OPERATIONS COMMITTEE AGENDA

Operations Committee Meeting
Monday, May 15, 2017
Tom Davies Square

COUNCILLOR ROBERT KIRWAN, CHAIR

Evelyn Dutrisac, Vice-Chair

4:00 p.m. OPERATIONS COMMITTEE MEETING
COMMITTEE ROOM C-11

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DECLARATIONS OF PECUNIARY INTEREST AND THE GENERAL NATURE THEREOF

PRESENTATIONS

1. Report dated May 1, 2017 from the General Manager of Growth and Infrastructure regarding Transportation Demand Management Plan for Greater Sudbury. **4 - 9**
(ELECTRONIC PRESENTATION) (FOR INFORMATION ONLY)

- Marisa Talarico, Active Transportation Co-ordinator

(This report presents an introduction to transportation demand management (TDM) and outlines the benefits and opportunities a TDM Plan may create for the City of Greater Sudbury.)

CONSENT AGENDA

(For the purpose of convenience and for expediting meetings, matters of business of repetitive or routine nature are included in the Consent Agenda, and all such matters of business contained in the Consent Agenda are voted on collectively.

A particular matter of business may be singled out from the Consent Agenda for debate or for a separate vote upon the request of any Councillor. In the case of a separate vote, the excluded matter of business is severed from the Consent Agenda, and only the remaining matters of business contained in the Consent Agenda are voted on collectively.

Each and every matter of business contained in the Consent Agenda is recorded separately in the minutes of the meeting.)

CORRESPONDENCE FOR INFORMATION ONLY

C-1. Report dated April 28, 2017 from the General Manager of Growth and Infrastructure regarding Winter Control Operations Update for March 2017. **10 - 12**
(FOR INFORMATION ONLY)

(This report provides the financial results of the 2017 winter roads operations up to and including the month of March 2017.)

REGULAR AGENDA

MANAGERS' REPORTS

R-1. Report dated May 2, 2017 from the General Manager of Growth and Infrastructure regarding Drinking Water Backflow By-law. **13 - 49**
(RESOLUTION PREPARED)

(This report recommends a strategy to finalize the Backflow Prevention By-law and implement a risk reduction program for the City of Greater Sudbury.)

ADDENDUM

CIVIC PETITIONS

QUESTION PERIOD AND ANNOUNCEMENTS

NOTICES OF MOTION

ADJOURNMENT

Presented To:	Operations Committee
Presented:	Monday, May 15, 2017
Report Date	Monday, May 01, 2017
Type:	Presentations

For Information Only

Transportation Demand Management Plan for Greater Sudbury

Resolution

For Information Only

Relationship to the Strategic Plan / Health Impact Assessment

This report refers to providing quality multimodal transportation alternatives to connect neighbourhoods and communities within Greater Sudbury, which is identified in the Strategic Plan under Sustainable Infrastructure.

Report Summary

This report presents an introduction to transportation demand management (TDM) and outlines the benefits and opportunities a TDM Plan may create for the City of Greater Sudbury. This report is for information only.

Financial Implications

The Transportation Demand Management Plan is being undertaken within existing approved budget and staff complement.

Signed By

Report Prepared By
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Active Transportation Coordinator
Digitally Signed May 1, 17

Health Impact Review
Marisa Talarico
Active Transportation Coordinator
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Financial Implications
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Recommended by the C.A.O.
Ed Archer
Chief Administrative Officer
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Transportation Demand Management Plan for Greater Sudbury

Background:

In December 2016, Council adopted the Transportation Master Plan (TMP) for the City of Greater Sudbury. The TMP recommends a sustainability-focused approach to the planning and management of the transportation network in the City, which is to optimize the network through the improvement of transportation facilities for motorists, transit users, cyclists and pedestrians. In line with this approach, the TMP recommends the development of a Transportation Demand Management Plan ('TDM Plan') to maximize the effectiveness of the City's investments in sustainable transportation.

The TDM Plan is being funded through a partnership with the Provincial and Federal governments through the Public Transit Infrastructure Fund. A consultant has been retained to develop the TDM Plan for the City, which is anticipated to be completed by March 2018.

What is Transportation Demand Management?

Transport Canada defines Transportation Demand Management (TDM) as a wide range of policies, programs, services and products that influence how, why, when and where people travel to make travel behaviours more sustainable. TDM can, therefore, include strategies to improve the efficiency and effectiveness of existing transportation infrastructure in addition to strategies that aim to change travel behaviour. Put another way, the objectives of TDM are to motivate individuals to change modes (walk, cycle, take transit or carpool instead of driving alone), travel less (telework, shop online, link several purposes in one trip), or change trip times or routes (choose off-peak hours or less congested roads). The following diagram (Figure 1) shows potential TDM programs, services, policies and measures that may be included in a TDM Plan for Greater Sudbury.

Figure 1. Potential Programs, Services and Policies for the TDM Plan for Greater Sudbury

Why undertake the development of a TDM Plan for the City of Greater Sudbury?

TDM has the potential to support land use policies, encourage more sustainable transportation options, reduce congestion and air pollution and improve public health. TDM programs can result in measureable and positive changes to traffic and pollution issues.

Throughout North America, municipalities are continuing to experience increasing levels of traffic congestion, resulting in longer commute times, increased levels of stress and significant economic losses. To effectively increase the efficiency of the transportation network, solutions other than roadway expansion are required; of which TDM is an integral component. Transportation Demand Management provides a framework for optimizing the transportation system, and may enable the municipality to utilize scarce transportation resources more efficiently.

The introduction and implementation of TDM programs and policies may introduce a number of benefits to the community, including:

1. Integrating land use planning with transportation supply (infrastructure) and transportation demand (Figure 2; Transport Canada);
2. Providing residents and workers with the opportunity to explore alternative transportation options;
3. Reducing costs related to building and maintaining transportation-related infrastructure;

4. Reducing impacts from transportation infrastructure on the environment
5. Improving quality of life for residents and visitors;
6. Reducing overall household transportation-related costs; and
7. Improving health and physical activity levels of the population.

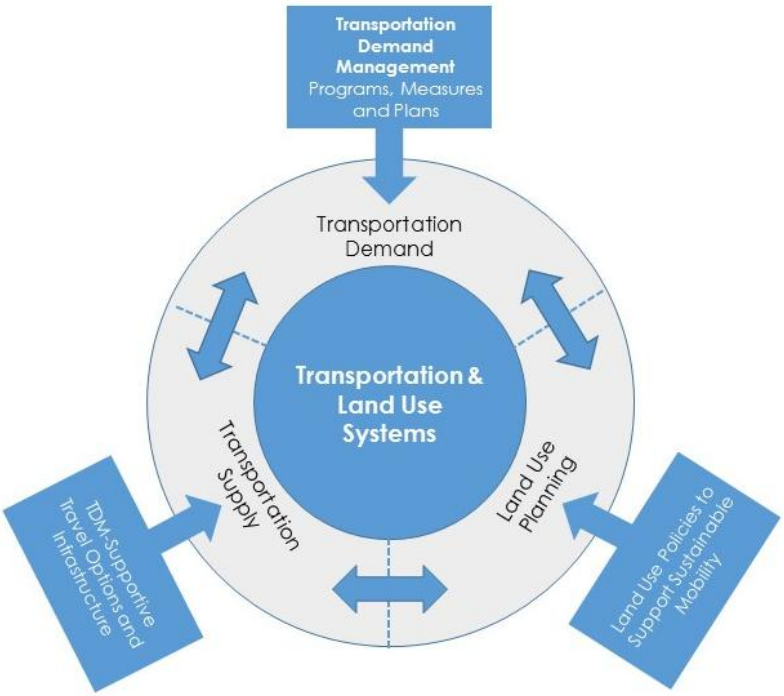

Figure 2. Influencing Travel Behaviours

What Constitutes a Successful TDM Program?

TDM is an excellent way to maximize the efficient operation of urban land use and transportation systems. However, it is critical to emphasize that TDM programs and policies are not a substitute for transportation supply (the infrastructure, vehicles and services that people use to travel) and land use changes – rather, they are a powerful and cost-effective complement. In fact, all three types of measures represented in Figure 2 work best when planned and delivered together in an integrated approach.

Successful TDM programs across North America have seen reductions in single occupant vehicle kilometres travelled in the order of 4% (Vancouver, BC) to 10% (Arlington, VA). Achieving these reductions required both a concerted effort and investment over a period of years.

Opportunities for Greater Sudbury

Implementing TDM requires examining opportunities available within a municipality. Greater Sudbury has many existing building blocks from which to move forward and build a complementary and comprehensive TDM program for the City. The following is a list of City-led initiatives currently underway which may be further enhanced by transportation demand management:

1. The Transportation Master Plan was recently adopted and includes a significant component dedicated to improving Active Transportation, including recommendations for the development of a cycling and pedestrian network. The TDM Plan will assist with achieving objectives outlined in the TMP.

2. The development of the Transit Route Optimization Study (occurring in parallel with the development of the TDM Plan) will provide the City with recommendations to improve the overall efficiency and attractiveness of public transit, which will directly support TDM efforts, and vise versa.

3. Phase 2 of the City of Greater Sudbury Official Plan Review is anticipated to begin later in 2017 and will integrate policies and recommendations of the Transportation Master Plan into the update. This will also present an opportunity to incorporate TDM supportive development policies into the City's Official Plan.

