Plumbing & Mechanical Systems: What's New & Expected

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City of Vancouver

May 16, 2023 | ASHRAE & ASPE BC Chapters Joint Meeting

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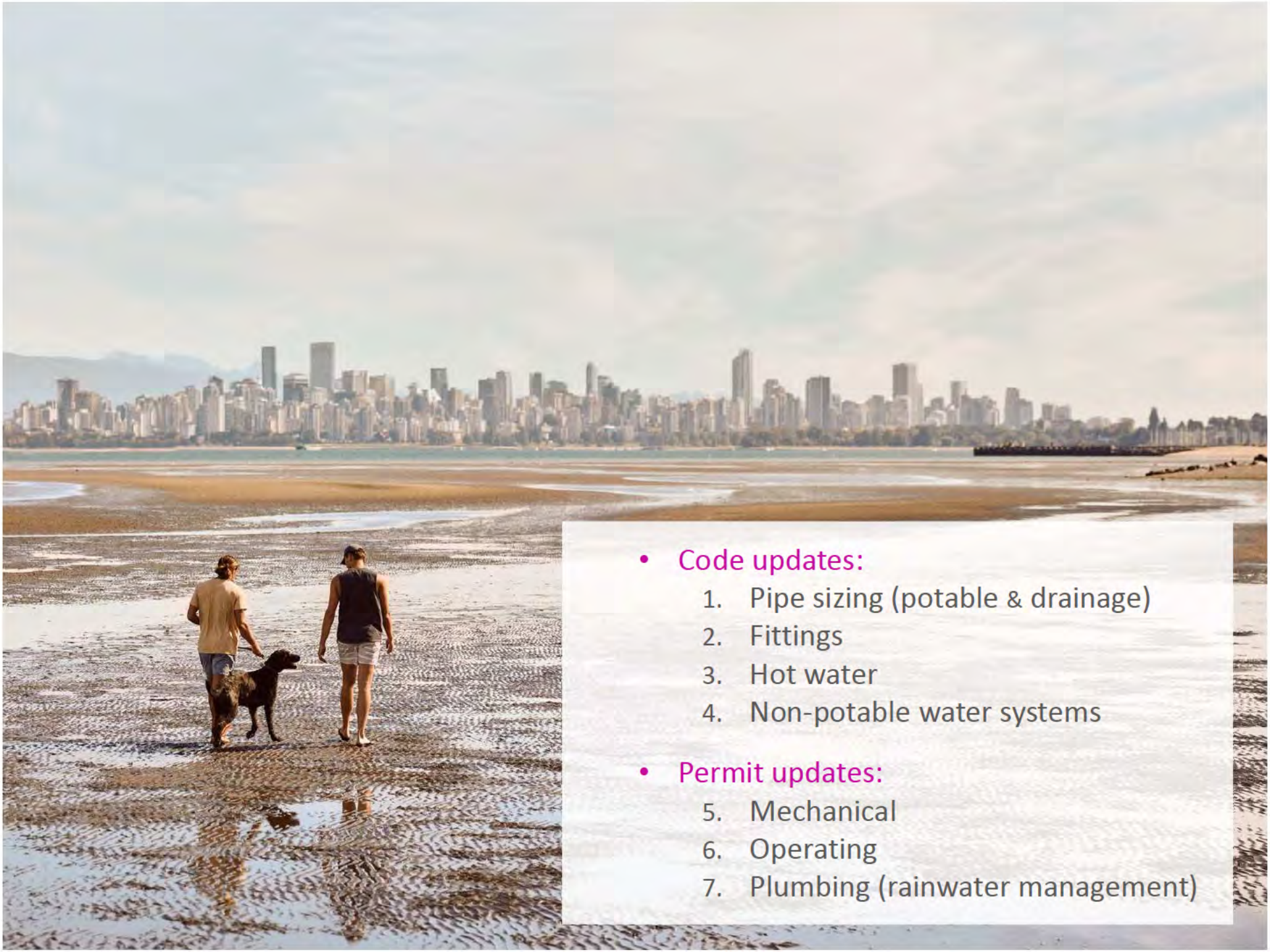
Photo courtesy of Destination Vancouver.



