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Regional District of East Kootenay
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December 5th 2018

**Re: Regional District of East Kootenay Solid Waste Management Plan Update
Waste Reduction and Diversion Opportunities**

Dear Mr. Paterson,

Sperling Hansen Associates (SHA) is pleased to present following report which outlines a variety of waste reduction and diversion strategies that could be utilized in the Regional District of East Kootenay (RDEK). The report has been prepared as part of the Solid Waste Management Plan (SWMP) update and intends to provide potential strategies and initiatives that may assist the RDEK in increasing diversion and reducing waste disposal in the Regional District. The options outlined in this report will help guide discussions with the RDEK's SWMP Advisory committee.

1. INTRODUCTION

Reduction, reuse, and recycling programs are important as they increase waste diversion, and reduce waste sent to landfill. New landfills are increasingly hard to site, thus extending the life of existing landfills is a high priority. Further, recycling, reusing or repurposing materials reduces the demand on the resources required to manufacture new materials.

The Regional District of East Kootenay (RDEK) provides many opportunities for the reduction and reuse of materials, which have been outlined in the "Characterization of the System Report," and are briefly summarized throughout this report.

This report has been developed as part of the second phase of the RDEK's Solid Waste Management Plan Update. This phase will consist of advisory committee engagement, as well as community and stakeholder engagement, to review options for enhancing the RDEK's system and select preferred options for the RDEK. The third and final phase will consist of community and stakeholder consultation on the Draft Plan and obtain input on the options and strategies identified in the Plan.

1.1 Waste Composition and Disposal

Waste Composition

In 2018, the RDEK completed a waste composition study at the Central Subregion Landfill. The study sampled waste from all three subregions, and consisted of almost 80 garbage samples weighing approximately 130 kilograms each. The overall waste composition results are shown in Figure 1 below. As shown, the study results show that the largest component of the waste stream is Compostable Organics (29%), followed by Plastics (14%), Paper and Paperboard (13%), Construction and Demolition (11%), Non-compostable Organics (8%), Textiles (5%), Household Hygiene (5%), Metals (4%), Glass (3%), Household Hazardous Waste (2%), Electronics (2%), Bulky Waste (2%) and Fines (2%).

The Compostable Organics consisted of Kitchen Waste (meats, dairy etc.) (11%), Yard and Garden Waste (9%), Backyard Compostable Food Waste (vegetables, fruits, egg shells etc.) (7%), Clean Lumber (1.8%), Clean Pallets and Skids (0.7%), followed by Other Organic Waste (0.1%). In addition to the Compostable Organics, the waste stream consisted of 8% Non-Compostable Organics (Treated Lumber, Rubber etc.). The study showed that, in total, nearly 50% of the waste stream consist of organic wastes (38%) and construction materials (11%).

Based on the samples sorted, the results show the amount of wood waste (clean and contaminated) in the waste stream is 3 times greater at rural transfer stations than at urban transfer stations (16% compared to 5% sorted respectively). This is possibly due to the opportunity to divert wood waste at most of the attended/urban transfer stations, and minimal opportunities to divert wood waste at rural transfer stations. This is further supported by the low percentage of wood waste (clean and contaminated) observed in the Elk Valley (4%) where every transfer station is attended and offers a diversion opportunity for wood waste; thus, keeping wood out of the landfill.

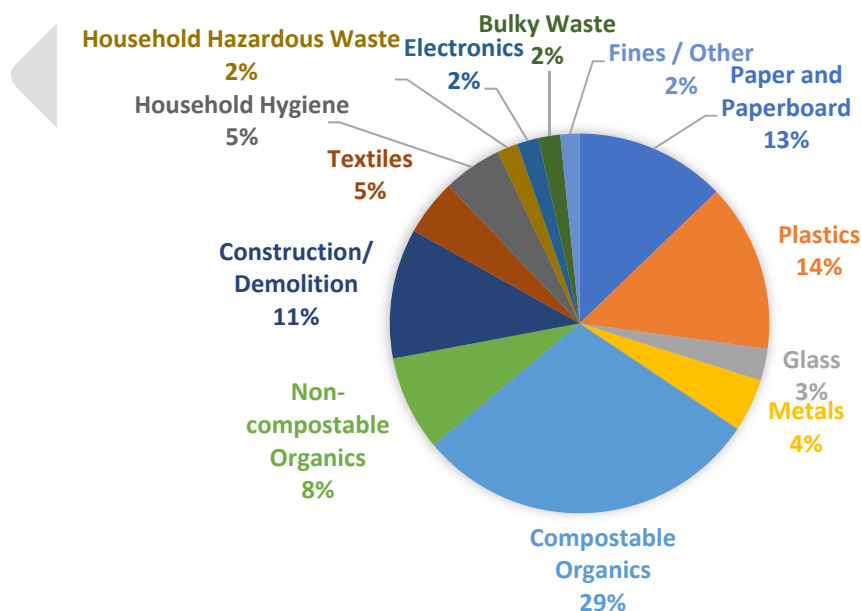


Figure 1: Overall Waste Composition in the RDEK

An observation that was noted during sorting was that several bags were sorted that contained only single-stream recycling (no waste). This was unexpected as the RDEK provides yellow recycling bins (for single stream recycling) at all transfer stations and landfills.

Based on the materials accepted in the RDEK's single stream recycling program (paper, tin/aluminum cans, grocery bags and plastics #1-6), it appears that up to 19% of the overall waste stream could be diverted through existing recycling programs (assuming the materials are clean).

Waste Disposal Rate

Based on the Province's Waste Disposal Calculator, the 2016 disposal rate for the RDEK was 561 kilograms per capita. This is based on a population of 74,975 people, which is higher than the reported census data in order to factor in the seasonal tourist population in the region.

The province of British Columbia has set provincial waste disposal targets of lowering the waste disposal rate to 350 kilograms per person per year by the year 2020. Additionally, the Province is working towards a target of having 75% of the population covered by organic waste disposal restrictions by 2020.

To facilitate a reduction of the RDEK's waste disposal rate, a number of waste reduction and diversion initiatives will need to be implemented. As outlined in the previous text, major components of the waste stream where opportunities exist include compostable organics, plastics, paper and paperboard, and construction and demolition wastes.

