

**City of Yellowknife
Solid Waste Management
Implementation Strategy for:
Single Family Units
Multi -Family Units
Commercial Units
Tipping Fees**

Report –FINAL
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Submitted by

Dillon Consulting Limited

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EXECUTIVE SUMMARY

This report has been initiated as one of the steps that the City has prioritized from the community waste management strategic plan adopted in August 2001. This report has been revised to include an evaluation of the implementation strategy for single family units (SFU), multi family units (MFU), commercial units both smaller (COMM1) and larger (COMM2) and tipping fee structures under a user pay system.

City of Yellowknife - Waste Management System Expenditures

	Expenditures 2005 Budget ⁽¹⁾
Collection	\$611,000
Waste Processing	\$522,000
Recycling	\$284,000
Closure	\$ 88,000
Reserve Fund	\$119,000
Admin Fee to General Fund	\$162,000
TOTAL	\$1,786,000

⁽¹⁾ From the City's Solid Waste Management Fund as per 2005 Budget

An evaluation of waste generation for the City of Yellowknife along with revenue generated from the solid waste system has been completed from the information available. The table below shows that the solid waste program is currently running at an estimated annual deficit of \$143,000/year based on current budgeted expenditures. An allocation from formula funding has been used to offset costs and balance the annual budget. The formula funding is planned to be phased out in 2007.

Revenue Ratification

Type	Annual tonnage	Revenue ⁽¹⁾	Costs	Net
SFU	2,280	\$570,768	\$261,155	\$309,613
MFU & COMM1	5,702	\$627,132	\$653,116	-\$25,984
COMM2 ⁽²⁾	2,320	\$124,872	\$265,736	-\$140,864
Tipping Fees ⁽³⁾	5,291	\$320,000 ⁽⁴⁾	\$605,993	-\$285,993
TOTAL	15,593	\$1,642,772	\$1,786,000	-\$143,228

⁽¹⁾ Based on \$11/month waste levy effective March 1, 2005(10% increase). Revenue calculated as 2004 + 10%

⁽²⁾ COMM revenue from City records

⁽³⁾ As described in Section 2.2.2 Other Wastes, includes revenue from the sale of recyclables

⁽⁴⁾ Estimated revenue based on new tipping fees effective July 1, 2005, based on information from G Kehoe, Director of Public Works

This information was used to develop strategies for each area of the solid waste stream as summarized in the recommendations below.

Validation of Assumptions

Successful implementation of any changes to the waste system are dependent on a good understanding of the current conditions. It is recommended that the City continue to monitor and track waste tonnages at the landfill, along with the completion of a landfill capacity survey, waste generation study and recycling program study as an initial step towards implementation of the user pay system.

Tipping Fees

This study has revealed that the current tipping fee structure at the landfill does not cover the estimated expenditures for the solid waste program. Tipping fees should be adjusted in accordance with the estimated cost of \$75/tonne for the current operation of the landfill to process and dispose of waste. An initial tipping fee of \$65/tonne is recommended to reduce rate shock. A tipping fee increase was approved by council to be implemented on July 1, 2005. Appropriate tipping fees are necessary to balance the financial model being used along with deterring users from circumventing the user pay collection system by hauling their own waste to the landfill. Appropriate tipping fees also promote waste diversion and convey the message that there is a cost associated with the disposal of all waste materials regardless of their source. For these reasons, there should be disposal charges associated with all wastes, and a charge for residential waste drop off should be implemented at the landfill. The system described in this report cannot be successfully implemented without the recommended tipping fees.

Single Family Units (SFU)

A user pay system for the collection of single family unit waste has been selected by the City for implementation. The information was evaluated to develop the recommended implementation strategy summarized in the table below:

Implementation Phases		Levy/ Revenue		Estimated Tag Fee/Revenue		Total Revenue
Current	\$11/SFU/month waste levy ⁽¹⁾	\$11.00	\$570,768			\$570,768
Phase 1	3 bag limit, tags	\$11.00	\$570,768	\$1.00	\$22,485	\$593,253
Phase 2	1 bag limit, tags	\$8.00	\$415,104	\$2.00	\$179,878	\$594,982

⁽¹⁾ \$11/month solid waste levy effective March 1, 2005

This strategy incorporates a two tiered system with continued revenue from the levy supplemented by revenue from tags sold for the collection of bags in excess of the stipulated bag limit. The waste levy was increased by council to \$11/SFU/month effective March 1, 2005. This system helps initially to recover some of the costs of the overall waste system. The introduction of the 3 bag limit will have

limited financial impact on most users. A tipping fee structure at the landfill, including a fee per vehicle, must be implemented along with the user pay system.

An annual evaluation of the program is recommended. Once the solid waste fund has built up a reserve, as set out by council, the feasibility of the next phase of implementation should be evaluated.

Phase 2, as described above, is based on estimated future revenues and expenditures. The phase 2 system must be evaluated and designed based on actual conditions and data available at the time and may in fact be different than that proposed in order to satisfy public opinion, and balance budgets. Phase 2 will be established to be revenue neutral without formula funding revenue. A reduction of the bag limit to 1 bag per SFU per week bag limit, with tags at \$2.00 accompanied by reduced levy of \$8/SFU/month is assumed at this time as the preferred option for phase 2 of the user pay program. It is important that the implementation of the 1 bag limit be done concurrent with the implementation of increased recycling activities and increased tipping fees. This transition offers the user the option of either paying more for the collection of more than one bag per week or additional incentive to utilize the three R's to limit waste collection to one bag per week. The \$8 levy provides the city with a sustained revenue from all SFU's plus additional revenue from tag sales. As part of the annual evaluation of the user pay system, it may be determined that an intermediate implementation step is required prior to phase 2 implementation.

Multi Family Units (MFU)

For MFU units, it is recommended that the monthly levy be dropped and replaced with a user pay subscription service based on bin size and collection frequency suited to their waste generation. Under this system, a bin of an appropriate size and collection frequency based on the waste generation will be designated for each building (some buildings may agree to continue to share bins). As under the current waste levy system, the fees for waste collection and disposal are collected from the building owner then passed along to tenants through their rent. This system of cost distribution would continue, but the costs for each MFU would better reflect the waste generation of that building.

Commercial Waste Units (COMM)

Commercial wastes are collected in two discrete manners and are therefore separated as COMM1 and COMM2. Smaller commercial units (COMM1) are collected concurrently with MFU's using overhead style bins, while larger commercial units (COMM2) are collected individually with roll off style bins. Both types of commercial users are charged a waste levy of \$11/1,000 ft² of building footprint.

The revenue ratification table on page 1 shows that revenue recovered from commercial waste units under the existing system is not sufficient to cover expenditures. Through implementation of the user pay system and in particular through increases to commercial tipping fees, this sector will gradually be brought to a revenue neutral condition.

COMM1

It is recommended that the same system described above for MFU's be applied to COMM1 users. COMM1 users would have bin size and collection frequency suited to their waste generation needs. They would be charged a rate based on this level of service. MFU and COMM1 wastes being collected by the same hauler could continue to be collected concurrently in the same loads. The appropriate tipping fee of \$65/tonne would be applied to wastes at the landfill.

COMM2

COMM2 users are defined as users generating more than 18.2 m³/day of waste. These users have large 30yd³ roll off style bins, most with internal compactors, which are collected using an automated flat bed style truck. A bin from a single COMM2 user is collected by a hauler then dumped at the landfill and the empty bin is returned to the user.

There are currently 17 COMM2 users showing large inequities in the amount of waste generated and the fee charged under the current structure. An evaluation of the current waste levy system shows that the revenue for COMM2 users equates to a range from \$10 to \$220/tonne. It is recommended that the monthly levy be dropped and be replaced with a direct cost by tonnage user pay system. Each COMM2 user would have a roll off bin with a collection schedule based on their waste generation. Because each bin is collected independently and hauled directly to the landfill, the user can be charged a flat rate for collection plus a bin rental fee (unless they own their own bin) and a \$65/tonne tipping fee based on scale weights from the landfill.

A minimum tipping fee for commercial waste of \$65/tonne is required as the initial implementation step. It is estimated that the current cost to the City for the processing and disposal of waste is \$75 per tonne. Following an evaluation of the system after implementation, further tipping fee adjustments are recommended to achieve a revenue neutral system.

Recycling

It is expected that the user pay system will promote increased recycling potential throughout the system. In particular, it is anticipated that the tipping fee structure can provide financial incentive for large commercial businesses to separate recyclables, (example - cardboard). An initial tipping fee rate of \$30/tonne is recommended for recyclable cardboard. This fee will help cover some of the costs associated with recycling yet provide a cost saving opportunity versus the \$65 tipping fee for commercial waste.

In anticipation of greater household recycling, the City has added additional recycling bins at the existing depots to expand the range of materials received and better service users. As stated above, a study of the recycling system and expansion opportunities is recommended. The goal of waste reduction and diversion is only possible if a successful recycling program is in place. Before a user

pay system and other initiatives to promote recycling are initiated, it is essential to understand the impacts that increased recycling will have on the financial model.

Waste Collection

The current waste collection contract is set to expire on January 1, 2006. This presents an opportunity for the City to negotiate and structure the waste collection system to suit the user pay system and incorporate efficiencies for the City's operations. As a result of consultation with commercial waste haulers, it has been identified that due to the size of the City it will be most efficient to include all of the City's waste collection operations under one tender package.

The collection of SFU waste will be structured similar to the current system. The tender will solicit a collection rate per house. New SFU accounts can be added and deleted based on this unit rate. For MFU, COMM1 and COMM2 users, the rate structure identified above will incorporate a landfill tipping fee set by the City plus the tendered price for waste collection and bin rental (where required) including an administrative fee. The successful hauler would be responsible for administering the system based on the tendered unit price. The waste hauler will collect revenues based on a fee schedule and pay the City for waste disposal based on the set tipping fees. The revenue ratification below does not include the waste collection figures. This expense will be handled by the successful bidder in administering the contract. The City will simply collect tipping fees for the disposal of wastes.

