Recycling Program Implementation Evaluation

CIF Project 226

September 2010

Prepared for
Continuous Improvement Fund

Prepared by

This Project has been delivered with the assistance of Waste Diversion Ontario's Continuous Improvement Fund, a fund financed by Ontario municipalities and stewards of blue box waste in Ontario. Notwithstanding this support, the views expressed are the views of the author(s), and Waste Diversion Ontario and Stewardship Ontario accept no responsibility for these views.

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1. Introduction

The Province of Ontario has succeeded in bringing recycling to majority of residential households throughout the province, with a few exceptions. Those exceptions include communities characterized by small populations (less than 5,000 populations), remote locations (Northern Ontario) with limited access to markets (typically hundreds of kilometers to the nearest material recycling facility). This portrays the situation experienced by the communities of Wawa, White River and Dubreuilville situated on the eastern shore of Lake Superior.

Currently none of these communities has a formal recycling program (Dubreuilville and Wawa provide recycling programs for steel and aluminum cans). However, they are not required to provide a recycling program for their residents as each community falls below the population requirements set out by Ontario 3Rs Regulation (O.Reg. 101/94), that exempts any community less than 5,000 population from the need to establish and operate a blue box recycling program.

Over the past several years, each community has explored opportunities to implement a recycling program, and in the case of White River, established a short lived curbside program. The challenges faced in implementing a recycling program have proven daunting due to lack of staff and financial resources, access to processing facilities and markets and bulking and transportation limitations.

The three communities have chosen to pursue partnering opportunities in order to benefit from the economies of sharing financial and staff resources and a cost effective and efficient recycling recycling program. Consequently, a request was made to the Continuous Improvement Fund (CIF) of Waste Diversion Ontario (WDO), to undertake an evaluation of different recycling program options and costs.

The following report examines a variety of opportunities to provide recycling services to these three communities and the estimated costs associated with collection, transportation and processing of the recyclables. The costs estimates provided in this report are based on best available information at this point in time. The cost estimates acquired from different sources were not obtained through a tendering process and are subject to change.

2. Current Waste Management Situation

2.1. Community Profiles

All three participating communities are situated on the eastern shore of Lake Superior within a three to four drive from Sault Ste. Marie and a five to six hour drive from Thunder Bay as shown in Table 1 and the map in Figure 1. The cities of Sault Ste. Marie and Thunder Bay represent the closest market locations as well as the closest locations with material recycling facilities (MRFs).

Table 1: Distances to Nearest Cities

City	Town	Distrance	Time to Travel
Sault Ste. Marie	Wawa	230 km	~ 3 hours
	Dubreuilville	330 km	~ 4 hours
	White River	320 km	~ 4 hours
Thunder Bay	Wawa	480 km	~ 6 hours 30 minutes
	Dubreuilville	470 km	~ 6 hours 15 minutes
	White River	380 km	~ 5 hours

Figure 1: Map of Northern Lake Superior

Each of the three communities, in general, has experienced a steady decline in population over the past decade due to declining economic conditions in the area with recent closures of local mines and timber mills. This also has resulted in a declining tax base, with poor prospect of economic renewal in the future. Table 2 shows the declining population over time.

Table 2: Population Change over Time

	Population as reported in the Canadian Census			Population as reported by Staff	% change (1996-2010)
Community	1996	2001	2006	2010	
Wawa	4,145	3,668	3,204	2,756	- 33%
Dubreuilville	990	976	841	670	- 32%
White River	1,022	993	841	875	-15%

Currently, all three communities provide weekly curbside garbage collection to all households. Two of the communities, Wawa and Dubreuilville, also provide garbage collection service to commercial establishments. A profile of each community and its current waste management situation is provided below and summarized in Tables 3, 4, and 5.

Table 3: Demographic Statistics for 2010

Community	Population	Single Family Hhlds	Multi Family Hhlds	Total hhlds	Commercial Units	Total All
Wawa	2756	1635	39	1674	116	1790
Dubreuilville	670	321	5	326	27	353
White River	875	476	26	502	30	532

Table 4: Garbage Services for 2010

Community	Curbside Garbage	Public vs Private	User Pay	SF	MF	Commercial	Annual Collection Cost/unit
Wawa	Weekly	Contracted to Miller Sanitation	6 bag limit	√	√	√	$70.39
Dubreuilville	Weekly	public	No	√	√	√	$111.13*
White River	Weekly	Contracted to Belisle Contracting	4 bag limit	√	√	no	$99.28**

** includes can collection, disposal costs and management of landfill

** includes disposal costs and management of landfill

Table 5: Recycling Services for 2010

Community	Curbside Recycling	Depot Recycling	Cost	Description
Wawa	No	Cans only	free	Local school collects steel and aluminum cans as fundraiser for the school
Dubreuilville	Once a month, cans only	no	Part of collection contract	Dubreuilville collects steel and aluminum cans and sells to local scrap dealer
White River	No	no	n.a.	

2.1.1. Wawa, Ontario

The community of Wawa is located approximately 230 km north of Sault Ste. Marie and 480 km south-east of Thunder Bay on the east shore of Lake Superior. The town has a population of 2,756 with majority of residents living in single family homes. The town contracts out garbage collection services to Miller Sanitation which provides collection to all single family, multi family and commercial establishments in the town. All units are provided weekly garbage collection. The contractor uses two collection crew, alternating between one rear packer truck and one side loader collection vehicle, to collect the garbage. The town has not implemented a Pay-as-you-Throw (PAYT) program although it does have a six bag limit in effect, but is rarely enforced. In essence, there are no restrictions on the amount of garbage that can be set out at any one time and collected.

The Town of Wawa owns its landfill, located approximately 9 km outside of the town and has unknown years of capacity remaining. There are no scales at the landfill so all incoming waste is charged and recorded on a volume basis. The tipping fee is as follows:

Load		**$/half load**	**$/full load**
Per bag (maximum 3 bags)		n.a.	$1.00 each
Residential Vehicles	car	n.a.	$4.00
	Minivan/SUV	$7.00	$10.00
	Pick up Truck	$11.25	$29..50
Trailers	small	$6.00	$6.00
	11ft box	$11.25	$29..50
	8-14 ft	$21.25	$39.50

Currently, the town does not offer a formal curbside recycling service; however it offers a depot style collection system for steel and aluminum cans which are processed at the local French school as a fundraising project. The shop instructor has adopted the project and has used student resources to build a homemade can crushing machine (estimated to cost $10,000 to build from scratch) and to help collect and process the steel and aluminum cans. The instructor is currently looking for a market for the cans which he plans to transport in the back of his truck to the buyer. See photos below.

Photos: Collection spots in Wawa for cans
(discarded water treatment chemical barrels used as collection bins)

Photos: Homemade can crusher and stockpiled mini-bales of cans

In addition, Wawa provides the following special waste collection services:

Small Size Batteries - The municipality has purchased “boxes” for small batteries (i.e. AA, C sizes) and located them at the town hall. Employees and customers may deposit used small batteries for recycling. These “boxes” are then shipped to a recycling centre.

Municipal Household Special Waste Events - The municipality hosts a one day per year Municipal Hazardous and Special Waste Collection Day annually in agreement with Stewardship Ontario. The municipality receives funding for this initiative and the revenues are credited to the special initiatives account. There are a number of hazardous or special waste items on the designated list that the municipality can accept by way of this program.

2.1.2. Dubreuilville, Ontario

The Township of Dubreuilville is situated about an hour east of Highway 17 about 330 km north of Sault Ste. Marie and 470 km south-east of Thunder Bay. The township has a population of approximately 670 (which as been in decline since the mid 1990s) and an estimated 326 households (including single family, multi family) and 27 business establishments receiving in-house garbage collection services using town staff. The garbage collection services are provided once a week (Wednesday) to the residential sector and three times a week (Monday, Wednesday, Friday) to the commercial sector using two collection crew and a packer truck. The time to collect takes about two hours on Monday and Friday and six hours on Wednesdays. The township has not implemented a Pay-as-you-Throw (PAYT) program and there are no restrictions on the amount of garbage that can be set out at any one time and collected.

The Township has its own landfill which is located approximately one km from the centre with about ten years capacity remaining. Dubreuilville residents and property users pay no tipping fee at the landfill for regular household bagged garbage. The landfill has no scales.

Dubreuilville offers its residents a once a month curbside can (aluminum and steel cans) collection service. The cans are collected in blue bins by the collection crew using a side loader and taken directly to a local dealer (C.R.C. Tire) who separates the metals and markets the material in Sault Ste. Marie. The township receives no revenue for the cans and estimates that it is achieving about 11% participation rate in the program.

The local elementary school has offered battery collection in the past but it is currently without a company to take the batteries.

2.1.3. White River, Ontario

The Town of White River has a population of 875 of which majority of residents live in single family households. Located approximately 320 km north of Sault Ste. Marie and 380 south-east of Thunder Bay, the Town of White River contracts its garbage collection services to a private waste hauler (Belisle Contracting). Using two collection crew and a packer truck, garbage collection is provided on a weekly basis (Wednesday) to all households (476 single family). The town has a four bag limit on household garbage and accepts everything that is set out for collection. White River does not provide garbage collection service to its commercial sector (which includes multi family buildings).

The town has a landfill located three kilometers outside of the town. The landfill services the town as well as several small local communities and the Obatanga Provincial Park. It is estimated that the landfill has about two years capacity left. There are no scales at the landfill so the tipping fee is volume based. The tipping is as follows:

Bags	$2.00/bag
Truck Loads	$15.00/load
1 Ton Truck	$30.00
Small Pull Trailer	$10.00
Large Pull Trailer	$30.00
Single Axle Dump Truck	$100.00
Double Axle Dump Truck	$200.00
Trailer Dump Truck	$400.00 or sq/ft cost
Stove	$15.00
Fridge/Freezer/AC	$60.00
Fridge/Freezer/AC	$15.00 (decommissioned)
Large Loads	$2.50 sq/ft
TV/Computer/Furniture	$5.00 /item

The Town of White River does not offer recycling services although it has recently started to offer diversion of metal, wood waste, paper, compost and e-waste at its landfill at no cost to the user. Other local businesses offer battery and tire recycling services.

