HALIFAX
REGIONAL MUNICIPALITY

8.2

Halifax Regional Council
February 12, 2002

TO: Mayor Kelly and Members of Halifax Regional Council

SUBMITTED BY: Dan English, Acting Chief Administrative Officer

DATE: February 8, 2002

SUBJECT: **Ecological Wastewater Treatment/Solar Aquatics**

SUPPLEMENTARY REPORT

ORIGIN

HRM Council meetings of April 10, 2001, December 11, 2001 and January 29, 2002.

RECOMMENDATION

It is recommended that Halifax Regional Council:

1. not dedicate an outfall in the Harbour Solutions Project to Solar Aquatics technology,

2. consider the use of Solar Aquatics technology in the future in a full cost/performance comparison with other innovative and conventional systems for a small plant, serving a small community.

BACKGROUND

The attached Council report, dated January 23, 2002, outlining staff's position on the use of EWT/Solar Aquatics technology in the Harbour Solutions Project was presented to Council on January 29, 2002. After presentations from Ms. Margot Cantwell of EDM Consultants and staff, Regional Council deferred the item pending a staff report.

DISCUSSION

Staff has met with Ms. Margot Cantwell of EDM on January 31, 2002, and also received information from Mr. Jeff Wilson of GPI Atlantic on February 7, 2002. The issues raised by Ms. Margot Cantwell and Mr. Jeff Wilson were reviewed and the following is provided.

1. It was EDM's understanding that Council's motion pertained to the use of EWT/Solar Aquatics provided it is financially and technically feasible related to a EWT/Solar Aquatics stand alone project. Staff considered the directive to mean consideration of EWT/Solar Aquatics as part of the Halifax Harbour Solutions project, not as a stand alone technology. Staff has reviewed the matter with EDM in the context of the staff interpretation and no further information is required.

2. EDM asked staff to clarify the process followed through the HHS RFP to Council. As stated in the staff report, based on previous input from the stakeholders committee, public consultation, request for information, request for qualifications, and regulatory requirements, staff prepared the RFP for proponents to give a proposal for advanced primary treatment and also include any other cost effective technology which they would like HRM to consider. The two proponents provided proposals which did not include EWT/Solar Aquatics technology.

3. In discussions with HREP, they have indicated that they are not averse to doing EWT/Solar Aquatics, but as staff advised Council, all risks, capital costs, operating costs, regulatory approvals, delays to the main project due to resubmission for environmental approvals, etc. will be HRM.'s.

4. EDM has provided staff with information re EWT/Solar Aquatics technology costing for the two locations, i.e. the Burnside and the Lyle Street outfalls. The capital cost for these two facilities would be approximately $24.3M compared to $18.2 M in the proposal recommended by staff. The operating costs of these two EWT/Solar Aquatics facilities is $560,000, compared to $330,000. in the staff-recommended project. As detailed designs have not been done, these numbers are approximate only, but they were provided by EDM to staff.

   Based on the above information , the capital costs and operating costs for EWT/Solar Aquatics are higher than the staff recommended proposal, as outlined in the staff report.

5. EDM noted that there may be grants over and above the normal funding for EWT/Solar Aquatics available from the Provincial and Federal Departments. We have no way of assuring that these funds will be available, therefore they have not been factored into the staff evaluation.

6. EDM has an issue with staff's concern about the size of the treatment plants being proposed. We agree that EWT/Solar Aquatics is a modular system made up of a number of units of smaller size. The fact remains that we are treating much larger volumes of sewage than that being treated at this time in any other location. There is always a risk when we have much larger volumes than facilities operating elsewhere in the world.

7. Future use of EWT/Solar Aquatics at different locations in HRM.

   As per the January 23, staff report, we will consider the use of EWT/Solar Aquatics at future projects in a full cost/performance comparison with other innovative and conventional systems for a small community. Since the evaluation for the use of Ecological Wastewater Treatment would involve many factors such as the current and ultimate population being served, the type of development, the availability of the site, the location of the discharge of effluent etc., it is better to carry out the evaluation on a site specific basis. Because of time constraints, staff has not been able to do detailed analysis on the specific locations noted by Council, such as Sheet Harbour, Musquodoboit Harbour, etc. This will be done on a project by project basis.

8. Council asked for the locations and size of EWT/Solar Aquatics facilities. The list, provided by EDM, is attached as Appendix "A."

