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Onsite

ONTARIO ONSITE WASTEWATER ASSOCIATION NEWSLETTER

treatment | technology | innovation | reuse | recycle

Ontario Onsite Wastewater Association

INSIDE

Ontario Onsite Wastewater Association

Precast Tanks Paired with Advanced Filtration a Win for Homeowners

A precaster in Ontario provided a complete residential onsite wastewater solution that installs quickly, reduces the overall footprint and provides the homeowners with peace of mind for many decades to come.

By Kirk Stelsel, CAE
National Precast Association

Concrete's primary components are coarse and fine aggregates, cement and water. While there are other elements added to modern mix designs such as admixtures, fibers and sometimes even color, the four primary ingredients can be found in every batch of concrete. It's only fitting, then, that an engineer and homebuilder are using precast concrete tanks with advanced filtration systems to meet stringent effluent requirements for a new subdivision being built around a lake that was once an aggregate mine.

From mine to mansions

Driving through Heritage Lake Estates in Puslinch, Ontario, it's hard to imagine it was previously home to a steady stream of heavy equipment and dump trucks. Today, well-manicured lawns, picturesque greenspaces and homes torn straight from the pages of magazines dot the shoreline and area surrounding a lake that is now ready for fishing, boating and swimming.

Story continues page 3

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PROTECTING OUR ENVIRONMENT

PRESIDENT'S MESSAGE

What a year 2020 has been! As many of you are, I am looking forward to what positive changes 2021 will bring. Going into the winter, our industry continues to be less affected by the negative financial impacts and slow downs that have afflicted other areas of our economy. The products and services that our members provide are indeed an essential service to rural Ontario.

Despite the challenges thrown at us by COVID 19, OOWA has carried on our work providing value for our members. Earlier this year we launched the association's new website! Check it out: **www.oowa.org.** Based on feedback from members, the Onsite Technical Committee has begun work on Flow Distribution and Site Evaluation best practice documents with drafts targeted to be ready in early 2021.

With the recent shift to virtual environments, OOWA has established an Online Resources Committee. The goal of this committee is to develop on-line information sessions, webinars and other digital tools that will engage and educate our members.

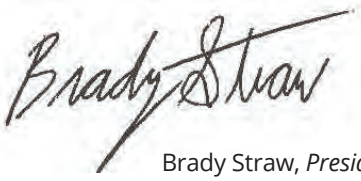
Our Professional Development Committee continues to fill the gap in course offerings for our Registered Professional Program by developing courses for regulators.

The External Relations Committee continues to advocate for decentralized systems by working to compile details and testimonials about their proven efficacy and how these systems can help solve municipal planning issues. Committee members are also representing our members interests in the ongoing consultations regarding the transformation of the administration and enforcement of the Ontario Building Code.

As you all know by now, our Events Committee is working on making our 2021 Convention and Expo a virtual experience. We are still accepting presentation proposals and would be keen to hear from our members about any interesting installation projects or technical case studies that you feel others would learn from. Please contact us with your ideas.

OOWA looks forward to finding ways of connecting with members without being able to do so in person. Our staff and volunteers have certainly missed the camaraderie that comes with our Regional Meetings and Burgers and Beer events. Most of all we'll miss seeing everyone in the convention expo hall, the information sessions, and hospitality suites of our annual gathering.

On behalf of all OOWA volunteers and staff we wish you and your family all the best of the holiday season. Stay healthy and stay safe. We'll see you all again in 2021.



Brady Straw, *President*

OOWA - Board of Directors

Ontario Onsite Wastewater Association

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The opinions expressed in this newsletter by contributing authors are not necessarily the opinions of OOWA's Board of Directors or the Association.

Submit an article or place an advertisement

Contact the editor at
outeach@oowa.org

PRECAST TANKS PAIRED WITH ADVANCED FILTRATION A WIN FOR HOMEOWNERS

A new housing development required advanced filtration for its sewer system. *Photo courtesy of Unit Precast.*

Not that long ago, though, the lake was a quarry, and those lawns were roads for heavy equipment coming and going. Once mining operations subsided, the pit became the lake that now serves as the heart of the development. Natural ecosystems and wildlife have reclaimed the spaces not occupied by homes, creating a scenic, natural allure that has drawn in homeowners.

A housing development, however, is much more than just homes. The infrastructure needed to supply water, power and treat waste must be designed to meet the demands of future homeowners and the needs of the land while complying with all applicable codes.

Residents of Heritage Lake Estates are relying on Timberworx Custom Homes to turn their dream homes into reality. Timberworx, in turn, relies on Van Harten Surveying, a professional land surveying and engineering company, to take the architectural house plans and site them on the properties to ensure they comply with the zoning requirements and determine the drainage characteristics of the soil.

Since homes in the subdivision are not connected to a sanitary sewer line, each property is privately serviced. *Photo courtesy of Unit Precast.*

This important work leads to a critical consideration for the homes being built for the development – how they handle wastewater. The houses are not connected to a sanitary sewer line, so each property is privately serviced. As part of Van Harten's engineering work for the development, it designs and specifies the wastewater system for each house. Many factors come into play, including the fact that the houses are taking up the maximum 20% of each lot space, leaving limited room for the wastewater disposal bed. Van Harten also takes into account a potential future pool or amenity area on the property. Finally, the system must meet a requirement for an extraordinarily high level of sewage treatment.

"We're putting together a complete detailed site-grading, site-sewage-design drawing and a report that our client uses to get a permit to start building the house," said John Duffy, a consulting engineer with Van Harten. "With septic systems, it's traditionally a septic tank and a leaching bed. In most of the subdivisions that we do work in, as part of the hydrogeological work that is done, the calculations tell the developer that instead of a standard septic tank system they have to install an advanced sewage treatment system."

Nitrate is a concern due to Heritage Lakes being a rural development, and Ontario has a 10 mg/L limit for nitrate in groundwater. As the effluent seeps into the ground in the subsurface disposal bed, it enters groundwater and could impact drinking water in surrounding neighborhoods. The result of the hydrogeological study for Heritage Lakes set the target effluent nitrate concentration at 14 mg/L, which dictates the need for an advanced treatment system.

The soils in the Heritage Lakes development vary greatly as well, from native gravel that was not mined and allows for a small filter bed to much less permeable native soil that requires an area bed or a shallow buried trench bed. As a result, each lot's system is unique.

Beyond the basics

While it was clear the residents of Heritage Lakes Estates would need more than a standard wastewater system, the needs of this development exceed what most advanced systems provide. Duffy said most systems typically achieve a 30-50% nitrate reduction. In this particular development, however, the engineering identified that the system needed a 65% reduction of nitrate concentration in the effluent. As homebuilding got underway, Van Harten turned to Unit Precast in Breslau, Ontario, thanks to a longstanding relationship. Unit Precast is able to supply the homes with the high quality precast concrete tanks paired with an advanced filtration system that would meet the treatment requirements.

PRECAST TANKS PAIRED WITH ADVANCED FILTRATION A WIN FOR HOMEOWNERS

With stringent nitrate requirements and varying soil conditions, a new housing development in Canada used precast concrete for its on-site systems. *Photo courtesy of Unit Precast.*

In January 2017, the development was thrown a curveball when the Ontario Building Code was changed, which meant the treatment systems needed to meet the new CAN/BNQ 3680-600 reference standard. Unit Precast prides itself on meeting the customer's needs from start to finish and was able to pivot quickly in order to continue its work in the development.

"Unit Precast's way of doing business has always been to provide installers with a complete solution so they can focus on excavation and disposal and not on the technology standpoint," said Scott Robinson, managing director of Unit Precast. "We provide a complete, full package including the precast concrete tanks, all components fully plumbed and wired and ready for backfill, along with full startup and commissioning services and after sales support and service. That's a differentiator and another way that a precaster can add value to their products in order to differentiate themselves from the crowd."

Each system is comprised of three precast tanks, which are installed in tight locations. Unit Precast was able to reduce the footprint of the tanks by approximately 40% by pouring the tanks upright, a first for the company, in a new form custom made for the job. Prior to that, Unit Precast had always poured tanks upside down and flipped them. The tank capacities range from 500 to 3,000 gallons.

Inside the tanks is an advanced treatment system from Waterloo Biofilter. The system features an anerobic digester with a long tube, either 12 inches or 15 inches, that runs the extent from the inlet to the outlet back around to the inlet. This tube hangs inside of the tank and works like a digester rather than a traditional septic tank. The concept is based on the laminar flow principle, which means all of the particles are flowing at the exact same speed and the overall movement of the fluid is calm.

