



# FCM Sustainable Communities Mission

British Columbia, 2008

## Case Study: Managing Water in B.C. Communities

### OVERVIEW

Sustainable neighbourhoods must exercise care when handling water. In a traditional system, drains collect runoff and pipelines whisk water away. As developer Joe Van Belleghem said, an “[engineer’s] job is to get water off the site as quickly as possible. They don’t know that nature is the best way.”

The traditional stormwater management system removes water from the ecosystem where it fell, and where it has a natural role. Stormwater management systems can be constructed to facilitate rehabilitation of waterway health.

Water from roads can be contaminated with oils; when water from many roads is combined, the accumulation of pollutants can be significant. One of the main sources of pollution in the Victoria Harbour is stormwater discharge. Leadership in Energy and Environmental Design (LEED®) standards indicate that stormwater management systems should avoid disrupting natural water flows by minimizing stormwater runoff, increasing on-site water absorption, and reducing contaminants.

The B.C. provincial government now requires water conservation in buildings. Low-flow toilets will be mandatory in new buildings as part of the revisions to the *B.C. Building Code*, effective September 2008. The *Green Infrastructure Guide* by West Coast Environmental Law, freely available on its website at [www.wcel.org](http://www.wcel.org), can help local governments to structure legislation that encourages sustainable stormwater management systems.

- Developments are managing stormwater naturally by building creeks, wetlands, and bioswails, to improve waterway health and to keep water where it falls.
- Instead of wasting potable water on non-potable uses, municipalities are creating separate non-potable water pipelines and collecting rainwater to use for flushing toilets.
- Through regulation and education, municipalities are reducing water demand to sustainable levels.
- Municipalities are protecting waterways to ensure the safety of the water supply and a healthy environment.



“Al Kemmere (Mountain View County, AB) studies the outdoor pond system at Dockside Green”

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B.C. communities] realize they have to take care of their environment,” said Annie Lessard, a councilor from Saint-Basile-le-Grand, Québec. “But [at home], everyone waits to do something until we hit the wall. In Québec, we think we have a lot of land, space, and water. But I think some of us realize by the example of other provinces and countries that we have to do something now, before it’s too late.”

The following initiatives illustrate leading edge examples of sustainable water management visited on the FCM Sustainable Communities Mission tour.

## **STORMWATER IN LEED NEIGHBOURHOODS**

### **Dockside Green**

Dockside Green in Victoria handles its stormwater entirely onsite, using a creek that runs through the development rather than storm drains. The creek naturally treats the water and slows it down, while integrating the community and delivering a social benefit. “As soon as we built [the creek],” developer Joe Van Belleghem said, “the geese and ducks showed up, and we had an otter playing in our water the other day.” When stormwater is managed naturally, the responsibility for maintenance moves from the engineering department to the parks department. Budget sharing should reflect this new division of roles.

### **Southeast False Creek**

The buildings in Southeast False Creek collect rainwater to flush toilets. Each building has a massive rainwater cistern beneath its parkade. Potable water is used to keep the water in the cisterns circulating, while sump pumps and regular maintenance prevent sludge from accumulating. The health officer ruled that non-potable water can be used in toilets, and a separate set of pipes will send rainwater directly to them. By harvesting rainwater, potable water consumption in the buildings will be reduced by fifty per cent.

Unused rainwater will be collected in bioswails and a drainage basin, and a wetland is being constructed to treat the water naturally. The water level in the wetland will be monitored, controlled, and released into False Creek as appropriate. Rehabilitating the intertidal marine habitat of False Creek was an important goal of the development, given that a century of industrial activity had severely contaminated the waterway.

The developers cleaned the site and built an island in the ocean—Habitat Island—to bring back the natural ecosystem. The intertidal space on the island was maximized so it is shaped like an iceberg, and at high tide it is very small. The path to the island is submerged at high tide to “send the

message that you’re a guest there” said Jody Andrews, Southeast False Creek project manager with the City of Vancouver. Construction was actually slowed when 3,000–4,000 stickleback fry were found in False Creek, a volume that has not been present in that area since the 1920s.

### **Whistler’s Cheakamus Crossing**

The developer of Whistler’s Cheakamus Crossing, which will be the Whistler Athlete’s Village during the 2010 Olympic Winter Games, has created a stormwater management system that will maintain pre-development water flows. Stormwater rain gardens have been designed to detain rainwater run-off and reduce sediment and contaminant levels in stormwater. The stormwater management system is designed to protect and enhance the natural wetlands in the region. Water flows will be directed away from the landfill to reduce leachate, a liquid contaminant that can leak from landfills.

## **VICTORIA WATER MANAGEMENT PLAN**

The Sooke Reservoir is the primary water source in the B.C. Capital Regional District (CRD) water system. In December 2007, CRD purchased the rights to the Leech Watershed to ensure the security of future water supply. Projections indicated that this new reservoir could be needed as early as 2023. In part because the cost of accessing the new reservoir is prohibitive, CRD hopes to delay tapping into the new watershed until 2050 through conservation initiatives. Residents currently use an average of 314 litres of water each day, already slightly lower than the national average of 329 litres per day. The Region hopes to reduce demand by ten per cent per capita by 2023.

The CRD region averages 60 inches of rain during the winter rainfall and only five to eight inches during the summer. Water demand spikes noticeably during these months, when a significant portion of water use is for aesthetic needs such as lawn maintenance. Twice, extreme drought conditions have forced CRD to implement severe restrictions on water use. Through water consumption initiatives it is hoped that such drastic measures can be avoided in the future.

