

SOLID WASTE ADVISORY COMMITTEE

Notice of Meeting on **Tuesday, April 9, 2019 at 12:30 pm to 3:00 pm**
Board Room, 6th floor, 625 Fisgard Street, Victoria, BC

Ariff, Nadia	Kurschner, Mark	Meisen, Axel	Squier, Jane
Daliran, Taaj	Laing, Dave	Monsour, Don	Tuggle, Chad
Hillis, Jason	Latta, Elizabeth	O'Grady, Evelina	Tulloch, Glen
Isitt, Ben (Chair)	Lawson, Aaron	Shaw, Jeff	Wiebe, Steven
King, Kelly	Maler, Tom	Speller, Rachel	Young Jr., Stew (Vice Chair)

LUNCH WILL BE SERVED

AGENDA

1. Approval of Agenda
2. Adoption of Minutes of March 12, 2019
3. Chair's Remarks
4. Solid Waste Management Planning Process – Status Update
5. Strategy Evaluation for the Solid Waste Management Plan
 - Staff Report: Strategy Development for the Solid Waste Management Plan (attached)
 - Presentation
 - Group Exercise
6. Update on Status of Organics Processing and Landfill Gas Utilization Staff Reports
7. Next Meeting
 - May 14, 2019 - CRD Headquarters
8. Closing Comments
9. Adjournment



Making a difference...together

**REPORT TO SOLID WASTE ADVISORY COMMITTEE
MEETING OF TUESDAY, APRIL 9, 2019**

SUBJECT **TECHNICAL MEMORANDUM - STRATEGY EVALUATION FOR THE SOLID
WASTE MANAGEMENT PLAN**

ISSUE

To present a technical memorandum with evaluations of proposed strategies for the Solid Waste Management Plan.

BACKGROUND

In October 2018, the Capital Regional District (CRD) engaged Tetra Tech Canada Inc. to research, identify, evaluate and summarize potential waste management strategy options for Revision 3 of the Solid Waste Management Plan.

At the November 15, 2018 meeting of the Solid Waste Advisory Committee (SWAC), Tetra Tech staff presented a comprehensive long list of strategy options for considerations. The strategy options were further discussed and refined at the January and February 2019 SWAC meetings. Tetra Tech and CRD staff examined all suggestions and grouped them into themes.

At the March 2019 meeting, SWAC members discussed eleven preliminary strategies with associated actions for the first three R's (Reduction, Reuse and Recycling) of the pollution prevention hierarchy. Members suggested to group the strategies related to Construction, Renovation and Demolition materials and Illegal Dumping under 'Recycling' (rather than 'Residual Management' where they were previously listed). CRD staff subsequently sent out information on the two additional strategies with associated actions and received feedback from three members.

Appendix A presents the evaluation of the thirteen proposed strategies, including cost considerations, recommended targets and a diversion potential analysis. This information will be presented and discussed at the April 9, 2019 SWAC meeting.

RECOMMENDATION

That the Solid Waste Advisory Committee receive this report for information.

Submitted by:	Tom Watkins, Acting Senior Manager, Environmental Resource Management
Concurrence:	Larisa Hutcheson, P.Eng., General Manager, Parks & Environmental Services

AB:ac

Attachment: Appendix A: Technical Memorandum - Strategy Evaluation for the Solid Waste Management Plan

ISSUED FOR USE

To: Anke Bergner, Tom Watkins, Russ Smith **Date:** April 5, 2019
c: **Memo No.:** 004
From: Wilbert Yang, Melissa Nielsen, and Claudia Castro **File:** 704-SWM.PLAN03075-01
Subject: Strategy Evaluation for the Solid Waste Management Plan

1.0 INTRODUCTION

Tetra Tech Canada (Tetra Tech) was retained by the Capital Regional District (CRD) to identify and evaluate potential waste management strategy options for Revision 3 of the Solid Waste Management Plan (SWMP). This Technical Memorandum (tech memo) discusses the Strategy Evaluation and resulting refined strategies and actions proposed for consideration in the SWMP and the Strategy evaluation process that is in progress.

The CRD's Solid Waste Advisory Committee (SWAC) was presented with initial strategies during the SWAC meeting on March 12, 2019 and provided feedback during these meetings. This feedback is presented in Appendix A.

1.1 CRD SWMP Revision 3

The process and timeline to review, evaluate and select strategy options for Revision 3 of the SWMP is illustrated on Figure 1.

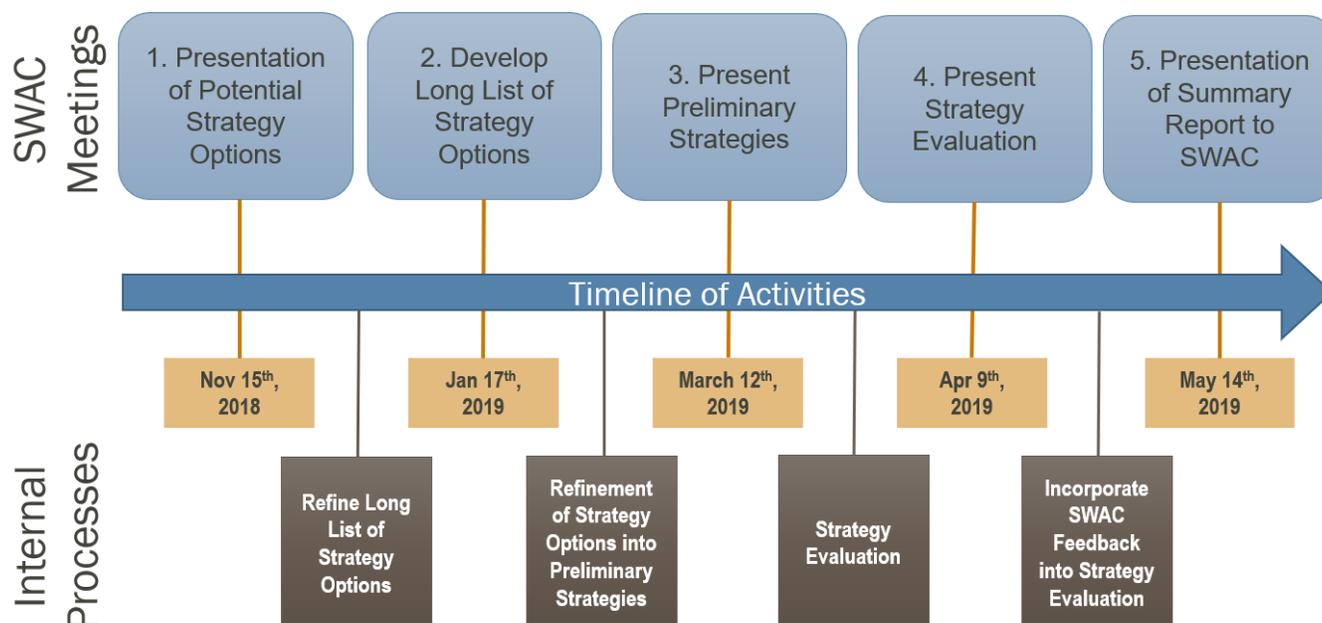


Figure 1: Timeline of SWMP Revision Process (From Strategy Options to Strategies: Review, Evaluate and Select)

The Strategy Evaluation presented in this tech memo forms a basis for discussion for the April 9, 2019 SWAC meeting. At this meeting, the SWAC will be asked to provide input on the Strategy Evaluation. After this meeting, Tetra Tech will work with the CRD to further refine the Evaluated Strategies. A Summary Report will be presented at the SWAC Meeting on May 14, 2019.

2.0 EVALUATION PROCESS

The objectives of the Evaluation Process is:

1. **Gather SWAC feedback on the Preliminary Strategies and Associated Actions** (completed at March 12 SWAC Meeting).
2. **Assess the Strategies according to the Evaluation Criteria.** The evaluation criteria used were Technical Feasibility and Effectiveness, Environmental Impact and Benefits, Social Impact and Effect on Waste Disposal.
3. **Determine high-level cost considerations and resource requirements for each strategy.**
4. **Identify how strategies would be implemented according to the CRD's resources over the next 10 years.**
5. **Create disposal targets.**

Figure 2 outlines the proposed evaluation process.

