

Review of Solid Waste Management Plan Revised Final Plan



Prepared for:

Regional District of Central Okanagan
1450 K.L.O Road
Kelowna, BC V1W 3Z4
Attention: Carol Suhan
RDCO Waste Reduction Coordinator

Submitted by:

Earth Tech (Canada) Inc.
Suite 600, 1901 Rosser Avenue
Burnaby, BC. V5C 6S3
Contact: Mareese Keane, P. Geo.

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1 Introduction

The purpose of this Plan is to establish a waste management system that will meet the Regional District's needs for the next twenty (20) years and that will guide the activities in the RDCO towards a zero waste goal. Given the length of this planning period, the RDCO will by necessity evaluate and review the directions set out in this Plan, as time elapses. This Plan provides clear and specific direction with respect to waste reduction over the next five years, and recommends areas of inquiry or focus for the subsequent 6 – 15 years. Subsequent Plan Review exercises will continue to refine the objectives identified in the Plan.

Development of this Plan followed the three stage process defined in the “Guide to the Preparation of Regional Solid Waste Management Plans by Regional Districts” and is based on the following major references:

- Regional District of Central Okanagan, Solid Waste Management Plan Review, Stage I Report, September 2005. Earth Tech (Canada) Inc.
- Regional District of Central Okanagan, Solid Waste Management Plan Review, Interim Strategy Report, September 2005. Earth Tech (Canada) Inc.
- Regional District of Central Okanagan, Solid Waste Management Plan Review, Stage II Report, June 2006. Earth Tech (Canada) Inc.
- Regional District of Central Okanagan, Solid Waste Management Plan Review, Public Consultation Report, June 2006. Jan Enns Communication and Earth Tech (Canada) Inc.

Waste reduction will be achieved by following the Five R's hierarchy of reduce, reuse, recycle, resource recovery and residual management. Following a brief introduction of guiding principles and plan objectives, this Plan presents strategies and procedures for implementation, which are presented in order of the “5 Rs”. These programs are then grouped together in a series of phases for implementation. The appendices include a minimum set of objectives for landfill operations (Appendix A), and a set of Program Information Sheets (Appendix B) for each of the programs recommended in this Plan.

The Solid Waste Management Plan, once approved by the Ministry for Environment under the Environmental Management Act, will authorize the Regional District and its member municipalities to manage waste in accordance with the plan.



2 Guiding Principles

The guiding principles described below will be the foundation for the implementation of the waste management strategies of the Plan. The RDCO will consider the implementation of programs described in the Plan in the context of these guiding principles:

2.1 Adopting a Zero Waste Goal

Adopting a Zero Waste goal is like implementing an “Accident Free Days” policy. It is a goal to help guide future decisions about the Plan and waste management programs, as well as provide a focus on how to reduce and reuse waste. Zero Waste goes beyond recycling by taking a “whole system” approach to the flow of resources over their whole lifetimes. This could include redesigning a product to use fewer raw materials, or finding new markets that use waste as an input to a process, so that the waste becomes a resource rather than a problem. On a personal level, it might mean changing purchasing habits to avoid buying items with excess packaging and avoiding waste before it happens. As an example, Toyota adopted a ZERO Waste policy in its plants and has reduced garage waste by 95 percent by finding new ways to reduce, reuse and recycle. Zero Waste does not mean that no waste will be landfilled or produced, but that we will continuously strive to reduce the waste going to landfill by adopting aggressive waste reduction policies.

Zero Waste maximizes recycling, minimizes waste, reduces consumption and ensures that products are made to be reused, repaired or recycled back into nature or the marketplace.

The RDCO will work to further the philosophy of Zero Waste in its member municipalities and electoral areas wherever possible.

2.2 Operational Best Practices

Best practices are procedures and/or policies that represent an optimal standard of operation, which meets regulatory requirements, minimizes environmental impacts, and makes the best use of available technology, equipment and facilities. The RDCO will uphold operational best practices at its facilities and in its programs, and encourage member municipalities to embrace and adopt these best practices.

2.3 Public Consultation and Education

Reduction, recycling and disposal policies and programs shall be developed through public consultation and must be socially acceptable, cost effective and based on full cost accounting. All of the programs described in this Plan will feature an integral education component. Education and social marketing influence behavior and are of critical importance to the success of a waste diversion program. The RDCO will continue to improve existing waste reduction and awareness programs and will introduce new programs as required.



3 Goals

3.1 Plan Objectives

Building on the guiding principles the following plan objectives are identified:

- Maximum practical advancement towards embracing a zero waste goal both in solid waste management and in all other aspects of operation within the RDCO and its member municipalities.
- To reduce greenhouse gas impacts associated with management of solid waste wherever feasible by implementing the programs laid out in this Plan
- Strive to implement operational best practices in all solid waste management activities.
- Maintain a consultative and open approach with the public in development of solid waste management programs.
- Use “user-pay” and market based incentives to achieve waste reduction goals and to ensure that the costs associated with solid waste management services are distributed equitably between Local Governments.

3.2 Waste Reduction Targets

A strategy for waste management was presented in the Stage II Report of the Solid Waste Management Plan Review process. Realistic but ambitious goals have been set on the basis of the strategy selected. Two specific waste reduction targets have been identified with associated timelines:

- To reduce waste disposal per capita to 34% of 2004 levels within 5 years after plan adoption by implementing the programs recommended in this Plan
- To further reduce waste disposal per capita by a minimum of an additional 5% relative to 2004 levels, during the six to fifteen year period after plan adoption depending on which programs adopted.

The additional waste reduction in the six to fifteen years after plan adoption will depend on whether the Glenmore Landfill becomes operated as a full-scale bioreactor. If this decision is not taken, organic materials will be targeted for diversion from the waste stream, resulting in an additional 25% reduction in landfilled waste.

3.3 Intermediate Benchmarks

In order to ascertain whether program implementation is on track to deliver the waste reduction targets identified, the RDCO will establish intermediate benchmarks throughout the plan period. Performance of programs will be measured against these benchmarks to indicate how the RDCO is performing in terms of meeting the overall objectives and targets.



