



**To:** Nicole Kohnert, P.Eng. **Date:** March 21, 2018  
**c:** **Memo No.:** 3  
**From:** Carey McIver, MA **File:** SWM.SWOP03478-01  
Tamara Shulman, BA, M.Sc.

---

**Subject:** Tech Memo 3 – System Recap, Bylaws, Policies, and Plan Options

---

## 1.0 INTRODUCTION

The Regional District of North Okanagan (RDNO) retained Tetra Tech Canada Inc. (Tetra Tech) to manage a review and update of the RDNO's 2011 Solid Waste Management Plan (SWMP) Update. The Draft SWMP Update in progress is to review current solid waste management policies and programs, identify and evaluate options for additional reduction and diversion, residual management, and financing, and also set the RDNO's waste management principles, targets, and strategies for the next ten years. A summary of the project phases and deliverables is included on Figure 1-1.

During the Stage One Assessment, the current system was reviewed and potential gaps and opportunities were identified in a Current Solid Waste System Report. For Stage Two Analysis and Evaluation, two Technical Memoranda (Tech Memo) have been issued to assess opportunities for and evaluate: recovery and residual management (Tech Memo 1); and reduce reuse and recycle options (Tech Memo 2).

This third Tech Memo is the final memorandum to be presented to the Regional Solid Waste Advisory Working Group (RSWAWG) at the sixth meeting on January 31, 2018, to gather feedback on the options and recommendations. The Sections are as follows:

- Section 2.0 – Recap and Reframe:
  - Provides updated information on garbage disposal by sector, waste composition, potential diversion, greenhouse gas (GHG) implications (full GHG Tech Memo provided separately), current financials and staff, priorities from the 2011 SWMP as captured in the 2016 Annual Report and a recap of the issues that must be addressed in this plan review and update.
- Section 3.0 – Reviews and evaluates RDNO solid waste-related bylaws and policies.
- Section 4.0 – Summarizes plan options and identifies initial resource needs.

The Working Group's input is being sought on each Tech Memo to help guide the selection of options for inclusion in the updated plan. The selected options will be further refined for the draft plan with 10 year costs and diversion estimates. A draft plan update with preferred options will be prepared for review by the Working Group prior to undertaking community and stakeholder consultation. Once these three Tech Memos and the preliminary plan have been reviewed, the consultation stage will engage RDNO constituents from public and private sectors through to First Nations to align on the direction of the Draft SWMP Update. The Draft SWMP Update will be finalized based on consultation feedback, approved by the RSWAWG, adopted by the full Board, and submitted to the Province.



**Figure 1-1: Solid Waste Management Planning Steps**

The stages of this project fit within the Ministry-defined steps as follows:

**Step 1:** Initiate the Process – Establish the project.

**Step 2:** Set the Plan Direction – Identify principles, goals and targets and assess the current system:

- Deliverable: Current Solid Waste System Report (July 25, 2017).

**Step 3:** Evaluate Options – Analyze opportunities, evaluate financial implications, and conduct consultation:

- Deliverables:
  - Tech Memo 1: Recovery and Residuals Management (September 12, 2017).
  - Tech Memo 2: Reduce, Reuse, and Recycle (October 25, 2017).
  - Tech Memo 3: System Recap, Finance, Bylaws, and Policies, and Plan Options (January 31, 2018).
  - Consultation Plan.

**Step 4:** Prepare and Adopt the Plan – Develop and finalize draft plan for submission to the British Columbia (BC) Ministry of Environment Climate Change and Strategy (Ministry):

- Deliverables:
  - Consultation Summary Report.
  - Solid Waste Management Plan Update (Issued for Review and Issued for Use).

## 2.0 RECAP AND REFRAME

At the fifth meeting of the RSWAG on December 6, 2017, the Study Team delivered a Power Point presentation which recapped and reframed information that had been provided in the Current Solid Waste System Report (July 2017) and Tech Memo No.2 – Reduce, Reuse, Recycle (October 2017). The updated information and data along with additional items for consideration are provided below to serve as the foundation for plan option development.

### 2.1 Garbage Disposal by Hauler

The Ministry has established waste disposal as an annual reporting requirement for regional districts and set a provincial target of 350 kilograms (kg) per capita per year to be achieved by 2020. A second performance measure set by the Ministry is to have 75% of the population in B.C. covered by an organic waste disposal restriction by 2020. As discussed in the Current Solid Waste Management System Report, in 2016 the disposal rate in the RDNO was 500 kg per capita which is slightly higher than the 2015 average provincial disposal rate of 497 kg per capita. Although the RDNO has been very successfully at reducing disposal from 1990 levels, there is significant potential to increase waste diversion even further. For example, in 2016, the Cowichan Valley Regional District (CVRD) and the Regional District of Nanaimo (RDN), similar size and demographic regions, reported disposal rates of 358 and 349 kilograms per capita respectively.

Reviewing garbage disposal by type and sector allows planners to target “best practice” policies and programs to maximize diversion such as those implemented in the CVRD and RDN. The RDNO Annual Reports and Tetra Tech’s Current Solid Waste Management System both report on tonnage by type of waste and jurisdiction as classified by scale clerks when loads enter the facilities. This reporting indicates that residential waste represents 63% of waste disposed at RDNO landfills, industrial, commercial, and institutional (ICI) waste represents 35% and construction and demolition (C&D) waste 2%. These numbers are atypical with respect to other regional districts in BC.

When RDNO scale data is organized according to who (residential, ICI or C&D) delivers it to disposal facilities, the picture changes significantly as indicated in Table 2-1. When broken down by “hauler type”, commercial haulers deliver single family (SF) residential garbage to disposal facilities primarily using rear or side load packer trucks and on behalf of municipalities and subscription customers via curbside public or private collection programs (20%); commercial haulers deliver multi-family residential (MF), ICI and C&D waste from the three sectors primarily using front load, roll off and other large trucks and trailers (62%) and self-haul customers deliver residential, ICI and C&D waste into containers at each facility, including the transfer stations, primarily using an assortment of small personal vehicles (18%). When viewed this way the biggest potential for diversion is in the ICI sector.

**Table 2-1: Current Garbage Disposal by Hauler**

Hauler	Estimated Garbage by Hauler (2017 <sup>1</sup> )	
	Tonnes	Percent
Single Family (SF RES) Municipal and Subscription Curbside	9,059	20%
ICI (including Multi-Family Residential [MF RES] and C&D)	28,084	62%
Self-Haul (SF RES, ICI, and C&D)	8,153	18%
<b>Total</b>	<b>45,296</b>	-

<sup>1</sup> Annualized based on extrapolation of actual scale data from March to November 2017.

