guelph, Guelph ON	17.89
July 17/14	City of Guelph, Guelph ON	21.14
July 30/14	City of Guelph, Guelph ON	18.82
August 13/14	City of Guelph, Guelph ON	17.39
August 19/14	City of Guelph, Guelph ON	19.53
September 11/14	City of Guelph, Guelph ON	22.95
September 18/14	City of Guelph, Guelph ON	19.75
September 25/14	City of Guelph, Guelph ON	21.89
October 8/14	City of Guelph, Guelph ON	19.58
October 22/14	City of Guelph, Guelph ON	22.73
November 05/14	City of Guelph, Guelph ON	21.79
November 20/14	City of Guelph, Guelph ON	18.82
December 4/14	City of Guelph, Guelph ON	20.35
December 18/14	City of Guelph, Guelph ON	21.50
December 23/14	City of Guelph, Guelph ON	18.44
Total number of transfer hauls for 2014		**28**
Total tonnes of recyclables hauled for processing		**545.46**
Average transfer haul load weight (Tonnes)		**19.48**

2.3.5 Collection vehicle breakdowns

The collection vehicle has experienced several separate break downs. The total cost for 2012 for the International truck was $12,800 over and above the warranty. This was primarily due to the new emissions and environmental systems on the truck. The alternative to the dual stream truck was the use of 5 tons trucks and loaders to collect carts. This is not a satisfactory fix, another truck would be more effective not only for the cost but for the liability of workers possibly getting injured.

2.3.6 Loader tires

Tires on the loader were being punctured by broken glass while managing materials in the transfer station. Staff purchased wingfill tires in order to prevent punctures at a cost of approximately $11,000. The new tires have an estimated useful life 10 years given the low amount of use and the tires have been performing as expected.

2.3.7 P&E opportunities

There are a lack of viable opportunities to complete adequate promotion and education to the general public in Cochrane. Newspaper, radio and television advertisements do not reach all residents.

P&E efforts for the Corporation of the Town of Cochrane were a multi- tiered effort to create awareness of the new curbside recycling program. The awareness and excitement generated by The Town's public awareness blitz was supported by tangible information that was easy to understand for all of Cochrane's residents. The information given to the public can be separated as direct and indirect tactics.

Direct information included:

- Information packages included with each set of bins during household delivery.
- These packages included a brochure with a materials list and tips.
- A more detailed package which included more information on tips, frequently asked questions regarding the new curbside program and bin set up.
- A fridge magnet (4 x 6 inches) which could be placed in each household
- A list of the accepted plastics based on their recycling numbers and a list of examples for each number

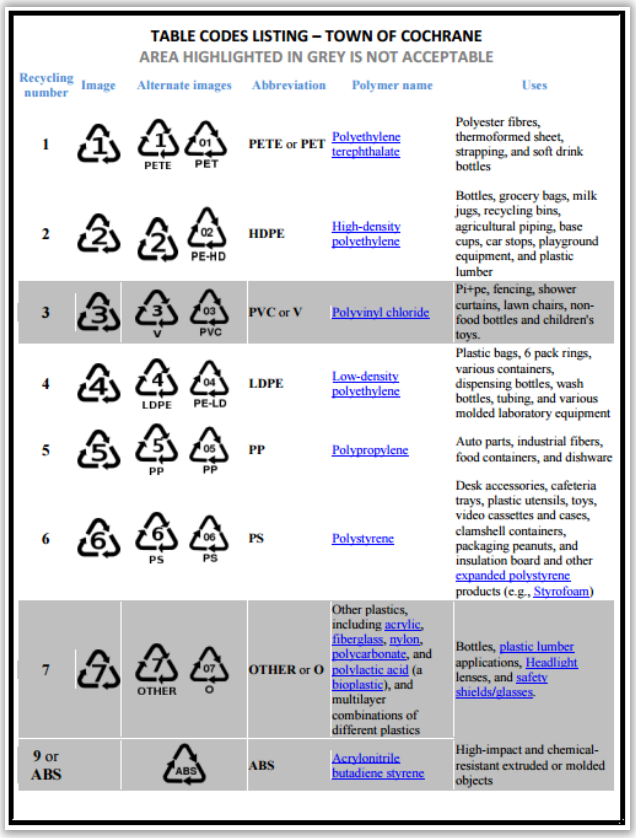


TABLE CODES LISTING – TOWN OF COCHRANE

AREA HIGHLIGHTED IN GREY IS NOT ACCEPTABLE

Recycling number	Image	Alternate images	Abbreviation	Polymer name	Uses
1		1 PETE 01 PET	PETE or PET	Polyethylene terephthalate	Polyester fibres, thermoformed sheet, strapping, and soft drink bottles
2		2 02 PE-HD	HDPE	High-density polyethylene	Bottles, grocery bags, milk jugs, recycling bins, agricultural piping, base cups, car stops, playground equipment, and plastic lumber
3		3 V 03 PVC	PVC or V	Polyvinyl chloride	Pi+pe, fencing, shower curtains, lawn chairs, non-food bottles and children's toys.
4		4 LDPE 04 PE-LD	LDPE	Low-density polyethylene	Plastic bags, 6 pack rings, various containers, dispensing bottles, wash bottles, tubing, and various molded laboratory equipment
5		5 PP 05 PP	PP	Polypropylene	Auto parts, industrial fibers, food containers, and dishware
6		6 PS 06 PS	PS	Polystyrene	Desk accessories, cafeteria trays, plastic utensils, toys, video cassettes and cases, clamshell containers, packaging peanuts, and insulation board and other expanded polystyrene products (e.g., Styrofoam)
7		7 OTHER 07 O	OTHER or O	Other plastics, including acrylic, fiberglass, nylon, polycarbonate, and polylactic acid (a bioplastic), and multilayer combinations of different plastics	Bottles, plastic lumber applications, Headlight lenses, and safety shields/glasses.
9 or ABS		ABS	ABS	Acrylonitrile butadiene styrene	High-impact and chemical-resistant extruded or molded objects

