



Office of the Commissioner
Environmental Services Department

MEMORANDUM

To: Members of Committee of the Whole

From: Erin Mahoney, M. Eng.
Commissioner of Environmental Services

Date: January 18, 2022

Re: 2021 Research and Innovation Update

This memo provides an update to Council on research activities undertaken by Environmental Services in 2021 to manage risk and deliver services in water, wastewater, waste management, natural heritage and forestry, and climate change energy conservation programs.

The value of Environmental Services' research activity is derived from:

- Directly addressing operational challenges and business needs
- Continually improving processes and services
- Attaining corporate and departmental long-term goals
- Anticipating and influencing future environmental and regulatory changes

Investment in research is leveraged through strong partnerships with industry, academia, conservation authorities, and funding agencies. Leveraging funding from partners and external grants produces a substantial multiplier effect for York Region's investments in research and delivery of services.

Strong partnerships help drive research and innovation

In 2021, York Region leveraged partnerships with the Water Research Foundation, the University of Toronto's (UofT) Drinking Water Research Group, Ryerson University, Trent University, and Natural Sciences and Engineering Research Council of Canada (NSERC). All research is driven by business needs to address problems relating to cost, quality, time and

improving service delivery. In this way, Environmental Services is ensuring that dollars spent on research are used effectively and efficiently.

Research enables informed decision making and leads industry practices

York Region relied on the strength of its research partnerships and collaborated with the University of Waterloo to access a portion of \$12 million in funding for Provincial COVID-19 wastewater surveillance to better understand the prevalence and growth of variants of concern in York Region. Wastewater-based epidemiology is a new and emerging epidemiological tool that was used as a complementary approach to current infectious disease surveillance systems. For example, in early 2021 wastewater signal data indicated that the Alpha variant became the dominant strain before case data. More recently, wastewater data showed Omicron as the dominant COVID-19 variant in York Region before the case data.

Research and innovation initiatives have and will continue to improve facility and field operations, asset management programs and inform design of future infrastructure. Staff engagement with industry experts has created opportunities to modify practices to meet and inform regulatory requirements, as well as develop new programs and tools to anticipate needs and challenges the industry faces.

Research being led by Environmental Services aligns with the Region's Strategic Plan objectives and is organized under the following areas of impact:

- **Public Health**, through surveillance of wastewater as an indicator of COVID-19 in York Region
- **Safe Drinking Water**, by improving treatment of our drinking water, and anticipating future threats to drinking water
- **Wastewater Treatment**, by better characterizing the prevalence and fate of substances of concern and exploring wastewater re-use options
- **Climate Change Action**, by testing new and innovative ways to reduce greenhouse gas emissions in operations and facilities and assessing and adapting to climate impacts on grey and green infrastructure
- **Healthy Forests**, by protecting York Region tree canopy from invasive species, supporting its rich biodiversity, and providing a healthy environment for residents
- **Minimizing Waste**, by researching innovative methods to help York Region residents reduce and reuse waste materials and promoting a circular economy

Despite staff capacity constraints caused by COVID-19, five new projects were initiated in 2021. 21 projects continued from 2020, for a total of 26 research and innovation projects actively underway over the course of 2021.

Key areas of research conducted last year are outlined in Table 1 below. Additional research highlights are outlined in Attachment 1.

Table 1
Summary of Notable Research and Innovation Projects in 2021

Theme	Example Research	Partners
Public Health	<p>ONGOING: COVID-19 Wastewater Surveillance</p> <p>Environmental Services and York Region Public Health joined the Provincial Surveillance Initiative to provide wastewater samples and advance COVID-19 detection in wastewater. Initiative leveraged program partnership with the Public Health Agency of Canada who provided analysis for the presence of variants of concern detected in wastewater.</p>	Universities of Waterloo and Ottawa, Province of Ontario, Public Health Ontario, Public Health Agency of Canada, Peel Region, and several Ontario municipalities
Safe Drinking Water	<p>ONGOING: Developing Guidance for Assessment and Evaluation of Harmful Algal Blooms, and Implementation of Control Strategies in Source Water</p> <p>In partnership with many utilities including South Nevada Water Authority and Water Research Foundation, the project aims to develop monitoring and assessment guidance for harmful algal blooms. York Region participated in the following areas: Adenosine Triphosphate (ATP) monitoring, source protection and monitoring, and benthic sampling around the Keswick Water Treatment Plant intake.</p>	Water Research Foundation, Drinking Water Research Group (UofT), South Nevada Water Authority, and various utilities
Wastewater Treatment	<p>ONGOING: Feasibility of using granular activated carbon (GAC) filter to treat for PFAS/PFOA in wastewater</p> <p>Investigating the possibility of using granular activated carbon to treat wastewater for PFOA (Perfluorooctanoic acid) and PFOS (Perfluorooctanesulfonic acid) compounds (also known as 'Forever Chemicals'). York Region continues to provide water from Keswick Water Resource Recovery Facility for testing.</p>	Drinking Water Research Group (UofT)
Climate Change Action	<p>ONGOING: Reducing municipal water loss and energy consumption through pressure management</p> <p>Awareness of new mobile technology, identification of distribution system leaks, as well as potential cost savings and increased water and energy efficiency.</p>	Hydratek, IESO, local municipalities, National Research Council Canada, Ontario Clean Water Agency, Ontario Water Works Association, UofT and other municipalities

Theme	Example Research	Partners
Healthy Forests	ONGOING: Biological controls for Emerald Ash Borer Tests biological control options informing management of Emerald Ash Borer populations to reduce impacts on trees and forests.	Natural Resources Canada
Minimizing Waste and Circular Economy	NEW: Circular Cities and Regions initiative Pilot designed to help municipalities in Canada advance the circular economy in their communities through information exchange, access to experts and facilitated support for road-mapping.	Federation of Canadian Municipalities (FCM), National Zero Waste Council, Recyc-Quebec, and Recycling Council of Alberta

Strong strategic partnerships with academic institutions, industry experts, consultants, conservation authorities, and other public utilities engaged in research, supports Environmental Services' continual implementation of innovative solutions to complex problems. Research and partnerships enable us to leverage a greater pool of funds and expertise to achieve more meaningful research outcomes, manage risk effectively and maximize the value of the Region's financial and staff contributions.



Erin Mahoney, M. Eng.
Commissioner of Environmental Services



Bruce Macgregor
Chief Administrative Officer

Attachment (1)
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