CITY OF VANCOUVER

POLICY REPORT

Report Date: November 19, 2018
Contact: Kevin Lau
Contact No.: 604.871.6085
RTS No.: 12782
VanRIMS No.: 08-2000-20
Meeting Date: December 5, 2018

TO: Standing Committee on City Finance and Services

FROM: General Manager of Development, Buildings, and Licensing, and the Chief Building Official, in collaboration with the General Manager of Engineering Services

SUBJECT: Water Use in Buildings: Enhanced Public Safety, Efficiency and Long-Term Resiliency Measures

RECOMMENDATION

A. THAT Council approve, in principle, the amendments to the Building By-law generally in the form attached as Appendix B, implementing improvements to various plumbing fixtures and building mechanical systems.

B. THAT Council instruct the Director of Legal Services to bring forward for enactment amendments to the Building By-law as set out in Appendix B, with certain provisions to come into force and take effect on January 1, 2019, June 3, 2019, January 1, 2020 and July 1, 2020.

REPORT SUMMARY

This report proposes phased amendments to the Building By-law that will pro-actively protect public health, reduce the impact of growing communities on infrastructure and resources, and improve the city's long-term resilience.

The proposed changes will provide:

- Reduced reliance on drinking water for toilet flushing and irrigation;
- Better protection of groundwater;
- Streamlined permit processing for new rainwater harvesting systems; and
- Enhanced public safety for alternate water systems, building water treatment systems, cooling towers and decorative water features.

There are no cost implications for the majority of new and existing buildings.

The amendments were developed in collaboration with local health officials and were refined thorough a consultation process which involved professional and industry associations, consultants, contractors and building owners.

Local health authorities strongly support these proposals.

COUNCIL AUTHORITY/PREVIOUS DECISIONS

In September 2013, Council adopted the 2014 Building By-law.

In April 2017, Council approved water efficiency updates to the Building By-law. Council also directed staff to review opportunities to further strengthen performance requirements for commercial and household fixtures and appliances.

In November 2017, Council approved the Rain City Strategy, embracing rainwater as a resource. Council also directed staff to implement integrated water resource strategies that reduce drinking water use and foster long-term water resilience through the expanded use of non-potable water resources such as rainwater and groundwater.

In May 2018, Council adopted enhanced water efficiency measures in the Building By-law for commercial and household fixtures and appliances.

In July 2018, Council endorsed the Utilities Servicing Plan for the Cambie Corridor, expanding the existing requirement for onsite rainwater management in all rezoning applications to all development and building permit applications within the Corridor.

CITY MANAGER'S/GENERAL MANAGER'S COMMENTS

The City Manager recommends approval of the foregoing.

REPORT

Background/Context

Water Supply

Treated drinking water from Metro Vancouver addresses the lion's share of the City's water demand. Such high quality water, however, is not essential for toilet flushing, irrigation and mechanical systems. More efficient fixtures and alternate sources such as rainwater can offset the City's demand for regional drinking water.

Using less regional drinking water will result in direct savings to residents, who will pay a smaller portion of regional infrastructure costs. Metro Vancouver's 10-year, $3.9 billion water capital plan already includes expansion of regional source capacity at the Coquitlam Reservoir. Beyond 2030, infrastructure expansion options which are expected to be even larger in scale are being assessed by Metro Vancouver.

This report proposes to refine toilet options, clarify design requirements for rainwater harvesting systems and improve the protection of groundwater.

Public Safety

The City of Vancouver delivers safe, clean drinking water to buildings throughout the city. These buildings accommodate a spectrum of commercial, industrial, institutional and residential uses, and so some buildings have quite complex premise plumbing. This may lead to undesirable water characteristics like stagnation and temperature fluctuations, and in the absence of effective building water management practices, can in turn cultivate so-called “opportunistic premise plumbing pathogens” within buildings. The most infamous pathogens within this class are of the *Legionella* species (Appendix A).

Legionella is the most frequently reported cause of water-associated outbreaks in the United States. Legionnaires’ disease is not acquired from drinking water, but rather by exposure to mist, which must be inhaled into the lungs. Buildings with mechanical systems which aerosolise water — including decorative fountains and cooling towers — have the potential for wide dispersal of *Legionella*-containing water mist.

Cooling towers are part of a building’s central cooling system. They are typically located on rooftops, and by design evaporate water to regulate temperature. They are implicated or suspected in 60% of *Legionella* outbreak-associated fatalities. Examples include Quebec City in 2012 (181 cases, 14 fatalities) and New York City in 2015 (133 cases, 16 fatalities).

In each of these examples, and also in the recent Surrey outbreak, authorities expended valuable resources to search for cooling towers in the affected areas in the midst of their respective outbreaks. This delayed identification of the source. Quebec and New York have since instituted mandatory cooling tower registries. Vancouver has no such registry, and staff from the City, Vancouver Coastal Health and the BC Centre for Disease Control do not know where the estimated 700 cooling towers are located.

This report proposes to enhance public safety by creating mandatory operating permits for cooling towers, decorative water features, alternate water systems and building water treatment systems.

Strategic Analysis

The building elements addressed within this report are summarised in Figure 1.

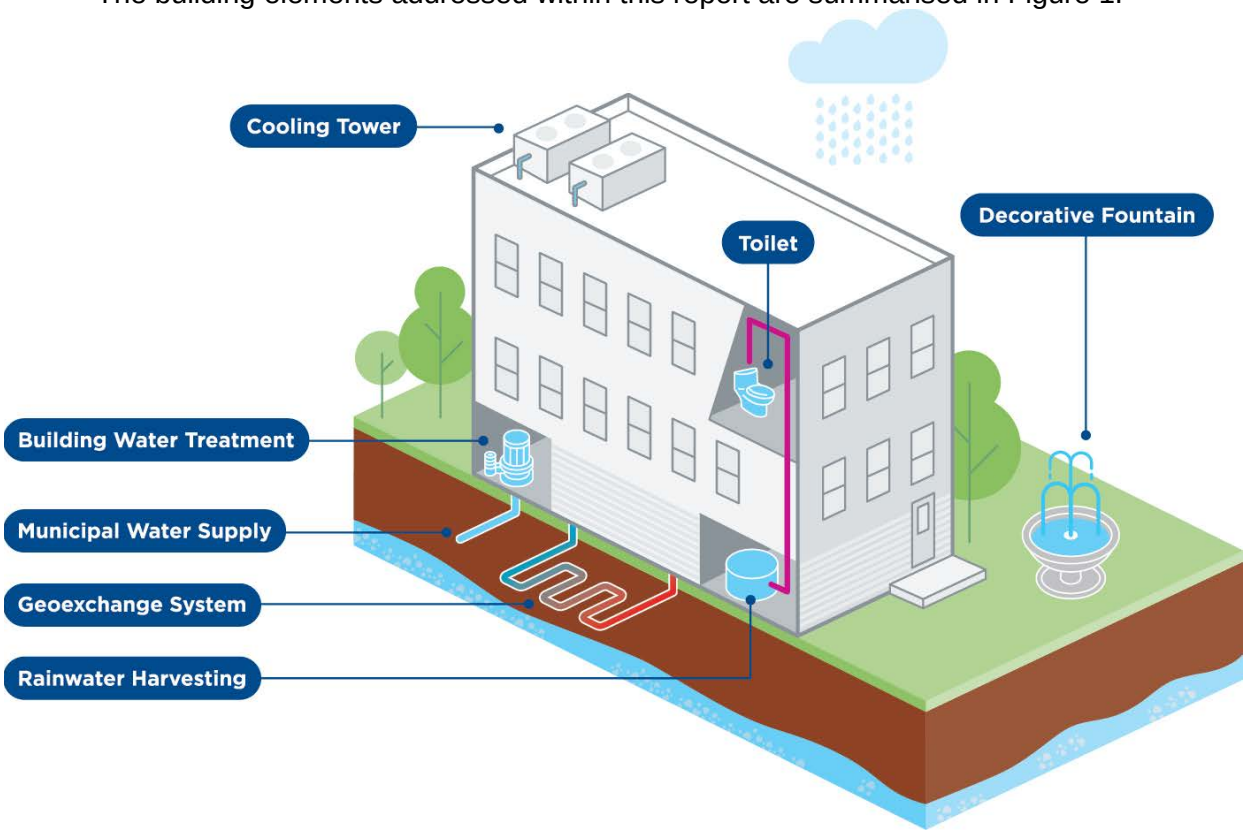


Figure 1. Plumbing fixtures and building systems addressed within this report.

Toilets

About 20% of household water use is for toilets. This report proposes to harmonise the requirements for all new toilets using drinking water to a maximum of 4.8 litres per flush.

The current Building By-law allows a maximum flush of 4.8 litres for new installations. However, there is an exception for a subset of toilets: “Dual-flush, tank-type” toilets can have a “large” flush of 6.0 litres and a “small” flush of 4.1 litres or less. The underlying assumption is that for every three flushes, one is large and two are small.[1]

This assumption is not supported by independent literature reviewing user behaviour: The large, 6.0 litre flush is often used more than assumed. This report therefore proposes to narrow the exception for dual-flush, tank-type toilets to those installations which use treated rainwater, but not drinking water.

[1] Therefore, the reasoning goes, the *average* of three flushes would be about the same as the *maximum* of 4.8 litres. Calculation: (1 large flush x 6.0 litres + 2 small flushes x 4.1 litres) ÷ 3 flushes = *average* flush of 4.73 litres.

There are no cost implications from this proposal. It does not affect the majority of toilets on the market, including over 2,000 single-flush, tank-type models which comply with Vancouver's current 4.8 litre maximum flush requirement.