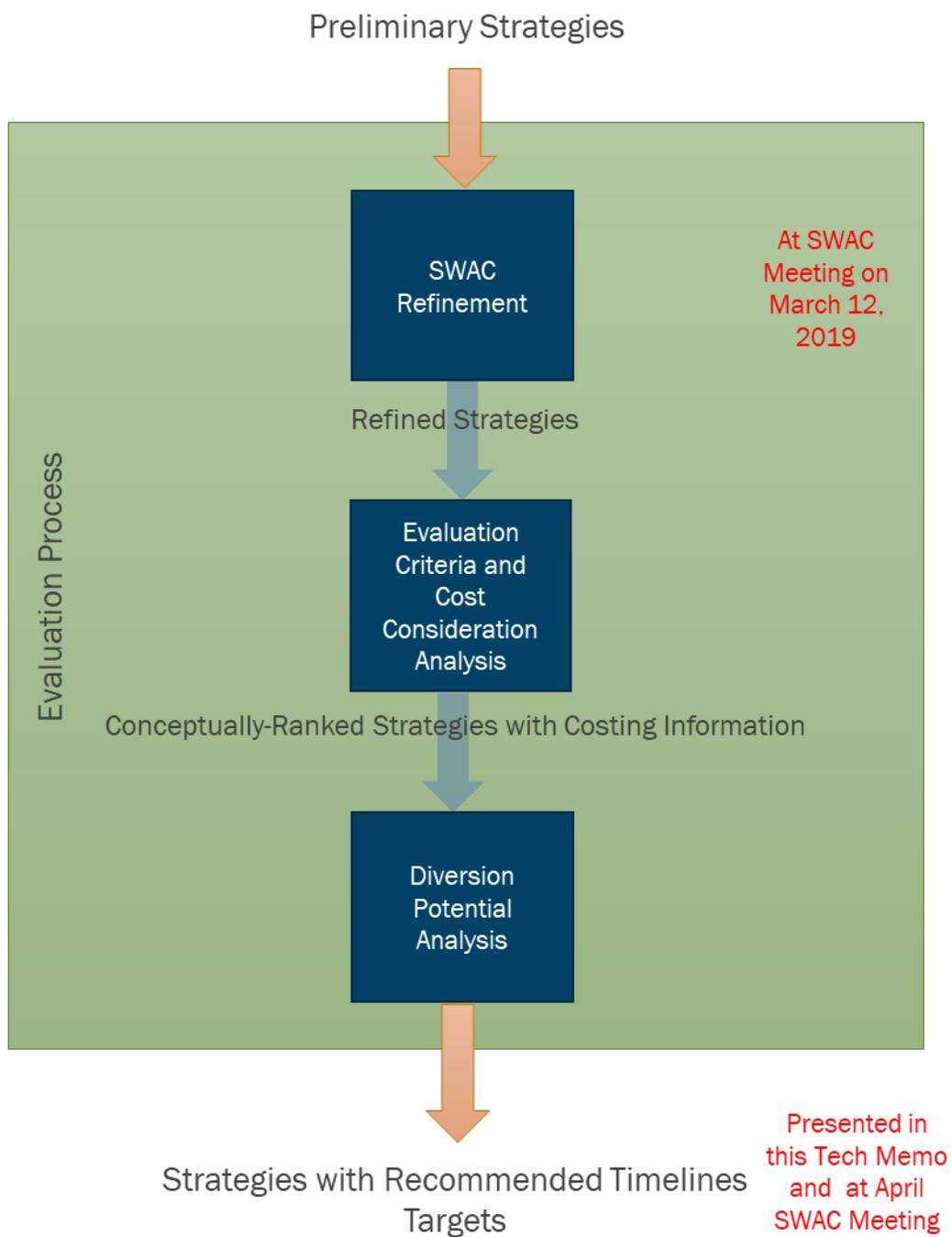


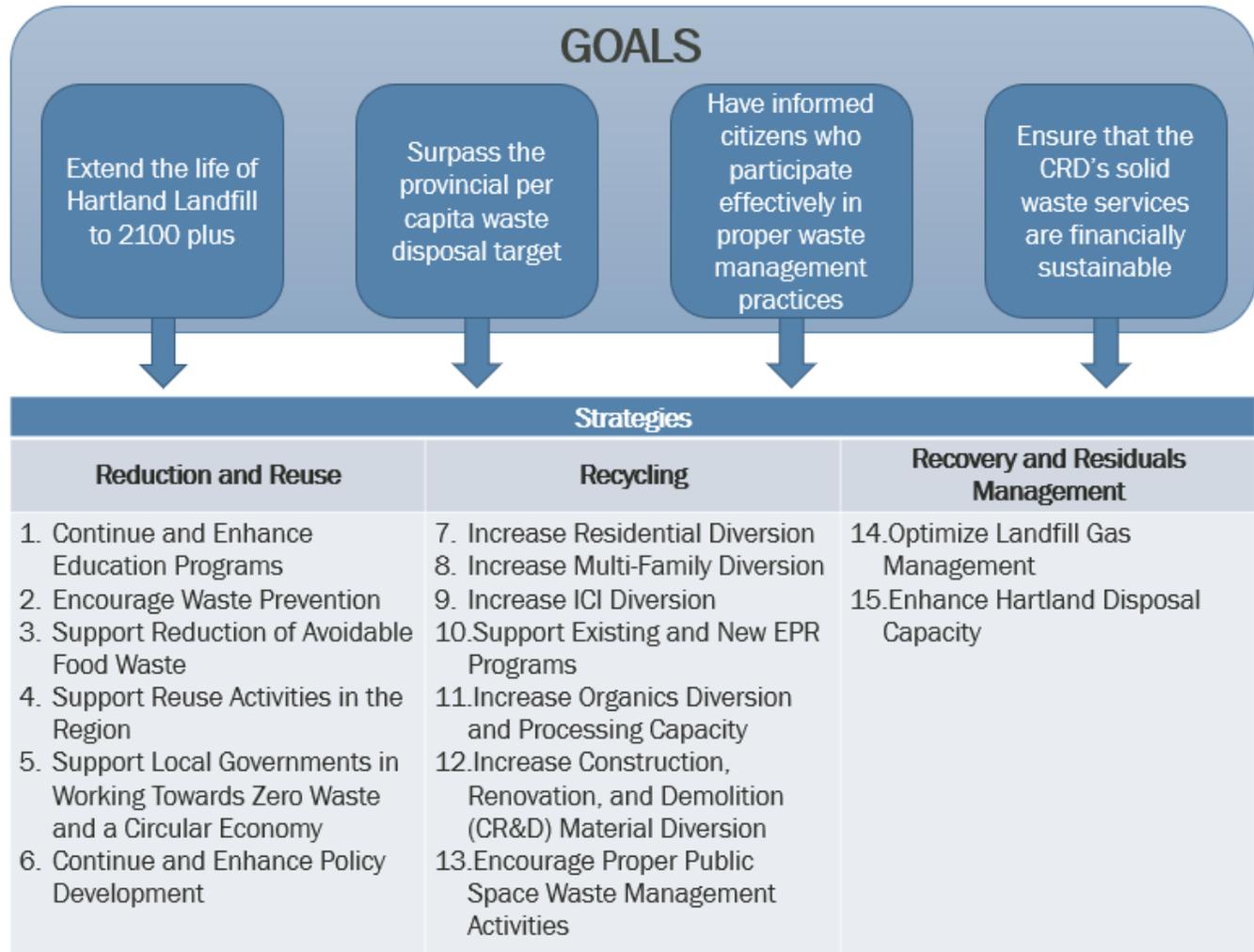
Figure 2: Evaluation Process Flow Diagram

3.0 REFINED STRATEGIES

Preliminary strategies were presented at the March 12, 2019 SWAC Meeting. SWAC Feedback (as presented in Appendix A) was gathered to refine the strategies, which are presented in this section.

3.1 Refined Strategies Summary

A summary of the refined strategies are summarized on Figure 3.



Each strategy has embedded Actions. Actions are further detailed in this Tech Memo.

Figure 3: Goals and Refined Strategies

3.2 Detailed Refined Strategies with Actions

After the March 12 SWAC Meeting, SWAC Feedback was incorporated to refine the strategies. The resulting refined strategies are presented in this section. Note that **'Strategies'** are numbered and shown in bold, **'Actions'** are denoted by a, b, c, etc. and are not bolded.

Strategies are grouped by Reduction and Reuse (Section 3.2.1), Recycling (Section 3.2.2), and Recovery and Residuals Management (Section 3.2.3), as recommended in the Guide to Solid Waste Management Planning.

3.2.1 Reduction and Reuse

1. Continue and Enhance Education Programs.

- A. Ensure ongoing, up-to-date promotion and education resources to enable effective participation in CRD programs and initiatives.
- B. Incorporate behaviour change components wherever possible (e.g., community-based social marketing); using a variety of education and communication strategies and tools, including digital marketing tools (e.g., social media).
- C. Expand education programs to MF and ICI sector.
- D. Enhance K-12 school program to include concepts of circular economy.
- E. Collaborate with stakeholders on education campaigns, (e.g. local governments, product stewards).
- F. Continue supporting environmental stewardship recognition.
- G. Continue to engage residents on solid waste matters; using the appropriate level of consultation.

2. Encourage Waste Prevention

- A. Promote less consumption and advocate for consumer responsibility.
- B. Establish a community-based waste reduction grant program (could include food waste prevention projects).
- C. Support single-use item reduction efforts.
- D. Promote sustainable and/or packaging-free purchasing options.
- E. Advocate provincially and federally to limit or eliminate the manufacturing, distribution or sale of single use items and non-recyclable materials.
- F. Advocate provincially and federally for sustainable product design (e.g., standardized packaging that is reusable, recyclable, or compostable).

3. Support Reduction of Avoidable Food Waste

- A. Support residential food waste reduction, for example, by continuing Love Food Hate Waste Canada program.
- B. Support ICI food waste reduction, for example, by encouraging stores to donate edible food.
- C. Continue to support food recovery organizations.
- D. Advocate for regulation to clarify use-by versus Best Before dates and educate accordingly.

4. Support Reuse Activities in the Region.

- A. Continue to provide funding to non-profits to help offset garbage tipping fees for unusable donated items.
- B. Continue to support and promote donations to reuse establishments.
- C. Support reuse, renting and sharing programs, such as tool libraries, repair cafes, and sewing hubs, and other materials exchange activities.
- D. Investigate free store at Hartland landfill or other facilities.

5. Support Local Governments in Working Towards Zero Waste and a Circular Economy.

- A. Develop model language for bylaws, best practices, OCPs, and Economic Development strategies for use by local governments using research and collaboration to guide this process.
- B. Work with local governments to identify the need for solid waste facilities and zoning for waste management activities.
- C. Use policy tools to enable local recycling infrastructure.
- D. Investigate 'Pay-As-You-Throw' principles to use as tools to incent less waste disposal.
- E. Investigate use of clear bags for garbage or recyclables collection to encourage proper recycling of materials, where practicable and enforceable (e.g. at events).

6. Continue and Enhance Policy Development.

- A. Develop model procurement policies for use by local governments, non-profits, etc.
- B. Continue to expand material bans when viable alternatives exist.
- C. Investigate licensing waste management facilities in the region to encourage transparency, consistency, and a requirement that all facilities protect public health and the environment.
- D. Investigate regulatory mechanisms to manage municipal solid waste and recyclable materials in the region.
- E. Investigate options for debris from extreme weather such as community chipping days or special burning allowances in electoral areas.

3.2.2 Recycling

7. Increase Residential Diversion.

- A. Continue to promote diversion of recyclable materials (including organics).
- B. Collaborate with municipal and private sector service providers to support depot diversion efforts in the region for non-curbside materials.
- C. Encourage local processing and markets for recyclables.
- D. Develop tools, such as a guide, to support event recycling.

8. Increase Multi-Family Diversion.

- A. Allocate resources to support MF recycling, for example, by developing standardized education materials.
- B. Work with local governments and private sector service providers to develop waste source separation requirements.
- C. Develop policy guide for recycling, composting and garbage space and access in multi-family developments.
- D. Collaborate with stakeholders (e.g., private haulers who service MF buildings or MF property managers) to implement support for MF recycling, such as a 'Train-the-Trainer' Program.