Indirect information included:

- Newspaper and Radio advertising that included information on important dates (start date, holidays) as well as tips to proper recycling.
- Display booth at local events (trade show, fall fair) for public outreach. Staff could field answers for questions and possible concerns.
- Presentations at local schools, pictured on next page

The majority of the information packages were read and understood by residents but not all. In order to combat any misunderstand or other barriers to recycling, the municipality has had to continue to promote he proper way to recycle, as well as act vigilantly in inspecting carts and materials at the transfer station to try and remove any unacceptable material before it is sent away to be processed.

Figure 5: Staff presenting to children at local area school

2.3.8 Ongoing monitoring activities

In terms of monitoring the recycling program during collection, drivers look for:

- a lack of recyclables and more waste
- no recycling bins out for several weeks
- waste and recycling bins used for materials other than household waste

An example of the visual inspections completed by drivers are photographed in Figure 6 below. Note, the photograph on the left contains plastic bags which are not accepted in the Town's recycling program. As such, this resident would receive a notice from Town Staff noting the materials that are not accepted in the recycling program and providing additional resources to remove barriers to proper recycling.

Figure 6: Visual inspection of recycling carts

3 RESULTS

To evaluate the effectiveness of the new Blue Box program, the Town monitored the following activities

- Recyclable materials diverted from landfill
- Collection program operations
- Transfer Station operations
- Haul and processing of recyclables

The program was fully implemented, and began operation, August 20th 2012.

3.1 Recyclable materials diverted from landfill

Under the former recycling depot system with the Cochrane Temiskaming Waste Management Board, 108 tonnes of recyclable materials were collected in 2011. This is a calculated amount based on an allocation of materials diverted from the entire northern node of the CTWMB on a per household basis. Following implementation of this project, the Town was able to recycle 477 tonnes of material in the first twelve months of operation. A monthly breakdown of the first twelve months tonnes diverted is presented in Figure 7 below. In 2014, the Town continued this trend and diverted 502 tonnes of recyclables.

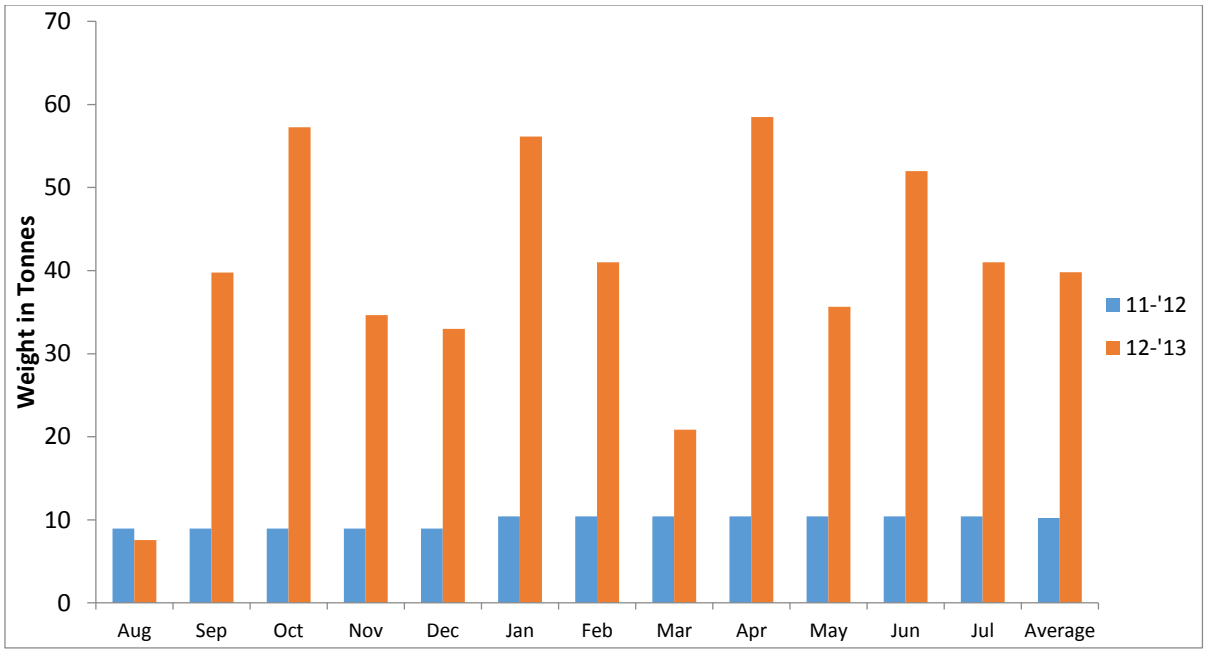


Figure 7: Recyclable materials collected Pre (CTWMB allocation) and Post (Town curbside service)

3.2 Collection Program Operations

Under the new curbside program 1 employee is needed to operate the collection vehicle with the automated arm. Due to the length of rural concession roads and lack of space in some downtown laneways, a 2nd employee is needed to assist the operator. The total costs to operate the collections component of the Town's Blue Box program was $124,959 for 2014. A full cost breakdown is presented in Table 2, below.

