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Down the Drain

How Effectively Are We
Managing Our Wastewater?

**Overcoming the
'Yuck' Factor**

**Renewing Water
Infrastructure**

**Digital
Transformation**

BIOSWALES INUNDATED WITH SEDIMENT?



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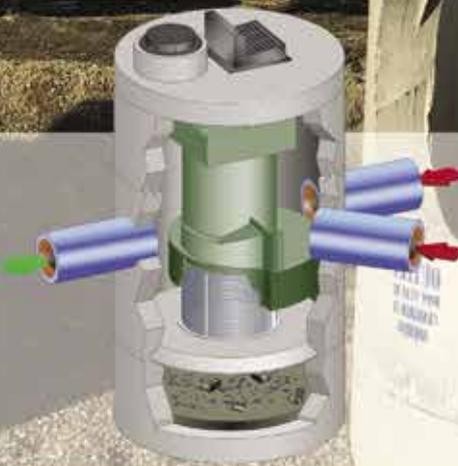
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EDITOR

Simran Chattha

CONTENT DIRECTOR

Corinne Lynds

CONTRIBUTING EDITORS

John Tenpenny, Connie Vitello

ART DIRECTOR AND SENIOR DESIGNER

Donna Endacott

ADVERTISING

Jackie Pagaduan jackie@actualmedia.ca

CONTENT CONTRIBUTORS

Sasha Aguilera, Saul Chernos, Molly Demma,
Carolyn DuBois, Karen Liu, Jamylynn
McDonald, Steve McDowell, Nadia Todorova

DIGITAL MARKETING MANAGER

Shannon Clark

EVENT MANAGER

Natasha Mawji

PRESIDENT

Todd Latham

PUBLISHER

Nick Krukowski

ADVISOR

James Sbrolla

WATER AMBASSADOR

Lee Scarlett



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The New Blue Economy

BY SIMRAN CHATTHA

OVER THE PAST FEW MONTHS, our team at Water Canada has been hosting a series of panel discussions as part of the Blue Economy Webinar Series.

The series kicked off with a discussion about how the term Blue Economy is currently defined and how we believe it should be defined. Currently, predominant definitions of the term are synonymous with ocean resources. Our team at Water Canada believes that this definition of the Blue Economy is too narrow and that it needs to be expanded to encompass the broader water sector.

For this reason, we have been exploring topics like what governance looks like within the new Blue Economy, what innovation looks like, and how we can increase diversity within the new Blue Economy.

There are several key takeaways from the discussions that have taken place so far with industry experts:

- 1 There is support for expanding the definition of Blue Economy to include more than ocean resources.
- 2 The definition of Blue Economy should be expanded to include activities that support water stewardship (i.e., protecting water bodies, using water resources in a way that

balances needs with availability, etc.). It should also be updated to include economic activities (i.e., identifying and supporting the sustainable development of business sectors that depend on water like fisheries, tourism, beverage, mining, etc.).

3 Activities, like offshore oil and gas, that have the potential to harm our water resources should not be included in the new definition of Blue Economy.

4 Jurisdictional silos need to be broken down to better support water governance. In other words, collaboration is needed between all levels of government.

5 Innovation is typically thought of in the context of water technology. However, it can be used in a much broader context in the Blue Economy. In other words, the term "innovation" can be used to refer to an improvement in a process, product, or service that leads to an improvement in performance.

Be sure to join us over the coming months as we continue to explore the key elements of the new Blue Economy. wc

Simran Chattha is the editor of Water Canada.

simran@actualmedia.ca

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SASHA AGUILERA
Sasha is the design ambassador at Next Level Stormwater Management. Pg. 12



KAREN LIU
Karen is the Green Roof Specialist at Next Level Stormwater Management. Pg. 12



STEVE MCDOWELL
Steve is a senior sales consultant for Schneider Electric Canada Pg. 20



CAROLYN DUBOIS
Carolyn is the executive director of the Water Program at DataStream Pg. 30



Recommendations Released for Canada’s First National Infrastructure Assessment

ABOUT THE COVER

The way that we’re managing our wastewater, and what we’re doing with our wastewater, is evolving. Learn more on page 16.

Recommendations have been released for Moving Forward on the National Infrastructure Assessment, which summarizes consultation findings to inform Canada’s first National Infrastructure Assessment.

The announcement was made by Catherine McKenna, minister of infrastructure and communities, Tamara Vrooman, chair of the Canada Infrastructure Bank, and Jan De Silva, president and CEO of Toronto Region Board of Trade.

“Our well-being, our prosperity, and our success in tackling climate change over the coming decades will depend on many things, including smart investments in 21st century infrastructure that support a net-zero economy and a stronger quality of life for all Canadians,” said McKenna. “Through the recommendations for moving forward on the National Infrastructure Assessment, we are working together to achieve that.”

Launched last March, the consultation—named “Building the

Canada We Want in 2050”—sought input from the public, Indigenous communities and organizations, provinces, territories, municipalities, and stakeholders on three main priorities of the assessment:

- Assessing Canada’s infrastructure needs and establishing a long-term vision.
- Improving coordination among infrastructure owners and funders.
- Determining the best ways to fund and finance infrastructure.

Over 300 organizations and individuals shared their views and ideas, providing essential information on how the National Infrastructure Assessment might address these three priorities.

Their submissions were clear. There is strong support for an independent advisory body to lead an evidence-based process to identify Canada’s infrastructure needs over the near, medium, and long term to achieve critical economic, social, and environmental outcomes. *wc*

Coming up in the next issue

NOVEMBER/DECEMBER

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Share your story about the Canadian water industry with Water Canada!

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Agreement in Principle Reached to Resolve Class Action Litigation Related to Drinking Water

An Agreement in Principle has been reached through a negotiation process to resolve a national class action litigation related to safe drinking water in First Nations communities.

The announcement was made by Tataskweyak Cree Nation, Curve Lake First Nation, and Neskantaga First Nation with Indigenous Services Minister Marc Miller.

"I strongly believe in resolving important matters like this through open dialogue grounded in the principles of co-operation, partnership, and transparency," said Miller. "We are proud to have worked in partnership with Tataskweyak Cree Nation, Curve Lake First Nation, and Neskantaga First Nation to establish an Agreement in Principle that lays the groundwork for long-term sustainable solutions to ensure access to clean water on reserves now and in the future."

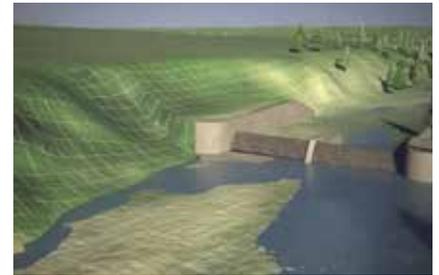
This Agreement in Principle addresses important concerns identified by

First Nations represented in the class action lawsuits. The agreement includes the following:

- \$1.5 billion in compensation for individuals deprived of clean drinking water.
- The creation of a \$400 million First Nation Economic and Cultural Restoration Fund.
- A renewed commitment to Canada's Action Plan for the lifting of all long-term drinking water advisories.
- The creation of a First Nations Advisory Committee on Safe Drinking Water.
- Support for First Nations to develop their own safe drinking water by-laws and initiatives.
- A commitment of at least \$6 billion to support reliable access to safe drinking water on reserve.
- Planned modernization of Canada's First Nations drinking water legislation. **wc**

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Credit: Government of Alberta

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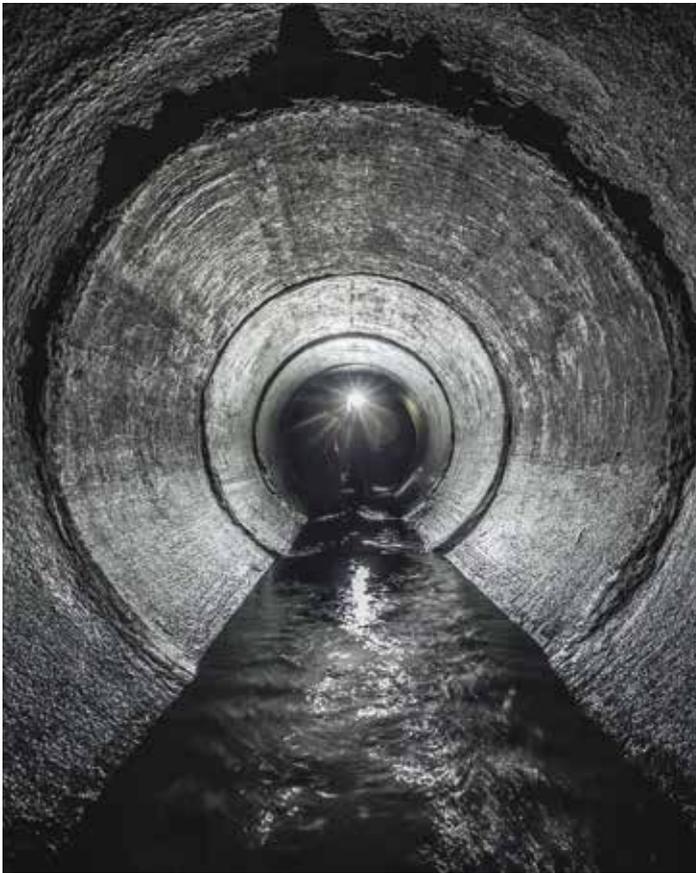


NEWS: Consultation Begins on Coastal Protection Act Regulations. bit.ly/CoastalConsultation



Credit: POLIS Water Sustainability Project

NEWS: Research Reveals B.C.'s Watershed Sector is a Jobs Powerhouse. bit.ly/BCpowerhouse



Renewing Water Infrastructure

Survey says environmental considerations are a major factor for asset renewal strategies in Canada. BY SIMRAN CHATTHA AND CONNIE VITELLO

IN THIS SECOND PART of a two-part feature on linear water infrastructure renewal, Water Canada reveals the results of a comprehensive survey on current practices and opinions related to the management, design, and procurement of linear public sector water infrastructure in Canada.