9. Increase ICI Diversion.

- A. Allocate resources to increase ICI diversion, for example, a business waste reduction liaison.
- B. Advocate to expand the packaging and paper product EPR program to the ICI sector.
- C. Create a business waste reduction toolkit, including education about how to apply Circular Economy principles.
- D. Encourage municipalities to require waste management plans with business licenses.
- E. Develop policy guide for ICI space and access requirements.
- F. Work with local governments and private sector service providers to develop ICI waste source separation requirements.
- G. Investigate shifting disposal ban enforcement to generator, rather than hauler.

10. Support Existing and New EPR Programs.

- A. Advocate to the province to expand EPR programs.

Note: The Province is currently conducting an EPR gap analysis and considering adding new materials.

- B. Collaborate with stewards to increase consumer awareness about EPR programs.
- C. Advocate for increased return-to-retailer opportunities.
- D. Advocate federally to standardize EPR programs across Canada.

11. Increase Organics Diversion and Processing Capacity.

- A. Continue to promote organics waste diversion.
- B. Investigate developing a resilient local organics processing infrastructure.

Note: The CRD Board has directed staff to issue a RFEOI for an in-region or near-region organics processing facility.

- C. Support compost markets by purchasing back materials.
- D. Collaborate with service providers and users (e.g., local businesses) to develop guidelines for use of compostable products and packaging.

12. Increase Construction, Renovation and Demolition (CR&D) Material Diversion.

- A. Develop a comprehensive CR&D strategy, including characterization of materials, best practices, and pilot projects.
- B. Develop educational tools to support CR&D material diversion, e.g., create an industry toolkit, a deconstruction guide, and/or guidelines for diverting and utilizing reused materials.
- C. Promote green building standards.
- D. Continue collaboration with local governments to develop and use policy tools (e.g., construction permits, building codes) to maximize diversion and to align management plans.
- E. Investigate beneficial uses of CR&D waste, including a clean wood waste ban.
- F. Investigate banning or surcharging mixed CR&D loads at the landfill to encourage source separation.
- G. Further develop programs for managing hazardous materials, like asbestos.

13. Encourage Proper Public Space Waste Management Activities.

- A. Develop educational materials to prevent and reduce litter and abandoned materials in our neighbourhoods and public spaces.
- B. Continue promoting alternatives to abandoned materials and illegal dumping by educating about proper management and disposal
- C. Collaborate with stakeholders, including local governments and private sector facilities, to develop a regional approach to illegal dumping.
- D. Investigate developing regionally-aligned bylaws.
- E. Develop and pilot methodologies to 'observe, record, and report' on abandoned materials and illegal dumping incidents throughout the CRD.
- F. Investigate options for large bulky item disposal, e.g., free drop-off days or large item pick-up days

3.2.3 Recovery & Residuals Management

14. Optimize Landfill Gas Management.

- A. Continue to capture landfill gas for beneficial use.

Note: The CRD Board has directed staff to investigate landfill gas utilization options.

- B. Investigate collaboration opportunities with educational institutions to research new beneficial uses and technologies.

15. Enhance Hartland Disposal Capacity.

- A. Review ban enforcement levels, subject to recycling market conditions.
- B. Continue to operate Hartland landfill using best practices.
- C. Develop design options to maximize disposal capacity until 2100 and beyond.

Note: A new fill plan is in development. Design and aggregate management options could extend landfill life significantly.

- D. Continue to conduct research and investigate emerging technologies.

4.0 STRATEGIES EVALUATION

Between the March 12 SWAC Meeting and the April 9 SWAC Meeting, strategies were evaluated. Notably, only strategies pertaining to Reduction, Reuse, and Recycling have been evaluated. Strategies pertaining to Recovery and Resource Management are currently on hold because of significant investigations into landfill gas usage and a new fill plan at Hartland Landfill.

4.1 Evaluation Summary

This section provides a brief description and total score for each strategy, presented in Table 4-1. Notably, all strategies have scored higher than 10 (out of a possible 20 points). Cost considerations have been provided in the table; these are rough estimates for the purpose of discussion.

Table 4-1: Evaluation Summary

Strategy #	Strategy	Score	Summarized Evaluation	Cost Considerations
1	Continue and Enhance Education Programs	14	<ul style="list-style-type: none"> Implementation of this strategy is feasible and will have considerable social impacts. Though this strategy has low diversion potential, this strategy is a priority to ensure effective participation the CRD waste management system. 	<ul style="list-style-type: none"> \$100,000 annually to enhance education programs. Additional funding may be required for special campaigns, initiatives, and/or consultation (e.g. new bans).
2	Encourage Waste Prevention	12	<ul style="list-style-type: none"> Implementation of this strategy will have considerable social impacts. This strategy is at the top of the pollution prevention hierarchy and may work to create culture and systems change that may ultimately reduce disposal in the CRD. 	<ul style="list-style-type: none"> \$50,000 annual grant allocation Minimal to moderate staff time for all years.
3	Support Reduction of Avoidable Food Waste	16	<ul style="list-style-type: none"> Implementation of this strategy is feasible and will have considerable social impacts. This strategy would have medium environmental impact and benefits, since edible food currently makes up 12% of the material disposed at Hartland. 	<ul style="list-style-type: none"> Minimal to moderate staff time for all years. Funding may be required to continue Love Food Hate Waste program (or similar initiative).
4	Support Reuse Activities in the Region	16	<ul style="list-style-type: none"> This strategy is expected to have only a small impact on disposal but may work to create culture and systems change that may ultimately reduce disposal in the CRD. 	<ul style="list-style-type: none"> Minimal to moderate staff time for all years.
5	Support Local Governments in Working Towards Zero Waste and a Circular Economy	12	<ul style="list-style-type: none"> Implementation of this strategy is feasible and will have considerable social impacts. This strategy does not have a directly associated impact on disposal, however, they contribute to creating a culture and systems change that may ultimately reduce disposal in the CRD. 	<ul style="list-style-type: none"> Minimal to moderate staff time for all years.
6	Continue and Enhance Policy Development	12	<ul style="list-style-type: none"> Implementation of this strategy is feasible. The main environmental and disposal impact associated with this strategy is the potential for material disposal bans. 	<ul style="list-style-type: none"> May require significant funding if CRD pursues licensing or regulatory mechanisms, including funding for consultation.
7	Increase Residential Diversion	12	<ul style="list-style-type: none"> Implementing this strategy and improving local recycling markets can enhance long-term stability and resiliency of recycling programs. 	<ul style="list-style-type: none"> \$25,000 annually to support depot diversion efforts. Evaluate effectiveness after two years.
8	Increase Multi-Family Diversion	16	<ul style="list-style-type: none"> Implementation of this strategy is feasible and will have considerable social impacts. The multi-family sector contributes 13% to the total material disposed at Hartland; this strategy would likely have the potential for a moderate effect on the CRD disposal rate. 	<ul style="list-style-type: none"> \$50,000 annually for education and to implement actions.
9	Increase ICI Diversion	18	<ul style="list-style-type: none"> Implementation of this strategy is feasible. The ICI sector contributes 41% to the total material disposed at Hartland; this strategy has the potential for a considerable effect on the CRD disposal rate. 	<ul style="list-style-type: none"> \$50,000 annually for education and to implement actions.
10	Support Existing and New EPR Programs	14	<ul style="list-style-type: none"> Implementation of this strategy is feasible. If the province implements additional EPR programs this could reduce the CRD's disposal rate significantly. 	<ul style="list-style-type: none"> Funding may be required to educate the public if new disposal bans for EPR materials take effect at Hartland landfill.
11	Increase Organics Diversion and Processing Capacity	20	<ul style="list-style-type: none"> Implementation of this strategy is feasible and will have considerable social impacts. 27% of the material disposed at Hartland is organic materials; this strategy may have a modest impact on reducing the quantity of organic material disposed. 	<ul style="list-style-type: none"> Additional required costs will be determined through the RFEOI process. Funding may be required to educate about use of compostable products and packaging.
12	Increase Construction, Renovation and Demolition (CR&D) Material Diversion	18	<ul style="list-style-type: none"> Implementation of this strategy is feasible. All actions in this strategy support the goal to decrease the CRD's overall disposal. If a disposal ban was implemented as a result of this strategy, this could have a significant impact on the CRD's disposal rate. 	<ul style="list-style-type: none"> \$50,000 annually for two years. Additional funding may be required to investigate beneficial uses of CR&D waste and banning or surcharging mixed CR&D loads at the landfill.
13	Encourage Proper Public Space Waste Management Activities	12	<ul style="list-style-type: none"> Implementation of this strategy is feasible. This strategy strives to reduce abandoned waste and illegal dumping, which are important social issues 	<ul style="list-style-type: none"> \$20,000 for annual illegal dumping campaign for two years; evaluate effectiveness after two years.

4.2 Recommended Targets

Based on the prioritization of strategies, Tetra Tech completed a diversion potential analysis of materials that could be removed from the waste stream in the short, medium, and long-term.

In the short-term, the focus will be the CR&D sector and organic materials. Also in the short-term, programs for single-family, multi-family, and ICI diversion will be implemented. Most of these programs are education programs, so they are expected to take several years before resulting in diversion. **The resulting diversion potential in the short-term is expected to be mostly due to a reduced tonnage of CR&D materials, and organic materials in the single-family, multi-family, and ICI sectors.**

In the medium-term, the focus will be on continuing and improving the single-family, multi-family, and ICI programs. These programs (which will begin implementation in the short-term) are expected to begin to show results by this timeframe. CR&D sector programs and organic materials diversion programs will be continued. **The improved diversion potential in the medium-term is expected to be mostly due to reduced tonnage of single-family, multi-family, and ICI sector recyclable materials. Diversion levels for organic materials are also expected to further improve in these sectors.**

In the long-term, all programs will be refined, resulting in increased diversion in all sectors. Additionally, new EPR programs may be implemented in this timeframe. **The improved diversion potential in the long-term is expected to be due to slight improvement in all sectors due to program refinement, and a reduced tonnage of printed paper and packaging programs from the ICI sector, and a reduced tonnage of textiles from all sectors.**

The current (2018) disposal in the CRD is 380 kg/capita. The BC Ministry of Environment and Climate Change (Ministry) has set a target for the province of 350 kg/capita by 2020. One of the SWMP goals is to surpass this 350 kg/capita target.

The diversion potential analysis is included in Appendix C. The resulting suggested disposal targets are presented in Table 4-2.