Next, the effluent is transferred to the basket tank which contains foam cubes. The foam cubes are the home for the microorganisms. The wastewater is pumped from the digester tank and is sprayed onto the foam cubes. There's a pump in bottom of the basket tank which then transfers the effluent to the last tank with two compartments for denitrification and discharging the wastewater to the disposal bed. Denitrification occurs through Waterloo Biofilters WaterNOX-LS, which is an upflow filter that uses autotrophic bacteria to dentrify effluent in a proprietary blend of agricultural minerals. The system is designed to remove 95% of total nitrogen.

Off and running

The new systems have been installed at eight properties so far, and Robinson said Unit Precast will install another eight later this year as new houses are built. The tanks in place are performing well and have met the stringent requirements set forth by the province. Unit Precast has had such success pairing its tanks with the advanced treatment system that it has another 92 unit development for the same system opening this year.

By using precast concrete tanks in combination with the advanced wastewater system, homeowners can rest easy knowing the system in place will meet local requirements and also stand the test of time thanks to the durability and resilience of precast concrete.

Ontario Onsite Wastewater Association

OOWA's 2021 Convention & Expo

Going Virtual!

Due to concerns around COVID 19, OOWA's annual Convention will be taking place virtually on the mornings of ***Monday, March 1st and Tuesday, March 2nd.***

This virtual conference will consist of a number of information sessions that will run from 9am-12pm noon on both days. Join us from the comfort of your home or office and benefit from the experience and expertise of industry leaders.

Stay tuned to our e-mail communications and website for registration and sponsorship details in the coming weeks.

Save the Date!

We are Still Accepting Presentation Proposals!
The organizing committee is still looking for interesting and engaging presentations. We will be asking our presenters to pre-record their presentations to be played for participants but then be available for a Q&A session afterwards. Please contact us if you have any questions about how we are planning to make this all happen.

Small Business Owners of the Year 2019-2020

At last year's Convention in London, Kirk Hastings and Penny Brake of Onsite Solutions were announced as the winners of OOWA's 'Small Business Owners of the Year' but were not in attendance to receive their award. Then COVID 19 complicated everything so it wasn't until recently that OOWA's Vice-President, Bill Goodale was able to present them with their award in November. OOWA is proud to hold Kirk and Penny up as members who strive to lift the industry by serving as exemplary examples of dedicated onsite professionals. Congratulations Kirk and Penny!

Member PROFILE

Marianne Willson

Name of Business: Waterloo Biofilter Systems Inc.

Services: Manufacturer and Servicing of Onsite Wastewater Treatment Systems

Service Area: Ontario-Western Half, and Michigan

Number of Years in Role: With Waterloo for 22 years.

MARIANNE WILLSON
TECHNICAL FIELD SUPPORT & SALES

What got you started in the onsite wastewater industry?

I am educated as an Environmental Technologist and have always had a passion for protecting our natural resources and helping people. My career began with the MOE as a local Provincial Offenses Officer and Abatement Enforcement for Regulation 358. I have been hooked ever since.

Give us one reason/secret for your success.

Compassion and listening. It always comes down to the being good to other people. These connections are the most important aspect of our daily lives.

What was the most challenging onsite job you worked on or participated in?

I find the most challenging jobs are when there is no access and a high water table on site. Wherever the use of machinery is limited, it makes every job harder, longer and with greater risk.

If you could change one thing about the onsite/ decentralized industry, what would it be?

I believe that greater collaboration between disciplines in the onsite industry would help us all integrate better and help each other.

Where do you see the onsite industry going?

I believe that the onsite industry continue to become more technically challenging as the “easy lots” are consumed by the building industry. This will challenge us to be more innovative and creative to service these smaller and difficult remaining lots.

JOIN AN OOWA COMMITTEE!

Want to really make an impact in the industry?

Why not contribute to our collective efforts in getting onsite and decentralized recognized as viable and critical rural infrastructure? OOWA is looking for enthusiastic and engaged individuals to help move the industry forward.

Contact Mike Gibbs to find out how to join our ranks!
outreach@oowa.org

The Provincial Policy Statement: Is the Province on our Side?

Roddy Bolivar, P.Eng.

Make-Way Environmental Technologies

While very remote from our day-to-day business, Ontario's Provincial Policy Statement (PPS) and their directions to municipalities on planning for development supported by onsite and private communal system has a direct impact on the business opportunity of OOWA members. The Association's External Relations Committee has advocated for positive changes to the PPS.

What is the PPS?

The PPS is a high level statement of the goals and objectives of land development in Ontario. First published in 1995, there have now been new versions in 2005, 2014 and 2020. All development in Ontario must be shown to follow the PPS.

The "servicing hierarchy"

Since the first PPS the policies have stated a "hierarchy" of servicing solutions starting with municipally owned central systems and followed by private communal systems and finally onsite systems. Some municipalities have interpreted the hierarchy as indicating the Province thinks that onsite solutions do not work and perhaps sometimes providing a municipality with a policy position that allowed them to refuse development supported by private communal or onsite solutions.

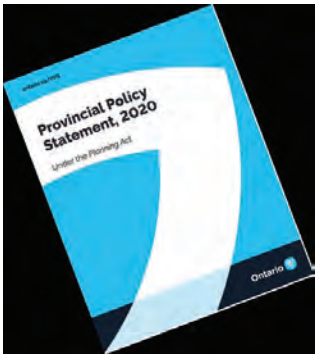
OOWA has advocated for changes to the presentation of a servicing hierarchy. In the 2020 update there have been very positive changes which clarify the Province's position and increase opportunity for OOWA members who deliver private services and OOWA members who deliver communal services:

Added to the PPS: "For clarity, where municipal sewage services and municipal water services are not available, planned or feasible, planning authorities have the ability to consider the (other) servicing options …"

A more pro-active approach to onsite planning

While not stated in the PPS, other Provincial documents such as the D-5 planning guidelines comment on the province's historic experience with community level failures of onsite systems (you know those systems … installed over 60 years ago on a ¼ acre lot by buddy and a backhoe and never maintained).

OOWA has commented to the Province that historic experience may not best advise forward looking policies. Our industry knows that today's onsite solutions – designed by qualified individuals, inspected during installation and increasingly across Ontario re-inspected on a regular basis are a permanent, sustainable and environmentally appropriate solution. Instead of relying on historical experience, OOWA has advocated the PPS take a pro-active approach to planning for today's onsite and private communal solutions. In the 2020 update new policy direction will help bring attention to the quality of the services provided by our members.



Added to the PPS "planning authorities should assess the long-term impacts of individual on-site sewage services and individual on-site water services on the environmental health and the feasibility of other forms of servicing set out in policies "

Rural lot development

Commencing with the 2009 PPS and again in 2014 the Province provided direction to municipalities which had the effect of limiting growth in rural areas. For instance in response the City of Ottawa prohibited new lot creation in Ottawa's general rural area and policies focussed growth to the serviced villages. The new PPS provides more flexibility for municipalities to consider lot creation:

Change "limited residential development" to "residential development, including lot creation, that is locally appropriate"

Add "In undertaking a comprehensive review, the level of detail of the assessment should correspond with the complexity and scale of the … development proposal"

Next steps for OOWA

OOWA's advocacy on behalf of members has had a positive impact on business opportunity. But our job is not over. The Association continues to participate with the Province on building code updates and clarification of the municipal responsibility agreement process.

Reflections on the Montreal Massacre

By Katherine Rentsch, P. Eng.
Crozier Consulting Engineers

November 13, 2020

It is November, and the days are getting shorter. Remembrance Day has just passed, and my thoughts turn to December 6. Thirty-one years ago, at L'Ecole Polytechnique in Montreal, fourteen women in engineering lost their lives, deliberately targeted for choosing a profession traditionally viewed as belonging to men. Ten more were injured. Four men were injured unintentionally in the crossfire.

I can't remember if I was aware of it when it happened. I was eleven at the time, and quite pre-occupied with my new braces and how they might affect my social life. I have a vague recollection of being horrified by the news but didn't really think about it. Thoughts of being an engineer were still years away.

Less than 10 years later I blithely went to university to pursue an education in engineering. Not once did it cross my mind that I might be putting myself in danger due to my choice of career. I was naively under the impression that sexism had been if not solved, then at least brought out into the open for all to see, and to be addressed. I was encouraged as a child to pursue anything I wanted and was told there were no more barriers because I was a woman. I was accepted into an Engineering program no different than any of my male colleagues, and my marks seemed to determine my success. Gender bias was not a term that I was familiar with at the time.

