Comprehensive Solid Waste Strategy

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January 2010

Table of Contents

Executive Summary

The District of Squamish is facing immediate and serious issues with respect to solid waste disposal. The landfill is expected to reach capacity by the end of 2010 and the only alternatives appear to be to expand the landfill, or to close it and export waste. There are significant issues with capital funds and serious environmental concerns at the landfill that must be addressed. Squamish must act quickly and decisively to ensure an economical and sound waste disposal system is available for the community.

This report provides Squamish with a proposed solid waste strategy that addresses a host of inter-linked issues related to solid waste management. The strategy supports the community's vision statements, including that by 2020, Squamish will be a leader in fostering social integrity, economic development, and environmental sustainability.

Solid Waste Goals and Objectives

Squamish currently does not have solid waste disposal goals or recycling objectives. By establishing specific goals, Squamish will have a framework to make decisions with respect to waste management. It is recommended that Squamish formally adopts the following solid waste goals:

- Enhance the solid waste decision-making process by launching a community-based engagement program,
- Decrease the community's waste from the existing 0.9 tonnes per person to 0.8 tonnes in 2015 and 0.6 tonnes in 2020, and
- Improve the community's waste disposal system by upgrading the landfill before the end of 2011.

Solid Waste Disposal

As noted above, Squamish must either expand the landfill and potentially import waste from Whistler in an effort to manage costs, or to close the landfill and export waste.

There is significant risk to the landfill closure option primarily because it will be difficult to secure an economical alternative. However, a vertical expansion of the landfill could be structured to address the existing environmental concerns at the site and enable operations on top of the liner for several years.

If waste from Whistler was accepted at the upgraded site, then Squamish would receive significant revenue from tipping fees and the site would capacity for approximately eight years.

Regulatory Consideration

In order to upgrade the landfill and accept waste from Whistler, a number of approvals are required. These approvals are all well underway and authorization has either been provided or is forthcoming from all agencies. No significant issues are expected.

Landfill Operations

The Squamish Landfill currently is out of compliance with a number of requirements that have been established by the Ministry of Environment. The non-compliance issues should be addressed immediately.

The contract with Carney's Waste Systems to operate and maintain the landfill is five years old and some portions of the agreement should be updated. The contract will become more out of date if Squamish upgrades the landfill. Given this, it is recommended that Squamish prepare a new operating contract for waste disposal services.

Residential Waste and Recycling Services

Squamish has retained Carney's Waste System to provide the services related to residential waste and recycling collection. Squamish should assess the residential services to determine if the waste and recycling program satisfies the community requirements and enhance recycling programs.

Solid Waste Utility

Several North American jurisdictions use utilities to manage municipal solid waste. By establishing a solid waste utility, revenues and expenses can be managed as a separate business unit and funding would not be shared with other services, such as parks, transportation and recreation programs. A utility that is based on a user pay system would provide stable funding and create an incentive for residents and business to reduce waste. A stable funding environment is important for operations that have relatively high capital and operating costs.

Key Recommendations

1. It is recommended that Squamish create an 18-month Solid Waste Manager position to oversee the solid waste program. The Manager's responsibilities would include the landfill upgrade project, revising the solid waste contract, assessing waste reduction programs and launching a community engagement initiative.

2. It is recommended that Squamish immediately commence the vertical expansion of the landfill and prepare to accept waste from Whistler. This waste disposal plan would provide Squamish with an eight-year disposal option and provide the financial resources that are required for capital and operating expenses.

3. It is recommended that Squamish prepare a new solid waste disposal contract to address the changing conditions at the landfill.

4. It is recommended that Squamish create a solid waste utility and develop a clear business plan to operate the utility in a financially sound and goal-oriented manner.

Section 1 - Solid Waste Goals and Objectives

The District of Squamish must immediately make several critical decisions to ensure its solid waste disposal program satisfies the community requirements. The Squamish Landfill is almost at capacity and there are serious environmental concerns at the site. Squamish could either expand the landfill, or to close it and export waste. The Ministry of Environment is anxious for Squamish to move forward on a plan - any plan - in order to bring the landfill into compliance with the landfill permit and environmental standards.

In order to make the best waste management decisions, Squamish must clearly understand its principles and values with respect to solid waste management. Until now, these values have not been articulated or defined. Establishing goals and objectives is a fundamental step to establishing any local government service.

SLRD Guiding Principles

In 2007, the Squamish-Lillooet Regional District (SLRD) completed a new Solid Waste Management Plan. This Plan includes a number of guiding principles and, as a key member of the SLRD, the District of Squamish endorsed these principles when the it supported the Plan. Some of the more relevant guiding principals are shown below:

- The Polluter Pays Principle shall be implemented to the greatest extent possible, such that producers and consumers are responsible for the costs of managing the pollution and waste they generate.
- The solid waste stream will be reduced to the greatest extent feasible, in accordance with the hierarchy of reduce, reuse, recycle, and consistent with local resources and the nature of the solid waste stream.
- The District will consider and utilize any new methods of municipal solid waste diversion that are environmentally and economically superior to current approaches.
- All policies, strategies, and facilities will be developed through public consultation, acceptable to the Ministry of Environment, and will be socially acceptable and cost effective, based on full accounting of costs and benefits, both monetary and non-monetary.
- Policies, strategies and programs will facilitate community economic health, to the greatest extent possible.