However, as discussed in the Current Solid Waste System Report, curbside garbage collection is only provided by the municipalities of Vernon, Armstrong, Enderby and Lumby. The remaining 35% of SF households in Coldstream, Spallumcheen and the Electoral Areas either subscribe to a private collection service or self-haul their household garbage to the nearest RDNO recycling and disposal facility (RDF). If those households that currently receive curbside recycling collection service from Recycle BC were to also receive curbside garbage collection, the proportion of garbage collected from SF households through a municipal program increases significantly as shown in Table 2-2.

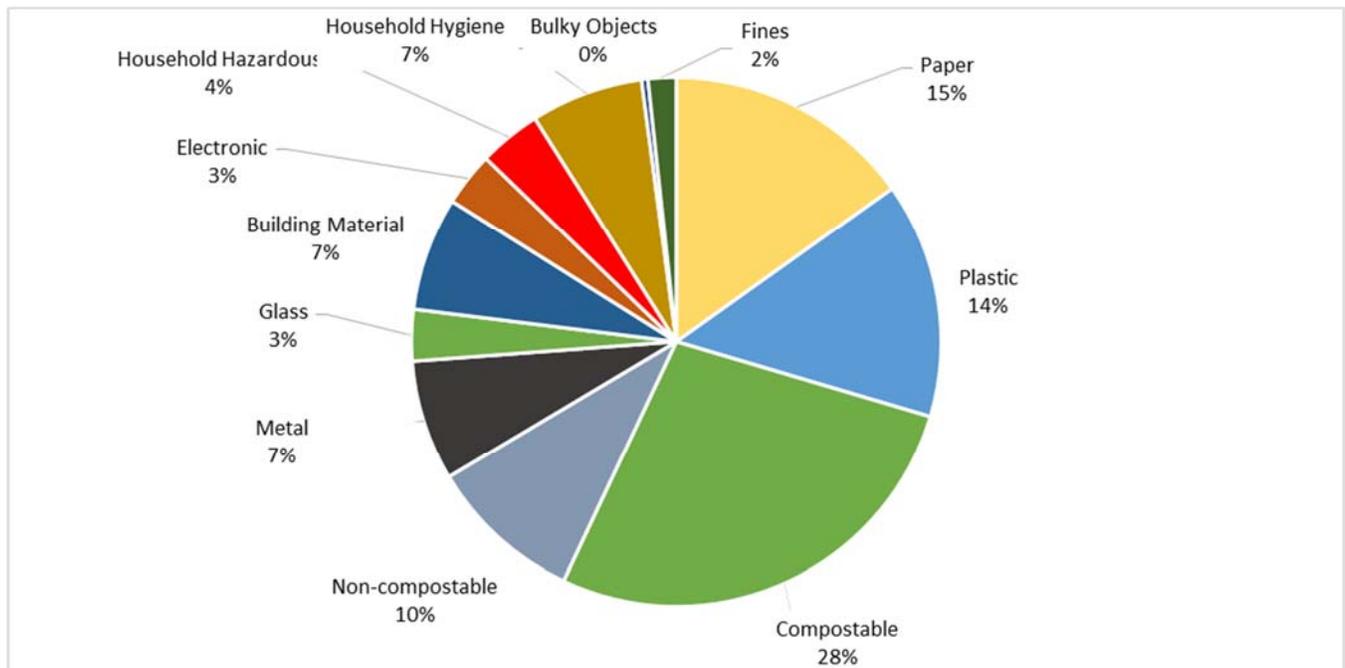
**Table 2-2: Adjusted Garbage Disposal by Hauler**

Hauler	Estimated Garbage by Hauler (2017 <sup>1</sup> )	
	Tonnes	Percent
SF RES Municipal and Subscription Curbside	14,059	30%
ICI (MF RES and C&D)	26,584	60%
Self-Haul (SF RES, ICI and C&D)	4,653	10%
<b>Total</b>	<b>45,296</b>	<b>-</b>

<sup>1</sup> Annualized based on extrapolation of actual scale data from March to November 2017.

## 2.2 Waste Composition

Figure 2-1 shows the adjusted 2012 waste composition results that represent aggregated results from across sectors. These results were adjusted to remove yard waste, given the 2016 program adjustment that permitted free year-round yard waste drop-off at all facilities and the corresponding reduction of yard waste in the garbage.



**Figure 2-1: Waste Composition Results (2012 Adjusted)**

## 2.3 Potential Diversion

---

Table 2-3 provides a mid-range and high-range estimate of the additional diversion that could be achieved by implementing the diversion strategy options across sectors (i.e., residential, ICI). As stated in Section 2.1, it is assumed that the residential universal collection will be considered as one of the programs in the plan. Therefore, the hauling distribution used here is 30%-60%-10% for residential, ICI and self-haul, respectively as identified above in Table 2-2. The level of diversion achieved by a given program can be affected by program maturity (new programs often take a few years before higher capture rates are achieved) and level of supporting activities employed (e.g., financial signals, communication, enforcement). As shown in the table, together, the diversion strategy components are expected to achieve an estimated disposal rate between 350 to 432 kg per capita per year. If the target for this plan were to be set at a disposal rate of 400 kg per capita; to achieve this target, a 30% reduction in the per-capita amount of garbage currently landfilled would be required. To meet the Provincial target or 350 kg per capita, a per capita garbage reduction of 44% would be required.