4. The Downtown Master Plan for the City of Greater Sudbury was completed in 2010 and provides a number of recommendations to improve access to downtown by modes other than motor vehicles and to improve the walkability of the area. The TDM Plan will continue to encourage residents to access while limiting the use of a personal motor vehicle.

5. The Strategic Parking Plan for the City of Greater Sudbury, completed in 2011, focuses on the Central Business District (Downtown) and is based on the principle that a balanced approach must be adopted for all facets of parking, as parking issues may be improved by more than just increasing supply.

Engagement Strategy

The public is perhaps the most important audience for the TDM Plan, given that ultimately, it is the behavior and transportation choices of the general population that are intended to be influenced by the outcomes of the TDM Plan. The public will have significantly varying levels of understanding related to TDM, and will need to be educated, informed, engaged and consulted through a variety of consultation and engaged tactics and promotional tools. The consultant for the City of Greater Sudbury's TDM Plan has proposed a range of engagement and consultation activities designed to solicit the input of a variety of important stakeholders, including decision-makers, technical stakeholders and community interest groups.

An online public opinion poll will be made available on the City's website to gather information about public knowledge and perceptions of transportation demand management measures. This survey will target the general public, with a particular emphasis on obtaining information from individuals who regularly use a motor vehicle for transportation. Information collected will be used to inform which types of programs and solutions may be most effective in the Greater Sudbury context.

The TDM Plan is being developed with input from partners across the organization, including Transit Services, Planning Services, Leisure Services, Parking Services and Environmental Planning Initiatives, as these divisions are likely to play a significant role in the delivery and success of a transportation demand management program for the City of Greater Sudbury.

Next Steps:

The Transportation Demand Management Plan for Greater Sudbury will be presented to Operations Committee for approval prior to the end of Q1 2018. Programs and policies to be recommended in the TDM Plan will be implemented as funds become available.

Resources Cited:

Transport Canada, *TDM Definition, Overview and Rationale,*
Accessed online: http://data.tc.gc.ca/archive/eng/programs/environment-utsp-tdmintro-1039.htm

Transportation Association of Canada, *Effective Strategies to Influence Travel Behaviour: Practical Guide*, November 2012

City of Greater Sudbury, *Downtown Master Plan 2012,*
Accessed online: http://www.greatersudbury.ca/inside-city-hall/downtown-sudbury/the-downtown-sudbury-master-plan/

City of Greater Sudbury, *Strategic Parking Plan 2011,*
Accessed online: http://www.greatersudbury.ca/inside-city-hall/open-government/strategic-plans1/

City of Greater Sudbury, *Transportation Master Plan 2016*,
Accessed online: http://www.greatersudbury.ca/living/roads/draft-transportation-master-plan1/

Presented To:	Operations Committee
Presented:	Monday, May 15, 2017
Report Date	Friday, Apr 28, 2017
Type:	Correspondence for Information Only

For Information Only

Winter Control Operations Update for March 2017

Resolution

For Information Only

Relationship to the Strategic Plan / Health Impact Assessment

This report refers to operational matters.

Report Summary

This report provides the financial results of the 2017 winter roads operations up to and including the month of March 2017. The results for the first three months of 2017 is an over expenditure of approximately $0.7 million.

Financial Implications

In accordance with the Reserve and Reserve Fund By-law, any Roads Winter Control year end under expenditure shall be credited to the Roads Winter Control Reserve Fund provided that the contribution would not place the City into a deficit position, and any year end over expenditure may be funded from this Reserve Fund.

Signed By

Report Prepared By
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Digitally Signed Apr 28, 17

Health Impact Review
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Division Review
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Recommended by the Department
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Digitally Signed Apr 28, 17

Financial Implications
Apryl Lukezic
Co-ordinator of Budgets
Digitally Signed May 1, 17

Recommended by the C.A.O.
Ed Archer
Chief Administrative Officer
Digitally Signed May 1, 17

Background

This report provides the financial results of the 2017 winter roads operations up to and including the month of March 2017. As depicted in Table 1 below, the results for the first three months of 2017 is an over expenditure of approximately $0.7 million. Certain estimates were necessary to account for outstanding invoices.

Table 1
2017 Winter Summary
As at March 31, 2017

	Annual Budget	2017 YTD		
		Budget	Actual	Variance
Administration & Supervision	2,479,180	1,240,447	1,293,501	(53,054)
Sanding/Salting/Plowing	6,885,895	4,434,495	5,349,660	(915,165)
Snow Removal	603,086	488,878	500,608	(11,730)
Sidewalk Maintenance	1,027,728	668,023	625,335	42,688
Winter Ditching/Spring Cleanup	1,762,369	603,912	477,406	126,506
Miscellaneous Winter Roads	4,275,342	1,934,030	1,823,194	110,836
Totals	17,033,600	9,369,785	10,069,705	(699,920)

2017 Winter Control Activities

As shown in Table 2 below, the City received approximately 159 centimeters or 108% of the average snowfall from January to March.

The above average snowfall and freezing rain contributed to an over expenditure of approximately $0.7 million in winter control activities. Large over expenditures occurred in sanding/salting/plowing ($0.9 million). Freezing rain during these months required an increase use of sand/salt. The over expenditure was partially offset by the miscellaneous winter road's activities and delayed winter ditching/spring cleanup.

The year to date budget for sidewalk maintenance and snow removal includes approximately $0.15 million from the enhanced winter sidewalk maintenance option approved in the 2017 operating budget. Without the addition of the budget enhancement, the financial results for the first three months of 2017 would be an approximate over expenditure of $0.85 million.

Table 2
2017 Snowfall

	Jan.	Feb.	Mar.	Apr.	Nov.	Dec.	Total
Normal 30 Year Avg. (cm)	60	52	35				147
2017 Actual (cm)	56	66	37				159
% of Actual to Normal	93%	128%	105%				108%

Miscellaneous Winter Roads

The annual budget for the miscellaneous winter roads cost centre totals approximately $4.28 million, and the major expenses in this cost centre are outlined in Table 3 below.

Table 3
2017 Miscellaneous Winter Roads

Expense Type	Annual Budget (millions $)
Employee Benefits	$ 1.4
Asphalt Patching	$ 0.9
Internal Recoveries (HR, Finance, IT)	$ 0.7
Standby (Contracted Service)	$ 0.7
Health & Safety	$ 0.2
Other (Road Patrol, Emergency Response, Tool Repair, Property Restoration, etc.)	$ 0.4
Total	$ 4.3

Summary

In summary, winter roads operations for the first three months of 2017 resulted in an over expenditure of approximately $0.7 million. As per the Reserve and Reserve Fund policy, any annual over/under expenditures in winter roads operations may be funded/contributed towards the Roads Winter Control Reserve Fund.

Presented To:	Operations Committee
Presented:	Monday, May 15, 2017
Report Date	Tuesday, May 02, 2017
Type:	Managers' Reports

Request for Decision

Drinking Water Backflow By-law

Resolution

THAT the City of Greater Sudbury receives the report dated May 2, 2017 from the General Manager of Growth and Infrastructure, entitled "Drinking Water Backflow By-law";

AND THAT staff be authorized to proceed with the next steps of the continued development of a Drinking Water Backflow Prevention By-law.

Relationship to the Strategic Plan / Health Impact Assessment

This report refers to a priority identified in the 2015-2018 Corporate Strategic Plan under Quality of Life and Place. More sepcifically, this report creates a program and service designed to improve the health and well-being of our youth, families and seniors.

Report Summary

This report recommends a strategy to finalize a Backflow Prevention By-law and implement a risk reduction program for the City of Greater Sudbury and provides the key elements of the backflow By-law as directed by Council following an Operations Committee Report of December 7, 2015. This By-law will satisfy our municipal duty of care as owners of drinking water systems, and address one of the City's corporate strategic priorities.

Financial Implications

This report has no financial implications.

Signed By

Report Prepared By
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Compliance Supervisor
Digitally Signed May 2, 17

Health Impact Review
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Division Review
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Recommended by the Department
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Financial Implications
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Co-ordinator of Budgets
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Recommended by the C.A.O.
Ed Archer
Chief Administrative Officer
Digitally Signed May 3, 17

Duty of Care

Our municipality has a "Duty of Care" that must be exercised with respect to the drinking water supply. A water purveyor has an obligation under the Safe Drinking Water Act to protect its drinking water supply from contamination, and to supply potable water to its customers. Section 11 of the Safe Drinking Water Act requires every owner of a municipal drinking water system ensure the following:

"That all water provided by the system to the point where the system is connected to a user's plumbing system meets the requirements of the prescribed drinking water quality standards"

While contamination events are admittedly rare, experiences with backflow incidents in Stratford and Walkerton show that once the municipal system is contaminated, it can take weeks to completely remove the contaminants from the drinking water system and restore the potable water supply to a safe condition. The public health consequences of such an event can be very significant.

Background

On December 7th, 2015 the Operations Committee directed staff to develop an appropriate by-law (Drinking Water Backflow Prevention By-law) to regulate and protect safe and clean drinking water delivery to the citizens of Greater Sudbury. Staff is currently working on such a By-law including an implementation plan, communication plan, and financial impacts on customers, for further consideration at Operations Committee.

The proposed By-law addresses all properties within the city of Greater Sudbury as well as any properties located outside the city boundaries who are directly connected to our City drinking water systems through a Council approved agreement. Industrial Commercial, Institutional (ICI) and multi-residential properties that pose a higher risk for backflow contamination are required to strictly adhere to this By-law. Residential properties are generally exempt from this By-law, except for those properties that operate an irrigation system, or other features that elevate their backflow risk profile.

