Peace River Regional District

SOLID WASTE MANAGEMENT PLAN

November 2008

March 3, 2009 - approved by the Honourable Barry Penner, Minister of Environment

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Project No. 50361-601 (03)

TABLE OF CONTENTS

ACKNOWLEDGEMENTS

The Peace River Regional District would like to thank all those who generously gave of their time, ideas, suggestions and energy over the past two years during the Plan Review Process. In particular we would like to acknowledge the contributions of all the members of the Public Advisory Committee, Technical Advisory Committee and the Plan Review Steering Committee, who have worked tirelessly with us through this process. Our member municipalities have also demonstrated their commitment to improving our waste management system in the region.

We are confident that the resulting Solid Waste Management Plan will be a stronger and more relevant document that clearly reflects the unique characteristics and issues of our region, as well as the new directions for managing our waste over the next 20 years. Just as you have all been a part of the process for developing the Plan, we invite you to be partners with us in its successful implementation.

Earth Tech (Canada) would also like to acknowledge the contributions of all the Committee members, as well as the staff at the Regional District and the Northern Environmental Action Team, who have worked tirelessly behind the scenes for the past two years to support this process.

EXECUTIVE SUMMARY

The Peace River Regional District (PRRD) began a formal review of its Regional Solid Waste Management Plan (RSWMP) in April 2006, in accordance with the Guide for the Preparation of Regional Solid Waste Management Plans by Regional Districts, published by the BC Ministry of Environment. The original RSWMP was adopted by the Regional District's Board of Directors in 1996 and has served as a guide to waste management in the region since that time.

The revised Regional Solid Waste Management Plan addresses three key areas.

- Spending tax dollars wisely. Getting better at managing waste means that the Regional District will make better use of tax dollars by providing more services, such as recycling and composting.
- Protecting our environment. Managing our garbage means putting less into landfills – and our environment - by reducing, reusing and recycling.
- Protecting our future. Managing our waste in a way that is sustainable means not leaving a mess for future generations to clean up.

This backdrop was the basis for the development of the goals, objectives and guiding principles of the revised RSWMP. It was recognized that the revised Plan would need to utilize the existing solid waste infrastructure to support new initiatives, support partnerships with the member municipalities to increase levels of service, prioritize environmental responsibility for present and future generations, and actively engage the commercial and industrial sectors to reduce the amount of waste being disposed.

Our Long Term Vision, Interim Goals and Guiding Principles

The Regional District supports Zero Waste as a long-term, overarching vision, based on the definition articulated by the Zero Waste International Alliance. In support of this vision, the Regional District will work towards maximizing the results of its waste reduction and waste diversion programs, and will use the Zero Waste philosophy as a guide to making decisions.

In addition to the long-term vision, a set of interim goals were also established. These targets will set levels of reduction in the amount of waste per capita being disposed to landfills, based on 2006 levels as a baseline. The interim goals are as follows:

- **26%** reduction in waste disposed per capita by the end of Phase 1;
- **A cumulative 41%** reduction in waste disposed per capita by the end of Phase 2, including reduction from Phase 1, and

- **A cumulative 42%** reduction in waste disposed per capita by the end of Phase 3, including reductions achieved in Phases 1 and 2.

A series of guiding principles support the vision and goals, and will be guide how future decisions are made with regard to managing waste in the region. These guiding principles express the values and priorities of the Regional District, our stakeholder partners and the general public:

- Programs will be implemented across the region so as to provide more equal levels of access to both rural and urban residents
- New programs will be pilot tested before full-scale implementation, to test their suitability, success and acceptability to the public
- Focus efforts on sectors, such as commercial or residential, to create the most workable solutions for each
- Make decisions using the "Triple Bottom Line" – where the environmental and social costs – in addition to financial costs – are taken into account
- Make priorities based on order of: reduce, reuse, recycle, resource recovery and residual management, as well as programs that reduce toxicity to the environment
- User pay and market-based incentives will be utilized in implementing programs in the Plan wherever possible, and will put preference on encouraging waste reduction
- Encourage more provincial stewardship programs so that manufacturers, retailers and consumers can take responsibility for the management and disposal of specific components of the waste stream
- Increase communication and education when new waste management policies and strategies are implemented, to foster support and participation.

The Regional District will use the guiding principles as a tool to support or guide how decisions are made, as a way to highlight the underlying strategic vision of the Plan.

Plan Implementation Approach

The Plan have been developed with programs and policies to address the needs of all groups within the region, that is, the residential, and institutional, commercial, and industrial (ICI) sectors. A phased approach was used in the Plan to allow programs and policies to be implemented in logical progression, at a pace that balances the priorities and resources of the Regional District. Four implementation phases have been formally defined. Specific objectives for each phase were also identified. These objectives link directly to the guiding principles of the Plan, and reflect the step-by-step approach that the PRRD will follow in the upgrade and reshaping of the regional solid waste management system. Key programs and policies for each phase are summarized in the following sections.

Phase One – Building a Foundation

In response for the demand to increase opportunities to recycle, the main features of Phase 1 include:

- Upgrade transfer stations to offer more services, like recycling, yard waste or even bulky waste drop-off at fenced sites that are open when staffed. Start by running a pilot project to find out what works best.
- Add more materials to the list of what can be recycled and make it standard across the region.
- Charge higher tipping fees at landfills for materials that can easily be recycled.
- Put bans on materials being buried in the landfill ONLY when an alternative for disposal or recycling exists. For example, ban disposal of paper and cardboard generated by residents, businesses, and industry where other recycling opportunities exist.
- Continue and strengthen public education and information programs to ensure people are aware of existing opportunities to reduce their waste streams.
- Support existing reuse and recycling programs, particularly in the non-profit sector, and coordinate efforts between the PRRD and these organizations to maximize benefits
- Increase the number of yard waste drop-off locations and composting facilities as an alternative to burying or burning.
- Launch a pilot project for recycling agricultural plastics.
- Set up a business, construction and industry working group to identify ways to increase education and reduce waste.
- Adopt a green purchasing policy for the PRRD and other member municipalities to follow.
- Begin investigative steps to address long-term disposal capacity for the region

From a triple bottom line perspective, at the end of Phase 1, the PRRD could expect to:

- Reduce greenhouse gas emissions by over 18,000 tonnes of CO_2 equivalents
- Achieve a landfill space saving equal to the size of 342 school buses
- Divert a cumulative total of 26% of the waste stream (including existing diversion)

Phase Two – Increasing Access To Recycling

Phase 2 expands on recycling opportunities for residents, and for the commercial and construction sectors. It also focuses on identifying strategies for securing sufficient disposal capacity to handle waste that doesn't get diverted through recycling or reuse. Highlights of Phase 2 include:

- Add "Share Sheds" at landfills and transfer station, where possible, so one person's discard can be another's discovery.
- Add more incentive-based tipping fees or bans where higher prices are charged for landfilling materials that can be readily recycled.

- Encourage more recycling by placing limits on the amount of garbage that can be accepted. Start with a pilot project to test the system and set limits at practical levels.
- Implement curbside recycling in member municipalities; starting with consultation with municipalities and a pilot test to determine the best way to collect and increase public participation.
- Continue to upgrade transfer stations in rural areas to provide recycling.
- Work with the construction and demolition industry to create new policies and pilot test to encourage reuse and recycling.

Placing limits on garbage to encourage recycling could save enough space in our landfills to hold 65 school buses each year.

At the end of Phase 2, the PRRD could expect to:

- Reduce greenhouse gas emissions further by over 17,000 tonnes of CO_2 equivalents
- Achieve an additional landfill space saving equal to the size of 282 school buses
- Divert a cumulative total of 41% of the waste stream

Phase Three – Looking Ahead to the Future

Phase 3 focuses on the longer-term plans for managing waste in the region. This phase would also include the continuation of programs started in earlier phases. In Phase 3, the Regional District will:

- Continue to make improvements to transfer stations and landfills, ensuring that all residents and business have access to recycling and other services.
- Look at options to reduce greenhouse gasses from landfill gas emissions.
- Implement the pilot test findings to help reduce waste from businesses, industry, construction and demolition.
- Complete the closure of the Fort St. John landfill in keeping with Ministry requirements, and continue with preparations for the new options for disposal.
- Investigate other waste management options including technology for waste-to-energy and collection and recycling of organics, like kitchen and restaurant waste.

At the end of Phase 3, the PRRD could expect to:

- Reduce greenhouse gas emissions further by over 3,300 tonnes of CO_2 equivalents
- Achieve an additional landfill space saving equal to the size of 19 school buses
- Divert a cumulative total of 42% of the waste stream (existing programs plus Phases 1 & 2 diversion)

Future Phases

Although a formal fourth phase has not been defined, it is expected that subsequent phases will cover the period 10 - 20 years after Plan adoption. It is expected that more long-term waste management options will be part of this phase, as well as continued improvement of programs established in earlier phases.

Plan Management & Administration

The PRRD will administer the Plan through financial and contract management and will be responsible for performance measurement against the Plan as it is implemented. The waste management services function will continue to be administered as a single region-wide function. Funding for the function will come from a combination of user fees, tipping fees, tax revenue and municipal requisitions, along with revenues from the sale of recyclable materials or other fee-based services provided by the PRRD as part of the waste management function.

Implementation monitoring and governance will be supported by a two-committee structure as follows:

- A Solid Waste Committee – made up of appointed members of the Regional District's Board of Directors.
- A Plan Monitoring & Advisory Committee, made up of representation from member municipalities staff, PRRD waste management staff, PRRD waste management contractors or partners, public agencies such as the Ministry of Environment, First Nations representatives within the region, private and non-profit sectors, industry and institutional representatives and the general public.

To establish the PMAC, the Regional District will develop a set of Terms of Reference for the Committee, and recruit members through direct contact, as well as general open invitations. The selected members of the PMAC will be confirmed by the Board of Directors.

Together these Committees will provide input to the Regional District staff and the Board of Directors as appropriate, work to monitor the implementation and effectiveness of the Plan, and to identify concerns and issues that may arise in the implementation process. The work of these Committees will also be supported by the development of an Annual Report, which will be used to update the Board, the Committees and any other stakeholders as to the progress of initiatives.

This Plan represents the current understanding and approach to the solid waste management challenges being faced by the Regional District. The version of the Plan that is formally adopted will be considered a "living document" that may be amended to reflect new considerations, priorities, resources, technologies, and issues.

The PRRD are confident that the revised Solid Waste Management Plan is a strong and relevant document that clearly reflects the unique characteristics and issues of our region, as well as the new directions for managing our waste over the next 20 years. The Regional District looks forward to working with all our partners to make its implementation a success.

1. THE PLAN REVIEW PROCESS

The Peace River Regional District (PRRD) began a formal review of its Regional Solid Waste Management Plan (RSWMP) in April 2006, in accordance with the Guide for the Preparation of Regional Solid Waste Management Plans by Regional Districts, published by the BC Ministry of Environment. The original RSWMP was adopted by the Regional District's Board of Directors in 1996 and has served as a guide to waste management in the region since that time.

The Plan Review process identified in the Guide consists of three stages:

- Stage 1: A review of the existing waste management system
- Stage 2: An analysis of waste management programs, policies and services aimed at reducing the amount of waste being disposed in landfills
- Stage 3: Development of the Regional Solid Waste Management Plan.

The Stage 1 Report was completed in December 2006. The Regional District commenced Stage 2 in March 2007 with the convening of three advisory committees to provide input and feedback into the selection of new programs and policies to be included in the revised RSWMP. The establishment of these committees also served as a component of the consultation element required in the plan review process outlined in the Guidelines. The three committees established were:

- The Public Advisory Committee, made up of volunteer members of the public, offers valuable feedback on how acceptable or compatible the options may be.
- The Technical Advisory Committee of waste management staff from the member municipalities, representatives from industry, school districts, provincial ministries, and Northern Health helps ensure that the proposed options are technically sound.
- The Plan Review Steering Committee, which consist of four electoral area directors and three elected officials from Fort St. John, Dawson Creek, and Chetwynd, helps oversee the process and ensures that various viewpoints are taken into account and forwards information to the Regional Board for consideration.

The three Committees reviewed the results of Stage 1, and gained a better understanding of the existing waste management system, as well as the range of possible options for new programs and policies. Throughout Stage 2, the Committees reviewed and evaluated options for improving waste management services in the Peace River region and member municipalities, resulting in this Draft Plan document. The Draft Plan was used as the basis of extensive public consultation throughout the region with the wider public and other stakeholders. Consultation with several First Nations through the Treaty 8 Council was also incorporated into this Stage of the Review. Further details on the consultation activities conducted can be found in the report

"Peace River Regional District Solid Waste Plan Review – Public Consultation Report" (September 2008).

Stage 3 was initiated in July 2008, and involved the incorporation of feedback from the public, and the finalization of the Plan, along with its approval by the Minister of Environment, and formal adoption by the Regional District Board. The revised SWMP will guide the direction of solid waste management in the Peace River Regional District for the next 10 to 20 years.

2. UNDERSTANDING THE REGIONAL SOLID WASTE PLANNING CONTEXT

In establishing new waste management strategies for the future, it was important to understand the planning context in which the new Plan would be developed. The Peace River Regional District is geographically extensive, and features a range of communities, industry and agriculture that makes for a number of unique areas.

2.1 Description of Plan Area

The Peace River Regional District is a geographically large district in North Eastern British Columbia. It comprises all lands south of the 58th parallel and east of the Rockies within BC, an area totaling over 117,000 square kilometers. The population resides in the seven incorporated municipalities of Dawson Creek, Fort St. John, Chetwynd, Hudson's Hope, Tumbler Ridge, Pouce Coupe and Taylor and the four rural electoral areas "B", "C", "D" and "E". The population of the PRRD was estimated to be 62,372 in 2007; of this the municipalities accounted for about 63% and the unincorporated areas accounted for about 35%, with the remainder residing on First Nations reserves.

The economy of the PRRD is varied and is comprised of agriculture, tourism, manufacturing, petroleum exploration and development, hydro-electric power generation, forestry and mining. New economic developments in the Peace River area include an increase in tourism, vast coal resources in the Rocky Mountain foothills, increased utilization of aspen in pulp and wood products, diversification in the agricultural sector and an increase in natural gas and petroleum exploration, development and processing as well as in the mining sector. Fort St. John is the hub of a vibrant oil and gas industry in BC that produces an estimated product value of $1.4 billion per year. Some 250 oil & gas companies are active in BC with Fort St. John the centre of industry activity.

The PRRD has seen a fluctuating trend in population over the past decade, with a gradual decline in population between 1996 and 2000, followed by a large population growth starting in 2000 which can be attributed to the oil and gas boom experienced in the region. This population growth is anticipated to continue. According to BC Stats, the population of PRRD has been growing at an average of 1.7% during the period 2000-2005.

2.2 Solid Waste Management Facilities & Services

The seven member municipalities and the Regional District share responsibilities for managing waste, with the Regional District being the sole provider of services in electoral areas. Disposal is the responsibility of the PRRD, and municipalities are requisitioned for their proportionate

share of waste management costs. Municipalities are also required to pay tipping fees for waste disposed at PRRD landfill sites.

Within this area, the Regional District operates four regional landfills. These are shown in Table 1 below, along with their annual waste disposal quantities.

Table 1: 2006 Waste Disposal Tonnages

Facility Name	2006 Total Waste Disposed (tonnes)
Fort St. John Landfill	39,898
Rose Prairie Landfill	2,000*
Bessborough Regional Landfill	18,145
Chetwynd Landfill	7,399

* estimate only, no weigh scale on site

The Regional District also operates 32 transfer stations, five of which are staffed. The majority of these transfer stations use PL-6 waste containers that are suitable for accepting bagged waste. The Regional District currently does not allow disposal of bulky waste at its transfer stations, although there are some sites where illegal dumping of these materials poses an on-going challenge.

Fort St. John, Dawson Creek, Chetwynd, Hudson's Hope, Taylor, Pouce Coupe and Tumbler Ridge curbside collection of waste is provided by the Municipality. Those residents within the PRRD who do not receive curbside collection may haul their waste to the PRRD transfer stations or landfills. The PRRD is also responsible for transportation of waste outside of municipal boundaries, e.g. from a transfer station to a landfill for final disposal.

There are 11 locations where recycling bin systems are operated by the PRRD where both residents and commercial businesses can bring materials for recycling. These are located outside of municipal centres. Recycling of scrap metal, wood waste, batteries, tires and other items is also facilitated at the regional landfills, and at some of the larger transfer stations, e.g. Hudson's Hope and Dawson Creek. There are also four privately operated recycling facilities, serving the communities of Chetwynd, Dawson Creek, Fort St John, Tumbler Ridge, and Hudson's Hope. Curbside collection of recyclables is not currently offered.

While the regional solid waste management system works well to support basic disposal services, it is recognized that access to recycling and other waste diversion services is limited. There has also been an increasing demand from the public and member municipalities to provide more services, specifically for handling more recycling, yard waste and household hazardous materials.