Since graduating, I have forged a successful and satisfying career. I have worked in both consulting and academia and have made contributions to my profession through participation in industry associations and on provincial commissions. I have become a respected voice in my field of onsite sewage systems. I have also raised two boys and have been the primary "breadwinner" for my household for the entirety of my career. We have a nice life, and I have much to be grateful for.

However, over the course of my career I have learned that gender discrimination and bias is very real in the engineering profession. Most often it is not intentional or malicious, or meant to cause harm. A story I like to tell is of meeting a client with whom I had been corresponding with via telephone and email for several months.

The client knew I was the engineer assigned to the project, and yet, when I arrived at the job site and introduced myself, the client asked where the engineer was. As I laughed it off, I remember thinking, "what is it about me that doesn't look like 'the engineer'?"

It's a funny story to tell. No one got hurt. I did my job and everything ended well – but it stayed with me. After almost 15 years of doing my job, why do I still not look like "the engineer"? It reminded me of something I was told as a junior engineer: I had three strikes against me – I was young, I was the engineer, and I was a woman.

It was well-meant advice before being sent out to a job site where there would be no other women. In a round-about way I think this was my manager's way of looking out for me and my safety. But think about it; I can age out of the first strike. My male colleagues also face the second strike, so that levels the playing field. But there is nothing I can do about the third strike. I can't outgrow it, I can't outsmart it, I can't out-anything it.

I call it a fence that I just seem to keep bumping up against. I bump into it during meetings when I am expected to provide refreshments, or when clients are more comfortable talking to my male colleagues. I bump into when I go to job sites, where at best I might be "mansplained", and at worst I might be too afraid to get out of my car.

I have been leered at, propositioned, followed around the job site and followed home. I bump into it during technical review of my work, when I am required to provide additional documentation and evidence.

I have been bullied and verbally harassed while making submissions on behalf of clients to regulatory agencies. I bump into it when I am teaching where students are more interested in my appearance than the content of the course. My experience and my work are discounted or undervalued simply because I am a woman. I bump into it during performance reviews and salary negotiations and promotions.

Katherine Instructing for the Ontario Rural Wastewater Centre

My family is often positioned as a conflict to my career. I am expected to be grateful for the opportunities offered to me and to keep quiet about what I perceive to be gender inequity.

Unfortunately, these experiences are not unique to me. Many of my female colleagues, young and old, have bumped into the same fence, to varying degrees. Make no mistake: we are climbing over the fence. More and more women are being represented in senior management roles, in positions of leadership and power, and in mentorship programs. When we see women in these roles, it makes it possible for the next generation to dream it too. But instead of just climbing over the fence, we should be trying to dismantle it. This will require collective action by all in the engineering industry. It will require us to confront our biases and to acknowledge our complacency.

Gender discrimination and bias is real, and studies and statistics bear it out time and again. Although we are registering a significant increase in enrollment of women in engineering programs across the province, in the present day workforce, only 13% of engineers are women, and only 30% of women who earn degrees in engineering are still working in the industry twenty years later. Women in engineering earn between 80 – 90 cents on the dollar to a man's salary, depending on discipline. For too long we have blamed women for these inequities, suggesting that their choices/actions/behaviours are the problem, instead of identifying and dismantling the barriers and obstacles that influence their decisions and careers.

As December 6 approaches, I reflect on my experiences and the ongoing bias statistics. It has become increasingly important to me to observe the anniversary and to remember the women who died, dreaming of one day being an engineer. I survived my education. 14 women, not more than 10 years before me, did not. I have had, and will hopefully continue to have, a successful and rewarding career. Tragically, 14 women had that chance taken away from them. Gender-based violence continues to be a plague in our country and around the globe. My stories and experiences seem so small and insignificant next to the horrors other women face. I hope that by standing up and talking about it, we can acknowledge the problem and start to facilitate change.

Geneviève Bergeron, Hélène Colgan, Nathalie Croteau, Barbara Daigneault, Anne-Marie Edward, Maud Haviernick, Maryse Laganière, Maryse Leclair, Anne-Marie Lemay, Sonia Pelletier, Michèle Richard, Annie St-Arneault, Annie Turcotte and Barbara Klucznik-Widajewicz.

I remember.

Katherine working in the field

New & Renewed Members Listing

For the period of July 25, 2020 to December 8, 2020

NEW MEMBERS

Maryam Amini, Lakehead University
Tom Berriault, Township of South Frontenac
Matt Farrell, Township of Huron-Kinloss
Bev Fisher, Township of Southgate
Geoff Henderson, Henderson Excavating
James Hotchkies, Enereau Systems Group Inc.
Mike Lacombe, City of Kingston
Tom MacIntyre, Thunderbolt Contracting Ltd.
Justin McDonald, Van Harten Surveying
Amanda Renton, The Township of Severn
Phil Schram, Township of Southgate
Kevin Tsang, Fleming College
Rebecca Walker, LDS Consultants Inc.
Anthony Wilfort, Clearwater Services Temagami Inc

RENEWED MEMBERS

Larry Acchione, Allto Construction Services Ltd.
Nick Acchione, Allto Construction Services Ltd.
Matthew Aldom, Town of Bancroft
Alexandra Anderson, Camping In Ontario/OPCA
Kelly Andrews, OOWA
Felipe Araque, BNA Inc (Bergmann North America)
J.P. Babineau, Allto Construction Services Ltd.
Richard Barg, Xylem Inc. - Goulds Water Technology
Andrew Beck, GM BluePlan Engineering Limited
Lars Bergmann, BNA Inc (Bergmann North America)
Adam Biancaniello, Verge Insurance Group (OOWA Insurance)
Doug Bingham, Newmarket Precast
Roddy Bolivar, MakeWay Environmental Technologies Inc.
Janis Bortolotti, LaSalle Backhoe Service
Lindsay Burtt, Douro/Dummer Township
Gary Cameron, Waste Water Nova Scotia
Madeline Carter, C.F Crozier & Asscociates
Carolyn Chan, GM BluePlan Engineering
Arnie Coulson, Coulson Bros Scow Service
Alison Cox, GM BluePlan Engineering
Mike Crain, Arnott Brothers Construction
James Cuming, Allto Construction Services Ltd.
Derek Demaine, Aqueous Operational Services
Gary Deppe, Polylok
Lesley Desjardins, Alberta Onsite Wastewater Mgement Assoc.
Dave Dobinson, Dave Dobinson Excavating Inc
Stewart Dolstra, Cambium Inc
John Doner, Wescor Wastewater & Environmental Systems Corp.
Bill Drury, Drumax Construction
Darren Drury, Drumax Construction
Cliff Eborall, Walters Custom Works Inc
Marc Ethier, E2Tech Services
Matt Farrell, Township of Huron-Kinloss
Brian Fawcett, Douro/Dummer Township
Dave Fedoriw, Township Of Georgian Bay
Graham Fisher, Haddad Geotechnical
Dan Friesen, Exact Septics Inc
Tony Gill, Ace Landscaping Construction
Richard Gionette, Algoma Bio-Septic Technologies
Rudy Hartfiel, OWSIM
James Hayden, University of Guelph- Student
Jeremy Hein, Groundwork Engineering Limited
Scott Hetrick, Norweco Inc
Ben Hyland, Strik Baldinelli Moniz Ltd
Daniel Kern, HomeWorks Inspection Services
Dean Kerr, Willis Kerr Contracting Ltd.
Randy Knight, Glen Knight Septic Service
Jeremy Kraemer, Cambium Inc
Don Krauss, Infiltrator Water Technologies
Terrilyn Latimer, Latimer Excavating Ltd
Perry Leifso, Interpump Supply Ltd.
Jeremy Lightheart, WMI & Associates
Miles MacCormack, BNA Inc (Bergmann North America)
Hamed Mahdavi, Unit Precast
Justin McDonald, Van Harten Surveying
Lloyd McMillan, Lloyd McMillan Equipment Ltd
Troy McMillan, Lloyd McMillan Equipment
Scott McMullen, Verge Insurance Group (OOWA Insurance)
Kevin Moniz, Strik Baldinelli Moniz Ltd
Stephen Morash, WMI & Associates
Archie Mulder, The Rideau Group
Caely Nicholson, Township of Georgian Bay
Nico Nirschl, Liberty Pumps
Jim Oakley, Township of Severn
Robert Passmore, Pinchin Ltd.
Jami Quathamer, Brooklin Concrete Products
Richard Raison, R R Equipment Rental
Terry Rees, FOCA - Federation of Ontario Cottage Assoc.
Michael Reid, C.E. Reid & Sons
Ian Robinson, BNA Inc (Bergmann North America)
Leroy Robinson, BNA Inc (Bergmann North America)
Monique Sauve, South Nation Conservation
Brian Shepherd, George Burnett Ltd.
Brad Smale, Township Of Norwich
Bernie Taylor, Cambium Inc
Don Taylor, Mr. Septic
Scott Thompson, MTS Environmental Inc.
Jeremy Tracey, Cambium Inc
Numair Uppal, OASIS
Mathew Walters, Walters Custom Works Inc
Kevin Warner, Cambium Inc
Ryan Weddel, Newmarket Precast Concrete Products Ltd.
Karen Wilkie, Upper Thames River Conservation
John Winkup, LaSalle Backhoe Service