Table 3: Costs to operate cart collection program

Item	Waste Management (2014)	Blue Box Recycling (2014)
Staffing requirements		
Supervisor		$ -
Collection vehicle operator	$ 71,014.09	$ 35,507.05
Collection vehicle assistant	$ 71,014.09	$ 35,507.05
Administration staff		$ -
Maintenance staff		$ -
Equipment and Fuel		
Collection vehicle - Fuel		$ -
Equipment repairs		$ -
Amortization		
Collection vehicle amortization	$ 38,900.40	$ 19,450.20
Collection carts amortization	$ 25,933.60	$ 12,966.80
Total collection costs		$ 103,431.09

In order to monitor if residents are following the bylaw the Town purchased the aforementioned monitoring system from Lateral Innovations. The monitoring system has not worked properly since being introduced. Therefore, rather than having set-out information collected electronically, the Town must continue to rely solely on the visual examinations of the operators. Following the rollout of the new program, staff completed a set-out study to determine program use in the Town (Table 2). Staff observed residents to have set out recycling for collection at over 90% of households in the Town's service area. Total recycling per days is 9 hours and 1 hours for fleet maintenance.

Table 4: Set out and participation study

Day/Route	Area	Time/ Shift	# of Addresses	# of Carts	Participation	Full Loads
Monday	Glackmeyer (rural)	7am- 5pm	352	412	85%	3
Tuesday	Organize (rural) + 6 Multi Family Units	7am- 5pm	220	252	87%	2
Wednesday	West Annex- 7th Avenue	7am- 5pm	405	435	93%	3
Thursday	8th Avenue- 14th Avenue	7am-5pm	496	515	96%	4
Friday	15th Avenue- Hillcrest	7am-3pm	458	516	89%	3

3.3 Transfer Station Operations

The new facility was constructed and operational as of August 2012. The facility is different than a traditional transfer station in terms of the materials used in construction and that there are no hydro/electrical services on site. The facility was constructed to be cost effective and meet the needs of a program that manages a relatively small amount of material. A picture of the collection vehicle dropping recyclable materials into the TS is presented on the next page.

Figure 8: Collection vehicle dropping a load of recyclable material at the Town TS

Traditional transfer station costs are in the range of $1-2M for a 2,500 tonne per year facility, instead the Town's transfer station cost approximately $150,000 to design and construct to manage the 500 tonnes per year generated by our residents.

Table 5: Annual Transfer Station costs

Item	Forecasted	Actual (2014)
Staffing requirements		
Site Supervisor	$ 7,752.00	$ 10,564.40
Loader Operator	$ 7,655.45	$ 6,142.70
Labour	$ 1,040.00	-
Maintenance Staff	$ 5,103.63	-
Administration Staff	$ 1,360.97	$ 1,278.44
Equipment, Utilities, and Fuel		
Front End Loader - Lease	$ 4,374.54	-
Front End Loader - Fuel	$ 2,373.84	$ 3,114.69
Utilities (water, electricity, natural gas)	-	-
Maintenance and other costs		
Building, road, site work	$ 748.25	-
Administration, legal, accounting costs	$ 2,430.30	-
Total TS operating costs	**$ 32,839.00**	**$ 21,100.23**
Annual capital amortization	$ 7,450.00	$ 7,360.15
Total TS annual costs	**$ 40,289.00**	**$ 28,460.38**
Tonnes of recyclables	**500**	**502**
Cost per tonne	**$ 80.58**	**$ 56.69**

The strategy to construct what was needed, to service cost efficiency, is translated into the operation of the Transfer Station. The Town is committed to operating as cost effectively as possible and reportedly manages materials at approximately $30 / tonne. The full breakdown for costs to operate the transfer station on an annual basis, providing 2014 reported costs, is presented in Table 5 above.

3.4 Haul and Processing Arrangements

3.4.1 Sanitri – Rouyn, QC.

Initially, materials were hauled on a bi-weekly basis to SANITRI in Rouyn. This is a 3 year backhaul contract set at $835 per haul (year 1), $860.05 per haul (year 2), and $885.85 per haul (year 3). The cost to ship recycling to SANITRI was $75 per ton = $35, 764.52. In the first year under Cochrane's curbside program the cost was $40,413.93 for shipping and processing of materials at SANITRI in Rouyn.

3.4.2 City of Guelph MRF

Following the shutdown of the MRF in Rouyn, staff elected to ship materials to the City owned MRF in Guelph, ON. Due to market conditions, Town staff were able to secure revenue of $30 per tonne of material shipped to the Guelph MRF (2014 revenues totaled $23,657), which offset the cost of hauling such a long distance. Alternatively, staff would have shipped material to MRFs in either Timmins or North Bay, which would offer cheaper shipping costs but would result in paying operators between $60 – 100 per tonne of material. In 2014, it cost the Town $83,519 to ship materials to the City.