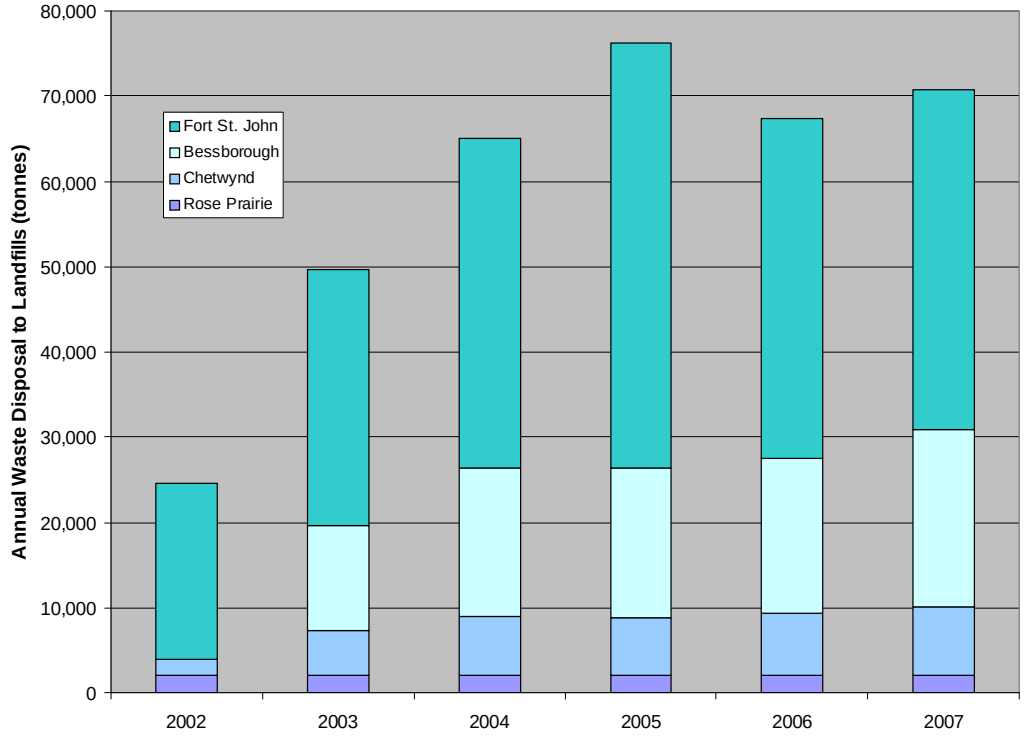
2.3 Understanding the Waste Stream

The ability to identify effective strategies for increasing the amount of waste diverted from landfills begins with developing a clear understanding of the regional waste stream. The PRRD worked to improve the understanding of waste stream characteristics, quantities and sources as a foundation for developing new programs and policies for the revised SWMP.

2.3.1 How Much Garbage is There?

In 2007, the total amount of waste disposed at all the PRRD landfills was almost 71,000 tonnes. Figure 1 below shows the distribution of waste over the four regional landfills.

Figure 1: Total Annual Waste Disposal

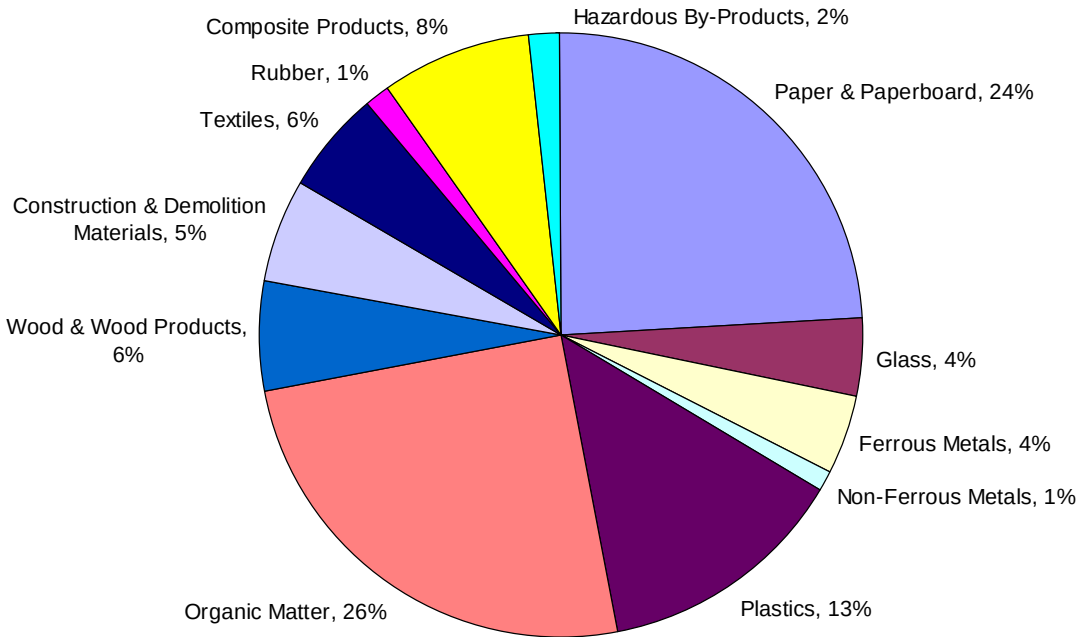


As Figure 1 shows, the total amount of waste that requires handling in the PRRD is on the rise. This is due to growing population, as well as increased levels of commercial and industrial activity that the region has experienced in the past five years.

2.3.2 What's In Our Waste?

Figure 2 shows the average waste composition by weight, separated into 13 primary categories used to identify the overall waste stream. This waste composition is an average, estimated from a number of regional districts in the province.

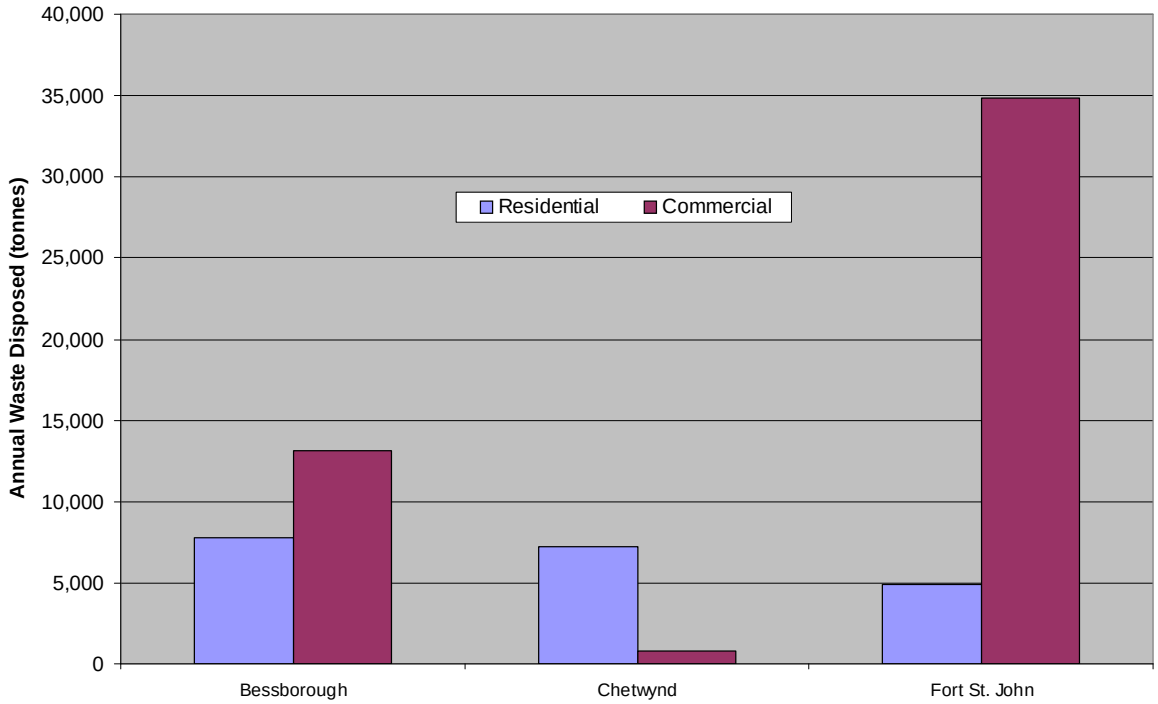
Figure 2: Estimated Waste Composition



2.3.3 Where Does Our Waste Come From?

In 2007, the PRRD landfills worked to track more precisely the sources of waste, i.e. from residential and commercial sectors. Figure 3 shows the split for 2007. It is important to note that this separation may not be precise at all sites, where a single load might combine both residential and commercial waste, and commercial waste may also include construction waste. None the less, understanding where waste comes from is an important step in identifying where and how we need to focus in order to put practical solutions in place to reduce the amount of waste entering our landfills.

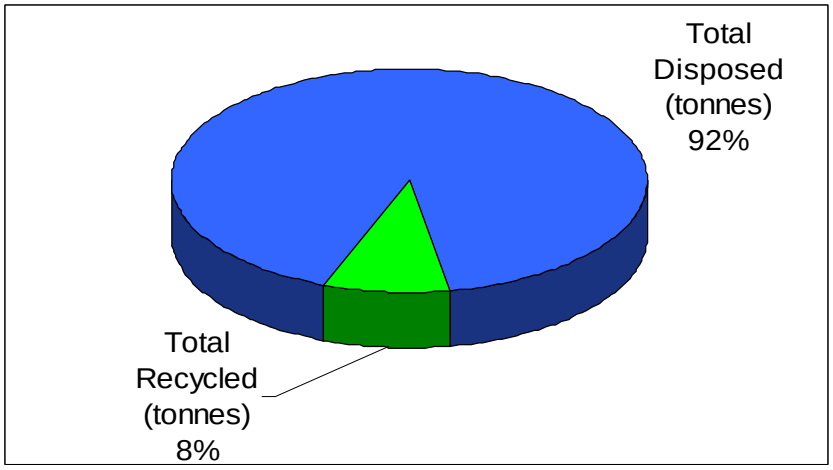
Figure 3: 2007 Waste Disposal Tonnages by Source



2.3.4 How Much Do Waste Do We Divert From Landfills?

Waste may be diverted through reuse or recycling, as well as other activities like composting. Waste diversion opportunities in the PRRD include recycling at landfills, some transfer stations and recycling depots, as well as through product stewardship programs. Materials accepted for recycling at PRRD landfills include tires, wood waste, scrap metal, and white goods. Recycling depots in various municipalities accept different types of plastics, glass, tin, aluminum, other scrap metal, paper, cardboard and newsprint. Figure 4 shows how much waste is currently being diverted, mainly through recycling, in the PRRD.

Figure 4: Recycling Rate



3. ESTABLISHING THE VISION – OUR APPROACH TO PLAN DEVELOPMENT

The Regional District remained fully committed to integrating environmental responsibility and engagement of the stakeholders and Advisory Committees throughout the planning process. This extended to involving the Advisory Committees in developing overall goals and guiding principles for the Plan, as well as integrating triple bottom line principles into the process for evaluating and selecting options for the SWMP.

3.1 Goals and Guiding Principles

When the PRRD embarked on the review of the existing Plan, it was recognized that one key area of focus would need to be a new goal or vision for the Regional District with respect to waste management. The Regional District used the combined input of the Advisory Committees and the public to examine options for a new goal for the Plan.

The overall consensus was that a broad and ambitious goal should be established, that could be readily measured, and that would be precise enough to embody accountability for the PRRD, to ensure that there was consistent effort towards achieving the goal. It was also recognized that the goal should be measured based on the reduction in the amount of waste going to the landfills on a *per capita* basis, to take into account changing population levels over time.

Based on the feedback from the Committees and the public, it was determined that the best way to address these various requirements was to use a two-fold approach:

- Establish a broad, long term vision, and
- Set interim targets with specific milestones in terms of time and level of achievement.

3.1.1 Zero Waste - The Long Term Vision

The Zero Waste International Alliance defines Zero Waste as follows:

"Zero Waste is a goal that is both pragmatic and visionary, to guide people to emulate sustainable natural cycles, where all discarded materials are resources for others to use. Zero Waste means designing and managing products and processes to reduce the volume and toxicity of waste and materials, conserve and recover all resources, and not burn or bury them. Implementing Zero Waste will eliminate all discharges to land, water or air that may be a threat to planetary, human, animal or plant health."

The Regional District supports Zero Waste as a long-term, overarching vision. In support of this vision, the Regional District will work towards maximizing the results of its waste reduction and

waste diversion programs, and will use the Zero Waste philosophy as a guide to making decisions.

3.1.2 Our Goals

In addition to the long-term vision, a set of interim goals were also established. These targets will set levels of reduction in the amount of waste per capita being disposed to landfills, based on 2006 levels as a baseline. The goals are as follows:

- **26%** reduction in waste disposed per capita by the end of Phase 1;
- **A cumulative 41%** reduction in waste disposed per capita by the end of Phase 2, including reduction from Phase 1, and
- **A cumulative 42%** reduction in waste disposed per capita by the end of Phase 3, including reductions achieved in Phases 1 and 2.

In all these cases, the total reduction would be cumulative, measured relative to the baseline year of 2006.

3.1.3 Our Guiding Principles

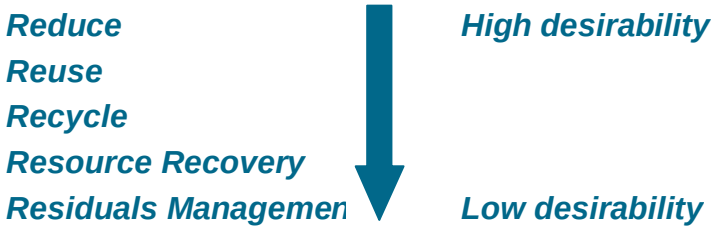
In addition to the long-term vision and goals outlined above, the Regional District has also identified a series of guiding principles that will be applied in implementing programs outlined in the Plan. The Regional District will use the guiding principles as a tool to support or guide how decisions are made, as a way to highlight the underlying strategic vision of the Plan. The following guiding principles were selected, based on the collective input of the three Committees, as well as the guiding principles articulated in the original Plan:

- Programs will be implemented across the region so as to provide more equal levels of access to both rural and urban residents
- New programs will be pilot tested before full-scale implementation, to test their suitability, success and acceptability to the public
- Waste reduction and diversion solutions will focus on the various waste generation sectors to identify solutions that are workable for individual sectors
- When considering the costs and benefits of new programs, a “triple bottom line” perspective will be applied to evaluate environmental, social and financial costs and benefits
- Priority for implementation will be given to programs that reduce toxicity to the environment
- The waste management hierarchy of Reduce, Reuse, Recycle, Resource recovery and Residuals management will be applied when considering and prioritizing programs for implementation.

- User pay and market-based incentives will be utilized in implementing programs in the Plan wherever possible, and will put preference on encouraging waste reduction
- Preference will be given to programs that encourage extended producer responsibility, so that manufacturers, retailers and consumers can take responsibility for the management and disposal of specific components of the waste stream.
- Waste management policies and strategies will be developed through public consultation to increase community buy-in and support in advance of implementation

3.2 Choosing Options for the Plan

The Plan have been developed with programs and policies to address the needs of all groups within the region, that is, the residential, and institutional, commercial, and industrial (ICI) sectors. Program selection has also been guided by the waste management hierarchy or "5 Rs" principle – Reduce, Reuse, Recycle, Resource Recovery and Residuals Management.



This hierarchy is a guide to the relative environmental benefits of different waste management options. Waste reduction most specifically refers to activities that reduce waste at the point of generation, i.e. prevent waste from occurring in the first place. Reuse supports the overall direction of reducing the amount of waste being disposed in the landfill by providing opportunities for usable items to have a longer useful life. Traditionally, reuse occurs in unstructured or informal ways, such as through garage sales, donations to non-profits and charity thrift shops, or giving away unwanted items to friends and family. While the options relating to the top of the hierarchy can be very good strategies, it is recognized that no single element on its own can offer a total solution. The Plan therefore reflects a balance between various waste management options, all aimed at minimizing the impact that waste has on the environment.

Several different options for managing waste in the PRRD exist, and range from relatively simple and easy options, to more extensive ones such as the development of new waste management facilities. Very early on, the Advisory Groups and the PRRD recognized that more than "just dollars" should be considered when assessing the cost-benefit profile of various options. As a result, the consideration of a range of social, environmental and financial factors

was included as a guiding principle. This approach to evaluating options is also known as a 'Triple Bottom Line" (TBL) assessment, and formed the basis of a framework for evaluating and considering potential options for the Plan. This approach provides a way of evaluating options that takes into account more than just financial cost or value by incorporating indicators of social and environmental benefits, to provide a more holistic understanding of options for the Plan.

While there is considerable work being done on environmental and social economics, the PRRD recognized that detailed analysis for the region was well beyond the scope of the Plan. To represent the triple bottom line, key indicators were used to provide a representative picture of environmental and social costs and benefits, along with a range of financial parameters. The full range of possible parameters is shown in the table below, although available information varied from program to program.

Table 2 describes the indicators used for the triple bottom line assessment. Further details on the calculations and assumptions associated with each parameter can be found in Appendix A.