Recommendations

If Squamish clearly understands its solid waste goals, then it can make decisions which will help achieve success. At this time, Squamish has not established any goals or objectives and it appears there has been little community consultation. Given this, it is recommended that the Squamish formally adopts, through Council resolution or Chief Administrative Officer policy, strategic goals that address the immediate solid waste disposal problem while providing for future community engagement on broader waste reduction issues.

Goal # 1 - Enhance the solid waste decision-making process by launching a community-based engagement program

Community-based decision-making process has been used extensively in Canadian communities working on integrated resource and waste management strategies. This process brings together different community members to develop policies, programs, and strategies through a consensus building process. For example, the Halifax Regional Municipality involved the public in its search for a new landfill and the development of a resource and waste management strategy. The city recognized that residents would only accept a solution they themselves helped author. The result was visionary, achieving 50 per cent reduction in solid waste and provides a model for other communities.

This type of decision-making is often time consuming, taking from months to years, but can avoid later disagreements. Halifax took two years for its consultations.

Objectives:

The goals of enhancing community participation can be supported by the following:

- Invite community participation in the process through committees comprising of different stakeholder groups, such as environmental nonprofit organizations, with a direct interest in the issue and different views about solutions;
- Provide a variety of venues (e.g., workshops, forums, town hall meetings) and times where the public can express views and participate in the decision process;
- Have committee members commit to attending public forums and workshops to express support for the process and resolutions;
- Identify and develop specific issues that can be resolved through public consultations and input.

Goal #2 - Decrease the community's annual waste generation from 0.9 tonnes per person to 0.8 tonnes in 2015 and 0.6 tonnes in 2020[1]

Waste diversion, or recycling, directs garbage away from landfills or incinerators through reuse, recycling or composting. Waste diversion is a key component of effective and sustainable waste management. There are many benefits to waste diversion which are consistent with the corporate mission to protect and enhance the livability and sustainability of Squamish.

Economic benefits: Landfill lifetimes are lengthened by increasing waste diversion, saving the cost of creating new landfills or transporting waste to more distant landfills. Also, diversion creates jobs: on average, recycling 14,000 tonnes of waste creates nine jobs, but landfilling it creates just one job.

Objectives:

The goal of increasing waste diversion can be supported by the following:

- Implement solid waste user fees to promote waste reduction.
- Adjust the landfill tipping fees to fund Squamish recycling programs.
- Offset recycling costs by targeting recyclable material with high value and relatively stable markets.
- Identify and develop specific issues that can be resolved through public consultations and input.

Environmental benefits: Recycling uses less energy than disposal in a landfill and manufacturing with recycled materials is more energy-efficient than with virgin materials. And the greenhouse gases and toxins generated by landfills are reduced.

Social benefits: Waste diversion encourages environmentally sustainable behavior. Also, reduced landfill usage improves quality of life in communities and reduces the need for new landfill sites. And less reliance on landfills reduces pollutants and improves health.

[1] See Section 6 - Waste Reduction and Recycling for more details on rates and percentages of material.

Goal #3 - Improve Waste Disposal System by Upgrading the Landfill Before the End of 2011

The third and final goal is to improve the community's waste disposal system by upgrading the landfill before the end of 2011.

Waste disposal includes the process of collecting, processing and disposing of waste. In Squamish, waste is disposed of in a sanitary landfill, which is one of the most popular form of waste disposal, primarily because landfills are inexpensive.

The Squamish Landfill does not meet the environmental and health standards established by the Ministry of Environment. To address these concerns, and to ensure Squamish has an economical waste disposal system, there are a number of changes which could be implemented, as discussed throughout this report.

Objectives:

The goal of improving the waste disposal system in Squamish can be supported by the following:

- Adjust the landfill tipping fees to ensure there are sufficient revenues for the landfill operating and closure costs.
- Upgrade the landfill to ensure the facility is in compliance with environmental permits and legislation.
- Develop a long-term solid waste management plan which has the ability to accommodate future waste disposal options as they become available.

Section 2 - Solid Waste Disposal

The Squamish landfill is facing an urgent situation; it is quickly reaching capacity and will be 100% full by the end of 2010; therefore, something must be quickly done to ensure there is a viable waste disposal option for the community. There have been two primary options considered by Council over the past several years - either close the landfill and export waste to another facility, or expand the landfill and potentially import waste from Whistler in an effort to manage costs. On December 11th, 2007, Council considered its options and directed staff to commence development of a regional landfill[2].

A brief review of the available options is summarized below (landfill closure or vertical expansion). Given the lateral expansion option does not need to be decided immediately, this issue could be put on the back burner while the vertical expansion option is addressed. This is discussed further in Section 9 - Long Term Solid Waste Plan.

Landfill Closure

There are significant challenges with immediate closure of the Squamish Landfill. The estimated cost to close the facility and maintain it after closure is $6.6 million. Squamish has established a reserve of $2.9 million[3]; approximately $3.7 million less than required. Council could implement a tax increase to cover the shortfall, or could build additional reserves by delaying the closure and collecting tipping fees as discussed below.

It will be difficult to find a suitable option for waste disposal if the Squamish Landfill is closed. For several years, Metro Vancouver has been trying to develop a new landfill to replace Cache Creek, which is almost full. A new site is not yet available and Metro Vancouver is unwilling to accept waste from other communities because of the limited capacity at Cache Creek. Whistler and other communities that have recently decided to export waste are sending garbage to Washington State and recently, both the Province of British Columbia and the United States have indicated they plan to prevent future export of waste from Canada.