- Code updates:
  1. Pipe sizing (potable & drainage)
  2. Fittings
  3. Hot water
  4. Non-potable water systems
- Permit updates:
  5. Mechanical
  6. Operating
  7. Plumbing (rainwater management)

1. Updates: Sizing – potable pipes

The IAPMO Water Demand Calculator is an Acceptable Solution for *dwelling units*.

Water-using Fixture or Appliance	1980s Water Use	'Green Code' Requirements	% Reduction in since 1980s
Residential Bathroom Lavatory Faucet	3.5+ gpm	1.2 gpm	66%
Showerhead	3.5+ gpm	2.0 gpm	43%
Toilet – Residential	5.0+ gpf	1.28 gpf	74%
Residential Clothes Washer	51 gallons/load	13 gallons/load (Energy Star)	75%
Residential Dishwasher	14 gallons/cycle	3.5 gallons/cycle (Energy Star)	75%

Source: Adapted from Table 1 of iapmo.org/media/25942/savings_potential_of_the_wdc.pdf

1. Updates: Sizing – potable pipes

High-Cost Area (New York City) 6-Unit Multi-Family Savings $ / %		
Savings vs.	Copper	PEX
UPC ($)	$3,995	$9,482
UPC (%)	3%	8%
IPC ($)	$7,602	$9,012
IPC (%)	5%	8%

High-Cost Area (New York City) 45-Unit Multi-Family Savings $ / %		
Savings vs.	Copper	PEX
UPC ($)	$52,409	$33,154
UPC (%)	8%	5%
IPC ($)	$58,877	$26,494
IPC (%)	9%	4%

2.6.3.1. Design, Fabrication and Installation

(See Note A-2.6.3.1.)

1) *Water distribution systems* shall be designed to provide peak demand flow when the flow pressures at the supply openings conform to the plumbing supply fitting manufacturer's specifications.

2) *Potable water systems* shall be designed, fabricated and installed in accordance with good engineering practice, such as that described in the ASHRAE Handbooks and ASPE Data Books, and for *dwelling units*, may be sized using the IAPMO Water Demand Calculator. (See Note A-2.6.3.1.(2).)

Source: Adapted from Table 2 of iapmo.org/media/25942/savings_potential_of_the_wdc.pdf

1. Updates: Sizing – drainage pipes

Proposed July 2023

For water closets:
Delete minimum sizes for branch & building drains and soil-or-waste stacks.

2.4.9.2. Serving Water Closets

1) Drainage pipes that serve a water closet shall be not less than 3 inches in *size*.

2) ~~*Branch* and *building drains* downstream of the third water closet *fixture drain* connection shall be not less than 4 inches in *size*.~~

3) ~~*Soil-or-waste stacks* that serve more than 6 water closets shall be not less than 4 inches in *size*.~~

4) Discharge pipes serving a macerating toilet system shall be not less than ¾ inch in *size*.

Source: Proposed change 1390 to the 2020 National Plumbing Code:
ccbfc-cccbpi.ca/eng/public-review/2023_1/pcfs/npc20_divb_02.04.09.02._001390.html

