Continuous Improvement Fund

Project #173 - Automated Blue Box Recycling Collection

CORP. OF THE CITY OF TIMMINS

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Introduction

The City of Timmins is centrally located in Northeastern Ontario, and is the regional centre for shopping, culture, commerce, health, industrial supplies and distribution channels. The City of Timmins has a population of 44,000, but draws consumers and business-to-business trade from throughout the Cochrane District, the James Bay Coastal area and nearby communities such as Chapleau and Kirkland Lake for a total regional market of approximately 118,000.
The City of Timmins currently provides waste and recycling collection to 10,250 households. On average 10,000 metric tonnes per year of waste are collected. Of that volume, 3,000 metric tonnes are diverted from the landfill to various recycling facilities.

Project Background

The City of Timmins provided curbside waste collection on a weekly basis and for blue box recycling on a bi-weekly basis.

Figure 1: Timmins Manual Waste Collection

The City of Timmins Waste and Recycling collection system consisted of four (4) side-load (1 operator each) trucks and one (1) rear-load (2 operators) truck for waste collection per day, with

2 additional trucks as spares. Recycling collection (single-stream) and processing was contracted out to a third party, which consisted of 3 trucks per day. Over time, a few challenges emerged for the waste management department: 1) varying ages of vehicles employed for waste collection which resulted in increased yearly cost for vehicle maintenance; 2) an expiring recycling contract with third party contractor.

Table 1: Status Quo Garbage and Recyclable Material Curbside Collection Program

Material Type	Tonnes/ Year	Tonnes/Day (252)	Tonnes/Day/ Truck	Trucks Per Day
Garbage	7,075	28.08	5.62	5.00
Recycling	2700	10.71	3.57	3.00

The City of Timmins Waste Management Department developed a waste management plan to increase waste diversion and initiate a long term waste management plan in 2009 (CIF Project #129). The waste management plan outlined what would be a paradigm shift in the way waste and recyclable services are delivered to residents and represents best practices within the industry in keeping with the province initiatives towards waste diversion and best practices. The City of Timmins decided to initiate one of the recommendations from the waste management plan: *Conversion from the current program to an automated dual stream collection program through current fleet replacement*.

Automated Waste Collection System Benefits

While a manual dual stream collection program presents a lower cost option than the automated program, the automated program offers a high productivity based program (compared to manual). The potential advantages to this automated program would be the benefit of reduced potential for worker injury and WSIB related incidences for the City, a system suitable to any city collection staff demographic and a system than may substantially reduce waste scavenging by bears.

Another benefit to the automated program is that the distribution of carts, renewed promotion and education of the program and the move to weekly (as opposed to bi-weekly) collection of recyclables will almost certainly increase participation rates in the recycling program. The R.W. Beck & KPMG *Blue Box Program Enhancement and Best Practices Assessment Project*, May 2007 report cites that municipalities that collect recyclables less frequently than garbage tend to

exhibit lower recovery rates, as compared to municipalities where collection frequency of garbage and recyclables is equal.

To fully initiate an automated waste collection system the City of Timmins will require a new fleet of automated trucks and to purchase waste and recycling carts for an entire municipality.

Automated Waste Collection

In April 2010, Timmins City Council approved the new waste collection recycling initiative. A key component of the program was the purchase of three automated collection trucks which in effect will be replacing 4 old units and eliminate the need to contract out the recycling aspect of City operations. Within the new waste collection recycling initiative, the City of Timmins was able expanded its list of accepted recyclable material and increase frequency of collection from bi-weekly collection to weekly collection.

In July 2010, Timmins City Council approved the supply and delivery of 3 automated/manual dual stream refuse packers. Through the city's RFP process, the vehicles purchased were the Labrie/Freightliner Expert Helping Hand/M2. The dual stream automated/manual side loading refuse packers have a thirty-five (35) cubic yard capacity, which utilized a two stream 60/40 split design.
The automated cart lifting mechanism has the ability to reach carts 84" – 120" away. Each packer is also equipped with a hydraulic cart tipper for when semi-automated operations is required.

Figure 2: New 35 cubic yard, dual stream automated side loading refuse packer

Automated Trucks began sporadic operation in Q1 of 2011 prior to implementation of Cart system in August of 2011; this soft start approach allowed operators to familiarize themselves with the trucks and how the vehicles would respond on route.

Automated co collection began on August 8th, 2011; operators were accompanied by factory trainers for the first week of operation. Operators quickly became familiar with the equipment and the nuances of street collection. Budgeted productivity of 100 carts per operating hour was achieved within the first two weeks of operations and has continued to increase. Crews often see productivity numbers of 120 carts per hour. The operation of the mechanized arm proved to be flawless and operators quickly shifted from working on the standup side to working from the driver's seat using the on board cameras to position the collection of carts. Operators soon became so efficient that they were required to wait and hold a cart in the dump position while the hydraulic ram dispensed with the contents of the previous cart. The body manufacturer has identified an upgrade to the trucks hydraulics that will reduce the hydraulic ram cycles time from 18 seconds to 12 seconds thus allowing an increase cycle times and more productivity on the street.

