

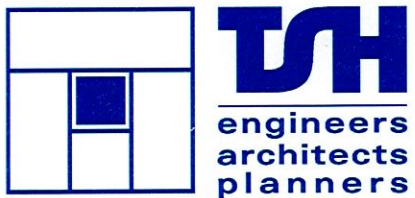
***City of Sault Ste. Marie***

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**SOLID WASTE MANAGEMENT PLAN  
BUSINESS AND IMPLEMENTATION PLAN**

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February, 2003





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February 4, 2003

**Mr. Don Elliott, P. Eng.**  
City of Sault Ste. Marie  
Engineering Department  
99 Foster Drive  
Sault Ste. Marie, Ontario  
P6A 5N1

Dear Mr. Elliott:

**Re: City of Sault Ste. Marie  
Business and Implementation Plan  
TSH Project No. 60219**

We are pleased to submit the final Business and Implementation Plan. This report identifies a proposed implementation schedule for various waste management programs, estimated waste quantities, projected expenditures, and projected revenues for the preferred waste management system. Several alternative diversion strategies (ie: Diversion Systems 4 and 5) and revenue structures have been developed and modeled within the context of the Plan.

The findings presented in this report are sensitive to the assumptions made. Please recognize that this is a living document that will require frequent review and modification as circumstances change over time.

We wish to express our appreciation to City staff for their input and cooperation during the preparation of this report. We look forward to making a presentation to Council on February 10, 2003. We will be available to address any questions Council may have at that time.

Should you have in questions in the interim, please do not hesitate to call.

Yours very truly,

A handwritten signature in blue ink, appearing to read 'R. Talvitie', is written over a horizontal line.

R. Talvitie, P. Eng.  
Project Manager

**CITY OF SAULT STE. MARIE  
 SOLID WASTE MANAGEMENT PLAN  
 BUSINESS AND IMPLEMENTATION PLAN**

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## APPENDICES

Appendix A -	Business and Implementation Plan Financial Model
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### LIST OF ABBREVIATIONS

AMRC	Association of Municipal Recycling Coordinators
hh	household
HSW	Household Special Waste
IC&I	Industrial, Commercial and Institutional
OCC	Old Corrugated Cardboard
PAYT	Pay-as-you-throw - a system under which residents pay for municipal waste management services based on the quantity of waste set out curb side for collection.
The Plan	Business and Implementation Plan
TSH	Totten Sims Hubiki Associates Limited
WDS	Waste Diversion Supervisor

## EXECUTIVE SUMMARY

A solid waste management plan has been developed for the City of Sault Ste. Marie which identifies a strategy to manage the solid waste stream in the City for the next 25 to 40 years. Through the study process the solid waste stream was characterized, waste diversion and waste disposal options were developed and evaluated and recommendations were documented.

The key problems addressed within the context of the study include the historical low level of diversion being achieved within the City and the limited available disposal capacity in the existing landfill site. The preferred solid waste management system addresses collection, diversion, and disposal of solid waste generated in the residential and industrial, commercial & institutional (“IC&I”) sectors.

The Business and Implementation Plan (“The Plan”) has been developed to provide City Staff and Council with guidance in preparing for and implementing future waste management programs. It has been developed on an Excel spreadsheet and it identifies the suggested timing for various waste management initiatives, projected system expenditures and alternative revenue sources for the period spanning 2003 to 2027.

In the recent past the annual waste management system expenditures have generally ranged from \$2.4 to \$2.9 million. Under Diversion System 4 the average annual expenditure over the next 7 years is projected to be in the range of \$3.8 to \$5.2 million (inclusive of a reasonable allowance for inflation). For the period 2010 to 2027 the costs are projected to be in the range of \$6.7 to \$12 million. The significant increase in future expenditures relative to past expenditures relates primarily to increases in diversion costs and the need for new waste disposal capacity. ***Additional revenues are required to fund the future waste management costs.***

Revenues can be sourced from the general tax levy or user fees (eg. tipping fees, gate fees, or pay-as-you-throw (“PAYT”) programs). With greater emphasis on full cost recovery for municipal services and accountability to the taxpayer, the recent trend has been to establish some form of user pay system. With the implementation of a user pay system, waste generators pay for waste management on the basis of the amount of waste they generate. This results in the following key advantages over the traditional method of funding a waste management system through the general levy:

- waste management costs are more transparent to residents;
- residents are encouraged to recycle and reduce waste; and
- costs are more equitably distributed amongst customers.

User fees are presently being charged in the City in the form of tipping fees and gate fees at the landfill site. The existing fees charged are significantly lower relative to other similar sized municipalities in the province and the fees do not reflect the “true cost” of waste disposal. ***The existing tipping fees and gate fees should be increased to levels that are more consistent with the true cost of waste disposal and the fees being charged in other Ontario municipalities.***

With the very low level of diversion historically being achieved in the City of Sault Ste. Marie some form of Pay-As-You-Throw (“PAYT”) program (ie: either partial or full) is deemed critical to the success of existing and future diversion programs. A PAYT program is a form of user fee

that requires advance payment for each bag of waste set out curbside for collection in excess of the designated bag limit (ie. purchase a tag and place it on each bag of waste in excess of the designated bag limit). Several PAYT programs have been developed and modelled within the Plan.

Although numerous assumptions have been made in developing this plan, the results highlight the need to plan for the projected significant increases in future waste management expenditures. In order to pay for the future expenditures additional revenues will be required through the general tax levy or user fees.

Following a review of the various cost recovery alternatives developed and presented within the context of this report, the City's Waste Management Steering Committee comprising of City staff, the engineering consultant, the general public and the Ministry of Environment is recommending the implementation of a partial user pay system with the following key features:

- Contributions from the general tax levy to the waste management program should remain stable at current levels in future years. This amounts to a contribution of \$2.1 million in 2003 with amounts in future years adjusted for inflation.
- The user fees charged at the landfill site should be systematically increased in the near term to reflect the true cost of waste disposal and the fees being charged in other similar municipalities across the province. It is proposed to increase tipping fees to \$65/tonne by 2006 and increase the gate fee to \$4 per visit in 2003. Subsequent increases in these fees would be tailored to meet future expenditures.
- A PAYT program should be implemented in 2003 with a bag limit of two bags/household/week with a charge of \$2.00/bag applied to each additional bag of waste in excess of the designated bag limit. Future increases in the bag fee or future reductions in the bag limit would be tailored to meet future expenditures and/or waste management goals.

The alternative to implementing an enhanced partial user pay system is increased property taxes. The projected increase in property taxes that would be payable by the average homeowner (ie: assessed value of \$96,000) would likely be in the range of \$40-\$50 in 2003 and continue to increase in each year of the plan to approximately \$130-\$140 in 2027.

# CITY OF SAULT STE. MARIE SOLID WASTE MANAGEMENT PLAN BUSINESS AND IMPLEMENTATION PLAN

## 1.0 INTRODUCTION

### 1.1 General

A solid waste management plan has been developed for the City of Sault Ste. Marie which identifies a strategy to manage the solid waste stream in the City for the next 25 to 40 years. Through the planning process the solid waste stream was characterized, waste diversion and waste disposal options were developed and evaluated and recommendations were documented.

The key problems addressed within the context of the study include the historic low level of diversion being achieved within the City and the limited available disposal capacity in the existing landfill site. The preferred solid waste management system addresses collection, diversion, and disposal of solid waste generated in the Residential and Industrial, Commercial & Institutional (“IC&I”) sectors.

Throughout this report references are made to waste Diversion Systems 4 and 5. These systems were developed as part of the waste management planning process and were defined in the “Alternative Waste Diversion/Collection System Options” Report. System 4 comprises of the following:

- Residential/small business curb side collection of expanded recyclables (including old corrugated cardboard);
- Landfill ban on old corrugated cardboard;
- Processing of recyclables generated by the IC&I sector
- Enhanced leaf and yard waste collection and processing;
- Landfill ban on yard waste;
- Enhanced public education;
- Backyard composting;
- Re-use centre;
- Household Special Waste Facility;
- Partial or full user fees; and
- Increased tipping fees.

System 5 comprises of each of the components noted above together with the following **additional components**:

- Residential/small business curb side collection of organics; and
- Processing of organics generated by the IC&I sector.

### 1.2 Purpose of the Business and Implementation Plan

It is important for the City to prepare for the future expenditures required to establish additional waste disposal capacity, implement new or expanded diversion programs and manage the environmental controls at the existing landfill site.

The Business and Implementation Plan (“The Plan”) has been developed to provide City Staff and Council with guidance in preparing for future waste management initiatives. It has been developed on an Excel spreadsheet and it identifies the suggested timing for implementing the key waste management programs together with projected system expenditures and alternative methods of recovering the system costs for the period spanning 2003 to 2027. A description of the overall layout of the spreadsheet and detailed descriptions of each component of the spreadsheet are included in Appendix A of this report.

In developing the plan, assumptions have been made regarding the future directions of the overall waste management system. In some cases separate plans have been prepared to reflect different future scenarios (ie: Diversion System 4 versus Diversion System 5). These different scenarios provide some insight into the manner in which the overall waste management plan can change. City Staff and Council must be prepared to react to changing circumstances and adjust the plan accordingly.

For example, based on the level of study completed to date, the preferred approach for future residual waste disposal is landfill mining and/or expansion of the existing site (refer to the report entitled “Waste Collection and Disposal, July, 2002”). The feasibility of implementing these options requires further technical study and may in part be dependant upon the conclusions of other related studies (eg. Aquifer Recharge Study being conducted by the Public Utilities Commission).

*Recognizing the numerous assumptions required over the 25 year planning period, this document is a “living” document that is intended to be updated on a regular basis (ie: ideally once annually).*

### **1.3 Preferred Waste Management System Implementation Schedule**

The preferred waste management system includes various components some of which are relatively easily implemented and others which will require further study and analysis to confirm feasibility and cost effectiveness. Furthermore some of the waste management programs are mandated by the provincial government. Specifically, the minimum requirements for diversion of municipal waste are contained in Ontario Regulation 101/94. That regulation stipulates that municipalities having a population of 5,000 or more shall establish, operate and maintain a blue box waste management system and a leaf and yard waste system. The preferred waste management system has been developed to address the provincially legislated requirements together with the historic low level of diversion and the limited available disposal capacity in the existing landfill site. The components of the preferred waste management plan and the scheduled implementation date for each is summarized in Table 1.1.

<b>TABLE 1.1 PREFERRED WASTE MANAGEMENT SYSTEM SUMMARY</b>	
<b>Component Description</b>	<b>Status</b>
<b>1.0 Waste Diversion</b>	
<b>1.1</b> Residential/small business curb side collection of expanded recyclables (including Old Corrugated Cardboard).	An enhanced recycling program was implemented in October 2002 through a new municipal recycling contract.
<b>1.2</b> Landfill ban (Old Corrugated Cardboard)	To be implemented in 2003. Presently the IC&I sector is banned from disposing of old corrugated cardboard ("OCC") in the City's landfill. With the implementation of the expanded recycling program in October 2002, the OCC ban can be extended to include the residential and small business sector.
<b>1.3</b> Processing of recyclables generated by the IC&I sectors	This is a private sector initiative that is presently being undertaken to a limited extent within the City. It is anticipated that this component will be more attractive to the IC&I sector in the future as tipping fees are increased.
<b>1.4</b> Residential/small business curb side collection of organics	A pilot study is being undertaken in 2002-2003 to determine the level of participation and willingness of residents to separate their organic wastes, the class of compost that can be produced and the financial viability of implementing a full scale organics collection and processing program. The results of the pilot study will likely identify the feasibility of proceeding with a full scale program.
<b>1.5</b> Processing of organics generated by the IC&I sectors	It is anticipated that this will likely be a private sector initiative that is undertaken in concert with the residential/small business sector program noted above.
<b>1.6</b> Enhanced leaf and yard waste collection and processing (bi-weekly during the growing season).	Presently the City is collecting leaf and yard waste in the late fall. It is proposed to enhance the existing system to provide collection on a bi-weekly basis throughout the growing season (ie: May through October). This component is scheduled to be implemented in the spring of 2003. This initiative may be contracted out or undertaken by City forces.
<b>1.7</b> Landfill ban (yard waste)	The landfill ban on yard waste would be initiated in concert with the expanded leaf and yard waste program identified above.

<b>TABLE 1.1 PREFERRED WASTE MANAGEMENT SYSTEM SUMMARY</b>	
<b>Component Description</b>	<b>Status</b>
<b>1.8</b> Enhanced public education	The City hired a Waste Diversion Supervisor (“WDS”) in 2000. The responsibilities of the WDS include enhanced public education relating to the waste management system. In addition the new recycling contract commencing in October 2002 includes obligations for promoting recycling and educating the public.
<b>1.9</b> Backyard composting	Presently being undertaken. It is anticipated that this component will be enhanced with the implementation of a landfill ban on yard waste.
<b>1.10</b> Establish a re-use centre	Scheduled to be established in 2004. A re-use centre allows for the exchange of items between individuals with the goal of avoiding disposal in the City’s landfill. Unwanted usable items are left at the facility by one party and may be retrieved and put into use by another party.
<b>1.11</b> Establish a household special waste (“HSW”) depot	The HSW facility was commissioned in the fall of 2001 and is presently operating. This facility provides for the disposal of hazardous wastes from residences and small businesses that cannot be disposed of in the City’s landfill.
<b>2.0 Waste Disposal</b>	
<b>2.1</b> Mining of the existing landfill site	The Waste Collection and Disposal report concluded that landfill mining should be investigated further. It is anticipated that landfill mining may be initiated in 2010±. The implementation of this component is however subject to the successful completion of relevant technical studies and approvals under the Environmental Assessment Act and Environmental Protection Act. The relevant studies, reports and applications are scheduled to be completed from 2003 to 2008. It may be possible to reduce this proposed schedule by approximately one year if the EPA work is undertaken concurrently with the EA approvals.

<b>TABLE 1.1 PREFERRED WASTE MANAGEMENT SYSTEM SUMMARY</b>	
<b>Component Description</b>	<b>Status</b>
<b>2.2</b> Expansion of the existing landfill site	The Waste Collection and Disposal report concluded that expansion of the existing landfill site should be investigated further. With appropriate environmental controls (ie. leachate collection and treatment) the area to the north of the existing landfill footprint may be suitable for the disposal of municipal solid waste. It is anticipated that expansion of the existing site may be initiated in 2010±. The implementation of this component is however subject to the successful completion of relevant technical studies and approvals under the Environmental Assessment Act and Environmental Protection Act. The relevant studies, reports and applications are scheduled to be completed from 2003 to 2008. It may be possible to reduce this proposed schedule by approximately one year if the EPA work is undertaken concurrently with the EA approvals.
<b>3.0 System Funding</b>	
<b>3.1</b> Implementation of an enhanced partial or full user pay system. A partial user pay system includes funds sourced from user fees in combination with funds from the general tax levy whereas a full user pay system sources funds solely through user fees. User fees typically comprise of tipping fees, gate fees and pay-as-you-throw programs ("PAYT"). PAYT programs require advance payment for each bag of waste set out curb side in excess of the designated bag limits.	It is proposed to enhance the existing partial user pay system or implement a full user pay system over the period 2003 to 2006. Over this period of time tipping fees and gate fees would be increased to levels that are consistent with other similar municipalities and more representative of the actual cost of disposing of waste. In addition the current bag limits (ie: six bags per household per week) would be reduced and charges would be applied to waste set out curb side in excess of the new designated bag limits.
<b>3.2</b> Increased Property Taxes	In the event that the user fee structure is not enhanced to recover the increased system costs, property taxes will have to be increased.

#### 1.4 Alternative Scenarios Modelled Within the Plan

As noted in the foregoing section some of the waste management programs require further study and analysis prior to implementation. In order to assess the impacts of the various directions that the overall waste management system may take a series of alternative scenarios were developed within the context of the Plan.



For example, the implementation of a full scale organics collection and processing program (ie: Items 1.4 and 1.5 listed in Table 1.1) is a significant undertaking that could have a significant impact on the waste management system and the overall system costs. Since the feasibility of undertaking a full scale organics collection and processing program is unknown at this time, it was considered prudent to develop separate business plans to illustrate the financial implications of these two scenarios. The waste management scenario which includes full scale organics collection and processing is identified throughout this report as **Diversion System 5** and the scenario that excludes organics collection and processing is referred to as **Diversion System 4**. This terminology is used throughout this report to differentiate these two scenarios.

In addition to the System 4 and System 5 scenarios the method selected to fund the waste management system costs could also have a significant impact on the overall waste management system including the level of diversion achieved within the City. The implementation of a partial or full user pay system (ie: Item 3.1 of Table 3.1) is an important component of the overall waste management system. User pay systems can include different forms of user fees but typically include, tipping fees, gate fees and a PAYT program. With user pay systems, fees are charged based on the level of waste generated for disposal. Studies have shown that the implementation of user pay systems which incorporate a PAYT program can have a significant influence on the level of participation in the diversion programs. A detailed discussion on the various methods of funding the waste management system expenditures is included in Section 2.0 of this report.

Initially a series of eight Excel spreadsheets were prepared to reflect the various scenarios considered within the context of this Plan. Each spreadsheet is described below:

- Diversion System 4 with partial user pay (Options A and B) – Spreadsheets 1 & 2.
- Diversion System 5 with partial user pay (Options A and B) – Spreadsheets 3 & 4.
- Diversion System 4 with full user pay (Options A and B) – Spreadsheets 5 & 6.
- Diversion System 5 with full user pay (Options A and B) – Spreadsheets 7 & 8.

Two options (ie: Options A and B) were developed for each scenario to illustrate different fee structures that could be established to achieve similar revenue streams.

With the input of the City's Waste Management Steering Committee comprising of nine City staff, two engineering consultant staff, one representative of the general public and one representative of the Ministry of Environment an additional scenario was developed as follows:

- Diversion System 4 with partial user pay (Option C) – Spreadsheet 9.

This scenario is similar to the scenarios presented on spreadsheets 1 and 2 but incorporates an accelerated reduction of the residential bag limit.

The alternative user pay programs that have been modelled are discussed in greater detail in Section 2.4.

## 2.0 WASTE MANAGEMENT SYSTEM FINANCING

Generally there are two principle ways of generating revenues to fund waste management system costs:

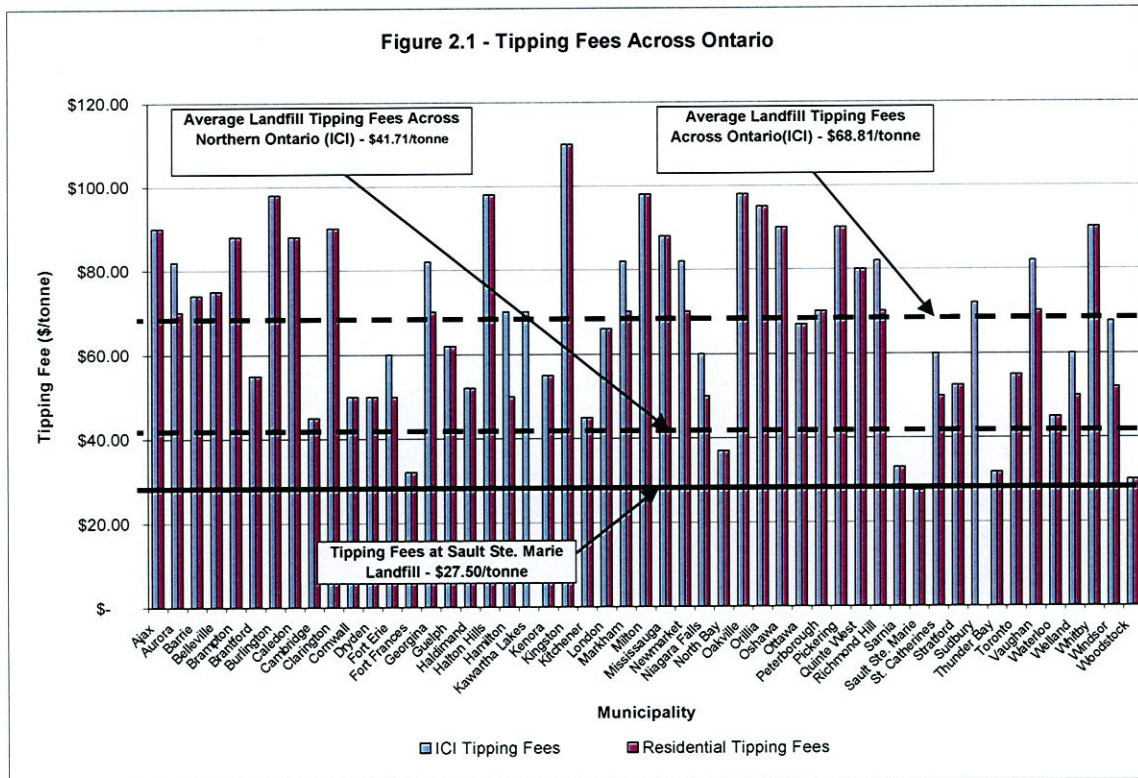
- General Tax Levy; and
- User Fees.

There has been increasing pressure on municipalities to provide services to ratepayers on a full cost recovery basis. In the case of the waste management system, this means that adequate revenues must be generated to pay for present and future system costs. There has also been greater emphasis on recovering municipal servicing costs in an equitable manner. Typically this involves some form of a “user pay” system where individuals are charged based on quantification of the service provided. **Some examples of other municipal and utility services that recover costs through user pay systems include sewage collection and treatment, potable water treatment and distribution, natural gas supply and distribution, and electrical supply and distribution.**

The existing waste management system is presently funded through the general tax levy in combination with user fees (ie: tipping fees and gate fees) applied at the landfill site. The existing method of recovering the system costs is considered a partial user pay system. As noted above the user fee component of the existing system comprises of tipping fees charged to the Industrial, Commercial & Institutional (“IC&I”) sector on the basis of the weight of waste delivered to the landfill site and a gate fee charged to the residential sector for each visit to the landfill site (provided the weight of the material is under 500 kg).

### 2.1 Tipping Fees

The tipping fees and gate fees presently being charged at the City’s landfill are significantly lower than other similar municipalities in Ontario. The tipping fees charged at other Ontario landfills are plotted in Figure 2.1 and compared to the fees charged at the City’s landfill.



The City currently charges a tipping fee of \$27.50/tonne, which is less than half of the average tipping fee of \$68.81/tonne for Ontario municipalities surveyed. Northern and north western Ontario municipalities generally have lower tipping fees which average \$41.71/tonne.

In order to determine whether the tipping fees being charged in other Ontario communities are appropriate relative to the actual costs incurred to dispose of waste, the estimated cost of developing and operating a new landfill site over its full life was prepared. An estimated cost was developed for a 2,000,000 tonne capacity site which would provide adequate capacity for the City for a period of approximately 27 years at present disposal rates. The cost estimate included the following components:

- identifying a suitable new site;
- obtaining all relevant approvals;
- operating costs over the period of landfilling;
- landfill closure; and
- post closure monitoring and maintenance costs.

Ideally the tipping fees should be adequate to recover all of the development, approvals, operating, closure and post closure costs associated with the site. Therefore, the total estimated cost was divided by the total tonnage capacity of the site to determine a suitable tipping fee.

