

### **Introduction**

When individuals argue against treatment for Core Area sewage, they claim the environmental benefits do not justify the high cost of a treatment plant. The cost estimate offered by the CRD to decision-makers and the public is \$447 million for a plant at Macaulay Point and one at Clover Point, leading to an annual per household cost of \$573 per year. At the same time, residents of North Saanich and Sidney currently pay only 1/5 of this rate - about \$108 per home per year for treatment through the CRD's Saanich Peninsula Wastewater Treatment Plant (1). Freedom of Information requests in 2006 revealed that the \$447 million estimate comes from one estimate from one consultant, based on unwritten guidance from a CRD administrator.

So what will secondary treatment really cost us in the Core Area, and how do we value the environmental and social benefits? Table 1 and Table 2 below compare the components of the CRD estimate for Core Area treatment with actual cost of the CRD's existing Saanich Peninsula treatment plant, and with other secondary treatment plants in BC.

The Victoria Sewage Alliance is not claiming to know the exact cost of treatment, but we are calling for an open investigation of modern resource recovery options for the Core Area. Perhaps the best way to accurately learn what the real costs and benefits of secondary treatment with resource recovery will be is to invite ideas from a wide range of sources through a design competition or a Request for Expression of Interest, as Toronto did in 2003 (2).

### **The Value of Treatment Through Resource Recovery**

There is a significant gap between innovations in wastewater treatment adopted by industry and municipalities in other parts of Canada and the world, and the limited number of traditional treatment options which have so far been discussed with the public here. An unintended benefit of the delay in implementing treatment in the Core Area is that technologies for resource recovery have become more advanced and attractive in the context of rising energy process and our understanding of climate change.

When issues of sewage, municipal solid waste, air pollution and climate change are considered in isolation, we limit the scope and creativity of our solutions. European municipalities are showing how green energy can be derived from several waste streams at the same time, and how waste-to-energy infrastructure can effectively treat sewage and also reduce inner-city air pollution and greenhouse gases. Countries like Sweden are dealing with sewage and municipal solid waste in concert, so that energy recovery plants convert organic materials from garbage, offal from abattoirs, and sludge from sewage plants in single processes.

Sewage treatment plants designed for resource recovery are less expensive to build and operate (more compact, require less electricity and chemicals) than traditional aerobic plants (3). Even in the worst case, basing our costs on comparable traditional plants (GVRD treatment plants, the Saanich Peninsula WWTP, pulp mill secondary treatment plants), there is no reason to believe the cost will be higher than the \$9 per home per month paid by most BC residents for secondary treatment.

## **Sewage Treatment Cost Analysis for the Core Area**

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Discussions of treatment costs must also take into account the actual and potential benefits, including;

- The opportunity to displace fossil fuels with biofuels which can be recovered from sewage, amounting to enough biodiesel to run 200 buses *and* enough biogas to run 5,000 cars. This energy is worth is \$6 million/year at 2006 prices.
- The value of Kyoto credits for the greenhouse gases which could be displaced by biofuels recovered from sewage, which at 2006 rates of \$10 per tonne would come to \$300,000 per year
- Protection and enhancement of the region's \$1 billion/year tourism industry
- Recovery of the currently closed shellfish and swimming scallop fisheries
- Protection of salmon, orcas, and other species from pollution
- Protection of marine habitats, including sediments, from further contamination
- The value of recovering the lost shellfish and swimming scallop fisheries
- The environmental benefit of preventing other polluters from using Victoria's untreated sewage as an excuse to not comply with Canadian environmental law

### **The Social Context of Treatment with Resource Recovery**

An Ipsos-Reid survey of 1,515 households commissioned by the CRD in 2004 showed that 75% of the public believe that it's simply unacceptable to dump untreated sewage into the ocean (4). Support for sewage treatment is high, in spite of the fact that the public has been told treatment is expensive, would cause other problems such as sludge disposal, and is unnecessary from an environmental point of view.

What would a survey show if citizens understood that sewage could power all the region's buses and whale watching boats, thus reducing greenhouse gas emissions and dependence on fossil fuels? What would the levels of support for treatment be if residents understood that the cost would equal what other BC residents pay - about \$9 per home per month?

How can we measure the long-term value of improving greater Victoria's reputation as a sustainable city, and of showing the next generation of citizens how we can live more sustainably?

