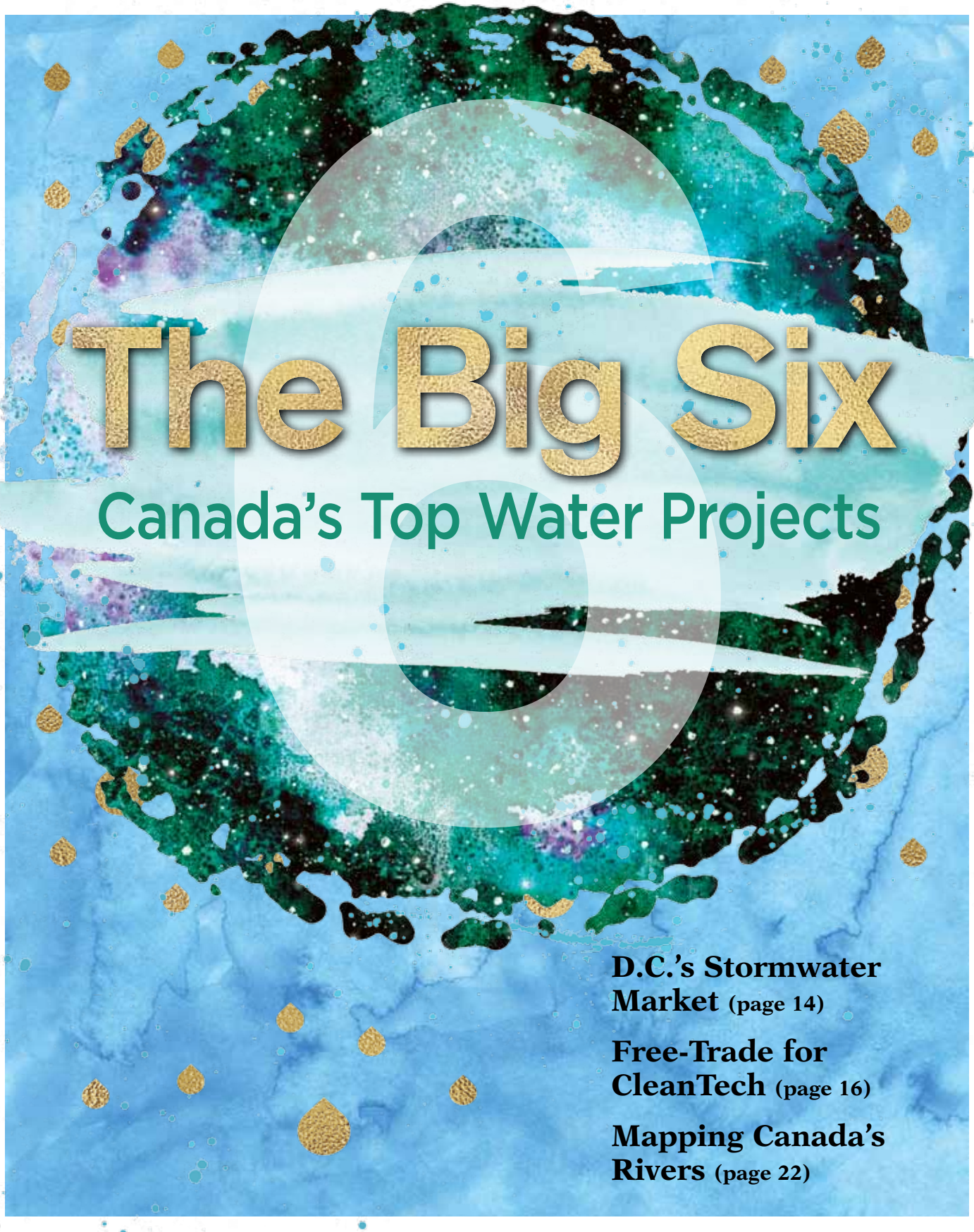
THE COMPLETE WATER MAGAZINE

JANUARY/FEBRUARY 2017

WATER CANADA



The Big Six

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JANUARY/FEBRUARY 2017
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WATERCANADA
THE COMPLETE WATER MAGAZINE

JANUARY/FEBRUARY 2017
VOLUME 17 NUMBER 1

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Beyond Borders

BY KATHERINE BALPATAKY

ON DECEMBER 8th, officials from Canada and the U.S. signed a new plan to regulate water levels and flows in Lake Ontario and the St. Lawrence River. It was a smallish news announcement, receiving much less attention than all the fanfare and speculation surrounding president-elect Donald Trump's new cabinet. But it's a smallish news piece with grand implications. After 60 years of regulating the Moses-Saunders Dam in Cornwall, Ont. and other control works to favour commercial shipping and shoreline properties, our two nations agreed on a plan that favours nature.

This historic agreement is a reminder that Canada and the U.S. have a long, successful history of cooperatively managing transboundary waters—a relationship that is foundational to our diplomatic ties. And while it is still unclear how the change in government and U.S. foreign policy will affect many domestic matters, water management is an area where it needn't hinder progress. With regional governments, the private sector, and scientific evidence driving decision making, adaptive management was always the name of the game anyway.

In this issue of Water Canada, you will see a thread of stories that look at our neighbours to the south. On page 12, U.S. Consul General Juan Alsace speaks about several programs that are happening now in collaboration between U.S. and Canadian partners for Great Lakes protection. On page 14, we look at a market-based system to improve stormwater management in Washington, D.C. that may provide a new way of operating in Canada. On page 36, representatives from the American Water and Wastewater Association and the Canadian Water and Wastewater Association work together to improve the uptake of optimization strategies for our utility managers. And on page 16, we explore how a modern day free-trade agreement could benefit our cleantech sector—could this be a model for a new NAFTA? Do we need one?

Of course, this is also our Top Projects issue (*see page 28*), where we celebrate bold investments and leadership to improve Canada's water infrastructure. This year, we profile the six largest water projects in the country and speak to people in the communities affected by the projects about the social value of that infrastructure. Bigger does not always mean better when it comes to water projects, but we think these stories are worth telling, because they represent the significant will of our federal, provincial, and municipal governments to invest in the health of our communities and ecosystems through modernizing our water assets and technologies.

Happy New Year. I hope you enjoy the issue. WC

All back issues of Water Canada are available for download at library.actualmedia.ca

Contact Katherine at 416-444-5842 ext. 116 or email katherine@watercanada.net

@CanadianWater

WaterCanada

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ALNOOR ALLIDINA
Alnoor is the technical lead for the City of Toronto's Water Transmission System Optimization.
PG 8

GARY THOMPSON
Gary in an area supervisor of process operations and maintenance for the City of Toronto's Water Supply Unit.
PG 8

JESSICA ISAAC
Jessica is a senior policy advisor at the Office of the Environmental Commissioner of Ontario.
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JUAN ALSACE
Juan is the Consul General at U.S. Consulate General in Toronto.
PG 12

ABOUT THE COVER

Every year, Water Canada publishes a list of the biggest water infrastructure projects in Canada. These projects are often controversial and are not without their challenges, yet they serve large portions of our nation's population and improve large volumes of our freshwater. This year, we go out into the communities that will benefit from these projects to ask people for their thoughts on the value of the infrastructure.

NEXT ISSUE: MARCH/APRIL

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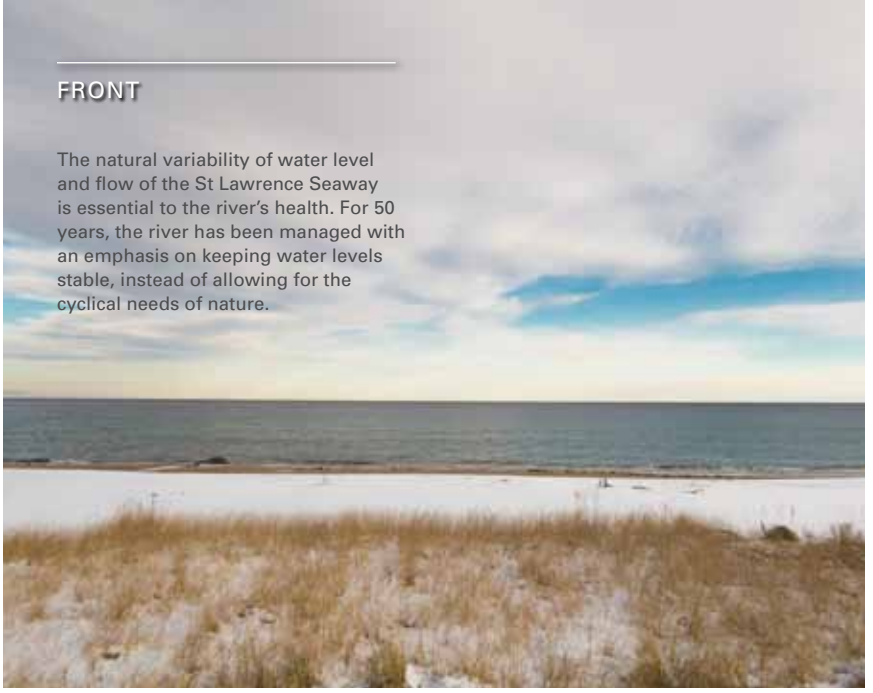


FRONT

The natural variability of water level and flow of the St Lawrence Seaway is essential to the river's health. For 50 years, the river has been managed with an emphasis on keeping water levels stable, instead of allowing for the cyclical needs of nature.

A Level Up

Canada and the U.S. agree on new flow levels for Lake Ontario and the St. Lawrence River.

GOVERNMENTS OF CANADA and the United States took a crucial step towards improving the health of Lake Ontario and the St. Lawrence River in December. They did so through an agreement to modernize regulations for water levels and flows in Lake Ontario and the St. Lawrence River.

Plan 2014 adjusts the volumes and timing of water released from the Moses-Saunders Dam and other control works, located between Cornwall, Ontario, and Massena, New York, to more closely mimic the variations of natural water levels. In doing so, Plan 2014 will foster the conditions needed to restore 26,000 hectares of coastal wetlands and better protect against extreme high and low water levels due to climate change.

"This is a historic moment for freshwater conservation in Canada," said Elizabeth Hendriks, VP of World Wildlife Fund Canada's freshwater program. "This will be the biggest ecosystem restoration endeavour in Canadian history, re-establishing the natural flow of the lake and river, restoring over 26,000 hectares of wetlands, boosting hydropower production, and increasing the resilience of hundreds of kilometres of shoreline in both countries."

The plan comes nearly two years after the International Joint Commission submitted a draft plan following extensive public consultation, scientific study, and efforts to model the impacts of changes to flows. Given that commercial shipping, shoreline property, hydroelectric generation, and climate resiliency are all affected by the changes, reaching a decision was not an easy task.

"Plan 2014 is an exceptional example of the power of patience and perseverance when combining research, data, and long-term partnership building across an array of sectors for the betterment of a crucial ecosystem. This result demonstrates that it is possible to create conservation measures that benefit freshwater species and habitat, local communities, and industry all at the same time," Hendriks said. —Staff

We love hearing from you! Tweet us **@CanadianWater**

Paris District High School students share their knowledge about wetlands with Ontario elementary students and teachers.

Merebeth Switzer welcomes students and teachers taking part in the Wetland Centre of Excellence national videoconference to B.C.

Students from Mossbank school learn about Saskatchewan's pot hole wetlands and waterfowl.

Students from Marc Garneau Collegiate Institute in Toronto.

Credits: Ducks Unlimited Canada

Wetland Mentors

Students and educators expand a national community of practice in wetland conservation.

A UNIQUE PROGRAM is helping teachers and students develop wetland stewardship programs in communities across Canada. In late November 2016, 24 schools were brought together as part of Ducks Unlimited Canada's (DUC) Wetland Centres of Excellence program, delivered in partnership with Wildlife Habitat Canada. Participants connected via video and joined in-person to learn from one another and understand the broader impacts of their efforts.

According to Merebeth Switzer, DUC's national manager of education, each community program is unique and has had its own success stories. "The main criteria that we have is that we want wetlands stewardship, that there are action programs associated with it, but that it's student-focused and student-driven; and we like it when there is an opportunity for mentored teaching," said Switzer.

"Some [groups] have built boardwalks and interpretive signs. We have one group in Manitoba that has planted 95,000 trees in the restoration of the wetland. Up in Timiskaming, Ont., they do bird banding with licensed bird banders and have built banding huts and run special programs in the community. A lot of it involves mentorship," she said.

The November virtual workshop was the first opportunity these groups have had to learn from one another and understand the bigger picture impacts they're having. Now, DUC is doing an inventory of the program to show some of the cumulative impacts of the program, in terms of the restoration, monitoring data, a tangible benefits, along with impacts on attitudes and behaviours towards nature.

