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FCM SUSTAINABLE  
COMMUNITIES AWARDS

## FCM Sustainable Community Awards 2011 Winner – Water

Village of Victoria, Prince Edward Island, and  
Engineering Technologies Canada Ltd.  
Population: 77

*Victoria  
by-the-Sea*



Aging septic systems were causing effluent breakouts  
Credit: Ron Garnett/Airscapes

### ***Water and Wastewater Pilot Project***

#### **Summary**

The tiny seaside Village of Victoria has never had a central sewage system. When aging septic systems started releasing effluent into Victoria Harbour, the community needed a solution. The village could not grow, or even survive for long, without adequate sanitation.

The village met the challenge with an innovative, affordable system ideally suited to its size and location. With the help of Engineering Technologies Canada Ltd., Victoria opted for a central collection system that uses small diameter pipes to collect liquid effluent from holding tanks on every lot in the community. The effluent is pumped to a series of pods for secondary treatment before it's released into a conventional drainfield with a supplementary system for the peak summer season. To encourage conservation, the utility introduced water meters and pay-per-use billing, and installed low-flow toilets in every residence and business.

The new system has eliminated the public health hazard associated with sewage backups and breakouts. Existing businesses are expanding, and the village's small but important tourist trade now has the opportunity to grow.

#### **Background**

The village of Victoria is located on the south shore of Prince Edward Island halfway between Charlottetown and Summerside, about 10 minutes from the Confederation Bridge. Founded in 1819, the community was established before the advent of indoor plumbing and centralized water and sewage systems. Victoria's streets are narrow and its houses are nestled close together. Three quarters of the housing lots don't comply with modern septic standards. By the 21st century, failing septic systems were causing effluent breakouts into the harbour.

Victoria has only about 100 homes and businesses and, because of its sewage problem, no new building permits could be issued, economic expansion was impossible and people were starting to leave — census figures show that between 2001 and 2006 the population dropped from 150 to 77. The village needed an affordable, sustainable and environmentally responsible solution to its sewage problem.

"We were looking for a solution that's outside the norm. Traditional solutions are not as kind to the environment as we wanted. Lagoon systems are cheap to install but they cause environmental problems in the long term. We have oyster leases, a clam fishery and lovely swimming here and we didn't want discharge to interfere with these activities," explains Ben Smith, chairperson of the Community Council.

## **Project Development**

When Victoria's municipal council decided to tackle the community's sewage problem, it called for volunteers to sit on a Sewage Planning Board and research innovative systems for the village. The challenge was to find a green system that was affordable and with low operation and maintenance costs.

After extensive research and community consultation, the village selected a land-based effluent dispersal (LBED) system that makes use of new technologies for sewage collection, treatment and dispersal. The system uses septic tanks installed on every lot, which are connected by small diameter pipes to pods in a central packed-bed filter system where liquid effluent is treated before being sent to a dispersal site outside of the village. The septic tanks will be pumped out every eight to 10 years and solid wastes will be hauled away for processing in a larger centre.

"We were excited when we found this system," says Smith. "It's modern but not very high tech, it's bacteria based and doesn't use chemicals, and it's a closed system, so water never sees the light of day and is never discharged. The system is monitored from the [vendor's] head office in Seattle and we have an operator here who can go online and check out everything in the system. It's highly automated but very simple."

To complete its integrated water and wastewater plan, the village decided to encourage water conservation by introducing water meters and pay-per-use billing, and by installing low-flow toilets in every residence and business.

## **Project Implementation**

Victoria developed its new water and wastewater plan with assistance from the Federation of Canadian Municipalities' Green Municipal Fund (GMF). A grant from GMF allowed the community to conduct a feasibility study assessing the merits of potential solutions to its sewage problem. With that study in hand, the community was able to access the funds it needed to implement the plan. Federal, provincial and municipal governments each paid one third of the cost. The municipality received a capital project loan and grant from GMF to help cover its portion of the budget.

Smith says that working with Federation of Canadian Municipalities, and the Federation of PEI Municipalities, was invaluable. "When you're involved with organizations like these you have a lot more say than when you're talking on your own, and federal and provincial governments will listen."

Victoria's municipal council wanted the unanimous approval of the town's residents for the water and wastewater plan. It held numerous public consultations during the planning stage and called a public meeting to present the finished plan to the community. Ninety-four per cent of the residents who attended voted to proceed with the project.

Once the community approved the plan, Council formed a Wastewater Committee to oversee the project and hired an experienced project manager. The project manager consulted regularly with residents during the implementation phase. He kept them informed about the project's progress, and addressed their concerns about the septic tanks being installed on their properties. Citizens responded by giving the project their complete support. No one complained, even when every garden in the village was uprooted to accommodate the new tanks.