The By-law will require property owners identified as posing a "risk" to the municipal drinking water systems to install backflow prevention devices and perform annual testing and maintenance on their backflow prevention devices. It is the responsibility of the property owner to install, test and maintain backflow prevention devices. Provisions of the By-law also require property owners to conduct and submit a plumbing survey (called a Cross Connection Survey) of their property once every five (5) years to identify any changes or additions made that could impact their backflow risk profile. Should any

changes be recognized as a contamination threat the property owner will be required to correct the issue and install a backflow prevention device immediately.

The By-law aligns with the current Ontario Building Code requirements for backflow prevention. The By-law does not supersede the Building Code or impose any higher standards than are required for construction of a new building and plumbing systems. The By-law is also consistent with the By-laws adopted by many other municipalities in Ontario.

Key Elements

- The By-law addresses all properties who are directly connected to our City drinking water system through Council approved agreement;
- The By-law supports the Ontario Building Code (OBC) requirements for backflow prevention without superseding the OBC or imposing any higher standards;
- The By-law requires a "full" Drinking water Backflow Prevention program for Industrial/Commercial/Institutional (ICI) and multi-residential property owners;
- The By-law aligns with the current building code standard for all properties by addressing retroactive backflow prevention device installations as well as existing backflow prevention devices;
- The By-law requires property owners to conduct plumbing surveys (Cross Connection Survey) once every five (5) years;

Implementation Plan

Drawing from the Canadian Standards Association published list of types of ICI activity, the Water/Wastewater Compliance department will prioritize properties in the City of Greater Sudbury by level of backflow hazard risk they present.

The Water/Wastewater Compliance department will utilize existing staff who are already involved with ICI customers under the Source Control programs and are trained to educate, investigate, administer and enforce the provisions of the by-law. Initially the Water/Wastewater Environmental Compliance Officers will visit each potential "severe Risk" property and educate the owner/manager of the new Drinking Water backflow Prevention by-law and explain their responsibilities under the By-law. Officers will also provide the "Cross Connection Survey" form to the property owner to initiate a risk assessment.

The “Cross Connection Survey” will identify specific risk information for benefit of both the CGS and the property owner and will assess any unaddressed backflow prevention situations. The Environmental Compliance Officers will work with the property owner throughout the process to help resolve the backflow risks within a specified time frame.

Implementation of the Drinking Water Backflow prevention By-law will be handled through the Water/Wastewater Compliance department with existing staffing. The format of the program and the database of current ICI customers, which was developed through our Source Control program inspections over the past five (5) years, will facilitate the planned program implementation.

The implementation program will be delivered in three phases over a ten year time frame. Initially properties recognized as “Severe Risk” will be address in Phase one, while “Moderate and Minor Risk” properties will be approached during Phase Two and Three.

Departmental Alignment & Cooperation

The Ontario Building Code and the CSA Standards provide the framework for the Drinking Water Backflow Prevention By-law program. The Ontario Building code (OBC) was amended in 2014 to require backflow prevention device installations on all new ICI buildings and certain classes of multi-residential properties. Since this amendment, the City Building Services have required necessary backflow prevention devices on all permit applications. The proposed Drinking Water Backflow Prevention By-law will ensure the OBC maintenance requirements of these installed backflow prevention devices will be completed annually. The OBC does not address any retroactive requirements to any properties constructed prior to 2014 so the proposed Backflow Prevention by-law will require any properties posing backflow risks to install and maintain backflow prevention devices in accordance to the OBC specifications.

Communication Plan

Property owners throughout the City of Greater Sudbury will be educated about the new Drinking Water Backflow Prevention By-law through a communication plan. Brochures and flyers have been developed in conjunction with the CGS Communications department. A series of Public Information sessions will be organized to speak to the general public, ICI and multi-residential property owners, and the Development Liaison Advisory Committee (DLAC). The City’s website and social media will also play an important role in educating the public of the new By-law. Staff has already met with the local MOECC and Sudbury and District Health Unit staff members to discuss the proposed Backflow Prevention Program and both parties support the initiative.

Program Elements

Staff conducted a survey throughout Ontario and collected best practices from various municipalities who presently administer a backflow prevention program. Staff has recommended a program that will achieve the following outcomes:

Premise Isolation

Premise Isolation is defined as the prevention of backflow into the drinking water system from a private property building or structure by the installation of a backflow prevention device located at the lot line or the first building/structure on the private property. This type of installation aims to protect the water quality in the municipal drinking water system only. The property owner is only responsible to install one backflow prevention device per water service line in most circumstances.

Zone Isolation

Zone Isolation is a more comprehensive program not only designed to protect the municipal drinking water system, but also to provide backflow prevention devices within each privately owned building where required. This type of installation will require the private property owner to not only install a backflow prevention device per water service prevention devices throughout the private facilities to protect the residents / workers on that private property from a backflow risk.

Next Steps

The next steps of the Drinking Water Backflow Prevention By-law program are as follows:

- Complete the Drinking Water Backflow Prevention By-law for Council approval
- Proceed with the Communication plan; education and outreach to the Public
- Proceed with the three phase implementation plan; Phase One (Severe Risk); Phase Two (Moderator Risk); Phase Three (Minor Risk)
- Proceed with administration and enforcement strategies to ensure compliance with the By-law
- Monitor compliance and effectiveness of the By-law

Conclusion

A comprehensive Backflow Prevention By-law with the key elements and implementation strategies as described in this report will satisfy our municipal duty of care as intended in the Safe Drinking Water Act, and satisfy our corporate strategic priority to strengthen the high quality of life we already know and love.

Presented To:	Operations Committee
Presented:	Monday, Dec 07, 2015
Report Date	Monday, Nov 23, 2015
Type:	Presentations

Request for Decision

Drinking Water Backflow By-Law

Recommendation

THAT the City of Greater Sudbury directs staff to develop an appropriate by-law (Drinking Water Backflow Prevention By-law) to regulate and protect safe and clean water delivery to the citizens of Greater Sudbury including an implementation plan, communication plan, and financial consideration, for further consideration at Operations Committee.

Signed By

Report Prepared By
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Digitally Signed Nov 23, 15

Division Review
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Digitally Signed Nov 23, 15

Recommended by the Department
Tony Cecutti
General Manager of Infrastructure Services
Digitally Signed Nov 23, 15

Recommended by the C.A.O.
Kevin Fowke
Acting Chief Administrative Officer
Digitally Signed Nov 25, 15

Background

The purpose of this report is to enhance Water/Wastewater Services commitment to maintain the delivery of safe, clean water to the residents of the City of Greater Sudbury (CGS). The development of a new by-law is required to oversee the appropriate installation and regular maintenance of devices which are designed to protect the CGS water systems from the risk of backflow contamination events.

In recognition of the potential risks involved with backflow contamination, the Ministry of Municipal Affairs and Housing amended the Ontario Building Code in 2014 to require the installation of backflow prevention devices in all new Industrial, Commercial and Institutional buildings. The Ontario Building Code is not retroactive and therefore cannot insist on backflow prevention device installations in existing facilities.

To address the existing facilities which may pose a threat to municipal drinking water, over 18 other municipalities in Ontario, including Toronto, Ottawa, London, Hamilton and Guelph, presently have Backflow By-laws in effect. Staff is recommending that a Backflow Prevention By-law for the City of Greater Sudbury be introduced to prevent contamination from entering our City drinking water systems.

What is Backflow?

In municipal drinking water systems, backflow is the undesired reversal of water flow against normal direction, which can cause contaminants to enter into the drinking water supply system. There are two causes for backflow: Back-pressure and Back-siphonage. Back-pressure occurs when the pressure in a

private water system is greater than the pressure in the City's water supply system. If this happens, water from a private water system can force its way into the City water supply system. This can be caused by a pump, elevated tank, temperature increase in boiler systems, or other events causing an increase in local pressure.

Back-siphonage is the reversal of normal flow. This is caused by a reduction in the pressure in the local water supply system which can result from nearby fire-fighting water consumption or a water-main break. Back-siphonage can cause contaminated water to be pulled into the municipal water supply system. Both situations pose risks to the integrity of the water supply and the safety of the water supply system.

Key Elements

The City of Greater Sudbury W/WW Services delivers safe and clean drinking water through our distribution systems. The Safe Drinking Water Act and Ontario Ministry of the Environment and Climate Change (MOECC) regulations mandate water purveyors to protect the water supply to the point of delivery. The proposed program would involve the isolation of private plumbing systems from the public waterworks in situations which present a risk to the municipal water supply. This is typically done through the installation of a backflow prevention device connected immediately after the water meter. This is called premise isolation.

The Safe Drinking Water Act places expectations upon everyone involved with the production and distribution of the municipal drinking water supply. Due to the fact that there have been documented backflow incidents in Ontario, staff recommends firm action to mitigate these backflow risks in our community.

The proposed Drinking Water Backflow Prevention By-law will require the installation and maintenance of backflow prevention devices in existing facilities that present risks to the drinking water supply. Also, the proposed by-law will monitor and confirm that the required annual maintenance on all existing backflow prevention devices within the City of Greater Sudbury is completed.

Recently staff has consulted with local stakeholders, such as the local office of the Ministry of The Environment and Climate Change and the Sudbury District Health Unit, concerning the need for a Drinking Water Backflow Prevention By-law. All parties agree that the development of this by-law would be beneficial in protecting our municipal drinking water supplies.