2020 OOWA Membership Benefits

Perkopolis is a discount program with hundreds of available discounts across the country on things like entertainment, car rentals, hotel stays, electronics, flights, food, wellness and attractions. To sign up, visit www.perkopolis.com and use your OOWA Member ID to create an account.

No reservation required! Simply use the code 1019186 at time of check out and automatically receive the discounted rates. Save $7/day and $90/week when parked in Toronto using the Park'N Fly Valet service, or $4/day and $39/week when choosing Toronto Self-Park.

The OOWA Insurance Plan is administered by SeptiGuard, a company within the Verge Group. Coverage includes: General Liability, Pollution/ Environmental, Impairment/ Underground tank policies, Contractors Equipment, Barging and Waterborne Risks, Professional Liability for inspectors, designers etc., Vehicle/ Fleet coverage and Discount Home and Auto rates. Contact Scott Mullen: 905-688-9170 ext. 132 or email at: mcmullen@vergeinsurance.com

A new CAA Plus membership is reduced to $99.00 for the first year ($39.00 savings!) or a CAA Plus Associate Membership is reduced to $75.00 for the first year. Contact CAA's Corporate Representative at 800-267-6394 ext. 6394 to sign up.

OOWA members save 10% at Mark's Work Warehouse on the following items and more; Carhart merchandise, Dakota workwear, coveralls and overalls, casual wear, work gloves, and all CSA footwear. Present your card at any location to receive your discount.

Grand & Toy is your one stop shop for all your office needs including ergonomics, furniture, computer supplies, PPE, Janitorial/Sanitary. OOWA's partnership with G & T provides preferred pricing on 240 commonly consumed essentials, plus 10% off market competitive web pricing. Each member can add a customized price list of up to 25 items reflecting your business needs. Your savings could easily offset OOWA membership dues!

ALS Laboratory Group provides a 30% discount on all your wastewater and soil testing needs. Contact Darlene Hoogenes-Stastny at 519-886-6910 or email at: Darlene.Stastny@ALSGlobal.com

Save 10% on any ORWC Course offering (cannot be used in conjunction with other discounts). See their course offerings at www.uoguelph.ca/orwc. Contact Bassim Abbassi at 519-824-4120 Ext. 52040 or via email at babbassi@uoguelph.ca

OOWA members get guaranteed and discounted rates on car and trunk rentals. Reference business Account Number LC23343 when booking a rental vehicle.

OOWA has redeveloped the Registered Professional Program (RPP) to include an 'In-Development Stream' that addresses the needs of ongoing training and continuing education demands from our members. OOWA Professional Designations include: Wastewater Service Technician, Designer, Installer, Private or Regulatory Inspector, Residuals Hauler, Project & Administrative Professional and Technical Sales Consultant.

OOWA collaborates with other associations in communicating to government with one united voice on issues that are of mutual concern to our industries. OOWA is proud to inform our members know that you can access membership rates for events and resources provided by our association partners:

- The Ontario Association of Septic Industry Service
- The Ontario Building Officials Association
- The Ontario Ground Water Association

To get more information on these member benefits please visit our website at: www.oowa.org/about/join-oowa/

perkopolis

OntarioOnsite WastewaterAssociation

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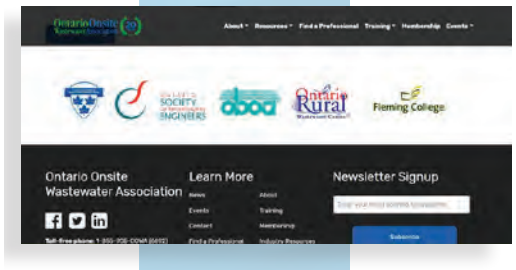

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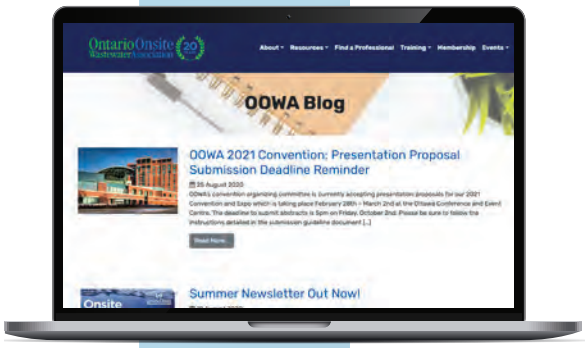

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Go Digital with the My Building Code App

Onsite wastewater professionals need to make numerous decisions while carrying out their responsibilities, many of which are guided by the Ontario Building Code (OBC). Even for those who are very familiar with the OBC, this immense and complex document can be difficult to navigate. And if you've ever tried to lug that enormous binder to a job site, or had to manually swap out pages when an update is issued, you know how cumbersome and inconvenient it can be.

While Covid-19 has been a challenge for everyone, some positive things have resulted from the pandemic. For example, it has highlighted the need for - and accelerated - many digital initiatives. One such initiative is a product called My Building Code - a digital version of the OBC that has been developed to ease the pain points experienced by users of the Code by delivering it via a web and mobile application.

Access anywhere

The My Building Code app is available via a website for convenient reference from your computer while in the office. It's also available as an app for iOS and Android devices, so you can download it onto your smartphone and tablet for easy access when you are on the road. The bottom line? Easy access to relevant regulations anytime, anywhere, on any device.

Easy navigation

One of the main benefits of having the Code available digitally is that it makes navigation and interpretation quick and easy. For example, there is a search function that lets you search the entire Code for any regulations relevant to your search term. You will also find defined terms identified in italics, which conveniently pop up with a full definition to give you clarification in-situ.

Customized experience

You can customize your interface with features such as bookmarks for sections that you refer to frequently. Bookmarks are just the first of many customizations that you will be able to make; future releases of the product will include the ability to add your own comments and notes on sections of the Code. The best part? Your preferences are saved to your profile and synchronized on all of your devices so you can see everything from your desktop, phone and tablet.

Automated updates

You may have found that updating your OBC binder can be labour-intensive when amendments are issued and need to be inserted into the binder in the appropriate spots. This process can take hours, and many code users choose to simply order a whole new binder instead of updating their old one. But while that may save time, it certainly doesn't save the environment. The new app keeps you synchronized with the latest version of the building code in real time with no manual work. That's a plus for you and the environment!

Influence the future

My Building Code is the first product from the SmartCodes suite, which will eventually be expanded to include other provincial and national codes as well as products such as fire and electrical codes. Right now, the app is available for free so that you can try it out, provide feedback and make suggestions for future product enhancements and codes to include. User feedback has already influenced the product with navigation improvements and new features like the bookmarks function described above.

Another popular request is for Volume 2 of the OBC to be included in the product. The team is working hard to deliver this in an upcoming release. Other features currently in development include the ability to set up projects and invite colleagues to share sections of the code, discuss regulations and collaborate in real time; and linking of content to allow you to open cross-referenced sections, redirections and exceptions in new tabs. There will also be handy tools such as the ability to view GIS-based information and calculators to determine design specifications.

While the base product will always be free, there will eventually be a subscription fee for enhanced features. Take advantage of the free version today!
Visit **mybuildingcode.com** for links to the browser version and to download the app for your tablet or smartphone.

Member PROFILE

Brian Zingula

Name of Business: R.J. Burnside & Associates Limited

Services: In addition to other civil disciplines, Burnside provides engineering services for all sizes and configurations of onsite wastewater systems.

Service Area: Predominately Southern and near-North Ontario.