Benchmarking of performance will coincide with the financial planning activities for the coming financial year, so that in situations where program implementation is falling behind schedule, additional resources as required to address the shortfall can be allocated in the coming year's financial plan.

4 Implementation Tools

The following policies and tools will be used as a means to implement waste management programs and meet waste reduction goals:

4.1 Feasibility Assessment

The feasibility of implementing programs will be reassessed prior to implementation. New programs will be pilot tested, where possible, and the results of the pilot tests will be used to decide if full-scale implementation of that program is feasible.

4.2 Continuous Evaluation of Programs

Ongoing evaluation of all programs will be carried out and the effectiveness of a program will be monitored and reported. Programs that are not operating successfully should be reassessed and appropriate action should be taken.

4.3 Conduct Waste Audits

Regular waste audits will be carried out at suitable and appropriate intervals in order to determine the composition of both the disposed and recycled streams. It is anticipated that waste audits will be conducted every four to five years, or at suitable intervals to measure performance of major program implementation. This will enable more accurate evaluation of the success of the various waste diversion programs and better estimation of the target quantities for future waste diversion programs.

4.4 Conduct Financial Distribution Study

Funding for new programs or services that are shared by Local Governments should be distributed in an equitable fashion between Municipalities and Electoral Areas of the Regional District on the basis of who uses the programs. This also applies to existing services that are shared by Local Governments. A financial assessment will be carried out at the beginning of the Plan period to determine how existing costs are distributed. Corrective measures that should be taken where costs are not equitably distributed will be reviewed and implemented. This exercise should be carried out for all of the waste management services provided in the Regional District.



4.5 Disposal Bans

There is currently a ban on paper and cardboard from all sectors at the Glenmore Landfill and further materials will be banned progressively as waste diversion programs are introduced. In order to fully capture the portion of the waste stream that is beyond voluntary compliance, enforcement measures need to be set in place. Such measures will include more regular spot checks of loads arriving at the landfill and automatic fines for loads containing more than a certain amount of a banned material.

4.6 Reducing Bag Limits

The RDCO currently has a residential garbage bag limit in place of two bags per household and an additional two bags per week if tags are purchased. As new residential waste diversion programs are introduced, the bag/container limits for residential garbage collection will be further reduced.

4.7 Licensing of Privately Owned Facilities

Any privately operated solid waste management facility operating within the RDCO will require a permit for operation and will be required to set its tipping fees in accordance with the RDCO's tipping fee schedule. In the case of landfill sites, operation will be in accordance with BC Environment's "Landfill Criteria for Municipal Solid Waste".

4.8 Cooperation with Air Quality Management Staff

The Waste Reduction Office will work closely with the Air Quality Management staff within the RDCO, to improve coordination and cooperation between their respective programs. The RDCO recognizes that these functions are linked, e.g. solid waste operations may have impacts on air quality such as odours, and air quality management strategies such as banning backyard burning of yard waste may in turn influence the level of collection of yard waste provided. As such, programs will be coordinated where appropriate, to support consistent messaging to the public.

4.9 Lobbying for Expansion of Product Stewardship Programs

The RDCO will continue to encourage and support product stewardship programs. Successfully lobbying the Provincial Government to expand the list of products governed by Product Stewardship regulations would mean more items could be diverted from landfill. In addition, it could mean reduced costs for Local Government since there would be less waste to manage at the local level.



5 Plan Implementation

Implementation of the Plan is scheduled to occur in three phases, with approximate time frames as follows:

- Phase 1 – 0 to 5 years from Plan adoption
- Phase 2 – 6 to 15 years after Plan adoption
- Phase 3 – 15+ years after Plan adoption

Programs associated with each phase have been listed below **in order of priority**; however, no specific dates for commencing individual programs have been outlined. This approach gives the RDCO the flexibility to assess developments on an ongoing basis and to introduce programs as appropriate and with the waste reduction goals in mind as outlined in Section 3.

For every phase, programs have been grouped according to the 5Rs hierarchy – **Reduce, Reuse, Recycle, Recover, Residuals Management**; the sector to which the programs will apply is also identified. The programs for each phase are summarized in the following sections; further information is available in a series of Program Summary Sheets which can be found in Appendix A.

6 Phase 1 – Zero to Five Years

Programs in Phase 1 are those that can be implemented in the short term, within the first five years after Plan adoption. Many of these options involve enhancing programs that already exist in the RDCO. These programs target the “low hanging fruit” so that waste diversion from landfill can be maximized. Phase 1 programs have been designed to be implemented in the short term without significantly impacting the general structure for how solid waste is managed within the RDCO.

6.1 Reduction and Reuse Programs

6.1.1 Education and Social Marketing

Education and social marketing influence behavior and are of critical importance to the success of a waste diversion program. The RDCO will continue to improve the existing waste reduction and awareness programs run by the Waste Reduction Office. New programs will be introduced as required. To support the expanded role that education and social marketing will play in the implementation of the Plan, an additional part-time staff person will be added to the RDCO Waste Reduction Office.

6.1.2 Green Procurement for Local Governments

The RDCO and member municipalities will commit to Zero Waste, by building the concept into all Local Government undertakings. This will include demonstrating leadership on the journey to Zero Waste by



adopting a Preferential Purchasing Policy. The RDCO will favour products made from recycled content such as paper products, motor oil and tires. The Preferential Purchasing Policy should include products that have minimal environmental impacts during production, products that are easily reused and recycled, and for products that do have to be finally disposed, those that will cause minimal environmental impacts. In-house waste reduction will also be enhanced by encouraging the use of reusable products.

6.1.3 Encouragement for Provincial, Federal and Industrial Programs

By adopting a Zero Waste policy, the RDCO have taken on a leadership role and will encourage provincial and federal waste reduction programs. A number of actions to be undertaken have been identified:

- Support adoption of Zero Waste goal on a provincial basis;
- Support changes to packaging regulations that encourage use of recyclable and recycled packaging materials and discourage excessive packaging.

The RDCO will seek out opportunities to act in conjunction with other regional districts to further the success of these programs.