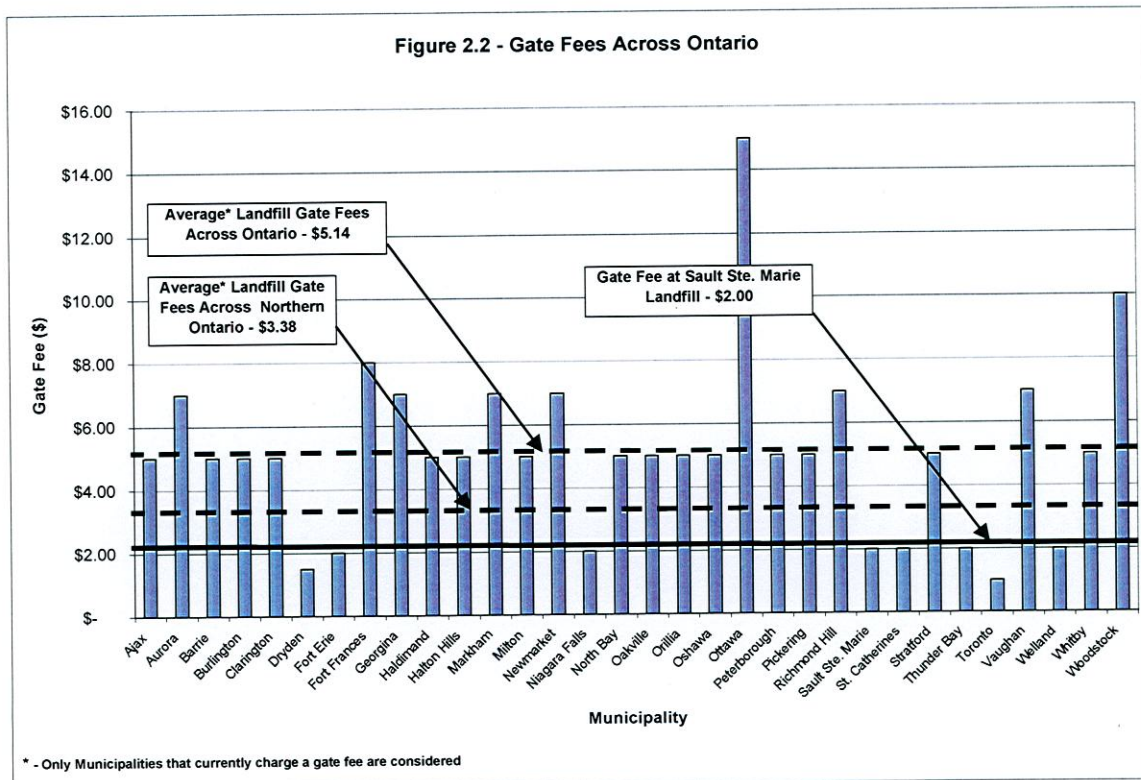
The foregoing calculation resulted in a tipping fee in the range of \$60 to \$70/tonne. This figure is indicative of the “true cost” of waste disposal for a suitably sized landfill site for the City.



*The results of the “true cost” of landfilling calculation together with the tipping fees being charged in other Ontario municipalities highlights the importance of increasing the existing tipping fees to more appropriate levels. In each of the scenarios developed within the context of the Plan it is proposed to systematically increase tipping fees from the present \$27.50/tonne to the \$65/tonne range over the period from 2003 to 2006. From 2006 to 2027 tipping fees are increased at a constant rate to ensure adequate revenues are generated to meet the projected expenditures.*

## 2.2 Gate Fees

Gate fees represent another source of revenue that is typically charged to residential customers for the disposal of waste delivered to landfill sites. Currently the City of Sault Ste. Marie charges residents a gate fee of \$2.00 per vehicle provided the quantity of waste is under 500 kg. Across Ontario, gate fees generally range from \$1.00 to \$15.00. The gate fees charged at other Ontario landfills are plotted in Figure 2.2 and compared to the fees charged at the City’s landfill.



The average gate fee for the municipalities surveyed was \$5.14 and the average fee charged in northern and north western Ontario was \$3.38. A gate fee of \$5.00 for loads of up to 100 kg is generally representative of what is being charged at other landfill sites that use a gate fee. This translates into a cost of \$50/tonne for the first 100 kg of waste. For weights in excess of 100 kg the normal tipping fee would apply.

*Considering the gate fees being charged in other municipalities together with the proposed increase in the tipping fees to the \$65/tonne range, it is recommended that the gate fee be increased to \$4.00 per visit in 2003 for loads under 500 kg. A \$4.00 per visit fee has been*

*selected to allow the continued use of the “payment drop box” presently being used at the landfill (ie: loonies or toonies are deposited into a payment drop box prior to proceeding to the public drop-off area). A further increase to \$6.00 per visit has been included for each scenario in 2006 and increases beyond 2006 have tailored to reflect tipping fee increases.*

*It is also recommended that the existing 500 kg weight limit be reduced to 100 kg in 2006. Once implemented the gate fee would apply to the first 100 kg of waste and the normal tipping fee would apply to the weight of waste in excess of 100 kg. The reduction from the present 500 kg limit to 100 kg will likely result in increased usage of the existing weigh scale at the landfill site. An allowance has been included for the installation of an additional scale in 2005 to accommodate the projected increased usage. This would allow the City to have separate scales dedicated for inbound and outbound traffic. It will also ensure that a single scale will be available in the event that one scale requires servicing or repair.*

### 2.3 “Pay-As-You Throw” Programs - General

In addition to increasing tipping fees and gate fees a third component of user pay systems which is currently not applied in the City of Sault Ste. Marie is a “Pay-as-you-throw” (PAYT) program. PAYT programs are structured to encourage citizens to divert and reduce waste and are increasingly becoming an accepted method for financing residential waste management services. In a PAYT program, waste generators pay for waste management on the basis of the amount of residual waste they generate.

“The three major selling points of a PAYT program are known as the three E’s – environment, economics, and equality. PAYT is billed as a program that can encourage residents to recycle and reduce waste, help communities pay for solid waste costs, and distribute costs more evenly among consumers”.<sup>1</sup>

Recognizing that a PAYT program is new to the municipality some information and data was gathered on the experiences with PAYT programs in other municipalities.

#### 2.3.1 PAYT Programs in Ontario

PAYT Programs may be introduced under one of two scenarios, a full PAYT program or a partial PAYT program.

Full PAYT Program: all waste that is placed at the curb for collection by the City must be paid for in advance (eg. by purchasing a tag and placing it on each bag of waste (ie: “bag tags”)).

Partial PAYT Program: a designated number of bags are permitted to be placed at the curb without requiring advance payment. If the resident exceeds the designated number of bags permitted at the curb then any additional bags must be paid for in advance (eg. by purchasing a tag and placing it on each additional bag of waste).

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<sup>1</sup> Horton, Tonia. 1998. “Environomics: Can the Marriage of Economics and the Environment End Happily Ever After?” MSW Management. Volume 8, No. 7: 50-57.

In lieu of bag tags some programs are implemented using different systems such as marked bags, variable standardized container sizes and weight-based systems. The majority of Ontario communities however use the bag tag system.

In 1996, 59 user-pay programs were operating in Ontario (mainly implemented between 1991 and 1996). In 2001, over 100 programs were in place in Ontario with many of the more recent programs being introduced in the larger municipalities.<sup>2</sup>

One of the most important advantages of PAYT is the positive influence on residential waste diversion programs. Residents are more inclined to maximize their participation in the available diversion programs in order to reduce their bag fee costs. This results in improved levels of participation in the diversion programs and improved capture efficiency of the diversion materials. This is an important benefit for the City as historical diversion rates have been very low in comparison to other municipalities in Ontario.

In terms of bag limits, communities that establish a bag limit program at four or more bags rarely experience a noticeable reduction in waste sent to landfill or an increase in materials diverted through recycling or composting programs. The introduction of a three-bag limit can alter waste disposal/diversion behaviour somewhat by targeting the portion of the population that exceeds three bags of waste per week on a regular basis and that does not fully participate in waste diversion programs.<sup>3</sup>

The results of the Residential Waste Composition Study completed for the City in 2000 indicated that the average number of bags set out each week by each household was 2.67. The results also indicated that approximately 24% of the households that participated set out four or more bags. The proportion of households that set out four or more bags of waste would likely be reduced with the implementation of bag limits/PAYT as residents would likely pack more waste into each bag. For example residents that typically generate 3 ½ bags per week could likely pack all of their waste in 3 bags with more efficient packing. Furthermore the residential waste audit was undertaken in 2000 prior to the implementation of the enhanced blue/yellow box recycling program. The implementation of that program has resulted in a significant reduction in the quantity of waste being set out curb side. *Therefore in order to achieve meaningful changes in diversion habits in the City a bag limit of two or less is recommended.*

In municipalities with PAYT programs bag prices ranged from \$0.50 to \$5.00 per bag with most charging between \$1.00 to \$2.00 per bag. However, it should be noted that a \$1.00 tag fee was found to be too low to maintain or promote further waste reduction efforts over time and rarely is the \$1.00 tag fee a reflection of the true cost of waste collection and disposal. Rather it is considered an acceptable fee to charge residents during the launch of a PAYT program without causing significant backlash.<sup>4</sup>

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<sup>2</sup> Enviro-RIS. April 2001. **The Waste Diversion Impacts of Bag Limits and PAYT (Pay-As-You-Throw) Systems in North America, Report to City of Toronto Policy and Planning, Works and Emergency Services Department**

<sup>3</sup> Association of Municipal Recycling Coordinators (AMRC). 1996. **User Pay Implementation Kit.** Guelph, Ontario cited in reference.

<sup>4</sup> Enviro-RIS. April 2001. **The Waste Diversion Impacts of Bag Limits and PAYT (Pay-As-You-Throw) Systems in North America, Report to City of Toronto Policy and Planning, Works and Emergency Services Department**



In addition to traditional “bag tag” PAYT programs, municipalities are introducing variations on the user-pay theme, from flat fees that cover part of the municipal waste management service to the outright removal of certain services (in particular bulky goods collection) from the tax base (ie: levy charges for bulky items).

For example, in Stratford, the pick-up of bulky items such as couches requires a \$10 tag and the City charges \$22 for pick-up of white goods. This trend reflects actual handling costs that were previously absorbed by the waste collection service.<sup>5</sup> The City of Sault Ste. Marie has adopted a similar policy to that in Barrie which precludes the collection of bulky items at the curb.

Listed in Table 2.1 are some examples of PAYT programs presently ongoing in Ontario.

<b>Municipality</b>	<b>Bag Limit</b>	<b>Tag Cost</b>	<b>Notes</b>
Barrie	2	\$1.00	Charge for extra bags in excess of limit.
Belleville	6	\$1.00	Every item requires a bag tag. Pay for each tag.
Brampton	3	\$1.00	Charge for extra bags in excess of limit.
Caledon	3	\$1.00	Charge for extra bags in excess of limit.
Clarington	3	\$1.00	Tag system being implemented next year.
Dryden	None	\$1.50	Pay for each tag.
Fort Erie	3	\$1.00	Charge for extra bags in excess of limit.
Georgina	None	\$1.00	Pay for each tag.
Kawartha Lakes	2	\$2.00	Charge for extra bags in excess of limit.
Kenora	None	\$2.00	Pay for each tag.
Kingston	3	\$2.00	Charge for extra bags in excess of limit.
Markham	3	-	Pick up more tags for no charge – 12 at a time.
Mississauga	3	\$1.00	Charge for extra bags in excess of limit.
Niagara Falls	3	\$1.00	Charge for extra bags in excess of limit.
Orillia	None	\$1.50	40 free tags issued to each residence free of charge. Charge for extra tags.
Oshawa	4	\$1.00	Charge for extra bags in excess of limit.
Quinte West	4	\$2.00	Pay for each tag.
St. Catherines	3	\$1.00	Charge for extra bags in excess of limit.
St. Thomas	2	\$1.50	Privately run by Green Lane Environmental.
Stratford	None	\$1.20	Various rate tag system – depends on size of item.
Welland	3	\$1.00	Charge for extra bags in excess of limit.

Typically there is resistance from the community when PAYT programs are initiated. Most PAYT programs have shown that opposition usually fades within six months.<sup>6</sup>

<sup>5</sup> Kelleher, M. and Dixie, J. **User Pay in Canada – A 1999 Survey: Here to stay and increasing in popularity and efficiency.** <http://www.risLtd.com/mpindex05s7.htm>, retrieved August 30, 2002

<sup>6</sup> Recycling Council of Ontario (RCO) Workshop. 1996. **Implementing Municipal User Fees for Garbage.**

### 2.3.2 Problems Experienced with PAYT Programs

Problems are likely to be experienced with individuals attempting to circumvent the bag fees. Typical problems include illegal dumping of waste, backyard burning of waste, and increased traffic to the public drop-off at the landfill. Despite concerns about illegal dumping, the majority of communities with PAYT programs did not experience serious illegal dumping problems.<sup>7</sup> Most communities have established enforcement procedures and fines in their waste management by-law/ordinances to deal with illegal dumping. Communities rely on education and promotion to inform residents about the “zero-tolerance” towards illegal dumping rather than enforcing the by law/ordinance penalty sections.

In Barrie, upon implementation of a PAYT program, illegal dumping increased for the first 3 to 4 months. City staff would sort through bags to identify the owner of the waste. Upon identification, the individual would be sent a letter with a photo of the evidence. Also included would be an invoice that included the cost to collect and landfill the waste, and the associated administrative costs (person hours). The media discouraged illegal dumping by covering the tactics the City would employ, if required. Now, illegal dumping has virtually disappeared. However, there are 1-2 calls per month involving incidents where residents have dumped waste on other residents’ property. Under the City by-law, City staff can sort through the bags and charge the residents up to a \$5000 fine.<sup>8</sup> This response is consistent with other communities surveyed by Enviro-RIS (ie. Orillia and St. Catherines).

Some communities will hire additional enforcement staff for the early stages of the program implementation and will simultaneously enact anti-dumping legislation with fines to deter illegal dumping. Consequently, illegal dumping rarely becomes a long-term problem for communities.<sup>9</sup>

Backyard burning of waste is a problem that is generally easier to address than illegal dumping. The identification of delinquents is generally driven by complaints. Communities rely on education and promotion to inform residents about the “zero-tolerance” towards backyard burning of waste and establish enforcement procedures and fines to deter this activity.

In some instances the level of traffic to the public drop-off has increased dramatically following the introduction of a PAYT program. For example, the City of Stratford which has a full PAYT program charges \$1.20 per bag at the curb but only \$0.50 per bag at the landfill. Thus, the community experienced a 160% increase in residential self-haul to the landfill. It is important that the bag fee and tipping/gate fee structure is properly integrated to deter this type of activity (eg. Implement a higher gate fee).

### 2.3.3 What are the Impacts on Diversion?

Quantitative work suggests that the impacts from PAYT are the single most effective change that could be made to a curb side diversion program. Implementing PAYT had a larger impact on

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<sup>7</sup> Enviro-RIS. April 2001. **The Waste Diversion Impacts of Bag Limits and PAYT (Pay-As-You-Throw) Systems in North America, Report to City of Toronto Policy and Planning, Works and Emergency Services Department**

<sup>8</sup> See reference <sup>7</sup>

<sup>9</sup> Ibid.



recycling than adding additional materials, changing frequency of collection or any other modifications to programs<sup>10</sup> (see the City of Peterborough example in Appendix B).

However, the combination of a convenient curbside recycling program coupled with a PAYT program can promote higher recycling rates than either program operating on their own.

In terms of waste going to landfill, the Association of Municipal Recycling Coordinators (“AMRC”) has approximated percentage waste reduction rates following the introduction of PAYT programs as follows:

- Partial, two ‘free bags’ will result in a 15-20% reduction in residential waste sent to landfill
- Partial, one ‘free bag’ will result in a 25-35% reduction in residential waste sent to landfill
- Full, no ‘free bags’ will result in 30-45% reduction in residential waste sent to landfill

These percentage reductions have been consistent with data reported by the communities of Barrie, Orillia, Georgina and Stratford.

In the end, the reduction in waste greatly depends on the available diversion alternatives and the participation achieved by the community.

Of some interest, Skumatz has demonstrated that PAYT programs actually lead to 5 to 7% source reduction as expressed as a percentage of residential solid waste generation. Source reduction is ultimately attributed to changes in behaviour including buying items in bulk or with less packaging, reusing items, reducing junk mail and backyard composting.<sup>11</sup>

#### **2.3.4 Additional Cost of Administering a PAYT Program**

Administrative costs will vary depending on the method through which a PAYT program is administered.

Barrie has experienced a 10-15% increase in administrative costs while Orillia reports no change in administrative burden because they mail their 40 tags to residents. Mainly, additional administration is required to track the sales of tags either in the Civic offices or through local retailers. Education and promotion of the program may also result in additional costs.

If illegal dumping surfaces as a serious problem, the municipality may hire an inspector that just deals with illegal dumping issues which would incur additional salary expenditures.

***For the purposes of the financial models developed for the City, an allowance of \$100,000 (2002 \$'s) has been included for increased administrative costs associated with the implementation of partial PAYT programs and an allowance of \$125,000 (2002 \$'s) has been included for full PAYT programs.***

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<sup>10</sup> Skumatz, Lisa. 1993. **Variable-rate or “Pay-as-you-throw” Waste Management: Answers to Frequently Asked Questions.** Policy Study No. 295, Reason Foundation, Los Angeles, California.

<sup>11</sup> Skumatz, Lisa. 2000. **Source reduction can be measured.** Resource Recycling Volume 38, No. 8: 22-26.

**2.3.5 Pros and Cons of Alternative Methods of Funding the Waste Management System**

In Table 2.2 the pros and cons of general tax levy funding versus PAYT programs are summarized. The overriding benefits of the PAYT programs are the positive impacts on diversion, and equity.

<b>TABLE 2.2                  PROS AND CONS OF ALTERNATIVE WASTE                  MANAGEMENT REVENUE SOURCES</b>		
<b>System</b>	<b>Pros</b>	<b>Cons</b>
<b>General Tax Levy</b>	<ul style="list-style-type: none"> <li>• Easy and less costly to administer.</li> <li>• Less resistance from the public.</li> <li>• Lower level of illegal dumping/backyard burning of waste.</li> </ul>	<ul style="list-style-type: none"> <li>• Reduced participation and capture efficiency in the waste diversion programs.</li> <li>• Requires higher disposal capacity due to reduced diversion.</li> <li>• Higher per capita waste generation rates are likely.</li> <li>• Less equitable distribution of costs.</li> <li>• Waste management costs are less visible to the community.</li> <li>• Will require significant tax increases to fund increased waste management costs.</li> </ul>
<b>Pay-as-you-throw</b>	<ul style="list-style-type: none"> <li>• Will likely result in increased participation and capture efficiency in diversion programs.</li> <li>• Will likely result in a reduced quantity of waste being landfilled.</li> <li>• Waste generation rates may be reduced.</li> <li>• More equitable distribution of costs.</li> <li>• Provides an alternate source of revenue which could eliminate or temper future tax increases.</li> <li>• Waste management system costs are more visible to the community.</li> </ul>	<ul style="list-style-type: none"> <li>• Increased administration costs.</li> <li>• Likely requires greater efforts to enforce illegal dumping/backyard burning of waste.</li> <li>• Resistance to change can be expected.</li> </ul>

Other important observations from other municipalities with user pay programs in place include:

- suitable alternatives should be available to residents to reduce their waste (ie: comprehensive curb side recycling and leaf and yard waste programs as a minimum) – *an*

*enhanced dry recyclables program was initiated in Sault Ste. Marie in October, 2002, an enhanced leaf and yard waste program is proposed for the spring of 2003 and the feasibility of undertaking residential organics collection and composting is presently being studied; and*

- public education programs play an important role particularly during the early stages of launching bag limits and/or PAYT programs. Suitable methods of disseminating information to the public may include printed materials delivered through PUC mailings, newspaper advertisements, local television and hot lines. – *the City hired a waste diversion supervisor in 2000 and the new dry recyclables contract includes provisions for public education.*

## 2.4 Alternative User Pay Systems Considered within the Context of the Plan

The success of the existing and future waste diversion programs will be dictated in part by the implementation of a suitable user pay system. Each of the user pay systems developed includes tipping fees, gate fees and some form of PAYT program (ie: bag fees). Each of the scenarios considered is described in the following subsections.

### 2.4.1 Partial User Pay Program

Five alternative partial user pay systems have been developed within the context of the Plan. Within each of these models revenues are generated through a combination of user fees and contributions from the general tax levy. In order to establish a suitable level of annual contributions from the general levy, the net levy contribution to waste management in the 2000 and 2001 calendar years was obtained from the City and is summarized in Table 2.3.

<b>Year</b>	<b>Net Contribution from General Levy</b>
2000	\$1,571,705
2001	\$2,011,854
2002	\$2,180,857 <sup>1</sup>

1. This is a budgeted amount.

For the purposes of developing a partial user pay system it was decided that a reasonable approach would be to maintain a relatively consistent contribution from the general levy and fund future increases in the waste management costs through user fees (tipping fees, gate fees and a PAYT program). Therefore the actual net 2000 and 2001 contributions noted above have been incorporated into each of the partial user pay system models and an allowance for inflation has been applied to the 2001 amount for all future years. Any funds in excess of the proposed general levy contributions required to fund the future waste management expenditures would be funded through new or increased user fees.

A partial user pay system has been modelled for each of Systems 4 and 5. In addition different fee structures have been developed and modelled for each of these systems (ie: Options A, B and C). Five separate spreadsheets have been developed featuring partial user pay systems:

- Diversion System 4 with partial user pay (Options A, B and C) – Spreadsheets 1, 2 & 9; and
- Diversion System 5 with partial user pay (Options A and B) – Spreadsheets 3 & 4.

For System 4 it has been assumed that the bag limit would be reduced from the current six bags per household per week to two bags per household per week.

For System 5 it has been assumed that the bag limit would be reduced from six bags per household per week to one bag per household per week.

The period of time over which these changes are effected differs with each scenario. The proposed bag limit under System 5 is reduced relative to System 4 due to the enhanced diversion opportunities afforded through the residential organics collection and processing program that is inherent in System 5. Although the bag limits have been established at 2 bags and 1 bag per household per week for each of Systems 4 and 5 respectively these limits could be reduced further in future years as circumstances warrant (eg. increased revenue required, enhanced participation required in the diversion programs, etc.).

The spreadsheets developed for each of the partial user pay scenarios have been provided to the City in a digital format. In addition a hardcopy of Spreadsheet 9 which reflects System 4 with a partial user pay program has been included in the pocket at the back of this report. A comparison of the various partial user pay scenarios is included in Section 3.0.

#### **2.4.2 Full User Pay System**

Several full user pay systems have been developed to generate sufficient revenues to meet estimated future expenditures over the 25 year planning period. Although the approach to funding the waste management system through a full user pay system is new to the community, it represents an **equitable** means of recovering the waste management system costs. It is similar to the approaches taken to pay for other municipal and utility services including water treatment and distribution, waste water collection and treatment, natural gas supply and distribution and power generation and distribution.

With the implementation of a full user pay system the majority of the waste management system revenues will accrue through bag fees, tipping fees and gate fees. A phased implementation of the full user pay system has been included over a period of four years (ie: 2003 to 2006). During this transition period the residential bag limit is reduced from the present six bags per household per week limit to zero bags in 2006. In 2006 and all future years each bag that is set out curb side would be subject to a bag fee.

A full user pay system has been modelled for each of Systems 4 and 5. In addition different fee structures have also been developed and modelled for each system (ie: Options A and B). Four separate spreadsheets have been developed featuring full user pay systems:

- Diversion System 4 with full user pay (Options A and B) – Spreadsheets 5 & 6.
- Diversion System 5 with full user pay (Options A and B) – Spreadsheets 7 & 8.

The spreadsheets developed for each of the full user pay scenarios have been provided to the City in a digital format. A comparison of the various full user pay scenarios is included in Section 3.0.