**Table 2-3: Potential Waste Diversion**

	Contribution to Landfill by Hauler Type	Material Contribution to Landfill	Diversion Potential if 20% of Targeted Material was Diverted	Diversion Potential if 30% of Targeted Material was Diverted	Diversion Potential if 44% of Targeted Material was Diverted
<b>SF RES Municipal and Subscription Curbside</b>	30%				
EPR-PPP		12.9%	0.8%	1.1%	1.7%
EPR-non-PPP		8.3%	0.5%	0.7%	1.1%
Other recyclables		5.6%	0.3%	0.5%	0.7%
Compostables		35.4%	2.1%	3.1%	4.7%
Building Material		8.0%	0.5%	0.7%	1.1%
Residential Diversion Potential			4.2%	6.2%	9.4%
<b>ICI (MF RES and C&amp;D)</b>	60%				
EPR-PPP <sup>1</sup>		9.1%	1.1%	1.6%	2.4%
PPP		8.5%	1.0%	1.5%	2.3%
Other recyclables		6.9%	0.8%	1.2%	1.8%
Compostables		34.5%	4.1%	6.1%	9.2%
Building Material		9.8%	1.2%	1.7%	2.6%
ICI Diversion Potential			8.3%	12.2%	18.4%
<b>Self-Haul (SF RES, ICI and C&amp;D)</b>	10%				
EPR-PPP		7.0%	0.1%	0.2%	0.3%
EPR-non-PPP		9.6%	0.2%	0.3%	0.4%
Other recyclables		2.6%	0.1%	0.1%	0.1%
Compostables		4.5%	0.1%	0.1%	0.2%
Building Material		27.9%	0.6%	0.8%	1.2%
Drop-Off Diversion Potential			2.1%	2.8%	4.3%
<b>Potential Additional Diversion from Landfill</b>			<b>13.52%</b>	<b>20.0%</b>	<b>30.0%</b>
			<b>68 kg/c</b>	<b>100 kg/c</b>	<b>150 kg/c</b>
<b>Estimated Annual Disposal<sup>2</sup></b>			<b>432 kg/c</b>	<b>400 kg/c</b>	<b>350 kg/c</b>

<sup>1</sup> EPR-PPP: Extended Producer Responsibility (EPR) – Printed Paper and Packaging (PPP)

<sup>2</sup> Calculated based on current disposal rate of 500 kg per capita.

Table 2-4 provides a list of items that are included in the categories listed above.

**Table 2-4: Category Items**

Category	Included Items (e.g.)
EPR-PPP (SF RES)	Packaging and Printed Paper Materials (Residential Managed by Recyclable BC)
PPP (ICI)	Packaging and Printed Paper Materials
EPR-non PPP	Electronics, Batteries, Used Oil, and Containers, Etc.
Other Recyclable	Textiles and Plastic Film
Compostable	Compostable Food and Compostable Paper
Building Materials	Drywall, Masonry, Clean Wood, and Metals

## 2.4 Financials and Staffing

The RDNO’s current operating revenue totals \$6.4 million with 84% of it derived from tipping fees. The budget is currently balanced with the current solid waste management system aligning to \$6.4 million annually. Over 40% of the expenses are for facility operations and 1% is allocated for policies and programs. Table 2-5 summarizes the 2017 RDNO Financial Plan.

**Table 2-5: Financial Plan**

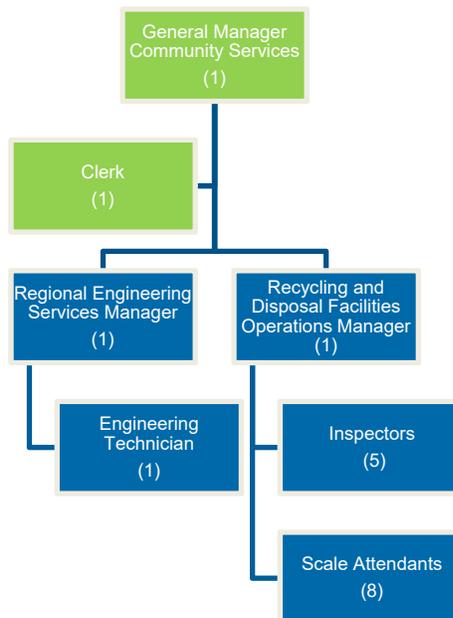
<b>FINANCIAL PLAN</b>	<b>2017</b>	<b>%</b>
<b>OPERATING REVENUE</b>		
Tipping Fees	\$5,342,000	83%
Tax Requisition	\$420,000	7%
Grants	\$2,500	0%
Interest Income	\$11,389	0%
Sundry Income	\$2,001	0%
Transfer from Operating Reserve	\$501,814	8%
Transfer from Statutory Reserve	\$50,000	1%
Recycled Commodities Revenue	\$77,500	1%
Other income - Gravel Royalties	\$3,000	0%
Rental and Lease Income	\$4,000	0%
<b>TOTAL OPERATING REVENUE</b>	<b>\$6,414,204</b>	<b>100%</b>
<b>OPERATING EXPENDITURES</b>		
Waste Reduction/Recycling – Policies and Programs	\$73,000	1.1%
Waste Reduction/Recycling	\$779,000	12.1%
Greater Vernon RDF (GVRDF)	\$1,389,400	21.7%
Armstrong / Spallumcheen RDF (ASRDF)	\$810,300	12.6%
Lumby RDF (LRDF)	\$206,800	3.2%
Cherryville RDF (CRDF)	\$67,700	1.1%
Kingfisher RDF (KRDF)	\$48,000	0.7%
Silver Star Solid Waste	\$116,814	1.8%
Administration and Overheads	\$781,189	12.2%
Other	\$411,000	6.4%
Capital Expenditures	\$800,000	12.5%
Closure & Post-Closure	\$50,000	0.8%
Transfer to Operating Reserve	\$225,000	3.5%
Transfer to Reserve/Landfill Closure	\$656,000	10.2%
<b>TOTAL OPERATING EXPENDITURES</b>	<b>\$6,414,203</b>	<b>100%</b>
<b>NET REVENUE/(EXP)</b>	<b>1</b>	<b>-</b>

Staffing costs (Administration) cover part of the General Manager position and a clerical position, and a full-time Regional Engineering Services Manager, Recycling and Disposal Facilities Operations Manager and Environmental Technician, along with management and operations staff for the three active RDFs. The staff structure is shown in Figure 3-1 below.

The Regional Engineering Services Manager is responsible for the development, implementation, management and coordination of capital projects, plans, policies, programs and activities associated with solid waste management planning, improvements and compliance such as landfill capital plans, environmental monitoring and closure planning as well as various other engineering services such as transit, air quality, drainage and street lights. The Engineering Technician – Solid Waste reports to the Engineering Services Manager to work with a technical team of engineers, technologists, operators and other RDNO staff to contribute to the efficient and effective delivery of sampling, monitoring, program delivery, and data compilation services for the solid waste management function.

The Recycling and Disposal Facilities Operations Manager provides leadership and overall management relative to the six RDNO RDFs (landfills, transfer stations and composting facility) including contract management. There are five Inspectors and eight scale attendants reporting to this Manager. Scale Attendants operated the scales and Inspectors inspect vehicles and direct customers to ensure that municipal solid waste and recyclable materials are deposited in the appropriate locations and enforce the facility bylaw and policies.