Table 2: Triple Bottom Line Evaluation Criteria

PARAMETER TYPE	CRITERIA	
Financial	Capital Cost ($)	Capital costs were determined as the costs of upfront activities, e.g. equipment purchases or facility construction. They include soft costs such as financing, engineering and project management. Capital costs exclude cost of land, business licensing, rezoning, permitting and any requirements to construct bench or pilot scale facilities as precursors to full scale plant development.
	Annual Operating Cost ($)	Operating costs are those costs associated with the day-to-day operation and maintenance of a facility or program. This includes staffing, energy, supplies and equipment, and insurance. These costs were based on estimates for existing facilities or programs and the building of operating cost profiles. No revenues, e.g. from product or energy sales, have been accounted for in the financial evaluations.
	Operating Cost per tonne ($/tonne)	This was derived from the total operating cost, divided by the expected annual net tonnage that could be diverted by implementing the program.
	Approximate Cost per Household ($/household)	It was recognized that most residents would be best able to judge the financial implications of a program by considering the “cost per household” rather than an estimate of total costs. This metric was based on current (2007) residential tax rates.
	Landfill cost savings (based on $54/tonne lifecycle costs)	In order to understand the full implications of diverting waste from the landfill, it was necessary to look at the potential cost savings over the entire life of the landfill. This included a consideration of landfill siting, construction, operating, monitoring and closure costs, as well as the total capacity of the landfill. The total life cycle cost of the landfill was computed, and divided by the total capacity in cubic metres to determine a cost per cubic metre, and a cost per tonne using the compaction density. The lifecycle cost per tonne was used to calculate the lifecycle savings achieved by diverting waste from the landfill.
Environmental	Net Waste Diversion Potential (tonnes)	The net diversion potential relates to the amount of material that could be diverted from landfills, less any waste resulting from this program that cannot be otherwise handled. Determination of the net waste diversion potential is dependent of the amount of the material being targeted that occurs in the waste stream, and the amount that a particular program or policy could capture for diversion.
	Greenhouse Gas Reduction	Greenhouse gas emissions associated with different programs are based on case

PARAMETER TYPE	CRITERIA	
	Potential in tonnes of CO_2/tonne of waste and equivalent # of Honda Civics taken off the road for 1 year	studies for different technologies and a representative range of materials in the typical municipal waste stream. The amount of greenhouse gas reductions is linked to the type of program or process, as well as the types and quantities of material targeted. A model was used to relate the amounts of material recycled, composted or otherwise diverted from landfill, to greenhouse gas emissions reductions, expressed as "tonnes of CO_2 equivalents". In order to make this simple to visualize, the greenhouse gas emissions reductions were presented in terms of "number of Honda Civics taken off the road for 1 year".
	Landfill space savings in cubic metres, and equivalent volume in # of school buses	This is the amount of space that materials to be diverted would take up in the landfill. It is based on the net diversion potential tonnage and the space taken up per tonne of material. To assist in visualization, the landfill space savings were converted to an equivalent number of school buses. The typical "big yellow school bus" has a volume of about 60 m^3.
Social	Ability to be equitably implemented across region	All programs or services were rated with these social parameters, as indicators of how easy it would be for residents in the PRRD to access and use the programs.
	Accessibility and convenience	As outlined in the guiding principles, there was a need to prioritize those programs that could make access to service more even for both rural and urban areas. Programs that could readily be implemented region-wide scored best, while those programs that were more suited to one or the other scored less favourably.

4. THE PLANNING FRAMEWORK

Managing waste in the Peace River region for the next twenty years is understandably a broad and complex undertaking. There was therefore a need to address the broader time frame in a series of shorter segments, and to ensure that each phase was structured around specific objectives to support the overall direction of the Plan.

4.1 Plan Implementation Phases

The Plan has been organized in phases to divide the 20-year time frame into more manageable segments. Four implementation phases that have been formally defined:

- Phase 1 – this is the first 2 years following adoption of the Plan, and will build on existing programs. This phase will also be a transitional period as the PRRD works towards more sweeping changes in subsequent phases.
- Phase 2 – covers the next 3 to 5 years following Plan adoption, and involves more significant changes to the waste management system, with a focus on increased recycling
- Phase 3 – covers the period 5 – 10 years after Plan adoption, and concentrates on long-term waste management options
- Phase 4 – covers the next 10-20 years after Plan adoption. It is expected that more long-term waste management options will be part of this phase, as well as continued improvement of programs established in earlier phases

Some of the programs outlined in the Phases will function on a region-wide basis to support the broad goals of the Plan and provide the PRRD with better control over the waste management system. These aspects of the plan include new waste management policies to govern how waste will be handled, and improvements to waste management facilities. Other programs focus on specific sections of the population, e.g. residents or the agricultural sector, or a particular portion of the waste stream. Finally, some program elements focus on the PRRD in terms of how it functions as an organization.

It should be noted that the inclusion of a particular program or policy in a phase provides an indication of when that program or policy will be initiated; however, some programs may begin in one phase with preparatory steps, but not be fully complete until a later phase. In addition, some programs represent more permanent change, and will be expected to continue for the life of the plan and beyond, once they are initiated.

4.2 Plan Objectives

In developing objectives for the Plan, there was a focus on addressing the question "What needs to be achieved?" While the vision and guiding principles provide perspective on the overall direction of the Plan, the objectives are intended to link to specific deliverables, grouping programs together so that each phase supports the next in a logical manner. These objectives link directly to the guiding principles of the Plan, and reflect the step-by-step approach that the PRRD will follow in the upgrade and reshaping of the regional solid waste management system.

The sections that follow describe the programs and policies that will be implemented to deliver these objectives, and connect with the guiding principles in the Plan.

5. PHASE 1 – BUILDING A FOUNDATION

Phase 1 covers the period immediately following Plan adoption. This phase is characterized by the expansion of existing programs, as well as the establishment of "foundation-level" policies and service levels, that will support later, more expansive programs. Establishing and strengthening the connections between the PRRD and various stakeholders in each waste generation sector is also an important element of Phase 1.

5.1 Phase 1 Objectives

The Phase 1 objectives are to:

- Establish a baseline set of practices with respect to the existing waste management system
- Establish levels of service for both rural and urban areas of the region, supported through the transfer station and landfill network;
- Establish a policy platform or foundation for changes in later phases;
- Support and/or expand existing programs and services, including education and awareness-building;
- Enhance product stewardship program access
- Initiate greater outreach to and partnership with the ICI and agricultural sector stakeholders.

The following programs and policies will be undertaken to support these objectives.

5.2 Programs to Support Objective #1 – Establish Baseline Set of Practices

5.2.1 Track Waste Generation Sources

The ability to effectively divert the maximum amount of waste from the landfill will depend in part on having a clear understanding of quantities and sources of waste, and the types of materials that are present in the waste stream. Once this is known, specific strategies can be developed to work with waste generators to address particular components of the waste stream.

There is already the practice of identifying residential vs. commercial loads, but more precise categorization, e.g. to capture construction and demolition waste, would be beneficial. The Regional District will implement a policy to track waste coming into the landfill by source category, e.g. residential, small commercial, institutional (hospitals, schools, government offices, etc.), large commercial and industrial. Specific codes for each of these will be designated in the landfill scale system, and landfill operators instructed to collect this information from customers at the landfill. There would also need to be some public education efforts to alert people as to

the change to the new system, and advise them as to how the information collected will be used.

5.2.2 Conduct a Waste Composition Study

More accurate waste composition information is needed to support waste diversion programming, and the tracking of success as new programs are implemented. The Regional District will budget for undertaking periodic waste composition studies at the regional landfills, with a focus on the Bessborough and Fort St. John landfills which receive the majority of the waste disposed in the region. The first waste composition study will take place in Phase 1, but it is likely that the exercise will be repeated periodically. Ideally, waste composition analysis should be undertaken every 5 years, or following the implementation of any major programs that are considered likely to significantly affect waste composition.

5.2.3 Establish Minimum Operating Standards for Landfills

While the landfill operations at the four sites are generally in good order, the PRRD recognizes that improvements can be made to the sites, to improve operational efficiency and minimize impacts on the surrounding neighbours. Contractors are employed to provide day to day management services, and variations in their performance have been observed in the past. To address this, minimum operating standards will be developed for each landfill, in keeping with the BC Landfill Criteria developed by the Ministry of Environment, as well as the provisions of the Operational Certificates or Permits for the landfills. Best management practices that minimize environmental and neighbourhood impacts will also be incorporated into the minimum standards.

Issues that have been specifically identified as minimum standards include:

- Require Manager of Landfill Operations certification or equivalent for all operators
- Strict enforcement of the “no unsecured loads” policy at landfills, whereby vehicles with unsecured loads arriving at the landfill could be surcharged or fined for transporting unsecured loads onto the site
- Regular perimeter clean-ups to reduce illegal dumping in the immediate surroundings of the landfill, and to address blown litter from landfills and unsecured loads
- Requirement to enforce disposal bans and other PRRD policies to encourage recycling and waste diversion from the landfill
- Minimum operational requirements relating to the proper compaction and placement of waste, safety of operations at the landfill, as well as other issues.
- Establishment of minimum landfill closure requirements

Examination of current operating hours and service levels will also be incorporated into this activity, in order to offer extended or more flexible hours to customers, and to provide increased access to proper waste disposal and recycling. The Regional District will also adjust landfill operations contract requirements as feasible, e.g. at the time of re-tendering or renewal, to reflect these operating standards.

5.2.4 Identify Development Needs for Waste Management System

The PRRD operates four landfills and 32 transfer stations throughout the region, in a combination of rural and urban areas. Some transfer stations are very simple, offering only disposal of bagged waste using small PL-6 containers. Other locations are at former landfill sites, and are larger stations. These offer waste disposal and as well as some recycling opportunities. The four regional landfills are located at Fort St. John, Bessborough, Chetwynd and Rose Prairie. These sites accept waste from the member municipalities and rural areas surrounding them. Some recycling opportunities, for items such as scrap metal, tires, and lead-acid batteries are also provided.

The existing network of landfills and transfer stations throughout the region provides the framework for the existing residuals management or waste disposal services. They also have the potential to be service delivery locations for new programs and services. To increase access and bring greater equity to rural and urban service levels, the PRRD will evaluate the inter-relationship between the transfer station network and the transfer stations, as well as the needs for future landfill capacity in the region. Outcomes of this work will identify:

- Opportunities to improve efficiencies within the transfer station network
- Different levels of upgrades and other changes required for existing transfer stations in order to support future programs
- Alternatives for landfills that are nearing the end of their life

This activity will be considered as the basis for prioritizing capital works programs within the waste management system in this and later phases. It should be noted that some of this review is already in progress, and will be integrated into this activity.

5.2.5 Continue Planned Development and Operation of the Bessborough Landfill

In keeping with the Operational Certificate and the Design and Operations Plan for the Bessborough Regional Landfill, the Regional District will embark on the development of the next waste disposal phase, Phase 2A, shortly following Plan adoption. It is anticipated that Phase 2A would begin to receive waste for disposal in early 2009. This expansion builds on consultation undertaken in October 2006 with immediate neighbours of the landfill, as well as the direction of the Regional Board.

As part of the requirements of the Operational Certificate, the Regional District will develop a detailed engineering design and implementation process for this expansion, in consultation with the Ministry of Environment. The new phase of the landfill will continue to be operated in accordance with the approved Design and Operations Plan which identifies site-specific design features, daily operational requirements, environmental monitoring programs and reporting requirements.

5.3 Programs to Support Objective #2 – Establish Rural and Urban Levels of Services

5.3.1 Standardize Recycling Programs across the Region

Currently, the types of materials that can be recycled vary in different places in the region. Some materials can only be recycled at the community recycling depots, but not at the recycling bin depots located elsewhere in the region. Some rural areas have little if any access to recycling services.

The Regional District will work with our recycling partners and member municipalities to standardize recycling services across the region, to align the various program requirements. This will offer the ability to streamline education and awareness materials in support of recycling programs, offer increased access to recycling services for those using the recycling bin drop-off locations, and lower contamination rates by reducing confusion about program requirements. It is anticipated that increased recycling participation will be achieved through these efforts.

As the Regional District currently manages a single recycling contract for recycling services in the region, these standardization requirements will be incorporated into new contract specifications.

5.3.2 Initiate Upgrades to Transfer Stations to Secure, Attended Full-Service Sites

This activity will be the natural follow-up to the identification of development needs within the waste management system, particularly with respect to transfer stations. Currently, the majority of the transfer station sites are unattended, with 24-7 access. This unrestricted access has been observed to result in several operational challenges, such as the illegal dumping of prohibited and/or dangerous materials, and the overfilling of bins, attracting a variety of pests. These issues result in increasing site servicing and maintenance costs. The lack of recycling services at many sites, as well as the unrestricted access that opens these sites to use and potential abuse by residents from outside the region are also challenges being faced.

To address this, strategically located transfer stations identified through the development needs assessment will be upgraded to incorporate a range of services and changes, including:

- **Site Security & Access –** This will involve fencing and securing the sites, to limit unregulated access
- **Employment of Site Attendants**. The Site Attendant will be responsible to manage the site on a day-to-day basis, and to deal with residents using the site. These duties will include providing information on disposal and recycling options, collecting tipping fees, and liaising with haulage contractors removing waste from the site.
- **Set Operating Hours -** Each transfer station would have posted operating hours during which the site would be open for business. Access would only be allowed during open hours. The needs of the local areas will be assessed and operating hours set accordingly. The schedule will be developed in consultation with the community's needs, and would likely utilize a combination of morning and afternoon hours on weekdays and weekends to provide greater flexibility.
- **Acceptance of Bulky Waste -** Currently, the PRRD's solid waste bylaws restrict the disposal of bulky waste at transfer stations. This is largely because many of the sites, particularly the smaller rural sites, do not have suitable containers or sufficient space to handle bulky waste. Selected sites will be upgraded to permit the disposal of bulky waste at transfer stations, supported by the necessary amendments to the existing bylaws. Since there may be some sites where this expansion is not feasible, the PRRD will consider the most suitable sites for expansion, taking into account equality of access across the region, as well as the ability to efficiently develop collection routes for handling bulky waste.
- **Provision of Recycling Services in Rural Areas –** This service will involve the provision of multi-material recycling service at PRRD transfer stations, so that recycling facilities are accessible to all residents. This system will provide recycling facilities for a range of materials equal to those accepted at the recycling depots in the member municipalities. Depending on the nature of the facilities and the desired levels of service, recycling services for other materials such as batteries, paint, household hazardous waste or other materials could also be included, in collaboration with the relevant stewardship agencies.

Other supporting features of the upgraded sites would include improved signage, layouts, parking and container systems, customized to suit the sites, and meet the needs of the communities. The Regional District may also consider the implementation of nominal tipping fees for the disposal of waste at transfer stations, to make this service equitable with landfill disposal services.

The upgrade of the transfer stations will be initiated on a pilot program basis, to allow the PRRD to investigate the suitability of various types of equipment and service delivery models to provide the enhanced levels of service to communities in the region. It is anticipated that the pilot program will encompass upgrades to three existing transfer station sites in Phase 1, with a full scale implementation of the program continuing in Phase 2. The PRRD will also need to

secure services from a contractor to collect materials from the recycling depots and transfer them to an appropriate processing facility.

5.3.3 Investigate Replacement Options for Fort St. John Landfill

The Fort St. John Landfill is one of the four regional landfill operated by the PRRD, and provides disposal services for the City of Fort St. John as well as many of the transfer stations in the North Peace, from Pink Mountain to Charlie Lake. This landfill is fast nearing the end of its current design capacity, and it will be necessary to identify new disposal capacity to handle the 35,000 – 40,000 tonnes disposed in the Fort St. John landfill each year.

Recognizing that the process for developing new disposal capacity is a lengthy one, the Regional District will examine a range of options for providing replacement disposal capacity for the Fort St. John Landfill, beginning in Phase 1. These options will include, but are not limited to:

- Utilization of existing disposal capacity at other PRRD regional landfills
- Development of an agreement with a private waste disposal facility
- Development of a new landfill site within the North Peace
- Expansion of existing regional landfills
- Development of waste-to-energy facilities for use as disposal capacity

Recognizing that this investigation phase will be lengthy, the PRRD began some preliminary landfill siting activities in 2007. A preliminary assessment of potential sites was undertaken in 2006, which identified two possible sites within a 30 km radius of the existing landfill – the Rose Prairie Landfill, which would require expansion and upgrade to an engineered landfill, and a green field site which would require complete development.

As part of the consultation activities undertaken during the Plan Review, it was recognized that many residents in the Rose Prairie and Montney communities are concerned about the negative impacts that an expansion to the Rose Prairie Landfill site could cause. There was also considerable interest from the public in investigating non-landfill approaches to disposal capacity. The Regional District will continue to work with all stakeholders to identify feasible, environmentally responsible and cost-effective options for developing replacement disposal capacity. It is anticipated that any options short-listed as a result of this investigation in Phase 1 will need to be reviewed in consultation with the stakeholders, the Ministry of Environment and any other relevant agencies as needed.

5.3.4 Explore Feasibility of Joint PRRD-Industry Waste to Energy Facility

The PRRD recognizes that the presence of considerable industry operations in the region may present a unique opportunity to explore waste-to-energy as a suitable option for managing

waste. In particular, the forestry and oil and gas industries could be strategic partners. To this end, the PRRD intends to explore the feasibility of developing a waste-to-energy facility in the region, based on the combined needs and resources of industry and the PRRD. This feasibility study would explore the composition and quantities of waste being generated in the region, both from municipal and industrial sources, as well as the possibility to use excess natural gas (currently flared) as a supplemental fuel source in the facility.

The PRRD has applied for a Green Municipal Fund grant to support this work. Should the grant be approved, it is expected that this study would be undertaken in Phase 1, with the results of that work feeding into how later phases are executed.

