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<b>To:</b>	Regional Solid Waste Advisory Committee	<b>Date:</b>	April 4, 2018
<b>c:</b>	Rory McKenzie Janette Derksen	<b>Memo No.:</b>	3
<b>From:</b>	Lauren Quan, P.Eng. Carey McIver, M.A.	<b>File:</b>	704-SWM.SWOP03664-01
<b>Subject:</b>	Tech Memo 3 – Options Costing and Financial Implications		

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*This 'Issued for Review' document is provided solely for the purpose of client review and presents our interim findings and recommendations to date. Our usable findings and recommendations are provided only through an 'Issued for Use' document, which will be issued subsequent to this review. Final design should not be undertaken based on the interim recommendations made herein. Once our report is issued for use, the 'Issued for Review' document should be either returned to Tetra Tech Canada Inc. (Tetra Tech) or destroyed.*

## 1.0 INTRODUCTION

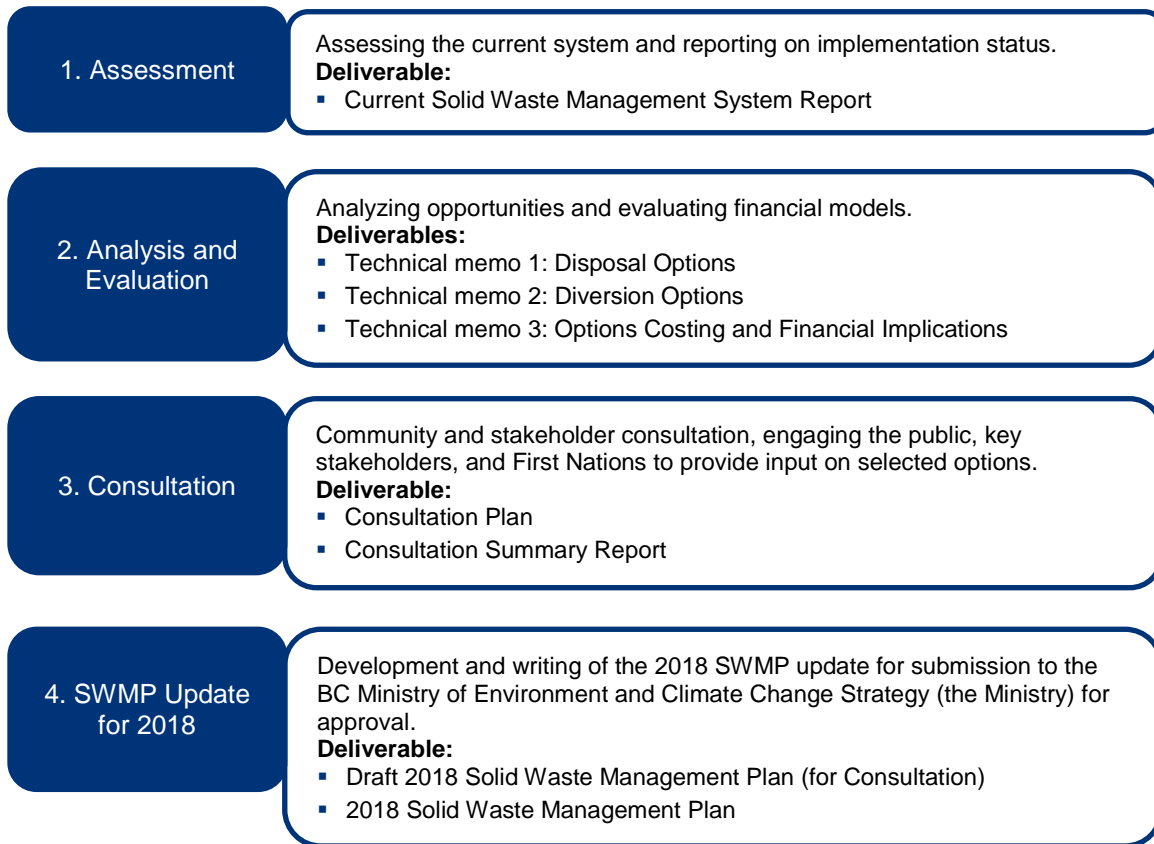
The Regional District of Bulkley-Nechako (RDBN) retained Tetra Tech Canada Inc. (Tetra Tech), MWA Environmental Consultants Ltd. (Maura Walker), and Carey McIver and Associates Ltd., (the Consulting Team) to manage a review and update of the RDBN's 1996 Solid Waste Management Plan (SWMP). The 2018 SWMP update will review existing solid waste management policies and programs, identify and evaluate options for reduction and diversion, residual management, and financing, and set the RDBN's waste management principles, targets and strategies for the next ten years. A summary of the project stages is included on Figure 1-1.

During the Stage One Assessment, the Consulting Team reviewed the current system, identified potential gaps and opportunities and presented their findings in the Current Solid Waste Management System Report. The Consulting Team presented this report to the Regional Solid Waste Advisory Committee (RSWAC) at their first meeting on January 24, 2018.

For Stage Two Analysis and Evaluation, the Consulting Team presented options related to additional reduction and diversion as well as residual management to the RSWAC as a Power Point webinar on February 21, 2018. Based on feedback from the Webinar, the Consulting Team issued two Technical Memoranda (Tech Memo) to assess opportunities for and evaluate: recovery and residual management (Tech Memo 1); and diversion options (Tech Memo 2).

The RSWAC reviewed these two Tech Memos at their March 7, 2018 meeting and selected a series of options to increase reduction and diversion and improve residual management. This third Tech Memo provides information on the costs associated with the diversion and residual management options selected by the RSWAC, the implications of these options on the 2018-2022 Financial Plan as well as cost recovery options and associated potential bylaw amendments.

The project consists of four stages, as shown on Figure 1-1.



**Figure 1-1: Project Phases and Associated Deliverables**

## 2.0 DIVERSION AND RESIDUAL OPTIONS COSTING

The following sections summarize the estimated operating and capital costs of implementing the diversion and residual options approved for further analysis by the Regional Solid Waste Advisory Committee.

### 2.1 Diversion Options

This SWMP review process has identified issues and associated program and policy options available to reduce the current RDBN 645 kilogram per capital disposal rate (in 2015). The issues and options are summarized below.

#### 2.1.1 Option 1: Reduce and Reuse

##### 2.1.1.1 Promote ideas from “Love Food Hate Waste”-style campaigns in regional education and communication.

Available statistics indicate that up to 6% of the waste disposed in RDBN landfills may be avoidable food waste. Based on the relatively low cost and high potential of reducing food waste, the region will incorporate information on food waste reduction into regional education programs.

**2.1.1.2 Encourage and promote food donation for businesses and restaurants to food banks and farms.**

Food waste occurs at many restaurants and businesses due to surplus in food and spoilage due to lack of planning and transportation delays. The region will encourage food donation by providing information through regional education programs to support food rescue through food banks (for people) and farms (for animals).

Actions	Estimated Capital Cost	Estimated Operating Cost
Promote ideas from “Love Food Hate Waste”-style campaigns in regional education and communication. Encourage and promote food donation for businesses and restaurants to food banks and farms.	-	0.1 FTE

**2.1.2 Option 2: Residential Recycling**

**2.1.2.1 Lobby the Province to reduce or eliminate the proposed Recycle BC population cut-off for curbside service.**

Although residents of small communities in British Columbia (BC) with populations less than 5,000 pay for recycling services as consumers of packaging and printed paper (PPP), under Recycle BC’s proposed Stewardship Plan they are not eligible for the same level of service as residents in communities with populations greater than 5,000. The region, in consultation with other largely rural regional districts, will lobby the Ministry to address this inequity in their review and approval of the revised Recycling BC stewardship plan. A letter should be written from the RDBN Board of Directors to the Minister of Environment and Climate Change Strategy expressing concern in the inequity in service between urban and rural populations.

**2.1.2.2 Host Recycle BC depots at all RDBN public drop-off facilities (where practical).**

**With Board approval, accept the Recycle BC offer to join the program as a contracted depot collection partner with depots at RDBN facilities to provide access to residential PPP recycling services in all waste sheds.**

By shifting the responsibility for the cost of collection, sorting and recycling residential PPP from local governments to producers and consumers, the Province has significantly reduced the barriers faced by the RDBN in implementing programs to recycle residential PPP. Consequently, it is incumbent on the RDBN to take full advantage of the services offered by this stewardship program.

In December 2017, Recycle BC provided a formal offer to the RDBN to join the Recycle BC program as a contracted depot collection partner for a period of five years. The deadline to formally accept this offer and submit signed collection agreements to Recycle BC is September 1, 2018. To become a contracted depot collection partner, the RDBN would need to meet the requirements of the Depot Statement of Work (SOW) and sign a Master Services Agreement (MSA) with Recycle BC. Depots must be staffed when open and secure when closed. Depots must also be sufficiently staffed to ensure interaction with residents, checking of program material and removal of contaminants. Collected material must be stored in a way that protects material quality from inclement weather such as rain and snow.