Prior to 2014, a Waste Reduction Coordinator position reported to the Recycling and Disposal Facilities Operations Manager. This position was omitted in 2014 when Recycle BC took over the RDNO’s Blue Bag Curbside Collection Program. This means that waste reduction and diversion planning, delivery, public outreach and communication initiatives are spread thinly between the two Managers and the Engineering Technician, with no one position having a direct responsibility for program design and implementation as well as education and promotion. Given that updated garbage disposal by sector shows that over 60% of the current garbage disposal is derived from ICI sources and close to 30% of the overall waste stream is comprised of compostable organics, it is clear that additional staff resources need to be allocated to develop and implement new waste reduction and diversion initiatives for both the ICI and residential sectors if the RDNO wants to achieve more waste diversion.



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

## 2.5 Priorities from 2011 Solid Waste Management Plan

The 2011 SWMP Update identified a total of 16 strategies; 10 through the main strategy and another six derived through additional consultation. The strategies below are grouped by current status so current priorities can be factored into continued options development. Note that the 2011 Plan vetted and prioritized options based on previous plans.

For Plan Consideration.

- **Organics Management Strategy** – Determine the best management strategy for organic waste including wood and yard waste from the DLC, residential, commercial, industrial, and agricultural sectors; and kitchen scraps from the residential, commercial, industrial, and agricultural sectors.
- **Expanded Residential Curbside Collection** – Determine the economic viability of a Expanded Residential Curbside Collection Program for all residential generated materials, including garbage, compostables, and recyclables.
- **Implement One Bag/Can Limit** – Consider a weekly one bag/can limit for households with a municipal curbside collection service. Since 1996 the limit has been set at two cans per week; given new diversion opportunities there is increased viability for shifting to a new norm of one can per week.
- **Blue Bag Recycling Program for Businesses** – Determine the best method for including businesses in the Blue Bag Recycling Program. To date only the City of Vernon has implemented a program, however other member municipalities have expressed some interest.
- **Upgrade Communications Tools** – Upgrade the RDNO web site and other communication tools to help residents, businesses and others determine what materials can be recycled.
- **Enhance Service at GVRDF for Commercial Haulers** – Evaluate the economic and operational implications of providing enhance service for commercial haulers at the GVRDF. Enhancements could include early openings and a dedicated commercial scale. Being addressed through ongoing operations and major capital works, including the addition of a third lane in 2018 to assist commercial haulers.

Not currently being pursued.

- **Audits of Large Waste Generators** – Consider offering a comprehensive waste audit to the 15 largest waste generators in the Region. Currently to be addressed through behaviour change programs that provide audit support.
- **Demolition and Land Clearing (DLC) Waste Management Strategy** – Examine mechanisms for further diversion of DLC waste, including but not limited to, private and public resource recovery parks and partnerships with industry. Currently to be addressed through building and demolition permitting processes.
- **Non-Typical Municipal Solid Waste Management** – Examine efficiencies and environmental protection needs with respect to including management of non-typical municipal solid wastes such as agricultural (e.g., plastics and slaughter waste) and industrial wastes (e.g., ash and wood), and water and wastewater treatment plant wastes in the SWMP. Currently addressed on a case by case basis with support from provincial and federal government agencies.
- **Blue Bag Recycling Program Improvements** – Evaluate the curbside Blue Bag Program and the Drop Centre Program to determine if the program should be expanded to include materials such as textiles, fluorescents, agriculture plastics, and other plastic products (Recycle BC is responsible for residential recycling for packaging and printed paper.) Currently being considered only when senior levels of government develop new programs (e.g. additions to the BC Recycling Regulation for Extended Producer Responsibility [EPR]).

Pursued but not currently viable.

- **Development Cost Charges** – Determine how local governments can include solid waste management infrastructure in their Development Cost Charge (DCC) bylaws by 2016.
- **Inter-Regional Solid Waste Management Committee** – If interest exists, facilitate cooperation of southern interior solid waste management staff, municipal councils, and regional district Boards of Directors through an interregional Solid Waste Management Committee.
- **Monitor Waste to Energy Technology** – Monitor waste to energy technology as it becomes accessible to small communities in Canada.

Completed.

- **Eco-Depots** – Evaluate eco-depot concepts and locations especially with respect to customer convenience and land use in the region.

No longer required.

- **Blue Bag Processing Facility** – Continue to operate the current Blue Bag processing system and facility with minor capital improvement until such time as more details about the provincial EPR program for packaging and printed paper are known.
- **More Frequent Free Styrofoam Collection Events** – Consider increasing the number of free Styrofoam collection events until Styrofoam packaging becomes part of an industry stewardship program.

## 3.0 BYLAWS AND POLICIES

Policies and bylaws define the “rules of the road” for how solid waste should be managed in the RDNO. They can also be applied to address many of the issues identified during the Draft SWMP Update. The following sub-sections describe current RDNO solid waste bylaw components as well as provide an overview of policies and bylaw amendments or additions that could be considered in the RDNO.

### 3.1 Bylaw Review

#### RDNO Municipal Solid Waste Management Bylaw No. 2659

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, such as in the City of Vernon the curbside collection service for recyclables is also available to some ICI customers. Facility regulation bylaws apply to RDFs and establish regulations, conditions of use as well as user fees and penalties. The RDNO regulates and sets fees at its RDFs under Municipal Solid Waste Management Bylaw No. 2659, as amended. Table 3-1 provides an outline of the sections and schedules to this bylaw.

**Table 3-1: RDNO Municipal Solid Waste Management Bylaw 2659**

Sections	Schedules	
Interpretation, Schedules and Definitions	Schedule A	Recycling and Disposal Fees
Regulations, Conditions of Use and General	Schedule B	Regulated Material
Exemptions, Violations and Penalties	Schedule C	Recyclable Material
Inspections and Dispute Mechanism	-	

The bylaw defines certain materials as prohibited waste, controlled waste, regulated material and recyclable material. Prohibited Waste means solid waste designated to be inappropriate for disposal at an RDF for environmental, regulatory or legal reasons, or for reasons related to the safe and efficient operation of the RDF. Controlled Waste means solid waste that requires preapproval by the Manager for disposal at an RDF and because of its inherent nature and quantity, may require special handling and/or disposal techniques. Regulated and Recyclable Materials means those materials listed in Schedules B and C that are considered to have alternative drop off opportunities (can be diverted from disposal).

Table 3-2 lists the materials that are included as Prohibited Waste, Controlled Waste, Regulated Material and Recyclable Material in Bylaw 2659.