3.4.3 Northern Environmental Solutions (NES) – Timmins, ON

In 2014, the Town did ship some materials to Northern Environmental Solutions (NES) in Timmins, Ontario. The Town sent the recycling to Northern Environmental Solutions temporally as Sanitri closed. Once we requested quotations from various depots, the town proceeded in sending the recycling to Guelph due to cost savings (Why did you do this?) Processing costs, Timmins and Sudbury were both charging from $95 per ton to process whereas Guelph was paying $30 per ton to process. This offset any increase costs in the transportation that we incurred due to shipping.

3.5 Total Blue Box program costs

In 2010, the management fees from the Cochrane Temiskaming Waste Management Board were $48, 860. The Northern node of the CTWMB allocated 108 metric tonnes of recyclables to the Town through aper household calculation. In 2014, the Town incurred total costs of $260,742 to provide Blue Box recycling to residents using the automated cart collection program. This cost was offset somewhat by processing revenues in the amount of $23,657 for a program net cost of $237,085.

Table 6: Blue Box program comparison: depot vs curbside

	2010	2014
Net Cost	$ 48,860	$ 237,085
Tonnes	108	502
Net Cost / Tonne	$ 452.41	$ 472.28
Households serviced	2,677	2,677
Cost per household	$ 18.25	$ 88.56

4 CONCLUSIONS

4.1 Summary

Key improvements to the Town of Cochrane's recycling program include:

- Improved accessibility and reduced sorting barriers
- More material is diverted from landfill
- Cost efficiency

These improvements encourage residents to participate more fully in the program. The previous depot program presented a service level that was not on par with garbage collection (which was then, and is now, offered through curbside weekly collection). This represented a barrier to recycling behaviors, as it was less convenient for residents to drive to the depot to recycle materials. Further, the depot required residents to sort their recyclables into multiple streams for drop off. The single stream curbside service matches the garbage service provided to residents and the expanded list of materials allows for recycling of most consumer packaged goods. This results in the elimination of the barriers present in the previous system and encourages engagement and participation in the cart program.

Figure 9: Proper curbside setout of recycling and garbage carts

We can see the effect of our resident's engagement and participation just by the incredible increase in recyclable material collected. In 2010 the Town of Cochrane collected roughly 108 tonnes of recycling through the depot program and in 2014 collected over 500 tonnes through the cart program. The goal of 20% diversion of recyclable materials have been met, as the Town estimates diversion to be approximately 25% of materials generated by residents. The diversion of these materials from landfill is a major environmental success and also means the Town landfill will have a significantly longer lifespan.

The cost for the Town to provide recycling services has increased in comparison to the previous depot system. However, this cost is offset by two important factors: one, the increase in diversion and two, cost efficiencies for the Town's waste management program overall. Net costs for recycling have increased over 300% from baseline, but the actual increase in cost per tonne (a key efficiency measure) to manage Blue Box materials have increased an insignificant 4%. Staff interpret this statistic to mean that the new expanded recycling service has been implemented in a cost efficient manner. The cost savings for the waste management program overall have created a savings in landfill space by diverting the recycling and a savings in WSIB claims as no injuries related to performing work duties in the waste and recycling operations have occurred. Further, automation has allowed the Town to reduce staff costs for the waste management program by one third.

Of high importance for us staff, customer satisfaction has been positive. The Town does track themes from calls received regarding the recycling program to ensure this success continues. The municipal clerk receives on average 10 calls a week with regards to the recycling program. Of the 10 calls received, roughly 7 are concerned with where to properly place household items. A large portion of these calls come from senior citizens as Cochrane has a large senior population. The remaining calls from customers were generally related their address being missed on collection day, questions concerning holiday pick-up and the need for more carts at new locations/duplexes.

4.2 Lessons Learned

The Town of Cochrane would deem this project as a success, Challenges with some of the hardware during bin delivery and with the RFID system in the truck itself have presented minor setbacks at times but the participation rates and the increased diversion, as well as the cost savings going forward on an annual basis from an operational perspective and in landfill space being saved far out way the challenges.

The implementation of a program shift of this magnitude requires a lot of planning, from the delivery of the carts, public education of the program (changing from depot to curbside, from sorted to single stream) to scheduling. The key to a successful program is a successful start as the level of confidence in the system from the public is key to maintaining the programs buy in and momentum. A more thorough engagement program should have been created to get residents addresses for cart delivery and better prepare the community for the new program. The recommendation to also evaluate the carts based off of climate and durability and warranty were also a critical step in the project development. Given the harsh winter condition the carts are exposed to the durability in extreme cold was considered. Damaged cart pictured right.

Program monitoring continues through visual inspection at the transfer station and on the truck with the hopper camera. The hopper camera can identify the resident that is contaminating the recyclable materials. When the driver notices a contamination issue, a notice to the resident is attached to the recycling bin. The incident is then recorded by the driver. The second time the bins remains full and another notification to remove non-recyclable material and to contact the office for pick up and clarification of recycling material allowed. Should the ratepayer refuse to comply the address is red flag for the driver to view the bins and leave the bin if it's contaminated. These materials have to be

removed at the transfer station prior to shipping or the load may be regarded as contaminated. The most common types of contaminations found in the transfer station are clothing, house hold wood such as frames, and small house hold electronics.