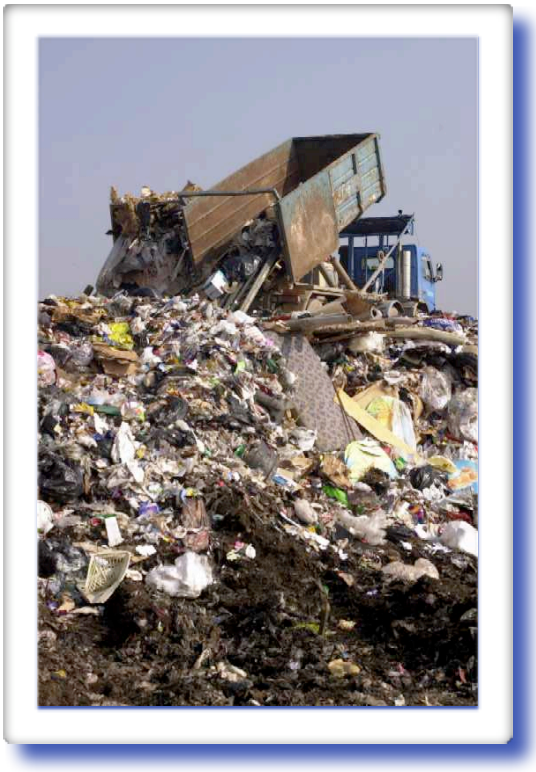
[2] See Section 3 of this report for more details regarding the Council report and resolution on December 11th, 2007.

[3] Sperling Hanson Pro-Forma Analysis, dated September 10, 2009

Given the situations described above, there is significant risk to the landfill closure option and, therefore, this is not a recommended approach at this time. It should be noted, however, there are several waste disposal options being pursued by others, including a waste incinerator for Metro Vancouver. It is generally expected that options will emerge as viable alternatives in a few years. These options are discussed further, below, in the section titled "Future Options".

Vertical Landfill Expansion

A detailed engineering report from Sperling Hanson Associates[4] discusses the viability of a vertical expansion of the Squamish Landfill and a considerable amount of work has been done to determine capital and operating costs.



In summary, the concept is to place a liner over the existing landfill. This would address a number of health and environmental concerns that exist. Once the construction is complete, the landfill operations would continue on top of the liner.

There are financial challenges associated with the expansion of the landfill. The total capital cost is estimated to be $6.7 million and the closure and post closure cost is estimated to be $6.6 million. Also, operating costs are expected to increase with new environmental controls that will be required for the expansion.

There are funding sources to assist municipalities with solid waste and environmental issues. For example, the Federation of Canadian Municipalities has a Green Municipal Fund (GMF) which offers below-market loans, in combination with grants, to support waste diversion projects. Rates for municipalities are 1.5 per cent lower than the Government of Canada bond rate. Eligible applicants can request up to $4 million in loans and

[4] Sperling Hanson letter report to the District of Squamish, dated September 10, 2009

$400,000 in grants for each project. FCM estimates the funding forecast for this program will be available until at least March 31, 2010.

Under the vertical expansion scenario, garbage could either include or exclude waste from Whistler. If Whistler's waste is accepted, then there are two significant considerations: First, the landfill will have only 8 years of capacity with Whistler's waste, as opposed to 15 years without. Second, Squamish will realize significant revenues from Whistler due to the landfill tipping fees. The financial issues are discussed below in more detail.

Financial Analysis - Vertical Expansion Including Whistler's Waste

Under the regional landfill scenario, approximately 55% of the landfill tipping fee revenue would be from other communities. It is expected that Squamish would take advantage of this revenue opportunity and adjust the tipping fees to finance all landfill capital and operating costs, as well as the residential recycling program in Squamish.

The tipping fee at the landfill is $80 per tonne for commercial waste but there is no tipping fee for residential waste which is collected under contract with Carney's Waste System. Squamish has accumulated approximately $2.9 million in reserve against the closure liability[5]. Under the financial plan outlined below, this $2.9 million would be recovered through the tipping fees.

Based on an estimated 33,400 tonnes per year, and a total cost of $26 million, the tipping fee would be $97/tonne over the 8 year period.

Revenues and expenses for the vertical expansion with Whistler's waste are summarized below.

[5] Sperling Hanson Pro-Forma Analysis, dated September 10, 2009

Table 1: Expenses For The Landfill Vertical Expansion Including Whistler's Waste

		(Million)
Solid Waste	Expansion Capital Cost	$6.7
	Closure Capital Cost	$3.9
	Operating Cost (See note 1)	$7.8
	Post Closure Operations and Monitoring	$2.7
	Closure Reserve Fund	$2.9
	Sub Total	**$24.0**
Recycling	Residential Collection (See note 2)	$2.0
	Total	**$26.0**

Note 1: $27.35/tonne x 33,400 tonnes/year x 8 years = $7.8 million

Note 2: $250,000/year x 8 years = $2.0 million

Table 2: Revenue For The Landfill Vertical Expansion Including Whistler's Waste

	Average Annual Waste (Tonnes)	Total Waste Over 8 Years (Tonnes)	Annual Tipping Fee at $97/ tonne (Million)	Total Tipping Fee Over 8 Years (Million)
Squamish	15,000	120,000	$1.450	$11.650
Whistler	16,000	130,000	$1.500	$12.400
Pemberton	1,800	14,400	$0.200	$1.400
Britannia Beach	500	4,000	$0.045	$0.350
Furry Creek	500	4,000	$0.045	$0.350
Pine Crest	55	440	$0.005	$0.040
	33,400	270,000	$3.245	$26.000

As shown above, other communities would provide approximately 55% of the total landfill tipping fee revenue. The total contribution from others would be 55% x $26 million, or $14.3 million. Most of the $14.3 million would be used for the landfill capital projects and operating expenses, however, under the scenario outlined above, Squamish would realize a net benefit of $2.7 million.