9. Quality of effluent

   Treatment plant designers and regulatory agencies use tests to evaluate the strength of wastewater being treated and the quality of the effluent. The tests typically used, are as follows:

   a) Biochemical oxygen demand (BOD)

      The BOD test measures biodegradable organic matter in wastewater. This test measures the amount of dissolved oxygen organisms in a receiving water are likely to need to degrade wastes in wastewater. The cleaner the wastewater the lower the BOD value. To perform this test, samples of the wastewater are diluted and the dissolved oxygen is measured. The samples are placed in an incubator at 25 degrees Celsius for 5 days. At the end of this period, the amount of oxygen is measured again. The amount of oxygen that was used is an indication of wastewater strength. The unit of measurement is expressed in milligrams per Litre (mg/L) for 5 days.

   b) Total suspended solids (TSS)

      The amount of suspended solids in the water will indicate the clarity of wastewater. TSS are measured as the portion of solids retained by a 2.0 micron filter and the unit of measurement is in milligrams per litre (mg/L).

It is common to use the level of BOD_5 and TSS together to indicate the quality of the effluent. For example, the existing HRM tertiary treatment plant in Fall River, with effluent discharging to a lake, has an effluent quality meeting BOD_5 of 5 mg/L and TSS of 5 mg/L – commonly designated by the abbreviation **5/5** and similarly the HRM Mill Cove treatment plant, with effluent discharging to the Bedford Bay (the inner estuary area of Bedford Basin), has an effluent quality meeting a BOD_5 of 30 mg/L and TSS of 30 mg/L -- commonly designated by the abbreviation **30/30**. The Harbour Solutions Project specified an effluent quality of **50/40**.

10. The correspondence from Mr. Jeff Wilson of GPI Atlantic was received by staff on February 8, 2002. The summary of thesis noted in the correspondence deals with the economic, technical, social, and environmental benefit of EWT/Solar Aquatics systems compared to advanced primary system in a stand alone project. There appears to be no reference in the paper how the Halifax Harbour Solutions Project will be impacted if EWT/Solar Aquatics is introduced at this stage of the project. The paper also uses the Bear River plant as an example.

In summary, staff's recommendation is as outlined in the January 23, 2002 report. It is staff's view that the EWT/Solar Aquatics technology could be used at certain locations based on the type of treatment and cost effectiveness and performance comparison. To introduce this technology at this time in the Harbour Solutions Project will jeopardize the progress of the project and could delay it by months, and will cost more. Staff is recommending that Council not consider the use of EWT/Solar Aquatics technology in the Harbour Solutions Project but consider at other locations in the future.

BUDGET IMPLICATIONS

There is no budget implication at this time.

FINANCIAL MANAGEMENT POLICIES/BUSINESS PLAN

This report complies with the Municipality's Multi-Year Financial Strategy, the approved Operating, Capital and Reserve budget, policies and procedures regarding withdrawals from the utilization of Capital and Operating reserves, as well as any relevant legislation.

ALTERNATIVES

Council could instruct staff to include Solar Aquatics in the Halifax Harbour Solutions Project. Staff is not recommending this because of the higher costs and reasons outlined in the attached Council report dated January 23, 2002.

ATTACHMENTS

- Council report dated January 23, 2002 - Ecological Wastewater Treatment/Solar Aquatics
- Appendix "A" - Solar Aquatics System ^{TM} Facilities
- Appendix "B" - Correspondence from Mr. Jeff Wilson of CPI Atlantic dated February 7, 2002.

Additional copies of this report, and information on its status, can be obtained by contacting the Office of the Municipal Clerk at 490-4210, or Fax 490-4208.

Prepared and Approved by: K. Dhillon

K. Dhillon, P.Eng., Director, Public Works and Transportation Services at 490-4855

11.2.3

HALIFAX
REGIONAL MUNICIPALITY

Halifax Regional Council
January 29, 2002

TO: Mayor Kelly and Members of Halifax Regional Council

SUBMITTED BY: George McLellan, Acting Chief Administrative Officer

DATE: January 23, 2002

SUBJECT: **Ecological Wastewater Treatment/Solar Aquatics**

ORIGIN

HRM Council meetings of April 10, 2001 and December 11, 2001

RECOMMENDATION

It is recommended that Halifax Regional Council:

1. not dedicate an outfall in the Harbour Solutions Project to Solar Aquatics technology,

2. consider the use of Solar Aquatics technology in the future in a full cost/performance comparison with other innovative and conventional systems for a small plant, serving a small community.