5.4 Programs to Support Objective #3: Establish Policy Foundation

The policy changes planned for Phase 1 will be used to lay a foundation to support changes in later phases of the Plan. The policy changes in this Phase are linked to guiding principles that support the use of user pay and market-based incentives, the desire to place a preference on encouraging waste reduction, and the need for equitable program implementation across the region.

5.4.1 Implement Incentive-Based Tipping Fees

Tipping fees are the charges applied at the landfill for disposal of waste. An incentive-based tipping fee is structured to provide a financial incentive to encourage new waste management behaviour. High tipping fee rates are linked to the action being discouraged, so that people are encouraged to do the right thing because of financial savings. Currently, the PRRD uses the incentive-based tipping fee model for certain materials, e.g. a $90/tonne rate for commercially generated cardboard, as compared with $30/tonne for regular waste.

The PRRD will establish incentive-based tipping fees for an expanded range of materials to encourage greater diversion. In Phase 1, potential materials that will be targeted for the incentive-based tipping fee structure include:

- All cardboard – expanding the program to loads of cardboard from just commercially generated, to include all sources
- Yard Waste for Composting – if the PRRD landfills were going to be used for composting yard waste dropped off at the sites, a lower fee would be charged for separated yard waste.

Incentive-Based Tipping Fees at Work

As an example, in 2005 the Regional District of Central Okanagan ran a DLC pilot program for 3 months with five companies. The regular tipping fee for waste at the landfill was $50/tonne. During the pilot, sorted materials were $10/tonne, mixed recyclables, sorted at the landfill were $105/tonne, and mixed waste (including recyclables) was charged at $160/tonne. Eighty-five percent of the DLC waste was recycled instead of being landfilled. All the companies involved reported reduced costs for waste hauling and disposal.

- Construction & Demolition Waste – much of this material is more readily recycled when sorted. To encourage diversion of this waste stream, the highest tipping fees would be applied to mixed construction and demolition waste, with lower rates in place for sorted materials.

The Regional District recognizes that corresponding recycling or diversion opportunities will need to be in place for this program to be implemented, so that residents are able to take advantage of the lower cost options. An increased level of monitoring and quality control will be required at the landfill, since there is a risk that low disposal cost materials will be contaminated with higher disposal cost materials, e.g. people placing regular garbage in with yard waste. To support the expanded use of incentive-based tipping fees, the Regional District will also work to provide recycling areas and additional staff or operational capacity for accepting the targeted materials.

5.4.2 Implement Disposal Bans to Encourage Recycling

Currently, the PRRD already has certain disposal bans in place at the regional landfills, for materials that are difficult to handle, or undesirable for landfill disposal. Phase 1 will also incorporate the expansion of the disposal ban concept as a second, more aggressive step following the implementation of incentive-based tipping fees, for the purposes of increasing diversion, rather than just avoiding hard-to-handle materials. The range of materials banned from disposal at the PRRD landfills will depend on the waste management options chosen for implementation, and will be such that no material will be banned unless an alternative handling option exists.

The outright prohibition would be preceded by a period where the incentive-based tipping fees are implemented, so that users would have time to adjust to the proposed ban. Depending on the materials, they might still continue to be handled at the landfill for **recycling**, but would not be disposed in the landfill. Material categories that will be considered for disposal bans in Phase 1 include cardboard, sorted construction and demolition materials, and materials that can be composted, provided that appropriate composting operation is in place. In addition, the PRRD will also consider implementing disposal bans on those materials currently covered by stewardship programs, or those materials currently accepted for recycling.

Implementation of disposal bans requires supporting education and awareness building in advance of imposing the bans. Residents and businesses will require time to become accustomed to utilizing the alternatives, and the Regional District will be prepared to transition to full scale bans over time. Enforcement of the bans once in place will also be required, in terms of increased inspections of incoming loads. Coordination with member municipalities will also be important when considering disposal bans, as member municipalities may consider enforcing a ban on curbside collection of banned items, in conjunction with the PRRD landfill disposal

ban. Private haulers or municipal haulers may consider preventing collection of the material in question at the source.

5.4.3 Implications of Phase 1 Policy Options

This strong foundation in the guiding principles means that these options are directly supportive of the overall intent of the Plan. These policy options will work best if implemented together, as they address various aspects of the same issue – how to reduce the amount of waste being disposed, by creating both incentives and drivers to divert more waste from the region's landfills. It is important to recognize that these policy options will also require co-operation between the PRRD and the member municipalities, as consistency of their implementation and enforcement is an important factor in their success.

In terms of the impacts of these policies on the waste management infrastructure in the region, it is likely that there will be some implications for the recycling service providers, as the intent would be to enforce these policies when alternative recycling options are in place. The regional district's transfer station and landfill network will also need to be upgraded so as to allow enforcement of these policies. Member municipalities would likely need to incorporate issues such as disposal limits and disposal bans at the point of collection to provide the needed continuity with the regional district's intentions.

5.5 Programs to Support Objective #4: Support & Expand Existing Programs

The program options in this section build on existing programs and services. Many of these programs focus on education and awareness building efforts, to increase waste reduction and reuse opportunities in particular.

5.5.1 Continue Existing Waste Reduction Education Program

The need for public engagement and outreach programming is considered to be a foundation activity in the Plan's success, particularly as it is recognized that many of the programs contemplated in the Plan rely on changes in the behaviours of the citizens of the region – whether at home, at work or both – in order to succeed.

Currently, recycling and waste reduction education programs are provided by the Northern Environmental Action Team (NEAT) on behalf of the Regional District, through a contract between the two organizations. The organization was formed as a not-for-profit community group, and has been in operation since 1989. The PRRD has contracted with NEAT since 1997 to provide its waste reduction education programming. NEAT is responsible for the development and implementation of waste reduction education promotion programs in the Regional District, the objectives of which are to reduce the volume of waste produced by residents and businesses, encourage the re-use of goods and materials by residents and

businesses, and to maximize participation in recycling, composting and other waste reduction initiatives.

Specific waste reduction education activities have and continue to include:

- Operation of the "Green Line", a toll-free hotline number providing waste reduction & recycling information for the BC Peace Region
- Develop of waste reduction education programs for businesses
- Composting education
- Sale of residential backyard compost units
- Household hazardous waste handling and reduction education
- Materials exchange program support
- Special events e.g. yard waste drop-off in Fort St. John
- School-based programs to encourage greater awareness of waste reduction in schools, children and youth
- Design and distribution of brochures, tools and educational materials on a range of waste reduction topics
- Maintenance of the www.prrrdy.com website
- Production of the "Prrrdy Says" Newsletter
- Ongoing support for waste reduction education and awareness throughout the region
- Acting as Waste Information Centre for the PRRD regarding tipping fees, facility locations, operating hours and policies.

The Regional District will continue similar programs to those noted above, in order to support existing and proposed programs. As is already occurring, these programs will continue to embrace the principles of community-based social marketing. This approach focuses on influencing behaviours, as much research has shown that providing information alone is not always successful in encouraging individuals to change how they do things.

This approach would continue to be integrated into the public outreach and engagement campaign to support the implementation of the Plan. Where appropriate, these strategies will be supported by informational materials using brochures, web sites and information provided by other partners such as environmental organizations, recycling organizations, stewardship agencies and community groups.

5.5.2 Promote and Support Existing Reuse Opportunities

The PRRD recognizes the value of formalized and informal reuse opportunities that exist throughout the region. Rather than duplicate other programs that already exist in the

community, the Regional District will focus on the promotion of these opportunities. These would include:

- Partnerships with non-profit organizations and thrift shops to promote their services, and to host combined education and awareness events
- Continued support of the "Free For All" newspaper classified section that currently appears in the Alaska Highway News and Dawson Creek Daily News. This program allows residents who have something that they want to get rid of to advertise it for free in the classified section of these newspapers, to allow those who might be interested an opportunity to see the notices and contact them about the items.
- Publicize the availability of informal networks for reuse, such as the online community reuse sites are already established to provide multiple channels of access for residents interested in these programs.

The Regional District will also work to coordinate more closely with the recycling depots, thrift stores and other waste diversion programs, to have a major "waste diversion drive" in advance of the Free Tipping events, currently held at the region's landfill sites in the Spring and Fall each year. In addition, as there are some periodic waste reduction events operated directly by member municipalities, increased communication between municipalities and the PRRD will be facilitates as part of the event planning. These Reuse and Recycling Events will be heavily promoted to encourage residents and businesses to maximize their opportunities for waste diversion, rather than disposal.

5.5.3 Partner with Retail Sector on Reusable Shopping Bag Program

The Regional District will work with grocery store and other retail chains to support existing reusable bag promotions. In addition, partnerships will be also sought with other parts of the retail sector to develop similar programs, e.g. other independent stores or chains, malls and shopping streets in various communities. These could be facilitated through area Chambers of Commerce or Business Improvement Associations, as well as economic development offices in the communities. The role of the PRRD will be to encourage and promote these programs, and link the use of these reusable bags to the broader waste reduction goals in the Plan.

5.5.4 Develop Yard Waste Drop-off & Composting Facilities

The PRRD recognizes that many member municipalities, as well as some rural communities, have a high interest in developing community compost facilities for yard waste. The Regional District strongly supports this as a means of diverting yard waste from landfills, and will work to develop drop-off facilities for yard waste at up to five selected locations around the region. This program would initially focus on member municipalities, with the Regional

What is Yard Waste?

Yard waste typically consists of leaves, grass, brush and tree trimmings up to 2" diameter, vegetable debris such as corn stalks, tomato plants, etc. Generally, yard waste facilities are not equipped to handle large trees or branches, or stumps.

District in partnership with municipalities, so that municipal assistance with operation could be provided, with the PRRD supporting in the provision of suitable locations.

The finished compost would be available for use by residents, as well as in municipal landscaped areas, parks, school playing fields or other locations. The PRRD regional landfills and larger transfer stations will be considered as possible locations for yard waste drop-off and composting, provided that sufficient space is available. Any yard waste compost facility must meet the requirement of the BC Organic Matter Recycling Regulation (OMRR) and other Codes of Practice that may apply.

Participation in yard waste composting programs will be encouraged through the use of incentive-based tipping fees and an eventual ban on the disposal of residential yard waste at the curb in member municipalities, along with a reduction of collection limits for residents where applicable. An educational component will also be required to inform users on the types of material suitable for handling at this location, as good control of the organics coming into the site will go a long way to reduce odour and leachate issues.

5.6 Programs to Objective #5: Enhance Product Stewardship Access

Product stewardship programs that focus on household hazardous waste (HHW) disposal will also be incorporated into Phase 1. This reflects the intent of the guiding principles to give priority to programs that reduce toxicity to the environment, and those that encourage extended producer responsibility, so that manufacturers, retailers and consumers can take responsibility for the management and disposal of specific components of the waste stream.

5.6.1 Lobby Senior Government for Increased Levels of Product Stewardship

The PRRD recognizes that while locally implemented programs can have significant effects, another effective way to promote reduction and reuse is to support and lobby for provincial and federal product stewardship programs.

In British Columbia, Product Stewardship is regulated by the Provincial Government, which works with producers to develop stewardship programs for various materials. Successfully lobbying the Provincial Government to expand the list of products governed by Product Stewardship regulations will mean that even more items could be managed through stewardship programs and diverted from landfill. This in turn will reduce the financial burden to the

What is Product Stewardship?

Product Stewardship is a policy approach in which the producer's responsibility for managing the environmental impact of their product is extended across the whole life cycle of the product, from selection of materials and design to its end-of-life. This means that the producers and consumers have financial responsibility for the products from production to final disposal, so that the cost of managing this waste is not borne by local government responsible for waste management.

Regional District and other local governments across BC associated with managing these items.

To this end, the PRRD will:

- Lobby senior levels of government to implement policy to expand extended producer responsibility programs within British Columbia and Canada, particularly those that focus on packaging waste.
- Support the continuation and expansion of product stewardship programs implemented at the provincial and federal levels
- Lobby senior levels of government to implement stronger requirements for performance measurement and auditing of program performance, in order to increase access to programs in the Peace Region.
- Support extended producer responsibility and Design-for-Environment initiatives that encourage or regulate manufacturers to use recyclable and recycled packaging materials and discourage excessive packaging.
- Develop a Public Support for Product Stewardship package for circulation to interested residents and businesses, that will include information on product stewardship programs and the BC Recycling Regulation, a form letter and petition template that can used by interested parties to send to provincial and federal agencies regarding potential new stewardship initiatives, and a list of contacts.
- Continue its participation in the Local Government Stewardship Council, an organization whose members include all Regional Districts across the province, as well as the Ministry of Environment and the stewardship agencies, which was created to provide direct input from local government to responsible parties developing new stewardship programs.

As noted elsewhere in the Plan, the PRRD will also allocate resources to promote existing stewardship programs, and to provide increased levels of access where feasible, using its own waste management facilities.

5.6.2 Support Existing Stewardship Programs Through Round-up Events

This program will involve periodic round-up events for household hazardous waste materials, and would be held in member municipalities and electoral areas. Household hazardous waste (HHW) includes chemicals and materials commonly used in the household that contain potentially hazardous or toxic elements, and therefore require special disposal. The events will focus on household hazardous waste materials that are covered under product stewardship programs, but could also include selected non-stewardship materials as appropriate. HHW includes items such as fuels, solvents, used oil, pesticides and fertilizers, as well as things like mercury thermostat switches, propane cylinders and fluorescent tubes.

These events will be held once or twice per year in different communities on a rotating basis, at existing transfer stations, landfill sites or other location convenient to residents, and would be sustained only until such time as those communities have reasonable accessibility to provincially mandated product stewardship programs to handle these materials.

The PRRD will partner with suitably qualified contractors who are able to safely collect, treat, recycle and/or dispose of these products appropriately. Promotion and awareness building activities will also need to be incorporated into the program, so that people can be made aware of where and when the events were occurring, and what types of materials can be accepted at the Round-up Events.

5.7 Programs to Support Objective #6: Initiate Greater Stakeholder Outreach

5.7.1 Provide Recycling Pilot Program for Agricultural Plastics

The agricultural sector in the BC Peace Region plays an important economic role in many communities. Managing non-organic agricultural wastes, such as plastics, presents a challenge for farm operators, many of whom have adopted environmental farm plans and are interested in recycling opportunities for these materials.

Under this program, the Regional District will utilize strategic disposal locations as collection points for agricultural plastics such as silage wrap and baling twine, provided that a recycling processor could be found to collect and process this material. This will be developed as a pilot program, so that a potential recycling processor would have an opportunity to test the possibility of recycling this material. In addition, a pilot project would also allow the PRRD and participating farms to determine how best to transport, handle and store their items prior to pick-up.

Once the pilot program has been successfully tested, a more comprehensive program will be developed and implemented in subsequent phases.

Agricultural Plastics Recycling in Okanagan-Similkameen

The Regional District of Okanagan-Similkameen (RDOS) has undertaken a successful pilot program for collecting agricultural plastics to determine the resin type, processing methods and where to find suitable markets for the waste plastic. Although the RDOS has yet to find suitable markets, they have determined ways to collect certain plastics to minimize contamination.

The RDOS started the program by supplying branded bags and information sheets to agriculturists. These bags were filled and dropped-off at landfills with no tipping fees. Landfills were willing to accept the recycled plastic although a place to accumulate significant volume to be sent for recycling processing still needed to be sited. The RDOS is planning to make templates for their collection program and trials available to other Regional Districts.

5.7.2 Explore Specific Education and Training Needs for Different Sectors

The Regional District recognizes that waste reduction education activities must be tailored to meet the needs of specific target sectors, such as schools, businesses and industries. The

PRRD, through its education program, will continue outreach to specific groups and organizations to identify specific training needs and interests for different areas, activities, age groups, etc. Examples of areas of potential focus include:

- Targeted programs for schools, based on their particular interests. This could include curriculum support, special events and activities, summer camp programs or long-term partnerships with particular schools through pilot programs
- Increased outreach to the institutional, commercial and industrial sector, with a focus on the provision of resources and tools to assist this sector with improving their waste management, tracking waste generation and composition information, and participation in the business-focused material exchange discussed in the next section

The PRRD will explore opportunities to partner with the relevant school districts, industry associations and business groups, to deliver these programs.

5.7.3 Develop Construction & Demolition Waste Working Group

The Regional District recognizes that the construction industry has the potential to be active partners in determining how best to manage construction and demolition waste generated in the region. There may be business opportunities to be developed that can support the waste reduction goals of the Regional District, and the PRRD would like to act as a facilitator of discussion with the construction sector to identify these opportunities. To this end, the PRRD will work with the construction industry to establish a Construction & Demolition Waste Working Group, whose role will be to:

- Improve the characterization and understanding of C&D waste generation patterns in the region
- Identify those materials for which alternative handling opportunities (other than landfilling) may exist
- Work with the PRRD to develop pilot programs to target particular material streams
- Develop practical regional solutions to increase the diversion of C & D waste from the PRRD landfills

The PRRD will act as a facilitator to kick-start the working group, through outreach with construction and building associations, major industry players in the various communities, and the hosting of meetings and support of discussions.