3. Blue Box Generation and Diversion Estimates

3.1. Potential Curbside Estimates

None of the participating communities have scales at their landfill; therefore, no records are kept on the amount by weight of garbage generated by the communities' residents and IC&I establishments. In order to project the amount of recyclables available for collection to the communities, it was necessary to use waste generation and composition studies conducted by other communities with similar characteristics.

In the past, Stewardship Ontario has completed a series of residential municipal solid waste audits in single family and multi family households as part of its monitoring and fee setting requirements. Since 2005, Stewardship Ontario has been conducting comprehensive waste audits in different communities throughout Ontario, providing a representative sample of geographic, size and urban/rural community characteristics in Ontario. The waste audit program has targeted both the single family residential sector as well as the multi family residential sector.

Over the past several years, Stewardship Ontario has conducted a series of municipal solid waste audits in northern Ontario communities, including West Nipissing, Thunder Bay and Sault Ste. Marie, see below for details:

2006 – Sault Ste. Marie (population 75,000) – single family and multi family waste audits
2006 – West Nipissing (population 13,000) – single family waste audits
2007 – Thunder Bay (population 110,000) – single family and multi family waste audits

Among the northern communities audited, it was decided that the waste composition for West Nipissing most closely approximates the waste composition of the eastern shore communities. The waste audits classify materials into approximately 60 categories including recyclable materials, organic materials, household hazardous waste materials, electronics and other non-recyclable wastes.

In order to determine the waste generation rates for single family households and multi family households, the following approach was used:

- The Town of Marathon reported waste generation rates for its single family residential sector as part of the Waste Diversion Ontario (WDO) 2007 datacall requirements. Marathon generates an estimated 772 kg/hhld/year. This generation rate can be used for multi-family dwellings as well since they tend to be low rise or duplexes that are treated in the same manner as single family residences.

The waste generation rate of 772 kg/hhld/yr was multiplied by the number of single family households and multi family households for each of the communities to calculate the amount of waste generated and the potential amount of recyclable material available in the residential sector for each of the communities.

In order to determine the amount of recyclables that could be reasonably diverted through a curbside recycling program, the capture rates reported for several communities were applied including:

- West Nipissing – low capture rate (~13%);

- Marathon – medium capture rate (~28%);
- Sault Ste Marie – high capture rate (~33%).

Diversion estimates for the IC&I sector were based on recycling rates reported by the Town of Marathon for the IC&I sector. In 2007, the Town of Marathon reported that a total of 50.76 tonnes of recyclable materials were collected from approximately 45 businesses, which equates to approximately 1.13 tonnes of recyclables diverted per business per year. This estimate was used for estimating the amount of recyclable materials that could be potentially diverted by the businesses in the three communities. Most of the recyclable material is cardboard and other paper.

Table 7 summarizes the range of recycling diversion estimates for the Towns of Wawa, Dubreuilville and White River. It is assumed that recycling services will be provided to all residential and commercial establishments in the communities. Detailed diversion tables for each community are provided in Appendix A.

Table 6: Blue Box Diversion Estimates

Diversion Rate Estimates for Recyclable Materials	**Wawa**	**Dubreuilville**	**White River**	**Total**
# of Households	1674	326	502	2876
# of Businesses	116	27	30	173
	tonnes/yr	**tonnes/yr**	**tonnes/yr**	**tonnes/yr**
Low estimate	274	58	77	408
Medium estimate	369	77	105	551
High estimate	431	87	120	638
Average	358	74	101	532

	Wawa	**Dubreuiville**	**White River**	**Total**
Average Recyclables Estimates	**tonnes/yr**	**tonnes/yr**	**tonnes/yr**	**Tonnes/yr**
Average Fibres (cardboard, boxboard, newprint, fine paper, envelopes, etc.)	213	42	64	319
Average Containers (steel and aluminum cans, HDPE and PET bottles - no glass)	24	5	7	36
combined ICI (expected to be mostly cardboard and fibre)	131	31	34	195
Medium estimate	**369**	**77**	**105**	**551**

4. What Works and Where

4.1. Blue Box Material Processors

Currently there are two potential blue box materials processors available to handle recyclable materials collected by the east shore communities:

- Recool Canada Inc. based in Thunder Bay;
- Green Circle Environmental based in Sault Ste. Marie.

Each processor has a different material collection and processing approach as described below.

4.1.1. Recool Canada Inc.

Recool Canada Inc. is a recycling and waste management company based in Thunder Bay that has been operating since 1991. Recool provides recycling collection and processing services to the City of Thunder Bay and collection or processing services to a variety of surrounding communities including the Town of Marathon, Neebing, O'Conner, etc.

Recool has a unique collection and processing system that allows the company to operate in a cost effective manner. In order to reduce collection costs, Recool collects recyclable materials using a three stream system in which transparent bags are used for two separate streams – select fibres and containers - and cardboard is bundled as a third stream. Recool asks that cardboard and other large cardboard/boxboard (i.e. cardboard boxes, pizza boxes, cereal boxes) be bundled and placed beside the transparent bags.

This set out approach enables Recool to use 16 ft and 18 ft cube vans to collect both streams in the one vehicle. In the City of Thunder Bay, the cube van is operated by one person who is responsible for driving and collecting the bags of recyclables. It is estimated that the collection crew can cover approximately 500 households before the cube van is full. The containers assume majority of the space in the cube van (about 70%) compared with fibres which take up about 30% of the space. Once the cube van is full, the driver delivers the material to the Material Recycling Facility (MRF) and off loads the bags of material into one of two areas, a fibre area or a container area.

ReCool has a split processing line. There are two in-feed conveyors in the centre of the MRF. One conveyor feeds a fibre sorting line to the right of the in-feed conveyor. A horizontal baler is at the end of this sorting line. One employee is responsible for manually opening the bags at the base of the conveyor and shaking out contents onto the conveyor. Three or more employees are situated at the top of the conveyor who pick out those fibre materials not heading for the baler. For example, if newspaper is being baled then the cardboard, boxboard and household paper will be pick off the conveyor.

The other conveyor feeds the container processing line to the left of the conveyor. An employee will stand at the base of the conveyor and manually open the bags containing the containers and pull out gable top and tetrapak containers that he drops in to an adjacent vertical baler. Three other employees pick PET, HDPE and the bags and drop them in to bunkers. Steel is removed by a belt magnet and aluminum with an Eddy current system. Glass and residual is negative sorted and drops into a 6 yard bin below. The containers are baled when there is enough material.

ReCool processed about 10,000 tonnes in 2007 using 1 shift of 6 employees working a 36 hour work week. Recool staff claim that the MRF can process up to 20,000 by staffing both sides of the processing line at the same time, or running two shifts alternating fibre and container materials on the different shifts.

Currently, Recool accepts a variety of recyclable material from outside programs, except glass, including:

Container stream To be washed and placed in transparent bags	Pop Cans Milk Cartons Juice Boxes Metal Cans No. 1 plastic containers (e.g. pop bottles) No. 2 plastic containers (e.g. shampoo bottles)
Fibre stream To be placed in transparent bags	Newspapers Flyers Junk Mail Magazines Soft Cover Books Fine Paper Cereal Boxes Phone Books
Cardboard Stream Bundle Cardboard (3' x 2' x 1') is placed beside bags of recycling Cannot accept Laundry Detergent Boxes or Produce Boxes (nor any boxes with a waxy coating)	Corrugated Cardboard Clean Pizza Boxes Cereal Boxes Misc. Food Boxes without wax coating Cardboard Egg Cartons

Photos: Tranparent bags of fibres and containers

Photos: Cube van used to collect recyclables and unloading cardboard

4.1.2. How the System Works in the Town of Marathon

The Town of Marathon, which is situated almost 300 km east of Thunder Bay, provides curbside recycling collection service to about 1,500 single family households, 190 multi family units and 40-50 commercial and institutional establishments. Marathon offers a two stream curbside recycling program in which mixed fibres are collected separately from mixed containers in transparent bags. Residents receive bi-weekly service (every two weeks) and commercial customers receive up to 3 times per week service, depending on their needs. Once collected, the recyclable materials are stored in 18 wheel transport trailers (fibres in one transport trailer and containers in the other) which are transported to the Recool material recycling facility (MRF) in Thunder Bay when full.

In June 2009, the Town renewed its contract with Recool Ltd. to provide curbside recycling collection, storage, transportation and processing services for the next three years. Recool offered a 5% discount if Marathon accepted all four options and keeps 100% of the revenue from the sale of the recyclable material. The annual contract cost is as follows:

Service Provided	Total Annual Cost
residential collection	$ 24,000.00
commercial collection	$ 26,000.00
processing	$ 36,000.00
transport	$ 41,000.00
Subtotal with 5% discount	**$ 120,650.00**

The cost to provide the curbside garbage and recycling services is provided in Table 7.

Table 7: Marathon's Recycling Costs

				Provision of Service			
Service	**Year of Cost Estimate**	**Frequency of Service**	**Public vs Private**	**SF**	**MF**	**IC&I**	**Annual Cost/unit**
Recycling (new contract 2010-2013)	2010	Bi-weekly IC&I -3 x weekly	Contracted to Recool Canada	√	√	√	$70.02*

* Recool keeps 100% of revenue from the sale of recyclable materials
Does not include administration and education costs at approximately $2.20/unit/yr

4.1.3. Green Circle Environmental

Green Circle Environmental is a privately owned and operated company that provides a wide range of services including: industrial and commercial collection, residential recycling collection and processing, Material Recovery Facility (MRF - Blue Box Materials), transfer station and other special services.