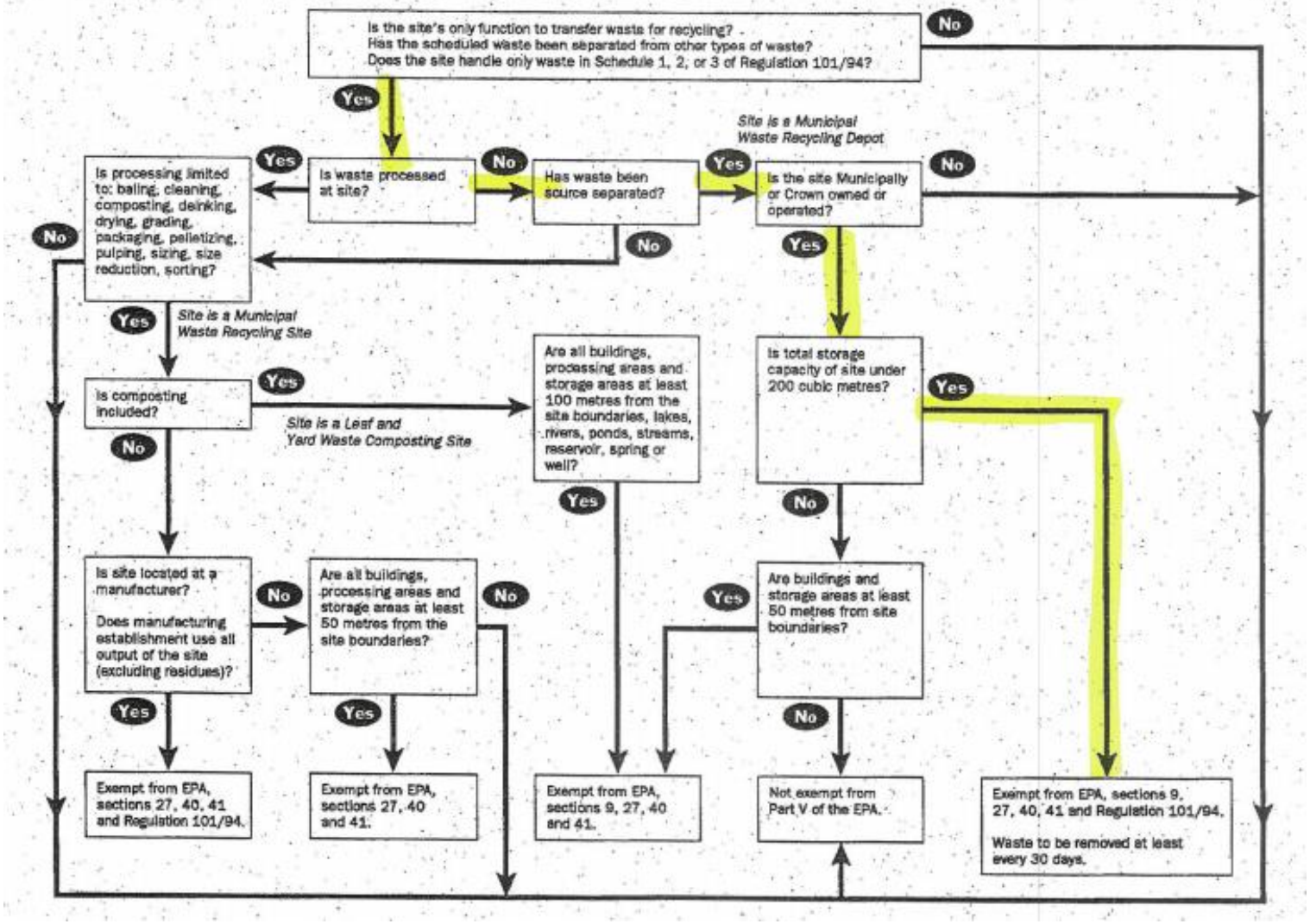
Waste management operational efficiencies have improved through automation of the collection program. Of key importance, the department has not had a loss time injury since changing to the automated collection vehicle. This result is consistent with other municipalities in the province who operate automated collection programs and will help the Town keep our collection staff healthy and injury free as the workforce ages.

4.3 Future Directions

The Town is looking to offer opportunities to partner with other local municipalities. The Town would be able to offer cost effective consolidation and shipping of materials for single stream recyclers, using the existing TS operation. The partnering municipalities would be allowed to drop off their single stream materials at the Town's TS for a per tonne fee that would allow for recovery of administration, consolidation, shipping, and processing costs.

APPENDIX A: Decision flow diagram for Waste Disposal Site exemption from Regulation 101/94

Figure 2.1: Determining if Regulation 101/94 Applies to a Waste Disposal Site and if any Exemptions are Available



APPENDIX B: P& E Materials - Promotional information flyer

New Recycling and Waste Management System

The Town of Cochrane is set to launch a new automated recycling and waste management system by early summer 2012. This new system will help save taxpayer dollars and the environment. New automated technology will help reduce waste collection costs and increase your recycling efforts. The result will be less waste in the Town's landfill site.

Overview of the New Recycling and Waste Management System

The new system allows for one vehicle to pick up both household waste and recyclables at the same time in a split bodied vehicle. An automated arm lifts and empties the waste bin into the vehicle's waste compartment.