A summary of the impacts of the proposed system is provided on the following page.

Summary of how the new collection system would affect various sectors

Sector	Impacts on User	Impacts on the City	Impacts on the Waste Hauler
SFU	<ul style="list-style-type: none"> - Monthly waste levy of \$11/month - \$1 per bag above 3 bag limit - <i>Similar to existing except for cost of tags for bags in excess of specified bag limit.</i> 	<ul style="list-style-type: none"> - Administer waste levy as existing - Distribute bag tags - Public tender of waste hauling contract - Administer waste collection contract - hauling contract to include flexibility through a unit price rate per house collection 	<ul style="list-style-type: none"> - Provide waste collection service to each household once per week. - Pay structure based on a per house per month unit price
MFU & COMM1	<ul style="list-style-type: none"> - Eliminate monthly levy - Bin size and collection frequency system with size and amount of collections to be adjusted over time to suit each user - <i>some will see cost savings, some will see an increase for existing system depending on waste generation</i> 	<ul style="list-style-type: none"> - Eliminate the administration of the monthly waste levy - Public tender of waste hauling contract - Bin size and collection frequency system to be administered by the waste hauler - hauling contract to include flexibility through a variety of unit price rates for bins size and collection frequency including collection, disposal, bin rental (where required) and administration - City collects tipping fees from the waste hauler for waste disposal 	<ul style="list-style-type: none"> - Collect waste from MFU and COMM1 users based on established bin size and frequency schedule. - Administer contract including invoicing and collection of revenue. - Pay the City monthly for waste disposal services based on initial tipping fee of \$65/tonne.
COMM2	<ul style="list-style-type: none"> - Eliminate monthly levy - Fee charged to each user based on tendered rate per pick up plus tonnage rate for disposal. Collection frequency to be adjusted over time to suit each user - <i>some will see cost savings, some will see an increase depending on waste generation</i> 	<ul style="list-style-type: none"> - Eliminate the administration of the monthly waste levy - Public tender of waste hauling contract - Cost per tonnage and collection frequency system to be administered by the waste hauler - hauling contract to include flexibility through a unit price rate for scheduled collection including bin rental (where required) and administration plus tipping fees. - City collects tipping fees for waste disposal 	<ul style="list-style-type: none"> - Collect waste from COMM2 users based on scheduled frequency - Administer contract including invoicing and collection of revenue. - Pay the City monthly for waste disposal services based on initial tipping fee of \$65/tonne.

Summary

Implementation of the recommended systems should begin immediately. Some of the changes discussed are dependent on the timing and the City's ability to alter the existing systems and contracts. The implementation time line is tight and should proceed as soon as possible.

The proposed first stage of the user pay system is summarized below. As further stages are implemented in particular increases to the tipping fees, and as the system is refined full recovery of the system costs will be achieved.

City of Yellowknife - Proposed User Pay Waste Management System Expenditures

	Expenditures 2005 Budget ⁽¹⁾	Expenditures User Pay System (2006)
Waste Processing	\$522,000	\$513,000 ⁽²⁾
User Pay Implementation ⁽³⁾		\$85,000
Recycling	\$284,000	\$293,000
Closure	\$ 88,000	\$ 88,000
Reserve Fund	\$119,000	\$119,000
Admin Fee to General Fund ⁽⁴⁾	\$162,000	\$138,000
Sub-Total	\$1,175,000	\$1,236,000
Collection ⁽⁵⁾	\$611,000	\$285,000
TOTAL	\$1,786,000	\$1,521,000

⁽¹⁾ From the City's Solid Waste Management Fund as per 2005 Budget

⁽²⁾ Savings shown in waste processing cost due to reduced tonnages through recycling

⁽³⁾ Estimated implementation cost of user pay system.

⁽⁴⁾ Based on administration fee charged by the General Fund of 10% of revenue as per current policy

⁽⁵⁾ Allocation for collection of SFU waste only under user pay system

The expenditure summary table above shows that the sub-total expenditures (excluding the tendered SFU collection total) under the initial phase of the User Pay system will increase from existing expenditures with the addition of user pay implementation costs such as purchase of tags, education and enforcement. This will be counter balanced with additional revenue, savings through reduced waste generation resulting in prolonged landfill life, and anticipated efficiencies of landfill operations by adjusting the terms of the waste collection contract. The revenue and expenditures shown in the User Pay System Summary table below include an estimate of the tendered cost for collection of SFU wastes only, the MFU and COMM collection will be administered by the waste hauler through the tendered rate for bin collection.

User Pay System Summary

Fee System	Recommended System	Proposed system	
		Collection	Disposal
 SFU (up to 4 units)	2 tiered tag-a-bag	\$11/SFU/month waste levy ⁽¹⁾ 3 Bag limit Extra bags at \$1.00/tag Collection through tendered hauling contract	
 MFU	Bin Size and Collection Frequency	No levy	
 COMM1	Bin Size and Collection Frequency	Tendered Hauling Contract	Tipping Fee \$65
 COMM2	Direct Cost by Tonnage at the landfill plus fee per pickup	No levy	
 Cardboard Recycling	Direct Cost by Tonnage at the landfill plus fee per pickup	Tendered Hauling Contract	Tipping Fee \$30
 Tipping fees	Direct Cost by Tonnage at the landfill	Private users	Tipping fees vary - Initially approx \$65/t
 Revenue from Recycling	Recycling depots	Private Hauler	Tipping fees vary

⁽¹⁾ Based on \$11/month waste levy effective March 1, 2005(10% increase).

User Pay System Summary

	Revenue	Expenditures	Net Cost
2004 - \$10 Levy for SFU, MFU, COMM	\$1,403,000	\$1,657,000	-\$254,000 balanced through funding
2005 - \$11 Levy for SFU, MFU, COMM (March 1, 2005) - Increased Tipping Fees (July 1, 2005)	\$1,652,000	\$1,785,000	-\$133,000 balanced through formula funding
2006 <i>User Pay System Implementation – Phase 1</i> - \$11 Levy for SFU, 3 bag limit, \$1 tags - MFU and COMM, bin size and collection frequency, \$65/t tipping fees, \$30/t for cardboard	\$1,423,000	\$1,521,000	-\$98,000 balanced through formula funding
Future – no formula funding <i>Future Expenditures</i> - Contaminated Soil Treatment <i>User Pay System Implementation – Phase 2</i> - \$8 Levy for SFU, 1 bag limit, \$2.00 tags - MFU and COMM, bin size and collection frequency, \$80/t tipping fees, \$50/t for cardboard	\$1,604,000	\$1,590,000	\$14,000

The table above shows the gradual shift of the Solid Waste system from a dependency on formula funding to balance annual budgets to a revenue neutral condition without formula funding. Implementation of the first phase of the user pay system is intended to bring revenue and expenditures closer together while promoting waste diversion. The system will be re-evaluated on a regular basis to make adjustments as necessary to build towards a revenue neutral system. The assumption of future rates will depend on the actual revenues and expenditures of the solid waste system. As future initiatives are implemented, the second phase of the user pay system will be initiated to recover the costs required for a revenue neutral system (without formula funding) and decreased burden on low waste producers.

1 INTRODUCTION

1.1 Background

The City of Yellowknife (City) adopted a Community Solid Waste Management Strategic Plan (Plan) in 2001. The goal of the Plan is:

“to reduce waste generation and make efficient use of the resources produced by consumption”.

The Plan outlined many community waste management objectives that focused on waste streams, landfill operation and public awareness. The objectives were categorized into ten waste management scenarios that fall within the anticipated City budget and ideally reduce the waste stream by approximately 40% in the first ten years.

1.2 Scope of Work

The City has identified that one of the initial steps toward waste reduction is the development of a user-pay system. This is one of several steps the City has prioritized from the Plan. The City retained Dillon Consulting Limited (Dillon) to develop an implementation strategy for a Single Family Unit (SFU), Multi-Family Unit (MFU), commercial waste streams and tipping fees. The scope of the work included the development of the actual costs associated with the types of users, the development of an implementation strategy to shift from the existing flat fee system to a user-pay fee system. The overall steps required for implementing the strategy and the expected impacts of the strategy is to be discussed.

The City’s general philosophy toward the user pay system is that the system is intended to be fair to all system users. The monies collected on the waste levies should approximately equal the expenditures the City incurs in the collection and disposal of the waste (including site closure and liability issues).

1.3 Version Tracking

This document was originally submitted to the City as a draft on May 23, 2003. The original submission was based on the best information available at the time. Since then, additional data has been obtained, some initiatives have been implemented and the results and recommendations of this report have evolved. This document has been updated as summarized below in **Table 1.1**.

Table 1.1: Summary of Additional Data

May 23, 2003	Draft Report	SFU Implementation Plan only
November 26, 2003	Final Report	<ul style="list-style-type: none"> - Added MFU, COMM and Tipping Fee Implementation Plans - Clarification of COMM waste generators
March 31, 2004	Rev 3	<ul style="list-style-type: none"> - Implemented comments from meeting with the City Jan 23, 2004
July, 2004	Rev 4	<ul style="list-style-type: none"> - Updated waste generation estimates based on landfill weigh scale data - Added executive summary
July 30, 2004	Rev 5	<ul style="list-style-type: none"> - Calibrated waste generation estimates based on landfill weigh scale data and updated text - Updated text based on meeting with City of Yellowknife staff July 8, 2004
February 22, 2005	Rev 6	<ul style="list-style-type: none"> - Updated waste generation estimates based on 2004 scale data - Updated expenditures based on approved 2005 budget - Updated SFU strategy based on proposed increase to the waste levy to \$11 - Updated MFU and COMM strategy based on additional information
June 22, 2005	Rev 7	<ul style="list-style-type: none"> - Incorporated information from solicitation of public feedback - Modified recommendation to City administered collection for all sectors based on feedback from waste haulers

2 CURRENT SYSTEM

2.1 Garbage Collection

2.1.1 Single Family Unit (SFU)



The City contracts Kavanaugh Bros. Waste Removal Services (Kavanaugh) to pick up SFU garbage from each residence once per week. The City initiated a solid waste levy and fee collection system in the early 1990's. The solid waste levy was originally set at \$10/month and remained unchanged until it was raised to \$11/month effective March 1, 2005. Each SFU household is charged \$11 per month, which is included in the monthly utility bill. On this system, there is no limit to the amount of garbage collected at each household. Therefore, large garbage producers pay the same as low garbage producers. This system does not promote waste reduction, but does provide constant revenue for the City.