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April 18, 2006

**Table 1. Analysis of CRD's Estimate for Traditional Treatment**

|                     | <b>CRD Estimate (July 6, 2005)</b>   | <b>Victoria Sewage Alliance Estimate</b>  |
|---------------------|--|---|
| <b>Capital cost</b> | <p><b>\$447 million</b> before grants</p> <p>Based on:</p> <ol style="list-style-type: none"> <li>1. One quotation for a traditional treatment technology from one consultant. The traditional treatment approach was not geared toward resource recovery.</li> <li>2. Constraints include underground construction, sized and priced for a population twice as large as the current Core Area equivalent population of 350,000.</li> <li>3. Engineering &amp; administration fees of \$62 million.</li> <li>4. Contingency fees of \$47 million.</li> <li>5. No cost sharing was assumed in the CRD's July 6, 2005 estimate, although three-way cost sharing is anticipated in the CRD's LWMP.</li> </ol> | <p><b>\$180 million</b> before grants</p> <p>Based on:</p> <ol style="list-style-type: none"> <li>1. \$90 million paid by BC pulp mills for secondary treatment plants in the early 1990s, for flows which are approximately 80% higher than the total from Clover and Macaulay point (5).</li> <li>2. \$20 million paid by the CRD in 2000 for the Saanich Peninsula Wastewater Treatment Plant, designed to serve a population of 50,000 (6). Scaling this cost up by a factor of five (based on flow rates) or seven (based on population) to serve an equivalent population of 350,000, discounting for economies of scale and the use of newer technologies, and adding for the effects of inflation leads to an estimate of \$180 million.</li> <li>3. Construction costs have increased, but newer treatment technologies require less equipment and space. For example, the electro-oxidation and electro-coagulation plant operating in Ladysmith BC will cost \$9.4 million, require only 200 m<sup>2</sup> of space, and will serve 9,000 people.</li> <li>4. Resource recovery plants do not require aeration equipment and large settling tanks, and are therefore less expensive than traditional designs.</li> <li>5. 1/3 cost-sharing with the federal government, and 1/3 shared with the province is assumed in this estimate, based on the experience of other municipalities and on the CRD's LWMP. Senior government has indicated that cost-sharing discussions cannot begin without a request from the CRD.</li> </ol> <p>Given the federal interest in encouraging sustainable energy initiatives, it is possible that further R&amp;D grants could be available for resource recovery.</p> |

## Sewage Treatment Cost Analysis for the Core Area

|                                      | CRD Estimate (July 6, 2005) | Victoria Sewage Alliance Estimate   |
|--------------------------------------|-----------------------------|---|
| <b>Carrying cost</b>                 | 10% interest rate           | 4.75% interest rate based on the cost of 30-year municipal loans at the time of the estimate.   |
| <b>Operating cost</b>                | \$16.7 million/year         | <p>\$9 million/year</p> <p>Based on:</p> <ol style="list-style-type: none"> <li>1. BC pulp mills spend \$7-8 million/year to operate secondary treatment plants which process 80% more flow than Clover and Macaulay Points combined (2).</li> <li>2. The existing CRD Saanich Peninsula Wastewater Treatment Plant has an operating budget of \$1 million/year.</li> </ol> <p>Note that the estimate of \$9 million/year does not take into account the value of resources which can be recovered and sold. At current energy prices, the biogas and biodiesel which could be recovered from Core Area sewage are worth \$6 million/year.</p> <p>If the fuel savings in the regional transit system are passed on to commuters through lower fares, the region can further encourage the use of (biofuel-burning) transit.</p> |
| <b>Net annual cost per household</b> | \$573.02 per home/year      | <p>\$108 per home per year</p> <p>Based on:</p> <ol style="list-style-type: none"> <li>1. Calculations factoring in the capital costs, cost-sharing, interest rates, and operating costs explained above.</li> <li>2. The actual rate of \$108 per home per year currently paid to the CRD by residents of North Saanich and Sidney for treatment through the CRD's Saanich Peninsula Wastewater Treatment Plant (1).</li> </ol>  |

In conclusion, there is no reason to believe secondary treatment based on resource recovery should cost more than the \$108 per home per year which residents of North Saanich and Sidney already pay for secondary treatment through the CRD.

The best way to learn the costs and resource benefits of secondary treatment with resource recovery will be to open the process to a wide range of sources through a design competition or a Request for Expression of Interest (2).

