

1

MATERIAL RECOVERY FACILITY EXPANSION

The Solid Waste Management Committee recommends the following report, May 26, 2008, from the Commissioner of Environmental Services be referred back to staff for a further report to Committee in September providing additional information on the processing effectiveness of and labour costs for a third shift or weekend shift at the material recovery facility as well as on engineering and design costs for capital upgrades at the facility.

1. RECOMMENDATIONS

It is recommended that:

1. Regional Council authorize staff to issue a Request for Proposal (RFP) to select and hire a consultant to prepare design and RFP documents specific to modifications to the Material Recovery Facility as proposed in this report.
2. Regional Council authorize staff to use funds in the Equipment Upgrade/Replacement capital reserve as approved in the Solid Waste Branch 2008 Capital Budget for the required Request for Proposal and design work at an estimated cost of \$200,000.

2. PURPOSE

This report will provide an overview of modifications required for the Material Recovery Facility to meet the Region's blue box processing requirements through to 2015.

3. BACKGROUND

In July 2005, the Region commissioned the Garfield Wright Waste Management Centre. The new Material Recovery Facility was designed, in consultation with the Region's local municipalities, to process commingled blue box recyclables and meet the needs of the growing population while reducing municipal collection costs.

York Region and its local municipalities jointly approved the Joint Waste Diversion Strategy in the fall of 2006. In the Strategy, improvements to the Region's Material Recovery Facility were identified as an objective to meet local municipal needs and contribute to meeting the initial waste diversion target of 65%.

In September 2007, staff retained Gartner Lee Limited to conduct a review of the Region's Material Recovery Facility to identify potential process modifications in response to the Joint Waste Diversion Strategy. The review was to determine if the

Material Recovery Facility, as it is currently designed, can manage expected growth in blue box tonnage and if it can not, what potential design modifications would be required to address the projected needs of the Strategy. A preliminary financial analysis was prepared for the various concept design modifications.

This review addressed two key issues:

- Optimizing the efficiency of the Material Recovery Facility to improve product recovery and product quality.
- Modifying the Material Recovery Facility's operations to meet the growing processing demand through employing additional manual labour, installing additional processing equipment or a combination thereof.

In February 2008, staff retained the same consultant to prepare a follow up report that considered the processing implications of adding new materials to the blue box program, modifying the collection system to either a cart based, fully bag based or overflow bag based program as well as addressing other infrastructure requirements identified after the initial report was completed. This supplemental report included a preliminary financial analysis for each of the potential program changes. Staff intends to prepare additional reports on impacts to the Material Recovery Facility resulting from the use of alternative collection containers and changes to the blue box composition for future consideration by Committee and Council.

4. ANALYSIS AND OPTIONS

The amount of blue box recyclable material collected in the Region has increased significantly since July 2005 when the comingled single-stream blue box program was launched. Prior to the launch, the average growth in blue box tonnes was 6.8% (using an operating period of July through June of the following year). After the launch, the average growth during the operation period increased to 12.9%. This is a growth rate of approximately 47%. Initiatives such as improved promotion and education, the addition of new materials, Region-wide weekly collection of blue box recyclables, source separated organics diversion and bi-weekly collection of waste combined with a greater than anticipated increase in population have contributed to this growth.

The Material Recovery Facility has a capacity of 90,000 tonnes per year when operating two shifts per day, five days per week. In 2009, it is anticipated that the Material Recovery Facility will process a minimum of 98,000 tonnes of blue box recyclables. This forecast is based on the current blue box program (collection method and accepted materials), population growth forecasts and current sources of material.

A number of program expansion options have been developed to accommodate the expected growth in blue box tonnage:

- Continue with the current design but add more manual labour.

- Modify the current process equipment and operations by incorporating new conveyors and technologies.
- Add more operating hours.
- Construct a new Material Recovery Facility or contract with another facility and/or;
- Any combination of the above.