"We are starting to see students who are choosing career paths in related fields that tell us how important the program was to their choices. We also see the program spreading through schools, drawing in all kinds of community partners." Switzer admits that that some of these benefits, that occur in the minds of the next generation of conservationists, are harder to measure. —Staff

Online at WATERCANADA.NET

VIDEO: From the traditional territory of the Coast Salish Peoples comes a film on the 2016 Wild Salmon Caravan.

bit.ly/SalishSCaravan

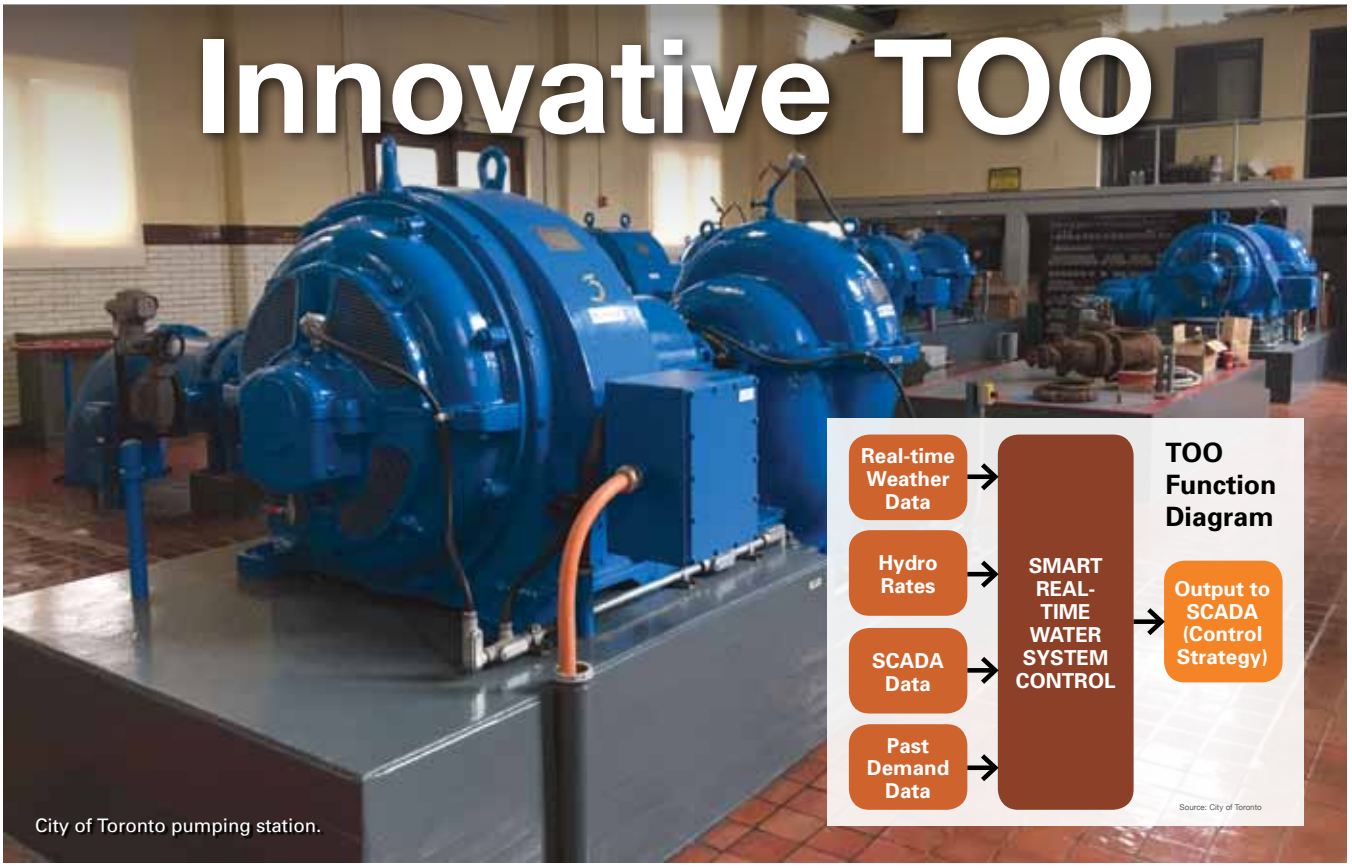
REPORT: New study identifies weaknesses in Canada's cleantech financing landscape.

bit.ly/CleantechFin

NEWS: Four water leaders listed among Canada's Most Powerful Women.

bit.ly/100PowerW

Innovative TOO



Credit: City of Toronto

City of Toronto pumping station.

The City of Toronto develops a system to optimize water transmission.

BY ALNOOR ALLIDINA AND GARY THOMPSON

THE CITY OF TORONTO AND YORK REGION water system is a large, complex integrated system consisting of pumping, storage, and transmission (water mains, meters, and valves). The system consists of four filtration plants and pumping stations, floating storage at reservoirs and elevated tanks, and approximately 500 kilometres of large transmission mains, ranging from 400 to 2,500 millimetres in diameter, that transport treated water from Lake Ontario up through the system. Water is pumped through a hierarchy of pressure districts with elevated storage facilities (reservoirs and tanks). Together, these pumping stations and floating storage facilities provide water to a population of over three million people.

It's no surprise that this system requires a lot of energy and is complicated to operate. Energy is expensive and the market has variable and volatile cost rates. Ontario's energy cost structure includes maximum demand charges, and when you are dealing with water, operation is further

complicated due varying water demand. With these complexities in mind, the city has embarked on an opportunity to use smart systems to increase the efficiency of its utility operations, by reducing energy use, operating cost, and improving service delivery. Together, IBI Group, the City of Toronto, and York Region, have developed one of the world's first large-scale intelligent, optimized water transmission control systems, known as the Transmission Operations Optimizer (TOO).

The project launched in November, 2015, and since then, independent verification by the power service provider, has shown considerable savings in energy and costs. Over a period of just six months, a total of 16 million kilowatts of energy was saved. Based on these savings, it is projected that the City and York Region will save around $1.5 million per year based on kilowatt reduction alone, with overall higher cost savings expected from optimization due to the variable energy rates. To put this in perspective, 16 million kilowatts of energy over six month is equivalent to 11,244 metric tonnes of carbon dioxide emissions that will no longer be released into the environment. This is the same as:

- 43 million kilometres driven by an average passenger vehicle
- 2,375 passenger vehicles driven for one year
- 1,660 homes' electricity use for one year
- 26,030 barrels of oil consumed

The TOO will minimize electrical energy costs at all times—amidst electrical power cost variations, planned and unplanned equipment downtime, and demand/storage variations. It is a real-time, online system that identifies the best control strategies, drawing on the following:

- Water consumption data/demand forecasts
- Energy rate predictions
- Hydraulic model
- Mathematical optimization
  - Time-varying constraints (reservoir critical limits, capacities)
  - System equipment status taken into account
  - Cost function, which includes pumping costs and production costs
- Analytical algorithms
- Online monitoring of system performance and spot market rates

The TOO monitors and takes into account weather data, energy cost rates, past water demand data, and Supervisory Control and Data Acquisition (SCADA) system data that monitors water transport, distribution, and treatment. Once the TOO system determines the most appropriate solution, this information is sent directly to the SCADA system; however, a human operator is required to approve the solution before it is implemented.

The TOO was designed to meet all the service delivery levels (pressures, reservoir levels, and water quality). All signs point to significant financial savings, with the payback period being approximately two years (including the incentive from service provider). It allows for greater automation in water utility operations, freeing up more time for operators to do other things and can be utilized to run automatically during emergencies (with operator monitoring). The system can be scaled up, but is equally versatile with smaller utilities too. In addition to TOO, a simulator has been developed that allows simulating and predicting of the system performance under various what-if scenarios. TOO works on-line alongside the City of Toronto and Region of York's SCADA Systems, while the simulator is an off-line tool.

The TOO system is an example of how smart and technologically advanced systems will change the way we manage water as well wastewater in the future. Smart water utility management will ensure the best use of the water and energy resources. WC

Alnoor Allidina is the technical lead for the City of Toronto's Water Transmission System Optimization. Gary Thompson leads the City of Toronto's Water Supply Unit as area supervisor process operations & maintenance and is the project lead for the Transmission Operations Optimizer (TOO).

Storm Window

The Environmental Commissioner of Ontario calls on the province to lead stormwater funding reform. BY JESSICA ISAAC

FOLLOWING DECADES of declining investments, Ontario has a $6.8 billion stormwater infrastructure deficit. It must fix aging infrastructure and build new infrastructure to accommodate future growth. Most Ontario municipalities lack adequate funding models to address this current deficit, let alone properly manage stormwater runoff into the future. If not properly managed, stormwater, especially in urban areas, can cause flooding, stream or riverbank erosion, and water pollution. To address these problems, some municipalities, such as Mississauga and Kitchener, are now using an alternate funding model: stormwater fees. Many other municipalities are also interested in following this path, but the Environmental Commissioner of Ontario, Dianne Saxe, found they need more provincial support to help them along the way.

Traditionally, stormwater is managed through engineered grey infrastructure, such as ditches, culverts, and storm sewers, which move water away from developed areas. More recently, green infrastructure, such as wetlands, rain gardens, and permeable pavement, has been recognized as a powerful tool to manage stormwater with reduced costs, increased climate resilience, and enhanced biodiversity.

Most municipalities in Ontario fund stormwater management programs through a combination of property taxes, development charges, provincial and federal grants, water and sewer fees, and gas taxes. However, Ontario's Environmental Commissioner recently cautioned in her report, Urban Stormwater Fees: How to Pay for What We Need, that this stormwater funding model is not working.

The current financial gap for stormwater infrastructure in Ontario could get even bigger as municipalities deal with larger flows and more polluted runoff, as landscapes are paved over to meet growth pressures. There may also be additional costs to deal with changes in precipitation, and thus runoff, from climate change.

Only 35 per cent of municipalities that responded to a survey conducted by the Commissioner currently recover the full costs of managing stormwater in Ontario. To ensure that municipalities have sufficient funds to build, operate, maintain, and replace stormwater infrastructure, the Commissioner called

> Forty per cent of the municipalities that responded to the survey do not have asset management plans for their stormwater.

on the province to require municipalities to recover the full costs of managing stormwater runoff.

Asset management plans are considered a first step towards achieving full cost recovery. Several provincial laws and programs require or propose to require municipalities to prepare these plans in certain cases, but they are not required for all municipalities or in all cases. Forty per cent of the municipalities that responded to the survey do not have asset management plans for their stormwater infrastructure. The Commissioner recommended that the Ontario government require all municipalities to prepare these plans for both their grey and green stormwater management infrastructure.

Stormwater fees are a great option for cities to shift to cost-recovery, better protect the environment, and become more resilient to climate change. Twenty-one Canadian municipalities, eight of them in Ontario, and more than 1,600 municipalities and utilities in the U.S. use stormwater fees. While Ontario municipalities, like Kitchener or Mississauga, each calculate the fee differently, most are based on impermeability (e.g., area of hard surfaces), type (e.g., residential, multi-residential or non-residential), and/or size of a property.

Stormwater fees provide municipalities with a dedicated and stable funding source. They can give developers and property owners an economic incentive to reduce the runoff from their property and increase the uptake of green infrastructure, particularly if there is an associated credit or rebate program. Additionally, these fees are a more equitable way to finance stormwater management, because they implement the polluter pay principle. Unsurprisingly, 35 per cent of the municipalities that responded to the survey are considering stormwater fees.

Despite the benefits and interest, the Ontario government provides little, if any, support to municipalities that want to charge a stormwater fee as a way to recover the costs of managing stormwater. Without better municipal funding models for stormwater, our future will include more overland and basement flooding, beach closure days, and sediment in lakes and rivers. WC

Jessica Isaac is a senior policy advisor at the Office of the Environmental Commissioner of Ontario.

The Environmental Commissioner of Ontario's report, *Urban Stormwater Fees: How to Pay for What We Need,* can be downloaded at **eco.on.ca**

Shared Resource

Leadership, innovation, and cross-border collaboration for Great Lakes protection.

BY JUAN ALSACE

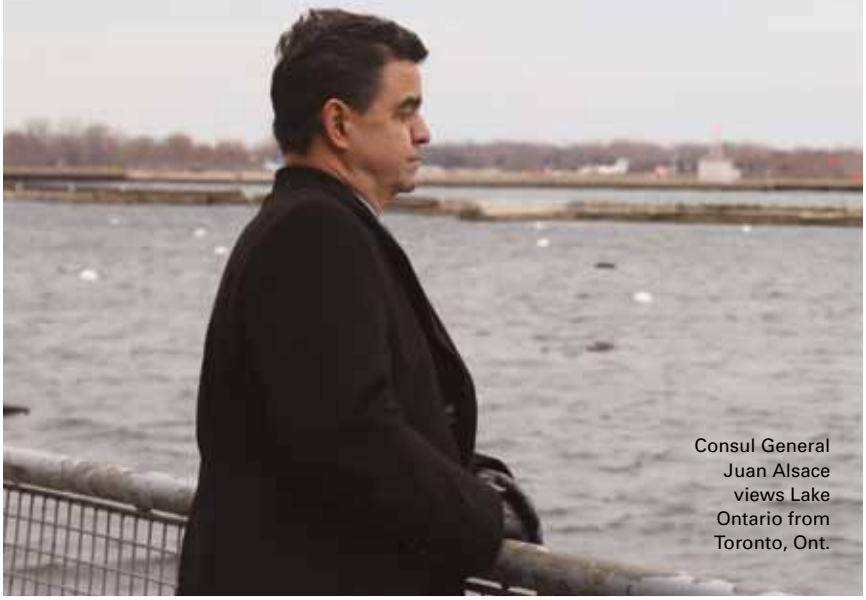
FOUR OF THE FIVE GREAT LAKES help to define the U.S.-Canada border; but what separates our two countries brings them together as well. The Great Lakes lie at the heart of the U.S.-Canada trade relationship, the largest in history, with bilateral trade totaling nearly $670 billion a year. Having grown up in Buffalo, N.Y., and attended high school in Niagara Falls, Ont., I have a personal appreciation of how cross-border collaboration is crucial for jobs, trade, and investment in the Great Lakes region. Since I arrived in Toronto in 2015 as the U.S. Consul General, I have made it my priority, in coordination with the U.S. Embassy in Ottawa, to foster dialogue and collaboration between our countries on water issues.

Canada and the United States share a long, fruitful history of collaboration on water-related issues. The Boundary Waters Treaty, the Great Lakes Water Quality Agreement, and the Columbia River Treaty—to name a few—have provided binational coordination and cooperation on transboundary water. Our countries work closely together to protect water quality, and through the Great Lakes Water Quality Agreement, announced phosphorus reduction targets for Lake Erie earlier this year. The governments of Canada and the United States have committed to a shared vision of a healthy and prosperous Great Lakes region in which the waters of the Great Lakes, through sound management, use, and enjoyment, provide benefits to present and future generations.

Thinking more locally, the Toronto Consulate hosted a roundtable in April 2016 in partnership with the Government of Ontario, Cleantech North, Water Canada, GreenCentres Canada, and WaterTAP. Out of this event, we formed four working groups: 1) Promoting Swimming in the Great Lakes; 2) Sharing Phosphorus Management Best Practices; 3) Improving Climate Change Resiliency through Technology and Innovation; and 4) Reducing Over-salting for Watershed Health and Management. The Consulate team works closely with

Credits: U.S. Consulate General in Toronto

Sustaining freshwater and marine resources for future generations is a priority for the U.S. government.



Consul General Juan Alsace views Lake Ontario from Toronto, Ont.

The Hon. Minister Glen Murray and U.S. Consul General Juan Alsace discuss priorities for the Great Lakes at the April 4, 2016 roundtable meeting in partnership with the Government of Ontario, Cleantech North, Water Canada, GreenCentres Canada, and WaterTAP.

each of the working groups to convene stakeholders and partners.