Green Circle provides recycling collection and processing for the City of Sault Ste. Marie, servicing over 23,000 single family households, approximately 9,000 multi-residential units and schools. All materials are processed at Green Circle's MRF, located at 86A Sackville Road. The MRF also processes recyclable material from the communities of Prince Township, Echo Bay and Bruce Mines.

The City of Sault Ste. Marie's waste diversion program currently includes a two stream recycling program with the collection and recycling of fibers and containers. Each resident receives a blue box for containers and a yellow box for fibres (paper products). Green Circle does not accept recyclable materials collected in bags. All recyclable material must be collected and received at the Green Circle MRF in loose form. Green Circle accepts the following recyclable materials from outside communities:

Containers	**Fibres**
steel (tin) food cans aluminum cans No. 1 plastic containers (e.g. pop bottles) No. 2 plastic containers (e.g. shampoo bottles)	newspapers and flyers magazines phone books boxboard/small boxes (e.g. cereal boxes) paper egg cartons toilet/towel paper rolls clean milk cartons clean pizza boxes all other paper products (e.g. mail, computer paper) Cardboard boxes should be broken down and bundled in 2' x 2' x1' bundles and placed beside the yellow box.

The MRF processes the two streams (fibres and containers) separately using sorters to pick off the fibres including newspapers and flyers, magazines, boxboard/small boxes (e.g. cereal boxes), household paper and cardboard. The container stream uses a belt magnet to separate steel cans and an Eddy current to separate out aluminum cans. The other containers are hand picked by sorters into separate bins (i.e. PET and HDPE).

Green Circle has stated that it will not accept glass, gable tops or aseptic containers from other programs. Green Circle charges $55/tonne processing fee for both streams and keeps 100% of the revenue.

Photos: Inside the Material Recycling Facility

4.1.4. How the system works in Prince Township

Prince Township (population 971 with 446 residences) is located about 20 kilometers to the west of Sault Ste. Marie and has offered a bi-weekly curbside collection program to its residents for over a decade. The curbside recycling program is simple and cost effective. Two of the Township's staff - the Road Superintendent and the Roads Labourer – collect the blue box materials from half of the township one week and the other half the next week (about 372 households altogether).

The township uses one of their pick-up trucks and a 36'x7' utility trailer which contains 24 recycling carts (240 litres/65 gallons) maintained in place by side walls. The trailer has a ramp at the back for easy movement of the carts. All 24 carts fit snuggly on the trailer with no need for reinforcement or additional securing. At the end of each collection day, all of the carts are filled with recyclables.

The residents are asked to sort the recyclables into a fibre stream (yellow bin) and a container stream (blue bin) which are collected by the staff dumped into allocated carts. The staff collect from Zone 1 (186 households) on Thursday of Week 1 and Zone 2 (186 households) on Thursday of week 2. Once the collection for the day is complete, the trailer is taken back to the Township garage and further sorted before being driven directly to Green Circle for processing. Each shift takes 6 hours, 4.5 to complete the collection and 1.5 to process and clean up.

In total, the Township rents about 26 recycling carts from Green Circle for $117/month. The Town staff feel that it is cheaper to lease the carts because Green Circle will replace them free of charge if they are damaged. Some of the carts are used on the utility trailer and others are placed at the community centre to provide further recycling opportunities.

Prince Township also provides carts at its community/municipal centre and have 3 x 4 yd^3 front end bins for cardboard recycling throughout the community. The bins are collected by Waste Management free of charge. The Township also collects recyclables from two businesses and provides them drums with plastic bags which can be easily removed and dumped into the recycling carts.

The town owns both the pick-up truck and the utility trailer. The program costs about $19,000 to operate (includes labour, cart rental and processing fees) and about $25,000 when gas and vehicle maintenance charges are included. This works out to $42 - $55 per household per year.

In addition, the Township has a two bag user pay program which requires the householder to purchase tags at $2.00 each for additional bags of garbage set out for collection beyond the designated two. The Township will send notices to households about problems encountered with their recycling set outs and provide friendly reminders in the local monthly newspaper.

4.1.5. How the System Works in the Town of Mattawa

A variation on the pick-up truck and utility trailer approach is provided by the system employed in the Town of Mattawa and the Township of Papineau-Cameron.

The Town of Mattawa and the Township of Papineau-Cameron are situated on the northern part of the Ottawa River, about 100 km east of North Bay. These small rural communities (combined population 3,000 with 1,200 single family households) provide bi-weekly curbside recycling services to residents using the services of a local entrepreneur, P. Lafreniere Contracting. The company collects a wide range of recyclables using a two stream, containers and fibres, system.

Due to the size of the communities serviced, the contractor could not justify investing in a recycling truck which was further complicated by the need to drive three hours (return) in order to deliver the recyclable materials for processing five times every two weeks. In response, the owner of the company devised a simple, cost effective collection system featuring a custom made recycling trailer which is pulled by a standard pick-up truck. The recycling trailer was designed and built by P. Lafrenier and is essentially a box built on a 24 ft. trailer base. The trailer dimensions are 24 feet long by 10 ft wide and 6 feet 10 inches high with several openings at one side of the trailer and a platform to enable the collection crew to step up and sort the containers and fibres into the designated openings. The trailer features three separate areas for:

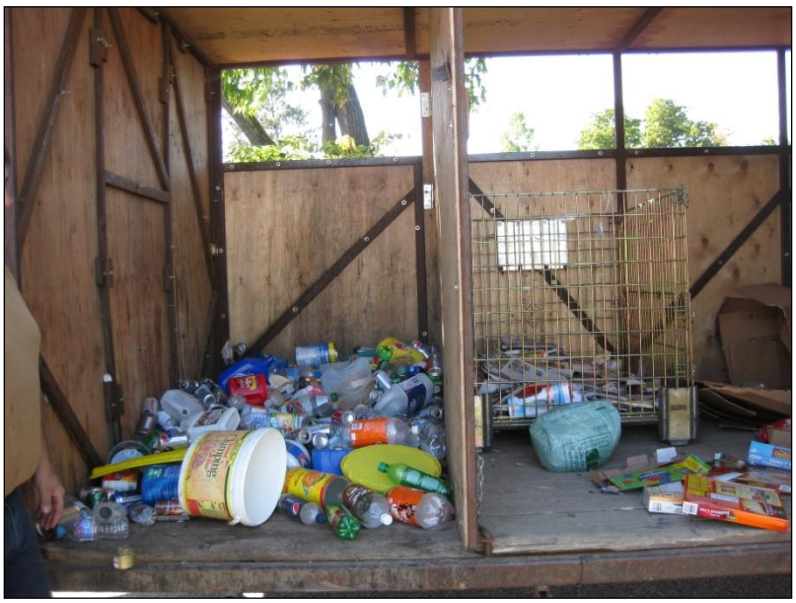
- household mixed paper and newspaper (ONP) in one area;
- cardboard (OCC) and boxboard (OBB) in a second area; and
- containers in a third area.

While one person drives the pick up truck, another person collects and sorts the materials.

The contractor is capable of collecting from 400 homes before the trailer needs to be emptied. In order to expedite removal of the recyclable materials, the back of the trailer opens and the side containing the containers opens. The floor of the trailer is strong enough to enable the contractor to operate a bobcat to remove the fibres from inside the trailer, or alternatively, the contractor moves the materials out of the trailer using a shovel. The trailer also features wire bins which can be used for additional materials and can be easily tipped to remove the contents from the trailer.

The recycling contract for the Town of Mattawa (population 2,112 with ~850 households and 80 commercial establishments) cost $45,000 in 2008 and about $48 per household/establishment.

The photos below show the recycling trailer used in the Town of Mattawa and the Township of Papineau-Cameron.



Photos: Recycling trailer used in Mattawa and Papineau-Cameron

5. Recycling System Opportunities

5.1. Challenges to Recycling

The three communities face a number of challenges to implementing a recycling program, which need to be taken into consideration during the evaluation of recycling system options. These challenges include:

- Each of the three communities, in general, has experienced a steady decline in population over the past decade due to declining economic conditions in the area with recent closures of local mines and timber mills. This has resulted in a declining tax base and public purse. The municipal taxes collected are placed in a general revenue fund and spent according to need; therefore, the start up and operational monies required to implement a recycling program in the communities must compete with other social and infrastructural funding needs.
- The geographic location of Wawa, Dubreuilville and White River mean that the recyclables must travel long distances to be processed. The closest urban centre with a processing facility is the City of Sault Ste. Marie, a distance of 230 to 330 km from the communities or the City of Thunder Bay which is situated 380 to 480 km away. These distances make it unrealistic to develop a collection system that delivers recyclables on an as-collected basis.

Any recycling system considered must have the following features:

- Simple and cost effective collection system;
- Communal, bulking and storage of material (which may include some processing).

The list of recycling system options provided in Table 8 includes a range of collection, storage, transportation and processing alternatives for consideration. The viability of the options, given the challenges facing the three communities is also identified.

