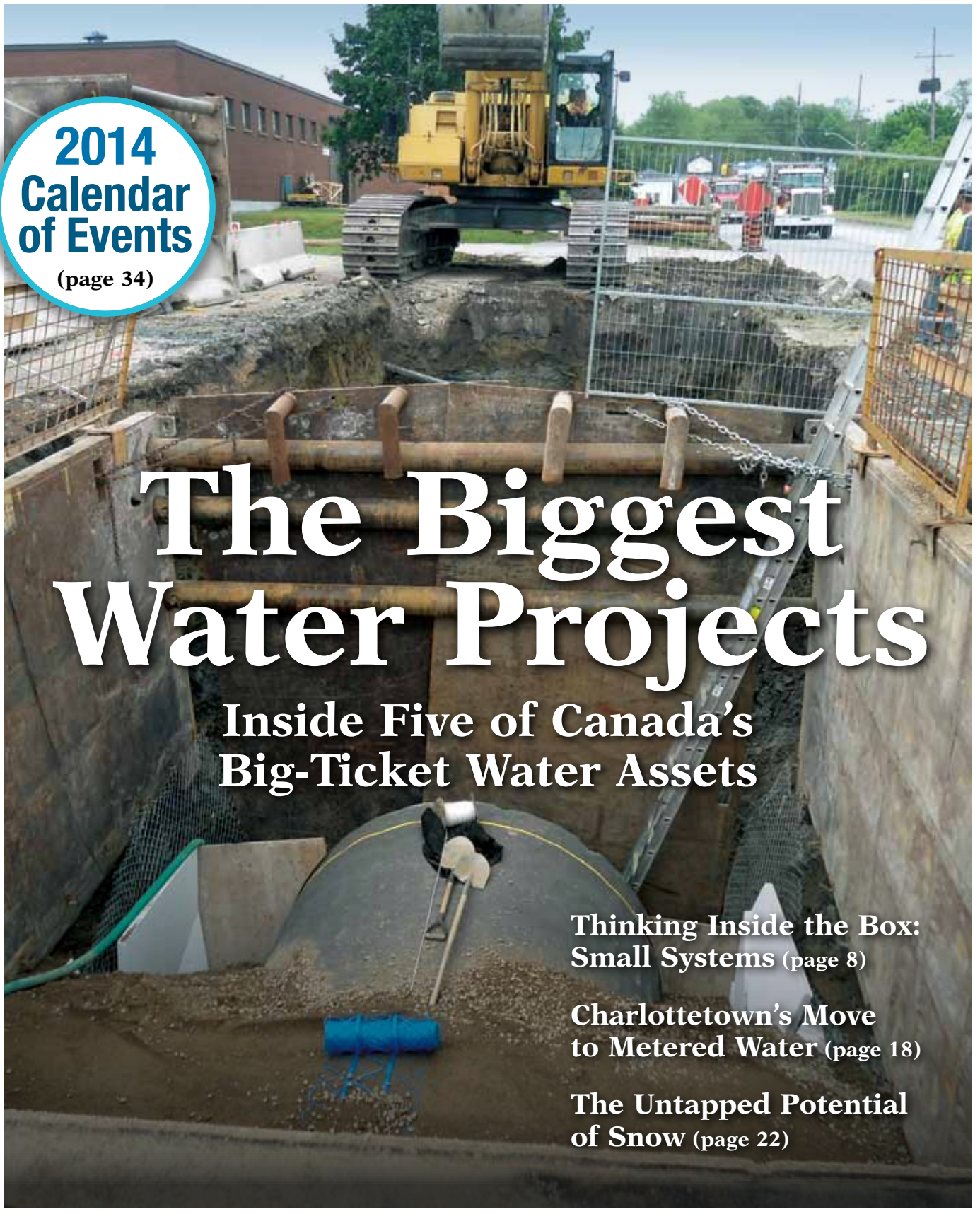
THE COMPLETE WATER MAGAZINE

JANUARY/FEBRUARY 2014

WATER CANADA



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The Biggest Water Projects

Inside Five of Canada's Big-Ticket Water Assets

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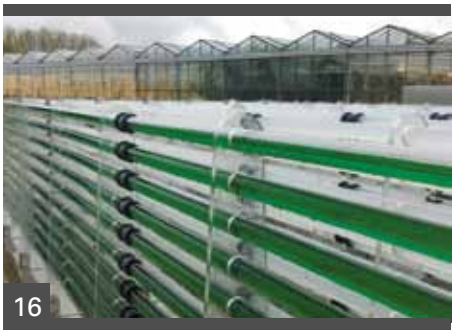

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Why aren't we monitoring the potential radioactive debris washing up on Canada's West Coast?
BY **MARY JOHNSTON**

DEPARTMENTS

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WATERCANADA
THE COMPLETE WATER MAGAZINE
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School's Out

BY KERRY FREEK

THIS ISSUE, we profile the country's biggest water projects, which combined are worth more than $2.5 billion. The newly renamed Seaterra Project, formerly the Core Area Wastewater Treatment Plan, leads the pack at a whopping $782.7 million—but not without controversy (*see* "A Light at the End of the Tunnel," *November/December 2013, bit.ly/victoriasewage*).

Water projects are rarely without controversy. This past year, we've seen Regina go to the polls with a city-wide referendum that ultimately supported P3 funding for its new wastewater treatment plant (*bit.ly/ReginaP3*). We've seen Winnipeg and Shoal Lake go head to head over a century-old International Joint Commission decision and a plan to expand services (*see* "Drinking Water Dispute," *May/June 2013, bit.ly/WinShoal*). We've also seen the long-awaited agreement between the City of Nanaimo and District of Lantzville over a divisive water-sharing plan.

But controversy isn't limited to big projects. In Ontario, the City of Kitchener's new stormwater user fee and credit program is raising some hackles. In November, Education Minister Liz Sandals sent a letter strongly encouraging the city to stop sending bills to local school boards. According to the Assessment Act and Municipal Act, schools are exempt from paying property tax and development charges. Sandals and the Ontario government made clear that this rule extends to paying taxes to support city infrastructure.

Does this decision send the wrong message? The Kitchener program is designed not only to pay for needed stormwater infrastructure, but to reward good stewards—those owners who install practices that reduce runoff and pollutant loading from their properties. According to Nick Gollan, manager of the stormwater utility, property owners qualify for stormwater rate credits when they demonstrate that their existing or proposed stormwater facilities or applied best management practices are functioning as approved (*see* "User Fees that Please," *March/April 2013, bit.ly/KitchStorm*).

What's unfortunate about the exemption—whether it makes sense for budgets or not—is that it's a wasted opportunity for community development. Many environmental organizations, including conservation authorities, argue schools could be the best places to do low impact development projects—and it really doesn't have to cost the school a thing. With little effort, schools can build a simple rain garden with donated supplies and maybe some in-kind support from a local consultant. How hard can it be to contribute to the community in which students live, grow, and learn?

> What's unfortunate about the exemption is that it's a wasted opportunity for community development.

Most importantly, with projects like Seaterra, we've seen how long it can take to get a community on board with major (and positive) environmental change. Forget the fees: If the school board agreed to participate in even the best management practice portion of the stormwater program, it would set a great precedent for budding young water stewards. Like many water projects, Kitchener's framework can solve some problems, encourage experiential learning opportunities that help shape communities, and, if done well, save some of the hassle when it comes to the big stuff. WC

Have you applied for stormwater credits from your municipality? Tell us about it on Twitter **@CanadianWater**

FEATURE CONTRIBUTORS

JULIE STAUFFER
Julie is an award-winning freelance writer and the owner of Cadmium Red Communications.
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CAITLIN HENDERSON-TOTH
Caitlin is a research analyst at WaterTAP Ontario.
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MARTINE PAWLOWSKI
Martine is the general manager of H2O Logics Inc. and a certified Canadian Environmental Professional.
PG 26

ROBERT HALLER
Robert is the executive director of the Canadian Water and Wastewater Association.
PG 36

ABOUT THE COVER

One of the top water projects in Canada, the 14.5-kilometre Hanlan Feedermain will supply water to the Region of Peel in Ontario and neighbouring municipalities and provide redundancy to the existing feedermain. Construction began in 2011 and is expected to finish by 2016.

Credit: Region of Peel

NEXT ISSUE: MARCH/APRIL

- **Hungry for P3s: Funding Water and Wastewater Projects in Canada**
- **Is Sewage the Ultimate Renewable Energy Source?**
- **Healthy Lakes: The Lake Simcoe Phosphorus Reduction Strategy**

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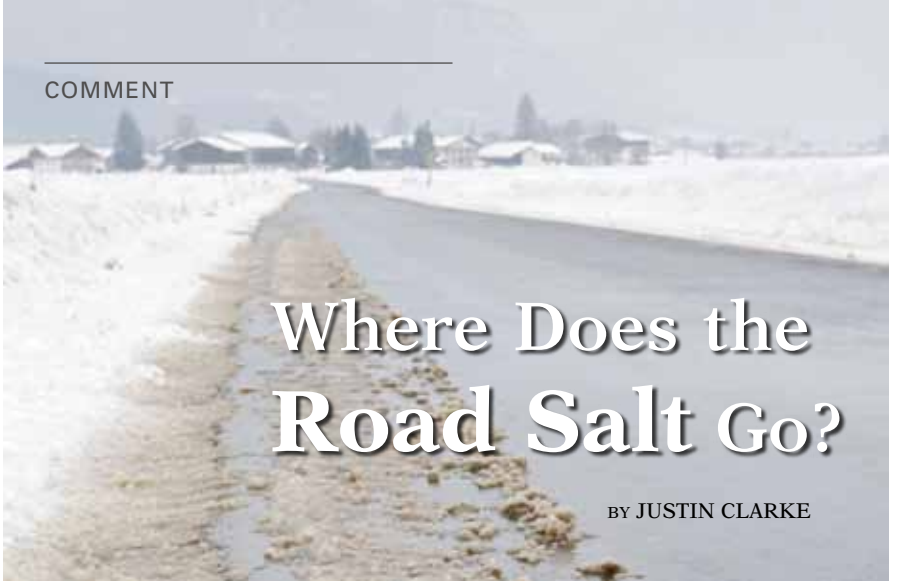


Where Does the Road Salt Go?

BY JUSTIN CLARKE

DURING MY TIME as an environmental consultant, I toured most of Southern Ontario by travelling between job sites. Over the past 15 years, I have noticed changes to our roadside landscapes. As I watched city and town limits grow, roads were often upgraded and salted in the winter to assist the local traffic. Roads that were previously unsalted or simply covered with sand for traction were now seeing salt trucks regularly. It slowly became apparent to me that our road safety has higher priority over the health of our environment.

As the years went by, roadside plant life in Southern Ontario cities like Orangeville began to show signs of fatigue, especially evergreen trees. Since some trees are so senstive to salt, I thought the water spray from passing cars might be the reason for so many brown needles—or perhaps the salinity in the shallow top soil was high enough to change the pH of the soil. It wasn't until later, during a monitoring program with several wells along a road adjacent to my job site, that I noticed the salt had travelled even farther. The salinity in the monitoring wells along the road was higher than those on other areas of the job site. If the road salt had reached the shallow groundwater, it now had the ability to be transported in the direction of groundwater flow.

This observation led to a discussion with my father, Bill, a hydrogeologist. He mentioned that the salinity in the Grand River was being monitored and had been rising slowly for many years. "As good as the wastewater treatment plants are, salt is not something that can be easily removed from water," he said.

He then told me about a site close to our home in Maryhill, Ontario that was used to store road salt. At this location, the stockpiles were not stored in an enclosure, allowing the rain to dissolve the salt and wash it away. The water table had absorbed so much salt that a large-scale dewatering plan was required to prevent it from migrating to an aquifer or surface water body. Re-crystallization of the salt required excavation of large volumes of fill to be taken off site for disposal. These storage sites now have their own impacts on our groundwater.

While rock salt is a cheap and effective way to reduce ice accumulation on our roadways, it requires regular application and does not disappear after washing away. An alternative that does not have the same long-term effects should be considered. Currently, calcium magnesium acetate, calcium chloride, and magnesium chloride are all being studied for their potential to replace salt as a de-icer. These alternatives can be two to three times the cost of conventional road salt with some requiring special processing and dispensing equipment on trucks. However, the environmental advantages outweigh the costs, especially in locations where the flora has little to no defence against salt contamination. Our groundwater is particularly susceptible as rural roadside ditches absorb much of the water runoff when the snow melts. Ultimately, we must find a viable solution to keep our roadsides safe and our natural environment healthy. We must stop prioritizing one over the other. WC

Justin Clarke is the environmental sales and services coordinator of MAXIM Environmental and Safety Inc.