2.1.2 Multi-Family Unit (MFU)



The City also contracts Kavanaugh to collect garbage from each MFU three times a week (Monday, Wednesday, and Friday). MFU households include apartments, duplexes (more than two units) and condo units. MFUs typically produce less waste than SFUs per unit due to the lower number of residents per household, and because the apartment dwellers do not produce yard (lawn) waste. Owners of MFU's are charged a \$11 monthly fee based on the number of Equivalent Residential Units (ERU's) within their buildings. For example, a 10 ERU complex would pay \$110 per month.

The current collection method for MFU's involves the use of overhead style compaction trucks. These trucks collect several building containers per load both from MFU's and from small commercial units prior to returning to the landfill. The City has initiated a program of weighing the trucks at the landfill, and has scale data available since January 1, 2004. This data has been used to derive the estimated waste generation figures in this report, however the MFU and small commercial wastes cannot be directly differentiated from these figures as they are collected concurrently with the same vehicle. To collect this information separately would require the hauler to run separate routes for MFU and Commercial waste collection which is deemed impractical at this time. More discussion on this issue is presented in subsequent sections.

2.1.3 Commercial



The City contracts Kavanaugh to pick-up commercial garbage two to four times a week depending on the demand. Commercial units (businesses and offices) pay a monthly fee of \$11 per 1,000 ft² of building footprint area. For example, a 4 story commercial building with a footprint area of 8,000 ft² would be charged \$88 per month. The existing cost system does not relate to the actual amount of waste produced by a commercial business.

The COMM waste generators can be further divided into two categories, namely;



- a) COMM1 – These are typical of the downtown office towers and the Kam Lake area, and use containers similar in size to the MFU units.



- b) COMM2 – These are the larger waste generators. Each generator has its own bins that are typically roll-off style bins most with compactors. Examples of this type of waste generator are the big box stores and grocery stores.

In past studies, the term COMM has been confused with MFU, and in most cases, COMM only included the COMM1 values. The COMM2 values have been absent from past reporting.

2.2 Data

2.2.1 Expenditures

According to the City's 2005 budget, the costs associated with waste collection and disposal, including the baling facility and recycling, amount to \$1,786,000 (Table 2.1). In addition to the budgeted items, it is recommended that in the future, additional monies be set aside for recycling initiatives and funding for the landfill expansion/relocation that will be needed in the coming years.

Solid Waste Management - Implementation Strategy for:

Single Family Units, Multi-Family Units, Commercial Units - Tipping Fees

Table 2.1: Expenditures

	Expenditures 2005 Budget ⁽¹⁾
Collection	\$611,000
Waste Processing ⁽²⁾	\$522,000
User Pay Implementation ⁽³⁾	
Recycling	\$284,000
Closure	\$ 88,000
Reserve Fund	\$119,000
Admin Fee to General Fund ⁽⁴⁾	\$162,000
TOTAL	\$1,786,000

⁽¹⁾ From the City's Solid Waste Management Fund as per 2005 Budget

⁽²⁾ Savings shown in waste processing cost due to reduced tonnages through recycling

⁽³⁾ Estimated implementation cost of user pay system.

⁽⁴⁾ Based on administration fee charged by the General Fund of 10% of revenue as per current policy

2.2.2 Waste Revenues

The annual total waste revenues (levies) by each waste stream (SFU, MFU and COMM) were calculated (**Table 2.2**) based on City's user charges on monthly water bills. These are the current best estimates for revenue generation for the 2005 Budget Year.

Table 2.2: Revenue Generation

Type	# Of units ⁽¹⁾	Monthly Revenue ⁽²⁾	Annual Revenue
SFU (residential)	4,324	\$47,564	\$570,768
MFU (multi-family) ERU	1,962	\$21,582	\$258,984
Commercial	3,735	\$41,085	\$493,020
Tipping Fees ⁽³⁾		\$25,000	\$300,000
Revenue from recyclables		\$1,667	\$ 20,000
TOTAL	10,021	\$136,898	\$1,642,772

⁽¹⁾ From City's utility records as classified according the rate code. Water delivery numbers were categorized into residential (SFU) and COMM

⁽²⁾ Based on \$11/month waste levy effective March 1, 2005(10% increase). Revenue calculated as 2004 + 10%. Waste Levies are not consistent throughout

⁽³⁾ As described in Section 2.2.2 Other Wastes

Based on Annual Expenditures of \$1,786,000 it can be seen that the City is running an annual deficit of \$143,228/year on the operation of waste collection and landfill.

2.2.2.1 Waste Quantities

The City has been tracking the actual truck flows and weights going over the landfill scale as of January 1, 2004. The totals from 2004 have been analyzed and were used to derive the annual tonnages used in this report.

Single Family Units

Based on scale data, it is estimated that the total annual tonnage of SFU waste is 2,280t.

Previous SFU waste estimates have been based on estimates of the number of collection trucks and estimates of average truck weights. The Earth Tech report in 2001 and the Bryant report in 1999, quoted 10 loads of SFU waste per week, it is now estimated that there are 12 loads per week hauled to the baler. This would be reflective of the apparent increase in waste generation over time. This is however not reflected in the tonnages as the tonnage estimates in this report are lower than in the past. This is likely due to the fact that previous estimates were based on truck loads and are now available based on scale data which is likely to be more accurate.

Waste will have a lower density when it is placed at the curb in a bag for collection and a higher density after it has been compressed in the baler. The use of the appropriate density is important for developing the volume occupied by the waste at the curb (related to the number of bags), the volume after the baler at the landfill (related to the volume requirements of the landfill) and the volume within the collection truck (related to the number of truckloads required). The user-pay system relies on a fee-per-bag system. It is important to properly assess the volume (or number of bags) generated at the curb of each house to estimate generated revenue. Estimates of these different volumes are given below.

Table 2.3: Estimated Annual SFU Waste Volumes and Tonnages

	At the Curb	Collection Truck	Baled
Measured Tonnage ⁽¹⁾	2,280 t/yr	2,280 t/yr	2,280 t/yr
Estimated Density	0.083 t/m ³ ⁽²⁾	0.332 t/m ³ ⁽³⁾	0.605 t/m ³ ⁽⁴⁾
Estimated Annual Volume	27,470 m ³	6,867 m ³	3,770 m ³

(1) Based on City scale data

(2) Estimated 1/4 of truck density

(3) Source: Stanley, Solid Waste Management Study, 1990

(4) Source: Bryant Consultants, February 7, 2000

According to City records, the number of SFU pick-ups is 4,324 units. This equates to an average of 0.01t (10 kg or 22 lbs) and 0.12 m³ of waste collected per SFU per week.

MFU and COMM1

Kavanaugh quotes 28.5 MFU and COMM1 compacted mixed loads collected per week with 36 yd³ and 40 yd³ front loading trucks. As discussed in Section 2.1.2, the MFU and COMM1 collection is completed as one operation, and the direct breakdown of these waste tonnages is not possible under the current system. The measured annual tonnage of waste per year is 5,702 t. The estimated number of loads per week has been reduced to approximately 20 based on weight scale data.

Table 2.4: MFU and COMM1 Estimated Waste Generation

Total Annual Number of Trips ⁽¹⁾	Total Annual Tonnage ⁽¹⁾
989	5,702 t

⁽¹⁾ Based on City scale data

COMM2

Kavanaugh quotes fifteen COMM2 compacted 30yd³ (22.0 m³) roll-off containers at large commercial centers in the City. In addition, there are two non-compacted roll off containers collected from COMM2's. When considering roll off bins, it is significant to note that loads are not consolidated and therefore the bins hauled for disposal are often not full to capacity.

Table 2.5: COMM2 Estimated Waste Generation

Number of COMM2 Customers	Total Annual Tonnage ⁽¹⁾
2 (non-compacted)	430 t
15 (compacted)	1,890 t

⁽¹⁾ Based on City scale data

Other Wastes

Other wastes are wastes that are not part of the City's waste collection contract and are dropped off at the landfill for disposal for a tipping fee as per the City rates. Other wastes includes construction and demolition wastes, residential waste loads that are dropped off, out of town wastes, recycling, contaminated soil and all other wastes received at the landfill. This tonnage was estimated by adding 30% to the sub-total of the collected wastes plus an estimate of 2,200t/yr for contaminated soils.

Contaminated soil meeting the acceptance criteria is received at the landfill for treatment and disposal. Revenue to cover the labour required to process the soils is generated from accepting contaminated soil based on the tipping fee charged. Once the soils have been treated, they are used for cover at the landfill and therefore do not occupy landfill airspace.

Other wastes will be highly variable from year to year and throughout each year. The average revenue generated from other waste and contaminated soils based on new tipping fees implemented on July 1, 2005 is estimated from City records to be \$300,000/year plus \$20,000 in revenue from the sale of recyclables.

Summary

In past reports, it has appeared as though it costs a substantial amount to process MFU wastes. However, the commercial components were not always separated from the MFU.