6.2 Recycling Programs

6.2.1 DLC Waste Diversion

Demolition, land clearing and construction (DLC) waste will be diverted from disposal in landfill by providing suitable recycling alternatives. A variable tipping fee structure for DLC waste will be introduced. A lower tipping fee will be charged for source separated recyclable materials, while a higher fee will apply to mixed DLC waste. The DLC recycling area will be located at the Glenmore Landfill Site. An area of the site will be designated and upgraded for DLC recycling activities.

6.2.2 Building Bylaw Amendment to Require Waste Management Plans

To further encourage the DLC sector to recycle, amendments to the RDCO building bylaws will be implemented to address two important issues with respect to waste diversion. These changes will be linked to the building permit and/or occupancy permit processes.

First, minimum requirements for waste management facilities will be specified, so that proposed new building designs will be required to include sufficient space to provide recycling services to building users/residents. Secondly, additional changes to bylaws will also require demolition and construction contractors to prepare a waste management plan as part of the building permit process, and to provide evidence that the recyclable materials from the job site have been disposed or recycled at the appropriate facilities.

6.2.3 ICI Paper and Cardboard Ban

The RDCO aims to increase paper and cardboard recycling in the private sector by strictly enforcing the existing ban on paper and cardboard at the landfills.



6.2.4 Improved Residential Blue Bag Recycling

Recycling through the residential blue bag program will be improved by offering collection of Numbers 1 and 2 plastic and plastic films and by targeting an increase in participation rates through continued education and promotion of the existing program.

Although this program does not provide as significant levels of reduction per dollar spent, this program has received overwhelming support from the public, with over 99% of survey responses received during the Public Consultation phase of the Plan Review process expressing approval for this program. This program will also bring the RDCO's recycling program in line those of neighbouring regional districts, all of which have plastics included in the diversion programs.

6.2.5 Collection of Hazardous and E- Wastes for Residential Sector

The RDCO will provide a year-round drop-off facility for hazardous and electronic (E-) wastes to give residents the opportunity to dispose of these materials at their own convenience. The Provincial Government has recently announced that E- waste will be added to the list of materials that are handled under industry product stewardship within 18 months of the time of writing. Until such time as the stewardship program is working effectively the RDCO would accept E-waste at the proposed drop-off facility.

6.2.6 ICI Yard Waste Composting

The RDCO aims to increase composting of yard waste generated by the private sector by placing a ban on the disposal of yard waste to landfill. This will be a policy-based program that will be focused on enforcement of the ban through regular checking of loads delivered for disposal and the imposition of penalties where necessary. It is assumed that additional volumes for yard waste composting can be handled at existing facilities.

6.2.7 Residential Yard Waste Recycling

Increased collection services for residential yard waste will be provided to residents so that all residential yard waste can be captured for composting. Participation in the yard waste collection program will be encouraged through a ban on the disposal of residential yard waste in the regular garbage and through a reduction in the current garbage bag collection volume for residents.

6.2.8 Back Yard Composting

Local Government subsidization for the purchase of backyard composters along with an intensive education and awareness program will be set in place to encourage the use of backyard composters. The back yard composting program would be partially funded by a user pay system and partially subsidized by Local Governments.

6.2.9 Multi-Family Unit Residential Collection

Local Governments will take over the collection of garbage and recyclables from multi-family residents so that the same level of recycling services can be provided to all residents. The same bans and limits will apply to the multi-family service as the single-family service.



6.3 Residuals Management

6.3.1 Operational Best Practices

The use of operating best practices will be maintained for disposal of residuals to Glenmore and Westside landfills and any other landfill operating within the RDCO. In the context of landfill disposal, operating best practices include procedures for placing waste in landfills so as to maximize capacity, preserving it for the longest possible period; environmental monitoring procedures; and if required by the Ministry of Environment, landfill gas collection for utilization or combustion to reduce greenhouse gas emissions.

At the present time, the Glenmore Landfill operates a landfill gas collection system, as specified in its Operational Certificate. At the present time, the Westside Landfill does not emit high enough levels of methane to require landfill gas collection. This is monitored regularly, and although this may change in the future, there is no such requirement under its Operational Certificate to collect landfill gas.

A minimum set of operational best practices for landfills is included in Appendix B.

6.3.2 Pilot Testing of Bioreactor Landfill Operations at the Glenmore Landfill

Pilot operation of a bioreactor cell at the Glenmore Landfill is currently underway and will be expanded during Phase 1 of the Plan period. A bioreactor landfill is a landfill designed and operated to accelerate the decomposition and stabilization of solid waste, usually under anaerobic conditions. The anaerobic conditions and rapid decomposition of waste result in savings in landfill space and enhanced production of landfill gas, which is captured and used for energy production.

In addition to the technical aspects of bioreactor operation, the feasibility study should include consultation with The Ministry of Environment and consider policy with respect to the operation of bioreactor landfills. One area of focus is likely to be that of tipping fees currently charged for disposal of MSW. If project economics indicate that operating costs per tonne will be higher than current traditional landfill disposal costs, then the RDCO will need to raise tipping fees accordingly.

6.4 Financial Considerations for Phase 1

In addition to the programs described above, other activities identified in the Plan will also take place during Phase 1. Costs associated with these activities are discussed below.

6.4.1 Additional Funding for Waste Reduction Education

As described in Section 6.1 of this report waste reduction education programs will compliment new waste diversion programs as they are introduced. The RDCO already has a sizable budget designated to waste reduction programs; it is therefore anticipated that additional programs could be incorporated into this budget. A number of the waste diversion programs recommended include changes in policy and increased policy enforcement. An additional budget of \$20,000 per annum has been estimated to cover the cost of changes to existing policies. The addition of a part-time staff person has been budgeted at \$25,000.



6.4.2 Funding for Financial Modeling Exercise

As described in Section 4.4 it has been recommended that a financial modeling exercise be carried out at the beginning of Phase 1 of the Plan period so that costs are distributed equitably between Local Governments. A budgetary allowance of \$20,000 has been estimated so that this recommendation can be carried out. This would be a one-time cost rather than an annual budgeting requirement.