Table 8: Recycling System Opportunities

		Examples	How system Could Work	Viability Considerations
1.	**Curbside Collection of Recyclables**			
	Turn Key operation	Marathon	- Hire one company to collect, transport and process the recyclable materials	- NOT VIABLE - Opportunity not available
	Bi-weekly 2 stream collection with weekly garbage	Prince Township	- curbside recycling provided bi-weekly - 2 stream collection of fibres and containers	- POTENTIALLY VIABLE , explore further
	Bi-weekly alternating with bi-weekly garbage collection all year	Township of Laurentian Valley, Ottawa Valley	- curbside recycling provided bi-weekly, alternating with bi-weekly garbage collection	- POTENTIALLY VIABLE, - explore further
	Bi-weekly alternating with bi-weekly garbage collection in the winter and weekly garbage	Mattawa and Papineau Cameron	- curbside recycling provided bi-weekly, alternating with bi-weekly garbage collection in the winter and weekly garbage collection during the summer	- POTENTIALLY VIABLE, - explore further

		Examples	How system Could Work	Viability Considerations
	collection in summer		(May to September)	
	Contracted by each Township	Marathon	- each community must hire a private company or use town staff to provide service	- POTENTIALLY VIABLE, - explore further
	Partnership among Townships	Mattawa and Papineau-Cameron	- all communities share the cost of one collection vehicle and collection crew – providing weekly collection of recyclables	- POTENTIALLY VIABLE, explore further
2.	**Depots**			
	Turn Key operation	Neebing	- Hire one company to provide depots, transport and process the recyclable materials	- NOT VIABLE, , opportunity not available
	Depot at landfill	Muskoka	- use attendants at landfill to monitor depot	- NOT VIABLE due to high contamination rates and poor location
	Depot(s) in Town centre (satellite locations) – not attended	Augusta	- study in Augusta identified that 75% of residents travel no more than 10km -	- POTENTIALLY VIABLE, explore further
	Depot in community centre - attended	Calvin Twp	- hired staff - community groups	- POTENTIALLY VIABLE, explore further
3.	**Storage and transportation**			
	Store and transport at central location	Southgate	- all recyclables are stored and transported from a central location that is shared among the partnering communities	POTENTIALLY VIABLE, explore further
	Store at different locations	Muskoka	- each community would store the recyclables at a location within their community	NOT VIABLE, too expensive
	Store using lean-to facility	Southgate	Recyclables brought to a lean-to facility at the landfill and stored in 40 cubic yd roll off containers and transported when full	NOT VIABLE, too expensive
	Construct Transtor units for compaction trailer	Marathon Dryden	System enables recyclables to be compacted into transportation trucks to increase efficiency – very costly City of Dryden = $440,000 capital costs	NOT VIABLE, too expensive

5.2. Depot Collection of Recyclables

The communities of Wawa, Dubreuilville and White River have several depot options that can be explored.

- Establish depots in each community but they remain unattended;
- Establish one depot in each community that is attended.

In general most recycling processors do not want depot recyclables. Neither Recool nor Green Circle showed an interest in processing depot materials due to:

- the high contamination rates at the depot locations;
- low participation and capture rates for the recyclable materials.

For this reason, a modified depot system has been presented in this report.

Waste Diversion Ontario (WDO) requires all communities with curbside or depot recycling services to complete a lengthy datacall survey as part of the requirements to receive Blue Box funding. Waste Diversion Ontario publishes the main results of the datacall from every participating community. Using 2007 datacall information provided by Northern Ontario communities with depot collection programs, the estimated costs to provide a depot collection program are provided in Table 9. These costs are gross costs without WDO funding.

Table 9: Estimated Costs for a Recycling Depot

Northern Ontario depot collection costs (2007)		**Wawa**	**Dubreuilville**	**White Rock**
residential hhlds		1674	326	502
Estimated Cost per Unit	**$32.97**	**$ 32.97**	**$ 32.97**	**$ 32.97**
Estimated Annual Costs		**$55,192**	**$10,748**	**$16,551**

According to a report by Quinte Waste Solution looking at the features associated with successful depot operations, "A responsible depot attendant is the best defense against material contamination. An attendant who promotes the program and encourages proper material separation contributes to the program's success and increases its perceived and actual effectiveness. This in turn, results in higher community participation and overall capture rates".[1]

Satellite depots located in each community

Currently, the Town of Wawa offers a depot style collection system for steel and aluminum cans that are processed at a local high school. The depot was constructed by Town staff and use discarded water treatment chemical barrels as collection bins. When full the contents of the bins are taken to the high school for processing.

[1] Quinte Waste Solutions. April 2006. Evaluation of Best Practices of Rural Recycling Depot Programs. Stage 1, pg ii.

Recycling depot in Wawa

Recycling depot in Faraday Township

A similar system could be employed in each community to provide recycling opportunities to residents. The system would employ one or more small depots in high traffic areas that could be attended by volunteers during peak hours of use. This would help educate residents about the recycling program and minimize material contamination.

Town staff and/or collection crew would need to transport the bins from the depot to a centralized storage area (see Section 5.4) and conduct a pre-sort to ensure that the recycled material contained minimal contamination.

Estimated costs to operate a depot program are provided in Table 10. The following assumptions were used in establishing the costs:

- Each community will establish one or more depots in high traffic locations using existing materials and containers. It is assumed minimal cost to construct the depots;
- Town staff or collection crew will regularly check the bins for contamination and transport the bins to the centralized storage location, conducting a pre-sort at the storage area;
- The recyclable materials can be transported from the depots to the storage areausing a pick up truck with or without a trailer, depending on the amount of materials and regularity of transport;
- The materials will be transported to either Thunder Bay (Recool) or Sault Ste. Marie (Green Circle) for processing. The centralized storage, transport and processing costs are provided in Section 5.4.

Table 10: Depot Operating Cost Estimates

Community	Total units	Transportation (assume 4 hrs/week)	Estimated Annual Cost	Cost per Unit
	(Hhlds)	hrs/year	assume $17/hr	Annual
Wawa	1674	208	$3,536	$2.11
Dubreuilville	326	208	$3,536	$10.85
White River	502	208	$3,536	$7.04

The success of this depot system requires that residents be educated about separating recyclables into correct streams and minimize contamination. Volunteers to educate and guide depot users will be critical.

5.3. Curbside Collection of Recyclables

There are a number of different opportunities worth exploring for the provision of curbside collection services of recyclables for the communities of Wawa, Dubreilville and Whtie River. The options explored include:

- Contract collection services to a local entrepreneur who collects for all three communities;
- Each community establishes separate contract for collection services; and
- Use existing garbage collection crew and modify the collection schedule.

Some of the considerations of each option are provided below.

	Examples	How system Could Work	Considerations
Curbside Collection of Recyclables			
Bi-weekly 2 stream collection with weekly garbage	Prince Township provides weekly garbage collection and bi-weekly (every other week) recycling collection)	- curbside recycling provided bi-weekly - 2 stream collection of fibres and containers - co-collected in vehicle and separated at transfer station - garbage continues to be provided weekly	- need to determine cost to provide bi-weekly curbside recycling - service could be provided under new contract with local entrepreneur or using existing collection crew (may require hiring additional crew)
Bi-weekly alternating with bi-weekly garbage collection all year	Township of Laurentian Valley, Ottawa Valley provides bi-weekly garbage, green bin and recycling collection all year	- curbside recycling provided bi-weekly, alternating with bi-weekly garbage collection - 2 stream collection of fibres and containers - co-collected in vehicle and separated at transfer station	- Investigate using existing garbage collection crew to alternate garbage collection with recycling collection - Will need to re-open garbage collection contract or wait until contract is up for renewal - Need to determine appropriate collection vehicle for recyclables
Bi-weekly alternating with bi-weekly garbage collection in	Mattawa and Papineau-Cameron provide bi-weekly	- curbside recycling provided bi-weekly, alternating with bi-weekly garbage collection in	- Investigate using existing garbage collection crew to alternate garbage collection

	Examples	How system Could Work	Considerations
the winter and weekly garbage collection in the summer	garbage and recycling collection in the winter and weekly garbage collection in the summer (May 1st to October 31st)	the winter and weekly garbage collection during the summer (mid-June to mid-September) - 2 stream collection of fibres and containers - co-collected in vehicle and separated at transfer station	with recycling collection - Will need to re-open garbage collection contract or wait until contract is up for renewal - Need to figure out crew requirements for summer - Need to determine appropriate collection vehicle for recyclables
Collection service contracted by each Township	Marathon	- each community must hire a private company or use town staff to provide service	- may be more costly but could be cost effective if alternate garbage collection with recycling
Partnership among Townships to provide collection services	Mattawa and Papineau Cameron	- all communities share the cost of one collection vehicle and collection crew	- must determine how costs of collection crew and collection vehicle (e.g. trailer for recyclables) are shared by each community (e.g. hours to collect, # of stops) - need to decide if contract collection service or hire crew

5.3.1. Using Packer Trucks

Most municipalities use rear loading packer trucks for manual collection of garbage. The packer trucks have the advantage of being able to compact collected trash while on route which enables the truck to carry a payload about twice as large. The truck can then be emptied as a conventional dump truck by tilting the body up. Packer trucks are relatively low cost compared to side loaders or automated loading collection vehicles.

Discussions with the MRF operators identified several disadvantages to using the packer trucks to collect the recyclable materials:

- Potential contamination of the recyclable materials with garbage residue means that the trucks would need to be washed after every garbage collection;
- Neither MRF is not willing to handle compacted recyclables which adds additional labour to sort and increases contamination of different recycling streams as the compacted materials tend to stick together and do not sort into their respective categories as easily;
- While the compaction level on the packer truck can be adjusted, it requires manual adjustment every time which is time and labour consuming (cannot press a switch to adjust compaction level).

For these reasons, the use of a packer truck to collect the recyclable materials was not considered a viable option.

5.3.2. Collection Trailers

The least cost collection vehicle alternatives involve one of three options:

- Constructing a recycling trailer using a flat bed trailer as the base which is pulled by a pick-up truck – i.e. Mattawa;
- Purchasing a utility trailer and carts which is pulled by a pick-up truck – i.e. Prince Township;
- Using a cube van in conjunction with a bag collection system – i.e. Recool.

Enclosed Trailer used in Mattawa

Efforts to obtain costs to construct the enclosed recycling trailer used to collect recyclables in Mattawa were unsuccessful. The contact did not return messages. However, a flat bed trailer with a floor size of 16 feet by 4 feet retails for approximately $6,000 (see the illustration below). The estimated cost to provide to construct the storage unit is $2,000 - $4,000. Amortized over 8 years at 6% is approximately $1,600 per year.