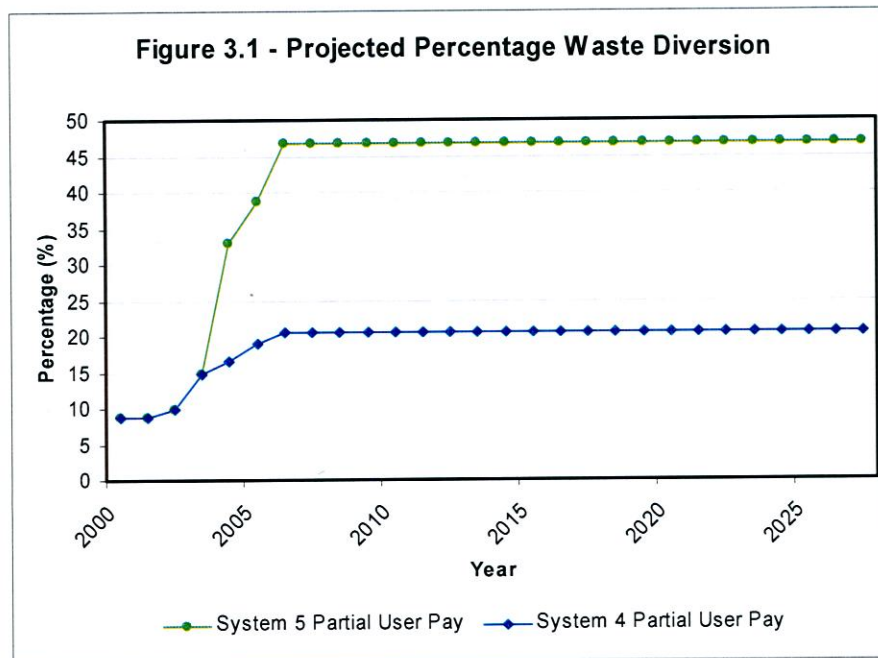
### 3.0 DISCUSSION OF FINANCIAL MODELS (SPREADSHEETS)

A total of nine financial models (spreadsheets) have been produced to reflect different waste management scenarios that may develop as the waste management plan is implemented over time. This Plan spans the period from 2003 to 2027. The estimated waste management quantities, expenditures and revenues have been developed for each year of the Plan to assist the municipality in planning and budgeting for future waste management programs.

Within the following subsections the content of the various financial models (ie: spreadsheets) are compared and discussed. For clarity and simplicity the graphical comparison of System 4 versus System 5 scenarios has been illustrated using the partial user pay models. Both the partial user pay models and full user pay models illustrate similar trends.

#### 3.1 Estimated Future Waste Diversion Quantities

One of the goals of the waste management planning process was to increase the level of diversion in the City. Each of the scenarios considered within the context of the Plan will result in a different level of diversion. In Figure 3.1 we have summarized the anticipated level of diversion to be achieved for each of Systems 4 and 5 with the implementation of a partial user pay system. For the purposes of this comparison Spreadsheets 1 and 5 have been used.



On the basis of the data presented in Figure 3.1 significant increases are anticipated in the existing diversion rate in the community. Under System 4 the diversion rate is projected to increase from less than 10% to the 20%-25% range while under System 5 the diversion rate is projected to increase to the 45%-50% range. The higher projected diversion rate for System 5 is attributable to the organics collection and processing program included in that system.

Council has endorsed, in principle, the implementation of System 5 subject to financial feasibility and public input. The feasibility of implementing System 5 is presently being studied through the Co-composting Pilot Study. A report will be made available to Council in 2003 with the results of the pilot study. The reporting will include the willingness of residents to separate their organic wastes, their impressions of the pilot program, the quality of compost that can be achieved and possible markets for the finished compost. Ultimately the pilot study will provide the necessary information to make a decision on whether to remain with Diversion System 4 or proceed with Diversion System 5.

### **3.2 Estimated Future Waste Disposal Quantities**

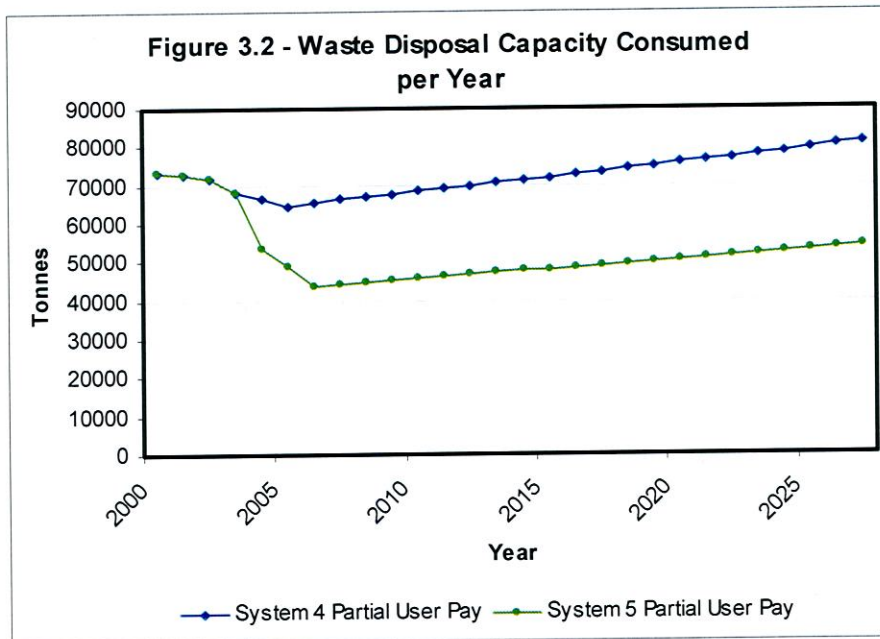
The estimated disposal capacity required over the 25 year planning period varies for each of the scenarios considered within the Plan. For example under System 5 the quantity of waste disposal in a given year is much lower than the disposal capacity consumed under System 4. This is attributed to the organics diversion program that is inherent in System 5. Similarly, the scenarios that include a partial user pay system consume more disposal capacity in comparison to the corresponding scenario with a full user pay system.

The disposal capacity that is consumed within the 25 year planning period is an important consideration as any reserve or unused disposal capacity has a significant value that must be considered when comparing the various scenarios.

Earlier in this report (ie: Section 2.1) an estimate of the “true cost” of waste disposal was presented. The calculation identified that the “true cost” of disposing of waste (ie: inclusive of site selection, environmental approvals, operations during the active site life, closure and post closure monitoring) is in the range of \$60 to \$70/tonne (2002 \$’s). Assuming that this cost will increase over time at a rate of 3% per annum the estimated 2027 cost for waste disposal will likely be in the range of \$125 to \$145/tonne. For the purposes of this Plan, \$125/tonne has been used to approximate the value of unused waste disposal capacity at the end of the 25 year planning period.

The total waste disposal capacity consumed in each year of the Plan for two scenarios (ie: System 4 Partial User Pay Option A – Spreadsheet 1 versus System 5 Partial User Pay Option A – Spreadsheet 5) has been plotted in Figure 3.2 and the total disposal capacity consumed over the full 25 year planning period for both partial and full user pay scenarios is summarized in the Table 3.1.





**TABLE 3.1  
 TOTAL WASTE DISPOSAL CAPACITY CONSUMED  
 (2003 TO 2027)**

Scenario Description	Total Waste Disposal Capacity Consumed (tonnes)
System 4 – Partial User Pay	1,813,599
System 4 – Full User Pay	1,772,436
System 5 – Partial User Pay	1,252,291
System 5 – Full User Pay	1,251,632

Based on the data presented in Table 3.1 the difference in the waste disposal quantities for a given system with the implementation of a partial versus full user pay system is relatively small. This relatively small difference is attributable to the reasonable bag limits proposed within each of the partial user pay systems. In the event that more modest bag limits were allowed (ie: greater than 2 bags per household per week for System 4 and 1 bag per household per week for System 5) the disparity in the waste disposal quantities would increase more substantially.

In contrast however, the difference in the waste to be disposed of under System 4 versus System 5 is significant. For example, under the partial user pay systems the additional capacity consumed under System 4 relative to System 5 is approximately 561,000 tonnes over the 25 year planning period.



Assuming a unit value of \$125/tonne, the total estimated value of the System 5 reserve disposal capacity equates to approximately \$70 million in 2027.

The reserve disposal capacity and its estimated value are summarized for each scenario in Table 3.2. System 4 with a partial user pay system (ie: scenario that features the highest waste disposal consumption) has been used as the base case (ie: 0 reserve disposal capacity in 2027).

<b>Scenario Description</b>	<b>25 Year Disposal (tonnes)</b>	<b>Reserve Disposal Capacity in 2027 (tonnes)</b>	<b>Estimated Value of Reserve Disposal Capacity in 2027*</b>
System 4 – Partial User Pay	1,813,599	0	\$0
System 4 – Full User Pay	1,772,436	41,163	\$5,145,375
System 5 – Partial User Pay	1,252,291	561,308	\$70,163,500
System 5 – Full User Pay	1,251,632	561,967	\$70,245,875

\* Based on an estimated unit value of \$125/tonne.

The value of reserve/unused disposal capacity is considered when comparing the net costs for each of the scenarios considered within this Plan (refer to Section 3.4).

### 3.3 Projected Expenditures

Generally the costs associated with each of the system components has been developed by either extrapolating historical costs, using the results of recent tenders or proposal submissions or using the costs for similar services in other municipalities. In computing the costs for future years a reasonable allowance for inflation (ie: 3% per annum) has been included.

The estimated future expenditures depend on the specific diversion system to be implemented (ie: System 4 or System 5) and the method selected to recover the expenditures (ie: partial or full user pay system). In subsections 3.3.1 and 3.3.2 we have compared the estimated waste management system expenditures for System 4 versus System 5 and for partial versus full user pay systems.

#### 3.3.1 Projected Expenditures (System 4 Partial User Pay versus System 5 Partial User Pay)

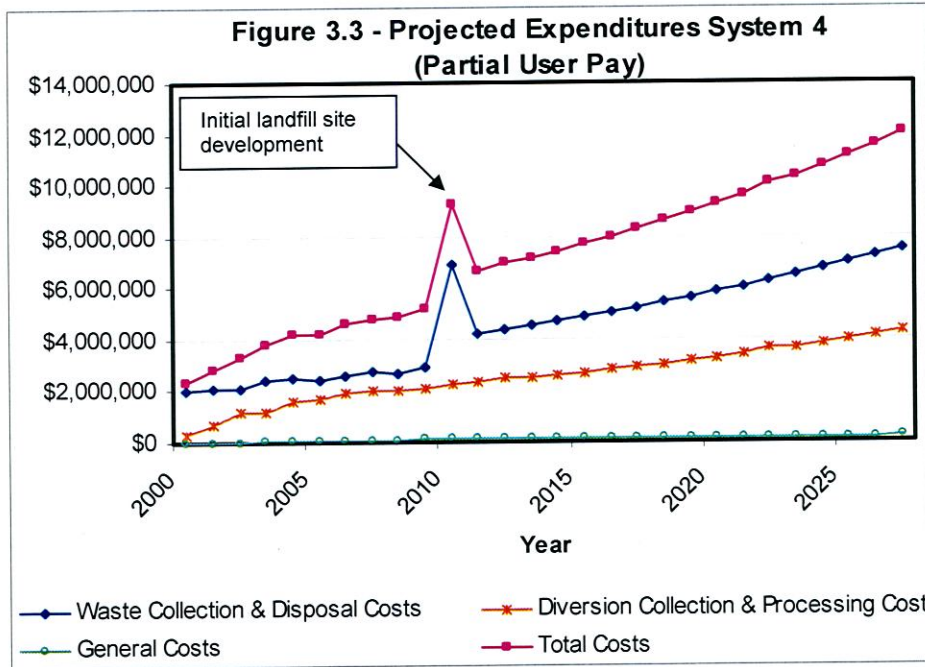
For the purposes of comparing the System 4 costs versus System 5 costs the following models (spreadsheets) were used:

- Spreadsheet 1 - System 4 (Partial User Pay Option A); and
- Spreadsheet 5 - System 5 (Partial User Pay Option A).

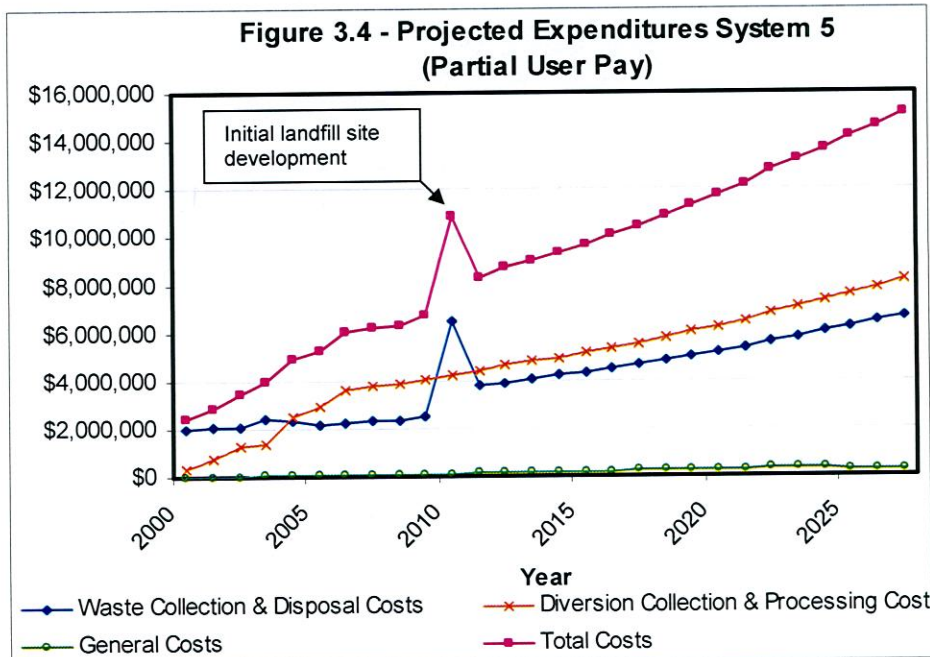
The estimated expenditures for each of the waste management components are itemized in the relevant Spreadsheets. Figures 3.3 and 3.4 summarize the estimated System 4 and 5 expenditures on the basis of the following categories:

- Waste Collection and Disposal;

- Diversion Collection and Processing;
- General (financing and additional administration); and
- Total Costs.

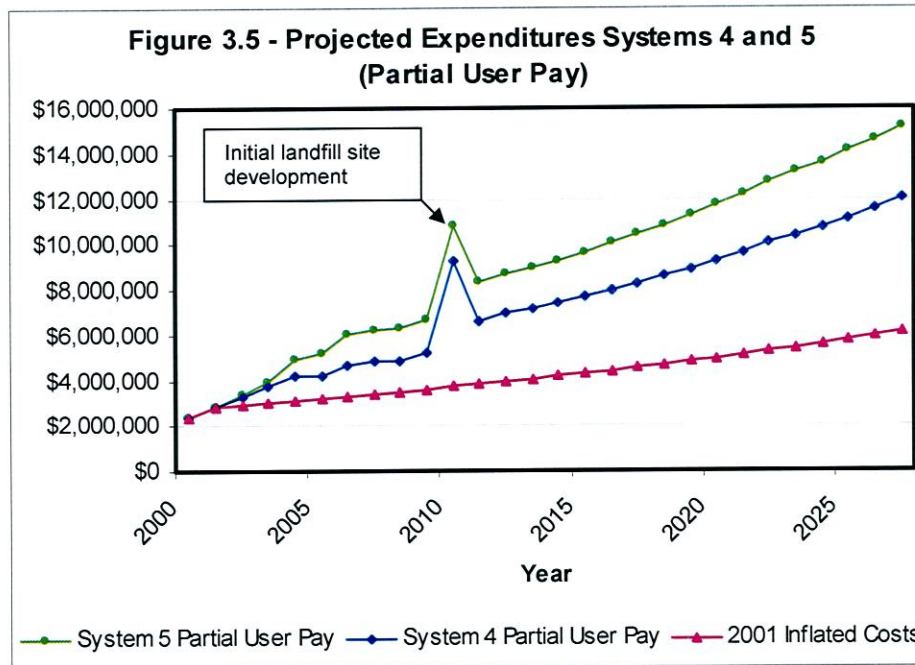


The projected annual System 4 waste management expenditures range from \$3.8 million in 2003 to \$12.0 million in 2027. The total estimated waste management expenditures over this period are \$195.9 million.



The projected total annual waste management expenditures for System 5 range from \$3.9 million in 2003 to \$15.2 million in 2027. The total estimated waste management expenditures over this period are \$245.3 million.

The total estimated expenditures for each of Systems 4 and 5 with the implementation of a partial user pay system are presented in Figure 3.5.



The total projected System 5 expenditures are approximately \$50 million higher than System 4 over the 25 year planning period. System 5 however includes additional waste diversion activities (ie: organics collection and processing) relative to System 4.

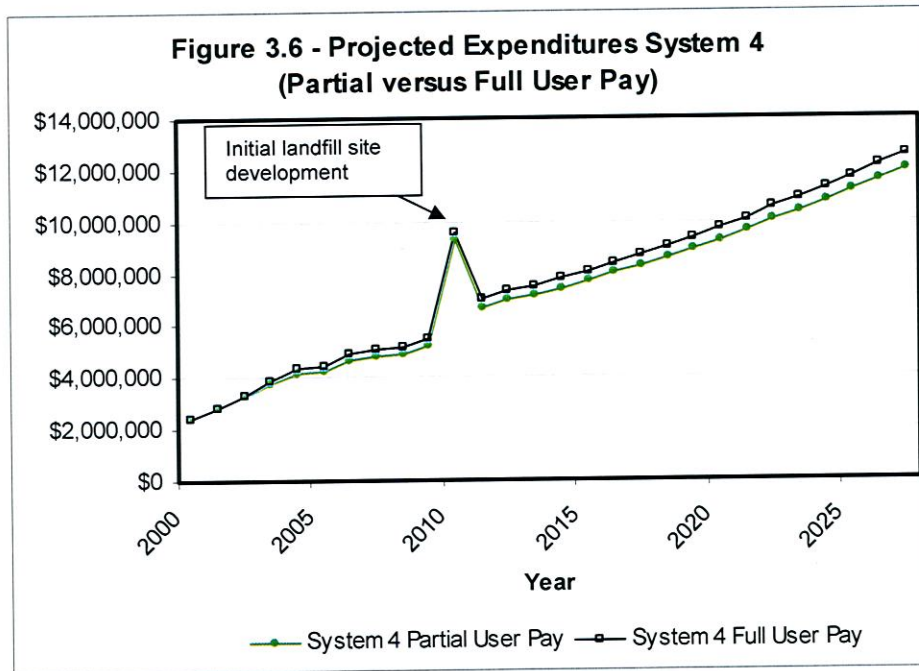
*The increased diversion activities in System 5 result in a significant reduction in landfilling relative to System 4. As a result a landfill reserve capacity exists under System 5 relative to System 4 at the end of the 25 year planning period. The reserve capacity has a significant value which must be considered when comparing the system costs. Refer to the discussion in Section 3.4.*

### 3.3.2 Projected Expenditures (System 4 Partial User Pay versus System 4 Full User Pay)

For the purposes of comparing the estimated expenditures under a partial user pay system versus a full user pay system the System 4 spreadsheets (ie: Spreadsheets 1 and 3) were used.

In Figure 3.6 the total estimated expenditures in each year of the Plan have been summarized for System 4 with a partial user pay system versus a full user pay system.





Based on the data presented in Figure 3.6 the implementation of a partial user pay system versus a full user pay system will have a relatively small impact on the projected overall waste management expenditures. The expenditures are slightly higher with the implementation of a full user pay system as the level of diversion is enhanced relative to the system being implemented with a partial user pay system.

*Although the costs are higher with the implementation of a full user pay system, additional waste disposal capacity will be consumed under the partial user pay scenario. The value of any reserve disposal capacity at the end of the 25 year planning period must be considered when comparing the costs associated with each scenario (refer to Section 3.4).*

### 3.4 Net System Costs

In Section 3.3.1 the projected 25 year System 5 expenditures exceeded the projected System 4 expenditures by approximately \$50 million. Those expenditure forecasts excluded any consideration of the difference in the disposal capacity consumed within each System. In order to effectively compare the options an allowance has to be made for the value of the reserve disposal capacity for each scenario. In Table 3.2 included in Section 3.2 the estimated value of the reserve disposal capacity was calculated for each scenario using System 4 Partial User Pay Option A (ie: the scenario that consumed the most disposal capacity) as a base. For the purposes of comparing the scenarios the value of the reserve disposal capacity has been subtracted from the projected expenditures presented in Sections 3.3.1 and 3.3.2 to provide a net system cost. The results are summarized in Table 3.3.

<b>Scenario Description</b>	<b>Projected 25 Year Expenditures</b>	<b>Estimated Value of Reserve Disposal Capacity in 2027*</b>	<b>Estimated Net System Cost</b>
System 4 – Partial User Pay	\$195,912,681	\$0	\$195,912,681
System 4 – Full User Pay	\$204,816,600	\$5,145,375	\$199,671,225
System 5 – Partial User Pay	\$245,254,318	\$70,163,500	\$175,090,818
System 5 – Full User Pay	\$252,352,112	\$70,245,875	\$182,106,237

On the basis of the data presented in Table 3.3 the lowest net cost waste management alternative is System 5 with the implementation of a partial user pay system. This conclusion is based on and is sensitive to the estimated costs included in the Plan for a full scale organics collection and processing program. Once the ongoing co-composting pilot study is completed, the estimated costs for the organics diversion program can be refined further and updated in this Plan. Ultimately the pilot study will provide the necessary information to make a decision on whether to remain with Diversion System 4 or proceed with Diversion System 5.

### 3.5 Comparison of Cost Recovery Alternatives

Several alternative scenarios have been modelled to recover the projected expenditures over the 25 year planning period. The alternative approaches considered to recover the expenditures comprise of full and partial user pay systems with PAYT programs as defined in Section 2.4 of this report. For comparison purposes we have also included the projected required increase in property taxes to generate revenues equivalent to those that will be generated by the proposed changes to the existing user fee structure. For this comparison it has been assumed that the existing user fee structure would remain unchanged (ie: tipping fee of \$27.50, gate fee of \$2.00 and no PAYT).

#### 3.5.1 Enhanced User Pay Models with PAYT

In order to compare the revenue structures required for different scenarios it was important to consider the value of the reserve disposal capacity in the year 2027. The implementation of System 5 with a full user pay system requires the lowest level of waste disposal of the scenarios considered and System 4 with a partial user pay system consumes the greatest quantity of disposal capacity. Therefore System 5 with a full user pay system has the largest reserve disposal capacity at the end of the 25 year planning period.

In order to compare the revenue structure requirements for each scenario, the revenues for System 5 with a full user pay system were structured to provide a cumulative financial reserve of essentially \$0 in the year 2027. This scenario was established as a base and the revenues for each of the other scenarios were structured to provide a positive cumulative reserve in 2027 to account for the higher disposal capacity consumed.

For example, System 4 with the implementation of a partial user pay program requires an estimated 1,813,599 tonnes of disposal capacity over the 25 year planning period which is

561,967 tonnes greater than System 5 with a full user pay program. Therefore the required cumulative reserve for System 4 in 2027 was established as follows:

$$561,967 \text{ tonnes} * \$125/\text{tonne} = \$70,245,875$$

This financial reserve is intended to account for the reserve disposal capacity remaining under System 5 (Full User Pay) versus System 4 (Partial User Pay). A similar approach was used to calculate a suitable cumulative financial reserve for each scenario in relation to System 5 with a full user pay program.

On the basis of the foregoing, the estimated fees that would have to be charged under each scenario over the 25 year planning period have been summarized in Tables 3.4 and 3.5 for System 4 and 5 respectively. This data has also been presented graphically in Figures 3.7 and 3.8 for each of the Partial User Pay Systems.

