

DISCUSSION PAPER NO. 2

Capital Regional District

Core Area and West Shore Sewage Treatment Decision Information Report

Triple Bottom Line Criteria

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1 Objective

The Capital Regional District (CRD) is required by the Provincial Ministry of Environment to provide additional treatment to the municipal wastewater flows generated in the Core Area and West Shore areas. By June 2007, the CRD must define the number and location of facilities and set a time frame for the implementation of additional treatment.

While the CRD is in a unique position to evaluate many alternatives for treatment and conveyance, the choices are not unlimited and sites are constrained by the linear nature of conveyance facilities and key engineering constraints for treatment facilities. A system of treatment plants, conveyance lines and pump stations must ultimately be sited as essential public facilities to achieve the goals of the Liquid Waste Management Plan (LWMP), to protect public health and to achieve environmental standards.

The objective of this Discussion Paper is to propose possible sustainability goals and criteria, as a starting point to help the CRD select a wastewater management strategy which best achieves a balance between the social, economic and environmental costs and benefits of implementing further treatment.

2 The Triple Bottom Line Approach

The approach we are using to select and screen sites and routes is to first select those sites that meet fundamental requirements to be considered candidate sites. These criteria are considered essential for a treatment plant site and provide the coarse screen by which candidate sites can be selected. Engineering factors are, necessarily, the more dominate factors in the coarse screen.

The coarse screening criteria will be used to select candidate sites from a larger list of potential sites. Remaining sites will be the "Candidate Sites and Wastewater Transmission Routes" to be evaluated using design and sustainability criteria to be established by the Steering Committee. The engineering criteria are being developed under a separate discussion paper. This paper will set the design criteria that must be met in the selection of technology and in the planning of the wastewater treatment plants.

2.1 Triple Bottom Line Framework

The TBL framework provides a very robust structure for evaluating alternative sites and routes. It is designed to provide decision makers with a framework to understand the cost and benefits of alternatives across a spectrum of social, economic and environmental attributes. In this way, a more balanced view of alternatives is created rather than one that relies on cost or only quantifiable factors.

The TBL outcome should not be used as a final decision. A TBL evaluation is best used when used as a guide for decision makers. It is a tool that can be used to look at numerous options (often a large number of options). It also allows decision makers to vary or weight criteria to discover those criteria that have the greatest influence on differentiating alternatives. However, it remains only a tool. TBL is a guide and not a substitute for the application of policy that may have more global importance than just wastewater management.

2.2 Establishing Goals and Criteria

The TBL structure recommended for the CRD establishes a goal criteria hierarchy for each of the three key areas:

- social and community
- economic
- environmental

For each goal a set of criteria are selected to measure how well an alternative achieves the particular goal. Any number of goals and criteria can be selected. However, the evaluation process will normalize the evaluation so that no one key area is unduly weighted because of the number of goals or criteria used to evaluate alternatives.

In establishing goals and criteria, a number of important rules must be followed to maintain an objective evaluation process. Those rules are:

- Independent
- Non-duplicative
- Measurable
- Exhaustive or comprehensive

This structure and rules assures a very objective approach to evaluating alternatives and facilitates the documentation of the evaluation. Documenting why a particular alternative achieves certain goals better than another is critical to public confidence in the process and assist in responding to challenges to a final decision.

2.3 Establishing Measurement Scales

In order to measure how well an alternative achieves the goals for each key area of the TBL, there are three steps to be undertaken:

Step 1 - Set up the Evaluation Questions

For example, what are the joint use opportunities at a site? Or, what are the water reuse opportunities at the proposed site? For each criterion, evaluation questions will be established and used to evaluate the alternatives. Establishing the questions and validation will occur during subsequent phases of the project.

Step 2 - Establish a Scale for Goal Measurement

This scale allows both monetary and non-monetary criteria to be placed on an equal footing in the TBL evaluation. Once the criteria are selected, the scales will be developed and validated with the Steering Committee. Scales will be developed and validated during subsequent phases. As an example, a scale could be used to rate how well an alternative achieves a goal on a scale of 1 to 10. The following chart illustrates how this might be used to rate a technology.

**Table 2-1
 Sample Utility Scales for Sustainability Criteria**

	Knowledge Base for Required Technologies		Contribution to Economic Development
Value	Utility	Value	Utility
0	Key technology only based on bench-scale or very limited pilot-scale results	0	Significant detriment to economic development
2	Key technology based only on limited full-scale experience where operating mechanisms and design/operating principals uncertain	3	Modest detriment to economic development
5	Limited full-scale experience for key technology but operating mechanisms and design/operating principals well defined and understood	5	Not identifiable impact on economic development
7	Several successful full-scale examples for key technologies and operating mechanisms and design/operating principals well defined and understood	7	Modest contribution to economic development

	Knowledge Base for Required Technologies		Contribution to Economic Development
Value	Utility	Value	Utility
10	Uses well established and characterized industry-standard technology	10	Significant contribution to economic development

Step 3 - Apply the Criteria

The final step is to apply the criteria to each alternative being considered and to document the achievement of goals for each alternative. Evaluation of the alternatives will be completed during Phase 3 and reviewed during the Phase 3 workshop.