5.7.4 Develop ICI Waste Working Group

The Regional District recognizes that the business and industry in general has the potential to be active partners in determining how best to manage the wastes generated by this sector in the region. There may be business opportunities to be developed that can support the waste reduction goals of the Regional District, and the PRRD would like to act as a facilitator of

discussion with the ICI sector to identify these opportunities. To this end, the PRRD will work with groups within the ICI sector to establish an ICI Waste Working Group, whose role will be to:

- Improve the characterization and understanding of ICI waste generation patterns in the region
- Identify those materials for which alternative handling opportunities (other than landfilling) may exist
- Work with the PRRD to develop pilot programs to target particular material streams
- Develop practical regional solutions to increase the diversion of ICI-sector waste from the PRRD landfills

Target members of the Working Group include representation from business associations, Chambers of Commerce, School Districts 59 and 60, Northern Health Region and the colleges and institutions in the region. The PRRD will act as a facilitator to kick-start the working group, through outreach with construction and building associations, major industry players in the various communities, and the hosting of meetings and support of discussions.

5.7.5 PRRD Adoption of a Green Purchasing Policy

The Regional District's Board of Directors has committed to incorporating sustainable practices into its operations where possible. To further this commitment, the PRRD will adopt a district-wide purchasing policy to favour products made from recycled content such as paper products, motor oil and tires. In-house waste reduction would be enhanced by encouraging the purchase and use of reusable products. Over time, the program will be considered for extended application to include products that have minimal environmental impacts during production, products that are easily reused and recycled, or cause minimal environmental impacts in operation and upon disposal. This will be a strategic opportunity for the Regional District to demonstrate its commitment to leading by example and "walking the talk" with respect to waste reduction.

Using the lessons learned from the adoption of the green purchasing policy at the Regional District, the Regional District will work with other organizations and regional institutions to implement similar programs.

5.8 Triple-Bottom Line Evaluation for Phase 1

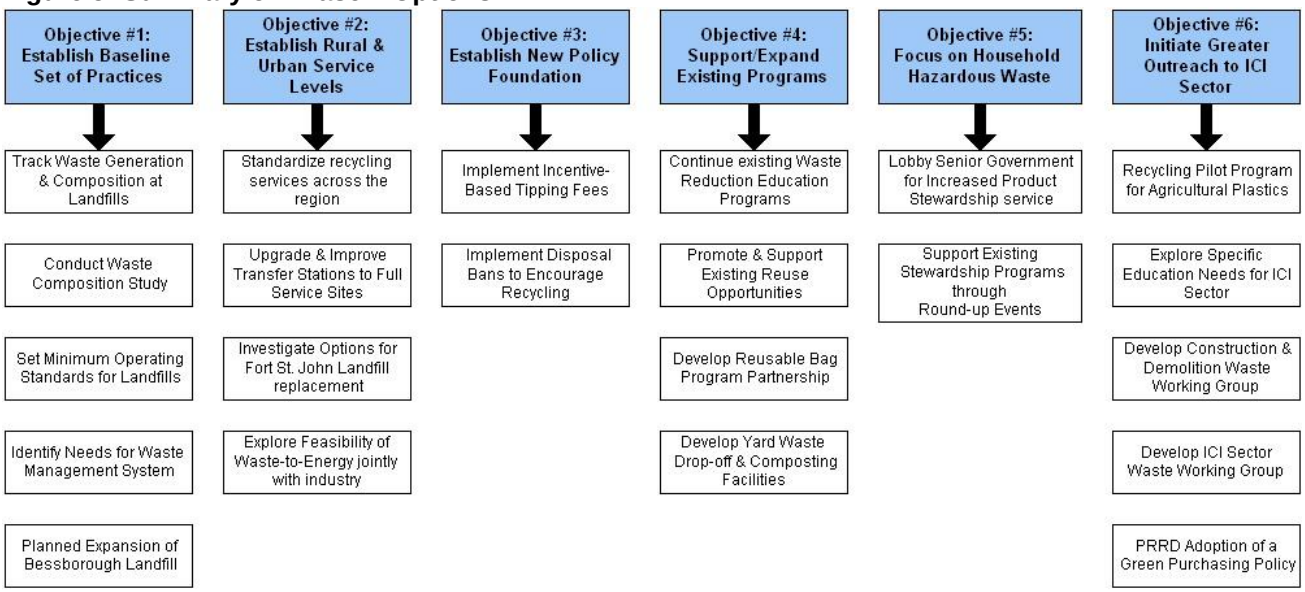
Triple bottom line evaluations were undertaken for those programs with a significant financial cost associated with them, or where the impacts of the program could have a noticeable environmental or social benefit. In those cases where the suggested program is primarily related to policy changes or decisions to be made internally by the PRRD, no formal evaluations were performed. Table 3 summarizes the triple bottom line evaluations for those programs that were analyzed.

Table 3: Summary of Triple Bottom Line Evaluations for Phase 1

TRIPLE-BOTTOM LINE CRITERIA	UPGRADE TRANSFER STATIONS	INCENTIVE-BASED TIPPING FEES	IMPLEMENT DISPOSAL BANS	REUSABLE SHOPPING BAG PROGRAM	YARD WASTE COMPOSTING	PRRD GREEN PURCHASING POLICY
Total Capital Cost ($)	$576,000	Negligible – no new costs to impose and enforce policy	Negligible – no new costs to impose and enforce policy	Low	$100,000	Low
Annual Operating Cost ($)	$500,000	Negligible – policy enforcement is a part of landfill operations contract responsibilities	Negligible – no new costs to impose and enforce policy	$2500	$75,000	Low – incremental over existing levels of expenditure
Operating Cost per tonne	$177	Negligible	Negligible	$43	$31	Low
Approximate Annual Cost per Household	$19.70/hh	< $1/hh	< $1/hh	< $1/hh	$3.13/hh	< $1/hh
Landfill life cycle cost savings (based on $54/tonne lifecycle cost)	$37,995	$252,839	$190,162	$3,160	$133,392	$3,017
Net Diversion Potential (tonnes)	699	4,654	3,493	58	2,450	56
Greenhouse Gas Reduction Potential in CO_2/tonne of material	1,686	n/a	n/a	0	525.1	Negligible
Equivalent to taking this many Honda Civics off the road for 1 year	296	1,719	n/a	0	96	0
Landfill space savings (cubic metres)	1,166	7,757	5,822	97	4,084	93
A volume equal to this many school buses	19.4	129.3	97	1.6	68.1	1.5
Ability to be equitably implemented across region	Medium	Medium	Medium	High	High	High
Accessibility and Convenience	Medium - High	Medium	Medium	High	High	Medium - High

At the end of Phase 1, a foundation would have been laid on which the later phases will be built. A summary of Phase is shown in Figure 5 below.

Figure 5: Summary of Phase 1 Options



6. PHASE 2 – INCREASING ACCESS TO RECYCLING

The programs in this phase are to be implemented in years 3 to 5 following adoption of the Plan. These programs require slightly more effort and planning than the programs in Phase 1 and are aimed at achieving a higher, more aggressive diversion rate. These programs continue to build on achievements from Phase 1 programs.

6.1 Phase 2 Objectives

Phase 2 has the following main objectives:

- Increase reuse and recycling opportunities for residents
- Focus on the business and construction/demolition sectors
- Address landfill and transfer station capacity needs

Phase 2 also incorporates a considerable level of investment in the solid waste management infrastructure, in order to support these objectives. Specific program and activity options to support these objectives are outlined in the following sections.

6.2 Programs to Support Objective #1: Increase Reuse & Recycling Opportunities

6.2.1 Install Share Sheds at Existing Waste Management Sites

Increasing the number of reuse and materials exchange opportunities is a critical step in increasing waste reuse. This program will involve the installation of Share Sheds at the PRRD landfills and larger transfer stations. Some of these locations already have designated areas for residents to drop off or take reusable items. These areas can be upgraded to provide a sheltered location that could be readily accessed and monitored as part of the site operations. Shelving and other areas suitable to store a range of materials would be installed. Site operators would be responsible to monitor the materials going into the Share Sheds, to prevent garbage and hazardous materials from being deposited there.

6.2.2 Implement Incentive-Based Tipping Fees

This policy option would involve the establishment of incentive-based tipping fees for an expanded range of materials to encourage greater diversion, following on from the initial steps taken in Phase 1. Fees will be higher or lower than the rate for regular garbage, depending on the planned approach for handling the material. Materials that will be targeted with incentive-based tipping fees include:

- Construction & Demolition Waste – much of this material is more readily recycled when sorted. To encourage diversion of this waste stream, the highest tipping fees will be applied to mixed construction and demolition waste, with lower rates in place for sorted
- Recyclable materials – tipping fees for cardboard and other readily recyclable items will be set at considerably higher levels that regular waste, to encourage customers to take those materials for recycling, rather than bring them to the landfill.

The Regional District recognizes that corresponding recycling or diversion opportunities would need to be in place for this program to be implemented, so that residents are able to take advantage of the lower cost options. The transition to incentive-based tipping fees will also be supported by appropriate education and promotional messages, to inform customers of the proposed changes to the tipping fee schedule, and advising of the recycling or reuse alternatives that exist.

Operational requirements potentially include additional staff at the landfill site for supervision of recycling activities, designated areas for handling those materials that continue to be accepted for recycling at the landfills, and additional equipment in some cases. Further processing of materials such as crushing of concrete and shredding of wood waste may also be required. An increased level of monitoring and quality control will be required at the landfills, since there is a risk that low disposal cost materials will be contaminated with higher disposal cost materials, e.g. people placing regular garbage in with yard waste.

6.2.3 Implement Disposal Bans to Encourage Recycling

In Phase 2, the use of disposal bans to encourage increased levels of waste diversion will be continued, targeting additional materials that are difficult to handle, undesirable for landfill disposal, or for which waste diversion programs are available.

The range of materials banned from disposal at the PRRD landfills will depend on the waste management options chosen for implementation, and will be such that no material will be banned unless an alternative handling option exists. The outright prohibition would be preceded by a period where the incentive-based tipping fees are implemented, so that users would have time to adjust to the proposed ban. This policy approach may also create opportunities for private business to provide the “alternative opportunity” since bans could drive business to the new service offered by the private sector.

Suitable material categories that will be considered for disposal bans in Phase 2 include:

- paper and cardboard
- recyclable plastics and glass
- other materials for which diversion programs are available

Implementation of disposal bans requires supporting education and awareness building in advance of imposing the bans. Residents and businesses will require time to become accustomed to utilizing the alternatives, and the Regional District will be prepared to transition to full scale bans over time. Enforcement of the bans once in place will also be required, in terms of increased inspections of incoming loads. Coordination with member municipalities will also be important when considering disposal bans, as member municipalities may consider enforcing a ban on curbside collection of banned items, in conjunction with the PRRD landfill disposal ban. Private haulers or municipal haulers may consider preventing collection of the material in question at the source.

6.2.4 Implement and Enforce Disposal Quantity Limits

Currently, there are disposal limits (set number of bags allowed for collection) in place within some member municipalities in the region, although these are not always strictly enforced. No disposal limits are in place at the PRRD facilities.

In order to further encourage reductions in the amount of waste being disposed, the PRRD will work with member municipalities to establish a consistent set of disposal limits, which will apply to waste set out for curbside collection, or to waste disposed at transfer stations and landfills. The implementation of disposal limits will involve establishing a maximum number of bags that can be set out for collection or brought to a transfer station before an additional fee must be paid.

The Regional District recognizes that disposal limits for garbage work best when combined with cheaper (or free) recycling service, which encourages residents to participate in recycling programs as a means of reducing the cost of waste disposal. As a result, the bag/container limits for residential garbage collection throughout the PRRD will be initiated when new residential waste diversion programs are introduced, and could be implemented to coincide with the introduction of curbside collection of recycling in the member municipalities. Pilot scale implementation of proposed bag limits will be used, so that limits can be set at practical levels.

6.2.5 Implement Curbside Recycling Program in Member Municipalities

While the Regional District does not provide collection services directly to municipal residents, the SWMP document is intended to recognize and support initiatives within the region that contribute to reducing waste disposal. Both the City of Fort St. John and the District of Chetwynd have expressed interest in commencing a curbside recycling program, initially for single-family residential households in their communities. These potential programs are therefore included in the SWMP.

The design of a curbside collection program for recyclables will need to take into account the following considerations:

- Level of source-separation – This is the degree to which individual residents will be required to separate their recyclables into different categories, prior to setting it out for collection. This will be dependent on the types of materials being accepted by the program, and the capacity of the facility where the collected materials will be processed.
- Method of collection – Recyclables collection programs in different communities utilize various combinations of bags, boxes, carts or other containers to facilitate collection. The program design will need to incorporate the type of collection system, again based on the processing facility that will be accepting the material, and the expected ease of use by residents
- Processing location and capacity – the member municipalities implementing a curbside collection program will need to determine how and where the collected material will be processed, and what level of responsibility processing service providers will have with respect to sorting and marketing the recovered materials.
- Need for transfer locations – the design of the program would also need to consider whether an intermediate transfer location will be required, where recyclable materials collected from individual households could be consolidated and/or compacted before hauling to the processing location.

Implementation of a curbside collection program in any municipality will also need to include a decision on the role and responsibilities of the PRRD and the participating member municipalities, to determine whether and how the PRRD would be involved. Many regional districts have benefited from the economies of scale associated with regional-level recycling service provision, and addressed cost sharing through contractual arrangements between municipalities or through municipal requisitions. In addition, where municipalities have implemented a “collection-only” level of service without consideration of long-haul transportation, processing and marketing of recyclables, there is the potential that the collection service provider will not have a suitable interest in maintaining program quality, reducing contamination of recyclables, or supporting education and promotion activities. To address these issues, the PRRD will work closely with member municipalities seeking to establish curbside recycling programs to determine how best to structure programs so as to support the overall intent of the Plan.

It should be noted that member municipalities should consider the relative increase or improvement in recycling recovery rates, against the expected increases in cost. In some communities where depot-based recovery rates are relatively good, there may be some question as to whether the incremental increase in recycling costs associated with a curbside collection program are “good value for money”, based on the resulting increase in recycling

rates. This will need to be determined on a case by case basis, and would likely involve specialized tracking of recycling recovery rates by municipality, to gain better insight into this issue.

Pilot scale implementation will be critical to ensure the long-term success of a major program such as curbside recycling collection. The pilot program should assess collection frequency, vehicle access, source-separation vs. commingled collection, effectiveness of communications and educational tools, opportunities for expansion to other municipalities, as well as other issues. Once the structure of the program was established, full-scale roll-out across the member municipalities would be supported by a rigorous education program to advise residents of the changes, the materials that they are able to recycle, and the benefits of participation in the program, such as reduced waste disposal costs. The provision of this service would be supported by the enforcement of appropriate disposal quantity limits and disposal bans as discussed above.

6.2.6 Continue Transfer Station Upgrades & Recycling Service in Rural Areas

In Phase 1, the pilot program to test rural recycling services and the upgrades to the transfer stations will have provided the best process for expanding recycling services to other rural areas. Phase 2 will involve a more region-wide implementation of rural recycling services, as the remaining transfer stations are upgraded. Provision of this service will include a multi-material recycling service on par with the range of materials accepted at the recycling depots in the member municipalities.

The upgrades to the transfer stations will incorporate the following:

- Attended and secured site with set operating hours
- Concrete pads for placement of containers and other equipment
- Containers or designated areas to collect material to be recycled
- Signage so that users can clearly see what materials go where
- Suitable parking facilities and road markings to facilitate orderly traffic flow
- Space to facilitate future expansion if required

The PRRD would also need to secure services from a contractor to collect materials from the recycling depots and transfer them to an appropriate processing facility. Depending on the nature of the facilities and the desired levels of service, recycling services for other materials such as batteries, paint, household hazardous waste or other materials could also be included, in collaboration with the relevant stewardship agencies.

To increase recycling access in some areas, the PRRD may also consider allowing the use of recycling depots by private companies wishing to provide a household-level recyclables collection service, but who are unwilling or unable to deal with the costs associated with long-haul transportation to recyclables processors. The private companies could use the depots to deposit their recyclables collected from households, and the PRRD would take responsibility for management of the recyclable materials from the depot to the recyclables processing location. This approach would provide a business opportunity for entrepreneurs wishing to collect recyclables but unable or unwilling to deal with the uncertainty of markets for recyclable materials. It would also assist the PRRD to reach waste reduction goals and provide an increased level of service to its residents.

Given that hauling from rural areas can be costly, the PRRD may also consider the use of commingled bins or compactor units for recyclables handling, which would prevent the schedule for transfer out of recyclables from being driven by one particular recyclable stream. This approach could have good applicability at some of the more remote areas. Since this option potentially reduces the number of service visits required, this option may also be more cost effective than utilizing separate bins for different materials.

Participation in the recycling depot program will be encouraged by creating financial incentives to utilize the recycling options, e.g. a small charge applied per bag to dispose of garbage at transfer station but unlimited recycling at no charge. The launch of the recycling depot program will also incorporate a rigorous education campaign, along with enforcement.