Table 4-2: Recommended Targets

	Short-Term (3 years)	Medium-Term (5 years)	Long-Term Aspirational Goal (10+ years)
Targeted Sectors	<ul style="list-style-type: none"> Construction, Renovation, and Demolition 	<ul style="list-style-type: none"> Single-family Multi-family ICI 	<ul style="list-style-type: none"> Refine programs to increase performance for all sectors
Disposal Target (kg per capita)	340¹	285	250²

¹This target is aggressive and assumes that disposal bans for CR&D materials would be implemented.

²This target is aggressive and assumes that new EPR programs will be implemented by the Ministry in the long-term timeframe.

Pending SWAC feedback at the April 9 SWAC meeting, a more detailed implementation schedule will be prepared and included in the summary report.

5.0 LIMITATIONS OF REPORT

This report and its contents are intended for the sole use of the Capitol Regional District 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 the Capitol Regional District, 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:
Melissa Nielsen, E.I.T.
Project Engineer-in-Training
Solid Waste Management Practice
Direct Line: 604.608.8638
Melissa.Nielsen@tetrattech.com



Reviewed by:
Wilbert Yang, P.Eng.
Senior Planning Engineer
Solid Waste Management Practice
Direct Line: 604.608.8648
Wilbert.Yang@tetrattech.com

/tv

APPENDIX A

MARCH 12, 2019 SOLID WASTE ADVISORY COMMITTEE – FLIPCHART EXERCISE

March 12, 2019 Solid Waste Advisory Committee – Flipchart Exercise

Reduction and Reuse: Anke Bergner

1. Combine C & D: Expand education programs to MF and ICI sector. Enhance K-12 school program to include concepts of circular economy.

- Identify goals and measures to evaluate

Promote less consumption and advocate for consumer responsibility under waste prevention – omit it's under general education

2. Support single use item reduction efforts ~~such as plastic bag bans~~
3. Support **avoidable** food waste reduction

Strategy 1 – Continue and Enhance Education Programs

- Front line staff play an important role in educating residents
- Visuals are very helpful, for example, on receptacles
- Explain “why” we should be diverting
- Provide feedback on what happens to materials after you put them in the recycling bins
- Extend the school program to higher educational institutions; don't limit to K-12
- Provide benchmarks and set targets. Targets should be set high and allow for comparison over time.
- Expand education programs to include management of CR&D materials
- Garbage/recycling is changing. For example, internet business creates more cardboard and Styrofoam.

Strategies 2 & 3 – Encourage Waste Prevention & Support Food Waste Reduction

- Extend community grant program include projects by university students
- Expand bans to include other plastic items, like plastic straws
- There is confusion about best before dates. We need regulation to help guide the consumer.

Strategy 4 – Support Reuse Activities in the Region

- Support for sharing/renting initiatives
- There are some successes in small communities with “lawning” items – putting gently used items out on the front lawn for others to use.
- Organized swap days may also work
- CRD can help educate the public about what reuse organizations exist and what they do

Strategy 5 – Support Local Governments in Working Towards Zero Waste and a Circular Economy

- CRD strategies should align with municipal strategies so that they complement each other, not duplicate
- Encourage municipalities to use real user pay like Pay As You Throw (PAYT)
- Clear garbage bags can play a role in reducing hazardous materials or recyclables in the garbage

Strategy 6 – Continue and Enhance Policy Development

- Expand procurement policies to ICI sector, not just for government
- All facilities in UK are licensed. This creates transparency and consistency, protects public health and the environment and levels the playing field
- Need clarity on what ‘investigating open burning restrictions’ means. Burning is a thing of the past. Community chipping days may be a solution to deal with fallen trees and debris from extreme weather events.

Reduction and Reuse: Melanie Tromp-Hoover

**make no mention of modern tech tools (i.e. social media)

1A: What does adequate mean? What is the measure? How do you benchmark?

March 12, 2019 Solid Waste Advisory Committee – Flipchart Exercise

1B: Behavioural psychology lens is important to highlight in this strategy

1D: Wishcycling – too specific to call out in a strategy? Should this be more general?

1G: Apply as overarching philosophy (use it elsewhere too)

Missing:

- what have other jurisdictions done? Gaps? So we are not reinventing just for our own region.
- Insights onto citizen views on reduction and reuse -survey?
- Survey data will give us a sense of people's attitudes and abilities to engage in education
- Potential to create guides for reduce/reuse like recycling

2: most important: educate consumer on producers

2B:

- education wording issue – ban vs efforts
- Encourage multiple use items (eg bags)
- Bans are regulatory
- Support reusable use of materials and products

2D: education

** reuse and repurpose are different

Transition economy to...

3: support AVOIDABLE food waste reduction

3D: element of education here too

4: support reuse activities in region

4B: add 'repurposing' establishments

4C, D & E: combine all three – develop and support infrastructure to ensure materials remain in use

4F: apply in individual munis? Multimedia platforms to show what is available and where

5: local governments – zero waste

**with respect to reduce and reuse efforts

5A&B: research and collaboration to guide this process

5F: emphasis on enforcement? What about no bag?

**benefit of knowing what works elsewhere?

Recycling – Tom Watkins

7:

- Suggest that the CRD "selectivity" promote diversion (of most viable materials)
- CRD munis set up transfer stations for depot recycling. Private depots have difficulty with costs and zoning
- Focus on 1 or 2 key recyclables to encourage local market development
- Economies of scale possible through working together to develop local markets
- Work with neighbouring regional districts and municipalities

8:

March 12, 2019 Solid Waste Advisory Committee – Flipchart Exercise

- Work with property management companies to facilitate recycling programs
- Establish Train the trainer programs to promote recycling
- Provide info on where to get signage/bins/service
- Supply new tenant information kits
- Set minimum service levels

9:

- Enforce bans at source, not hauler

11:

- More promotion/education to help food waste diversion

Other:

- Focus on more education and regulation
- More C&D waste diversion needed
- Establish C&D operation at Hartland to divert more of these materials

Recycling – Wendy Dunn

7: Increase Residential Diversion

Move 'Develop a guide to support event recycling' to a new strategy called 'Enhance public space waste management activity'

8: Increase Multi-family Diversion

Add 'Establish a waste reduction community grant program' (Note already identified in 2a)

New - 12: Enhance public space waste management activity

- Develop guide to support event recycling
- Also include streetscape, illegal dumping/abandoned waste and parks

New - 13: Increase diversion of CR&D material: clean wood, windows, building code, permits

Note – also include:

- Education in all recycling strategies
- Advocating for standardized packaging: either reusable, recyclable or compostable

APPENDIX B

STRATEGY EVALUATION

1.0 REDUCTION AND REUSE

B-1: Strategy Evaluation - 1. Continue and Enhance Education Programs

Strategy And Associated Actions	Technical Feasibility and Effectiveness	Environmental Impact and Benefits	Social Impact	Effect on Waste Disposal	Score	Cost Considerations
<p>1. Continue and Enhance Education Programs</p> <p>A. Ensure ongoing, up-to-date promotion and education resources to enable effective participation in CRD programs and initiatives.</p> <p>B. Incorporate behaviour change components wherever possible (e.g., community-based social marketing); using a variety of education and communication strategies and tools, including digital marketing tools (e.g., social media).</p> <p>C. Expand education programs to MF and ICI sector.</p> <p>D. Enhance K-12 school program to include concepts of circular economy.</p> <p>E. Collaborate with stakeholders on education campaigns, e.g. local governments, product stewards.</p> <p>F. Continue supporting environmental stewardship recognition.</p> <p>G. Continue to engage residents on solid waste matters; using the appropriate level of consultation.</p>	<ul style="list-style-type: none"> Action 1A is in accordance with current practice and should be simple to implement and maintain. Consistent messaging throughout the CRD will aid in public understanding and use of diversion services throughout the community and support the goal of having informed citizens that participate effectively in proper waste management practices. Action 1B will use techniques such as Community-based social marketing (CBSM). CBSM is an approach to program promotion and education that encourages high rates of effective participation and long-term behavior change. The CBSM process centres on uncovering barriers that inhibit individuals from engaging in sustainable behaviours, identifying tools that have been effective in fostering and maintaining behaviour change, then piloting takes place on a small portion of the community followed by ongoing evaluation once the program has been implemented community-wide. A significant bank of resources exist (within and beyond British Columbia) of sample education materials and guides for rolling out educational programs for different sectors, which could be used as a foundation for Action 1C. Initiating education programs for MF and ICI sectors now sets the CRD up for success when rolling out additional diversion programming or making changes to existing programs. Educating youth (Action 1D) is a critical key to long-term behaviour change in recycling^{1,2}. It influences not just recycling habits at home but builds a foundation for youth to develop positive diversion habits to continue throughout life. A myriad of resources exist on integrating zero waste education for youth which the K-12 could consider adapting for the K-12 program³ Interested stakeholders exist throughout the CRD (e.g., universities, local governments, and private sector service providers) who are open to collaboration (Action 1E); this collaboration may bolster the success of education programs. Actions 1F through 1G are in accordance with current practice and should be simple to implement and maintain. 	<ul style="list-style-type: none"> Actions 1A through 1H are expected to enhance rates of participation, though little environmental impact is anticipated as a <i>direct</i> result of these initiatives. Additional material capture and participation is typically attributed to emerging/improving collection and diversion programs, thus direct impact is hard to measure. This strategy contributes to creating culture and systems change that may ultimately reduce disposal in the CRD. This strategy is a priority to ensure effective participation the CRD waste management system. 	<ul style="list-style-type: none"> Actions 1A through 1H will increase overall engagement with waste management systems in the CRD. They may result in an overall growth in the waste reduction movement Confusion among residents can be often widespread in diversion programs, leading to general frustration among the public (i.e., “Why is recycling so confusing?”) Receiving information and active engagement through CRD programs (Actions 1A through 1H) may improve public perception. Collaborating with stakeholders (Action 1E) may result not only in improved education programs but also improved relationships with all stakeholders interested in waste management, thus creating a more resilient waste management system in the CRD. Furthermore, collaborating with local governments on education programs would likely result in consistent messaging and more harmony between initiatives within the CRD. 	<ul style="list-style-type: none"> This strategy may have a moderate direct impact on disposal capacity. This strategy contributes to creating culture and systems change that may ultimately reduce disposal in the CRD. 	16	<ul style="list-style-type: none"> \$100,000 annually to enhance education programs. Additional funding may be required for special campaigns, initiatives, and/or consultation (e.g. new bans).
Score (High- 5, Medium – 3, Low – 1)	High	Medium	High	Medium		