BACKGROUND

On April 10, 2001, Halifax Regional Council requested a report on solar aquatics and further on December 11, 2001 as part of the approval of the Halifax Harbour Solutions Project requested staff to consider the use of Solar Aquatics on one outfall in the Halifax Harbour Solutions Project if financially and technically possible.

DISCUSSION

Ecological Wastewater Treatment (EWT) is essentially secondary sewage treatment with the addition of plants to help the treatment process. Solar Aquatics is a patented example of EWT, using patented clear-walled tanks, and Living Machine is another example of EWT.

Halifax Harbour Solutions Project (HHSP) has been open to proponents for any technology in addition to the conventional advanced primary treatment which was the minimum requirement. EWT or Solar Aquatics was not proposed by either Proponent (HREP or HWG) in their submissions. Staff has discussed this technology with the selected proponent (HREP). HREP is not keen to include EWT or Solar Aquatics, and advises that any costs for this would be added to its proposal, i.e. there would be no savings, also EWT or Solar Aquatics would involve risks in the form of performance uncertainties.

Staff has discussed with EDM, who are agents for Solar Aquatics in Nova Scotia, the use of Solar Aquatics. Very preliminary costings provided by EDM, without breakdowns, show that Solar Aquatics plants at Tufts Cove and Lyle Street would involve net capital costs which will be substantially higher than the HHSP costs. Also the operating costs for Solar Aquatics would be higher. Solar Aquatics is a modular treatment system which does not benefit from economies of scale in the way that applies to conventional sewage treatment plants.

In addition to higher costs, there are other issues which are of concern to staff and these are as follows:

1. Solar Aquatics plant at Tufts Cove would be in the order of 100 times larger than the largest EWT experience elsewhere.

2. On a unit flow basis, EWT plants require considerably more land which HRM would have to acquire. The HHSP technical team considers EWT or Solar Aquatics to be potentially more appropriate to small volume plants for local communities, where land is not at a premium.

3. The climate is a concern because of the requirement of heating the greenhouses in the Winter in order to maintain the sewage at a certain temperature.

4. The plant life in the EWT or Solar Aquatics system contributes only about 10% to the treatment process, as determined by a USEPA report in 1997. The report also found that life cycle costs for EWT (Living Machine) treatment plants were higher than for conventional plants for flows over 100,000 USgpd, which represents a very small STP.

5. Solar Aquatics in Nova Scotia would be sole-sourced, and if introduced at this late stage would delay the CEAA environmental process for the project, it would involve cost, financial guarantee, and performance guarantee issues, and would be expected to involve a transfer of financial and operating risks to HRM.

6. If an outfall is dedicated to Solar Aquatics, the required collection and treatment capacity would still have to be provided in order to cover future risks in the case of malfunctions in the Solar Aquatics system.

BUDGET IMPLICATIONS

There is no budget implication at this time.

FINANCIAL MANAGEMENT POLICIES/BUSINESS PLAN

This report complies with the Municipality's Multi-Year Financial Strategy, the approved Operating, Capital and Reserve budget, policies and procedures regarding withdrawals from the utilization of Capital and Operating reserves, as well as any relevant legislation.

ALTERNATIVES

Council could instruct staff to include Solar Aquatics in the Halifax Harbour Solutions Project. Staff is not recommending this because of the higher costs and other reasons outlined in this report.

Additional copies of this report, and information on its status, can be obtained by contacting the Office of the Municipal Clerk at 490-4210, or Fax 490-4208.

Report Prepared by: Ted Tam, P. Eng. at 490-6130

Report Approved by: K. Dhillon, P.Eng., Director, Public Works and Transportation Services at 490-4855

PAWS, Inc., Sewage Treatment Facility - Muncie, Indiana
Built in the summer of 1990, this facility treats the waste from the offices of Jim Davis, creator of Garfield the Cat. The facility is permitted by the state of Indiana and the EPA. Though small, with a design capacity of 3,000 gpd, it is a fully functioning permanent facility discharging high quality effluent to surface water.

La Paz, Mexico
The La Fuente sewage treatment facility was built for a private housing development. The capacity is 185,000 gpd (3,000 people). Effluent is recycled for livestock and irrigation. Construction and startup were completed in November, 1994.