What the Toad Knows

WHAT CAN AMPHIBIANS tell us about arsenic levels in groundwater? Iris Koch and a team composed of researchers from the Royal Military College of Canada and scientists from the Canadian Light Source said frogs and toads could hold the key to arsenic detection in freshwater sites.

The team studied amphibians living in an old mine tailings site near Upper Seal Harbour, Nova Scotia. The animals showed high levels of arsenic after being tested using synchrotron light.

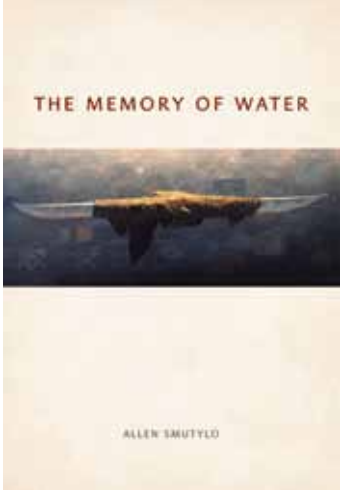
"Any time you have water that's contaminated, the organisms that are living in the water will likely give you some idea of how toxic the water is," Koch said. "Organisms might respond in ways that indicate that they are being poisoned."

While the amphibians appeared to be relatively healthy despite displaying very detectable levels of inorganic arsenic, which is typically toxic, Koch said the biggest outcome of the research is understanding arsenic movement in the environment.

"At the end of the day, looking at a contaminated site like the one in Nova Scotia, we are interested in whether any of the arsenic in the soil and tailings gets into plants and animals," she said. "We can learn about what animals do with the arsenic in their bodies and this might be helpful in predicting how people might interact with the arsenic, if they were exposed to it."

Groundwater arsenic contamination is an international health concern since many countries, including China, India, Bangladesh, and Nepal, are dealing with widespread contamination issues. —Staff

Winners!



Three lucky readers have won a copy of **Allen Smutylo**'s book, The Memory of Water. Congratulations to (from left) **Ahmed Badruddin**, the CEO of Watrhub Inc., **Shishir Handa**, a PhD candidate at the University of Waterloo, and **Carly McLennan**, an operator for OCWA, who provided the best answers when we asked our readers what drew them to water.

Online at WATERCANADA.NET

Credit: City of London Wastewater Treatment Operations

BLOG: Barry Orr follows up on his July/August "Toilet Toll" article (***bit.ly/toilettoll***) with a blog post on what progress has been made in controlling non-flushables in our systems. ***bit.ly/toilettoll2***

Credit: The Media Line

VIDEO: Members of Canada's water sector are collaborating with international partners in Israel to share expertise and gain new knowledge. Eric Hoskins, Ontario minister of economic development, stresses the benefits of these partnerships in this video.

bit.ly/CanIsrael

Credit: Alex Rixtas

BLOG: British Columbia's long overdue Water Sustainability Act is examined by **Anna Warwick Sears**. "The even greater task of putting the new rules into practice [has] only just begun," she writes.

bit.ly/bcwateract

Credit: EcoLibra Systems

EcoLibra's system is made up of a simple design of polymer tanks, PVC pipes, and impeller pumps and valves.

Thinking Inside the Box

For Canada's remote First Nations, smaller towns, and suburban developments, containerized sewage treatment promises plenty of benefits. Are we ready to rethink small systems? BY JULIE STAUFFER

ACROSS THE COUNTRY, small towns are facing the problem of sewage lagoons nearing capacity or reaching the end of their lives. On First Nation reserves in particular, more than half the wastewater systems have been classified as high or medium risk. Meanwhile, urban Canadian municipalities are spending hundreds of thousands of dollars to connect new outlying developments to existing treatment plants.

According to Trish Johnson, a senior environmental consultant at R.V. Anderson Associates Ltd., the status quo approach to small sewage systems no longer makes sense. "We have to do things differently," she says.

Bullish on boxes

More and more companies are betting the answer lies in packaged or containerized sewage treatment. The concept is simple. Fit your technology—complete with plumbing and electrical—into a shipping container or trailer, transport it to your site via truck or barge, hook everything up, and suddenly, you've got a functioning system in a matter of days at a fraction of the cost of conventional plants. As an added bonus, the effluent that comes out the other end is just as good—or better—than in traditional facilities.

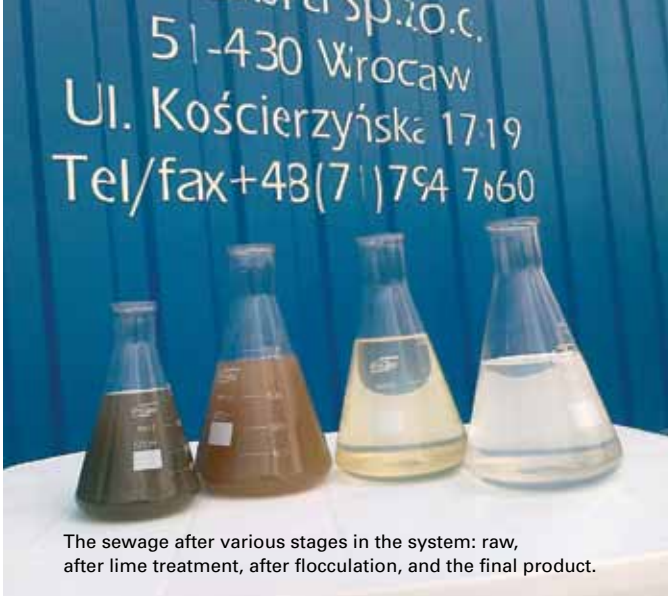
Take the example of EcoLibra Systems. A few years ago, this Saskatoon-based company was building sewage treatment plants from scratch with all the contracting headaches and weather delays that accompany any construction project. CEO Jason Tratch then decided to package his company's lime-based treatment technology in a standard 40-foot sea container. The resulting system serves roughly 300 people, and to scale up, the user simply adds another container.

Meanwhile, for the past 13 years, Calgary's FilterBoxx Packaged Water Solutions Inc. has been providing water and sewage treatment in the work camps of Northern Alberta, "literally 500 miles north of nowhere," CEO Larry Novachis says.

> The status quo approach to small sewage systems no longer makes sense.

The packaged membrane bioreactor

Credits: EcoLibra Systems



The sewage after various stages in the system: raw, after lime treatment, after flocculation, and the final product.

A First Nations technician examines the sewage before and after treatment during a demonstration at a lagoon in October 2013.

Fresh sludge from the system before the drying process.

The sludge is turned into biosolids/ fertilizer after being dried naturally on the ground for 48 hours.

sewage treatment systems serve anywhere from 600 people to more than 5,000. Now, FilterBoxx is expanding its clientele to small communities, First Nations, resorts, and hotels. "If the camp people put their faith in a packaged approach day in and day out in –50°C, there's no reason why a small town or an Indian reserve couldn't either," Novachis says.

There are dozens of other examples. Treatment containers from Canadian-owned Nomadic have seen action everywhere from fly-in fishing camps in British Columbia to mining camps in Siberia. Siemens has installed its Xpress system at Tsuu T'ina Nation's Grey Eagle Casino in Calgary, while Quebec-based Bionest piloted their Kodiak system in the Arctic town of Iqaluit.

And whether the company uses an activated sludge process, rotating biological contractors, chemicals, or membrane technology to treat wastewater, the objectives remain the same: provide a packaged system that is effective, easy to transport, and simple to maintain.

'It's a slam dunk'

So how do boxed systems stack up against conventional approaches? When compared to lagoons—the go-to solution for most Canadian communities of 5,000 people or fewer—the big advantage for small systems is performance. While lagoons are a well-established technology, a 2006 Canadian Council of Ministers of the Environment report cites problems with odour issues and high ammonia levels in the treated discharge.

As environmental regulations get stricter, Novachis expects more towns to look for alternatives to lagoon systems. Packaged or containerized systems are highly reliable, he says. They have a significantly smaller footprint than a lagoon, plus they're enclosed, avoiding odour issues. Most importantly, they produce an effluent that can be reused for anything from washing equipment to watering golf courses. "Really, it's a slam dunk going packaged versus lagoon," Novachis says.

Packaged systems have advantages over bricks-and-mortar facilities, too. In remote communities where on-site construction costs can run 10 times as high as urban areas, packaged systems make financial sense. While the material costs are similar to a so-called "stick-built" system, Novachis says, the huge savings on installation cut total ownership costs between a half and two-thirds.

Tratch also points out the economies of scale created when a company

manufactures standardized packages rather than constructing a custom-built facility. Packaged systems can be designed and installed much faster than the 18 to 24 months typically required to build a plant from scratch. "We can have a sea can at your door, ready to turn the key, within three to four months," he says.

As for suburban settings, packaged systems allow municipalities to expand without the need to connect nodes of development to treatment plants dozens of kilometres away. Tratch says he's getting calls from developers putting in 100 or 150 houses on the outskirts of town. "This is a big new market," he says.

And the advantages of small systems do not end there. Packaged systems don't require specialized expertise, which is ideal for small communities where highly trained engineers and operational staff are not always available. Take the example of an EcoLibra system: "Every three to four days, someone's going to have to go into the plant and add the green chemical to the green bin, the blue chemical to the blue bin, and then swap out the bag that was collecting the sludge," Tratch says. Compared to more traditional systems, this process is relatively easy.

As for FilterBoxx, it has 35 certified water and wastewater professionals in Stony Plain, Alberta dedicated to running the plants it installs.

Moving forward

In a country still dominated by big pipe, urban-focused thinking, manufacturers of packaged and containerized systems face a few hurdles. One of the biggest, according to Johnson, is policy. "Buttoned down" and "risk averse" federal protocols require operators and backup systems that are exorbitantly expensive, she says.

And while some provinces do allow communities to manage private systems, others insist new suburban developments should be connected to existing sewage treatment plants.

Then there's the additional problem facing any new technology: unfamiliarity. While the engineering companies that design and build municipal plants know all about bricks-and-mortar plants, plug-and-play systems are a different ballgame. "I think the next guys that need to change is the small and the large engineering firms," Tratch says.

However, Johnson points to economic drivers, the data flowing in from pilot plants, the federal government's willingness to look at alternatives for First Nations, and the growing number of qualified vendors as signs that attitudes are shifting. "Once we start to put out the information and the results, and the proof of the pudding is there, we're going to see huge changes," she predicts. WC

Julie Stauffer is an award-winning freelance writer and the owner of Cadmium Red Communications.

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Canada's Top 5 Water Projects

Seaterra Program
$782.7 million

Location: Southern Vancouver Island, British Columbia

Owner: Capital Regional District

Project/Construction Manager: Stantec

Engineer: CH2M HILL (preliminary planning/study); C.N. Ryzuk & Associates (geotechnical consultant); Westland Resource Group, Associated Engineering, Kerr Wood Leidal Associates (consultants)

Other: Ernst & Young (business case); Stantec (business case and technical planning services)

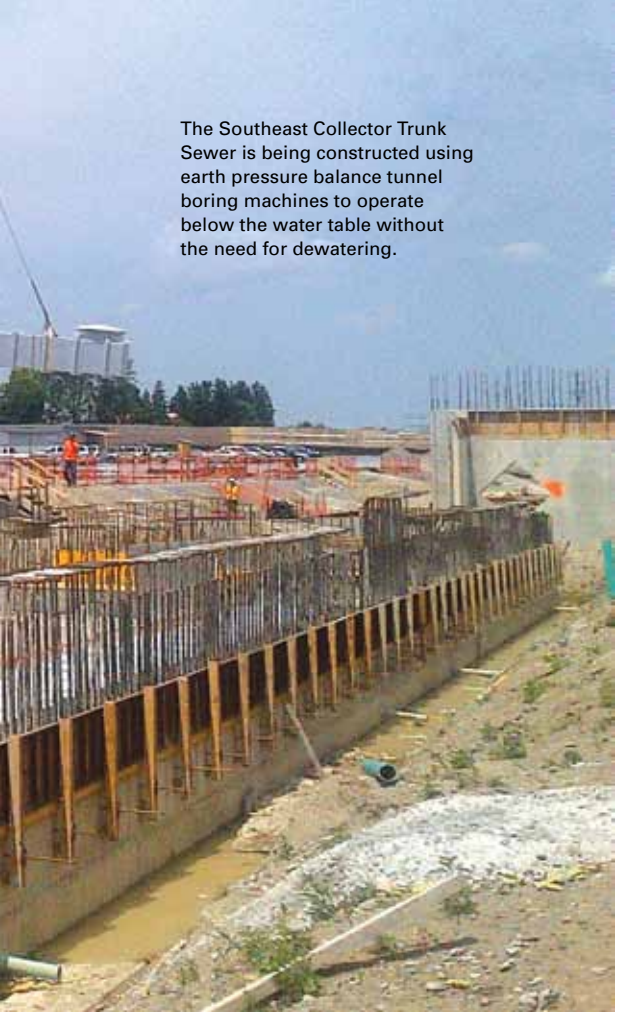
Funding: Public

- **Federal** $253.4 million
- **Provincial** Ministry of Community and Rural Development: $248 million
- **Municipal** Capital Regional District: $281.3 million

The Seaterra Program, also known as the Core Area Wastewater Treatment Plan (CAWTP), includes centralized, liquids-only treatment facility at McLoughlin Point in Esquimalt and a separate biosolids digestion facility, located at the Hartland Landfill. The existing pump stations at the Clover Point and Macaulay Point outfalls facilities will be expanded to include grit removal facilities and increase pumping capacity to pump wastewater to McLoughlin. The existing Craigflower pump station will be replaced and Currie Road pump station upgraded, along with force main additions and an underground tank to attenuate sewerage flows during storm events.