The Great Lakes Swimming working group seeks to create a Great Lakes open data resource to educate the public about the health of Great Lakes beaches. The Great Lakes Phosphorus Levels working group will facilitate the sharing of best practices amongst stakeholders to reduce Lake Erie phosphorus loading and combat harmful algae blooms. The Improving Climate Change Resiliency through Technology and Innovation working group envisages an engineering design competition to support municipal efforts in reducing the impact of storm water and combined sewer overflows into waterways. The Reducing Winter Road Over-Salting for Watershed Health and Management working group has proposed an action plan to combat chloride contamination in the Great Lakes Basin. The plan would increase the general public's awareness about road salt contamination of Great Lakes water and encourage businesses and municipalities to reduce road salt usage. Currently, the working groups are discussing timelines with partners, with the goal of reaching tangible outcomes in the next two years.

Sustaining freshwater and marine resources for future generations is a priority for the U.S. government. Joining 42 other locations around the world in coordination with the Secretary of State's Office of Global Partnerships, in April 2016, Consulate General Toronto hosted the 2nd annual Fishackathon competition to create technologically innovative solutions to challenges facing the global fisheries supply chain. Connecting government, business, nonprofit, and academic partners, the weekend-long event took place at Ripley's Aquarium in Toronto. The Fishackathon brought together dozens of public and private stakeholders and software developers, designers, and coders who looked at challenges of fisheries sustainability in the Great Lakes and beyond. The global winner, from Taiwan, developed a low-cost water sensor that can detect the presence of an invasive Asian carp species in the Great Lakes region. Many of the teams continue to develop their solutions and are seeking funding to make the applications available to the people who can most benefit from them.

It's through initiatives like this that Toronto Consulate can help forge connections between groups in Canada, the U.S., and abroad that will serve to protect these globally-significant and precious water resources. I believe that, together with smart infrastructure investments and innovative water solutions, Ontario can support sustainability, while at the same time meeting climate targets and achieving economic growth. Our work on these important issues will be a legacy for our children and grandchildren and is one we are committed to fulfilling. WC

Juan Alsace is the Consul General at the U.S. Consulate General in Toronto.

Credit: Kevin Arnold

In Washington, D.C., properties like this reduce stormwater and generate Stormwater Retention Credits (SRCs). Owners trade their SRCs in an open market to others who use them to meet regulatory requirements for retaining stormwater.

Credit: Karen Sayre

In a functional credit market, property owners will buy credits when it is cheaper or easier than implementing their own stormwater retention projects.

Rainy Day Fund

Washington D.C.'s market-based solution to stormwater management.

BY CRAIG HOLLAND

AS URBAN GROWTH around the world brings more impervious surfaces that generate stormwater run-off, some 37 trillion litres of stormwater pollution—a combination of rainwater, oil grease, heavy metals, pesticides, and raw sewage—wash off city streets into lakes, rivers, and oceans. Stormwater runoff is the fastest growing source of water pollution worldwide.

The cost and complexity of upgrading often antiquated sewer systems is a major impediment to addressing the stormwater run-off issue, and cities are increasingly looking for alternatives to traditional, municipally-funded grey infrastructure. In the United States, Washington, D.C., has taken a leading position by adopting a solution in the form of a Stormwater Retention Credit (SRC) trading program, the first of its kind in the country.

Washington's sewer system is one of the nation's oldest and is incapable of dealing with even moderate rainfall by today's standards. Each year, up to eleven billion litres of run-off and sewage flow into the Potomac and Anacostia rivers that border the city and run into the Chesapeake Bay. The impacts on Chesapeake Bay are significant. It consistently fails to meet federal pollution standards. The run-off also severely degrades drinking water quality, wildlife habitat, and places a regional economy built on fishing, tourism, and recreation at risk.

City green spaces, swales, and other nature-based infrastructure are proven methods for absorbing rainfall and can often deliver lower-cost solutions than grey infrastructure. With this in mind, Washington's SRC program allows for credit generation from green infrastructure, which also provides the benefits of construction and maintenance job opportunities, increased open space, community greening, greater property values, and improved air quality.

The SRC program was created as part of an update to D.C.'s building codes and federal water quality permitting regime

in 2013. The legislative changes require all new real estate development and major redevelopment projects to manage stormwater, in order to reduce the volumes of run-off that enter the municipal system. Developers have the option to meet stormwater retention requirements onsite or with a combination of onsite facilities and the purchase of SRC credits. Credits generated by stormwater retention projects elsewhere in D.C. are certified by the government and cleared through an online, public registry, similar to features of carbon and renewable energy credit markets.

NatureVest, the impact investing unit of The Nature Conservancy, and its partner, Encourage Capital, saw a need for a professional credit developer and counterparty to the regulated real estate projects. With the regulatory updates in place, credit developers and counterparties would be able to jumpstart and help scale green infrastructure projects. With an investment from Prudential Financial, the partners established District Stormwater LLC, which funds, develops, and manages SRC-generating projects in collaboration with landowners and community groups.

Establishing replicable standards

Developing the infrastructure to facilitate these new markets is not straightforward and could be costly, especially if it is developed on a city-by-city basis and need to consider city- or watershed-specific circumstances.

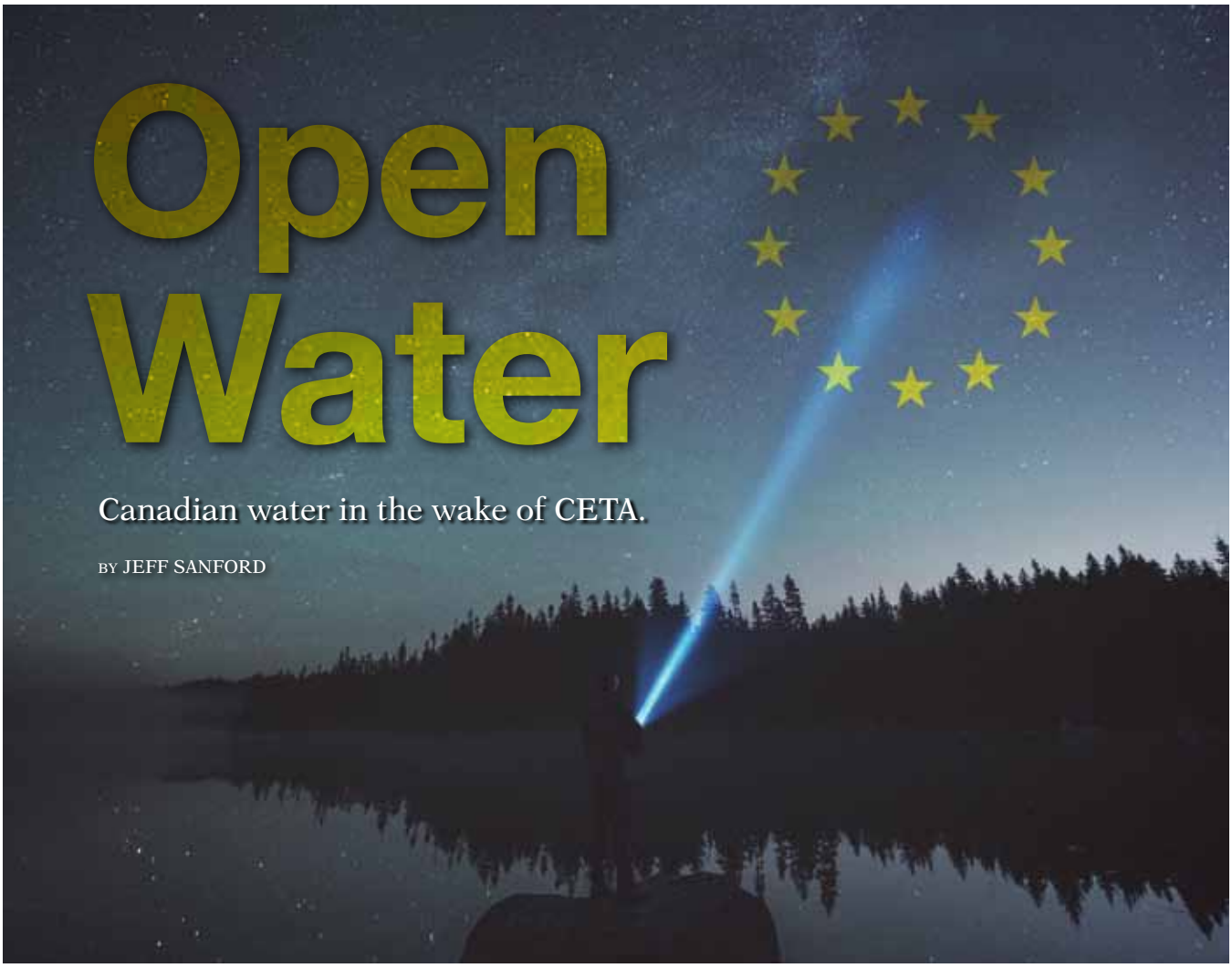
Creating a certification program that creates and tracks stormwater pollution reduction credits, which can be used and adopted by cities and watersheds across the country, provides a ready-made and affordable solution to stormwater run-off.

The SRC is an effective tool to drive investment in low-cost, high-impact stormwater management projects that reduce the pollution impacts on local rivers and the Chesapeake Bay, transform communities through increased green space, and inspire conservation-minded people who see the benefits of nature in their communities.

Establishing an SRC-like program in Canada, would require cooperation among municipalities, regulators, and lawmakers, but it can be done. And, if done correctly, it would unleash major private investment opportunities for a variety of financial products, services, and new business models. The next 20 years will be crucial as cities continue to grow, attracting new businesses and residents, while needing to provide reliable, low-impact infrastructure. WC

Craig Holland is a senior director of product development with NatureVest, an initiative of The Nature Conservancy.

A version of this article first appeared in the publication Environmental Finance.



Open Water

Canadian water in the wake of CETA.

BY JEFF SANFORD

THE CANADA-EU ECONOMIC AND TRADE AGREEMENT (CETA) moved closer to full implementation this fall. A late-October challenge from the Walloon region of Belgium threatened to knock negotiations off course, but concessions were made, and a ratification ceremony in Brussels went ahead on October 30. A draft agreement was signed by ministers paving the way for ratification by the Canadian and European parliaments.

Now that the freshly negotiated agreement is poised to deliver, what effect will CETA have on this country's water sector? How will the new free trade agreement reorient the Canadian water industry?

Experts warn it will be some time before final ratification occurs. And there are legal interpretations of language to be sorted out, as CETA contains several new ideas not found in previous free trade agreements. But pro-business types agree that the deal comes at a good time for Canada. Ninety-eight percent of the customs duties between Canada and the EU will be removed, including restrictions on public procurement contracts. Canada will be the only developed country in the world with guaranteed preferential access to both the North American and EU markets—a unique Canadian advantage in the age of Brexit and Trump.

Janet Bobechko, a senior partner at Norton Rose Fulbright Canada, emphasized the opportunities that are opening up for companies in the water sector. "Like Canada, Europe faces the issue of ageing infrastructure. As Canadians, we have some great advantages. There may be opportunities for our cleantech companies, our leak detection expertise, as well as membranes, data analysis, and water data gathering," she said.

Open for business

One key measure in CETA that may affect the water industry involves the ability of companies to bid on goods and services tenders at the municipal level (for, say, wastewater systems). In previous trade agreements like the North American Free Trade Agreement (NAFTA), municipalities and territorial

> Canadian companies now have to treat Euro companies bidding on contracts the same as Canadian companies.

and provincial governments have not been included. According to Bobechko, the European negotiators were adamant that the lower governments be included: "They said, 'We don't want to make a deal with only the Feds.' [...] That's why the provinces were at the table."

The result: provincial and municipal governments will have to treat EU companies the same as Canadian ones when it comes to awarding service or procurement contracts. "This is one of the big trends. [...] Canadian companies now have to treat Euro companies bidding on contracts the same as Canadian companies," she said.

The benefit according to basic economic theory is that there should be more competition for contracts leading to lower bids. But critics have expressed concern that EU companies could end up privatizing more utility operations. Bobechko does not think that will happen. She acted as legal counsel for a Ministry of Environment provincial officer at the Walkerton hearings. "One thing we learned from Walkerton was that ownership has to remain at the municipal level. At the end of the day the ownership will remain with the municipality," she said.

Watering the world

Another fear that is frequently expressed by those who are wary of new free trade deals is that of bulk water transfers. However, article 1.9 of CETA is structured to ward off those fears. "Nothing in this Agreement obliges a Party to permit the commercial use of water for any purpose, including its withdrawal, extraction or diversion for export in bulk," reads the text.

Jacqueline Wilson, a lawyer with the Canadian Environmental Law Association (CELA), said that there could be a path to commercialization of water resources. She pointed out sections of CETA (Annex II) that uphold EU companies' immediate rights to water resources if those water resources are commercialized by a Canadian government. "If the government opens it up, it opens up quite broadly. [...] If the state wanted to reverse that decision to use water commercially, the language seems

Credit: Adam Scott, Government of Canada

After seven years of negotiation, Trudeau joined presidents of the European Council and European Commission, Donald Tusk and Jean-Claude Juncker, and signed the partnership agreement.

"Our expectation is that Britain will ratify the CETA deal and be part of that deal with Canada," said Bill Morneau, Minister of Finance.

Janet Bobechko is a recognized expert in environmental legal issues. She views CETA as an opportunity for Canadian water cleantech firms.

to leave that decision open to challenge by foreign investors," said Wilson. "What could be included under Annex II is something Canadians should have concerns about. It's hard to say how that will be interpreted. We're certainly concerned."

Agriculture and CETA

Another area of trade that is bolstered by CETA that could have consequences for Canadian watersheds is agriculture. Canada is already the world's fifth largest exporter of foodstuffs. CETA is poised to increase Canada's exports to the EU. Could the agreement set up a sharper conflict between economically-advantaged experts and domestic conservation concerns?

Francis Scarpaleggia is a Liberal MP and chair of the national Liberal caucus on water. He thinks CETA could be more protective of the environment than other agreements like NAFTA. He pointed to articles 24.5.1 through 24.5.3, which state, basically, that it is inappropriate to "encourage trade or investment by weakening or reducing the levels of protection afforded in their environmental law." Compared to NAFTA (or even earlier agreements like the General Agreement on Trades and Tariffs) Scarpaleggia said that CETA, "[...] gives more latitude to a country that wishes to prohibit, or restrict, the bulk export of its water."