Respondents revealed that environmental considerations are poised to play a pivotal role in the decision-making for future asset renewal strategies.

Engineers and consultants from across the country weighed in to provide expert perspective on renewal

options—mainly rehabilitation and replacement—that can be implemented, independently, or jointly. They also provided insight into the priorities involved in the decision-making process and other pressing water infrastructure issues.

When it comes to linear water infrastructure, how do municipalities and water infrastructure owners decide how to rebuild or renew their pipelines? What are their key priorities and concerns?

Our research in part one indicated that a variety of factors traditionally impact decisions around linear water

infrastructure renewal, including:

- Project objectives (age and size of the renewal project and nearby developments).
- Site constraints (such as a sensitive surface structure or geographic challenges).
- Schedule timeframes (emergency service versus planned project).
- Client budgets.

However, our research also revealed an increasing awareness of indirect costs that are coming into play. These include impacts to trees, interference with

neighbourhoods, traffic congestion, idling traffic emissions, and disruption to business patterns.

The survey, which included responses from 375 participants, echoed our research findings in many ways and illuminated the growing appreciation and application of green solutions and water quality protection.

Lead infrastructure

When conducting watermain renewal or rehabilitation an alarming number of respondents indicated that they often encounter lead infrastructure, with 45.33 per cent selecting “sometimes” and 43.33 per cent selecting “regularly.”

This could be due to the fact that utilities don’t know where many lead pipes are located because the information is not available or is not complete. Utilities are starting to use new approaches, like artificial intelligence, to determine where lead pipes might be located. Once utilities determine where lead pipes are located, they will be in a better position to address ongoing concerns (e.g., impacts on health).

Open-cut versus trenchless excavation solutions

When working with municipal clients on linear water infrastructure renewal projects, respondents most often recommend a roughly even split between full open-cut replacement and trenchless excavation solutions. A majority of respondents indicated a preference for a combination of methods (31.73 per cent).

Selecting a technology

There was a relatively balanced response when it came to consultants’ main priorities for selecting a technology for a client’s replacement or rehabilitation of water infrastructure. There was a close tally between the following priorities:

- Profit to the firm.
- Reduced disruption in the community.
- Environmental impacts.
- Cost to the client.

Figure 1: When working with your municipal clients on linear water infrastructure renewal projects, which do you most often recommend?

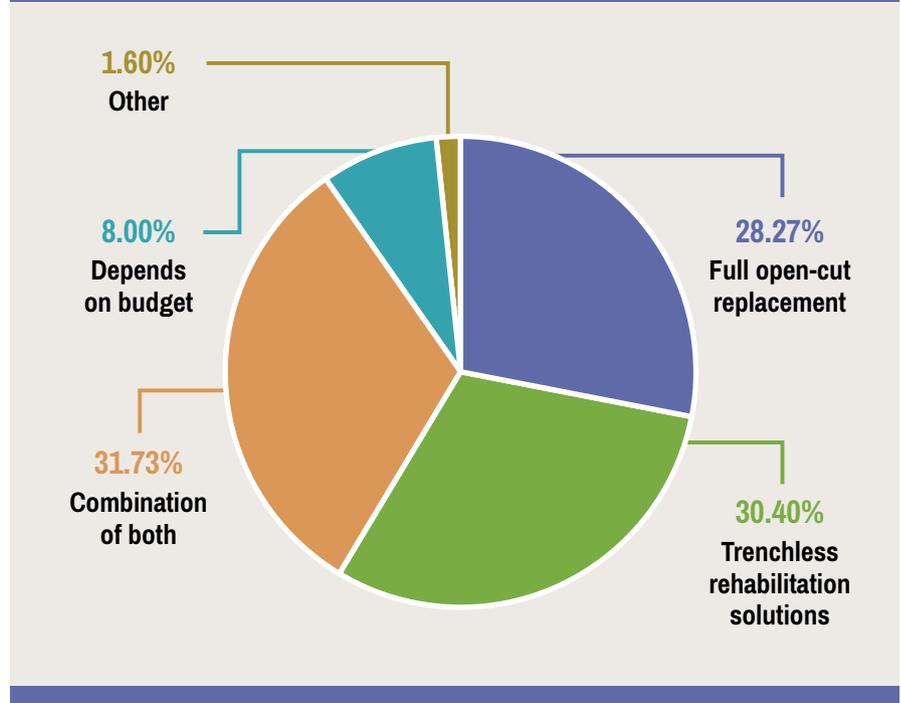


Figure 2: What are your municipal client’s priorities when replacing or rehabilitating their water infrastructure?

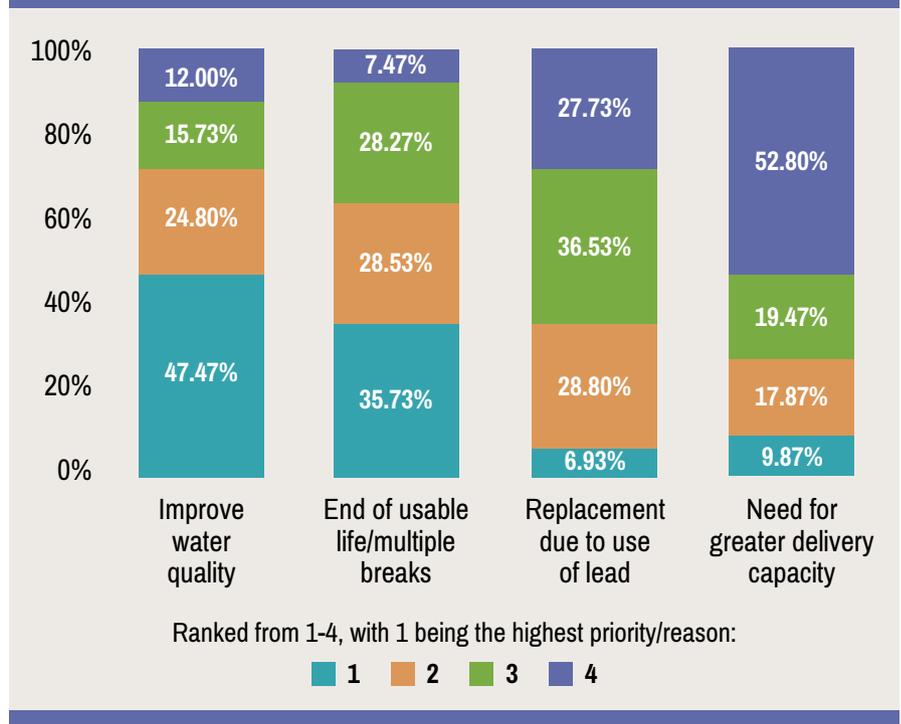
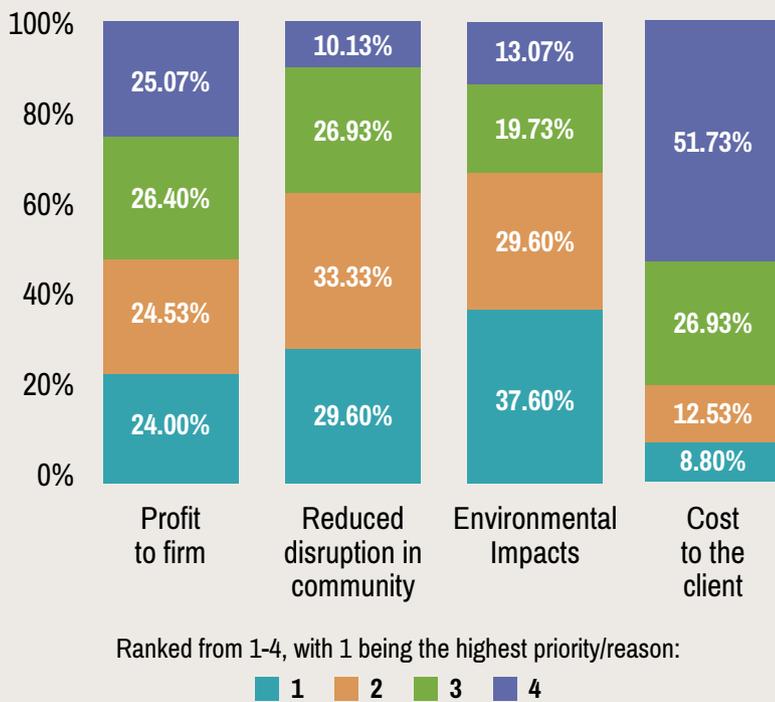


Figure 3: As a consultant, what are your priorities when selecting a technology for your client's replacement or rehabilitation of water infrastructure?



Once again, the environmental impacts were the top consideration.

Environmental benefits

When discussing linear water infrastructure projects with clients, do consultants ask clients to consider environmental benefits of a technology when selecting a method of replacement versus rehabilitation?

An overwhelming majority of respondents (96 per cent) indicated that environmental benefits are a concern for clients.

A variety of factors traditionally impact decisions around linear water infrastructure renewal.

