

To: Warden and Members of County Council

From: Director of Public Works

Proposed Backflow Prevention Program and Draft By-law

RECOMMENDATIONS

1. That Oxford County Council receive Report No. PW 2022-35 entitled “Proposed Backflow Prevention Program and Draft By-law” as information;
2. And further, that Oxford County Council authorize staff to undertake a public consultation and engagement campaign to seek input on the proposed Backflow Prevention Program and draft By-law, and report back to Council with final policy recommendations and results for consideration in 2023.

REPORT HIGHLIGHTS

- The purpose of this report is to obtain Oxford County Council approval to initiate a public consultation and engagement campaign in Q3 2022 to Q2 2023 for the development of a user fee based Backflow Prevention Program in order to further safeguard Oxford's municipal drinking water systems and the public health of its water customers.
- This report provides an overview of the proposed Backflow Prevention Program including a phased multi-year implementation plan and a draft Backflow Prevention By-law to govern the program. This report also outlines the existing areas in which the Backflow Prevention By-law would align with legal and regulatory requirements, industry best practices and recommendations, and the County's levels of service.
- The proposed Backflow Prevention Program and By-law will regulate and enforce the installation, inspection, maintenance and testing requirements of backflow prevention devices and other associated cross-connection activities that pose potential risk to the safety of the County's municipal drinking water system.
- Based on the Canadian Standards Association B64 Standard definition of hazards, the proposed Backflow Prevention Program will focus on medium to severe/high hazard threats at industrial, commercial, institutional and multi-residential properties across the County.
- Upon full implementation, it is estimated that the proposed user fee based Backflow Prevention Program will annually offset over \$150,000 of existing rate funded water system operational activity costs.

Implementation Points

Upon approval of the recommendations contained in this report, staff will begin to effectively facilitate communications, program development, and administrative activities associated with the development and implementation of the Backflow Prevention Program and By-law.

The Backflow Prevention Program will be implemented in a multi-year phased plan involving the following key work tasks:

- Public Consultation, Education and Communication (Q3 2022 to Q2 2023);
- Development of Backflow Prevention Program Administration and Financial Requirements (Q3 2022 to Q2 2023); and
- Development of the Backflow Prevention Implementation Program (Q3 2023 to Q3 2024).

Staff will be reporting back to County Council with regular status updates on the implementation progress of the Backflow Prevention Program. Staff will also be seeking future Council approval of the associated Backflow Prevention By-law once finalized.

Financial Impact

Backflow Prevention Program User Pay Fee Model

In Ontario, nearly all of the municipalities with Backflow Prevention Programs charge user fees (property owner) for different elements of the program to recover costs, including but not limited to the following:

- Backflow Prevention Device and Installation Permit Fees (Building Permit);
- Test Tag Fees;
- Cross Connection Inspection and Report Submission Fees;
- Backflow Testing and Report Submission Fees; and,
- Backflow Prevention Device Tester Registration Fees (Qualified Person or Contractor).

The proposed Backflow Prevention Program will help the County ensure that minimum requirements for annual inspections, maintenance, reporting and auditing of Backflow Prevention devices are followed. The proposed Backflow Prevention Program and By-law also ensures that best practices related to the selection, purchase, installation, inspection and maintenance of Backflow Prevention device systems are appropriately carried out by property owners (at their expense) in order to further safeguard the municipal drinking water system.

The County reviewed different cost recovery structures of five other municipalities' backflow prevention programs (refer to Attachment 1). In all cases, compliance with the Municipalities Backflow Prevention By-law does not negate the premise owner's responsibility to obtain any other required permits (i.e. building permits).

The specific fees and operational costs of the Backflow Prevention Program will vary across municipalities based on levels of service, implementation/enforcement practices and hazard risk mitigation process. The County will complete a more detailed review of municipal comparators and develop a budget neutral financial plan to fund the operational and resource costs of Backflow Prevention Program on a full cost recovery basis through a user pay model system.