Old and new partners

In the U.S., Trump came into office on a promise to renegotiate NAFTA. That has some wondering if the age of globalization has hit some kind of turning point. "Brexit and Trump have added some confusion. There are a lot of moving parts right now," admitted Bobechko. Others suggest that Canadian politicians need to push forward with CETA now more than ever. This country is seemingly, suddenly, one of the last bastions of liberalized trade among major developed western nations, and so it has a role to play in preserving a rules-based global economic order. To this end, Canadian finance minister Bill Morneau recently stated that Canada expects Britain to be part of the EU trade deal, even if that country makes a break with the continent. Minister of International Trade Chrystia Freeland has stated she is "worried" about the new anti-global trade talk from Trump.

Interestingly the late-in-the-game protests by the Walloon region in Belgium could see one of the most contentious parts of the agreement—the so-called investor dispute mechanism—removed from the text. This most contentious part of CETA gave corporations the right to take a trade dispute to a forum set up outside of the purview of Canadian courts for settlement. The removal of that specific measure is, apparently, one of the key demands of the Walloon region. According to Bobechko, ridding the agreement of the dispute mechanism wouldn't be a big deal and would make the deal even stronger if its removal

generated wider popular support.

"If you're investing into Canada and you were subject to the dispute mechanism, you would have a right to bring certain claims outside of Canada and into an international commercial court. Those clauses are put in when you think you won't get a fair shake in a country's court system. But these measures are less of a concern when you're talking about Canada and the EU. Our commercial arbitration courts are strong," she said.

Taking advantage

Bobechko returns to her key message, that CETA is an opportunity for companies to exploit new markets. "We have an opportunity here. Start thinking about what the opportunities might be and how to execute on those," she said. "At the end of the day, our advice is read through the text, go through it. Remember that we don't know how things are going to be interpreted yet; but we should start thinking about how [to] take advantage of this agreement."

We have an opportunity here. Start thinking about what the opportunities might be and how to execute on those.

She noted that many European countries have highly evolved and efficient water systems. The large population base living on a relatively small land base demands that. "They are efficient when it comes to water because they have to be," she said. But if large countries like Germany represent mature and developed markets, there are opportunities in many of the smaller, more marginal regions like Latvia or Romania. I think the government has to offer some support here in the roll-out to get people over there, to begin making connections."

Bobechko said executives should take advantage of the CETA training sessions the federal government has provided, trade missions, and networking opportunities. Companies interested in new global opportunities should also do research on how European procurement works. "When people get worried about competition, I think we're in trouble. Too often we get stuck in our own neighbourhood. I think we have work to do, but we also have an opportunity. I'm passionate about this. It's a global world. Let's get out there." WC

Jeff Sanford is a freelance journalist in Toronto.

Opportunity Flows

Adapting a made-in-Canada market-based solution to boost clean water innovation.

BY RICK SUTIN

THERE IS A SIGNIFICANT OPPORTUNITY in Canada to catalyze market-based solutions to address water challenges. Canadians are blessed with world-class scientific expertise, an entrepreneurial culture, and globally recognized capital markets. Yet, there is a gap in risk capital used to support innovation-focused businesses from start-up to maturity. Addressing this gap could put Canada on track to deliver solutions to the important social challenges arising from water resource management, while assuming leadership in the innovation economy. A Canadian embrace of risk capital would translate into high quality jobs, a skilled work force, and economic growth.

Building on successes

Early-stage resource and development companies are similar to water technology start-ups in that both require the convergence of discovery, entrepreneurship, and risk capital to succeed. Yet, for the resource and development sector, the challenges in raising adequate capital were addressed when flow-through shares were introduced through the *Income Tax Act* approximately 50 years ago.

Flow-through shares are a successful made-in-Canada financial instrument that have enabled the Canadian resources industry to gain access to necessary growth capital. Flow-through shares have also positioned Canada's capital markets as global leaders in resource finance. This leadership has fostered a constellation of equipment and service providers, technical experts, finance professionals, and legal and professional advisors in Canada.

Many leaders in the business sector agree. Take the Coalition for Action on Innovation—a group of over 50 business and academic leaders in Canada—co-chaired by former Finance Minister John Manley and GlaxoSmithKline CEO Paul Lucas. In their Action Plan for Prosperity, published in October 2010, the Coalition said, "By any measure, the [flow-through shares] program has been a success; it has helped make Canada a global leader in resource financing." The report recommended extending flow-through shares to the innovation sector as one way of using fiscal stimulus to drive innovation.

Targeted spending

A company that issues flow-through shares to investors must spend the proceeds on prescribed qualifying expenditures. For the resources sector, the qualifying expenditures are exploration and development in Canada. These expenditures are renounced by the company in favour of the investor who is able to deduct the renounced expenditures against other income. In this way, the program has effectively reduced the risk of investment by approximately one-half.

The revenue cost to government as a result of these tax credits is more than recouped through a combination of (i) tax paid by the recipients of the qualifying expenditures such as employees, contractors, landlords, etc.; (ii) greater capital gains tax paid by investors as their flow-through shares have a cost of zero for tax purposes; (iii) a reduction in corporate tax loss carry forwards for companies that have renounced expenditures in favour of flow-through investors; and (iv) tax revenues resulting from ongoing employment and the other economic benefits of greater market activity.

There are few private sector studies on the effectiveness of flow-through shares, which is surprising given the program's endurance and the significant role it has played in growing the Canadian economy. However, two reports published in 1994 and 2013 by the Department of Finance found that flow-through shares, while not guaranteeing successful outcomes, did generate significant incremental spending on mining and petroleum exploration and benefited the economies of several provinces. Companies issued shares at premiums of 18–25 per cent and had issuance costs in line with the market for regular junior equity. The

cost to the government in foregone revenues averaged $440 million between 2007–2012, but this cost was triggered by over $1 billion in expenditures for equipment, salaries, etc. In fact, a 1997 Department of Natural Resource study found that every dollar of flow-through tax credit resulted in $2.60 of exploration spending. The program is very likely cash flow positive to government, while creating new jobs. Viewed this way, the program effectively redistributes money from high net worth investors to job seekers in an important sector, socially, and economically.

A recent paper by Vijay Jog of the University of Calgary School of Public Policy found poor investment returns for flow-through investors between 2008–2012 and, from that, concluded that between the investor losses, cost to government, and the potential crowding out of investment in other sectors, flow-through shares do more harm than good. While Jog surmises that poor investor returns imply poor sector performance and misguided government intervention, the evidence indicates the opposite: industry success despite poor investor returns. Poor investment returns are a reflection of the risk profile, which is the rationale for the tax credit support.

A unique opportunity

As we have seen in Silicon Valley, areas where risk capital is available will draw innovators, entrepreneurs, and investors. In turn, these centres will draw new talent, build intellectual capital, and grow a self-reinforcing cluster of high-quality jobs. A recent Bloomberg article reported that the San Francisco, New York, and Boston metropolitan areas account for two-thirds of U.S. venture capital funding. This figure increases to almost three-quarters when you add in Los Angeles.

Extending flow-through shares to Canada's water technologies sector could open the door to the private sector funding needed to commercialize important discoveries. The government can target how flow-through funding is spent by defining the qualifying expenditures. Because the investment decision rests with the investor who is at risk for one-half of the cash outlay, the investment decision is a disciplined one. This makes it easier for the government to administer and removes the task of picking winners.

We have a unique opportunity to marry a proven, successful financing tool to world-class science and entrepreneurial leadership. Through market innovation, we can accelerate the development of new technologies in areas such as water, where we have a natural advantage. WC

Rick Sutin is a partner with Norton Rose Fulbright in Toronto. He specializes in business law with a focus on innovators and entrepreneurs.

O all the little rivers that run to Hudson's Bay,
They call me and call me to follow them away.
Missinaibi, Abitibi, Little Current—where they run
Dancing and sparkling I see them in the sun.

—Excerpt of the poem Rivers of Canada
by Bliss William Carman.

Prints of Robbi Bishop-Taylor's maps are available for purchase through Etsy at **earthartaustralia.etsy.com**

CARTOPHILIA

A researcher from Down Under brings life to Canada's river data.

BY KATHERINE BALPATAKY

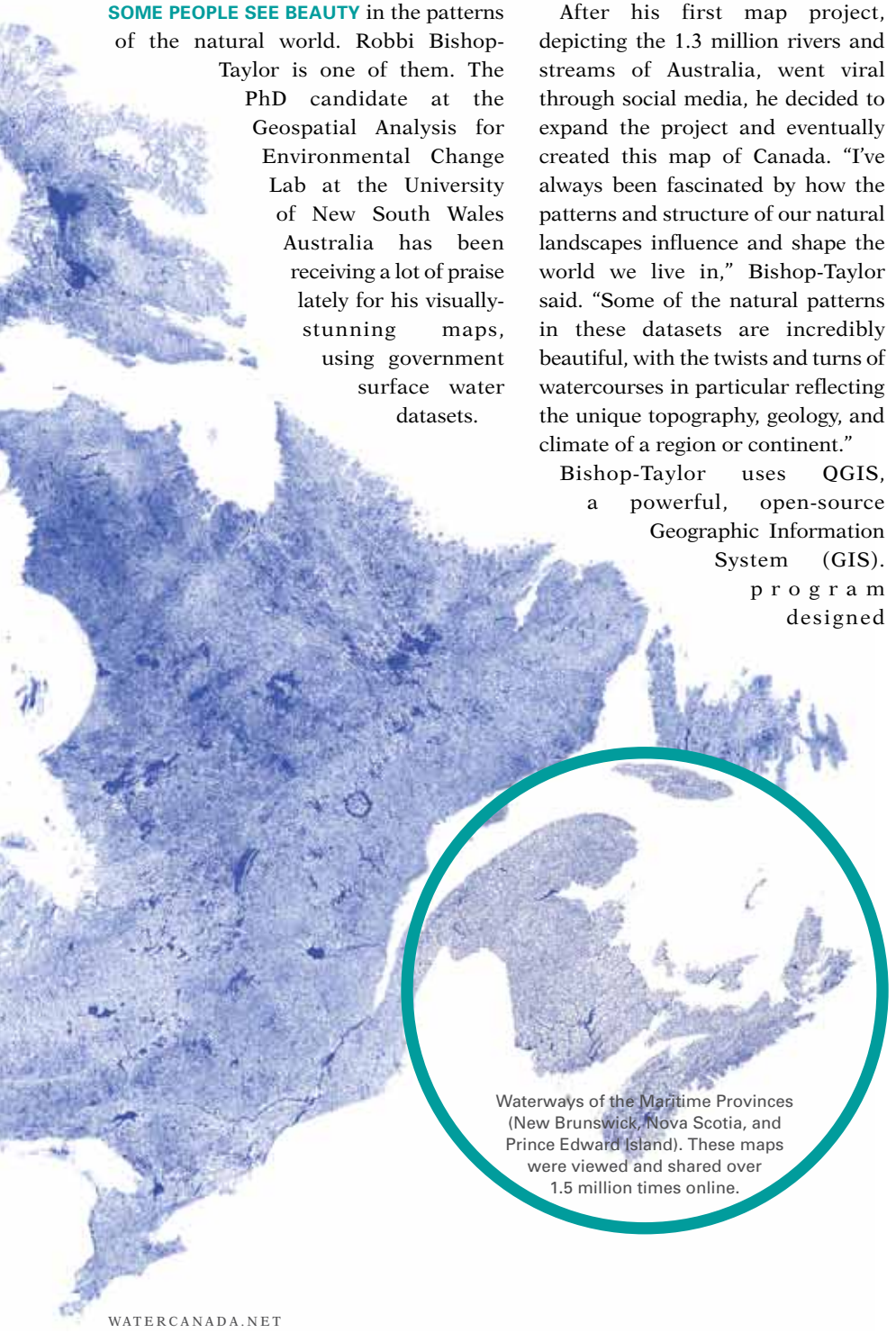
SOME PEOPLE SEE BEAUTY in the patterns of the natural world. Robbi Bishop-Taylor is one of them. The PhD candidate at the Geospatial Analysis for Environmental Change Lab at the University of New South Wales Australia has been receiving a lot of praise lately for his visually-stunning maps, using government surface water datasets.

After his first map project, depicting the 1.3 million rivers and streams of Australia, went viral through social media, he decided to expand the project and eventually created this map of Canada. "I've always been fascinated by how the patterns and structure of our natural landscapes influence and shape the world we live in," Bishop-Taylor said. "Some of the natural patterns in these datasets are incredibly beautiful, with the twists and turns of watercourses in particular reflecting the unique topography, geology, and climate of a region or continent."

Bishop-Taylor uses QGIS, a powerful, open-source Geographic Information System (GIS). program designed to analyze and map large geographic datasets. The maps are based on Natural Resources Canada's CanVec 1:250,000 scale lakes and rivers datasets, and contain in total around 2.6 million rivers and streams and almost two million lakes and waterbodies. The streams and lakes are accurate down to around 150 metres.

As part of his doctoral research, Bishop-Taylor is using complex geographic datasets and satellite data to model how drought and flooding affect ecosystems across arid Australia. He said, "Although this geographic data is often freely available online, it unfortunately rarely gets used outside of government departments or scientific papers. By turning these datasets into visual map art, my hope is that more people can experience and enjoy the beauty of geography and the natural world for themselves."