The region has opted to purchase modified shipping containers (sea-cans) to begin providing collection of Recycle BC materials at the Vanderhoof Transfer Station (VTS) and Smithers-Telkwa Transfer Station (STTS) in 2018. Two sea-cans are expected to be required for the region’s largest transfer stations. The region has opted to increase staffing levels at STTS and VTS so that an attendant is supervising the reuse shed and Recycle BC depot during

all transfer station hours. The same assumptions have been used to set the budget for the depot at the Burns Lake Transfer Station (BLTS). Additional staff hours and one sea-can per site have been added to support management of the RecycleBC depots at the Fort St. James Transfer Station (FSJTS), the Area D Transfer Station (ADTS), and the Houston Transfer Station (HTS) at Knockholt Landfill for the busiest hours at the transfer stations. It is assumed that the existing transfer station attendant will supervise the Recycle BC depot during non-peak times. The smallest transfer stations (Southside Transfer Station and Granisle Transfer Station) are budgeted for one sea-can with a part-time recycling coordinator to support public communication and education and on-site supervision by the existing transfer station attendant.

The approved 2018 regional budget provides total subsidy of \$263,448/year to local recycling organizations from 2019 to 2022. This equates to an average per capita subsidy of \$7.40 throughout the region to fund recycling programs and support public communication/education. Proposals from local recycling organizations were considered on a case-by-base basis by staff and the Board for approval.

With the establishment of Recycle BC depots throughout the region, there is an opportunity to create a standard for funding local organizations to support the region's overall waste reduction, reuse, and recycling goals. The Board has approved staff plans to implement a Recycle BC depot at VTS. The staff plan included a \$20,000 subsidy to the Nechako Waste Reduction Initiative to provide public education, public communication, recycling coordination and support reduction, reuse, and recycling initiatives in the area. This Board-approved subsidy equates to \$2.50 per capita in the area serviced. For budgeting purposes, a subsidy of \$2.50/capita (serviced population) has been applied to each local recycling organization subsidized under the region's existing budget and five-year financial plan. This represents a significant decrease in the region's contributions to local organizations (a reduction of approximately \$212,000/year total) in favour of providing services at the existing transfer stations and landfills. No allocation to local organizations has been assumed for populations receiving curbside recycling collection as all municipalities with curbside collection programs receive funding from Recycle BC to provide recycling education to their residents.

Based on the success of these future residential recycling programs the region may also elect to construct consolidation centers for residential PPP. The decision to construct consolidation facilities will depend on the tonnage of recycling collected in the catchment area of the facilities and the incentives available from Recycle BC for providing consolidation and baling services. Consolidation facilities are contemplated for each of the eastern and western sections of the region (expected to be located at the Vanderhoof Transfer Station and the Smithers-Telkwa Transfer Station respectively). The estimated capital cost for the construction of a basic fabric-covered structure for storage and baling and purchase of a horizontal baler is estimated at \$634,000.

**Table 2-1: Recycling Consolidation Facility - Estimated Capital Cost**

Item	Estimated Costs
Mobilization/Demobilization and Contract Costs	\$78,268
Site Preparation	\$37,340
Storage Building (10 m x 15 m)	\$150,000
Lock Block Wall	\$32,000
Surfaces (gravel surface)	\$12,000
Horizontal Baler	\$100,000
Fork Lift	\$60,000
Subtotal	\$469,608
Engineering/Design (15%)	\$70,441
Construction Management (5%)	\$23,480
Contingency (15%)	\$70,441
<b>Total Estimated Cost</b>	<b>\$633,971</b>

Actions	Estimated Capital Cost		Estimated Operating Cost
Lobby the Province to reduce the proposed Recycle BC population cut-off for curbside service.	-		Current Staff
Host Recycle BC depots at all RDBN public drop-off facilities (where practical).	<b>Facility</b>	<b>Capital Costs</b>	Full-time staff for re-use shed and Recycle BC depot at the three largest transfer stations: \$51,250/year (additional) Part-time staff at three medium-sized transfer stations: \$29,874/year (additional) Recycling Coordinator to support education and resident engagement at small transfer stations and throughout the region: \$30,000/year Subsidy to local organizations for communication and education: -\$212,200/year Not assessed.
	Smithers-Telkwa Transfer Station	\$30,000	
	Granisle Transfer Station	\$15,000	
	Burns Lake Transfer Station	\$30,000	
	Fort St. James Transfer Station	\$15,000	
	Area D Transfer Station – Fraser Lake Rural	\$15,000	
	Southside Transfer Station	\$15,000	
	Vanderhoof Transfer Station	\$25,000	
	Public Drop-Off at Knockholt Landfill*	\$15,000	
Consolidation Center (each)	\$634,000		

## 2.1.3 Option 3: Industrial Commercial Institution (ICI) Recycling

### 2.1.3.1 Work with the private sector to educate businesses on recycling options.

Develop consistent signage and messaging for use by municipalities, businesses and institutions on collection containers and within the workplace. Consistency within the region should result in better participation in recycling and lower contamination of the recyclables.

### 2.1.3.2 Implement disposal restrictions on readily divertible materials.

The RDBN currently defines corrugated cardboard as a regulated recyclable material and restricts its disposal at transfers stations and landfills. All stewardship materials, including PPP collected by Recycle BC should be added to the list of regulated recyclable materials to support diversion in the residential sector and encourage private-sector services in the ICI sector.

### 2.1.3.3 Advocate for ICI PPP to be included in Extended Producer Responsibility (EPR) legislation in the North.

Northern communities do not have local markets for recyclable materials. While much of the lower mainland and Vancouver Island is well serviced by the private sector for ICI recycling, rural and northern communities typically lack services due to the cost of transporting recyclables to consolidation facilities and eventually to commodity markets. The region will lobby the Ministry to address the challenges of ICI recycling in northern communities. A letter should be written from the RDBN Board of Directors to the Minister of Environment and Climate Change Strategy expressing the need for additional programs and resources to support ICI recycling in the North.

### 2.1.3.4 Provide ICI only cardboard bins at transfer stations for small load ICI Old Corrugated Cardboard (OCC) or consider including small load ICI PPP with residential.

Provide a bin for small load ICI OCC at large and medium sized transfer stations.

Actions	Estimated Capital Cost	Estimated Operating Cost
Work with the private sector to educate businesses on recycling options. Implement disposal restrictions on readily divertible materials. Advocate ICI to be included in EPR legislation in the North.	-	0.25 FTE
Provide ICI only cardboard bins at transfer stations for small load ICI OCC or consider including small load ICI PPP with residential.		Bins at STTS, BLTS, FSJTS, VTS, HTS: \$8,500/year

## 2.1.4 Option 4: Organics Diversion

### 2.1.4.1 Improve backyard composting program.

Backyard composting is a cost effective and environmentally friendly way to produce nutrient-rich soil for the yard and garden. Increasing the number of subsidized composters available while improving education programs is a low-cost way to decrease the organic material going to the landfill. A 20% increase in program budget will provide additional composters for distribution to residents in the region.

### 2.1.4.2 Develop Regional Composting Facilities

**Collaborate with municipalities to identify options to collect organics (i.e., food scraps, food soiled paper, yard and garden debris). If demand for organics processing exists, assess requirements for centralized composting facilities to process collected organics.**

Any municipality that is currently collecting garbage from residences could consider implementing a curbside collection of organics. Curbside collection has shown a higher diversion rate compared to drop-off programs as the system is convenient and easy to use.

If there is demand for organics processing, the region will consider constructing a demonstration compost facility appropriate for the volume and type of material diverted to be located at an RDBN transfer station or landfill. An appropriate composting technique should be selected based on the projected tonnes of organics (food scraps, food soiled paper and yard and garden debris) collected, the space available for processing, potential vectors, and the anticipated end use of the compost material. Based on likely tonnages available from the larger municipalities in the region and assumed end-use of landfill cover material, small low-tech facilities could be constructed to process the organic material collected until the tonnage is sufficient to warrant more mechanized solutions.

A regional facility would be expected to process food scraps collected at curbside in multiple municipalities (including the Town of Smithers, Village of Telkwa, District of Vanderhoof, and Village of Burns Lake), collected from ICI in multiple municipalities (including the Town of Smithers, Village of Telkwa, and District of Vanderhoof), and dropped off at transfer stations throughout the region. An equal amount of carbon-dense material (yard waste and woody waste) would be required to balance out food scraps for organics processing.

**Table 2-2: Summary of Estimated Annual Organics Available for Processing at Compost Facilities**

Sector	Vanderhoof Transfer Station	Smithers-Telkwa Transfer Station	Regional Organics Facility
Residential Curbside Food Scraps (52kg/capita)	228 tonnes	344 tonnes	660 tonnes
Drop-Off Food Scraps (10kg/capita)	36 tonnes	53 tonnes	163 tonnes
ICI Food Scraps (30kg/capita – Urban)	133 tonnes	202 tonnes	335 tonnes
<b>Total Food Scraps</b>	<b>397 tonnes</b>	<b>598 tonnes</b>	<b>1,158 tonnes</b>
Browns (Yard Waste, Woody Waste)	397 tonnes	598 tonnes	1,158 tonnes
<b>Total Organics</b>	<b>794 tonnes</b>	<b>1,196 tonnes</b>	<b>2,316 tonnes</b>

Two small-scale facilities are contemplated for construction at the STTS and the VTS. Based on the amount of organic material available, a pilot facility could be constructed with a capital investment of approximately \$200,000 to compost yard waste and limited food scraps.