Table 2.6: Total Annual Amount of Waste

Type	Annual Tonnage (t)
SFU (residential)	2,280
MFU & COMM1 (mixed)	5,702
COMM2 (non-compacted)	430
COMM2 (compacted)	1,890
Other ⁽¹⁾	5,291
TOTAL	15,593

⁽¹⁾ Other wastes as described in Section 2.2.2

Table 2.7: Calculation of Average Cost per Tonne for Waste Disposal

Expenditures/Costs	Amount of Waste	Average Cost per Tonne
\$1,786,000	15,593 t	\$114.54/tonne

Based on the City's total expenditures associated with waste collection and processing, the cost to process one tonne of waste is \$114.54/tonne. This value can now be applied to each waste type used.

It is estimated that the current solid waste levy system collected from all waste streams brings in \$1,642,772; thus incurring an annual shortfall of \$143,228 for the collection and processing of all garbage under the current rate structure.

The costs shown in Section 2.2.3 are based on a number of assumptions that need to be clarified prior to developing a strategy to increase the revenue stream to meet the budgeted costs for solid waste management. The assumptions are as follows:

- Each waste type costs the same unit value for collection. While there is no imperial data to suggest this is not the case, intuitively, it can be stated that the collection effort for SFU is greater than the collection effort for a large commercial user on a per tonne basis. While it makes logical

sense that the collection of one large roll-off container has a lower \$/tonne collection cost, there is no means to calculate the value, and as such, the common cost model is used.

- It is assumed that each waste type has the same density value. There are specific waste types that will have a higher density. An example would be concrete rubble material. No allowance has been provided for the potential for a single waste generator to be compensated for high density/low volume waste.
- It is assumed that all waste types have the same disposal costs.
- Collection costs do not vary with the distance from the waste generation point to the landfill. While the collection area is relatively compact, there would be a difference in cost related to the haul distance.

2.2.3 Revenue Ratification

In developing the costs for the system, the 2005 estimates from the City were used. In the future, other items as listed below will be added and/or altered in the development of these costs and should be taken into consideration when setting future rates:

- The increase in the cost to the City to provide for an enhanced recycling program.
- The cost to develop a new landfill (or expand existing area) amortized over a 20 year life span has been provide by the City's Public Works department and are included in the total operational cost.
- The cost of processing contaminated soil at a soil treatment facility.

The costs for each sector can be estimated by multiplying the estimated annual tonnage by the average cost per tonne from Table 2.7. Revenue and costs can then be compared to determine the net cost for each sector.

Table 2.8: Revenue Ratification

Type	Annual tonnage	Revenue ⁽¹⁾	Costs	Net
SFU	2,280	\$570,768	\$261,155	\$309,613
MFU & COMM1	5,702	\$627,132	\$653,116	-\$25,984
COMM2 ⁽²⁾	2,320	\$124,872	\$265,736	-\$140,864
Tipping Fees ⁽³⁾	5,291	\$320,000 ⁽⁴⁾	\$605,993	-\$285,993
TOTAL	15,593	\$1,642,772	\$1,786,000	-\$143,228

⁽¹⁾ Based on \$11/month waste levy effective March 1, 2005(10% increase). Revenue calculated as 2004 + 10%

⁽²⁾ COMM revenue from City records

⁽³⁾ As described in Section 2.2.2 Other Wastes, includes revenue from the sale of recyclables

⁽⁴⁾ Estimated revenue based on new tipping fees effective July 1, 2005, based on information from G Kehoe, Director of Public Works

This table shows that regardless of the system that is implemented, more revenue is required to recover the current costs to process and collect the waste for a 100% cost recovery model. SFU's are currently revenue positive. The largest discrepancy to the cost recovery model being achieved is from "other" wastes. This group of waste includes a variety of materials that need to be individually assessed based on

their value and time required to process. The COMM2 classification also shows large discrepancies. Revenues would need to more than double in the COMM2 classification to match expenditures.

Under this model, the current COMM2 monthly fee of \$11 per 1,000 ft² of building footprint area would have to increase to \$23.40 per 1000 ft² to recover costs. This assumes that the system for revenue collection remains based on a building area calculation. Alternatives to this type of system are discussed later.

The following sections discuss methods to implement a user-pay system that would move the City closer to a 100% cost recovery situation.

3 NEW FEE SYSTEM

All current waste stream users will experience changes in fee structures based on the most current costs to process and collect waste. It is clear that the fees paid in all areas of solid waste collection and disposal must increase from their current rates. A report completed by EarthTech in 2001 recommended a preferred fee option that combines a user fee for SFU and a cost per pick-up for both Multiple Family Unit Households and the Commercial units. Further development of an implementation plan for waste streams is discussed below.

The City's goal is to implement a solid waste system that is 100% cost recoverable while at the same time prevents rate shock to the community. The user-pay system is intended to provide a combination of benefits called the three E's: environmentally sound; equitable to users; and economic advantages for users and the City. The strategy is intended to encourage people to produce less garbage (by reducing, reusing, composting and recycling). This in turn will be beneficial both economically (lower costs of collection) and environmentally (re-use of materials and decrease in landfill use).

3.1 Tipping Fees

A user pay system is dependent on tipping fees that also reflect full cost recovery. Current tipping fees should be adjusted based on current costs to process a tonne of garbage less the cost of collection according to the following:

- $\$1,786,000$ (expenditures) – $611,000$ (cost of collection effort) / $15,593t$ = $\$75.36/\text{tonne}$

Tipping fees for the site should be adjusted to reflect the actual cost of \$75/tonne where possible. In some cases, this may need to be done over a period of time to avoid rate shock. It is recommended that the initial step of the user pay system be established initially using a tipping fee of \$65/tonne for commercial waste. Landfill tipping fees have recently been adjusted effective July 1, 2005 as shown in Appendix A.

Without proper tipping fees, users will attempt to circumvent the user pay system by hauling their waste to the landfill for a cheaper rate. If this is the case, the system is inefficient and insufficient revenue will be generated. This along with the fact that public perception should begin to include the concept that there is a cost associated with the disposal of all wastes. A minimum charge for all wastes should be implemented at the landfill. The system described in this report cannot be successfully implemented without the recommended tipping fees.

As new initiatives are brought on-line in the future such as the cost to develop a new landfill and expanded recycling services, the cost of landfill space as described above will have to be re-evaluated. Phase 2 of the user pay system will incorporate adjusted tipping fees to recover actual expenditures at that time. At this point, phase 2 tipping fees are estimated to be \$80/tonne for full cost recovery.

3.2 SFU

3.2.1 Objectives

The user pay system is intended to be revenue neutral, and equitable to users. Under a full cost recovery user pay system, each user is charged the full cost to collect, process and dispose of the amount of waste that they generate. In the long term, SFU's who produce less will pay less for this service.

The SFU waste collection and processing is currently one of the streams that are generating sufficient revenue. The goal of a modified SFU system should be to promote waste reduction while continuing to generate sufficient revenue in an equitable manner.

3.2.2 Other Municipalities

There are many municipalities across Canada who have implemented user-pay systems; sometimes referred to as Pay-As-You-Throw or Unit Pricing. Bag fees and limits vary widely and are a function of how the waste management system is financed. Each system is specific to the needs of each municipality. Table 3.1 compares the bag limit systems in other municipalities that were considered as options for Yellowknife's user-pay system.

Table 3.1: Bag Limits, Weights and Costs in Other Jurisdictions

Municipality (2001 Population)	Collection Frequency	Bag Limit	Max Weight per Bag	Cost of Bags	Comments
Whitehorse, Yukon (22,000)	Every 2 weeks	4 every 2 weeks	25	7.25/month \$1.00 tag fee	Compost collection every 2 weeks (alternating between garbage pick-ups)
Fort St John (16,000)		4		\$3.99/month \$1.00/bag	Considering changing limit to 2 bags/week
Grand Prairie, AB (37,000)		3		\$7.25/month \$1.00/bag	Mandatory recycling program at \$3.85/month
St. Albert, Alberta (40,000)	Weekly	1 2 4 6	33 lbs " " "	4.75/month 7.50/month 13.00/month 18.50/month	Subscription Fee Oversize bags will be charged as 2 bags Bags more than 66 lbs are not collected
Red Deer, Alberta (68,000)	Weekly	5	55	7.05/month \$1.00/bag	Recycling 2.94/month
Kelowna, BC (148,000)	Every 2 weeks	2	23 kg (51 lbs)	\$33.44/year \$1.50/bag	Blue bag program, curbside collection. Extra bags per week will be collected with appropriate \$1.50 bag tag 4 bags total maximum, public consultation after one year 86% approval

3.2.3 Recommended Fee Strategy

A preliminary strategy has been developed based on the information available. The City should use further information as it becomes available, to refine the implementation strategy. The development of the user pay system uses cost estimates for implementation in 2006 plus additional estimates for the implementation cost of the user pay system as shown in Table 3.2.

The proposed system imposes a limit on the size and number of bags that will be collected from each SFU. The two-tiered system will continue to include a waste levy administered in the same way as the current system. Bags in excess of the bag limit will only be collected if they are properly tagged with a tag purchased from a City vendor at the specified rate.

The model used to evaluate this system incorporated the following assumptions:

- It is estimated that each SFU produces 0.12 m³ or 0.01 t (22lbs) of waste per week at the curb. Using 0.077 m³ (20 gallon) garbage bags or bins as the standard size, each SFU generates approximately 1.5 bags of garbage per week. This equates to a cost of approximately \$1.00 per bag for the City to collect and process each SFU bag of garbage under the current system.
- A value of \$5,000 was estimated as a material cost for the purchase of tags.

Table 3.2: User Pay System Total Annual Cost

Description	Value
Estimated material cost to supply tags	\$ 5,000
Education programs and enforcement	\$ 40,000
Additional recycling initiatives	\$ 40,000
Total Additional Cost per Year	\$ 85,000
Cost of processing and disposal of SFU waste ⁽¹⁾	\$154,631
Estimated cost of SFU waste collection	\$285,384
Total Cost	\$525,015

⁽¹⁾ Based on \$75/tonne as per section 3.1 and SFU waste tonnage reduced by 10%

The total annual cost as stated above will vary slightly depending on the variable material cost for tags. For the comparisons below, a total cost of \$525,000 was used throughout.