Bear River, Nova Scotia
This SAS sewage treatment facility was built in the center of this small coastal town. Phase I is for 17,500 gpd; full build out is 55,00 gpd. Construction and startup were completed April, 1995. Town won the 1995 Nova Scotia Sustainable Communities Award and the Gulf of Maine Award. In 1996, the facility received the International Waterfront Award for environmental protection and enhancement fro its Solar Aquatics System. In 1996, 8,000 tourists visited the facility.

Ontario Science Centre, Toronto, Ontario
This exhibit demonstrates Solar Aquatics natural wastewater treatment. The system treats 2,000 gpd of sewage from the Science Centre. Construction and startup ware completed in April 1995. The exhibit began operation in September, 1995.

Beaverbank Villa, Nova Scotia
This facility treats sewage for a large extended care facility and low income housing. The system replaced a 40 year old system. It treats 80,000 gpd with combined sewer overflows exceeding 250,000 gpd. Construction and startup were completed in August, 1995.

All Clear Services, Weare, New Hampshire
This private septage treatment facility was built to treat 5,000 gpd. It is owner-operated to meet tertiary discharge standards. Construction and startup were completed in April, 1996. Reed-bed composting is used to manage residual biosolids. Population served: 10,000 people.

Beausoleil, Errington, British Columbia
This facility is located in a trailer park and treats septic tank effluent at flows of 10,000 gpd. Construction and startup were completed in June, 1996. Population served: 200 people.

Ashfield, Massachusetts
This Solar Aquatics facility treats sewage for Ashfield town center. It is designed at 25,000 gpd average flows for tertiary quality discharge to groundwater. Construction was completed and startup began in October, 1996. Current flows average 18.000 gpd.

Weston, Massachusetts
Ten commercial buildings in town center commissions a Solar Aquatics sewage treatment facility with tertiary groundwater discharge. Their on-site systems no longer met requirements for groundwater discharge to an area that constitutes part of the Cambridge drinking water supply. Design flow is 7,000 gpd. Construction began in November, 1996, and the plant was started up in June, 1997. The project included design and construction of a small diameter pressure sewer system.

Mèze, France

The first Solar Aquatics System in Europe was completed in 1999. This 40,000 gpd (150 M3/d) sewage treatment facility. located near the Mediterranean, is a full scale facility to demonstrate the effectiveness and benefits of Solar Aquatics to the European community.

APPENDIX "B"

To: Honourable Mayor Kelly and fellow councilors

GPI Atlantic, a non-profit group dedicated to developing indicators of progress that reflect economic, social and environmental factors would like to submit the following results and conclusions of a Master's Thesis exploring the full cost-benefits of solar aquatics. The thesis was completed at the School of Environment and Resources, Dalhousie University, under the guidance of Doctor Ray Cote and Dr. Peter Duniker.

Contrary to recent indication in the media that solar aquatics is not economically feasible, treating HRM's sewage with a solar aquatics system results in the highest total economic value to the region. In addition to the economic benefits, a solar aquatics system offers a greater amount of social and environmental benefits in comparison to an advanced primary treatment system.

A solar aquatics system would, furthermore, establish Halifax as a progressive leader in the field of sewage treatment and complement nicely our reputation, as world leader in solid waste management.

I have enclosed the Conclusions and Recommendations of the report. More information can be obtained by contacting Jeff Wilson of GPI Atlantic at 424-7115 or by Martin Willison, Professor of biology and environmental studies at 494 2966. Copies of the thesis can be requested by contacting the School of Environmental Resources, Dalhousie University.

Further inquires can be made to -

Jeff Wilson
Research and Analysis
GPI Atlantic
Tel: 902-424-7115

For more information on GPI Atlantic please refer to our website at www.gpiatlantic.org.

For more information on the economic benefits of being a global leader in Solid Waste-Resource Management please contact Bob kenney of the Department of Environment and Labour at 424-2388.

Chapter 5: CONCLUSIONS AND RECOMMENDATIONS

The previously applied six-step valuation framework (FIGURE 2-1) allowed me to identify and understand environment–economy linkages for various types of resource uses. The discussed scenarios described changes in active and passive use values of Halifax Harbour as a result of changes in harbour water quality. The analysis indicates that by far the greatest component of the TEV in all scenarios comes from commercial shipping followed by tourism and recreational activities. Commercial shipping and a few other harbour uses, however, were left out of calculations because their values stay constant throughout all scenarios. Benefits from harvesting activities are relatively small in comparison (APPENDIX III). The parts of the TEV comprised by other than direct and indirect use values remind us that society puts a larger value on the harbour than from actual activities alone. People also express a willingness to pay for potentially using the harbour in the future or for its continued existence for present and future generations. Although WTP values can be seen as controversial, it is clear that the harbour is socially and economically important beyond the benefits provided by harvesting, recreational or industrial activities.

otal Economic Value.