1.2 Key Drivers for SWMP Update

As presented in the Stage 1 Report and at the first Advisory Committee meeting, some of the key drivers that have been identified in this plan update include:

1. Explore opportunities to **incentivize waste reduction**
 - a. This includes considering a user-pay system.
2. **Increase service levels** at unattended rural transfer stations
 - a. This includes considering providing additional services and increased supervision to encourage diversion of recyclable materials.
3. Explore opportunities to **divert organic waste**
4. Maintain system cost efficiency

In addition, the Province's guiding principles will be used to guide the plan update. These include:

- Promote zero waste approaches and support a circular economy.
- Promote the first 3 R's (Reduce, Reuse, Recycle)
- Maximize beneficial use of waste materials and manage residuals appropriately.
- Support polluter and user-pay approaches and manage incentives to maximize behavior outcomes.

- Prevent organics and recyclables from going into the garbage wherever practical.
- Collaborate with other regional districts wherever practical.
- Develop collaborative partnerships with interested parties to achieve regional targets set in plans.
- Level the playing field within regions for private and public solid waste management facilities.

2. STRATEGIES TO INCREASE WASTE REDUCTION

As per the Ministry of Environment's 2016 *Guide to Solid Waste Management Planning*, reduction and reuse strategies can be classified into three strategies, as described below:

1. Informational Strategies, aimed at changing behavior and informing decisions. Examples include: public education encouraging waste reduction; emphasizing waste reduction actions which can reduce greenhouse gas emissions; in-house programs such as employee education; increased use of electronic documents, and printing double sided; and awards / public recognition.

2. Incentive programs, aimed at encouraging behavior change through financial and logistical support. Examples for this strategy includes: user-pay programs; increased and / or variable tipping-fees; tax exemptions for food donations; and encouraging businesses to implement incentives (such as fee for plastic bags).

3. Regulatory Strategies, enforce limits on waste generation, expand environmental obligations and impose environmental criteria on public contracts. Examples of this strategy include: procurement standards for local government purchases including durability, reusability, recyclability, and recycled material content; banning the acceptance at disposal sites of certain materials; increasing fines for illegal dumping; encouraging or mandating waste audits in the ICI sector; and user pay fees for demolishing buildings that do not require demolition.

The RDEK employs many waste reduction and diversion strategies, which are discussed in detail in the "Characterization of the System Report". Table 1 below summarizes the current opportunities available to divert residential, institutional and demolition and construction (D&C) waste.

Table 1: Diversion Opportunities in the RDEK

Residential Waste	Institutional & Commercial Waste	Demolition & Construction Waste
<ul style="list-style-type: none"> - Reuse Centre's (Share Sheds) At all attended transfer stations. - Mixed Recycling is widely available. - Recycling Guides for Extended Producer Responsibility products. - Backyard Composting - promotion and education. - Wood waste diversion at all attended transfer stations and unattended marshalling areas. - Mattress Diversion (select attended transfer stations) - Textiles Diversion through drop-off's and thrift stores - Education provided by RDEK. - Variable tipping fees at attended transfer stations 	<ul style="list-style-type: none"> - Mixed Recycling is widely available. - Recycling Guides for EPR products. - Mattress Diversion (select attended transfer stations) - Education provided by RDEK. - Variable tipping fees at attended transfer stations 	<ul style="list-style-type: none"> - Wood waste diversion at all attended transfer stations and unattended marshalling areas. Wood waste is chipped and hauled to a co-generation facility at the Skookumchuck pulp mill (for energy recovery) - Wood Reuse Pilot Program (Kimberley transfer station) - Education provided by RDEK. - Variable tipping fees at attended transfer stations

2.1 Current Informational Strategies and Education in the RDEK

The RDEK has a robust promotion and education efforts which includes active (in person) and passive (media and advertising) campaigns to increase awareness of solid waste and recycling education.

The RDEK's education program is run by the RDEK's communication manager and is supported by a summer student. The program includes school tours throughout the year, geared towards students of all ages, and also includes working with future teachers enrolled in the education program at the College of the Rockies. The RDEK also participates in community presentations such as at garden club meetings, Rotary club meetings, community association meetings and seniors' homes. Further, the RDEK also provides education and information at festivals and farmers markets. In 2017, there were over 1,218 personal contacts made in the RDEK, and education was provided at 6 festivals, 14 farmers markets, 4 parades, 8 school tours and 3 summer camps.

In addition, the RDEK promotes seasonal education campaigns which include messaging for Spring Clean-up, Earth Week, National Environment Week, National Waste Reduction Week, and Holiday Recycling. The seasonal campaigns are shared with over 4,000 people via an email list and are included in the Electoral Area Newsletters which are distributed to over 9,700 homes. Each year, over 2,000 radio spots are directly related to recycling in the RDEK.

In addition to Regional District staff efforts, organizations such as the Columbia Basin Environmental Education Network and Wildsight provide community education within the RDEK.

2.1.1 Potential Future Promotion and Education Initiatives

Potential future promotion and education initiatives to enhance waste reduction and diversion include:

- Continue to update the RDEK Recycling database and enhance the accessibility of the guide by making it available in multiple forms.
- Continue to employ a summer student dedicated to supporting waste reduction and education efforts; and evaluate the need for additional full-time staff as necessary.
- Continue to provide education for all ages and update the program's curriculum regularly. The program should consider including information regarding new recycling initiatives in the region, composting, and other zero-waste initiatives.
- Collaborate with industry associations, member municipalities and First Nations to enhance participation in recycling and diversion programs and develop consistent messaging.
- Develop illegal dumping strategy and information campaign in conjunction with any proposed changes to transfer stations or tipping fees.
- Continue to support community-group based initiatives for waste reduction and diversion education.

2.2 Current Incentive Strategies and Programs in the RDEK

As discussed briefly at the beginning of this section, incentive programs are aimed at encouraging behavior change through financial and logistical support. This could mean support from the regional district or the Provincial government.

Regional Incentives

A review of the tipping fee rate structure in the RDEK and the implementation of tipping fees for additional types of wastes could incentivize waste reduction in the RDEK.