Table 3: Net Financial Benefit to Squamish

Landfill Closure Reserve Fund	$2.9 million x 55%	= $1.6 million
Recycling Program	$250,000 x 8 years x 55%	= $1.1 million
		$2.7 million

Given the revenue noted above, the net cost for Squamish to dispose of 120,000 tonnes of waste would be $8.95 million (i.e. $11,650,000 - $2,700,000) which is equivalent to $75/tonne over the 8 year period.

Financial Analysis - Vertical Expansion Excluding Whistler's Waste

Another option for waste disposal is to proceed with a vertical expansion of the landfill and provide for approximately 15 years capacity without accepting Whistler's waste. This option would also address most of the environmental and health concerns at the site.

As in the scenario outlined above, the landfill tipping fees could be adjusted to fund all landfill capital and operating costs as well as the residential recycling program. Some revenue would be collected from other communities which currently utilized the landfill (Furry Creek, Britannia Beach, etc), but this revenue would be small without Whistler's waste.

Squamish has accumulated approximately $2.9 million in reserve against the closure liability[6] and the landfill tipping fees would add to this reserve to ensure there are sufficient funds to close the landfill.

Based on an estimated 17,700 tonnes per year and a total cost of $24 million, the tipping fee would be $90/tonne over the 15 year period.

Revenues and expenses for the vertical expansion without Whistler's waste are summarized below.

[6] Sperling Hanson Pro-Forma Analysis, dated September 10, 2009

Table 4: Expenses For The Landfill Vertical Expansion Excluding Whistler's Waste

		(Million)
Solid Waste	Expansion Capital Cost	$6.7
	Closure Capital Cost	$3.9
	Operating Cost (See note 1)	$9.5
	Post Closure Operations and Monitoring	$2.7
	Closure Reserve Fund (See note 2)	(-$2.9)
	Sub Total	**$20.0**
Recycling	Residential Collection (See note 3)	$4.0
	Total	**$24.0**

Note 1: $36/tonne x 17,700 tonnes/year x 15 years = $9.5 million

Note 2: The Closure Reserve Fund is negative to indicate the funds are already established

Note 3: $250,000/year x 15 years = $4.0 million

Table 5: Revenue For The Landfill Vertical Expansion Including Whistler's Waste

	Annual Average Waste (tonnes)	Total Waste Over 15 Years (tonnes)	Landfill Tipping Fee at $90/tonne (Million)	Total Tipping Fee Over 15 Years (Million)
Squamish	15,000	225,000	$1.35	$20.250
Pemberton	1,800	27,000	$0.16	$2.400
Britannia Beach	500	7,500	$0.045	$0.700
Furry Creek	500	7,500	$0.045	$0.700
Pine Crest	55	800	$0.005	$0.075
	17,700	270,000	$1.600	$24.000

As shown above, Squamish would pay for most of the cost to expand, operate and close the landfill. Other communities contribute approximately 15% of the total tipping fee revenue. The total net contribution from others would be associated with the Squamish recycling program: $250,000 x 15 years x 15% = $560,000.

Squamish would dispose of 225,000 tonnes of waste at a cost of approximately $18.1 million ($18,700,000 - $560,000), which is equivalent to $80/tonne over the 15 year period.

Recommendations

The following recommendations are designed to ensure Squamish continues to have a cost effective waste disposal option that satisfies the community needs.

- In order to deal with the urgent concern of a landfill which is quickly reaching capacity, Squamish should immediately proceed with the initial stages of constructing a vertical landfill expansion including selection of an engineer.
- Squamish should immediately advise the Resort Municipality of Whistler, the Squamish-Lillooet Regional District and the Ministry of Environment that the landfill will be expanded and upgraded and will accept Whistler's waste, as described in the SLRD Solid Waste Management Plan.
- Squamish should request the Ministry of Environment to issue an Operational Certificate for the landfill, as this is a requirement to accept Whistler's waste.
- Squamish should thoroughly pursue funding opportunities, such as the FCM Green Municipal Fund.
- Squamish should increase the landfill tipping fees from the current $80 per tonne to $97 per tonne prior to the completion of the landfill upgrade project.
- Squamish should prepare a communications brief and issue a media statement which outlines the environmental and public health benefits of the landfill upgrade project as well as explains the landfill tipping fee adjustment.

Section 3 - Regulatory Considerations

In order to implement the vertical expansion of the landfill, as proposed in Section 2 of this report, there are several approvals that are required including from:

- District of Squamish
- Squamish-Lillooet Regional District, and
- Ministry of Environment

As discussed below, these approvals are well underway.

District of Squamish

On December 11th, 2007, Council received a brief staff report which outlined 3 waste disposal options: regional landfill expansion, landfill closure, and construction of an incinerator. The staff report did not contain a thorough discussion of costs, risks or implementation considerations. Council considered the staff report, which was accompanied by a presentation by the manager of operations and Sperling Hanson Associates. A Council resolution was passed which directed staff to commence development of a regional landfill.