6.4.3 Waste Reduction Program Evaluation & Best Practices Research

A budgetary allowance of \$30,000 per annum has been allocated for evaluation of existing programs, waste audits, researching new technologies and generally continuing to implement operational best practices. This funding will be required to support the overall direction of the Plan.

6.4.4 Summary of Phase 1 Costs

Table 6-1 summarizes the costs of those programs that will be implemented in Phase 1, as described in the preceding sections. Diversion costs have been shown as net of any savings in waste disposal or waste collection costs realized due to the reduced amounts of waste being landfilled.

Table 6-1: Summary of Costs for Phase 1

Program Description	Cost of Implementation
Improvements to Waste Reduction and Education Programs	\$20,000
Part-time Staff Added to RDCO Waste Reduction Office	\$25,000
Financial Modeling Study	\$20,000
Program Evaluation	\$30,000
Net Diversion Program Costs	\$1,407,420
Total Cost of Implementation of Phase 1	\$1,502,420





7 Phase 2 – Six to Fifteen Years

Phase 2 programs have been selected to be implemented in the medium term, or six to 15 years after Plan adoption. Targets for additional diversion during Phase 2 will be refined at the end of Phase 1 based on evaluation of the success of Phase 1 programs.

The sections below summarize the Phase 2 activities; additional information is provided in Appendix B.

7.1 Reduction, Reuse and Recycling Programs

7.1.1 Improvement on Existing and Phase 1 Programs

As discussed in Section 4.2, the RDCO will continuously evaluate new and existing programs in terms of performance and will reset target diversion levels as appropriate. Therefore, Phase 2 also includes a number of programs that have been earmarked for improvement (from Phase 1 levels) during Phase 2. One program where improved participation is expected is the DLC recycling program. The target diversion for Phase 1 was 17,000 tonnes or a 13% reduction in total waste disposed. A further reduction of 6,000 tonnes or 4% is expected in Phase 2 due to increased participation and stricter enforcement of disposal bans. Another program that has been targeted for improvement during Phase 2 is the recycling of all remaining ICI paper and cardboard through increased compliance with disposal bans. An additional 2% of diversion from landfill over the existing situation is expected during Phase 2 through recycling of ICI materials. Further diversion could be achieved with a complete ban on all recyclables from the ICI sector.

7.1.2 ICI Organics Composting

Composting of all organics, including food waste, generated by the ICI sector will be considered as the Plan period progresses. The feasibility of implementation of organics composting programs will depend on whether or not the Glenmore Landfill is operating successfully as a bioreactor landfill. Should the RDCO receive any proposals for organics composting from the private sector these will be considered as and when they are received to determine their feasibility, environmental desirability, impact on the Plan and cost-effectiveness.

7.1.3 Residential Organics Composting

Composting of all organics, including food waste, generated by the residential sector will be considered as the Plan period progresses. The feasibility of implementation of organics composting programs will depend on the whether or not the Glenmore Landfill is operating successfully as a bioreactor landfill. In the meantime, should the RDCO receive any proposal for organics composting from the private sector these will be considered as and when they are received to determine their feasibility, environmental desirability, impact on the Plan and cost-effectiveness.



7.2 Residuals Management

7.2.1 *Development of Glenmore Landfill as a Bioreactor*

Depending on the results of pilot testing during the Phase 1 period, the Glenmore Landfill may be developed as a full scale bioreactor during Phase 2 or beyond. This will have implications for the organics recycling programs described in sections 7.1.2 and 7.1.3

7.2.2 *Investigate Alternative Landfill Options*

The feasibility of siting another landfill within the RDCO or of sending waste to a regional landfill should be investigated fully during Phase 2 of the Plan period. Two options will be explored – siting a new landfill within the region, and utilizing a large regional landfill, likely outside the RDCO.

This program will also be impacted by the planned closure of the Westside Landfill. At the present time, the landfill is scheduled to close in 2012, according to its Operational Certificate. However, the closure may happen 1 – 2 years earlier. The closure of the Westside Landfill will be taken into account in the assessment of alternative landfill options.

7.2.2.1 **Siting Another RDCO Landfill**

Opportunities for siting another landfill in the RDCO will be investigated in during Phase 2 of the Plan period. In 2003 CH2M Hill carried out a Disposal Alternative Feasibility Study (DAFS) for the RDCO and three of its neighbouring districts. The study concluded that landfill disposal appeared to be the least expensive and possibly the most socially acceptable means of waste disposal. Continuing to utilize existing landfill capacity was found to be the most cost effective, short-term approach for waste disposal within a Regional District. Where feasible, development of additional landfill capacity within a jurisdiction is expected to be a less expensive option than transporting of waste to another region for disposal.

The RDCO will attempt to site another landfill within the regional district, to reduce waste transportation costs.

7.2.2.2 **Regional Landfill**

If no landfill can be sited within the RDCO, the option of joint cooperation to develop and operate an inter-regional landfill will be investigated, although this would increase transportation costs associated with waste export. An agreement will need to be reached between Regional Districts, whereby the exporting district would pay a host tipping fee or other levy to the receiving district. The DAFS report concludes that the increased waste quantities resulting from inter-regional cooperation will result in very low disposal costs due to the corresponding economies of scale. The RDCO will initiate discussions with regional neighbours to pursue this option and potentially develop financial models and policy for longer-term solutions.



7.3 Financial Considerations for Phase 2

An additional annual cost of \$155,600 is anticipated in order to provide continuous improvement of existing and Phase 1 waste diversion programs. In addition to this, other activities will also take place during Phase 2. Costs associated with these activities are discussed below.

7.3.1 Waste Reduction Education

No additional budget has been allocated for education programs and social marketing in Phase 2. It is assumed that the allocation of \$20,000 per annum in Phase 1 would be sufficient throughout Phase 2, and that the \$25,000 allocation for a part-time staff person would also be continued at Phase 1 levels.

7.3.2 Waste Reduction Program Evaluation & Best Practices Research

No additional budget has been allocated for evaluation of existing programs, waste audits, researching new technologies and generally continuing to implement operational best practices in Phase 2. It is assumed that the allocation of \$30,000 per annum in Phase 1 would be sufficient throughout Phase 2, and will therefore be continued at Phase 1 levels.