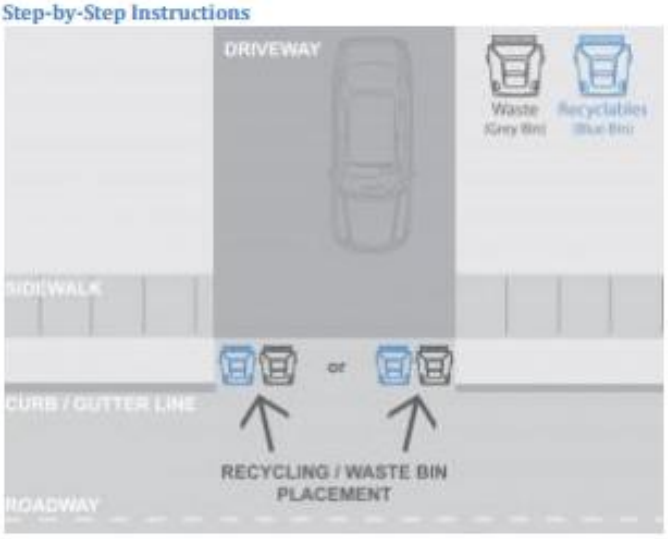
The arm then lifts and empties the recycling bin into the recycling compartment.
At the landfill, the vehicle's waste compartment is emptied first. Because sorting of recyclables is not necessary with the new system, recycling is much easier. This means less waste in the landfill.

The vehicle then empties the recycling compartment into the transfer station that will then be transported to a municipal recycling facility for sorting.

Two Bins to a Greener Future

Each home will receive a green bin for household waste and a larger blue bin for recyclables.

Step-by-Step Instructions



4) Aluminum:

Examples: Soda cans, plates, foil, trays

TIPS:

- Rinse items before placing them in your blue box
- Do not crush cans
- Remove lids from soda cans and recycle

5) Plastics #1, #2, #4 and #5:

Examples:

- Plastics include drink bottles, peanut butter jars, and mouthwash bottles
- Plastics include shampoo bottles and liquid laundry and dish detergent bottles
- Plastics include shrink wrap, garment bags, and coffee can lids
- Plastics include margarine containers, ketchup bottles, etc.

TIPS:

- **Be sure to rinse all plastics containers thoroughly before recycling**
- Look for the recycling symbols to determine which class the plastic belongs to
- **Do not place plastic motor oil containers in your blue box**

6) Polystyrene Foam #6:

Examples: Take-out containers, foam meat trays, foam egg cartons, foam plates and cups, white foam packaging used to pack electronics

TIPS:

- Be sure items have the #6 recycling symbol
- Ensure material is broken down
- Do not include any dirty foam, foam peanuts, or treated foam for fire retardant materials (thermal insulation)

7) Plastic Bags:

Examples: Grocery bags, vegetable bags, bread bags, dry cleaning bags, outer milk bags (not the litre bags)

TIPS:

- Place all plastic bags in a single tied bag and place it in your blue box
- Use re-usable grocery bags to minimize waste
- **Plastics such as chip bags, granola or candy wrappers are NOT recyclable**

Do I have to place both bins out at the same time?

Yes, if you have recyclables and waste.

What if I have no recyclables? Do I still have to place the blue bin at the curb?

No.

If my recycling bin is not full, do I still have to bring to the curb?

You may opt to wait until your recycling bin is full before bringing it to the curb.

Can I recycle my personal hygiene products if they are made of plastic?

No. Place all items such as tooth or hair brushes with other household waste.

Blue Recycling Program

Items which can be placed in the blue box:

1) Clear and Coloured Glass Containers:

Examples: Glass bottles and jars used for food or drinks

TIPS:

- Rinse containers
- Labels can be left on
- Remove any lids and place both containers and lids in the blue box
- **Do not include drinking glasses, dishes, crystal, window glass or light bulbs**

2) Metal Containers and Empty/Dry Paint Cans:

Examples: Food cans, paint cans, chip and nut cans, coffee cans, and also cardboard cans such as frozen juice and refrigerated dough cans.

TIPS:

- Rinse cans and push lids down inside
- Remove paint can lids and place both the cans and lids in your blue box
- Remove any plastic or aluminum lids or seals

3) Empty Aerosol Cans:

Examples: Shaving cream, hairspray, cooking sprays, air fresheners

TIPS:

- Remove plastic lids and dispose of in your household waste
- Be sure that all aerosol containers are completely empty before recycling

1. On your regular weekly waste collection day, take the green waste and the blue recycling bin to the curb if full.

2. Take the blue recycling bin to the curb and place it on the left of the green bin.

3. Make sure to leave at least two feet between the bins.

4. Make sure to place both bins as shown in the graphic.

5. Make sure you place both bins facing the street.

6. Place all acceptable recyclables in the blue bin. Do not pack recyclables tightly in the blue bin. Cut down polystyrene foam and cardboard before placing it in the blue bin.

Frequently Asked Questions

When will my household waste and recycling be collected?

Both household waste and recyclables will be collected on a weekly basis on the same day as your regularly scheduled collection day.

How will my household waste and recycling be collected?

Two bins – a green one for household waste and a larger blue bin for recyclables – will be delivered to your home at no cost. One vehicle, using automated technology, will pick up and empty both bins.

Do I have to sort my recycling?

No. Sorting of recyclables is not necessary. However, do not tightly pack recyclables in the blue bin.

Do cut down corrugated card board down.

Where do I place the bins?

Place bins at least two feet apart with the blue bin on the left side of the green bin. Make sure that both bins are two feet from the curb or gutter line and that both bins are facing the street. In the winter, place the bins in an open area at the end of your driveway.