**TABLE 3.4  
SUMMARY OF COST RECOVERY ALTERNATIVES – SYSTEM 4**

Scenario Description	Principle Revenue Sources								
	General Levy (\$'s per year in millions \$)			Bag Fees (\$'s per bag) (\$'s per year in millions)			Tipping Fees (\$/tonne) (\$'s per year in millions)		
	2003	2006	2027	2003	2006	2027	2003	2006	2027
System 4 Partial User Pay (Option A)	\$2.1	\$2.3	\$4.3	\$1.00	\$1.00	\$3.55	\$30	\$45	\$160
				\$0.2	\$0.6	\$2.5	\$1.0	\$1.5	\$6.5
System 4 Partial User Pay (Option B)	\$2.1	\$2.3	\$4.3	\$1.00	\$1.00	\$2.00	\$35	\$65	\$136
				\$0.2	\$0.6	\$1.4	\$1.2	\$2.2	\$5.6
System 4 Partial User Pay (Option C)	\$2.1	\$2.3	\$4.3	\$2.00	\$2.00	\$2.95	\$35	\$65	\$96
				\$1.2	\$1.1	\$2.1	\$1.2	\$2.2	\$3.9
System 4 Full User Pay (Option A)	\$1.6	\$0	\$0	\$1.00	\$1.27	\$2.74	\$35	\$50	\$127
				\$0.3	\$3.3	\$8.2	\$1.2	\$1.6	\$5.1
System 4 Full User Pay (Option B)	\$1.6	\$0	\$0	\$1.00	\$1.00	\$2.00	\$35	\$65	\$171
				\$0.3	\$2.6	\$6.0	\$1.2	\$2.1	\$6.8

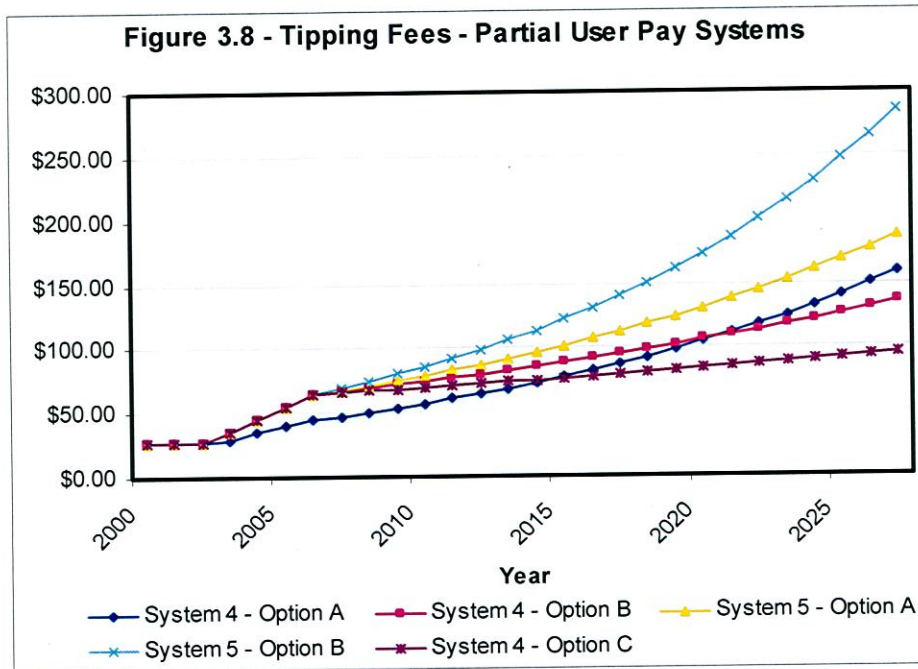
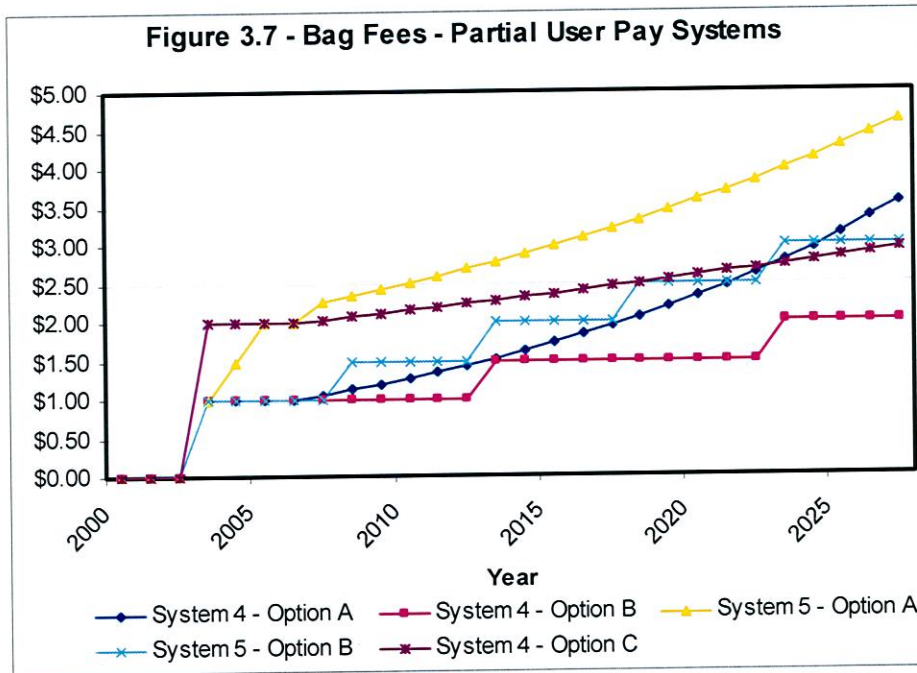
Note: The figures in the above table result in an adequate reserve in 2027 to provide equivalent disposal capacity for each scenario.

**TABLE 3.5  
SUMMARY OF COST RECOVERY ALTERNATIVES – SYSTEM 5**

Scenario Description	Principle Revenue Sources								
	General Levy (\$'s per year in millions \$)		Bag Fees (\$'s per bag)		Tipping Fees (\$/tonne)				
	2003	2006	2007	2003	2006	2007	2003	2006	2007
System 5 Partial User Pay (Option A)	\$2.1	\$2.3	\$4.3	\$1.00	\$2.00	\$4.61	\$35	\$65	\$188
				\$0.1	\$1.2	\$3.4	\$1.2	\$1.4	\$5.2
System 5 Partial User Pay (Option B)	\$2.1	\$2.3	\$4.3	\$1.00	\$1.00	\$3.00	\$35	\$65	\$285
				\$0.1	\$0.6	\$2.2	\$1.2	\$1.4	\$7.8
System 5 Full User Pay (Option A)	\$1.6	\$0	\$0	\$1.00	\$2.75	\$5.49	\$35	\$65	\$103
				\$0.1	\$4.4	\$9.9	\$1.2	\$1.4	\$2.8
System 5 Full User Pay (Option B)	\$1.6	\$0	\$0	\$1.00	\$1.00	\$3.00	\$35	\$65	\$561
				\$0.1	\$1.6	\$5.4	\$1.2	\$1.4	\$15.4

Note: The figures in the above table result in an adequate reserve in 2027 to provide equivalent disposal capacity for each scenario.

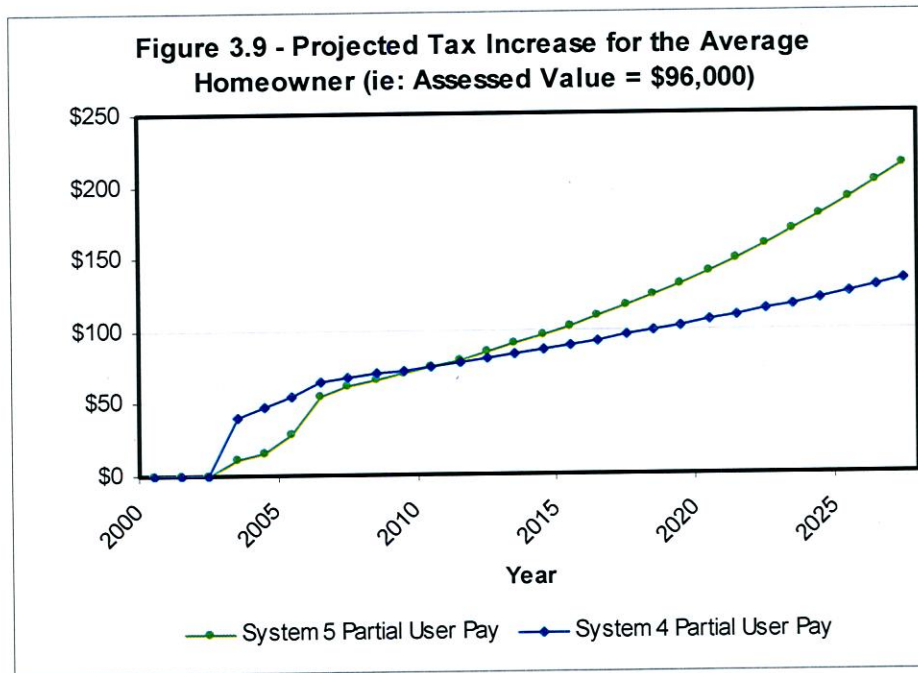




Each of the scenarios included in Figures 3.7 and 3.8 include an annual general levy contribution ranging from \$2.1M in 2003 to \$4.3M in 2027.

### 3.5.2 Increased Property Taxes

In lieu of recovering the projected increased costs through user fees the municipality may elect to increase property taxes to generate adequate revenues to meet the future waste management costs. For comparison purposes we have presented in Figure 3.9 the projected required increase in property taxes in each year of the plan for the average homeowner (ie: based on an assessed value of \$96,000). In developing the projected increased property taxes it has been assumed that the existing user fees would remain at their current levels.



Based on the data presented in Figure 3.9 the property tax payable for the average homeowner under System 4 would increase by some \$40-\$50 in 2003 and continue to increase in each year of the plan to approximately \$130-\$140 in 2027. These projected increases are in addition to any inflationary increases.

### 3.5.3 Summary of Cost Recovery Alternatives

The financial models (ie: spreadsheets) developed within the context of the Plan allow the development and comparison of an unlimited number of cost recovery scenarios. The alternatives presented in Table 3.4 and Figures 3.7 to 3.9 are intended to give City Staff and Council an idea of the fees that need to be charged to generate adequate revenues to meet future estimated expenditures. It must be reiterated that this Plan is intended to be a living document. It is important that this plan be re-visited and modified as the circumstances relating to waste management change.

#### 4.0 CONCLUSIONS AND RECOMMENDATIONS

The following are the principle conclusions of this report:

- The City currently has a partial user pay program in place. The waste management system is funded through a combination of user fees (tipping fees = \$27.50/tonne and gate fees = \$2.00/visit) and contributions from the general levy (\$2.01 million in 2001).
- The requirements for diversion of municipal waste are contained in Ontario Regulation 101/94. The regulation stipulates that municipalities having a population of 5,000 or more shall establish, operate and maintain a blue box waste management system and a leaf and yard waste system. The preferred waste management system complies with Regulation 101/94.
- The future waste management expenditures are expected to increase substantially relative to the expenditures in the recent past. Over the period 2000 - 2001, the annual waste management system expenditures have generally ranged from \$2.4 to \$2.9 million. Under System 4 the average annual expenditures over the next 7 years are projected to be in the range of \$3.8 to \$5.2 million (inclusive of a reasonable allowance for inflation). For the period 2010 to 2027 the annual costs are projected to be in the range of \$6.7 to \$12 million.
- Additional revenues will be required to fund the increased expenditures. The additional required revenues can be sourced from the general tax levy (ie: tax increases) or through user fees.
- The tipping fees (ie: \$27.50/tonne) and gate fees (ie: \$2.00/visit) presently being charged at the City's landfill are essentially the lowest in the province based on the municipalities surveyed.
- The true cost of disposing of waste is estimated to be in the range of \$60 to \$70/tonne (2002 \$'s). This estimate includes allowances for site selection, environmental approvals, operations during the active landfilling period, closure and post closure monitoring.
- The implementation of some form of PAYT program with reasonable bag limits is important to the success of the existing and future waste diversion programs.
- The lowest net cost alternative based on the assumptions made is System 5 with the implementation of a partial user pay program. The feasibility of implementing System 5 is presently being investigated through the Co-composting Pilot Study.
- The Waste Management Steering Committee is recommending the implementation of a Partial User Pay system included in this report as System 4 Partial User Pay Option C (refer to Spreadsheet 9). The recommended system includes the following key elements:
  - a contribution from the general tax levy that is consistent with amounts contributed in the recent past (ie: 2003 contribution = \$2.1 million with amounts in future years adjusted for inflation).

- a reduction in the bag limit from 6 bags per household per week to 2 bags per household per week commencing in 2003;
  - a bag fee of \$2.00/bag for each bag set out in excess of the two bag limit;
  - an increase in the gate fee to \$4.00 in 2003; and
  - an increase in the tipping fees to \$65/tonne by 2006.
- Future changes to bag limits and user fees should be tailored to meet the goals of the waste management system (eg. increased waste diversion) and the future waste management system expenditures.
  - User fees offer several important benefits including enhanced participation and capture efficiency in the diversion programs, reduced waste generation rates, more equitable distribution of costs and enhanced public awareness of waste management costs.
  - In lieu of the proposed user fee structure recommended by the Waste Management Steering Committee the projected increase in property taxes payable by the average homeowner would likely be in the range of \$40-\$50 in 2003 and continue to increase in each year of the plan to approximately \$130-\$140 in 2027.
  - Adjustments should be made to this Plan each year to reflect any changes in expenditures/revenues or in the implementation of specific waste management programs.

**APPENDIX A**

**BUSINESS AND IMPLEMENTATION PLAN  
FINANCIAL MODEL**

***City of Sault Ste. Marie***

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***SOLID WASTE MANAGEMENT PLAN  
BUSINESS AND IMPLEMENTATION PLAN***

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**APPENDIX A**

**FINANCIAL MODEL**

**February, 2003**

**CITY OF SAULT STE. MARIE  
SOLID WASTE MANAGEMENT PLAN**

**APPENDIX A  
BUSINESS AND IMPLEMENTATION PLAN  
FINANCIAL MODEL**

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# **CITY OF SAULT STE. MARIE BUSINESS AND IMPLEMENTATION PLAN FINANCIAL MODEL**

## **1.0 BUSINESS AND IMPLEMENTATION PLAN SPREADSHEETS**

A series of Excel spreadsheets have been prepared to reflect the various scenarios considered within the context of this Plan. Separate spreadsheets have been prepared to reflect the following distinct scenarios:

- Diversion System 4 with partial user fees (Option A)
- Diversion System 4 with partial user fees (Option B)
- Diversion System 4 with partial user fees (Option C) – this scenario was developed by the Waste Management Steering Committee
- Diversion System 5 with partial user fees (Option A)
- Diversion System 5 with partial user fees (Option B)
- Diversion System 4 with full user fees (Option A)
- Diversion System 4 with full user fees (Option B)
- Diversion System 5 with full user fees (Option A)
- Diversion System 5 with full user fees (Option B)

A digital copy of each spreadsheet has been provided to the City and a hardcopy of Spreadsheet 9 is included in the pocket at the back of this report. Each spreadsheet has been segregated into six major divisions as follows:

1. Implementation Plan
2. Estimated Unit Costs/Revenues
3. Estimated Quantities
4. Estimated Expenditures
5. Estimated Revenues
6. Reserves

Within each of these divisions there are a number of columns. Each of the major divisions and columns are discussed/defined in the following subsections.

In addition there are several parameters that are used in the calculations throughout the spreadsheet. Each parameter is defined below:

- An inflation rate of 3% per year has been assumed.
- It has been assumed that the population will remain stagnant until 2006 and then grow at a rate of 1% per annum for the remainder of the plan.
- A financing rate of 6% per annum has been assumed.
- An interest rate of 4% per annum has been assumed.

Each of these parameters can be changed at the bottom of the spreadsheet and the changes will be reflected throughout the spreadsheet.

It is also noted that the City allows small businesses to participate in residential waste management programs. References to residential programs throughout the report and spreadsheets also include small businesses.

## **1.1 Division 1 – Implementation Plan**

### **1.1.1 Year**

Identifies each year covered by the plan.

### **1.1.2 Key Activities**

Identifies the key waste management initiatives to be undertaken within each year of the plan (ie: generally those activities that are not part of normal operations have been identified).

## **1.2 Division 2 – Estimated Unit Costs/Revenues**

In order to develop the annual costs and revenues associated with the overall waste management plan, unit cost and unit revenue estimates were developed for various components of the plan. Generally the unit costs/revenues have been developed by extrapolating historical costs provided by the City, or using the results of recent tenders or proposal submissions or using the costs for similar services in other municipalities. For the purposes of this plan the base year is the year 2000. Each of the unit costs/revenues is defined below.

### **1.2.1 Estimated Unit Costs**

**1.2.1.1 Residential Waste Collection:** The unit costs are expressed in \$/person. These are derived from the base year information (ie: total 2000 residential waste collection costs divided by the 2000 population). Each year the unit cost is adjusted for inflation and multiplied by the population to obtain an estimate of the annual residential waste collection cost. This approach recognizes that as the population increases the number of stops increases and the overall collection costs increase. No reduction in cost has been included for the reduction in the quantity of waste that will be set out curbside as diversion increases. This unit cost also includes an appropriate reserve for the replacement of collection equipment.

**1.2.1.2 Landfill Site Operations:** The unit costs are expressed in \$/tonne. These are derived from the base year information (ie: total 2000 waste disposal operating cost divided by the 2000 disposal tonnage). Each year the unit cost is adjusted for inflation and multiplied by the disposal quantity to obtain the estimated annual operating cost for disposal. This unit cost also includes an appropriate reserve for the replacement of disposal equipment.

**1.2.1.3 Leachate Treatment:** The unit costs are expressed in \$/cu. m. The leachate generated at the landfill site is being collected and directed to the City's waste water treatment facilities. The costs incurred to treat the leachate should be accounted for in the waste management budget. The base year data was derived from the industrial rates established by the City for the collection and treatment of sewage. Each year the unit cost is adjusted for inflation and multiplied by the estimated quantity of leachate collected at the landfill site to obtain the estimated annual costs for the treatment of leachate.

**1.2.1.4 Diversion at Landfill:** The unit costs are expressed in \$/tonne. These are derived from the base year information (ie: total 2000 landfill diversion costs divided by the 2000 landfill diversion tonnage). The unit cost generally includes contracts for managing wood waste/brush, tires and scrap metal. Each year the unit cost is adjusted for inflation and multiplied by the landfill diversion quantity to obtain the estimated annual costs for landfill diversion.

**1.2.1.5 Residential Recyclables Collection and Processing:** The unit costs are expressed in \$/tonne. These are derived from the 2002 contract price submitted by Green Circle Environmental Recycling Inc. Each year the unit cost is adjusted for inflation and multiplied by the estimated quantity of dry residential recyclables to obtain the estimated annual costs for the collection and processing of recyclables.

**1.2.1.6 Residential Organics Collection and Processing:** The unit costs are expressed in \$/tonne. It has been assumed that a private contractor will be contracted to collect and process the organics (ie: similar to the dry recyclables contract) and a unit price will be charged to the City. It has also been assumed that there will be no revenue sharing relating to the sale of the final compost. A 2002 unit cost of \$100/tonne has been assumed for the collection and composting of leaf and yard waste. This unit cost was derived from the bids received for the optional items included in the 2002 Request for Proposals for the collection and processing of recyclables. Under the System 5 scenario the cost has been increased in 2004 to reflect the implementation of full scale residential organics collection and composting. A unit price of \$150/tonne (expressed in 2002 \$'s) has been assumed. Each year the unit cost is adjusted for inflation and multiplied by the estimated quantity of organics to obtain the estimated annual costs for the collection and processing of organics.

**1.2.1.7 Sewage Sludge Processing:** The unit costs are expressed in \$/tonne. Processing of sewage sludge would be initiated in 2004 under the System 5 scenario only. It has been assumed that the sewage sludge would be co-composted with the residential organics. It has also been assumed that there will be no revenue sharing relating to the sale of the final compost. A 2002 unit cost of \$50/tonne has been assumed for the composting of sewage sludge. Transportation of the sewage sludge is excluded. Each year the unit cost is adjusted for inflation and multiplied by the estimated quantity of sewage sludge to obtain the estimated annual costs for the processing of sewage sludge.

## **1.2.2 Estimated Unit Revenues**

**1.2.2.1 City Share of Sale of Recyclables (50% of Basket of Goods Price):** The unit revenue is expressed in \$/tonne. Under the terms of the 2002 recycling contract the City is entitled to share the revenue (ie: 50/50 split) from the sale of the recyclable materials to end markets. The amount shown represents the City's proportion (ie: ½) of the revenue and reflects a mixed basket of recyclable materials. Each year the unit revenue is adjusted for inflation and multiplied by the estimated quantity of recyclables to obtain an estimate of the City's share of the annual revenue relating to the sale of the recyclable materials to end markets.

**1.2.2.2 Residential Bag Fee:** The unit revenues are expressed in \$/bag. This fee would be payable in 2003 and all future years for each bag of refuse set out curb side in excess of the designated bag limit. Several bag limit/bag fee scenarios have been considered within the Plan

including full and partial user pay systems. Under the partial user pay system it has been assumed that the existing bag limit would be reduced from six bags per household per week to 2 bags per household per week under System 4 and 1 bag per household per week under System 5. A lower bag limit is proposed for System 5 because it includes more diversion opportunities (ie: organics collection and processing) relative to System 4. Under the full user pay system it has been assumed that the bag limits would gradually decrease from the current limit of six bags to zero bags in 2006 (ie: in 2006 full user fees would apply).

**1.2.2.3 Gate Fees at the Landfill:** The unit revenues are expressed in \$/visit. The present gate fee is \$2.00 per visit and an increase to \$4.00 per visit has been proposed in 2003. The gate fee remains at \$4.00 for the period 2003 to 2005 inclusive and is raised to \$6.00 in 2006. For the remainder of the plan it is increased each year in proportion to the tipping fee increase. This fee applies to residents that use the public drop-off facility at the landfill site. The present gate fee applies provided the weight of the waste does not exceed 500 kg. In concert with the proposed gate fee increase it is also recommended that the weight limit be reduced to 100 kg in 2006. Therefore the standard tipping would apply to wastes delivered to the site in excess of the 100 kg threshold. This approach will result in increased demands on the weigh scale. For the purposes of the Plan the installation of an additional scale has been incorporated in 2005. An additional benefit of having a second scale is to serve as a back-up during periods when one scale is being repaired or maintained. The gate fee is multiplied by the estimated number of visitors in each year to obtain the estimated annual revenue from this source.

**1.2.2.4 Sewage Sludge Tipping/Processing Fee:** The unit revenues are expressed in \$/tonne. For the purposes of the waste management plan this fee has been included to allow offsetting revenue for the disposal or processing of sewage sludge. The City is presently incurring significant costs for the disposal of sewage sludge in its landfill (ie: the loss of valuable disposal capacity). In future years sewage sludge may be processed (ie: co-composted with residential organics) to produce either a restricted or unrestricted compost (ie: System 5) or it may continue to be landfilled (ie: System 4). A pilot study is presently underway to assess the feasibility of co-composting sewage sludge with residential organics. Regardless of whether the sewage sludge is landfilled or processed there is a significant cost associated with the management of this material. The introduction of a revenue stream to offset the costs allows the City to remove the sewage sludge disposal/processing costs from the waste management budget and include it with sewage collection and treatment. Each year the unit revenue is adjusted for inflation and multiplied by the estimated quantity of sewage sludge to obtain the estimated annual revenue from this source.

**1.2.2.5 Landfill Tipping Fees:** The unit revenues are expressed in \$/tonne. This fee applies to IC&I waste delivered to the landfill. This fee is presently \$27.50/tonne which is very low in relation to the actual cost to dispose of waste and tipping fees being charged in other Ontario municipalities. Over the short term it is proposed to increase the tipping fees to more appropriate levels with longer term increases tied to the changes in the cost of disposing of waste. The tipping fee is multiplied by the estimated quantity of waste subject to tipping fees in each year to obtain the estimated annual revenue from this source.