Geoexchange Systems

Groundwater is essential to the City's Earthquake Preparedness Strategy. To improve the protection of this resource, this report proposes measures specific to geoexchange systems: a prohibition on the use of methanol and restrictions on open-loop systems.

Geoexchange (geothermal) systems are an important tool in the Renewable City Strategy, providing renewable heating or cooling for buildings. There are two basic configurations: Closed-loop and open-loop. In closed-loop systems, an underground loop circulates a contained heat transfer fluid through a heat exchanger, and there is no pumping of groundwater. In open-loop systems, groundwater is drawn through a heat exchanger and discharged.

For closed-loop systems, a key concern is potential groundwater contamination from leaks or failures. There are a variety of heat transfer fluid options, such as methanol. Environmental concerns with methanol have precluded its use within the City's civic facilities, and methanol use is prohibited in Ontario. It is proposed that methanol use be prohibited in geoexchange systems in Vancouver. Economically feasible alternatives are readily available.

Open-loop systems are far rarer in Vancouver. Key concerns are the rate and effects of groundwater withdrawal and discharge. One commercial installation in Vancouver discharged in excess of 1,500 litres per minute into the sewer for years. Such "pump and dump" configurations are both wasteful of groundwater and city infrastructure. It is proposed that discharge by open-loop systems into the sewer be prohibited.

An alternative discharge option for open-loop systems is reinjection into the ground. There are inherent risks from withdrawing and reinjecting groundwater, and it is proposed that open-loop systems be prohibited on single and duplex family properties. For all other open-loop systems, approval would be conditional upon staff acceptance that potential impacts and risks have been professionally assessed.

Alternate Water Systems (Rainwater Harvesting)

To offset the City's demand for drinking water, a complement to improved efficiency requirements — such as a maximum flush volume for toilets — is the use of alternate water sources, like rainwater. Rainwater harvesting is also central to the Rain City Strategy, which seeks to capture 90% of Vancouver's average annual rainfall.

This report proposes requirements for the design, operations and maintenance of alternate water systems to facilitate these goals and to safeguard public health.

a) Design

Developers, as a voluntary green initiative or in response to the City's requirements, have expressed increased interest in rainwater harvesting. The Building By-law, however, provides industry with five sentences on the City's technical requirements. Engineers have requested clarity on the expectations of the City and health authority.

In answer to this request, officials from the City and Vancouver Coastal Health collaborated to formulate the proposed by-law amendments. For the first time, industry will have a clear, minimum design standard for rainwater harvesting (Appendices B and C). This will expedite permit processing and reduce staff workload. These amendments also provide a foundation for future proposals to Council addressing more complex alternate water sources, such as greywater.

These requirements would be applicable to new systems installed after January 1, 2019. Exempt would be rain barrels and alternate water systems installed in single or duplex family homes.

Within this proposal, there is a strong focus on public health from both the design and operational perspectives. For builders who choose to install an alternate water system, these amendments mandate smaller pipe sizing and connections to high-frequency use fixtures which do not require drinking water, like toilets. These conditions help to keep water flowing and prevent stagnation, while ensuring a genuine offset to drinking water demand. A second, critical part to these proposals is an ongoing monitoring and maintenance expectation. This will be addressed through new, mandatory operating permits, introduced in the next section.

b) Operations and maintenance

Unfortunately, amongst the approximately 60 alternate water systems in the City (excluding single and duplex family homes), there are many examples of systems that are improperly operated and maintained. Some have been disconnected and altogether bypassed with drinking water. Rainfall is then diverted to the sewer, burdening infrastructure and contributing to combined sewer overflows. Sometimes the cisterns, often out-of-sight and classified as confined spaces, remain with large volumes of stagnant water.

This report proposes mandatory operating permits for new and existing alternate water systems, effective January 1, 2019, to help to address these concerns by introducing regulatory overview. This includes mandatory monitoring, laboratory testing and reporting of water quality parameters and inspections. Exempt would be rain barrels and alternate water systems installed in single or duplex family homes.

There would be no cost for operating permits in 2019. Thereafter, funding to administer operating permits would be on a cost-recovery basis through a minor annual fee. (A preliminary estimate for an operating permit is $250 per year. Further analysis will be conducted and the fee will be forwarded as part of the standard fee review next year.) There would be a small cost to the owner to meet the laboratory testing requirements (less than $200 per year). The program would be incorporated into the City's existing, web-enabled POSSE inspection platform, and all reporting would be managed through a customer's online account. Mapping would be integrated with the City's existing VanMaps platform.

Building Water Treatment Systems

These systems provide supplementary treatment to city-supplied drinking water through chemical injection into the incoming water service or other means. Improperly installed, operated or maintained, however, they have the potential to be deleterious to an entire building's drinking water supply. This report proposes mandatory operating permits for new and existing building water treatment systems, effective June 3, 2019.

Approximately 700 Vancouver buildings have these systems. Typically, these systems are installed with the objective of increasing the longevity of copper pipes. The majority are supplied on a contract basis, and there are no City notification requirements should the contract be cancelled, renewed or altered.

With the implementation of operating permits, the City would require bi-annual reporting and annual inspections. This will provide the City with a database of products being injected into building potable water systems, and ensure conformance with approved engineering design. Exempt would be single and duplex family homes. Like alternate water systems, the program would be implemented through the City's existing electronic platforms and there would be no charge for operating permits in the first year.

A co-benefit to the operating permit approach would be streamlined City approvals, with diversion of applications from the current "Alternative Solutions" approval pathway. This will provide immediate upfront time and cost savings for owners, and will accelerate permit processing.

Cooling Towers

Cooling towers are associated with the greatest number of confirmed Legionnaires' disease cases in outbreaks between 2006 and 2017. With the strong support of health authorities (Appendix F), this report proposes mandatory operating permits for new and existing cooling towers, effective January 1, 2020.

When surveillance by the BC Centre for Disease Control and Fraser Health Authority identified a geographic cluster of *Legionella* cases in Surrey this summer, efforts to identify the source were prolonged by the absence of a cooling tower registry. The Surrey outbreak could be a harbinger of the region's future. As the region densifies, there will be more high-rises with more cooling towers. As the population grows, there will be more people in closer proximity to cooling towers. As summer temperatures increase, there will be increased loads on cooling towers. Following the Toronto 2005 outbreak (135 cases, 23 fatalities), the Expert Review Panel noted a likely factor was "record breaking summer heat, which led to much heavier use of the cooling system."

This report derives its pro-active proposals from the lessons learned by cities which have suffered large *Legionella* outbreaks. Analysing Quebec City's 2012 outbreak, the Report of the Public Health Director documents the scramble to merely locate cooling towers and contact owners. This included time-consuming analysis of satellite imagery and the indiscriminate distribution of 2,700 letters to buildings. The Quebec Coroner's Report lamented the lack of a cooling tower registry as slowing the implementation of an action plan. This delay has been estimated as over a month – in the midst of a lethal outbreak.

In contrast, following a July 2018 cooling tower outbreak, New York City's Health Commissioner highlighted how their mandatory registry "allowed the Health Department to quickly identify all cooling towers in the affected neighbourhood, review their inspection records, obtain samples … and conduct an immediate visual inspection …"

In Vancouver, this first proposed step of mandatory operating permits for new and existing cooling towers will provide local health authorities and City officials with a geographic registry of cooling towers, up-to-date owner contact information and a comprehensive database of existing practices.

The second step will be to analyse, in collaboration with local health authorities, the information collected through the operating permits and from observations. Comprehensive consultations will be held to discuss the observed maintenance practices and proposed approaches to remedying deficiencies. These extensive discussions will include building owners, property management firms, developers, consultants, contractors, and other stakeholders.

Furthermore, by analysing the data collected from the operating permits, the City can assess opportunities to improve water efficiency. In Vancouver, about 700 cooling towers exist and are estimated to consume up to 6.2 billion litres of drinking water annually (about 6% of the City's total water demand). New York City estimates that cooling towers are responsible for 20% of the city's overall water demand during the cooling season.

Like alternate water systems and building water treatment systems, the program would be implemented through the City's existing POSSE and VanMaps platforms. There would be no charge for these operating permits.

Decorative Water Features

Like cooling towers, decorative water features generate aerosols and have been the source of *Legionella* outbreaks. In the United States, the Department of Veterans Affairs recommends against their installation in its healthcare facilities, citing a hospital outbreak in which some of the victims were visitors who simply passed by a water feature on their way through the lobby.

This report proposes mandatory operating permits for new and existing decorative water features, effective July 1, 2020. As is currently the case with cooling towers, there is no registry with the locations of these features in the City. An annual operating permit for decorative water features would be implemented in the same manner as for cooling towers. Exempt would be single and duplex family homes.

Public/Civic Agency Input

There is strong support for these proposals from public health authorities. Selected letters are in Appendix F.

Staff research and collaboration with Vancouver Coastal Health began in 2016. Public consultation for the first draft of proposals commenced in 2017. This included sector-specific presentations which led to refinement of the proposals, and culminated in a May 31, 2018 public engagement letter and workshops on June 28-29, 2018.

Stakeholder concerns and input were reviewed and staff modified recommendations to improve outcomes and address unanticipated hardships where consistent with the City's objectives and the public interest. Details are in Appendix D.

Implications/Related Issues/Risk

Financial

There are no cost implications for the majority of new and existing buildings. Letters from the Building Owners and Managers Association (British Columbia) and the Urban Development Institute (Pacific Region) are in Appendix E.