2. Updates: Press-connect fittings

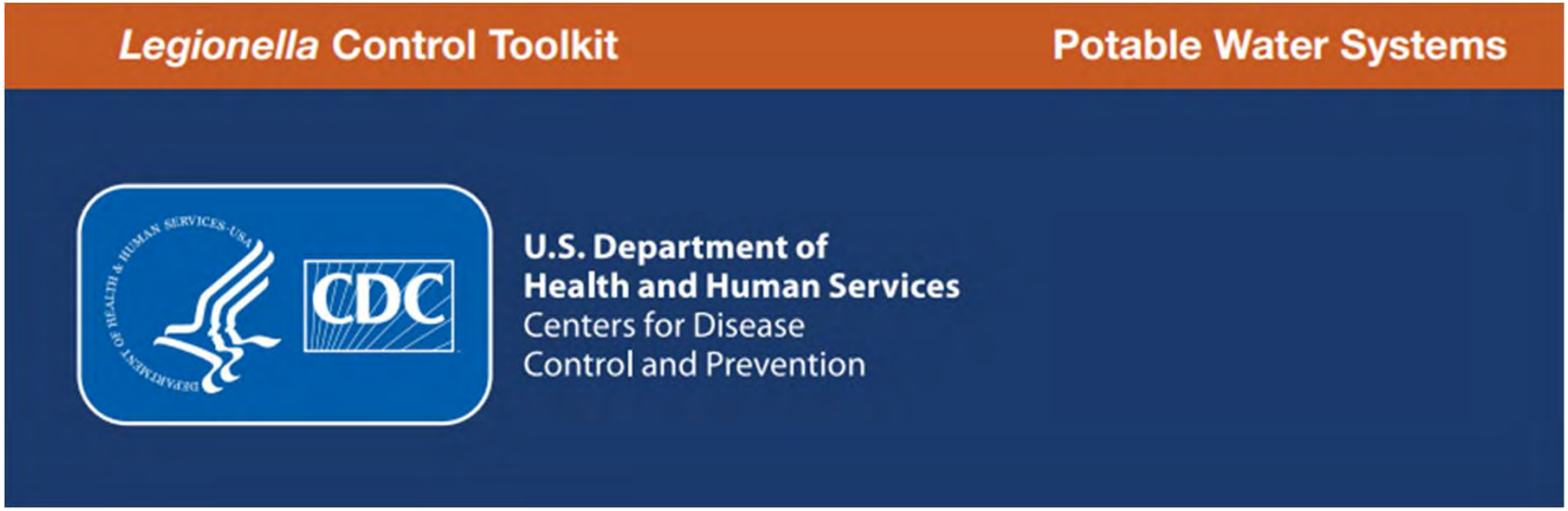
Press-connect fittings are an Acceptable Solution.

2.2.7.8. Press-Connect Water Fittings

1) *Press-Connect* fittings for *water distribution systems* shall conform to

Source: Viega LLC.
Any mention of trade names or commercial products does not constitute endorsement or recommendation for use.

3. Updates: Hot water



- Store hot water at temperatures above 140°F (60°C) and ensure hot water in circulation does not fall below 120°F (49°C). Recirculate hot water continuously, if possible.

Source: cdc.gov/legionella/downloads/Control-Toolkit-Potable-Water.pdf

3. Updates: Hot water

2.6.1.12. Service Water Heaters

1) *Storage-type service water heaters* shall operate at a temperature not lower than 60°C. (See Note A-2.6.1.12.(1).)