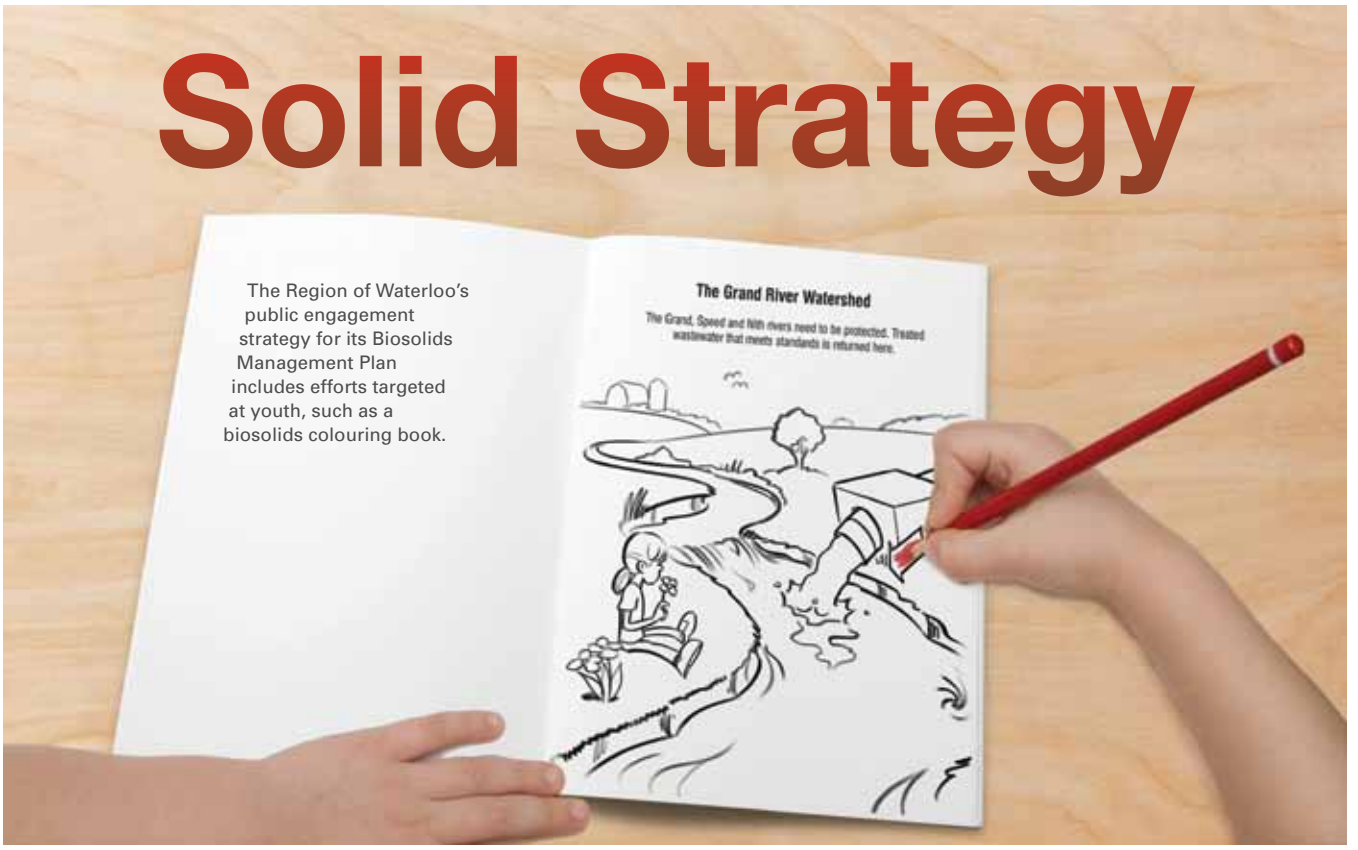
He was pleased to learn that even higher resolution datasets of water bodies exist for Canada, with this data improving every day as computing power grows and terabytes of new satellite imagery becomes available. "With its extremely high density of lakes and freshwater streams, Canada couldn't be more of a contrast to the harsh, dry landscapes of inland Australia. To do justice to this incredible natural geography, I settled on a minimalist design that mapped Canada by nothing but the water bodies themselves: no distractions created by internal border divisions or influences of the human world." WC



Waterways of the Maritime Provinces (New Brunswick, Nova Scotia, and Prince Edward Island). These maps were viewed and shared over 1.5 million times online.

Katherine Balpataky is Water Canada's editor.

Solid Strategy



The Region of Waterloo's public engagement strategy for its Biosolids Management Plan includes efforts targeted at youth, such as a biosolids colouring book.

Sometimes a new approach to public engagement is needed for water projects.

BY KATHERINE BALPATAKY

ON A CHILLY APRIL EVENING IN 2013, a large group of residents filed into a crowded room at recreational facility in Cambridge, Ont. The mood was beginning to intensify, as the lineup expanded down the hall. To an outsider, the scene resembled a checkout counter at Toys "R" Us on Boxing Day. But it wasn't cheap toys that roused these residents—it was a proposed $80-million biosolids plant that was to be built at the southeast end of town.

Kaoru Yajima, senior project engineer for the region, was at the centre of it all. As the project lead who championed the Biosolids Master Plan, he was there to answer questions and describe all the benefits of the project. By the end of the evening, he was surrounded by irate residents demanding answers on why they weren't consulted.

"In our eyes, we did the discretionary public consultation early in both of the two locations that were closest to the two [site] options that were identified," said Yajima. "This was more than what was required under the class EA process. We had asked the public for their input. A lot of people told us that this was too much information and that they weren't agreeable to the preferred station," he said. The top three concerns voiced were odour, trucking, and public safety. "Obviously we do our due diligence to have the answers for those types of things, but what we found was by the time we got to the public consultations, many people already had their minds made up and were dead set against the facility."

> By the time we got to the public consultations, many people already had their minds made up.

In the months that followed, the public's malaise did not go away. Instead, it deepened, and had become the frequent topic of debate on local radio shows, social media groups, and during the regional elections. Of the tri-cities that were to benefit from the project, it was if Cambridge was the poor stepsister, fated to assume the unwanted waste of her sisters. At a June 17, 2013, Cambridge council meeting councillor Neil Ritchie, of North Dumfries Township, and resident, Harold Drewitz told Waterloo Region's director of water services, Nancy Kodousek, that they were unsupportive of the project, because of the cost, inadequacy of the public information sessions, and the transparency of the process. By September, the Region of Waterloo council decided to scrap the plans for the proposed facility and start the process over. The lesson was this: certain kinds infrastructure projects require a more deliberate and concerted

Credit: Region of Waterloo

Aerial view of the Region's Manitou Drive biosolids dewatering facility in Kitchener.

Credit: Action Media

Ground view of the new primary digester.

Credit: Region of Waterloo

Dan Meagher oversees students conducting a wastewater and biosolids design activity at a science and engineering Fair.

effort to gain input from the public, above and beyond what is required, and that complex issues can't be explained in one session.

A new direction

Although the Region has a Biosolids Master Plan in place (and has since 1990), the community's growth projections necessitated a new, forward-looking plan. At present, the Region operates 13 wastewater plants that produce five to seven truckloads of dewatered biosolids each day. The Region currently has only about a day's worth of storage. Their first priority is to find beneficial uses for the material, so much of it is shipped for agricultural land spreading or for northern mine reclamation. However, these are both seasonal options, so in the off-season it must be trucked away to landfill.

Under the proposed plan, a new facility would be built that creates pellets out of the biosolids. This material could also be used to deliver agricultural nutrients, with added potential to be sold for energy production. The plant itself would use heat from a steel smelting plant, a form of recycled energy that scored well in the Region's assessment of options using triple bottom line criteria. Though the proposal had been deemed the best and most economically and environmentally responsible choice for the Region, all options would go back on the table.

"Typically when the Region does this kind of technical study, it is predominantly engineering teams that we involve. But the second time around, we questioned how we were going to engage the public. It's that old adage of knowing where your blind spots are. That's why we brought Dan in, to look at the task at hand and bring a different view," said Yajima.

Dan Meagher is a communications coordinator of water efficiency in the Water Services branch at the Region of Waterloo for twelve years. Meagher joined the biosolids team to advise on the engagement process. "The public wanted to be consulted early and often," said Meagher. "What went off the rails [in the first Master Plan] was that people didn't really understand what it was we were


Contractor tests the new primary digester control panel at the Region's Kitchener Wastewater Treatment Plant.


A rooftop view of the new primary digester, which will support the Region's goal of energy conservation.

Credits: Actual Media


Aerial view of Kitchener Wastewater Treatment Plant.


Centre, José Bicudo, senior project manager of wastewater operations in the Region, describes the new primary digester mechanism to Kaoru Yajima and Dan Meagher.

talking about. When that's your starting point, you are kind of doomed to failure. So, we wanted to go through this with an open mind and to make sure that we were all having the same conversation," he said.

The group put forward a bid for consulting services to produce a second, revised Master Plan. Only this time, they included a strong emphasis on communications and engagement in addition to the engineering services required for the technical assessment. In June 2015, the Region entered into agreement with Dillon Consulting Limited to provide the services until 2018.

"We understood that there are really two audiences: the people who have a stake in the project, and maybe have a very fixed idea of what they want to happen, and the community at large. The community at large is a mixture of people who don't care, don't understand, and/or do care and haven't had the background," said Meagher. To meet the needs of both groups, the plan would try to build a much greater community understanding of the issues at large.

Colouring outside the lines

With the help from Dillon Consulting, the team created a multi-faceted plan to reach as many people as possible. First, they branded the strategy with an easily identifiable green-brown-and-blue logo to symbolize green energy, brown for earth, and blue for water. They also dropped the use of the term Biosolids Master Plan, recognizing that it sounds institutional and intimidating. "The Master Plan only refers to the big binder that you have at the end of the project. We called it a Biosolids Strategy to reflect that it is a work in progress […] Even that slight nuance—as an engineer, I would not have picked up on that,'" said Yajima.

The new strategy included an online survey (that reached over 500 people), webinars, a YouTube video, a theatre-style presentation on biosolids by CBC host Bob MacDonald (that drew over 100 people), a biosolids school science fair, a biosolids colouring book, and dozens of pop-up events at community gathering points such as the farmer's market, strawberry festival, and EcoFest (where over 400 people stopped to learn about the initiative). They even hired a telemarketing team to phone people at their homes for feedback.

"The old way of doing this [was] to go to a town hall or a church and set up some poster boards and invite the community out," said Yajima. Meagher added that, "Sometimes you get a bit of tunnel vision when you've been [at] this a while, in terms of who you hear from […] If you don't make the effort, then you only hear from one pocket of residents," he said.

Karla Kolli, a partner at Dillon Consulting Limited, and leading consultant on the project explained, "The Region is using this as an opportunity to address the longer-term vision, for example, by reaching out to youth. When we hosted a science fair for grade seven and eights, we used the biosolids project as a way to teach young people about what happens to water after it goes down the drain. Now there are efforts underway to pool resources to continue to teach that," she said.

Morgan Boyco, a community and environmental planner at Dillon, added that the Wellington Science and Engineering Fair reached over 200 kids from around the region. "That kind of approach has the potential to expand out the message to their parents and friends. With the colouring book, there is the potential their parents will look over their shoulder and read it, and visit the project website," Boyco said.

Technical experts delivered the information that was necessary for the public to understand, but then Meagher

and Dillon worked together to make it as simple as possible. "The overall philosophy is always about trying to reduce confusion. When you dump a whole lot of information on people, or you make it hard to locate, there is a certain perception that goes with that. Everything we are doing is trying to break down that wall and say: 'we really did make our best effort so that you could find it, you weren't confused, and it was simple,'" said Meagher. "We also learned that you don't pick up an audience on day one and carry them through to the end. People join at their own discretion, at their own convenience, and people jump off at the same rate." So the team designed a process that would allow people to jump in or out at any time, ensuring that all levels and details of resources were available at all times. "It's about being consistent."

The process is far from over and no decisions about the strategy have been made. The next step is to begin to convey information pertaining to the various options for managing biosolids in the future. The team plans to use the values that have been identified by the community—things like managing odour, keeping costs down, and public safety—as the criteria against which the various options will be measured. All this information will then be shared for more input.

"I think we have only scratched the surface in terms of the engagement. But at the same time, it is all going according to plan," said Yajima. "We knew that the education component was going to take some time. People need to understand how much biosolids material we produce, where it goes, what kinds of regulations must be followed [...] There is no way that [we] can start talking about alternatives, evaluations, and the selection process, never mind the processing of the biosolids before this. Those things take time for people to understand. The general population [doesn't] think about those things. So we are making inroads there," said Yajima. He added, "When you start talking about building a new facility, there is often public interest. But what I find more and more in this industry is that people want to know more about their drinking water, where their wastewater is going and how it's being treated, and how the water bodies are affected. On top of that, now that the term biosolids is a little more prevalent in society, people want to know what happens to our biosolids. WC

Katherine Balpataky is Water Canada's editor.

To learn more about the Region of Waterloo's biosolids strategy, visit **regionofwaterloo.ca/biosolids**

The Big Six

Canada's largest water infrastructure projects.

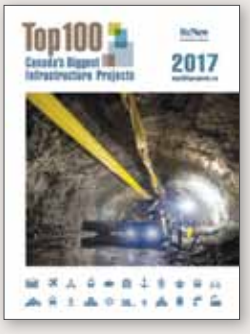
Every year, Water Canada publishes a list of the biggest water infrastructure projects in Canada. These projects are often controversial, and aren't without their challenges—be they in funding, procurement, or political will—yet they serve Canada's growing population. Major water infrastructure projects also improve vast quantities of Canada's freshwater, benefitting our ecosystems. Put together, Canada's top six water projects represent over $3.4 billion invested in our public infrastructure and significant milestones in establishing Canada's capacity for future growth.

This year, in addition to profiling the individual projects, we have gone out into the communities that will benefit from them to understand the impact these investments will have. Given the $20 billion in federal funding that has been earmarked for water infrastructure in 2017, we expect to see some interesting shakeups in next year's research.

Minister **Amarjeet Sohi**, Minister of Infrastructure and Communities.

"Our government believes that investing in water and wastewater systems is critically important to building strong, sustainable, and inclusive communities. That is why as part of the first investments in our Investing in Canada plan, we are funding projects that will lead to improvements in reliability and performance of the water, wastewater and storm water systems across Canada.

The water and wastewater projects featured in Water Canada's Top Projects list demonstrate the importance of investing in our country's water and wastewater infrastructure and reinforce the scale at which these investments are needed. In 2017, our government will present our long-term Investing in Canada plan to Canadians which will see transformative infrastructure projects built across our country including new water and wastewater systems that will make Canadian cities and towns even more desirable places to live, work, and raise a family."