Using the information available, a variety of implementation options were evaluated, depending on what is best suited to meet the needs of the City and the community. The estimated costs of the systems are summarized below. These figures will be further supported as additional information becomes available through the waste characterization studies. The costs of implementing and administering the systems have been included.

The revenue generated from tag sales will be dependent on several factors such as bag limit, recycling programs, enforcement, public acceptance etc. There is no concrete basis for estimating tag sales but the estimates below have been incorporated into the model for the sake of analysis.

Table 3.3: Assumed Tag Sales

Bag Limit	Assumed Tag Sales per Total Number of SFU's
4	0 (negligible)
3	10%
2	20%
1	40%

Several user pay systems for SFU's were evaluated, the program summarized a system which meets the criteria preferred by the City of being initially unobtrusive, easily implemented, secure and trending towards being revenue neutral.

Table 3.4: Summary of Proposed SFU Implementation Phases

Implementation Phases		Levy/ Revenue		Estimated Tag Fee/Revenue		Total Revenue
Current	\$11/SFU/month waste levy ⁽¹⁾	\$11.00	\$570,768			\$570,768
Phase 1	3 bag limit, tags	\$11.00	\$570,768	\$1.00	\$22,485	\$593,253
Phase 2	1 bag limit, tags	\$ 8.00	\$415,104	\$2.00	\$179,878	\$594,982

⁽¹⁾ \$11/month solid waste levy effective March 1, 2005

This strategy incorporates a two tiered system with continued revenue from the levy supplemented by revenue from tags sold for the collection of bags in excess of the stipulated bag limit. The waste levy was increased by council to \$11/SFU/month effective March 1, 2005. This system helps initially to recover some of the costs of the overall waste system. The introduction of the 3 bag limit will have limited financial impact on most users. A tipping fee structure at the landfill, including a fee per vehicle, must be implemented along with the user pay system. An annual evaluation of the program is recommended. Once the solid waste fund has built up a reserve, as set out by council, the feasibility of the next phase of implementation should be evaluated.

Phase 2, as described above, is based on estimated future revenues and expenditures. The phase 2 system must be evaluated and designed based on actual conditions and data available at the time and may in fact be different than that proposed in order to satisfy public opinion, and balance budgets. Phase 2 will be established to be revenue neutral without formula funding revenue. A reduction of the bag limit to 1 bag per SFU per week bag limit, with tags at \$2.00 accompanied by reduced levy of \$8/SFU/month is assumed at this time as the preferred option for phase 2 of the user pay program. It is important that the

implementation of the 1 bag limit be done concurrent with the implementation of increased recycling activities and increased tipping fees. This transition offers the user the option of either paying more for the collection of more than one bag per week or additional incentive to utilize the three R's to limit waste collection to one bag per week. The \$8 levy provides the city with a sustained revenue from all SFU's plus additional revenue from tag sales. As part of the annual evaluation of the user pay system, it may be determined that an intermediate implementation step is required prior to phase 2 implementation.

It is recommended that the City start immediately to implement the preliminary tasks of public education and consultation, waste characterization study, improved recycling system, and passing of the bylaws followed by implementation of the user pay system described above.

The system should be evaluated as needed and at a minimum on an annual basis to allow for adjustments to the revenue and expenditure streams. The net cost of this system is subject to the tendered unit rate for the collection of SFU waste. The waste collection tender should solicit a rate per unit per month for the collection of SFU waste in the City based on an estimate of the number of SFU's. As units are added or deleted from the system, the contract value can be adjusted accordingly.

3.3 Multi-Family Units and Commercial

Under the existing system, MFU's are charged per unit and commercial units are charged per building area. In the review of these waste generators, three options for fee structures were considered. These are described below, and then the benefits of each option are outlined in the subsequent table.

Option A – Direct Cost by Tonnage through a private hauler

In this option, each user would need to obtain a service contract with a waste collector. They may choose to complete their own collection and haul operations. The waste would be charged based on a tipping fee at the landfill, regardless of collection method. The City's landfill would still receive the waste, and would charge a tipping fee to the waste hauler. It would be the responsibility of the waste hauler to recover their costs for the waste collection and the tipping fees from the waste producer.

Option B - Cost by Bin Size and Collection Frequency through a public tender

In this option the user would be charged a unit fee for a designated bin size. The unit fee would be charged for each pick up. The unit price for the bin size and collection frequency would be set to include collection, bin rental (where required), administration and tipping fees. The unit fee multiplied by the frequency would result in the monthly fee.

Example – a 6 yd³ bin picked up 2 times per week would result in a monthly fee of 8 times the cost of the bin rate. (not including bin rental)

The user would need to be consulted on the bin size and frequency. These would likely need some tweaking within the implementation period to address specific user issues. The City would tender the collection contract for SFU along with MFU and Commercial. Tendered rates would be established based on the tipping fees set by the City.

Option C - Cost by Building Area

This option is similar to the existing option. Different rate classifications could be added to address the waste generation of different users. The current rate of \$11 per 1,000 sq ft is clearly too low of an average and would need to be increased to address the current shortfall for this type of user.

A summary of the system options for MFU and Commercial waste is included on the following page.

Table 3.5: Summary of Options and Benefits

Option	Benefits	Issues
<i>A - Direct Cost by Tonnage</i>	<ul style="list-style-type: none"> • Implementation by private sector waste collectors. • Each user would pay their share of the waste collection and disposal cost • Each user can have their waste management system tailored to their needs. • With the use of private sector contracts, there would be the ability to have competitive firms completing waste collection. • City's revenue stream would be from a minimum number of firms, and would be collected based on tonnage disposed at the landfill • Revenue stream would be well known, and there would be limited fluctuation in the expected revenue over the year. 	<ul style="list-style-type: none"> • Not recommended for MFU and COMM1 as the technology required to weigh each bin during collection is unreliable. • Each user may require a separate bin. This would increase the number of bins in the downtown alleyways and may create congestion. • City would need to police the incidents of illegal dumping in the dumpsters. • May impact the collection costs • Significant implementation cycle to move all users to private sector collection contracts. • Based on consultation with waste haulers, it is estimated that the volume of waste generated for each sector within the City is not sufficient to support multiple haulers, resulting in inefficiencies.
<i>B - Cost by Bin Size and Collection Frequency</i>	<ul style="list-style-type: none"> • Can be implemented using either or both of a City run system or a private collection system • Each user would pay their approximate share of the waste collection and disposal cost • Each user can have their waste management system tailored to their needs. • With the use of private sector contracts, there would be the ability to have competing bids for the hauling contract. 	<ul style="list-style-type: none"> • Each user may require a separate bin. This would increase the number of bins in the downtown alleyways and may create congestion. • City would need to police the incidents of illegal dumping in the dumpsters. • May impact the collection costs • City would need to set up a system for fee assessment and collection. • Revenue stream would not be well known at start up, and there would be fluctuation in the expected revenue over the initial years until data is collected on usage of bin size and frequency.
<i>C - Cost by Building Area</i>	<ul style="list-style-type: none"> • System can be implemented using either a City operated collection system or a private sector collection system • City's revenue stream would be similar to current system • Revenue stream would be well known, and there would be limited fluctuation in the expected revenue over the year. 	<ul style="list-style-type: none"> • Poor representation of waste generation and fees paid. • No incentive to reduce waste generation.

3.3.1 MFU and COMM1

3.3.1.1 Objectives

The objective of extending the user pay system to MFU and COMM1's is to change from a flat rate system (currently \$11/ equivalent residential unit) to a system where each unit is charged for the amount of waste collected. The cost for each unit will then be derived from the amount of waste generated rather than the footprint area of the building.

3.3.1.2 Other Municipalities

A survey of other municipalities was conducted to evaluate the types of systems used.

Table 3.6: MFU and COMM1 Collection Systems in Other Jurisdictions

Municipality (2001 Population)	Collection System	Cost per Month	Comments
Whitehorse, Yukon (22,000)	Up to 4 ERU 4 bags/2weeks/ERU	\$7.25/month/ERU includes compost pick-up \$1/tag	-Greater than 4 ERU and commercial is privatized -Garbage collection every 2 weeks Compost collection every 2 weeks, alternating between garbage pick-ups.
Sault Ste. Marie, ON (75,000)	Up to 4 ERU 2 bags/week/ERU	\$2.80/month/ERU	-Greater than 4 ERU and commercial is privatized
Fort St John, BC (16,000)	Up to 4 ERU 2 bags/week/ERU	\$3.99/month \$1.00/tag	-Greater than 4 ERU and commercial is privatized -Considering changing limit to 2 bags/week
Grand Prairie, AB (37,000)	Up to 4 ERU 3 bags/week/ERU	\$7.25/month/ERU \$1.00/bag	-Greater than 4 ERU and commercial is privatized -Mandatory recycling program at \$3.85/month
Red Deer, Alberta (68,000)	Up to 4 ERU 5 bags/week/ERU	\$7.05/month/ERU \$1.00/tag	-Greater than 4 ERU and commercial is privatized -Recycling \$2.94/month/ERU
Kelowna, BC (148,000)	2 bags/wk/ERU \$1.50/bag up to 4 bags max	\$60.00/year includes recycling	Collection every 2 weeks

3.3.1.3 Recommended Fee Strategy

Under the current system, a residence with 3 or more ERU's is considered to be a MFU. The units with less than 3 units are collected using garbage bins similar to those for SFU units. It is recommended that this definition be altered so that units with 4 or less ERU's fall under the SFU structure as described above. It is recommended that a bin size and collection frequency system as defined in Option B be implemented for MFU's greater than 4 ERU's.

COMM1 users represent a unique set of issues. These are collected in conjunction with the MFU users, and are often on the same routes as the MFU users some with shared bins. The COMM1 operations that are combined with the MFU operations are typically (but not exclusively) located within the Downtown core area. Under the bin size and frequency method, MFU's and COMM1's could continue to be collected concurrently and bins and costs could be shared by businesses if required.

