

# Sustainability Now

Newsletter of the Sustainability Initiative  
of the Association of Professional Engineers and Geoscientists of B.C.



## APEGBC Sustainability Guidelines

Core to APEGBC's articulation of sustainability are the Sustainability Guidelines that state that, within the scope of a Member's task and work responsibility each Member, exercising professional judgment, should:

1. Develop and maintain a level of understanding of the goals of, and issues related to, sustainability.
2. Take into account the individual and cumulative social, environmental and economic implications.
3. Take into account the short and long term consequences
4. Take into account the direct and indirect consequences.
5. Assess reasonable alternative concepts, designs and/or methodologies.
6. Seek appropriate expertise in areas where the Member's knowledge is inadequate.
7. Cooperate with colleagues, clients, employers, decision-makers and the public in the pursuit of sustainability.

*If not now, when? If not us, who?*

## Special APEGBC Sustainability 2003 Awards Issue

### Introduction to Sustainability

One comprehensive definition of sustainability is found in Paul Hawkin's book, *The Ecology of Commerce*:

"Sustainability is an economic state where the demands placed upon the environment by people and commerce can be met without reducing the capacity of the environment to provide for future generations. It can also be expressed in the simple terms of an economic golden rule for the restorative economy: leave the world better than you found it, take no more than you need, try not to harm life of the environment, make amends if you do."

### APEGBC's Position on Sustainability

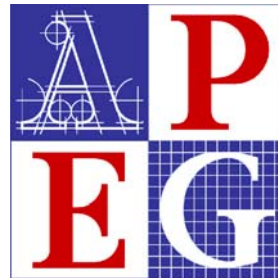
Sustainability is at the centre of APEGBC's vision for professional engineering and geoscience. APEGBC's corporate mission is:

*"to forge a cohesive, able and articulate membership to lead in: the protection of public safety, health and well-being; the creation of value through engineering and geoscience, and the promotion and achievement of sustainability."*

Furthermore, the first principle of APEGBC's Code of Ethics alludes to the importance of sustainability: *"to hold paramount the safety, health and welfare of the public, the protection of the environment and promote health and safety within the workplace."*

Since the early 1990s, Council has consistently supported and encouraged the activities of its Sustainability Committee, by adopting the *Sustainability Guidelines* in 1995 and the *Sustainability Management System* in 2000.

If sustainability principles will guide us to a secure future, then nowhere do these principles need more urgent application than within the engineering and geoscience fields.



Professional Engineers  
and Geoscientists of BC  
www.apegbc.ca

### APEGBC's First Annual Sustainability Award

The Sustainability Award was created to recognize the important contribution that engineering and geoscience make to the well being of human life and the ecosystems on which we all depend. It further seeks to recognize the positive role of human qualities such as ethics, imagination, reason and common sense in achieving this end.

The inaugural APEGBC Sustainability Award received an amazing number of good submissions. The Sustainability Committee found it difficult to declare a "winner", since each submission clearly adds a piece toward building a sustainable future. We finally decided to recognize the efforts of the **Greater Vancouver Regional District's (GVRD) Engineering & Construction Department** for the four recent projects it submitted: the Little Mountain Reservoir Reconstruction, the SEE-Gen Waste to Energy Project, the Cloverdale Sanitary Sewer Overflow Storage Facility and the Integrated Utility/Greenway corridor project. These excellent projects are part of the Sustainable Region Initiative of the GVRD.

This special edition of Sustainability Now is dedicated to four award winning projects and the initiative they are part of. The projects are also showcased as part of the exhibit "Sustainability 2003: Greening the Built Environment". More information on the exhibit can be found at [www.sustainability.ca](http://www.sustainability.ca).

## Special APEGBC Sustainability 2003 Awards Issue

### Interview with Tim Jervis, P. Eng, Manager, Engineering and Construction Department, Greater Vancouver Regional District

**AJ: What is the Sustainable Region Initiative?**

TJ: The board has resolved that we incorporate sustainability into all of our major plans and certainly our utility plans are captured by that. This includes our department's update of the Drinking Water Management Plan, the recently finished Liquid Waste Management Plan and the Planning Department's Air Quality Management Plan. We are also about to undertake the Livable Region Strategic Plan review. All of those updates should be done incorporating sustainability, and we go by the three legs of the stool: environmental, social and economic. The engineering group adds to that list the technical end of it. In a lot of the work we are doing right now we are looking at the four aspects. But it is basically the three legged stool, but without one of the legs you don't have stability, so you have to look at all three.

**AJ: How has the Sustainable Region Initiative come about?**

TJ: Through our Chief Administrative Officer, Johnny Carline, who is passionate about sustainability. He got our whole organization involved in the SRI. He launched it in 2001 when, quite frankly, most of us in the organization had heard of sustainability only in passing. I have never seen anybody as committed to something. He is driven and wants to see it come to fruition.