Processing modifications required to meet current demand

In 2009, the Material Recovery Facility will be required to process recyclables beyond its normal operating capacity. Expansion of the existing processing capacity is needed to provide an adequate level of service to the local municipalities. The processing modification options described below are the minimum required to manage recyclables collected via the current blue box program.

Increasing productivity by using more manual labour at higher throughput speed

In this option, the Material Recovery Facility will not change. The number of labourers will increase from 40 to a maximum of 55 per shift. This change will allow the facility to operate at a higher throughput speed without compromising product quality or capture rate.

The facility's current design provides for a maximum of 55 manual sorting positions. If the processing requirements exceed the available manual sorting positions, then additional sorting lines will be needed to ensure that quality levels and capture rates are maintained.

While this additional labour will assist in meeting the processing capacity and product quality needs, in isolation, this is only a short term solution. Staff recommend that this option be used in combination with additional systems.

Meeting demand through increased labour and a new container line

The facility, as currently designed, can accommodate additional labour to assist in meeting the processing needs as well as improving product recovery and quality in all areas except for the current container line. This single container line is a key limiting factor to increasing throughput and efficiency due to the fact that containers are sorted manually (except for metals which are removed magnetically) and there are limited additional labourer positions available on this line.

Current trends in the consumer market place show that the amount of single serving beverage containers is increasing exponentially. This increase requires sorting capacity beyond the current facility design. While adding two new sorting staff to the existing

container line will assist in recovery of containers, it will not be sufficient to meet the seasonal or long term demands.

To address the increased demand, a second container processing line is recommended. This line would operate in parallel with the current container line. It will have the positive benefit of increasing product recovery, improving quality and allowing the facility to operate at the required higher throughput.

Increasing productivity through optical sorting

The consumer sector is rapidly moving towards more single serving food and beverage containers. Most of these containers are plastics. The current manual sorting demand for plastics is very high and at times in the year, is greater than the Material Recovery Facility's current capacity. In order to improve sorting efficiency and adapt to the growth in plastic tonnage, optical sorting for plastics will satisfy the processing requirements while at the same time reduce labour costs.

Optical sorting technology uses near infra-red light to differentiate different types of materials. The machine then sorts the materials according to type using air jets. Optical sorting equipment is not 100% efficient and manual labour is still required to ensure adequate quality control. It is expected that the optical sorting technology for plastics will reduce the manual labour complement by four staff from seven staff per shift and would allow the facility to operate at a faster processing rate.

The City of Toronto and Region of Durham have already installed optical sorting for plastics. The Region of Peel and City of Hamilton are in the process of installing optical sorting for plastics in their Material Recycling Facilities.

Staff recommends that optical sorting for plastics be installed in the Region's facility.

Achieving throughput by adjusting material flow

As the blue box tonnage requiring processing increases, so do baling requirements. The current baling operation will become a bottleneck to facility throughput and the facility will not be able to meet its processing requirements if it is not adjusted.

The facility is currently designed with two balers and a series of conveyors to deliver the sorted products to them. The current design is limited in that during the majority of the operating day, one of the two balers is unavailable. This is because the conveyor system that delivers product to it is transferring newspaper to the newspaper storage bunker. The only time that this baler is available for use is during shift breaks.

Installation of a new conveying system to bypass the baling conveyors and transfer newspaper to the storage bunker is recommended to amend this deficiency. The system

would be designed so that the current method of transferring newspaper is still available in the event that it is needed (i.e. contingency/emergency operations).

Future processing enhancements to optically sort for fibres

The composition of materials in the blue box is approximately 70% fibre products and 30% container products. To accommodate the growth in blue box tonnage, the Material Recovery Facility will be required to operate faster with more manual sorting to ensure quality is maintained. This increased demand will decrease the manual sorting efficiency to the point where the fibre products may not meet the required quality requirements even with additional labour. Optical sorting technology could be required to mitigate this issue. It is expected that optical sorting technology for fibres will reduce the manual labour staff by eight per shift from its current level of eighteen per shift. The City of Toronto has installed optical sorting for fibres in its Material Recovery Facility operated by Metro Waste.