To see the complete list of 2017 Top100 infrastructure projects in Canada visit top100projects.ca

Credit: Metro Vancouver

1

North End Sewage Treatment Plant Biological Nutrient Removal Upgrade

$794.6 million (Class 5 Estimate)

Location: Winnipeg, Manitoba

Owner: City of Winnipeg

Engineer: AECOM Canada Ltd (owner's advocate/consultant)

Project/Construction Manager: KGS Group (owner's advocate/consultant)

Legal: Blake, Cassels & Graydon LLP

Funding: Public

- **Provincial** $195 million
- **Municipal** $599.6 million

The City of Winnipeg's North End Sewage Treatment Plant (NEWPCC)—one of Canada's oldest biological wastewater treatment plants—is upgrading to an advanced biological nutrient removal and recovery facility. NEWPCC treats 200 million liters of wastewater per day, serving 70 per cent of the city's population. The upgrade will allow the city to meet the Manitoba Regulatory Licence mandate of 15 milligrams of nitrogen per litre of total nitrogen, and 1 mg phosphorus per litre of phosphorus in the effluent for the year 2037. It includes provisions for future expansion to 2067 population forecasts.

The process upgrade includes new headworks, a wet weather treatment system, and a biological nutrient removal process with phosphorus recovery followed by an upgraded UV disinfection of final effluent. The solids processing train will receive material waste from all three Winnipeg plants to be treated in thermal hydrolysis and anaerobic mesophilic digestion. The final dewatered, high-quality product will be of suitable use for land spreading as fertilizer. The Design-Build project is estimated to be awarded in 2019.

City of Winnipeg councillor, **Brian Mayes** of St. Vital Ward and Quartier de Saint-Vital, Winnipeg, Man.

"The North and South End sewage treatment plant upgrades are massive. The cost of the North End plant alone forms the largest capital investment in the history of the City of Winnipeg. There will be benefits from this infrastructure investment both in terms of greater capacity, as Winnipeg continues to grow, and in terms of better treatment of discharge, which ultimately ends up in Lake Winnipeg.

I was not yet elected when these projects were first approved, but as chair of the Water and Waste Committee, newly created in 2015 by mayor Bowman, I now am part of a group of councillors closely monitoring progress on the construction. [...] The scope of work at North End may yet change with the election of a new provincial government in April, 2017, but we are committed to improving the city's environment and helping Lake Winnipeg."

Jan A. Oleszkiewicz, distinguished professor of environmental engineering at the University of Manitoba, specializing in biological wastewater treatment and biosolids management. Oleszkiewicz has been involved in an advisory role for all three Winnipeg wastewater treatment plants. He currently serves as technical advisor to AECOM Canada Ltd.

"The advanced biological nutrient removal and biosolids processes planned for the North End Sewage Treatment Plant will complete the City of Winnipeg's transition to a sustainable utility, recovering phosphorus and energy and generating excellent quality organic soil conditioner for agricultural utilization."

Credit: Metro Vancouver

2 Lions Gate Secondary Wastewater Treatment Plant

$700 million

Location: District of North Vancouver, BC

Owner: Metro Vancouver

Design Build Consulting Team: AECOM (prime consultant); HDR/CEI Architecture Associates (architectural consultant); Local Practice Architecture + Design (sustainability and community integration); Connect Landscape Architecture; Louis Berger Group (procurement); Golder Associates (geotechnical); Compass Resource Management (structured decision-making); FVB Energy Inc. (district energy consultant); RWDI (acoustic, noise and vibration);

Other: Bull Houser (external legal counsel); Miller Thomson LLP (fairness monitor); Boughton Law (conflict of interest adjudication); Deloitte LLP (financial and commercial advisory);

Funding: design-build-finance

Invited Design-Build Proponents: ADAPT Consortium; PCL Partnerships; First Narrows Partnership

Christianne Wilhelmson, executive director, Georgia Strait Alliance

"The upgrade to Lions Gate, with its efforts to integrate community amenities and recovery of resources, is a great example of how we can protect our marine environment in a way the benefits the surrounding community for many generations. The inclusion of the community in the design and development process was also key."

John Hunter, P. Eng., president & CEO of J. Hunter & Associates Ltd., and volunteer on the Lions Gate Public Advisory Committee.

"I was astounded on a tour of nearby Washington sewage treatment plants that they had little (or in most cases) no odour, and some looked like office buildings or even restaurants. However, I am disappointed in the apparent Metro Vancouver bias, for our plant, against a public-private partnership alternative for the entire plant."

The Lions Gate Secondary Wastewater Treatment Plant is a key component of Metro Vancouver's Integrated Liquid Waste and Resource Management Plan, which was approved by the B.C. Ministry of Environment in May 2011. Based on the new federal wastewater regulations, the existing Lions Gate Wastewater Treatment Plant must be upgraded to secondary treatment by December 31, 2020.

The new plant will be built on a 3.5-hectare brownfield site approximately two kilometres east of the current facility. Once commissioned, it will provide secondary treatment to approximately 200,000 residents of the North Shore, including the District of West Vancouver, City of North Vancouver, District of North Vancouver, Squamish Nation, and Tsleil Waututh Nation.

In 2013, Metro Vancouver completed a multi-disciplinary project design process with stakeholders to develop a facility plan that complements the neighbourhood. The facility is designed to be compact, secure, resilient, and to support experiential learning and education on topics such as water use and sustainable water infrastructure.

Metro Vancouver contracted KMPG to conduct a procurement options analysis for the project, and has collaborated with Partnerships BC to determine the optimal procurement strategy for its design, construction, and financing. Based on the KPMG report, input from Partnerships BC, and its own assessment, Metro Vancouver has adopted a design-build-finance procurement model for the project, with private financing for the five-year construction period comprising approximately 35 per cent of the project's total construction costs.

The three Members of Parliament for the North Shore—Jonathan Wilkinson of North Vancouver, Pamela Goldsmith Jones of West Vancouver, Sunshine Coast, and Sea to Sky Country, and Terry Beech of Burnaby North and Seymour—have been strong advocates for the project. The project also received support from the Squamish Nation and mayors of the communities that will be served by the new plant.

The new facility is scheduled to be operational by the end of 2020, and the existing plant will be decommissioned once the new plant is in service. The Government of Canada has committed $212.3 million from its Building Canada Fund for the Lions Gate project, and Metro Vancouver is still working with the province to secure provincial funding support for the construction of the new plant.

Credit: City of Calgary

3 Bonnybrook Wastewater Treatment Plant D Expansion

$600 million

Location: Calgary, Alberta

Owner: City of Calgary

Project/Construction Manager: Graham

Consulting Engineers: Stantec, CH2M, AECOM

Other: Hanscomb (owner's design stage cost consultant); Aon (owner advisor and construction insurance broker)

Funding: Public

One of Calgary's three wastewater treatment plants, Bonnybrook, is undergoing an expansion with the plant estimated to be able to service an additional population of 325,000 people. When construction is completed in 2022, the facility will service a population of 1.366 million people in Calgary and the surrounding areas (Cochrane, Airdrie, and Elbow Valley).

The Plant D expansion includes new primary and secondary clarifiers, new bioreactors with biological nutrient removal system, new treated effluent filtration facility, new Thermal Hydrolysis Process facility (a first for Canada), and a new berm along the Bow River near the Ogden Bridge to protect the plant from flooding. The City is also upgrading the existing ultraviolet disinfection system, digester, and primary sludge thickening systems. Construction began in 2016. In February 2016, Calgary received $13 million from the province and $8.4 from the federal government for flood resiliency projects, including for the construction of the berm. The Plant D expansion is part of $1.1 billion the City of Calgary is investing in a series of projects at the Bonnybrook Wastewater Treatment Plant over the next six years to accommodate future growth. These investments ensure continued protection of the Bow River and enhanced flood protection measures while maintaining a high level of customer service. Calgary's advanced wastewater treatment processes meet or perform better than all federal and provincial health and environmental guidelines.

Mayor Naheed Nenshi, City of Calgary.

"The City of Calgary is committed to protecting public health, improving our environmental performance, and protecting the watersheds," said City of Calgary Mayor Naheed Nenshi. "Our upgrades to and expansion of the Bonnybrook Wastewater Treatment plant will allow us to return higher quality water to the Bow River, be more energy efficient, increase capacity to serve a growing population, and improve flood resiliency. We're excited about this project, because it will ensure wastewater treatment service for Calgary and surrounding regions today and well into the future."

City of Calgary councillor, **Peter Demong**.

"The upgrades at Bonnybrook really show how we are looking ahead to the future. Increased capacity to serve our growing population, better effluent water quality, and more efficient energy use through our biogas to cogeneration process are steps in the right direction for Calgary. The economic stimulus and new jobs we are creating right now are also a huge bonus."

Conor Tapp, executive director of Green Calgary Association.

"The upgrades and expansion to the Bonnybrook Wastewater Treatment Plant D strike a positive balance for the community. The addition of the thermal hydrolysis process facility, as well as upgrades to existing disinfection systems, and overall increased capacity of the treatment plant are important steps that will protect downstream water quality."

Credits: Metro Vancouver

4

Annacis Island Wastewater Treatment Plant Expansion

$600 million

Location: Delta, British Columbia

Owner: Metro Vancouver

Engineer: Brown and Caldwell with Stantec, EIC Solutions, and Klohn Crippen Berger

Contractor: TBA

Other: JJM/Geopac (Ground Improvements); NAC Constructors Ltd. (Solid Contact Tank Blowers); Kenaidan (computer control system & lab building); Golder Associates (outfall design team).

Funding: Public

- **Municipal** $600 million

Over the next several years, Metro Vancouver will be undertaking a number of construction projects to increase the capacity of the Annacis treatment facility to accommodate future growth, improve its ability to operate in the event of a major earthquake, take advantage of green energy captured on-site, and manage odour. The Annacis expansion is to be built in two phases, the first phase to be finished in 2019 and the second in 2026. The project is Stage 5 of an 8-stage facility plan.

When Stage 5 project by Metro Vancouver is complete, the Annacis Island facility will serve 1.5 million people in 14 Metro Vancouver municipalities. It's one of the region's largest treatment facilities and releases treated water into the Fraser River. "A new outfall is currently under design to provide greater capacity, improve effluent dispersion in the river, and allow for continued operation after a seismic event," said Nancy Bonham, the lead senior engineer for the project. "The design accommodates future growth beyond this current expansion, and is being designed to accommodate future sea level rise due to climate change."

Jeff Carmichael, division manager of utility research and innovation, Metro Vancouver.

"Innovation is important to Metro Vancouver's efforts to be a utility of the future. [Innovation] occurs not only by using the latest technologies and operational methods when plants are expanded, but also by expanding the scope of how we manage wastewater by treating waste as a resource."

Nancy Bonham, lead senior engineer of Metro Vancouver Liquid Waste Services, Project Development Civil/Mechanical.

Raaj Chatterjee, student from Simon Fraser University who toured the facility.

"…I learned that what [waste] may be out of sight and out of mind, is not out of this planet. We are a part of a greater sphere of interconnectedness and everything we do impacts in some way."

Credit: Region of Peel

Several tunnel boring machines were used on the Hanlan Water Project. The first to be launched was Celtic Tiger, which excavated the tunnel for the Hanlan Feedermain on Lakeshore Road.

5 Hanlan Water Project

$450 million

Location: Mississauga, Ontario

Owner: Region of Peel

Engineer: CH2M (detailed design consultant: South Assignment—Contracts 1 & 2); WSP (detailed design consultants: North Assignment—Contract 3); The Municipal Infrastructure Group; GM Blueplan

Contractor: McNally Construction Inc. (Contract 1, Lakeshore and Dixie Roads to Golden Orchard Drive); T2DMP (Contract 2, Dixie Road from Golden Orchard Drive to Eastgate Parkway); Southland Technicore Mole JV (Contract 3, Eastgate Parkway and Tomken and Cawthra Roads)

Environmental Services: AECOM (environmental assessment)

Supplier: Hanson Pipe and Precast (concrete pressure pipe); DECAST Ltd. (concrete pressure pipe, precast chambers); CRH Canada, Dufferin Concrete, and Dufferin Aggregates (materials supply)

Legal: Borden Ladner Gervais LLP (legal advisor)

Other: AECOM (preliminary design report); Arup (geotechnical engineering, tunnel design, pipeline and structural design support, engineering and construction phase services); exp Services (instrumentation and monitoring); Revay and Associates (project management support services); WSP (consultant and geotechnical); Aon (risk advisor/broker for preferred proponent on their phases of the project); Golder Associates

Funding: Public

- **Municipal** Peel Region: $330 million; York Region: $120 million

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 once it's completed. Part of the same project, the 1,500-millimetre-wide (1.5-metre) Mississauga City Centre Subtransmission Main will run approximately six kilometres from the Hanlan pumping station to the intersection of Cawthra and Burnhamthorpe roads. Developed under the York-Peel Water Agreement, Peel Region will provide water to York Region via the feedermain. In exchange, York Region is funding 35.6 per cent of the feedermain costs. Both the feedermain and the subtransmission main are undergoing installation. Construction began in 2011 and is scheduled to be completed by mid-2017.

The Hanlan Water Project is a point of pride for councillors Chris Fonseca and Jim Tovey, Mississauga's wards 3 and 1, respectively, both members of the advisory group that directed the development and implementation of the Hanlan project. Tovey is particularly pleased by the fact that the project was executed with little upset in the community, despite the usual burdens of constructing a capital works project in a dense urban space. Better than that, fill from the feedermain construction will contribute to the development of a new, 25-hectare conservation area on the lakefront.

Integral to the process, commented Fonseca, was developing a communications strategy that used community ambassadors for each state of the project. "Ambassadors have been working with residents on an individual basis," said Fonseca. "We felt it was very important to have ambassadors address issues throughout [the project] as quickly as possible."

