

Clause 14 in Report No. 10 of Committee of the Whole was adopted, without amendment, by the Council of The Regional Municipality of York at its meeting held on June 23, 2016.

14

University of Toronto Drinking Water Research Group Partnership
Renewal to Support Research and Innovation

Committee of the Whole recommends adoption of the following recommendations contained in the report dated June 9, 2016 from the Commissioner of Environmental Services:

1. Council enter into agreement with the Governing Council of the University of Toronto, Drinking Water Research Group, to renew York Region's partnership in the Natural Sciences and Engineering Research Council of Canada Senior Industrial Research Chair for a total cost of \$400,000 divided evenly over five years.
2. The term of the agreement extend from April 1, 2017 until March 31, 2022.
3. The Commissioner of Environmental Services be authorized to sign this agreement.

Report dated June 9, 2016 from the Commissioner of Environmental Services now follows:

1. Recommendations

It is recommended that:

1. Council enter into agreement with the Governing Council of the University of Toronto, Drinking Water Research Group, to renew York Region's partnership in the Natural Sciences and Engineering Research Council of Canada Senior Industrial Research Chair for a total cost of \$400,000 divided evenly over five years.
2. The term of the agreement extend from April 1, 2017 until March 31, 2022.
3. The Commissioner of Environmental Services be authorized to sign this agreement.

2. Purpose

This report outlines the benefits of continued partnership with the Drinking Water Research Group and seeks Council endorsement of the renewed five year partnership agreement.

3. Background

Drinking Water Research Group partnership puts York Region at the forefront of innovative water treatment research in Canada

The Drinking Water Research Group partners with municipalities and industry leaders to explore new technologies, develop, advance and optimize expertise in drinking water treatment and delivery by linking treatment with source water quality and enabling the use of emerging technology.

York Region first entered into a partnership with the Drinking Water Research Group in 2008 and Council endorsed the renewal of the partnership for a further five years (2012 to 2017) in September 2011. Through this seven year partnership, the Region has positioned itself as a leader in innovative research relating to new and emerging issues in drinking water treatment, completing multiple projects that realized benefits for the Region and the water industry as a whole.

York Region's partnership with the Drinking Water Research Group is up for renewal in 2017. Renewing this agreement now provides an opportunity over Q3/Q4 2016 to finalize details of the joint research plan for 2017 and beyond.

Drinking Water Research Group partnership has resulted in process and water quality improvements for the Region

As previously reported to Council on an annual basis, with the most recent report in March 2016, Table 1 briefly describes recent Drinking Water Research Group partnership projects and programs, which have yielded benefits to the Region.

Table 1
Drinking Water Research Projects Summary and Benefits

Project	Summary	Benefits/Findings
Biological Active Filtration	Assess biological removal of organic substances at Georgina Water Treatment Plant	Enhanced reduction of regulated disinfection by-products in drinking water Extended life of filter media, saving \$450,000
Mussel Deterrence and Control	Investigate alternative chemicals to minimize quagga mussel invasion on Lake Simcoe intakes	Maintain intake integrity and improved water treatment
Quantitative Microbial Risk Analysis	Assess treatment process resiliency to pathogens at Georgina Water Treatment Plant using emerging Health Canada protocols	Very low risk to pathogens compared to other Ontario drinking water systems
Chloramine Secondary Disinfection Studies	Investigated impacts of water age, source blending, nitrification, optimum treatment and residual stability	Better understanding of in-pipe sedimentation and enhanced chloramine stability for local municipal systems

4. Analysis and Options

Partnership projects are cost effective due to matching federal funding and pooled partner resources

Since 2007, the Drinking Water Research Group at the University of Toronto has held a Senior Industrial Research Chair awarded by the Natural Sciences and Engineering Research Council, a federal agency tasked with promoting and funding industry leading research. Research Chairs are awarded to professors who are demonstrated leaders in their area of study at the national and international levels. Through this Chair, the Drinking Water Research Group has access to matching funding from the Natural Sciences and Engineering Research Council for partner projects, resulting in good value for money for York Region. The Drinking Water Research Group estimates the total federal funding contribution to be \$2 million over the next five year period.

The Natural Sciences and Engineering Research Council promotes opportunities for collaborative research within localized geographical areas. Accordingly, the Drinking Water Research Group Industrial Research Chair works with many local

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water utilities in Southern Ontario, including York Region, the City of Toronto, Region of Peel, Region of Durham and City of Barrie, encouraging and enabling them to leverage and share knowledge based on their common interests in Lake Ontario and Lake Simcoe. Through research projects, multiple partners work collaboratively to better understand and resolve key challenges and emerging issues impacting the group as a whole. This allows the Drinking Water Research Group to pool resources and maximize the benefit to each of its partners. Work done to assist the Region of Peel and City of Toronto also benefits York Region in terms of improved water quality, asset management and responsiveness to industry change. Accounting for contributions from all industry partners, York Region will benefit from a projected \$4 million research program while contributing only one tenth of the funding.