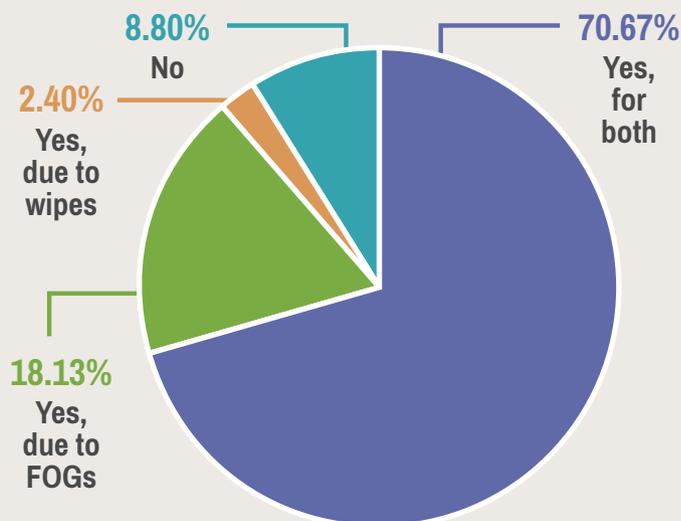
Waste management woes

A vast majority of respondents have had to recommend that municipal clients replace their linear wastewater infrastructure in the past 12 months due to clogs caused by FOGs (fats, oils, and greases) or flushable wipes.

Concluding thoughts

The results of this survey indicate strong preference for green and innovative linear water infrastructure technologies and should give consultants and engineers across Canada the confidence to encourage clients to see assess the big picture—the direct and indirect costs—when deciding on infrastructure solutions. wc

Figure 4: Have you had to recommend to a municipal client that they replace their linear wastewater infrastructure in the past 12 months due to clogs caused by FOGs (fats, oils, and greases) or flushable wipes?



Simran Chattha is the editor of Water Canada magazine.

Connie Vitello is the editor of the Environment Journal.

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UPCOMING EVENTS

ENSURING RELIABLE ACCESS TO SAFE DRINKING WATER

September 15, 2021

In Canada, the federal and provincial governments play an important role in setting and updating the guidelines and regulations needed to provide

reliable access to safe drinking water. This session will explore questions such as: what's working? What's not working? What more is needed?

ADVANCING MUNICIPAL CO-DIGESTION

October 20, 2021

Many stakeholders recognize that the amount of greenhouse gas (GHG) emissions entering the atmosphere need to be limited, if not reduced, given the negative implications of global warming. Since wastewater treatment plants generate a significant amount of GHG emissions, there's an opportunity

for municipalities to help reduce the overall emissions. This session will examine the benefits of municipal co-digestion, explore regulatory requirements and financing options for projects, and provide examples of municipalities that are currently undertaking projects.

INNOVATIONS IN STORMWATER MANAGEMENT

November 17, 2021

Stormwater management has been evolving over the past few years in Canada. This session will explore projects that have been undertaken to

improve traditional stormwater practices in Canada. It will also explore new approaches that have been developed to improve stormwater management.

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Building Resilience

Green roofs help Canadian cities adapt to climate change.

BY SASHA AGUILERA AND DR. KAREN LIU

GLOBAL WARMING increases the intensity and frequency of extreme weather events such as heatwaves, rainstorms, and hurricanes. This summer, China, India, Germany, Belgium, and the U.S.A. experienced unprecedented rains and catastrophic floods that resulted in loss of life and widespread damage. While floods are common in many parts of the world, climate change and rapid urbanization have exacerbated the problem. Stormwater management is a global challenge.

Low impact development (LID) mimics a site's natural hydrological cycle to manage runoff close to its source. As land is expensive real estate, designers are turning to the many rooftops, which make up 20-25 per cent of the land area in major North American cities. There is growing

interest in using green roofs, blue roofs, and blue-green roofs to manage stormwater in urban centres such as Toronto and Vancouver.

Traditional green roofs for retention

Green roofs are specialized roofing systems that support vegetation growth on rooftops. They provide a bounty of benefits such as improvements in air quality, biodiversity, urban heat island effect, and roof membrane longevity to name a few. They also deliver stormwater management by retaining rainfall volume in their components. Once these layers become fully saturated, their water storage capacity is reached, and excess rainfall leads to the roof drain as quickly as it falls on the surface of the green roof. Additional stormwater management benefits can be achieved

through rooftop detention mechanisms that function independently of green roof saturation levels.

Evolution of rooftop detention systems

There are different types of roof-based detention tools on the market. They all have one characteristic in common—they release water runoff at a reduced rate over a longer period of time to prevent the overloading of stormwater infrastructure. All solutions have their merits, and often a single project may benefit from multiple approaches.

Blue roofs pond water on a roof and slowly release it over time. Runoff is controlled through strategically localized flow restrictors (i.e., orifice restrictor, holes in an elevated drainpipe, or a mechanical valve that opens and closes using smart technology).



Green roofs form a part of this amenity terrace.



Typical system buildup for friction detention green roof and blue green roof.

Credit: K. Design

They are often the most economical rooftop detention tool. The technology was introduced in North America in the 1970's and while effective, blue roofs have some inherent disadvantages that have prevented them from becoming a popular stormwater water management solution. For instance, blue roofs require zero per cent slope to maximize water storage as even a one to two per cent

storage volume. Special attention must be paid to the waterproofing membrane type and installation technique to ensure warranties are valid. Lastly, standing water may pose a risk of disease and safety issues to maintenance personnel.

Blue-green roofs are exactly what their name suggests. They are essentially a traditional green roof with a blue roof basin below. The vegetated portion of the systems serves to filter runoff and provide all the benefits of a traditional green roof while the lower portion offers detention like a blue roof. Unfortunately, due to their similarity with blue roofs,

blue-green roofs end up inheriting most of a blue roof's weaknesses.

A nature-based approach

In nature, rainfall joins the nearest stream after travelling a laborious path crowded

with trees, plants, grasses, rocks, and fallen debris. These obstacles create friction which serves to slow down the rate of runoff. Using the principles of biomimicry, a traditional green roof can be re-designed to emulate nature's friction-detention mechanism.

Friction-detention green roofs delay runoff and reduce peak intensity at the drainage level over the entire roof surface. A friction-detention mat, which is made up of thousands of very fine vertical fibres sandwiched between two geotextiles, creates friction for the runoff. This mat allows small amounts of runoff to flow through unimpeded but slows down large volumes of runoff. As a result, runoff enters the roof drains at a slower rate over a longer time, which prevents overloading the storm sewers.

Friction-detention green roofs support living plants and provide all the benefits of traditional green roofs. Because the detention mechanism does not rely on single flow restrictors, it is

There is a growing interest in using green roofs, blue roofs, and blue-green roofs to manage stormwater.

slope can prevent the surfaces away from the drain from being fully utilized.

However, the National Building Code requires a minimum roof slope of two per cent to promote positive drainage, which greatly reduces a blue roof's water



While floods are common in many parts of the world, climate change and rapid urbanization have exacerbated the problem.

a flexible system that is better suited to more applications than blue-green roofs.

Friction-detention green roofs:

- Can manage back-to-back rainfall events and large intense storms regardless of antecedent weather conditions (i.e., even when retentive layers are completely saturated).
- Can be implemented on low-sloped roofs without losing efficiency and sloped roofs effectively.
- Can “recharge” or repeat detention performance within a short time span, usually within 24 hours.
- Are particularly economical on irregular shaped roofs where numerous roofs drains would require flow restrictors.

The research behind vegetated systems with friction-detention technology

Green Roof Diagnostics has conducted thousands of rain tests and research on

various blue-green systems.

Water fills and exists differently given a “traditional” system using simple drainage cups to expedite fast drainage, an “enhanced retention” system with a high performing water retention layer, and a “friction-detention” green roof with both retention and friction-detention layers.

Research has also been done to examine the effectiveness of the friction-detention green roof by comparing hydrographs from the same three systems in an actual rain test.

Calculating detention performance

A successful friction-detention green roof design requires collaboration from several disciplines. Civil engineers, architects, mechanical engineers, and landscape architects provide project-specific details (i.e., size, location, design storm, maximum allowable outflow rate, etc.). Using this input data, a proprietary detention

modeling program accurately predicts performance and calculates the appropriate green roof profile to meet detention and retention requirements.

Conclusion

A friction detention green roof combines retention and detention in a single system. This increases the stormwater management capacity per unit area of rooftop space and maximizes the ROI. It stores a large amount of rainwater to be evaporated back to the atmosphere and delays runoff reliably during heavy downpour to minimize flood risks. Adding detention to retention on green roofs better manages stormwater and increases resilience in our cities. **wc**

Sasha Aguilera is the design ambassador at Next Level Stormwater Management.

Dr. Karen Liu is the Green Roof Specialist at Next Level Stormwater Management.



Overcoming the ‘Yuck Factor’

Alberta pilot project produces beer made with treated wastewater.

BY JOHN TENPENNY

WATER IS A KEY INGREDIENT in the beer-making process. It's so simple, it's generally an afterthought. But what if it wasn't just any water, but the water that began its life being flushed down a toilet?

Water conservation was taken to a whole new level in the spring of 2020 in Calgary with a partnership between a local brewery, the University of Calgary and Xylem Inc., which produced a limited batch of 1,600 cans of Village Blonde beer using treated wastewater.

While the idea may be unique, the thought process behind it wasn't, says Christine O'Grady, program coordinator at the University of Calgary's Advancing Canadian Water Assets (ACWA).

"This beer shows that water reuse can be a safe and important part of our sustainable future," says O'Grady. "Wastewater can be treated using advanced treatment technology, making it into a reliable and safe water supply for many uses."

ACWA, an initiative of the Urban Alliance, is a strategic partnership between the university and the City of Calgary. Its research facility is integrated into the Pine Creek wastewater treatment plant and includes ultrafiltration and nanofiltration membrane modules, plus O₃ and H₂O₂ oxidation with and without UV.

Its purpose, says O'Grady, is "to advance best practice in water treatment—raising the bar as far as contaminants of concern, looking at environmental effects, encouraging innovation to do better and ideally helping the municipality to save money in the way that they treat wastewater."