The current rate structures in the RDEK (for each subregion) include variable tipping fees, however, the unattended transfer station system makes it difficult to recover tipping fees from all generators of wastes. Further, the tipping fees schedule which exists in the RDEK does not include charges for residential garbage. As a result, the RDEK solid waste system is largely funded through tax requisition.

Provincial Incentives

An example of Provincial Incentives is the B.C. Farmer's Food Donation Corporate Income Tax Credit, which provides an income tax credit to encourage farmers and farming corporations to donate products that they produce in British Columbia to registered charities (such as food banks or school meal programs). Eligible donations include items such as meat, eggs, fish, seafood, fruits, vegetables, grains, honey etc. that have been raised or harvested on a British Columbia farm. The credit is 25% of the eligible amount of a farming corporation's qualifying gifts for the tax year and is available to farming corporations who make a gift of agricultural product after February 2016 and before January 2019.

The RDEK should continue to support and promote provincial incentive programs which may be available in the region.

2.2.1 Potential Future Incentive Programs in the RDEK

Incentive programs that the RDEK could consider include:

- Moving towards a user-pay system, from a mostly tax-based system could provide financial incentive to residents to reduce the amount of waste sent to the landfill and increase participating in recycling and re-use programs.
- Continue to utilize a variable tipping fee structure. This would incentivize waste reduction if waste that was thrown out was subject to higher fees than recycling and/or diversion materials; i.e. the less you throw out the less you pay.

Variable tipping fees could also encourage source separation of wastes. For example, if mixed demolition waste was charged at a higher fee than sorted wood, concrete, and other recyclable materials there would be more incentive to divert recyclable materials from the landfill.

Implementation of such a system will require the ability to collect tipping fees at all RDEK transfer stations and landfills; this could be through controlled transfer stations with punch cards, cash sales or swipe cards. Scales are currently in place at the three RDEK landfills and at the Cranbrook, Kimberley, Sparwood and

Elkford transfer stations; however, scales and attendants are not currently in place at the other RDEK transfer station sites.

2.3 Current Regulatory Strategies in the RDEK

Under the RDEK's User Fee (Tipping Fee) Schedule, loads containing banned or recyclable materials are subject to a minimum \$100 charge or double tipping fee. Although these regulatory strategies are in place, they are difficult to implement due to the abundance of unattended transfer stations. If waste is subject to a double charge at an attended site, a user can choose to dispose of the waste at an unattended site (for free) instead.

2.3.1 Potential Future Regulatory Strategies for the RDEK

There are many potential regulatory strategies that the RDEK could use to incentivize waste reduction. These strategies will be discussed further throughout this planning process. Some examples of regulatory strategies that could be implemented in the RDEK include:

- Disposal bans can be implemented on recyclable materials such as cardboard and yard waste where there are adequate alternative disposal options. Enforcement of bans is often through fines / increased tipping fees on the waste hauler who discharges waste for disposal. Increased tipping fees on banned materials acts as a disincentive for disposal.
- Disposal bans can also be implemented on construction and demolition materials such as asphalt shingles, wood waste and concrete.
- The implementation and enforcement of disposal bans requires a staff member observing the discharge and communicating with the attendant collecting the fees. Implementation of disposal bans requires policy development and consultation with waste haulers and generators to ensure awareness of the disposal bans and consequences.
- Implementation of effective disposal bans in the RDEK will also require uniformity in transfer stations; for example, a disposal ban will not be effective if a hauler can dispose of the material at a nearby unattended transfer station.
- Waste Audit Kits for Businesses. The Regional District of North Okanagan provides Waste Audit Kits for the ICI Sector on their website. The Waste Audit kit encourages employees to get involved to provide information on the waste they produce and how to reduce or eliminate it. The program is not incentivized or enforced by the RDNO; however, incentives are provided through tipping fees. The RDNO has defined "regulated materials" as materials which can be diverted from the landfill (such as cardboard, wood waste and metal). Inspectors are present at the active face of the landfill to observe commercial loads, especially roll-off bins. Loads which contain high amounts of "regulated materials" are charged a premium tipping fee. The charge is placed on the hauler of waste, with the expectation that it is the hauler's responsibility to educate their customers.

- **Illegal Dumping.** The RDEK may consider developing an illegal dumping bylaw and allocating resources towards enforcing penalties for offenders.

3. INCREASE SERVICE AND SUPERVISION

The RDEK should also consider increasing service levels at their transfer stations. This may include providing an attendant at the rural transfer stations, and/or providing additional opportunities to divert wastes; such as through stewardship programs, share-sheds, etc. Collecting stewardship materials at the transfer stations would require transfer station upgrades, as discussed below. It is predicted that the introduction of attendants at the transfer stations may help to spread awareness of alternate locations to drop off / recycle stewardship managed goods, further reducing the amount of waste disposed.

As outlined in the previous section, the implementation of tipping fees could help to incentivize waste reduction in the RDEK and increase participation in the stewardship diversion programs. Additionally, this would discourage out-of-area residents or commercial haulers from disposing of garbage for free at unattended transfer stations.

The RDEK currently employs staff and contractors to clean-up waste at unattended transfer stations and marshalling areas which is occasionally dumped at the diversion areas and around the site. Increased supervision would also enhance security at transfer station sites and would in-turn reduce vandalism and “illegal-dumping” of unrecyclable materials at marshalling areas.

Case Study: Cariboo Regional District

The Province approved the CRD’s SWMP in 2013. Priority of implementation for the plan was given to increasing hauling efficiencies, controlling the busiest sites and providing recycling access. The system has continued to be funded through taxation, and not through user-pay fees. In one of the operational areas of the Cariboo’s solid waste system, nearly all of the sites have been converted to controlled transfer stations since the implementation of the SWMP. In this area, waste tonnages hauled to landfill have been reduced by approximately 36%.

It is suspected that much of this decrease in hauling is due to wood waste diversion opportunities that have been offered at the upgraded transfer stations. Additionally, commercial users such as roofers can no longer dispose of shingles and roofing materials in the bins for free at uncontrolled transfer stations. Further reductions are suspected due to increased recycling access throughout the region.