Source: Miska Trailers at http://www.miskatrailers.com/product_details.asp?cid=30&pid=35

Trailer used in Prince Township

The utility trailer used by Prince Township is 36 feet long by 7 feet wide and cost $3,400-$4000 new (2004) and was purchased at Martin's trailers in Sault Ste. Marie. It is constructed of aluminum and is also use for other purposes. Messages left to obtain 2010 prices were not returned; therefore a price of $5,000 was used. Amortized over 8 years at 6% is approximately $800 per year.

Carts will be required for the trailer which can be rented from Green Circle at $117 per month ($1,400 per year) for 26 carts. The average cost to purchase a cart is about $100 per cart. Alternatively, the communities may be able to use modified water treatment chemical barrels, free of charge, as is currently used for can collection in Wawa (see Section 2.1.1).

Source: Utility Trailer from Martin's Trailers http://www.martinstrailers.com/utility-trailers#

Cube van used by Recool

A new 16ft van costs about $50,000. Recool has been selling used 16 ft cube vans for an estimated cost of $10,000 to $20,000. Amortized over 5 years at 6% is approximately $2,500 to $5,000 per year for a used vehicle.

Cube van used by Recool

5.3.3. Collection Bins

The cost to purchase recycling bins for each household is estimated to cost $30 per household ($15 for a blue bin and $15 for a yellow bin) as quoted by Green Circle. The estimated cost per community is provided in Table 11.

Table 11: Estimated Cost for Recycling Bins

Community	Total units currently provide garbage service	Cost for 2 Recycling Bins	Amortized (5 yrs @ 6%)	Total Cost per Hhld
		$15/bin		
Wawa	1790	$53,700.00	$12,800.00	$7.15
Dubreuilville	353	$10,590.00	$3,000.00	$8.50
White River	502	$15,060.00	$3,600.00	$7.17
Each household will require a blue bin for containers and a yellow bin for papers. Each bin retails for $15.				

The CIF provides funding to help communities cover the up-front costs to purchase containers and should be contacted to determine possible funding opportunities.

5.3.4. Bi-weekly Curbside Recycling Services

The communities of Wawa, Dubreilville and White River have several curbside collection options that can be explored:

- Scenario 1 - Bi-weekly contracted curbside recycling collection services shared by all three communities;
- Scenario 2 - Bi-weekly individual contracted curbside recycling collection services;
- Scenario 3 - Bi-weekly curbside recycling alternating with bi-weekly curbside garbage collection using existing collection crews (same service provided all year);
- Scenario 4 - Bi-weekly curbside recycling alternating with bi-weekly curbside garbage collection using existing collection crews with weekly garbage collection provided for three months in the summer.

Scenario 1 - Hiring one company to provide recycling services to all three communities

Under this scenario, the three communities would hire one company to provide bi-weekly contracted curbside recycling collection services to all three communities with costs shared by all three communities on a per stop basis + transportation. The communities should experience some economies of scale by contracting all recycling collection services to one company; however, the long transportation distances between the three communities may cancel out any potential savings.

The estimated scheduling and costs are provided in Table 12. The cost estimates used the following assumptions:

- It is assumed that contracted services will require the contractor to provide a recycling trailer similar to the one described above in order to keep costs down.
- The cost per household are based on recycling costs from other smaller northern communities as shown below.

Municpality	# Households	Description	Bi-weekly Recycling Collection Costs Per Hhld/year
Marathon	1,678	Bi-weekly, contract	$29
Prince Township	400	Bi-weekly, in-house	$55
Mattawa	748	Bi-weekly, contract	$48
Papineau-Cameron Township	532	Bi-weekly, contract	$43
Average (contract only)			**$40**
Average (all four)			**$44**

Table 12: Estimated Costs to Provide Curbside Recycling Service Using Collective Contract

Cost Estimates for Bi-weekly Curbside Recycling Services	**Wawa**	**Dubreuilville**	**White River**	**Total**
# of Households	1674	326	502	2876
# of Businesses	116	27	30	173
Total	**1790**	**353**	**532**	**3049**
	$/yr	**$/yr**	**$/yr**	**$/yr**
Low cost estimate ($40/hhld/year)	$ 71,600.00	$ 14,120.00	$ 21,280.00	$ 107,000.00
Medium cost estimate ($44/hhld/year)	$ 78,760.00	$ 15,532.00	$ 23,408.00	$ 117,700.00
High cost estimate ($50/hhld/year)	$ 89,500.00	$ 17,650.00	$ 26,600.00	$ 133,750.00

Scenario 2: Use Existing Collection Resources

Under this scenario each community continues to use its existing collection crew which provides weekly garbage collection to the entire community and bi-weekly curbside recycling collection to half of the community on week 1 and the other half of the community on week 2.

The communities of Wawa and White River contract out garbage collection services with the community of Dubreuilville using in-house labour. The garbage collection schedule for each community is provided in Table 13.

It is assumed in order to calculate hourly rates that the crew put in full 7.5 hour days for each collection day.

Table 13: Garbage Collection Schedules and Costs

	Residential Garbage Service	IC&I Garbage Service	Number of Crew	Annual Collection Costs	Estimated Hourly Rate per crew
Wawa	- Monday, Tuesday, Thursday, Friday (4 hrs)	- Wednesday (4 hrs)	2	- Contract -$126,000	- $16.15
Dubreuilville	- Wednesday (6 hrs)	-Monday and Friday (2 hours each)	2	- In-house estimated cost - $19,000	- $19.39 - $16.82
White River	- Wednesday (5 hours)	- not provided	2	- Contract $24,920	- $15.97

It is assumed that White River's collection services are 50% of its waste management contract costs which is $49,890

In order to generate the cost estimates to provide bi-weekly recycling collection services using existing collection crew, the following assumptions were made:

- It takes Prince Township 1.6 minutes (0.027 hours) per unit to collect recyclables on a bi-weekly basis;
- Recycling services are provided to all households and businesses;
- It is assumed that contracted services will require the contractor to provide a recycling trailer similar to the one described above in order to keep costs down;
- Since it is assumed that a simple recycling trailer and pickup truck will be used to collect the recyclables, the costs to operate and maintain the pick-up truck and trailer are already built into the collection crew hourly rate for the Wawa and White River contracts (this does not apply to Dubreuilville);
- There are additional costs added for Dubreuilville associated with fuel costs and maintaining the vehicle, etc. The costs are based on Prince Township and include an additional $3,000 added to the annual operating costs;
- The communities should see a reduction in the amount of garbage set out for collection with the introduction of a curbside recycling program; consequently, this should result in reduced times for garbage collection and more time available for recycling activities.

All three communities are able to provide full curbside garbage collection services to the residential and IC&I sector in 20 hours or less per week. It should be possible to use the existing collection crew to provide recycling collection services on alternative days, when garbage collection is not taking place.

Based on the time required to collect two-stream recycling from Prince Township households on a bi-weekly basis, Table 14 shows the additional cost estimates to provide bi-weekly collection using existing collection crews to the three communities. The cost estimates are based on the current costs to provide garbage collection service in each community on an hourly basis.

Table 14: Estimated Costs to Provide Recycling Services Using Existing Collection Crews

Community	Total units	Estimated Number of hrs based on Prince Township* (@1.6 minutes/unit)		Transportation (assume 2-3 hrs/collection)	Total Hours	Estimated Annual Cost ($/hr/2crew)	Total Cost Estimate for Residential & IC&I	Cost per Unit
	(hhlds & businesses)	hrs/bi-weekly collection	hrs/year	hrs/year	per year	2 crew	bi-weekly collection	Annual
Wawa	1790	47.9	1244.4	78.0	1322.4	$32.31	$42,723.21	$23.87
Dubreuilville	353	9.4	245.4	52.0	297.4	$36.21	$13,768.89	$39.01
White River	532	14.2	369.8	78.0	447.8	$31.95	$14,307.90	$26.89

* It takes 1.6 minutes per unit to collect recyclables in Prince Township

Scenario 3: Alternating Bi-weekly Garbage and Recycling Service Provided Year Round

Under this scenario each community continues to use its existing collection crew which provides bi-weekly curbside garbage and recycling collection to half of the community on week 1 and bi-weekly curbside garbage and recycling collection to the other half of the community on week 2, all year long.

Although collecting two stream recyclables is more time consuming than collecting garbage, it is assumed that the overall collection time will not change since the communities should see a reduction in the amount of garbage set out for collection with the introduction of a curbside recycling program. Consequently, this should result in reduced times for garbage collection and more time available for the recycling collection. Some additional costs may apply to White River if it chooses to provide recycling services to its retail establishments.

The collection costs will remain the same they are now as shown in Table 15. It is assumed that White River's collection services are 50% of its waste management contract costs

Table 15: Estimated Costs to Provide Alternating Bi-weekly Garbage and Recycling Collection Year Round

Community	Total units currently provide garbage service	Total Cost Estimate for alternating bi-weekly garbage and recycling collection	Annual Garbage and Recycling Cost per Unit	Extra Annual Cost for Recycling Service per Unit
Wawa	1790	$126,000.00	$70.39	$0.00
Dubreuilville	353	$19,000.00	$53.82	$0.00
White River	502	$24,920.00	$49.64	$0.00

It is assumed that White River's collection services are 50% of its waste management contract costs

Scenario 4: Alternating Bi-weekly Garbage and Recycling Service Provided All Year but Summer

In this scenario each community continues to use its existing collection crew to provide bi-weekly curbside garbage and recycling collection to half of the community on week 1 and bi-weekly curbside garbage and recycling collection to the other half of the community on week 2 from mid September to mid June. From mid June to mid September the entire community receives weekly garbage collection and bi-weekly curbside recycling collection to half of the community on week 1 and the other half of the community on week 2.