**Table 3-2: Prohibited Waste, Controlled Waste, Regulated Material and Recyclable Material**

Prohibited Waste	Controlled Waste	Regulated Material	Recyclable Materials
<ul style="list-style-type: none"> <li>▪ Liquid or semi-solid including septage</li> <li>▪ Hazardous Waste</li> <li>▪ Solid Waste on fire or smouldering</li> <li>▪ Automobiles etc.</li> <li>▪ Renderable Products</li> <li>▪ Slaughterhouse, fish hatchery etc.</li> <li>▪ Biomedical Waste</li> </ul>	<ul style="list-style-type: none"> <li>▪ Screenings from municipal treatment plants etc.</li> <li>▪ Condemned foods</li> <li>▪ Animal feces</li> <li>▪ Bloody furniture</li> <li>▪ Sawdust</li> <li>▪ Bulky Waste</li> <li>▪ Clinical/Laboratory Waste</li> <li>▪ Carcasses</li> <li>▪ Contaminated Soil</li> <li>▪ Waste Asbestos</li> <li>▪ Foundry Dust</li> <li>▪ Food Processing Waste</li> <li>▪ Septage Waste</li> <li>▪ Noxious Weeds</li> <li>▪ Logs and Stumps- large, dirty, ungrindable</li> <li>▪ Infested Vegetation</li> <li>▪ Tire – Oversize, and</li> <li>▪ Preserved Wood.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Stewardship Products</li> <li>▪ Asphalt Roofing</li> <li>▪ Batteries</li> <li>▪ Box Springs</li> <li>▪ Crushable Material for Aggregate</li> <li>▪ Drywall, Recyclable</li> <li>▪ Fluorescent Tubes and Bulbs</li> <li>▪ Glass Jars and Bottles</li> <li>▪ Logs and Stumps – Clean and Grindable</li> <li>▪ Mattresses</li> <li>▪ Propane Tanks</li> <li>▪ Recyclable Material</li> <li>▪ Refrigeration Appliances</li> <li>▪ Scrap Metal</li> <li>▪ Soil or other Fill Material</li> <li>▪ Styrofoam</li> <li>▪ Tires</li> <li>▪ Wood Waste – Clean and Dirty</li> <li>▪ Yard and Garden Waste</li> </ul>	<ul style="list-style-type: none"> <li>▪ Aluminum-cans, trays, foil</li> <li>▪ Cardboard</li> <li>▪ Mixed Paper</li> <li>▪ Newspaper</li> <li>▪ Plastics includes #1, #2, #3, #4, #5, #6, and #7 plastic labelled containers and plastic film</li> <li>▪ Tin Cans</li> </ul>

Under the Regulations Section, the bylaw states that no person shall:

- Bring Prohibited Waste to a RDF unless acceptance is specifically authorized in writing by both the Regional District and the B.C. Government

- Bring Controlled Waste to a RDF unless preapproved by the Manager
- Deposit Regulated Material in locations at a RDF that are not specifically designated for the material type by signage or verbal or written instructions
- Deposit Recyclable Material in locations at a RDF that are not specifically designated for the material type by signage or verbal instructions.

## Tipping Fees

A tipping fee schedule has multiple purposes. Applying tipping fees to incoming waste is how the RDNO funds current operations, future capital expansion and final closure costs. In addition, through the application of variable rates to the different waste streams, the RDNO provides a financial incentive to their customers to separate and divert Regulated and Recyclable Materials from disposal.

Similarly, tipping fees can be set at a level that encourages waste generators to seek out lower-cost private sector alternatives, like a private recycling depot or scrap metal yard, which avoids the RDNO having to store and subsequently transport the material to recycling facility or market. Another purpose for the tipping fee schedule is to track the quantities of the different categories of waste that are handled at the facilities. Having detailed information on the volumes and revenues associated with each waste stream is invaluable for planning purposes.

Under the current fee schedule the tipping fee for regular refuse is \$100 per tonne while the fee for refuse containing Regulated Material (other than drywall) is roughly double that fee at \$203 per tonne while the fee for any refuse containing drywall is \$303 per tonne. Controlled Waste is charged at \$174 per tonne.

It is important to note that Regulated Material is not banned from disposal. If customers choose to dispose of a Regulated Material, they are subject to higher recycling and disposal fees. This “carrot” approach puts the onus on the RDNO to provide sufficient resources at RDF’s (the back-end) to enforce the bylaw. Regional district’s that have gone beyond variable tipping fees to full disposal bans have had greater success at diversion as discussed in the following section.

## 3.2 Policy Overview

### 3.2.1 Disposal Bans

To encourage even more source-separation and diversion without relying solely on variable tipping fees, many regional districts and municipalities implement disposal bans on recyclable and compostable materials. This is a low-cost policy tool used to signal to waste generators and waste collection companies that they are expected to separate and recycle/compost specific materials for which alternatives are readily available (e.g. cardboard, metal, yard waste).

Disposal bans are enforced at the point of disposal (i.e. at transfer stations and landfills) through the application of significant surcharges on garbage found to contain banned materials. To ensure sustained success, disposal bans require the local government to work closely with ICI waste generators and particularly commercial waste haulers in the design, start up and on-going maintenance of this policy. The RDN, whose disposal ban on cardboard was implemented in 1992, has a consistent approach whenever they introduce a new disposal ban:

1. **Regulate** (decide to ban a waste stream with a readily available alternative to landfilling)
2. **Collaborate** (work with affected stakeholders to determine the timing of implementation and the ramp up of enforcement measures)
3. **Educate** (make sure all haulers and waste generators are aware of the upcoming new disposal ban, and plan to communicate regularly)
4. **Enforce** (enforce the disposal ban at the point of disposal).

### Approaches to Disposal Ban Enforcement

The approach to enforcing disposal bans has evolved over the last decade as regional districts have gained more experience with this policy tool. Enforcement is only one component of an integrated approach to implementing a disposal ban. As indicated in Figure 4-1, collaboration with waste haulers and generators is essential not only during the design of a disposal ban but also during implementation.

Many regional districts have discovered that the need to enforce a disposal ban is short-term and minimal if adequate up-front collaboration with waste haulers, supported by effective education of waste generators, results in diversion becoming “business-as-usual”. In effect, waste haulers become the enforcers since the implementation of a disposal ban provides them with an opportunity to increase their market share if they can provide more cost-effective collection options to their customers.