The user pay approach appropriately removes the cost burden of backflow protection from the residential homeowner (rate payer) who is not posing a hazard to the municipal drinking water system and places that onus, cost and responsibility to the Industrial, Commercial and Institutional (ICI) and Multi-residential customers that are connected to the municipal water distribution system and posing the risk to the safety of the drinking water.

All financial aspects of the County's administration requirements of the Backflow Prevention Program will be brought forward for Council consideration as part of the 2023 and 2024 Business Plan and Budget Process.

The proposed user pay model is intended to nominally charge user fees at a level which is sufficient to offset annual backflow prevention program costs in a manner which operates a net zero budget.

Operational Cost Savings

On June 22, 2022, Report No. **PW 2022-32** entitled "2018-2020 Water Distribution and Wastewater Collection Service Delivery Review – Outcomes and Recommendations", identified Backflow prevention of drinking water systems as a best management practice across almost all municipalities across Ontario. The proposed implementation of a County-wide Backflow Prevention Program will annually afford the reallocation of approximately \$100,000 in front line operator costs from the City of Woodstock. This would be achieved by migrating the operational cost of backflow device installation, testing and inspection activities from rate payers to user fees. These services can be delivered by appropriately certified third parties, instead of municipal water operators, as is the standard municipal practice across the province.

Report No. PW 2022-32 also further recognized that additional annual savings of approximately \$50,000 in operational resources (reallocated from rate to Backflow Prevention Program user fees) can be achieved once the County's proposed Backflow Prevention Program is fully implemented (based on a user fee program).

Communications

Upon approval of the recommendations contained in this report, Public Works staff will work with the Communications team to develop a detailed public consultation and engagement plan to seek input and feedback on the proposed Backflow Prevention Program and draft By-law (refer to Attachment 2).

The consultation and engagement campaign includes, but is not limited to, virtual and in-person public meetings, social media, media outreach, advertising and/or other approaches. More information with respect to the campaign is detailed later in this report.

The findings and outcomes of the consultation process will be documented by County staff and utilized to refine the Backflow Prevention Program and its associated policy recommendations. Staff will report back to Council with the findings of the public consultation and provide final By-law policy recommendations for consideration.

Following Council deliberation, Report No. PW 2022-35 will be circulated to Area Municipalities, local Chambers of Commerce/Business Improvement Associations, Rural Oxford Economic Development Corporation, local Economic Development Officers and local Building Officials for information.

Strategic Plan (2020-2022)

					
WORKS WELL TOGETHER	WELL CONNECTED	SHAPES THE FUTURE	INFORMS & ENGAGES	PERFORMS & DELIVERS	POSITIVE IMPACT
1.i. 1.ii.		3.ii.	4.i. 4.ii.	5.i. 5.ii.	

DISCUSSION

Background

Over the last 30 years across North America, there has been a number of documented backflow incidents that have posed a potentially significant threat to municipal drinking water systems. Backflow incidents within the water distribution system can contaminate the quality and safety of municipal drinking water that can result in health risks to consumers, disrupt the supply of municipal drinking water to residents and businesses, and affect public confidence in municipal water system operations.

As a result of Justice Dennis O'Connor's Walkerton Inquiry Report (2002), a number of municipal water system best management practice recommendations were identified, along with subsequent legislative changes, namely the *Safe Drinking Water Act, 2002*. As the municipal water purveyor, Oxford County provides safe, reliable and high quality drinking water to consumers and is legally responsible for continuously protecting its municipal drinking water system from potential contamination under the *Safe Drinking Water Act, 2002*.

Since the Walkerton water tragedy, the Ministry of the Environment, Conservation and Parks (MECP) has been urging municipalities to implement backflow prevention programs as another multi-barrier protective measure to help ensure municipal water distribution systems are free from potential contamination. Currently, there are more than 50 municipalities in Ontario (i.e. Toronto, Hamilton, Region of Waterloo, Halton Region, York Region, London, Stratford, Guelph, Barrie) that have implemented a Backflow Prevention By-law and successfully executed a Backflow Prevention program.