The idea to produce beer with treated wastewater came from a lighthearted remark at a meeting where ACWA was discussing projects to collaborate on with water technology company Xylem.

"Yeah, we could make beer with the water. Why can't we make beer?" recalls O'Grady. "We had the technology. We had the treatment train,

Alberta's first beer made with treated wastewater was brewed as a collaboration between the University of Calgary's Advancing Canadian Water Assets (ACWA), Village Brewery, and Xylem Inc.

Christine O'Grady (left), program director at Advancing Canadian Wastewater Assets (ACWA) and Jeremy McLaughlin, head brewer at Village Brewery.



we just linked it all together.”

The project was enthusiastically embraced at Xylem.

“When we were approached about the idea, we thought it would fit neatly into Watermark, our corporate social responsibility program,” says Kevin Flis, client solutions manager at Xylem Digital Solutions. Flis adds that the company has a strong relationship with ACWA through

This beer shows that water reuse
can be a safe and important part
of our sustainable future.

its Calgary branch office. “Xylem is very dedicated to the water reuse industry as a whole because it’s aligned with our sustainability efforts, one of which is to

help communities achieve water reuse by optimizing global water management by saving more than 16.5 billion cubic meters of water through advanced technologies that avert water loss and enable water reuse.”

The ‘Yuck Factor’

ACWA then approached Village Brewery, a local company that is “very sustainably-minded,” according to O’Grady.

“There’s a mental hurdle to get over of how inherently gross this could be,” says Jeremy McLaughlin, head brewer at Village Brewery. “But we know that

this water is safe, we know that this beer is safe, and we stand by our process.”

Jackson Stuart, the brewery’s marketing manager, says Village was

excited to take part in a project that put sustainability front and centre.

“The big thing for us was to try and make sure that the beer tasted the exact same as our other normal Village Blonde and we achieved that. We’re confident.”

O’Grady concurs. “I understand the yuck factor, but I knew the technology that was treating [the water] was very safe.”

Alberta Health Services’ Safe Healthy Environments (AHS-SHE) provided guidance to the team as it created a water safety plan for the project. AHS-SHE supports safe and healthy communities, as set out under the *Public Health Act* and related legislation.

Before being sent to the brewery, the water was treated at ACWA using tertiary treatment technologies including advanced oxidation and nano-filtration. It was then tested to demonstrate that it met rigorous standards outlined by AHS-SHE for water reuse, including pathogen



Credit: Bill Brundage/University of Calgary

Calgary's Village Brewery produced 1,000 litres of its Village Blonde ale using treated wastewater.

reduction requirements, as well as Canadian Drinking Water Guidelines.

“With the right measures in place alternative water sources—such as wastewater, greywater, rooftop collected rainwater, and stormwater—can be made safe for many potable and non-potable end uses,” says Jessica Popadynetz, AHS public health inspector.

Municipal wastewater normally runs through a complex system involving screens, filters, microbes, and ultraviolet light to make it clean enough to return to Calgary’s Bow River.

The ACWA team took partially treated water from the plant and ran it through additional advanced treatment using ultrafiltration, followed by advanced oxidation (ozone plus ultraviolet treatment), then reverse osmosis.

The advanced oxidation system was Xylem’s contribution to the project.

“The unit was used to create an

effective barrier for removing viruses and bacteria from the water stream to disinfect it,” says Flis, “but also to remove any of what we call contaminants of emerging concern—essentially, items that are unregulated, but we are aware of their potential harmful impact, in particular pharmaceuticals.”

The ozone activation is only one part of the entire treatment train that included ultrafiltration membranes, followed by the ozone activation, followed by ultraviolet or UV disinfection, and finally reverse osmosis.

The beer went on sale on August 22, 2020, Earth Overshoot Day.

Earth Overshoot Day marks the date when humanity has supposedly exhausted nature’s budget for the year. For the rest of the year, our ecological deficit is maintained by drawing down local resource stocks and accumulating carbon dioxide in the atmosphere.

The project was undertaken from a mindset of promoting water reuse, she adds.

“Proper stewardship of water resources is critical to the planet’s sustainability, and water reuse can reduce the amount of fresh water required by some applications and decrease diversion from sensitive ecosystems,” says O’Grady. “ACWA is proud to lead by example and champion water reuse with our partners in this project.” WC

This article first appeared in the April 2021 issue of Plumbing & HVAC magazine and is reprinted with permission.



John Tenpenny is the editor of *Renew Canada*, Water Canada’s sister magazine.

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How digital transformation will make municipal water management more resilient.

BY STEVE MCDOWELL

ACROSS CANADA, municipalities must be ready for big growth—and big change. Increased immigration levels and housing booms outside of major urban centres mean municipalities of all sizes and in all corners of the country are preparing for unprecedented population growth.

At the same time, they face a tough road ahead to stay prepared. As a 2020 report from KPMG put it, “the clock is ticking on Canada’s municipal infrastructure.” The consultancy suggests that 13 per cent of the country’s core municipal infrastructure assets—including roads, pipes, and water treatment plants—are in significant decay and either unreliable or entirely unfit to meet current needs, let alone the future population growth this country expects to see in the coming decade.

It’s not a surprise that municipalities are in this position. Severe and often unpredictable weather is taking its toll on already aging infrastructure, while budgets are already constrained. The pandemic has only exacerbated the financial pressures municipalities are already facing.

But doing nothing is not an option.

The future resiliency of the country depends on strong communities that are ready to accommodate what’s coming. Municipalities’ willingness to modernize is vital, not only for keeping critical infrastructure afloat now, but for making our communities stronger and more sustainable as we grow.

The most forward-looking municipalities will be the ones thinking about how to use digital transformation to make smarter decisions, manage energy usage more effectively, and stay prepared for disruption.

Well-functioning, reliable water treatment facilities are vital for healthy, thriving communities. Inefficient facilities, on the other hand, can lead to wasted water, energy, and revenue loss. More importantly, even a few hours of downtime in a water treatment facility can create huge public health issues.

Over the past few months, we’ve seen encouraging announcements that recognize the importance of improving these aging facilities. Three levels of government have committed \$73 million in funding for upgrades to the regional wastewater treatment system for the

city of Winkler in Manitoba. In Quebec, the government is investing in a new water treatment plant for Drummondville.

While this kind of news is encouraging, it’s no secret that for most municipalities, budgets are a barrier. Competing priorities and limited resources make investment decisions difficult. To meet current needs and prepare for growing development, water companies must invest constantly to replace pipes, refurbish equipment, and expand their treatment plants, all while meeting increasingly stringent water quality standards.

However, advancements in digital technology and systems mean that critical industrial facilities like water treatment plants can modernize without the upfront CapEx investment you may expect. The Town of Midland in Ontario is one municipality that has recognized this and acted.

Not unlike other municipalities across the province and country, Midland’s water treatment facility had 35-year-old infrastructure in place. Its dated system couldn’t provide the data collection, monitoring, and analysis the



The most forward-looking municipalities will be the ones thinking about how to use digital transformation to make smarter decisions.

team needed to efficiently manage their energy needs and have confidence in the system's uptime.

This would be a challenge on its own, but added to that is the town's projected growth. Midland is part of a booming area of the province set to grow exponentially in the coming decade. In the town specifically, the population is predicted to increase by 25 per cent to 22,500 people by 2031.

A big part of this transformation is rooted in gaining access to information for smarter energy management.

As the influx of residents and development grows, demands on infrastructure will, too. As a result, the town is committed to "Building Midland's Future," including upgrading key infrastructure.

To deliver on that promise within its water treatment plant, Midland partnered with Schneider Electric to implement the EcoStruxure solution within its existing infrastructure. This has become the backbone for a modernized facility

that now consumes less energy and has lower operating costs, and where staff have greater visibility into how essential functions are performing.

A huge part of this transformation is rooted in gaining access to information for smarter energy management and better decision-making grounded in real-time insights. As part of the project, we upgraded the plant's SCADA, the system that gathers and analyzes real-time data to monitor and control equipment, plus integrated new, connected products and screens to better monitor its systems.

The idea is to get data flowing and then let workers harness it remotely, ultimately saving on labour and maintenance costs, with the facility performing at its best. Using digital tools to improve visibility into water systems lets operational and maintenance teams keep tabs on how the facility is operating, so they can stay ahead of any potential issues. Midland's operations team can proactively manage any red flags early, avoiding financial, health, and logistical consequences that come with downtime.

They can also spot opportunities to better manage their energy. Managing electricity usage is an increasingly important part of managing the total operating costs for a facility with industrial pumping systems like this one. With the right energy management practices, though, it's possible to reduce electrical consumption by at least 30 per cent, plus reduce maintenance costs—with minimal CapEx investment.

Take, as an example, how the plant now operates its motors, pumps, and aerators. These are critical assets within water treatment plants, but often dated and not optimized to work as efficiently as they could, depending on demand at certain times of days. These pieces of equipment are also big energy consumers, typically responsible for 60 per cent of electrical energy usage, on average, in industrial businesses. For a typical pump, energy costs represent 40 per cent of the total cost of ownership.

In Midland's case, the simple act of

updating the facility's motor control centre brought the entire plant forward 15 to 20 years, without a major capital expenditure investment. Adding variable speed drives on its aerators have reduced energy consumption by between 36 and 40 per cent. Installing the drives enables the aeration cells to control the amount of dissolved oxygen in each tank—the drive speeds up as the amount of oxygen drops and slows down once the desired amount is met, promoting greater energy efficiency and ensuring the right amount of oxygen is reached.