Currently, the sewage management system in the Capital Regional District (CRD) consists of a six-millimetre screen to remove inorganic material from the waste prior to it being pumped a kilometre offshore into the Pacific Ocean. For years, this solution has been the source of debate—is dilution a sufficient method of treatment, or should the region invest in facilities that treat wastewater to a higher standard? New federal wastewater regulations have rendered the debate moot. Under the regulations, all municipalities above a certain size must implement secondary wastewater treatment before sewage can be discharged into the environment, and these measures must be in place by 2020 for a location like Victoria.

Based on a request for qualification, three teams have been shortlisted and invited to submit proposals: Capital Clear, which includes Dragados Canada and Knappett Projects Inc.; Harbour Resource Partners, which includes AECOM Canada, Graham Infrastructure, and SUEZ North America; and PCL Partnerships, which includes PCL Constructors Westcoast



The Southeast Collector Trunk Sewer is being constructed using earth pressure balance tunnel boring machines to operate below the water table without the need for dewatering.

Southeast Collector Trunk Sewer
$546 million

Location: York and Durham regions, Ontario

Owner: The Regional Municipality of York

Project/Construction Manager: A joint venture of Hatch Mott MacDonald and AECOM (detailed design and construction management)

Contractor: Zublin/Strabag (prime contractor, tunnel contractor)

Supplier: Armtec Holdings (pre-cast concrete tunnel lining); Caterpillar, formerly Lovat (tunnel boring machines); Salit Steel, Schoek (pipes)

Other: AECOM (integrated EA); LVM (geotechnical engineer, materials testing, quality assurance)

Funding: Public
- **Municipal** York Region: $546 million

Inc., Veolia Water Solutions, and North America Construction. A preferred proponent is expected to be selected by the spring of 2014.

"The commission is looking forward to receiving full proposals from the shortlisted teams," CAWTP Commission chair Brenda Eaton said in summer 2013. "The McLoughlin Point Wastewater Treatment Plant will be the foundation of the core area wastewater treatment system."

The plant will provide increased treatment for the region's wastewater, and will include heat recovery for the plant and administrative buildings. The project is expected to reduce volume and incidents of untreated water being discharged, and will meet all of British Columbia and Canada's wastewater regulations. It is expected that the plant will account for a full third of the $782.7-million price tag. Funding will be divided between the municipal, provincial, and federal governments: $253.4 million from Ottawa; $248 million from the province; and $281.3 million from the Capital Regional District.

Construction of the McLoughlin Point Wastewater Treatment Plant Project is anticipated to get underway in summer 2014 with completion in 2018.

This project has been in development since 2002—though the EA was not approved until early 2010. The earth pressure balance tunnel boring machines, which avoid requirements for dewatering and impacting the aquifers, and the segmental precast concrete tunnel lining, have both been procured. Hatch Mott MacDonald and AECOM (in a joint venture) have completed design of the tunnel, shafts, and surface facilities, as well as conforming the contract documents. Project design involves a 15 kilometre long, 3,000 millimetres diameter tunnel with 17 access shafts ranging between four and 48 metres in depth and diameter varying from four to 14 metres.

One of this project's challenges includes moving sewage between two municipalities. "The route runs through the City of Markham and the City of Pickering [in Durham Region]," Grant Robinson of the Regional Municipality of York said last year. As a result, a good community relations plan plays an important role.

"We've got 15 sites along the 15-kilometre alignment, and several of these compounds are close to residential areas," Robert Kerrigan of Hatch Mott MacDonald said. "Additionally, we have to connect this new tunnel sewer into the existing one at two locations, both of which are in the middle of residential areas." Odour management, he says, is a major challenge.

That's where innovation comes into play. AECOM's Christopher Sandink said that, upon completion, the odour management system will convey air countercurrent to the liquid flow to handle odour issues. "That hasn't been done before," he said. "Using large fan systems, the odour control program will ensure that air from the sewer doesn't enter Durham Region and air is processed in York Region."

Construction began in 2011 and is scheduled for completion by 2016.

The Hanlan Feedermain will supply water to the Region of Peel and neighbouring municipalities and provide redundancy to the existing feedermain.

Hanlan Water Project
$480 million

Location: Mississauga, Ontario

Owner: Region of Peel

Engineer: CH2M HILL (south section); MMM Group (north section); The Municipal Infrastructure Group and GHD (value engineering)

Other: AECOM (EA, preliminary design report); WSP (previously GENIVAR) (consultant); SPL Consultants (geotechnical consultant)

Like the Southeast Collector Trunk Sewer, the Hanlan Feedermain (part of the larger Hanlan Water Project) is needed to service a growing population. It will supply water to the Region of Peel and neighbouring municipalities, such as York Region, and provide redundancy to the existing feedermain.

The Hanlan Feedermain will run approximately 14.5 kilometres from the Lakeview Water Treatment Plant on Lake Ontario to the Hanlan Reservoir and Pumping Station at Tomken Road and Britannia Road East. Part of the same project, the 1,500-millimetre wide Mississauga City Centre Subtransmission Main will run approximately six kilometres from the Hanlan Reservoir and Pumping Station to the intersection of Cawthra and Burnhamthorpe roads. As part of the York-Peel Water Agreement, Peel Region will provide water to York Region via the feedermain. In exchange, York Region will be funding 35.6 per cent of the feedermain costs.

Construction began in 2011 and is expected to finish by 2016.

Lions Gate Secondary Wastewater Treatment Plant
$400 million

Location: North Vancouver, British Columbia

Owner: Metro Vancouver

Engineer: AECOM, CH2M HILL

Architect: Miller Hull

Other: KPMG (business advisor); BTY Group (cost consultant); Maple Reinders (compatibility advisor); 7group (integrated design facilitator)

This treatment plant will replace an existing primary treatment plant. Metro Vancouver is required to build a new secondary treatment plant for the North Shore by 2020 to comply with regulations and standards adopted by federal and provincial environment ministers. These new federal and provincial regulations require that all primary treatment plants be upgraded or replaced with secondary treatment facilities.

The existing primary plant is only capable of removing 40 to 60 per cent of materials in the wastewater, which is then pumped directly into Burrard Inlet—a long-time matter of concern for some environmentalists—and is located on land leased from the Squamish Nation. The new plant will be able to remove more than 90 per cent of suspended solids and will be located on a site two kilometres east.

The project definition phase is almost complete with the development of a recommended indicative design. The project definition phase has been guided by an integrative design process that brings together technical experts, community interests, and decision makers. In early 2013, design ideas and concepts were screened and three build scenarios were prepared and reviewed throughout 2013. The project definition phase is meant to determine the scope of the upgrade and will include recommendations on how to procure the design and construction phase, which

will take place between 2014 and 2020. Federal, provincial, municipal cost sharing arrangements will be determined at the end of this phase.

Construction of the new facility will enhance environmental protection and fulfill the commitment made in Metro Vancouver's Integrated Liquid Waste and Resource Management Plan (*bit.ly/vanwaste*). Decommissioning of the existing plant will take place once the new facility is commissioned.

Woodward Avenue Wastewater Treatment Plant Upgrade
$332 million*

Location: Hamilton, Ontario

Owner: City of Hamilton

Construction Manager: AECOM

Engineer: AECOM (lead subconsultant, detail design); CH2M HILL (design)

Funding: Public

- **Federal/Provincial:** $200 million
- **Municipal:** $132 million (financed through water rates and development charge revenues)

Hamilton's main wastewater treatment facility will be upgraded, which is a change in scope from last year's guide when it included an expansion component. The main objective of this future work is to improve effluent water quality and increase treatment for wet weather flow. The program will be delivered through several sub-projects, including a new 1,700-megalitre-per-day raw sewage pumping station and improvements to secondary and new tertiary treatment (with the exact treatment technology yet to be selected). Also included is a new chlorine contact tank, a new tertiary effluent outfall, upgrades to the Red Hill Creek (such as widening the creek and works to mitigate erosion), upgrades to the power supply, electrical distribution system and standby power, and other ancillary upgrades. The long-term goal of this initiative is to improve the quality of effluent flowing into Hamilton Harbour, and ultimately, to make a significant contribution toward de-listing the harbour as an "area of concern" identified under the Great Lakes Water Quality Agreement.

**The project scope changed. The total project cost is now $332 million, down from last year's estimated $600 million, with the federal and provincial governments each contributing $100 million.*

These projects were researched as part of the Top100 Projects 2014 report in ReNew Canada's January/February 2014 issue. They are ranked according to value.

Top100 Canada's Biggest Infrastructure Projects

Visit **top100projects.ca**

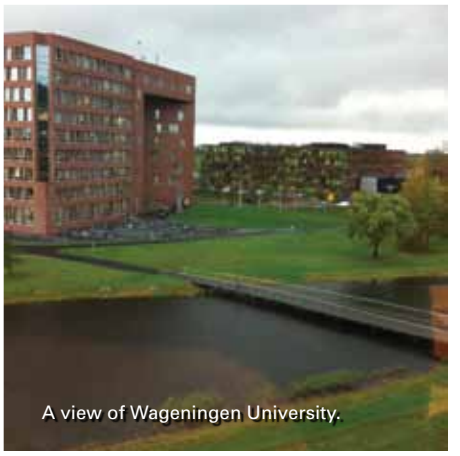
A cloudy day at Wageningen's AlgaePARC outdoor facility.

A detail of Wageningen's AlgaePARC outdoor facility.

Credits: Kerry Freek

Hans Wouters of Blueleg Monitor demonstrates how to take surface water quality readings with his device.

Gerard Schouten of Biotrack.



A view of Wageningen University.

Going Dutch

The Netherlands has made significant advances in the water space. Are there opportunities for Dutch technologies in Canada?

BY KERRY FREEK

SINCE TWO-THIRDS OF THE NETHERLANDS is vulnerable to flooding, it's safe to say the Dutch know a thing or two about flood control. For hundreds of years they've constructed dikes, dams, and even major engineering marvels, such as giant storm surge barriers and floodgates, to protect their homes in one of the world's most densely populated countries.

While its flood management expertise is top notch, the Netherlands has more to offer the world when it comes to water. In fact, it has emerged as a European water technology hub, creating a focused innovation ecosystem that takes game-changing ideas from academic research to fully fledged businesses.

This past November, the consulate invited me to cover International Water Week and Aquatech Amsterdam, an event that biannually affirms the country's growing status as a hub for exciting new developments in the water space. The event attracted more than 750 exhibitors and some 18,500 international visitors. Here's a small sample of what I saw and learned.

A world without sewers

For a few days before participating in the conference and trade show, I joined a small delegation of Manitoba organizations and businesses for a trip to Wageningen University, where we met several bright young researchers, as well as a few more established ones, including professor Grietje Zeeman.

Zeeman wants to bridge the gap between food production and food consumption, and she believes the answer lies in rethinking sanitation. The term "new sanitation," she explains, is the collection, transport, treatment, recovery, and reuse of domestic wastewater. The concept's main objective is to maximize the recovery and reuse of raw materials, such as nitrogen and phosphorus, for fertilizer.

So far, the concept is proving successful at four demonstration sites, including one neighbourhood of 250 newly developed homes in Sneek. Each home diverts blackwater from greywater and adds kitchen waste to separate 80 to 92 per cent of the home's total nitrogen, phosphorus, and potassium into a concentrated stream. Various techniques are used to remove these nutrients, which are later used to produce fertilizer, while the remainder of the organic material can be used to produce energy from biogas for heat.

Currently, the system offers many environmental benefits. Homes are outfitted with vacuum toilets that use much less water than the conventional seven-litre flush toilet. Also, treating at the source can prevent micropollutants from entering the environment, Zeeman points out. As it is further improved and developed, the system could produce many other possible benefits and become even more efficient.

Zeeman imagines the new sanitation process, if widespread, could eventually eliminate the need for cities to build expensive, large-scale sewer systems.

Let there be light

Algae blooms are a serious problem for Lake Winnipeg, so members of the Manitoba delegation were especially interested in BlueLeg Monitor's offering at the Aquatech trade show. The company's hand-held ecological surface water monitor uses light reflected off the water to pick up anomalies in the spectrum, such as the pigments of blue-green algae. In other words, it can derive water quality indicators without the need for lab analysis and it could cut down the number of samples field staff need to take.