Number of Years in Role: 1

BRIAN ZINGULA
Environmental Technologist

What got you started in the onsite wastewater industry?

My participation in the onsite wastewater industry began when I attended a water resources conference which included a presentation of onsite system designs by Andrew Hellebust of Rivercourt Engineering. I was intrigued, and he was gracious enough to discuss my prospects with similar projects. Through him I learned of ESSE Canada, where I applied and was accepted as a wastewater system inspector/compliance analyst in 2016. After completing a healthy number of due-diligence assessments of onsite wastewater systems, I felt confident in transitioning my field experience to a more design-oriented role.

Give us one reason/secret for your success.

There is no question that I have had the golden opportunity of receiving mentorship by some of the best in our field – Rick Esselment of ESSE Canada, and Anne Egan at Burnside. Rick, for his unending push to challenge my assumptions of what the onsite wastewater field can and should look like, and Anne for her incredible depth of knowledge in all technical and regulatory intricacies. Without their inspiration and guidance, it is possible that I would not have considered to continue my career in onsite wastewater.

What was the most challenging onsite job you worked on or participated in?

My team at ESSE Canada, in conjunction with Burnside, performed an intrusive investigation into a wastewater system serving a township campus located within southern Ontario, which featured a number of municipal buildings connected to a single conventional system.

In addition to its size, long-broken pumps; a leaching bed of unusual configuration and near failure; confounding tank connections; and a total lack of historic documentation significantly complicated the assessment. As one of my earlier projects, it was a compelling lesson in the (lack of) priority and concern these systems sometimes receive.

If you could change one thing about the onsite/decentralized industry, what would it be?

Sorry, but I have two items. In my time spent inspecting residential onsite systems, there is one flaw in system operation that I have seen most frequently – poor effluent filter maintenance. Such a simple task, but an important one that is misunderstood by so many homeowners, many of whom are unaware that they even have a filter installed. I would improve the communication we provide to our clients to inform them of their maintenance responsibilities.

Second, I want to see more inclusion in Ontario college programs. I came upon the industry by chance, not design, and that should change.

Where do you see the onsite industry going?

I do believe that increased outreach to post-secondary institutions will happen (I know that it is already), and that the dividends will be realized through high quality hires in all aspects of the industry. There will always be the day-to-day challenges of maintenance, design, regulation, inspection, and technology development. Attracting and retaining the best new talent, who can enter with a technical understanding of the systems, will facilitate cooperation and innovation across our organizations.

Importance and Benefits of a Level 4 Septic Tank Inspection

Mike Rahme
Home Pro Inspections

I have lived in Haliburton County for 12 years now and I have been lucky enough to have worked here for 20 years. In that time, I have had the dubious pleasure of having my nose in close to 1000 septic tanks. With this insight I have learned to expect the unexpected and to never underestimate the creativity of home and cottage owners. I am sure that, like my colleagues who have spent any time in the field, they too could fill volumes with old septic wivestales that property owners were only too happy to share with you.

An aspect of septic inspections that I do not take as lightly is the Part 8 section of the OBC that refers to General Requirements for Operation and Maintenance **8.9.1.2.**

(1) Every sewage system shall be operated and maintained so that,

(a) the sewage system or any part of it shall not emit, discharge or deposit sanitary sewage or effluent onto the surface of the ground,

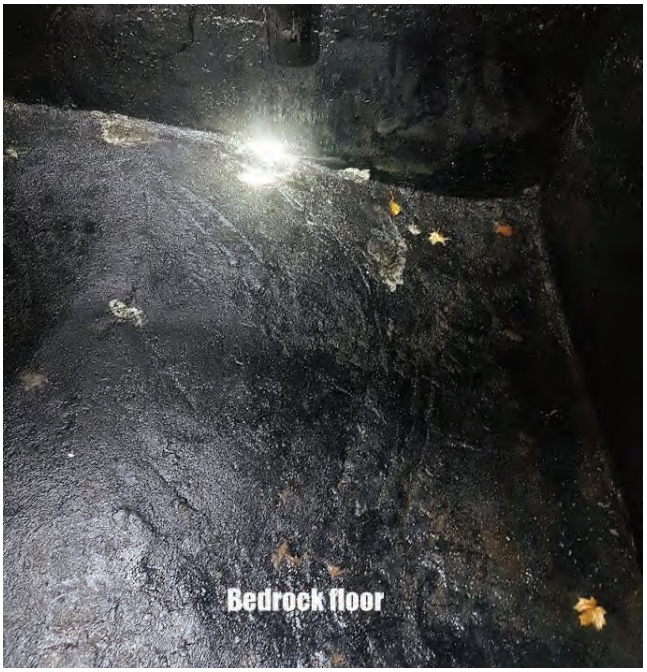
(b) sanitary sewage or effluent shall not emit, discharge, seep, leak or otherwise escape from the sewage system or any part of it other than from a place or part of the sewage system where the system is designed or intended to discharge the sanitary sewage or effluent, and

(c) except as provided in Sentence (2), sanitary sewage or effluent shall not emit, discharge, seep, leak or otherwise escape from the sewage system or any part of it into a piped water supply, well water supply, a watercourse, groundwater water or surface water.

Is there ever a point where you wake up in the morning, rinse off the nights slumber, look squarely at your reflection in the mirror and say to yourself

> *"Today I am going to work to the most minimum standard that is possible?"*

Yes, it is acceptable, in fact the Building Code, as we all know, sets out the standard for us to ensure that we never do less than what has been defined as the rock bottom standard we can safely follow. Ironically, Part 8 of the OBC has taken the steps to graduate septic inspection (already the minimum standard) into four separate septic inspection levels, each being more robust than the one it precedes. Levels 1 through 4.



At a time when Septic Re-Inspection programs on waterfront properties are becoming the new norm, I find it somewhat frustrating that a number of municipal leaders' main objectives are to be fast, cheap and easy, rather than educational, robust and definitive.

As professionals, the public looks to us for guidance and understanding. If our industry could stand as one this would speak volumes. Our priority is, collectively ensuring that today, the environment comes first! Unfortunately money outweighs common sense in a lot of cases. Fast, cheap and easy, sadly, most Municipalities seem to gravitate to as a means of dealing with the challenges of re-inspection programs. Here is a novel thought, let's think through every challenge, every problem. It has to be good for our bottom line but it should not be at the expense of our ecology or our health. Cost will initially appear higher up front but it is important to not be fixated in the moment. Making the bigger effort up front will make us all winners in the future. My personal endeavor is to show people if you spend more money now on a Level 4 septic tank inspection, pumping included this can be paid back in spades addressing small problems before they manifest into larger ones. Property owners must recognize it's not just their pocketbook they have to worry about.

If we have one blue-green algae breakout in our lakes, property values can drop by as much as 30% and the lake may not be fit for any type of use...that hits home.

It has been my experience, waterfront property owners are embracing the Level 4 septic tank inspection, and even as some cottagers learn their septic systems require updates, significant repairs, and even replacement. Homeowners are very supportive and understand it is important (once explained) that everyone does their part. Make no mistake, there is always grumbling but in the end everyone knows it has to be done and it is the right thing to do!

A Level 4 should carry a big emphasis on the educational component, and that's the angle I come at it from. If someone understands why the rule's are what they are, property owners are more willing to move toward compliance. I never rush, I am there to answer every question, often the same one multiple times, and that is fine. The typical time on site for our Level 4 septic tank inspections can range between 1 and 1.5 hours.

When you care, they care...

Anyone that works with, or even just understands existing septic systems, knows that some amount of deficiencies will be overlooked with a Level 3 program. Essentially everything that is below liquid level is impossible to access: Tank without or damaged partitions, outlet grommet deterioration side wall inlets, sidewall baffles, structural damage at walls and floors to the point where septage is leaking outside the system, heavy root mass in both pump chamber and septic tank. In fact, according to our records, the Municipality of Dysart et al Septic Re-Inspection program, identified 47 deficiencies that would have been missed while performing a Level 3 septic tank inspection. How many septic tanks leaking into the lakes and rivers is acceptable? That depends on which Municipal official you talk to.

Narrowing a focus to a specific era of septic systems to prioritize an inspection program is a misguided approach. Tank deterioration has little to do with age. I regularly inspect 40 year old tanks that are without flaw, equally, I have looked at 10 yr old tanks that have decayed to mud.

Do a Level 4, see more!

The unknown, or the variable that every tank, old and new, is subject to is property owner use habits and maintenance. The only thing consistent about owners and septic tanks is there is no consistency.