Staff will be reviewing the results of this operation to verify and quantify throughput and product quality improvements. At this time, staff is recommending a “wait and see” approach to optical sorting for fibres. However, if proven and cost effective, staff will be recommending that it be installed in the Region’s facility.

Expanding capacity through increasing operating hours

Increasing the operating hours of the Material Recovery Facility is an alternative to additional conveyors or optical sorting technology to meet the minimum processing requirements. This could be done by adding a third operating shift or operating on weekends.

Currently the time available during the third shift and weekends is used to conduct preventative maintenance and equipment repairs on the Material Recovery Facility processing equipment. Approximately 150 hours per month are used for preventative maintenance. An additional 50 hours per month are used for unexpected equipment repairs, which leaves approximately 100 hours per month for material processing.

Throughout the year the quantity of blue box material received has peaks and valleys that will need to be considered when adding a third processing shift. As throughput increases, the frequency of preventative maintenance and equipment repairs also increase. As a result, the available time to process blue box materials during the third shift and weekends decreases because of mandatory preventative maintenance.

Under the current contract, this additional processing work would have to be done on an overtime basis at an increased cost of 30% or \$26/tonne. A new contract will be negotiated for the facility in 2010. An option is to use this available time at reduced premiums and could be negotiated. Using this time to process material rather than perform maintenance, does, however, increase the risk of equipment failure which could

result in the complete shut down of the facility. Staff will be analyzing the cost implications of this option as part of the planned facility optimization and will include the results as part of the additional reports.

Expanded capacity by adding infrastructure

Adding a third processing line is an option to expand the Region's processing capacity. In the year 2015, between 110,000 and 125,000 tonnes of blue box recyclables will be generated from York Region sources. Staff is not recommending a third processing line be added as this would require a significant facility retrofit requiring a substantial amount of time during which the Material Recovery Facility would not be operational. The alternative options presented in this report are expected to fulfil these processing requirements until 2015 without making this change.

Constructing another Material Recovery Facility is an option to expand the Region's processing capacity. At this time, staff is not recommending this option as the alternative options are expected to provide adequate capacity based on the current blue box program. However, if the blue box collection method were to change to an alternative container (i.e. carts or bags) or new sources of material were added (i.e. apartments or open spaces) or the accepted materials were expanded (i.e. plastic bags or Styrofoam), and it was determined that their impact on the blue box processing system could significantly decrease throughput and/or product quality, then this option may be necessary and will be the subject of a future report. Rather than constructing another Material Recovery Facility to meet processing demands, contracting with a public or private sector Material Recovery Facility is an option and may be advantageous from a capital and operating standpoint. Staff is recommending that a search begin to investigate processing capacity at other facilities for consideration as an alternative to construction of an additional facility in the longer term.

5. FINANCIAL IMPLICATIONS

The Material Recovery Facility operations will have to be modified to manage the anticipated quantity of recyclables in 2009 through 2015. These modifications will require a higher throughput in combination with more staff and additional equipment. Staff is recommending spending approximately \$200,000 to issue an invited Request for Proposal (RFP) to select and hire a consultant to prepare design and RFP documents specific to modifications to the Material Recycling Facility as proposed in this report. There are sufficient funds in the Solid Waste Branch 2008 Capital Budget to cover this expenditure.

It is expected that the Material Recovery Facility, as it is now, will require fifteen additional sorters per shift (30 per day) by the end of 2009. Using a conservative annual salary of \$50,000 per sorter, this equates to \$1.5 million in extra labour costs per year.