**Figure 3-1: Integrated Disposal Ban Design and Implementation**

Nevertheless, local governments do need to provide some level of enforcement. With respect to disposal bans on cardboard, mixed waste paper and scrap metal, some local governments such as the Capital Regional District, who contract out disposal operations, have dedicated bylaw enforcement officers at the landfill inspecting loads at the working face and issuing fines if required. In the RDN, bans are enforced at the landfill by RDN equipment operators who notify a supervisor to inspect the load, take pictures and then advise the scale clerk to apply a surcharge to the

load. This information is then passed on to a Zero Waste Compliance Officer who follows up with the hauler and generator to educate them on compliance options.

It is important to note that the goal of the surcharge is not to make money for the regional district but to provide an opportunity to educate. In most cases the first infraction results in a warning while the second infraction results in a surcharge. However, based on experience, most infractions occur within the first six to twelve months of ban implementation after which fines are minimal as waste diversion becomes business as usual.

Metro Vancouver (MV) refined this approach with the introduction of their food scraps disposal ban in January 2015. From 2012-2013, MV planned their organics diversion strategy in collaboration with stakeholders and then released their implementation strategy in 2014. The strategy was based on a phased implementation approach as illustrated in Figure 5-1 below. Although the ban was effective January 2015, the first six months was considered as an education period with no surcharge on tipping fees. However, from July to December 2015, if a hauler arrived with a load at a transfer station or disposal facility containing more than 25% food scraps, a 50% surcharge was applied to their tipping fee. This 20% threshold was reduced to 10% in 2016 and then down to 5% in 2017.



**Figure 5-1: Metro Vancouver Organics Disposal Ban Phased Implementation**

Although MV hired contracted enforcement staff at their facilities to inspect incoming loads for food waste, most regional districts have used their own staff to enforce disposal bans on a wide range of materials. This is because, as discussed above, enforcement activity is usually short-term while waste generators and haulers adjust to new waste management behaviours.

MV's phased approach was extremely successful and has been adopted by other regional districts as they introduce their own disposal bans. Most recently, in April 2017 the Regional District of Fraser-Fort George approved a commercial cardboard diversion program that will apply phased surcharges and thresholds to loads containing cardboard. This program will be implemented by regional staff.

### 3.2.2 Waste Stream Management Licensing

The BC *Environmental Management Act* (the Act) grants the authority and responsibility to manage all municipal solid waste and recyclables to the province's regional districts. As part of this authority, under Section 24 of the Act,

regional districts are responsible for developing and implementing SWMPs that provide long term visions for the management of municipal solid waste, including waste diversion and disposal activities.

For the purposes of implementing an approved SWMP, Section 25 of the Act contains provisions for the regulation of solid waste management facilities and haulers by regional districts. As per the Act, this tool can be used by regional districts, if they so choose, to regulate their local solid waste industry by achieving operational and administrative control over privately-owned and/or publicly-owned facilities and haulers managing recyclable material and municipal solid waste in their region.

The Act allows regional districts to create bylaws respecting the following:

- The types and quantities of waste materials managed at a site;
- The types and quantities of waste materials transported within the regional district (*haulers*);
- The operation, closure and post-closure of a waste management site;
- The fees and charges applied to waste management activities;
- The recording and submission of waste management information;
- The requirement to hold a license;
- The requirement to comply with a code of practice; and
- The requirement for operators of sites to obtain risk insurance or provide some form of security.

In particular, the Act allows for the licensing system to establish different prohibitions, conditions, requirements, and exemptions for different classes of sites, operations, activities, waste or recyclables. This means that each license can be case specific.

Therefore, waste stream management licensing is another potential tool for the RDNO to employ to assert control over the waste management system.

Licenses can be used to administer and enforce any bylaw developed by a regional district under the Act's authority. The Act provides for two types of licenses that a regional district can issue: a waste stream management license (WSML) issued to the owner or operator of a site that accepts and manages municipal solid waste; and, a hauler license issued to a hauler.

Regional Districts may choose to regulate their local solid waste industry for the following reasons:

- To ensure the diversion of recyclable material;
- To prevent abandonment of large quantities of solid waste or recyclable material;
- To track the movement of municipal solid waste and recyclable material;
- To assist in determining success in meeting waste reduction goals;
- To establish minimum administrative and operational requirements for facilities;
- To encourage private sector investment in waste management (through the establishment of a level playing field); and

- To protect the public interest by managing the flow of municipal solid waste to regional district facilities to ensure financial sustainability.

### Examples of Regional Districts with Licensing Bylaws

MV introduced a regulatory program to ensure proper management of privately operated municipal solid waste and recycling facilities in their 1995 SWMP. These facilities are regulated by the Municipal Solid Waste and Recyclable Material Regulatory Bylaw which specifies operating requirements so as to protect the environment and public health, protect the region's land base in accordance with the host municipality's zoning and land use policies, ensure that regional, municipal and private facilities operate to equivalent standards, and to achieve the objectives of the MV Integrated Solid Waste and Resource Management Plan.

Under the Bylaw, licenses are required for the following types of privately owned facilities: disposal facilities; material recovery facilities, transfer stations, composting facilities, storage facilities and certain types of brokering facilities.

In another example, RDN and CVRD, working in partnership, adopted Waste Stream Management Licensing Bylaws No. 1386 (RDN) and 2570 (CVRD) in 2004. Under these bylaws, the RDN and the CVRD are authorized to license all private or non-government operated municipal solid waste diversion and recycling facilities within their respective regions.

The bylaws were established under the authority of both the RDN and CVRD SWMPs and were approved by the Ministry of Environment in 2005. The bylaws are a response to concerns by the recycling industry in both districts regarding competing businesses that operate with low standards. The photograph below shows one example of an undesirable operation competing with legitimate recycling operations prior to the establishment of a licensing system.



Pile of waste drywall being "stored" on private land in the CVRD

The bylaws create a level set of standards for the recycling and composting industry that protects private sector investment in local solid waste management infrastructure, and enhances diversion in the regions. They are also intended to shield taxpayers from the risk and expense related to clean-up of poorly operated and/or abandoned facilities. In both the RDN and the CVRD, the WSML bylaws help improve the quality of data received from private diversion and recycling facilities, as they are required to submit monthly material statements to the districts. Improved data reporting allows both the RDN and CVRD to effectively track progress towards their waste reduction goals and to plan future programs and program improvements.

In the three regional districts discussed above, the license application process includes a 45-day public consultation period for new applications. License applications are reviewed by staff; and if applications are acceptable, staff also issues the license. Any applicant or licensee affected by the staff decision may appeal the decision to the Board.