Table summarizes the conceptual level costs for low to medium technology Aerated Static Pile (ASP) or Aerated Static Bunker (ASB) facilities. Depending on the ultimate use of the compost produced, some aspects of the conceptual designs below may be limited, eliminated, or expanded. For example:

- If the compost will be used for final landfill cover, a limited amount of screening would be required; and
- Depending on the placement and existing infrastructure at the facility, less site grading and leachate & surface water management may be required.

Facility cost is highly variable depending on the composition of the material to be composted and the goals for the finished product. Limited pilot-scale test facilities have been constructed for as little as \$50,000 (excluding labour) at small institutions and government sites. The following costs represent construction of typical permanent government composting facilities constructed at the region’s existing solid waste facilities.

**Table 2-3: Compost Facility Conceptual Costs - Vanderhoof and Smithers-Telkwa Transfer Stations**

Item	Aerated Static Pile or Aerated Bunker at Vanderhoof Transfer Station	Aerated Static Pile or Aerated Bunker at Smithers-Telkwa Transfer Station
<b>Capital</b>		
General Site Grading and Preparation	\$66,400	\$72,800
Leachate & Surface Water Management	\$33,200	\$35,400
Receiving Area	\$3,800	\$6,900
Organics Processing	\$60,500	\$68,700
Screening, Curing, and Storage	\$40,500	\$49,600
Equipment (mobile)	\$200,000	\$200,000
<b>Subtotal Capital (without mobile equipment)</b>	<b>\$204,500</b>	<b>\$233,500</b>
<b>Subtotal Capital (with mobile equipment)</b>	<b>\$404,500</b>	<b>\$433,500</b>
Engineering (10% of non-mobile equipment capital)	\$20,400	\$23,300
Contingency (25% of non-mobile equipment capital)	\$51,100	\$58,400
<b>Total Capital</b>	<b>\$476,000</b>	<b>\$515,200</b>
<b>Annualized Capital (20 years)</b>	<b>\$41,500</b>	<b>\$44,900</b>
<b>Operations</b>		
Electricity	\$7,000	\$7,000
Water	\$50	\$100
Labour	\$34,500	\$35,700
Equipment Maintenance and Use	\$38,200	\$50,200
Bi-Product Revenue	\$-	\$(200)
<b>Subtotal</b>	<b>\$79,700</b>	<b>\$92,700</b>
Contingency (20%)	\$15,900	\$18,500
<b>Total Operating</b>	<b>\$95,700</b>	<b>\$111,200</b>
<b>Cost Summary</b>		
<b>First Year Cost (Capital + Operating)</b>	<b>\$571,750</b>	<b>\$626,400</b>
<b>Annualized Total</b>	<b>\$137,200</b>	<b>\$156,200</b>
<b>Cost per Tonne</b>	<b>\$160</b>	<b>\$100</b>

A regional composting facility could be constructed at one of the sub-regional landfills to process materials collected throughout the region. Due to a higher material throughput, lower costs per tonne would be achieved by a regional



facility. The cost to transport materials to one location have not been accounted for in the conceptual costs in Table

**Table 2-4: Regional Compost Facility Conceptual Costs**

Regional Organics Facility	Aerated Static Pile	Membrane Covered Aerated Static Pile
<b>Capital</b>		
General Site Grading and Preparation	\$78,400	\$75,000
Leachate and Surface Water Management	\$39,000	\$37,800
Receiving Area	\$11,200	\$11,300
Organics Processing	\$153,100	\$303,700
Screening, Curing, and Storage	\$53,400	\$32,500
Equipment (mobile)	\$-	\$-
<b>Subtotal Capital (without mobile equipment)</b>	<b>\$335,100</b>	<b>\$460,300</b>
Subtotal Capital (with mobile equipment)	\$335,100	\$460,300
Engineering (10% of non-mobile equipment capital)	\$33,500	\$46,000
Contingency (25% of non-mobile equipment capital)	\$83,800	\$115,100
<b>Total Capital</b>	<b>\$452,300</b>	<b>\$621,400</b>
<b>Annualized Capital (20 years)</b>	<b>\$39,400</b>	<b>\$54,200</b>
<b>Operations</b>		
Electricity	\$7,000	\$7,600
Water	\$30	\$20
Diesel	-	-
Labour	\$36,200	\$36,500
Equipment Maintenance and Use	\$61,200	\$93,700
Bi-Product Revenue	\$-	\$-
<b>Subtotal</b>	<b>\$104,400</b>	<b>\$137,500</b>
Contingency (20%)	\$20,900	\$27,500
<b>Total Operating</b>	<b>\$125,300</b>	<b>\$165,000</b>
First Year Cost (Capital + Operating)	\$577,600	\$786,500
Annualized Total	\$164,700	\$219,200
Cost per Tonne	\$60	\$90

Actions	Estimated Capital Cost	Estimated Operating Cost
Improve backyard composting program.	-	Increase program budget by 20%: \$2,500/year (additional)
Develop regional composting facilities.	Vanderhoof Transfer Station: \$476,000 Smithers-Telkwa Transfer Station: \$515,200 Regional Compost Facility: \$621,400	Vanderhoof Transfer Station: \$95,692 Smithers-Telkwa Transfer Station: \$111,200 Regional Compost Facility: \$165,000

## 2.1.5 Option 5: Construction and Demolition (C&D) Waste Diversion

### 2.1.5.1 Work with local partners to identify potential processors and markets for higher value materials.

Work with businesses to identify potential markets for divertible material. If reliable processors are identified, differential tipping fees or material bans could be considered to encourage divertible material to stay out of the landfill. The region will make materials available to the private sector if financially neutral or positive for the RDBN.

### 2.1.5.2 Lobby the Province to include C&D materials into BC’s EPR system.

C&D materials were identified as a priority for inclusion in EPR programs by the 2009 Canadian Council of Ministers of the Environment Canada-Wide Action Plan for EPR. These materials are often difficult to divert at a local or regional level as processors and recyclers are primarily located in the lower mainland. The region will lobby the Ministry to address the challenges of diverting C&D materials. A letter should be written from the RDBN Board of Directors to the Minister of Environment and Climate Change Strategy expressing the need for additional programs and resources to support C&D diversion.

Actions	Estimated Capital Cost	Estimated Operating Cost
Work with local partners to identify potential processors and markets for high value materials. Lobby the Province to include C&D materials into BC’s EPR system.	-	0.1 FTE

## 2.1.6 Option 6: Extended Producer Responsibility

### 2.1.6.1 Establish a policy framework for making decisions regarding participation in current and future EPR programs.

As EPR expands to cover an increasing portion of BC’s waste management system, the RDBN and member municipalities may benefit from determining the extent that they wish to engage in EPR-related services. In BC, three models of local participation appear to be emerging:

- Provide as broad a range of EPR drop off services at local solid waste facilities as possible (i.e., aim to provide “one stop drops”);
- Minimize local government participation or do not participate in EPR programs directly;

- Hybrid- Participate in the collection of specific products and packaging based on some or all of the following:
  - Available space and resources to manage the EPR program at local government facilities;
  - The current role of the local government in collecting the designated product/package;
  - The level of remuneration offered by stewardship organizations for the collection service; and
  - The presence of alternative service providers (e.g. A local bottle depot operates as a take-back depot).

Depending on direction from the Board, staff will prepare a policy to direct participation in future EPR programs.

Actions	Estimated Capital Cost	Estimated Operating Cost
Establish a policy framework for making decisions regarding participation in current and future EPR programs.	-	Current Staff

## 2.1.7 Option 7: Household Hazardous Waste (HHW) Diversion

### 2.1.7.1 Increase public education and communication on proper handling and collection locations for HHW.

To facilitate diversion of HHW materials, staff will integrate information from product stewards into regional education and public communications and collaborate with EPR programs as relevant.

Actions	Estimated Capital Cost	Estimated Operating Cost
Increase public education and communication on proper handling and collection locations for HHH.	-	Current Staff

## 2.1.8 Option 8: Other Waste

### 2.1.8.1 Work with local partners to encourage alternative management of Agricultural Plastics.

Agricultural plastics are typically difficult to recycle due to the types of material used for packaging and wrapping of agricultural products and the difficulty in keeping material clean on farms. The region will provide information as requested to support the work of local partners who are identifying potential alternative solutions to manage Agricultural Plastics and may take part in pilot programs to manage these materials.

### 2.1.8.2 Lobby the Ministry to create an EPR program for Agricultural Plastics.

The Ministry has previously considered including agricultural plastics under the EPR regulation. Through the creation of an EPR program the onus would be placed on the producers of agricultural plastics to manage end of life care for the materials instead of local governments attempting to manage a material that is not defined as municipal solid waste (MSW). Producers can educate their customers and adjust design to make their products more easily recyclable.

The provinces of Manitoba and Saskatchewan are addressing Agricultural Plastics through their EPR regulations. Saskatchewan enacted Chapter E-10.22 Reg 4 the Agricultural Packaging Product Waste Stewardship Regulations in 2016. The Act limits the definition of Agricultural Packaging Product to grain bags. Manitoba has indicated that agricultural plastics will be addressed through future EPR legislation.

The region will lobby the Ministry to address the challenges of diverting Agricultural Plastics. A letter should be written from the RDBN Board of Directors to the Minister of Environment and Climate Change Strategy expressing support to include Agricultural Plastics in future EPR programs.