Table 1
Option 1: Cost of Employing Additional Sorters to Increase Throughput

Option	Projected Cost (Annualized)	
	Capital Cost	Operating Cost
Current Design with Additional Manual Sorting (maximum)	\$0	\$1,500,000
Second Container Line ¹	\$433,000	\$0 ²
Baler By-pass ³	\$457,000	\$0
Sub-Total	\$890,000	\$1,500,000
Eligible Provincial Funding ⁵	\$(445,000)	N/A
Total	\$445,000	\$1,500,000

Optical sorting technology can displace some manual sorting of plastics. Employment of this technology is expected to reduce manual sorting staff by four per shift (8 per day). Using the same conservative annual salary as above, this equates to an annual labour savings of \$400,000. Despite the reduction in manual sorters, the products will meet the required quality specifications. The anticipated capital expenditure required for optical sorting technology for plastics is approximately \$1.4 million. This is a pay-back period of approximately 3.5 years compared with utilizing increased sorting labour. Moreover, this pay-back estimate is calculated without the inclusion of additional market revenue from the sale of increased captured recyclables which could further improve the associated business case.

Table 2
Option 2: Cost of Using Optical Sorting Technology to Increase Throughput

Option	Projected Cost (Annualized)	
	Capital Cost	Operating Cost
Current Design with Additional Manual Sorting (maximum)	\$0	\$1,500,000
Second Container Line ¹	\$433,000	\$0 ²
Baler By-pass ³	\$457,000	\$0
Optical Sorting Technology ⁴	\$1,400,000	\$(400,000)
Sub-Total	\$2,229,000	\$1,100,000
Eligible Provincial Funding ⁵	\$(1,145,500)	N/A
Total	\$1,083,500	\$1,100,000

- 1 Second container line uses 1 sorter for HDPE, 1 for Mixed Plastics and 2 for Glass and Polycoat where PET is directed to the optical sorting equipment.
- 2 Operating cost for second container line is \$400,000 (4 sorters per shift) but there will be a reduction of 4 sorters (per shift) from the existing container line due to optical sorting for plastics. Therefore, no new sorters will be required as they will just be reassigned to new sorting positions.

- 3 Operating cost for baler by-pass conveyor is \$200,000 (2 sorters per shift) but these sorters are used on the current system. No additional staff are required for this system as existing sorters will be reassigned to new sorting positions.
- 4 Optical sorting is for plastics (PET) will reduce manual labour by 4 per shift.
- 5 Eligible Provincial Funding from Stewardship Ontario's Continuous Improvement Fund is expected to be 50% of the capital cost.

The tables above outline two upgrade scenarios for the Material Recovery Facility, both of which will meet the processing requirements but have different costs. The second container line and baler by-pass are required for both scenarios. In option 1, additional manual labour is driving high long-term operation costs. In option 2, additional manual labour is still required but is reduced and off-set by optical sorting equipment resulting in lower long-term operational cost. As such, staff are recommending option 2.

York Region and the local municipalities receive funding from the Province of Ontario for blue box processing and diversion from landfill. Each year, provincial funding is split equally between the Region and local municipalities. York has sufficient funding in the Equipment Upgrade/Replacement capital reserve to finance required facility upgrades.

6. LOCAL MUNICIPAL IMPACT

As the population of York Region continues to grow, the Material Recovery Facility must process the corresponding increase in blue box tonnes. Upgrading the Material Recovery Facility with new sorting conveyors and optical sorting technology will assist in achieving this result and ensure the Region and local municipalities achieve their collective goal of 65% diversion from landfill.

7. CONCLUSION

It is recommended that the Region retain a consultant to prepare and issue a Request for Proposal (RFP) for the proposed process modifications to the Material Recovery Facility. The proposed scope of the RFP will include installation of a second container line, baler by-pass conveyor system and optical sorting equipment for plastics. It is further recommended that the use of additional manual sorters be considered as throughput requires.

Options for improving the capacity of the Material Recovery Facility are in line with the objectives of the Joint Waste Diversion Strategy. Installing these process modifications will enable the Region to achieve a higher diversion rate and an increase in revenue from the sale of recyclable materials. This advancement will result in increased provincial funding received by the Region and local municipalities.

Report No. 4 of the Solid Waste Management Committee
Regional Council Meeting of June 19, 2008

For more information on this report contact Shaun Spalding, Project Coordinator of the Solid Waste Management Branch at extension 5719.

The Senior Management Group has reviewed this report.