7.3.3 Feasibility Study on Alternative Landfill Options

An estimated \$20,000 has been allocated for carrying out a feasibility study into alternative landfilling options within the RDCO. This cost could be expected to be higher if a full scale landfill siting study were to be carried out during Phase 2.

7.3.4 Cost Implications of Organics Management

The cost of organics management will depend on the results of the evaluation of the bioreactor operations at Glenmore Landfill as compared to the expansion to separate and process organic materials. An additional cost of \$4 per tonne for landfilling of waste is typically expected for bioreactor landfills over conventional landfills. A further cost of \$1,300,000 could be expected if organic waste diversion programs are introduced. A budget estimate of \$50,000 has been included to conduct a feasibility study on the operation of Glenmore Landfill as a full-scale bioreactor.

7.3.5 Summary of Phase 2 Costs

Table 7-1 summarizes the costs of those programs that will be implemented in Phase 2, as described in the preceding sections. Diversion costs have been shown as net of any savings in waste disposal or waste collection costs realized due to the reduced amounts of waste being landfilled. Depending on the results of the bioreactor feasibility assessment for the Glenmore Landfill, Phase 2 will either include organics composting or the full-scale operation of Glenmore Landfill as a bioreactor.



Table 7-1: Summary of Phase 2 Program Costs

Program Description	Phase 2 (Organics Composting)	Phase 2 (Bioreactor Landfill)
Improvements to Waste Reduction and Education Programs	\$0 (maintain Phase 1 levels)	\$0 (maintain Phase 1 levels)
Part-time Staff Added to RDCO Waste Reduction Office	\$0 (maintain Phase 1 levels)	\$0 (maintain Phase 1 levels)
Waste Reduction Program Evaluation & Best Practices Research	\$0 (maintain Phase 1 levels)	\$0 (maintain Phase 1 levels)
Feasibility Study for Alternative Landfill Options	\$20,000	\$20,000
Bioreactor Feasibility Assessment	\$50,000	\$50,000
Net Diversion Costs	\$573,678	(\$27,496)
Additional Landfill Costs for Bioreactor	\$0	\$389,750
Total Cost of Implementation of Phase 2	\$643,678	\$432,254





8 Phase 3 – Fifteen Years Plus

8.1 Reduce, Reuse and Recycle

8.1.1 Continuous Improvements to Existing, Phase 1 and Phase 2 Programs

The programs implemented during Phases 1 and 2, as well as those that are currently in place, will have established the strong foundation needed to achieve the targeted levels of waste reduction. Sustaining these programs will be critical to prevent a fall-off in waste reduction over time. As the communities grow and change, there will be a need to update and maintain the support for these programs. The RDCO will also focus on the continual improvement of education and awareness campaigns so as to enhance participation.

8.2 Resource Recovery

8.2.1 Thermal Treatment of Waste

The “4th R” refers to resource recovery, and is typically characterized by energy recovery from waste. This includes both thermal treatment of residual waste by conventional and advanced treatment methods. No new energy recovery programs are planned for this time. The RDCO will actively consider the suitability of thermal treatment of waste in the 15-year plus timeframe as landfill space becomes depleted. In the meantime, should the RDCO receive any proposal for thermal treatment technologies these will be considered as and when they are received to determine their environmental desirability, impact on the Plan and cost-effectiveness.



9 Plan Implementation Cost Summary

The total costs of implementing all of the programs recommended in the Plan are summarized in Table 9-1. Cumulative costs are shown for each phase, i.e. Phase 1 costs shown in the table are the combination of the existing (2004) programs, and those new programs identified for Phase 1. Depending on the results of the bioreactor feasibility assessment for the Glenmore Landfill, Phase 2 will either include organics composting or the full-scale operation of Glenmore Landfill as a bioreactor.

All costs in Table 9-1 are given in today's dollars. The RDCO, as part of its annual financial planning activities, will develop more accurate costs for programs as the Plan period progresses, so that costs reflect the year in which the program is implemented.

Table 9-1: Summary of Costs for Plan Implementation

Program/Activity Description	Existing System	Phase 1	Phase 2 (Organics Composting)	Phase 2 (Bioreactor Landfill)
Cost of Collection and Diversion	\$2,926,771	\$4,916,648	\$6,253,269	\$5,072,234
Cost of Collection and Disposal of Residuals	\$9,730,154	\$9,147,697	\$8,384,754	\$9,354,365
Cost of Waste Management Education, Administration & Studies	\$498,361	\$593,361	\$663,361	\$663,361
Total Cost of RDCO Solid Waste Management System	\$13,155,286	\$14,657,706	\$15,301,384	\$15,089,960

10 Target Diversion Tonnages

Target diversion tonnages that are projected for the end of each phase are shown in Table 10-1 on the following page. It should be noted that this table also includes diversion attributable to existing programs that will not require any changes during the Plan period.



Table 10-1: Target Diversion Tonnages for Phases 1, 2 and 3

Program	Existing	End Phase 1	End Phase 2	End Phase 2
			Organics Composting	Bioreactor Landfill
	2004	2011	2019	2019
Programs that will remain the same:				
Materials Reuse	N/A	N/A	N/A	N/A
Recycling Depots	2,000	2,700	3,500	3,500
Industry Product Stewardship	12,000	14,700	18,300	18,300
Residential Programs targeted for improvement:				
Blue Bag Recycling	8,000	13,400	17,600	17,600
Yard Waste Composting	13,000	22,700	28,000	28,000
Household Composting	30	3,600	4,400	4,400
E-waste Recycling	52	4,100	5,000	5,000
Hazardous Waste Round Up	65,000 litres	1,600	1,900	1,900
New Residential Programs:				
Local Government Collection from Multi Family	0	2,700	3,500	3,500
Residential Food Waste Composting	0	0	7,700	0
ICI programs targeted for improvement:				
Private Sector Recycling	16,000	25,700	35,700	35,700
Private Sector Yard Waste Composting	5,000	10,400	13,000	13,000
New ICI Programs:				
ICI Food Waste Composting	0	0	13,100	0
DLC Programs targeted for improvement:				
DLC Waste Recycling	100	21,400	26,500	26,500
Total Diversion	57,000	120,400	178,900	157,190
Diversion-Based Savings in Waste Disposal Costs	\$684,000	\$1,444,800	\$2,146,800	\$1,886,280
Tonnes Landfilled	133,000	103,984	91,000	112,000
Percent Diversion	30%	54%	66%	58%
Per Capita Disposal (tonnes/person/annum)	0.82	0.54	0.40	0.49