Victoria's new wastewater management system incorporates a number of innovative technologies that have never been used by municipalities in the Maritimes. Primary treatment of effluent takes place in the holding tanks on residents' lots. Secondary treatment occurs in 10 pods installed at the wastewater treatment plant. The pods use a packed-bed filter system that can reduce pollutants by as much as 99 per cent.

Tertiary treatment is provided by the LBED system, which consists of a conventional drainfield for the winter months, and is supplemented by a subsurface drip irrigation system for the peak summer months. The LBED system uses microbes to polish and disinfect the effluent, and plant roots to convert nitrates and absorb phosphorus and nitrogen.

The modular system is designed to accommodate the community's changing needs. When the village expands, pods can be added to increase the overall capacity of the system. The modular system also allows for changing flow rates throughout the year — some of the pods can be taken offline during the winter when flow rates are low.

For a small community like Victoria, the innovative closed system offers another advantage: it keeps stormwater out. “The system has no manholes so all you’re dealing with is the effluent that leaves the houses. Municipalities that have combined sewage and stormwater systems are spending a lot to separate those systems. Here, the stormwater just runs off,” Smith explains.

The village estimates that it would have cost residents twice as much to replace their private septic systems as it did to install the new centralized system, which also has the lowest lifecycle cost of all the systems the village evaluated. The new system has eliminated the public health hazard associated with sewage backups and breakouts and rid the village of occasional bad smells. The village is now developing a new subdivision, existing businesses are expanding, and tax revenues are increasing. Victoria is now in a position to attract new residents and tourists who can safely enjoy sport fishing, clamming, bird watching, water sports and the village’s pristine beaches.

## Results

- 100 per cent reduction in phosphorus and fecal coliform discharges into Victoria Harbour.
- 90 per cent reduction in suspended solids and 29 per cent reduction in nitrogen in discharged water.
- 54 per cent reduction in CO<sub>2</sub> emissions related to pumping out holding and septic tanks.
- Six per cent reduction in water consumption from installation of low-flow toilets.
- At least five local businesses have expanded since the completion of the central sanitation system allowed them to acquire construction permits.
- The village’s tax revenues have increased due to growth in the commercial sector.
- The village is developing a new subdivision with 29 lots that will all be fully serviced. (In the past the village provided water but not sewer services to new lots.)

## Lessons Learned

- INVOLVE THE COMMUNITY EARLY AND OFTEN. “It was our policy to involve everyone and volunteers from the community spent hundreds of hours researching possible solutions and trying to develop community-wide consensus on the best approach,” says Ben Smith, chairperson of Victoria’s Community Council. That policy was a great success: at a community meeting held to approve the project’s implementation, 94 per cent of participants voted to proceed.
- HIRE AN EXPERIENCED PROJECT ADMINISTRATOR. Small communities often rely on volunteers, but they may not have enough time or experience to manage your project. “We were very lucky to find an administrator with experience in this kind of project. He was constantly out in the field looking at what was going on, and he reviewed the billing to be sure we got what we paid for, and got what we had agreed to buy,” says Smith.
- REMEMBER INNOVATION ON PAPER IS DIFFERENT FROM INNOVATION IN REALITY. “Find a community that’s already using the system you’re considering. We wanted an innovative system that had a history of working properly, and we were reassured when we found a small community in New Brunswick that had a similar system,” says Smith.
- STICK TO YOUR PRINCIPLES, STAY INVOLVED, AND KEEP AN EYE ON THE DETAILS. “Don’t assume the firm you hire has the same viewpoint as the community. Our contractor was going to put up a power line in front of an historic lighthouse. But landscape is very important here, and we wanted the whole project to be unobtrusive, so we decided to spend a little extra money and run that power line underground,” Smith concludes.

## Related and Future Initiatives

Victoria chose a site for its wastewater treatment plant where wind power could be harnessed to provide electricity to run the plant. The community is now talking with neighbouring communities and businesses about a more ambitious public-private wind energy project on the site.

In planning its new wastewater system Victoria had to make some decisions to maintain the shoreline. With the project complete, the village has taken the next step and is repairing seawalls and considering creating a park to help protect the shoreline from erosion.

## **Partners and Collaboration**

Engineering Technologies Canada Ltd. helped research, identify and successfully apply the appropriate new technologies to address Victoria's wastewater challenge.

Prince Edward Island's Department of Environment, Energy and Forestry, and Environment Canada's Atlantic Canada Opportunities Agency consulted with Victoria regarding approvals and permits associated with Environmental Impact Assessment screening.

Public Works and Government Services Canada consulted with Victoria on harbour discharge options.

Transport Canada consulted with Victoria on harbour discharge and its potential impact on harbour traffic. The department also allowed the community to locate the pumping station for its wastewater system on department land near the lighthouse.

## **Contact**

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