3.1 Facilitating Extended Producer Responsibility in the RDEK

In British Columbia, Extended Producer Responsibility (EPR) is an environmental policy approach in which the producer’s responsibility for reducing environmental impact / managing the product is extended to the end of the product’s life. This is also known as Product Stewardship. There are many product stewardship programs in British Columbia, which recycle items such as: antifreeze, used oil, batteries, beverage containers, cell phones, electronics, lamps and fixtures, large appliances, small appliances, medicine, smoke alarms, paint and flammable liquids, and tires.

There are two different strategies which Regional Districts within the Province of BC use to manage EPR products:

- 1) Offering EPR collection at Regional District owned transfer stations and recycling Depots, or
- 2) Minimizing Regional District participation in EPR programs and shifting the focus to utilizing private facilities which are already in place.

Currently, the majority of the EPR programs in the Regional District of East Kootenay (RDEK) are located at and available through local retailers (such as Canadian Tire) and at bottle depots. The location of the EPR depots are discussed in detail in the “Characterization of the System Report”.

The amount of EPR products collected in the RDEK, compared to the provincial average in 2015 are shown in Table 2 below. As shown, the RDEK performed better than the provincial per capita collection rate in the following categories: tires, lights, aerosols, beverage containers, oil/filters/containers, Shaw communications collected electronics, and thermostats.

Table 2: Extended Producer Responsibility Collection Rates in the RDEK in 2015

EPR Category	Stewardship Program	Estimated Collected in RDEK in 2015	Unit	RDEK Collection Rate Per Capita in 2015	Unit Rate	Total Collected in Province in 2015	Unit	Provincial Collection Rate Per Capita	Unit Rate
Tires	Tire Stewardship BC	1,141	Tonnes	18.88	kg/person/year	44,940	Tonnes	9.60	kg/person/year
Smoke Alarms and Carbon Monoxide Alarms	ReGeneration	215	Units	0.004	unit/person/year	33,481	units	0.007	unit/person/year
Small Appliance and Power Tools	ElectroRecycle	30	Tonnes	0.50	kg/person/year	4,225	Tonnes	0.90	kg/person/year
Lights	LightRecycle	100,803	Units	1.67	unit/person/year	5,322,452	units	1.14	unit/person/year
Paint Plus	PaintRecycle								
Paint		336	Tubsids	0.0056	Tubsids/person/year	26,502	Tubsids	0.0060	Tubsids/person/year
Aerosols		16	Tubsids	0.0003	Tubsids/person/year	1,399	Tubsids	0.0003	Tubsids/person/year
Solvents		7	Tubsids	0.0001	Tubsids/person/year	798	Tubsids	0.0002	Tubsids/person/year
Pesticides		4	Tubsids	0.0001	Tubsids/person/year	217	Tubsids	0.0000	Tubsids/person/year
Other aerosols		30	Tubsids	0.0005	Tubsids/person/year	185	Tubsids	0.0000	Tubsids/person/year
Beverage Containers	Encorp Return-It	1,356	Tonnes	22.43	kg/person/year	92,703	Tonnes	19.81	kg/person/year
aluminum		81	Tonnes	1.35	kg/person/year	4,943	Tonnes	1.06	kg/person/year
Plastic		176	Tonnes	2.91	kg/person/year	10,891	Tonnes	2.33	kg/person/year
Glass		1,069	Tonnes	17.69	kg/person/year	74,269	Tonnes	15.87	kg/person/year
Polycat		22	Tonnes	0.36	kg/person/year	1,840	Tonnes	0.39	kg/person/year
Other		8	Tonnes	0.13	kg/person/year	761	Tonnes	0.16	kg/person/year
Electronics	Electronic Products Recycling Association (EPRA)	217	Tonnes	3.59	kg/person/year	21,613	Tonnes	4.62	kg/person/year
Cell Phone	Recycle My Cell	1,132	Units	0.02	unit/person/year	119,754	Units	0.03	unit/person/year
Used Oil/Filters/Containers /Antifreeze	BC Used Oil Management Association								
Oil		1,163,533	Litres	19.25	l/person/year	47,295,822	Litres	10.11	l/person/year
Filters		126,790	Units	2.10	unit/person/year	5,905,525	Units	1.26	unit/person/year
Containers		33	Tonnes	0.55	kg/person/year	1,730	Tonnes	0.37	kg/person/year
Antifreeze		14,565	Litres	0.24	l/person/year	2,632,203	Litres	0.56	l/person/year
Batteries	Call2Recycle	5	Tonnes	0.09	kg/person/year	628	Tonnes	0.13	kg/person/year
Lead Acid Batteries	Canadian Battery Association	254	Tonnes	4.21	kg/person/year	20,700	Tonnes	4.42	kg/person/year
Outdoor Power Equipment	Outdoor Power Equipment Institute of Canada (OPEIC)	no data	no data	no data			no data	no data	
Major Appliances	Major Appliance Recycling Roundtable (MARR)	337	Tonnes	no data	kg/person/year	38,269	Tonnes	8.18	kg/person/year
Packaging and Printed Paper	Multi-Material BC (MMBC)	77	Tonnes	1.274	kg/person/year	186,509	Tonnes	43.55	kg/person/year
Electronics	Shaw Communications Inc.	18	Tonnes	0.291	kg/person/year	891	Tonnes	0.19	kg/person/year
Thermostats	Thermostat Recovery Program	42	Units	0.695	unit/person/year	3,645	Units	0.001	unit/person/year

Strategy 1 - Expand / Offer EPR collection at RDEK Transfer Station Sites

Some Regional Districts (like the TNRD) offer EPR collection at their transfer station facilities on behalf of the producers. The transfer station then becomes a “one stop drop” where residents can take all of their divertible and residual wastes. In this structure, the Regional District would ideally provide the collection / drop-off service to the residents and the producer would cover the collection or transportation / disposal cost for the Regional District.