11 Closing Statement

The RDCO has undertaken an extensive Solid Waste Management Plan review process to develop a waste management strategy for the next 20 years. Through the Plan, the RDCO has set ambitious but realistic goals for waste diversion, and has embraced a major policy shift towards adoption of a Zero Waste goal. It is acknowledged that the Solid Waste Management Plan reflects the best available information at the time of writing. However, as the Plan period progresses the continual evaluation of programs, and the investigation into new waste management technologies and practices will assist with the fine-tuning of programs as they are implemented.

The RDCO has actively sought public input in the development of the Plan, and we are confident that the residents of the regional district will support and embrace the Plan's goals and objectives. We are confident that this approach to solid waste management will position the RDCO to take a leadership role in the management of solid waste in British Columbia.





Purpose

The purpose of this Appendix is to provide a minimum set of standards or objectives for all landfills operating within the RDCO. The Plan mandates these objectives to be implemented consistently across all public and private landfills in the TNRD. The objectives reference the BC Landfill Criteria as well as industry operating best practices for landfilling of waste.

Objectives

Policy

All landfills will establish and maintain disposal bans as appropriate to support the RDCO's waste reduction and diversion targets

Waste Receiving

All landfills will install weigh scale facilities so as to be equipped to enforce user-pay systems for disposal of waste

Operators shall inspect every load received at the point of entry into the facility, and before mixing with any other load

Waste Placement

All landfills will establish and execute procedures for placing waste in landfills so as to maximize capacity and optimize the lifespan of the facility. Specifically:

- Waste placed in landfill cells shall be compacted to an in situ (in place) density of no less than 650 tonnes/m³
- Compaction shall be achieved by use of a compactor with a machine weight of at least 2 tonnes, which will be used to perform between 3-5 passes over waste placed in landfill
- Weekly cells shall be built such that all slopes are no greater than 3:1, cell width is minimized but allows for sufficient tipping space for commercial vehicles
- Cover material shall be applied to a depth of 6" for daily cover, and 1m for final cover. Alternate daily cover may be used such as tarps or spray-on fibre mulch mixed with a tackifier, provided that this is approved for use by the Ministry of Environment in accordance with the Operational Certificate for the facility

Site Maintenance

All landfill operators shall prevent the escape of litter, dust, mud or debris from the facility site to adjoining roads, adjacent land or ambient air as appropriate



All landfill operators shall ensure that any municipal solid waste or recyclable material that is removed from the facility is taken to a site or facility that complies with all applicable local, provincial and federal regulations and with local zoning, business license or other requirements

General Management

As part of the process to improve landfill operations, and maintain them at a high standard, all landfills will require an updated Design, Operations and Closure (DO & C) Plan to be completed within 1 year of the ratification of the final amended RSWMP. These updated DO&C Plans should become part of the sites' Operational Certificate.

For landfills that where the annual tonnage landfilled exceeds 20,000 tonnes per year, the operator shall be required to hold a recognized certification in landfill operations, such as the MOLO certification. All employees shall have received operations and safety training appropriate to the jobs they perform.





DLC Waste Diversion (DLC)

IMPLEMENTATION PHASE 1

Description of Program						
The RDCO will divert DLC waste from landfills by providing suitable recycling alternatives						
Supporting Policies						
Variable tipping fees would be implemented with a charge for separated recycled materials at a lower fee than mixed DLC waste						
Facility/ Operating Requirements						
Glenmore Landfill will be used as the DLC recycling area where containers will be purchased for the placement of segregated materials or specific areas designated for larger, heavy materials						
Funding Requirements						
This program would be funded by local government since the recycling will take place at City of Kelowna and RDCO landfills. Appropriate cost sharing methods will be applied.						
Environmental Impact						
Minimal savings on greenhouse gas emissions are expected from this program						
Duration						
The program is expected to be implemented during Phase 1 and to continue after implementation						
Project Highlights						
<i>Diversion Potential (Tonnes)</i>	<i>Landfill Percentage Reduction</i>	<i>Cost/Tonne</i>	<i>Cost per Household</i>	<i>Option Rating</i>	<i>Change in GHG Emissions Reduction (MTCO₂E)</i>	<i># of passenger cars from the roadway each year.</i>
17,600	13%	\$20.00	\$	#1	N/A	N/A



Paper and Cardboard Ban (ICI)

IMPLEMENTATION PHASE 1

Description of Program						
The RDCO will enhance the existing paper and cardboard recycling in the private sector so as to exclude the involvement of Local Government. There will be strict enforcement of the existing ban at the landfills.						
Supporting Policies						
The RDCO will need to adopt the Solid Waste Management Bylaw which requires the ICI sector and multifamily residences to undertake mandatory recycling of recyclables.						
Facility/ Operating Requirements						
No additional facility or operation is required as landfill staffing resources and space will be used.						
Funding Requirements						
Ban implementation costs will be covered by Local Government whereas all handling and processing will be funded by the private sector						
Environmental Impact						
High reduction in GHG emissions and additional landfill space saved are expected from this program.						
Duration						
The program is expected to be implemented during Phase 1 and to continue after implementation						
Project Highlights						
<i>Diversion Potential (Tonnes)</i>	<i>Landfill Percentage Reduction</i>	<i>Cost/Tonne</i>	<i>Cost per Household</i>	<i>Option Rating</i>	<i>Change in GHG Emissions Reduction (MTCO2E)</i>	<i># of passenger cars from the roadway each year.</i>
5,300	4%	\$0.00	\$	#1	(13,580)	2,800



Yard Waste Recycling (ICI)