Partnership renewal increases York Region's leadership role in drinking water research and innovation and increases collaborative opportunities with the Regions' service delivery partners

Partnering with the Drinking Water Research Group has increased York Region's profile within the water industry as well as demonstrated leadership and due diligence. York Region's industry profile as a leader in water research and innovation is enhanced through presentations by the Drinking Water Research Group members at local, national and international conferences. Over the last four years, many journal articles based on partnership work have been published in peer-reviewed journals. Dozens of graduate and post-graduate students have passed through the Drinking Water Research Group, bringing with them keen awareness of York Region and a positive working experience, graduating as technology leaders in the industry.

Partnership renewal provides advance knowledge of emerging issues

Association with the Drinking Water Research Group has provided York Region immediate access to industry insight, knowledge and expertise as well as developing key Federal, Provincial and industry contacts. This awareness has enabled York Region to anticipate and prepare for policy and regulatory changes, future industry challenges as well as respond to customer concerns. Key examples of this preparation include detection and treatment for emerging contaminants including pharmaceuticals and cyanotoxins.

Partnership renewal leads to operational excellence and generates valuable learning opportunities

York Region staff have been actively involved in all projects with the Drinking Water Research Group and have had the opportunity to learn first-hand from

industry research leaders. Staff attend the annual “Technology Transfer Day” hosted by the Drinking Water Research Group, where keynote speakers highlight new industry trends or challenges and project outcomes. The event provides networking opportunities with partners including the cities of Toronto, Barrie and Peterborough as well as the regions of Durham and Peel. In addition, the Drinking Water Research Group professors have presented at several Region sponsored events including a leadership event, the Water Summit and a Water Re-Use seminar. The industry insight and knowledge sharing at these events are valuable benefits of this partnership.

Continued partnership with the Drinking Water Research Group would permit the Region to further explore the subject areas previously mentioned plus have the ability to participate in important new drinking water research. Research projects over the next five years include:

- Further evaluation of Ferrate as an effective mussel deterrent and ability to act as a pre-coagulant improving membrane performance.
- Analysis of the impacts of membrane aging, cleaning and fouling on performance and modelling of the asset life cycle to inform the cost effective replacement of membranes at the Georgina Water Treatment Plant.
- Collaborative drinking water quality and treatment research studies with partners at the City of Toronto and Region of Peel.
- Optimization of biologically active filtration exploring the impacts of microbial community structure and operational regimes.
- Study impacts of the Region’s new re-chloramination facilities (secondary disinfection boosting for the York Water System) on the formation of nitrogenous disinfection by-products (NDMA).
- Developing a robust tool to determine remaining lifespan for granular activated carbon with respect to taste and odour compounds

Access to the Drinking Water Research Group’s laboratory facilities and research expertise is critical to enabling the Region to achieve these research objectives.

Link to key Council-approved plans

Renewal of the partnership will address business drivers and strategic objectives included in the 2015-2019 Strategic Plan. It will strengthen existing partnerships with the City of Toronto, Region of Peel and Region of Durham on collaborative research studies. The partnership provides a seamless support team that continually improves the quality of water services. This proactive approach positions York Region to respond to regulatory challenges and supports

communication and increased confidence in the Region's drinking water systems. The partnership also advances York Region's standing with respect to the Provincial *Water Opportunities Act*.

5. Financial Implications

Partnership has realized operational savings offsetting research investment

The total cost of renewing the partnership with the Drinking Water Research Group is \$400,000 over a five year period from April 1, 2017 to March 31, 2022. The annual cost breakdown for the partnership is summarized in Table 2.

Table 2
Drinking Water Research Group Annual Cost Summary

York Region Costs	Year 1 2017	Year 2 2018	Year 3 2019	Year 4 2020	Year 5 2021
Annual Costs	\$80,000	\$80,000	\$80,000	\$80,000	\$80,000

The annual cost is included within the approved operating budget for the Environmental Services Department.

Over the previous five year partnership period, operational savings of approximately \$450,000 were realized, exceeding the Region's partnership funding cost of \$400,000.

6. Local Municipal Impact

Partnership with the Drinking Water Research Group will continue to enhance York Region's treatment processes, provide efficiencies in operations and enhance water quality, providing direct benefits to all local municipalities. Continued communication of study results to local municipalities at events such as the 2015 Water Summit attended by several municipalities provide learning opportunities and knowledge enhancing operational planning and practices.

7. Conclusion

Continued partnership with the Drinking Water Research Group will allow York Region to participate in key industry research areas, show leadership and proactive responsibility for emerging issues related to drinking water supply,

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provide process efficiencies, create a strong position on proposed Federal and Provincial policies and regulatory changes as well as maintain public confidence in the Region's drinking water supply. Council is asked to approve the funding and cost of the five year agreement.

For more information on this report, please contact Roy Huetl, Director Operations Maintenance and Monitoring at ext. 75323.

The Senior Management Group has reviewed this report.

June 9, 2016

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Accessible formats or communication supports are available upon request