The three regional districts also operate their respective licensing systems on a self-financing basis, in that license application, amendment and annual administration fees have been designed to pay for the regulatory program. In MV, the application fees range from \$500 to \$5,000 depending on the type of facility, with an annual administration fee of \$1,000 for all licensed facilities. In the RDN and CVRD system, license application fees range from \$100 to \$1,000 depending on the type of facility, with an annual administration fee of \$100 - \$500 depending on the type of facility.

All three regulatory schemes require staff time to review applications, inspect facilities and enforce license requirements. For the RDN in particular, staff time dedicated to the WSML bylaw, at 1 Full-time Equivalent (FTE) annually, exceeds the revenue generated by the system. However, the RDN reports that the documented diversion attributed to the WSML system has been worth the expense.

Nevertheless, as part of their SWMP Review, the RDN will be reviewing the fee structure contained in their WSML, to determine whether the fees should be adjusted to more accurately reflect costs.

### 3.2.3 Codes of Practice Bylaws

Code of Practice bylaws are another approach to facility regulation, that is similar to waste stream management licensing, but instead of licensing all solid waste management facilities, code of practice bylaws seek to establish operating standard *for a specific type* of solid waste facility. This is the approach the Capital Regional District (CRD) has undertaken with the development of the Composting Facilities bylaw and the Salt Spring Island Transfer Station bylaw.

This approach to facility regulation limits the authority to only those types of facilities that the CRD deemed necessary to assert some level of operating standards. As an example, the CRD implemented the *Salt Spring Island Transfer Station Regulation Bylaw 2810* in 2002. The purpose of the bylaw is to regulate and license the operation of facilities that are used for the management of municipal solid waste or recyclable material on Salt Spring Island (SSI). Under this bylaw, transfer stations must not contaminate ground or surface water or generate unacceptable levels of odour, vectors, litter or dust. This bylaw also requires performance security.

The bylaw was put in place to address the development of private sector transfer stations on Salt Spring Island to ensure that they met minimum desired operating standards and created a level playing field.

In summary, adoption of a waste stream management licensing or code of practice bylaw could provide the RDNO with tools that can provide a level of local government control over the operation of private sector solid waste facilities, and could also be used to diminish the potential for facilities that operate at a low standard.

### 3.2.4 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 RDNO

could take a hard stance or a more flexible and soft stance with respect to sharing the costs of managing the promotion, stockpiling, preparation for markets, and shipping of products that are the responsibility of EPR stewardship agencies (Stewards) in the region. The RDNO currently takes a fairly soft stance on supporting the stewards on and off the RDF sites. For example, the more recently implemented Major Appliances Program, the RDNO bares all the costs of Freon removal from the refrigerated appliances, moving the appliances from the drop off location to the stockpiles and managing the stockpiles. Fortunately this program is being amended so that costs are more shared with the steward. The SWMP should reflect how the RDNO wants to share in the responsibility of managing products with and for the Stewards, including continue to advocate for the continuation and expansion of product stewardship programs through Recycling Regulation enforcement and improvements; cover the full cost of program implementation; require an increased return for products in the program (i.e., from 75 to 100% especially for more established programs such as tires); and ensure that program access is readily available in more 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. RDNO 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 RDNO is a member (e.g., BCPSC). The management by the RDNO 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.

## 4.0 ISSUES AND PLAN OPTIONS

### 4.1 Reduce, Reuse, and Recycling

This SWMP review process has identified issues and associated program and policy options available to reduce the current RDNO 500 kilogram per capital disposal rate. The issues and options are summarized below.

#### 4.1.1 Option 1: Increase organics diversion

Issue: Almost 30% of the current waste stream is comprised of compostable organics.

- A. Review and adopt an Organics Diversion Strategy based on the four options considered in the Organics Management Options Study to provide clear direction with respect to policy (disposal restrictions), collection (kitchen scraps or food and yard waste combined, universal collection or current municipal collection programs only); processing (public or private, in-region or out-of-region); and transfer out of region.
- B. Develop an implementation plan for the organics strategy to address residential and ICI sectors.
- C. Provide additional staff resources to consult with applicable stakeholders including municipal partners and solid customers, processors, and commercial haulers.
- D. Implement the processing infrastructure component of the organics strategy.

#### 4.1.2 Option 2: Reduce disposal from SF residential households

Issue: Not all households receive curbside garbage collection resulting in less diversion potential compared to a three-stream system (recycling, organics, and garbage).

- A. Expand curbside garbage collection to all SF RES households that currently receive curbside recycling collection (Universal Collection). Consider clear bag options.
- B. Implement a One Bag/Can Limit for SF RES households that currently receive municipal curbside garbage collection, expand to all SF RES households if Universal Collection is implemented.
- C. Undertake a study to determine the demand for curbside collection of yard waste as well as the implications of switching to automated collection, for both SF RES and MF RES.
- D. Implement a kitchen scraps collection program for SF RES households that currently receive municipal curbside garbage collection; expand to all SF RES households if Universal Collection is implemented. Implement a One Bag/Can Limit with every other week garbage collection service.
- E. Design and implement behaviour change (education and promotion) programming using a community-based social marketing (CBSM) approach.
- F. Provide additional staff resources to consult with municipal partners and customers to recommend policy decisions regarding implementation of universal curbside collection: number and location of households, trial areas, types of materials collected (kitchen scraps only or food and yard waste), type of cooperation with Recycle BC's Blue Box Program, and type of collection system (manual or automated).

#### **4.1.3 Option 3: Reduce disposal from commercial haulers (ICI, Multi-family and C&D waste)**

Issue: Over 60% of the current waste stream is collected through commercial haulers.

- A. Review the effectiveness of the current level of application/enforcement of the Regulated Material (R03) recycling and disposal fee and consider implementing disposal bans on recyclable materials including kitchen scraps and addressing other existing bylaw policies such as secure loads. Consider use of a “regulate, collaborate, communicate, educate and enforce” model.
- B. Review the impact of disposal bans on illegal dumping levels and implement an illegal dumping prevention and enforcement program if required.
- C. Explore waste stream management licensing options to ensure a level playing field to support private sector market development for recycling materials.
- D. Work with private sector to ensure markets for diverted materials, with a focus on wood and compost, by banning these items from disposal and encouraging the development of private sector infrastructure to process and market non-residential recyclable materials.
- E. Design and implement behaviour change (education and promotion) programming using a CBSM approach.
- F. Provide the additional staff resources to implement disposal bans, including enforcement and education, for MF RES in particular.

#### **4.1.4 Option 4: Develop programs to actively promote waste reduction and reuse initiatives**

Issue: There are currently insufficient programming and behaviour change resources to support the first levels of the pollution prevention hierarchy including rethink, reduce and reuse initiatives.