The RDEK currently accepts some EPR materials at their attended transfer stations and landfills, such as car batteries and tires. In order for the RDEK to expand EPR collection using this strategy, most of the existing transfer station sites would have to be upgraded to facilitate the safe and organized collection of these materials. This would involve a redesign of the current transfer station infrastructure and construction of larger, more functional diversion areas. The collection of EPR materials could be facilitated through a combination of lock block bays, locking sea-cans and plastic bins. Examples of collection areas in the TNRD can be seen in Photo 1 and Photo 2 below.



Photo 1: Battery, Paint and Use Oil collection areas at the Blue River Eco-Depot (TNRD)



Photo 2: Electronic Recycling area at South-Thompson Eco-Depot (TNRD)

The process of engaging stewards and collectors will require a significant investment of time from the Regional District. In addition to the capital investment required to update the transfer station facilities, the money recovered through stewardship agencies does not fully cover the cost of providing the service (controlling and attending the site, and hauling the materials if required). Depending on the stewardship material and the location of the transfer station, the RDEK would likely be required to consolidate materials from rural sites and haul them to central locations for collection by the stewardship agency.

According to the Thompson-Nicola Regional District, the first step in the process of engaging stewardship agencies is to build the infrastructure required, and then engage the steward for participation. If the RDEK opted to engage with stewardship agencies for participation at sites that are already controlled, the remaining sites would need to be upgraded if the services were to be offered uniformly throughout the region.

The upgrade of the RDEK transfer stations could be completed in phases where in which larger transfer stations could be strategically constructed in high impact areas; allowing the RDEK to reach a larger volume of consumers, maximizing the benefit of their capital investment.

Following the upgrade of the transfer station sites, the RDEK should consider hiring an additional staff member to undertake the process of engaging with EPR stewards and collectors and managing contracts which are put in place.

Case Study: Thompson-Nicola Regional District

One of the goals of the TNRD's 2008 RSWMP was to provide increased recycling opportunities to residents of the TNRD. To meet this goal, transfer stations were upgraded to "Eco-Depots" that offer increased service; to support this process, consolidation of transfer stations was required.

The TNRD closed rural transfer stations and landfills and upgraded the remaining transfer stations to controlled sites. User-fees were also implemented at the TNRD sites. The implementation of user-pay fees was coupled with the introduction of increased diversion services. This means the TNRD offered increased opportunities to divert materials for free, while introducing user-fees for what was thrown away.

Since implementing these system changes, the TNRD has seen a reduction in waste disposed at rural sites by nearly 50% when comparing tonnages from the early 2000's to present. It is assumed that the increase in recycling and diversion opportunities, as well as the tipping fee incentive have contributed to the decrease in waste disposal in the TNRD. Additionally, the implementation of controlled sites means that commercial users could no longer dump divertible wastes (like wood and shingles) for free unless the material was sorted/diverted.

Strategy 2 Utilize Existing Collection Depots

Instead of offering additional EPR programs at transfer stations and landfill, an alternative strategy for the RDEK would be to shift the responsibility for promoting diversion of recyclables onto the stewardship agencies and existing facilities. The stewards would then be responsible for encouraging the public to participate in the programs offered in their region. This is the strategy currently employed in the RDEK.

As discussed previously, the RDEK collects some EPR materials at their sites, such as batteries and tires; however, additional materials are encouraged to be taken to existing collection depots located at local bottle depots or businesses (Canadian Tire etc.). Signage is present at all transfer stations in the RDEK indicating local places to which residents can take EPR materials for which collection facilities have not been established.

The RDEK has developed recycling guides for each subregion, outlining where products can be returned. The distribution of this recycling guide, through mail-outs or a web-based outreach may help to raise awareness for locations where the public can take their goods. Additionally, this recycling guide should be available at all landfills and transfer stations.

Case Study: Regional District of North Okanagan

The Regional District of North Okanagan also relies mostly on existing facilities for EPR collection. For example: some EPR materials, like tires, lights, and appliances are accepted at RDNO facilities but are subject to a tipping fee. Residents are instead encouraged to take their EPR products to stores/shops in town which accept them for free. The Regional District receives little, if any, revenue from collecting stewardship materials, therefore they encourage the products to be taken elsewhere. The RDNO also classifies recyclable materials such as glass jars and bottles, lights, cardboard, paper and plastics, and tires as "regulated material;" refuse containing "regulated material" is subject to a premium tipping fee. With the exception of PPP through

RecycleBC (for participating regions) and scrap metal salvage, most divertible materials cost money to handle and manage which is not recovered or recouped through stewardship agencies. By charging a tipping fee on waste received at the landfill, and educating and encouraging users to take divertible materials to facilities which will accept the materials at no charge, the Regional District can reduce waste landfilled.

3.2 Facilitating Recycle BC Programs

As of May 2014, the BC recycling Regulation, under the Environmental Management Act, requires that every producer of packaging and printed paper product (PPP) that wishes to sell, offer for sale or distribute their products to residents in British Columbia must operate or be a member of, an approved plan concerning the end-of-life management of their products. The proposed stewardship plan for PPP was developed by MMBC (now known as Recycle BC) in 2012 and was last updated in November 2016.

Recycle BC, formerly Multi-Material BC (MMBC) is a non-profit organization responsible for residential packaging and printed paper recycling throughout BC. Recycle BC is funded by retailers, manufacturers and restaurants which are the original generators of the PPP. The goal of the new policy is to shift the recycling costs away from homeowners and onto producers.

Local governments may be qualified as Recycle BC collectors, provided that they meet the collector qualification standards. Recycle BC is to engage qualified collectors using the following approach:

- Financial incentive for single family and multi-family curbside collection and public education services.
- Financial incentive to operate depots for receiving PPP from residents.
- Financial incentive to service streetscapes in areas that meet reasonable access criteria.

In some participating municipalities, the financial incentives provided to local governments partially or fully offset the cost of recycling, transferring the cost from tax-payer to businesses. In other situations, Recycle BC directly manages curbside recycling for local governments, completely removing the responsibility from the local government.

Recycle BC and the RDEK are undertaking contract negotiations for financial incentives for PPP. The financial incentives will be for PPP received at Recycle BC Depots which will be located at RDEK transfer stations. Recycle BC requires that a depot is to be staffed, fenced and locked when closed. The responsibility of site attendants includes checking the containers which residents place PPP, removing items that are not PPP, and communicating with residents about contamination or improperly sorted PPP. This means, that the RDEK will only be compensated for PPP that is collected at attended transfer stations, due to the openness of the unattended, rural sites.