For regions suffering from algae blooms, the device and its accompanying software can enable a warning system that helps track trends and locations. "If you can see the algae bloom coming, you can mitigate the risks at an early stage," says company partner Hans Wouters.

Speedy detection

Skipping the lab was a recurring theme at Aquatech. Leeuwarden-based Biotrack is attempting to speed up the traditionally slow process of detecting bacteria. The company's AquaScope—a "lab in a box," as co-founder Gerard Schouten describes it—is only four years into development, but he says customers are already waiting in line.

The product combines flow cytometry technology with fluorescent additives to detect bacteria in liquid samples ranging from one to 500 millilitres in 10 minutes. Not only can it handle multiple samples and parameters at once in significantly condensed time, it can do the job on the go—you don't need a full laboratory to get actionable results. Schouten sees the product saving time and money in drinking water production, agriculture, shipping, beverage production, food processing, water treatment, and meat processing, as well as the medical sector and the oil and gas industry.

It was easy to see how these innovations (and others) could be applicable in Canada—and indeed, some are already making headway. Wouters' device is currently being used in Alberta and has great potential elsewhere. At the right price point, Schouten's nearly portable "lab in a box" could prove especially useful in mobile or remote applications. One Canadian delegate from a rural community even saw an opportunity to make a progressive move using the "new sanitation" concept in a new development, provided it would work in colder weather. If these solutions work in concert with Canadian technology and expertise, the potential improvements to our national water space could be significant. WC

Kerry Freek is Water Canada's editor-at-large and WaterTAP's manager of marketing and communications. She would like to thank the Netherlands Consulate-General in Toronto and the World Trade Centre Winnipeg for the opportunity to participate in International Water Week Amsterdam.

A Measure of Progress

Charlottetown is slowly making its move to metered water in its latest effort to conserve a dwindling groundwater supply. BY CAITLIN HENDERSON-TOTH

THE BIRTHPLACE OF CONFEDERATION is gearing up for a major change—at least in regard to the monthly water bill. In October 2013, Charlottetown city council approved plans that will place all homes and businesses on water meters by December 2019. Many islanders believe such metering regulations will help conserve precious groundwater reserves in quickly drying watersheds.

Currently, all of Prince Edward Island uses groundwater for their water supply. Charlottetown, a town of 40,000, specifically relies on the Winter River watershed, which has declined significantly in recent years. Levels have remained so low that the city has begun the process of drilling five new wells into the neighbouring Miltonvale Park watershed.

Don Mazer, co-chair of the Winter River-Tracadie Bay Watershed Association, says low water levels in the watershed relate to "the amount of extraction by the city of Charlottetown." But Edward Rice, Charlottetown city councillor and chair of water and wastewater, maintains water usage in Charlottetown is not increasing. Instead, he blames hotter summers and decreased rainfall for the watershed's failure to regenerate.

While the reason for the water shortage may be up for debate, there is no doubt that metering provides a sense of fairness and can contribute to more sustainable water usage when implemented correctly.

The move towards a metered system started decades ago with businesses and commercial properties. In 2010, the city began a voluntary metering program to encourage residents paying a flat fee to adopt a metered system. The newest mandate will address Charlottetown's more than 7,000 remaining flat fee customers, requiring the installation of meters at no additional cost to the consumer.

Charlottetown residents have been aware of the need for water conservation for more than a century. In 1880, the Water and Sewer Utilities Commission was formed at the request of local residents, who worried that water and

Credit: City of Charlottetown

Mayor Clifford Lee and councillor Edward Rice, chair of Water and Sewer Utility, gathered at the new Wellfield site in Miltonvale with MLAs representing the area, city councillors, Miltonvale community council members, and city staff.

THE DRILLING OF FIVE WELLS at the Miltonvale Wellfield Development—the future location of an additional water supply for the City of Charlottetown—began in November 2013.

The City of Charlottetown's Water & Sewer Utility acquired provincial and federal funding to help finance the development of the wellfield including: drilling and testing wells, constructing a road, site pipe work, and the control building.

"The new wellfield site is a much needed development to continue to provide water supply services to the residents of our growing city," Mayor Clifford Lee said. "The City has taken large steps forward with water conservation initiatives and we thank our residents for actively engaging and participating in the programs offered through the utility department."

The construction of the control building, wellfield roadway, and piping are expected to take place in 2014.

"This project involves many detailed documents, which are currently in progress including the engineering design," said councillor Edward Rice, chair of the Water & Sewer Utility Department. "Drilling of additional exploration wells commenced this month and the project is expected to be complete with service to residents in 2016." —Staff

wastewater on the island required better management. Ramona Doyle, projects officer with the Charlottetown Water & Sewer Utility, recounted the city's numerous modern efforts, including a toilet rebate program, the sale of rain barrels, a showerhead exchange program, a leak awareness campaign, city-wide water restrictions, and the hotel water audit program, to name a few.

Councillor Rice spoke proudly of his constituents and their open-mindedness in accepting water-saving initiatives. "I think they're driving us," he said in regard to the many messages he has received on grassroots efforts to conserve, including the use of air conditioner condensate to water indoor plants.

But in a place that has already dedicated many years and significant efforts to water conservation, will metering make a discernible difference? The answer may be in the dollars and cents. Very high rates could force unprecedented conservation without savings for consumers, while lower rates could be a step backward in managing water consumption. The successful reception of the metered system likely depends on wise choices by the utility as they adjust rates going forward.

Charlottetown's move toward mandatory water metering will take place slowly over the next seven years. About 1,000 customers will be switched to the new system each year to allow for the gradual adjustment of rates. "It's going to cost somebody, somewhere," David Zetland of Aguanomics says, implying that the cost of installing meters will likely be reflected in new water rates.

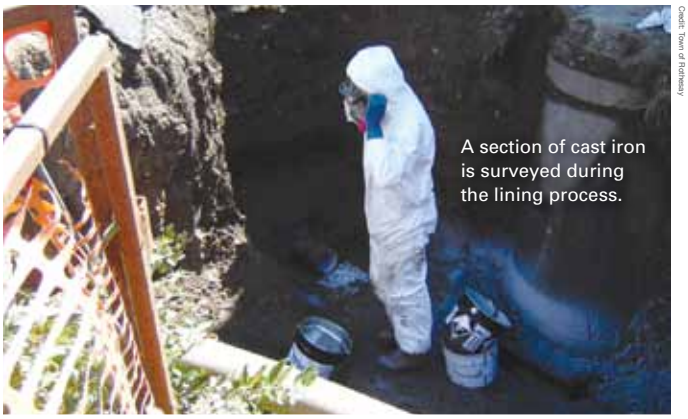
Many one or two-person households have requested to move to metering because they are currently charged a flat rate that assumes every house has four people. This raises the question about whether customers are genuinely motivated to conserve water since they will likely see an immediate and drastic reduction in their monthly water bill. Zetland believes there will always be an incentive when potential savings are involved, saying, "It's like comparing an SUV to a compact car. Your gas bill will drop, but if you leave your car running, you'll notice."

Does Charlottetown's receptive attitude toward metering have implications for other blue initiatives? It's an important question for a city whose potable water concerns are, perhaps, second only to their need to prevent future incidences of stormwater/wastewater overflow into the city's harbour at Navy Quay. The separation of these lines, already underway, could be a first step toward implementing a city-wide greywater system.

At this point it seems there is little hope that conservation alone will lead to a solution for the depleted Winter River watershed. Critics assert that with the long-standing watershed so far gone, Charlottetown's sustainable drinking water solution depends on innovative technology. Doyle believes that even with a mandatory metering system, "As time advances, there is no doubt that provincial regulations will open up to consider more opportunities for recycled or greywater use." WC

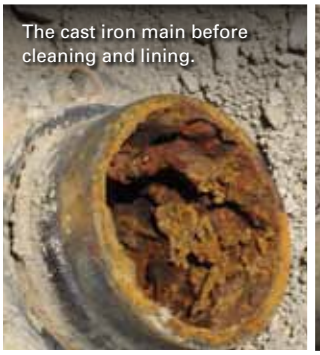
Caitlin Henderson-Toth is a research analyst at WaterTAP Ontario.


A process trailer is set up at the excavation site in Rothesay.


A section of cast iron is surveyed during the lining process.

Credit: Town of Rothesay


The section of cast iron main after cleaning and lining, but before being bolted up and put in service.


The cast iron main before cleaning and lining.


The cast iron main after the pipe coating was installed.

Line of Defence

Pipe lining is quickly becoming a cheaper alternative for protecting drinking water from corrosive material and contamination—so what are the benefits? BY RACHEL PHAN

Who are the major players?

While this trenchless pipe lining technology is relatively new to North America, a number of Canadian companies are offering similar technologies and services to municipalities dealing with rapidly aging infrastructure. These companies include:

- FER-PAL Infrastructure
- Insituform
- LiquiForce Services

WHEN THE TOWN OF ROTHESAY, New Brunswick began to receive complaints about dirty water, it was discovered that the source of the problem was a section of cast iron watermains constructed in the 1960s. Rather than digging up and replacing the pipes, the Town opted to explore other cheaper and less disruptive options. Pipe lining—a relatively new technology in North America—was chosen as the most convenient solution.

Liners are primarily used to solve the problem of municipal water pipe deterioration. When pipes are corroded over time, pipe liners are applied to the inside of unlined cast iron or cement mortar-lined pipes. While older structural spray lining, often called Cured-In-Place-Pipe, is slow setting and requires a minimum 16 hour cure period and an additional 36 hours of service shutdowns, the new generation polyurea pipe linings are rapid-setting and quick cure.

"Generally speaking, pipe liners have been specifically developed for the rehabilitation of potable water pipe infrastructure to help extend service life, reduce leaks, and improve water quality by preventing tuberculation—the build-up of corrosive material on the inside of iron piping—that can lead to colour, taste, and odour issues," says Sylvain Masse, the business development manager of the 3M Infrastructure Protection Division.

"Essentially, liners reduce the contact water has with piping, which in turn reduces the likelihood of water discolouration and poor pressure," he adds.

Aside from acting as a thin layer of protection, liners can also be applied as a structural addition to the pipe, which means the layer of liner can act as a pipe in the event that the actual pipe fails due to age or corrosion. As a result, pipe liners can prevent contaminants from reaching water in cases where the

earth surrounding a corroding pipe is contaminated.

The Town of Rothesay came across the new lining technology after receiving complaints about poor pressure and water becoming yellowish or rusty during high flow events. While these issues are not generally health hazards, the discoloured water is often unsettling for customers. In 2011, Rothesay started a trial run project where 1,000 metres of cast iron pipe were relined in about three to four weeks.

"Initially, it was very attractive to do the relining versus digging up pipes and replacing them because there was minimal disruption to the customer and it was cost saving for the municipality," says Bruce King, Rothesay's utilities coordinator. "The benefit of relining outweighed the process of replacing the pipe."

In Rothesay, approximately 100 metres of pipes were relined in a day, and for the most part, the water was back in service by night on sections that were relined that day (albeit on a boil water advisory while the process was ongoing). This made the process relatively pain-free for residents.

The original trial run was so successful that the Town of Rothesay applied the liner to an additional 1,600 metres of iron pipe in 2012, which took approximately four to five weeks to complete. An engineer estimates that the 2012 project was about 36 per cent of the cost to replace the pipe.

"There was a dramatic drop in dirty water complaints and the process was fairly easy," King says. "We received a lot of immediate positive feedback, especially about the water quality improvement."

He says Rothesay has plans to reline its last remaining cast iron mains in 2014. In the meantime, the technology continues to gain popularity with municipalities looking for a cost-effective alternative to replacing aging infrastructure. WC

Rachel Phan is Water Canada's managing editor.

A street in Montreal after a blizzard, a familiar sight for many Canadians this winter.

Waste Not, Want Not

Are Canadians turning a blind eye to the untapped potential of snow?

BY CLARK KINGSBURY

IT IS NO SURPRISE that snow is cumbersome for cities. It must be removed from streets and disposed of as swiftly as possible, creating an organizational headache and a monetary burden. For example, the City of Montreal spent $120 million to remove 13 million cubic metres of snow in 2006.

Generally speaking, snow in Canadian cities is collected and dumped in a snow disposal facility (SDF), where it is left to melt over the course of the year. But alternatives where snow is treated as an untapped commodity rather than as an expensive nuisance are slowly being suggested both in Canada and abroad.

Patrick Evans is an architect and professor of environmental design at the Université de Québec à Montréal, as well as the author of the children's book Where the Snow Goes. He believes that the snow Montreal receives can be used either as a source of energy, or as a "visible, celebratory, urban event."

Evans traces his interest in snow removal and its possible re-use back to his first winter in Montreal in the 1990s.