The CRD water system was awarded a 2007 FCM-CH2M HILL Sustainable Community Award for its water demand management program. CRD’s attitude to water conservation is to avoid adversely affecting lifestyle while eliminating water waste. A suite of programs encourage conservation:

- The water conservation bylaw limits days and times when lawns may be watered and identifies the equipment that may be used, such as a hose or a hand-held watering device.



- Educational campaigns include distributing rainwater gauges and instructing residents how little water is necessary to maintain a green lawn.
- The installation of meters on every home is expected to help encourage responsible water use.
- Full-cost pricing means that customers pay the entire cost of the water they use, including the capital costs and maintenance costs; customers will see the impact of wasting water.
- Rebates encourage the installation of water-conserving appliances.

To be eligible for the rebate, the old appliance must be recycled at a specific location, to ensure that it is taken entirely out of commission. Comprehensive testing assured consumers that new low-flow appliances work and generated retailer buy-in because their stock was being promoted.

### VICTORIA WATERWAYS REMEDIATION PROJECTS

One of the goals of the CRD's community-based, multi-stakeholder Roundtable on the Environment is to maintain and restore the integrity of the natural environment. To that end, the CRD's Stormwater, Harbours & Watersheds Program works with communities and stakeholder groups to remediate and protect streams and waterways.

Cecelia Creek, which runs through the Burnside Gorge community in Victoria, was once a significant fish-bearing waterway that ran directly into the Gorge Waterway and Victoria Harbour. It was later enclosed as a result of development; sewer and storm drain cross connections led to increasing contamination. When two major storms resulted in flooding, it was necessary to replace the undersized stormwater system. The Burnside Gorge Community Association became involved and asked the City of Victoria to open the creek to daylight.

In 1998, City Council's support led to the creation of the regionally coordinated multi-stakeholder Cecelia Creek Restoration project. Over 130 meters of the creek was exposed to the daylight in 2000–2001 beside a section of the Galloping Goose Regional Trail, which links downtown Victoria to outlying areas. Now the water quality is significantly improved and the ravine provides a green space for the neighbourhood. Educational efforts inform would-be polluters that anything that is illegally dumped will be visible downstream. An additional walkway was installed next to the creek to bring the community close to the waterway, and

a headwall was marked to show flood levels. Cecelia Creek is an excellent case study in how stormwater management can support social and environmental sustainability.

Historically, the Victoria Harbour has been an industrial working harbour. As a result of this industrial activity, its sediment is extremely contaminated—the seabed in Rock Bay severely so with coal tar. Eel grass, an important fish habitat, has been adversely affected by pollution. Stormwater discharge is currently one of the major sources of pollution in the harbour, and studies have begun to show that water contamination is affecting wildlife, including otters and fish. An intergovernmental committee was formed to develop an environmental strategy for the harbour. Federal government ownership of the Victoria Harbour seabed “presents challenges for management,” said Jody Watson, harbours and watershed coordinator with CRD Environmental Services. However, significant shoreline and soil remediation has been undertaken along the waterfront, largely as a prelude to sustainable developments. The Greater Victoria Harbour Authority is a non-profit advocate group that includes two First Nation bands and has been very active in harbour remediation.

In 2006, FCM's Green Municipal Fund was the major source of funding for the CRD's Bowker Creek Master Drainage Plan. The Bowker Creek Watershed Management Plan, completed in 2003, identified the creation of an Integrated Stormwater Management Plan as a key action. The Master Drainage Plan funded by FCM is part of the Integrated Stormwater Management Plan.

The Bowker Creek watershed falls within the municipal boundaries of the CRD, the Districts of Saanich and Oak Bay, and the City of Victoria. These municipalities and other stakeholders formed the Bowker Creek Urban Watershed Renewal Initiative. The CRD and its partners conducted the hydrological and hydraulic modeling and analysis required to complete the Master Drainage Plan.

The best available climate change information was identified to inform the solutions that were incorporated within the plan: for example, trees will be planted where a riparian zone is needed and to mitigate climate change. Innovative approaches have been planned for stormwater and watershed management. The plan will enable projects to be prioritized in a way that maximizes return on investment, and science-based information gathered for it will help the CRD to make informed



decisions on future stormwater management activities within the watershed. The next phase of the Bowker Creek initiative will integrate social and environmental sustainability; the final recommendations will include the social objectives and take economics into consideration.

### NARAMATA

Naramata is situated in an arid climate in B.C.'s Interior. Until 2007, the Naramata water system relied on upland creek water blended with water pumped from Okanagan Lake. A new pump station and treatment facility was commissioned in 2007 to provide drinking water solely from the lake and improve water quality. Naramata took advantage of the opportunity to improve conservation of potable water. Separate pipes, one with treated water from the lake and one with untreated water from the creek, will be twinned to provide potable water for consumption and creek water for agricultural purposes, saving energy from unnecessary pumping and water treatment, while helping to conserve potable water. This is "a solution to treated water going on lawns," said Gary Maclsaac, executive director of the Union of British Columbia Municipalities.

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### ADDITIONAL RESOURCES

This case study highlights sites visited by delegates on the 2008 FCM Community Energy Planning Mission. For additional information on the Mission, including more Mission case studies, presentations and the 2008 Mission Report, visit the FCM Centre for Sustainable Community Development Website at [www.sustainablecommunities.fcm.ca/Community\\_Energy\\_Mission](http://www.sustainablecommunities.fcm.ca/Community_Energy_Mission).