Ministry of Environment

The Squamish Landfill operates through provisions in a Permit issued by the Ministry of Environment in 1978. Although the Permit was amended in 1993, it is outdated and does not contain many of the requirements in the "Landfill Criteria for Municipal Solid Waste" (the Criteria) which was released by the Province in 1993.

During the past several years, the Ministry has been phasing-out landfill permits and replacing them with Operational Certificates. These Certificates reflect more modern environmental and public health standards, as outlined in the Criteria.

The Ministry has indicated that it will replace the Squamish Landfill permit with a new Operational Certificate to reflect current legislation and Ministry standards[7]. It is likely that the Operational Certificate will contain much more strict leachate testing, monitoring and treatment

[7] This was noted in a letter from Ashley Smith, MOE solid waste officer, in a letter to the District of Squamish, dated December 9, 2008.

requirements as well as wildlife control, litter clean-up and requirements around daily operations.

SLRD Solid Waste Management Plan

In 1989, the provincial government amended the *BC Waste Management Act* to require every regional district to prepare a solid waste management plan. The Squamish-Lillooet Regional District (SLRD) completed its Solid Waste Management Plan (the "Plan") in 1996. The Plan originally called for the Squamish Landfill to close. However, the Plan was amended in 1999 to allow the Squamish and Whistler landfills to operate until 2008. A revised Plan was completed in 2007 which included the ability for the Squamish Landfill to be expanded as a regional landfill.

It is important to note that the Plan states Whistler is *required* to disposed of waste at the Squamish Landfill when the Ministry has replaced the outdated Permit with a new Operational Certificate.

The Plan's timeline for the development of a regional landfill in Squamish is shown below:

2008	Confirm landfill design and costs
	Obtain additional land from Crown
	Tender closure of old landfill and construction of new landfill (vertical expansion)
2009	Closure of old landfill
	Construction of new landfill (lateral expansion)
2010	New regional landfill operational

The Plan also recognizes that implementation schedules will be flexible to reflect priorities and available funding. [8]

[8] Refer to Section 8.4 of the 2007 SLRD Solid Waste Management Plan

Section 4 - Landfill Operations

Landfill Contract

Squamish has retained Evergreen Projects Limited (doing business as Carney's Waste Systems), on a sole source basis to operate the landfill site. The main services the contractor provides under this contract, is the following:

- Sanitary landfill maintenance and operation
- Burn site maintenance
- Recycling area maintenance
- Land clearing and wood waste maintenance

The contract was authorized on January 1, 2005 and it expired on December 31, 2009. Effective January 1, 2010, the contract was "automatically" extended and remains in effect until either party provides 180 days notice.

Ministry of Environment

In December 2008, the Squamish Landfill was inspected by Mr. Ashley Smith, solid waste officer for the Ministry of Environment. Mr. Smith followed-up with a letter outlining "numerous compliance issues and health concerns". The Ministry's concerns focused on day-to-day operational issues, such as litter clean-up, as well as leachate management. Mr. Smith concluded that Squamish was out of compliance with its Permit and asked for an action plan to address their concerns.

Sperling Hanson responded to the Ministry, on behalf of Squamish, and outlined an action plan in a letter dated January 9, 2009. Unfortunately it appears that the District has not implemented many of the items on the action plan.

Recommendations

- Based on the Ministry of Environment's inspection of December 2008, the landfill operations were not in compliance with the requirements of the Permit. This issue should be addressed immediately.

- The contract with Carney's Waste Systems has passed its expiry date, but remains in effect due to an "automatic" renewal clause. The contract is outdated, especially if the landfill is upgraded and new operational conditions are established by the Ministry of Environment via an Operational Certificate. Given this, it is recommended that Squamish prepare a new contract for waste disposal services.

Section 5 - Residential Waste and Recycling Services

Squamish retained Carney's Waste System, on a sole source basis, to provide the services related to:

- Residential garbage collection
- Residential recycling program, and
- Recycling and sorting of material

The agreement was authorized on January 1, 2005 and expires on December 31, 2013. Key terms of the agreement are summarized below.

- The Contractor will provide a bear-resistant 65 gallon tote to every residential dwelling for waste disposal and empty the container every two weeks.
- The Contractor will provide every residential dwelling a 65 gallon tote for recycling materials (metal containers, paper, cardboard, plastics and other material designated by Squamish) and empty it every two weeks.
- The Contractor is required to carry out an educational program to ensure residents have good information on waste disposal and recycling.
- The Contractor is required to provide and maintain a Recycle Center to sort and handle all of the residential recycling material that is collected.

Municipal Costs and Revenues

Squamish pays the Contractor almost $100,000 per year to supply bear-resistant containers to residential dwellings. Squamish also pays the Contractor an additional $500,000 annually to service the waste and recycling containers.

Squamish collects a flat rate of $100 per residential household to fund the residential waste and recycling programs. With 5,400 properties, Squamish collects $540,000, which is almost $100,000 less than the cost of the residential collection service.

User Fees

User pay or user fees are terms generally describing the practice of charging a variable fee for solid waste services. User fees are sometimes known as pay-as-you-throw, or variable rates.

One option to encourage waste reduction in Squamish is to implement user fees for residential waste collection. Under a user fee system, the more waste generated from a residence, the more the homeowner will pay. This can be accomplished in a number of methods which does not burden the District with complex billing systems. This system would allow properties that produce less waste to be charged less than their neighbors that generate produce more garbage.