These amendments will divert some applications from the "Alternative Solutions" pathway. For new buildings with specific mechanical systems, developers will have a streamlined application process, cutting permitting times and initial costs. They will also have clearer requirements, reducing engineering uncertainty.

There will be no cost for operating permits in the first year for alternate water systems and building water treatment systems. In subsequent years, funding to administer these operating permits will be on a cost-recovery basis through a minor annual fee. For alternate water systems, there will be a small annual cost to owners to meet laboratory testing requirements.

There will be no cost for operating permits for cooling towers and decorative water features.

The program will be incorporated into the City of Vancouver's existing, web-enabled POSSE inspection platform, and all reporting requirements will be managed through a customer's online account. Mapping will be integrated with the City's existing VanMaps platform.

Human Resources/Labour Relations

Administrative and technical staff support will be required to review operating permit applications, verify mandatory reporting requirements and conduct inspections. Existing staffing will be able to manage these elements in the first year of the program. Future staffing requirements and operating permit fees will be evaluated to cover program expansion on a cost-recovery basis.

Environmental

Within the City's context of projected population growth, economic development and climate change, these proposals will help to safeguard resources and infrastructure, and improve the city's long-term resilience. The proposed amendments will enhance public health through formalised expectations on the design, operations and maintenance of specific building mechanical systems.

Legal

Council has the authority from the *Vancouver Charter* to make by-laws for regulating the installation of plumbing facilities and for fixing standards for plumbing facilities under section 306(1)(l) and for protecting the health of inhabitants of the city and for preventing, prohibiting and remedying insanitary conditions in the city under sections 330(a) and 330(b).

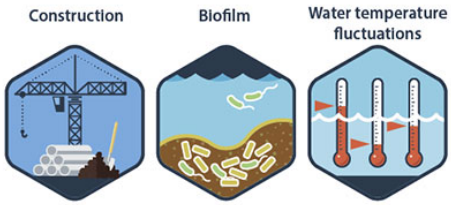
CONCLUSION

The proposed Building By-law amendments will lead to improved public safety, and will deliver longer-term economic and ecologic benefits to the City and its residents.

* * * * *

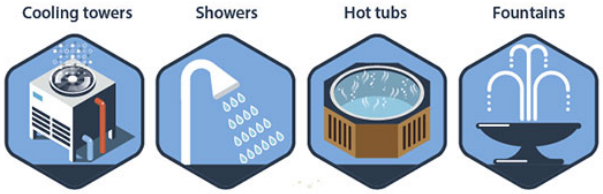
How *Legionella* affects building water systems and people

1. Internal and external factors can lead to *Legionella* growth in building water systems.

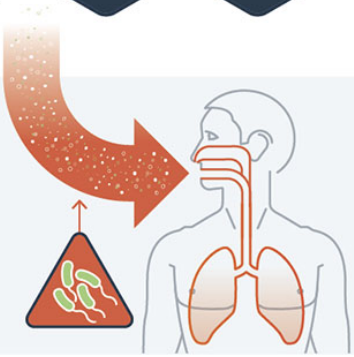


2. *Legionella* grows best in large, complex water systems that are not adequately maintained.

3. Water containing *Legionella* is aerosolized through devices.



4. People can get Legionnaires' disease when they breathe in mist or accidentally swallow water into the lungs containing *Legionella*. Those at increased risk are adults 50 years or older, current or former smokers, and people with a weakened immune system or chronic disease.



www.cdc.gov/legionella

01/12/2018

Source: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention (January 2018)

* * * * *

DRAFT By-law to amend Building By-law No. 10908
Regarding Non-potable Water Systems and New Requirements for Other Water Systems

Note: A by-law will be prepared generally in accordance with the provisions listed below, subject to change and refinement prior to posting.

1. This by-law amends the indicated provisions of Building By-law 10908.

2. In Sentence 1.1.1.1.(1) of Division A of Book II, Council strikes out "renewal or repair" and substitutes "renewal, repair, or operation".

3. In Article 1.4.1.2. of Division A of Book II, Council adds the following definitions in the correct alphabetical order:

"*Accredited Laboratory* means a laboratory approved by the BC Provincial Health Officer for drinking water microbiology testing.

Alert means a bell, horn, speaker, light or text display that provides audible, tactile or visible outputs, or any combination thereof.

Alternate water source system means a system designed to collect, treat, and use non-*potable* water from alternate water sources in lieu of *potable* water, but excludes a system in a *building* containing no more than four *dwelling units* and no other *major occupancies*, or a *laneway house*, and excludes the use of rain barrels of up to a cumulative capacity of 500 litres.

Blackwater means waste water from water closets, urinals and other sanitary fixtures designed for carrying human waste, kitchen sinks, utility sinks, medical sinks, laboratory sinks, and industrial processes, but does not include *clear-water waste*.

Cistern means a tank for storing non-*potable* water as part of an *alternate water source system*.

Cooling tower means a cooling tower, evaporative condenser, or fluid cooler that is part of a recirculated *water system* incorporated into a *building's* cooling, industrial process, refrigeration, or energy production system.

E. coli means *Escherichia coli.*

Greywater means waste water from all sources except *blackwater* and *clear-water waste*.

Groundwater means a freestanding body of water in the ground.

Operating permit means permission or authorization in writing by the *Chief Building Official* to install or retain existing equipment or systems for which an operating permit is required under this By-law.

Perimeter drainage water means water collected from the foundation of a structure.".

4. In Article 1.4.1.2. of Division A of Book I and Book II, Council amends the definition of "permit" by adding the words ", but does not include an *operating permit*" after "to occupy any *building* or part thereof".

5. In Note 2 of Table 10.3.1.3.A of Division B of Book I, Council adds the words "when a non-*potable* water source is used" after "complies with this requirement".

6. In Division B of Book I, Council:

a) strikes out Article 10.3.1.5. Geoexchange Systems; and

b) renumbers Article 10.3.1.6. Vehicle Wash Facilities and Article 10.3.1.7. Non-recirculating Applications as Article 10.3.1.5 and Article 10.3.1.6., respectively.

7. In Article 10.3.1.6. of Division B of Book I, Council:

a) in Sentence (c), strikes out the word "or";

b) in Sentence (d), strikes out "." and substitutes ","; and

c) adds the following new Sentences:

"e) machinery powered by water,
f) non-recirculating ponds, waterways, water features, ornamental fountains, or swimming pools,
g) non-recirculating systems or equipment that use water for thermal conditioning of building surfaces or roofs, except that this does not apply to emergency fire protection of buildings, or
h) non-recirculating systems or equipment that use water for melting or thawing.".

8. In Division B of Book II, Council inserts the following row into Table 1.3.1.2. in correct alphabetical order:

"NSF/ANSI 14-2017 Plastics Piping System Components and Related Materials 2.7.2.1.(1)".

9. In Division B of Book II, Council inserts the following into Article 1.3.2.1. in correct alphabetical order:

"NSF NSF International (789 North Dixboro Road, Ann Arbor, Michigan 48105 U.S.A.; www.nsf.org)".

10. In Division B of Book II, Council inserts new Sentences 2.6.2.1.(3) and Sentences 2.6.2.1.(4) and renumbers the remaining Sentences accordingly:

"**3)** An *operating permit* shall be obtained for the installation of a water treatment device or apparatus, or the retention of an existing water treatment device or apparatus, except for a water treatment device or apparatus installed in a *building* containing no more than four *dwelling units* and no other *major occupancies*, or a *laneway house*.
4) The *operating permit* number assigned to a water treatment device or apparatus shall be posted on a sign or plate that is securely fastened to the water treatment device

or apparatus in a location that is conspicuously visible and constructed of a durable, weather resistant material.

5) The *Chief Building Official* shall be notified within 30 days of any changes to the information that was last provided to the *City* with regard to the *operating permit*, in the form prescribed by the *Chief Building Official*.".

11. In Division B of Book II, Council strikes out Subsection 2.7.2. and substitutes the following:

"**2.7.2. Piping Identification**

2.7.2.1. Piping Identification

1) All non-*potable* water distribution system piping shall be purple in colour and conform to the requirements of NSF-rw and NSF/ANSI Standard 14.

2) All other non-*potable* water piping shall conform to the requirements of CAN/CSA-B128.1.".

12. In Division B of Book II, Council strikes out Subsection 2.7.4. and substitutes the following:

"**2.7.4. Alternate Water Source Systems Installed Prior to January 1, 2019**

2.7.4.1. Requirements for Alternate Water Source Systems Installed Prior to January 1, 2019

1) An *operating permit* shall be obtained.

2) The *operating permit* number assigned to the *alternate water source system* shall be posted on a sign or plate that is securely fastened to the *alternate water source system* in a location that is conspicuously visible and constructed of a durable, weather resistant material.

3) The *Chief Building Official* shall be notified within 30 days of any changes to the information that was last provided to the *City* with regard to the *operating permit*, in the form prescribed by the *Chief Building Official*.

4) Water quality shall comply with the water quality standards, testing, documentation, and reporting requirements set out in Articles 2.7.7.1. and 2.7.7.2.

5) If a test result shows that the water quality fails to meet any of the standards set out in Table 2.7.7.1., the response set out in Table 2.7.4.1. shall be undertaken.

Table 2.7.4.1. Required Response to Failure to Meet Water Quality Standards Forming part of Sentence 2.7.4.1.(5)		
Parameter	Test Result	Required Response
E. coli	100 or more Colony Forming Units (CFU) per 100 mL	1. Immediately supply the *alternate water source system* with *potable* water only; and 2. Immediately notify the *Chief Building Official*
Turbidity	> 15 Nephelometric Turbidity Units (NTU)	
Temperature	> 25 degrees Celsius	

6) The *alternate water source system* shall be maintained in accordance with any manufacturer's specifications.