3.2.1 Potential Future Opportunities with Recycle BC

As the largest tonnage of stewardship materials is composed of PPP, engaging with Recycle BC to commencing participating in the management of PPP in the RDEK is a top priority. In order to further expand opportunities to partner with Recycle BC, the RDEK will need to consider increasing the amount of supervision at transfer stations in the Regional District (i.e. by converting rural transfer stations to attended sites).

Additionally, to ensure a smooth transition from the region's yellow-bin program to that of a Recycle BC depot, the RDEK should ensure the Recycle BC program is covered in their education program.

4. STRATEGIES TO INCREASE ORGANIC WASTE DIVERSION

Organic waste is comprised of yard and garden waste (grass, leaves, weeds, twigs), food waste (from food production and consumption) and wood waste (branches, stumps, clean structural wood). The organic fraction of landfilled waste is estimated to be 30% by weight and therefore finding other methods to manage the organics represents a significant opportunity to reduce the amount of waste sent to landfill. By redirecting the organic fraction to composting, the following can be achieved:

- increasing the life of landfills;
- reducing the production of leachate at landfills;
- reducing the production of landfill gas and reducing greenhouse gas emissions;
- reducing settlement in the landfills;
- reducing the attraction of vectors (birds, rodents, bears) to the landfills; and
- developing useful end-products such as compost (that can also generate revenue).

The RDEK currently diverts organic waste from the landfill through wood waste burning, wood waste diversion to cogeneration facilities, wood waste reuse programs (at selected transfer stations), and through yard waste composting.

Composting is an effective means of diverting organic matter from landfill and producing a useful soil-like product from the waste material. At this stage, composting is at its infancy in the RDEK with activity limited to back yard composting and several pilot projects. This section examines a number of composting systems that have been rolled out in other regional districts and municipalities in B.C., including windrow compost pads for yard and garden waste, aerated static piles and in-vessel composting systems for food waste.

Depending on the technology and end use, it may be possible for the RDEK to manage biosolids in conjunction with organic wastes, however as this would fall into the RDEK's liquid waste management plan / strategy and is not included in this Solid Waste Review.

4.1.1 Continue to Promote Wood Waste Reduction

The RDEK should continue to offer wood waste diversion opportunities at its attended transfer stations and marshalling areas. The feasibility of additional drop-off locations should be assessed based on the available diversion opportunities (i.e. burning, composting, or cogeneration).

Open burning is a strategy used at four waste disposal facilities in the RDEK to dispose of clean wood waste. The RDEK should continue to utilize this strategy for as long as it is available to them. If the RDEK's burn permits are ever suspended, the RDEK will have to look to other options to manage wood waste in the region.

In addition to open burning, the RDEK transfers clean wood to a cogeneration facility located at the Skookumchuck pulp mill. The RDEK should continue to encourage and promote wood waste diversion opportunities, including cogeneration. This may require the RDEK increasing wood waste diversion opportunities at additional transfer stations.

4.1.2 Increase Accessibility to Yard Waste Composting

The RDEK currently composts yard waste at their regional landfills through turned windrow composting. The material is used at the landfills as soil amendments for progressive closure as well as in fabrication of 'Biocover' used as a surface application on dormant portions of the sites to reduce GHG emissions.

The advantages of turned windrow composting are relatively low capital and operating costs (estimated to be roughly \$50 per tonne), simple low technology requirements, and flexibility in management of material. Disadvantages associated with turned windrow methods include large land area requirements, difficulty maintaining moisture in dry climates and managing leachate in wet climates, and potential for significant odour and vector attraction issues. Open windrow composting is suitable for many organic waste materials, although is most commonly used for processing yard waste.

Currently, yard waste drop-offs are available at attended transfer stations only. The RDEK should consider the feasibility of providing additional yard waste drop-off locations throughout the region to reduce the amount of organic waste sent to landfill, and subsequently reduce fugitive methane emissions at the site.

4.1.3 Continue to Promote Food Waste Reduction and at-home Composting

Backyard composting is one of the most cost-effective methods of waste reduction. When people compost at home, that organic material does not require collection, disposal or composting at a centralized facility, and the associated costs are avoided. Even if a centralized organics waste management facility is established in the RDEK, it is possible that rural residents would not be serviced by collection of organics, thus backyard composting is a feasible option for rural properties and should continue to be promoted and encouraged.

The RDEK currently offers a composting course in the summer and in addition to the course, the Regional District sells backyard composters at wholesale cost (\$55) all year round.

The RDEK should continue to promote the current backyard composting program and if deemed necessary, expand the program to include the following components:

- Enhance education/outreach on self-management of organic waste, e.g. At-home compost coaching, information booths at farmers markets, home shows, and other appropriate venues. To further promote food waste reduction, the RDEK could expand on their current education program to include food waste reduction strategies.
- Compost demonstration sites (located at community gardens)

- Promote other approaches to self-management of organic waste which can accommodate broader range of organic wastes than backyard composters, e.g. Green Cone Digesters
- Promote other organic waste reduction strategies such as xeriscaping and/or fruit and vegetable gleaning.

4.1.4 Consider Feasibility of Centralized Composting in the Long-term

The amount of organic waste produced by the commercial and service industry in urban environments cannot usually be managed “on-site;” therefore, backyard composting does not appeal or is not possible for every home and business that generates organic waste. Further, some food wastes, such as meat, bones, grains, grease and dairy are not appropriate for a backyard composter. As a result, a centralized composting system is required to handle large volumes of organics and to maximize the diversion of organic waste.

Most composting systems include design features that recognize the need for addressing several potential issues present when handling organic waste. Most important among these issues are odour control, management of liquids generated during the composting process, and achieving minimum temperature and residence time to eliminate pathogenic organisms contained in the organic waste.

Available composting processes are diverse and mechanically quite different, although all operate to achieve similar objectives in disposal of waste and production of a useful product. There are four composting processes which would likely be considered for centralized composting in the RDEK including: turned windrow composting, aerated static pile, membrane-covered aerated static pile, and in-vessel composting.

