FINAL REPORT AND PROJECT EVALUATION

FOR

COMPACTORS FOR RECYCLABLE MATERIAL CONTAINERS

AT

BEIERS LANDFILL (GRAVENHURST) AND SINCLAIR (LIMBERLOST) AND BAXTER (PORT SEVERN) WASTE TRANSFER STATIONS IN THE DISTRICT MUNICIPALITY OF MUSKOKA, CIF #454

April, 2015

THE DISTRICT MUNICIPALITY OF MUSKOKA
70 PINE STREET
BRACEBRIDGE, ONTARIO P1L 1N3

1. Executive Summary

1.1. Communities in the cottage country region of Ontario, specifically the District Municipality of Muskoka (Muskoka) are confronted with unique waste management issues such as seasonally fluctuating populations, large rural road networks and long distances to recycling material processing facilities and markets. These obstacles present operational and economic challenges for the Muskoka recycling program. Muskoka in association with Waste Diversion Ontario (WDO), The Continuous Improvement Fund (CIF) and Stewardship Ontario entered into an agreement to install equipment to improve efficiency and reduce transportation costs at two of Muskoka's Transfer Stations and one landfill. The three selected sites were Sinclair Transfer Station located in the Township of Lake of Bays, Baxter Transfer station located in the Township of Georgian Bay, and the Beiers Landfill located in the Town of Gravenhurst.

1.2. The following equipment was installed at the selected Sites:

- 6 model RJ 225 Remote, Marathon Compactors (two at each site)
- 9 Forty cubic yard roll-off containers – three for each site

The addition of this equipment has dramatically increased the efficiency of Muskoka's recycling operations. Regardless of seasonal fluctuations in quantities, the key area of improvement is the reduction of transportation costs. A related benefit is the reduction of greenhouse gases.

Two six month periods – one before and one after the installation of the compactors – have been analyzed to demonstrate the benefits of the new equipment. When the two periods are compared, it is clear that the reduction in transportation costs justify the installation of the compaction equipment. For transportation of recyclables without the compactors, Muskoka's invoices for the three selected sites totalled $23,980.56 for the six months. With compaction the total cost is $6,943.25 for the six months a year later, a net saving of $17,037.31.

2. Background

2.1. The District Municipality of Muskoka was created in 1971. Muskoka is an upper tier municipality with responsibility for solid waste management. Muskoka contains six lower tier municipalities which are predominately rural with urban centres within each of the municipalities. The six lower tier municipalities are The Towns of Huntsville, Bracebridge and Gravenhurst and the Townships of Georgian Bay, Lake of Bays and Muskoka Lakes. Muskoka's year-round population is roughly 57,000 with an additional 76,000 residents in the summer bringing the total population closer to 133,000. The land area of Muskoka is 4, 761 square kilometres.

2.2. Solid waste management in Muskoka is a blend of curbside garbage and recycling pickup, staffed waste transfer stations where residents drop-off garbage and recyclable materials, and un-staffed small bin sites for both garbage and recyclables. The focus of this project was the recyclable streams at staffed waste transfer stations and landfills. Muskoka has ten such facilities with at least one in each Town of Township. The three sites chosen for this project were the Beiers Landfill located in the Town of Gravenhurst, Baxter Transfer Station located in the Township of Georgian Bay and the Sinclair Transfer Station located in the Township of Lake of Bays. Two of the facilities offer seven day a week service to residents in the summer with reduced hours/days of operation in the winter season, the Sinclair Transfer Station is closed Monday, Wednesday and Friday year-round. Recyclables at all three of the selected locations are handled in the same manner and are diverted into two streams. There was an open top bin for mixed paper and a side loading depot style bin for containers. Prior to the installation of the compactors, un-compacted recyclables were hauled by BFI Canada to the Materials Recovery Facility (MRF) located in Bracebridge. The current recycling operation with the compactors in place remains similar, with two streams. However, the side loading depot bins have been replaced with dedicated compactor bins for mixed paper and container streams.

A challenge to this project was the lack of mainline electrical power to the Baxter Transfer Station and solar power was the preferred alternate power supply. The site had a small solar power system to supply the scale-house electrical needs. In order to install the recycle compactors the system was upgraded from 120 Volt to 240 Volt and an additional solar array was added; the existing batteries proved sufficient and did not require any upgrades. Thus, standalone solar compactors were not required at the Baxter Transfer Station; the only change to the Baxter units was a 5 HP hydraulic motor was supplied versus the 10 HP motors supplied for the Sinclair Transfer Station and Beiers Landfill compactors.

2.3. Muskoka was incurring expensive transportation costs prior to the installation of the compactors due to the frequent lifts of recyclable materials. The loose fill depot bins only held an average of 1.21 metric tonnes of containers and 1.35 metric tonnes of mixed papers and cardboard. The low capacity of the loose fill containers in conjunction with the high number of monthly trips to the recycling facility, an average of 2.3 trips/month for containers and 3.4 trips/month in the September to February season for mixed paper caused recycling costs at the Transfer Station and Landfills to come under scrutiny. As a result, economical and environmentally friendly solutions that would reduce transportation costs and increase the efficiency of the transfer stations were explored.