7) If the *alternate water source system* is in use, cross connection control tests shall be performed as required by CAN/CSA-B128.1.

2.7.4.2. No Other Requirements

1) *Alternate water source systems* installed prior to January 1, 2019 need not comply with any other requirements set out in Subsections 2.7.5. through 2.7.8.

2.7.5. Alternate Water Source Systems

2.7.5.1. Alternate Water Sources

1) An *alternate water source system* shall collect only rainwater from roof surfaces or similar areas that do not allow the passage of vehicular traffic and are above grade, and where hydrocarbon-based fuels, hazardous materials, or fertilizers are not stored or used on such surfaces, or *clear-water waste*, or both.

2) An *alternate water source system* shall not collect *perimeter drainage water*, *groundwater*, *storm water*, *greywater*, or *blackwater*.

2.7.5.2. Mandatory and Optional Uses

1) An *alternate water source system* shall use treated non-*potable* water in lieu of *potable* water for the mandatory uses set out in Table 2.7.5.2.

2) An *alternate water source system* may use treated non-*potable* water in lieu of *potable* water for the optional uses set out in Table 2.7.5.2.

3) Non-*potable* water shall not be used in lieu of *potable* water for any other uses.

Table 2.7.5.2.
Mandatory and Optional Uses for Treated Non-potable Water
Forming part of Sentences 2.7.5.2.(1) and (2)

Non-*potable* Water Source	Mandatory Uses for Treated Non-*potable* Water	Optional Uses for Treated Non-*potable* Water
Rainwater from roof surfaces or similar areas that do not allow the passage of vehicular traffic and are above grade, and where hydrocarbon-based fuels, hazardous materials, or fertilizers are not stored or used on such surfaces	Water closets, urinals and trap primers	Irrigation of non-food purpose plants, make-up water for boilers, and make-up water for cooling towers
Clear-water waste	Water closets, urinals and trap primers	Irrigation of non-food purpose plants, make-up water for boilers, and make-up water for cooling towers
Perimeter drainage water	Not permitted	Not permitted
Groundwater	Not permitted	Not permitted
Storm water	Not permitted	Not permitted
Greywater	Not permitted	Not permitted
Blackwater	Not permitted	Not permitted

2.7.5.3. Occupancy

1) Before occupancy of a *building* is permitted, an *alternate water source system* shall be commissioned in accordance with Article 2.7.5.4., and an *operating permit* shall be obtained in accordance with Article 2.7.5.5.

2.7.5.4. Commissioning

1) In order to commission an *alternate water source system*
   a) the non-*potable* water shall be tested by an *accredited laboratory* for *E. coli* weekly for a period of four weeks with samples being drawn from the sampling port as referenced in Sentence 2.7.6.9.(1), and test results shall be provided to the *Chief Building Official*,
   b) written confirmation that the *alternate water source system* operates in conformance with the operating manual shall be provided to the *Chief Building Official* by the *registered professional of record*, and a cross connection control test shall be performed and witnessed by the *Chief Building Official*.

2.7.5.5. Operating Permit

1) An *operating permit* shall be obtained for an *alternate water source system*.
2) The *operating permit* number assigned to the *alternate water source system* shall be posted on a sign or plate that is securely fastened to the *alternate water source system* in a location that is conspicuously visible and constructed of a durable, weather resistant material.
3) The *Chief Building Official* shall be notified within 30 days of any changes to the information that was last provided to the *City* with regard to the *operating permit*, in the form prescribed by the *Chief Building Official*.

2.7.5.6. Continued Operation

1) Once an *operating permit* has been issued, an *alternate water source system* shall operate continuously unless written approval to discontinue its use has been obtained from the *Chief Building Official* or *City Engineer*.

2.7.6. Design

2.7.6.1. Professional Design

1) An *alternate water source system* shall be designed by a *registered professional* and shall be designed to prioritize the use of non-*potable* water.

2.7.6.2. Pipe Sizing

1) Distribution piping shall be sized in conformance with the IAPMO Water Demand Calculator.

2.7.6.3. Continuity of Supply

1) A secondary water supply shall be provided.

2.7.6.4. Backflow Prevention

1) An *air gap* at least two times the size of the discharge opening shall be installed for the *potable* water make-up supply.

2.7.6.5. Removal of Particulates and Impurities

1) Provision shall be made upstream of the *cistern* to remove the accumulation of particulates and impurities before they enter the *cistern*.

2.7.6.6. Cistern Security

1) *Cisterns* shall be secured to prevent tampering and unintended or unauthorized entry either by a lockable device or another *approved* method, and all penetrations shall be sealed to prevent insect or vermin entry.

2.7.6.7. Minimum Withdrawal Level

1) Water shall be withdrawn a minimum of 0.3 m from the base of the *cistern*.

2.7.6.8. Water Metering Requirements

1) A water meter shall be installed and located within 1.5 m of the *potable* water make-up supply and shall be capable of recording the volume of *potable* water being supplied.
2) A water meter shall be installed and located on the non-*potable* water outlet prior to distribution and shall be capable of recording the volume of non-*potable* water being supplied to the distribution piping.

2.7.6.9. Water Quality Sampling Locations

1) A sampling port, and provision for continuous in-line measurements required in order to conform with Table 2.7.7.1., shall be installed and located downstream of the water meter at the non-*potable* water outlet and prior to distribution.

2.7.6.10. Alerts

1) All monitoring devices referred to in Sentence 2.7.6.9.(1) above shall be capable of activating an *alert* that is designed to activate continuously for the duration of the *alert* condition whenever the water quality fails to meet the standards set out in Table 2.7.7.1.

2.7.6.11. Power Interruption

1) If a *building* is required to have an emergency system generator, provision shall be made for the continued operation of any mandatory uses for non-*potable* water listed in Table 2.7.5.2. in the event of a power interruption.

2.7.7. Water Quality Standards

2.7.7.1. Water Quality Standards, Testing, and Documentation

1) Water quality shall meet the standards set out in in Table 2.7.7.1.
2) Water quality shall be tested as set out in Table 2.7.7.1.
3) All test results shall be documented as set out in Table 2.7.7.1., and documentation shall be retained for no less than 24 months.

Table 2.7.7.1.
Water Quality Standards, Testing, and Documentation
Forming part of Sentences 2.7.7.1.(1), (2), and (3)

Applicability	Parameter	Standard	Testing Type and Frequency	Testing Result Documentation Requirement
Any non-*potable* water source	Temperature	< 20 degrees Celsius	Continuous	Daily
Any non-*potable* water source	Turbidity	< 10 Nephelometric Turbidity Units (NTU)	Continuous, and one laboratory sample tested every three months	Daily, plus all laboratory tests
Any non-*potable* water source	*E. coli*	< 100 Colony Forming Units (CFU) per 100 mL	One laboratory sample tested by an accredited laboratory every three months	All laboratory tests

2.7.7.2. Water Quality Reporting

1) Water quality reports containing all documentation required by Sentence 2.7.7.1.(3) shall be submitted to the *Chief Building Official* before the end of the third month following the issuance of an *operating permit*, and then every three months thereafter.

2.7.7.3. Required Response to Failure to Meet Water Quality Standards

1) If a test result shows that the water quality fails to meet a standard set out in Table 2.7.7.1., the response set out in Table 2.7.7.3 shall be undertaken.

Table 2.7.7.3.
Required Response to Failure to Meet Water Quality Standards
Forming part of Sentence 2.7.7.3.(1)

Parameter	Test Result	Required Response
Turbidity	Between 10 and 15 Nephelometric Turbidity Units (NTU)	Take the appropriate corrective action as set out in the operating manual.
Temperature	Between 20 and 25 degrees Celsius	
E. coli	100 or more Colony Forming Units (CFU) per 100 mL	1. Immediately supply the *alternate water source system* with *potable* water only; 2. Immediately notify the *Chief Building Official*; and 3. Take the appropriate corrective action as set out in the operating manual.
Turbidity	> 15 Nephelometric Turbidity Units (NTU)	
Temperature	> 25 degrees Celsius	

2.7.8. Operating Manual and Maintenance

2.7.8.1. Operating Manual

1) An operating manual shall be supplied to the *owner* or representative of the *owner* by the designer of the *alternate water source system* and shall be stamped by a *registered professional of record*, and shall include the following
(a) address and location of the *alternate water source system*,
(b) system designer contact details,
(c) a simplified process flow diagram,
(d) a schematic of the entire system showing locations of all system components,

(e) instructions on operating, maintaining, and inspecting the system,
(f) required frequency of maintenance and inspections,
(g) instructions on deactivating and restarting the system for repair or other purposes,
(h) details on the corrective action that shall be taken if the water quality fails to meet the standards set out in Table 2.7.7.1., and
(i) safety data sheets.

2.7.8.2. Maintenance

1) *Alternate water source systems* shall be maintained in accordance with the operating manual and any manufacturer's specifications.
2) Cross connection control tests shall be performed as required by CAN/CSA-B128.1.
3) A maintenance log shall be maintained and shall include
a) the address and location of the *alternate water source system,*
b) the name and contact information of the *owner*,
c) a record of inspections and any maintenance performed within the last 24 months,
d) details of any changes or alterations made to the system at any time after commissioning,
e) a record of water quality test results as set out in Article 2.7.7.1., including the name of the person and company conducting the test,
f) copies of water quality reports prepared and submitted in accordance with Article 2.7.7.2 within the last 24 months, and
g) if a water quality test fails to meet a standard defined in Table 2.7.7.1., a description of the extent of the deviation from the standard, the corrective action taken, a record of any required notification, and the outcome of the corrective action, including all applicable dates and times.