The Kam Lake area presents its own set of issues. There are residential (SFU) users located within the industrial park. For the purpose of this study, it is assumed that all Kam Lake is essentially COMM1.

For MFU and COMM1 units, it is recommended that the waste levy be eliminated and replaced with a user pay subscription service based on bin size and collection frequency suited to their waste generation. Under this system, collection and disposal fees for MFU and COMM1's can be assessed based on the waste generation of a building and not on a per unit basis. As under the current waste levy system, the fees for waste collection and disposal are collected from the building owner then passed along to tenants through their rent. This system of cost distribution would continue but the costs would better reflect the waste generation of that building.

This system is subject to the tendered unit price for the collection, bin rental (where required) and administration costs to be determined as part of the public tender for services. The City would establish the tipping fee rate for waste disposal, this rate would be used by the contractor to establish a unit pricing fee schedule per bin size and collection frequency.

As an example, an excerpt from the tender form could look similar that shown below

Table 3.7: Example Excerpt From Tender Form for Bin Size and Collection Frequency

Bin collection once per week (including Bin Rental)	Unit	Approximate quantity	Unit price	Amount	% of unit pricing to tipping fees
2 Yd ³	Each/year				
4 Yd ³	Each/year				
6 Yd ³	Each/year				
Bin collection twice per week (including Bin Rental)					
2 Yd ³	Each/year				
4 Yd ³	Each/year				
6 Yd ³	Each/year				

Under the existing system, MFU and COMM1 waste is collected three times per week. By changing to a bin size and frequency system, it is estimated that there will be a reduction in the size and or frequency of collection from current values. This reduced collection effort will also result in a reduction in the waste collection cost over time.

3.3.2 COMM2

3.3.2.1 Objectives

The COMM2 waste stream represents a significant area of waste generation that is not generating the revenue required to provide full cost recovery. This is the area where significant cost recovery gains can be achieved.

To achieve the 100% cost recovery for the COMM2 users, the City would be required to increase the fee by more than 2 times. This would likely meet a fair amount of resistance during implementation, and would not meet the criteria of preventing rate shock.

3.3.2.2 Other Municipalities

Looking at other jurisdictions provides a fair amount of insight into this issue. Most areas of Canada, both large and small communities, do not provide for waste collection from COMM2 users as part of the city services. These users are responsible for their own waste collection and disposal. Local and national waste operators provide for the collection service. Both private and public landfills receive this waste and charge the tipping fees for the waste disposal operation.

Table 3.8: COMM2 Collection Systems in Other Jurisdictions

Municipality (2001 Population)	Collection System	Cost per Month	Comments
Whitehorse, Yukon (22,000)	Private contractors		
Sault Ste. Marie, ON (75,000)	Private contractors		
Fort St John, BC (16,000)	Private contractors		
Fort Saskatchewan (15,000)	Private contractors Pricing tendered through the City	Tendered Pricing	Franchised System Except for Construction waste which is left to the marketplace
Grand Prairie, AB (37,000)	Private contractors		99% is contracted out. The City has one overhead truck that is used for some commercial buildings.
Red Deer, Alberta (68,000)	Private contractors		
Kelowna, BC (148,000)	Private contractors		

3.3.2.3 Recommended Fee Strategy

Currently, there are no bylaws specifying limits for COMM1 users or defining COMM2 users. Garbage by-law No. 3761 states:

“Any business premises creating more than 18.2 cubic meter (20 cubic yards) of garbage daily shall be required to use a garbage compactor to reduce the volume of garbage created.”

It is recommended that this limit of 18.2 m³/day (20yd³/day) be used to define businesses that should be collected as COMM2.

COMM2 users represent a relatively small number of larger commercial users, which produce relatively large amounts of waste on a regular basis. The collection method for COMM2 users takes place by having Kavanaugh collect a roll-off bin from a large commercial user and deliver that bin to the landfill. Although the fee structure is based on footprint area of the business, the weight of waste from each bin is tracked at the landfill. With only 17 users, and a good data set, we are able to track the waste generation and revenue from each user. An analysis of the data available for COMM2 users under the existing system shows the following:

- The waste generated from users ranges from 15 tonnes per year to nearly 500 tonnes per year.
- Because the levy basis is strictly related to footprint area of the building rather than waste generation, there are inequities in the system. The revenue per tonne of COMM2 waste ranges from approximately \$10/t to \$220/tonne.
- Under the existing system, there is only one COMM2 user that segregates cardboard from their waste stream for recycling.

It is recommended that the direct cost by tonnage system described above be implemented for COMM 2 users. Through consultation with waste haulers, it appears that the City would be best served to have COMM2 waste collected by a private hauler but that the collection rate be established through a public tender along with the collection of wastes from other sectors. This will allow for the incorporation of operating efficiencies as the City may not be large enough to support multiple haulers at this time. This will also allow the City to take advantage of economies of scale to get the most cost effective pricing for the collection of the recycling bins for the various depots.

The administration of waste collection would be the responsibility of the waste hauler based on the tendered rates. The City's landfill would still receive the waste, and would charge a tipping fee to the waste hauler. It would be the responsibility of the waste hauler to recover their costs for the waste collection and the tipping fees from the waste producer.

The cost for collection, bin rental (where required) and administration would be established under the tendered unit price contract. This system would mean that each COMM2 user would establish a

collection schedule based on the tendered unit price established through the City contract. The bin would be collected at a scheduled frequency or as required and dumped at the landfill. The hauler (and in turn the user) would then be charged a tipping fee for the quantity of waste dumped plus a collection rate.

Under the Direct Cost by Tonnage system, it is anticipated that there will be an increase in waste segregation at the source for recycling. It is also anticipated that there will be a reduction in waste generation and the collection effort. Based on the one COMM2 that currently segregates their cardboard, a diversion rate of up to 30% by weight can be expected for some of the larger COMM2 users.

It is shown in Section 3.1 that a tipping fee of \$75.36 is required for full cost recovery, yet a tipping fee of \$65/t is recommended as an interim step. This will not result in full cost recovery for this sector (nor for MFU and COMM1) thus leaving some dependence on revenue from SFU's to balance revenues. It will however be a large step towards becoming revenue neutral for the entire system and across each sector.

It is anticipated that by implementing a fee by tonnage and collection frequency system, the efficiency of this system will allow the costs of operating the system to decrease and full cost recovery to be achieved through increases to the tipping fees in future years.

3.4 User Pay System Summary

The recommendations for the new fee system include the tendering of the waste collection services. Under this proposed system, unit pricing would be solicited for all sectors of waste collection under one contract. In the case of MFU and Commercial collection under a bin size and collection frequency system, the unit pricing would incorporate the tipping fee established by the City along with a set rate for collection. As a result, the collection expense and revenue for these users would simply be incorporated into the unit pricing rate. For this reason, the collection expense has been removed from the expenditures in

Table 3.9, except for an estimate for the collection of SFU waste. Revenue for the City would be generated from a tipping fee at the landfill to recover the costs of processing and disposing of waste on a tonnage basis.

Table 3.9: City of Yellowknife - Proposed User Pay Waste Management System Expenditures

	Expenditures 2005 Budget ⁽¹⁾	Expenditures User Pay System (2006) ⁽¹⁾
Waste Processing	\$521,000	\$513,000 ⁽²⁾
User Pay Implementation ⁽³⁾		\$85,000
Recycling	\$284,000	\$293,000
Closure	\$ 88,000	\$ 88,000
Reserve Fund	\$119,000	\$119,000
Admin Fee to General Fund ⁽⁴⁾	\$162,000	\$138,000
Sub-Total	\$1,174,000	\$1,236,000
Collection ⁽⁵⁾	\$611,000	\$285,000
TOTAL	\$1,785,000	\$1,521,000

⁽¹⁾ From the City's Solid Waste Management Fund Budget

⁽²⁾ Savings shown in waste processing cost due to reduced tonnages through recycling

⁽³⁾ Estimated implementation cost of user pay system.

⁽⁴⁾ Based on administration fee charged by the General Fund of 10% of revenue as per current policy

⁽⁵⁾ Allocation for collection of SFU waste only under user pay system

The initial phase of the User Pay system will be beneficial in promoting waste reduction and recovering costs with the aim of approaching full cost recovery. An allocation from formula funding has been used to offset costs and balance the annual budget. The formula funding is planned to be phased out in 2007. The User Pay System can be seen as a re-structuring of the waste management system used by the City. Once this system is in place, it should be re-evaluated on a regular basis as new initiatives are implemented, as operating costs fluctuate. The expenditures for the system will increase over time due to inflation and growth, but may potentially decrease due to efficiencies, competition, a reduction in the amount of waste to be collected, and prolonged landfill life. The system can be manipulated in the future to balance costs by altering tipping fees, and altering the waste levy, bag limit and bag tag fee for SFU's.

The table below shows the progression of the waste management program over time. The dependence on formula funding can be shown to be diminished over time as the system approaches full cost recovery. The conditions surrounding Phase 2 implementation of the system are difficult to predict and dependent on a series of variables. One example is however presented in Table 3.10 on the following page to show that through altering tipping fees, the waste levy, bag limits and tag fees the system can be adjusted to recover costs.