### 1.3 Division 3 – Estimated Quantities

The quantity estimates play an important role in computing the estimated system costs and revenues associated with the various waste collection, diversion and disposal programs. During

the development of the “Alternative Waste Diversion/Collection System Options” report detailed quantity estimates were produced for each of the five Alternative systems. The systems were designed to build upon each other, and each system is intended to increase the amount of waste being diverted from landfill. Steps are presently being undertaken by the City to implement System 4 and City Council has endorsed the implementation of System 5 subject to the receipt of public input and a determination of the financial feasibility.

The quantities presented in the business and implementation plan have been derived from the quantity estimates produced for Systems 4 and 5 of the “Alternative Waste Diversion/Collection System Options” report. It is however noted that the “waste reduction” quantities developed for systems 4 and 5 have been assumed to be zero for the purposes of the Business and Implementation Plan. The “waste reduction” quantities developed for systems 4 and 5 reflect conscious decisions by residents and businesses to alter their waste generation habits to reduce the amount of waste being generated. The anticipated change in waste generation habits is expected to accrue as a result of the enhanced public education program in conjunction with a user pay program. The approach taken for the Business and Implementation Plan (ie: assume no waste reduction) is more conservative.

### **1.3.1 Miscellaneous Quantities**

**1.3.1.1 Population:** The base year population was derived from the year 2000 census data. For the purposes of the Plan an assumption was made that the population would remain stagnant until the year 2006 and then grow at a rate of 1% annually from 2007 to 2027 inclusive. The population is used in a number of the calculations throughout the plan.

**1.3.1.2 Number of Households:** This figure is used to estimate the revenue that would accrue to the City through bag fees. The City’s Planning Department provided a listing of various housing types and the number of residential units within the City. The information provided by the City was used for the base year. The number of residential units in future years is directly proportional to the population.

**1.3.1.3 Bags per Household per Week:** This figure is an estimate of the average number of bags set out curb side by each household each week. It is used to estimate the revenue that would accrue to the City through bag fees. The City completed a comprehensive residential waste composition study in the summer/fall of 2000. Through that study it was determined that an average of 2.67 bags of waste was set out curb side each week by each household. In estimating the number of bags that will be set out in future years the following approach was used: the number of bags has been proportioned in relation to the change in diversion rate (ie: as the diversion rate increases in future years it has been assumed that the number of bags of waste will be reduced proportionally); and it has also been acknowledged that as bag fees are introduced residents will likely pack more waste into each bag. In this regard it has been assumed that the number of bags set out by each household will decrease as partial or full user fees are phased in.

**1.3.1.4 Number of Bags with Tags per Year:** This figure is an estimate of the number of bags of waste placed at the curb for collection that are paid for in advance (ie: number of bags with tags set out in excess of the designated bag limits). It is used to estimate the revenue that would accrue to the City through bag fees. It is computed by multiplying the number of households by the estimated number of bags per household per week by the number of weeks in a year by the

estimated percentage of bags with tags. The proportion of the total bags of waste that will have tags affixed is related to the bag limit and the diversion system (ie: System 4 or System 5). The lower the bag limit for a given system the greater the proportion of tagged bags relative to the total number of bags set out. In order to establish an estimate of the percentage of bags with tags for different bag limit scenarios the data gathered through the residential waste composition study completed in 2000 was used. During that study the number of bags of waste set out by each household was recorded and is summarized in the first two columns of Table 1.1.

Once the diversion programs included in systems 4 and 5 are fully operational, the number of bags of waste set out by each household will be reduced relative to the set out rate documented in the residential waste composition study. In addition it is also assumed that as a partial or full user pay system is phased in, residents will pack more waste into each bag. In the two right-hand columns of Table 1.1, estimates of the number of bags of waste that are anticipated once the respective diversion programs and user pay programs are fully implemented are shown. For example, 11% of households set out 4 bags of waste during the conduct of the residential waste composition study. It is anticipated that the same households will likely set out 3 bags of waste under System 4 and 2 bags of waste under system 5. The lower set out rate is attributable to the increased diversion opportunities and the desire to pack more waste into each bag.

<b>Number of Bags of Waste</b>	<b>Percentage of Households from Residential Waste Composition Study</b>	<b>Number of Equivalent Bags Under System 4 with some form of User Pay</b>	<b>Number of Equivalent Bags Under System 5 with some form of User Pay</b>
1	28	1	1
2	28	2	1
3	20	2	2
4	11	3	2
5	6	4	3
6	4	5	3
More than 6 (Average number set out was 8)	3	6	4

The data presented in Table 1.1 was used to calculate the estimated proportion of bags with tags relative to the total number of bags set out curb side for various bag limit scenarios. The results are summarized in Table 1.2 and are used in estimating the number of bags with tags within the Plan.

<b>Bag Limit</b>	<b>Percentage of Bags with Tags – System 4</b>	<b>Percentage of Bags with Tags – System 5</b>
3	10.5	1.9
2	21.5	10.0
1	54.3	37.5
0	100.0	100.0

**1.3.1.5 Residential Public Drop-off Trips per Year:** This figure is an estimate of the number of trips that residential customers will make to the public drop-off at the landfill site each year. It is used to estimate the revenue that would accrue to the City through gate fees at the landfill site. The gate fee applies to each residential customer disposing of waste at the public drop-off area provided the weight of the waste does not exceed a designated weight limit. The base year information has been used to identify the number of trips in 2000. The number of residential public drop-off trips in future years is directly proportional to changes in the population.

### **1.3.2 Diversion Quantities**

**1.3.2.1 Residential Recycling:** This figure is an estimate of the quantity, in tonnes, of dry recyclables to be collected and processed through the City’s residential recycling program. A new recycling contract was initiated in October 2002. The contract was awarded to Green Circle Environmental Recycling Inc. for a ten year period. Payment to the contractor will be based on the quantity of recyclables collected and processed each year. The estimated quantities included in the Plan are generally increased from 2003 to 2006 as a partial/full user pay system is phased in. Generally the quantity estimates in 2006 reflect the estimates presented for the various waste diversion systems in the “Alternative Waste Diversion/Collection System Options” report. Under a partial user pay system the estimated recycling quantities are lower relative to a full user pay system. The quantities in future years change in proportion to changes in the total waste managed.

**1.3.2.2 Multi-residential and IC&I Recycling:** This figure is an estimate of the quantity, in tonnes, of dry recyclables to be collected and processed in the IC&I and multi-residential sectors. This diversion program would be a private sector initiative established through private contracts between contractors and property owners in the IC&I and multi-residential sectors. **There are no City costs or revenues associated with this item in the model.** The quantities are increased proportionally from 2003 to 2006 as higher tipping fees are introduced. Generally the quantity estimates in 2006 reflect the estimates presented for the various waste diversion systems in the “Alternative Waste Diversion/Collection System Options” report. The quantities in future years change in proportion to changes in the total waste managed.

**1.3.2.3 Landfill Diversion:** This figure is an estimate of the quantity, in tonnes, of materials diverted at the landfill site. Generally the materials that are presently being diverted at the landfill site include scrap metal, clean wood/brush, and tires. The estimated quantity varies over



the 2003 to 2006 transition period. In 2006 the quantity is derived from the various waste diversion systems estimates included in the “Alternative Waste Diversion/Collection System Options” report. The quantities in future years change in proportion to changes in the total waste managed.

**1.3.2.4 Backyard Composting:** This figure is an estimate of the quantity, in tonnes, of residential organic material processed in backyard composters. **There are no City costs or revenues associated with this item in the model.** The quantity was derived from the estimates included in the “Alternative Waste Diversion/Collection System Options” report. A sizable increase in the quantity is shown in 2003 with the introduction of the landfill ban on leaf and yard waste. The quantities in future years change in proportion to changes in the total waste managed.

**1.3.2.5 Residential Organics Processing:** This figure is an estimate of the quantity, in tonnes, of residential organic material collected and processed through the City’s organics collection and processing program. The present organics program comprises of the collection and processing of leaf and yard wastes in the late fall only. The scale of a future residential organics collection and processing program is presently unknown and separate business plans have been developed to reflect different scenarios (ie: System 4 versus System 5). System 4 includes the collection and processing of leaf and yard waste throughout the growing season only. System 5 includes a leaf and yard waste program throughout the growing season together with the collection and processing of other residential organic wastes throughout the year.

A pilot study is presently being undertaken to determine the feasibility of collecting and co-composting residential organic wastes and sewage sludge. The results of that study will likely dictate whether it is feasible/cost effective to enhance the scope of the organics program beyond the collection and processing of leaf and yard wastes. For the purposes of the model it has been assumed that an expanded leaf and yard waste program would be initiated in 2003 under Systems 4 and 5. The quantity estimates shown reflect the collection of leaf and yard waste throughout the growing season (May through October) for all years from 2003 onward. Under the System 5 scenario the residential organics quantities would also increase substantially in 2004 with the implementation of a full scale residential organics collection and processing program. The estimated quantities were derived from the various estimates prepared for the waste diversion systems in the “Alternative Waste Diversion/Collection System Options” report. The quantity estimates in future years change in proportion to changes in the total waste managed.

**1.3.2.6 Multi-residential and IC&I Organics Processing:** This figure is an estimate of the quantity, in tonnes, of multi-residential and IC&I organic material collected and processed. This diversion program would be a private sector initiative established through private contracts between contractors and property owners in the IC&I and multi-residential sectors. **There are no City costs or revenues associated with this item in the model.** As noted above for the residential organics program, the quantities will be dependant upon whether System 4 or System 5 is implemented by the City. Under System 4 the quantities reflect leaf and yard wastes only whereas under System 5 a significant increase in the quantity would occur in 2004 with the initiation of full scale organics processing. The estimated quantity in 2003 was derived from the various estimates prepared for the waste diversion systems in the “Alternative Waste Diversion/Collection System Options” report. The quantity estimates in future years change in proportion to changes in the total waste managed.

**1.3.2.7 Sewage Sludge Processing:** This figure is an estimate of the quantity, in tonnes, of the sewage sludge that would be processed through an organics processing facility. The City is presently disposing of sewage sludge in its landfill. In future years sewage sludge may be processed (ie: co-composted with residential organics) to produce either a restricted or unrestricted compost or it may continue to be landfilled. A pilot study is presently underway to assess the feasibility of co-composting sewage sludge with residential organics. Under System 4 the quantity under this item remains at 0 as organics processing is limited to leaf and yard waste only. Under System 5 however, it has been assumed that all sewage sludge would be processed commencing in 2004 with the initiation of full scale organics processing. The estimated quantity of sewage sludge to be processed in future years changes in proportion to changes in the total waste managed. In addition a 3,000 tonne increase has been included in 2006 to reflect the addition of secondary treatment at the City's east end plant.

**1.3.2.8 Household Special Waste Program:** This figure is an estimate of the quantity, in tonnes, of special waste that is managed through the household special waste program. The quantity gradually increases over the first three years of operation to 135 tonnes and changes in future years are proportional to changes in the total waste managed.

**1.3.2.9 Reuse Centre:** This figure is an estimate of the quantity, in tonnes, of waste managed through a reuse centre. It has been assumed that a reuse centre would be established in 2004. The quantity gradually increases over the first three years of operation to 1650 tonnes (ie: the quantity presented in the "Alternative Waste Diversion/Collection System Options" report) and changes in future years are proportional to changes in the total waste managed.

**1.3.2.10 Total Waste Diverted:** This figure is an estimate of the quantity, in tonnes, of waste diverted from disposal. This quantity is computed by adding the values in the nine preceding columns which reflect different components of the waste diversion system.

**1.3.2.11 Waste Diversion Rate:** This figure is an estimate of the overall waste diversion rate being achieved in the City. It has been computed by dividing the waste diversion tonnage in the preceding column by the total waste managed.

### **1.3.3 Waste Disposal Quantities**

**1.3.3.1 Leachate Treatment:** This figure is an estimate of the quantity, in cubic metres, of leachate impacted ground water that is collected and pumped into the City's sanitary collection system for treatment. The estimated quantity for the period 2000 to 2002 is based on the quantity reported in the 2001 annual monitoring report for the landfill site. The estimated quantity for 2003 and future years has been increased to reflect the proposed addition of additional purge wells at the landfill site.

**1.3.3.2 Private Sector Waste Subject to Tipping Fees:** This figure is an estimate of the quantity of waste, in tonnes, that will be subject to tipping fees. The proportion of landfilled waste that was subject to tipping fees in the base year is used to determine the quantity of waste that will be subject to tipping fees in future years. The values in this column are computed by multiplying the Total Waste Disposal quantity by the proportion subject to tipping fees in the base year.

**1.3.3.3 Residential Public Drop-off:** This figure is an estimate of the quantity, in tonnes, of the waste delivered to the landfill by the residential sector. Historical records available for the landfill site include the total tonnage recorded at the public drop-off. This tonnage includes both residential waste (gate fee) and IC&I waste (tipping fees). It was necessary to make an assumption regarding the percentage composition from the residential sector (ie: 70%) versus the IC&I sector (ie: 30%). The assumed proportions shown above have been provided by landfill site staff familiar with the operations. The quantities in future years are computed by multiplying the Total Waste Disposal quantity by the proportion of residential public drop-off waste computed for the base year.

**1.3.3.4 Sewage Sludge:** This figure is an estimate of the quantity, in tonnes, of sewage sludge disposed of at the landfill site. In future years sewage sludge may be processed (ie: co-composted with residential organics) to produce either a restricted or unrestricted compost or it may continue to be landfilled. A pilot study is presently underway to assess the feasibility of co-composting sewage sludge with residential organics. Under System 4, it has been assumed that the full quantity of sewage sludge will be landfilled in future years. Under System 5 however, it has been assumed that sewage sludge would only be landfilled until 2003 at which time a full scale organics processing program would be initiated. The estimated quantity of sewage sludge to be landfilled in future years changes in proportion to changes in the total waste managed. In addition a 3,000 tonne increase has been included in 2006 to reflect the addition of secondary treatment at the City's east end plant.

**1.3.3.5 Total Waste Disposal:** This figure is an estimate of the quantity, in tonnes, of waste disposed of at the landfill. This quantity is computed by subtracting the total waste diverted quantity from the total waste managed quantity.

#### **1.3.4 Total Waste Managed**

This figure is an estimate of the quantity, in tonnes, of the solid non-hazardous waste managed by the City. It has been calculated by multiplying the population by a waste generation rate that was developed from the base year data provided by the City (ie: 1.06 tonnes/person/year). The waste generation rate has been increased from 1.06 tonnes/person/year to 1.10 tonnes/person/year in the year 2006 to reflect the anticipated increase in sewage sludge resulting from the construction of the new secondary sewage treatment plant in the City's east end.

### **1.4 Division 4 – Estimated Expenditures**

In order to assist City Staff and Council in planning and budgeting for future waste management initiatives it was necessary to develop estimates of the future expenditures for each component of the overall waste management system. The expenditure estimates have been developed based on the unit costs and quantity estimates described in the preceding sections of this report. The Plan covers a significant period of time (25 years) and in general the confidence in the estimates dissipates with time. Recognizing the variables and assumptions involved in developing the expenditure projections the importance of updating of the plan frequently is emphasized.

This section of the spreadsheet is subdivided into the waste collection and disposal costs, diversion collection and processing costs and general costs. In developing the expenditure

projections a reasonable inflation allowance of 3% per annum has been assumed. The individual components within each of these subdivisions are described in the following subsections.

#### **1.4.1 Waste Collection and Disposal Costs**

**1.4.1.1 Description of Engineering/Capital Expenditures:** In this column the specific disposal related engineering or capital works to be undertaken in each year of the Plan are described.

**1.4.1.2 Engineering:** This figure is an estimate of the cost for contracted waste disposal engineering services in each year. The estimates have been developed based on experience with similar initiatives in other municipalities.

**1.4.1.3 Capital:** This figure is an estimate of the cost for waste disposal related capital improvements. The estimates have been developed based on experience with similar capital works in other municipalities.

**1.4.1.4 Residential Waste Collection:** This figure is an estimate of the cost for the curb side collection of residential waste. The amount shown for the base year is based on actual cost data provided by the City. The amount in future years is computed by multiplying the population by the residential waste collection cost per person in each year. This figure includes an appropriate reserve for repairs and replacement of collection equipment.

**1.4.1.5 Waste Disposal Operations:** This figure is an estimate of the cost of operating the landfill site. The amount shown for the base year is based on actual cost data provided by the City. The amount in future years is computed by multiplying the tonnage of waste disposed of in the landfill site by the unit operating cost per tonne. This figure includes an appropriate reserve for repairs and replacement of landfill operating equipment.

**1.4.1.6 Leachate Treatment:** This figure is an estimate of the cost of treating the leachate impacted ground water that is collected at the landfill site. The amount in each year is computed by multiplying the quantity of leachate by the unit rate charged to the IC&I sector for waste water collection and treatment.

**1.4.1.7 Total Disposal Costs:** This figure is an estimate of the total cost to the municipality for waste disposal related initiatives. It is computed by adding the values in the preceding four columns.

#### **1.4.2 Diversion Material Collection and Processing Costs**

**1.4.2.1 Description of Engineering Expenditures:** In this column the specific engineering work to be undertaken to implement the diversion programs in each year of the Plan is described.

**1.4.2.2 Engineering:** This figure is an estimate of the cost for contracted waste diversion engineering services in each year. The estimates have been developed based on experience with similar initiatives in other municipalities.

**1.4.2.3 Landfill Diversion:** This figure is an estimate of the cost of processing and diverting materials at the landfill site. The materials that have typically been processed in the past include

tires, wood and scrap metal. The amount shown for the base year is based on actual cost data provided by the City. The amount in future years is computed by multiplying the estimated tonnage of material diverted at the landfill by the relevant unit cost in each year.

**1.4.2.4 Residential Recyclables Collection and Processing:** This figure is an estimate of the cost of undertaking curb side collection and processing of residential recyclables. The amount shown for the base year is based on actual cost data provided by the City. That contract was based on a fixed lump sum monthly price. A new weight-based contract was initiated in the fall of 2002. The estimated program cost for the year 2003 and future years is computed by multiplying the estimated tonnage of residential recyclables by the relevant unit cost.

**1.4.2.5 Residential Organics Collection and Processing:** This figure is an estimate of the cost of undertaking curb side collection and processing of residential organics. Presently the City has a limited leaf and yard waste program with leaf collection three times in the fall of each year. Since the program is very limited, the costs associated with this program have been included with the residential waste collection costs for the years 2000 through 2002. In 2003 and future years it has been assumed that an expanded leaf and yard waste program would be initiated with leaf and yard waste collection undertaken throughout the growing season (ie: May through October of each year). Furthermore under the System 5 scenario it has also been assumed that full scale organics collection and processing would be initiated in 2004. Therefore in 2003 and all future years this figure has been computed by multiplying the quantity of residential organics by the relevant unit cost.

**1.4.2.6 Sewage Sludge Processing:** This figure is an estimate of the cost to process sewage sludge to produce a restricted or unrestricted compost. This figure is computed by multiplying the tonnage of sewage sludge by the relevant unit cost. Under the System 4 scenario the cost under this item is 0 for all years as it has been assumed that full scale organics processing would not be undertaken. Conversely, under the System 5 scenario it has been assumed that all sewage sludge would be processed commencing in 2004.

**1.4.2.7 Household Special Waste (“HSW”) Program:** This figure is an estimate of the cost to operate the HSW program each year. An annual cost of \$125,000 was established for 2002 based on input from City staff. The cost in future years reflects the 2002 annual cost with an appropriate allowance for inflation.

**1.4.2.8 Re-Use Centre:** This figure is an estimate of the cost to establish and operate a re-use centre. Within the Plan it has been assumed that a re-use centre would be established at the landfill site in 2004. An allowance of \$200,000 has been included in 2004 to establish suitable infrastructure and a budget of \$100,000 has been included in 2005 to operate the facility. The operating budget in future years is based on the 2005 budget with an appropriate allowance for inflation.

**1.4.2.9 Total Diversion Costs:** This figure is an estimate of the total cost to the municipality for waste diversion programs. It is computed by adding the values in the preceding seven columns.

### 1.4.3 General Costs

**1.4.3.1 Financing:** This figure is an estimate of the annual financing costs required for the waste management system. This figure has been computed by multiplying a negative cumulative reserve in the preceding year by the assumed financing rate. In the event that the cumulative reserve in the preceding year is positive it has been assumed that interest revenue would accrue to the municipality.

**1.4.3.2 Additional Administrative Costs:** This figure is an estimate of the additional costs to accrue to the City to administer a partial or full user pay program. An allowance of \$100,000 (in 2002 \$'s) for the partial user pay scenarios and \$125,000 (in 2002 \$'s) for the full user pay scenarios has been incorporated into the models. This allowance is intended to cover the costs associated with the sale of bag tags, policing and enforcement.

**1.4.3.3 Total General Costs:** This figure is an estimate of the total general waste management costs to accrue to the municipality. It is computed by adding the values in the preceding two columns.

### 1.4.4 Total Expenditures

This figure is an estimate of the total waste management system expenditures in a given year. This figure has been computed by adding the total disposal costs, total diversion costs and the total general costs.

## 1.5 Division 5 – Estimated Revenues

There are several alternative methods available to generate revenues to meet the projected waste management system expenditures. The alternatives comprise of the general tax levy, a partial user pay program or a full user pay program. Under a partial user pay program, the waste management system is funded through a combination of the general levy and user fees while under a full user pay program adequate revenues are generated from user fees to meet all of the projected expenditures (ie: no contribution is required from the general levy).

This section of the spreadsheet is subdivided into waste collection and disposal revenues, diversion revenues and interest income. An interest rate of 4% per annum has been assumed. The individual columns within each of these subdivisions are described in the following subsections.

### 1.5.1 Waste Collection and Disposal Revenues

**1.5.1.1 Bag Fees:** This figure is an estimate of the revenue to accrue to the City through the implementation of a Pay-As-You-Throw (“PAYT”) program. Revenues would accrue in 2003 and all future years for each bag of refuse set out curb side in excess of the designated bag limit. This figure is computed by multiplying the unit revenue per bag of waste by the estimated number of bags set out each year with a bag tag.

**1.5.1.2 Gate Fees:** This figure is an estimate of the revenue to accrue to the City for each visit to the landfill’s public drop-off by a residential customer provided the weight of waste is under the

designated maximum. This figure is computed by multiplying the estimated number of residential visitors to the landfill in a given year by the gate fee.

**1.5.1.3 Sewage Sludge Tipping Fee:** This figure is an estimate of the revenue that would accrue to the waste management budget to account for the disposal of sewage sludge in the City's landfill. The City is presently incurring significant costs for the disposal of sewage sludge in its landfill (ie: the loss of valuable disposal capacity). In future years sewage sludge may be processed (ie: co-composted with residential organics) to produce either a restricted or unrestricted compost (ie: System 5) or it may continue to be landfilled (ie: System 4). A pilot study is presently underway to assess the feasibility of co-composting sewage sludge with residential organics. Regardless of whether the sewage sludge is landfilled or composted there is a significant cost associated with the management of this material. The introduction of a revenue stream to offset the costs allows the City to remove the sewage sludge disposal/processing costs from the waste management budget and include it with sewage collection and treatment. This figure is computed by multiplying the tonnage of sewage sludge by the sewage sludge tipping fee.

**1.5.1.4 Landfill Tipping Fees:** This figure is an estimate of the revenue to accrue to the City through the collection of tipping fees at the landfill site. This fee applies to waste delivered to the landfill by the IC&I sector. This figure is computed by multiplying the tonnage of private sector waste subject to tipping fees by the tipping fee.

**1.5.1.5 Total Waste Collection and Disposal Revenues:** This figure is an estimate of the revenue to accrue to the City for the collection and disposal of residential waste and the disposal of IC&I waste. It is computed by adding the figures in the preceding four columns.