¹ Call 2 Recycle. Recycling is Important at Any Age. <https://www.call2recycle.ca/recycling-is-important-at-any-age/>

² City of Boroondara. Schools as gateways to community behaviour change on consumption and waste. <https://www.mwrrg.vic.gov.au/assets/resource-files/Smart-school-MF-R1-Final-Report-Bo.pdf>

³ Sustainability Victoria. Waste Smart Schools: A practical 'how to' guide for Victorian schools, January 2016. <https://www.sustainability.vic.gov.au/-/media/SV/Publications/Schools/Modules/Waste/RSS-waste-how-to-guide-PDF-version.pdf>

Table B-2: Strategy Evaluation - 2. Encourage Waste Prevention

Strategy And Associated Actions	Technical Feasibility and Effectiveness	Environmental Impact and Benefits	Social Impact	Effect on Waste Disposal	Score	Cost Considerations
<p>2. Encourage Waste Prevention</p> <p>A. Promote less consumption and advocate for consumer responsibility.</p> <p>B. Establish a community-based waste reduction grant program (could include food waste prevention projects).</p> <p>C. Support single-use item reduction efforts.</p> <p>D. Promote sustainable and/or packaging-free purchasing options.</p> <p>E. Advocate provincially and federally to limit or eliminate the manufacturing, distribution or sale of single use items and non-recyclable materials.</p> <p>F. Advocate provincially and federally for sustainable product design (e.g., standardized packaging that is reusable, recyclable, or compostable).</p>	<ul style="list-style-type: none"> It is recommended that Action 2B grant criteria for projects eligible for funding including food waste prevention and recycling initiatives. This Action complements the existing Recycle BC Community Champions funding program⁴ for waste reduction initiatives in communities. Efforts similar to Action 2C in BC municipalities (e.g., City of Victoria, City of Vancouver) have proven successful at increasing engagement. Sustainable and/or packaging-free purchasing options (Action 2D) have gained popularity in recent years. One Zero Waste grocery store exists in Victoria and others exist throughout BC. These types of stores mainly reach ‘early adopters’ – that is, environmentally-minded individuals who care and think deeply about waste. Actions 2E and 2F tackle issues that are outside of the CRD’s jurisdiction. Advocating provincially and federally about these issues is currently the most feasible way to address them. 	<ul style="list-style-type: none"> Strategy 2 is at the top of the pollution prevention hierarchy as it deals with reduction, therefore, it has potential for environmental impacts. <i>Waste reduction</i> (as opposed to recycling) results in reduced embodied energy for materials that were not created in the first place (or were created in a less wasteful way). 	<ul style="list-style-type: none"> The intention of Action 2A creates widespread understanding of the importance of reducing waste at the top of the pollution prevention hierarchy. This understanding is positive as it empowers residents to make positive and impactful choices about the way that they consume. Actions 2B, 2C, and 2D engage with early adopters of the zero-waste movement and have the potential to create a strong community. Action 2B provides mechanism for the community to act on its own initiatives / take ownership for improvements in reduction. Action 2C directly engages with something that is highly visible and many residents feel strongly about. Action 2D supports organizations that have the potential to create a widespread community of residents who care deeply about zero waste. This is already happening in the CRD at the Zero Waste Emporium in the City of Victoria, where waste reduction events are hosted. Another excellent example of how these businesses can create community is Nada⁵ in Vancouver, BC, a zero-waste grocery store which additionally functions as a hub for the zero-waste community in Vancouver and hosts regular events including zero waste cooking workshops and monthly meetups for interested individuals. Actions 2E and 2F indirectly have the potential to address residents’ ‘Recycling is confusing’ complaints by simplifying product design and ensuring materials are clearly recyclable, compostable, or reusable. However, because this can only be done through advocacy, this positive social impact will likely not be realized in the near future. 	<ul style="list-style-type: none"> Action 2C (and, to a small extent, 2D) have some potential to reduce waste disposal. Other Actions (2A, 2B, 2E, and 2F) are not expected to have a direct impact on waste disposal but work to create culture and systems change that may ultimately reduce disposal in the CRD. 	<p>12</p>	<ul style="list-style-type: none"> The CRD has initially proposed that the total grant funding for Action 2B would be \$50,000. In general, Strategy 2 is in line with current practice, therefore new resources required would be minimal to moderate.
<p>Score (High- 5, Medium – 3, Low – 1)</p>	<p>Medium</p>	<p>Medium</p>	<p>High</p>	<p>Low</p>		

⁴ Recycle BC. Community Champions. <https://recyclebc.ca/education/community/community-champions/>

⁵ <https://www.nadagrocery.com/>

Table B-3: Strategy Evaluation - 3. Support Reduction of Avoidable Food Waste

Strategy And Associated Actions	Technical Feasibility and Effectiveness	Environmental Impact and Benefits	Social Impact	Effect on Waste Disposal	Score	Cost Considerations
<p>3. Support Reduction of Avoidable Food Waste</p> <p>A. Support residential food waste reduction, for example, by continuing Love Food Hate Waste Canada program.</p> <p>B. Support ICI food waste reduction, (e.g., encouraging stores to donate edible food).</p> <p>C. Continue to support food recovery organizations.</p> <p>D. Advocate for regulation to clarify use-by versus Best Before dates and educate accordingly.</p>	<ul style="list-style-type: none"> Nationwide efforts exist to reduce food waste (Actions 3A through 3D), especially as data on the enormous quantity of food being wasted comes into public view (recent estimates show that more than half of all food in Canada is being wasted).⁶ Research has shown that avoidable household food waste can be reduced by up to 15% with an intensive Love Food Hate Waste campaign (Action 3A).⁷ Several Canadian retailers (e.g., Save-On Foods and Walmart) have committed to reducing food waste and partners may exist (e.g., FoodMesh Food Recovery Program⁸) to catalyze food waste reduction in the ICI sector (Action 3B and 3C). Research has shown that restaurants can save up to \$7 in operating costs for every \$1 invested to reduce kitchen food waste, thus providing a powerful incentive to build upon (Action 3B).⁹ The National Zero Waste Council, a leadership initiative advocating for waste prevention in Canada, advocates regulating for clarity around Best Before dates. Date labelling guidance exists from organizations such as ReFed in the US and WRAP in the UK (Action 3D).¹⁰ 	<ul style="list-style-type: none"> Wasted food embodies significant amounts of wasted resources (energy, water, etc.) that were required to grow, produce, and distribute that food. Reducing the amount of food wasted by one tonne has the equivalent effect on CO₂ emissions as taking one car off the road for a year (Actions 3A through 3D).¹³ According to 2016 waste composition results, 12% of the material disposed at Hartland is edible food waste.¹¹ Food waste disposed in landfills is a significant source of greenhouse gas emissions. However, much of the landfill gas is currently captured (68% in 2018)¹² and turned into electricity or flared, and the landfill gas system may be upgraded, which would likely increase the capture rate (Actions 3A through 3D). 	<ul style="list-style-type: none"> Residents directly benefit financially when they reduce food waste. Estimates of money spent on wasted food per household in Canada range from \$1,100¹³ to nearly \$1,800⁸ annually. Action 3A directly encourages residents to waste less food, thereby encouraging consumer savings in their food budgets. Strategy 3d may indirectly result in cost savings to residents, as residents will waste less food and money if they understand when an item is truly no longer edible. Local non-profits benefit twofold from this strategy: Action 3B encourages local businesses to donate edible food, which results in an influx of food to local charities. Action 3C supports food recovery organizations in the region directly. 	<ul style="list-style-type: none"> Edible food waste makes up a large proportion of the materials disposed at Hartland (12%)¹¹. One study demonstrated that an intensive Love Food Hate Waste campaign reduced household food waste by up to 15%. With Action 3A, similar results in the CRD (a 'best-case scenario') could yield a disposal reduction of approximately 1,400 tonnes (a 1% reduction). ICI food waste reduction (Action 3B) could have a more significant impact on tonnage: each year, the ICI sector disposes of over 9,000 tonnes of edible food. 	16	<ul style="list-style-type: none"> This strategy requires minimal additional funding due to actions that will require additional staff time. Funding may be required to continue Love Food Hate Waste program (or similar initiative).
Score (High- 5, Medium – 3, Low – 1)	High	Medium	High	Medium		

⁶ Second Harvest, 2019 (<https://secondharvest.ca/wp-content/uploads/2019/01/Avoidable-Crisis-of-Food-Waste-The-Roadmap-by-Second-Harvest-and-VCMI.pdf>)

⁷ WRAP UK, 2012 (<http://www.wrap.org.uk/sites/files/wrap/hhfdw-2012-main.pdf.pdf>)

⁸ Food Mesh (<https://foodmesh.ca/>)

⁹ Champions 12.3 (https://champions123.org/wp-content/uploads/2019/02/Report_The-Business-Case-for-Reducing-Food-Loss-and-Waste_Restaurants.pdf)

¹⁰ National Zero Waste Council, 2018 (<http://www.nzwc.ca/focus/food/national-food-waste-strategy/Documents/NZWC-FoodLossWasteStrategy.pdf>)

¹¹ Capital Regional District, 2016 (<https://www.crd.bc.ca/docs/default-source/recycling-waste-pdf/WasteCompositionStudy2016.pdf?sfvrsn=4>)

¹² Maura Walker and Associates, Capital Regional District Solid Waste Management Plan Existing Solid Waste Management System, 2018.