As we all know septic tanks work on the premise of retention. Meaning, the longer the solid waste can reside within the bottom of the tank the better it is. Once the volume of the tank exceeds more than 1/3 the solids are more likely to become suspended within the effluent and with this we begin to move nutrient rich effluent out to our septic fields. This condition can also elevate phosphorus and nitrate levels and render the bed less or completely ineffective.

A Level 3 septic inspection can effectively gauge the amount of solid waste that lays on the bottom and floats on the top of a concrete tank (FOG). The same cannot be said for the plastic tanks, this due to the heavy corrugation of the tanks construction. This is where guesswork becomes all too common as a correct sample is extremely difficult if not impossible to extract.

In a concrete tank should a sludge judge samples show the need for pumping, further inconvenience occurs. Now another appointment is required as is an additional cost incurred if an inspector has to do a re- inspect. That is not speeding up any process or in the best interest of the property owner.

Importance and Benefits of a Level 4 Septic Tank Inspection

It appears that another misconception is that a sludge judge will identify one of the bigger challenges that we have in Haliburton County, that being root mass. Some things that you need to know about roots.

- 1st - They do not respect the 3m clearance requirement that we are looking for;
- 2nd - A root mass is typically one thirrd bigger than its canopy;
- 3rd - Most tanks have some degree of root infiltration;
- 4th - A sludge judge (Level 3) will not effectively measure root mass, roots do not lay on the bottom of the tank like a carpet.

Roots from foliage will migrate into the tank as fine hair, entering at the inlet and the outlet pipes as well between the top of the tank and the wall of the tank, from there it hangs like a curtain down the walls. Until the tank is pumped there is no way to assess the impact, unless a Level 4 is performed.

I have personally seen where pumpers are using saws, once the tank is pumped to remove ¾ inches diameter root mass that can easily weigh 50 lbs. If roots are coming through would it not be realistic to believe effluent can be seeping out?

Equally, we have now displaced important volume in a tank and the sludge judge was never the wiser. Another point that needs to be identified is where the inlet pipe enters the tank.

Between 15 and 20% of all inlets observed during our segment of the Septic Re-Inspection program carried out for the Municipality of Dysart et al comes in through the sidewall of the tank. Without pumping it is 100% impossible to access. Easily, 50% of those do not have baffles installed. The inlet baffle is an integral component of the septic tank's inlet pipe.

Breaking the velocity of the water surge from a laundry machine, bathtub drain or even the operation of a water closet. Without it, solids will more readily migrate out to the bed as they remain in suspension of the effluent

A Level 4 inspection will require the septic tank to be pumped-out at the time of the inspection. Performing a Level 4 will leave nothing to chance conversely a Level 3 septic inspection will allow the inspector to at most, accurately comment on roughly 30% of the septic tank in question.

A Level 4 is providing a true and complete service, nothing will slip through the proverbial cracks.

When a septic tank is not pumped it is very difficult to fully assess the integrity of the inlet and the outlet grommets to ensure there is no seepage. It is impossible to assess the integrity of the partition wall, this is an area that also suffers from corrosion in the concrete tanks.

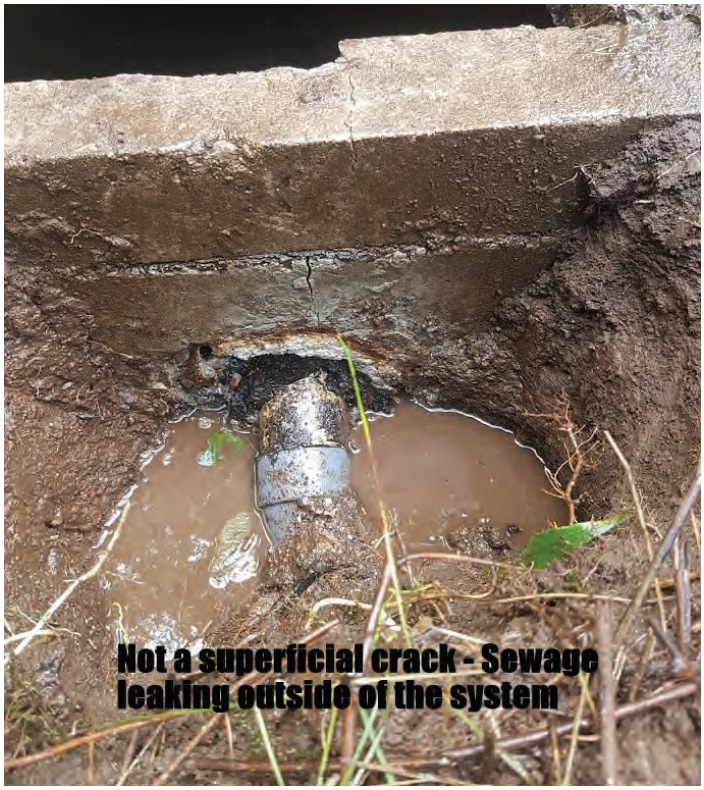
Providing a Level 3 you are walking away from an "inspected" tank not fully knowing if the correct operation of this tank has been compromised.

As per the requirements set out in **8.2.2.3 (5).**

(5) Partitions separating the septic tank into compartments shall extend at least 150 mm above the liquid level at the outlet, and there shall be one or more openings.

Our concern here is, of course, are we properly segregating the FOG, or is it able to readily migrate to our effluent chamber?

Plastic tank partition walls can be popped out of alignment as the plastic tanks flex or collapse, and of course we all know that sidewall inlets, outlets and their "baffles" are impossible to access on any type of



tank undergoing a Level 3 inspection.

Excessive root mass is also very problematic and due to the way it enters the tank it is virtually impossible to assess the impact that it is having or the volume that it has displaced within the tank.

Working with a rationale that faster is better is nothing short of an irresponsible comment and process. What amount of continuous low level poisoning from overlooked septic problems are you comfortable with? Are you responsible for?

The objective should not be how fast can we get to the finish line. The objective should be what must we do to ensure we leave the smallest environmental footprint possible.

OOWA welcomes all perspectives from our members as we work to elevate our industry and protect our shared freshwater resources. To have your thoughts shared with our membership in this forum, please contact us. The deadline for our next newsletter is Friday, February 1st. We look forward to continuing this conversation with you.

MEMBER PROFILE

Madeline Carter

Name of Business: C.F. Crozier and Associates Inc.

Services: Civil Engineering Services, Hydrogeological Engineering Services

Service Area: South-Western Ontario

Number of Years in Role: Project Engineer since 2018, with Crozier since 2016

What got you started in the onsite wastewater industry?

I have worked on land development projects for about 6 years and there is a large contingent of rural land development where onsite wastewater is a critical component of the project. When I joined Crozier, we had staff who were familiar with onsite wastewater but no experts! So, after working on more rural projects, I decided to take that role on and assist all four of our offices with designs of these systems.

Give us one reason/secret for your success.

A reason that I am successful is that I can integrate the design of onsite sewage systems with the rest of the typical civil engineering design such as stormwater management, grading and domestic/fire water supply. I can provide a holistic approach to the site development by understanding the needs for all the civil engineering components including the onsite sewage system. We also have hydrogeological services in-house so we can also provide the impact assessments required for MECP applications. We provide the entire package for rural land development applications which makes it easier for the Client and means less coordination is needed.

What was the most challenging onsite job you worked on or participated in?

I have had some challenging residential sites where the CBO's interpretation of the Ontario Building Code results in altering the design. There has been some projects where we had to switch the design from a shallow buried trench system to balancing residential flows with a Type A bed so it could fit on the site as the CBO did not like the disposal bed to be a shallow buried trench.

MADELINE CARTER
P. Eng.

This was difficult to justify to the client that we had to redesign the system since the CBO will not accept a disposal bed that is permitted under the Ontario Building Code.

If you could change one thing about the onsite/ decentralized industry, what would it be?

The industry does need more recognition for the development and maintenance of these systems. We have clients who are developers in urban areas and do not realize the size and cost of onsite sewage systems required to support their developments in un-serviced areas. We also have lots of residential applications as more people are leaving the cities to live in rural areas due to housing prices and more people working from home. People who move to rural areas usually do not understand or know they have an onsite sewage system but it's important to be aware so it can be maintained. As an industry, I believe we need to do a better job educating people outside of our concentrated field and groups in order to get the information where it needs to go.

Where do you see the onsite industry going?