Who will be affected by this bylaw?

The proposed by-law will affect customers whose activities pose a backflow risk to the municipal water supply. This could include various Industrial, Commercial and Institutional customers as well as specific residential customers (i.e. with swimming pools and/or irrigation systems) where there is a greater potential for backflow and contamination to the drinking water supply.

The proposed program would commence with a focus on Education and Outreach and voluntary compliance with the by-law. This would be followed by a prioritized implementation of the by-law according to levels of risk, (highest to lowest) once the by-law receives approval.

Conclusion

That the City of Greater Sudbury support and approve the development of a Drinking Water Backflow

Prevention By-law and implementation program to protect our City's drinking water systems.

Staff will then draft a proposed by-law and implementation program which will be presented for Council's review in early 2016 at the Operations Committee. The implementation program will include the following:

- communications plan
- financial plan / new business plan
- information on cost to community

A Guide for Drinking Water System Owners Seeking To Undertake a Backflow Prevention Program

MINISTRY OF THE ENVIRONMENT AND CLIMATE CHANGE

PIBS #9676e

Ontario

Disclaimer:

This guide is for information purposes only and is intended to provide suggested parameters for the development and implementation of backflow prevention programs should a drinking water system owner decide it wishes to undertake such a program. It is not intended to provide specific advice or recommendations in any circumstances. Moreover, this guide is not, and should not be construed as, legal advice. It is intended for information and educational purposes only and must be read in light of any applicable Acts, regulations and other provincial publications related to backflow prevention programs that are currently in use or as may be published from time to time. If you have any questions about the application or interpretation of referenced legislation or regulations or have other legal questions, including authority for backflow prevention programs, you should consult a lawyer.

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1.0 Background

Backflow incidents have caused contamination of drinking water distribution systems around the world and have not only resulted in a loss of confidence by the public as to the safety of the water that comes from their taps, but also numerous health-related issues. Justice O'Connor also considered their impacts during the Walkerton Inquiry. On pages 236 and 237 of Part Two - Report of the Walkerton Inquiry, he noted that "In addition, as part of their comprehensive distribution program, water providers should have active programs, working together with building inspectors and public health agencies, to detect and deter cross-contamination" and "Distribution systems should have regularly tested backflow prevention valves that can prevent or at least isolate incursions."

Ontario is recognized by many as being a world leader in issues pertaining to drinking water. Stakeholders have consistently highlighted the need for backflow prevention programs. On March 7, 2005 a drinking water advisory was issued to the 30,000 residents of the City of Stratford after a red, foamy substance from a car wash was discovered in the drinking water system. Businesses and schools shut down and some residents were unable to drink the water that came from their taps for a number of days. Upon investigation it was discovered that a properly installed and functioning backflow prevention device could have prevented this event from happening. This incident is just one of many that have occurred in Ontario over the last twenty years that have been reported.

The ministry, responding to the Stratford incident, established a multi-stakeholder working group which included staff and representatives from the Ministry of Municipal Affairs and Housing, the Ontario Water Works Association (OWWA) and the Ontario Municipal Water Association (OMWA). Membership within the working group grew to include representatives from a number of other ministries, building/plumbing associations/organizations, training groups and municipalities which have direct experience with cross-connection control/backflow prevention. The working group was tasked with reviewing existing information and developing ideas/concepts for reducing the frequency and risk of cross-connection/backflow incidents and the impacts they have on drinking water systems.

The working group and many other jurisdictions have recognized that backflow prevention programs are needed. They have also recognized that the prevention of backflow is a critical component in ensuring the safety of the drinking water supply and ultimately public health.

To proactively assist our ministry program partners and regulatory stakeholders in understanding and adapting to issues raised by the working group and in response to requests from stakeholders, the ministry's Chief Drinking Water Inspector requested the development of a document which could serve as a

guide for those partners seeking to develop or implement backflow prevention programs.

The efforts of the working group resulted in the development of this document. It provides technical guidance to the owners of drinking water systems who have moderate and severe hazard facilities (as defined within the Canadian Standards Association (CSA) B64.10-11) connected to their drinking water systems. Though primarily focused on owners/operators of municipal drinking water systems, the information contained within this guide can be used by any owner of a drinking water system seeking to develop and implement a backflow prevention program.

This guide is not intended to be a detailed engineering or procedural manual. However, it is intended to address aspects pertinent to the design of water treatment units, as well as cross-connection control considerations that may help protect drinking water consumers in a more standardized and consistent manner.

2.0 Introduction

Cross-connections are present in every drinking water supply system and, depending on the size of the system, hundreds or thousands of potential cross-connections can exist. Cross-connections that are not protected against backflow are potentially a dangerous source of contamination. When backflow occurs through an unprotected cross-connection, pollutants and contaminants can enter the private plumbing system and the municipal water distribution system and be delivered to other consumers or locations. The task of eliminating, mitigating or reducing the risks created by cross-connections is enormous.

Water typically flows within a drinking water system in one direction. If the water within the system begins to flow in the opposite direction as a result of back pressure (pressure greater than water supply pressure) or back-siphonage (caused by negative pressure within a water system), there is a possibility for contamination as a result of a backflow. This possibility can be increased if there are potential cross-connections within/to the system. These can occur in any building, structure or property - whether industrial, commercial, institutional, multi-residential or residential - connected to the drinking (potable) water supply distribution system. Problems can be caused by breaks or repairs to watermains, fire fighting activities or reductions to or stoppages of the main water supply pressure.

Backflow as a result of actual or potential cross-connections between a drinking water system and any source of pollution or contamination (such as pathogens or chemicals) has the potential to impact the users of the drinking water system. The purpose of backflow prevention programs is to ensure that the drinking water supply is protected against the entry of contaminants, pollutants, infectious agents (pathogens) and other materials and substances from cross-connections which could harm users and negatively impact the water supply distribution network.

> ***NOTE:*** *The terms cross-connection control and backflow prevention are often used interchangeably.*

It is important to understand that for a drinking water supply to become contaminated via a cross-connection three things need to happen simultaneously:

1. an open source of drinking water supply piping must be unprotected (or improperly protected) from a cross-connection;
2. a physical cross-connection must be made between the drinking water supply piping and a contaminant source; and
3. hydraulic event/backflow conditions must occur.

In general terms, plumbing codes attempt to address backflow prevention. They do so in various ways. The method can be as simple as the provision of an air gap or as complex as requiring the installation of a backflow prevention device. Within any building, it is possible to have interconnections between the drinking water supply and any fixture, appliance, system, or process which has a drinking water supply. These connections are defined as cross-connections and some form of backflow prevention device should be in place to prevent backflow (including back-siphonage and back pressure) from impacting the drinking water supply.

Regulatory requirements under the Building Code are supplemented by good engineering practices as outlined in CSA B64.10- 11/ CSA B64.10.1-11 as amended, the AWWA M14 Manual and the AWWA – Canadian Cross Connection Control Manual, as amended. In the case of a conflict between the provisions of the Building Code and a standard referenced in the Building Code, the provisions of the Building Code prevail (Division A, Article 1.5.1.2, Ontario Regulation 332/12).

2.1 Methods for Backflow Prevention

Water distribution systems - due to their size, complexity and variety of users - are often exposed to potential health risks. Sources of such health risks include cross-connections and backflow. Implementing a backflow prevention program is one way in which a drinking water system owner can minimize water quality degradation from a source connected to the distribution system.

There are several ways to mitigate the potential for backflow:

- provide a physical separation between drinking and non-drinking water systems
- install backflow prevention devices and assemblies
  - ***NOTE:*** *The choice depends on the health hazard of the actual or potential cross-connection and the plumbing hydraulics using a risk based approach.*
- maintain positive pressures in the distribution system
- implement backflow prevention programs

Three primary methods (individual [point of use], zone/area, and premise) are available to protect the drinking water supply. The method used is dependent upon the degree of the hazard. Through the incorporation of the available protection methods the property owner is able to implement a multi-barrier approach that is designed to not only protect the drinking water supply but also the users within the building.

Individual (Point of Use) Protection

Individual (point of use) protection is a means by where backflow devices are installed on each potential source of backflow within the piping of a building/facility in order to protect the rest of the piping within that building/facility from potential contamination.

Zone/Area Protection

Zone or area protection is practiced within buildings/facilities where there exist both drinking and non-drinking water piping systems. This type of protection may also be practised within the distribution system of a drinking water system in order to protect individual zones or areas from possible contamination from another zone or area within the distribution system.

Premise Isolation

Backflow preventers in this instance are typically installed within the facility on the service line connection to the drinking water supply.

NOTE: *Overall, water distribution system operations, including maintaining chlorine residuals, maintaining positive pressures, performing appropriate levels of distribution system maintenance and procedures for responding to customer complaints about water aesthetics, should be covered under a municipality's or drinking water system owner's total water quality management program. A backflow prevention program complements these other aspects of the multi-barrier approach to providing safe drinking water.*

Based on the number of actual and potential cross-connections in a drinking water system, and the potential resulting health hazards, it is important that effective cross-connection control measures be in place. This guide sets out some comprehensive measures that can be adopted into any backflow prevention program established by a drinking water system owner. These include:

- Establishing the need;
- Reviewing regulations and standards;
- Establishing program policy and authority;
  - Obtaining legal advice on what is authorized if the program will be established through a by-law or involves measures that are more than merely voluntary for owners of pre-existing buildings;
- Assessing hazards and classifying them;
- Fire Protection Systems
- Conducting a review of records to identify hazards;
- Establishing a budget and a source of funding;
- Establishing program requirements – including roles and responsibilities

for the drinking water system owner and property owners; and
- Implementing and maintaining the program.