6.3 Programs to Support Objective #2: Focus on ICI and Construction & Demolition Sectors

6.3.1 Support Reuse and Recycling of All Building & Demolition Material

The large geographic area of the PRRD makes the universal enforcement of policies or restrictions with respect to construction and demolition waste materials challenging. However, in a continued effort to reduce the amount of this type of material entering the region's landfills, the PRRD will consider:

- The requirement for demolition or construction crews to recycle certain materials, through the help of landfill bans. For example, there may be a focus on recycling and reusing wood waste to begin with, providing an alternative location at the transfer station where this material could be dropped-off, and supporting this through a landfill ban on wood waste.
- Providing new homeowners with educational resources on material reuse/recycling opportunities supported by the PRRD upon initiation of new services, e.g. when owner contacts the PRRD for new address information, emergency services number etc. This will be structured as more of an educational program to provide new homeowners with

alternatives for disposal of building/demolition material such as wood waste, glass, drywall etc. such as information on the reuse drop-off sites (possibly located at the PRRD landfills).

- In conjunction with member municipalities, consider incorporating the requirement for a waste management plan to be filed, as part of the planning and building permit process where applicable.

6.3.2 Develop Building Material Reuse Capacity

Currently, there are considerable amounts of construction & demolition waste coming into the regional landfills, however, very little reuse or recycling opportunities exist. As a result, a lot of this material is buried because there is no alternative.

To address this, the PRRD will identify and designate suitable areas at the regional landfills, to be used for collection and storage of used building materials. The area(s) will be located so as to provide space for storage of separated materials, and a space to allow loads to be sorted by customers. Lower fees would apply for the sorted materials. This area will need to be staffed, to prevent persons from dropping off waste that should be designated for disposal, as a means of avoiding regular waste tipping fees.

The Regional District also acknowledges that the C&D Waste Working Group established in Phase 1 may identify other locations and processes to develop this capacity within the private sector. Any such recommendations will be incorporated in Phase 2 as appropriate. In addition, the PRRD also recognizes the potential for non-profit organizations to provide this service in partnership with the PRRD. In either case, on-going promotion of the reuse facility, through the PRRD website and other communications tools will be required to encourage participation.

6.3.3 Promote Reuse & Recycling Opportunities for Business

This activity will focus on increasing opportunities for the commercial and industrial sector to take advantage of potential reuse and recycling opportunities. This option would involve the development of a business-focused educational reuse program. The goal of this program is to help keep reusable items in good working order out of landfills, by encouraging businesses, institutions and industries to “exchange” their items with others who need them.

In this option, a reuse toolkit for businesses would be created to help the sector network and contact with other generators and recipients with potential reuse opportunities. Information would be sorted according to mid/smaller size business, school districts and hospitals.

This program could be operated in partnership with the region’s Chambers of Commerce or other business and industry associations. Program delivery could be web site-based, and combined with promotion of the opportunity through the media and other solid waste information

materials. PRRD landfill and transfer station operators could also provide this information to customers at the sites, to encourage reuse through the materials exchange, instead of disposal.

6.3.4 Continue Working Group Pilot Programs from Phase 1

As the Working Groups established in Phase 1 proceed to identify new strategies for dealing with construction and demolition, and other ICI sector wastes, it is anticipated that pilot projects begun in Phase 1 may continue into Phase 2. While no formal evaluation of these programs is feasible at this stage, it is important to recognize that suitable resources will need to be allocated to support this work.

6.4 Programs to Support Objective #3: Address Waste Management System Capacity Needs

6.4.1 Identify Strategies for Reducing Landfill Gas Emissions

Landfill gas is produced through the biological degradation of the material deposited in the landfill. Landfill gas contains nearly equal parts of methane and carbon dioxide; however methane is about 21 times more powerful and damaging than carbon dioxide as a greenhouse gas. The Ministry of Environment has established its intention to regulate landfill gas emissions, as part of the overall provincial approach to reducing greenhouse gas emissions.

The Regional District recognizes that there will be a need to comply with the requirements of any eventual regulations established by the province. The Landfill Gas Regulation Policy Intentions Paper (2008) indicates that all landfills with more than 100,000 tonnes of waste in place, or an annual disposal rate of at least 10,000 tonnes will be required to undertake landfill gas assessments to determine their emissions by 2010. In the context of the PRRD, it is anticipated that compliance with this regulation will therefore include the need to undertake landfill gas assessments at the Fort St. John and Bessborough Regional Landfills, to determine whether landfill gas capture infrastructure will be required at one or both of these sites.

The PRRD will also work with the Ministry to identify other strategies for reducing greenhouse gas emissions from the region's closed and active landfills, and through the recognition that programs that reduce organic material being disposed in the region's landfills could form part of this strategic approach. The Regional District will also work to leverage other potential opportunities for methane emissions reduction at applicable landfill sites, and explore the use of carbon offsets/credits as a means of mitigating this impact and reducing the methane gas emissions.

6.4.2 Develop Transfer Station to Replace Fort St. John Landfill

The Fort St. John landfill is nearing the end of its useful life and is scheduled to be closed by 2010 - 2011. Given that a replacement disposal option is likely to be farther away from the city

that the current landfill, it may be necessary to develop a transfer station to replace the closed landfill, and provide a convenient location close to the city for waste disposal.

The configuration of the new transfer station will be developed with a consideration of the types of customers and vehicles that will need to be accommodated. This level of service, along with the relative distance between the replacement disposal location and the current landfill site, and the expected volumes of waste to be accepted will impact the cost, capacity and design of the transfer station. Table 4 describes the scope of the two most likely options for transfer station development.

Table 4: Classes of Transfer Stations

Class of Transfer Station	Type of Users	Description of Facility Type
Class 1	Residential and small, self-haul commercial	■ Relatively small facility, similar to existing rural transfer station sites ■ Will likely utilize modular containers, e.g. PL-6 or roll-off bins for waste disposal ■ No compaction equipment ■ Partial or full recycling services would be provided ■ Site would be staffed, with fixed hours of access ■ Weigh scales would be installed
Class 2	All traffic	■ Large, full-service facility ■ Would completely replace landfill after closure ■ Designed to accept waste from individual resident drop-off as well as curbside collection vehicles or large commercial haul vehicles ■ Would likely include waste compaction ■ Full recycling and waste diversion services would be provided ■ Site would be staffed, with fixed hours of access ■ Weigh scales would be installed

Estimated costs are provided below, based on the PRRD existing budget for operating similar sites, as well as estimates from other regional districts with similar facilities.

Table 5: Cost Estimates for Classes of Transfer Station

TRANSFER STATION TYPE	CAPITAL COSTS	ANNUAL OPERATING COSTS
Class 1	$192,000	$165,000
Class 2	$2 - $3 million	$250,000 - $400,000

The selection of replacement disposal capacity for the Fort St. John landfill will be addressed in Phase 1. Depending on the outcome of that investigation, and the potential location of a new disposal solution, there may be a need to select the larger type of transfer station, to avoid curbside collection vehicles and commercial haulers from having to drive excessively long distances from the city to the new site. As more definitive plans for replacement disposal capacity are established, this will be considered in more detail.

No triple bottom line analysis was performed for this option, as it relates to residuals management rather than diversion, and does not directly result in any reduction in the amount of waste going to landfills.

6.4.3 Develop Replacement Landfill Capacity for Fort St. John Landfill

Once a replacement disposal solution has been selected through the activities identified in Phase 1, it will be necessary to proceed with the design and development of the new site. Regardless of the location selected by the PRRD as a replacement for the Fort St. John landfill, or the type of facility that is developed, there are a number of significant components that will need to be put in place:

- Consideration of First Nations treaties and land management requirements as part of the site selection process
- Land acquisition or long-term lease of land for the location
- Feasibility study, preliminary and detailed design phases
- Construction and development
- Development of operational and environmental management plans
- Securing of necessary permits
- Facility commissioning, staffing and management

Depending on the type of disposal solution that is identified, there may be additional components that will need to be considered, such as financing, operational contracts, or other partnerships. The Regional District also recognizes that specialized consultation activities, both with stakeholders and the Ministry of Environment, will be required in order to establish a new disposal solution to replace the Fort St. John Landfill.

No triple bottom line analysis was performed for this option, as it relates to residuals management rather than diversion, and does not directly result in any reduction in the amount of waste going to landfills.

6.4.4 Develop Illegal Dumping Strategy

The Regional District recognizes that the large, rural areas of the region are particularly susceptible to illegal dumping abuse. In addition, there are currently challenges associated with people dumping material illegally at transfer stations and landfills outside of regular operating hours. The material ranges from regular waste to banned substances such as used oil, paint and other household hazardous waste. It is also recognized that existing enforcement by provincial agencies, e.g. fines for littering, have not been visible and effective deterrents.

To address this, the Regional District will focus on the development of specific strategies to deal with illegal dumping, that incorporate both education and enforcement approaches. These strategies may include:

- Continued education and promotion activities to make residents and businesses aware of the safe recycling and disposal options available for handling household hazardous waste materials
- Partnership with the Conservation Service and the Ministry of Highways to report and enforce provincial regulations with respect to illegal dumping and littering, and to identify sites where illegal dumping is a common and chronic problem
- The development of partnerships with or in-kind support for other agencies which facilitate clean-ups at sites, such as the waiving of tipping fees for organizations who are involved with cleaning up illegal dump sites.
- Work with community groups to develop a Community Clean-Up Program, whereby those who wish to volunteer to clean up illegal dump sites are supported through the provision of small grants, safety gear and free tipping at PRRD sites.
- Continue to liaise with communities to determine optimal operating hours at PRRD sites, so as to reduce the incidents of waste being dumped outside of regular operating hours.

The Regional District will also work with member municipalities and other agencies to duplicate similar programs within their respective jurisdictions, and to investigate opportunities to restrict access to those sites where illegal dumping is a chronic issue.

No formal evaluation of this program was undertaken as it is very difficult to quantify the amount of waste currently being dumped illegally, and the composition of that waste stream in terms of materials that could be recycled. It is anticipated that initially financial commitments will relate to the PRRD's development of a more detailed strategic approach, and would be supported through the existing cost allocation for education and awareness building activities.

6.5 Triple-Bottom Line Evaluation

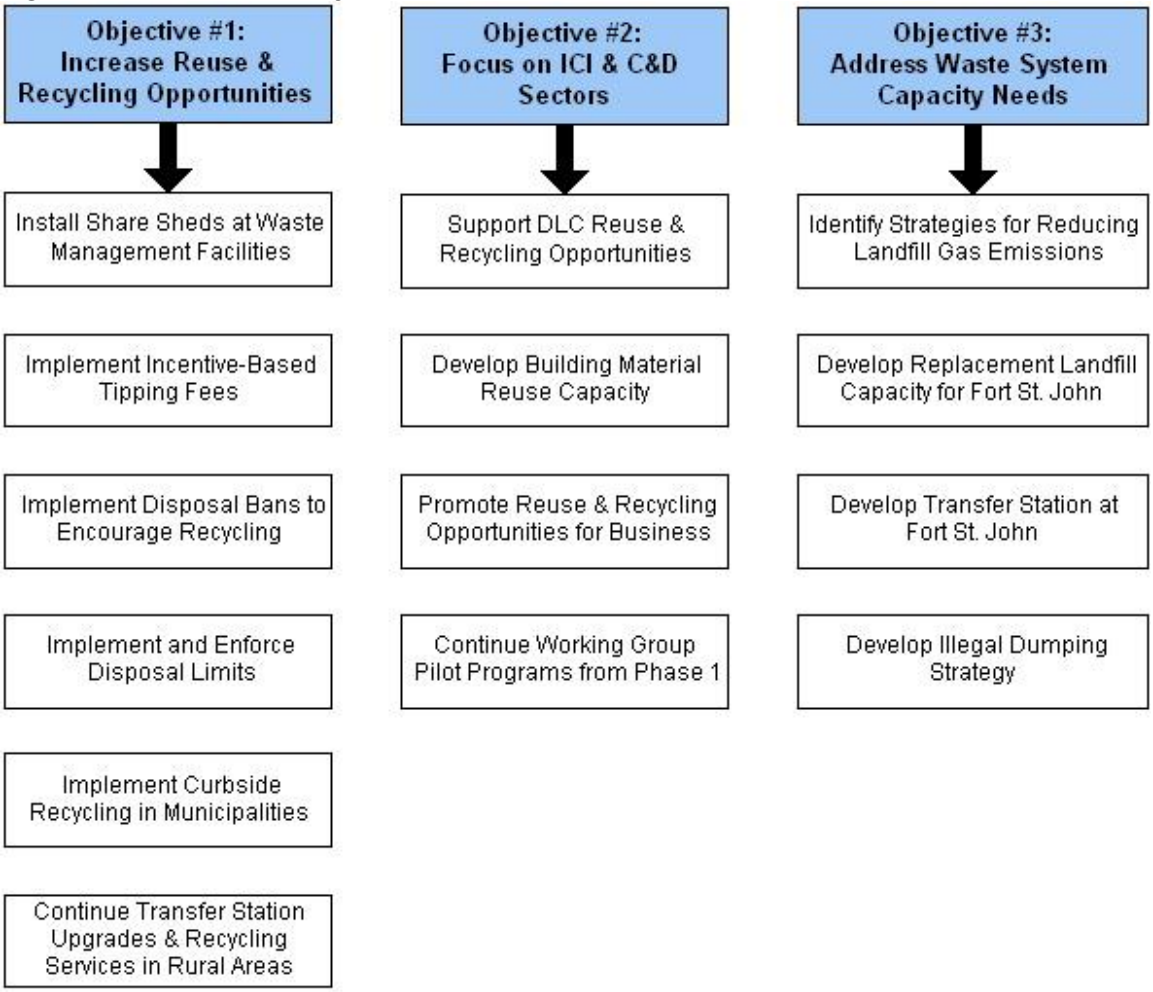
Triple bottom line evaluations were undertaken for those programs with a significant financial cost associated with them, or where the impacts of the program could have a noticeable environmental or social benefit. In those cases where the suggested program is primarily related to policy changes or decisions to be made internally by the PRRD, no formal evaluations were performed. Table 6 summarizes the triple bottom line evaluations for those programs that were analyzed.

TBL CRITERIA	SHARE SHEDS	DISPOSAL LIMITS	CURBSIDE RECYCLING IN MUNICIPALITIES	CONTINUE TRANSFER STATION UPGRADES	DEVELOP C&D REUSE CAPACITY	REUSE & RECYCLING PROMOTION FOR ICI
Capital Cost ($)	$36,000	Low	Assumed none	$1,152,000	$70,000	Negligible
Annual Operating Cost	$6,000	Low	$144/household/year (estimated)	$990,000	$10,000	$5,000 Support and promotion
Operating Cost per tonne ($/tonne)	$48	Low		$531	$22	$8
Landfill Cost savings per year (based on $54/tonne lifecycle cost)	$6,846	$128,671	$280,577	$75,990	$24,999	$33,503
Approximate Annual Cost per Household	$0.45/hh	< $1/hh	$144/hh/year (estimated)	$34.35/hh	$0.83/hh	< $1/hh
Net Waste Diversion Potential (tonnes)	126	2,368	5,165	1399	460	617
Greenhouse Gas Reduction Potential in tonnes of CO_2/tonne of waste	146	288	12,450	3372	235	1,017
Equivalent # of Honda Civics taken off the road for 1 year	27	53	2,264	592	43	185
Landfill Space Savings (m3)	210	3,947	8,608	2331	767	1,028
Equivalent # of School Buses	3.5	65.8	143.5	39	12.8	17.1
Ability to be equitably implemented across region	Medium	Medium	Medium	Medium - High	Low - Medium	Medium
Accessibility and convenience	Medium	Medium	High	Medium - High	Low - Medium	Medium

6.5.1 Summary of Phase 2

Phase 2 expands recycling opportunities for residents as well as the ICI and DLC sectors. It also establishes the on-going capacity needs of the waste management and disposal system in the region.

Figure 6: Phase 2 Summary



7. PHASE 3 – LOOKING AHEAD TO THE FUTURE

Phase 3 programs are expected to be implemented in years 5-10 following adoption of the RSWMP. The focus of Phase 3 becomes more long-term than previous phases, and incorporates more in-depth investigation of potential options for long-term waste management.

7.1 Phase 3 Objectives

The objectives of Phase 3 are:

- Continue to improve existing programs and waste management system infrastructure
- Investigate long-term waste management facility options

The sections that follow describe the programs and policies that will be implemented to deliver these objectives, and connect with the guiding principles in the Plan.

7.2 Programs to Support Objective #1: Continue to Improve Programs & Infrastructure

7.2.1 Develop Construction and Demolition Materials Handling Capacity

By Phase 3, it is anticipated that the pilot programs and other activities of the C&D Waste Working Group will provide sufficient information to support a more regional approach to handling construction and demolition waste.

One area of focus will be the development of sufficient capacity within the region to sort and process construction and demolition materials for reuse and recycling, using mechanical and manual sorting to separate mixed construction and demolition waste. Once the material streams have been separated, the individual streams can be reused or recycled accordingly.

The Regional District will work with the C&D Waste Working Group to support private sector-driven development of this capacity, and maintain an enabling role to support this growth. This role may include the PRRD working with the private sector to identify suitable locations, supporting rezoning and site servicing requirements, and working with the facility to develop targeted outreach to both the residential and commercial sectors, to inform these groups of the opportunities for recycling and reuse at the facility. The construction sector, and the residential population involved in small-scale renovations will be specific targets for these educational efforts. The PRRD will also encourage the use of this facility by the construction and demolition sector through regulatory instruments, such as charging higher tipping fees on C & D waste brought to the landfills for disposal, and linking waste management during the construction/demolition activities to the planning permit process.