"I think it was the sheer unadulterated awe of witnessing the late night winter choreography of snow removal in Montreal's narrow urban streets," he wrote in an email. "Even then, I was immediately struck by the question: where does the snow go?"

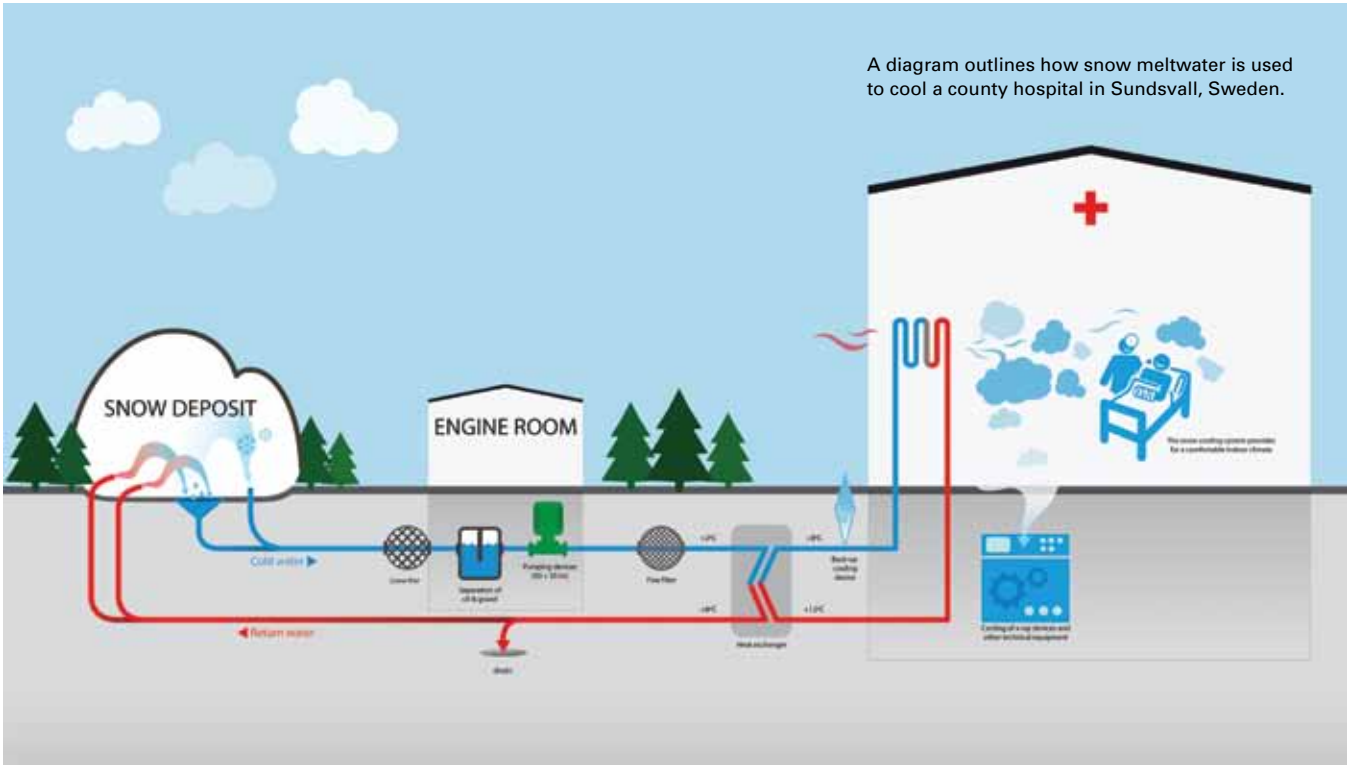
His book details the magnitude of the snow removal operation in the city, describing how, at the time, 300,000 truckloads of snow were shipped to the city's outskirts and deposited into SDFs over the course of a winter. Evans suggests that we take a more creative and useful approach to snow removal—an idea that has been gaining traction at different locations around the world.

In their study, Potential Utilization of City Owned Snow Disposal Facilities for Seasonal Cooling in Ottawa, Canada, Paul Cipcigan and Frederick Michel state that more than 100 seasonal storage systems exist in Japan and China, as well as a seasonal cooling project at the county hospital in Sundsvall, Sweden, part of Västernorrland County.

Prior to the year 2000, the 190,000 metre-squared hospital used a conventional cooling system to control the indoor climate and to ensure technical equipment didn't overheat. However, a new cooling facility was eventually constructed at a nearby repository for snow cleared from area streets. Snow is stored in a seven-metre-deep bowl-shaped asphalt basin and is insulated with wood chips during the spring and summer to slow the melting process.

According to the Västernorrland County Council's website, meltwater is "pumped through the heat exchanger

Credit: ÅAG Design Sweden



A diagram outlines how snow meltwater is used to cool a county hospital in Sundsvall, Sweden.

where the water cools the technical equipment as well as the ventilation air, which passes through the hospital." The water warms through this process and is used to melt more snow on its way back through the system.

Efforts have been made to incorporate similar technologies in Canada. Cipcigan and Michel's paper describes both the technical principle behind seasonal ice and snow storage, as well as the massive energy potential of Ottawa's Conroy SDF.

"The principle behind the seasonal storage of ice/snow technologies consists of utilizing the energy stored as latent heat in the phase change of water into ice during winter," the paper reads. "The natural snow/ice collected during winter is then stored until summer when it is used as a sink for the heat removed during cooling of buildings or other industrial processes.

"The heat transfer is done through a heat exchanger and the cooling agent can be either re-circulated or discharged after use. The most common cooling agents used are water, ice/snow meltwater, and air, which are more environmentally friendly than the ones used by the conventional chiller systems."

Cipcigan and Michel's study, conducted in the winter of 2008/2009, investigates the amount of potential cold energy available from the Conroy SDF in Ottawa. "The cold energy," the report reads, "is the amount of heat that can be consumed or dissipated during cooling."

The report determined that in the winter of 2008/2009, the Conroy SDF held around 500,000 cubic metres of snow, from which an estimated 30,430 MWh was available. The study goes on to assume a 30-per-cent loss of snow before temperatures would necessitate cooling, based on the experience at the Sundsvall hospital. Even after the snow loss, the facility would possess an estimated 21,300 MWh of available energy.

The report also presented energy use data from a city-owned office building with 39,000 square metres of floor space, which was cooled during the warmer months by a pair of rooftop chillers. The average annual energy consumption of the two chillers from 2005 to 2009 was 512 MWh, costing $51,200 based on the cost of energy in 2009.

Comparing energy consumption figures at the office building and stored energy at the Conroy SDF, the report states that the volume of snow stored at the Conroy SDF "represents the equivalent cooling energy for over 40 buildings similar to the one analyzed, with a total floor space of approximately 1.6 million square metres and an estimated annual energy value of over $2 million." The value was again based on energy prices in 2009.

"If all city SDFs were filled to capacity—approximately three million m^3—the energy potential after a 30-per-cent per season loss allowance represents roughly 130,000 MWh of cooling energy, currently worth an estimated C$12.5 million annually," the report continues.

Although the City of Ottawa, citing issues of cost and space for snow storage, decided not to pursue the exploitation of snow and ice for its cold energy potential, Cipcigan and Michel's report, along with successful examples in Sweden and elsewhere, highlights the possibilities available to those cities lucky enough to exist in a northern climate. WC

Clark Kingsbury is Water Canada's assistant editor.


Credit: AECOM


Credit: AECOM

Clean and Clear

After restoring creeks and treating groundwater, a newly remediated Sydney Tar Ponds reopens as a public park.

BY SAUL CHERNOS

IT TOOK MORE THAN A DECADE, but one of Canada's most polluted sites has been refashioned into park space. In all, this $400-million, award-winning Sydney Tar Ponds remediation project involved solidifying and capping contaminated sediments, restoring creeks, and treating groundwater.

With 97 hectares of heavy metals, dioxins, and polychlorinated biphenyls (PCBs) left over when the last of century-old steel mills and coke ovens closed in the mid-1980s, the Sydney Tar Ponds had Cape Bretoners anxious about foul-smelling air and high cancer rates.

In 2004, the federal and provincial governments signed a memorandum of understanding to finance and kick-start the project.

This past fall, the two governments unveiled Open Hearth Park. The 39-hectare green space has sports

1986: Original remediation plan to dredge tar ponds and incinerate sludge announced

1988: Coke ovens close

1995: Original remediation plan abandoned due to engineering problems

2000: Steel mill closes. Serious pollution-related health problems, including cancer, documented in surrounding community

2004: Canada and Nova Scotia announce new joint $400-million cleanup plan

2005: Full panel review of cleanup plan, the most rigorous form of environmental assessment, announced by federal government

2006: Barrier built at mouth of Muggah Creek to prevent further contamination of Sydney Harbour

2007: Panel issues report, which is approved by federal government, allowing plan to proceed

2008: Work begins on the new remediation process, using a solidification and stabilization approach rather than incineration

2013: Remediation finishes and the site reopens as a public park

fields, ice skating, and walking trails meandering through naturalized and landscaped areas. There's a concert venue, and a permanent art display chronicles the history and aftermath of industries that employed generations of Nova Scotians.

"It's an awesome feeling to see the wildlife return," says Donnie Burke, project director with the Sydney Tar Ponds Agency, which oversaw the cleanup. "These were lucrative eel fishing grounds for Aboriginal people in the 1800s, and when we were pulling our last pumps [...] there was a small mass of eels coming up the channel."

Getting there wasn't easy. The cleanup techniques proved nearly as controversial as the waste. Proponents persisted through two false starts, including a test burn of PCBs that ended amidst concerns that waste-to-energy incinerator plumes could land near a newly built school.

Work finally got underway in 2008 with a view to containment. Crews solidified and stabilized the sediment, mixed it with cement, and topped it with clay, soil, and an engineered cap.

Yet, as recently as this past August, federal Green Party leader Elizabeth May described the cleanup to the CBC as "a giant toxic sarcophagus" and "cosmetic [...] for purposes of making it look like it's all gone away."

Time will prove May right or wrong. Still, Burke disagrees with characterizing the technology as unproven.

"There's more than 50 years of data and it's been used in the U.S. on Superfund sites," he says. "What we saw in the field far exceeded our expectations."

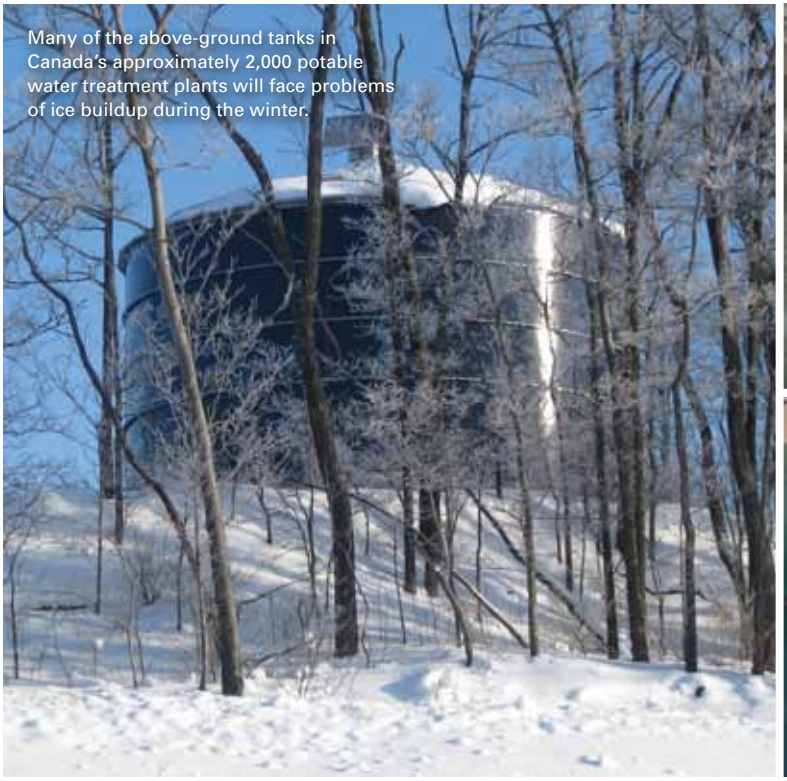
Bruce Noble, project manager with AECOM, the lead engineer, says proponents conducted bench-scale studies and full-scale pilot testing of the sediment and presented the results to regulators and stakeholders prior to construction in order to obtain approval.

"A number of remedial technologies were applied, including groundwater collection and treatment and cut-off walls," Noble says. "They were proven and adapted as required to the site specifics."