These measures are detailed further under individual headings within the body of this guide.

2.2 Establishing Need

Drinking water system owners/operators need to review the types of facilities that are connected to the drinking water supply and the potential hazard that each one presents in order to determine if and what kind of a backflow prevention program is needed. Each type of facility (industrial, commercial, institutional) and residential building (multi-tenant vs. single family) presents different hazards. For example, a single family residential property presents a different set of potential hazards compared to those typically associated with an industrial connection to the drinking water supply. Backflow prevention programs should be flexible enough to address the hazard present rather than treating all connections in the same manner.

2.3 Reviewing Regulations and Standards

When undertaking the task of establishing a backflow prevention program, drinking water system owners should consider the following legislation and standards.

- *Building Code Act, 1992*
  - Ontario Regulation 332/12, Building Code
    - Canadian Standards Association (CSA) (B64 Series Standards) – *standard referenced in the Code for the selection and installation of backflow prevention devices*
- *Safe Drinking Water Act, 2002*
  - Ontario Regulation 170/03 Drinking Water Systems Regulation,
  - Ontario Regulation 248/03 Drinking Water Testing Services,
  - Ontario Regulation 169/03 Ontario Drinking Water Quality Standards,
- *Municipal Act, 2001*
- *Fire Protection and Prevention Act, 1997*
  - Ontario Regulation 213/07, Fire Code

The Building Code includes provisions to prevent the contamination of the drinking water in plumbing. The Building Code is a regulation made under the *Building Code Act, 1992* and sets out technical and administrative requirements that must be met when a building is constructed, renovated or undergoes a change of use.

The Building Code contains objectives and provisions to limit the probability that, as a result of the design or construction of *a* building:

- a person in or adjacent to the building will be exposed to an unacceptable risk of injury,
- a person will be exposed to an unacceptable risk of illness,
- a person in the building will be exposed to an unacceptable risk of illness due to unsanitary conditions caused by consumption of contaminated water; or
- the public will be exposed to an unacceptable risk of illness due to the release of hazardous substances from the building.

Part 7 of the Building Code specifically deals with plumbing and requirements associated with plumbing. Section 7.6 of Part 7 addresses the requirements for potable water systems and includes provisions to protect potable water systems from contamination. This includes the requirements that potable water systems be designed, fabricated and installed in accordance with good engineering practices (Article 7.6.3.1.), and that connections to potable water systems be designed and installed so that non-potable water or substances that may render the water non-potable cannot enter the system (Article 7.6.2.1.).

The Building Code also generally requires backflow preventers where either backflow or back-siphonage may occur from a source of potential contamination (e.g. Articles 7.6.2.2. and 7.6.2.3.). Premise isolation is covered in Article 7.6.2.6. of the Building Code. Article 7.6.2.4. deals with backflow from fire protection systems.

Section 20 of the *Safe Drinking Water Act, 2002* expressly prohibits any person from causing or permitting any thing to enter a drinking water system if it could result in,

- a drinking water health hazard;
- a contravention of a prescribed standard; or
- interference with the normal operation of the system.

Persons who allow contaminants to enter a municipal drinking water system and interfere with its normal operation have been successfully prosecuted under section 20 of the *Act*.

The CSA B64 standards require that the cross-connection control requirements meet all local, provincial and national building permit and code requirements. In Ontario, this includes the Building Code and local by-laws.

> ***NOTE:*** *There are a number of reference manuals also available to assist with program development. These include the InfraGuide Methodology for Setting a Cross Connection Control Program, AWWA M-14 and the AWWA Canadian Cross Connection Control Manual.*

2.4 Establishing Program Policy and Authority

In the event a drinking water system owner (e.g. a municipality) decides to implement a backflow prevention program, the drinking water system owner may wish to develop policies containing detailed information about the program and its goals and make them available to all parties involved in the program (drinking water system owner staff, customers, installers and testers, engineers, mayor and council, and other interested parties).

> ***NOTE:*** *The terms backflow prevention device tester and cross-connection control specialist are often used interchangeably.*

Drinking water system owners/operators may also want to consider developing a separate policy document detailing an education and outreach campaign designed to increase the level of awareness around the issue and the potential impacts to the drinking water supply.

Stakeholders that have developed backflow prevention programs have raised questions about the legal authority for certain aspects of programs which may go beyond Building Code requirements for new construction or changes in use, or may involve more than voluntary actions on the part of owners of existing buildings. Section 35 of the *Building Code Act, 1992* provides that the Act and the Building Code supersede all municipal by-laws respecting the construction or demolition of buildings. Legal advice should be sought in respect of questions associated with more comprehensive backflow prevention programs, including those that are proposed to be established by municipal by-law in light of Section 35 of the Act.

2.5 Assessing and Classifying Hazards

A backflow prevention program should include a method to assess the risk or "hazard" of each potential cross-connection to the drinking water supply and whether the property owner has implemented the appropriate protections for that category of risk. The CSA B64.10-11 standard defines hazards to the drinking water system in three categories; Severe, Moderate and Minor.

- Minor is nuisance to the water supply and results in a reduction in only the aesthetic quality of the water.
- Moderate is any minor hazard connection that has a low probability of being a severe hazard.
- Severe is any type of cross-connection or potential cross-connection involving water that has additives or substances that, under any concentration, can create a danger to health.

Each type of facility (industrial, commercial, institutional) and residential building (multi-tenant vs. single family) connected to a drinking water system presents

different hazards. For each hazard category, the backflow prevention program should be explicit about the kinds of protections needed. For example, a fulsome program may require protection at the fixture as well as zone/area and premise isolation, plus monitoring and tracking of backflow devices and assemblies. A more minimal program may only require premise isolation and monitoring, leaving other requirements up to the owner of the facility.

> ***NOTE:*** *There are a variety of backflow prevention assemblies and devices designed to protect the levels of hazard. The CSA B64.10-11 standard and the Canadian Cross Connection Control Manual provide a guide for the assessment of hazards and the selection of backflow preventers for both internal and premise protection.*

The hazards present within industrial, commercial and institutional facilities are well known but it is also important to consider the hazard that multi-tenant residential buildings may present. Policies may be developed to address multi-tenant residential building connections and the potential for backflow from such buildings. However, it is important to note that the Building Code states "*Buildings of residential occupancy within the scope of Part 9 are not required to be isolated unless they have access to an auxiliary water supply.*" In most cases residential connections would fall in the moderate or minor categories.

2.6 Conducting a Records Review to Identify Hazards

Once the categorization of hazards and level of protection required has been established the owner of the drinking water system can begin the process of identifying sites that may present a hazard to the drinking water system. This process can begin with an internal review of records associated with water billings, building permits, business licences, and planning and zoning.

> ***NOTE:*** *Other local officials (e.g., works, local fire department) may also have information as to the hazard potential that a site may present which could be useful in the identification of sites.*

The list of sites that is compiled as a result of this process should also be divided into specific categories associated with industrial, commercial, and institutional connections and then by the level of potential hazard that each may present. The adoption of such an approach allows the drinking water system owner to focus its resources on those facilities which present the highest hazard.

> ***NOTE:*** *Protecting all services the same way may have hidden costs – For drinking water system owners who choose to protect all services (industrial, commercial, institutional and residential) at the service connection/meter, inspection costs for their program may be higher than necessary. By treating all facilities in the same manner, regardless of the level of hazard presented by the cross-connection, inspections cannot be tailored to best*

meet the risks posed.

2.7 Establishing a Budget

A backflow prevention program requires an established budget. Costs associated with program development, implementation and maintenance (including adequate staff time and resources) should be defined, and any additional funding requirements identified. Typical budget costs include:

- survey and hazard assessment
- records/data management
- education and outreach
- training

The drinking water system owner should also budget for implementation of the backflow prevention program requirements for its own facilities at the initial phase of the program. This would demonstrate to affected facility and property owners that the drinking water system owner is supportive of and committed to the success of the program.

The cost of implementing a successful backflow prevention program can vary significantly depending on the type of program the municipality decides to implement and the number of identified potential hazard connections. A municipality's historical cost for water quality incident responses associated with potential backflow events could be applied to the implementation costs of a backflow prevention program, since hazards are now being assessed, controlled, and reduced (assuming the municipality can tabulate these historical costs).

2.8 Fire Protection Systems

Devices installed in fire suppression systems, as required by the Fire Code, should be maintained and tested in accordance with the requirements of the associated Fire Code standards.

- Fire suppression systems, as required by the Fire Code, should have check valve(s) or equivalent installed to ensure that the system is "charged" and ready for use. If this assembly is determined to be functioning as designed, no additional device would be required.
- If a hazard from the fire suppression system is identified during the survey of the facility, an assessment of the fire suppression system should be conducted by a qualified person, prior to the installation of a device.
- Any devices that are found to be non-functional should be replaced with a similar device by a qualified person.

When implementing a backflow prevention program, the drinking water system owner should be aware of requirements for backflow preventers on certain types

of fire protection systems. These are outlined in CSA B64.10–11, CSA B64.10.1–11 and Article 7.6.2.4. of the Building Code.