¹³ Love Food Hate Waste, 2017 (<https://lovefoodhatewaste.ca/about/food-waste/>)

Table B-4: Strategy Evaluation - 4. Support Reuse Activities in the Region

Strategy And Associated Actions	Technical Feasibility and Effectiveness	Environmental Impact and Benefits	Social Impact	Effect on Waste Disposal	Score	Cost Considerations
<p>4. Support Reuse Activities in the Region</p> <p>A. Continue to provide funding to non-profits to help offset garbage tipping fees for unusable donated items.</p> <p>B. Continue to support and promote donations to reuse establishments.</p> <p>C. Support reuse, renting and sharing programs, such as tool libraries, repair cafes, and sewing hubs, and other materials exchange activities.</p> <p>D. Investigate establishing a free store at Hartland landfill or other facilities.</p>	<ul style="list-style-type: none"> ▪ Actions 4A and 4B are in accordance with current CRD practices and should be simple to implement and maintain. ▪ An existing groundswell of community reuse organizers exists, which the CRD can build on with Actions 4C. ▪ Free Stores (Action 4D) can be a successful and low-cost model to raise awareness of a) high value goods being disposed of and b) availability of finding 'another person's treasure' for oneself. ▪ Free Store (Action 4D) feasibility is dependent on availability of appropriate space, and potentially, a local organization to run the program. 	<ul style="list-style-type: none"> ▪ Strategy 4 is near the top of the pollution prevention hierarchy as it deals with reuse, therefore, it has potential for environmental impacts. Material reuse results in reduced embodied energy for materials that were not created in the first place. 	<ul style="list-style-type: none"> ▪ Actions 4A through 4D improve access to reused goods, which can save residents money, as they don't need to purchase new materials. Furthermore, promotion of reuse organizations may improve social acceptability of reusing items, which is a positive social impact as residents become aware of costs savings that could be realized and the environmental benefits of buying used materials. ▪ Actions 4A through 4C build trust and deepen relationships with organizations essential for exchange of reused materials. Promotion of these programs is a key part of the Strategy's success. ▪ Renting and sharing programs (Action 4D) have the potential to become community hubs for environmentally-minded individuals. The Victoria Tool Library is an existing example of this. By supporting these initiatives, the CRD will be supporting the waste reduction community. 	<ul style="list-style-type: none"> ▪ This strategy is expected to have only a small (and nearly impossible to measure) impact on disposal but work to create culture and systems change that may ultimately reduce disposal in the CRD. ▪ Action 4D will enable a small reduction in disposal by encouraging reuse of materials at Hartland. 	<p>16</p>	<ul style="list-style-type: none"> ▪ Actions 4A through 4C do not require any additional new funding.
<p>Score (High- 5, Medium – 3, Low – 1)</p>	<p>High</p>	<p>Medium</p>	<p>High</p>	<p>Medium</p>		

Table B-5: Strategy Evaluation - 5. Support Local Governments in Working Towards Zero Waste and a Circular Economy

Strategy And Associated Actions	Technical Feasibility and Effectiveness	Environmental Impact and Benefits	Social Impact	Effect on Waste Disposal	Score	Cost Considerations
<p>5. Support Local Governments in Working Towards Zero Waste and a Circular Economy</p> <p>A. Develop model language for bylaws, best practices, OCPs, and Economic Development strategies for use by municipalities and electoral areas using research and collaboration to guide this process.</p> <p>B. Work with municipalities and electoral areas to identify the need for solid waste facilities and zoning for waste management activities.</p> <p>C. Use policy tools to enable local recycling infrastructure.</p> <p>D. Investigate 'Pay-As-You-Throw' principles to use as tools to incent less waste disposal.</p> <p>E. Investigate use of clear bags for garbage or recyclables collection to encourage proper recycling of materials, where practicable and enforceable (e.g. at events).</p>	<ul style="list-style-type: none"> Local governments in the CRD value waste reduction and would likely be open to support from the CRD in language for bylaws, best practices, OCPs, and Economic Development strategies (Action 5A and 5B). Disposal bans for material categories that have processing opportunities and markets can be effective to enable local recycling infrastructure (Action 5C). Action 5D would require a study by the CRD to help municipalities understand concepts of 'Pay-As-You-Throw' (PAYT) and approaches that they could incorporate into their municipal waste collection systems. Local governments typically administer waste collection. Municipalities with collection in the CRD already have a 'User Pay' system which limits the number of containers at the curb. Residents have to purchase tags to put out additional bags. This Action would involve investigating weight-based and/or frequency-based approaches. Action 5E would require a study to investigate an approach for using clear bags to improve diversion rates. This has been implemented in several Canadian jurisdictions (mostly in Nova Scotia and Ontario¹⁴) and typically relies on manual collection systems, where discarded materials are put into clear bags so that collection staff can visually inspect the contents before being placed in the collection truck. The study would help the CRD to assess whether this type of approach would be feasible for CRD municipalities to adopt. 	<ul style="list-style-type: none"> Actions 5A through 5C do not have directly associated environmental impacts, however, they contribute to creating a culture and systems change that may ultimately reduce disposal in the CRD. Action 5C and 5D could, if implemented, reduce the amount of material disposed and encourage proper diversion of materials. 	<ul style="list-style-type: none"> Action 5A strives to improve alignment of local governments and the CRD. This may ultimately lead to greater harmony between the local governments. Furthermore, regionally aligned programs may lead to less resident confusion, thereby supporting effective participation in CRD programs and initiatives. Action 5C encourages local recycling where options are available, which could in turn boost the local economy. PAYT programs (Action 5D) create awareness of disposal habits. These programs can save low waste generators money, thus aligning monetary incentives with waste reduction. However, these programs could lead to increased inappropriate disposal of household waste for 'free' (for example in park litter bins). However, as discussed in the 'Technical Feasibility and Effectiveness' comment for Action 5D, it is not expected that implementing PAYT for residential collection would be feasible or practical in the CRD. Use of clear bags (Action 5E) creates a social incentive for generators to sort waste properly. 	<ul style="list-style-type: none"> Actions 5A through 5C do not have directly associated impact on disposal, however, they contribute to creating a culture and systems change that may ultimately reduce disposal in the CRD. Action 5D and 5E will provide more information on potential effects on waste disposal that the programs described could have. 	<p>12</p>	<ul style="list-style-type: none"> Action 5A, 5B, and 5C are significant undertakings for a CRD staff member but would not require any capital funding.
Score (High- 5, Medium – 3, Low – 1)	High	Low	High	Low		

¹⁴ Background Research on Clear Garbage Bag Programs Across North America, <https://www.niagararegion.ca/government/committees/pdf/Quinte%20Clear%20Bag%20Report.pdf>

Table B-6: Strategy Evaluation - 6. Continue and Enhance Policy Development

Strategy And Associated Actions	Technical Feasibility and Effectiveness	Environmental Impact and Benefits	Social Impact	Effect on Waste Disposal	Score	Cost Considerations
<p>6. Continue and Enhance Policy Development</p> <p>A. Develop model procurement policies for use by local governments, non-profits, etc.</p> <p>B. Continue to expand material bans when viable alternatives exist.</p> <p>C. Investigate licensing waste management facilities in the region to encourage transparency, consistency, and a requirement that all facilities protect public health and the environment.</p> <p>D. Investigate regulatory mechanisms to manage municipal solid waste and recyclable materials in the region.</p> <p>E. Investigate options for extreme weather debris such as community chipping days or special burning allowances in electoral areas.</p>	<ul style="list-style-type: none"> Examples of procurement policies exist for many regions within BC that could be adapted for CRD use (Action 6A). Since the CRD has existing material bans, it should be relatively straightforward to adapt the existing process material ban procedure for any materials that are added (Action 6B). Waste generators in the CRD also already have familiarity with existing bans, which lends itself to greater adherence to future bans. Several regional districts in BC, including Regional District of Nanaimo and Cowichan Valley Regional District have the ability to license waste management facilities (Action 6C). This action would involve the CRD studying the requirements to establish a licensing system and understanding the positive and negative impacts. Action 6D would involve the CRD studying regulatory tools and mechanisms to manage materials in the region. Action 6E would involve the CRD studying measures to deal with debris from extreme weather events. 	<ul style="list-style-type: none"> Developing model procurement policies (Action 6A) could indirectly decrease disposal or encourage contractors to use other more sustainable practices. A sustainable or “green” procurement policy provides guidance to employees and departments to make purchasing decisions. Through this kind of policy, the CRD can encourage policies that prioritize the reduction of consumption, use of durable goods, or choosing items with 100% recycled content. Action 6B would likely lead to decreased disposal and could help to manage any materials that are identified as hazardous. Actions 6C, 6D, and 6E would investigate possible environmental implications of the programs described. 	<ul style="list-style-type: none"> Actions 6A and 6B would have an underlying impact on the system but direct social impacts would not likely be present. Programs resulting from Actions 6C, 6D, and 6E would also not be likely to have direct social implications – these actions describe investigations, which would include investigating social implications of any programs to be implemented. 	<ul style="list-style-type: none"> Action 6B has the potential for significant disposal reduction, depending on which materials are banned. However, this is a high-level maintenance action that may not result in disposal bans in the near future. Actions 6C, 6D, and 6E would investigate waste disposal implications of the programs described. 	<p>12</p>	<ul style="list-style-type: none"> Actions 6A and 6B would require minimal to moderate CRD staff resources. Actions 6C and 6D may require significant funding if CRD pursues licensing or regulatory mechanism, including funding for consultation.
<p>Score (High- 5, Medium – 3, Low – 1)</p>	<p>High</p>	<p>Medium</p>	<p>Low</p>	<p>Medium</p>		

2.0 RECYCLING

Table B-7: Strategy Evaluation - 7. Increase Residential Diversion

Strategy And Associated Actions	Technical Feasibility and Effectiveness	Environmental Impact and Benefits	Social Impact	Effect on Waste Disposal	Score	Cost Considerations
<p>7. Increase Residential Diversion</p> <p>A. Continue to promote diversion of recyclable materials (including organics).</p> <p>B. Collaborate with municipal and private sector service providers to support depot diversion efforts in the region for non-curb-side materials.</p> <p>C. Encourage local processing and markets for recyclables.</p> <p>D. Develop tools, such as a guide, to support event recycling.</p>	<ul style="list-style-type: none"> ▪ Action 7A through 7D can be developed and implemented by CRD staff in partnership with local governments and other stakeholders. ▪ Local processing options (Action 7C) exist for some materials currently, such as concrete and asphalt, yard waste, and metal. The CRD should stay abreast of recycling opportunities for various materials in the CRD so that opportunities can be identified and promoted. ▪ The CRD staff can investigate approaches and tools such as City of Vancouver's Green Events Planning Guide¹⁵ and the Downtown Victoria Business Association Green Events Guide¹⁶ to assist with developing tools for the CRD (Action 7D). 	<ul style="list-style-type: none"> ▪ Action 7A creates positive environmental impacts by diverting materials from landfill. ▪ Given the increasing instability of international markets for recyclable materials, improving local recycling markets (Action 7C) can enhance long-term stability and resiliency of recycling programs. 	<ul style="list-style-type: none"> ▪ Overall, 38% of the waste produced in the CRD is produced by residential sources. Programs should continue to educate the residents about the materials that they discard, because these programs are far-reaching in that they make residents more generally conscientious about waste. This makes Action 7A important. ▪ Encouraging local markets for recyclables Action 7C, instead of shipping recyclables overseas, can provide a boost to the local economy. ▪ Event recycling (Action 7D) is important because though the overall amount of materials diverted at events may not be significantly large, events are an excellent opportunity to educate the public in what materials can be recycled, which improves the strength and resiliency of residential recycling. 	<ul style="list-style-type: none"> ▪ Recyclable materials from residential sources represent 9% of the overall material disposed at Hartland Landfill. These actions, especially Action 7A and 7B support programs to divert recyclable materials that are disposed at Hartland Landfill. ▪ Action 7D may result in a small decrease in waste disposal, as events can create a significant amount of waste. 	12	<ul style="list-style-type: none"> ▪ Actions 7A through 7D would require minimal to moderate CRD staff resources. ▪ The CRD has initially proposed that the total support funding for Action 7B would be \$25,000 annually for two years and evaluate effectiveness after two years.
Score (High- 5, Medium – 3, Low – 1)	Medium	Medium	Medium	Low		