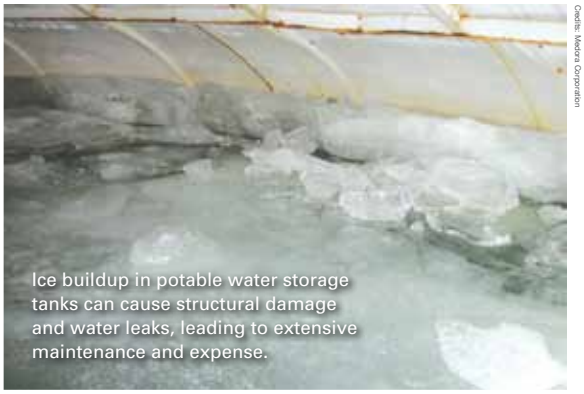
Another major challenge arose from the sheer scope of the project. Burke says multiple participants had to be lockstep in terms of communication, dealing with issues that arose in the field, and staying on schedule and on budget. "Coordinating this took some effort, but I think we ended up in a good spot finishing about eight months early."

The project is completed, yet one final challenge remains: The province must monitor the site for 25 years, or longer, should the need arise. WC

Saul Chernos is a Toronto-based writer and frequent Water Canada contributor.



Many of the above-ground tanks in Canada's approximately 2,000 potable water treatment plants will face problems of ice buildup during the winter.



Ice buildup in potable water storage tanks can cause structural damage and water leaks, leading to extensive maintenance and expense.

Active mixing with long-distance, laminar flow machines overcomes winter icing problems by circulating water the full width and depth of a potable water tank.

Credits: Madora Corporation

In the Mix

Active mixing solves problems like ice buildup and stratification in water tanks.

BY MARTINE PAWLOWSKI

ICE BUILDUP IN potable water storage tanks is a common problem during Canadian winters because thick layers of ice often form at the surface of these tanks during prolonged periods of subfreezing weather.

This problem is especially common in mid-size and smaller communities, where water is typically stored in elevated tanks, standpipes, or reservoirs designed with excess storage capacity for fire protection and adequate water pressure. These tanks are especially vulnerable, not only because of cold conditions, but because daily usage is relatively small in relation to the size of the tank, and as a result, there is not much flow in and out. Without movement, the water will freeze.

This insufficient mixing enables water to become thermally stratified within the tanks. During subfreezing weather, temperatures in the lower portion of the water column are warmest because influent waters—surface water or groundwater, varying from approximately 4°C to 11°C—are the primary source of heat. When influent volumes are low, influent water temperature declines quickly to fall between 3°C and 5°C. The new water stays in the lower portion of the water column because the density of water is greatest at about 4°C. Water temperatures in the tank decline with increasing elevation until ice forms wall-to-wall on the surface. Subsurface ice continues to form, often reaching a thickness of 0.3 to 0.6 metres, or one to two feet.

A common practice in an attempt to prevent freezing is passive mixing. This can include repositioning the inlet and outlet pipes, changing flow direction with baffles, or "exercising" the tank by drawing down the water and then refilling it. The water movement from frequent drawdowns and fills helps prevent ice from forming on the water surface, and the warmer water that enters with each fill cycle offsets the colder water in the tank. This practice has limited effectiveness, and it wastes water and money. In addition to passive mixing, other means include insulating or heating a tank, but these are minimally effective and can cost more than a small community can afford.

Overcoming problems of layered ice

The need for excess storage capacity limits the benefits of passive mixing. A more effective solution is active mixing, which blends new inflow water throughout the entire water body, keeping water temperature and age as uniform as possible. Active mixing is effective because water in potable water storage tanks naturally forms thin horizontal layers. The heaviest, most dense layer is at the bottom, and each layer above it is progressively lighter. An active mechanical mixer pulls water in from 2.5 to five centimetres off the tank floor, pulling in water from the very bottom of the tank, where the densest layers are, and directly transporting it to

the top. Soon, the temperature becomes nearly identical throughout the tank, which prevents ice from forming.

Active mixing designed around continual, long-distance laminar flow can circulate water the full width and depth of a potable water tank. The surface water travels a long distance because it is essentially powered by gravity and experiences little resistance. This feature makes it possible to mix the water throughout the entire water column—from the bottom of the tank to the outer walls and everywhere in between.

While these near laminar flow mixers can circulate up to 38,000 litres per minute, they require very little power due to the minimal head, or lift, in the up-flow pump design. This feature allows them to be driven by solar or low-watt electricity. Solar power is especially suited for remote areas not connected to a utility grid.

Year-round benefits

In addition to ice prevention, active mixing year-round combats problems including thermal and chemical stratification and loss of residuals. Pulling water right off the tank floor ensures the most efficient mixing of important boundary layers without disturbing the sediment. It also provides uniform distribution of disinfectant, which ensures uniform water age and prevents stratification.

Active mixing can significantly benefit communities whose above-ground or semi-above-ground storage tanks continually freeze up during the winter. Reducing tank damage reduces maintenance, while year-round mixing overcomes problems of stratification and ensures the highest quality water at the most effective cost. WC

Martine Pawlowski is the general manager of H2O Logics Inc. and a certified Canadian Environmental Professional with more than 10 years of experience managing wastewater, potable water, and freshwater projects in Canada.

Dangers of Ice Buildup

THE SEAMS OF STEEL TANKS can expand during ice formation, causing structural damage and water leaks, while huge ice chunks moving around inside the tank during inflows and outflows may cause further damage. Ice may also build up in riser pipes of elevated tanks, and when water is drawn down, the ice may fall and damage side walls. In extreme cases, ice can form a cap on the water surface, creating a vacuum when water is drawn down, which could potentially cause the tank to collapse. WC

Sentinel Bioactive Paper Network prototype development of bioactive paper sensors. Paper sensors are low-cost, portable and can provide fast indication of pesticides and pathogens. The sensors have multiple applications in developing countries such as India and Kenya.

Credit: Tara Nakrri, McMaster University, Office of International Affairs

Water Quality on the Go

Canadian researchers lead the development of bioactive papers with the potential to detect and deactivate water-borne pathogens. BY CLARK KINGSBURY

IMAGINE PAPER TOWELS that can immediately alert you to contamination on kitchen counters, and strips of paper that can remove pathogens from water while confirming the water is safe to drink. These forward-looking ideas, according to McMaster University professor Bob Pelton, demonstrate the tremendous potential of bioactive paper.

While this technology hasn't yet reached these lofty goals, Canada's Sentinel Bioactive Paper Network, an NSERC funded network headquartered at McMaster University with Pelton as the scientific director, has taken significant steps in developing and improving the capabilities of the product.

At this moment, bioactive papers can detect toxins like pesticides, E. coli, and heavy metals in water, but they cannot yet deactivate the contaminants. Nevertheless, the technology has great potential as it is, both in developed countries like Canada and the developing world.

"You could use it to check for E. coli at a lake or beach, for example, to ensure it's safe for swimming," says Carlos Filipe, associate professor and acting associate dean (academic) in the department of chemical engineering at McMaster. Felipe, who works closely with Pelton, adds, "It's also good for testing drinking water in rural Canada, and we collaborate with groups in India [in 2012 and 2013] to do field testing. They're already off the line and in use in Mysore, India."

The technology's potential in developing countries is particularly noteworthy. The low cost, portability, and disposability of bioactive paper, as well as the fast detection time, make it extremely attractive to nations without the resources for sophisticated testing systems.

In 2012, a pair of McMaster and Sentinel researchers travelled to Kenya to demonstrate the possibilities of bioactive paper products during a point-of-care diagnostics conference in Nairobi. Clémence Sicard, a postdoctoral fellow, and Madiha Khan, a master's student, used pre-made pesticide-detection sensor strips to test bottled water served at the conference, a demonstration that took fewer than 15 minutes and needed no electricity or supplementary equipment to complete.

Although pathogen guidelines made it impossible for Sicard and Khan to actively demonstrate E. coli sensors, they were able to indicate the relative ease and affordability of production. They located and purchased a printer locally, and after filling the cartridges with the necessary substrate, used it to print test strips on the spot.

Next in line for Sentinel researchers is the development of a strip that will not only identify dangerous substances in water, but eliminate them as well. Felipe says researchers are also developing a smartphone app that will be able to analyze test strips. WC

Clark Kingsbury is Water Canada's assistant editor.

canadian water summit 2014

Toronto
June 18

THE BUSINESS OF WATER

Across Canada and around the world, local governments and industry realize that successfully navigating our pressing urban water challenges can provide multiple benefits—social, environmental and economic. The 5th Annual Canadian Water Summit is returning to Toronto on June 18th to connect water professionals with paths that lead to solving the Canadian urban water puzzle.

Luncheon Keynote: **Edward Burtynsky**

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THE COMPLETE WATER MAGAZINE

watersummit.ca

Credit: Erin Longworth

Longworth spent 18 months in Melbourne, Australia, where she helped with the design of a recycled water treatment facility and a biosolids management facility.

For the Love of Water

Erin Longworth's lifelong attachment to water brought her to the industry at 24. Now 32, she works to develop wastewater infrastructure projects from early inception.

"I GREW UP with a family cottage in the Muskoka Lakes region and spent most summers in the water, so that gave me an appreciation for the environment and water quality," says Erin Longworth, a project engineer at CIMA+'s office in Vaughan, Ontario. Longworth's interest in water led her to a bachelor of engineering chemistry degree from Queen's University and a master of civil (environmental) engineering degree at the University of Toronto. She is now involved in large-scale wastewater infrastructure projects around Ontario.

Water Canada: In 2011, you travelled to Australia to work in AECOM's Melbourne office. What unique challenges did you encounter while working Down Under?

Water issues in Australia are different from those we experience in Canada due to their limited fresh water sources and warm climate. When I arrived in Australia, they were emerging from their drought period, which had necessitated extensive investment in water recycling and desalination projects as a result of historically low levels in their rainwater storage reservoirs. I helped with the commissioning of a recycled water treatment plant, which supplies high quality treated wastewater to a dual-pipe system, using the recycled water for non-potable uses such as toilet flushing and irrigation. I was also involved in the design of a biosolids treatment system utilizing sludge solar dryers to dry biosolids to up to 70 per cent solids.

Now that you're back in Canada, what are your duties in your current role with CIMA+?

At CIMA+, I work as a project engineer in the water and wastewater group of the infrastructure division. I tend to be involved in projects in the environmental assessment and planning stages. Projects at this stage focus on detailing the project needs and constraints, developing and evaluating various options to meet those needs, and documenting the process with input from the public and other stakeholders. I'm involved in all aspects of these studies: from developing the solutions, to carrying out evaluations, to presenting the information to the public and stakeholders through meetings and open houses. I enjoy the big picture aspect of these projects where decisions are made early on in the process, prior to solutions being implemented through detailed design and construction.

Could you talk about some of the projects you've worked on in Ontario?

I've been fortunate to work on some large-scale planning projects within Ontario's wastewater industry. The City of Toronto's Biosolids Master Plan Update project looked at finding a preferred strategy for managing the biosolids generated at the City's four wastewater treatment facilities through an evaluation of numerous biosolids treatment and disposal practices. I have also been a part of the project teams for wastewater treatment studies for both the City of Hamilton's Woodward Avenue wastewater treatment plant and the Region of Waterloo's Kitchener wastewater treatment plant that incorporated environmental assessments to determine a preferred treatment strategy and a conceptual design of that preferred solution. These were interesting projects as they allowed me the opportunity to look at different treatment technologies through the evaluation process and expand on the preferred technology to identify how this could be best implemented at that particular facility.

What role do you play with the Water Environment Association of Ontario (WEAO)?

I became active with the Water Environment Association of Ontario (WEAO)'s Young Professionals (YP) Committee soon after starting my career in the water industry. I wanted to help provide technical and professional development opportunities for other young professionals and students entering the industry. I held several roles on the YP Committee prior to becoming Chair and YP representative to the Board of Directors for the 2010-2011 year. In 2009, I was presented with the Association's Outstanding Young Professional Award. I also currently serve on several other WEAO committees, including the Residuals & Biosolids, Conference, and Communications committees, where I help to plan and implement events and initiatives for Ontario's wastewater industry. WC —Staff

Trustworthy

Are infrastructure trusts a worthwhile option to consider in Canada?

BY TREENA HEIN

PRIVATE-PUBLIC PARTNERSHIPS (P3s) are becoming more common across Canada and the United States, and while such partnerships have many benefits, there are a number of risks that can turn these projects into potential minefields. At their worst, P3 projects can involve low levels of consensus and an unbalanced focus on profit or potential political gain.

Infrastructure trusts, at least in theory, offer a way to sidestep the potential pitfalls of P3s. Trusts involve an organization that works at an arm's length to handle P3 projects. But industry leaders like Robert Haller, the executive director of the Canadian Water and Wastewater Association, praise the fact that there are so many P3 options available. "There is no one-size-fits-all model that is best in any situation," he says. "There are so many governance models, and each community is different."