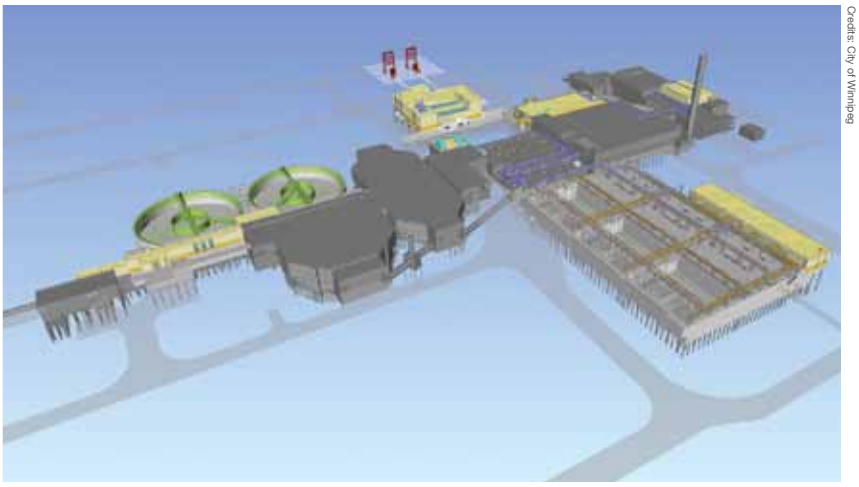
And this was not just a measure to assuage commuters frustrated by traffic congestion. Two schools, John Cabot and Philip Pocock Catholic Secondary, are within the project bounds. "A lot of the students walk, and we wanted to make sure the schoolboard knew [about the project] well in advance," said Fonesca. "We were able to find out [Cabot's] summer school schedule, and we could have officers at the crossing. It was very positive communication, and [the schools] have been very appreciative of that." The communications strategy helped protect students from the hazards of large vehicle traffic.

With the Hanlan Project in place, Mississauga will be "set up for the best water in Canada for the next century," said Tovey, which Fonseca attributed to "a rigorous coordination of municipal and regional managers in term so public works and sticking to timelines."

Councillor **Jim Tovey** of Ward 1 Mississauga.

"A lot of people see the dump trucks going down the street, and they're almost cheering," said Tovey. "Using the fill from other capital projects in Peel Region to create land for the conservation area will generate approximately $25 million in revenue and lower the total cost of the conservation project to around $35 million."

Councillor **Chris Fonesco** of Ward 3 Mississauga.



Credits: City of Winnipeg

6 South End Water Pollution Control Centre

$335.6 million

Location: Winnipeg, Manitoba

Owner: City of Winnipeg

Engineer: CH2M Hill Canada Ltd.

Other: PCL Constructors Ltd. (site preparation works); Graham Construction and Engineering LP (clarifier and grit removal concrete); NAC Constructors Ltd. (bioreactors, blower building and secondary clarifiers)

Funding: Public

- **Federal** $53 million
- **Provincial** $234.81 million
- **Municipal** $45.79 million

The South End Water Pollution Control Centre processes approximately 70 per cent of the wastewater treated in Winnipeg. This $335.6-million project also involves building two new facilities at the North End sewage treatment plant.

The project responds to a provincial Environment Act License that was issued to the city requiring it to treat the nitrogen and phosphorus that winds up in the Red River and, eventually, Lake Winnipeg, among other requirements. The Biological Nutrient Removal (BNR) system will also help meet Winnipeg's growing population.

Mary Lou Mendro of Probe Research Inc. is responsible for the Clear Perspective of Canadians and their Drinking Water survey and water-related research.

"Water and wastewater is indeed a big issue here in Winnipeg these days with the wastewater treatment plant expansion projects underway both in the north end and in the south end of the city," said Mary Lou Mendro, the director of Syndicated Studies at Probe Research Inc., a Winnipeg-based pollster.

In a summer 2016 survey, Probe Research gathered opinions from 2,050 Canadians—including 200 Manitobans—asking residents whether or not they had heard, read, or seen anything lately about the quality or condition of water-related infrastructure in their community. "We found one-third of Manitobans (34 per cent) said they had, compared to just 22 per cent of Ontarians and 27 per cent of the national populace," said Mendro. The only province that reported higher awareness was Saskatchewan at 45 per cent.

"I am very pleased to see the progress that has been made by the City of Winnipeg, in collaboration with other levels of government, in upgrading its sewage treatment plants. There can be no doubt that this will contribute towards the long-term sustainability of the Red and Assiniboine Rivers and will help protect our treasured Lake Winnipeg" said Mendro.

Councillor **Brian Mayes** (left) and MP **Dan Vandal** at dedication of new trail by Winnipeg's Seine River.

"I grew up in Winnipeg's south end, and then moved away from the city for almost 30 years. Over the past few decades the city has spread to the south, and I am pleased that we will be able to offer a modern, efficient sewage disposal system for these growing areas. Both quality control and increase capacity are important, and while these expenditures are not as visible as road repairs, they are essential. There are more households still on septic systems in my ward than in any other ward, so I am particularly appreciative of the need for a modern, effective south end plant.

These are complicated and time-consuming projects. The City is engaged in other large water and sewer projects, such as a Biosolids Master Plan, costing over $200 million, but the North and South End upgrades are central to our infrastructure commitment and environmental planning."

Over-Achievers

AWWA's Partnership for Clean Water Promotes Wastewater Utility Optimization.

BY BARB MARTIN

OUR WATER AND WASTEWATER UTILITIES have the great task of providing safe drinking water to Canadians and treating wastewater to a level suitable for discharge to the natural environment. We are directed to treat to a certain standard and comply with all provincial and federal regulations. Our challenge lies in meeting compliance as efficiently as possible, or even exceeding the minimum standard, as we strive for continual improvement.

In response to these challenges, the American Water Works Association (AWWA) offers support through the Partnership for Safe Water and now the new Partnership for Clean Water. These programs provide the guidance and methodology to develop a utility optimization program and celebrate program success. Over the past 20 years, the Partnership for Safe Water's optimization programs for drinking water treatment plants and distribution systems have been used successfully by more than 400 drinking water utilities across the U.S. and also in Quebec. Two years ago, the program was expanded to all Canadian municipalities and Halifax Water, the City of Calgary, and the Region of Halton each saw this as a great opportunity.

The new Partnership for Clean Water was developed as a parallel program to offer a global wastewater utility optimization and recognition program. The launch of the Partnership for Clean Water truly brings optimization full circle—from source to tap, and back to the source again. Parallel programs for utility optimization are offered in Quebec, through Réseau Environnement, including the Programme d'excellence en eau potable (PEX Starre) for drinking water utilities and the Programme d'excellence en eaux usées (PEXStaRRE) for wastewater utilities.

The Partnership for Clean Water

focuses on optimizing wastewater treatment plant performance and operations to improve treated effluent water quality, with a margin of safety beyond current regulatory requirements while achieving efficient use of energy. These improvements can help protect environmental water quality, including that of surface water sources used for drinking water supply. Although initially focused on wastewater treatment plants, the Partnership for Clean Water program aims to expand to include optimization of reuse facilities and collection systems.

The program begins with a comprehensive self-assessment of wastewater treatment plant performance and operations. The self-assessment provides a unique opportunity for utility staff to objectively evaluate plant performance, capacity, unit treatment processes, facility energy efficiency, process control, and administration using a proven framework based on the structure of the U.S. Environmental Protection Agency's Composite Correction Program. The process emphasizes the multi-barrier approach to wastewater treatment optimization to help ensure the performance of each unit of the treatment process is maximized. The self-assessment also identifies factors limiting optimized performance and encourages development and implementation of an action plan that enables utility staff to work toward achieving optimization. The results are reviewed by utility optimization experts who provide feedback and further recommendations for improvement. Upon successful completion of this process, the utility is eligible to receive the Directors Award, providing industry-wide recognition and a means to share with the community the utility's commitment to efficiency and optimization.

A variety of resources are provided by the program to help support utility optimization efforts, including self-assessment guidance, a secure online data reporting interface, and a Sludge Mass Control Tool software program. All of these resources help to encourage data collection, evaluation, and trending, which in turn support the process of making data-driven decisions that help utilities realize improvements in treatment plant operations and performance. WC

Barb Martin, is the senior manager of partnership programs at American Water Works Association.

Learn more about this new program at **awwa.org/partnership**

APPOINTED

Sevaun Palvetzian

Janet Rieksts-Alderman

Mazyar Mortazavi

The Government of Canada has appointed three new directors to the Waterfront Toronto Board of Directors. **Amarjeet Sohi**, Minister of Infrastructure and Communities, announced that **Sevaun Palvetzian**, **Janet Rieksts-Alderman**, and **Mazyar Mortazavi** will take positions on the board.

Sevaun Palvetzian is the CEO of CivicAction, an organization that engages with leaders from all sectors to address urban challenges in the Greater Toronto and Hamilton region. **Janet Rieksts-Alderman** is a partner at Examine Construction Consultants Canada, a team of engineers and construction consultants who provide expertise on project execution and construction. **Mazyar Mortazavi** has been in the development business for 16 years and is the CEO and President of TAS, an urban development company that is a leader in design, development, and construction, twice awarded the BILD Green Developer of the Year award.

The Waterfront Toronto corporation has a 25-year mandate and a $30-billion long-term plan to transform 800 hectares of brownfield lands on Toronto's waterfront into accessible and sustainable mixed-use communities and dynamic public spaces.

Justin Arseneault

Marc Li

Singer Valve is pleased to add two new members to their engineering department: **Justin Arseneault** as instrumentation and automation engineer and **Marc Li** as applications engineer. With the growing need for automation and innovative design in the water industry, both Arseneault and Li are meeting a much-needed demand at Singer.

(L-R) Rong Xu, Chair of CleanConnect Congress, James Sbrolla, diplomatic lead from Finland.

Credit: Actual Media

CleanConnect Congress
Hangzhou, China

The last time I visited China was 1996. When I arrived in Hangzhou— the capital of China's Zhejiang province—it was clear to me that the country's approach to central planning has reaped impressive results. It's fair to say that China has leap-frogged past North America through technology advancements.

I have arrived to attend the CleanConnect Congress— an annual event for Chinese and global clean tech companies and Institutes to meet potential investors and partners. With close to 300 delegates from 18 countries, the 2016 event was hosted by UMORE Group—a private transfer agency that specializes in providing services to assist clean tech enterprises, academic institutes, and governments with Chinese partners.

Forecasts for China suggest that by 2030, water demands will exceed supply. This could lead to economic losses in the range of US$35 billion every year. Within the Chinese Central Government (CCG)'s 13th five-year planning cycle, the commitment to improve water security is a top priority. Increasing water prices, adding water taxes, and incentivizing water permit trading are some of the tools that Chinese policymakers are using to address these challenges.

Dr. Rong Xu, founder and CEO of Umore said, "We see China as not only the largest population in the world; it's also the biggest business opportunity. The building of industrial plants, water and wastewater treatment, and the other infrastructure that comes with it, all bring incredible profit potential for the companies with an established base in mainland China."

Given that the CGC has budgeted approximately US$1.5 trillion in water technologies over the next decade, the opportunity for Canadian firms is significant. And yet, there are significant challenges to getting started in China.

Language and cultural barriers are the first hurdle. Identifying which locations to target within China's vast landscape can be equally daunting. Canadian entrepreneurs who want to tap into opportunities in China will ultimately need assistance from a local presence who can help them navigate the complex requirements for foreign businesses. Finding a local partner and fostering a meaningful relationship is basically the starting point. With these needs in mind, the CleanConnect Congress was designed for those who want to enable business growth and commercialization opportunities in China.

—James Sbrolla is a director of Actual Media and Water Canada.

Workshop on Treatment of Drinking Water Environmental Contaminants

Toronto, ON

On Thursday, November 24, the University of Toronto Institute for Water Innovation and Department of Chemical Engineering & Applied Chemistry and Trojan Technologies hosted a workshop on advanced oxidation processes for water treatment at Alumni Hall. **Dr. Shahram Tabe** of the Ontario MOECC and **Dr. Ramin Farnood** from the University of Toronto spoke about frontier research on the development of nano-fibre membrane technologies. **Alan Royce** of Trojan Technologies presented on scaling up the implementation and operations of combined UV disinfection and UV/H2O2 AOP. Barrie Holden, formerly with Anglian Water in the U.K., discussed UV-based technologies for treating pesticides in drinking water.

(R-L): Indra Majarjan, Rajeev Goel, Nick Larson, Geoff Riggs.

Sangeeta Chopra of the Ontario Clean Water Agency.

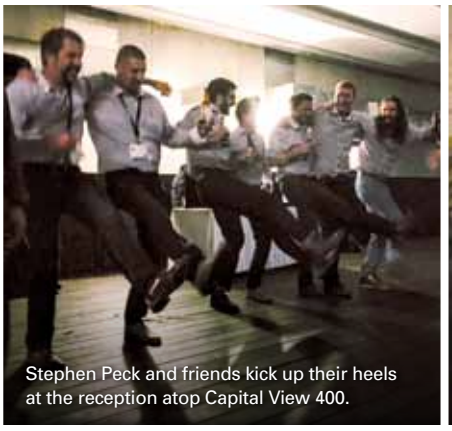
Credits: Ontario Clean Water Agency

Moving Towards Smart Water in Ontario Toronto, ON

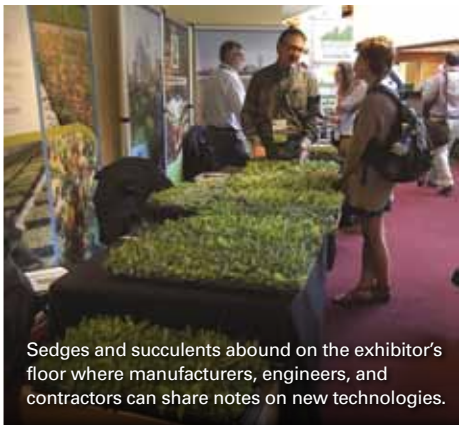
Hosted by the Southern Ontario Water Consortium, Ontario Clean Water Agency, and WaterTAP, this workshop convened nearly 40 water clean-tech entrepreneurs and over a dozen utility leaders to identify specific actions and recommendations for governments, utilities, and private sector players. Short, action-oriented presentations were delivered from **Rob Andrews** of Ontario Clean Water Agency, **Dave Szepycki** of York Region, **Nick Larson** of GM Blueplan, **Emily Moore** of Hatch, and **Dave Henderson** of XPV Water Partners. Participants worked worked to make recommendations on digitizing water infrastructure. A report containing the recommendations is forthcoming. For more information visit *sowc.ca*.

Credits: GRHC

Kerry Ross of Green T Design accepts the Extensive Industrial/Commercial Award for the Alberta Ecoroof in Calgary, Alta.



Stephen Peck and friends kick up their heels at the reception atop Capital View 400.