**AJ: Where is the SRI going from here?**

TJ: We have broken it down into three phases or levels. The first level is corporate, we want to make our own operation sustainable. The second level is looking at the five areas of air quality, housing, growth management, utilities, and regional parks that our mandate focuses on. The third level, which has proven to be more of a challenge, is taking sustainability out beyond the GVRD's boundaries, so looking at trying to partner with other organizations and agencies.

We are trying to figure out how we can make sustainability real. We are concentrating on those five focus areas (air quality, housing, growth management, utilities and regional parks) to come up with a set of proposals that we can put in front of the politicians and the public early 2004.

Winning the APEGBC Sustainability Award showed some real life examples so people can see that there are ways to make this work on the ground and have something to show for it.

**AJ: Do use Sustainability Reporting at the GVRD?**

TJ: We are just developing a framework for triple bottom line reporting, and hope to have that in place for the 2003 annual report.

**AJ: What is the role of engineers in general, and of APEGBC specifically, in realizing a sustainable future?**

I've always believed that engineers can make sustainability real, and I think we've always looked at things like life cycle costs and in some respects a lot of the elements of sustainability. We've been looking at the environmental and social issues of projects all along, so a lot of the engineers wonder what is new here.

I think we need to be looking at our projects and trying to come up with a standard framework that we can use to incorporate sustainability principles. I think some of the things we have been able to come up with though effective partnering like the Joint Utility Greenways (See Page Four) are good examples.

**AJ: What is your approach to making the business case for sustainable development?**

TJ: We've just awarded a proposal call to look at going beyond a conventional business casing.

When you look at all three legs of the stool and form your analysis based on that, that is when you get the true cost of the project. That is the direction we are trying to move in. A good example is the site selection for the Capilano Filtration Plant. We looked at social, environmental, economic and technical aspects, and based our preferred site on that basis. The community and elected officials were supportive of that approach, so it was used for that project.

**AJ: Is there anything else that you wanted to add?**

TJ: Every corner of our operation, down to the level of our individual work units, are looking for ways to be more sustainable. There are some real quick wins that people are identifying, whether it is out in an operating facility at one of the treatment plants, or ways to save energy. We are going to every nook and cranny in our organization to look at ways to be more sustainable corporately and I think we have come up with innovative things for some of our project work as well.



## Special APEGBC Sustainability 2003 Awards Issue

### The GVRD Builds Toward a Sustainable Region

Four projects in the Greater Vancouver region are showing how large construction projects can promote social, environmental and economic sustainability. The Greater Vancouver Regional District projects have just been recognized with the first municipal sustainability award from the Association of Professional Engineers and Geoscientists of B.C.

Many organizations and builders have often assumed that social and environmental planning add unacceptable costs to their projects. But the GVRD's successful projects – a turbogenerator at a waste-to-energy facility, a combined greenway/utility corridor, a water storage reservoir and a sanitary sewer overflow facility – demonstrate that engineers can balance social and environmental factors with economic ones. The projects all met their economic goals while protecting the environment and creating social amenities.

The sustainability award was created by the Association of Professional Engineers and Geoscientists of B.C. (APEGBC) to showcase people, organizations and projects that show a commitment to sustainability.

The four projects submitted by the GVRD were part of the District's "Sustainable Region Initiative." The GVRD adopted the Initiative in 2002 to define a vision and a framework for the region that reflects the principles of community well-being, environmental integrity and economic prosperity.

The GVRD hopes that by demonstrating actual projects that meet social, environmental and economic tests for sustainability, it will be able to inspire other initiatives to follow the same principles.

A key to the success of the four projects was careful planning and consultation. GVRD project managers were careful to include all of the project participants, from construction site workers to government regulators. Often, extensive public consultation helped the stakeholders better understand the possible social and environmental impacts, and find ways to lessen negative impacts while increasing positive ones.

Creative uses of new technologies and processes also helped reduce impacts beyond the footprint of the region, such as reducing greenhouse gases and construction waste.

The Sustainable Region Initiative is a comprehensive approach to building a better future for the citizens of Greater Vancouver. The APEGBC Sustainability Award shows that the Initiative can demonstrate real solutions that balance economic, environmental and social factors for a sustainable future.

### SEE-Gen Project - Turning Garbage into Electricity

The tall red and white striped exhaust stack of the GVRD's Waste-to-Energy Facility (WTEF) in Burnaby is a new flag of sustainability in the GVRD. Built in 1988 to handle over 20% of the region's solid waste, the facility now generates electricity as well.