2.7.8.3. Request for Operating Manual or Maintenance Log

1) The operating manual and the maintenance log shall be made available on such request to the *Chief Building Official* or *City Engineer*.".

13. In Division B of Book II, Council:

a) adds a new Section 2.8. as follows:

"**2.8. Building Mechanical Systems**

2.8.1. Geoexchange Systems

2.8.1.1. Geoexchange Systems

1) Make-up water for a closed loop geoexchange (geothermal) ground heat exchanger shall be provided by a feeder tank isolated from the domestic water supply.
2) The use of a direct connection to the domestic water supply as a source of make-up water for a closed loop geoexchange (geothermal) ground heat exchanger is prohibited.
3) Methanol shall not be used for geoexchange (geothermal) applications.
4) An open loop geoexchange (geothermal) system serving a *building* containing no more than four *dwelling units* and no other *major occupancies*, or a *laneway house*, shall not be installed.
5) An open loop geoexchange (geothermal) system shall not discharge into the *sewer*."; and

b) renumbers the existing Section 2.8. Objective and Functional Statements, as Section 2.9.

14. In Division B of Book II, Council adds a new Subsection 2.8.2. as follows:

"**2.8.2. Cooling Towers**

2.8.2.1. Cooling Towers

1) An *operating permit* shall be obtained for the installation of a *cooling tower*, or the retention of an existing *cooling tower*.
2) The *Chief Building Official* shall be notified within 30 days of any changes to the information that was last provided to the *City* with regard to the *operating permit*, in the form prescribed by the *Chief Building Official*.
3) If a *cooling tower* is removed or its use is permanently discontinued, it shall be safely drained, thoroughly sanitized, and the make-up water line shall be disconnected and capped.".

15. In Division B of Book II, Council adds a new Subsection 2.8.3. as follows:

"**2.8.3. Decorative Water Features**

2.8.3.1. Indoor and Outdoor Decorative Water Features

1) An *operating permit* shall be obtained for the installation of an indoor or outdoor decorative water feature, or the retention of an existing indoor or outdoor decorative water feature, including green walls with an integrated water system, except for an indoor or outdoor decorative water feature in *building* containing no more than four *dwelling units* and no other *major occupancies*, or a *laneway house*.
2) The *Chief Building Official* shall be notified within 30 days of any changes to the information that was last provided to the *City* with

regard to the *operating permit*, in the form prescribed by the *Chief Building Official*.

3) If a decorative water feature is removed or its use is permanently discontinued, it shall be safely drained, thoroughly sanitized, and the make-up water line shall be disconnected and capped.

4) Where an outdoor decorative water feature is provided as an auxiliary system to a *building*, then the outdoor decorative water feature shall be considered part of the *building* for the purposes of this Article.".

16. In Article 1.5.2.10. of Division C of Book II, Council:

a) adds the words ", and Operating Permits" to the title of the Article; and

b) adds a new Sentence (2) as follows:

"**2)** The *Chief Building Official* may issue an *operating permit* to install or retain existing equipment or systems for which an *operating permit* is required under this By-law in accordance with the provisions of Subsection 1.6.9.".

17. Council adds a new Subsection 1.6.9. to Division C of Book II as follows:

"**1.6.9. Operating Permits**

1.6.9.1. Operating Permit Required

1) No person shall install or retain existing equipment or systems for which an *operating permit* is required under this By-law, without an *operating permit*.

1.6.9.2. Compliance with Permit Conditions

1) No person shall install or retain existing equipment or systems for which an *operating permit* is required under this By-law, in contravention of the conditions of an *operating permit*.

1.6.9.3. Application Requirements

1) To obtain an *operating permit*, the *owner* shall file an application in writing in the form prescribed by the *Chief Building Official*.

2) The application for an *operating permit* shall be accompanied by the *operating permit* fees and any documentation required by the *Chief Building Official* to verify that the requirements of this By-law are being met.

1.6.9.4. Permit Expiry

1) An *operating permit* shall expire and the rights of the *owner* under the *operating permit* shall terminate on the expiry date noted on the *operating permit*.

1.6.9.5. Operating Permit Fees

1) *Operating permit* fees are as set out in the Schedule of Fees at the end of this Part.".

18. In Clause 1.7.2.2.(1)(a) of Division C of Book II, Council adds ", including *operating permits*," after "the necessary *permits* have been obtained".

19. In the Schedule of Fees of Division C of Book II, Council adds the following at the end of the Schedule:

"PART C – OPERATING PERMITS

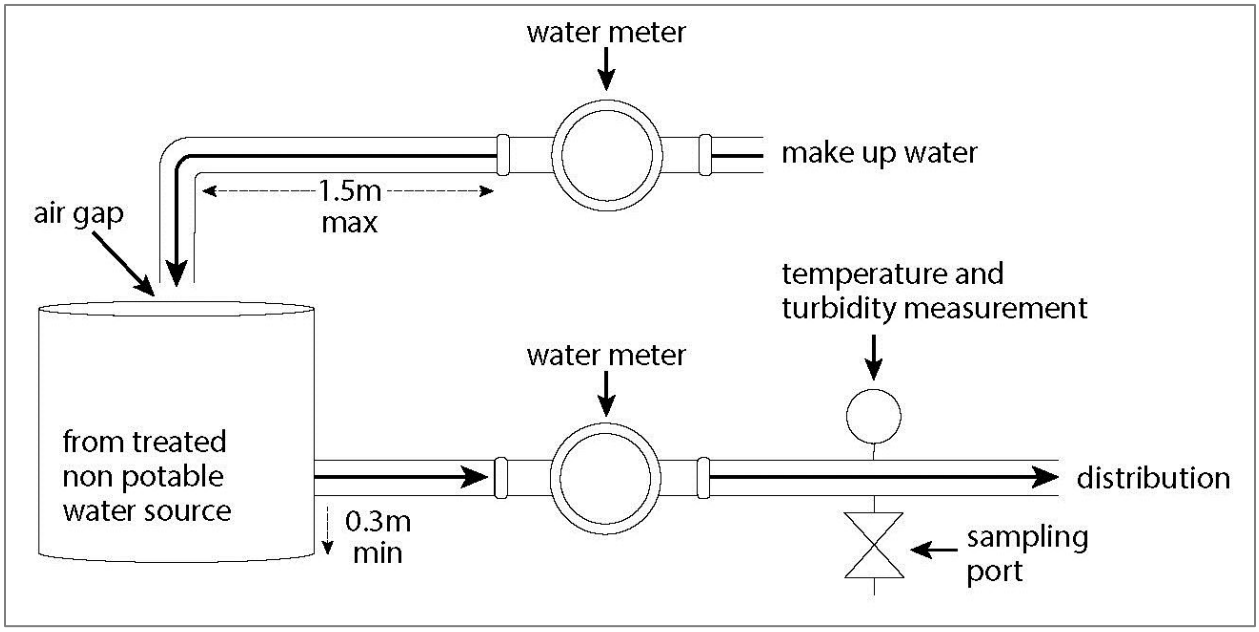
Every applicant for an OPERATING PERMIT shall, at the time of application, pay to the City the fee set out hereunder:

For each OPERATING PERMIT…….$00.00".

* * * * *

Appendix to Building By-law No. 10908
Regarding Non-potable Water Systems and New Requirements for Other Water Systems

To assist with interpretation of the proposed Building By-law amendments (Division B of Book II, Articles 2.7.6.7, 2.7.6.8 and 2.7.6.9), the following schematic has been prepared for Appendix A – Division B "Explanatory Material":



* * * * *

Public Consultation Process & Summary

Staff research and collaboration with Vancouver Coastal Health commenced in 2016. This included a peer-exchange in June 2017 with New York City, a leader in *Legionella* regulations (this exchange was funded entirely by the Urban Sustainability Directors Network).

Early in the proposal development process, technical feedback was solicited from public health professionals and engineers. This included a presentation in October 2017 at the annual conference of the Canadian Institute of Public Health Inspectors (CIPHI), a seminar in November 2017 with the Engineers and Geoscientists of British Columbia (EGBC), and a presentation in April 2018 to the American Society of Plumbing Engineers – BC Chapter.

Concurrently, a Greenest City Scholar co-supervised by the Vancouver Economic Commission and the City of Vancouver conducted interviews with local businesses to assess the opportunities for and obstacles to alternate water use.

The refined proposals were summarised in a May 31, 2018 public engagement letter which was sent to about 250 professional and industry associations, consultants, contractors, property owners and managers, and other entities (listed on the following pages), and was shared with Corporate Communications and 311 Operations. The engagement letter was further distributed by professional and industry associations to hundreds more, as they shared this information with their members and other organisations.

Three follow-up workshops were held on June 28-29, 2018. Each involved special guest Christopher Boyd, who as an Assistant Commissioner in New York City's Department of Health and Mental Hygiene led the agency's response to the largest *Legionella* outbreak in that city's history (Mr. Boyd is now with NSF International). A summary of these workshops follows:

- June 28, 2018: Two-part public workshop, first with a presentation and discussion on the proposals, followed by an afternoon round-table on the Greenest City Scholar's work.

- June 28, 2018: Workshop for public health authorities, with attendees from the BC Centre for Disease Control, Vancouver Coastal Health, the BC Ministry of Health and Metro Vancouver.

- June 29, 2018: Workshop for facility engineers and operators, with invitations sent through the Building Owners and Management Association of BC, the International Facility Management Association – BC Chapter, the Vancouver Tourism Facility Managers Association, Tourism Vancouver, and Vancouver Coastal Health.