It is assumed that the cost to provide 3 months of weekly garbage will increase the annual cost developed in Table 12 by an additional 25%. See Table 16 for adjusted costs to provide weekly garbage collection in the summer.

Table 16: Estimated Cost to Provide Bi-weekly Collection for Nine Months and Weekly Garbage for Three Months

Community	Total units currently provide garbage service	Total Cost Estimate for alternating bi-weekly garbage and recycling collection	Cost Estimate to Provide additional weekly garbage collection in the summer	Extra Cost Per Unit for Recycling Service
			add additional 25% to cost	Annual cost
Wawa	1790	$126,000.00	$157,500.00	$17.60
Dubreuilville	353	$19,000.00	$23,750.00	$13.46
White River	502	$24,920.00	$31,150.00	$12.41

It is assumed that White River's collection services are 50% of its waste management contract costs

Summary Estimated Curbside Collection Costs

The summary costs for the following four curbside collection scenarios are provided in Table 17.

- Scenario 1 - Bi-weekly contracted curbside recycling collection services shared by all three communities;
- Scenario 2 - Bi-weekly individual contracted curbside recycling collection services;
- Scenario 3 - Bi-weekly curbside recycling alternating with bi-weekly curbside garbage collection using existing collection crews (same service provided all year);
- Scenario 4 - Bi-weekly curbside recycling alternating with bi-weekly curbside garbage collection using existing collection crews with weekly garbage collection provided for three months in the summer.

Table 17: Cost Estimates for Curbside Collection Scenarios

Scenario		Assumptions	Wawa	Dubreuilville	White River
	Total Units to be Serviced		1790	353	532
Scenario 1	Hiring one company to collect from all three communities	low cost $40/hhld	$71,600.00	$14,120.00	$21,280.00
	extra $/unit/yr		$40.00	$40.00	$40.00
Scenario 2	Using existing Collection Services	based on Prince Twp	$42,723.21	$13,768.89	$14,307.90
	extra $/unit/yr		$23.87	$39.01	$26.89
	Total units with garbage service		1790	353	502
Scenario 3	Total Cost Estimate for alternating bi-weekly garbage and recycling collection	no additional cost	$126,000.00	$19,000.00	$24,920.00
	extra $/unit/yr		$0.00	$0.00	$0.00
Scenario 4	Cost Estimate to Provide additional weekly garbage collection in the summer	add additional 25% to cost	$157,500.00 ($31,500)	$23,750.00 ($4,750)	$31,150.00 ($6,230)
	extra $/unit/yr		$17.60	$13.46	$12.41

5.4. Storage and Transportation of Recyclables

Determining the storage transportation and processing of the recyclables is the final challenge in designing a recycling program. The storage location and design for the three communities will ultimately depend on the chosen processing (MRF) location, of which there are two viable options:

- Recool located in Thunder Bay;
- Green Circle located in Sault Ste. Marie.

Recyclables taken to Recool for processing:

- Recyclables can be either 18 wheel transport trailers or 40/50 cubic yard roll off containers. Two of each will be required – one to store containers and one to store fibres (papers)
- Location of the storage containers would need to be as close to White River as possible, to reduce transportation time and distance to the Recool MRF.

Recyclables taken to Green Circle for processing:

- Recyclables can be either 18 wheel **walking** transport trailers or 40/50 cubic yard roll off containers. Two of each will be required – one to store containers and one to store fibres (papers)
- Location of the storage containers would need to be as close to Wawa as possible, to reduce transportation time and distance to the Green Circle MRF.

As part of the study, multiple companies were contacted to provide cost estimates for a variety of system components including storage, transportation and processing:

1. Cost to rent two 18 wheel trailers on a monthly basis for the purpose of storing and transporting the recyclables materials;
2. Cost to rent two 18 wheel walking trailers on a monthly basis for the purpose of storing and transporting the recyclables materials;
3. Cost to rent two 40 cubic yard containers on a monthly basis for the purpose of storing and transporting the recyclables materials;
4. Cost to transport recyclables from the Wawa storage site to the Green Circle Material Recycling Facility in Sault Ste. Marie;
5. Cost to transport recyclables from the White River storage site to the Recool Material Recycling Facility in Thunder Bay.

Four companies were contacted for quotes:

- Recool of Thunder Bay;
- Green Circle of Sault Ste. Marie;
- Provost of Wawa;
- Freight Managers of Thunder Bay.

Of the four companies contacted only three provided quotes (see Table 18). Freight Managers chose not to respond.

Table 18: Quotes Provided for Storage, Transportation and Processing of Recyclables

	Recool Quote	Green Circle Quote	Provost Quote
Cost to rent two 18 wheel trailers per month	$300 per trailer		~~Assume $900~~$2,300 per trailer
Cost to rent two 18 wheel walking trailers per month			$3,800 per trailer
Cost to rent two 40 cubic yard containers per month		$200 per container	$700 per container
Cost to transport from Wawa to Green Circle (assumes 250 km)		$700 per container	$2.50 per km (~$625)
Cost to transport from White River to Recool (assumes 400 km)	$1,080 per trailer		$2.50 per km (~$1,000)
Per tonne processing cost at Green Circle		$55 per metric tonne	
Per tonne processing cost at Recool	$85 per metric tonne		

The volume of an 18 wheel trailer is based on a typical trailer size of 53 feet long by 8.5 feet wide and 9 feet high. The volume is approximately 150 yd^3 or 115 m^3. Using the data provide below, the estimated

time that it will take the containers to fill with recyclables is provided in Table 19. (Although no quote was provided for a 50 yd3 roll off bin, there is reason to include it in the time estimates).

Curbside Collection

	Wawa	Dubreuiville	White River	Total	Total
Average Recyclables Estimates	**tonnes/yr**	**tonnes/yr**	**tonnes/yr**	**Tonnes/yr**	**kg weekly**
Average Fibres	213	42	64	319	6,135
Average Containers	24	5	7	36	692
ICI (expected to be mostly cardboard)	131	31	34	195	3750
Medium estimate	**369**	**77**	**105**	**551**	**10,596**

Table 19: Estimated Time to Fill Storage Containers with Recyclables from Curbside Collection

Storage Container	Density*	18 wheel trailer	40 yd3 roll off container	50 yd3 roll off container
size		165 yd3 (120 m^3)	40 yd3 (31 m^3)	50 yd3 (38 m^3)
Fibres	150 kg/m3			
weeks to fill (residential only)		3	3/4	1
trips per year		18	69	56
separate OCC trailer**	150 kg/m3			
weeks to fill (ICI only)		5	1	2
trips per year		11	42	34
Containers	50 kg/m3			
weeks to fill		8	2	3
trips per year		6	23	19

*Source of density data is Report on Transfer of Blue Box Recyclable Material: Factors Affecting Decision Making. July 2009. Prepared for Continuous Improvement Fund by Genivar

** It is assumed that the three communities will be able to work out an arrangement with a waste hauler (e.g. Waste Management) or one of the processors to provide storage containers and transportation for the separated cardboard generated and diverted from local businesses. Such an arrangement currently exists in the Township of Prince and has existed, in the past, with the Wawa French School Board. The communities could pursue collection arrangements with the Public, Catholic and French school boards as well as the local hospital in Wawa to collect and store the OCC generated by these institutions.

Based on the estimated time to fill the different types of storage containers in Table 18, the estimated costs associated with container rental, transportation and processing are provided in Table 20. For the purpose of providing a wide range of cost estimates, an additional cost estimate has been developed

based on the idea that the three communities would purchase four 50 yd^3 containers at an estimated cost of $12,000 each. Amortized over 8 years at 6%the cost is approximately $1,950 each ($7,800 for four containers).

The two least cost scenarios calculated in Table 20 are as follows:

Scenario 1 – rent two 18 wheel trailers from Recool, transportation provided by Recool and process recyclables at the Recool MRF – annual estimated cost $64,109

Scenario 6 – Purchase four 50 yd^3 roll off containers, transportation provided by Provost and process recyclables at the Green Circle MRF – annual estimated cost $75,650

Table 20: Annual Cost Estimates to Store, Transport and Process Recyclables from Curbside Collection

			Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5	Scenario 6
		number	Transport to Recool		Transport to Green Circle			
Storage								
18	wheel trailers rental per month	2	$ 7,200	$ 21,600				
18	wheel walking trailer rental per month	2			$ 91,200			
40	yd3 roll off rental per month (Provost)	2				$ 16,800		
40	yd3 roll off rental per month (Green Circle)	2					$ 4,800	
50	yd3 purchase	4						$ 7,800
Transport								
to	Recool (by Recool)	Fibres	$ 19,972					
		Containers	$ 6,762					
to	Recool (by Provost)	Fibres		$ 18,493				
		Containers		$ 6,261				
to	Green Circle (by Green Circle)	Fibres					$ 48,022	
		Containers					$ 16,258	
to	Green Circle (by Provost)	Fibres			$ 11,928	$ 44,248		$ 36,097
		Containers			$ 4,038	$ 14,981		$ 12,221
Processing								
by	Recool ($85/tonne)	85	$ 30,175	$ 30,175				
by	Green Circle ($55/tonne)	55			$ 19,525	$ 19,525	$ 19,525	$ 19,525
	Total Annual Cost		$ 64,109	$ 76,529	$ 126,691	$ 95,554	$ 88,605	$ 75,643

			Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5	Scenario 6
		number	Transport to Recool		Transport to Green Circle			
Storage								
18	wheel trailers rental per month	2	$ 7,200	$ 55,200				
18	wheel walking trailer rental per month	2			$ 91,200			
40	yd3 roll off rental per month (Provost)	2				$ 16,800		
40	yd3 roll off rental per month (Green Circle)	2					$ 4,800	
50	yd3 purchase	4						$ 7,800
Transport								
to	Recool (by Recool)	Fibres	$ 19,972					
		Containers	$ 6,762					
to	Recool (by Provost)	Fibres		$ 18,493				
		Containers		$ 6,261				
to	Green Circle (by Green Circle)	Fibres					$ 48,022	
		Containers					$ 16,258	
to	Green Circle (by Provost)	Fibres			$ 11,928	$ 44,248		$ 36,097
		Containers			$ 4,038	$ 14,981		$ 12,221
Processing								
by	Recool ($85/tonne)	85	$ 30,175	$ 30,175				
by	Green Circle ($55/tonne)	55			$ 19,525	$ 19,525	$ 19,525	$ 19,525
	Total Annual Cost		$ 64,109	$ 110,129	$ 126,691	$ 95,554	$ 88,605	$ 75,643

Depot Collection

A depot collection service will not achieve the same participation and material recycling rate as a curbside collection program. Prior to the curbside recycling program, the Town of Marathon operated a depot recycling program. Under the depot program, the Town reported recycling diversion rates of 5-7%; now with curbside collection, it reports diversion rates of 28% in 2007.