- **Turned Windrow Composting:** As discussed previously, turned windrow composting facility places a blend of organic wastes in long “windrows” or linear triangular piles some 2-3 meters high, 3-5 meters wide, and up to several hundred meters long arranged in parallel lines (see photo below). The piles are periodically turned with the frequency being determined by the stage of composting. Turning the windrows speeds the composting process and ensures uniform pathogen reduction and product quality. The majority of composting facilities in Canada are windrow facilities.

The advantage of turned windrow composting is relatively low capital and operating costs. Disadvantages include large land requirements.

- **Aerated Static Pile:** Most large aerated static pile systems contain similar elements. These include an impermeable surface with embedded aeration pipes, industrial blowers and aeration controls. Some advantages of aerated static piles are: smaller land area requirements than for windrows, effective air management, and relatively low overall technology and staffing requirements. Disadvantages of aerated static piles systems include higher capital costs than for windrow systems, potential odor management and vector problems, and potential for preferential air channels to develop that lead to an inconsistent end product.

- **Membrane Covered Aerated Static Pile:** A popular form of covered aerated static pile composting uses membrane covers. This system was first developed by GORE using their patented PTFE membrane. GORE Cover compost plants have had good success in BC with facilities operating near Pemberton, in Abbotsford and on Vancouver Island and work well in a variety of environments and climates. All of these have demonstrated good odour control and provided a good quality product, while keeping costs minimal. Capital costs for a GORE compost facility range from \$1.5 to \$3.0 million.
- **In-vessel units:** In-vessel composters are completely enclosed composting units. Organic wastes are composted under conditions where air, moisture and temperature are carefully controlled. In vessel technologies are highly automated and come in two general varieties: batch processes or a continuous feed processes. The advantages of in-vessel composters are: the high degree of process control achievable (temperature, moisture and oxygen levels), the ability to completely control odours during initial composting; and scalability (most in-vessel systems are modular and can be extended or added to at a later date).

Many systems require continued composting/curing after the initial in vessel residence time is complete. This can be a source of odours, since the partially composted and odourous material must be further cured in windrows or static piles.

Typical capital costs of in-vessel systems are \$5 to \$10 million.

Collection of organics is an important part of food waste composting programs. Implementation of a food waste composting program in the RDEK would require curbside collection of organics on a weekly basis.

As with recycling, the two main collection mechanisms for organics collection are curbside and depots. Curbside collection of food and yard waste is provided in many municipalities across Canada, typically in urban and suburban communities. The RDEK could employ curbside organics collection to communities that already receive curbside garbage collection. In this program, residents would receive a separate cart for organics such as kitchen scraps and yard trimmings and the carts would be picked up weekly on the same day as garbage collection. Several BC communities have implemented programs, including Ladysmith, Mission, Port Coquitlam, Vancouver, Duncan and Nanaimo.

Curbside collection of organic waste in rural areas is much less common due to the cost of providing the service and generally the lack of interest in receiving such a service by rural area residents. A typical cost for collecting organics at curbside is \$25 per home per year (not including the cost for collection containers).

Yard waste depots are probably the most popular method of yard waste collection due to their low cost and flexibility to handle the seasonal fluctuations in volumes. These depots are usually set up on large parcels of land at compost facilities or landfills. Smaller depots can be established at “z” wall transfer sites. Although usually reserved for yard waste only, special roll off bins are available for depot style

collection of putrescible organic waste as well. The disadvantage of depot-based collection is generally lower participation and lower diversion rates.

Composting process options that the RDEK could consider, include:

Option A:

- Local composting facilities serving local areas with facilities sited at Invermere, Cranbrook and Sparwood
- Enhance and continue to promote back yard composting program

Option B:

- Central composting facility serving the entire region sited in the Cranbrook area
- Enhance and continue to promote back yard composting program

Option C:

- Enhance and continue to promote back yard composting program

Option D:

- No additional support for composting programs
- Rely on independent initiatives

Table 3 outlines the conceptual requirements for each of the aforementioned options.

Table 3: Summary of Composting Options in the RDEK

	Option A: Local Windrow Facilities (at Landfills)	Option B: Centralized Facility	Option C: Enhance Backyard Composting	Option D: No Additional Support
Large Land Area Required	Yes	Yes	No	No
High Capital / Operating Costs to RDEK	No	Yes	No	No
Collection Infrastructure Required	Yes	Yes	No	No

The RDEK should continue to consider and examine the feasibility of centralized composting in the region. The infrastructure and requirements of the facility/facilities would also need to consider the recent Organics Matter Recycling Regulation (OMRR) intentions paper, which outlines regulatory requirements and best management practices for minimizing nuisances and odours.

Case Study: Regional District of East Kootenay

In 2016 a composting pilot initiative was conducted at the Sparwood Landfill and the Columbia Valley Landfill between August and October. Compost bins were provided at a local music festival, a local park, local retailers in Fernie, Invermere and Radium, and at the Fernie transfer Station. The bins were hauled

to the Columbia Valley Landfill or Sparwood Landfill and composted via turned and watered windrows. It is not known how much compostable waste was collected, however and estimated ten cubic metres of compost was produced.

The cost of the pilot was \$92,488 which included the purchase of a brown bear compost windrow turner, signage, consulting fees, Gortex compost covers, delivery and removal of bins, delivery of water and skid steer rental. Annual costs would likely be higher than this as the pilot was only conducted for a three-month period.

As outlined above, the start-up costs are very high to implement such a program unless costs are amortized over a long period of time. As such, the RDEK should determine the most feasible option for composting in the region prior to investing in and developing organics management infrastructure.

Case Study: Grand Forks

The City of Grand Forks introduced weekly curbside collection of food waste in October 2012 to service approximately 1,800 households. Residents receive weekly collection of food scraps, alternating bi-weekly collection of garbage or recycling, and yard waste collection 9 times per year. The food scraps, diapers, dog waste and kitty litter collected is composted with yard and garden waste at the Regional Landfill through low-tech aerobic composting (windrows). The finished product is beneficially used as operational cover for the landfill.