It is recommended that retrofitting older fire protection systems to apply backflow prevention devices be done only with a comprehensive evaluation of each system by a qualified, competent person (such as a professional engineer). This qualified person will be able to ensure adequate flow and pressure through the device(s) to meet fire protection needs, and to address the thermal expansion issues associated with installing backflow prevention devices on sections of the fire protection system that include anti-freeze.

> ***NOTE:*** *AWWA Research Foundation (AwwaRF), Impact of Wet-Pipe Fire Sprinkler Systems on Drinking Water Quality (AwwaRF, 1998) provides more information on the application of backflow preventers to new fire protection systems, as well as possible hydraulic problems associated with retrofitting existing wet-pipe fire sprinkler systems.*

3.0 Establishing Program Requirements

Backflow prevention programs should set out the roles and responsibilities of the drinking water system owner and the property owner.

3.1 - Drinking Water System Owners - Roles and Responsibilities

Drinking water system owner responsibilities would typically include:

- providing safe water to all drinking water users, including facilities that may present a risk through cross-connections
- providing staff to administer the backflow prevention program
- providing resources to assess facilities connected to the drinking water supply
- reporting back to the property owner the results of the assessment and recommended actions for the protection, installation and ongoing testing of the backflow prevention assemblies and devices (see 3.1.7); and
- developing an education and outreach awareness program (see 3.1.1)

3.1.1 - Education and Outreach / Awareness

Raising awareness of the issues associated with cross-connections and the potential for contaminating and damaging the drinking water supply and public health is critical to the success of the backflow prevention program. Support for and credibility of the program depends on the participation of those implementing the program as well as those affected by it (e.g., industry, plumbers, design engineers, suppliers and other related agencies).

The public relations and education components of a backflow prevention program are also essential to its success. Many groups should be targeted, including municipal staff (e.g., works, fire department), councillors, the mayor, and administrators; residential, commercial, and industrial consumers; and stakeholders such as professional, trade, and technical groups including private house/business inspection firms.

Municipal staff, councillors, the mayor, and administrators should be educated about the drinking water system and backflow prevention program so they can communicate effectively with consumers and the public.

Awareness can happen through personal contact and presentations as well as written letters, brochures and bill stuffers to customers. To date some very successful approaches have included:

- presentations;
- advertising;

- displays;
- brochures;
- bill stuffers;
- letters;
- articles in newspapers and electronic publications; and
- information on the drinking water system owner's web page.

Presentations made at related organizational conferences and seminars as well as advertising in print, radio and TV media can be used as a way to get the message out to a large number of customers in a relatively short time. Displays at fairs, malls, hardware stores or home shows are another venue to publicize the program. A key message to share in the materials generated and distributed is that the program is designed to protect the drinking water supply from potential contamination and the health of all users.

Stakeholders are an important part of a successful program, since they are directly involved with the piping systems where cross-connections can occur. Architects, engineers, contractors, builders and trades associated with the installation/maintenance of irrigation systems, sprinkler systems, fire protection systems, HVAC (heating, ventilation and air conditioning) and plumbing should all be educated about the drinking water system owner's requirements for cross-connection control. Trade associations can be an effective venue through which to educate these stakeholders.

Establishing a backflow prevention committee and having stakeholders as members of the committee will increase awareness of the program and enable more groups to be reached. Representatives for a backflow prevention committee could include a drinking water system owner's staff, building/plumbing inspectors, bylaw/legal representatives, health department representatives, plumbing contractors, cross-connection control instructors from local accredited schools, and other interested parties (e.g., industrial, commercial, institutional, multi-unit residential, etc.).

Approaches such as these will foster a greater level of buy-in from these stakeholders, as they will feel some ownership in the process and become champions of the program within their respective local community, organizations and associations.

3.1.2 - Supporting Documentation Currently Available

Information concerning explanations of cross connection control and backflow prevention can be found on:

ABPA video, (2010) available on YouTube or through www.abpa.org;

ABPA Michigan Chapter video, "Mission: Educating the Public", available on YouTube or by contacting the Michigan Chapter through www.abpa.org;

AWWA video, "Backflow Prevention and Cross-Connection Control" (AWWA, 2003).

> ***NOTE:*** *Each video presents the concepts of how backflow can occur, methods to prevent backflow, and elements of a cross-connection control program. It should be noted that these videos use American terminology, which in some cases is different than Canadian terminology.*

3.1.3 - Records Management

A document and record control system should be developed to track the facilities assessed/inspected, assessment/inspection records and requirements, the devices and assemblies installed and the testing requirements of those assemblies.

> ***NOTE:*** *Municipal drinking water system owners should use Ontario's Drinking Water Quality Management Standard - Pocket Guide (Element 5) to develop this system.*

Drinking water system owners/operators should also consider requiring that property owners make documentation associated with backflow prevention program requirements available for inspection by the system owner or its agent.

As part of a backflow prevention program, a drinking water system owner may need to track licensed testers and equipment, and be able to develop and generate standard templates, letters and notifications. To help with these tracking activities, manual and/or computerized systems could be developed internally or available data management packages used.

> ***NOTE:*** *The drinking water system owner should assess its end requirements at the start of the program to develop a tracking system that will meet its needs and will be flexible enough to evolve as the program develops.*

3.1.4 - Qualified Persons

The program should outline not only the requirements for hazard assessment and device inspection and testing, but who can perform such activities. In most cases, the property owner will retain a registered or licensed tester who meets the requirements established by the drinking water system owner.

Many tasks associated with cross-connection control and backflow prevention require training. These include program administration, survey and hazard

assessment, device selection and installation, inspection, testing, repair and potentially enforcement. While a drinking water system owner may wish to conduct its own in-house training for some elements, especially for administration of its program, an increasing number of accredited schools and colleges are offering cross-connection control survey courses, and backflow prevention device tester certification and re-certification courses.

> ***NOTE:*** *The requirements for the selection and installation of backflow preventers for new construction or changes in use are set out in the Building Code and this work should be conducted by persons qualified for those purposes. The working group has identified that the testing of backflow preventers should also be carried out by qualified persons, as identified within the CSA B64 standards.*

Backflow prevention device testers can obtain certification through an accredited school or college, and will have to attend a recertification course within the period specified by the certification body after the issuance of the certificate. In addition to certification, a municipality registering or licensing the tester should require a calibration certificate for its testing equipment, another trade or professional qualification (e.g., plumbing certificate), and current liability insurance coverage (CSA B64.10.1-11).

Testers of backflow prevention devices/cross-connection control equipment should meet the requirements outlined within the CSA B64.10.1-11 standard; which states that a tester should be a journeyman/apprentice plumber, pipefitter or equal professional and certified cross connection control specialist from an accredited school. The testing equipment used should be verified and calibrated on an annual basis to maintain and confirm its accuracy.
The regular testing and inspection of the backflow prevention assemblies should be carried out by journeyman/apprentice plumbers registered/licensed by the drinking water system owner (typically the municipality) to perform that work. Licensed testers should be certified by a recognized training institution, in the proper testing and maintenance of backflow prevention assemblies. In Ontario that training is available through commercial training organizations.

> ***NOTE:*** *Proper training of staff in the area of cross-connection control/backflow prevention and experience/knowledge of plumbing principles and systems would be an asset.Cross-connection control courses, offered by accredited schools or colleges, also provide guidance on hazard assessment.*

When undertaking a backflow prevention program it would be helpful to provide a central contact for any inquiries that may arise (e.g., who the drinking water system owner accepts as "qualified persons").

Representatives of the drinking water system owner involved with a cross-connection survey and hazard assessment, inspection, and testing should also be trained in safety procedures, including access issues associated with entry into private buildings, dealing with difficult customers, use of special tools to inspect and test backflow preventers, and access to hazardous locations for both municipal and private property applications. They should also be familiar with relevant Occupational Health and Safety Act requirements.

> ***NOTE:*** *The AWWA has implemented a Cross Connection Control Specialist course and facilitates its delivery through accredited teaching institutions. In Ontario, this and other accredited courses are provided through third party training providers and local colleges. It is up to the drinking water system owner to ensure that testers working in the system owner's jurisdiction are qualified and that the testers' test equipment is verified and/or calibrated on a regular basis. The drinking water system owner could maintain a list of qualified testers and make it available to those customers installing and/or testing backflow prevention assemblies.*

3.1.5 - Registering / Licensing Device Testers

When making application to the drinking water system owner for licensing or registration as a backflow prevention device tester, the applicant should have the following qualifications:

- a certificate as a backflow prevention device tester that has been issued by an accredited organization or association or renewed by that organization or association following completion by the applicant of a re-certification course;
- a current calibration certificate for test equipment (dated within the 12 months before the date of application for licensing or registration);
- another trade or professional qualification (i.e., as per the authorized functions list within the CSA standard); and
- current liability insurance coverage (with an expiry date no less than 6 months after the date of application for licensing or registration).

> ***NOTE:*** *The regulatory authority administering the cross-connection control program should license or register backflow prevention device testers who have the above-noted qualifications.*

3.1.6 - Survey and Hazard Criteria

Although the Building Code mandates that a drinking water supply be protected from cross-connections, backflow incidents still occur both within the internal plumbing of buildings and externally into the drinking water supply. A cross-connection survey and hazard assessment can identify any actual or potential cross-connections, the potential risk of contamination, the probability that backflow could occur, and a determination of the appropriate backflow preventer

to use.