More aggressive depot programs typically achieve about 10-12% diversion rate. This represents about a third of the average diversion rate achieved through a curbside recycling program (the average curbside diversion rate achieved in the medium diversion scenario is 28% as shown in Table 6). Therefore, it is assumed that the depot program will achieve about one-third the diversion rate achieved for the curbside collection program.

The estimated costs to store, transport and process the recyclable materials collected through a depot program are provided in Table 21. The two least cost scenarios calculated in the previous section are used to develop the depot storage, transportation and processing costs.

Table 21: Estimated Annual Costs to Store, Transport and Process Recyclables from a Depot Program

		Scenario 1	Scenario 6
	number	Transport to Recool	Transport to Green Circle
Storage			
18 wheel trailers rental per month	2	$7,200	
50 yd3 purchase	4		$7,800
Transportation			
to Recool (by Recool)	Fibres	$6,657	
	Containers	$2,254	
to Green Circle (by Provost)	Fibres		$12,032
	Containers		$4,074
Processing			
by Recool ($85/tonne)	85	$10,058	
by Green Circle ($55/tonne)	55		$6,508
Total Annual Cost		$26,170	$30,414

6. Comparison of Costs and Recommendations

6.1. Recycling Options Cost Comparisons

Table 22 provides a summary of the collection, storage, transportation and processing costs associated with a depot collection system described in Section 5.0 for the communities of Wawa, Dubreuilville and White River. Table 23 provides a summary of the costs associated with a curbside collection system.

Table 22: Comparison of Depot Program Costs

Scenario		Assumptions	Wawa	Dubreuilville	White River
Units			1790	353	532
Collection Equipment					
		amortized			
	Enclosed Trailer	**8 yrs @6%**	$1,600.00	$1,600.00	$1,600.00
	Utility Trailer with carts	**8 yrs @6%**	$2,200.00	$2,200.00	$2,200.00
	Utility Trailer with used barrels	**8 yrs @6%**	$800.00	$800.00	$800.00
	$/unit	**low**	$0.45	$2.27	$1.50
		high	$1.23	$6.23	$4.14
	Bins (blue and yellow per hhld)	**5 yrs @6%**	$12,800.00	$3,000.00	$3,600.00
	$/unit		$7.15	$8.50	$7.17
Depot Service					
Attended	**Estimated Annual Operationg Costs (N.O.)**		$55,191.78	$10,748.22	$16,550.94
	extra $/unit/yr		$32.97	$32.97	$32.97
Non-attended	**Satellite depots in each community and central storage**		$3,536.00	$3,536.00	$3,536.00
	extra $/unit/yr		$2.11	$10.85	$7.04
Storage, Transportation and Processing					
Scenario 1	rent 18 wheel trailers from Recool, transportation provided by Recool and process at the Recool MRF		$17,511.65	$3,453.41	$5,204.58
	Depot Collection $/unit		$9.78	$9.78	$9.78
Scenario 6	Purchase four 50 yd^3 roll off containers, transportation by Provost and process at the Green Circle MRF		$20,352.12	$4,013.57	$6,048.79
	Depot Collection $/unit		$11.37	$11.37	$11.37

Table 23: Comparison of Curbside Program Costs

Scenario		Assumptions	Wawa	Dubreuilville	White River
Units			1790	353	532
Collection Equipment					
		amortized			
	Enclosed Trailer	**8 yrs @6%**	$1,600.00	$1,600.00	$1,600.00
	Utility Trailer with carts	**8 yrs @6%**	$2,200.00	$2,200.00	$2,200.00
	Utility Trailer with used barrels	**8 yrs @6%**	$800.00	$800.00	$800.00
	Cube Van (used)	**5 yrs @6%**	$4,000.00	$4,000.00	$4,000.00
	$/unit	**low**	$0.45	$2.27	$1.50
		high	$2.23	$11.33	$7.52
	Bins (blue and yellow per hhld)	**5 yrs @6%**	$12,800.00	$3,000.00	$3,600.00
	$/unit		$7.15	$8.50	$7.17
Curbside Collection					
Scenario 1	Hiring one company to collect from all three communities	low cost $40/hhld	$71,600.00	$14,120.00	$21,280.00
	extra $/unit/yr		$40.00	$40.00	$40.00
Scenario 2	Using existing Collection Services	based on Prince Twp	$42,723.21	$13,768.89	$14,307.90
	extra $/unit/yr		$23.87	$39.01	$26.89
Scenario 3	Cost Estimate for alternating bi-weekly garbage and recycling	no added cost	$126,000.00	$19,000.00	$24,920.00
	extra $/unit/yr		$0.00	$0.00	$0.00
Scenario 4	Cost Estimate for additional weekly garbage collection in the summer	add 25% to cost	$31,500.00	$4,750.00	$6,230.00
	extra $/unit/yr		$17.60	$13.46	$12.41
Storage, Transportation and Processing					
Scenario 1	rent 18 wheel trailers from Recool, transportation provided by Recool and process at the Recool MRF		$42,897.10	$8,459.60	$12,749.31
	Curbside Collection $/unit		$23.96	$23.96	$23.96
Scenario 6	Purchase four 50 yd^3 roll off containers, transportation by Provost and process at the Green Circle MRF		$50,617.19	$9,982.05	$15,043.77
	$/unit		$28.28	$28.28	$28.28

WDO Blue Box Funding

In December 2003, the Minister of the Environment approved the Blue Box Program Plan which addresses a portion of consumer packaging material and printed papers commonly found in the residential waste stream and obligate stewards to pay fees that will be used to cover up to 50% of the municipal Blue Box program costs. The Blue Box Program Plan designated and defined "Stewards" as brand owners and first importers in Ontario of products that result in Blue Box waste.

The formula used for determining the amount of funding received by each municipality is very complicated and is based on operating costs, revenues and recovery rates for materials. Data collected through the annual WDO datacall on revenues for each material, as well as gross costs, are entered into the Blue Box Funding Formula to calculate net program costs and the share that industry will pay in any given year. Some compensation is built in for geographic location of the municipalities. The funding is provided for municipal operating costs reported two years previous; therefore, municipalities are currently receiving funding in 2010 for costs reported in 2008. In general, northern communities receive about 40% of the residential recycling program operational costs. The funding only applies to the residential recycling operational costs and any IC&I recycling costs must be backed out.

Tables 24 and 25 incorporates the estimated financial support that the three communities could receive from Waste Diversion Ontario using a funding formula of 40% for different recycling scenarios. The funding only applies to operational costs and not capital expenditures.

Table 24: Estimated Depot Costs with WDO Funding

Scenario		Assumptions	Wawa	Dubreuilville	White River
Units			1790	353	532
Depot Service					
Attended	Estimated Annual Operational Costs (N.O.)		$55,191.78	$10,748.22	$16,550.94
	Storage, transportation, and processing average cost	Average of Scenarios 1&6	$19,000.00	$3,700.00	$5,500.00
	Total Annual Cost		$74,191.78	$14,448.22	$22,050.94
	Total Annual Cost with 40% WDO funding	40% funding	$44,515.07	$8,668.93	$13,230.56
	Annual $/unit with WDO funding		**$24.87**	**$24.56**	**$24.87**
Non-attended	Satellite depots in each community and central storage		$3,536.00	$3,536.00	$3,536.00
	Storage, transportation, and processing average cost	Average of Scenarios 1&6	$19,000.00	$3,700.00	$5,500.00
	Total Annual Cost		$22,536.00	$7,236.00	$9,036.00
	Total Annual Cost with 40% WDO funding	40% funding	$13,521.60	$4,341.60	$5,421.60
	Annual $/unit with WDO funding		**$7.55**	**$12.30**	**$10.19**