O. Reg. 332/12 (Ontario Building Code) under the *Building Code Act, 1992*, and the Canadian Standards Association (B64 standard) have also introduced similar backflow prevention requirements in this regard. The *Ontario Building Code* includes technical objectives and administrative provisions to prevent the contamination of the drinking water in private or plumbing systems. The *Ontario Building Code* sets out minimum requirements that must be met when a building is constructed, renovated or undergoes a change of use to a property.

In the document “*Guide for Drinking Water System Owners Seeking To Undertake a Backflow Prevention Program Backflow Prevention Guide*”, the MECP identifies that the *Ontario Building Code* contains objectives and provisions to limit the public’s exposure to an unacceptable risk of injury or illness as a result of hazardous substances including contaminated water.

However, the MECP also identified some limitations with the *Ontario Building Code* backflow prevention provisions as follows:

- Some properties or cross connections may be excluded from requiring a backflow prevention device under the general design requirements.
- Once a premise is occupied, source isolation requirements can be circumvented through changes made to plumbing systems, resulting in new cross-connections within the property.
- During the construction and inspection stages, the design requirements are not always properly identified, documented or enforced due to staff limitations and capacity.
- Limited requirements related to the inspection, maintenance and field-testing of backflow prevention devices once installed.

Such limitations under the *Ontario Building Code* may leave municipal water supply systems at risk. The above are examples of how some premises that may pose a risk to the municipal water supply can bypass the need for a backflow prevention device. This protective gap in coverage can be filled by a municipal backflow prevention program that allow municipalities to intervene and ensure that risk and public safety are consistently evaluated.

The implementation of the proposed Backflow Prevention Program and By-law provides enhanced protection for the County’s municipal drinking water system to address the potential limitations associated with the *Ontario Building Code* to ensure the health risk is fully and consistently assessed for all foreseeable circumstances.

Backflow and Cross Connection

Under typical conditions in the County’s municipal drinking water system, the normal direction of drinking (potable) water flows from the County’s pressurized municipal water distribution system into the private property owner’s plumbing or building system(s). As the municipal water system is operated under continuous positive pressure, water can rarely flow backwards from a serviced private property into the municipal water distribution system.

Backflow refers to the rare circumstance where contaminants may potentially enter the municipal water distribution system from private water services. Backflow is defined as the reversal in the direction of flow where water (and any contaminants within the water) may flow from private plumbing or building system(s) into the County’s municipal water distribution system. Backflow can occur due to either back siphonage or back pressure events as follows:

- Back pressure can occur when the pressure in a private water system is greater than the municipal water distribution system. Back pressure can be caused in industrial processes and situations where booster pumps, elevated process water tanks, temperature increases in boiler systems and elevated piping systems exist.
- Back siphonage can occur when there is a loss of positive pressure in the municipal water distribution system (i.e. large fire fighting event, watermain break, equipment power failures, customer peak demand water use).

A cross connection is defined as any actual or potential connection between the municipal potable drinking water distribution system and any private side non-potable water supply containing source of pollution or contamination. It includes any temporary or permanent connections to private side water systems (through which backflow may occur) including, but not limited to, the following:

- A water conditioning (softener) equipment or boiler systems;
- Auxiliary water supply (wells and storage tanks);
- A chemical or pesticide sprayer attached to a garden hose;
- A high pressure washer utilizing soaps or cleaners connected to a hose bib;
- Heat and cooling systems;
- Irrigation or lawn sprinkler system;
- Connections to firefighting equipment or fire prevention systems (sprinkler systems);
- Industrial chemical feed and process systems;
- Food and beverage processing equipment;
- Connections for medical devices such as dental procedures or dialysis equipment; and
- Photo developing equipment.

The potential for cross connections exists in each of the County's 17 municipal drinking water systems. When backflow occurs through an unprotected cross connection, pollutants or contaminants can enter the County's municipal drinking water system which could threaten the safe, reliable and sustainable supply for its residents and businesses.