IMPLEMENTATION PHASE 1

Description of Program						
The RDCO will capture all ICI yard waste by enhancing yard waste composting at Glenmore and Westside Landfills						
Supporting Policies						
Enforcement of penalties on the ban of disposing yard waste at landfills						
Facility/ Operating Requirements						
No new facility is required at this time as program will be implemented at Glenmore and Westside landfills. There may be a future need to expand in the future depending on waste growth in which case the facility may be moved to another part of the landfill or an entirely new site all together.						
Funding Requirements						
No additional funding is required at this time because composting fees could be covered by the tipping fee or the fee could be increased so it covers the cost of processing						
Environmental Impact						
A net increase in GHG emissions is expected from this program.						
Duration						
The program is expected to be implemented during Phase 1 and to continue after implementation						
Project Highlights						
<i>Diversion Potential (Tonnes)</i>	<i>Landfill Percentage Reduction</i>	<i>Cost/Tonne</i>	<i>Cost per Household</i>	<i>Option Rating</i>	<i>Change in GHG Emissions Reduction (MTCO2E)</i>	<i># of passenger cars from the roadway each year.</i>
3,300	2%	\$32.00	\$	#2	2,000	(410)



Collection of Hazardous and E-Wastes (RESIDENTIAL)

IMPLEMENTATION PHASE 1

Description of Program							
The RDCO will introduce a year round drop-off facility for hazardous and electronic wastes (e-waste).							
Supporting Policies							
Banning the disposal of E-waste could be implemented as soon as the recycling program is in place. A ban on hazardous waste already exists.							
Facility/ Operating Requirements							
A facility would need to be opened in either an existing RDCO landfill or a private location. A full time attendant would be needed but could have shared duties if a landfill site was chosen							
Funding Requirements							
The RDCO would need to choose from two options for funding: <ul style="list-style-type: none"> • Pay per use where residents would pay a fee for every material • General Taxation where residents would pay through general taxes to use the facility for no charge 							
Environmental Impact							
High toxicity of hazardous waste and the heavy metal content in E-waste causes extensive damage to the environment. Recycling of these wastes has positive environmental impacts.							
Duration							
The program is expected to be implemented during Phase 1 and to continue after implementation							
Project Highlights							
<i>Program</i>	<i>Diversion Potential (Tonnes)</i>	<i>Landfill Percentage Reduction</i>	<i>Cost/Tonne</i>	<i>Cost per Household</i>	<i>Option Rating</i>	<i>Change in GHG Emissions (MTCO2E)</i>	<i># of passenger cars from the roadway each year.</i>
Curbside Collection	5,800	4%	\$137.00	\$\$\$	#3	3,550	(740)
Self-Haul	3,000	2%	\$32.00	\$	#4	1,900	(390)



Yard Waste Recycling/ Self Hauling Yard Waste (RESIDENTIAL)

IMPLEMENTATION PHASE 1

Description of Program						
Local Governments within the RDCO will offer collection services as to capture all residential yard waste for composting						
Supporting Policies						
A ban on residential yard waste in regular garbage is required and decreasing the current garbage bag collection volume for residents						
Facility/ Operating Requirements						
No new facility is required as composting will take place at Glenmore and Westside Landfills. A more frequent yard waste collection schedule needs to be implemented. For self hauling yard waste, residents will need to haul their own yard waste to composting facilities at the Glenmore and Westside Landfills.						
Funding Requirements						
Funding for the collection service would be funded by Local Governments through user pay basis on utilities bills. Curbside collection is estimated at \$137/tonne. The Self-hauling option would require a tipping fee or subsidized from parcel tax collection. Self Hauling is estimated at \$32/tonne.						
Environmental Impact						
Both options would create a net increase in GHG emissions. Emissions are associated with transportation and equipment. A moderate increase in GHG emissions is expected for the self hauling option.						
Duration						
The program is expected to be implemented during Phase 1 and to continue after implementation.						
Project Highlights						
<i>Diversion Potential (Tonnes)</i>	<i>Landfill Percentage Reduction</i>	<i>Cost/Tonne</i>	<i>Cost per Household</i>	<i>Option Rating</i>	<i>Change in GHG Emissions Reduction (MTCO₂E)</i>	<i># of passenger cars from the roadway each year.</i>
5,800 (curbside collection)	4%	\$137	\$\$\$	#2	3,122	(642)
3,000 (drop-off)	2%	\$32	\$	#2	1,665	(343)



Back Yard Composting (RESIDENTIAL)

IMPLEMENTATION PHASE 1

Description of Program						
Local Governments within the RDCO will subsidize the purchase of backyard composters.						
Supporting Policies						
To encourage backyard composting, an intensive education and awareness program would need to be set						
Facility/ Operating Requirements						
A location to storage and sell the composters is required, usually existing facilities are sufficient.						
Funding Requirements						
Local governments and consumers would share the cost for the implementation of this program.						
Environmental Impact						
A reduction in GHG emissions is expected at a 75% efficiency in landfill gas recovery						
Duration						
The program is expected to be implemented during Phase 1 and to continue after implementation						
Project Highlights						
<i>Diversion Potential (Tonnes)</i>	<i>Landfill Percentage Reduction</i>	<i>Cost/Tonne</i>	<i>Cost per Household</i>	<i>Option Rating</i>	<i>Change in GHG Emissions Reduction (MTCO₂E)</i>	<i># of passenger cars from the roadway each year.</i>
3,000	2%	\$40.00	\$	#2	(890)	190



Multi-Family Collection (RESIDENTIAL)

IMPLEMENTATION PHASE 1

Description of Program

Local Governments within the RDCO would take over garbage and recycling collection services to multi-family residents

Supporting Policies

A policy decision would sanction Local Governments to collect multi-family waste. Bans and limits on single-family service would also apply to the multi-family service.

Facility/ Operating Requirements

No new facility is required as all of the following aspects will apply to both single and multi-family collection services:

- Organization of collection contracts
- Development of collection schedules
- Providing information to residents and building managers/owners
- Organizing recycling contracts

Funding Requirements

Funding will be collected by the Local Governments via utility bills

Environmental Impact

A moderate reduction in GHG emissions is expected from the implementation of this program.