Stakeholder concerns and input were reviewed and staff modified recommendations to improve outcomes and address unanticipated hardships where consistent with the City's objectives and the public interest.

This appendix concludes with a list of the recipients of the May 31, 2018 public engagement letter and attendees to the June 28-29, 2018 workshops. Those entities prefixed with an asterisk provided comments to the City of Vancouver:

a) Professional and Industry Associations & Utilities

- * Alliance to Prevent Legionnaires' Disease
- American Rainwater Catchment Systems Association (ARCSA)
- American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE), BC Chapter
- American Society of Plumbing Engineers (ASPE), BC Chapter
- Architectural Institute of BC (AIBC)
- BC Advanced Conservation and Efficiency Association
- BC Apartment Owners & Managers Association
- * BC Centre for Disease Control
- BC Golf Course Superintendent's Association (BCGSA), Lower Mainland Chapter
- BC Housing
- BC Hydro
- BC Institute of Power Engineers
- BC Ministry of Health
- BC Non-Profit Housing Association
- BC Real Estate Association
- BC Restaurant & Food Services Association (BCRFA)
- * Building Owners and Managers Association (BOMA) of BC
- Canadian Federation of Apartment Associations
- * Canadian Institute of Plumbing & Heating (CIPH)
- Centers for Disease Control and Prevention (U.S.)
- City Green Solutions
- Climate Smart
- * Condominium Home Owners Association (CHOA)
- Creative Energy
- FortisBC
- * Fraser Health Authority
- * GeoExchange BC
- * Global Alliance for Patient and Public Safety
- Greater Vancouver Board of Trade
- Greater Vancouver Home Builders' Association (GVHBA)
- Heating, Refrigeration and Air Conditioning Institute of Canada (HRAI Canada)
- Homeowner Protection Office
- Hotel Association of Vancouver
- * International Association of Plumbing and Mechanical Officials (IAPMO)
- International Facility Management Association (IFMA), BC Chapter
- Independent Contractors and Business Association
- LandlordBC
- Light House Sustainable Building Centre
- * Mechanical Contractors Association of BC (MCABC)
- * Metro Vancouver
- * NSF International
- * Plumbing Manufacturers International (PMI)
- Professional Engineers and Geoscientists of BC (EGBC)
- Retail Council of Canada

- Society Promoting Environmental Conservation (SPEC)
- Strata Property Agents of British Columbia
- Technical Safety BC
- Tourism Industry Association of BC (TIABC)
- Tourism Vancouver
- * Urban Development Institute, Pacific Region (UDI)
- * Vancouver Coastal Health (VCH)
- Vancouver Economic Commission
- Vancouver Regional Construction Association
- Vancouver Tourism Facility Managers Association (VTFMA)
- Water Quality Association (WQA)

b) Building Water Treatment Systems

- Culligan Water
- * Hytec Water Management
- * 1ClearWater
- * Watertiger BC

c) Cooling Towers

- Baltimore Aircoil Company (BAC)
- Cooling Technology Institute (CTI)
- Delta Cooling Towers
- Evapco
- SPX Cooling Technologies (Marley)

d) Irrigation

- Able Irrigation
- Artee Lawn Sprinkler Systems
- BC Landscape & Nursery Association
- Coastal Irrigation Inc.
- Irrigation Industry Association of BC
- Kore
- Summit Irrigation
- T. Moscone & Bros. Landscaping Ltd.
- University Sprinklers

e) Laboratories

- AGAT Laboratories
- ALS Environmental
- * BC Centre for Disease Control, Public Health Laboratory
- CARO Analytical Services
- EXOVA Canada Inc.
- IG Micromed Environmental
- Maxxam
- Metro Vancouver

f) Consultants, Contractors, Manufacturers, Wholesalers & Suppliers

- Allied Plumbing & Heating
- Allstar Mechanical Group
- AloPluvia
- Alpha Mechanical
- AME Consulting
- Ameresco
- Andrew Sheret Ltd.
- * Angelo Décor International Inc.
- * APANA
- Arete Mechanical
- Ashton Service Group
- Associated Engineering (AE)
- AYO Energy Solutions
- Barclay Sales BC
- * BARR Plastics
- BC Comfort
- BES Consulting
- Black & McDonald
- Bond Mechanical
- Boni - Maddison Architects
- Brighter Mechanical
- Broadway Refrigeration
- BSA Engineering
- Building It Right
- Cada and Associates Consulting Ltd.
- Cambridge Plumbing
- CFT Engineering
- * Chem-Aqua Canada
- Cimco Toromont
- Clairmont Mechanical Contracting Ltd.
- Connelly Mechanical Systems Ltd.
- ControlChem
- Core Mechanical
- Creus Engineering
- Daryl-Evans
- Davidson Bros.
- Dialog
- * Dierks Equipment Sales Ltd.
- * Division 15 Mechanical
- DMS Mechanical
- Domus Home Energy Inc.
- Draft on Site Services Inc.
- Dual Mechanical
- * DuBois Chemicals Canada (formerly IPAC)
- Eagle Ridge Mechanical Contracting Ltd.
- ECCO Supply
- Elafon Mechanical
- EMCO Plumbing & Heating Supplies
- Enercon Water Treatment Ltd.

- * Enviro-Tech Mechanical
- Filterco Water Treatment Ltd.
- Flow Consulting Group Inc.
- Fluid Mechanical
- * Fraser Valley Refrigeration
- Fred Welsh Mechanical
- FWD Engineering Ltd.
- G.R. Hudson Sales Ltd.
- Georgia Mechanical
- GML Mechanical Ltd.
- Greyter Water Systems Inc.
- Haakon HVAC Services
- * HC Information Resources Inc.
- Hillcrest Plumbing & Heating
- Hy-Line Sales Ltd.
- IB&T Consulting and Technologies
- Infinity Mechanical
- Inlet Mechanical Services Ltd.
- Innovative HVAC
- Insightful Healthy Homes Inc.
- Integral Group
- ITOH2
- * Jade West Engineering Co. Ltd.
- Jeda Mechanical
- JQ Mechanical
- * JSA Sales Inc.
- Just Mechanical
- Keith Plumbing & Heating
- Kirkland Heating & Cooling
- * Kohler
- KWL
- Langara Mechanical
- Lathams
- Lisi Mechanical
- LMDG Code Consultants
- Lockerbie & Hole
- Markell Mechanical
- McGregor Mechanical Contracting Ltd.
- MCW Consultants Ltd.
- Milani
- Mitchell Installations Ltd.
- Morrison Hershfield
- Nalco (Ecolab)
- * National Hydronics Group
- National Plumbing
- NDY Sterling Cooper
- North Mark Mechanical
- Northland Mechanical Contracting Ltd.
- Ocean Park Mechanical
- Omega Mechanical
- Ostrem Chemical Co. Ltd.

- * Pace Chemicals Ltd.
- Pacific Mechanical Systems Ltd.
- Pennington Mechanical
- Perkins + Will
- Phase Mechanical
- Pitt Meadows Plumbing & Mechanical
- PPL Mechanical
- Prism Engineering
- Public Design
- Rehau
- Ridgeway Mechanical Ltd.
- Rock Mechanical
- Rocky Point Engineering Ltd.
- Ron Wong & Associates Inc.
- Russel Mechanical
- SaveMore Plumbing & Lighting
- Sentrax Mechanical
- SES Consulting
- Sloan
- Smith and Andersen
- Somatic HVAC
- SRC Engineering
- Stantec
- Summit Building Consultants Inc.
- Sundawn HVAC
- * Terra Marra
- * 3 Phase Power
- * Total Energy Systems Ltd.
- Tower HVAC
- Turner Construction Company
- Universal Supply Co. Inc.
- * Uponor
- Uptime Industrial
- Urban Systems
- Vanguard Mechanical
- Vanwest Plumbing & Heating Inc.
- Victaulic
- Voltas Engineering
- * WaterfallNow Vancouver
- * Watts Water Technologies
- Westchem Industrial Water
- William Kelly and Sons Plumbing Contractors Ltd.
- Williams Engineering
- Wolseley
- WSP Group
- Xpert Mechanical
- Yoneda and Associates

g) Other End Users

- BC Pavco
- Bentall Kennedy
- * Brookfield GIS (BGIS)
- Cadillac Fairview
- Catholic Independent Schools of the Vancouver Archdiocese
- Coast Hotels
- Coast Mountain Bus Company
- Delta Hotel
- Fairmont Hotel
- Federation of Independent School Associations in BC (FISA)
- Fortinet Technologies
- Four Seasons
- Fraser Health Authority – Facilities Management
- GWL Realty Advisors
- Ivanhoe Cambridge
- Leverage Lab
- Listel Hotel
- Oxford Properties
- Pacific Gateway Hotel at Vancouver Airport
- Riocan
- Science World
- Triovest
- UBC
- VanCity
- Vancouver Convention Centre
- Vancouver General Hospital
- Vancouver School Board
- Wall Centre
- Westin
- Westin Grand Vancouver

* * * * *

Letters of Support: Building Owners and Developers

November 23, 2018

Kaye Krishna
General Manager of Development, Buildings and Licensing
City of Vancouver

By email to: kaye.krishna@vancouver.ca

RE: Water Use in Buildings: Enhanced Public Safety, Efficiency and Long-Term Resiliency Measures

Dear Ms. Krishna,

On behalf of the Building Owners and Managers Association of British Columbia (BOMA), thank you for the opportunity to comment on the proposed amendments to the Building By-law, including mandatory operating permits and a registry for building water systems.