All of this has a major impact on the bottom line. By reducing operating and maintenance costs, facilities like Midland's can free up budget for much-needed, larger scale infrastructure updates that keep them prepared for future growth.

This project has also had an undeniable human benefit. The workers at Midland's plant are more engaged because they have greater insight into how their facility is performing—and confidence that they are making the best decisions possible. By providing a real-time view of what's happening across the plant, operators easily make changes and monitor the impact these changes have across operations. This information is then stored and available for all current—and future—operators to reference.

Embracing digital transformation within water management facilities may seem daunting, but as Midland shows, the results are worth it. More importantly, the benefits can be realized with incremental upgrades to existing infrastructure, not just through major CapEx investment.

With that in mind, there is no reason for municipalities not to capture the productivity, efficiency, cost savings, and sustainability benefits that come with digital transformation. In fact, it's essential for the resilience of Canada that they do. **wc**

Steve McDowell is a senior sales consultant for Schneider Electric Canada. He boasts more than 25 years of experience in electrical sales, primarily in Industrial Automation. Since joining Schneider Electric 15 years ago, he has worked on OEM and End User sales, with a focus on water and wastewater in recent years.



The wastewater reuse guidelines developed by the Alberta government are a first for the province.

Wastewater Reuse

Alberta issues new guidelines for dealing with wastewater and stormwater. **BY SAUL CHERNOS**

THE GOVERNMENT OF ALBERTA has issued new guidelines for municipalities, developers, irrigators, and other parties dealing with stormwater and wastewater on their projects and properties.

The Public Health Guidelines for Water Reuse and Stormwater Use set water quality objectives and provide guidance on how to evaluate and mitigate risks to health from using, reusing, reclaiming, and otherwise handling stormwater and wastewater.

Until now, outside of Alberta Building Code, National Plumbing Code and assorted municipal requirements, Alberta has had only minimal regulations or standards directly addressing reclaimed water. While some basic rules have been in place—for instance, disallowing

domestic use of reclaimed stormwater and wastewater unless approved by the local municipality—the new guidelines essentially introduce provincial public health criteria and considerations to the discussion.

Debra Mooney, an environmental public health advisor with Alberta Health, says the guidelines are rooted in frequent queries by municipalities, developers, and other stakeholders seeking clarity from three provincial government departments: Health, Municipal Affairs, and Environment and Parks.

“A lot of the questions were around risk assessment and how to protect health, so we formed a working committee, listened to their

questions, and incorporated that into our document,” Mooney says.

With considerable involvement from in-house personnel and independent specialists, Alberta Health reviewed available data, characterized factors such as microbial loads in different sources of water and wastewater, and calculated log reductions and other targets needed to set appropriate benchmarks.

The guidelines address microbiological health hazards for five potential health sources: municipal wastewater, greywater, stormwater, rooftop collected rainwater, and vehicle wash wastewater. The guidelines then list nine non-potable end uses where human exposure is probable: agri-food and non-agri-food irrigation, clothes washing, vehicle

The guidelines are meant to be exactly that: guidelines. They are not intended to be provincially legislated rules or standards, according to Debra Mooney, an environmental public health advisor with Alberta Health.



washing, dust control and street sweeping, cooling towers and evaporative condensers, toilet and urinal flushing, ornamental uses such as fountains, and recreational swimming and boating.

The guidelines recommend a water quality management plan approach, including an assessment from source to end use, for water reuse projects that present potential risks to public health. The document then outlines a process for developing a plan that includes performance targets for reducing

Mooney is quick to emphasize that the guidelines are indeed such, and not provincially legislated rules or standards. “It’s up to the municipalities to decide to what extent they want to use it.”

Smaller municipalities might choose to adopt the guidelines in their entirety, whereas larger municipalities might have sufficient staff and resources to perhaps use the guidelines as a reference in devising their own policies and standards. “It really depends on the capacity of each municipality,” Mooney explains.

“Development officers bring their expertise but often have no health expertise, so they turn to Alberta Health Services for comment. We’re just providing guidance around health risk assessment.”

The guidelines also recognize that factors such as stormwater systems and site conditions can vary considerably from one community or even one neighbourhood to another. Mooney says

that’s why it’s key to first assess and characterize the water and then design monitoring and treatment systems appropriate to a site’s proposed end use and related factors.

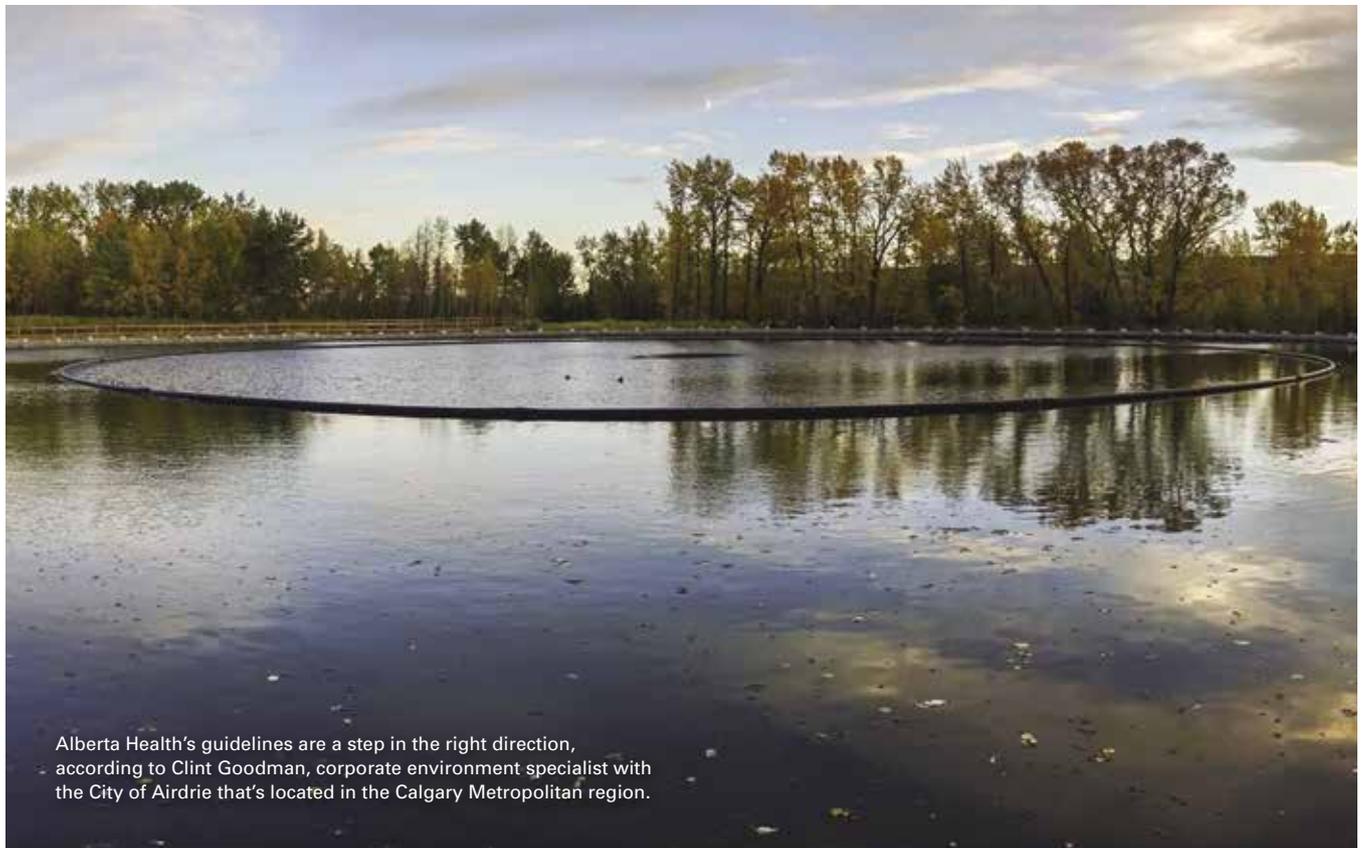
Measures might involve irrigating in ways that offer protections such as watering at off hours to reduce risks, and Mooney says the guidelines can help proponents address any potential challenges at the earliest possible stages of their projects.

Clint Goodman, corporate environment specialist with the City of Airdrie, located in the Calgary Metropolitan region, says the guidelines are a step in the right direction. Lacking direct access to sources of drinking water, Airdrie relies on potable supplies transported from Calgary, so there’s a strong incentive for water management and conservation. “The South Saskatchewan River Basin is closed to new water licenses,” Goodman explains. “So reusing and conserving water are critical in a growing region like Metro Calgary.”

Until now, Alberta has had only minimal regulations or standards directly addressing reclaimed water.

pathogens as well as ongoing monitoring and verification.

Municipalities, not upper levels of government, are ultimately charged with approving many of these proposals.



Goodman, who represents Airdrie on the Nose Creek Watershed Partnership, says his community has several stormwater management ponds with recirculating systems and fountains and he anticipates developer demand for reuse systems in order to meet stormwater volume control targets.

The guidelines recognize that factors such as site conditions can vary considerably from one community to another.

“We have a vested interest in protecting the watershed, considering the fast paced development, so stormwater use guidelines provide an actual level of direction and support some of the end objectives for protecting watershed health and the creek itself.”

Ultimately, Goodman says he would like to see the guidelines evolve into a provincial standard similar to the sanitary or potable water standards.

“It could be one step towards a standard, but that ultimately depends on the direction of the province.”

Alberta's water sector also has its eyes on the new guidelines. Tige Procyshyn of Landscape Irrigation Solutions, says industry stakeholders such as his company have long anticipated the guidelines. “We have been designing these pump systems for over a decade with limited or interim/draft guidelines and regulations.”