It is also proposed to not charge residential fees for the recycling program. Instead, revenue to fund the recycling program will be collected through the landfill tipping fees.

Evaluation of Existing Residential Recycling Program

In order to understand the most economical waste reduction opportunities, is necessary to examine the current recycling program. One key consideration area to consider, when examining the effectiveness of a program, is the number and type of complaints that have been received from the public.

In 2008 and 2009, the District of Squamish received approximately 20 complaints pertaining to the residential garbage collection program. Virtually all residents stated the same concern;

they were opposed to changing from a weekly garbage collection schedule to a biweekly schedule, especially during summer months. The reason for the opposition was generally because homeowners produced more waste than one container could handle, and 2-week old garbage produced an offensive odour, which was possibly a wildlife attractant.

As part of this *Comprehensive Solid Waste Strategy*, a brief survey was completed to determine if the residents were still unsatisfied with the service. Four residents replied to the survey and they are now in support of the biweekly program.

The residents have managed to reduce waste by recycling or composting more material and the biweekly waste collection generally does not cause any difficulties. It was suggested that weekly pick-up would be beneficial during the summer (to reduce odour) and during the Christmas period (to help deal with the high volume of waste).

Comparison with Communities of Similar Size

The existing residential recycling program can be compared with other communities to assess costs and efficiencies. Perhaps the most comprehensive data on solid waste performance measures in Canada is contained in the report titled *Ontario Municipal Performance Measurement Program*. The 2007 edition shows the following cost comparison for communities of a similar size to Squamish:

Table 7: Waste Disposal Costs

	Ontario	Squamish
Garbage collection ($/household)	$102	$113
Garbage disposal ($/household)	$46	$11
Solid waste management ($/household)	$151	$124
Number of complaints per year (per 1,000 home)	6	5 – 10
Residential solid waste diverted (tonnes/total waste)	30%	22%

It is also worthwhile to compare the Squamish residential waste and recycling program with other communities in British Columbia that have a similar population. Some information regarding other BC communities was presented to Council in a staff report.[9] It appears that there have been no significant changes to the comparison communities with respect to solid waste management during the past year, as shown below.

Table 8: Recycling Collection

	Population	Homeowner Cost ($/Yr)	Frequency	Volume per Household
Dawson Creek	11,514	N/a	N/a	N/a
Esquimalt	17,628	General taxes	Every 2 weeks	One blue box
Port Alberni	17,741	General taxes	Every 2 weeks	77 liters, max.
Comox	13,444	Solid waste fees	Every 2 weeks	One blue box, min.
Central Saanich	16,701	N/a	N/a	N/a
Terrace	11,675	N/a	N/a	N/a
Squamish	17,181	Solid waste fees	Every 2 weeks	246 liter container

Table 9: Waste Collection

	Homeowner Cost ($/Yr)	Frequency	Volume per Household
Dawson Creek	$144	Weekly	Three 45 liter containers, max.
Esquimalt	Part of general taxes	Every 2 weeks	Two 130 liter containers, max.
Port Alberni	$105	Weekly	Two containers
Comox	$138	Weekly	One 121 liter container
Central Saanich	N/a	N/a	N/a
Terrace	$104	Weekly	Two containers
Squamish	$100	Every 2 weeks	One 246 liter container

[9] The Staff report was titled *Phase 2 Carney's Waste Systems Proposal*, and dated September 2, 2008.

Recommendations

- Squamish should enhance the residential recycling program by developing a comprehensive social-marketing program and focusing on common household products such as paper, cardboard, plastic, aluminum, tin cans and glass.
- Squamish should enhance its special waste collection program to ensure dangerous products are not discarded in the residential waste stream. Special waste includes fluorescent light bulbs, pesticides, flammable liquids, electronics, oils and paint.
- Squamish should re-consider a yard-waste collection program to reduce solid waste. A community engagement program should be launched to obtain input from homeowners on waste collection options that offer a wide range of options: from backyard worm composting to the Whistler Composter.
- Squamish should research various user pay options for the household waste collection and prepare the required bylaw and budget modifications.

Section 6 - Recycling and Waste Diversion

In order to assess the effectiveness of the various business and commercial recycling programs in Squamish, it is necessary to examine data from other locations. This comparison will provide a benchmark for waste reduction.

Since recycling is done by many companies and organizations in a community, it is difficult to determine how much material is recycled in Squamish and other communities. However, waste disposal rates are often easy to determine because the local government usually provides the only disposal service in a community. Given this, it's important to understand the waste disposal rates in Squamish.

In British Columbia, the average waste per capita is 0.66 tonnes per year. Data for Squamish is shown below.

Table 6: 2009 Squamish Solid Waste Data

	Waste (Tonnes)	Recycled (Tonnes)	Total Material (Tonnes)
Residential	2,818	785	3,603
Commercial	8,592	860	9,452
Private Drop-off at Landfill	6,741	721	7,462
Recycle Centre	0	2,353	2,353
Construction Material	0	1,365	1,365
Compost	0	221	221
Biosolids	0	1,363	1,363
Wood chips	0	859	859
TOTAL	18,151	8,527	26,678

It is estimated that about 20,000 people utilize the Squamish Landfill (i.e. Pemberton, Pine Crest, Furry Creek, etc). Given this, the estimated waste generation rate in Squamish is approximately 0.9 tonnes per person.