The drinking water system owner, or an acceptable third party, would conduct this assessment to ensure appropriate backflow preventers are identified, and to satisfy itself that adequate protection of the drinking water supply has been provided.

The primary focus of the assessment should be based on the hazards that a facility may pose to the drinking water supply. A systematic approach needs to be taken. Typically, the municipality would identify each facility to determine the types of industrial, commercial and institutional uses that exist, and conduct a cross-connection survey and hazard assessment, focusing first on the types of uses with the highest potential for contamination. Connection size may also be a consideration when deciding which facilities to assess first as this can impact whether a service connection needs be isolated.

> ***NOTE:*** *The drinking water system owner is normally responsible for preparing the survey and hazard assessment templates to be used and accepting the templates completed by those authorized in the program. Using templates is desirable in order to maintain consistency of information and ensure the proper protection of drinking water systems.*

The drinking water system owner, or its representative conducting the assessment, would begin by contacting the property/building owner either directly or in writing to make arrangements to conduct the assessment.

> ***NOTE:*** *The majority of water services a drinking water system owner will have will be in the single family residential sector. The Building Code exempts residential buildings within the scope of Part 9 from having premise isolation unless an auxiliary water supply is present. A municipality may choose to educate these property owners through an awareness campaign.*

The assessment should identify the cross-connections found and whether the required protection is in place. The assessment results should be documented and provided to the property owner. The assessment results could include information such as when installations are needed and the device testing frequency.

> ***NOTE:*** *The type of survey conducted and accepted by the drinking water system owner (i.e., owner self-report; registered/licensed external qualified person conducting assessment on behalf of owner; assessment by qualified staff of drinking water system owner) should recognize the potential hazards present and the manner in which backflow prevention devices may have been previously installed. It should also identify any changes made since original construction that may require that action be taken to protect*

the drinking water supply within the facility, or the connection between the drinking water supply and the facility.

For the hazard assessment, Clause 5.1.4 of CSA B64.10-11 requires identification of:

- the probability that back siphonage will cause backflow;
- the probability that back pressure will cause backflow;
- the severity of any hazard; and
- the type of building.

NOTE: *Assessment of the probability of backflow and severity of the hazard is a very subjective task, since there is no simple formula to apply.*

New building permits need to be reviewed and backflow prevention requirements need to be identified as part of the process in accordance with the Building Code. Educating building officials and building inspectors with respect to Building Code requirements and the objectives of the backflow prevention program may improve the success of the program.

The CAN/CSA B64.10–11 Standard, AWWA Canadian Cross Connection Control Manual, and AWWA Manual M14 all provide guidance on the type of backflow prevention device and level of hazard protected against (i.e., minor, moderate, or severe), and the type of cross-connection and level of hazard (e.g., Annex B of CSA B64.10–11 where photo lab sinks are considered a severe hazard).

NOTE: *Many of the standards and manuals use different terminology for some aspects. For example, AWWA Manual M14 uses the classification of health hazard, or non-health hazard, while the Canadian publications use a three-tiered classification of minor, moderate, or severe. The AWWA Manual M14 provides guidance on the "recommended protection for water purveyor's hazards," which covers the distribution system, treatment plants, offices, and work areas.*

The assessment process should also include the inspection of facilities owned by the drinking water system owner. It is a good idea to carry out these inspections, and any resulting installation and testing of the required backflow prevention devices prior to implementing the program with respect to other potentially affected property owners. Doing so demonstrates that the drinking water system owner has proactively conducted a review of its facilities and addressed the potential hazards. Through such an approach the drinking water system owner can ensure that its assessment/inspection reporting processes are working and foster increased "buy in" from other property owners.

NOTE: *In accordance with the CSA B64.10-11 standard as referenced in the Building Code for the selection and installation of devices, it would be appropriate to isolate the premise as a preventative measure where access*

to a facility is restricted. If the facility owner refuses to install the required protection, then the drinking water system owner may use the tools available, based upon the advice of legal counsel, to protect the drinking water supply.

Survey and hazard assessments should be conducted every five (5) years or as warranted by a change in ownership or facility operations.

3.1.7 - Regular Inspection and Testing (Device)

Regular inspection and testing of backflow prevention devices should be carried out according to recognized industry standards, including CSA B64.10.1-11 Maintenance and Field Testing of Backflow Preventers. There are many other sources for inspection and testing standards, including the AWWA Canadian Cross Connection Control Manual. Generally, backflow prevention assemblies should be tested on installation, when repaired or relocated and at least once a year following installation.

NOTE: *A unit that has been taken out of service for maintenance should be tested prior to putting it back in service.*

Temporary water connections to hydrants should not be allowed unless protected as well as being metered. The protection required would be a Reduced Pressure backflow (RP) preventer supplied by the applicant with test results indicating it is in good working order, or an RP backflow preventer supplied by the drinking water system owner as part of a hydrant use permit process.

3.1.8 - Incident Response Planning and Reporting

Municipal drinking water system owners must have a plan in place to respond to adverse water quality incidents and other problems (other drinking water system owners should also consider having a plan in place). This would include appropriate and expeditious communication to the customers in the affected area, and between the different personnel involved in sampling, flushing, lab analysis, and on-site inspections. This plan should be expanded to incorporate information specific to backflow incidents. This would include procedures municipal staff should follow to isolate and sample the affected area. An on-site cross-connection survey and hazard assessment of the facilities to determine the source of contamination should also be performed. By isolating and flushing the contaminant, it can typically be removed from the system in a timelier manner.

NOTE: *There is an obligation under s.18 of the Safe Drinking Water Act, 2002 to report adverse drinking water test results prescribed in the Drinking Water Systems Regulation, Ontario Regulation 170/03, to the Ministry of the Environment and Climate Change and the medical officer of*

health, and to take such other steps as are directed by the medical officer of health under that regulation.

In instances where detected backflow incidents may result in severe hazards such as depletion of disinfection potential or danger to consumer health, priority measures are required of the drinking water system owner/operator to notify water consumers and resolve the situation. Detection of backflow related to severe hazards that could adversely affect the quality of drinking water must be reported as an "other observation" in accordance with section 16-4 of the Drinking Water Systems Regulation.

The plan should provide for collection of as much information as possible, including licensed laboratory results to determine the type of contamination and the required measures based on health impacts (e.g., boil water advisory, drinking water advisory, etc.). A data management system can be used to identify the addresses where existing backflow prevention devices are installed. This will help reduce or narrow the facilities that may require an on-site inspection for determination of the origin of the contaminant.

While the contaminants can come from facilities with unknown cross-connections that are not protected by backflow prevention devices, they can also come from malfunctioning backflow preventers. In these cases, it is important for the drinking water system owner to have the proper authority available to require immediate testing during a water quality incident to check if a backflow preventer is malfunctioning.

As a follow-up to a backflow incident, the drinking water system owner should promptly review its records and where it is identified that unprotected facilities may have caused the incident, work to have proper backflow preventers installed and tested, and that malfunctioning backflow preventers are repaired or replaced, and re-tested, all in a manner consistent with the policy.

Although the Ontario Ministry of Environment and Climate Change does not specifically regulate or require backflow prevention programs, where such programs exist, operating them in accordance with this guideline will help promote continuous improvement of drinking water safety and security of drinking water distribution systems and provide a consistent approach across the province when dealing with backflow prevention.

3.1.9 - Program Compliance

When a drinking water system owner decides to put in place a backflow prevention program, it will also need to consider ways to promote compliance with affected stakeholders. Backflow prevention programs include selection, installation, inspection (maintenance), testing and reporting requirements that will need to be monitored. In situations where stakeholders refuse to participate the

drinking water system owner will need to consider whether mechanisms are available to it that will promote compliance such as notifications, work orders, fines, etc. If so, these should be clearly detailed within the policy, and communicated in the education program.

3.1.10 - Quality Assurance

The program should be flexible enough to provide for changes due to technology and new innovations in the industry. Program administrators should review their processes and refine them to best suit the requirements of the drinking water system owner on a regular basis.

A process could be put into place that allows the drinking water system owner to review the performance of testers and the validity of test results submitted. The drinking water system owner should maintain a historical record of test results. If need be the drinking water system owner should have a means of revoking a tester's registration/licence. Another quality assurance component would be to maintain records that may verify performance and the impact that the backflow prevention devices may have on local water quality.

3.1.11 - Program Maintenance

The drinking water system owner should be responsible for program maintenance and administration. This includes maintaining ongoing testing records and information as to the location of the devices.

3.2 - Property Owners - Roles and Responsibilities

Property Owner/Customer responsibilities may typically include:

- developing and implementing an internal program to meet insurance and legal requirements (e.g., availability of Material Safety Data Sheet (MSDS));
- deciding on a voluntary basis whether to provide the drinking water system owner or its agent with access to the facility in order for the system owner to determine appropriate cross connection control measures;
- protecting cross-connections found on property or within facility in accordance with the assessment/inspection report provided by the drinking water system owner or its agent;
- receiving approval from the drinking water system owner prior to the removal of any devices;
- advising the drinking water system owner of any changes to its backflow prevention devices so that the hazard survey can be updated;
- the purchase, installation and testing of the backflow prevention devices and assemblies;

- providing the drinking water system owner with a copy of test results; and
- conducting ongoing testing (usually annually) and maintenance of the unit (e.g., as per manufacturer directions or CSA B64.10.1-11 Maintenance and Field Testing of Backflow Preventers).
    - ***NOTE:*** *If a unit fails the testing process it should be repaired or replaced within a certain time period set out by the drinking water system owner.*

3.2.1 - Device Ownership

In most programs, the property owner is the owner of the backflow prevention devices and assemblies. The rationale is that the potential cross-connection was created by the property owner, or its tenant, and therefore the property owner should be responsible for providing the protection.