We support creating a registry of cooling towers and decorative water features in the City to provide a means to engage building owners and encourage best practices in the event of a *Legionella* (or other disease) outbreak. This is a laudable goal and we support proactively protecting public health.

We understand the mandatory operating permits for cooling towers and decorative water features will be at zero cost. In our opinion, this approach will help ensure the participation of the highest number of building owners and managers.

We also understand the City is committed to consulting with industry on the future development of the registry and look forward to being part of that process.

BOMA represents the leaders in our industry and our building owners and managers are continuously improving their buildings.

As an example, our BOMA Better Environmental Standards (BEST) building management program provides a significant number of points (17 specifically) for a *Legionella* bacteria control management program (see: http://bomacanada.ca/wp-content/uploads/2016/09/BOMA-BEST-3.0-Office.pdf, section 5.1.1) as part of the certification process.

While it is admirable the City is taking a leadership role on this issue, we feel a provincial approach, rather than diverse municipal efforts, would be best in the long term.

BOMA British Columbia

BUILDING OWNERS AND MANAGERS

ASSOCIATION
British Columbia

Suite 556
409 Granville Street
Vancouver, BC
V6C 1T2

TELEPHONE
(604) 684-3916
FASCIMILE
(604) 684-4876
WEBSITE

As noted in the policy report, cooling towers can have a "long rage aerosol dispersal potential", making municipal efforts less effective than a regional or provincial approach.

We understand Technical Safety BC has an existing registry for chillers. Adding cooling towers to this registry could be a way to add more data to an existing infrastructure.

Thank you for the opportunity to provide comments on the above proposed amendments. Please let me know if you would like any additional information or comments.

Sincerely,

Damian Stathonikos
President – Building Owners and Managers Association of British Columbia

Cc: Patrick Ryan – Chief Building Official, City of Vancouver
Jerry Dobrovolny – General Manager of Engineering, City of Vancouver

URBAN DEVELOPMENT INSTITUTE – PACIFIC REGION
#1100 – 1050 West Pender Street
Vancouver, British Columbia V6E 3S7 Canada
T. 604.669.9585 F. 604.689.8691
www.udi.bc.ca

November 23, 2018

Kaye Krishna,
General Manager, Development, Buildings & Licensing
City of Vancouver
453 West 12th Avenue
Vancouver, BC V5Y 1V4

Dear Ms. Krishna

RE: Water Use in Buildings: Enhanced Public Safety, Efficiency and Long-Term Resiliency Measures

On behalf of the 850 corporate members of the Urban Development Institute (UDI), I would like to thank your office for consulting us on the proposed plumbing and mechanical systems amendments. We appreciated Chris Radziminski, taking the time to review the proposals with us directly in detail.

We generally do not oppose the proposed manner of gathering additional information on active cooling towers and decorative fountains through an online registration. At this point we do not have any issues with a "census-type" approach, using the existing POSSE online registration system. At this time our support is based on the understanding from conversations with City staff that related costs will be minimal, and not exceed approximately $350 per year.

We view the consultation of key stakeholders as a critical part of current and future phases of changes to plumbing and mechanical regulations. As further changes are considered we would request that consultation meetings be held well in advance with stakeholders such as the Condominium Home Owners Association (CHOA), Building Owners and Managers Association (BOMA), LandlordBC, Vancouver Coastal Health, Fraser Health and other relevant groups. Buy-in from these stakeholders along with UDI will be important going forward. In addition, we would like the opportunity to review the fees and charges associated with any proposed changes. We would also ask for an inter-departmental approach to be taken to future consultations. This should include other city staff from the other departments and any others who may play a role in the planning, location or installation of water use systems.

We would also note that our support of these proposed changes is predicated on the assurance that the City is working with utility providers to take preventative measures at the water source. We expect that equally stringent regulations are, or will be, applied to infrastructure outside of buildings to ensure that once water reaches buildings through city plumbing, measures have already been taken to address potential concerns. We would stress that the responsibility for public safety not just be downloaded onto building owners.

Regarding the proposed rainwater harvesting regulations, we would encourage the City to track the installation of these optional alternate water systems as these changes are implemented. We would caution that the cost and complexity of connecting these systems to building plumbing through water closets and urinals will discourage many developers from installing them in new buildings.

It is our understanding that the proposed changes regarding the geothermal exchange systems are supported by those system builders, and as such we do not oppose these changes.
If you should wish to discuss these changes or future proposals further, please don't hesitate to contact us. We have a member committee that reviews changes associated with the Building Code, and we would be happy to organize a meeting at an appropriate time.

Yours sincerely,

Anne McMullin
President & CEO

CC: Gil Kelley, General Manager, Planning, Urban Design and Sustainability
Patrick Ryan, Chief Building Official
Jerry Dobrovolny, General Manager of Engineering

S:\Public\POLICY\MUNICIPAL LIAISON\Vancouver\Letter To COV Plumbing And Mechanical Regulations-November 23.Docx

2

* * * * *

Letters of Support: Health Authorities

Vancouver CoastalHealth
Promoting wellness. Ensuring care.

Office of the Chief
Medical Health Officer

#800 - 601 West Broadway
Vancouver, BC V5Z 4C2

November 1, 2018

Mr. Sadhu Johnston, City Manager
City of Vancouver
453 W 12th Avenue
Vancouver BC, V5Y 1V4
VIA Email: Sadhu.Johnston@vancouver.ca

Dear Mr. Johnston:

Re: Proposed By-Law Amendments Related to Alternative Water Systems and Permitting Requirements for Certain Building Water Systems

Vancouver Coastal Health Medical Health Officers and Environmental Health Officers support the proposed City of Vancouver by-law amendments pertaining to drinking water systems in the City. We appreciate the work done to ensure the amendments will address current public health concerns and also prevent introduction of new public health risks as water conservation is enhanced.

Water systems such as cooling towers can be a source of disease-causing bacteria, including legionella. Vancouver has experienced a past outbreak of legionella associated with a cooling tower, and outbreaks have more recently been reported from other municipalities. Climate change may increase the risk of future outbreaks by creating warmer conditions more favorable for bacterial growth. Conversely, rainwater systems can be a valuable tool for water conservation but must be operated in a manner that does not increase the risk of public exposure to disease-causing organisms.

The proposed by-law amendments, by requiring permitting and establishing operational standards for water systems, will address these issues in the following ways:

- While most rainwater systems in the City were installed to meet LEED requirements, there is no current registry of where these systems are installed nor any oversight or requirements to ensure that they continue to operate in a safe manner. Permitting these systems will help to address these historic shortcomings and will ensure that these systems continue to operate safely while contributing to overall water conservation.

- There is currently no registry of existing cooling towers in the City. Without a registry, there can be delays in identifying the location of cooling towers so they can be investigated as a possible source in the investigation of cases or outbreaks of legionella. Timely identification of the source of an outbreak, and subsequent interventions, can prevent additional illnesses and even deaths in the community.
- Currently there is no oversight or ongoing maintenance requirements for cooling towers after they have been installed. Registration and maintenance requirements under a by-law will result in regular inspection and testing of these systems. This will help reduce the potential health risk from these systems.

By regulating rainwater, cooling tower and decorative fountain systems through the use of a permit process that includes minimum standards for construction, treatment and maintenance, the City of Vancouver will be introducing safeguards that will help to better protect its citizens from disease-producing pathogens that can be associated with these systems. We are pleased to support the City of Vancouver in its proposed by-law amendments.

Sincerely,

Patricia Daly MD, FRCPC
Vice-President, Public Health and Chief Medical Health Officer
Vancouver Coastal Health

cc. Kaye Krishna, General Manager, Development, Buildings & Licensing
Patrick Ryan, Chief Building Official
Jerry Dobrovolny, General Manager of Engineering

fraserhealth

Better health.
Best in health care.

November 9, 2018

Mr. Sadhu Johnston, City Manager
City of Vancouver
453 W.12th Ave
Vancouver, BC V5Y 1V4
VIA EMAIL: sadhu.johnston@vancouver.ca

Dear Mr. Johnston,

Re: Proposed by-Law amendments related to alternative water systems and permitting requirements for certain building towers

We are writing today to inform you that Fraser Health Medical Health Officers and Environmental Health Officers support the cooling tower and decorative water features registry proposal to the City of Vancouver. We strongly support this proposal considering its significant benefits, to the point that we would actually support a provincial registry if one were to be proposed, something we intend to work toward in the near future.

Water systems such as cooling towers can be a source of disease-causing bacteria, legionella being of particular health concern. During our management of the recent Legionella outbreak in Surrey, BC involving three suspected water cooling towers, we experienced significant challenges of not having a cooling tower registry available from the start of the investigation. The outbreak lasted 20 weeks, and 13 people became seriously ill. In order to identify and investigate possible sources of the outbreak, we ended up constructing an improvised cooling tower registry. Our staff spent many hours looking at City building plans/maps data to determine whether buildings in and around the affected area have cooling towers or not. The data from these building plans was imprecise and in the end we were required to write letters to building owners we thought had cooling towers to confirm their presence. We learned that only 13% of nearly 160 facilities we checked have towers. Had a cooling tower registry been available, significant staff time and resources would have been spared. In addition, we found that not all building managers have knowledge of this equipment, further challenging our work.