What do I do if the bins are too heavy for me?

Bins should be tilted and wheeled to the curb, not carried.

Where do I place the bins if I have no driveway?

Place the bins in front of your home, two feet away from the street.

8) Polycoat Containers:

Examples: Juice, milk and cream cartons

TIPS:

- Rinse all items before placing them in your blue box

9) Aseptic Containers:

Examples: Packaged milk, juice, soy beverages, sauces, soup broth, cream, wine boxes, liquid meal replacements

TIPS:

- Aseptic packages are more commonly known as juice or drink boxes
- Please rinse containers and remove straws

10) Household Papers:

Examples: Newspapers, magazines, phone books, catalogs, flyers, junk mail, office papers, paper bags, greeting cards and paper gift wrap

11) Cardboard and Boxboard:

Examples: Cereal, shoe, toothpaste, pizza, moving, detergent and cracker boxes, paper egg cartons and paper rolls

TIPS:

- Flatten all cardboard and boxboard
- Remove any plastic, foil, residue, inserts, and liner bags
- **Please do not include any waxed cardboard, tissues or dirty napkins**

In addition to the new Blue Box Program, the collection of Waste and Recycling Materials will now be conducted weekly as opposed to our current two week schedule.

For more information regarding the Town's new Blue Box Program, please contact the Public Works Department at 705-272-5086.

ENVIRONMENTAL SOLUTIONS AT WORK!

APPENDIX C: P&E Materials – Newspaper notice

The Corporation of the Town of Cochrane

Notice to all Cochrane and Area residents

WASTE & RECYCLING

The Town of Cochrane is pleased to announce that the new and highly anticipated Automated Recycling and Waste Management system will be implemented soon. Delivery of a recycling bin and a waste bin will begin shortly to the residents of Cochrane. Once residents receive the bins the Town requests that they be stored and not used until the program is in full effect. You will be notified once the bins can be used. Your cooperation will be greatly appreciated through this transitional period.

Any additional information, please contact the Municipal Operations Department at (705) 272 5064. (Pour renseignements en français composez le (705) 272-5064.)

Dan Maltais
Director of Operations

Shane Skinner
Manager of Engineering

Reduce, reuse, recycle

Environmental Solutions at Work!

www.town.cochrane.on.ca

APPENDIX D: P&E Materials – Magnet

APPENDIX E: P&E Materials – Recycling brochure 1

YOUR GUIDE TO RECYCLABLES AND THE NEW WASTE MANAGEMENT SYSTEM

1. Clear and coloured glass containers:

Examples: Glass bottles and or Jars used for food or drink products.
Do not recycle: Broken glass, windows/mirrors, light bulbs, pottery, ceramic dishes and cups

2. Metal containers and empty dry paint cans:

Examples: Food cans, empty and dry metal paint cans, stain cans (remove lid), chip and nut cans, coffee cans, also cardboard cans such as frozen juice and refrigerated dough cans.
Push lids down inside containers. Remove any plastic or aluminum lids or seals.

3. Empty aerosol containers:

Examples: Shaving cream, hairspray, cooking sprays and air freshener containers.

4. Aluminum containers:

Examples: Soda cans, take-out food containers, plates, foil and trays.
(**do not** crush cans)

5. Plastic containers:

Examples: Shampoo bottles, jugs, tubs, pails, liquid laundry detergent. Peanut butter jars shrink wrap, garment bags, margarine containers, drink bottles, grocery bags, bread bags, dry cleaning bags, clear clamshells and milk bags (rinsed). Includes items with the following recycling symbols:

6. Polystyrene foam:

Examples: Take-out containers, foam meat trays, egg cartons, plates, cups white packing used for electronics Items must have the recycle #6 symbol.
Do not include any dirty foam, peanuts, or treated foam for fire retardant (thermal insulation)

7. Aseptic and Polycoat containers:

Examples: Packaged milk, juice cartons, drink boxes, soy beverages, sauces soup broth, cream, wine, and liquid meal replacements, cream cartons

8. Household papers:

Examples: Newspapers, magazines, phonebooks, catalogues, flyers, unsolicited or direct mail, office papers, non treated paper bags, greeting cards, paper gift wrap soft and hard covered books

9. Cardboard and boxboard:

Examples: Cardboard, Pizza boxes, Cereal, shoe, detergent, cracker, toothpaste boxes, etc. Paper rolls, Paper egg carton (no waxed cardboard). Remove any plastic, foil, residue, inserts, and liner bags.

Town of Cochrane

Thinking beyond the box
Stewardship Ontario

Environmental Solutions At Work Visit www.town.cochrane.on.ca

APPENDIX F: P&E Materials – Recycling brochure 2

Lean and Green.

Your new recycling and waste collection system will begin in August 2012. This automated system will save taxpayers dollars and the environment. This new technology reduces waste collection costs and increases your ability to recycle. Less garbage ends up in the municipal landfill.

Recycle more often with the new weekly pick-up of recyclables

Best Practices for Recycling:

- Rinse all containers and bottles to reduce odours.
- Do not crush cans.
- Break down styrofoam and flatten cardboard & box board
- Place materials loosely in your blue box.
- Clean and rinse your blue box regularly.

Rule of 2's:

- Place bins 2 feet apart
- Place the 2 bins facing the street
- In winter, place bins in the center of your shoveled driveway

Wood and Brush Disposal now available at the south yard of Genier Bros. Site at the corner of 8th Street and Genier road.