In this case, as owner of the device, the property owner is responsible for maintaining and testing the backflow prevention device in accordance with best practices and/or the backflow prevention programs requirements.

> ***NOTE:*** *In some cases the drinking water system owner may supply a water meter and backflow preventer for premise isolation and thus retain ownership. In such instances the drinking water system owner would also assume the ongoing maintenance and testing responsibilities associated with the device and any implemented backflow prevention program requirements.*

3.2.2 - Education and Outreach

Raising awareness of the issues associated with cross-connections and the damage to the drinking water supply and public health is critical if a backflow prevention program is to succeed. A strong commitment to education and outreach on the part of those that have decided to implement such a program is integral to ensuring that affected property owners are aware of the risks associated with cross-connections and the role that they play in ensuring that they are protected. For these reasons, if a drinking water system owner establishes a backflow prevention committee, affected property owners should be encouraged to actively participate in and become involved with the committee.

3.2.3 - Survey and Hazard Assessment

The property owner should ensure that a survey and hazard assessment is conducted in accordance with the drinking water system owner's backflow prevention program and that any piping and process changes are conducted under a building/plumbing permit issued by the municipality.

3.2.4 - Selection and Installation of Devices

The property owner should ensure that backflow prevention devices are selected and installed in accordance with the requirements of the Building Code and outlined within CSA B64.10–11 Selection and Installation of Backflow Preventers.

> ***NOTE:*** *The requirements for the selection and installation of backflow preventers for new construction or changes in use are set out in the Building Code and this work should be conducted by persons qualified for those purposes.*

3.2.5 - Regular Inspection and Testing (Device)

Generally, annual testing of each backflow prevention device is recommended as a minimum; however this should be evaluated on a case-by-case basis depending on the risks to the drinking water system. The drinking water system owner may have special testing requirements and the property owner should discuss these with the drinking water system owner.

> ***NOTE:*** *Inspection and testing should be carried out according to the requirements as detailed within the backflow prevention program and should recognize industry standards, such as CSA B64.10.1-11 Maintenance and Field Testing of Backflow Preventers.*

3.2.6 - Records Management

The property owner should maintain copies of the survey and hazard assessment, inspection, testing, maintenance and repair records on the premises where the devices are located. The property owner should also make records available in accordance with any requirements contained in the backflow prevention program.

Reference Materials

- Ontario Water Works Association (OWWA) - Cross Connection Control Committee
- AWWA Canadian Cross Connection Control Manual
- Ontario Backflow Prevention Association (OBPA) Model By-Law
- American Water Works Association (AWWA) M14 Manual Recommended Practice for Backflow Prevention and Cross Connection Control
- InfraGuide – Methodology for Setting a Cross Connection Control Program
- *Municipal Act, 2001*
- *Building Code Act, 1992*
    - Building Code, Ontario Regulation 332/12
- *Safe Drinking Water Act, 2002*
    - Drinking Water Systems Regulation, Ontario Regulation 170/03
- Ontario's Drinking Water Quality Management Standard – Pocket Guide Ontario Ministry of the Environment (July 2007 – PIBS 6278e)
- *Fire Protection and Prevention Act, 1997*
    - Fire Code, Ontario Regulation 213/07
- NFPA Standards
- Canadian Standards Association (B64 Series Standards)
- Canadian Standards Association (CSA) B64.10-11 Selection and Installation of Backflow Preventers
- Canadian Standards Association (CSA) B64.10.1-11 Maintenance and Field Testing of Backflow Preventers
- CAN/CSA–B125–12 Plumbing Fittings
- Saskatchewan Ministry of Environment - Cross Connection Control and Backflow Prevention Guidelines (February 2010 – EPB #422)
- Ontario Ministry of the Environment - Guidance Document Preparing for Corrosion Control Plans for Drinking Water Systems (December 2009 – PIBs #7463)

City of Greater Sudbury Charter

WHEREAS Municipalities are governed by the Ontario Municipal Act, 2001;

AND WHEREAS the City of Greater Sudbury has established Vision, Mission and Values that give direction to staff and City Councillors;

AND WHEREAS City Council and its associated boards are guided by a Code of Ethics, as outlined in Appendix B of the City of Greater Sudbury's Procedure Bylaw, most recently updated in 2011;

AND WHEREAS the City of Greater Sudbury official motto is "Come, Let Us Build Together," and was chosen to celebrate our city's diversity and inspire collective effort and inclusion;

THEREFORE BE IT RESOLVED THAT Council for the City of Greater Sudbury approves, adopts and signs the following City of Greater Sudbury Charter to complement these guiding principles:

As Members of Council, we hereby acknowledge the privilege to be elected to the City of Greater Sudbury Council for the 2014-2018 term of office. During this time, we pledge to always represent the citizens and to work together always in the interest of the City of Greater Sudbury.

Accordingly, we commit to:

- Perform our roles, as defined in the Ontario Municipal Act (2001), the City's bylaws and City policies;
- Act with transparency, openness, accountability and dedication to our citizens, consistent with the City's Vision, Mission and Values and the City official motto;
- Follow the Code of Ethical Conduct for Members of Council, and all City policies that apply to Members of Council;
- Act today in the interest of tomorrow, by being responsible stewards of the City, including its finances, assets, services, public places, and the natural environment;
- Manage the resources in our trust efficiently, prudently, responsibly and to the best of our ability;
- Build a climate of trust, openness and transparency that sets a standard for all the City's goals and objectives;
- Always act with respect for all Council and for all persons who come before us;
- Ensure citizen engagement is encouraged and promoted;
- Advocate for economic development, encouraging innovation, productivity and job creation;
- Inspire cultural growth by promoting sports, film, the arts, music, theatre and architectural excellence;
- Respect our historical and natural heritage by protecting and preserving important buildings, landmarks, landscapes, lakes and water bodies;
- Promote unity through diversity as a characteristic of Greater Sudbury citizenship;
- Become civic and regional leaders by encouraging the sharing of ideas, knowledge and experience;
- Work towards achieving the best possible quality of life and standard of living for all Greater Sudbury residents;

Charte
de la Ville du Grand Sudbury

ATTENDU QUE les municipalités sont régies par la Loi de 2001 sur les municipalités (Ontario);

ATTENDU QUE la Ville du Grand Sudbury a élaboré une vision, une mission et des valeurs qui guident le personnel et les conseillers municipaux;

ATTENDU QUE le Conseil municipal et ses conseils sont guidés par un code d'éthique, comme l'indique l'annexe B du Règlement de procédure de la Ville du Grand Sudbury dont la dernière version date de 2011;

ATTENDU QUE la devise officielle de la Ville du Grand Sudbury, « Ensemble, bâtissons notre avenir », a été choisie afin de célébrer la diversité de notre municipalité ainsi que d'inspirer un effort collectif et l'inclusion;

QU'IL SOIT RÉSOLU QUE le Conseil de la Ville du Grand Sudbury approuve et adopte la charte suivante de la Ville du Grand Sudbury, qui sert de complément à ces principes directeurs, et qu'il y appose sa signature:

À titre de membres du Conseil, nous reconnaissons par la présente le privilège d'être élus au Conseil du Grand Sudbury pour le mandat de 2014-2018. Durant cette période, nous promettons de toujours représenter les citoyens et de travailler ensemble, sans cesse dans l'intérêt de la Ville du Grand Sudbury.

Par conséquent, nous nous engageons à :

- assumer nos rôles tels qu'ils sont définis dans la Loi de 2001 sur les municipalités, les règlements et les politiques de la Ville;
- faire preuve de transparence, d'ouverture, de responsabilité et de dévouement envers les citoyens, conformément à la vision, à la mission et aux valeurs ainsi qu'à la devise officielle de la municipalité;
- suivre le Code d'éthique des membres du Conseil et toutes les politiques de la municipalité qui s'appliquent à eux;
- agir aujourd'hui pour demain en étant des intendants responsables de la municipalité, y compris de ses finances, biens, services, endroits publics et du milieu naturel;
- gérer les ressources qui nous sont confiées de façon efficiente, prudente, responsable et de notre mieux;
- créer un climat de confiance, d'ouverture et de transparence qui établit une norme pour tous les objectifs de la municipalité;
- agir sans cesse en respectant tous les membres du Conseil et les gens se présentant devant eux;
- veiller à ce qu'on encourage et favorise l'engagement des citoyens;
- plaider pour le développement économique, à encourager l'innovation, la productivité et la création d'emplois;
- être une source d'inspiration pour la croissance culturelle en faisant la promotion de l'excellence dans les domaines du sport, du cinéma, des arts, de la musique, du théâtre et de l'architecture;
- respecter notre patrimoine historique et naturel en protégeant et en préservant les édifices, les lieux d'intérêt, les paysages, les lacs et les plans d'eau d'importance;
- favoriser l'unité par la diversité en tant que caractéristique de la citoyenneté au Grand Sudbury;
- devenir des chefs de file municipaux et régionaux en favorisant les échanges d'idées, de connaissances et concernant l'expérience;
- viser l'atteinte de la meilleure qualité et du meilleur niveau de vie possible pour tous les résidents du Grand Sudbury.