7.2.2 Continue Transfer Station Capital Upgrades Program

As initiated in Phase 1, this option would involve the continued upgrades and refinements of the transfer station system. This could involve the relocation of some transfer stations, as well as the expansion of others to enable the provision of a full range of waste diversion and disposal services to customers, including recycling drop-off, yard waste drop-off, and/or household hazardous waste disposal services.

7.2.3 Complete Closure of Fort St. John Landfill

Options for the replacement of the Fort St. John landfill will be explored within the timeframe of Phase 2. Once the preferred option has been identified, it will be necessary to complete final closure of the Fort St. John landfill site. It is anticipated that final closure activities will involve final capping and re-vegetation of the site in accordance with Ministry of Environment requirements. Post-closure monitoring of environmental parameters will also be required. In the event that there is a transfer station developed at the Fort St. John landfill site, the closure plan and its execution will also take this into account.

In addition to fulfilling Ministry requirements, the closure of this landfill would also serve to reduce toxicity to the environment, and reduce the overall environmental impacts associated with the region's waste management system.

7.3 Programs to Support Objective #2: Explore Long-Term Waste Management Options

7.3.1 Investigate Centralized Material Processing Facility Development

Currently, the PRRD utilizes contractor services for the processing of its recyclables, involving the shipping of sorted recyclables to processing facilities outside of the region. Under this option, the PRRD will consider the development of recyclables processing capacity within the region, potentially in partnership with a private sector operator. This would enhance the potential for the sorted recyclables to be used locally through other businesses.

The PRRD will investigate the type and suitability of materials processing facilities, based on the state of technology at the time of investigation, and the types of collection programs in place. Various types of waste processing facility will be considered, to process source-separated recyclables or a mixed waste stream. In addition, the Regional District will explore the possibility of integrating material recovery processes with other waste management technologies, e.g. waste-to-energy facility.

As part of this investigative process, it will also be necessary for the PRRD to determine its role with respect to facility development and management. Many local governments opt to contract

with the private sector for access to facilities of this nature, rather than undertake the development of such facilities directly.

7.3.2 Investigate Organics Management Options

The Regional District will consider options that expand on the yard waste diversion programs developed in Phase 1, to include the diversion of all organic waste from the waste stream, including food waste. The PRRD will undertake an investigation as to the suitability of more comprehensive organics management technologies for the region, including an assessment of:

- Various types of organics management technologies and their applicability for the region
- Potential quantities of municipal and/or agricultural organic materials as feedstock for the process
- Potential markets for the products from these technologies
- Financing and product sales options
- Location requirements
- Transportation and logistics
- Cost sharing opportunities with member municipalities and/or private sector
- Identification of potential partners or service providers

In conjunction with the agriculture sector partnerships developed through the preceding phases, this investigation may also involve determining how organics processing capacity could be jointly developed to manage both organic materials from municipal sources, as well as the agricultural industry. In particular, there may be an opportunity to manage specified risk materials (SRM) waste from the meat processing industry.

This investigation will be aimed at providing a clear direction with respect to whether an organics management facility will be feasible for the region. This will also address the financial and marketing aspects of such an undertaking, and may involve the identification of a preferred technology and/or service provider to develop the facility. This will position the Regional District to be able to make a conclusive decision on how to proceed, and the development of the facility could then be undertaken in a subsequent phase of Plan implementation.

7.3.3 Investigate Source Separated Collection Options for Organics & Recyclables

In tandem with the exploration of new waste management options to target organics or more recyclables, it will also be necessary to consider how collection services will need to change to support these new program options. The Regional District will investigate various collection mechanisms, policies and types of service, in coordination with the new waste management technologies being considered.

7.3.4 Investigate Waste-to-Energy Options

There are several systems for solid waste management involving proprietary technologies which have been developed to thermally treat waste to recover energy. Some of these processes have been in successful operation for several years, while others are newer and beginning to grow in the number of successful systems for waste treatment. Several thermal treatment and energy recovery technology options now exist, including mass burn incineration, fluidized bed incineration, two-stage starved air combustion, gasification, pyrolysis and bio-oil production. Supported by improvements in energy recovery components such as boilers and turbines, thermal treatment of waste, primarily by mass burn incineration, currently represents the second most common method of treating waste, after landfilling.

Whether or not a centralized waste sorting and processing facility is developed, there may be an opportunity to look at waste-to-energy solutions for managing waste in the PPRD in the long-term. Depending on the outcome of the initial investigation undertaken in Phase 1, the PRRD may wish to look at facility development options, technologies and potential locations for the development of a waste-to-energy facility. As time progresses, improvements in the technologies currently available or the emergence of new processes, may also support more in-depth investigation by the PRRD.

This option would represent the fourth “R” – resource recovery – in the 5Rs hierarchy, and would therefore be implemented only after other waste diversion strategies focus on the first 3Rs – reduction, reuse and recycling – have been maximized.

7.4 Triple-Bottom Line Evaluation

Triple bottom line evaluations were undertaken for those programs with a significant financial cost associated with them, or where the impacts of the program could have a noticeable environmental or social benefit. In those cases where the suggested program is primarily related to policy changes or decisions to be made internally by the PRRD, no formal evaluations were performed. Table 7 summarizes the triple bottom line evaluations for the continued upgrade of the transfer stations, the only option in Phase 3 that was assessed from a triple bottom line perspective.

Table 7: Triple Bottom Line Evaluations for Phase 3

TRIPLE-BOTTOM LINE CRITERIA	VALUE
Capital Cost ($)	$576,000
Annual Operating Cost ($)	$500,000
Operating Cost per tonne	$177
Landfill life cycle cost savings (based on $54/tonne lifecycle cost)	$37,995
Approximate Annual Cost per Household	$19.70/hh
Net Diversion Potential (tonnes)	699
Greenhouse Gas Reduction Potential in CO_2/tonne of material	1,686
Equivalent to taking this many Honda Civics off the road for 1 year	296
Landfill space savings (cubic metres)	1,166
A volume equal to this many school buses	19.4
Ability to be equitably implemented across region	Medium
Accessibility and Convenience	Medium - High

7.4.1 Resource Allocations for Feasibility Studies

A large area of focus for Phase 3 is the investigation into the feasibility of several long-term waste processing and disposal options. Some of these options could offer good long-term solutions for the region's residents and businesses, but will require in-depth evaluations as to their financial and technical viability, and the approach to their implementation.

No formal triple bottom line was undertaken for these activities, since they are essentially research-based steps rather than actual programs. In terms of resources, the Regional District will provide an allocation of $50,000 to $100,000 depending on the exact scope of the work, to undertake the feasibility assessments.

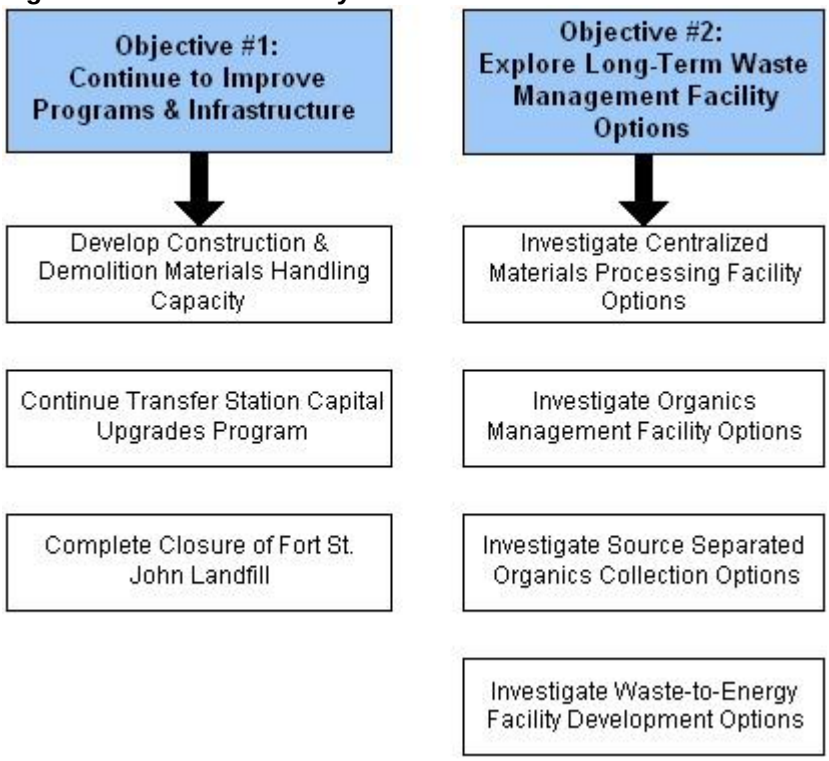
7.4.2 Resource Allocations for Disposal Capacity Development in Phase 3

No formal evaluations of the development of new disposal capacity and the closure of the Fort St. John landfill were undertaken, as these activities relate only to the management of residual materials and will not contribute to further waste diversion. Detailed budgets for these activities will be prepared closer to the time of actual implementation, to reflect more accurately the current conditions at the time.

7.4.3 Summary of Phase 3

Phase 3 sets the stage for the consideration of more complex, centralized waste management technologies or facilities, along with the continuation of programs begun in earlier phases.

Figure 7: Phase 3 Summary



8. FUTURE IMPLEMENTATION PHASES

It is anticipated that the investigative steps in Phase 3 will assist the PRRD in determining what programs and policies should be incorporated into future phases of the Plan. The PRRD also expects to have completed a review of the RSWMP by the time Phase 3 ends, which would be used to provide more detailed direction on how to proceed with future implementation phases. New emerging technologies and funding availability may also determine the priority given to pursuing these programs.

Other aspects that may become part of future phases include:

- Continued improvements and upgrades to existing infrastructure as needed
- Expansion of programs in keeping with the growth of the region and the needs of the various communities
- Development of new landfill capacity, likely through the expansion of existing regional landfills as per their respective development plans
- Final closure of partially closed landfill sites
- Post-closure monitoring of closed landfills

It is important to recognize that although the specifics of future phases may as yet be undetermined, the Regional District will continue to develop programs to support the overall objective to advance the diversion of waste from landfill, by employing comprehensive waste management technologies, as well as continuing the support of existing waste diversion programs.

9. PLAN MANAGEMENT & ADMINISTRATION

9.1 Management of Waste Management Function

The PRRD will administer the Plan through financial and contract management and will be responsible for performance measurement against the Plan as it is implemented. Financial management will consist of preparing and administering annual budgets and collecting revenues through user-fees, taxation and revenue from recycling and other activities as appropriate. Contract management will consist of tendering for services and administering those contracts as needed.

The waste management services function will continue to be administered as a single region-wide function. Funding for the function will come from a combination of user fees, tipping fees, tax revenue and municipal requisitions, along with revenues from the sale of recyclable materials or other fee-based services provided by the PRRD as part of the waste management function.

9.2 Implementation Governance

9.2.1 Solid Waste Committee

The Regional District will maintain a Solid Waste Management Committee, to oversee the implementation and management of the Plan. This Committee will be made up of appointed members of the Regional District's Board of Directors. This Committee will be responsible to make recommendations to the PRRD Board of Directors to support the successful implementation of the Plan.

9.2.2 Plan Monitoring & Advisory Committee

Under this Plan, the Regional District will form a Plan Monitoring & Advisory Committee (PMAC). This Committee may be made up of representatives from:

- Member municipalities staff
- PRRD waste management staff
- PRRD waste management contractors or partners
- Public agencies such as the Ministry of Environment
- First Nations representatives within the region
- Private and non-profit sectors
- Industry and institutional representatives
- The general public

To establish the PMAC, the Regional District will develop a set of Terms of Reference for the Committee, and recruit members through direct contact, as well as general open invitations. The selected members of the PMAC will be confirmed by the Board of Directors.

The role of this Committee would be to monitor the implementation and effectiveness of the Plan, and to identify concerns and issues that may arise in the implementation process. It is anticipated that this group will also act as a "sounding board" for the PRRD to review results of pilot programs, and make suggestions regarding how programs should be implemented. Recommendations of this Committee will be forwarded to the Solid Waste Committee and Board of Directors for approval and recommendation for action.

9.2.3 Performance Measurement & Reporting

The Regional District recognizes that there will need to be on-going monitoring of the implementation process, to identify and report out on how successful programs have been in achieving the desired objectives, and the overall goals of the Plan. To support this, there are a number of information-gathering activities such as the tracking of waste generation, and the performance of waste composition studies, that have been directly incorporated into the Plan.

To build on these steps, the Regional District will develop a standard Report Template that will be used to update the Board, the Plan Monitoring and Advisory Committee and any other stakeholders as to the progress of initiatives. It is suggested that this Report Template will encompass the following information:

- Program Phase and Name
- Status of implementation, including a statement of baseline conditions
- Expected costs and staffing resource requirements
- Expected outcomes
- Timelines for implementation
- Supporting policy requirements
- Supporting education requirements
- Partnership agencies and involvement levels

This Reporting exercise should be applied at least annually in conjunction with annual financial planning, to focus attention on the programs to be undertaken in the coming year, and to support the overall implementation process.

9.2.4 Augmentation of Staffing Resources to Support Implementation

It is recognized that the implementation of this Plan will require a considerable incremental effort over the current staffing complement at the Regional District dedicated to solid waste

management issues. The Regional District will forecast additional resource needs, and meet these needs through a combination of resources that may include additional staff, education and promotion contractors, facility operations contractors, technical consultants, partnerships with other organizations and volunteers.

9.2.5 Dispute Resolution

Given the complexity of the Plan, the number of stakeholders and the varying interests addressed in the Plan, the possibility exists that disputes may occur during implementation of the Plan, and through the process of amendments to the Plan that may arise in future. This section establishes a dispute resolution procedure for addressing such issues as disputes arising from administrative decisions made by the Regional District, interpretations of plan activities and services, economics, land tenure, jurisdictional responsibility or other issues. The structure presented below is intended to resolve disputes in a timely and cost-effective manner.

- The parties having a dispute must make all reasonable effort to come to an equitable agreement without outside intervention, before proceeding to the next step.
- Should the parties determine that an agreement is not within reach, the Plan Monitoring and Advisory Committee and/or the Solid Waste Management Committee will then be utilized as a mediator between the parties. Any member of the PMAC or the SWMC directly involved with the parties or in a relationship that may be perceived to be a conflict of interest with regard to the dispute will not be granted voting/motioning privileges, but will remain an active participant in all discussions. All attempts will be made to reach an agreement.
- Should an agreement still not be achievable, the Regional Board will be called upon to act as a mediator. The disputing parties must both agree with referring the dispute to the Regional Board, and agree that the Regional Board's decision will be binding.
- Should the Regional Board be unable to resolve the dispute, an arbitrator may be assigned, the cost to be shared equally between the disputing parties. The reporting materials provided to the PMAC, SWMC and the Regional Board shall be provided to the arbitrator, who will review the report and make any inquiries he/she feels necessary to resolve the dispute. The arbitrator's decision shall be submitted to the Regional Board in writing, and the dispute will be considered resolved when the arbitrator's decision is approved by the Regional Board and the dissenting parties.

9.3 Plan Flexibility, Review and Amendment

This Plan represents the current understanding and approach to the solid waste management challenges being faced by the Regional District. The version of the Plan that is formally adopted will be considered a "living document" that may be amended to reflect new considerations, technologies, and issues.

9.3.1 Plan Implementation Flexibility

Due to changing circumstances and priorities that may evolve over time, and with the input of the stakeholders, all major components of the Plan will be reviewed for appropriateness before implementation. This will generally occur on an annual basis when the PRRD's five-year financial planning process is initiated. The Plan's implementation schedule will be flexible enough to reflect the variability in the availability of technologies that may arise over time, as well as the potential changes in regional issues and priorities that may arise. In addition, it will also take into account the financial priorities of the Regional District, its member municipalities and other partners, the availability of funding to undertake activities, and the availability of contractors and service providers.

9.3.2 Plan Review & Amendment

It is anticipated that the Plan will be reviewed periodically and as programs are implemented; this will happen at least once every 5 years. Subsequent phases (beyond the four currently defined) may be identified as the need arises.

The Regional District also recognizes that there may be a need to amend the Plan from to time, to more accurately reflect the waste management system in place in the PRRD. The Regional District will employ an amendment process that remains consistent with the guiding principles of this Plan, the policies outlined in this section, and that reflects the requirements of the Guidelines for Plan Development and the provisions of the Environmental Management Act.

9.4 Compatibility with Other Environmental Initiatives

On September 26, 2007 local governments from across BC signed a Climate Action Charter with the Province and the Union of BC Municipalities to commit to the goal of carbon neutrality by 2012. The PRRD is a signatory to the Climate Action Charter, and plans to take steps towards these targets.

This commitment from the provincial government may result in some opportunities for funding of recycling and waste management plans, organics recovery options, greenhouse gas local plans, and other programs geared towards carbon neutral municipal operations and should be leveraged by the Peace River Regional District. This may result in some of the later options becoming more feasible at an earlier stage of the Plan's implementation, as priorities and potential funding opportunities shift to reflect these goals.

10. PLAN FINANCES

The Regional District currently funds the solid waste management function through a combination of tipping fees and taxes, with a 50-50 split being the ideal. The Regional District will continue to use both tipping fees and taxes to fund the programs in the Plan. As indicated in the guiding principles, the PRRD will support the use of user pay and other market incentives to obtain funds to support particular activities, especially where the use of market incentives will support the desired outcomes of the programs.