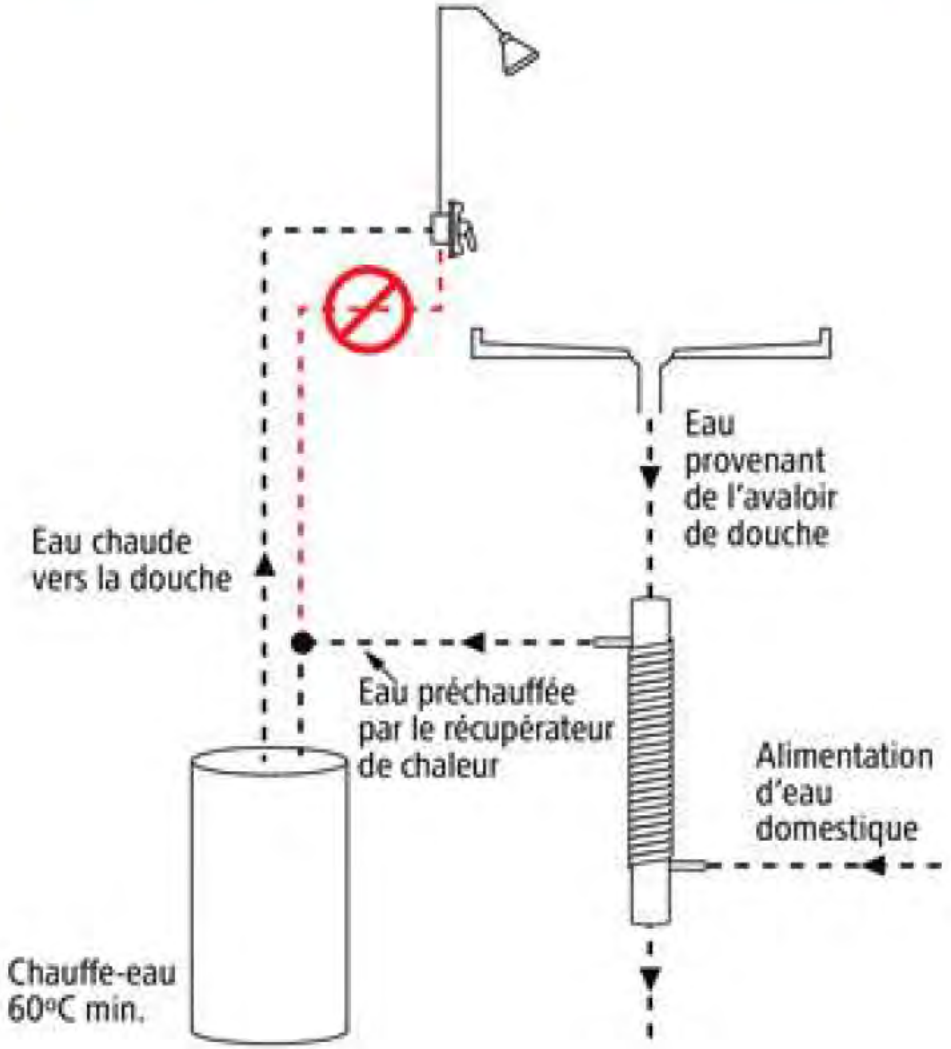
10.2.2.2. ANSI/ASHRAE/IESNA 90.1

Proposed July 2023

- In Part 10: No requirement to comply with "Service Water-Heating System Controls" of ASHRAE 90.1, Article 7.4.4.
- Recirculation loop: Temperature ≥ 49 °C (120 °F).
- Drain water heat recovery units:
  Shall only supply *service water heaters*.