Actions	Estimated Capital Cost	Estimated Operating Cost
Work with local partners to encourage alternative management of Agricultural Plastics. Lobby the Ministry to create an EPR program for Agricultural Plastics.	-	Current Staff

## 2.1.9 Option 9: Education and Behaviour Change

### 2.1.9.1 Apply community based social marketing (CBSM) as a method to develop new and/or build on existing waste reduction and diversion programs and campaigns.

CBSM is an approach to program promotion, education and behaviour change that encourages high rates of effective participation and long-term behaviour change. This approach can be applied to campaigns for general waste reduction education, including increasing recycling rates, to help achieve longer-term behaviour changes. The region will include CBSM as a key component of education and public communication programs.

### 2.1.9.2 If available, use Recycle BC education and administration top-ups to support regional recycling education and promotions.

If the RDBN becomes a Recycle BC collector, an education top-up and program administration top-up of \$0.75 and \$2.50 per household serviced per year respectively could be directed to recycling education and promotion of services. Additionally, use of Recycle BC’s province-wide materials would offer consistency in the look and feel of recycling throughout the region.

Actions	Estimated Capital Cost	Estimated Operating Cost
Apply CBSM as a method to develop new and/or build on existing waste reduction and diversion programs and campaigns.	-	Current Staff
If available, use Recycle BC education and administration top-ups to support regional recycling education and promotions.		When all facilities are in operation: -\$42,000 (i.e. net revenue)

## 2.2 Disposal Options

This SWMP review process has captured issues and potential solutions to address residual management over the next 10 years, as outlined below.

### 2.2.1 Option A: Continue operating disposal sites according to ministry requirements.

Continue operating the region’s three disposal sites, upgrade environmental controls and infrastructure as needed to meet MOE requirements.

Based on historical records and current site conditions the following items have been budgeted for the Clearview Sub-Regional Landfill:

- Complete a study to confirm compliance and conformance with the 2016 landfill guidelines (\$6,000 in 2019);
- Complete a leachate management plan (\$25,000 in 2020);
- Provisional installation of leachate treatment pond (\$100,000 in 2023).

The following items have been budgeted for the Knockholt Sub-Regional Landfill:

- Additional budget for consulting fees to support landfill design and planning (\$5,000 per year);
- LFG generation assessment study (\$5,000 in 2020);
- Complete a study to confirm compliance and conformance with the 2016 landfill guidelines (\$6,000 in 2021);
- Study to assess the performance and capacity of existing leachate treatment ponds (\$15,000 in 2022);
- Development of Phase 3B (\$382, 000 in 2023, \$704,000 in 2028);
- Provisional leachate treatment pond improvements (\$250,000 in 2024).

The following items have been budgeted for the Manson Creek Landfill:

- Provisional budget for landfill operation and management review (\$5,000 in 2022);
- Provisional budget for additional site maintenance (\$10,000 in 2022).

Actions	Estimated Capital Cost	Estimated Operating Cost
Continue operating disposal sites according to Ministry requirements. (Clearview Sub-Regional Landfill)	Leachate management improvements: \$100,000	Landfill compliance and conformance review: \$6,000 Leachate management plan: \$25,000
Continue operating disposal sites according to Ministry requirements. (Knockholt Sub-Regional Landfill)	Development of Phase 3B: \$382,000 Development of Phase 3C: \$704,000 Leachate treatment pond improvements: \$250,000	Additional landfill design and planning: \$5,000 per year Landfill gas generation assessment study: \$5,000 Landfill compliance and conformance review: \$6,000 Leachate pond performance and capacity study: \$15,000
Continue operating disposal sites according to Ministry requirements. (Manson Creek Landfill)	-	Landfill operation and management review: \$5,000 Additional landfill site maintenance: \$10,000

### 2.2.2 Option B: Continue to assess landfill gas (LFG) generation and manage as needed.

LFG must be monitored at all landfill sites in BC for health and safety reasons, and to reduce impacts to air quality. The BC Landfill Gas Regulation required that a landfill site that receives more than 10,000 tonnes of MSW per year, or has a total MSW in place at or above 100,000 tonnes completes an initial LFG generation assessment and report to the Ministry. Landfills that generate 1,000 tonnes or more of methane per year must ensure that a LFG management plan is prepared for the landfill site and an active gas collection system installed to reduce fugitive LFG emissions to the atmosphere.

LFG generation assessments were completed for the Knockholt Sub-Regional landfill (in 2010 and 2016), and for the Clearview Sub-Regional landfill (in 2018). The assessments estimated that each facility was generating well under 1,000 tonnes of methane per year. Based on these assessments LFG capture will likely not be required within the plan timeframe.

The region will work to manage and limit the production of LFG by:

- Continuing to assess LFG generation at Knockholt and Clearview sub-regional landfills;
- Minimize organics in MSW to reduce LFG generation; and
- Considering an alternative cover (e.g. biocover) to naturally treat methane produced instead of conventional cover for future landfill closure systems which attempt to confine emissions within the landfill.

Actions	Estimated Capital Cost	Estimated Operating Cost
Continuing to assess LFG generation at Knockholt and Clearview sub-regional landfills.	-	Cost identified in Option A
Minimize organics in MSW to reduce LFG generation.	-	Cost identified in Option 4
Consider an alternative cover system to naturally treat methane produced in landfills.	-	No additional cost identified at this time.

### 2.2.3 Option C: Implement disposal charges for Camp Waste and other industries not already paying into the system.

The region’s solid waste system is primarily funded through taxes based on property assessments. Therefore, some industries may not be paying their fair share into the system. The region has identified industry work camps as one industry that requires an alternative method to fund their use of the solid waste system if no tipping fees are charged for disposal at regional facilities.

Two options are identified to allow the region to recover the cost of managing waste from these industries:

- Require that all materials from specified industries are delivered to scaled facilities and charge a weight-based tipping fee for all landfilled waste.

The region has established a cost for landfilling C&D waste as \$90/tonne. Depending on direction from the board, this cost or an equivalent future MSW tipping fee could be applied to specified industries under a regional policy developed by staff.

- Set an annual per head or per bed cost for all facilities being constructed in the region and assess this as a solid waste disposal fee with other regional fees and taxes.

The cost of airspace within the region’s landfills can be established based on the cost to operate, close, and care for landfills over their contaminating lifespan. The current system costs of the region’s landfills are far less than the operating costs of the transfer station system, administration, and other programs. Therefore, a cost per tonne of has been established based on the total regional solid waste system costs. The average system cost per tonne of waste disposed in 2015 and 2016 was \$220/tonne.

An average waste generation rate of 410 kg/person has been calculated based on Peace River Regional District reporting. The resulting estimated cost of solid waste services for industry work camps is \$90/person/year.

Actions	Estimated Capital Cost	Estimated Operating Cost
Implement disposal charges for Camp Waste and other industries not already paying into the system.	-	Current Staff No revenues have been projected.

### 2.2.4 Option D: Partner to identify alternatives to disposal.

Due to lack of economies of scale there are limited cost-effective opportunities to recovery energy from waste as an alternative to disposal however some source separated materials (wood, asphalt shingles) could potentially find better use in these markets through private facilities involved in wood waste management or other energy-intensive industries. The region will look for opportunities and partners to manage select materials with thermal treatment (such as clean wood in co-gen facilities) and if a partnership is advantageous to the region will make waste materials available for alternative management.

Actions	Estimated Capital Cost	Estimated Operating Cost
Partner to identify alternatives to disposal.	-	Current Staff

### 2.2.5 Option E: Manage small closed landfills according to ministry requirements.

There are 21 closed landfills in the RDBN. Seven of these facilities are used as transfer stations and one became the Knockholt Landfill. As directed by the Ministry, facilities with the potential to impact receptors have environmental monitoring programs to assess trends in groundwater, and in some cases surface water quality. The RDBN is currently engaging Ministry staff to confirm closure of the facilities and assess the potential to abandon previous permits for these historical facilities. No additional costs related to management and final closure of historical landfills have been identified in the plan.

Actions	Estimated Capital Cost	Estimated Operating Cost
Manage small closed landfills according to ministry requirements.	-	Current Staff

## 3.0 FINANCIAL IMPLICATIONS

The proposed options to increase reduction and diversion and improve residual management discussed above will have an impact on the current RDBN Financial Plan. Section 3.1 provides an overview of the current 2018-2022 Financial Plan and staff establishment to provide a baseline for assessing financial implications. Section 3.2 provides a summary of the costs of the proposed diversion and residual management options and their impact on the current Financial Plan as well as recommendations for changes to the staff establishment.