Sedges and succulents abound on the exhibitor's floor where manufacturers, engineers, and contractors can share notes on new technologies.

CitiesAlive Green Roof and Wall Conference Washington, D.C.

On the eve of the 14th annual CitiesAlive Green Roof and Wall Conference, hosted by Green Roofs for Healthy Cities (GRHC), San Francisco became the first city in the U.S. to require green roofs and/or solar panels on new construction projects. The announcement was cause for celebration, in light of the work the GRHC team had done supporting the city develop its policy.

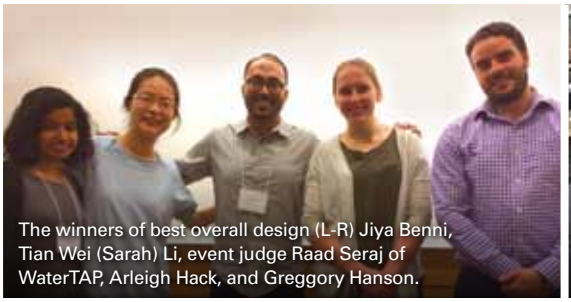
"CitiesAlive has proven to be a catalyst for policy change," said **Steven W. Peck**, founder and president of GRHC. "Over the last three years, Green Roofs for Healthy Cities has actively facilitated the development of this legislation with CitiesAlive, technical policy support, as well as providing Green Roof Professional training in the marketplace," Peck said.

The 2016 CitiesAlive Green Roof and Wall Conference was held in Washington, D.C., with a focus on stormwater. Over 400 green roof and wall professionals, policy makers, planners, civil engineers, landscape architects, and designers attended.

GRHC also hosted the 2016 Green Roof and Wall Awards of Excellence as part of the conference. Awards in twelve categories recognizing accomplishments in design, research, policy development, advertising, and corporate leadership were awarded. Four Canadian teams accepted awards for projects in Peterborough, Toronto, Edmonton, and Calgary.

GRHC is a Toronto, Ont.-based not-for-profit industry association that promotes the industry across North America through training, advocacy, and leadership. CitiesAlive 2017 is scheduled for October 10–13, 2017 in Seattle, Washington.

Credit: Actual Media



The winners of best overall design (L-R) Jiya Benni, Tian Wei (Sarah) Li, event judge Raad Seraj of WaterTAP, Arleigh Hack, and Greggory Hanson.

Credits: Ryerson Urban Water

Alex Gill, Raad Seraj, Sheila Boudreau, and Tom Kaszas judges on the panel.

Credits: Ryerson Urban Water

(L-R) Madeline Gibson, Angela Murphy, Pinaz Mehta, the Ryerson Urban Water team that organized the hackathon.

Green Infrastructure Hackathon Toronto, ON

The Green Infrastructure Hackathon was the result of a collaboration between Ryerson Urban Water and the City of Toronto. Ryerson Urban Water (RUW) is a consortium of researchers who believe in the goal of healthy water and healthy cities. RUW researchers are working collaboratively across the university from disciplines in science, engineering, urban planning, public health, geography, political science, business, and ethics to achieve this goal.

The hackathon brought students and recent graduates together to design green infrastructure for the City of Toronto. Students registered from nine universities and colleges in the Great Toronto and Golden Horseshoe Area, and more than 70 professionals from the green infrastructure sector volunteered their time as presenters, mentors, and judges.

On Friday, students met, formed teams, and networked with professionals. On Saturday, speakers presented background information and defined some of the key challenges the industry faces in designing and implementing green infrastructure. Mentors guided the teams in identification of a key problem area before each team developed their concepts. On Sunday, ten teams delivered five-minute presentations to a panel of judges with representatives from industry, academia, and government.

Team Drip Pop Up took top scores when they pitched their modular art installations to both engage and educate the public. The team won $2,500 and a career coaching session with **Jennifer Keesmaat**, chief planner for the City of Toronto. The second place team won $1,250 and career coaching sessions with Xeroflor, manufacturer of green roof supplies. All students won books and magazines from Water Canada, ReNew Canada, and FATHOM and City of Toronto pins. Ryerson Urban Water continues to follow and support the students as they navigate developing their green infrastructure designs.

Credits: Gordon Foundation

(L-R) Carolyn Bennett, minister of Indigenous and Norther Affairs, Jonathan Wilkinson, parliamentary secretary to Minister of Environment and Climate Change, and Sherry Campbell, president and CEO of The Gordon Foundation.

Robert McLeod, minister of Environment and Natural Resources in the NWT and Dr. Erin Kelly, acting deputy minister of Environment and Natural Resources.

Mackenzie DataStream Southern Launch Ottawa, ON

Mackenzie DataStream's southern launch took place on Parliament Hill in Ottawa on November 22nd. The launch included a demonstration of the new and improved website and an official screening of the new Mackenzie DataStream video.

Jonathan Wilkinson, parliamentary secretary to Minister of Environment and Climate Change, **Robert McLeod**, Minister of Environment and Natural Resources in the Northwest Territories, and **Lana Lowe**, lands manager of Fort Nelson First Nation delivered speeches.

The Gordon Foundation was honoured to celebrate this milestone in the company of attendees from federal, territorial and Indigenous governments as well as representatives from non-profit organizations.

Latornell Conservation Symposium Alliston, ON

Hundreds of biologists, ecologists, landscape architects, planners, conservation authorities, and municipal leaders across Ontario descended upon the Nottawasaga Inn Resort to share their progress in conserving natural capital. This year focused on green infrastructure. Delegates explored its applicability and benefits in relation to important issues in Ontario such as climate change, biodiversity loss, water management, economic development, improving public health, and fostering sustainable communities.

Dr. Dianne Saxe, Environmental Commissioner of Ontario, shared the findings of two reports, one on stormwater pricing (see page 10 of this issue) and the other on climate change. The climate change report presented harrowing new data that suggests that the tipping point may have past for dramatic climate changes. Nearly 800 guests attended and over 52 organizations and companies exhibited.

National Water and Wastewater Conference Toronto, ON

Credit: Actual Media

Carl Bodimeade of Hatch and David Main of AECOM sound off on Canadian infrastructure in the style of The Debaters, moderated by Colwyn Sunderland of CWWA.

The National Water and Wastewater Conference, hosted by the Canadian Water and Wastewater Association (CWWA), convened water utility leaders with a focus on charting the path for the utility of the future. The event kicked off with two workshops on Understanding Vulnerability within the Water Sector and Integrating Climate Risk into Infrastructure Management. The main event included keynotes by The Water Brothers, **Alex** and **Tyler Mifflin**, **John Woodhouse** of the Woodhouse Partnership, and **Colin Perkel**, author of A Well of Lies: The Walkerton Water Tragedy.

Over 300 people attended over the three days, including a diverse floor of 30 exhibitors. Participants included a delegation of companies from Israel—a country that is 60 per cent desert and whose population has increased tenfold since 1950. Israeli delegates, such as **Andy Pascoe** of Signa Security, shared their knowledge and experiences through B2B sessions.

"Israel is the most hacked nation in the world," Pascoe said. Signa has developed a technology that analyzes the patterns of electrical signals between water treatment equipment and servers to identify abnormalities related to a hack.

In a session about professional development, **G. Tracy Mehan** of the American Water Works Association noted, "The role of the water utility in the community is changing and can change for the better. It's about is coming out from behind the fence and being present in the community and recognizing the impact that water management can have on the community's success."

At the event's close, CWWA executive director **Robert Haller** introduced keynote **Colin Perkel** and shared a personal story about how he fell into the water sector. Haller drew inspiration from Perkel's book, Well of Lies. When Perkel joined Haller onstage, he posed a question to the audience: "What do you think is the single most important threat to save drinking water today?" A few answers were offered and one woman shouted, "complacency." Perkel responded, "I don't want to minimize the threats of pathogens, or pollution of water sources, because all of those threats are very important. But overarching all these things—complacency is what it is all about."

Credits: Actual Media

Lieutenant Governor of Ohio, Mary Taylor, delivers the keynote address at the Great Lakes Infrastructure Xchange.

Panel discussion on key ingredients to fostering P3s in the Great Lakes Region.

Great Lakes Infrastructure Exchange Toronto, ON

For the first time, the Great Lakes Infrastructure Exchange was held as part of the CCPPP's P3 Conference. The half-day event, which followed the conclusion of CCPPP, focused on issues surrounding joint infrastructure development on both sides of the Great Lakes. The event was organized by the Council of the Great Lakes Region (CGLR) and featured keynotes and panelists from both Canada and the United States.

Ohio's Lieutenant Governor, **Mary Taylor**, discussed the value of using P3s to move infrastructure projects forward in her state. Ohio is currently undergoing its first-ever P3 project, the $429-million Southern Ohio Veterans Memorial Highway. Taylor suggested that she was hopeful that strong investments in infrastructure could result from the U.S. election, as President-elect **Donald Trump** had announced a significant increase in infrastructure spending in his campaign platform.

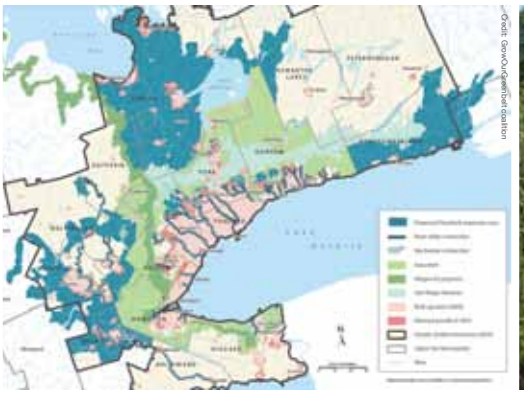
A panel discussion on bi-national P3 opportunities became animated as a result of a series of bold suggestions from Transport Canada assistant deputy minister **Helena Borges**. Borges discussed the jointly-owned St. Lawrence Seaway infrastructure and the potential to expand the region in order to increase import and export capacity. How that infrastructure gets paid for is a question facing both governments, a question that will need to be addressed in the coming years.

Close to 200 people took part in the inaugural event, which is expected to continue in 2017. For more on the Council of the Great Lakes Region, visit *councilgreatlakesregion.org*.

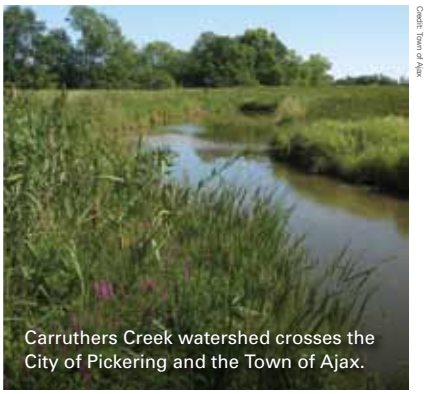
Credit: Town of Ajax

Further urbanization of this sensitive headwater area will result in the loss of prime agricultural lands for growing local food.

Right: Map of the vulnerable hydrological areas within the proposed Bluebelt area, including headwaters, moraines, and groundwater recharge areas.



Credit: GreenOurGreenbelt Coalition



Carruthers Creek watershed crosses the City of Pickering and the Town of Ajax.

Credit: Town of Ajax

Champion Bluebelt

Ontario must act to protect waterways within the Greenbelt.

BY STEVE PARISH

PRESSURE IS MOUNTING on all sides. The Greater Toronto Area is planning to accommodate another four million people and provide over six million jobs in the next 25 years. New residents will demand affordable housing options, connected and walkable communities, social services, and the preservation of our environment. Preservation will include farmland for growing local food, green spaces, and the protection of our water quality. All of this, with lower taxes. In response, the provincial government is conducting a thorough review of The Greenbelt Plan that aims to strike a balance between these competing needs.

The winning vision

Ontario introduced the Growth Plan for the Greater Golden Horseshoe, 2006, and the Greenbelt Plan, 2005, in an effort to grow strategically, more efficiently, combat sprawl, and create more complete communities where we can live, work, and play. The plans are a step in the right direction and have received many awards in recognition of vision and positive impacts. And yet, more is needed to protect our natural heritage.

Mounting pressures

Looking back over the past ten years, it is clear that, municipalities need support to accommodate increases in intensification and density targets so that roads, transit, and other infrastructure is in place sooner. Going forward, even greater provincial support is needed and should be addressed through the current Coordinated Land Use Planning Review process. The province needs to allow for municipalities to achieve provincial goals; but one size does not always fit all. A clear and transparent process needs to be established for growing the Greenbelt.

Growing the green; protecting the blue

Being that the Growth Plan and the Greenbelt Plan have begun to address the protection of green space, attention should also be given to expanding the plan by adding sensitive water features. The headwaters of the Carruthers Creek, located in northeast Pickering, is situated outside the Oak Ridges Moraine, and is therefore not protected. The area is vulnerable to development pressure that could result in downstream flooding and erosion. These headwaters are comprised of prime agricultural lands, containing sensitive hydrological features completely surrounded by the Greenbelt. The Toronto and Region Conservation Authority has identified the Carruthers headwaters as a priority area that should be protected. Guided by an environment-first philosophy, the Town of Ajax believes that protecting the Carruthers Creek headwaters is necessary. A watershed study is underway now that will inform whether urbanization should occur in the area; developers own a significant portion of this area and intend to build.

Protection of headwaters is just one of four priority areas identified for action by the Friends of the Greenbelt Foundation for the Co-ordinated Review. They propose a Bluebelt that includes threatened headwaters, moraines, groundwater recharge and discharge areas, wetlands, and rivers and streams across Southern Ontario. Recognizing that the pressure to urbanize on and around our sensitive water features is never going to decrease, the group believes that now is the time to ensure that these areas are protected, before irreparable damage is done.

The province must act

Water is one of Canada's greatest resources, and it is up to us as citizens to protect it. Urbanization needs to be planned in a sustainable, smart way that considers water systems holistically and prevents downstream flooding, biodiversity loss, and erosion. Although the Co-ordinated Review includes a new Urban River Valley designation to protect waterways between the Greenbelt and the Great Lakes and other inland lakes, it does not go far enough.

The Growth Plan and Greenbelt Plans will continue to shape growth and development across the Greater Golden Horseshoe, but we must seize this unique opportunity and apply the lessons learned to improve the sustainability of our communities. WC

Steve Parish is the Mayor of Ajax.

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