In our experience, the absence of a cooling tower registry created delays in identifying the location of cooling towers to allow a timely investigation of possible sources of cases or outbreaks of legionella. The availability of a cooling tower registry early in our recent investigation would have likely shortened the outbreak duration by two weeks or more. Registration and maintenance requirements under a by-law would strengthen our capacity to ensure that regular inspections and testing of these systems be done and that adequate

Medical Health Officer
Fraser Health
400 – 13450 102nd Avenue
Surrey, BC V3T 0H1
Canada
Tel: (604) 930-5404
Fax: (604) 930-5414
www.fraserhealth.ca

fraserhealth
Better health.
Best in health care.

maintenance and remediation, when necessary, are timely. Further, it would allow for proactive processes that would trigger notifications to conduct more frequent inspection and testing when weather conditions reach particularly hot and humid thresholds, something that will likely be more frequent in the future due to climate change. Overall, a cooling tower registry would help to reduce the potential health risk from these systems – proactively and reactively – and prevent disruption to local businesses, illness and even deaths in the community.

Of note, our investigation led to interesting learnings, whether directly from the literature or from a few other North-American jurisdictions that have faced similar challenges in the past and have developed promising and effective strategies to manage the health risk that water cooling towers can pose. Of particular significance and interest here, the jurisdictions of New York, Hamilton, Québec all suggested a facilities inventory (i.e. GIS mapping of cooling towers and other facilities that are routinely inspected) and a schedule of routine inspection or compliance checks.

We hope that our recent experience will benefit others and that our challenges can serve as a learning opportunity in British Columbia. We strongly support a cooling tower registry and we firmly believe that it has a significant role in how we manage health risks inherent to such equipment.

If you have any further questions or require further information, feel free to contact Inderjeet Gill at 604-930-5447.

Sincerely,

Dr. Ingrid Tyler
Medical Health Officer,
Fraser Health Authority

Oonagh Tyson
Regional Director, Health Protection
Fraser Health Authority

Cc: Kaye Krishna
Patrick Ryan
Jerry Dobrovolny
Chris Radziminski
Phillip White
Kevin Lau

Medical Health Officer
Fraser Health

400 – 13450 102nd Avenue
Surrey, BC V3T 0H1
Canada

Tel: (604) 930-5404
Fax: (604) 930-5414
www.fraserhealth.ca

2018 BC's Top Employers

A service of the Provincial Health Services Authority

PHSA Laboratories

BCCDC Public Health Laboratory

November 5, 2018

Mr. Sadhu Johnston, City Manager
City of Vancouver
453 W.12th Ave
Vancouver, BC V5Y 1V4
VIA EMAIL: sadhu.johnston@vancouver.ca

Dear Mr. Johnston,

Re: Proposed By-Law Amendments Related to Alternative Water Systems and Permitting Requirements for Certain Building Water Systems

This is to inform you that the BC Centre for Disease Control (BCCDC) supports the cooling tower and decorative water features registry proposal to the City of Vancouver. I am pleased to see that Vancouver is taking on this leadership! From the public health perspective, having an up-to-date registry will greatly support, accelerate and focus outbreak investigations to the most likely implicated sources, saving public health time and resources. This will lead to expedited identification of the outbreak source and therefore remediation that potentially can prevent additional infections and illnesses. This initiative is aligned with the BCCDC Guidelines (section 5.2).

As you may be aware, the BCCDC has been supporting the recent legionella outbreak in Fraser Health Authority (FHA). Having a cooling tower registry in place would have greatly expedited the detection of the source, prevented the significant amount of door to door and aerial viewing of the area to identify existing cooling towers within the implicated geographic area. These activities were resource intensive for FHA during the early phase of the investigation, and delayed implicated source detection.

With the recent FHA experience, with climate changes towards hotter summer weather, and increased densification of both cooling towers and populations, it is important to ensure through regulation and oversight, registration and proper maintenance of these systems are in place to reduce the potential health risks for the population.

We are pleased to discuss further as needed.

Sincerely,

L. Hoang

Linda Hoang, MD, FRCPC
Associate Director, Public Health Laboratory
Program Head, Bacteriology and Mycology
BCCDC Public Health Laboratory

Mel Krajden

Mel Krajden, MD, FRCPC
Director, Public Health Laboratory
Program Head, Virology
BCCDC Public Health Laboratory

cc. K. Krishna, C. Radziminski, P. Ryan, P. White, J. Dobrovolny, K. Lau

Provincial Health Services Authority
Province-wide solutions. Better health.

Correspondence address: BCCDC Public Health Laboratory, 655 West 12th Avenue, 2nd floor, Vancouver, BC V5Z 4R4
1 877 PHSA LAB (1-877-747-2522)

October 30, 2018

Mr. Sadhu Johnston, City Manager
City of Vancouver
453 W 12th Ave
Vancouver, BC V5Y 1V4
VIA EMAIL: sadhu.johnston@vancouver.ca

Dear Mr. Johnston,

NSF International is an independent, not-for-profit organization founded in 1944 in Ann Arbor, MI that develops consensus national standards, provides product inspection, testing and certification, auditing, education, and related services in public health and safety. The core purpose of NSF is to "protect and improve human and environmental health." NSF has a long history of working with health-related governmental entities in the United States and Canada, as well as other international bodies, to advance protection of environmental health.

NSF supports your initiative for a proposed operating permit for evaporative cooling towers and condensers, and decorative water features. NSF strongly supports the implementation of regulatory oversight of water systems that have the potential to cause outbreaks of Legionnaires' disease. The U.S. Center for Disease Control found in a comprehensive review of outbreak investigations that 9 out of 10 of these incidents could have been avoided if a water management plan had been properly implemented.

Evaporative cooling towers have been implicated as a source of several Legionnaires' disease outbreaks. In 2015, New York City experienced the largest outbreak in its history with 133 cases confirmed in the South Bronx, resulting in 16 deaths. Because of this outbreak, New York City and New York State implemented registration, surveillance, and proactive water management requirements for cooling towers. As of 2018, all cooling towers are registered with NYC Department of Buildings and inspected at least annually by NYC Department of Health and Mental Hygiene (NYC Health). Cases of Legionnaires' disease can now be effectively responded to within 24 hours. Health orders are issued with clear direction on what actions must be taken. NYC Health tracks compliance with the requirements of the Health Order which can be used to take enforcement action if delays occur.

Public health departments should adopt best practices to incorporate prevention strategies along with consistent emergency management. Currently, there are about 700 cooling towers in the City of Vancouver, consuming up to 6% of treated drinking water annually. A registry would allow Vancouver to identify each tower in the city in order to effectively respond to cases and outbreaks of disease, and to monitor the effectiveness of the water management strategies. Importantly, in addition to cooling tower systems, the regulation will capture other sources of environmental exposure, such as fountains, and secondary disinfection systems.

The steps being taken by Vancouver will ensure that it can evaluate and respond efficiently to increases in legionella cases. As demonstrated by the recent outbreak in neighboring Surrey and the large outbreak in Quebec, the lack of a registry of common sources of community exposure can result in significant delays in the public health response.

NSF INTERNATIONAL
789 N. Dixboro Road, Ann Arbor, Michigan 48105-9723 USA
T +1 734 769 8010 | **F** +1 734 769 0109 | **www.nsf.org**

Incorporation of prevention strategies with better emergency management will increase efficiencies, maximize resources, and save lives.

Thank you for your consideration of these comments.

Sincerely,

Chris Boyd
General Manager
Building Water Health

cc: Jerry Dobrovolny, General Manager of Engineering
Kaye Krishna, General Manager, Development, Buildings & Licensing
Patrick Ryan, Chief Building Official

NSF INTERNATIONAL
789 N. Dixboro Road, Ann Arbor, Michigan 48105-9723 USA
T +1 734 769 8010 | **F** +1 734 769 0109 | **www.nsf.org**

BC Centre for Disease Control
An agency of the Provincial Health Services Authority

November 16, 2018

Mr. Sadhu Johnston, City Manager
City of Vancouver
453 W.12th Ave
Vancouver, BC V5Y 1V4
VIA EMAIL: sadhu.johnston@vancouver.ca

Dear Mr. Johnston,

Re: Proposed By-Law Amendments Related to Alternative Water Systems and Permitting Requirements for Certain Building Water Systems

Cooling towers, water features and other devices which cause aerosolization of water are potential sources of *Legionella* infection. Legionellosis is a severe and occasionally fatal infection of the lungs that can be prevented with regular maintenance of at-risk water devices. Mitigation of risk is facilitated by having a registry, standards, inspection and testing.

A registry of water devices will greatly support outbreak investigation efforts as experienced in the recent Surrey outbreak. It would have facilitated the localization and prioritization of high risk cooling towers for further investigation.

BCCDC recently developed provincial *Legionella* control guidelines (http://www.bccdc.ca/resource-gallery/Documents/Guidelines%20and%20Forms/Guidelines%20and%20Manuals/Epid/CD%20Manual/Chapter%201%20-%20CDC/Legionella%20Guidelines.PDF). In these guidelines, we highlight that several jurisdictions have implemented permitting and registration of cooling towers to prevent *Legionella* risk and facilitate outbreak investigations.

I believe the registration of cooling towers will soon become a best practice in public health. As *Legionella* infection risk is thought to increase with climate change and aging infrastructure, the risk and need to prevent it will only increase in the future.

Provincial Health Services Authority
Province-wide solutions. Better health.

A research and teaching centre affiliated with UBC

BC Centre for Disease Control
An agency of the Provincial Health Services Authority

As a public health physician responsible for the surveillance and control of legionellosis in BC, I support the cooling tower and decorative water features registry proposal to the City of Vancouver.

Sincerely,

Eleni Galanis, MD, MPH, FRCPC
Physician Epidemiologist
eleni.galanis@bccdc.ca
604-707-2558

* * * * *