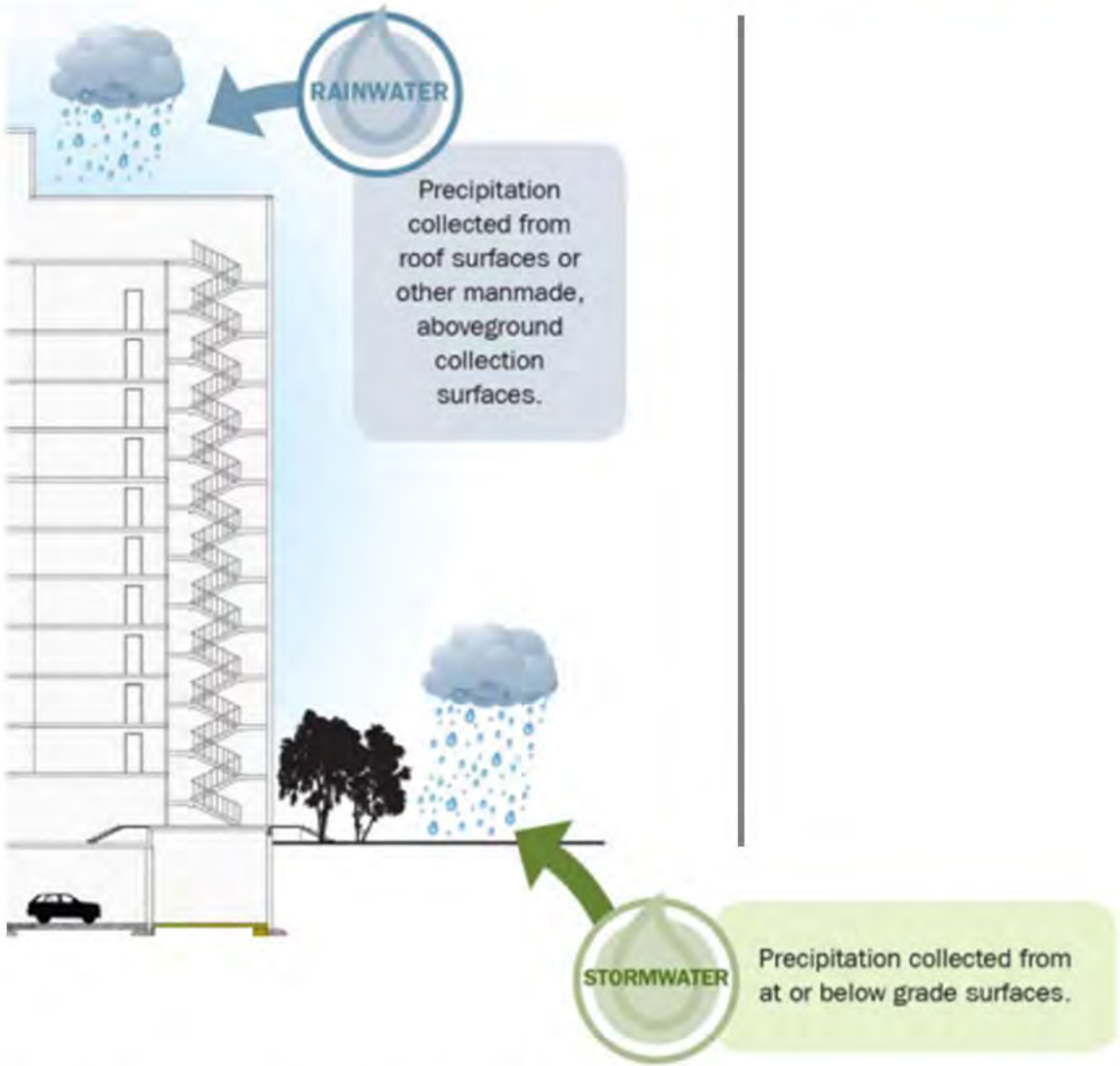
3. Updates: Hot water

Proposed July 2023



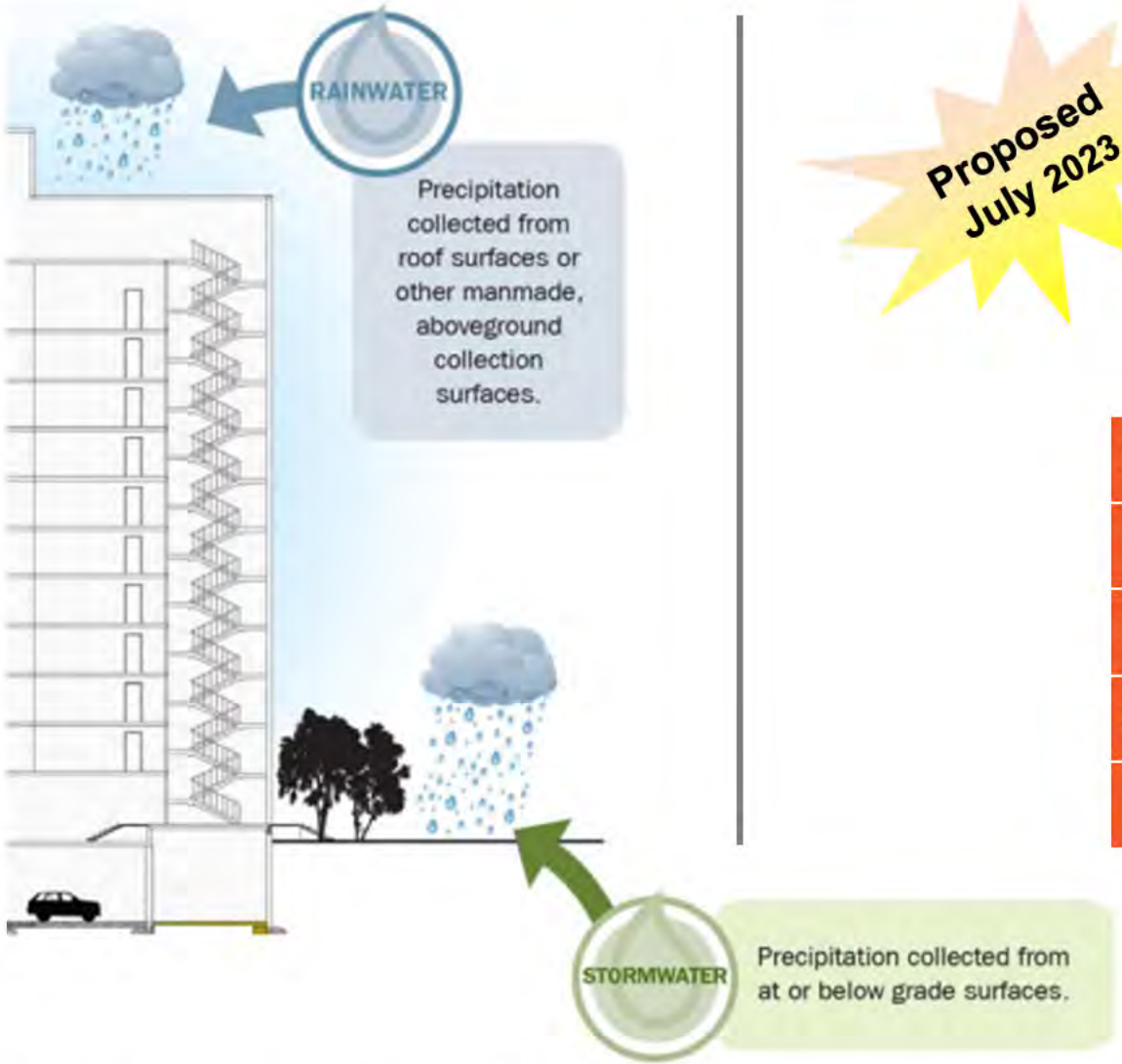
Source: rbq.gouv.qc.ca/domaines-dintervention/plomberie/interpretations-et-directives-techniques/branchement-des-systemes-de-recuperation-de-chaleur-des-eaux-de-drainage-attention-aux-legionelles/

4. Updates: Non-potable water systems



Source: Adapted from sfpuc.org/sites/default/files/construction-and-contracts/design-guidelines/NP_buildingschematic.pdf

4. Updates: Non-potable water systems



Proposed July 2023

Storm water use is an Acceptable Solution.

Finished water quality standards:

Benzene	< 0.005 mg/L
Toluene	< 0.024 mg/L
Ethylbenzene	< 0.0016 mg/L
Xylenes (total)	< 0.02 mg/L
TSS	< 20 mg/L

Source: Adapted from sfpuc.org/sites/default/files/construction-and-contracts/design-guidelines/NP_buildingschematic.pdf

4. Updates: Non-potable water systems

By 2027:

↑ **101%**

Table 2 – Sewer Utility Rate Outlook 2023-2027

Sewer Utility Rate Forecasts	2023	2024	2025	2026	2027
Metro Rate Increase	6.6%	23.9%	25.4%	18.0%	11.7%
Proposed City Rate Increase	15.0%	15.0%	15.0%	15.0%	15.0%