I see the onsite industry moving towards more advanced treatments systems for residential lots. We are seeing bigger homes and smaller lots and advanced treatment systems are critical to provide servicing for these properties. This also means that maintenance will be even more important for these advanced systems. Onsite sewage systems need to become top of mind since they are a critical piece of the servicing infrastructure with direct impact to the environment and to our health.

Coffee and Soda Down the Drain: What are the Impacts on Septic Systems?

An OSTP study looks at how these beverages change the pH and other levels in an onsite system

By Sara Heger, Ph.D.

Onsite Installer Magazine

The Onsite Sewage Treatment Program (OSTP) at the University of Minnesota Water Resources Center conducted a brief study to understand more about the effect that coffee and soda beverages have on the functionality of a septic system.

Many septic professionals can agree that putting coffee grounds into a septic system is a bad practice and could negatively affect its function. Coffee grounds will not break down in a septic tank; they will build up over time and might cause the tank to have to be pumped more often. Also, because they are so acidic, they can compromise the pH of a tank. If the contents of a septic tank become too acidic, it can create an unhealthy environment for the bacteria that contribute to the healthy ecosystem of the tank and help break down waste.

For this study, the OSTP was interested particularity in restaurants, convenience stores or gas stations that are serviced by a septic system and what the possible impacts could be to the system when coffee and soda are dumped down the drain.

Five different types of product were used for this study:

- Black coffee
- Iced coffee
- Coffee with a sweetened creamer
- Coffee with regular half and half added
- Coke (regular)

These products were selected to represent a wide range of products offered at gas stations, convenience stores and restaurants. Of these beverages, it would seem most likely that more regular soda or black coffee would be put down the drain most often. A common scenario might be if someone pours a soda and decide they want another type, so they pour their first choice down the drain. Similarly, someone pours a coffee, and they decide they want another kind, or they pour off the top to add creamer. There are also convenience stores and restaurants that regularly dump coffee to assure freshness. It can be assumed from these inferences that most of the ingredients going down the drain would come from either the regular soda or the black coffee products.

As can be seen in the table to the right, the concentrated beverages all had levels significantly higher than septic tank effluent. Generally black coffee had the lowest levels and as there were cream or flavor additions to the coffee the waste strength increased. Iced coffee is a product that is increasingly being offered at convenience stores which was found to have very high levels. The pH of the soda was very low.

	Black Coffee	Iced Coffee	Soda-Regular Coke	Coffee with Hershey's Creamer	Coffee with Half and Half	Typical Domestic Septic Tank Effluent
	Wastewater Concentrations (mg/L)					
Biochemical Oxygen Demand (BOD)	5,560	168,000	84,400	53,000	19800	140-200
Chemical Oxygen Demand (COD)	12,700	321,000	110,000	46,000	32,100	389
Total Suspended Solids (TTS)	260	960	265	1150	667	50-100
Chloride	127	760	27.3	374	383	18
Total Phosphorus	28.9	155	159	88.9	52	6-1
Total Kjeldahl Nitrogen (TKN)	331	547	42.3	347	531	60
pH	5.6	5.7	1.9	6.5	6.3	7.3

For septic system designers this data indicates it is important to characterize the facility to determine if there are self-serve soda or coffee dispensers and if soda and coffee are regularly refreshed. The CIDWT forms for Analyzing Wastewater Treatment Systems for High Strength Waste and Hydraulic Loading available on the UMN website at https://septic.umn.edu/ssts-professionals/forms-worksheets are useful in performing these characterizations.

After this assessment or while providing service, it is worthwhile to discuss with the facility owner or manager if changes can be made to the equipment or management practices to reduce the amount of beverage waste entering the system. During design or management for all existing facilities, several samples should be taken and analyzed, as the influent levels are likely to be quite variable.

A full version of the report from this study can be found at https://septic.umn.edu/research.

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Application of Electroflotation Technology for Microbrewery Wastewater Treatment

By James Arambarri, B.A.Sc., MASc Student, University of Guelph

Bassim E. Abbassi, PhD, P.Eng, University of Guelph, Director of the Ontario Rural Wastewater Centre

Problem Statement

Breweries are becoming an increasingly integral component of the Ontario economy with the number of breweries increasing by **17.6%** from 2017 (695) to 2018 (817) (Swain, 2019). Much of this growth can be attributed to craft beers. They remain the LCBO's fastest growing sector with sales growth averaging **20-30% per year** (Ontario Ministry of Food Agriculture and Rural Affairs, 2018).

Despite their recent economic success, microbreweries are becoming increasingly at risk from rising Overstrength Disposal Fees (ODFs). Sewer Use Bylaws introduced ODFs as a mechanism for regulating contaminant concentration limits while providing municipalities a means to recover the cost of treating overstrength wastewater. ODFs were originally proposed to encourage industrial wastewater generators to build their own treatment systems. However, many producers do not have enough capital to design, construct and operate independent wastewater treatment systems (WWTS) capable of meeting municipal discharge limits. In addition, WWTS often require extensive floor space for both equipment and technical personnel for maintenance and operation. As a result, many producers choose to dispose of raw or partially treated wastewater into the municipal sewers while paying the corresponding ODFs (Stantec, 2012). ODFs are constantly increasing and therefore, presenting a long-term economic challenge for businesses discharging high strength industrial wastewater.

In Ontario, **24%** of industrial wastewater treatment plants fail to meet environmental guidelines placing both human health and surface water ecosystems at risk (Kapitain, 1995). Consequently, there exists an urgent need to develop and introduce more sustainable decentralized systems.

Case Study: Guelph Microbrewery

Guelph is home to a considerable number of successful independent microbreweries. However, as the industry continues to expand, the Municipality of Guelph has begun applying pressure to industries discharging overstrength wastewater. Limited floor space and smaller operating budgets are commonplace among decentralized brewers with the majority opting to discharge raw or only partially treated wastewater while paying the corresponding ODFs. As a result, many microbreweries only maintain simple primary wastewater treatment systems such as a sedimentation tank prior to discharging.

Recognizing this problem, the research team has been collaborating with one of Guelph's microbreweries to identify a cost-effective and space-efficient decentralized treatment process. Unlike large scale brewers, who brew consistently year-round, the composition of the wastewater at microbreweries is extremely variable with day-to-day concentrations capable of changing significantly. **Table 1** outlines this heightened contaminant variability in microbrewery effluent compared with typical industry effluent:

Parameter	Guelph Microbrewery (2018-19)	Industry Typical
Total Phosphorus (mg/L)	30-233.5	10-50
COD (mg/L)	3,700-30,000	2,000-6,000
TSS (mg/L)	10-28,367	200-3,000
Total Nitrogen (mg/l)	78.3-80.9	25-80
pH	4.99-7.62	4.5-12

Table 1: Characteristics of the Microbrewery Effluent

Table 1 highlights the significantly higher concentrations of organics and Total Suspended Solids (TSS) in craft beer compared to more conventional brands. In 2018, the Ontario Craft Brewers Conference and Suppliers Marketplace emphasized the need to encourage the development of decentralized wastewater treatment options, particularly in rural regions (Horne, 2018). This prompted the research team to identify an on-site treatment system capable of meeting the constraints and criteria of a decentralized producer.

Electroflotation Wastewater Treatment

Conventional wastewater flotation typically falls within two categories: (1) dispersed air flotation and (2) dissolved-air flotation. These two methods are only capable of capturing particles between 50-200µm. Removal of particles smaller than 50µm through flotation can only be achieved through a lesser known and unconventional flotation method of Electroflotation (EF).

Electroflotation treatment begins when a DC current is passed between an electrode pairing submerged in a conductive medium producing an electric field resulting in electrolysis. The EF process is facilitated by the production of hydrogen and oxygen bubbles generated during electrolysis. EF reactors are designed to utilize the adhesive properties of oxygen and hydrogen micro-bubbles that are produced at the electrode surfaces during the electrolysis of water to capture pollutants as they rise to the surface. This fine cloud of microbubbles is very low in turbulence and when accompanied with an appropriately sized electrode grid, EF can ensure an effective and uniform clarification by flotation. Due to the reduction in buoyancy forces accompanying smaller bubbles, increased current density will lead to greater removal by flotation due to the extended detention time of the smaller micro-bubbles. Furthermore, smaller bubbles offer reduced contact angles between the gas-solid-liquid interface that reduces the shear forces of the bubbles on the surrounding flocs significantly improving the clarification of the wastewater (Holt, 2002).