The programs and policies outlined in this Plan will require the Regional District to commit financial resources in each year of Plan implementation. The standard five-year financial planning model will be applied to the development of financial projections and budgets for the implementation of the Plan, as part of the on-going budget process for the Regional District's solid waste management function.

GLOSSARY

TERM	DESCRIPTION
Anaerobic Digestion (AD)	A biological process using microbes to break down organic material in the absence of oxygen. Digestion takes place in an enclosed chamber, where critical environmental conditions (e.g. moisture content, temperature and pH levels) can be controlled to maximize microbe generation, gas generation and waste decomposition rates.
Bulky Waste	Large items of waste materials, such as appliances, furniture and large auto parts.
Construction and Demolition (C&D) waste	The portion of MSW originating in the demolition, land clearing and construction sectors. Also may be referred to as DLC waste
"Clean" materials recovery facility	Material is collected in a source-separated program, where contamination is minimal.
Combined Heat and Power (CHP)	The combined generation of heat and electric power from a thermal treatment process for waste. Also known as co-generation.
Commingled	Recycling programs where a number of different materials are mixed together rather than collected separately.
Composting	A biological process whereby organic matter is decomposed through microbial activity, in the presence of oxygen, to produce a peat like humus.
Contamination	Material that is inadvertently collected as part of a recycling or organics program and that must be removed before processing or marketing.
Co-collection	The collection of recyclables and organics together with municipal garbage in one truck; separated later for recycling and composting/digestion or disposal.
Collection	The process of picking up waste, recyclables, or compostable materials from a household or business.
Demand Side Management (DSM)	A utility program aimed at reducing consumer use of a service, such as waste services or electricity, through reduction, conservation or efficiency measures.
Disposal bans	Regulation prohibiting disposal of materials or products (e.g. yard waste, or lead-acid batteries) in landfills and/or incinerators; typically targeted at items that contribute substantial volume or toxicity to the solid waste stream
Diversion (of waste)	The redirection of generated wastes away from disposal through reuse, recycling, or recovery. It does not include source reduction.
Demolition, Land clearing & Construction (DLC)	The portion of MSW originating in the demolition, land clearing and construction sectors. Also referred to as C&D waste.
Drop-off/Depot	Facilities (staffed or unstaffed) where the public brings recyclables materials, organics or garbage for management by the municipality.

Extended Producer Responsibility (EPR)	Extended Producer Responsibility (EPR) (sometimes referred to as Industry Product Stewardship) is an environmental policy approach in which the producer's responsibility for reducing environmental impact and managing the product is extended across the whole life cycle of the product, from selection of materials and design to its end-of-life.
Fibre	Paper materials, such as cardboard, newsprint, and mixed papers.
Green Energy	Energy generated from renewable resources through licensable and environmentally and socially responsible projects—to contribute to meeting future demand for electricity
Hierarchy (for waste)	A hierarchy method for solid waste management. The following practices are ranked in order of preference: source reduction; reuse; recycling; energy and materials recovery; and landfill disposal.
Industrial, Commercial & Institutional (ICI)	The portion of MSW originating in the light industrial, commercial and institutional sectors.
In-vessel composting	Composting involving a closed tank or unit with physical controls
Multi Family unit (MFU)	Multi family residences including apartments, condos, duplexes and townhouses.
Mixed Paper Products (MPP)	The mixed paper portion of the paper products. Includes office paper and boxboard. Does not usually include newspapers, magazines and corrugated cardboard.
Materials Recovery Facility (MRF)	A facility where recyclable materials (such as glass, metals, plastics or paper) are separated and processed into marketable materials.
Municipal Solid Waste (MSW)	The solid waste stream from residential, ICI and DLC sources.
Old Corrugated Cardboard (OCC)	Corrugated cardboard that has been separated for recycling. Corrugated boxes have a fluted, corrugated medium layer (rippled layer), sandwiched between layers of linerboard.
Organics	The organic fraction of the waste stream, consisting of material that is biodegradable, typically food, yard waste, and sometimes paper.
Old News Paper (ONP)	Used newspapers that have been separated for recycling.
Old Magazines (OMG)	Used magazines that have been separated for recycling.
Processing	Preparation of solid waste for sale to markets through such activities as hand-sorting, magnetic and/or mechanical separation or shredding, composting or digestion.
Product stewardship	Also known as Extended Producer Responsibility, product stewardship is an environmental policy approach in which the producer's responsibility for reducing environmental impact and managing the product is extended across the whole life cycle of the product, from selection of materials and design to its end-of-life.
Reuse	The use of product, such as refillable beverage bottle, more than once, possible with slight modification.
Source separation	The separation of materials suitable for recycling or composting from the rest of solid waste at the source of generation (e.g. households, businesses).

Source Separated Organics (SSO)	A system whereby organics are separated by householders according to municipal guidelines. The separation occurs “at source” i.e. organic materials are separated from other garbage at the point when they are produced
Tipping Fee	The fee charged at a landfill, waste-to-energy plant or other waste handling facility for the service of handling MSW.
Triple Bottom Line (TBL)	Triple bottom line accounting means expanding the traditional reporting framework to take into account environmental and social performance in addition to financial performance.
Waste stream	The waste output of a community, region or facility. Total MSW is categorized into different waste stream components (e.g. organic waste, construction waste, paper products etc.)
Waste-to-Energy (WTE)	A general description for the process by which MSW is converted to a usable form of energy, generally through incineration or other thermal treatment process
Wet/dry waste	Wet waste is the organic or compostable portion of waste and dry wastes are wastes that can be collected for recycling.
Windrow Composting	Composting process whereby piled organic material is placed in a series of rows, usually two meters deep. The rows are turned periodically for natural aeration.
Yard Waste	Yard and garden wastes from the residential or ICI sectors including leaves, grass clippings, cuttings etc.

LIST OF ACRONYMS

AD	Anaerobic Digestion
C&D	Construction and demolition
DSM	Demand Side Management
FCM	Federation of Canadian Municipalities
GHG	Greenhouse gases
IVC	In-vessel composting
LFG	Landfill Gas
MFU	Multi Family Unit
MPP	Mixed Paper Products
MRF	Materials Recovery Facility
MSW	Municipal Solid Waste
OCC	Old corrugated cardboard
ODS	Ozone depleting substance
ONP	Old newspaper
OMG	Old Magazines
PRRD	Peace River Regional District
TBL	Triple Bottom Line
tpa	Tonnes per Annum
tpd	Tonnes per Day
VOC	Volatile Organic Compounds
$/hh	Cost in dollars per household

APPENDIX A - TRIPLE BOTTOM LINE ANALYSIS

Very early on, the Advisory Groups and the PRRD recognized that more than "just dollars" should be considered when assessing the cost-benefit profile of various options. As a result, the consideration of a range of social, environmental and financial factors was included as a guiding principle. This approach to evaluating options is also known as a 'Triple Bottom Line" (TBL) assessment. This approach provides a way of evaluating options that takes into account more than just financial cost or value by incorporating indicators of social and environmental benefits, to provide a more holistic understanding of options for the Plan.

Even though there is a clear understanding that environmental and social values exist, measuring these values is more challenging. While there is considerable work being done on environmental and social economics, the PRRD understood that detailed analysis for the region was well beyond the scope of the Plan. To represent the triple bottom line, key indicators were used to provide a representative picture of environmental and social costs and benefits, along with a range of financial parameters. The full range of possible parameters is shown in the table below, although available information varied from program to program.

Table 1: Triple Bottom Line Evaluation Criteria

PARAMETER TYPE	CRITERIA
Financial	Capital Cost ($)
	Annual Operating Cost ($)
	Operating Cost per tonne ($/tonne)
	Approximate Cost per Household ($/household)
	Landfill cost savings (based on $54/tonne lifecycle costs)
Environmental	Net Waste Diversion Potential (tonnes)
	Greenhouse Gas Reduction Potential in tonnes of CO_2/tonne of waste and equivalent # of Honda Civics taken off the road for 1 year
	Landfill space savings in cubic metres, and equivalent volume in # of school buses
Social	Ability to be equitably implemented across region
	Accessibility and convenience

Since this is a high-level plan, exact costs, sizes and configurations of programs and services are still to be determined. However, there was also a need to provide information about

potential costs and benefits of implementing the various programs. The following sections outline how the values for each option were determined.

Capital Costs

Capital costs were determined as the costs of upfront activities, e.g. equipment purchases or facility construction. They include soft costs such as financing, engineering and project management. Capital costs exclude cost of land, business licensing, rezoning, permitting and any requirements to construct bench or pilot scale facilities as precursors to full scale plant development. Existing facilities were used where possible to estimate costs for components, or scaled based on the total facility cost to the appropriate size for PRRD.

The PRRD may opt to fund capital work through the use of reserve funds, or borrow money to perform the necessary work. However, it is unknown at this time which capital costs will be financed by which methods. To address this, it was decided that total capital costs would be reported, and that it would be assumed that the capital costs would be spread out only over the duration of the phase in which they were needed in determining annual capital cost requirements. It is important to note that this may therefore be more of a "worse case scenario" in that capital costs might be spread over longer periods, thereby reducing the annual capital cost needs.

Annual Operating Costs

Operating costs are those costs associated with the day-to-day operation and maintenance of a facility or program. This includes staffing, energy, supplies and equipment, and insurance. These costs were based on estimates for existing facilities or programs and the building of operating cost profiles. No revenues, e.g. from product or energy sales, have been accounted for in the financial evaluations.

Operating Cost per Tonne

This was derived from the total operating cost, divided by the expected annual net tonnage that could be diverted by implementing the program.

Approximate Cost per Household

It was recognized that most residents would be best able to judge the financial implications of a program by considering the "cost per household" rather than an estimate of total costs. To determine this, the PRRD identified the following information:

- For every $100,000 in funding that the PRRD needs to raise, there needs to be a charge of $0.01 per $1000 of assessment, with the current PRRD tax base

- This is the residential rate, and there may be multipliers applied to this rate for utilities, industry and businesses
- An "average household" assessment value of $250,000 was used to determine the approximate cost per household.

Lifecycle Landfill Cost Savings

In order to understand the full implications of diverting waste from the landfill, it was necessary to look at the potential cost savings over the entire life of the landfill. To do this, the following were considered:

- Landfill siting, preliminary investigation and public consultation to select a landfill site
- Landfill construction costs over the whole life of a landfill
- Landfill operating costs over the whole life of a landfill
- Environmental Monitoring costs per year, for the whole operating life of the landfill
- Closure costs at the end of the landfill's life
- Post-closure environmental monitoring costs, for a mandated 25-year period following the closure of the landfill
- The total capacity of the landfill for waste, as a volume in cubic metres
- The estimated compaction level in the landfill, assumed to be 0.6 tonnes/cubic metre

The Bessborough Landfill was used as a template for developing these costs, as the most recent construction and landfill life and capacity information is available for this site. The total life cycle cost of the landfill was computed, and divided by the total capacity in cubic metres to determine a cost per cubic metre, and a cost per tonne using the compaction density. The following were the results:

- Lifecycle Cost per cubic metre = $\$33/m^3$
- Lifecycle Cost per tonne = $54/tonne

The lifecycle cost per tonne was used to calculate the lifecycle savings achieved by diverting waste from the landfill.

Net Diversion Potential

The net diversion potential relates to the amount of material that could be diverted from landfills, less any waste resulting from this program that cannot be otherwise handled. For example, the net waste diversion potential from a yard waste composting operation would be the amount of

yard waste kept out of the landfill, less any “non-compostable” materials such as rocks or pieces of plastic that may be contained in the yard waste and need to be landfilled.

Determination of the net waste diversion potential is also dependent of the amount of the material being targeted that occurs in the waste stream. Generally, this is established through a waste audit at the landfill facilities, to assess what is being put in the landfill. As noted previously, the PRRD has not undertaken a formal waste audit, and therefore there is a factor of uncertainty with respect to waste composition. However, waste composition date from the Thompson Nicola Regional District and the Regional District of Fraser-Fort George was used to develop waste diversion estimates for the PRRD.

Table 2 shows the average waste composition (by weight) based on the 13 primary categories used to identify the overall waste stream, based on the data used.

Table 2: Assumed Waste Composition in PRRD Landfills

PRIMARY CATEGORY	PERCENTAGE COMPOSITION
Paper & paperboard	24.06%
Glass	4.28%
Ferrous Metals	4.27%
Non-Ferrous Metals	1.03%
Plastics	13.28%
Organic Matter	24.95%
Wood & Wood Products	5.99%
Construction & Demolition Materials	5.39%
Textiles	5.64%
Rubber	1.25%
Composite Products	8.29%
Hazardous By-Products	1.55%
Other	0.02%
Total	100.00%

The final refinement to the waste composition information was the application of an assumed combination of food waste and yard waste to make up the total organic component. It was assumed that 40% of the organic fraction was yard waste, and 60% food waste.

Waste generation data from 2006 was used as the baseline year for determination of waste quantities. Table 3 summarizes the waste quantities received for disposal at the four regional landfill sites in 2006. Materials received for recycling at these sites was excluded, as this material is already being successfully diverted from landfill.

Table 3: 2006 Waste Disposal Tonnages

Facility Name	2006 Total Waste Disposed (tonnes)
Fort St. John Landfill	39,898
Rose Prairie Landfill	2,000*
Bessborough Regional Landfill	18,145
Chetwynd Landfill	7,399

* estimate only, no weigh scale on site

The percentage composition data was applied to the total amount of waste landfilled from all four regional facilities. This provided an estimate of the quantities of the various material types on the waste stream. Diversion potential was based on these assumed quantities of material, as well as conservative estimates about the participation rates and capture rates that could be achieved for this material. The participation rate is determined as the percentage of the target group, e.g. residents, that is likely to regularly participate in a program. The capture rate is more material-related, and refers to the portion of a given material that is likely to be readily diverted, e.g. materials typically ending up in a recycling program as compared with smaller amounts that may become litter, and therefore not recycled.

In general, the following were assumed, although other rates may be used as appropriate:

- A participation rate of 75% for programs which involved curbside collection of material, e.g. curbside recycling programs, as it is anticipated that the ease of use will cause participation levels to be high. This participation rate was also used for some ICI programs where it was assumed that significant education efforts targeting this sector would drive participation levels up.
- A participation rate of 50% for drop-off programs, where residents would be required to make a greater effort to participate in the program
- Capture rates of 5% - 50% depending on the type of material and the type of program

The proportion of the total waste stream contributed by each sector was also taken into account. Where a program or service was expected to consider only one sector's waste, e.g. residential,

the capture and participation rates were applied only to the residential portion of the waste stream. Provincial averages for waste generation were used.

It should be noted that in some cases where proposed program options target very specific materials, estimates of diversion potential were unable to be determined, as these categories were not identified separately. For example, one of the potential programs proposes new opportunities for agricultural plastics such as silage wrap, but as all plastics were grouped together, the specific diversion associated with removing silage wrap from the waste stream could not be determined at this time.

Greenhouse Gas Reduction Potential

It is recognized that the implementation of waste diversion programs can have a positive impact to reduce the amount of greenhouse gas emissions that would otherwise arise if the material was landfilled. The amount of greenhouse gas reductions is linked to the type of program or process, as well as the types and quantities of material targeted. Greenhouse gas emissions associated with different programs are based on case studies for different technologies and a representative range of materials in the typical municipal waste stream. These greenhouse gas emissions should be viewed as order of magnitude estimates only, as the actual greenhouse gas emissions will be directly influenced by the specifics of the waste being treated, and the technology or process being applied. Since precise locations of facilities were unknown, no calculations for emissions based on transportation were performed.

A model was used to relate the amounts of material recycled, composted or otherwise diverted from landfill, to greenhouse gas emissions reductions. Since there are many different types of greenhouse gases including carbon dioxide or CO_2, the industry standard is to express the amounts of the various different gases in equivalent amounts of CO_2, which results in the units of "tonnes of CO_2 equivalents".

Greenhouse gas emissions for the Honda Civic were based on standard annual fuel consumption estimates for an annual distance traveled of 25,000 km, with 55 percent city and 45 percent highway driving. Under these parameters, a 2007 automatic Honda Civic produces about 5.7 tonnes of CO_2 eq/year.

In order to make this simple to visualize, the greenhouse gas emissions reductions were presented in terms of "number of Honda Civics taken off the road for 1 year". This is because the savings or reductions are annual, and would occur each year the program was in place.

Landfill Space Savings

This is the amount of space that materials to be diverted would take up in the landfill. It is based on the net diversion potential tonnage and the space taken up per tonne of material.

To assist in visualization, the landfill space savings were converted to an equivalent number of school buses. The typical "big yellow school bus" has a volume of about 60 m^3.

Accessibility and Convenience

All programs or services were rated with these social parameters, as indicators of how easy it would be for residents in the PRRD to access and use the programs. Programs and services that were offered directly to residents, e.g. collection of materials at the residence, were ranked as "High" in these terms, while programs that required more effort on the part of participants were scored lower.

Ability to be Implemented across the Region

As outlined in the guiding principles, there was a need to prioritize those programs that could make access to service more even for both rural and urban areas. Programs that could readily be implemented region-wide scored best, while those programs that were more suited to one or the other scored less favorably.