Still, as he absorbs the details, Procyshyn says he has numerous technical questions about details such as risk categories for various applications, the timing and logistics of irrigation, and water quality testing for faecal markers.

“The guidelines seem to be quite nonchalant about the possibility of up to 10 per cent of stormwater being raw human sewage,” Procyshyn says. “We’re struggling with (that) content classification.”

At Alberta Health, Debra Mooney acknowledges a cautious approach to the guidelines, which state that studies have found stormwater contaminated by raw human sewage at levels up to 10 percent. “Even in some of the newer areas, there can be contamination from sewage lines,” Mooney says, noting that stormwater and wastewater sources might appear to be relatively clean yet be affected unintentionally by leakage, cross connections, and even human error.

Still, Mooney says Alberta Health is anticipating and looking forward to feedback and questions. “It would be helpful to hear from [people] directly,” Mooney says. “This work is ongoing and the guidelines will be revisited as new information and research is available.” WC



Saul Chernos is a freelance journalist specializing in environmental issues.

The Wolastoq River is known as the St. John River in English and fleuve Saint-Jean in French.

A Collaborative Future

Moving towards the sustainable management of the Wolastoq River.

BY MOLLY DEMMA AND JAMYLYNN MCDONALD

IN 1966 author Esther Clark Wright wrote in her seminal work *The St. John River and its Tributaries*, “a river is something more than a feature of the landscape. Interesting as it may be aesthetically, geographically, geologically, what matters is its relationship to the people who come upon it and who live beside it. Who they are, where they come from, why they come, what use they make of the river, what kind of communities they develop, what they do to the river, what it does to them—these are the considerations that give purpose and vitality to the study of the river.” This resonates with many of us who value the spiritual, cultural, and natural values a river and its watershed provide.

The Wolastoq, which means beautiful river in *Wolastoqiyik*, winds its way from the state of Maine, collects water from Quebec, and travels through New Brunswick to the famous Bay of Fundy and the world’s highest tides.

The Wolastoq is a priority region for

the Government of Canada under the Pan-Canadian approach to transforming Species at Risk conservation in Canada and is a Parks Canada designated Canadian Heritage River. The Wolastoq is under the jurisdiction of the federal, provincial, and municipal governments along with NB Power, which manages most of the hydroelectric dams along its tributaries and mainstem. As an impounded system, the river plays a key role in the production of energy while providing critical ecological, social, and cultural benefits to plants, wildlife, and communities along its banks.

Like many places around the world, there are river stewards working toward the health, management, and betterment of this waterway—Rights Holders, governments, non-profit organizations, academia, and community groups are all working in this watershed. As elsewhere, these agents tend to act independently. This siloed approach is often detrimental to the long-term health of a waterway,

whose very nature is interdependence and connectivity.

A more holistic approach

The Ecological Limits of Hydrologic Alteration (ELOHA) framework is designed for impounded systems. It gathers knowledge to inform management practices for a given waterway, including e-flows data that describe the water quantity, quality, and timing that is necessary to support various organisms and life stages. It also includes social-cultural data that describe flow needs from a human perspective. Often, management frameworks are grounded in either environmental science or social science and use that information to make decisions. This can highlight usage conflict points but does not necessarily lead to sustainable management decisions. An extensive literature review revealed that the social-cultural component of the ELOHA framework has been difficult to complete,

There are river stewards working toward the health, management, and betterment of the Wolastoq River.



and many jurisdictions had small successes. Could we do any better? We had one thing going for us—the Maritimes is small, people are friendly and want to help, and everyone knows everybody. Could we use this to our advantage?

The group of five project partners decided it was worth a shot. We received project funding and moved ahead tapping into the vast experience and expertise in our region by identifying a Project Advisory Committee. With the people and funding in hand, we were ready to start.

The ELOHA framework has two components that feed into it—the environmental piece and the social-cultural piece. The environmental factors associated with the Wolastoq were continuing to be developed by researchers through the Mactaquac Aquatic Ecosystem Study (MAES) and the Canadian Rivers Institute (CRI) at the University of New Brunswick. These researchers first identified the

ELOHA framework as being suitable for the Wolastoq.

The task at hand was to determine how we could successfully collect the social-cultural data in English and French, since we are the officially bilingual province, to feed into the framework. The group determined we needed to collect two different sources of information: usage data from Rights Holders and stakeholder groups, and values and perception information from the public using Ecological Goods and Services research as the base.

We started with usage data and worked up a plan. The project used Maptionnaire, a mapping software, to develop usage-based questions that correlated with GIS layers and began working toward a series

of meetings along the length of the river. By March 2020, we were ready to schedule our in-person meetings. The cookies and tea were ordered, and then the world shut down. The lesson we learned is that

Diverse and interdisciplinary backgrounds played an important role in envisioning a better way to manage the river.

technology is very often a good thing, and meetings were held online with enthusiastic participation, waving of fingers at the map on the screen, and sharing of critical information about how groups and their members use the river in different geographical locations. This information was then

The Wolastoq winds its way from the state of Maine, collects water from Quebec, and travels through New Brunswick to the famous Bay of Fundy, home of the world's highest tides.



overlaid with the environmental data to determine areas of potential conflict between plants, wildlife, and people.

The other piece of information to collect was the public's values and perceptions of the Wolastoq. In consultation with the Project Advisory Committee, literature and other experts, the group determined that an online survey, advertised through Facebook was the best choice. The data told us this was the social media platform of choice for New Brunswick and Quebec residents. A survey of 10 questions was developed and targeted to river residents in New Brunswick and Quebec. While 200 respondents may not sound like a lot, remember we are a small place.

The project took the social data, aggregated it with the previously collected environmental data, and screened it for potential management impacts. This data aggregation can be used to identify areas of potential improvement between environmental

needs and human activities, where a shift of how the resource is managed could result in improvements for all.

At the end of this three-year project, we can tell you a few things. First, our hypothesis about a small place yielding big things proved true. Diversity and interdisciplinary backgrounds of the project management team, partners, and the overseeing Project Advisory Committee allowed for a range of environmental, cultural, and social perspectives. They also played an important role in envisioning a better way to manage the river.

Second, our goals at the beginning of the project seemed simple: collect data, strengthen relationships, and complete the framework. But simple things often become complex: competing uses and values, climate change impacts, water quality and quantity in an impounded system, and its impact on the flow regime all contributed to the challenges.

Third, if we never have another Zoom meeting again, that will be great. We can't wait to have a cup of tea in person with these caring groups. They are collectively moving toward the common goal of creating a framework for a healthy and resilient watershed using their scientific expertise, sense of place, and desire to make their communities the best they can. *wc*

The authors acknowledge the contributions of all the project partners and funders.



Molly Demma is the executive director of The St. John River Society, a non-profit in Fredericton, New Brunswick.

Jamyllynn McDonald is a climate change project coordinator at ACAP Saint John.



There are three important elements to consider when using the term 'innovation' in the water industry.

Innovating in the Blue Economy

What does the term innovation mean? BY SIMRAN CHATTHA

INNOVATION IS A TERM that is widely used in the water industry when talking about technologies, processes, and projects. Although the term is ubiquitous, there isn't a consensus about what it means.

During Water Canada's webinar on Innovating in the Blue Economy, Actual Media's **Todd Latham** hosted a discussion about what innovation means in the context of the Blue Economy.

Currently, predominant definitions of the term Blue Economy are synonymous with ocean resources. Our team at Water Canada believes that this definition of the Blue Economy is too narrow and that it needs to be expanded to encompass the broader water sector.

Building on this, **Kariann Aarup**, director at AquaHacking, **Jeanette Jackson**, chief executive officer of Foresight, **Rahim Kanji**, executive director of the Ontario Water Consortium, and **Steven Liss**, vice president of research and innovation at Ryerson University, provided some

context and definitions for how they use the term innovation.

For Kanji the definition of innovation has to do with the context that it's being used in.

"I think fundamentally we all know that there are a lot of different water challenges related to quality, quantity, accessibility, reliability, affordability, and so on," says Kanji. "Fundamentally, we also want to tackle these challenges and we want to do that by applying novel tools and novel approaches."

"I think that that's not just limited to technology, but also approaches to new revenue models or new project delivery models or progressive policy or regulatory sandboxes," adds Kanji. "The driver of that is we're doing this to tackle those problems. We're also doing this

to achieve some sort of economic advantage, achieve an environmental advantage, or to maximize scarce resources."

For Jackson, the definition of innovation has to do with an improvement in a process, product, or service that leads to an improvement in performance.

"Performance has to do with sustainability for Foresight and

Transforming business models is as important as developing novel tools and technologies.

all of our ventures, but also other socioeconomic opportunities," says Jackson. "If you look at the Sustainable Development Goals (SDG) goals, there's a lot of innovation that will be required

for us to check all the boxes in terms of a holistic, comprehensive, inclusive, diverse approach to tackling climate change and a lot of broader issues.”

Jackson also supports Kanji’s comment around business models. She notes that there’s a perception that innovation has to do only with technology, but business models and the transformation of how we do things is equally important.

From Liss’ perspective, the term innovation isn’t as bold or aspirational as it needs to be.

“Innovation is a very powerful word and I think we need to really reset that particularly when we think about the intractable and the significant challenges with regards to our water resources,” says Liss. “When I think about innovation, I think about harvesting new ideas, a novel combination of ideas, and new insights that make new opportunities but more importantly, achieve breakthroughs in

addressing those intractable challenges and problems.”

“I also think there’s an obligation,” adds Liss. “Water is a vital resource and there’s a service that water provides with respect to sustaining our natural resources [...] Innovation should extend not just the technical elements of this, but the way we actually undertake the processes that lead to new solutions.”