Based on data outlined in on the Ministry of Environment website – Organics Case Study 5 – the capital costs for the program included the purchase of 2,000 curbside containers at a total cost of \$60,000 total. Additionally, the garbage collection contractor purchased a split body truck to facilitate collection and was hired under a 5-year contract. The operating costs are recovered as a service utility at a cost of \$12 per household per month – or \$144 per household per year.

The program has reduced the amount of garbage collected from the curb by an estimated 55%, down from 264 kg / household / year to 119 kg / household / year.

Case Study: Regional District of Kitimat-Stikine (RDKS)

Composting feasibility was also completed recently for the Regional District of Kitimat Stikine to service the region's residential and ICI sectors initially, with plan to service camps (Hydro, Mining, LNG, etc.) eventually. Without including camp waste, the anticipated organics collection in the initial phases of the program was approximately 3,300 tonnes of organic waste, increasing to 6,500 tonnes during the later phases of roll-out.

An independent study conducted by the regional district concluded that the most suitable composting technology for the RDKS is the covered aerated static pile (ASP). Capital costs for the facility, not including the required heavy equipment, were estimated to be \$1.4 million dollars.

4.1.5 Potential for Centralized Composting in the RDEK

The RDEK should complete a feasibility study to determine the most appropriate method for organics waste management in the RDEK. Once food waste composting capacity is established in the RDEK, long-term strategies that would assist in organic waste reduction include:

- Providing curbside organics pick-up to residents who currently receive garbage pick-up
- Providing drop-off locations for residents who do not receive garbage pick-up
- Developing and enforcing disposal bans on organic wastes in the commercial sector.

It is recommended that the RDEK first decide if and how they will address the regional transfer station system and tipping fee system. If the RDEK chooses to undergo infrastructure upgrades, the logistics of collecting and hauling organic waste can be evaluated further.

If the current solid waste system remains operational, the most appealing option maybe to implement low tech composting at the three subregional landfills. Curbside collection of organic waste from municipalities could potentially be directly hauled to each landfill (similar to the Grand Forks case study).

Alternatively, if a centralized private facility were to be established in the RDEK, the Regional District and its member municipalities may choose to haul organic waste to this facility. The caution here is any private facility would likely charge a tipping fee to accept the organic matter – requiring higher tax requisition from residents or a re-evaluation of the RDEK's tipping fee structure.

Detailed design of the compost facility is a complex task. Any chosen facility should be accurately sized for the appropriate treatment method and the consideration must be given to achieving optimum conditions and proper operating procedures including leachate management and odour control.

4.1.6 Continue to support and encourage independent initiatives

As an alternative option, the RDEK could rely on independent initiatives for composting programs. This would shift the responsibility onto the RDEK's member municipalities to develop programs for residents, such as yard waste composting in municipal works yards or community gardens.

Funding for these projects could be supported by grants. Examples of grants that may be available include the following:

Federation of Canadian Municipalities (FCM) Green Municipal Fund provides funding for plans, feasibility studies, pilot projects and capital projects. Included in eligible initiatives are waste management and diversion initiatives. For municipalities the project must demonstrate the potential to divert at least 60% of municipal solid waste from the landfill to be eligible for funding. If your municipality has already achieved a diversion rate of 60%, your project must demonstrate the potential to result in an incremental improvement above 60%. For remote communities, an eligible project must target an incremental diversion rate of 15% above the current baseline. Examples of programs include:

reuse programs or centres, recycling programs or centres, composting and other biological programs excluding anaerobic treatment. Projects related solely to the construction of transfer stations are excluded.

FCM Funding available:

Feasibility studies – up to 50% of eligible costs to a maximum of \$175,000

Pilot projects – up to 50% of eligible costs to a maximum of \$350,000

Capital projects – low interest loans, funding is provided for up to 80% of the project cost. The loan maximum is \$5 million and the grant amount is 15% of the loan.

Government of Canada – Environment and Climate Change Canada – The EcoAction Community Funding Program encourages Canadians to take action to address clean air, clean water, climate change and nature issues, and to build the capacity of communities to sustain these activities into the future. Eligible groups include non-profit organizations such as environmental groups and community associations. The organization must secure at least half of the total project funding from sources other than the federal government. The maximum funding amount is \$100,000 per project.

The RDEK should continue to support reduction and reuse initiatives in the RDEK. In addition to the already established Share-Sheds, this may include supporting initiatives for local Repair Café's or "Thingery's" (lending libraries).

Repair Cafés are neighbourhood initiatives where people share tools and knowledge to repair household items and devices. The idea behind Repair Café's is to repair and reuse items instead of throwing them away. The Columbia Valley Maker Space Society held a Repair Café in Invermere in 2017.

Similarly, a Thingery is a community owned lending library of things located in a modified shipping container. The items contained in the lending library are donated by the users of the library, and include items such as recreational equipment, power tools, household appliances etc. The Thingery enables waste reduction by promoting sharing in communities. The RDEK should support community initiatives to establish re-use and reduction initiatives in local communities.

5. DIVERSION POTENTIAL

Based on the current waste disposal rate of 561 kilograms per capita (as per BC's waste disposal calculator), and the 2018 waste composition study results, the estimated material recovery rates are shown below in Table 4.

Based on a range of recovery rates for each of the products, the future potential disposal rate for the RDEK is estimated to be between 260 kg/person/year to 432 kg/person/year; provided that a wide range of waste reduction and diversion strategies are implemented.

Table 4: Estimated Diversion Potential in the RDEK

Material Type	Recovery Rate (kg/person/yr)		
	Low	Med	High
Compostable Organics	50	84	117
Paper	22	36	51
Plastic	24	41	57
Non-compostable wood	6	10	14
Demolition materials	19	31	44
Metals	8	13	18
Potential Diversion (Total kg)	129	215	301
Current Disposal Rate (kg/person/yr)	561	561	561
New Potential Disposal rate (kg/person/yr)	432	346	260

The options and opportunities outlined in this report are intended to support the RDEK's Solid Waste Management Plan Update, and will be evaluated and updated throughout the process as preferred strategies are identified.