## **1.5.2 Diversion Revenues**

**1.5.2.1 Residential Recycling (Sale of Materials):** This figure is an estimate of the revenue to accrue to the City for the sale of recyclable materials to end markets. A new recycling contract was initiated in October 2002 which included provisions for the sharing of revenues from the sale of recyclable materials to end markets. The revenues are to be split 50/50 between the Contractor and City. This figure is computed by multiplying the estimated quantity of residential recyclables in a given year by the estimated unit revenue for a mixed basket of recyclable materials.

**1.5.2.2 Diversion Subsidies:** The City is presently receiving subsidies to assist with the costs of diverting glass. The amount of the subsidy in recent years has been in the range of \$30,000 annually. An allowance of \$30,000 per year has been incorporated into the Plan for the time being without an allowance for inflation. Although the longevity and value of any subsidy program is rarely well-defined this is a marginal allowance that can easily be adjusted as new programs are implemented and/or existing programs are terminated. Legislation was recently passed which mandates the food packaging industry to provide financial assistance to municipalities to operate a dry recycling program. The funding formula was being developed in the fall of 2002 and it is anticipated that efficient and comprehensive diversion programs will be rewarded with higher levels of funding. It is expected that this component of the Plan will be adjusted annually to reflect the subsidy programs of the day.

**1.5.2.3 Sewage Sludge Processing Fee:** This figure is an estimate of the revenue that would accrue to the waste management budget to account for the co-composting of sewage sludge with



residential organics. The City is presently incurring significant costs for the disposal of sewage sludge in its landfill (ie: the loss of valuable disposal capacity). In future years sewage sludge may be processed (ie: co-composted with residential organics) to produce either a restricted or unrestricted compost (ie: System 5) or it may continue to be landfilled (ie: System 4). A pilot study is presently underway to assess the feasibility of co-composting sewage sludge with residential organics. Regardless of whether the sewage sludge is landfilled or composted there is a significant cost associated with the management of this material. The introduction of a revenue stream to offset the costs allows the City to remove the sewage sludge disposal/processing costs from the waste management budget and include it with sewage collection and treatment. This figure is computed by multiplying the tonnage of sewage sludge by the sewage sludge processing fee.

**1.5.2.4 Total Diversion Revenues:** This figure is an estimate of the revenue to accrue to the City through the diversion programs. It is computed by adding the figures in the preceding three columns.

### **1.5.3 General Revenue**

**1.5.3.1 General Levy:** This figure is an estimate of the net contribution to be made to the waste management system from the general tax levy. Under the partial user pay programs the value of the contribution in each year of the Plan has been established based on the year 2001 net contribution with an appropriate allowance for inflation in future years. Conversely under the full user pay programs the value of the contribution has been progressively eliminated over the period from 2003 to 2006 as the user pay program is phased in. In 2006 and all future years the contribution from the general tax levy has been established as \$0 as the entire system costs are funded through system revenues.

**1.5.3.2 Interest:** This figure is an estimate of the annual interest income to accrue through the investment of the funds in the reserve account. This figure has been computed by multiplying a positive cumulative reserve in the preceding year by the assumed interest rate. In the event that the cumulative reserve in the preceding year is negative it has been assumed that financing costs would accrue to the municipality.

**1.5.3.3 Total General Revenues:** This figure is an estimate of the total general revenues in a given year. This figure has been computed by adding the revenue figures in the two preceding columns.

### **1.5.4 Total Revenues**

This figure is an estimate of the total revenues that will accrue to the waste management budget in a given year from all sources. It has been computed by adding the total waste collection and disposal revenues, total diversion revenues and the general revenues.

## **1.6 Division 6 – Reserves**

### **1.6.1 Annual Reserve (Revenues minus Expenditures)**

This figure is an estimate of the annual reserve for the waste management system. It has been computed by subtracting the total expenditures from the total revenues. A positive value indicates that revenues are expected to exceed expenditures in a given year whereas a negative value indicates that expenditures are expected to exceed revenues in a given year.

### **1.6.2 Cumulative Reserve**

This figure is an estimate of the cumulative reserve that will accrue over time. It has been computed by taking the cumulative reserve in the previous year and adding to it the annual reserve in the current year. A positive value indicates that revenues are expected to exceed expenditures over the given period of time whereas a negative value indicates that expenditures are expected to exceed revenues over the given period of time.

## 2.0 BAG FEE CALCULATION SPREADSHEET

In a user pay system revenues are typically generated through tipping fees and gate fees applied at the landfill site and bag fees applied to each bag of refuse set out curbside in excess of the bag limit. Since the principle means of recovering the costs related to the residential waste management programs is through bag fees and the general tax levy, calculations have been completed to identify suitable bag fee rates that will be adequate to recover the net expenditures from one, two or all three of the residential waste management programs noted below.

- Waste collection and disposal;
- Dry recyclables collection and processing; and
- Organic waste collection and processing. The implementation of a full scale organics collection and processing program will be dependant upon the success of an ongoing pilot feasibility study.

The intent of these calculations is to provide a range of bag fees that may be appropriate depending on whether a partial or full user pay program is implemented. For a full user pay program it may be desirable to establish a bag fee that provides sufficient revenues to meet the projected expenditures for all three residential waste management programs noted above. Alternatively under a partial user pay program a more moderate bag fee may be appropriate.

Separate bag fee calculation spreadsheets have been developed for Systems 4 and 5 (digital copies have been provided to the City). A detailed explanation of each component of the System 5 bag fee calculation spreadsheet is provided in the following subsections. The System 4 bag fee calculation spreadsheet is generally the same with the exception that division 4 noted below is excluded.

The spreadsheet has been segregated into four major divisions as follows:

1. General
2. Bag Fee for Collection and Waste Disposal
3. Bag Fee for Collection, Waste Disposal and Recycling
4. Bag Fee for Collection, Waste Disposal, Recycling and Organics Processing

Within each of these divisions there are a number of components in individual columns. Each of the major divisions and columns are discussed/defined in the following subsections.

### 2.1 Division 1 - General

Each of the columns in this division is defined in detail under the Business and Implementation Plan spreadsheet. The values in each of these columns is automatically updated from the corresponding data included in the "System 5 - Full Bag Fee" spreadsheet. This approach ensures that these columns always reflect the entries in the corresponding columns in the "System 5 - Full Bag Fee" spreadsheet.

## **2.2 Division 2 – Bag Fee for Collection and Waste Disposal**

In this division of the spreadsheet an equitable bag fee is calculated to generate sufficient revenues to cover the anticipated costs of the residential waste collection and disposal programs. Each of the components within this division is defined below.

### **2.2.1 Estimated Residential Waste Collected and Disposed**

This figure is an estimate of the quantity, in tonnes, of the waste collected through the residential waste collection program and disposed of in the landfill. The quantity shown for the base year is based on actual data provided by the City. The quantity in future years is inversely proportional to the diversion rate and directly proportional to the total quantity of waste managed.

### **2.2.2 Disposal Fee for Residential Waste:**

This figure is an estimate of the revenue that would accrue if tipping fees were applied to the disposal of residential waste. It is computed by multiplying the estimated residential waste collected and disposed of in the landfill by the proposed tipping fee.

### **2.2.3 Collection Costs for Residential Waste**

This figure is an estimate of the cost of undertaking curb side collection of residential waste. The amount shown for the base year is based on actual cost data provided by the City of Sault Ste. Marie. The amount in future years is computed by multiplying the population by the residential waste collection cost per person in each year. This column is automatically updated to reflect the data in the corresponding column of the “System 5 - Full Bag Fee” spreadsheet.

### **2.2.4 Total Cost Collection and Disposal of Residential Waste**

This figure is an estimate of the total cost for the collection and disposal of residential waste in each year. The values in this column are computed by adding the values in the two preceding columns (ie: Disposal Fee for Residential Waste and Collection Costs for Residential Waste).

### **2.2.5 Estimated Number of Bags with Tags**

This figure is an estimate of the total number of bags set out curb side and paid for in advance (ie: set out with a tag). This column is automatically updated to reflect the data in the corresponding column of the “System 5 - Full Bag Fee” spreadsheet. A detailed explanation of the approach taken to estimate this quantity is provided under the Business and Implementation Plan spreadsheet.

### **2.2.6 Suitable Bag Fee for Collection and Disposal of Residential Waste**

This figure is an estimate of an equitable fee to be charged for each bag of waste to reflect the costs for collection and disposal of residential waste. This value is calculated by dividing the “Total Cost for Collection and Disposal of Residential Waste” by the “Estimated Number of Bags with Tags” set out curb side.

### **2.3 Division 3 – Bag Fee for Collection, Waste Disposal and Recycling**

In this division of the spreadsheet an equitable bag fee is calculated to generate sufficient revenues to cover the anticipated costs of residential waste collection, residential waste disposal and the collection and processing of dry recyclables. Each of the components within this division is defined below.

#### **2.3.1 Recycling Collection and Processing Costs**

This figure is an estimate of the cost of undertaking curb side collection and processing of residential recyclables. The amount shown for 2003 and future years is computed by multiplying the estimated tonnage of recyclables collected and processed by the relevant unit cost. This column is automatically updated to reflect the data in the corresponding column of the “System 5 - Full Bag Fee” spreadsheet.

#### **2.3.2 Municipal Revenues from Sale of Materials and Subsidies**

This figure is an estimate of the Municipality’s share of the revenues that accrue from the sale of the recyclable materials to end markets combined with any subsidies from other levels of government. The revenues from the sale of recyclable materials will be realized in late 2002 and future years. The values in this column are computed by multiplying the tonnage of recyclables collected and processed by the relevant unit revenue and adding to it any subsidies from government programs. This column is automatically updated to reflect the data in the corresponding columns of the “System 5 - Full Bag Fee” spreadsheet.

#### **2.3.3 Total Net Cost Collection and Disposal of Waste and Recycling**

This figure is an estimate of the total net cost for the collection and disposal of residential waste and collection and processing of residential recyclables in each year. The values in this column are computed by adding the “total cost of collection and disposal of residential waste” to the “recycling collection and processing costs” and subtracting the “municipal revenues from the sale of materials and subsidies”.

#### **2.3.4 Estimated Number of Bags with Tags**

This figure is an estimate of the total number of bags set out curb side and paid for in advance (ie: set out with a tag). This column is automatically updated to reflect the data in the corresponding column of the “System 5 - Full Bag Fee” spreadsheet. A detailed explanation of the approach taken to estimate this quantity is provided under the Business and Implementation Plan spreadsheet.

#### **2.3.5 Suitable Bag Fee for Collection, Waste Disposal and Recycling**

This figure is an estimate of an equitable fee to be charged for each bag of waste to reflect the costs for collection and disposal of residential waste and collection and processing of residential

recyclables. This value is calculated by dividing the “Total Net Cost for Collection and Disposal of Waste and Recycling” by the “Estimated Number of Bags with Tags” set out curb side.

## **2.4 Division 4 – Bag Fee for Collection, Waste Disposal, Recycling and Organics Processing**

In this division of the spreadsheet an equitable bag fee is calculated to generate sufficient revenues to cover the anticipated costs of residential waste collection, residential waste disposal, collection and processing of dry recyclables and collection and processing of residential organics. Each of the components within this division is defined below.

### **2.4.1 Residential Organics Collection and Processing Costs**

This figure is an estimate of the cost of undertaking curb side collection and processing of residential organics. It has been assumed that an expanded leaf and yard waste program would be initiated in 2003 and full scale residential organics collection and processing would be initiated in 2004. The amount shown for 2003 and future years is computed by multiplying the tonnage of residential organics collected and processed by the relevant unit cost. This column is automatically updated to reflect the data in the corresponding column of the “System 5 - Full Bag Fee” spreadsheet.

### **2.4.2 Total Cost Collection, Waste Disposal, Recycling & Organics Processing**

This figure is an estimate of the total net cost for the collection and disposal of residential waste, the collection and processing of residential recyclables and the collection and processing of residential organics in each year. The values in this column are computed by adding the “Total Net Cost Collection and Disposal of Waste and Recycling” to the “Residential Organics Collection and Processing Costs”.

### **2.4.3 Estimated Number of Bags with Tags**

This figure is an estimate of the total number of bags set out curb side and paid for in advance (ie: set out with a tag). This column is automatically updated to reflect the data in the corresponding column of the “System 5 - Full Bag Fee” spreadsheet. A detailed explanation of the approach taken to estimate this quantity is provided under the Business and Implementation Plan spreadsheet.

### **2.4.4 Suitable Bag Fee for Collection, Waste Disposal, Recycling and Organics Processing**

This figure is an estimate of an equitable fee to be charged for each bag of waste to reflect the costs for collection and disposal of residential waste, the collection and processing of residential recyclables and the collection and processing of residential organics. This value is calculated by dividing the “Total Cost Collection, Waste Disposal, Recycling & Organics Processing” by the “Estimated Number of Bags with Tags” set out curb side.

**APPENDIX B**

**USER PAY CASE STUDY  
CITY OF PETERBOROUGH, ONTARIO**



## User Pay Case Study City of Peterborough, Ontario

Relevance to Toronto: Over 5 years, moved from a 6 to 3 bag limit in 1994, and to a 2 bag limit in 1995. Close to Toronto.

**Demographics:**

Population: 68,748 (2000)

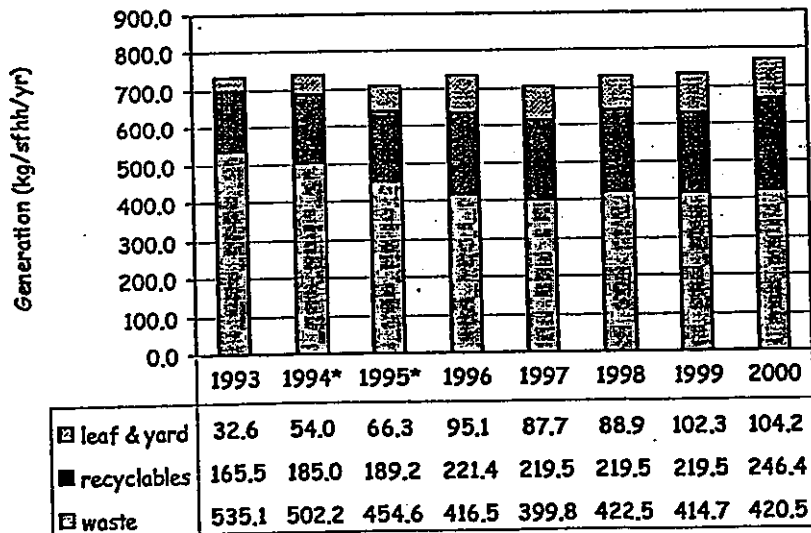
- Households: 29,000

### City of Peterborough, Waste Diversion at a Glance

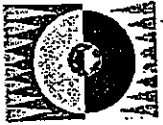
Type of System	Date Started	Years with Data	% change in waste landfilled (kg/sfhh)	% change in recycling (kg/sfhh)*	% change in leaf & yard collection (kg/sfhh)	% diversion (without BYC)
			Compared with baseline year 1993			
Bag Limits	3 bag limit introduced in 1994	1993				+27%
		1994	-6%	+12%	+66%	+32%
		1995	-15%	+14%	+104%	+36%
		1996	-22%	+34%	+192%	+43%
	2 bag limit introduced in 1995	1997	-25%	+33%	+169%	+43%
		1998	-21%	+33%	+173%	+42%
		1999	-23%	+46%	+214%	+45%
		2000	-21%	+49%	+220%	+45%

\*Note: New materials added to recycling program in 1993, 1994, 1995 and 2000.

### Peterborough - Impacts of Bag Limits



\* Bag limit reduced from 6 to 3 in 1994 and 3 to 2 in 1995



### Program Description:

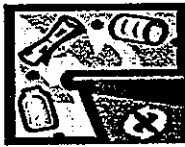
- The City of Peterborough introduced a two bag/container limit per week in 1995. Prior bag weekly limits were 18 bags in 1989, 6 bags in 1990, four bags in 1991 and three bags in 1994.
- An acceptable container is defined as a 120 litres (32 gallon can) or a plastic bag. Containers cannot exceed 23 kg (50lb).
- Households that exceed the two container limit are required to store waste until a subsequent collection period or drop waste at the landfill for a minimum fee of \$5.00.
- The data provided by the City included the following: 1) waste to landfill data includes businesses that participate in the 4 bag business bag limit but excludes most residential multi-units with six or more units. City staff expect these factors to balance out. 2) The recycling tonnages include collection from businesses that participate in the curbside waste collection program and large multi-units.



### Impacts on Waste to Landfill

Year	HHs	Tonnes	% Change from base year (1993)
1993 (base year)	27,950	14956	
1994	28,100	14111	-6%
1995	28,250	12842	-15%
1996	28,400	11829	-22%
1997	28,550	11414	-25%
1998	28,700	12126	-21%
1999	28,850	11964	-23%
2000	29,000	12195	-21%

- Average set out of 1.2 bags/household/week.



*Recycling*

Year	HHs	Tonnes*	% Change from base year (1993)
1993 (base year)	27,950	4627	
1994	28,100	5199	+12%
1995	28,250	5346	+14%
1996	28,400	6289	+34%
1997	28,550	6268	+33%
1998	28,700	6301	+33%
1999	28,850	6956	+46%
2000	29,000	7146	+49%

\*Note: The recycling tonnages include collection from businesses that participate in the curbside waste collection program and large multi-units.

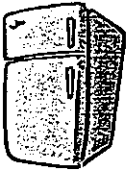
- Weekly collection.
- Curbside Blue Box program since 1987.
- Since 1995, blue box recyclables have been banned from waste disposal.
- The City currently collects: ONP, OCC, OBB, OMG, mixed paper, glass, plastics #1 and #2, aluminum cans and foil, steel cans, empty paint cans, empty aerosol cans, aseptic packages and gable top cartons. Polystyrene can be dropped of at the depot.
- Blue box materials evolved as follows:
  - In 1987, the City collected glass containers, metal cans, ONP and Plastic #1 bottles.
  - Film plastic was introduced in 1991.
  - In 1993, plastic #2 bottles, OMG, OCC and foil were added.
  - In 1994, OBB and phone books were added.
  - In 1995, plastic tubs and jugs and mixed paper were added.
  - In 2000, empty paint cans, empty aerosol cans, aseptic packages and polycoat was added.
- A study showed the average set out per household is 8.8 kg and the average bag weight is 6.6 kg.



**Leaf and Yard Waste**

Year	HHs	Tonnes	% Change from base year (1993)
1993 (base year)	27,950	910	
1994	28,100	1516	+66%
1995	28,250	1873	+104%
1996	28,400	2700	+192%
1997	28,550	2504	+169%
1998	28,700	2552	+173%
1999	28,850	2950	+214%
2000	29,000	3021	+220%

- Weekly collection between April and November.
- Mandatory leaf and yard waste composting by-law.
- Curbside collection of leaf and yard waste introduced in 1993. Loose collection of leaves since 1990.
- Since 1990, over 13,000 composters have been purchased by residents through the City's subsidy program.
- Since September 1998, the City has provided a 50% subsidy on the cost of a mulching blade, that can be installed on most lawn mowers.
- Yard waste tonnages (above) exclude estimated loose curbside leaf collection. Between 1994 to 1997, an estimated 965 tonnes per year of loose leaves were collected. With the promotion of mulching, the City estimates the following: 465 tonnes in 1998; 431 tonnes in 1999 and 456 tonnes in 2000.



**Bulky Wastes**

- Since 1992, four large article collections are scheduled each year. Tickets must be purchased the week before collection at City Hall or Public Works for \$15 for the first item and \$5 for each additional item.
- Bulky items are defined as items over 23 kg (50 lbs).

### **Exchange Day**

- Since 1991, the City has sponsored 2-3 "Reusables Exchange" weekends per year. Participants place reusable items to curb on the Friday and pick up remaining items on the Sunday evening.

### **Textiles Collection**

- Since 1996, in partnership with Peterborough Green-Up, two curbside textiles drives are held each year.

### **Promotion and Education:**

- The program is promoted on the website,

### **Lessons Learned:**

- The City always introduced alternatives for reducing waste when new bag limits were introduced.
- Staging program changes over time will help get a higher level of support (e.g., material ban and reduced bag limit).

### **Future Goals:**

- Collection of food wastes being investigated in 2001.



**City of Sault Ste. Marie**  
**Solid Waste Management Business and Implementation Plan**  
**SPREADSHEET 9 - System 4 Partial User Pay (Option C)**  
**Bag limit = 2, Bag fee = \$2.00/bag to 2006 and increased at same rate as tipping f**

Implementation Plan		Estimated Unit Costs/Revenue						
Year	Key Activities	Unit Costs						
		Residential Waste Collection (\$/person)	Landfill Site Operations (\$/tonne)	Leachate Treatment (\$/cu. m)	Diversion at Landfill (\$/tonne)	Residential Recyclables Collection & Processing (\$/tonne)	Residential Organics Collection & Processing (\$/tonne)	Sewage Sludge Processing (\$/tonne)
2000	Initiate Solid Waste Management Plan	\$12.91	\$13.59	N/A	\$48.93	N/A	N/A	N/A
2001	Undertake Solid Waste Management Plan Initiate preparation of Enhanced Recycling RFP Open Household Special Waste Facility Initiate Expanded Public Education Program	\$13.29	\$14.00	N/A	\$50.40	N/A	N/A	N/A
2002	Finalize Solid Waste Management Plan Tender and Award Enhanced Recycling Contract Initiate Co-composting Feasibility Study	\$13.69	\$14.42	N/A	\$51.91	\$210.00	N/A	N/A
2003	Finalize Co-composting Feasibility Study Initiate Expanded Leaf and Yard Waste Program/Landfill Ban Expand ban on OCC to Residential Sector Initiate Environmental Assessment for Disposal Increase Tipping Fees and Gate Fees Reduce Bag Limits (two bags) and charge bag fees	\$14.10	\$14.85	\$0.36	\$53.47	\$210.00	\$103.00	N/A
2004	Finalize Environmental Assessment for Disposal Establish Re-use Centre Increase Tipping Fees	\$14.53	\$15.30	\$0.37	\$55.07	\$216.30	\$106.09	N/A
2005	Environmental Assessment Act Approvals Increase Tipping Fees	\$14.96	\$15.75	\$0.39	\$56.72	\$222.79	\$109.27	N/A
2006	Initiate Environmental Protection Act Requirements for Disposal Increase Tipping Fees	\$15.41	\$16.23	\$0.40	\$58.42	\$229.47	\$112.55	N/A
2007	Finalize Environmental Protection Act Requirements for Disposal Increase Tipping Fees and Bag Fees to meet system costs	\$15.87	\$16.71	\$0.41	\$60.18	\$236.36	\$115.93	N/A
2008	Environmental Protection Act Approvals Increase Tipping Fees and Bag Fees to meet system costs	\$16.35	\$17.21	\$0.42	\$61.98	\$243.45	\$119.41	N/A
2009	Detail Design of Landfill Increase Tipping Fees and Bag Fees to meet system costs	\$16.84	\$17.73	\$0.43	\$63.84	\$250.75	\$122.99	N/A
2010	Initial Site Construction Increase Tipping Fees and Bag Fees to meet system costs	\$17.35	\$18.26	\$0.45	\$65.76	\$258.27	\$126.68	N/A
2011	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$17.87	\$18.81	\$0.46	\$67.73	\$266.02	\$130.48	N/A
2012	Re-tender Recycling Contract Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$18.40	\$19.38	\$0.47	\$69.76	\$274.00	\$134.39	N/A
2013	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$18.96	\$19.96	\$0.49	\$71.86	\$282.22	\$138.42	N/A
2014	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$19.52	\$20.56	\$0.50	\$74.01	\$290.69	\$142.58	N/A
2015	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$20.11	\$21.17	\$0.52	\$76.23	\$299.41	\$146.85	N/A
2016	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$20.71	\$21.81	\$0.53	\$78.52	\$308.39	\$151.26	N/A
2017	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$21.33	\$22.46	\$0.55	\$80.87	\$317.64	\$155.80	N/A
2018	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$21.97	\$23.14	\$0.57	\$83.30	\$327.17	\$160.47	N/A
2019	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$22.63	\$23.83	\$0.58	\$85.80	\$336.99	\$165.28	N/A
2020	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$23.31	\$24.54	\$0.60	\$88.37	\$347.10	\$170.24	N/A
2021	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$24.01	\$25.28	\$0.62	\$91.02	\$357.51	\$175.35	N/A
2022	Re-tender Recycling Contract Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$24.73	\$26.04	\$0.64	\$93.75	\$368.24	\$180.61	N/A
2023	Annual Liner Construction Increase Tipping Fees and Bag Fees to meet system costs	\$25.47	\$26.82	\$0.66	\$96.57	\$379.28	\$186.03	N/A
2024	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$26.24	\$27.62	\$0.68	\$99.46	\$390.66	\$191.61	N/A
2025	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$27.03	\$28.45	\$0.70	\$102.45	\$402.38	\$197.36	N/A
2026	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$27.84	\$29.31	\$0.72	\$105.52	\$414.45	\$203.28	N/A
2027	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$28.67	\$30.19	\$0.74	\$108.69	\$426.89	\$209.38	N/A
TOTALS (2000 to 2027)								
TOTALS (2003 to 2027)								