Results illustrate the great socio-economic and environmental importance of Halifax Harbour. If raw sewage discharges are not controlled, however, benefits such as new or additional economic value from new or existing uses or ecosystem functions will be foregone. Not treating sewage results in a low TEV of Halifax Harbour for all discussed uses with the exception of industrial cooling, commercial shipping, and recreational fishing from charter boats. Sewage treatment on the other hand generally raises the TEV of the harbour. Treating sewage with SAS results in the highest overall TEV, with or without trying to operate SAS for a profit, and greatest economic as well as environmental benefits, leaving APT second (TABLE 5-1). SAS is thus recommended for treating HRM's sewage on environmental and economic grounds. Investing into APT is also feasible, providing many of the same social, environmental and economic benefits as SAS, but, to a lesser degree.

Solar Aquatics System

TABLE 5-1: Summary of results. TEV and net-costs and -benefits are for 40 years.

	No Treatment	APT	SAS
TEV	CAN$ 3,745,880,000	CAN$ 4,943,350,000	CAN$ 5,887,040,000
Net-cost or -benefit	CAN$ -84,120,000	CAN$ 1,281,590,000	CAN$ 2,225,280,000
Net-benefits per m^3 installed	n.a.	CAN$ 2,138	CAN$ 2,993

It might not be enough to present numbers only to convince people that SAS is the better solution for sewage treatment in Halifax. Besides numbers, good case studies where SAS has been successfully implemented need to be presented and strategies developed on how to get people to appreciate SAS also in their backyards. A number of Canadian and international papers on sewage-related issues can also help to identify recent trends in treatment philosophy for additional support.

One good case study for example is the SAS in Bear River, N.S. The Bear River SAS was Canada's first and has been a grassroots, community-driven and community-supported project (Annapolis County 2000). The project has successfully overcome the "not in my backyard" fears through "early and consistent community consultation" during all stages of planning and construction (Annapolis County 2000). Residents of Bear River "share in the enthusiasm for a project, which enhances and embraces environmentally friendly principles" (Annapolis County 2000). The inhabitants of Bear River could be valuable contacts for HRM to learn how to reach public acceptance for SAS in Halifax's neighborhoods. Another concept plan for using SAS was worked out by the Geography Department of Simon Fraser University for Burnaby Mountain near Vancouver, a community of 32,500 people (Roseland 1999). Reasons to use SAS were to minimize the need to expand and upgrade existing conventional sewer infrastructure such as sewer lines and pumping stations, and to develop Burnaby Mountain as a sustainable community that treats sewage as a resource rather than waste (Roseland 1999).

TOTAL ECONOMIC VALUE

In certain cases the total value for 40 years was calculated by taking the average annual value from the present to the future because changes in value can be gradual and do not have to occur suddenly (values with grey background). This is the reason why the total value for 40 years is not always 40x the total value per year.

ACTIVE USE VALUES

Direct Use Values (DUV)

Production Function	Present (2001)	No treatment (2041)	APT (2041)	SA (2041)
Use				
Fishing	$500,000	$135,000	$625,000	$625,000
Lobster trapping	$1,100,000	$800,000	$1,200,000	$1,200,000
Shellfish harvesting	$0	$0	$489,000	$489,000
Seaweed harvesting	$0	$0	$64,000	$64,000
Aquaculture	$0	$0	$150,000	$150,000
Fish holding	$0	$0	$22,500	$22,500
TOTAL value per year	$1,600,000	$935,000	$2,550,500	$2,550,500
TOTAL value for 40 years	n.a.	$50,700,000	$83,010,000	$83,010,000

Support Function	Present (2001)	No treatment (2041)	APT (2041)	SA (2041)
Use				
Swimming	$0	$0	$350,000	$350,000
Diving	$0	$0	$390,000	$390,000
Wind surfing	$0	$0	$960,000	$960,000
Recreational fishing from th	$0	$0	$175,000	$175,000
Kajaking, canoeing, rowing	$60,000	$45,000	$133,000	$133,000
Boating & sailing	$11,250,000	$10,688,000	$11,813,000	$11,813,000
Harbour cruises & whale w.	$1,750,000	$1,750,000	$1,840,000	$1,840,000
Cruise ships	$8,900,000	$8,900,000	$9,167,000	$9,360,000
Property value change	$0	$0	$4,350,000	$4,350,000
TOTAL value per year	$21,950,000	$21,383,000	$29,178,000	$29,361,000
TOTAL value for 40 years	n.a.	$868,660,000	$1,167,120,000	$1,174,440,000