Backflow Prevention and Cross Connection Control

If a cross connection cannot be eliminated, a backflow prevention (BFP) device can be installed to prevent backflow (including back siphonage and back pressure) from impacting the County's municipal drinking water distribution system. There are three different methods available to protect the County's municipal drinking water distribution system:

- Fixture or Source Isolation – the installation of a BFP device on each source of potential contamination within a building or facility, which only provides protection to a portion of the plumbing system at the fixture.
- Zone or Area Isolation – the installation of a BFP device that provides protection of individual zones or areas within a building or facility.
- Premise Isolation – the installation of a BFP device at the municipal water line connection within the building or facility providing protection to the County municipal drinking water system.

The *Ontario Building Code* requires protection be provided for both fixture isolation and premise isolation which serves to protect private buildings from any potential water contamination or prevent any potential contaminated water from private buildings flowing back into the municipal water distribution system, respectively. In most cases, premise isolation is generally in place for residential water customers for homes built since this version of the *Ontario Building Code* came into effect.

Backflow Prevention in Oxford County

Oxford County completes annual backflow prevention inspections on approximately 70 County owned BFP devices that are installed at water treatment facilities and bulk water filling stations across 15 municipal drinking water systems. The County also maintains an inventory of voluntarily submitted BFP test reports from various water customers. In 2021, nearly 30 commercial, industrial, and multi residential customers submitted backflow prevention test reports for water services connected to eight different County municipal drinking water distribution systems.

The County's 2016 Design Guidelines and Supplemental Specifications for Municipal Services (Design Guidelines) require that BFP devices be installed at all ICI developments at the property owner's expense. The Design Guidelines indicate the requirement for calibration, testing and records, annual testing and that BFP devices be specified as per the AWWA Canadian Cross Connection Control Manual, which also include the requirements of the CSA B64 Standards.

While the County does not currently have a formal authorized Backflow Prevention By-law in place for the ICI sector, the City of Woodstock has an informal process in place where approximately 900 existing BFP devices within the ICI sector are annually inspected by their water operations staff. However, costs for this service are currently being passed on to all ratepayers as opposed to only those customers who pose the water contamination threat to the municipal drinking water system. The proposed By-law would transition such costs (and related responsibilities) back to these ICI sector customers, as appropriate, via a user fee model.

Comments

Backflow events can expose the County's municipal drinking water system to contaminants, which can result in a deterioration of water quality and in some cases even introduce a public health risk. It is the responsibility of the County to ensure that potable water is protected against the entry of contaminants, pollutants, infectious agents, or other materials or substances.

The proposed Backflow Prevention Program and By-law is considered a best management practice that will provide the County with more authority to further control and safeguard the integrity of their water supply from source to tap. It will formally regulate and enforce the installation, inspection, and testing requirements of BFP devices and other associated cross-connection activities that pose potential risk to the safety of the County's municipal drinking water system. The proposed implementation of backflow prevention will serve to help reduce the risk of cross connections during backflow events by ensuring that in all cases where a BFP device is required, an appropriately selected BFP device is installed, annually tested and regularly maintained.

These proposed undertakings are consistent with the Statutory Standard of Care provisions of the *Clean Water Act, 2006*, *Safe Drinking Water Act, 2002* and the County's drinking water Quality Management System (QMS) policy. Report No. [PW 2022-11](#) (2021 Annual Drinking Water Quality Management System Update) details the requirements of County Council with respect to the Statutory Standard of Care, QMS Annual Management Review, and Risk Assessment process. Such proposed action further complements and expands on the backflow prevention requirements contained within O.Reg. 332/12 (Ontario Building Code) under the *Building Code Act, 1992*.

The County's proposed Backflow Prevention By-law and associated implementation program will mirror those of other successful municipalities in terms of definitions, legal authority, hazard surveys, and ICI/multi-residential property owner obligations for installation, testing, servicing, and records requirements for BFP devices.

Backflow or Cross-Connection Hazard Identification

Oxford County contains a diverse array of serviced mixed-use buildings and businesses. All types of building classification may carry some degree of hazard risk to the municipal drinking water system. As shown in Attachment 3, the Canadian Standards Association (CSA B64 Standard) provides a guide for the assessment of hazards and assigns building types, facilities or operations into three categories (minor, moderate, severe/high).