**Notes and Assmptions:**

Assumed Inflation Rate = 3 %  
 Assumed Population Growth Rate after 2006 = 1 %  
 Percentage Increase in fees after 2006 = 1.9 %  
 Financing Rate = 6 %  
 Interest Rate = 4 %  
 Estimated Value of Disposal Capacity in 2027 125

**Financial Model Summary**

System funded through a combination of the general levy and system revenues (primarily user fees).  
 Contribution from general levy is approximately equivalent to net contributions in 2000 and 2001 - increa-  
 Bag limit reduced from 6 bags to 2 bags in 2003.  
 Each bag set out curb side in excess of designated bag limit must be paid for in advance.  
 \$2.00 2006 Bag Fee  
 \$2.95 2027 Bag Fee  
 \$65.00 2006 Tipping Fee  
 \$95.80 2027 Tipping Fee  
 \$70,288,778 Cumulative Reserve in 2027  
 1813599 Disposal Capacity Consumed  
 561968 Additional Disposal Capacity Consumed Relative to System 5 - Full User Pay  
 \$70,245,958 Required Cumulative Reserve



# City of Sault Ste. Marie

## Solid Waste Management Busine

### SPREADSHEET 9 - System 4 Part

Implementation Plan		Unit Revenues					Misc	
Year	Key Activities	City Share of Sale of Recyclables (50% of Basket of Goods Price) (\$/tonne)	Residential Bag Fee (\$/bag)	Gate Fees at Landfill (\$/visit)	Sewage Sludge Tipping/ Processing Fee (\$/tonne)	Landfill Tipping Fees (\$/tonne)	Population	Number of Households
2000	Initiate Solid Waste Management Plan	N/A	\$0.00	\$2.00	\$27.50	\$27.50	75576	26500
2001	Undertake Solid Waste Management Plan Initiate preparation of Enhanced Recycling RFP Open Household Special Waste Facility Initiate Expanded Public Education Program	N/A	\$0.00	\$2.00	\$27.50	\$27.50	75576	26500
2002	Finalize Solid Waste Management Plan Tender and Award Enhanced Recycling Contract Initiate Co-composting Feasibility Study	\$42.00	\$0.00	\$2.00	\$27.50	\$27.50	75576	26500
2003	Finalize Co-composting Feasibility Study Initiate Expanded Leaf and Yard Waste Program/Landfill Ban Expand ban on OCC to Residential Sector Initiate Environmental Assessment for Disposal Increase Tipping Fees and Gate Fees Reduce Bag Limits (two bags) and charge bag fees	\$43.26	\$2.00	\$4.00	\$40.00	\$40.00	75576	26500
2004	Finalize Environmental Assessment for Disposal Establish Re-use Centre Increase Tipping Fees	\$44.56	\$2.00	\$4.00	\$40.00	\$40.00	75576	26500
2005	Environmental Assessment Act Approvals Increase Tipping Fees	\$45.89	\$2.00	\$4.00	\$55.00	\$55.00	75576	26500
2006	Initiate Environmental Protection Act Requirements for Disposal Increase Tipping Fees	\$47.27	\$2.00	\$6.00	\$65.00	\$65.00	75576	26500
2007	Finalize Environmental Protection Act Requirements for Disposal Increase Tipping Fees and Bag Fees to meet system costs	\$48.69	\$2.04	\$6.11	\$66.21	\$66.21	76332	26765
2008	Environmental Protection Act Approvals Increase Tipping Fees and Bag Fees to meet system costs	\$50.15	\$2.08	\$6.23	\$67.45	\$67.45	77095	27033
2009	Detail Design of Landfill Increase Tipping Fees and Bag Fees to meet system costs	\$51.65	\$2.11	\$6.34	\$68.70	\$68.70	77866	27303
2010	Initial Site Construction Increase Tipping Fees and Bag Fees to meet system costs	\$53.20	\$2.15	\$6.46	\$69.98	\$69.98	78645	27576
2011	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$54.80	\$2.19	\$6.58	\$71.29	\$71.29	79431	27852
2012	Re-tender Recycling Contract Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$56.44	\$2.23	\$6.70	\$72.62	\$72.62	80225	28130
2013	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$58.14	\$2.28	\$6.83	\$73.97	\$73.97	81028	28412
2014	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$59.88	\$2.32	\$6.96	\$75.35	\$75.35	81838	28696
2015	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$61.68	\$2.36	\$7.08	\$76.75	\$76.75	82656	28983
2016	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$63.53	\$2.41	\$7.22	\$78.18	\$78.18	83483	29272
2017	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$65.43	\$2.45	\$7.35	\$79.64	\$79.64	84318	29565
2018	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$67.40	\$2.50	\$7.49	\$81.13	\$81.13	85161	29861
2019	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$69.42	\$2.54	\$7.63	\$82.64	\$82.64	86013	30159
2020	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$71.50	\$2.59	\$7.77	\$84.18	\$84.18	86873	30461
2021	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$73.65	\$2.64	\$7.92	\$85.75	\$85.75	87741	30766
2022	Re-tender Recycling Contract Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$75.86	\$2.69	\$8.06	\$87.35	\$87.35	88619	31073
2023	Annual Liner Construction Increase Tipping Fees and Bag Fees to meet system costs	\$78.13	\$2.74	\$8.21	\$88.97	\$88.97	89505	31384
2024	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$80.48	\$2.79	\$8.37	\$90.63	\$90.63	90400	31698
2025	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$82.89	\$2.84	\$8.52	\$92.32	\$92.32	91304	32015
2026	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$85.38	\$2.89	\$8.68	\$94.04	\$94.04	92217	32335
2027	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$87.94	\$2.95	\$8.84	\$95.80	\$95.80	93139	32658
TOTALS (2000 to 2027)								
TOTALS (2003 to 2027)								

Notes and Assmptions:

Assumed Inflation Rate = 3  
 Assumed Population Growth Rate after 2006 = 1 ses in future years based on inflation.  
 Percentage Increase in fees after 2006 = 1.9  
 Financing Rate = 6  
 Interest Rate = 4  
 Estimated Value of Disposal Capacity in 2027 = 125



**City of Sault Ste. Marie  
Solid Waste Management Busine  
SPREADSHEET 9 - System 4 Part**

Implementation Plan		Miscellaneous Quantities						
Year	Key Activities	Bags per Household per week	Number of Bags with Tags per year	Residential Public Drop-off Trips per year	Residential Recycling (tonnes)	Multi-residential & IC&I Recycling (tonnes)	Landfill Diversion (tonnes)	Backyard Composting (tonnes)
2000	Initiate Solid Waste Management Plan	2.67	0	57240	2433	1300	1125	976
2001	Undertake Solid Waste Management Plan Initiate preparation of Enhanced Recycling RFP Open Household Special Waste Facility Initiate Expanded Public Education Program	2.67	0	56789	2478	1324	1125	976
2002	Finalize Solid Waste Management Plan Tender and Award Enhanced Recycling Contract Initiate Co-composting Feasibility Study	2.64	0	56200	2734	1934	980	976
2003	Finalize Co-composting Feasibility Study Initiate Expanded Leaf and Yard Waste Program/Landfill Ban Expand ban on OCC to Residential Sector Initiate Environmental Assessment for Disposal Increase Tipping Fees and Gate Fees Reduce Bag Limits (two bags) and charge bag fees	2.10	619933	53167	4000	2544	835	1276
2004	Finalize Environmental Assessment for Disposal Establish Re-use Centre Increase Tipping Fees	2.04	603538	51987	4750	3154	690	1276
2005	Environmental Assessment Act Approvals Increase Tipping Fees	1.97	583366	50534	5500	3764	545	1276
2006	Initiate Environmental Protection Act Requirements for Disposal Increase Tipping Fees	1.92	569225	51370	6256	4376	404	1276
2007	Finalize Environmental Protection Act Requirements for Disposal Increase Tipping Fees and Bag Fees to meet system costs	1.92	574917	51884	6319	4420	408	1289
2008	Environmental Protection Act Approvals Increase Tipping Fees and Bag Fees to meet system costs	1.92	580666	52402	6382	4464	412	1302
2009	Detail Design of Landfill Increase Tipping Fees and Bag Fees to meet system costs	1.92	586473	52926	6446	4509	416	1315
2010	Initial Site Construction Increase Tipping Fees and Bag Fees to meet system costs	1.92	592338	53456	6510	4554	420	1328
2011	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	1.92	598261	53990	6575	4599	425	1341
2012	Re-tender Recycling Contract Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	1.92	604244	54530	6641	4645	429	1354
2013	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	1.92	610286	55075	6707	4692	433	1368
2014	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	1.92	616389	55626	6774	4739	437	1382
2015	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	1.92	622553	56182	6842	4786	442	1396
2016	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	1.92	628778	56744	6911	4834	446	1409
2017	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	1.92	635066	57312	6980	4882	451	1424
2018	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	1.92	641417	57885	7049	4931	455	1438
2019	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	1.92	647831	58464	7120	4980	460	1452
2020	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	1.92	654309	59048	7191	5030	464	1467
2021	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	1.92	660852	59639	7263	5080	469	1481
2022	Re-tender Recycling Contract Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	1.92	667461	60235	7336	5131	474	1496
2023	Annual Liner Construction Increase Tipping Fees and Bag Fees to meet system costs	1.92	674136	60838	7409	5183	478	1511
2024	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	1.92	680877	61446	7483	5234	483	1526
2025	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	1.92	687686	62060	7558	5287	488	1542
2026	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	1.92	694563	62681	7634	5340	493	1557
2027	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	1.92	701508	63308	7710	5393	498	1573
TOTALS (2000 to 2027)			15736673	1583020	174989	121108	15187	37982
TOTALS (2003 to 2027)			15736673	1412791	167344	116550	11957	35054

**Notes and Assmptions:**

Assumed Inflation Rate = 3  
 Assumed Population Growth Rate after 2006 = 1  
 Percentage Increase in fees after 2006 = 1.9  
 Financing Rate = 6



# City of Sault Ste. Marie Solid Waste Management Busine SPREADSHEET 9 - System 4 Part

Implementation Plan		Estimated Quantities						
Year	Key Activities	Diversion Quantities						Waste Diversion Rate (%)
		Residential Organics Processing (tonnes)	Multi-residential & IC&I Organics Processing (tonnes)	Sewage Sludge Processing (tonnes)	Household Special Waste Program (tonnes)	Reuse Centre (tonnes)	Total Waste Diverted (tonnes)	
2000	Initiate Solid Waste Management Plan	1245	0	0	0	0	7079	9
2001	Undertake Solid Waste Management Plan Initiate preparation of Enhanced Recycling RFP Open Household Special Waste Facility Initiate Expanded Public Education Program	1245	0	0	62	0	7210	9
2002	Finalize Solid Waste Management Plan Tender and Award Enhanced Recycling Contract Initiate Co-composting Feasibility Study	1245	0	0	98	0	7967	10
2003	Finalize Co-composting Feasibility Study Initiate Expanded Leaf and Yard Waste Program/Landfill Ban Expand ban on OCC to Residential Sector Initiate Environmental Assessment for Disposal Increase Tipping Fees and Gate Fees Reduce Bag Limits (two bags) and charge bag fees	1944	1126	0	135	0	11860	15
2004	Finalize Environmental Assessment for Disposal Establish Re-use Centre Increase Tipping Fees	1944	1126	0	135	300	13375	17
2005	Environmental Assessment Act Approvals Increase Tipping Fees	1944	1126	0	135	950	15240	19
2006	Initiate Environmental Protection Act Requirements for Disposal Increase Tipping Fees	1944	1126	0	135	1650	17167	21
2007	Finalize Environmental Protection Act Requirements for Disposal Increase Tipping Fees and Bag Fees to meet system costs	1963	1137	0	136	1667	17339	21
2008	Environmental Protection Act Approvals Increase Tipping Fees and Bag Fees to meet system costs	1983	1149	0	138	1683	17512	21
2009	Detail Design of Landfill Increase Tipping Fees and Bag Fees to meet system costs	2003	1160	0	139	1700	17688	21
2010	Initial Site Construction Increase Tipping Fees and Bag Fees to meet system costs	2023	1172	0	140	1717	17864	21
2011	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	2043	1183	0	142	1734	18043	21
2012	Re-tender Recycling Contract Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	2064	1195	0	143	1752	18224	21
2013	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	2084	1207	0	145	1769	18406	21
2014	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	2105	1219	0	146	1787	18590	21
2015	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	2126	1231	0	148	1805	18776	21
2016	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	2147	1244	0	149	1823	18963	21
2017	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	2169	1256	0	151	1841	19153	21
2018	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	2191	1269	0	152	1859	19345	21
2019	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	2212	1281	0	154	1878	19538	21
2020	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	2235	1294	0	155	1897	19733	21
2021	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	2257	1307	0	157	1916	19931	21
2022	Re-tender Recycling Contract Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	2279	1320	0	158	1935	20130	21
2023	Annual Liner Construction Increase Tipping Fees and Bag Fees to meet system costs	2302	1334	0	160	1954	20331	21
2024	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	2325	1347	0	161	1974	20535	21
2025	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	2349	1360	0	163	1993	20740	21
2026	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	2372	1374	0	165	2013	20947	21
2027	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	2396	1388	0	166	2033	21157	21
TOTALS (2000 to 2027)		57140	30933	0	3869	41628	482844	
TOTALS (2003 to 2027)		53405	30933	0	3709	41628	460588	

Notes and Assmptions:

Assumed Inflation Rate = 3  
 Assumed Population Growth Rate after 2006 = 1  
 Percentage Increase in fees after 2006 = 1.86  
 Financing Rate = 6



**City of Sault Ste. Marie  
Solid Waste Management Busine  
SPREADSHEET 9 - System 4 Part**

Implementation Plan		Waste Disposal Quantities					TOTAL WASTE MANAGED (tonnes)	Description of Engineering/Capital Expenditures
Year	Key Activities	Leachate Treatment (cu. m)	Private Sector Waste Subject to Tipping Fees (tonnes)	Residential Public Drop- off (tonnes)	Sewage Sludge (tonnes)	Total Waste Disposal (tonnes)		
2000	Initiate Solid Waste Management Plan	178000	36995	4939	9185	73479	80558	Solid Waste Management Plan(\$49,605)
2001	Undertake Solid Waste Management Plan Initiate preparation of Enhanced Recycling RFP Open Household Special Waste Facility Initiate Expanded Public Education Program	178000	36704	4900	9134	72901	80111	Solid Waste Management Plan(\$79,165)
2002	Finalize Solid Waste Management Plan Tender and Award Enhanced Recycling Contract Initiate Co-composting Feasibility Study	178000	36323	4849	9134	72144	80111	Finalize Solid Waste Management Plan (\$38,815)
2003	Finalize Co-composting Feasibility Study Initiate Expanded Leaf and Yard Waste Program/Landfill Ban Expand ban on OCC to Residential Sector Initiate Environmental Assessment for Disposal Increase Tipping Fees and Gate Fees Reduce Bag Limits (two bags) and charge bag fees	200000	34363	4587	9134	68251	80111	Initiate EA for Disposal (\$300,000)
2004	Finalize Environmental Assessment for Disposal Establish Re-use Centre Increase Tipping Fees	250000	33600	4485	9134	66735	80111	Finalize EA for Disposal (\$300,000)
2005	Environmental Assessment Act Approvals Increase Tipping Fees	250000	32661	4360	9134	64870	80111	EA Act Approvals for Disposal (\$100,000) Install additional scale (\$100,000)
2006	Initiate Environmental Protection Act Requirements for Disposal Increase Tipping Fees	250000	33201	4432	12134	65944	83111	Initiate EPA Work for Disposal (\$300,000)
2007	Finalize Environmental Protection Act Requirements for Disposal Increase Tipping Fees and Bag Fees to meet system costs	250000	33533	4476	12255	66603	83942	Finalize EPA Work for Disposal (\$300,000)
2008	Environmental Protection Act Approvals Increase Tipping Fees and Bag Fees to meet system costs	250000	33868	4521	12378	67269	84781	EPA Approvals for Disposal (\$100,000) MOE Review Fee (\$50,000)
2009	Detail Design of Landfill Increase Tipping Fees and Bag Fees to meet system costs	250000	34207	4566	12502	67942	85629	Detail Design of Landfill (\$300,000)
2010	Initial Site Construction Increase Tipping Fees and Bag Fees to meet system costs	250000	34549	4612	12627	68621	86486	Initial Site Construction (\$4,000,000) Design/construction admin. (5% of construction)
2011	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	250000	34895	4658	12753	69307	87350	Annual Construction Design/construction admin. (5% of construction)
2012	Re-tender Recycling Contract Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	250000	35244	4705	12880	70000	88224	Annual Construction Design/construction admin. (5% of construction)
2013	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	250000	35596	4752	13009	70700	89106	Annual Construction Design/construction admin. (5% of construction)
2014	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	250000	35952	4799	13139	71407	89997	Annual Construction Design/construction admin. (5% of construction)
2015	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	250000	36312	4847	13271	72121	90897	Annual Construction Design/construction admin. (5% of construction)
2016	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	250000	36675	4896	13403	72843	91806	Annual Construction Design/construction admin. (5% of construction)
2017	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	250000	37041	4945	13538	73571	92724	Annual Construction Design/construction admin. (5% of construction)
2018	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	250000	37412	4994	13673	74307	93651	Annual Construction Design/construction admin. (5% of construction)
2019	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	250000	37786	5044	13810	75050	94588	Annual Construction Design/construction admin. (5% of construction)
2020	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	250000	38164	5095	13948	75800	95534	Annual Construction Design/construction admin. (5% of construction)
2021	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	250000	38545	5145	14087	76558	96489	Annual Construction Design/construction admin. (5% of construction)
2022	Re-tender Recycling Contract Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	250000	38931	5197	14228	77324	97454	Annual Construction Design/construction admin. (5% of construction)
2023	Annual Liner Construction Increase Tipping Fees and Bag Fees to meet system costs	250000	39320	5249	14370	78097	98429	Annual Construction Design/construction admin. (5% of construction)
2024	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	250000	39713	5301	14514	78878	99413	Annual Construction Design/construction admin. (5% of construction)
2025	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	250000	40111	5354	14659	79667	100407	Annual Construction Design/construction admin. (5% of construction)
2026	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	250000	40512	5408	14806	80464	101411	Annual Construction Design/construction admin. (5% of construction)
2027	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	250000	40917	5462	14954	81268	102425	Annual Construction Design/construction admin. (5% of construction)
TOTALS (2000 to 2027)		6734000	1023127	136578	351793	2032123	2514967	
TOTALS (2003 to 2027)		6200000	913106	121891	324340	1813599	2274188	

Notes and Assmptions:

Assumed Inflation Rate = 3  
 Assumed Population Growth Rate after 2006 = 1  
 Percentage Increase in fees after 2006 = 1.86  
 Financing Rate = 6  
 Interest Rate = 4



**City of Sault Ste. Marie  
Solid Waste Management Busine  
SPREADSHEET 9 - System 4 Part**

Implementation Plan		Waste Collection and Disposal Costs						Estimated
Year	Key Activities	Engineering	Capital	Residential Waste Collection	Waste Disposal Operations	Leachate Treatment	Total Disposal Costs	Description of Engineering Expenditures
2000	Initiate Solid Waste Management Plan	\$49,605	\$0	\$975,496	\$998,551	\$0	\$2,023,652	Solid Waste Management Plan(\$49,605)
2001	Undertake Solid Waste Management Plan Initiate preparation of Enhanced Recycling RFP Open Household Special Waste Facility Initiate Expanded Public Education Program	\$79,165	\$0	\$1,004,761	\$1,020,412	\$0	\$2,104,338	Solid Waste Management Plan(\$79,165) Initiate preparation of Enhanced Recycling RFP (\$8,700)
2002	Finalize Solid Waste Management Plan Tender and Award Enhanced Recycling Contract Initiate Co-composting Feasibility Study	\$38,815	\$0	\$1,034,904	\$1,040,109	\$0	\$2,113,828	Finalize Solid Waste Management Plan (\$38,815) Tender and Award Enhanced Recycling Contract (\$41,300)
2003	Finalize Co-composting Feasibility Study Initiate Expanded Leaf and Yard Waste Program/Landfill Ban Expand ban on OCC to Residential Sector Initiate Environmental Assessment for Disposal Increase Tipping Fees and Gate Fees Reduce Bag Limits (two bags) and charge bag fees	\$300,000	\$0	\$1,065,951	\$1,013,509	\$72,800	\$2,452,260	Design and Tender Re-use Center (\$40,000)
2004	Finalize Environmental Assessment for Disposal Establish Re-use Centre Increase Tipping Fees	\$300,000	\$0	\$1,097,929	\$1,020,732	\$93,730	\$2,512,391	
2005	Environmental Assessment Act Approvals Increase Tipping Fees	\$100,000	\$100,000	\$1,130,867	\$1,021,973	\$96,542	\$2,449,382	
2006	Initiate Environmental Protection Act Requirements for Disposal Increase Tipping Fees	\$300,000	\$0	\$1,164,793	\$1,070,046	\$99,438	\$2,634,278	
2007	Finalize Environmental Protection Act Requirements for Disposal Increase Tipping Fees and Bag Fees to meet system costs	\$300,000	\$0	\$1,211,734	\$1,113,169	\$102,421	\$2,727,325	
2008	Environmental Protection Act Approvals Increase Tipping Fees and Bag Fees to meet system costs	\$150,000	\$0	\$1,260,567	\$1,158,030	\$105,494	\$2,674,091	
2009	Detail Design of Landfill Increase Tipping Fees and Bag Fees to meet system costs	\$300,000	\$0	\$1,311,368	\$1,204,699	\$108,659	\$2,924,725	
2010	Initial Site Construction Increase Tipping Fees and Bag Fees to meet system costs	\$200,000	\$4,000,000	\$1,364,216	\$1,253,248	\$111,919	\$6,929,383	
2011	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$65,250	\$1,305,000	\$1,419,194	\$1,303,754	\$115,276	\$4,208,474	
2012	Re-tender Recycling Contract Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$67,208	\$1,344,150	\$1,476,388	\$1,356,295	\$118,734	\$4,362,775	Re-tender Recycling Contract (\$70000)
2013	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$69,224	\$1,384,475	\$1,535,886	\$1,410,954	\$122,296	\$4,522,835	
2014	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$71,300	\$1,426,009	\$1,597,782	\$1,467,815	\$125,965	\$4,688,872	
2015	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$73,439	\$1,468,789	\$1,662,173	\$1,526,968	\$129,744	\$4,861,114	
2016	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$75,643	\$1,512,853	\$1,729,159	\$1,588,505	\$133,637	\$5,039,795	
2017	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$77,912	\$1,558,238	\$1,798,844	\$1,652,522	\$137,646	\$5,225,161	
2018	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$80,249	\$1,604,985	\$1,871,337	\$1,719,118	\$141,775	\$5,417,465	
2019	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$82,657	\$1,653,135	\$1,946,752	\$1,788,399	\$146,028	\$5,616,971	
2020	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$85,136	\$1,702,729	\$2,025,206	\$1,860,471	\$150,409	\$5,823,952	
2021	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$87,691	\$1,753,811	\$2,106,822	\$1,935,448	\$154,921	\$6,038,693	
2022	Re-tender Recycling Contract Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$90,321	\$1,806,425	\$2,191,727	\$2,013,447	\$159,569	\$6,261,489	Re-tender Recycling Contract (\$90000)
2023	Annual Liner Construction Increase Tipping Fees and Bag Fees to meet system costs	\$93,031	\$1,860,618	\$2,280,053	\$2,094,589	\$164,356	\$6,492,647	
2024	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$95,822	\$1,916,436	\$2,371,940	\$2,179,001	\$169,287	\$6,732,485	
2025	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$98,696	\$1,973,930	\$2,467,529	\$2,266,814	\$174,365	\$6,981,335	
2026	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$101,657	\$2,033,147	\$2,566,970	\$2,358,167	\$179,596	\$7,239,538	
2027	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$104,707	\$2,094,142	\$2,670,419	\$2,453,201	\$184,984	\$7,507,453	
TOTALS (2000 to 2027)		\$3,537,529	\$32,498,872	\$46,340,768	\$42,889,945	\$3,299,593	\$128,566,706	
TOTALS (2003 to 2027)		\$3,369,944	\$32,498,872	\$43,325,607	\$39,830,872	\$3,299,593	\$122,324,888	