The winter of 2011-2012 brought large accumulations of snow, several freeze/thaw cycles and some extended periods of -30℃. During these cold periods productivity was challenged due the reduced efficiencies:

Truck hydraulics: most affected was the automated arm. The issue was rectified by the use of year round synthetic oil.

Frozen waste and recycling: compaction was reduced during these cold periods as waste and recycling products were frozen. In addition to the additional truck space required, frozen waste and recycling products tended to exit the hopper as the load neared maximum capacity. The addition of a retaining bar in the throat of the hoppers was required to eliminate this problem.

Cart Roll Out

A key component of the automated collection program is the purchase 22,000 residential carts and associated tracking routing software. Standard cart sizes that were specified in the Request for Proposal (RFP) were 65 gallon and 95 gallon. A separate pricing option was requested for a smaller cart with a capacity of 35 gallon to address specific resident needs.

Rehrig Pacific Company was awarded the contract to supply and deliver 22,000 residential carts to the City of Timmins. In addition to the contract, each cart was installed with Radio Frequency Identification (RFID) technology, and data management software (C.A.R.T.S.). The C.A.R.T.S. software easily tracks all deliveries, swaps and repair issues.

Delivery was for the most part completed by the first week in August. Cart delivery was completed by the cart manufacturer's contractor and was problem free and on time. The Corporation did identify during the initial roll out that the house count was short by 3000 carts. This required a second phase of delivery which took place in October of 2011. All carts were identified and tracked in the C.A.R.T.S. software system.

Acceptance of the cart program by Timmins residents was virtually unanimous; residents readily participated in the program. Cart placement however proved to be a challenge even though a significant education period was allowed. Each cart was delivered with a flyer indicating the required placement of the carts i.e end of driveway, at the curb or gutter line. Carts have arrows on the lids indicating which side of the cart should face the street. Some residents continue to put the carts out backwards, we have begun not picking these up. Residents are identified with the exception buttons on the RFID system.

Table 1: Comparative tonnages of waste and recycling 2010-2012.

	2012		**2011**		**2010**	
	Waste	Recycling	Waste	Recycling	Waste	Recycling
Jan	637.539	300.5	585.01	210.61	575.99	170.92
Feb	425.542	225.86	513.00	173.08	523.035	139.63
Mar	659.066	272.62	573.75	197.31	640.685	150.95
Apr	434.602	278.62	541.22	203.13	643.16	149.51
May	772.76	309.03	641.28	240.88	702.26	184.93
Jun			583.84	217.41	692.805	228.68
Jul			518.02	177.24	628.5	198.59
Aug			637.06*	292.62	634.39	204.02
Sept			697.11	333.66	672.085	223.36
Oct			618.14	301.66	649.42	219.8
Nov			635.39	292.73	649.55	242.92

Dec			539.08	286.88	613.82	210.87
Total	**3136.759**	**1487.7**	**7082.884**	**2927.21**	**7625.7**	**2324.18**

**start of automated collection system*

Figure 3: Cart implementation on a residential street

The implementation of this initiative has brought about an increase in tonnage of 32% with seasonal peaks in the 37% range. Participation rates however have remained consistent. It appears that residents who recycle continue to drive the program.

Project Financials

The total cost of the project was $2,294,565 which is made up of the purchase of carts for $1,318,654 and the remaining balance of $929,798 was spent on the 3 automated/manual dual stream refuse packers. The project as a whole was on budget however we did go over budget on advertising and cart delivery but there were savings on the project as a whole that compensated for these overages.

The Continuous Improvement Fund (CIF) funded a portion of the project where the City received $517,000 in funding. The remaining balance of unfunded costs will be paid for by the City by the annual savings the project is estimated to generate until the project is paid in full. It is estimated to be paid off in 10 years.

Lessons Learned

Implementation of this project went relatively smoothly, although we have encountered a few faults.

Cart delivery went somewhat effortless as the cart supplier was able to deliver waste and recycling carts to the majority of the city. During this process it was discovered that an error occurred in the house counts as we were short a number of waste and recycling carts to a few neighborhoods. This required the City to initiate a second phase of cart delivery which took place in late September. Also during this event the City was able to identify many unregistered multi-units through onsite verification or by residents calling in and requesting supplemental carts.

With a city wide initiative of this magnitude a dedicated body should have been put in place to thoroughly go over all details of the project instead of supplementing to the regular duties of the waste management supervisor. There have been a few streets identified throughout the city which are exempt from the automated collection program. These streets are predominately "one-way streets" which require more detail in automated collection, thus these identified areas will remain with manual collection. It is also imperative to obtain an additional automated dual waste collection truck as currently all 3 refuse packers are continuously in operation. Downtime for maintenance, etc. was not considered and when an unexpected event occurs, this causes setbacks in collection throughout the city. The additional refuse packer will assist with "double-day" collection after statutory holidays as this would reduce the hiring of contractors to supplement the collection fleet on collection days.