Green Cart - Garbage

What goes IN!

Food Items: Fruits, vegetables, meats, fish, products, cooled grease and fat, sauces, gravy and dairy products, breads, grains, baked goods and ingredients, pasta and rice, eggs, eggshells, nuts and shells, coffee grounds/filters/tea bags.

Non-Recyclable Paper Products:
Muffin's paper cups, freezer, waxed paper, Tissues, napkins, paper towels, paper plates, cups, takeout containers. Waxed cardboard, Ice cream cartons, Sugar, flour, potato/popcorn bags

Others:
Chip bags, straws, Styrofoam peanuts, bubble wrap, "crinkly" plastic, packaging such as pasta packages
Zipper-style plastic bags, Broken glasses, Pottery, ceramic dishes and cups,
Cereal/cracker box liners, plastic wrap,
House plant and soil, Light bulbs, windows, Mirrors, Motor Oil Bottles, wood or wood crates and pet food bags.

Have any question Call?

(705) 272-5086

Recycling Bins

The Corporation of the Town of Cochrane

Place items loosely in your blue bins

THE NEW AUTOMATED RECYCLING AND WASTE MANAGEMENT SYSTEM COMES IN EFFECT AUGUST 2012

For more information regarding the new recycling and waste management system, contact the Public Works Dept. at 705-272-5086 or visit the Town of Cochrane website at www.town.cochrane.on.ca

Thinking beyond the box — Stewardship Ontario | Waste Diversion Ontario | CIF Continuous Improvement Fund

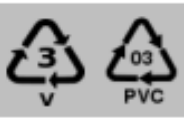
Your guide to the new recycling system for Cochrane

ENVIRONMENTAL SOLUTION AT WORK!

APPENDIX G: P&E Materials – Accepted materials list

TABLE CODES LISTING – TOWN OF COCHRANE

AREA HIGHLIGHTED IN GREY IS NOT ACCEPTABLE

Recycling number	Image	Alternate images	Abbreviation	Polymer name	Uses
1			PETE or PET	Polyethylene terephthalate	Polyester fibres, thermoformed sheet, strapping, and soft drink bottles
2			HDPE	High-density polyethylene	Bottles, grocery bags, milk jugs, recycling bins, agricultural piping, base cups, car stops, playground equipment, and plastic lumber
3			PVC or V	Polyvinyl chloride	Pi+pe, fencing, shower curtains, lawn chairs, non-food bottles and children's toys.
4			LDPE	Low-density polyethylene	Plastic bags, 6 pack rings, various containers, dispensing bottles, wash bottles, tubing, and various molded laboratory equipment
5			PP	Polypropylene	Auto parts, industrial fibers, food containers, and dishware
6			PS	Polystyrene	Desk accessories, cafeteria trays, plastic utensils, toys, video cassettes and cases, clamshell containers, packaging peanuts, and insulation board and other expanded polystyrene products (e.g., Styrofoam)
7			OTHER or O	Other plastics, including acrylic, fiberglass, nylon, polycarbonate, and polylactic acid (a bioplastic), and multilayer combinations of different plastics	Bottles, plastic lumber applications, Headlight lenses, and safety shields/glasses.
9 or ABS			ABS	Acrylonitrile butadiene styrene	High-impact and chemical-resistant extruded or molded objects

APPENDIX H: Notice to Resident

APPENDIX "A"

NOTICE TO RESIDENT/AVIS AUX RESIDENT

ADDRESS: _____

The Municipal Opeartions Department wishes to advise of the following issue(s):
Le department d'Opération Municipal vous avise du suivant:

Garbage Bins/
Les poubelles

- ☐ Comtaminated Cart/Panier contaminer
  - contravention of the Municipal By-law #/Contravention municipal
- ☐ Animal waste (owner to transport to the landfill site)
  Les déchets d'animaux(propriétaire à transporter à la décharge)
- ☐ Sawdust/Brin de Scie
- ☐ Ashes/Cendres
- ☐ Household Hazardous/Ménages dangereux
- ☐ Trees/Abres (can be brought to Genier Bros yard)
- ☐ Conntamined waste/d'échets contaminer

Recycle Bins
Panier Recyclable

- ☐ Only contain approved recyclables
  Seulement contiennent des matières recyclables
- ☐ Plastic number 1,2,4,5,and 6 ONLY (NO 3 AND 7)
  Nombres plastique 1,2,4,5 et 6 seulement (Pas 3 et 7)
- ☐ Please rinse containers, jars, bottles etc
  S'il vous plaît rincer les contenants, pots, boutelles etc.
- ☐ NO FULL PAINT CANS - only empty dry pain cans
  Pas de canettes a peintures pleines
- ☐ NO DIAPERS
  Pas de couches
- ☐ NO Windows, mirrors or light bulbs
  Pas de fenêtres, mirroirs our des ampoules
- ☐ NO motor Oil bottles
  Pas de bouteilles d'huile à moteur
- ☐ NO wood
  Pas de bois

☐ Placement of bins must be at least 2 ft apart or on either side of the driveway is acceptable./Placement des bacs doit être au moins 2 pied appart ou sur chaque côtés de l'allée sera acceptable.

- ☐ Others - _____
  Autres- _____

_____

Authorized by: _____ **Dated/**Date: _____
Authorizée par: **Signed/**Signée