Duration

The program is expected to be implemented during Phase 1 and to continue after implementation

Project Highlights

<i>Program</i>	<i>Tonnes Handled</i>	<i>Landfill Percentage Reduction</i>	<i>Cost/Tonne</i>	<i>Cost per Household</i>	<i>Option Rating</i>	<i>Change in GHG Emissions (MTCO2E)</i>	<i># of passenger cars from the roadway each year</i>
Multi Family Recycling	2,000	1%	\$88.98	\$	#3	(5,540)	1,140
Multi Family Garbage Collection and Disposal	11,000	0%	\$96.96	0	#3	N/A	N/A



Improved Blue Bag Recycling (RESIDENTIAL)

IMPLEMENTATION PHASE 1

Description of Program

The RDCO will improve the current Blue Bag program by accepting number 1 and 2 plastics as well as plastic film.

Supporting Policies

A stricter enforcement of banned recyclables and limiting the number of garbage containers that can be set out would need to be implemented

Facility/ Operating Requirements

No addition facility or staffing is required as recyclables would still be sent

Funding Requirements

Local Governments would hold financial responsibility which would be charged to residents if any additional charges are required.

Environmental Impact

A low reduction in GHG emissions is expected from the implementation of this program.

Duration

The program is expected to be implemented during Phase 1 and to continue after implementation

Project Highlights

<i>Diversion Potential (Tonnes)</i>	<i>Landfill Percentage Reduction</i>	<i>Cost/Tonne</i>	<i>Cost per Household</i>	<i>Option Rating</i>	<i>Change in GHG Emissions Reduction (MTCO2E)</i>	<i># of passenger cars from the roadway each year.</i>
2500	2%	\$527.81	\$	#4	(236)	49



OPTION A- ICI Organics

IMPLEMENTATION PHASE 2

Description of Program						
Collect organic waste (including food waste) from ICI sources to be composted at a private composting facility						
Supporting Policies						
A disposal ban on ICI organics at the landfills would need to be implemented. The RDCO would need to ensure the landfill tipping fees be set at a rate that is higher than the composting tipping fee.						
Facility/ Operating Requirements						
A new facility is required in which composting operations taking place in landfill sites can be transferred. An in-vessel system is required for handling post consumer waste and proper storage and collection services are critical. A breathable collection container with a sealed container needs to be considered in order to overcome the high odour problems. A private-public partnership would be ideal to find a site for such a facility. Equipment does not typically vary with processing tonnage but the number of employees will.						
Funding Requirements						
The Private sector will entirely fund this program which would be motivated by profit through tipping fees.						
Environmental Impact						
Significant reduction in GHG emissions is expected from the implementation of this program.						
Duration						
The program is expected to be implemented during Phase 2 and to continue after implementation						
Project Highlights						
<i>Diversion Potential (Tonnes)</i>	<i>Landfill Percentage Reduction</i>	<i>Cost/Tonne</i>	<i>Cost per Household</i>	<i>Option Rating</i>	<i>Change in GHG Emissions Reduction (MTCO₂E)</i>	<i># of passenger cars from the roadway each year.</i>
8,500	6%	\$250.00	\$	#1	(2,452)	505



OPTION A-Collection of Residential Organics

IMPLEMENTATION PHASE 2

Description of Program

Local governments would collect organics separately and the RDCO would pay a tipping fee to bring residential organics on site. (This program implantation depends on the development of the ICI organics composting facility.)

Supporting Policies

Educational campaigns would be needed to ensure metals and other materials are kept out of the organic waste stream. The organic collection program can be enhanced by further reducing the household garbage bag limit for disposal. The private sector should be offered the 'put or pay' option as an incentive from the municipalities.

Facility/ Operating Requirements

No additional Local Government facility is required as the waste would be privately owned. Local Governments are responsible for the collection service of organic waste which should be incorporated into the service already provided for garbage and recycling.

Funding Requirements

Local Governments are financially responsible for changes in the residential collections service which would paid through utility bills or general taxation. Local Governments would be pay a tipping fee to the private facility operator.

Environmental Impact

A low reduction in GHG emissions are expected from the implantation of this program.

Duration

The program is expected to be implemented during Phase 2 and to continue after implementation

Project Highlights

<i>Diversion Potential (Tonnes)</i>	<i>Landfill Percentage Reduction</i>	<i>Cost/Tonne</i>	<i>Cost per Household</i>	<i>Option Rating</i>	<i>Change in GHG Emissions Reduction (MTCO₂E)</i>	<i># of passenger cars from the roadway each year.</i>
4,800	4%	\$250.00	\$\$\$\$	#2	(2,496)	514



OPTION B- Glenmore Landfill as Bioreactor

IMPLEMENTATION PHASE 2

Description of Program						
The RDCO will operated the Glenmore Landfill as a bioreactor landfill which is designed and operated to accelerate the decomposition and stabilization of solid waste.						
Supporting Policies						
Policy decisions need to be made by the RDCO and Local Governments to run the landfill as a bioreactor. The RDCO will need to raise tipping fees according the higher operating costs needed for the bioreactor.						
Facility/ Operating Requirements						
<p>Glenmore landfill will need to be redesigned to incorporate the bioreactor and the following issues need to be addressed:</p> <ul style="list-style-type: none"> Required quantities of liquid are not always available in all landfill locations or only at a prohibitively high cost Increased gas emissions Increased odours Physical instability of waste mass due to increased moisture and density Surface seeps Increased potential risk of landfill fires 						
Funding Requirements						
Funding will be incorporated into the landfill tipping fees						
Environmental Impact						
High savings in GHG emissions are expected with 90% efficiency in energy recovery from the implantation of this program.						
Duration						
The program is expected to be implemented during Phase 2 and continue until the landfill is closed.						
Project Highlights						
<i>Diversion Potential (Tonnes)</i>	<i>Landfill Percentage Reduction</i>	<i>Cost/Tonne</i>	<i>Cost per Household</i>	<i>Option Rating</i>	<i>Change in GHG Emissions Reduction (MTCO₂E)</i>	<i># of passenger cars from the roadway each year.</i>
0	0%	N/A	\$	#1	(58,532)	12,045