### 3.1 Current Financial Plan and Staff Establishment

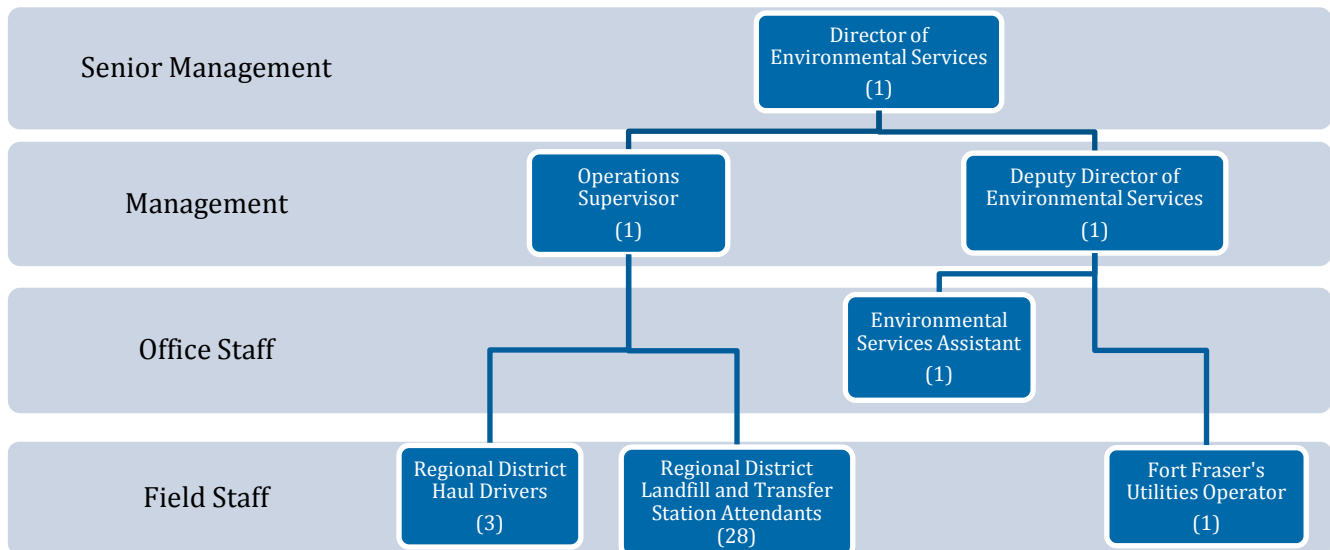
The solid waste management system in the RBDN is primarily funded through taxation with approximately 60% of average annual revenue coming from taxes. Tipping fees account for approximately 5% of average annual revenue. Based on the region’s budget, a tax rate is established and applied based on assessed property value. Table 3-1 summarizes the RBDN’s projected budget as identified in the five-year financial plan through 2022. RBDN’s main solid waste expenses are administration (41%) transfer station operations (31%) and landfill operations (12%) which comprise almost 85% of average annual expenditures. Recycling expenditures represent roughly 10% and are directed to funding for re-use sheds, subsidies to local recycling organizations and the provision of recycling services at facilities. Contributions to reserves and landfill closure and post-closure costs represent 4% and 2% respectively.

**Table 3-1: Existing Five-Year Financial Plan (Approved in 2018)**

	2018	2019	2020	2021	2022
<b>REVENUE</b>					
Taxation	\$3,144,752	\$3,383,962	\$3,428,064	\$3,008,737	\$3,011,903
Recycling	\$240,000	\$140,000	\$140,000	\$140,000	\$140,000
Tipping Fees	\$206,000	\$206,000	\$206,000	\$206,000	\$206,000
Transfer from Reserves	\$1,043,700	\$783,700	\$741,700	\$693,700	\$693,700
Prior Year's Surplus	\$1,171,798	\$ -	\$ -	\$ -	\$ -
Grants	\$390,395	\$390,395	\$390,395	\$390,395	\$390,395
Other	\$95,000	\$5,000	\$220,000	\$5,000	\$5,000
<b>TOTAL REVENUE</b>	<b>\$6,291,645</b>	<b>\$4,909,057</b>	<b>\$5,126,159</b>	<b>\$4,443,832</b>	<b>\$4,446,998</b>
<b>EXPENDITURES</b>					
<b>Operating Expenditures</b>					
Administration	\$2,249,988	\$1,764,351	\$1,776,830	\$1,382,498	\$1,393,608
Transfer Station Ops	\$1,683,821	\$1,658,334	\$1,681,933	\$1,704,256	\$1,726,842
Landfill Ops	\$663,943	\$651,618	\$664,645	\$667,328	\$680,668
Recycling	\$525,959	\$417,944	\$417,944	\$417,944	\$417,944
Contribution to Reserves	\$239,233	\$159,233	\$159,233	\$169,233	\$169,233
Post-Closure	\$93,700	\$93,700	\$43,700	\$43,700	\$43,700
Closure	\$30,000	\$15,000	\$15,000	\$15,000	\$15,000
<b>Total Annual Operating Expenditures</b>	<b>\$5,486,644</b>	<b>\$4,760,180</b>	<b>\$4,759,285</b>	<b>\$4,399,959</b>	<b>\$4,446,995</b>
<b>Existing Capital Expenditures</b>					
Capital Expenditures	\$805,000	\$105,000	\$323,000	\$ -	\$ -
<b>Total Annual Capital Expenditures</b>	<b>\$805,000</b>	<b>\$105,000</b>	<b>\$323,000</b>	<b>\$ -</b>	<b>\$ -</b>
<b>TOTAL EXPENDITURES</b>	<b>\$6,291,644</b>	<b>\$4,865,180</b>	<b>\$5,082,285</b>	<b>\$4,399,959</b>	<b>\$4,446,995</b>



Staffing costs (Administration) cover a full-time Director of Environmental Services, Deputy Director of Environmental Services, Environmental Services Assistant, and Environmental Services Operations Supervisor. Operations/Field Staff for regional waste hauling, landfill attendants, transfer station attendants, and reuse shed attendants are covered under facility operations costs. The staff structure is shown in Figure 3-1 below.



**Figure 3-1: Current Staffing Structure**

The Director of Environmental Services is responsible for updating and implementation of the Regional District's Solid Waste Management Plan and overseeing the operations and capital infrastructure works of the Environmental Services, Fort Fraser Water and Sewer, and Liquid Waste Functions. The Director of Environmental Services is also responsible for overseeing the RDBN Invasive Plant (Weed) function and participating in the Occupational Health and Safety Program.

The Deputy Director of Environmental Services is responsible for contract administration, managing RDBN's landfill leachate collection and treatment systems, conducting environmental monitoring, overseeing proper operation of sewer and water systems, report preparation, providing information to the public, and overseeing RDBN's invasive plant program. The Deputy Director of Environmental Services is also responsible for assisting with the implementation of the SWMP.

The Environmental Services Operations Supervisor is responsible for the supervision and to assist in the operations of all RDBN landfills, transfer stations and waste hauling services. The Supervisor will also be called upon to assist other Environmental Services staff in performing required tasks.

The Environmental Services Assistant is a primarily clerical position responsible for assisting in the development and implementation of waste reduction initiatives, public education programs, sustainability initiatives including the RDBN's Corporate Energy and Emissions Plan, report preparation, maintaining and developing databases and other clerical duties.

Prior to 2018, an Operations Foreman reported to an Environmental Services Manager of Operations for a total of five senior management, management, and office staff in the region. This position was absorbed into the Operations Supervisor role following changes in staff in 2017. The Environmental Services department elected to continue with four full-time office, management, and senior management staff through the SWMP update process to better assess the future needs of the department before hiring an additional staff member.

## 3.2 Summary of Proposed Costs

The cost of the proposed options and additional staffing required to support future programs are summarized in Table 5.

**Table 3-2: Summary of Financial Implications of Proposed Options**

	2018	2019	2020	2021	2022
<b>Revenues</b>					
<b>CURRENT TOTAL OPERATING REVENUE</b>	<b>\$6,291,645</b>	<b>\$4,909,057</b>	<b>\$5,126,159</b>	<b>\$4,443,832</b>	<b>\$4,446,998</b>
<b>EXISTING Expenses</b>					
Operating Expenses	\$5,486,644	\$4,760,180	\$4,759,285	\$4,399,959	\$4,446,995
Capital Expenses	\$805,000	\$105,000	\$323,000	-	-
<b>CURRENT TOTAL EXPENSES</b>	<b>\$6,291,644</b>	<b>\$4,865,180</b>	<b>\$5,082,285</b>	<b>\$4,399,959</b>	<b>\$4,446,995</b>
<b>PROPOSED Operating Expenses</b>					
<b>DIVERSION</b>					
Option 2: Expand Residential Recycling (excluding capital, including tonnage revenue)	-\$13,200	\$33,000	\$34,700	\$34,700	\$34,700
Option 3: Increase ICI Recycling	\$3,000	\$8,500	\$8,500	\$8,500	\$8,500
Option 4: Increase Organic Waste Diversion	\$2,500	\$2,500	\$2,500	\$98,192	\$98,192
Option 9: Promotion and Education (Recycle BC education and administration top-ups)	-\$19,300	-\$27,100	-\$41,800	-\$41,800	-\$41,800
<b>DISPOSAL</b>					
Option A: Continue facility operation and upgrades as needed.	-	\$11,000	\$35,000	\$11,000	\$35,000
Additional Staffing Costs		\$90,000	\$90,000	\$90,000	\$90,000
<b>Proposed Implication to Operating Expenses</b>	<b>-\$27,000</b>	<b>\$117,900</b>	<b>\$128,900</b>	<b>\$200,592</b>	<b>\$224,592</b>
<b>PROPOSED Capital Expenditures</b>					
<b>DIVERSION</b>					
Option 2: Expand Residential Recycling (capital)	\$55,000.00	\$45,000.00	\$60,000.00		
Option 4: Increase Organic Waste Diversion (capital)	-	-	-	\$515,000	
<b>DISPOSAL</b>					
Option A: Continue facility operation and upgrades as needed.					
<b>Proposed Implication to Capital Expenses</b>	<b>\$55,000</b>	<b>\$45,000</b>	<b>\$60,000</b>	<b>\$515,000</b>	<b>\$-</b>
<b>PROPOSED Operating and Capital EXPENSES</b>	<b>\$28,000</b>	<b>\$162,900</b>	<b>\$188,900</b>	<b>\$715,592</b>	<b>\$224,592</b>
<b>TOTAL EXPENSES</b>	<b>\$6,319,644</b>	<b>\$5,028,080</b>	<b>\$5,271,185</b>	<b>\$5,115,551</b>	<b>\$4,671,587</b>
<b>Budget Implications (Revenues-Expenses)*</b>	<b>-\$27,999</b>	<b>-\$119,023</b>	<b>-\$145,026</b>	<b>-\$671,719</b>	<b>-\$224,589</b>

\* In budget implications a negative value indicates a budget deficit (net expense to the region).