Table 25: Estimated Curbside Cost with WDO Funding

Scenario		Assumptions	Wawa	Dubreuilville	White River
Units			1790	353	532
Curbside Collection, Storage, Transportation and Processing					
Scenario 1	Hiring one company to collect from all three communities	low cost $40/hhld	$71,600.00	$14,120.00	$21,280.00
	Storage, transportation, and processing average cost	Average of Scenarios 1&6	$47,000.00	$9,300.00	$14,000.00
	Total Annual Cost		$118,600.00	$23,420.00	$35,280.00
	Total Annual Cost with 40% WDO funding	40% funding	$71,160.00	$14,052.00	$21,168.00
	Annual $/unit with WDO funding		**$39.75**	**$39.81**	**$39.79**
Scenario 2	Using existing Collection Services	based on Prince Twp	$42,723.21	$13,768.89	$14,307.90
	Storage, transportation, and processing average cost	Average of Scenarios 1&6	$47,000.00	$9,300.00	$14,000.00
	Total Annual Cost		$89,723.21	$23,068.89	$28,307.90
	Total Annual Cost with 40% WDO funding	40% funding	$53,833.93	$13,841.34	$16,984.74
	Annual $/unit with WDO funding		**$30.07**	**$39.21**	**$31.93**
Scenario 3	Cost Estimate for alternating bi-weekly garbage and recycling	no added cost	$0.00	$0.00	$0.00
	Storage, transportation, and processing average cost	Average of Scenarios 1&6	$47,000.00	$9,300.00	$14,000.00
	Total Annual Cost		$47,000.00	$9,300.00	$14,000.00
	Total Annual Cost with 40% WDO funding	40% funding	$28,200.00	$5,580.00	$8,400.00
	Annual $/unit with WDO funding		**$15.75**	**$15.81**	**$15.79**
Scenario 4	Cost Estimate for additional weekly garbage collection in the summer	add 25% to cost	$31,500.00	$4,750.00	$6,230.00
	Storage, transportation, and processing average cost	Average of Scenarios 1&6	$47,000.00	$9,300.00	$14,000.00
	Total Annual Cost		$78,500.00	$14,050.00	$20,230.00
	Total Annual Cost with 40% WDO funding	40% funding	$47,100.00	$8,430.00	$12,138.00
	Annual $/unit with WDO funding		**$26.31**	**$23.88**	**$22.82**

6.2. Additional Supporting Policies and Regulations

In order to promote higher participation in recycling, communities will implement waste diversion policies and regulations. These policies and regulations provide an incentive to the resident or IC&I establishment to participate more actively in recycling and other waste diversion activities in order to reduce their operating costs and to reduce their environmental footprint. Many of the policies are low cost measures that can be effectively implemented in a small community. The communities of Wawa, Dubreuilville and White River could investigate implementing the following waste diversion policies in conjunction with implementing a recycling program in their communities.

Pay-as-you-Throw (User Pay)

Pay-As-You-Throw (PAYT), also referred as user pay, has become a popular method for financing residential waste management services and making householders more directly responsible for their waste generation and disposal habits. Pay-as-you-Throw is a program supported by a bylaw requiring residents pay directly for the amount of garbage they set out for collection, which may employ a tag or bag system or a variable cart system (e.g. different fee levels for different sized containers). Before implementation, supporting diversion programs must be in place.

PAYT may be introduced under one of two scenarios: a full PAYT program or a partial PAYT program. Under a full PAYT program, all garbage that is placed at the curb for collection must be paid for in advance (i.e. by purchasing a tag and placing it on each bag of garbage). Under a partial PAYT system, a designated number of bags/cans are permitted to be placed at the curb without requiring advance payment. If the householder exceeds the designated number of bags permitted at the curb then any additional bags/cans must be paid for in advance (i.e. by purchasing a tag and placing it on each additional bag of garbage). Many small communities in Ontario have implemented full and partial PAYT programs including:

- Town of Marathon – full PAYT;
- Town of Dryden – full PAYT;
- Brockton Township – full PAYT;
- Town of Hanover – full PAYT;
- Township of Amaranth – Partial 2 bag PAYT;
- Town of Fort Frances – Partial 1 bag PAYT.

PAYT is considered one of the most effective policies for maximizing diversion of single family waste, as it communicates a clear message to householders that encourages recycling and other diversion activities which minimize the amount of residential waste discarded.

Mandatory Recycling By-Laws

Many communities have mandatory recycling by-laws and support the by-laws with fines for non compliance. This approach targets the 5% to 10% of the population that does not participate in a recycling program or participates in a haphazard manner. The key to mandatory recycling is the communication of the by-law requirement to all residents and enforcement of the by-law.[2] Residents need to be given plenty of warning that they are in contravention of the by-law by providing them with notices that they are not participating, followed by a letter from a Town official and finally a fine. A number of communities have taken the following approach:

[2] Enforcement relies on the collection crew noticing recyclables in the garbage and leaving the bag(s) at the curb with a tag attached that notifies the resident about the mandatory recycling by-law and the reason for rejecting the bag(s) of garbage.

- ***Township of Minden Hills*** - The Council of the Township of Minden Hills passed a mandatory recycling by-law in August 2007, which was deemed necessary to ensure the longevity of the present landfill sites and to encourage all users to separate recycled material prior to arriving at any of the Municipal sites;
- ***Township of Algonquin Highlands*** – The Township implemented a mandatory recycling by-law in 2004 which prohibits residents from depositing Blue Box materials in the Township's waste disposal sites.

Clear Bags

A clear bag program requires residents to set out all garbage for collection in clear garbage bags. The concept of requiring clear bags for garbage is that collectors can leave bags behind if they contain visible recyclable material, which has been effectively banned from the garbage through mandatory recycling by-laws.

Nova Scotia's first Clear Bag Program was launched in Richmond County in 2003. Residential garbage was no longer collected in solid black or green bags. All garbage had to be placed in clear, transparent bags when set out at the curb. For privacy issues, most communities allow residents to use one solid bag (e.g. grocery bag) for personal waste. The clear bag program is attributed to increasing waste diversion between 20 to 40% on average in the participating municipalities in Nova Scotia. Over 22 municipalities in Nova Scotia have adopted a clear bag system[3].

There are other communities sprinkled throughout Ontario that have implemented the clear bag program including

- City of Guelph, Ontario;
- Rideau Lakes Township in Ontario;
- Township of Madoc;
- Township of Amaranth.

Disposal Bans at Landfill

Disposal bans ensure that materials that can be easily and effectively recycled do not end up in the landfill. A disposal ban by-law prohibit users from discarding the specified materials in the garbage and can be reinforced at the curb by leaving garbage bags behind that contain banned materials. Examples of communities with disposal bans include:

- Bluewater Recycling Association – has a ban on recyclables being disposed at the landfill;
- Hanover and Walkerton - have introduced a by-law banning electronic waste at the landfill.

Promotion and Education

Effective Promotion and Education (P&E) is the backbone of any strong recycling program. Developing strong, consistent messages that ring true to the audience is the key to a successful P&E strategy. Many efforts have been made to better understand the characteristics of successful P&E strategies; for example, in the winter of 2007, the Association of Municipal Recycling Coordinators

[3] The clear bag initiative was recently rejected by Halifax recently, stating that although the Province thought clear bags were a good policy to increase diversion, they invade people's privacy.

(AMRC)[4] conducted a series of focus groups across the province to field test P&E best practices. During the focus groups, participants were asked to identify positive P&E messages to promote waste diversion. A number of positive incentive examples were offered such as:

- Tell people what the benefits are,
- Show the community the good they are doing,
- Offer tax rebates or credits, or hold a lottery for best Blue Box street.,
- Show the community's progress in public using signage (as in the ISO program),
- Show people (especially children) what is being made from recycled material,
- Post information on billboards.

6.3. Recommended Approach

The following report examined a variety of opportunities to provide recycling services to these three communities and the estimated costs associated with collection, transportation and processing of the recyclables. The costs provided in this report are based on best available information at this point in time. The cost estimates acquired from different sources were not obtained through a tendering process and are subject to change.

Although a curbside recycling program is more expensive than a depot recycling program, it achieves more social and environmental benefits. It provides convenience to the householder and business which increases diversion rates and reduces garbage requiring disposal.

Prior to the curbside recycling program, the Town of Marathon operated a depot recycling program. Under the depot program, the Town reported recycling diversion rates of 5-7%; now with curbside collection, it reports diversion rates of 28% in 2007. More aggressive depot programs typically achieve about 10-12% diversion rate. This represents about a third of the average diversion rate achieved through a curbside recycling program (the average curbside diversion rate achieved in the medium diversion scenario is 28% as shown in Table 6).

Furthermore, WDO Blue Box funding supports higher diversion rates by providing more funding. For this reason, it is recommended that the communities adopt alternating curbside bi-weekly garbage and recycling collection schedules, with additional garbage collection provided in the summer, if required.

The two least cost scenarios for storing, transporting and processing the curbside recyclables are as follows:

Scenario 1 – rent two 18 wheel trailers from Recool, transportation provided by Recool and process recyclables at the Recool MRF – annual estimated cost $64,110

Scenario 6 – Purchase four 50 yd^3 roll off containers, transportation provided by Provost and process recyclables at the Green Circle MRF – annual estimated cost $75,650

[4] Part of a Promotion and Education best practices report prepared for Stewardship Ontario

The determining factor will be the manner in which the communities prefer to set out their recyclables and the ease of collection. Depending on whether the recyclables are processed at the Recool MRF in Thunder Bay or the Green Circle MRF in Sault Ste. Marie will impact the collection approach.

Recool has a unique collection and processing system that allows the company to operate in a cost effective manner. In order to reduce collection costs, Recool collects recyclable materials using a three stream system in which transparent bags are used for two separate streams – select fibres and containers - and cardboard is bundled as a third stream. This enables the materials to be collected in an enclosed trailer (such as the one used by Mattawa) or a cube van (or other similar enclosed vehicle). Collection is straight forward as is transfer into the storage containers. Bins are not required by the household, rather the resident is required to purchase transparent bags.

Green Circle uses a two stream recycling system with separate collection and recycling of fibers and containers. Each household would receive a blue box for containers and a yellow box for fibres (paper products). Green Circle does not accept recyclable materials collected in bags. All recyclable material must be collected and received at the Green Circle MRF in loose form. The collection system requires that the loose material be emptied into containers/carts using an enclosed trailer with compartments (such as Mattawa) or a modified utility trailer with carts/barrels (such as Prince Township).

Further discussions with the two material recycling companies (Recool and Green Circle) should be pursued to determine a preferred, least cost transportation and processing arrangement. From there, the collection arrangement will be apparent. This coupled with an alternating curbside bi-weekly garbage and recycling collection schedule with weekly garbage collection in the summer should meet the needs of the community.