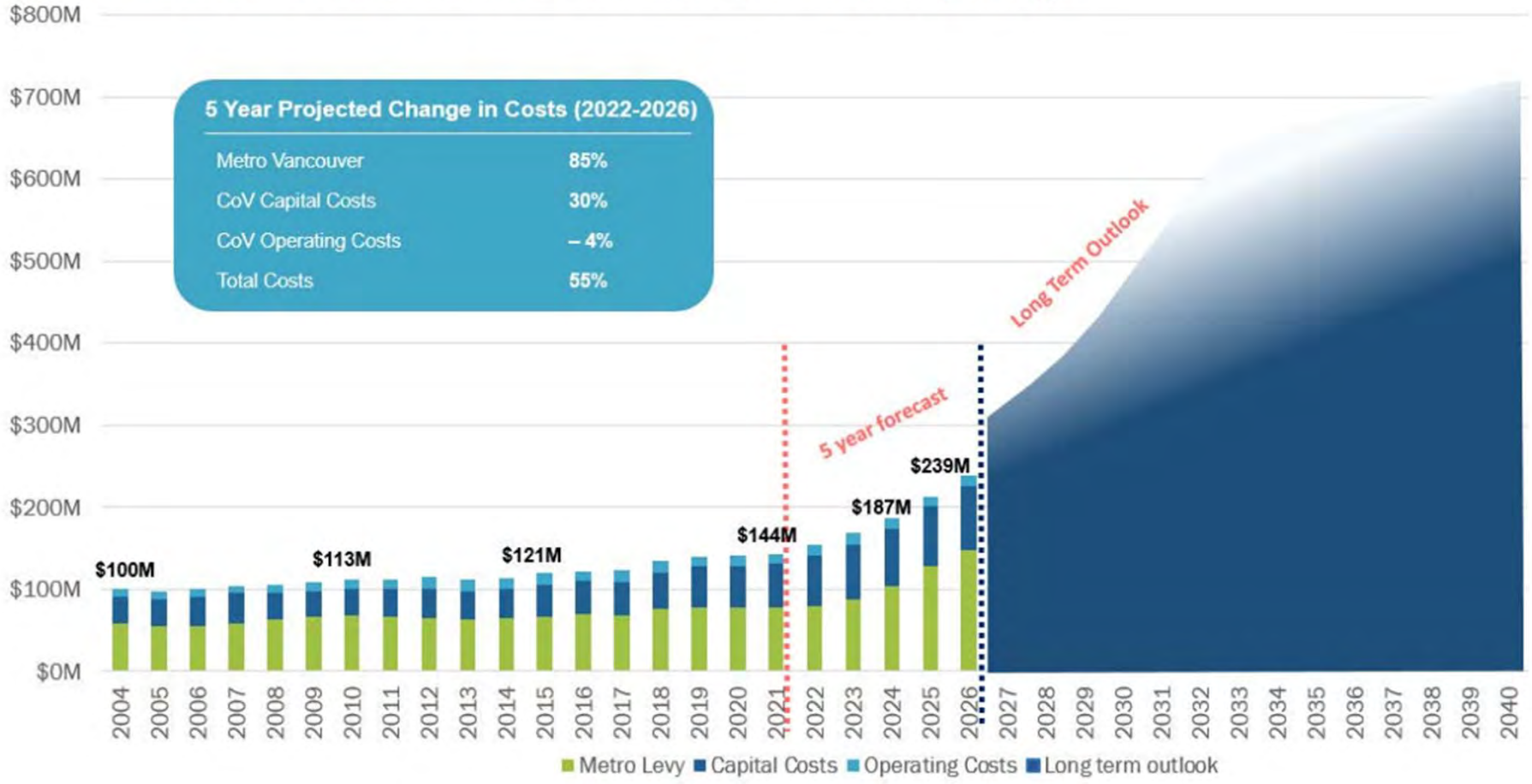
Iona Wastewater Treatment Plant:

		Source of Funding	Phase 1	Future Phases
1.		Federal Government	$250M	?
2.		Provincial Government	$250M	?
3a.		Metro Vancouver	$250M	?
3b.		Canada Infrastructure Bank	-	?
		TOTAL	$750M	$9,190M