Through the application of the CSA B64 Standard to MPAC assessed properties, over 2,500 ICI and multi-residential properties were categorized to pose either a moderate or severe/high hazard to the Oxford's municipal water distribution system as shown in Table 1. Single family residential homes will be excluded from the Backflow Prevention Program and By-law as the properties represent a low potential risk to the County municipal water supply and are generally regulated under O.Reg. 332/12 (Ontario Building Code) of the *Building Code Act, 1992*.

Table 1: Property by Zone Category and Potential Hazard Risk Level

Zone Category	Number of Properties*	Potential Hazard Rating
Commercial	1,200	Severe/High, Moderate
Industrial	850	Severe/High, Moderate
Institutional	80	Severe/High, Moderate
Mixed Use	450	Severe/High, Moderate
Multi Residential (Includes apartments, condos, seasonal residences, retirement homes)	TBD	Moderate

* May include up to 900 ICI customers in Woodstock which already have operational BFP devices

As part of the proposed implementation of a Backflow Prevention By-law and Program, the County will begin the process of validating the specific property hazard ratings using cross-connection surveys to better understand the potential risk to the County's municipal drinking water system. The County will initiate the process with an internal review of records associated with water billings, building permits, business licences, and planning and zoning information.

For each hazard category, the CSA B64 Standard and the AWWA Canadian Cross Connection Control Manual is then used to confirm the need and type of backflow prevention measures (i.e. BFP devices for premise, zone or fixture isolation) to be employed at a given property in order to sufficiently address the existing/potential risk to the County's municipal drinking water system.

Backflow Prevention Implementation Plan

Based on the Backflow Prevention Guide and Federation of Canadian Municipalities (FCM) Methodology for Setting a Cross-Connection Control Program, the County has developed a multi-year phased Backflow Prevention implementation plan that will consist of 13 detailed steps as shown in Attachment 4.

The implementation plan would begin by first surveying ICI and multi-residential properties categorized to contain severe/high hazards. Once the surveys are assessed, the installation of BFP devices on their water services would be mandated as appropriate.

The implementation plan includes communication strategies to inform and engage ICI, and mixed-use and multi-residential property owners of the proposed Backflow Prevention By-law and related implementation program. The proposed community engagement and consultation campaign will involve the following activities and tasks:

- Development of detailed Consultation and Communication Plan;
- Virtual Public Consultation Centres (PCC) or Open Houses;
- Consultation and coordination with the Area Municipalities related to the development, implementation and maintenance of the Backflow Prevention Program;
- Consultation with large volume water users to provide an opportunity to obtain input and provide feedback from the public on the draft proposed Backflow Prevention By-law;
- Various online communication and engagement opportunities (e.g. Website, Speak Up Oxford, Social media), including the ability to review related information and materials and submit comments and feedback; and
- Any other consultation and engagement opportunities that may be identified as being required through the review process.

Conclusions

The proposed Backflow Prevention Program and By-law is considered a best management practice that will provide Oxford County with more authority to further control and safeguard the integrity of its water system from source to tap by formally regulating and enforcing the installation, inspection, and testing requirements of backflow prevention devices and other associated cross-connection activities that may pose potential risk to the safety of the County's municipal drinking water system.

SIGNATURES

Report Author:

Original signed by

Travis Pawlick, P.Eng.
Supervisor of Water and Wastewater Technical Services

Departmental Approval:

Original signed by

David Simpson, P.Eng., PMP
Director of Public Works

Approved for submission:

Original signed by

Michael Duben, B.A., LL.B.
Chief Administrative Officer

ATTACHMENTS

Attachment 1: Municipal Backflow Prevention Fees
Attachment 2: Draft Backflow Prevention By-law
Attachment 3: CSA B64 Standard – Guide to Hazards
Attachment 4: County Backflow Prevention Implementation Plan