Prototype Electroflotation Unit/Reactor

The prototype EF treatment unit **(Figure 1)** consists of four chambers with a total working volume of 18L. The sequential functions of the four chambers are a primary settling tank for large flocs and solids, two consecutive EF reactors, and a final polishing tank.

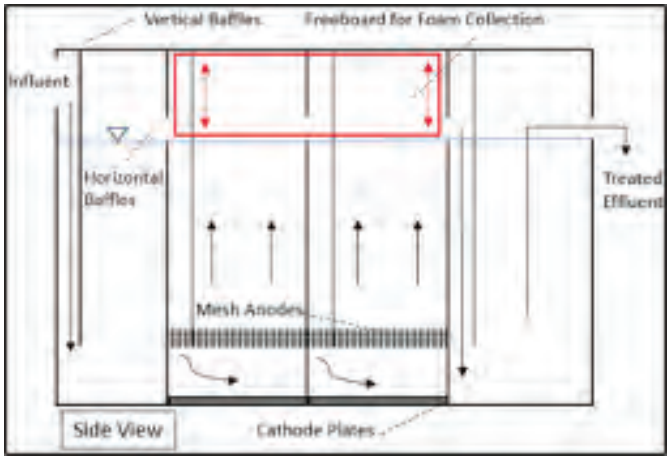


Figure 1: Flow pathway for prototype EF unit

The two primary operating variables are the system flow rate and the applied current. The flow rate can be optimized to encourage settling in the primary chamber while minimizing the cost of EF treatment per unit volume of wastewater. Increasing the applied current results in greater bubble density in the EF columns improving pollutant removal.

Objectives of Product Development

The primary objective of this research was to develop and evaluate a space-efficient electrokinetic based design as a standalone treatment unit or integrated alongside existing treatment systems. The resulting design should be capable of treating high-strength industrial effluent from a decentralized wastewater producer. The results generated by the prototype reactor will provide the framework for developing a pilot-scale design.

Performance of the EF Reactor

The performance of the reactor was assessed based on its capabilities of removing both suspended solids and organic contaminants from the wastewater. **Table 2** summarizes the performance of the EF unit relative to the removal of RP, TP, COD and TSS. The results show that the EF unit can remove a large percentage of TSS with minimal applied current. It is also evident that a linear relationship exists between applied current and organics removal, implying that an equilibrium condition exists between energy consumption and pollutant removal.

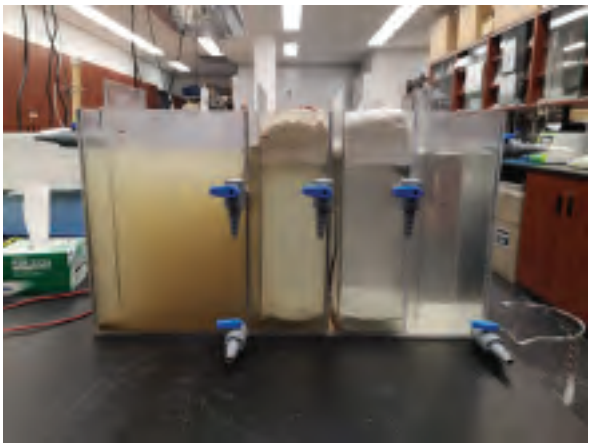
Parameter	High Strength		
	Raw (Avg)	% Removal (0.1A)	% Removal (0.8A)
RP- Reactive Phosphorus (mg/L)	178.0	12.7	89.8
TP - Total Phosphorus (mg/L)	210.3	16.5	83.3
COD (mg/L)	10,840	27.73	46.2
TSS (mg/L)	3,050	85.75	97.6

Table 2: EF Reactor Performance

Figure 2 shown below provides a steady-state snapshot of the EF reactor in operation. It is important to note the following observations:

- Chamber 1 (left) homogenizes the influent wastewater allowing for the settling of the largest solids.
- The floated scum layers in Chambers 2 & 3 (centre) highlight the removal pathway for organics and colloids alongside the smaller suspended solids (Arambarri, Abbassi, & Zytner, 2019).
- The clarification of the EF unit is evident in Chamber 4 (right) due to the reduction in colour and turbidity.

Figure 2: Steady state continuous EF treatment of high strength microbrewery wastewater



Conclusion & Future Plans

The successful treatment of high strength microbrewery wastewater has confirmed the research team's concept that Electroflotation can be integrated alongside existing treatment systems or operate as an independent treatment system. Future tests will focus on identifying other decentralized wastewater sources suitable for EF treatment.

The research team is seeking to collaborate with an industry partner to commence development of a pilot scale system (1-2m3) to assess the scalability of electroflotation technology. The pilot project will also allow the research team to integrate more sophisticated mechanisms into the existing system. These include recycled flow, scum removal, and advanced continuous EF treatment regimes such as pulsed power and electrode polarity reversal.

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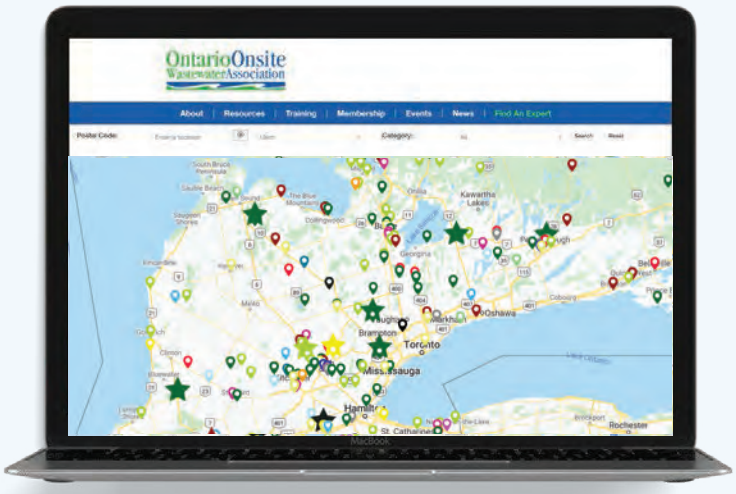

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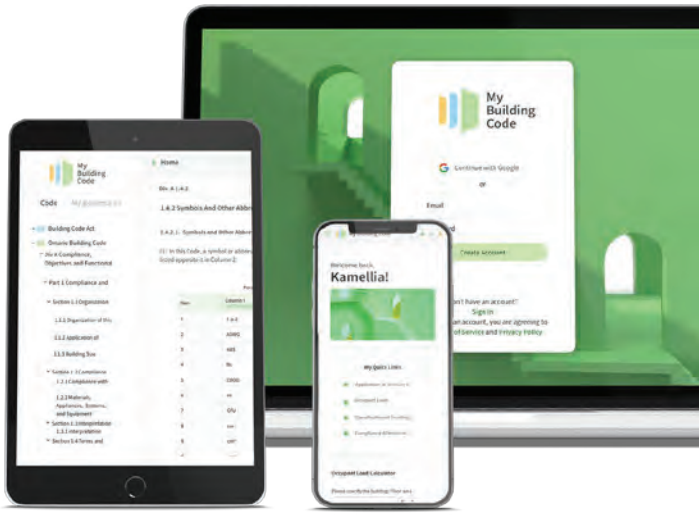

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The challenge: The OBC is hard to carry on construction sites and other locations. As a result, building practitioners are unable to consult the code on construction sites and during inspections. This imposes inefficiencies and delays on the construction and inspection process.

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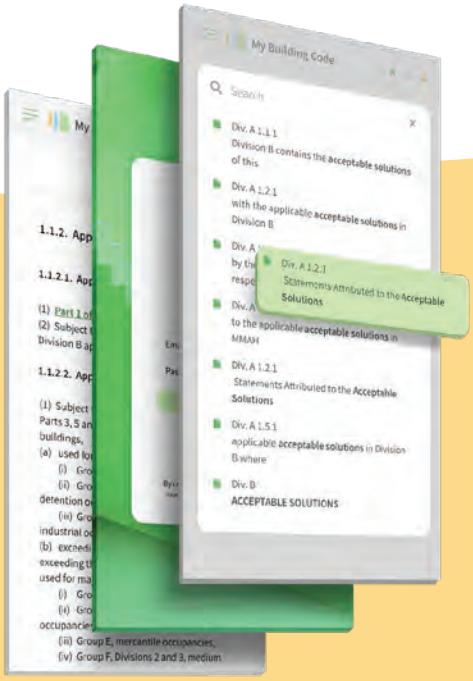

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