Solid Waste Management - Implementation Strategy for:

Single Family Units, Multi-Family Units, Commercial Units - Tipping Fees

Table 3.10: User Pay Phased Implementation Summary

	Revenue	Expenditures	Net Cost
2004 - \$10 Levy for SFU, MFU, COMM	\$1,403,000	\$1,657,000	-\$254,000 balanced through funding
2005 - \$11 Levy for SFU, MFU, COMM (March 1, 2005) - Increased Tipping Fees (July 1, 2005)	\$1,652,000	\$1,785,000	-\$133,000 balanced through formula funding
2006 <i>User Pay System Implementation – Phase 1</i> - \$11 Levy for SFU, 3 bag limit, \$1 tags - MFU and COMM, bin size and collection frequency, \$65/t tipping fees, \$30/t for cardboard	\$1,423,000	\$1,521,000	-\$98,000 balanced through formula funding
Future – no formula funding <i>User Pay System Implementation – Phase 2</i> <i>Future Expenditures</i> - Contaminated Soil Treatment <i>User Pay System Implementation – Phase 2</i> - \$8 Levy for SFU, 1 bag limit, \$2.00 tags - MFU and COMM, bin size and collection frequency, \$80/t tipping fees, \$50/t for cardboard	\$1,604,000	\$1,590,000	\$14,000

4 IMPLEMENTATION STRATEGY STEPS – ALL WASTE STREAMS

4.1 Approval of Strategy

- Dept of Public Works presents proposal to Municipal Services Committee (MSC)
- City Adopts User Pay Strategy along with required Bylaw changes (Bylaw changes may be separate)

If due to timing, the validation of assumptions must occur after approval, flexibility should be allowed if any adjustments to the system are deemed necessary.

4.2 Validation of Assumptions

Throughout the process of developing the user pay system it has become evident that there is limited data available on the operating details of the existing system. The proposed system has been developed based on available information and should be refined where possible to include information as part of the validation of the assumptions. This should include the following

- Continue to monitor and track waste tonnages at the landfill
- Complete a landfill capacity survey
- Complete a study of the recycling program and potential
- Develop and Implement Waste Generation Study (details below)

4.2.1 Waste Generation and Composition Study

One of the benefits of a user pay system is that it promotes waste reduction and recycling for all users. Some estimates of these changes have been incorporated into the analysis above. A method to better estimate and measure the amount of waste diversion is by conducting waste audits of each waste stream.

A waste audit consists of taking a sampling of a certain waste stream at a certain point in time, such a random sampling of SFU's per day for the entire one-week waste cycle. The waste collected is divided into categories and weighed to arrive at a percentage of the total waste stream for each category. By knowing the amount of cardboard, paper, organics etc in the waste stream prior to implementation of the user pay system, changes resulting from user pay implementation can be measure by conducting another waste audit.

In addition to the waste composition study, ongoing waste generation tracking is vital. As per the Earth Tech report, we also recommend the City of Yellowknife undertake a more detailed study of the volume of waste generated by single-family units, MFU and COMM. It appears that waste is collected primarily based on an established collection schedule and not necessarily based on a collection need established from waste generation. The numbers in this report are based on scale data from 1 year of records. As data continues to be available, the waste generation estimates will be improved.

The risk to the City in not completing detailed waste studies is that insufficient revenue would be generated if the bag limits or fees were set incorrectly. In addition, the more data that can be provided during the tendering process, the more refined and efficient the proposed collection systems will be. In addition to increasing the accuracy of the implementation strategy, a study of waste generation and composition would provide a baseline against which future waste volumes could be measured. This would be beneficial in evaluating success of the strategy in changing waste generation rates, therefore extending the life expectancy of the landfill. The waste composition study would also identify potentially recyclable waste streams to help establish recycling and waste reduction targets.

The study of waste generation and composition could be undertaken as part of “the development of a system to monitor and evaluate all waste streams and report publicly on the progress in waste management”. This has been identified as Priority 2 of the 12 objectives determined by the Solid Waste Management Strategic Planning Committee (SWMSPC).

4.3 Pre-implementation Strategy

4.3.1 Public Feedback and Education

- Educate the public of City’s intention to implement the user pay system with a combination of various press releases, public forums, brochures, discussion papers, and the City Capital Update newsletter. . The City may want to consider distributing a residential waste survey accompanied with a community waste reduction handbook and/or hold a short pilot project demonstration.
- A waste management forum has tentatively been planned for the fall of 2006. The focus of this forum could be on educating the public on the proposed system.
- Prepare presentations for various public interest groups such as the Chamber of Commerce
- Partnerships and public meetings with schools, organizations and businesses

4.3.2 Tender of Waste Hauling Contract

- Consult with other jurisdictions and waste haulers as to successful waste hauling tendering methods and contracts.
- Advertise and distribute tender or request for proposal (RFP) information.
- Close and award tender providing a minimum of three months prior to the implementation date. With an implementation date coinciding with the expiration of the existing contract on January 1, 2006, the new contract should be awarded prior to October 1, 2005.

4.4 User Pay Strategy Implementation (Phase 1)

- Evaluate results of recycling, and waste generation studies plus landfill waste tonnage tracking and evaluate impacts on proposed strategy.
- Update implementation plan based on validation of assumptions

- Determine infrastructure needs such as tag distribution and invoicing to implement the system

A. Find a Tag Vendor

- Determine the cost and number of tags required for excess bags
- Design and order SFU tags
- Develop a tag distribution plan with local merchants

B. Control and Enforcement

- Develop an enforcement plan with contractors, landfill staff, municipal enforcement officers, local businesses and multi family units to control illegal dumping (on land, outside landfill gates or in other bins). This may require locked commercial and multi family unit garbage bins and a motion sensor video camera monitoring system at the landfill. This will require MFU and COMM owners to give keys to tenants who require access, and to the waste collection contractor

C. Public Education

- Begin public education program. This should include public presentations, information bulletins and work with local media and special interest groups. The information should include the goals of the program and a summary of the long range plan for the solid waste program and SFU service.
- Solicit public feedback and input into continued program development

D. New user pay system in Effect – January 1, 2006

- Implement phase 1 of the user pay system
- Implementation to include free entry weeks to the landfill twice per year for residents
- Establish a system to address likely increased public inquiries during initial implementation phase

4.5 Recycling

- Implement recommendations of Recycling Program Study
- Adjust tipping fees as required to provide incentive/disincentives where required
- Continue to investigate local re-use and recycling options

4.6 Monitoring of Program and Potential Contingencies

4.6.1 SFU, MFU and Commercial

Public complaints or inquiries will be dealt with by City staff. On a quarterly basis, a summary of public complaints will be reviewed along with the bag tag sales. The waste collection contract will include penalty clauses if there are excessive complaints or the collection contractor is determined to be negligent in the level of service provided.

Waste tonnages will be tracked at the landfill. On a quarterly basis, they will be reviewed and tracked to forecast annual revenues and compare versus expenditures. Waste tonnages will be reviewed to evaluate the impacts on waste generation.

4.6.2 Recycling

It is important to be aware of the impacts of the system on the recycling program. It is important that the recycling program must be well established and well run prior to implementing the user pay system. The recycling program should continually be updated as required and in particular in the search for local recycling opportunities.

Information on the success of the recycling program should be included in the public education program. It is important that the public is reassured that the recycling initiative is worthwhile.

4.6.3 Tipping Fees

The key to the success of all other strategies is strict enforcement at the landfill. Regardless of the number of monitoring and security contingencies that are set in place for SFU, MFU and COMM units, the end result will be people bringing their garbage to the dump for disposal. A user pay system cannot be successful if there are not adequate tipping fees charged at the landfill and if they are not enforced. If there is not a tipping fee per tonne of garbage charged at the landfill, the City will not recover enough revenue to cover its long term expenditures.

4.7 Recommended By-Law Changes

The success of the User Pay System will depend on control and enforcement of waste management issues currently dictated by the City's Solid Waste Levy By-law 3517. The following outlines the current by-laws that will likely require improved enforcement or amendments and new by-laws to be adopted based on the strategy.

By-law 3517(1) levy charge – Amendment

- Add a bag limit and fee per bag structure for SFU's
- Replace levy charge to accommodate the elimination of the waste levy for MFU and COMM units. Add a new By-law for the administration of collection and disposal fees. For MFU's and COMM1's it will be based on a bin size and frequency structure, for COMM2 units it will be based on a disposal fee based on tonnage plus a collection cost.

By-law 3761 Part 2 Definitions - New

Add the definition of a "garbage container" to include an overall capacity of 77 litres and a maximum weight of 25 kg.

Add definition of a multi family unit to consist of dwellings with more than 3 units.

By-law 3761 Section 11(a) - Enforce

Outlines that no person shall dispose of their own garbage in any other container/can but their own.

By-law 3761 Schedule B Section 11(a) -Enforce

Currently, there is a \$200 fine for depositing waste or garbage in a container other than your own.

By-law 3761 13 (a) – Enforce

Manager and property owners of businesses are required to secure garbage containers and cans to prevent access and entry by unauthorized personnel.

By-law 3761 Section 15 - Enforce

Every garbage compactor shall be locked to prevent public access. \$100 fine.

By-law 3761 Section 24 (a) – Enforce

No person can dispose, deposit or leave litter on highway, lane, sidewalk, public or private area, and waterway or ice surface. \$200 fine.

By-law 3761 Part 10, Section 40 – Enforce

No person shall dispose of garbage or trash at the landfill site outside normal working hours. This will prevent midnight dumping outside landfill gates.

By-law 4350 Tipping Fees - Enforce

Initiate strict enforcement and monitoring at the landfill.

Add tipping fees for commercial waste generated within the City.

Add a \$5 fee for all residential waste of \$5 per vehicle except for salvagers and those bringing in tagged fee for residential waste

4.8 Impacts of Strategy

4.8.1 Rate Shock

The key to minimizing rate shock among users is through communication and education. Once users are more aware of the economic and environmental costs of waste management and disposal, they will likely choose steps to minimize it. The City is currently educating the public about waste reduction and recycling through newsletters, newspaper articles and media. It is expected that these efforts will continue as part of the Public Education step of the Implementation Strategy. The management of solid waste should be equivalent to any other utility service (i.e. hydro) whereby the user pays for the amount they consume or produce. In addition, the recommended approach to have a modest change to the residential user and multi-family users, who are most vulnerable to changes in rate structure. The recommended phase 2 strategy offers an incentive and possibly a decrease in the levy for SFU users that produce one bag of garbage per week or less. Coupling the decrease in the levy and increased recycling with the 1 bag limit implementation presents users with clear alternatives.