¹⁵ <https://vancouver.ca/doing-business/greening-your-event.aspx>

¹⁶ <https://downtownvictoria.ca/app/uploads/2018/07/Green-Events-Guide-final.pdf>

Table B-8: Strategy Evaluation - 8. Increase Multi-Family Diversion

Strategy And Associated Actions	Technical Feasibility and Effectiveness	Environmental Impact and Benefits	Social Impact	Effect on Waste Disposal	Score	Cost Considerations
<p>8. Increase Multi-Family Diversion</p> <p>A. Allocate resources to support MF recycling, for example, by developing standardized education materials.</p> <p>B. Work with local governments and private sector service providers to develop waste source separation requirements.</p> <p>C. Develop policy guide for recycling, composting and garbage space and access in multi-family developments.</p> <p>D. Collaborate with stakeholders (e.g., private haulers who service MF buildings or MF property managers) to implement support for MF recycling, such as a ‘Train-the-Trainer’ Program.</p>	<ul style="list-style-type: none"> Allocating additional staff to support multi-family diversion would be a start to improving MF waste diversion (Action 8A). This staff member could research approaches from other jurisdictions, such as the standardized educational materials for multi-family recycling exist in other nearby jurisdictions, such as Metro Vancouver.¹⁷ Requiring source separation (Action 8B), for example by developing bylaws, is feasible, as has been demonstrated by municipalities throughout BC. Municipalities in the CRD support MF diversion measures. Having the CRD work with local governments and the private sector to develop source separation requirements for the MF sector should be feasible. Action 8C is feasible; the CRD should consider the resources required to develop this policy guide. Action 8D is feasible and implementation examples exist throughout BC, including the City of Vancouver’s Multi-Family Ambassador Program and the Zero Waste Coach in the City of North Vancouver. 	<ul style="list-style-type: none"> The multi-family sector disposed approximately 13% of the total materials disposed at Hartland. Of this, approximately 75% of these materials could be diverted.¹⁸ Actions 8A through 8D may have a modest impact on disposal by reducing the amount disposed from the MF sector. It should be considered that the MF sector will likely grow faster than the SF sector, and therefore the quantity of materials consumed by this sector will increase. 	<ul style="list-style-type: none"> This strategy (especially Actions 8A and 8B) would lead to enhanced standardization across buildings and potentially municipalities, leading to improved buy-in and participation in recycling programs. Multi-family residents often report feeling ‘left out’ of recycling programs or are confused about what can be recycled because each building’s recycling system is different. This is especially exaggerated because there tends to be a higher turnover of residents in multi-family housing than in single-family housing. This leads to frustration with the overall recycling system. 	<ul style="list-style-type: none"> Actions 8A to 8D would likely have the potential for a moderate effect on multi-family diversion. 	<p>16</p>	<ul style="list-style-type: none"> The CRD has initially proposed that the total allocation for Action 8A would be \$50,000 annually for education and to implement actions.
<p>Score (High- 5, Medium – 3, Low – 1)</p>	<p>High</p>	<p>Medium</p>	<p>High</p>	<p>Medium</p>		

¹⁷ <http://www.metrovancouver.org/services/solid-waste/apartments-condos/apartment-recycling-toolkit/Pages/default.aspx#>

Table B-9: Strategy Evaluation - 9. Increase ICI Diversion

Strategy And Associated Actions	Technical Feasibility and Effectiveness	Environmental Impact and Benefits	Social Impact	Effect on Waste Disposal	Score	Cost Considerations
<p>9. Increase ICI Diversion</p> <p>A. Allocate resources to increase ICI diversion, for example, a business waste reduction liaison.</p> <p>B. Advocate to expand the packaging and paper product EPR program to the ICI sector.</p> <p>C. Create a business waste reduction toolkit, including education about how to apply Circular Economy principles.</p> <p>D. Encourage municipalities to require waste management plans with business licenses.</p> <p>E. Develop policy guide for ICI space and access requirements.</p> <p>F. Work with local governments and private sector service providers to develop ICI waste source separation requirements.</p> <p>G. Investigate shifting disposal ban enforcement to generator, rather than hauler.</p>	<ul style="list-style-type: none"> Allocating additional staff resources to support ICI sector diversion would be a start to improving ICI waste diversion (Action 9A). This resource could also undertake Actions 9C, 9D, and 9E. Other regional districts have been advocating for an ICI PPP EPR program (Action 9B). Researching and identifying source separation approaches for ICI sector (Action 9F) with the intent to develop future bylaws is feasible. Action 9G would involve the CRD studying approaches for shifting the disposal ban enforcement to generators. It is feasible because it could be undertaken by the FTE identified 9A. 	<ul style="list-style-type: none"> The ICI sector is the largest waste-generating sector in the CRD, representing 41% of the waste disposed at Hartland. Of this, up to 74% has diversion potential. Actions 9A through 9G could decrease the disposal rate. 	<ul style="list-style-type: none"> Actions 9A, 9C, 9D and 9G may have a positive social impact, as they will create engagement between local businesses and the CRD. Shifting disposal ban enforcement to the generator (Action 9G) may have a negative impact on businesses who are not interested in recycling or reducing their waste. 	<ul style="list-style-type: none"> Because the ICI sector generates so much waste, this strategy has the potential to reduce waste disposal considerably. Of special note is Strategy 9B. Though the CRD does not have direct jurisdiction over an ICI PPP EPR program, if this was implemented, it could have a large impact on disposal. 	<p>18</p>	<ul style="list-style-type: none"> The CRD has initially proposed that the total allocation for Action 8A would be \$50,000 annually for education and to implement actions.
Score (High- 5, Medium – 3, Low – 1)	High	High	Medium	High		

Table B-10: Strategy Evaluation - 8. Support Existing and New EPR Programs

Strategy And Associated Actions	Technical Feasibility and Effectiveness	Environmental Impact and Benefits	Social Impact	Effect on Waste Disposal	Score	Cost Considerations
<p>10. Support Existing and New EPR Programs</p> <p>A. Advocate to the province to expand EPR programs. <i>Note: The Province is currently conducting an EPR gap analysis and considering adding new materials.</i></p> <p>B. Collaborate with stewards to increase consumer awareness about EPR programs.</p> <p>C. Advocate for increased return-to-retailer opportunities.</p> <p>D. Advocate federally to standardize EPR programs across Canada.</p>	<ul style="list-style-type: none"> EPR programs must be informed by the needs of regions and constituents. Providing feedback as in Actions 10A through 10D are critical to build resilient and foundational EPR programming. 	<ul style="list-style-type: none"> No direct environmental impact is expected for this strategy; the increased relevance and practicability of EPR programs will indirectly improve diversion rates and participation. If the province proceeds with EPR for mattresses, textiles, plastics, CR&D materials this could have a high environmental impact. 	<ul style="list-style-type: none"> Action 10B will improve communication and the understanding of EPR within the communities impacted by it. This can assist with greater community ownership and adherence to EPR programs. 	<ul style="list-style-type: none"> No direct impact on waste disposal is expected for this strategy; the increased relevance and practicability of EPR programs could indirectly impact disposal rates in the future. If the province implements additional EPR programs this could reduce tonnage significantly. 	<p>14</p>	<ul style="list-style-type: none"> Funding may be required to educate the public if new disposal bans for EPR materials take effect at Hartland landfill.
<p>Score (High- 5, Medium – 3, Low – 1)</p>	<p>High</p>	<p>Medium</p>	<p>Medium</p>	<p>Medium</p>		

Table B-11: Strategy Evaluation 11. Increase Organics Diversion and Processing Capacity

Strategy And Associated Actions	Technical Feasibility and Effectiveness	Environmental Impact and Benefits	Social Impact	Effect on Waste Disposal	Score	Cost Considerations
<p>11. Increase Organics Diversion and Processing Capacity</p> <p>A. Continue to promote organics waste diversion.</p> <p>B. Investigate developing a resilient local organics processing infrastructure. <i>Note: The CRD Board has directed staff to issue a RFEOI for an in-region or near-region organics processing facility.</i></p> <p>C. Support compost markets by purchasing back materials.</p> <p>D. Collaborate with service providers and users (e.g., local businesses) to develop guidelines for use of compostable products and packaging.</p>	<ul style="list-style-type: none"> ▪ Action 11A is ongoing and feasible. ▪ Action 11B is continuing to proceed. Processing capacity is required for organics collected. ▪ The CRD can work with municipalities to support procurement of composted materials from local processors (Action 11C). ▪ Action 11D requires coordination by CRD staff to develop guidelines and is feasible. 	<ul style="list-style-type: none"> ▪ Organics are currently diverted in the CRD – this has resulted in decreased disposal and reduction in GHG emissions from landfills. Action 11A and 11B is a continuation of existing efforts. ▪ Purchasing compost from local processors (Action 11C) supports principles of circular economy. 	<ul style="list-style-type: none"> ▪ Organics processing infrastructure supports organics diversion programs (Action 11B). CRD residents support diverting organics over disposal at landfill. ▪ A resilient local organics processing infrastructure should appropriately manage odours from processing facilities which have the potential to create significant community impacts (Action 11B). ▪ Supporting composting markets by purchasing compost (Action 11C) may have a positive social impact by improving the relationships between organics processing facilities and the CRD. ▪ Action 11D may have a positive social impact by creating engagement between key stakeholders, such as local businesses, and the CRD. 	<ul style="list-style-type: none"> ▪ 27% of the material disposed at Hartland is organic materials¹⁹. Action 11A may have a modest impact on reducing the quantity of organic material disposed. ▪ Actions 11B through 11D do not have a direct impact on disposal capacity. 	<p>20</p>	<ul style="list-style-type: none"> ▪ Additional required costs will be determined through the RFEOI process. ▪ Funding may be required to educate about use of compostable products and packaging.
Score (High - 5, Medium – 3, Low – 1)	High	High	High	High		

¹⁹ In the 2016 waste stream characterization study, the proportion of organic materials was found to be 21.1%, which included only food and yard waste. The 27% stated herein also includes compostable paper.