3 Coarse Screening Criteria

The first part of the site selection process is to narrow down the number of potential sites. This is done through a negative attribute coarse screening process, where sites are eliminated from further consideration.

The following criteria are suggested for coarse screening potential of sites and wastewater conveyance routes from further consideration.

- Site has ownership restrictions
- Site is too far from the core area of wastewater generation
- Site is too high in elevation relative to the core area of wastewater generation
- Site is too small
- Site shape is inadequate - length to wide ratio is greater than 10:1
- Site is within earthquake fault zone
- Site slopes are greater than 30%
- Site is located in flood plain
- Site is a designated hazardous waste site
- Site is designated natural habitat
- Site is a designated historical site
- Site is a cemetery

4 Sustainability Criteria

The sites and routes remaining after the coarse screening are considered “candidate” sites and routes. They would then be subjected to the TBL sustainability criteria.

The suggested criteria are shown in Table 4-1. We propose that these criteria remain in “draft” through the next phases of the decision information process. They can thus be revised or added to as required by subsequent discussions with the Steering Committee.

**Table 4-1
Sustainability Criteria**

Social/Community	Economic	Environmental
Goal: 1.0 Minimize community disruption	Goal 1.0 Minimize impact on tax payers	Goal 1.0 Minimize disruption to terrestrial systems
Criteria 1.1 - No detectable odours	Criteria 1.1 - Lowest life-cycle costs	Criteria 1.1 - Avoid removal or diminishing of wetlands and wetland value
Criteria 1.2 - Meet or do better than community standards for noise decibels.	Criteria 1.2 - Site/conveyance configuration provides opportunity for phased implementation	Criteria 1.2 - Avoid disruption of rare or endangered species or rare habitats
Criteria 1.3 - Minimize traffic disruption during construction	Criteria 1.3 – Opportunity to optimize existing wastewater infrastructure	Criteria 1.3 - Avoid removal or disruption of fish spawning and rearing areas
Criteria 1.4 - Minimize traffic disruption during operations	Criteria 1.4 – Opportunity for partnerships in energy and waste management	Criteria 1.4 – Avoid sensitive marine and terrestrial habitat areas
Criteria 1.5 - No detectable vibration		Criteria 1.5 - Avoid critical green / blue space areas
		Criteria 1.6 – Avoid removal of land from the Agricultural Land Reserve
Goal: 2.0 Create opportunity for on-site mitigation	Goal 2.0 Support economic development	Goal 2.0 Create opportunities for reuse of treated effluent
Criteria 2.1 - Site can be screened and or buffered from view.	Criteria 2.1 - Site provides opportunity for future expansion to support community growth	Criteria 2.1 - Treatment technology and site/conveyance configuration maximizes potential for water reuse

Social/Community	Economic	Environmental
Criteria 2.2 - Restoration of brown-field/redevelopment possible	Criteria 2.2 - Site provides opportunity for future expansion to meet regulatory requirements	Criteria 2.2 - Site/configuration provides proximity to identified re-use sites
	Criteria 2.3 - Site provides opportunity for re-development of existing land-uses	Criteria 2.3 - Site/configuration provides opportunity for stream and groundwater augmentation.
	Criteria 2.4 – Support opportunities for environmental research or operator training	Criteria 2.4 – Provide opportunity for environmental improvement or mitigation.
Goal 3.0 Site offers opportunity for community joint use	Goal 3.0 Flexible system for future operations	Goal 3.0 Achieve lowest net energy use
Criteria 3.1 - Community recreational opportunities can be developed on-site	Criteria 3.1 – Sewerage area flow management options are increased	Criteria 3.1 - Site and conveyance configuration maximize use of gravity flow
Criteria 3.2 - Environmental education opportunities can be developed on-site	Criteria 3.2 - Total conveyance length and pump station requirements reduce asset “cost of ownership”.	Criteria 3.2 - Treatment technology has lowest net energy requirements
		Criteria 3.3 - Site and conveyance configuration provide opportunities for energy development through heating and cooling systems
Goal 4.0 Minimize disruption of cultural resources		Goal 4.0 Recovery and use of biosolids as a resource not a waste
Criteria 4.1 - Avoid disrupting, removal of historic, cultural or archaeologically significant resources		Criteria 4.1 - Maximize use of biosolids in land reclamation, silviculture and agriculture.
		Criteria 4.2 - Provide opportunities for diversified biosolids use

Social/Community	Economic	Environmental
Goal 5.0 Protect public health and safety		Goal 5.0 Create opportunity to resolve or assist in solution of other regulatory requirements or environmental goals
Criteria 5.1 - Minimize chemical use and storage		Criteria 5.1 - Reduce discharge of untreated wet weather flows.
Criteria 5.2 - Minimize overflows and spills		Criteria 5.2 - Reduce discharge of sanitary sewer overflows.
		Criteria 5.3 – Reduce the emission of green house gases.
		Criteria 5.4 – Reduce the transportation requirements for site access or materials haulage