## Sewage Treatment Cost Analysis for the Core Area

### Table 2. Cost of Traditional Treatment: Detailed Comparison

|                              | CRD Estimate  | Notes | VSA Estimate  | Notes | CRD Saanich Plant |
|------------------------------|---------------|-------|---------------|-------|-------------------|
| <b>Inputs</b>                |               |       |               |       |                   |
| Capital cost                 | \$447,000,000 | 1)    | \$180,000,000 | a)    | \$20,000,000      |
| Less: Federal Infrastructure | \$-           |       | \$60,000,000  |       |                   |
| Less: Provincial share       | \$-           |       | \$60,000,000  |       | \$10,000,000      |
| Net cost to the CRD          | \$447,000,000 |       | \$60,000,000  |       | \$10,000,000      |
| Cost of money                | 10.0%         | 2)    | 4.75%         | b)    | 5.00%             |
| Amortization period          | 25            |       | 25            |       | 25                |
| <b>Results</b>               |               |       |               |       |                   |
| Amortization cost            | \$49,150,495  |       | \$4,151,108   |       | \$709,525         |
| Operating costs              | \$16,700,000  | 3)    | \$9,000,000   | c)    | \$1,000,000       |
| Total annual cost            | \$65,850,495  |       | \$13,151,108  |       | \$1,709,525       |
|                              |               |       |               |       | \$/year           |
| Percent paid by industry*    | 0%            |       | 15%           | d)    | 25%               |
| Percent paid by residents    | 100%          |       | 85%           |       | 75%               |
| Population served            | 380,000       |       | 340,000       |       | 39,000            |
| Households in Core Area      | 114,804       |       | 102,719       |       | 11,782            |
| Cost per household           | \$573.59      |       | \$108.83      |       | \$108.82          |
|                              | \$47.80       |       | \$9.07        |       | \$9.07            |
|                              |               |       |               |       | \$/month          |

#### Notes:

- 1) Based on one estimate from one consultant to an administrator, without written terms of reference. The Georgia Strait Alliance requested the terms of reference for the quote in February, 2006, and was told the quote was based on verbal instructions to the consultant from the CRD.
  - 2) This rate is far higher than the (then current) 30-year Canada bond rate.
  - 3) Operating costs are almost double those reported by other BC treatment plants.
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- a) Based on interviews with treatment plant operators in BC, including the \$20m Saanich WWTP.
  - b) Per Mike McCliggott on February 26, 2006 Victoria's rate is 4.75% for 30 years
  - c) Based on interviews with treatment plant operators in BC. Does not include the value of recovered resources.
  - d) Through permit fees similar to those the GVRD charges industry for discharges to their treatment plants.

### References

- 1) *Personal communication with Jim McIsaac, resident of North Saanich, 2005*
- 2) *Summary of Individual Responses to Toronto's REOI on New and Emerging Waste Management Technologies*  
[http://www.toronto.ca/wes/techservices/involved/swm/net/pdf/oct15\\_review.pdf](http://www.toronto.ca/wes/techservices/involved/swm/net/pdf/oct15_review.pdf)
- 3) *Anaerobic Treatment Advantages*  
[http://www.draaisma.net/rudi/anaerobic\\_wastewater\\_treatment.html](http://www.draaisma.net/rudi/anaerobic_wastewater_treatment.html)
- 4) *CRD Liquid Waste Management Study – 2004. The study was conducted by Ipsos-Reid from February 27th to March 3rd 2004, and included 1,515 interviews of CRD residents; overall results ± 2.6%, 19/20. Obtained through a Freedom of Information Request.*
- 5) *Personal communication with three BC pulp mills in 2005*
- 6) *Saanich Peninsula Wastewater Treatment Plant*  
<http://www.eocp.org/spwwtp.html>

### Links to BC Municipal Wastewater Treatment Plant Information

|                         |   |
|-------------------------|---|
| CRD - Saanich Peninsula | <a href="http://www.eocp.org/spwwtp.html">http://www.eocp.org/spwwtp.html</a>   |
| GVRD - Annacis          | <a href="http://www.gvrd.bc.ca/sewerage/index.htm">http://www.gvrd.bc.ca/sewerage/index.htm</a>   |
| GVRD - Lu Lu Island     | <a href="http://www.eocp.org/plants-lulu.html">http://www.eocp.org/plants-lulu.html</a>   |
| Abbotsford              | <a href="http://www.abbotsford.ca/Page347.aspx">http://www.abbotsford.ca/Page347.aspx</a>   |
| Campbell River          | <a href="http://www.dcr.ca/city_services/engineering_services/sewage/ortho.htm">http://www.dcr.ca/city_services/engineering_services/sewage/ortho.htm</a>               |
| Kelowna                 | <a href="http://www.eocp.org/plants-kelowna.html">http://www.eocp.org/plants-kelowna.html</a>   |
| Ladysmith (Pureleau)    | <a href="http://www.pureleau.com/">http://www.pureleau.com/</a>   |
| Nanaimo                 | <a href="http://www.rdn.bc.ca/cms.asp?wpID=230">http://www.rdn.bc.ca/cms.asp?wpID=230</a>   |
| Penticton               | <a href="http://www.penticton.ca/city/public_works/wastewater.asp">http://www.penticton.ca/city/public_works/wastewater.asp</a>   |
| Port Alberni            | <a href="http://www.city.port-alberni.bc.ca/CityHall/Engineering/sewerdrain/index.htm">http://www.city.port-alberni.bc.ca/CityHall/Engineering/sewerdrain/index.htm</a> |