Haller says P3s are not just a financing model, but a way to marry the best aspects of government—such as accountability—with those of the private sector—such as innovation and risk-taking. "With the trust model, you are releasing some controls to the private sector," he says, "but for a trust to work, a service must be maintained correctly."

Simply put, trusts require public confidence that a service or project will be delivered "as advertised." Haller says whether it's a trust or some other P3 arrangement, the public's concerns come down to ownership and accountability. Water service is understandably an area where public concern is strongest, and the concept of privatizing water service could be scary for Canadians. "Any P3 partnership is going to be about public confidence," Haller says. "But when you can explain the benefits, you can gain the public confidence."

In terms of benefits, Haller says he believes trusts are advantageous because they separate delivery of a service or an infrastructure upgrade from the political arena since elections and election boundaries are removed from the equation. "When the call to raise rates comes from a trust, it's not seen as a political decision," he says. "With politics a non-factor, trusts can also allow for wiser courses of action, for better management. Appropriate reserves are built up, and maintenance rates are not deferred. If you put things into a trust agreement, basic business principles can't be ignored."

But trusts also have their downsides.

"There is no direct representation or accountability," Haller says. "And sometimes the people's concerns need to override the business concerns. But trusts should allow tough decisions to be made without worrying about political ramifications, and in that respect, maybe arm's length isn't such a bad approach."

Trusts in action?

Currently, Canada is very new to infrastructure trusts. Individuals at municipalities like Halifax, Calgary, and Metro Vancouver all declined to weigh in on the pros and cons of these trusts, as did the Canadian Council for Public-Private Partnerships. All cited unfamiliarity with the topic as the primary—or the only—reason.

In the United States, Oklahoma City is a leader in the area of trusts with four currently in place, including a trust for a water utilities project. Although these trusts are all separate legal entities, they do not function as independent bodies. Oklahoma City's trusts were all created simply as a way around ancient state laws. "It goes back to our history when the state was created and we didn't want government to have much power," city manager Jim Couch says. "Most of the items handled by the trusts go to city council, and the mayor and councillors sit on the trust boards. [...] We're all in it together."

The Chicago Infrastructure Trust has gained much attention since it was created in April 2012 by mayor Rahm Emanuel and the city council. It was formed to give the city government and its sister agencies access to "alternative financing and project delivery options for transformative infrastructure projects." The trust is backed by five financial companies and is involved in one project so far: a school

Defining Infrastructure Trust

AN INFRASTRUCTURE TRUST is a type of income trust—typically financed by private investors—that exists to finance, construct, own, operate, and maintain different public works projects that might be too expensive to be paid for by public funds.

While infrastructure trusts are growing in popularity south of the border, Canada is still new to the game. One example is the BPC Generation Infrastructure Trust that was established by the Ontario Municipal Employees Retirement System (OMERS) as part of the consortium to run the Bruce Nuclear Generating Station in Ontario. The trust owns 31.6 per cent of Bruce Power. Ontario Tory leader, Tim Hudak, said that his Progressive Conservative government would establish an Ontario transportation trust if his party was ever elected to power. —Staff

energy retrofit in partnership with the City of Chicago and Chicago Public Schools. The project, according to many media reports, will apparently save $20 million per year. The trust did not respond to questions about how it will pay investors back for various projects.

The initiative is a hopeful one, especially for a city with a budget deficit of more than $600 million. Emanuel has even called a "breakout strategy" to deal with the political gridlock surrounding federal and state funding. The trust's executive director, Stephen Beitler, has stated publicly that he expects to have billions of dollars of projects underway in a year or two. He is preparing both an investment strategy and a collection of best trust operation practices that have been used around the world.

Beitler believes foreign sovereign investment may be a possibility for the trust to leverage, which is daunting for some residents in Chicago and beyond. The school energy retrofit is behind schedule, and spokespeople for the City and the trust responded by explaining that things are proceeding slowly and carefully because it's breaking new ground. The trust has also been questioned about seeking private financing for construction projects that have already been completed and paid for by Chicago Public Schools.

For his part, Zachary Spicer isn't sure if the creation of trusts, such as the one in Chicago, is as innovative as some would claim. "They are essentially public-private partnerships," says the post-doctoral fellow at the Institute on Municipal Finance and Governance at the Munk School of Global Affairs with the University of Toronto. He adds, "The public can be very distrustful of private firms, and transparency is key in making them more palatable to the public. This appears to be Mayor Emanuel's problem. People have no idea where the projects are going beyond energy retrofit, which creates skepticism."

Spicer is sure municipalities will continue to look to the private sector for help, especially with infrastructure where capital costs are so high. "In the United States, many municipalities are handicapped by the deep fragmentation in metropolitan areas, which can hinder co-operation and a long-standing public resistance to property tax increases," he notes. "They have to get creative somewhere with financing to meet demands. Similar trends are evident in Canada as well, although the regulatory and institutional environments differ."

Experts like Spicer believe P3s in all forms are probably going to be our reality for a long time to come unless additional sources of revenue become available. WC

Treena Hein is a freelance writer based in Pembroke, Ontario.

2014 EVENTS CALENDAR

January 16
Activated Sludge Seminar – Celebrating its 100th Year
Milton, ON
Water Environment Association of Ontario
weao.org

January 20-21
Certificate in Greenhouse Gas Inventory, Accounting and Reporting
Toronto, ON
University of Toronto's School of the Environment
learn.environment.utoronto.ca

January 22
Flooding in Toronto
Toronto, ON
WaterTAP
watertapontario.com

January 22-23
In Situ Oil Sands Water Treatment & Re-Use Optimization 2014
Calgary, AB
Canadian Business Conferences
in-situ-oil-sands-water.com

January 30
OPWA Annual Conference
Mississauga, ON
OPWA
opwa.ca

January 31
Making it Work: How to Properly Construct Low Impact Development (LID) Stormwater Management
Waterloo, ON
Credit Valley Conservation
epic-edu.com

February 3-5
The National First Nations Infrastructure Conference and Trade Show: Building for a Sustainable Future
Toronto, ON
Assembly of First Nations
afn.ca

February 7
Making it Work: How to Properly Construct LID Stormwater Management
Barrie, ON
Credit Valley Conservation
epic-edu.com

February 9
MWWA Annual Conference and Tradeshow
Portage la Prairie, MB
Manitoba Water & Wastewater Association
mwwa.net

February 10-12
Environment Business 2014
Edmonton, AB
Environmental Services of Alberta Association
environmentbusiness.ca

February 11-13
2014 Sustainable Communities Conference and Trade Show
Charlottetown, PEI
Federation of Canadian Municipalities
fcm.ca

February 19-21
Water Governance Landscape: Focus on Québec
Québec City, PQ
Canadian Water Network
cwn-rce.ca

March 3-7
Policy and Water: Ideas to Implementation
Ottawa, ON
Canadian Water Network
cwn-rce.ca

March 5-7
49th Central Canadian Symposium on Water Quality Research and Wastewater Management Conference
Niagara Region, ON
CWWA and CAWQ
cwwa.ca

March 10-14
39th Annual Operators Seminar
Banff, Alberta
Alberta Water and Wastewater Operators Association
awwoa.ab.ca

March 17-23
Canada Water Week
Canada-wide
Canadian Freshwater Alliance
canadawaterweek.com

March 22
World Water Day 2014
Everywhere
UN-Water
unwater.org

March 23-25
2013 Alberta Floods: The Rains, Response, Recovery & Resiliency
Calgary, AB
CWRA
cwra-ab-events.org

March 25-26
TRIECA
Brampton, ON
TRIECA
trieca.com

March 26-28
GLOBE
Vancouver, BC
GLOBE Series of Conferences
2014.globeseries.com

April 3-5
62nd OGWA Convention & Trade Show 2014
Niagara-on-the-Lake, ON
Ontario Ground Water Association
ogwa.ca

April 4-5
The Water Show
Abbotsford, BC
The Water Show
watershow.ca

April 6-8
WEAO's 43rd Annual Conference and OPCEA Exhibition
London, ON
Water Environment Association of Ontario
weao.org

April 9-11
WaterTech 2014
Banff, AB
ESAA
esaa-events.com

April 23
The Ontario Environment and Cleantech Business and Policy Forum
Toronto, ON
ONEIA
oneia.ca

May 4-5
BCWWA Annual Conference Trade Show
Whistler, BC
BC Water & Wastewater Association
bcwwa.org

May 7-8
21st Annual Symposium on the Great Lakes/St Lawrence River Ecosystem
Cornwall, ON
The River Institute and the City of Cornwall
riverinstitute.ca

May 27-30
Trenchless Technology Road Show
Niagara Falls, ON
Centre for Advancement of Trenchless Technologies
catttrenchlessroadshow.ca

May 30-June 2
FCM Annual Conference and Trade Show
Niagara Falls, ON
Federation of Canadian Municipalities
fcm.ca

June 2-4
67th National CWRA Conference
Hamilton, ON
Canadian Water Resources Association
cwra.org

June 5
Canadian Biosolids and Residuals Conference
Vancouver, BC
BC Water & Wastewater Association
bcwwa.org

June 18
Canadian Water Summit
Toronto, ON
Actual Media Inc.
watersummit.ca

August 17-20
APWA Congress: "The Best Show in Public Works"
Toronto, ON
APWA
apwa.net

September 27-October 1
WEFTEC
New Orleans, LA
Water Environment Federation
weftec.org

October 15-17
Remediation Technologies Symposium 2014 (RemTech)
Banff, AB
ESAA
esaa-events.com

October 26-29
National Drinking Water Conference
Gatineau, PQ
Canadian Water and Wastewater Association
cwwa.ca

November 2014
Window on Ottawa
Ottawa, ON
Canadian Water and Wastewater Association
cwwa.ca

Visit Watercanada.net for new and updated information

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To be featured in this section, contact lee@watercanada.net

View a list of services for these companies at **watercanada.net/buyers-guide**

Our Focus is Still on Infrastructure

Canada still needs to do more to improve its infrastructure and to educate the public. BY ROBERT HALLER

THE INFRASTRUCTURE DEBATE did not end with the announcement of the federal budget—rather, we just changed arenas. The Canadian Water and Wastewater Association (CWWA) presented a number of arguments to the infrastructure roundtables to have water and wastewater identified as a priority category within any grant programs and to have conditions attached to grant programs that would demand asset management, support full-cost recovery, and promote innovation through open procurement. When the federal budget was announced, our association was pleased enough with the dollar amounts ($36 billion over 10 years through the Building Canada Fund and the Gas Tax Rebate), but concerned with the absence of conditions and lack of priority setting. What's worse: the Gas Tax was opened to even greater competition.

Our challenge for 2014 is to take this discussion to the provincial and municipal level. CWWA will be working closely with regional association partners—WEF and AWWA—to develop a campaign that identifies the critical need for infrastructure renewal, encourages provincial and municipal governments to set water and wastewater as priority projects, and directs federal infrastructure funding to those priorities. This Canadian utility partnership will also be developing tools and resources that support local asset management, priority setting, and full-cost recovery planning.

On a broader scale, we need to take this discussion to the general public to create awareness of the value of water and an understanding of water issues. The ultimate goal is to build support for the critical decisions that need to be made. There is a powerful coalition in the United States working on these concepts, and CWWA will be building a Canadian coalition to develop our own communications strategy. This team is fully supported by our Canadian WEF and AWWA units while bringing in other water-related organizations, educators, health units, economic developers, and marketing specialists.

As we move to renew our infrastructure, we also need to consider the challenges of energy, efficiency, climate change adaptation, and security. CWWA technical committees are actively focused on each of these topics. We are also introducing or reviving technical committees on biosolids, stormwater, and small systems. Another challenge we face is how we are expected to implement new wastewater systems effluent regulations (WSER) with critical deadlines as early as 2020. CWWA and the Federation of Canadian Municipalities have identified the need for another $20 billion to meet these new federal regulations that are still unsupported by any federal funding.

As our general mission, CWWA continues to provide forums for national dialogue, including our Wastewater Management Conference in Niagara-on-the-Lake, Ontario from March 6 to 8, 2014, the National Drinking Water Conference in Gatineau, Quebec from October 27 to 29, 2014, and our annual Window on Ottawa from November 26 to 28, 2014. We have also opened our CWWA Bulletin to all members and non-members alike to better share our Canadian stories and experiences. WC

Robert Haller is the executive director of the Canadian Water and Wastewater Association.

SAVE THE DATE

The Assembly of First Nations invites you to attend:

February 3-5, 2014

The National First Nations Infrastructure Conference & Tradeshow:

"Building for a Sustainable Future"

The Westin Harbour Castle Hotel, Toronto, Ontario

Location:

The Assembly of First Nations (AFN) will be hosting the National First Nations Infrastructure Conference and Tradeshow: "Building for a Sustainable Future" on February 3-5, 2014 at the Westin Harbour Castle Hotel in Toronto, Ontario.

Who Should Attend?