Aarup noted that innovation can also come from recognizing what you don’t know and working with partners to identify solutions for common challenges. She provided an example of an NGO partner of an AquaHacking Challenge that indicated they didn’t really know what was going to come of the partnership and what they were going to hear from students participating in the Challenge. What the individual found was that the students turned the problem on its head and the opportunity became a spark for innovation to happen.

All in all, while a definition of innovation for the water industry hasn’t been established, industry experts have provided some considerations for a potential definition. It could include:

- ① The application of novel tools, ideas, and/or approaches that help address difficult challenges and problems.
- ② An improvement in a process, product, or service that leads to an improvement in performance.
- ③ Opportunities for collaboration that provide a different perspective to help address common challenges.

These three elements will help individuals working in the water industry become more precise about what we mean when we use the term innovation. **WC**

Simran Chattha is the editor of Water Canada.



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Improving data access is a priority and doing so is a major undertaking that requires systems changes and cultural shifts.

Open Access Water Data

As DataStream comes to the Great Lakes region, Carolyn DuBois reflects on the importance of open access water data.

HOW DO WE BUILD A FUTURE where we have the data necessary to make confident, transparent, and inclusive decisions to protect freshwater? This question is what drives our work on DataStream—an open access platform for sharing water data.

In growing DataStream over the last few years, we have had the privilege to meet some of the most extraordinary and passionate people working from coast to coast to understand and protect freshwater health. To date, over 135 organizations have collaborated with us to openly share their findings on DataStream. We now have more than five million observations from over 10,000 sites across Canada.

As we prepare for the fall release of our fourth regional hub, Great Lakes DataStream, we have been reflecting on water data availability today and what is needed to support more open data flows.

Data access issues continue to hinder freshwater research and decision-making

There is a rich diversity of water monitoring and research underway across the country. This includes government and academic programs and increasingly, sophisticated community-based programs run by watershed groups and Indigenous Nations and organizations.

The data collected by this complex web of efforts is invaluable. However, the very qualities that make these initiatives so impactful—the diversity of organizations collecting data and their distribution across landscapes—also pose challenges for managing the data they generate.

It can be difficult and, in some cases, impossible to pull together data collected by such a wide range of initiatives in order to answer basic questions about

the health of watersheds. In its 2020 Watershed Reports, WWF Canada was unable to provide health scores for 60 per cent of watersheds due to a lack of available data. Importantly, this does not necessarily mean the data does not exist, but simply that it is inaccessible or is provided in formats that make it unusable.

This lack of access to structured, usable data imposes a major burden on researchers and decision-makers across sectors. For example, we have heard from some researchers working on watershed models that they can spend up to 50 per cent of their time finding and formatting data before getting down to their real work. These data scavenger hunts turned repetitive data-formatting missions are replicated by researchers again and again across the country, often while working on the very same datasets.

In other cases, though data are available, they may be unusable. A 2016 study in *Water Research* by United States Geological Survey researchers illustrates the potential economic loss when data is not well described. The study examined 25 million nutrient records collected since the late 1800s by hundreds of organizations in the United States to determine their reusability or “secondary use.” The authors found that more than half of the records had ambiguous metadata and they estimated the value of these ambiguous records to be \$US 12 billion.

These data management challenges are frustrating, inefficient, and a major hindrance to our collective ability to understand and respond to environmental changes that are increasingly complex and have severe impacts on our lives and livelihoods.

Advancing openness in water science

The need for ready access to data was recently highlighted in the recent Environment and Climate Change Canada (ECCC) *What We Heard* report, which summarizes stakeholder engagement about the formation of the Canada Water Agency (CWA). When 2,700 people ranked 10 potential objectives to enhance freshwater management in Canada, having “data and information... available to support informed decision-making at all levels” came in second. The report goes on to state that “comments frequently underscored the importance of access to reliable freshwater data through increased sharing and access to open data.”

Lack of access to structured, usable data imposes a major burden on researchers and decision-makers.

Clearly, improving data access is a priority and doing so is a major undertaking that requires systems changes and cultural shifts. Thankfully, these shifts are underway. Governments at all levels in Canada and around the

world are adopting open by default policies, while funding agencies and journals are requiring open sharing of datasets as a mandatory requirement for receiving funding or acceptance for publication.

These top-down levers are important in driving change and are more often than not supported by researchers. In the 2019 State of Open Data Survey of more than 8,500 members of the research community “69 per cent of respondents think that funders should make the sharing of research data part of their requirements for awarding grants” and “67 per cent of respondents think that funders should withhold funding from, or penalise in other ways, researchers who do not share their data if the funder has mandated that they do so.”

While these high-level drivers are key to achieving more open access to water data, it is equally important that resources are available to help organizations of all sizes adapt and build internal capacity for managing and sharing data. This is true across sectors and certainly true for community-led efforts.

Supporting community monitoring supports more collaborative, responsive water management

Across Canada and around the world there is a growing movement of community-based water monitoring and research initiatives. These programs are grounded in local concerns and priorities and are driven by individuals and organizations with a very real, vested interest in safeguarding their local waterways. For this and many other reasons, organizations including the Our Living Waters network

have consistently been highlighting the importance of community water monitoring. This will continue in the fall, with the release of the *Business Case for Community-Based Water Monitoring in Canada* report.

The new report examines the cost-effectiveness and value to Canadians of local organizations understanding what is happening to their lakes, rivers, and streams and using data to inform decisions.

Increasingly community programs are interested in openly sharing their data and at DataStream we work with many of these groups to help make this happen. For example, as part of the Great Lakes DataStream Data Drive we are offering tailored one-on-one sessions with our Data Specialists to address the necessary but often nitty-gritty questions that must be answered to arrive at comprehensive and unambiguous datasets.

In other cases, we collaborate with other platforms to make data as open as possible. Our most recent collaboration is a great example of this. In 2021 DataStream began working with Water Rangers, which equips communities with the tools to actively monitor and manage their waters, in order to accelerate data sharing in the Great Lakes region. This collaboration means that data uploaded to Water Rangers’ platform by community groups will feed directly into Great Lakes DataStream, where it can be accessed by decision makers and scientists.

All of the extensive work being done by the water community across Canada to generate and openly share data is very exciting. Among other things, this paves the way for community data to be used in decision-making at all levels, both now and in the future. This could be transformational. Having data flow this way could build and reinforce lines of communication from the local to regional and national levels, fostering a more collaborative approach to managing water—one where we have the data necessary to make confident, transparent, and inclusive decisions to protect freshwater. WC

Carolyn DuBois is the executive director of the Water Program at DataStream.

APPOINTED



JACKIE PAGADUAN

Actual Media is pleased to announce that **Jackie Pagaduan** has joined the company as business development manager for Water Canada and Environment Journal.

“I’m excited to be working in the water and environment industries,” said Pagaduan. “My previous work experiences have naturally led me to my new role at Actual Media.

“As the business development manager of Water Canada and Environment Journal, I’m looking forward to connecting with key players in the water and environment industries,” added Pagaduan. “I’m also looking forward to learning more about the great work that’s being done. In turn, I hope to make a positive impact in these industries through my work!”

As business development manager, Pagaduan will be working with marketers in the water and environment sectors to build effective and creative programs that utilize Actual Media platforms to deliver a range of marketing solutions, from showcasing innovative thought leadership, to lead generation, increased brand visibility, and more.



CHRIS HUNTER

GHD has appointed **Chris Hunter** executive general manager for Canada. He previously served as the firm’s regional general manager for Ontario.

Hunter’s experience includes civil engineering, municipal water, wastewater, and other infrastructure projects. He has been with GHD since 1999. During his tenure as regional general manager for Ontario, GHD was recognized in 2019 as one of the Waterloo area’s top employers.

“I am honoured to have the opportunity to lead our Canadian team,” said Hunter. “We recognize the urgent need to ensure our communities are made sustainable for generations to come. We have a renewed focus

on behaviours, social values and environmental footprint.”



MICHELLE EDKINS

The International Institute for Sustainable Development (IISD) has welcomed **Michelle Edkins** as the chair of its Board of Directors.

Edkins, a managing director at BlackRock, has been an active member of the IISD board since 2016. She takes over from **Alan Young** who held the role for 6 years.

“I’m honoured to step into this new role as chair of the board at IISD,” said Edkins. “Over the past five years, I’ve seen the organization accomplish huge strides forward in sustainable development, even throughout the COVID-19 pandemic. I’m excited to be part of this next chapter.”



MARGUERITE XENOPOULOS

Aquatic scientist Dr. **Marguerite (Maggie) Xenopoulos** has been appointed a Tier I Canada research chair (CRC) in Global Change of Freshwater

Ecosystems at Trent University.

“The Canada research chair appointment recognizes and solidifies Professor Xenopoulos’ reputation as a global leader in the field of freshwater ecosystems,” said Dr. **Cathy Bruce**, vice president of research and innovation at Trent University. “Her research program is vital to better understanding how aquatic ecosystems are responding to global change. As the first female Tier 1 CRC at Trent, Professor Xenopoulos serves as a role model for young researchers, particularly women and other under-represented researchers, who dream of following in her footsteps.”

As a CRC, Xenopoulos, a biology professor at Trent, will continue her research on the effects of human activities on the biogeochemistry and function of aquatic ecosystems. Her research will explore the pressures of climate change, floods, land use effects, nutrient pollution, and other stressors on lakes and rivers with a particular focus on carbon.



MATTHEW SUTTON

Matrix Solutions, an environmental consulting firm headquartered in Calgary, has hired **Matthew Sutton** as president and chief executive officer.

“When looking for our next CEO, our Board of Directors conducted an extensive search for a candidate with broad environmental industry experience across many sectors and substantial executive leadership expertise,” said **John Feick**, board chair of Matrix Solutions. “Matthew possesses both and was the enthusiastic and unanimous selection.”