Indirect Use Value (IUV)

Regulatory Function	Present (2001)	No treatment (2041)	APT (2041)	SA (2041)
Sewage disposal	-$7,400,000	-$10,360,000	$6,200,000	$6,200,000
TOTAL value per year	-$7,400,000	-$10,360,000	$6,200,000	$6,200,000
TOTAL value for 40 years	n.a.	-$355,200,000	$248,000,000	$248,000,000

Option Value (OV)

	Present (2001)	No treatment (2041)	APT (2041)	SA (2041)
TOTAL value per year	$43,000,000	$36,000,000	$70,000,000	$70,000,000
TOTAL value for 40 years	n.a.	$1,680,000,000	$2,800,000,000	$2,800,000,000

PASSIVE USE VALUES

Existence Value

	Present (2001)	No treatment (2041)	APT (2041)	SA (2041)
TOTAL value per year	$30,117,000	$37,275,000	$37,275,000	$37,275,000
TOTAL value for 40 years	n.a	$1,491,000,000	$1,491,000,000	$1,491,000,000

Bequest Value

	Present (2001)	No treatment (2041)	APT (2041)	SA (2041)
TOTAL value per year	$2,277,000	$2,818,000	$2,818,000	$2,818,000
TOTAL value for 40 years	n.a.	$112,720,000	$112,720,000	$112,720,000

APT & SAS specific net-benefits/-costs

	Present (2001)	No treatment (2041)	APT (2041)	SA (2041)
TOTAL value per year	n.a.	n.a.	-$24,273,250	-$553,250
TOTAL value for 40 years	n.a.	n.a.	-$970,930,000	-$22,130,000

TEV

	Present (2001)	No treatment (2041)	APT (2041)	SA (2041)
TEV per year	$91,544,000	$88,051,000	$123,748,250	$147,651,250
TEV for 40 years	n.a.	$3,745,880,000	$4,930,920,000	$5,887,040,000
Difference from present by year	n.a.	-$3,493,000	$32,204,250	$56,107,250
Difference from present for 40 years	n.a.	-$139,720,000	$1,288,170,000	$2,244,290,000

Support for SAS from a higher level, for example, can be found in UNEP's Agenda 21, chapter 18 (UNEP 1992) on integrated water resource management. It calls for community-based self-help projects for pollution prevention, and for the development for eco-technologies for waste treatment that allow wastewater to be reused in agriculture and aquaculture. Individual SAS are suitable to be adopted by local groups of people, just like a community garden for example, since they are relatively low-tech and comparatively uncomplicated to operate (EDM 2001). NSDOE also underlines the value of community-based groups taking responsibility for environmental stewardship at the local level: "What governments alone have appeared incapable of doing, community groups, with the assistance of government, have demonstrated considerable success. For example, in 1998, the Bear River SAS received a "Pollution Prevention Award" from the Canadian Council of Ministers of the Environment for its world famous Solar Aquatics sewage treatment facility" (NSDOE 1998, p.41). In its final report the Halifax Harbour Solutions Advisory Committee (HSAC) reports to Council that "there is a need to consider innovative and alternative technology options which may be appropriate as components of the overall harbour solution for storm and sanitary water treatment in order to meet the set water quality objectives" (HSAC 1998, p.15). SAS are explicitly mentioned in the report as a technology, which is already found within HRM at Beaverbank (Canada's second SAS), and which offers an advanced level of treatment. "Parts of the Municipality's sewage flows might feasibly be treated in this fashion" (HSAC 1998, p.15). Also Canada's "National Programme of Action for the Protection of the Marine Environment from Land-based Activities" (NPA) promotes research into alternative technologies for sewage treatment (FPTAC 2000. p.20).

I strongly believe that the time for SAS has come and that HRM should use this unique opportunity to continue to promote the city as a role model and leader for sustainable development in Canada and internationally. Risks are minimal since one SAS at a time can be built at relatively low costs and decision-makers have the chance to look first and see how effective SAS is.