The strategy will likely not affect low garbage producers, as the system will be more equitable to them than the current system. They will no longer be subsidizing the high volume users. They will also be informed through public education that this one of the initial steps in the City's overall goal to reducing waste.

There is also a need to emphasize that improvement to waste reduction as the strategy progresses will maximize costs savings. This strategy cannot be successful without an improved recycling program.

5 RECOMMENDATIONS

The overall goal of the Community Waste Management Strategic Plan is:

“to reduce waste generation and make efficient use of the resources produced by consumption.”

This is accompanied by the goal of making the solid waste program revenue neutral. The following are recommendations for implementation of the strategies discussed in this report.

1. *Validation of Assumptions* - Successful implementation of any changes to the waste management system are dependent on a good understanding of the current conditions. It is recommended that the City continue to monitor and track waste tonnages at the landfill, along with the completion of a landfill capacity survey, waste generation and characterization study and recycling program study
2. *Tipping Fees* - This study has revealed that the current tipping fee structure at the landfill does not cover the estimated expenditures for the solid waste system. Tipping fees should be adjusted in accordance with the estimated cost of \$75/tonne for the long term operation of the landfill (including closure and expansion costs) to process and dispose of waste. The implementation of a user pay system is dependent on a full costs tipping fee rate structure and cannot be implemented without the recommended initial tipping fees.
3. *Recycling* - As stated above, a study of the recycling system and expansion opportunities is recommended. The goal of waste reduction and diversion is only possible if a successful recycling program is in place. Before a user pay system and other initiatives to promote recycling are initiated, it is essential to understand the impacts that increased recycling will have.
4. *SFU* – Section 3.2 of this report outlines the proposed phase 1 and phase 2 options for implementation of a SFU system. The recommended two tier system includes two steps. Initially, a 3 bag limit with tags for additional bags for sale at \$1.00 each is implemented. The bag limit is later reduced to 1 bag per SFU per week, with tags at \$2.00 accompanied by reduced levy of \$8/SFU/month and increased recycling initiatives. This system is simple with only two steps for implementation
5. *MFU and Small Commercial(COMMI)* - For MFU and small Commercial units, it is recommended that a user pay subscription service be implemented based on bin size and collection frequency suited to their waste generation. This system will be implemented with a tendered waste collection unit price schedule including the cost for collection, bin rental (where required), a disposal fee established by the City and administration by the contractor. The city would charge a tipping fee at the landfill to recover it's cost for waste disposal.

6. *Large Commercial Waste Units (COMM2)* - A direct cost by tonnage system is recommended for COMM 2 users. This system would be implemented with a tendered waste collection unit price for each pick up including the cost for collection, bin rental (where required), and administration by the contractor. A tipping fee based on weight would also then be assessed at the landfill based on the tipping fee established by the City to recover their costs. The bin would be collected at a scheduled frequency or as required and dumped at the landfill. Currently the largest discrepancy with the City's goals for collected waste lies in the commercial waste collection area.

The recommended bag limit and costs of the implementation strategy are seen as a first step towards full implementation and full cost recovery. As the implementation of the system proceeds, waste generation rates and revenue will be monitored so that the system can be adapted as required to balance cost recovery and rate shock. In addition, the community has adapted to an unlimited amount of garbage collection, and it will take time to communicate and educate users about the City's plan. For these reasons, it is recommended that the City follow through with a waste characterization study and a user survey to get a good baseline of garbage collection numbers and community concerns.

More importantly, the implementation of a user-fee system needs to be considered as a part of a larger system of waste management practices, including recycling and waste reduction programs. If the waste generation habits can be altered, there will ultimately be less waste in the system. The amount of waste that is generated needs to be handled through one of the existing or proposed programs. Waste diverted from entering the landfill will result in an increase in the waste handled through the recycling and reduction programs.

This implementation strategy is intended to be adapted as more information is obtained and as the ongoing process of refining the waste management system to suit both the financial needs of a cost recovery system and needs of a healthy community.

6 REFERENCES

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Earth Tech (Canada) Inc., Solid Waste Management Levy and Fee Review – Final Draft, December 2001

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United States Environmental Protection Agency (USEPA), Pay-As-You-Throw Tool Kit, USEPA 1996

Yellowknife, City of, Community Waste Management Strategic Plan Synopsis, July 2001

Yellowknife, City of, Memorandum to Priorities, Policies & Budget Committee. Issue: Whether to agree in principal to a transition from a flat fee collection system to a user-pay fee collection system for solid waste, September 23, 2002

Yellowknife, City of, Consolidation of Garbage By-law No. 3761, Adopted June 13, 1994

Yellowknife, City of, By-law No. 4350, Adopted February 28, 2005, Schedule “A” Tipping Fees

Yellowknife, City of, Solid Waste Levy By-law No. 3561, Adopted October 28, 1991

APPENDIX A

By-law No. 4350, Schedule “A” Tipping Fees

SCHEDULE "A"
TIPPING FEES

These charges apply only to commercial establishments and residents as specified.

The City does not accept commercial hazardous waste.

The following Tipping Fees shall be charged for the disposal of waste at the Solid Waste Facility.

Type of Waste	Cost
Commercial Establishments	
Construction/Demolition Waste	\$40.00 per tonne
Contaminated Soils – Hydrocarbons	\$60.00 per tonne
Cooking Grease	\$20.00 per tonne
Asbestos \$20 minimum plus \$130/hr equipment charge with a minimum 1 hr	\$50.00 per tonne
Special Waste (Note 3) \$20 minimum plus \$130/hr equipment charge with a minimum 1 hr – if required	\$38.00 per tonne
Scrap Steel, Metal Waste	\$35.00 per tonne
Commercial Waste from outside of City boundaries requires prior approval \$20 minimum plus \$130/hr equipment charge with a minimum 1hr - if required	\$65.00 per tonne
Domestic Vehicles	\$100.00 per vehicle
Animal Carcasses:	
- small	\$5.00 each
- large	\$10.00 each
Oversized Loads (Note 2)	\$10.00 per cubic metre
Mixed Loads	Charged at the higher rate

SCHEDULE "A"
TIPPING FEES

Type of Waste	Cost
White Goods (appliances):	
- fridge (Note 4)	\$35.00 each
- other	\$10.00 each
Oil Tanks (up to 250 gallon)	\$100.00
Larger tanks will be accepted once the commercial establishment has cleaned and cut up the tank as per the environmental guidelines	
Good Clean Scrap Wood (no fastenings/glues)	charge under construction / demolition
Clean Granular Fill	No charge
Light Waste Loads	\$5.00 minimum charge
Automotive Batteries	\$4.00 per battery up to 3 batteries per month
Tires (without rims):	
- Less than 20" in diameter	\$4.00 per tire
- Greater than 20" up to 48"	\$8.00 per tire
Recycled Materials such as glass	\$65.00 per tonne
Tree Branches	\$65.00 per tonne
minimum charge	\$25.00

SCHEDULE "A"

TIPPING FEES

Type of Waste

Cost

Residential

Tires (without rims):

- Less than 20" in diameter
- Greater than 20" up to 48"

\$4.00 per tire
\$8.00 per tire

Automotive Batteries

\$4.00 per battery up to 3
batteries per month

Oil Tanks (up to 250 gallon)

\$100.00

Larger tanks will be accepted once the resident has steamed
and cut up the tank as per the environmental guidelines

White Goods (appliances):

- fridge (Note 4)
- other

\$35.00 each
\$10.00 each

Domestic Vehicles

\$100.00 per vehicle

Notes:

1. Acceptance and determination of nature of waste is at the discretion of the Director of Public Works and Engineering or his/her designate.
2. Oversized loads mean any loads wider than 3.2 metres or 10 feet and 6 inches.
3. Special waste means any waste that has to be handled (ie. pallets loads of computers, waste to be buried immediately, or materials not covered by other types of waste above such as wire wheel spools, propane bottles, office furniture, etc.).
4. White goods include refrigerators, freezers, stoves, dishwashers, clothes washers, clothes dryers, hot water heaters, and bath tubs.

SCHEDULE "A"
TIPPING FEES

Supplementary Tipping Rates

During any period that the weigh scale is inoperable, either due to planned maintenance or repair, or if specified by the Director of Public Works and Engineering (or designate), the following Supplementary Tipping Rates will apply.

Vehicle	Rate per Load
15 yard construction bin	\$50.00
30 yard construction bin	\$100.00
Single Axle Towing Trailer	\$20.00
Tandem Axle Towing Trailer	\$30.00
Cube Van	\$30.00
1 Ton Truck	\$40.00
2 Ton Truck	\$80.00
3 Ton Truck	\$120.00
5 Ton Truck	\$200.00
Tandem Dump Truck	\$150.00
End Dump Truck	\$175.00

**CITY OF YELLOWKNIFE
TO BY-LAW NO. 3761
SCHEDULE "B"**

Page 1

Voluntary Penalties

<u>Offense</u>	<u>Section</u>	<u>Penalty</u>
Failure to provide proper garbage can/container	3	Private \$50.00 Commercial 100.00
Failure to keep garbage can covered	4	50.00
Failure to put garbage in a garbage can	5	50.00
Filling any garbage can or container to the point where the lid or cover cannot be properly secured		50.00
Causing damage to or removal of a public garbage or litter container	10(c)	200.00
Schedule B		
Amended by By-law No. 4064 July 12, 1999		
Depositing waste or garbage in a container or can by someone other than the lawful user	11(b)	200.00
Unsecured container	13(a)	100.00
Open dumpster lid	13(b)	50.00
Depositing liquids in a dumpster compactor	13(c)	200.00
Failure to bag office paper, wrapping paper, shipping or packaging materials	13(e)	100.00
Unlocked compactor	15	100.00
Unsecured load	23	100.00
Littering	24	200.00
Failure to remove construction waste	26	100.00
Burning at the Solid Waste Site	38	2000.00