Sutton brings more than 30 years of experience leading organizations at the intersection of environment, energy, and economic development.



JOANNE VANDERHEYDEN

Joanne Vanderheyden was acclaimed as president at the Federation of Canadian Municipalities’ (FCM) virtual 2021 Annual Conference and

Trade Show.

The long-time mayor of Strathroy-Caradoc, Ontario succeeded Prince George, B.C.’s **Garth Frizzell**.

“President Frizzell has been an extraordinary leader for us in extraordinary times,” said Vanderheyden. “Through these difficult months, FCM has secured vital progress for municipalities at the federal level—from funding to protect frontline services to rapid housing solutions to recovery-supporting investments in transit, rural broadband and infrastructure. That’s a testament to Garth’s leadership and it sets a high bar for FCM’s work in this crucial year ahead.”



DAVID LINDSAY

The Government of Ontario appointed **David Lindsay** as the new chair of Infrastructure Ontario. Lindsay previously held the position of deputy minister at the Ministries

of Energy and Infrastructure, Northern Development, Mines and Forestry, Natural Resources, and Tourism and

Culture. He also served as the principal secretary and chief of staff to the Premier of Ontario from 1995 to 1997.

Following this role, he was president and CEO of the Ontario Jobs and Investment Board from 1997 to 1999, and president and CEO of the Ontario SuperBuild Corporation. He is also the former president and CEO of the Council of Ontario Universities, the Forest Products Association of Canada, and of Colleges Ontario.

“Mr. Lindsay’s significant experience and leadership will be a great asset as we continuously strive to be a world-class agency helping the government create a more connected, modern, and competitive Ontario,” said **Michael Lindsay**, president and CEO of Infrastructure Ontario.



MIKE SAVAGE

Halifax Mayor **Mike Savage** was elected by his peers as the Federation of Canadian Municipalities’ (FCM) chair of the Big City Mayors’ Caucus

(BCMC). He will succeed Edmonton Mayor **Don Iveson**, who held the position between 2016 and 2021.

“It is an honour to be named as next Chair of FCM’s Big City Mayors’ Caucus, and I am well aware of the responsibility that comes with it,” said Mayor Savage. “The past months have been challenging for our cities but much has been accomplished. We have worked hard to keep our citizens safe in the face of these unprecedented pressures.

“Now as we look to a post-Covid recovery this caucus—the cities that represent the economic engine of Canada—knows the work ahead of us,” added Savage. “We will continue to engage and collaborate with our federal partners to ensure that our recovery is inclusive, strong, and long lasting. Like my colleagues I am indebted to Mayor Don Iveson for his leadership and incredible work on behalf of all Canadians.”



SEAN CONNOR

XPV Water Partners announced that it has appointed **Sean Connor** as its new chief financial officer.

“We are very excited to have Sean join the team as we continue to grow and expand our capital base,” said **David Henderson**, managing partner of XPV. “His deep and extensive experience in leading and growing financial and fund operations will make an immediate impact.”

According to XPV, Connor has a long and distinguished career in finance with more than 20 years of progressive and diverse industry experience in private equity, financial services, and corporate finance.

Most recently, Connor was the chief financial officer, chief compliance officer, and partner with the private equity firm Whitehorse Liquidity Partners where he was responsible for finance and operations. Sean previously worked with two of the largest Canadian pension plans, CPP Investments and Ontario Teachers’ Pension Plan. **wc**



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A leaking pipe causes a chain reaction of consequences.

Hidden Leakages

BY NADIA TODOROVA

A MASSIVE AMOUNT of drinking water is being pumped into the ground due to leaky and broken pipes, a recently released study by the Residential and Civil Construction Alliance of Ontario (RCCAO) found.

Tamer El-Diraby, a professor in the department of civil and mineral engineering at the University of Toronto, prepared the study, which confirmed that our water infrastructure is aging and in dire need of repair.

The study indicated that many Ontario municipalities report an estimated leakage rate of at least 10 per cent. However, it also noted that reports by consultants who conducted actual assessments show that rates in Ontario could be as high as nearly 40 per cent. An analysis for the Town of Smiths Falls estimated that leakage rates between 2003 and 2019 ranged between 41 and 67 per cent.

The City of Toronto has consistently reported a leakage rate of 10-15 per cent, which means it wastes 103 million litres a day—equivalent to supplying the

daily demand of a system servicing a population of about 250,000 people or filling more than 15,000 Olympic-sized swimming pools with water every year.

It is difficult to put an exact dollar figure on how much money is being wasted due to leakage, as many municipalities do not consistently collect that type of data. But it is substantial. A leaking pipe causes a chain reaction of consequences. More energy is needed to pump the water to homes and businesses and, as a result, more carbon emissions are also emitted in producing that power.

A hole in a water pipe as small as 1.5 millimetres can waste up to 3,570 litres of water in 24 hours and cost \$14.54 a day. A nearly five-millimetre hole can waste 32,130 litres in 24 hours and cost \$130.88 a day.

There has been significant progress in asset management awareness and mastery of best practices in Ontario. However, there is more work that needs to be done. The typical age of a failing watermain is 50 years and the study found that in Toronto 13 per cent

of the more than 6,000 kilometres of watermains are 80-100 years of age and 11 per cent are more than 100 years old.

Underground water infrastructure is often out of sight, so it usually doesn't get the same attention as a deteriorating road or rusting bridge. However, it is essential to keep our systems in good repair as inadequate investments will only lead deteriorating assets that can cause public health issues.

Governments must provide sustained funding to fix and replace these critical water infrastructure assets as well as embrace new asset management practices and new smart technologies.

It is incredibly inefficient and almost singlehandedly defeating our water conservation goals when treated drinking water never makes it to the taps because of leaky pipes. **wc**



Nadia Todorova is the executive director of the Residential and Civil Construction Alliance of Ontario.

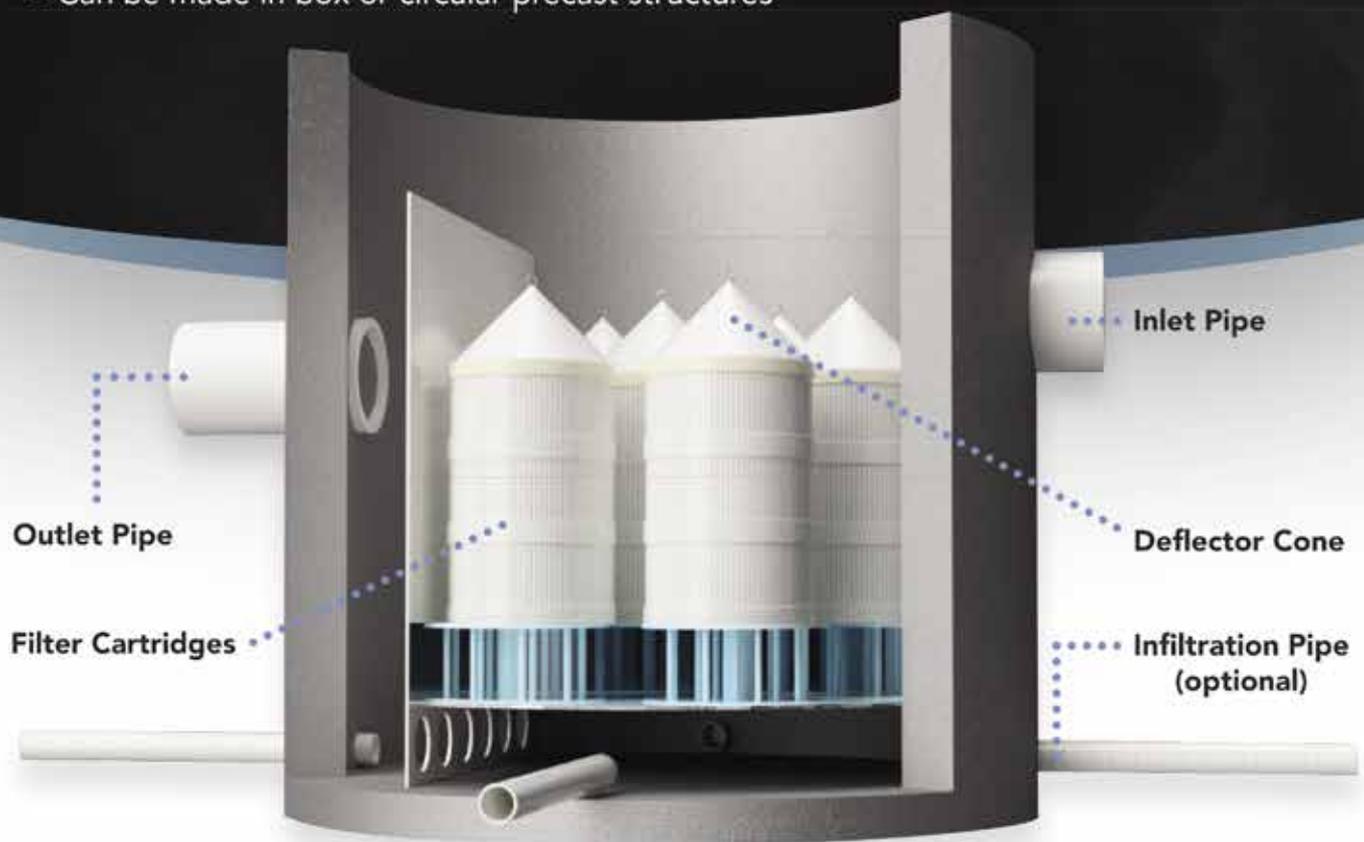
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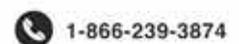
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