Notes and Assmptions:  
 Assumed Inflation Rate = 3  
 Assumed Population Growth Rate after 2006 = 1  
 Percentage Increase in fees after 2006 = 1.86  
 Financing Rate = 6



**City of Sault Ste. Marie  
Solid Waste Management Busine  
SPREADSHEET 9 - System 4 Part**

Implementation Plan		Expenditures						
Year	Key Activities	Diversion Material Collection and Processing Costs						
		Engineering	Landfill Diversion	Residential Recyclables Collection & Processing	Residential Organics Collection & Processing	Sewage Sludge Processing	Household Special Waste Program	Re-Use Centre
2000	Initiate Solid Waste Management Plan	\$49,605	\$55,046	\$251,931	\$0	\$0	\$0	\$0
2001	Undertake Solid Waste Management Plan Initiate preparation of Enhanced Recycling RFP Open Household Special Waste Facility Initiate Expanded Public Education Program	\$87,865	\$56,697	\$506,175	\$0	\$0	\$100,000	\$0
2002	Finalize Solid Waste Management Plan Tender and Award Enhanced Recycling Contract Initiate Co-composting Feasibility Study	\$80,115	\$50,871	\$953,690	\$0	\$0	\$125,000	\$0
2003	Finalize Co-composting Feasibility Study Initiate Expanded Leaf and Yard Waste Program/Landfill Ban Expand ban on OCC to Residential Sector Initiate Environmental Assessment for Disposal Increase Tipping Fees and Gate Fees Reduce Bag Limits (two bags) and charge bag fees	\$40,000	\$44,645	\$840,000	\$200,232	\$0	\$128,750	\$0
2004	Finalize Environmental Assessment for Disposal Establish Re-use Centre Increase Tipping Fees	\$0	\$37,999	\$1,027,425	\$206,239	\$0	\$132,613	\$200,000
2005	Environmental Assessment Act Approvals Increase Tipping Fees	\$0	\$30,914	\$1,225,340	\$212,426	\$0	\$136,591	\$100,000
2006	Initiate Environmental Protection Act Requirements for Disposal Increase Tipping Fees	\$0	\$23,604	\$1,435,581	\$218,799	\$0	\$140,689	\$103,000
2007	Finalize Environmental Protection Act Requirements for Disposal Increase Tipping Fees and Bag Fees to meet system costs	\$0	\$24,555	\$1,493,435	\$227,617	\$0	\$144,909	\$106,090
2008	Environmental Protection Act Approvals Increase Tipping Fees and Bag Fees to meet system costs	\$0	\$25,544	\$1,553,620	\$236,789	\$0	\$149,257	\$109,273
2009	Detail Design of Landfill Increase Tipping Fees and Bag Fees to meet system costs	\$0	\$26,574	\$1,616,231	\$246,332	\$0	\$153,734	\$112,551
2010	Initial Site Construction Increase Tipping Fees and Bag Fees to meet system costs	\$0	\$27,645	\$1,681,365	\$256,259	\$0	\$158,346	\$115,927
2011	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$0	\$28,759	\$1,749,124	\$266,586	\$0	\$163,097	\$119,405
2012	Re-tender Recycling Contract Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$70,000	\$29,918	\$1,819,614	\$277,330	\$0	\$167,990	\$122,987
2013	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$0	\$31,123	\$1,892,945	\$288,506	\$0	\$173,029	\$126,677
2014	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$0	\$32,378	\$1,969,230	\$300,133	\$0	\$178,220	\$130,477
2015	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$0	\$33,683	\$2,048,590	\$312,229	\$0	\$183,567	\$134,392
2016	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$0	\$35,040	\$2,131,148	\$324,811	\$0	\$189,074	\$138,423
2017	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$0	\$36,452	\$2,217,034	\$337,901	\$0	\$194,746	\$142,576
2018	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$0	\$37,921	\$2,306,380	\$351,519	\$0	\$200,588	\$146,853
2019	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$0	\$39,449	\$2,399,327	\$365,685	\$0	\$206,606	\$151,259
2020	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$0	\$41,039	\$2,496,020	\$380,422	\$0	\$212,804	\$155,797
2021	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$0	\$42,693	\$2,596,610	\$395,753	\$0	\$219,188	\$160,471
2022	Re-tender Recycling Contract Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$90,000	\$44,414	\$2,701,253	\$411,702	\$0	\$225,764	\$165,285
2023	Annual LIner Construction Increase Tipping Fees and Bag Fees to meet system costs	\$0	\$46,203	\$2,810,114	\$428,293	\$0	\$232,537	\$170,243
2024	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$0	\$48,065	\$2,923,361	\$445,554	\$0	\$239,513	\$175,351
2025	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$0	\$50,002	\$3,041,173	\$463,509	\$0	\$246,698	\$180,611
2026	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$0	\$52,018	\$3,163,732	\$482,189	\$0	\$254,099	\$186,029
2027	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$0	\$54,114	\$3,291,230	\$501,621	\$0	\$261,722	\$191,610
TOTALS (2000 to 2027)		\$417,585	\$1,087,365	\$54,141,679	\$8,138,436	\$0	\$4,919,130	\$3,445,288
TOTALS (2003 to 2027)		\$200,000	\$924,751	\$52,429,883	\$8,138,436	\$0	\$4,694,130	\$3,445,288

Notes and Assmptions:

Assumed Inflation Rate = 3  
 Assumed Population Growth Rate after 2006 = 1  
 Percentage Increase in fees after 2006 = 1.9  
 Financing Rate = 6  
 Interest Rate = 4



**City of Sault Ste. Marie  
Solid Waste Management Busine  
SPREADSHEET 9 - System 4 Part**

Implementation Plan		General					Waste Coll	
Year	Key Activities	Total Diversion Costs	Financing Costs	Additional Administrative Costs	Total General Costs	TOTAL EXPENDITURES	Bag Fees	Gate Fees
2000	Initiate Solid Waste Management Plan	\$356,582	\$0	\$0	\$0	\$2,380,234	\$0	\$114,480
2001	Undertake Solid Waste Management Plan Initiate preparation of Enhanced Recycling RFP Open Household Special Waste Facility Initiate Expanded Public Education Program	\$750,737	\$0	\$0	\$0	\$2,855,075	\$0	\$113,579
2002	Finalize Solid Waste Management Plan Tender and Award Enhanced Recycling Contract Initiate Co-composting Feasibility Study	\$1,209,676	\$0	\$0	\$0	\$3,323,505	\$0	\$112,399
2003	Finalize Co-composting Feasibility Study Initiate Expanded Leaf and Yard Waste Program/Landfill Ban Expand ban on OCC to Residential Sector Initiate Environmental Assessment for Disposal Increase Tipping Fees and Gate Fees Reduce Bag Limits (two bags) and charge bag fees	\$1,253,627	\$0	\$103,000	\$103,000	\$3,808,887	\$1,239,865	\$212,670
2004	Finalize Environmental Assessment for Disposal Establish Re-use Centre Increase Tipping Fees	\$1,604,275	\$0	\$106,090	\$106,090	\$4,222,756	\$1,207,077	\$207,947
2005	Environmental Assessment Act Approvals Increase Tipping Fees	\$1,705,271	\$0	\$109,273	\$109,273	\$4,263,925	\$1,166,732	\$202,135
2006	Initiate Environmental Protection Act Requirements for Disposal Increase Tipping Fees	\$1,921,672	\$0	\$112,551	\$112,551	\$4,668,501	\$1,138,450	\$308,219
2007	Finalize Environmental Protection Act Requirements for Disposal Increase Tipping Fees and Bag Fees to meet system costs	\$1,996,606	\$0	\$115,927	\$115,927	\$4,839,858	\$1,171,267	\$317,104
2008	Environmental Protection Act Approvals Increase Tipping Fees and Bag Fees to meet system costs	\$2,074,483	\$0	\$119,405	\$119,405	\$4,867,980	\$1,205,031	\$326,245
2009	Detail Design of Landfill Increase Tipping Fees and Bag Fees to meet system costs	\$2,155,422	\$0	\$122,987	\$122,987	\$5,203,135	\$1,239,767	\$335,650
2010	Initial Site Construction Increase Tipping Fees and Bag Fees to meet system costs	\$2,239,543	\$0	\$126,677	\$126,677	\$9,295,603	\$1,275,505	\$345,325
2011	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$2,326,972	\$0	\$130,477	\$130,477	\$6,665,923	\$1,312,274	\$355,280
2012	Re-tender Recycling Contract Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$2,487,839	\$0	\$134,392	\$134,392	\$6,985,005	\$1,350,102	\$365,521
2013	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$2,512,281	\$0	\$138,423	\$138,423	\$7,173,539	\$1,389,020	\$376,058
2014	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$2,610,439	\$0	\$142,576	\$142,576	\$7,441,887	\$1,429,061	\$386,898
2015	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$2,712,460	\$0	\$146,853	\$146,853	\$7,720,427	\$1,470,255	\$398,051
2016	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$2,818,497	\$0	\$151,259	\$151,259	\$8,009,551	\$1,512,638	\$409,525
2017	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$2,928,709	\$0	\$155,797	\$155,797	\$8,309,667	\$1,556,241	\$421,331
2018	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$3,043,262	\$0	\$160,471	\$160,471	\$8,621,197	\$1,601,102	\$433,476
2019	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$3,162,326	\$0	\$165,285	\$165,285	\$8,944,582	\$1,647,256	\$445,972
2020	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$3,286,082	\$0	\$170,243	\$170,243	\$9,280,277	\$1,694,741	\$458,827
2021	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$3,414,715	\$0	\$175,351	\$175,351	\$9,628,758	\$1,743,594	\$472,054
2022	Re-tender Recycling Contract Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$3,638,417	\$0	\$180,611	\$180,611	\$10,080,517	\$1,793,856	\$485,661
2023	Annual Liner Construction Increase Tipping Fees and Bag Fees to meet system costs	\$3,687,391	\$0	\$186,029	\$186,029	\$10,366,067	\$1,845,566	\$499,661
2024	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$3,831,844	\$0	\$191,610	\$191,610	\$10,755,939	\$1,898,767	\$514,065
2025	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$3,981,994	\$0	\$197,359	\$197,359	\$11,160,687	\$1,953,502	\$528,883
2026	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$4,138,067	\$0	\$203,279	\$203,279	\$11,580,885	\$2,009,814	\$544,129
2027	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$4,300,298	\$0	\$209,378	\$209,378	\$12,017,129	\$2,067,750	\$559,814
TOTALS (2000 to 2027)		\$72,149,485	\$0	\$3,755,304	\$3,755,304	\$204,471,495	\$37,919,232	\$10,250,959
TOTALS (2003 to 2027)		\$69,832,489	\$0	\$3,755,304	\$3,755,304	\$195,912,681	\$37,919,232	\$9,910,501

Notes and Assmptions:

Assumed Inflation Rate = 3  
 Assumed Population Growth Rate after 2006 = 1  
 Percentage Increase in fees after 2006 = 1.9  
 Financing Rate = 6  
 Interest Rate = 4



**City of Sault Ste. Marie  
Solid Waste Management Busine  
SPREADSHEET 9 - System 4 Part**

Implementation Plan		Estimated Revenues						
Year	Key Activities	Collection and Disposal Revenues			Diversion Revenues			
		Sewage Sludge Tipping Fee	Landfill Tipping Fees	Total Waste Collection and Disposal Revenues	Residential Recycling (Sale of Materials)	Diversion Subsidies	Sewage Sludge Processing Fee	Total Diversion Revenues
2000	Initiate Solid Waste Management Plan	\$0	\$1,017,363	\$1,131,843	\$0	\$30,000	\$0	\$30,000
2001	Undertake Solid Waste Management Plan Initiate preparation of Enhanced Recycling RFP Open Household Special Waste Facility Initiate Expanded Public Education Program	\$0	\$1,009,354	\$1,122,933	\$0	\$30,000	\$0	\$30,000
2002	Finalize Solid Waste Management Plan Tender and Award Enhanced Recycling Contract Initiate Co-composting Feasibility Study	\$0	\$998,873	\$1,111,272	\$39,438	\$90,000	\$0	\$129,438
2003	Finalize Co-composting Feasibility Study Initiate Expanded Leaf and Yard Waste Program/Landfill Ban Expand ban on OCC to Residential Sector Initiate Environmental Assessment for Disposal Increase Tipping Fees and Gate Fees Reduce Bag Limits (two bags) and charge bag fees	\$365,359	\$1,374,513	\$3,192,407	\$173,040	\$70,000	\$0	\$243,040
2004	Finalize Environmental Assessment for Disposal Establish Re-use Centre Increase Tipping Fees	\$365,359	\$1,343,988	\$3,124,371	\$211,650	\$30,000	\$0	\$241,650
2005	Environmental Assessment Act Approvals Increase Tipping Fees	\$502,369	\$1,796,340	\$3,667,577	\$252,420	\$30,000	\$0	\$282,420
2006	Initiate Environmental Protection Act Requirements for Disposal Increase Tipping Fees	\$788,709	\$2,158,069	\$4,393,447	\$295,730	\$30,000	\$0	\$325,730
2007	Finalize Environmental Protection Act Requirements for Disposal Increase Tipping Fees and Bag Fees to meet system costs	\$811,445	\$2,220,279	\$4,520,095	\$307,648	\$30,000	\$0	\$337,648
2008	Environmental Protection Act Approvals Increase Tipping Fees and Bag Fees to meet system costs	\$834,836	\$2,284,281	\$4,650,393	\$320,046	\$30,000	\$0	\$350,046
2009	Detail Design of Landfill Increase Tipping Fees and Bag Fees to meet system costs	\$858,901	\$2,350,129	\$4,784,447	\$332,944	\$30,000	\$0	\$362,944
2010	Initial Site Construction Increase Tipping Fees and Bag Fees to meet system costs	\$883,660	\$2,417,875	\$4,922,365	\$346,361	\$30,000	\$0	\$376,361
2011	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$909,133	\$2,487,573	\$5,064,259	\$360,320	\$30,000	\$0	\$390,320
2012	Re-tender Recycling Contract Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$935,340	\$2,559,281	\$5,210,243	\$374,841	\$30,000	\$0	\$404,841
2013	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$962,302	\$2,633,056	\$5,360,436	\$389,947	\$30,000	\$0	\$419,947
2014	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$990,042	\$2,708,957	\$5,514,958	\$405,661	\$30,000	\$0	\$435,661
2015	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$1,018,581	\$2,787,047	\$5,673,934	\$422,010	\$30,000	\$0	\$452,010
2016	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$1,047,943	\$2,867,387	\$5,837,494	\$439,017	\$30,000	\$0	\$469,017
2017	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$1,078,152	\$2,950,044	\$6,005,768	\$456,709	\$30,000	\$0	\$486,709
2018	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$1,109,231	\$3,035,083	\$6,178,892	\$475,114	\$30,000	\$0	\$505,114
2019	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$1,141,206	\$3,122,573	\$6,357,007	\$494,261	\$30,000	\$0	\$524,261
2020	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$1,174,103	\$3,212,586	\$6,540,257	\$514,180	\$30,000	\$0	\$544,180
2021	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$1,207,948	\$3,305,193	\$6,728,789	\$534,902	\$30,000	\$0	\$564,902
2022	Re-tender Recycling Contract Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$1,242,769	\$3,400,470	\$6,922,756	\$556,458	\$30,000	\$0	\$586,458
2023	Annual Liner Construction Increase Tipping Fees and Bag Fees to meet system costs	\$1,278,593	\$3,498,493	\$7,122,314	\$578,883	\$30,000	\$0	\$608,883
2024	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$1,315,451	\$3,599,342	\$7,327,625	\$602,212	\$30,000	\$0	\$632,212
2025	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$1,353,370	\$3,703,099	\$7,538,854	\$626,482	\$30,000	\$0	\$656,482
2026	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$1,392,383	\$3,809,846	\$7,756,172	\$651,729	\$30,000	\$0	\$681,729
2027	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$1,432,521	\$3,919,670	\$7,979,754	\$677,993	\$30,000	\$0	\$707,993
TOTALS (2000 to 2027)		\$24,999,706	\$72,570,764	\$145,740,661	\$10,839,994	\$940,000	\$0	\$11,779,994
TOTALS (2003 to 2027)		\$24,999,706	\$69,545,174	\$142,374,613	\$10,800,556	\$790,000	\$0	\$11,590,556

Notes and Assmptions:

Assumed Inflation Rate = 3  
 Assumed Population Growth Rate after 2006 = 1  
 Percentage Increase in fees after 2006 = 1.86  
 Financing Rate = 6



**City of Sault Ste. Marie  
Solid Waste Management Busine  
SPREADSHEET 9 - System 4 Part**

Date Revised: March 25/03

Implementation Plan		General			Reserves		
Year	Key Activities	General Levy	Interest	Total General Revenues	TOTAL REVENUES	Annual Reserve (Revenues minus Expenditures)	CUMMULATIVE RESERVE
2000	Initiate Solid Waste Management Plan	\$1,571,705	\$0	\$1,571,705	\$2,733,548	\$353,314	\$2,451,850
2001	Undertake Solid Waste Management Plan Initiate preparation of Enhanced Recycling RFP Open Household Special Waste Facility Initiate Expanded Public Education Program	\$2,011,854	\$98,074	\$2,109,928	\$3,262,861	\$407,786	\$2,733,453
2002	Finalize Solid Waste Management Plan Tender and Award Enhanced Recycling Contract Initiate Co-composting Feasibility Study	\$2,072,210	\$109,338	\$2,181,548	\$3,422,258	\$98,753	\$2,832,206
2003	Finalize Co-composting Feasibility Study Initiate Expanded Leaf and Yard Waste Program/Landfill Ban Expand ban on OCC to Residential Sector Initiate Environmental Assessment for Disposal Increase Tipping Fees and Gate Fees Reduce Bag Limits (two bags) and charge bag fees	\$2,134,376	\$113,288	\$2,247,664	\$5,683,111	\$1,874,224	\$4,706,430
2004	Finalize Environmental Assessment for Disposal Establish Re-use Centre Increase Tipping Fees	\$2,198,407	\$188,257	\$2,386,664	\$5,752,685	\$1,529,929	\$6,236,359
2005	Environmental Assessment Act Approvals Increase Tipping Fees	\$2,264,359	\$249,454	\$2,513,814	\$6,463,811	\$2,199,886	\$8,436,245
2006	Initiate Environmental Protection Act Requirements for Disposal Increase Tipping Fees	\$2,332,290	\$337,450	\$2,669,740	\$7,388,917	\$2,720,416	\$11,156,661
2007	Finalize Environmental Protection Act Requirements for Disposal Increase Tipping Fees and Bag Fees to meet system costs	\$2,402,259	\$446,266	\$2,848,525	\$7,706,267	\$2,866,410	\$14,023,071
2008	Environmental Protection Act Approvals Increase Tipping Fees and Bag Fees to meet system costs	\$2,474,327	\$560,923	\$3,035,249	\$8,035,688	\$3,167,708	\$17,190,779
2009	Detail Design of Landfill Increase Tipping Fees and Bag Fees to meet system costs	\$2,548,556	\$687,631	\$3,236,188	\$8,383,578	\$3,180,443	\$20,371,222
2010	Initial Site Construction Increase Tipping Fees and Bag Fees to meet system costs	\$2,625,013	\$814,849	\$3,439,862	\$8,738,588	-\$557,014	\$19,814,208
2011	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$2,703,764	\$792,568	\$3,496,332	\$8,950,911	\$2,284,988	\$22,099,195
2012	Re-tender Recycling Contract Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$2,784,876	\$883,968	\$3,668,844	\$9,283,928	\$2,298,923	\$24,398,118
2013	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$2,868,423	\$975,925	\$3,844,347	\$9,624,730	\$2,451,192	\$26,849,310
2014	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$2,954,475	\$1,073,972	\$4,028,448	\$9,979,067	\$2,537,181	\$29,386,491
2015	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$3,043,110	\$1,175,460	\$4,218,569	\$10,344,513	\$2,624,087	\$32,010,577
2016	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$3,134,403	\$1,280,423	\$4,414,826	\$10,721,336	\$2,711,785	\$34,722,362
2017	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$3,228,435	\$1,388,894	\$4,617,330	\$11,109,806	\$2,800,139	\$37,522,501
2018	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$3,325,288	\$1,500,900	\$4,826,188	\$11,510,195	\$2,888,997	\$40,411,499
2019	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$3,425,047	\$1,616,460	\$5,041,507	\$11,922,776	\$2,978,194	\$43,389,692
2020	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$3,527,798	\$1,735,588	\$5,263,386	\$12,347,823	\$3,067,546	\$46,457,238
2021	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$3,633,632	\$1,858,290	\$5,491,922	\$12,785,612	\$3,156,854	\$49,614,092
2022	Re-tender Recycling Contract Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$3,742,641	\$1,984,564	\$5,727,205	\$13,236,419	\$3,155,901	\$52,769,994
2023	Annual Liner Construction Increase Tipping Fees and Bag Fees to meet system costs	\$3,854,920	\$2,110,800	\$5,965,720	\$13,696,917	\$3,330,850	\$56,100,844
2024	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$3,970,568	\$2,244,034	\$6,214,602	\$14,174,439	\$3,418,499	\$59,519,343
2025	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$4,089,685	\$2,380,774	\$6,470,459	\$14,665,794	\$3,505,107	\$63,024,450
2026	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$4,212,376	\$2,520,978	\$6,733,354	\$15,171,254	\$3,590,369	\$66,614,820
2027	Annual Construction Increase Tipping Fees and Bag Fees to meet system costs	\$4,338,747	\$2,664,593	\$7,003,340	\$15,691,087	\$3,673,958	\$70,288,778
TOTALS (2000 to 2027)		\$83,473,544	\$31,793,720	\$115,267,265	\$272,787,920	\$68,316,425	
TOTALS (2003 to 2027)		\$77,817,775	\$31,586,308	\$109,404,084	\$263,369,253	\$67,456,572	

Notes and Assmptions:

Assumed Inflation Rate = 3  
 Assumed Population Growth Rate after 2006 = 1  
 Percentage Increase in fees after 2006 = 1.86  
 Financing Rate = 6  
 Interest Rate = 4