Based on existing and proposed program needs a minimum 1 FTE is required to fill the vacant position in supporting ongoing and small proposed programs. Additional focus is required to plan and implement diversion programs which will require additional staff as the region take on a greater role in recycling and composting programs.

## 4.0 POLICY AND BYLAW OVERVIEW

Policies and bylaws define the “rules of the road” for how solid waste can be managed in the RDBN. They can also be applied to achieving many of the targets for increasing waste reduction and diversion identified so far in the SWMP update process. This section discusses the current cost recovery policy to fund the solid waste management function in the RDBN as well as the associated bylaws that implement this policy. The section ends with options to adjust the current cost recovery policy and amend the current regulation and tipping fee bylaw to support additional waste reduction and diversion in the RDBN.

### 4.1 Cost Recovery Policy

One of the most important aspects of a SWMP is financing, namely, what will the plan cost and how will costs be recovered. Given the potential cost increases associated with the options to increase reduction and diversion and improve residual management discussed in Section 3.2, it may be timely for the regional district to reconsider its cost recovery policy.

Over twenty years ago the original SWMP identified the following funding objectives:

- Waste management funding should include mechanisms for user-pay to encourage waste reduction but retain enough taxation for stability of funding.
- There should be a minimum level of service for all residents across the region.
- All tipping fees at waste management facilities across the region should be harmonized.

These objectives were used to evaluate various funding models for financing the 1996 Plan. The results of the evaluations showed that a regional approach would be the best method of apportioning the costs of the plan to the various municipalities and rural areas. This is currently the case for the RDBN solid waste management function.

With respect to cost recovery, the 1996 Plan considered two options: user-pay and taxation. The funding model adopted in the Plan was based on a user-pay system in conjunction with taxation according to the following principles:

- User-pay should be phased in gradually so that municipalities, residents, businesses and industries can adjust to the change;
- There must be alternatives (e.g. recycling, composting) in place in all areas of the regional district, which allow people the opportunity to reduce their waste stream before user-pay is fully implemented;
- User-pay should fund, at a minimum, all operating costs for waste transfer, landfill and recycling.

Based on implementation costs at the time (\$2.8 million per year), the 1996 Plan included a funding formula based on taxation to fund administration costs and capital expenditures and user fees to pay for operations. The estimated split was 70% user fees and 30% taxation. While the plan implementation schedule showed user fees being implemented in 1998, an addendum to the 1996 Plan stated the regional district was prepared to implement a user-pay system as soon as was feasibly possible.

According to a consultant's report on tipping fees prepared for the RDBN in 2004, during 1998 and 1999, there were extensive consultations to review the implementation of the SWMP, especially the implementation of tipping fees. Because of these consultations, the implementation of tipping fees for residential and commercial garbage was deferred.

Instead, the RDBN adopted Bylaw 1109 in 1999 to implement tipping fees for the disposal of contaminated soils; Bylaw 1202 in 2001 to implement a service fee for the disposal of appliances containing Ozone Depleting Substances; and, Bylaw 1258 in 2003 to implement tipping fees for the disposal of construction, demolition and land clearing waste. These three bylaws were repealed and replaced by Solid Waste Management Facility Regulation and User Fee Bylaw 1764 in 2016. This bylaw will be discussed further in Section 4.2.

As discussed in Section 3.1 the current solid waste management system in the RDBN is primarily funded through taxation with approximately 60% of average annual revenue coming from taxes. User fees for the disposal of contaminated soil, appliances containing ozone depleting substances and construction, demolition and land clearing waste amount to \$206,000 annually which represents approximately 5% of average annual revenue.

If the Board approves some or all the potential options discussed in Section 2, there will be a need to either increase taxes or recover a greater percentage of costs from user fees. The RDBN is one of only three regional districts in BC that do not charge weight or volume-based tipping fees for residential and commercial garbage. The other two regional districts, the Central Coast Regional District (CCRD) and the Regional District of East Kootenay (RDEK) do impose fees for construction and demolition waste and some controlled waste such that user fees represent 9% of revenue in the CCRD and 13% of revenue in the RDEK.

Other regional districts of a comparable size and population density recover a much higher percentage of their costs from user fees. For example, the North Coast Regional District obtains 80% of their revenue from user fees, the Regional District of Kitimat-Stikine recovers 33%, the Peace River Regional District recovers 38%, the Cariboo Regional District recovers 20% and the Thompson-Nicola Regional District (excluding the City of Kamloops) recovers 25%. These regional districts have successfully introduced weight and volume-based user fees for sites with and without scales. The RDBN could consider reviewing the cost recovery programs in these regional districts to assess whether a similar approach should be adopted in the Bulkley-Nechako region.

## 4.2 Solid Waste Bylaws

There are typically two types of bylaws that local governments adopt to manage solid waste: collection service bylaws and facility regulation bylaws. Collection service bylaws regulate the curbside collection of garbage, recyclables and organics from primarily single family residential customers, although in some cases curbside collection is also available to multi-family and ICI customers. Facility regulation bylaws apply to recycling and disposal facilities and establish regulations, conditions of use as well as user fees and penalties. Given that the RDBN does not provide any curbside collection services, this section will deal with the current facility regulation bylaw.

### 4.2.1 Solid Waste Management Facility Regulation and User Fee Bylaw

In 2016 the RDBN repealed Contaminated Soil Tipping Fee Bylaw No. 1109, 1999, Appliance Containing Ozone Depleting Substances Service Fee Bylaw No. 1202, 2001 and Construction/Demolition and Land Clearing Waste Regulation and Tipping Fee Bylaw No. 1258, 2003 with a consolidated Solid Waste Facility Regulation and User Fee Bylaw No. 1764. This bylaw applies to the RDBN's solid waste facilities consisting of three regional landfills and seven transfer stations. Table 6 provides an outline of the sections and schedules to this bylaw.

**Table 4-1: Solid Waste Management Facility Regulation and User Fee Bylaw**

Sections	Schedules	
Citation, Interpretation and Definitions,	Schedule A	RDBN Solid Waste Facilities
Schedules, Application, Exemptions	Schedule B	Prohibited Waste
Conditions of Use/Regulations	Schedule C	Regulated Recyclable Material
Violations and Penalties	Schedule D	User Fees
Inspection, Dispute Resolution, Repeal	Schedule E	Volume to Weight Material Conversion Factors

The bylaw defines biomedical waste, free liquids, hazardous waste, industrial waste, PCBs, waste on fire or smoldering, and regulated recyclable material as prohibited waste and states that no person shall deposit prohibited waste unless the acceptance of such waste is specifically authorized in writing by both the Regional District and the BC Government. Tires and corrugated cardboard are currently the only materials designated as regulated recyclable materials.

Table 7 provides an outline of the user fees for various waste types at the staffed RDBN solid waste facilities except Manson Creek which is unstaffed.

**Table 4-2: User Fees at RDBN Facilities**

Waste Type	User Fees	
	Landfill	Transfer Station
Household, Commercial, Institutional Waste	No Charge	No Charge
Yard Waste, Noxious Weeds, Wet Organic Waste	No Charge	No Charge
Auto Hulks, Scrap Metal	No Charge	No Charge
Mixed C/D, Concrete, Roofing/Asphalt Shingles – less than 2m <sup>3</sup>	No Charge	No Charge
Clean Wood Waste	No Charge	No Charge
Contaminated Wood Waste	No Charge	No Charge
Land Clearing Waste - less than 2m <sup>3</sup>	No Charge	No Charge
Dead Animals and Dead Stock Excluding Specified Risk Material (SRM)	No Charge	No Charge
Slaughter House Waste Excluding SRM	No Charge	No Charge
Mixed C/D, Concrete, Roofing/Asphalt Shingles – greater than 2m <sup>3</sup>	\$90/tonne	Not Accepted
Bulky Waste - greater than 2m <sup>3</sup>	\$90/tonne	Not Accepted
Land Clearing Debris - greater than 2m <sup>3</sup>	\$90/tonne	Not Accepted
Asbestos	\$90/tonne	Not Accepted
Contaminated Soil Characterized as CL/IL or ≤ CL/IL	No Charge	Not Accepted
Contaminated Soil ≥ CL/IL or ≤ Hazardous Waste	\$18/tonne	Not Accepted
Specified Risk Material (SRM) – In Region	No Charge	Not Accepted
Specified Risk Material (SRM) – Out-of-Region	\$100/tonne	Not Accepted
ODS Appliances (e.g. fridges, freezers/air conditioner/water coolers)	\$20 per unit	\$20 per unit

As indicated in Table 7, fees only apply to construction demolition and land clearing waste, contaminated soils, out-of-region specified risk material and appliances containing ozone depleting substances (ODS). With respect to construction, demolition and land clearing waste fees are only charges on loads that are greater than 2 cubic meters, which, as outlined in Schedule E, are loads arriving in vehicles that are larger than a filled pickup truck or passenger vehicle. In general, except for appliances containing ODS, fees are only charged at the Knockholt and Clearview Landfills which are equipped with scales. Therefore, user fees only represent roughly 5% of average annual revenue.