Table B-12: Strategy Evaluation - 12. Increase Construction, Renovation and Demolition (CR&D) Material Diversion

Strategy And Associated Actions	Technical Feasibility and Effectiveness	Environmental Impact and Benefits	Social Impact	Effect on Waste Disposal	Score	Cost Considerations
<p>12. Increase Construction, Renovation and Demolition (CR&D) Material Diversion</p> <p>A. Develop a comprehensive CR&D strategy, including characterization of materials, best practices, and pilot projects.</p> <p>B. Develop educational tools to support CR&D material diversion, e.g., create an industry toolkit, a deconstruction guide, and/or guidelines for diverting and utilizing reused materials.</p> <p>C. Promote green building standards.</p> <p>D. Continue collaboration with local governments to develop and use policy tools (e.g., construction permits, building codes) to maximize diversion and to align management plans.</p> <p>E. Investigate beneficial uses of CR&D waste, including a clean wood waste ban.</p> <p>F. Investigate banning or surcharging mixed CR&D loads at the landfill to encourage source separation</p> <p>G. Further develop programs for managing hazardous materials, like asbestos.</p>	<ul style="list-style-type: none"> This strategy is feasible however represents significant effort and resources for CRD staff. It is known that markets exist in the CRD for CR&D materials, however, Action 12A needs to be undertaken to understand the state of CR&D waste management in the region, characteristics of the waste stream, best practices from other jurisdictions, and approaches to enhance CR&D diversion. This is a first step to completing other Actions outlined in this strategy, including Action 12B and 12G. Actions 12E and 12F involve investigating disposal bans on CR&D materials. Other jurisdictions have implemented similar bans; thus, this is a feasible approach. Since the CRD has existing material bans, it should be relatively straightforward to adapt the existing disposal ban process for any materials that are added. 	<ul style="list-style-type: none"> All actions in this strategy support the goal to decrease the CRD's overall disposal. Green building standards (Action 11C) such as LEED typically require diversion and the use of sustainable materials. Action 11E and 11F require studying the environmental impacts of potential CR&D disposal bans. If such a ban was implemented, it would have significant implications, including a decreased disposal rate. 	<ul style="list-style-type: none"> Many CRD residents recognize that CR&D materials represent a large quantity of waste and are expected to be supportive of reuse and recycling efforts for this sector. 	<ul style="list-style-type: none"> The CR&D waste sector contributes 16% of the regional garbage. CR&D diversion rate in other jurisdictions is typically 60-75%. All actions in this strategy support the goal to decrease the CRD's overall disposal. 	<p>18</p>	<ul style="list-style-type: none"> Strategy 12 will require an additional \$50,000 per year for two years. Additional funding may be required to investigate beneficial uses of CR&D waste and banning or surcharging mixed CR&D loads at the landfill.
<p>Score (High- 5, Medium – 3, Low – 1)</p>	<p>High</p>	<p>High</p>	<p>Medium</p>	<p>High</p>		

Table B-13: Strategy Evaluation - 13. Encourage Proper Public Space Waste Management Activities

Strategy And Associated Actions	Technical Feasibility and Effectiveness	Environmental Impact and Benefits	Social Impact	Effect on Waste Disposal	Score	Cost Considerations
<p>13. Encourage Proper Public Space Waste Management Activities</p> <p>A. Develop educational materials to prevent and reduce litter and abandoned materials in our neighbourhoods and public spaces.</p> <p>B. Continue promoting alternatives to abandoned materials and illegal dumping by educating about proper management and disposal</p> <p>C. Collaborate with stakeholders, including local governments and private sector facilities, to develop a regional approach to illegal dumping.</p> <p>D. Investigate developing regionally-aligned bylaws.</p> <p>E. Develop and pilot methodologies to 'observe, record, and report' on abandoned materials and illegal dumping incidents throughout the CRD.</p> <p>F. Investigate options for large bulky item disposal, e.g., free drop-off days or large item pick-up days</p>	<ul style="list-style-type: none"> ▪ Actions 13A through 13C are feasible and should be ongoing programs. ▪ Action 13D is feasible and would require the CRD to coordinate with local governments to develop regionally-aligned bylaws. ▪ Action 13E is feasible if partners are found to collaborate with to assist in reducing illegal dumping. ▪ Action 13F would involve the CRD studying options for bulky item disposal. 	<ul style="list-style-type: none"> ▪ Illegal dumping and abandoned waste are more related to community issues and to the community's perception of the local environment. 	<ul style="list-style-type: none"> ▪ This strategy strives to reduce abandoned waste and illegal dumping, which are important social issues. All Actions should contribute to this goal. ▪ Action 13F would investigate possible social implications of the programs described. 	<ul style="list-style-type: none"> ▪ Theoretically, waste disposal would slightly increase if abandoning materials and illegal dumping was decreased, however, this is expected to be extremely minimal. ▪ Actions 13F would investigate waste disposal implications of the programs described. 	<p>12</p>	<ul style="list-style-type: none"> ▪ \$20,000 for annual illegal dumping campaign for two years; evaluate effectiveness after two years.
Score (High- 5, Medium – 3, Low – 1)	High	Low	High	Low		

APPENDIX C

DIVERSION POTENTIAL ANALYSIS

Appendix C- Diversion Potential Analysis

Sector	Sector Contribution to Landfill (%)	Material Type	Material Contribution to Landfill (%)	Material Contribution to Landfill (tonnes)	Short-Term		Medium-Term		Long-term Aspirational Goal	
					Expected Diversion Potential (%)	Per capita diversion potential (kg per capita)	Expected Diversion Potential (%)	Per capita diversion potential (kg per capita)	Expected Diversion Potential (%)	Per capita diversion potential (kg per capita)
Single-Family	25%	Curbside Recyclable Material	2.8%	4,316		0.0	20%	2.1	40%	4.2
		Depot Recyclable Material (EPR)	3.2%	5,022		0.0	35%	4.3	50%	6.1
		Wasted Food	3.8%	5,963	25%	3.6	50%	7.2	75%	10.8
		Inedible Organic Materials	4.9%	7,611	25%	4.6	50%	9.2	75%	13.8
		Clean Wood	0.1%	157		0.0		0.0		0.0
		Other Recyclable Building Materials	0.9%	1,452		0.0		0.0		0.0
		Textiles	1.8%	2,746		0.0		0.0	50%	3.3
		Bulky Objects	0.0%	0		0.0		0.0		0.0
Total Possible Divertable from SF			17.4%	27,267						
Multi-Family	13%	Curbside Recyclable Material	1.7%	2,652		0.0	50%	3.2	60%	3.8
		Depot Recyclable Material (EPR)	1.6%	2,448		0.0	25%	1.5	30%	1.8
		Wasted Food	2.0%	3,081	13%	0.9	25%	1.9	40%	3.0
		Inedible Organic Materials	2.9%	4,488	25%	2.7	50%	5.4	60%	6.5
		Clean Wood	0.0%	20		0.0		0.0		0.0
		Other Recyclable Building Materials	1.1%	1,734		0.0		0.0		0.0
		Textiles	0.6%	877		0.0		0.0	50%	1.1
		Bulky Objects	0.0%	0		0.0		0.0		0.0
Total Possible Divertable from MF			9.8%	15,301						
Bins	5%	Curbside Recyclable Material	0.1%	165		0.0		0.0		0.0
		Depot Recyclable Material (EPR)	0.4%	565		0.0		0.0		0.0
		Wasted Food	0.1%	110		0.0		0.0		0.0
		Inedible Organic Materials	0.4%	636		0.0		0.0		0.0
		Clean Wood	0.2%	369		0.0		0.0		0.0
		Other Recyclable Building Materials	0.9%	1,428		0.0		0.0		0.0
		Textiles	0.1%	157		0.0		0.0	50%	0.2
		Bulky Objects	0.3%	408		0.0		0.0		0.0
Total Possible Divertable from Bins			2.4%	3,837						
ICI	41%	Curbside Recyclable Material	6.4%	10,037		0.0	50%	12.1	70%	17.0
		Depot Recyclables	5.8%	9,137		0.0	25%	5.5	30%	6.6
		Wasted Food	5.8%	9,072	25%	5.5	50%	11.0	60%	13.2
		Inedible Organic Materials	7.2%	11,260	25%	6.8	50%	13.6	60%	16.3
		Clean Wood	0.2%	386		0.0		0.0		0.0
		Other Recyclable Building Materials	1.3%	2,059		0.0		0.0		0.0
		Textiles	2.6%	4,118		0.0		0.0	50%	5.0
		Bulky Objects	0.8%	1,287		0.0		0.0		0.0
Total Possible Divertable from ICI			30.2%	47,355						
CR&D	16%	Curbside Recyclable Material	0.1%	151		0.0		0.0		0.0
		Depot Recyclables	0.7%	1,155	50%	1.4	50%	1.4	55%	1.5
		Wasted Food	0.0%	0		0.0		0.0		0.0
		Inedible Organic Materials	0.0%	50		0.0		0.0		0.0
		Clean Wood	2.2%	3,465	70%	5.9	75%	6.3	75%	6.3
		Other Recyclable Building Materials	3.6%	5,574	60%	8.1	60%	8.1	60%	8.1
		Textiles	0.2%	251	50%	0.3	50%	0.3	55%	0.3
		Bulky Objects	0.1%	176		0.0		0.0		0.0
Total Possible Divertable from CR&D			6.9%	10,822						

Reduction in Disposal	40	93	129
New Disposal Rate	340	287	251
New Disposal Target (kg/capita)	340	285	250

APPENDIX D

TETRA TECH'S LIMITATIONS ON THE USE OF THIS DOCUMENT

LIMITATIONS ON USE OF THIS DOCUMENT

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 third parties other than the Client.

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

1.6 GENERAL LIMITATIONS OF DOCUMENT

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

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

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

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