- A. Continue to demonstrate backyard composting and deliver the Composter Rebate Program.

- B. Continue to administer the Waste Reduction Initiatives Fund for not-for-profit organizations that need seed capital funding for new or amended programs.
- C. Provide behaviour change and education programs including a kitchen scraps reduction campaign (e.g., Love Food Hate Waste).
- D. Advocate with senior governments to support expansion of EPR programs (e.g., mattresses, carpet, textiles).

#### **4.1.5 Option 5: Establish staff positions to develop, implement, and provide ongoing efficiency to ensure program effectiveness**

Issue: No staff resources are currently committed to supporting and implementing residential and ICI waste reduction programs, including collection and diversion efforts.

- A. Re-establish a waste reduction program planner to oversee the expansion to universal collection.
- B. Establish a staff position that collaborates with key stakeholders, including haulers and businesses, and provides educational support and other services, including providing support for organics program development and implementation.

## **4.2 Residual Management**

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

### **4.2.1 Option 1: Develop centralized disposal plan with additional landfill capacity**

Issue: The Armstrong/Spallumcheen RDF (ASRDF) is reaching capacity, there are emerging and ongoing environmental issues at the ASRDF and Lumby RDF (LRDF), and additional land has been purchased beside the Greater Vernon RDF (GVRDF) to allow for mitigation of environmental issues and lateral expansion of the site, reconfiguration of the disposal system may be necessary to mitigate issues and increase efficiency in the system.

- A. GVRDF – A conceptual design for a lateral expansion has been developed to extend the landfill footprint to the west of its current boundary resulting in a potential 30 years of additional disposal capacity. The current footprint is expected to last until 2059. The expansion will need to commence within the next ten years in order to secure a permit amendment from the Province. Major permit amendments can take five years or more and must be approved in the SWMP prior to the application stage.

Regarding GVRDF access, the Ministry of Transportation and Infrastructure has a current project underway to address infrastructure challenges along the full corridor, including the section near the GVRDF. Congestion and routing issues can also be addressed by reducing the amount of traffic going to the site.

- B. ASRDF – Unless waste reduction measures are enhanced significantly, it is expected that the current landfill capacity will be filled by 2027 (9 years). The planned phase one closure (north unlined section) will help mitigate environmental issues at this site starting in 2019. It is recommended that the landfill be closed as soon as the capacity is reached and a self-hauler transfer station be constructed, with all large loads (front load, rear and side load, and roll off trucks) going directly to the GVRDF. Options for waste transfer will be studied to determine the best overall option.
- C. LRDF – The most financially sustainable model for landfill operation, environmental protection and closure warrants preserving landfill space at this site only for inert C&D waste with a transfer station put into place to accommodate self-haul loads only. The timing for this change should be determined within the next five years.

D. Hesperia Landfill – The City of Vernon has hired a consultant to help with regulatory compliance for their Hesperia Landfill (Upper Bench Row Road), which is operated by the City of Vernon as a demolition, land clearing, and construction material disposal facility. The landfill is authorized under Operational Certificate (OC) 15288 to dispose of up to 15,200 m<sup>3</sup> of demolition and construction wastes, comprised of inert material such as clean fill and concrete, each year. The OC, which was issued by the Ministry in 1998, states that is in accordance with the RDNO SWMP. This landfill was included in the original SWMP, but it has not been included in any of the updates because RDNO was unaware that operations were on-going at this landfill. The City of Vernon has recently approached the Ministry to discuss amending the OC to increase the annual maximum discharge rate and to revise some of the OC clauses that are not necessarily applicable to their operations. The Ministry has also recommended that the City of Vernon seek a formal amendment for these changes. However, for the Ministry to consider an amendment, the landfill needs to be included in the RDNO's regional SWMP.

#### **4.2.2 Option 2: Prepare a disaster response plan**

Issue: The RDNO has no debris management plan.

- A. Address disaster response waste (e.g., docks, Styrofoam, sandbags, burned buildings, fires) – Ensure solutions for disaster materials management are developed before a disaster occurs so systems can be put into place to manage the rapid increase in materials that are often generated after a disaster. This effort is likely to need inter-departmental collaboration and resource sharing.

## **5.0 LIMITATIONS OF REPORT**

This report and its contents are intended for the sole use of Regional District of North Okanagan 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 North Okanagan, 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.



Prepared by:  
Carey McIver, MA  
Principal  
Carey McIver & Associates Ltd.  
Direct Line: 250.821.9889  
Carey@careymciver.com



Reviewed by:  
Tamara Shulman, BA, M.Sc.  
Team Lead – Planning and Consultation Specialist  
Solid Waste Management Practice  
Direct Line: 604.608.8636  
Tamara.Shulmand@tetrattech.com

/lm

Attachment (1): Tetra Tech's Limitations on the Use of this Document

# 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").

The Professional Document is intended for the sole use of TETRA TECH's Client (the "Client") as specifically identified in the TETRA TECH Services Agreement or other Contractual Agreement entered into with the Client (either of which is termed the "Contract" herein). TETRA TECH does not accept any responsibility for the accuracy of any of the data, analyses, recommendations or other contents of the Professional Document when it is used or relied upon by any party other than the Client, unless authorized in writing by TETRA TECH.

Any unauthorized use of the Professional Document is at the sole risk of the user. TETRA TECH accepts no responsibility whatsoever for any loss or damage where such loss or damage is alleged to be or, is in fact, caused by the unauthorized use of the Professional Document.

Where TETRA TECH has expressly authorized the use of the Professional Document by a third party (an "Authorized Party"), consideration for such authorization is the Authorized Party's acceptance of these Limitations on Use of this Document as well as any limitations on liability contained in the Contract with the Client (all of which is collectively termed the "Limitations on Liability"). The Authorized Party should carefully review both these Limitations on Use of this Document and the Contract prior to making any use of the Professional Document. Any use made of the Professional Document by an Authorized Party constitutes the Authorized Party's express acceptance of, and agreement to, the Limitations on Liability.

The Professional Document and any other form or type of data or documents generated by TETRA TECH during the performance of the work are TETRA TECH's professional work product and shall remain the copyright property of TETRA TECH.

The Professional Document is subject to copyright and shall not be reproduced either wholly or in part without the prior, written permission of TETRA TECH. Additional copies of the Document, if required, may be obtained upon request.

### 1.2 ALTERNATIVE DOCUMENT FORMAT

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 persons 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 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.