Waste Reduction Opportunities

There are several Squamish recycling and waste diversion programs in place for the commercial and business sectors. These programs include collection of material, primarily from Carney's Waste Systems, as well as drop-off opportunities at the Recycle Centre and the Squamish Landfill.

Perhaps the best opportunity to increase waste diversion is by enhancing the existing facilities and provide better customer service to the public. In general, the drop-off facilities are unappealing because they are not well maintained, there is poor lighting and there is exposure to the elements. As part of the landfill upgrade project, the public drop-off facilities can be improved. Also, as part of the solid waste disposal contract, which requires modifications, standards should be established to ensure the contractor's facilities meet the District's expectations.

In addition to addressing deficiencies with the existing waste diversion systems, there are considerable opportunities to add new services. There is interest in Squamish to establish a materials exchange centre for building materials (kitchen cabinets, doors, windows, etc). This could be investigated in partnership with the private sector. A demolition bylaw would help ensure the success of a material exchange centre.

There is also interest for a re-use-it center in Squamish. This facility would act as a central exchange for personal items (clothing, books, toys, bicycles, etc). These exchange centers have been very successful in other communities.

There is also the opportunity to ensure new and existing developments have adequate recycling space on their premises. There are provisions in the development approval process for waste management, but the standards could be enhanced to ensure all projects have sufficient space for to sort and store recycling material.

It is expected that the waste diversion efficiency would increase by moving forward in a comprehensive manner, as outlined above.

Recommendations

In order to increase recycling efficiencies, it is recommended that Squamish make a number of improvements to the existing waste management facilities and also pursue new programs.

- Squamish should assess the effectiveness of the various recycling and waste diversion programs that are available to the commercial and business sectors.
- The public drop-off areas at the landfill should be improved as part of the landfill upgrade project.
- There should be specific standards for the drop-off areas provided by the contractor under the terms of the slid waste management contract.
- Squamish should work with the private sector and non-profits to pursue a local material exchange centre and/or a re-use-it centre.
- When reviewing development projects, Squamish should ensure there is adequate space for sorting and storage of recyclable materials.

Section 7 - Solid Waste Utility

Current Administration Structure

The District solid waste services are shared amongst several departments. The Manager of Operations is responsible for the District's solid waste public services including landfill operations and waste collection, which are contracted services. The Manager is responsible for solid waste leadership, planning, customer service, and establishing service standards.

The Manager of Engineering is responsible for capital projects, including landfill upgrades.

Finance Department oversees the municipal budget. Solid Waste revenues are collected through landfill tipping fees ($1.3 million) and an annual household refuse collection fee ($630,000). These fees and charges form part of the General Fund. Solid waste operating costs amount to approximately $1.5 million per year. Additionally, a closure and post-closure reserve has been established, as required by the provincial government. Squamish estimates the closure and post-closure liability at $3.3 million based on the landfill reaching capacity in 2015[10]. Sperling Hanson estimates the closure and post closure cost at approximately $6.6 million[11]. This discrepancy should be resolved.

Utility Model

Several North American jurisdictions use utilities to manage municipal solid waste. The solid waste utility operates like a water or power utility: residents are billed for the municipal service provided.

In general, solid-waste utilities offer municipalities two unique advantages including:

Protection of solid waste finances from budget cuts

Because utilities are usually self-financing through user fees or flat-rate charges to consumers, the programs are somewhat protected from budget cuts caused by shortfalls in other areas or by economic downturns.

[10] Refer to District of Squamish Consolidated Financial Statements, dated December 31, 2008.

[11] Refer to Sperling Hanson Pro-Forma Analysis, dated September 10, 2009.

Increased public awareness of waste costs

A utility's rates are visible to the consumer, as opposed to services financed by the tax base. Cost awareness is key to waste reduction, as the latter activities can be tied directly to cost savings.

When establishing a utility, care must be taken to explain how the system works, or it may be perceived by residents as a fee for services already covered by taxes. Transparency is key; the waste management component of taxes can be highlighted a year in advance on bills, then removed when the utility is put in place (to be replaced by utility fee).

The steps required to establish a solid waste utility are straight forward and involve municipal bylaws as permitted under the *Local Government Act*. Additionally, the District budget will need to be modified to establish the utility's operating, capital and reserve accounts.

Recommendations

It is recommended that Squamish establish a solid waste utility by preparing the required bylaws and adjusting the municipal budget to reflect a self-funded operation.

Section 8 - Action Plan

Manager of Solid Waste

A considerable amount of work is required by the District of Squamish over the next eighteen months.

- In order to upgrade the landfill, Squamish must issue an RFP for engineering services and select an engineer. Squamish must also oversee project management, including liaison with the design engineer, issue a tender for the construction work and select a contractor. After the construction is awarded, Squamish will be responsible for project management for several months.
- A new contract for landfill operations must be prepared to reflect new requirements that will be established by the Ministry of Environment. The contract must be issued and a contractor must be retained. Squamish will be responsible for contract management, which may be time-consuming during the construction and post-construction phases of the project.
- Squamish should pursue grants from senior levels of government to provide financial assistance for the upgrades to the landfill.
- Concurrently with the construction program, Squamish must negotiate with Whistler and the Ministry of Environment to ensure all approvals are in place to upgrade the landfill and accept waste from Whistler.
- To encourage waste reduction and to ensure there are sufficient funds for waste management, the landfill tipping fees and the residential waste collection fees should be adjusted.