3. Monitoring & Reporting

3.1. Budget

3.1.1. Upon review of the transportation costs associated with Muskoka's recycling program a plan was developed to increase the efficiency of the program and an application was made to the Continuous Improvement Fund (CIF) administered by Waste Diversion Ontario (WDO). The District Municipality of Muskoka in association with WDO, CIF and Stewardship Ontario entered into an agreement to install six compactors and nine forty cubic yard roll-off bins at the three sites. A detailed budget was prepared and a synopsis of budgeted versus actual costs is as follows:

CIF #454 Muskoka Recycle Compactors Project Costs		
Expenses	**Budget**	**Actual**
Site Works & power supply	$45,000	$99,248
9 Forty Yard Bins	$78,840	$67,500
2 Beiers Site Compactors, incl remote operation system	$74,790	$39,727
2 Baxter Site Solar Compactors, incl remote operation system	$95,600	$38,159
2 Sinclair Site Compactors	$61,190	$39,727
Contingency Allowance	$35,542	$26,286
Total	$390,962	$310,646

3.1.2. Upon installation and commissioning of the compactors, the actual costs of the project were 79% of the budget. The departure from budgeted costs was due primarily to competitive tendering for the supply of the compactors and bins and project management was in-sourced by Muskoka. The date of Substantial Performance for the project was August 14, 2014.

3.2. **Maintenance**

3.2.1. Upon completion of the installation of the compactors and forty cubic yard roll off bins a few trouble shooting initiatives took place. Baxter compactors in particular had the incorrect motor starters installed and would overload the solar power system. The vendor replaced the compactor motor starters with suitable soft starters and the units have run well since.

3.3. **Labour**

3.3.1. This most recent recycle compactor project builds upon a trial operation system first piloted at the McLean Transfer Station in Baysville. The pilot system allows the site attendant to operate the compactors remotely and not physically attend the unit. The amount of time spent operating the units had been noted as an issue in the first compactor units installed in Muskoka. This was a successful pilot and all six of the new compactor units were supplied with remote operator station in the scale-house allowing the

units to be operated by the site attendant while remaining in the scale-house and continue offering services to residents. The change for residents has been the doors of the compactor unit charge chamber are closed at all times and an automatically closing door must be held open to deposit their recyclable materials. This change in compactor operation, i.e. the closed loading door, has been meet with some resistance by residents but is being accepted and most importantly allows for transfer station operation to continue with a single site attendant.

3.4. **Transportation Savings**

3.4.1. The installation of the recycle compactors and forty cubic yard roll off bins has provided immediate positive results and savings. To properly quantify the transportation savings, environmental value and the increase in efficiency at the selected sites, the actual lifts for the fall and winter seasons of 2013/14, without the equipment have been compared to the actual lifts for the same period in 2014/15 with the equipment, as follows:

Pre CIF #454 Recycle Bin Sep- Feb 2014 Activity					
	Containers Lifts	Tonnes	Mixed Paper Lifts	Tonnes	Total Tonnes
Sep-13	11	11.4	20	26.84	38.24
Oct-13	10	12.44	13	16.61	29.05
Nov-13	5	5.96	13	18.06	24.02
Dec-13	5	7.15	13	16.43	23.58
Jan-14	6	9.08	14	19.73	28.81
Feb-14	4	4.62	9	8.82	13.44
Total	41	50.65	82	106.49	157.14
Post CIF #454 Recycle Bin Sep- Feb 2015 Activity					
	Containers Lifts	Tonnes	Mixed Paper Lifts	Tonnes	Total Tonnes
Sep-14	3	11.43	3	14.61	26.04
Oct-14	3	10.87	5	24.97	35.84
Nov-14	1	3.83	3	13.51	17.34
Dec-14	1	2.16	4	17.76	19.92
Jan-15	3	9.89	3	9.81	19.7
Feb-15	1	1.73	1	3.73	5.46
Total	12	39.91	19	84.39	124.3

3.4.2. Since the installation of the compactors and roll-off bins, Muskoka has handled a similar tonnage of recycling material while requiring fewer lifts from BFI Canada. Examination of the table above demonstrates that in the six month period in which compactors were in place, approximately the same amount of material was transported in 75% fewer lifts than in a similar period without the compactors. Another way of looking at this is to calculate the number of lifts that would have been required in 2014/15 had the compactors not been in place. This can be done by dividing the total weights of materials collected in 2014/15 by the "tonnes per lift" calculated for 2013/14. Based on 1.21 and 1.35 tonnes per lift for containers and mixed paper respectively, in 2014/15, without the compactors, 33 lifts and 62 lifts would have been required for containers and mixed paper respectively, for a total of 95 lifts. As noted in the table above, with the compactors, only 12 lifts and 19 lifts were required for containers and mixed papers respectively for a total of 31 lifts – a 68% reduction. These financial benefits are in addition to the reduction of green house gases.

4. Conclusion

4.1. The completion of CIF #454 has increased efficiency at three of Muskoka's waste management sites. As was anticipated during the project application, the compactors and forty cubic yard roll off bins have reduced the number of lifts of recycling materials to the MRF. When 2013/14 recycling totals for mixed paper and container streams are assessed by converting to compacted lifts required for the transportation using the 2014/15 lift costs per tonne, the amounts saved are as follows:

Est. Savings Present Rates for 2013/14 Recycle Tonnes		
Site	**Savings using 2013/14 tonnes**	**Estimated Annualized Savings**
Beiers	$4,021.00	$8,719.00
Sinclair	$3,154.00	$8,388.00
Baxter	$8,575.00	$24,685.00
	$15,750.00	$41,792.00

4.2. The annualized recycling lift activity demonstrates a significant reduction in costs. Theoretically, with the compactors installed Muskoka saves over $40,000 over the course of the year. Based on this saving, the project payback period will be 7.4 years. Furthermore, it is anticipated to realize higher savings during the substantially busier summer period, the six month analysis period was in the seasonal population off-season and may therefore be considered conservative in the tonnes per lift.