- First Nations Leadership
- First Nations Band Administrators
- First Nations Water, Housing and Infrastructure Technicians
- Federal and Provincial Governments
- Industry Suppliers and Consultants

Conference Highlights & Topics

The Conference will be an opportunity to exchange ideas, discuss best practices and network on innovative ways of building, managing, procuring, and financing infrastructure in First Nation communities.

- Interactive Workshops and Information Plenary Sessions • Networking Events • Tradeshow
- Presentation/Workshop Topics:
  - Alternative infrastructure financing options
  - Alternative infrastructure procurement/P3
  - Innovative technologies for water, housing and infrastructure
  - Housing capacity development opportunities
  - Waste management
  - Durable and sustainable products
  - Cost effective and appropriate technology
  - New construction methods for community infrastructure
  - Innovative and smart technology in home systems
  - Water and waste water systems
  - Connectivity
  - Training
  - Information on new federal policies
  - Success stories and case studies

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WATER CANADA — THE COMPLETE WATER MAGAZINE

ReNew Canada — The Infrastructure Magazine

For more information about the National First Nations Infrastructure Conference and Tradeshow, please visit the AFN website at www.afn.ca/NFNIC or contact Regina Toulouse by email at rtoulouse@afn.ca or by phone at 613.241.6789 Ext. 326 or toll free at 1.866.869.6789

APPOINTED

Mark Taylor

GHD has appointed **Mark Taylor** as the business group manager of water in Canada, based in Markham, Ontario. Taylor previously worked across a number of GHD's offices in Queensland, Australia.

Simon Courtenay

The Canadian Water Network's board of directors appointed **Simon Courtenay** as scientific director.

Richard Broderick has been appointed president of Fountain Quail Water Management. He replaces **Delzon Elenburg**, the founder and president since 1999.

The Ontario Clean Water Agency announced the appointment of **Rob Andrews** as its new president, effective January 6, 2014.

CELEBRATED

BioteQ Environmental Technologies Inc. won the HSBC Leadership in International Trade – Asia Pacific Award at the 2013 HSBC International Business Awards. The Vancouver-based company was recognized for its successful technologies in treating wastewater from mine sites in China.

The Tiger Dam System, a water barrier system developed in Manitoba, was given a platinum certification by a group made up of the U.S. Army Corps of Engineers and Factory Mutual. The designation makes the Tiger Dam the highest rated flood mitigation system in the world.

HIRED

Albert Smith

WaterGroup has hired **Albert Smith** as the regional account manager for Western Canada.

JOINED

Christopher Edmonds

James Friel

FilterBoxx Water & Environmental Corp. added several industry experts to its management team, including **Steve Kroll** as vice president of sales and marketing, **Christopher Edmonds** as vice president of strategic business development, **Sam Malik** as senior director of operations for the packaged water division, and **James Friel** as director of supply chain.

Find additional event reviews and photos at **bit.ly/novdec13**

PARTNERED

The Insurance Bureau of Canada will partner with Coquitlam, British Columbia; Fredericton, New Brunswick; and Hamilton, Ontario. for a pilot project to help communities fight flooding by identifying vulnerabilities in sewer and stormwater infrastructure and prioritizing improvements to prevent sewer backups.

Quebec-based Premier Tech Inc., a specialist in wastewater treatment technologies, is partnering with U.S. firm Entex Technologies Inc. Premier Tech will have exclusive Canadian distribution rights for Entex's treatment systems.

LAUNCHED

Anaergia Inc. announced that UTS Biogas LTD., its wholly owned subsidiary based in the United Kingdom, delivered a large-scale anaerobic digestion facility to Shropshire Energy. The project is expected to set a benchmark for how environmental sustainability can be achieved by the food industry.

EVENTS

John Nicholson, Environmental Business Consultants; Todd Latham, Actual Media; Enrico Di Nino, Environmental Innovations Branch at Ontario Ministry of the Environment; Karim Tejani, Consulate General of the Netherlands.

Environment Industry Day Toronto, ON

The Ontario Environment Industry Association hosted its 13th annual Environment Industry Day (EID) on November 27, 2013. More than 100 representatives from a range of companies and various government ministries attended a panel discussion of challenges facing the sector. The panel was moderated by Dan Ovsey of the National Post and featured executives from leading environment and cleantech companies who offered their candid observations on the often-challenging relationship between industry and government. Panelists included Bruce Lounsbury, CEO of newterra, and Rene Danis of Degrémont Ltd. The day was capped off by a reception co-hosted by Environment Minister Jim Bradley that featured a who's who of industry and government leaders.

L-R: Roland Richard, Canadian Water and Wastewater Association, and Robert Haller, Canadian Water and Wastewater Association.

Window on Ottawa Ottawa, ON

The Canadian Water and Wastewater Association hosted its popular Window on Ottawa this November. This is CWWA's core event, giving delegate updates on new and existing federal programs and initiatives and how they will impact water and wastewater utility operations. With its unique format and content, the event offers delegates a chance to not only learn of these initiatives first-hand, but also to express concerns and influence the shape of these programs as they're developed. CWWA also hosted three specialty workshops in conjunction with the Window exploring climate change, cyber security, and drinking water quality.

L-R: Bruce Linton, Clearford Industries Inc; Sangeeta Chopra, OCWA Engineering Services; Lou Di Gironimo, Toronto Water; and Eric Apps, Wildeboer Dellelce LLP.

OCWA Technology Showcase Mississauga, ON

The 3rd annual OCWA Technology Showcase welcomed more than 230 guests on December 4 at the Hilton Toronto Airport. Attendees enjoyed a day of presentations from various speakers, including representatives from municipalities who spoke about the successful implementation of innovative technology into their facilities. More than 30 technology companies were also on hand to showcase their products and services.

OCWA was pleased to welcome keynote speaker, Biju George, the interim director at the Greater Cincinnati Water Works, who spoke about the Cincinnati Water Story: A Tradition of Innovation. Guests also enjoyed two "pitch" sessions where technology companies had the opportunity to present their products and services to the audience and receive feedback from a panel comprised of industry, municipal, financial, and OCWA representatives.

The Technology Showcase was preceded by the Fundraising Dinner for GlobalMedic, where more than 130 guests had an opportunity to hear from the guest speakers for the evening: Rahul Singh, founder of GlobalMedic, and Gord Martineau, anchor at CityNews.

Alexandra Cousteau and her Blue Legacy organization were nominated for the Growing Blue Awards at the American Water Summit.

American Water Summit
Washington, DC

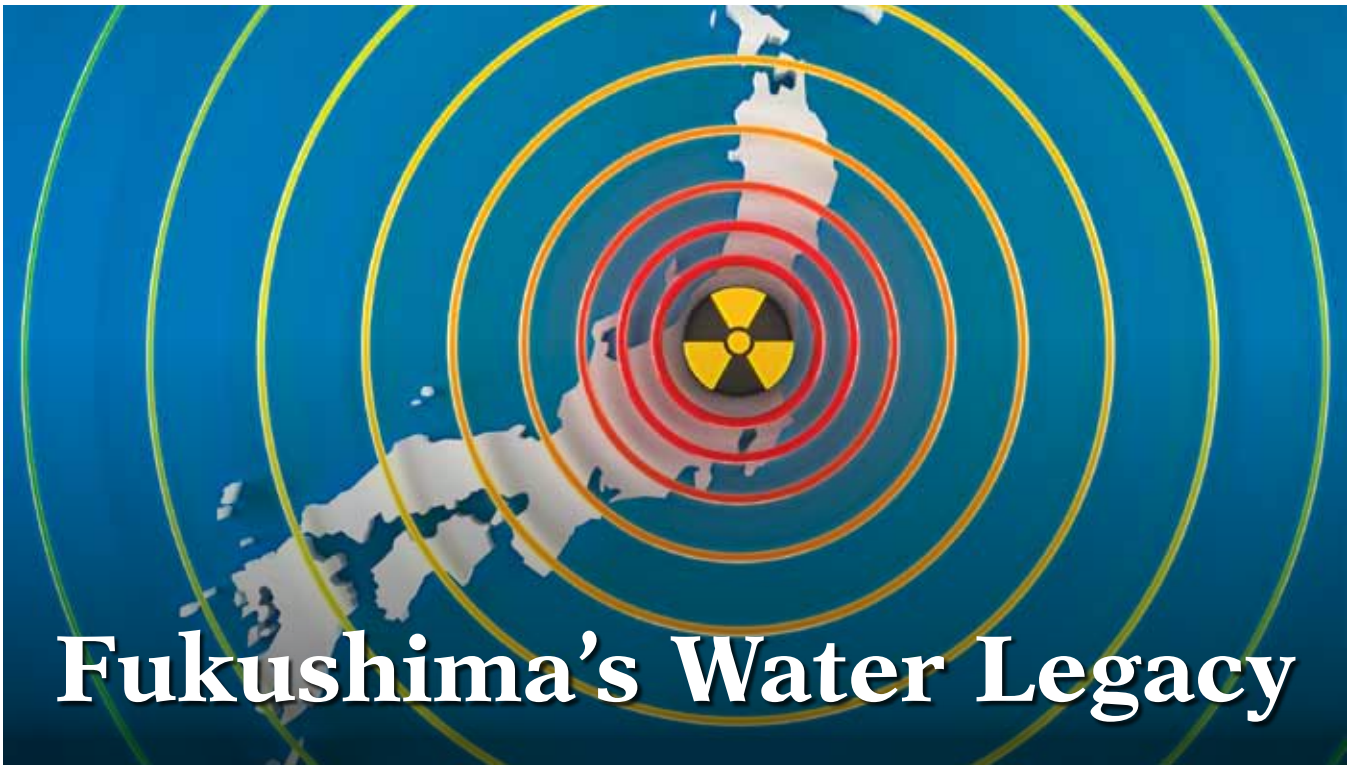
Presented by Global Water Intelligence, the fourth annual American Water Summit in Washington, DC, brought together more than 300 high level water executives, government officials, and investors to explore ways they could be "accelerating change" in the water sector.

National Conference on Public-Private Partnership
Toronto, ON

The Canadian Council for Public-Private Partnerships' (CCPPP) 21st annual conference took place November 7 and 8 in Toronto. Through a series of keynote speakers and panel discussions, the conference explored all aspects of the P3 industry in Canada, including a look at water and wastewater financing on the second day.

Latornell Conservation Symposium Alliston, ON

More than 1,000 people celebrated the 20th Anniversary of the Latornell Conservation Symposium this year, along with keynote speaker Chris Hadfield, former Commander of the International Space Station.



Fukushima's Water Legacy

Why aren't we monitoring the potential radioactive debris washing up on Canada's West Coast?

BY MARY JOHNSTON

IT IS TIME to take a candid look at how ongoing radionuclides escaping from Fukushima are affecting the Pacific West Coast and our water and food supply in Canada. All attempts to improve water quality pale in the face of not confronting this issue, which involves the largest ticking time bomb in human history.

Ocean currents have started to wash up radioactive debris from Fukushima onto Canadian shores. Radioactive contamination is showing up in migratory fish populations. This is the beginning of visible damage—and clearly the worst is yet to come. Where is the ongoing monitoring of this situation? So far, most of the available information is only coming from academics or concerned individuals struggling for funding.

Meanwhile, federal, provincial, and local officials continue to deny there is a problem while making feeble references to "background radiation," failing to answer phone calls and emails, or redirecting concerns to other government entities with equally unsatisfactory responses. This intellectual dullness in the face of a potential extinction-level threat is one the scariest aspects of our collective dilemma.

It is well known that the current situation at Fukushima is far from stable. In fact, as David Suzuki recently reported, the statistical probability of another and even greater catastrophe is extremely high as fuel rods are being removed at Fukushima.

At a symposium on water ecology held at the University of Alberta on Oct. 30, 2013, Suzuki said, "Fukushima is the most terrifying situation I can imagine [...] The fourth [reactor] has been so badly damaged that the fear is, if there's another earthquake of a seven or above, that that building will go and then all hell breaks loose." He went on to say, "And the probability of a seven or above earthquake in the next three years is over 95 per cent."

Canadians should be deeply concerned about this situation, which in all probability involves ongoing, invisible damage coming from Fukushima. The public is keenly aware there has been a lack of data and responsiveness from the Canadian government, provincial disease control agencies, and regional public-works departments.

In Metro Vancouver and Victoria, residents wonder how much atmospheric radiation is being rained down on them and into their large, open drinking water reservoirs. Test results that are released twice a year from institutions with questionable testing procedures provide insufficient information to a population living in what could become a nuclear evacuation zone.

It is time to get the facts and to stop passing off this topic as fear mongering or hearsay. We should demand genuine, intelligent, and courageous engagement regarding this issue from all levels of government, our scientific community, and the general public.

Mary Johnston is the founder and CEO of WaterMatters, a Vancouver-based business specializing in water-quality products and information.

American Water Works Association

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