In order to ensure sufficient resources are allocated to successfully complete the work, the District should retain, on an 18-month term, a Manager of Solid Waste, that reports to the Manager of Engineering. It is anticipated the new Manager of Solid Waste will find opportunities to reduce costs and to increase efficiencies.

Waste Disposal

As discussed in Section 2 - Residual Disposal, it is recommended that Squamish immediately proceed with a vertical expansion of the landfill. This option would address a number of environmental concerns, including leachate management, and would provide Squamish about 8 years worth of waste disposal capacity. During the operational period, the landfill tipping fees would be structured to collect sufficient funds for the landfill capital and operating costs, as well as provide funding for recycling programs in Squamish.

The pre-design reports for the vertical expansion were prepared by Sperling Hanson Associates, and they have offered their services as the primary consultant on a design-build contract in partnership with Carney's Waste Systems[12].

A discussion on the benefits of a design-build contract, as well as other options, follows:

Design-Build

The design-build procurement option is normally utilized on civil projects, such as a basic bridge or building. The simplicity of the project usually enables all parties to ensure the design and construction risks are low prior to entering into a contract.

If quantities of material are uncertain, or if the project involves complex construction methods, then the owner does not have a clear understanding of the costs before the work begins. Consequently, contract administration costs can become very high because equipment and materials must be carefully recorded on a daily basis for payment purposes.

In the case of the landfill, the unit volumes of material such as sand, gravel, clay and cover liner cannot be well defined until the contractor starts to expose stockpiles of material and garbage. Given this, the owner will have significant cost risks, (i.e. uncertainty of the construction costs before work begins) therefore the design-build approach may not be the preferred option.

[12] The SHA and Carney's Design-Build proposal was presentation to Mayor and Council on October 13, 2009.

Design-Bid-Build

As an alternative to the design-build option, the traditional design-bid-build approach may be a preferred choice for the landfill upgrade. Under this method, Squamish would issue a request for proposals (RFP) for engineering services and award the design work to the qualified firm which offers a competitive price. (Alternatively, Squamish could award the engineering work to Sperling Hanson or another firm without a RFP process.)

The engineer would complete the design and prepare contract documents that ensures Squamish does not assume responsibility for risks outside of its control; for example, Squamish cannot guarantee water table levels, or the exact amount of stockpiled sand and gravel. The tender form would ensure the contractor submits prices in a format that is beneficial to Squamish - i.e. lump sum price for dewatering, unit rates for supply of sand and gravel based on estimated amounts, etc. The Master Municipal Contract Documents provide a good template and general conditions for a contract.

After the engineer completes the design and issues the tender documents, the construction work would be awarded to a qualified contractor with the lowest price.

Design-Build-Operate

Another method to upgrade the landfill is a design-build-operate (DBO) contract. Under this scenario, Squamish would tender the expansion work along with the operations. The successful proponent would oversee the construction and operation. This method is intended to minimize the life cycle costs of a project.

This procurement option is not recommended because a DBO contract takes longer to implement. Contract documents are relatively complex because they involve both construction and operational considerations and, therefore, more time is required to prepare the agreement. Also, because the size and scope of the contract is larger than just a construction project, the tender period and evaluation period is often longer. Squamish needs to upgrade the landfill as soon as possible because it is almost at capacity, so the DBO option presents significant difficulties from a timing perspective.

The traditional design-tender-build option would likely ensure Squamish obtains the lowest price for the engineering and construction work for the project.

Waste Reduction

As discussed in Section 6 - Recycling and Waste Reduction, in order to make long term improvements to waste reduction programs, it is necessary to enhance the existing recycling systems. Squamish should initiate a community-based decision-making process with the goal of improving waste diversion programs.

Long Term Waste Disposal

Major decisions regarding future landfill expansions do not need to be considered for a few years because the vertical expansion of the Squamish landfill will provide approximately 8 years of capacity. Additionally, other disposal options appear to be developing and will likely emerge as viable alternatives in a few years from now. For example, the Highland Valley Copper Landfill[13] project was approved in 2008 and is expected to commence operations when economic conditions are favorable. Also, the Cache Creek Landfill has applied for a significant expansion. And Metro Vancouver could be getting at least one new waste-to-energy incinerator as early as 2015, according to the latest draft of the regional district's new Solid Waste Management Plan.

Clearly, waste disposal is a growing field and it is likely that a new option will be available in a few years. Given this, an eight year landfill expansion in Squamish would likely provide the community with a strategic advantage with respect to future options.

An assessment of long term disposal options should take place a few years before the 8 year vertical expansion of the Squamish Landfill reaches capacity. This would be a key responsibility for the proposed Manager of Solid Waste.

[13] The Highland Copper Valley Landfill has enough capacity for 50 million tonnes of waste, or approximately 80 years lifetime based on waste from Metro Vancouver.

If an economical option for waste disposal at another site does not emerge, then Squamish could proceed with the proposed lateral landfill expansion. The technical reports which assess the viability of a lateral expansion suggest there is sufficient capacity for several decades of waste disposal.

Recommendations

In order to ensure the landfill upgrade is done quickly and at the lowest possible cost while meeting specific design criteria, the following is recommended:

- In order to successfully deliver the work program, the District should retain, on an eighteen month term, a Manager of Solid Waste, that reports to the Manager of Engineering.
- Squamish should immediately issue a RFP for engineering services related to the proposed upgrade to the landfill and select a consultant based on qualifications, experience and costs.

End of Report