Over 250,000 tonnes of municipal solid waste are handled at the WTEF each year utilizing three separate processing lines. Built to meet the highest standards of environmental sustainability, it was only the second facility of its kind in North America to qualify for the rigorous ISO 14001 environmental standard.

Historically steam from the waste-to-energy facility has been sold to the nearby Norampac paper recycling mill. However, not all of the steam could be utilized by the mill. The plant operators, Montenan Inc., and GVRD engineers saw the excess steam as an opportunity to make the plant more sustainable.

They found that generating electricity from the steam and selling the power to BC Hydro provided social, economic and environmental benefits.



⊕ Producing electricity from garbage created four new full-time jobs, creating positive social impacts.

⊕ Selling the electricity to BC Hydro will generate gross revenues of \$5-6 million a year for the GVRD, an economic benefit for the region's residents.

⊕ Reducing the need to generate power elsewhere

creates a positive environmental impact. In fact, if BC Hydro had to generate the same power at its Burrard Thermal gas-fired generating station, it would produce 59,000 tonnes of greenhouse gases.

Because the project meets social, economic and environmental tests, engineers took the initial letters of the three sustainability tests and called it the SEE-Gen project.

Work on the project started in late 2001, using the best available technology. For example, low-noise designs prevent disturbance to wildlife and the surrounding community and an air-cooled condenser reduces the need for cooling water. The SEE-Gen project commenced commercial operation in July 2003.

The SEE-Gen project will produce 15 megawatts of electricity, enough to power 15,000 homes. Project engineers are still looking for more savings – including ways to generate additional steam and a proposal to sell residual heat from the turbogenerator to a nearby industrial development.

Center Photo: Turbine at SEE-Gen Project.

## Special APEGBC Sustainability 2003 Awards Issue

### Turning Utility Corridors into Greenways

A common-sense idea to turn utility corridors into “greenways” has proven so successful that the GVRD hopes to make it part of a regional strategy for the Lower Mainland.

Greenways are “green” walks, trails and pathways that connect regional parks and other major Green Zone sites. They give people a way to move through the region in a more natural setting than by busy urban streets. They can also help protect wildlife habitat.

The GVRD and its member municipalities have been creating greenways for several years. Talks between the GVRD’s Parks and Utilities departments led to the idea of “integrated corridors,” meeting the desire for green spaces with the need to find suitable locations for underground sewage and water pipes and overhead construction.

Utilities are often buried beneath streets where they lie untouched for many years. Some, such as elevated Skytrain tracks and power cables, are built overhead. By choosing appropriate routes, designs and landscaping, utility corridors can be turned into pleasant greenways for walking, cycling and roller-blading.

GVRD staff and external stakeholders met in a series of workshops to work out questions such as conflicting maintenance standards for parks and water and sewer mains, environmental protection, tenure and security. They concluded that they could meet both utility and greenway needs and save money for regional taxpayers.

Their first test was the Lake City Interceptor, a 4.8 kilometre sewer line in Burnaby. With the help of the Department of Fisheries and Oceans, the City of Burnaby, and local environmental groups, the sewer corridor was integrated into the regional greenway. A utility road designed to accommodate cyclists and walkers allows access for both people and utility vehicles. Innovative trenchless technologies such as pipe-bursting were also utilized to minimize impacts on the public and the environment.

The second project was in New Westminster where the City, TransLink and the GVRD collaborated to convert an abandoned rail bed into a multi-use corridor. By infilling the shore of the Fraser River, tree-planting and landscaping, the team created a 2.2 hectare riverside park as well as significant new fish habitat with the construction of tidal marshes. Blended into the park are a 1.8m diameter sewer line, elevated Skytrain tracks and a 1.2 kilometre sewer access road along the Fraser River that doubles as a greenway for cycling and in-line skating.

With these successful experiences, utility engineers and park planners now want to create a network of paths and trails, making the whole region more sustainable and pleasant.

### Little Mountain Reservoir Reconstruction

“Sustainable demolition” may sound like a contradiction in terms, but sustainability guides the demolition and reconstruction of the 175 million litre Little Mountain Reservoir in Vancouver’s Queen Elizabeth Park.

Built in 1911, the reservoir stores water for emergency use and to meet fluctuations in daily water demand. Located at the high point in one of Vancouver’s most popular parks, the roof of the concrete reservoir provides parking as well as a landscaped park area. The reservoir required upgrading to meet current seismic standards as well as to provide additional storage capacity and improved operational flexibility.

With sustainability principles in mind, a key goal for the project team was to keep the impact of the work on the park, and on the region, to a minimum. The new reservoir fits into the same footprint as the original one, and the project work has been planned in close consultation with park users and the host municipality to minimize impacts.

After a series of public meetings with park users, GVRD staff, consultants, contractors and sub-contractors signed a “Project Charter” that stresses safety, budget, environmental stewardship, responsiveness to public concerns, effective communication and timeliness.