The lack of user fees minimizes financial incentive for residents, businesses and municipalities to divert rather than dispose of materials. Although many residents and businesses will recycle because it is the right thing to do, some will only respond to financial incentives. In regional districts that charge tipping fees for garbage, recyclable materials are usually accepted at no charge or for a reduced or variable fee. These policies encourage and support significant waste reduction and diversion. Also, regional districts that charge tipping fees typically apply a surcharge to loads that contain banned recyclable materials such as corrugated cardboard, scrap metal and yard waste. However, under the current RDBN cost recovery structure, although corrugated cardboard is prohibited from disposal as a regulated recyclable material, there is no financial penalty in the bylaw for including this material with regular waste.

As discussed in Section 4.1, some regional districts with similar populations, geographic characteristics and solid waste management facilities (attended, unattended, scaled and unscaled) are applying either weight-based or volume-based fees to increase cost recovery from users and provide more incentives for waste reduction and diversion. These systems are discussed in the next section.

### 4.3 Options to Increase Cost Recovery

As the cost of sustainable solid waste management increases, regional districts adjacent to the RDBN that previously recovered little or no revenue from user fees have adopted bylaws to apply user fees in varying degrees to increase this funding source. The following section provides information for the Regional District of Kitimat-Stikine, the Peace River Regional District, the Regional District of Fraser-Fort George, the Cariboo Regional District and the Thompson-Nicola Regional District.

#### **Regional District of Kitimat-Stikine (Population 36,270)**

The Regional District of Kitimat-Stikine adopted Kitimat-Stikine Terrace Area Waste Management Facility Regulation Amendment Bylaw No. 682 in 2016 to establish fees and regulations for depositing solid waste at the new Thornhill Transfer Station and Forceman Ridge Waste Management Facility which consists of a compost processing facility and lined landfill. As both these facilities are staffed and have weigh scales the tipping fee for garbage, construction and demolition waste, and land clearing waste is \$110 per tonne for all users. The fee for metal is \$55 per tonne and \$99 per tonne for organic materials. The minimum charge for deposit of solid waste at the Thornhill Transfer Station or Forceman Ridge Waste Management Facility, regardless of quantity is \$10.00. Cost recovery from user fees is roughly 33%.

#### **Peace River Regional District (Population 62,231)**

In the Peace River Regional District, Bylaw No. 2053 imposes fees for the disposal of solid waste at regional disposal facilities. The bylaw imposes weight-based fees for staffed facilities with scales and volume-based fees for staffed facilities without scales. The bylaw imposes a range of fees and other charges based on weight. The fee for 5 bags of garbage or less is \$0.80 per bag after which the charge is \$55.00 per tonne. There is also a minimum fee of \$3.75 for all materials except for 5 bags of garbage or less.

For fees and charges based on volume, the Bylaw 2053 charges \$0.80 per bag for eight garbage bags or less. A passenger car (containing bagged or non-bagged waste) is charged at \$5.00, stations wagons, mini-vans and sport utility vehicles are charged at \$7.00 with fees increasing based on the size of the vehicle. There is also a minimum fee of \$3.75. Cost recovery from user fees is roughly 38%.

### **Regional District of Fraser-Fort George (Population 19,805 excluding City of Prince George)**

The Regional District of Fraser-Fort George (RDFFG) operates 17 transfer stations and 3 landfills. RDFFG Municipal Solid Waste Tipping Fee and Site Regulation Bylaw No. 3023 2016 classifies each facility according to whether it is staffed, scaled, gated, full service, mid-level or basic. Staffed scaled landfills charge fees based on weight (\$85/tonne with a minimum fee of \$6.00 up to 100 kg), while staffed transfer stations without scales charge volume-based fees.

Volume-based fees are charged by load class with no charge applied to Load Class 1 (passenger and light truck vehicles up to 3 cubic metre capacity) and Load Class 2 (passenger and light truck vehicles towing utility trailers, up to 3 cubic metre capacity). Vehicle with greater than 3 cubic metre capacities are charged escalating fees starting at \$62 for Class 3.

Volume based fees are also charged to municipal waste collected by the Villages of McBride and Valemount and deposited at the non-scaled McBride and Valemount Transfer Stations. The McBride collection vehicle is charged \$105.00 per municipal collection and the Valemount vehicle is charged \$73.00 per municipal collection. Cost recovery from user fees is roughly 50%.

### **Cariboo Regional District (Population 63,364)**

The Cariboo Regional District (CRD) operates 14 landfills and 18 transfer stations throughout the region. The CRD updated their SWMP in 2013. Under the current Plan, costs for disposal of average amounts of residential waste are covered through taxation and not from tipping fees. However commercial waste and above-average/large loads of residential waste are charged tipping fees. CRD Fees and Charges Bylaw 4950 does not charge tipping fees for residential loads of 450 kg or less, however CRD staff advised that this will be reduced to 250 kg in 2019. Residential loads greater than 450 kg are charged at \$53 per tonne at scaled facilities. Residential users at attended facilities without scales are not charged a volume-based fee, however commercial users with loads of wood and other CD waste at increasing fees based on the size of vehicle. Cost recovery from user fees is roughly 20%.

### **Thompson-Nicola Regional District (Population 46,106 excluding City of Kamloops)**

The Thompson-Nicola Regional District (TNRD) operates 10 Eco-Depots, 18 transfer stations and 2 landfills. The City of Kamloops operates 3 landfills separate from the TNRD. As of 2009, region wide tipping fees were introduced to satisfy the user pay goal outlined in the 2008 SWMP. Tipping fees were initially paid on a per volume basis, weight-based fees have been in place at the region's 10 Eco-Depots as of 2013. TNRD Solid Waste Management Facilities Bylaw No. 2465, 2014 establishes weight-based and volume-based user fees that apply to all users, regardless of source (residential or commercial). For example, the weight-based charge for refuse is \$80/tonne with a \$1 minimum charge and the volume-based user fee is \$10/m<sup>3</sup> with a \$1 minimum charge or \$1/bag. There are set rates applied to various vehicles depending on type and capacity. Cost recovery from user fees is roughly 25%

The range of user pay systems implemented by the regional districts described above can provide valuable insights to the RDBN with respect to recovering more costs from users. The updated SWMP should include a study to investigate these approaches in detail to determine their applicability to the RDBN. This is significant since increasing cost recovery from user fees will provide funding for increased waste reduction and diversion and improved residual waste management without raising taxes.

## 4.4 Support Expansion of EPR Programs

EPR is a provincial policy tool that aims to shift the responsibility for end-of-life management of products (physically and economically) to their manufacturer and retailers (called “producers”) and away from local governments. This policy is intended to, among other things, create an incentive for producers to include environmental considerations in design of products.

Regional districts can engage with the product stewards through facility agreements (collecting products for the stewards), program promotion, sharing knowledge and information, and stewardship plan consultation. The SWMP should reflect how the RDBN wants to share in the responsibility of managing products with and for the Stewards, including continuing to advocate for the expansion of product stewardship programs through Recycling Regulation enforcement and improvement: covering the full cost of program implementation; requiring an increased return for products in the program (i.e., from 75 to 100% especially for more established programs such as tires); and ensuring that program access is readily available in rural areas.

The Canadian Council for Ministers of the Environment (CCME) also continues to provide guideline updates for Canada-wide implementation of EPR programs. For example, products not yet in the BC Recycling Regulation that are recommended for Canada-wide EPR include carpet, textiles, and furniture. RDBN can continue to stay abreast of industry trends through conferences and annual updates as provided by the CCME and the BC Product Stewardship Council (BCPSC). There is also an opportunity to advocate for new programs through direct correspondence with the Ministry or through associations of which RDBN is a member (e.g., BCPSC). The management by the RDBN of materials such as mattresses, propane tanks and drywall through well managed programs presents an opportunity to justify the expansion of EPR to these materials.

## 5.0 LIMITATIONS OF REPORT

This report and its contents are intended for the sole use of Regional District of Bulkley-Nechako and their agents. Tetra Tech Canada Inc. (Tetra Tech) does not accept any responsibility for the accuracy of any of the data, the analysis, or the recommendations contained or referenced in the report when the report is used or relied upon by any Party other than Regional District of Bulkley-Nechako, or for any Project other than the proposed development at the subject site. Any such unauthorized use of this report is at the sole risk of the user. Use of this document is subject to the Limitations on the Use of this Document attached in the Appendix or Contractual Terms and Conditions executed by both parties.



## 6.0 CLOSURE

We trust this technical memo meets your present requirements. If you have any questions or comments, please contact the undersigned.

Respectfully submitted,  
Tetra Tech Canada Inc.