The project puts the principles of the Charter into action by using innovative technologies such as on-site concrete recycling and separation of rebar. For reconstruction, contractors used “EcoSmart” concrete, utilizing flyash from coal-fired power plants. Compared to conventional concrete, manufacturing “EcoSmart” concrete for this project produces 3000 fewer tonnes of carbon dioxide emissions.

Contractors use noise barriers and controls to reduce construction impacts in the park, wash truck wheels and roads, and control dust, runoff and debris. Plans call for protecting trees and replanting vegetation that is disturbed.

To keep park users informed, the GVRD has hosted a series of open houses and distributed project updates in the surrounding community. A wheelchair-accessible viewing platform allows visitors to safely view the progress of the project.

With the cooperation of the project team, the first phase of the project was finished on budget and on schedule. By planning for social, environmental and economic concerns, the project team has set a model for a sustainable demolition and reconstruction project in a sensitive, busy urban park.



Center Photo: Construction of the Integrated Utility Corridor.

## Special APEGBC Sustainability 2003 Awards Issue

### Cloverdale Sanitary Sewer Overflow Storage Facility

As part of the Liquid Waste Management Plan, the GVRD is working to further reduce discharges of sanitary sewage to the environment.

To manage sanitary sewer overflows in Cloverdale, the GVRD has designed a unique storage system that will automatically divert overflows to a 6700 cubic metre concrete storage tank, hold the flow until the storm has passed, and then return the flow to the wastewater conveyance system. When it is completed in mid-2004, the system will protect human health and avoid potential environmental damage to the surrounding farm land.

The design also incorporates “green building” features and energy-efficient operations. For example, designers were able to use gravity for most of the drainage, saving pumping energy. An innovative flushing system uses a small amount of retained wastewater to avoid pumping in fresh water for tank cleaning. Automated controls connected to the GVRD’s control center in Burnaby will monitor and control the process, reducing the need for operators to travel to the site.

Natural and wetland grasses provide landscaping and reduce surface runoff. Contractors will reuse excavated soils to reduce hauling and the need for imported fill. The tank also uses “EcoSmart” concrete, which utilizes flyash from coal-fired power plants and reduces carbon dioxide emissions from concrete manufacturing.

In addition, the facility will provide social benefits to the community. For example, the project team was able to design a permanent solution to long-standing concerns of neighbouring farmers about access to fields near the site by designing a utility road that farmers can use for their equipment.

Consultation and planning ensure the GVRD’s designers create sustainable developments that reflect social, economic and environmental values.

Below: Rendering of the Cloverdale Sanitary Sewer Overflow Storage Facility.



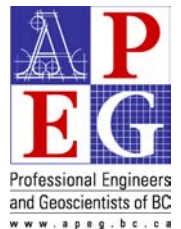
### Notes

**New Sustainability Researcher** — APEGBC is pleased to announce the appointment of Anthea Jubb, EIT for the third term of the Sustainability Researcher position. Anthea has a Bachelor of Applied Science in Chemical Engineering from the University of British Columbia. She brings energy and passion for sustainability and plans to investigate and promote sustainability in areas such as manufacturing, process technology and forestry. Please contact her at [ajubb@apeg.bc.ca](mailto:ajubb@apeg.bc.ca) or by phone at (604) 412-4868 with suggestions and inquiries.

**Sustainability 2003: Greening the Built Environment** — The APEGBC Sustainability Committee and the AIBC Energy & Environment Committee have collaborated to present the second in an ongoing series of sustainability exhibits. After inviting submissions from architects, engineers, landscape architects, planners, interior designers, other professionals and students, they have amassed a fabulous collection of over 30 varied projects and products that will tour the province over the next year. Check [www.sustainability.ca](http://www.sustainability.ca) for exhibit dates and details.

### Contact

200 - 4010 Regent Street  
Burnaby, BC, Canada V5C 6N2  
Phone: 604.412.4868  
Fax: 604.430.8085  
Email: [ajubb@apeg.bc.ca](mailto:ajubb@apeg.bc.ca)  
[Info@sustainability.ca](mailto:Info@sustainability.ca)  
Website: [www.sustainability.ca](http://www.sustainability.ca)



### Contributors

#### Editor

Anthea Jubb, EIT

#### Editing Sub-Committee:

Michel de Spot, PEng  
Susan Nesbit, PEng, PhD

Acknowledgments for this issue:  
Chantal Babensee P.Eng; Frank Huber P. Eng; Tim Jervis P.Eng; Don Littleford P.Eng; Simon So P.Eng, Chris Squire P.Eng; Dr. A. Sukumar P.Eng; Paul Wilting P.Eng; Larry Yee P.Eng.