### ***ISSUED FOR REVIEW***

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/tv

Attachment (1): Tetra Tech's Limitations on the Use of this Document  
Attachment (2): Table A: Five Year Operations and Capital Plan and Ten Year Capital Plan for Solid Waste in the Regional District of Bulkley-Nechako

# LIMITATIONS ON USE OF THIS DOCUMENT

## GEOENVIRONMENTAL

### 1.1 USE OF DOCUMENT AND OWNERSHIP

This document pertains to a specific site, a specific development, and a specific scope of work. The document may include plans, drawings, profiles and other supporting documents that collectively constitute the document (the "Professional Document").

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Where TETRA TECH submits electronic file and/or hard copy versions of the Professional Document or any drawings or other project-related documents and deliverables (collectively termed TETRA TECH's "Instruments of Professional Service"), only the signed and/or sealed versions shall be considered final. The original signed and/or sealed electronic file and/or hard copy version archived by TETRA TECH shall be deemed to be the original. TETRA TECH will archive a protected digital copy of the original signed and/or sealed version for a period of 10 years.

Both electronic file and/or hard copy versions of TETRA TECH's Instruments of Professional Service shall not, under any circumstances, be altered by any party except TETRA TECH. TETRA TECH's Instruments of Professional Service will be used only and exactly as submitted by TETRA TECH.

Electronic files submitted by TETRA TECH have been prepared and submitted using specific software and hardware systems. TETRA TECH makes no representation about the compatibility of these files with the Client's current or future software and hardware systems.

### 1.3 STANDARD OF CARE

Services performed by TETRA TECH for the Professional Document have been conducted in accordance with the Contract, in a manner

consistent with the level of skill ordinarily exercised by members of the profession currently practicing under similar conditions in the jurisdiction in which the services are provided. Professional judgment has been applied in developing the conclusions and/or recommendations provided in this Professional Document. No warranty or guarantee, express or implied, is made concerning the test results, comments, recommendations, or any other portion of the Professional Document.

If any error or omission is detected by the Client or an Authorized Party, the error or omission must be immediately brought to the attention of TETRA TECH.

### 1.4 DISCLOSURE OF INFORMATION BY CLIENT

The Client acknowledges that it has fully cooperated with TETRA TECH with respect to the provision of all available information on the past, present, and proposed conditions on the site, including historical information respecting the use of the site. The Client further acknowledges that in order for TETRA TECH to properly provide the services contracted for in the Contract, TETRA TECH has relied upon the Client with respect to both the full disclosure and accuracy of any such information.

### 1.5 INFORMATION PROVIDED TO TETRA TECH BY OTHERS

During the performance of the work and the preparation of this Professional Document, TETRA TECH may have relied on information provided by third parties other than the Client.

While TETRA TECH endeavours to verify the accuracy of such information, TETRA TECH accepts no responsibility for the accuracy or the reliability of such information even where inaccurate or unreliable information impacts any recommendations, design or other deliverables and causes the Client or an Authorized Party loss or damage.

### 1.6 GENERAL LIMITATIONS OF DOCUMENT

This Professional Document is based solely on the conditions presented and the data available to TETRA TECH at the time the data were collected in the field or gathered from available databases.

The Client, and any Authorized Party, acknowledges that the Professional Document is based on limited data and that the conclusions, opinions, and recommendations contained in the Professional Document are the result of the application of professional judgment to such limited data.

The Professional Document is not applicable to any other sites, nor should it be relied upon for types of development other than those to which it refers. Any variation from the site conditions present, or variation in assumed conditions which might form the basis of design or recommendations as outlined in this report, at or on the development proposed as of the date of the Professional Document requires a supplementary exploration, investigation, and assessment.

TETRA TECH is neither qualified to, nor is it making, any recommendations with respect to the purchase, sale, investment or development of the property, the decisions on which are the sole responsibility of the Client.

### 1.7 NOTIFICATION OF AUTHORITIES

In certain instances, the discovery of hazardous substances or conditions and materials may require that regulatory agencies and other persons be informed and the client agrees that notification to such bodies or persons as required may be done by TETRA TECH in its reasonably exercised discretion.

**Table A: Five Year Operations and Capital Plan and Ten Year Capital Plan for Solid Waste in the Regional District of Bulkley-Nechako**

	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
<b>Revenues</b>											
<b>CURRENT TOTAL OPERATING REVENUE</b>	<b>\$ 6,291,645</b>	<b>\$ 4,909,057</b>	<b>\$ 5,126,159</b>	<b>\$ 4,443,832</b>	<b>\$ 4,446,998</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>
<b>Existing Expenses</b>											
Operating Expenses	\$ 5,486,644	\$ 4,760,180	\$ 4,759,285	\$ 4,399,959	\$ 4,446,995	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Capital Expenses	\$ 805,000	\$ 105,000	\$ 323,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>CURRENT TOTAL EXPENSES</b>	<b>\$ 6,291,644</b>	<b>\$ 4,865,180</b>	<b>\$ 5,082,285</b>	<b>\$ 4,399,959</b>	<b>\$ 4,446,995</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>
<b>PROPOSED Operating Expenses</b>											
<b>DIVERSION</b>											
Option 1: Reduce and Reuse	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Option 2: Expand Residential Recycling (excluding capital, including tonnage revenue)	\$ (13,200)	\$ 33,000	\$ 34,700	\$ 34,700	\$ 34,700	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Option 3: Increase ICI Recycling	\$ 3,000	\$ 8,500	\$ 8,500	\$ 8,500	\$ 8,500	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Option 4: Increase Organic Waste Diversion (excluding capital)	\$ 2,500	\$ 2,500	\$ 2,500	\$ 98,192	\$ 98,192	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Option 5: Increase C&D Waste Diversion	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Option 6: Extended Producer Responsibility	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Option 7: Household Hazardous Waste Diversion	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Option 8: Support Diversion of Agricultural Plastics	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Option 9: Promotion and Education (Recycle BC education and administration top-ups)	\$ (19,300)	\$ (27,100)	\$ (41,800)	\$ (41,800)	\$ (41,800)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>DISPOSAL</b>											
Option A: Continue facility operation and upgrades as needed.	\$ -	\$ 11,000	\$ 35,000	\$ 11,000	\$ 35,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Option B: Continue to assess LFG generation and manage as needed.	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Option C: Implement disposal charges for Camp Waste.	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Option D: Partner to identify alternatives to disposal.	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Option E: Manage small closed landfills according to ministry requirements.	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Additional Staffing Costs	\$ -	\$ 90,000	\$ 90,000	\$ 90,000	\$ 90,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>PROPOSED Total Operating Expenses</b>	<b>\$ (27,000)</b>	<b>\$ 117,900</b>	<b>\$ 128,900</b>	<b>\$ 200,592</b>	<b>\$ 224,592</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>
<b>PROPOSED Capital Expenditures</b>											
<b>DIVERSION</b>											
Option 2: Expand Residential Recycling (capital)	\$ 55,000	\$ 45,000	\$ 60,000	\$ -	\$ -	\$ 634,000	\$ -	\$ -	\$ 634,000	\$ -	\$ 60,000
Option 4: Increase Organic Waste Diversion (capital)	\$ -	\$ -	\$ -	\$ 515,000	\$ -	\$ -	\$ 476,000	\$ -	\$ -	\$ -	\$ 452,000
<b>DISPOSAL</b>											
Option A: Continue facility operation and upgrades as needed.	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 482,000	\$ 250,000	\$ -	\$ -	\$ -	\$ 704,000
<b>PROPOSED Total Capital Expenses</b>	<b>\$ 55,000</b>	<b>\$ 45,000</b>	<b>\$ 60,000</b>	<b>\$ 515,000</b>	<b>\$ -</b>	<b>\$ 1,116,000</b>	<b>\$ 726,000</b>	<b>\$ -</b>	<b>\$ 634,000</b>	<b>\$ -</b>	<b>\$ 1,216,000</b>
<b>PROPOSED OPERATING AND CAPITAL EXPENSES</b>	<b>\$ 28,000</b>	<b>\$ 162,900</b>	<b>\$ 188,900</b>	<b>\$ 715,592</b>	<b>\$ 224,592</b>	<b>\$ 1,116,000</b>	<b>\$ 726,000</b>	<b>\$ -</b>	<b>\$ 634,000</b>	<b>\$ -</b>	<b>\$ 1,216,000</b>
<b>TOTAL EXPENSES</b>	<b>\$ 6,319,644</b>	<b>\$ 5,028,080</b>	<b>\$ 5,271,185</b>	<b>\$ 5,115,551</b>	<b>\$ 4,671,587</b>	<b>\$ 1,116,000</b>	<b>\$ 726,000</b>	<b>\$ -</b>	<b>\$ 634,000</b>	<b>\$ -</b>	<b>\$ 1,216,000</b>
<b>Budget Implications* (Revenues-Expenses)</b>	<b>\$ (27,999)</b>	<b>\$ (119,023)</b>	<b>\$ (145,026)</b>	<b>\$ (671,719)</b>	<b>\$ (224,589)</b>	<b>\$ (1,116,000)</b>	<b>\$ (726,000)</b>	<b>\$ -</b>	<b>\$ (634,000)</b>	<b>\$ -</b>	<b>\$ (1,216,000)</b>

\* In budget implications a negative value indicates a budget deficit (net expense to the region).