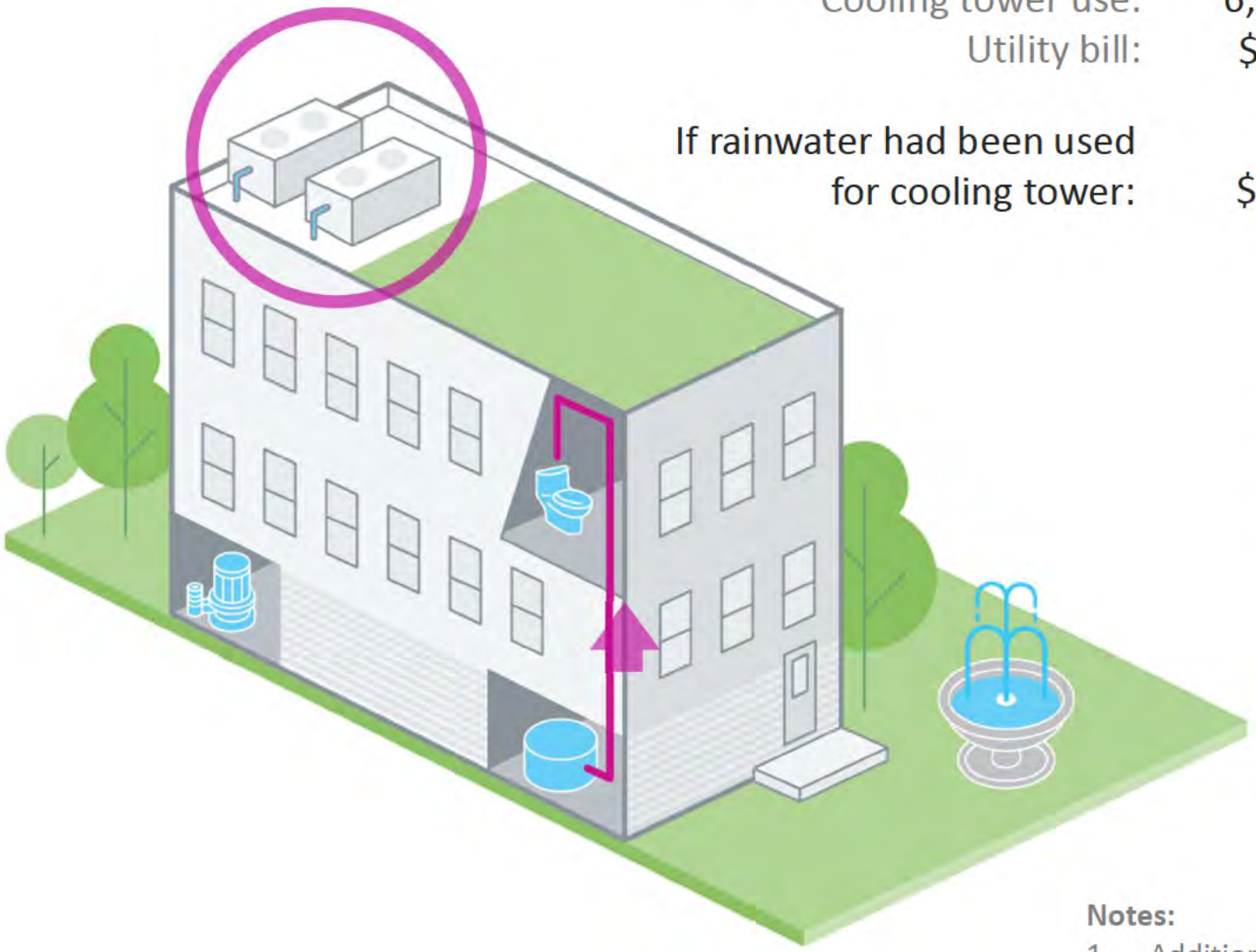
Sources: Tables adapted from council.vancouver.ca/20221129/documents/spec1c.pdf and council.vancouver.ca/20230426/documents/pspc1-Presentation-PDF.pdf

4. Updates: Non-potable water systems

FIGURE B10. SEWAGE AND RAINWATER MANAGEMENT COSTS (2020$) [12]



Source: council.vancouver.ca/20230201/documents/cfsc1.pdf



Total water purchase (2022):	13,088 m^3
Cooling tower use:	6,533 m^3
Utility bill:	$36,000
If rainwater had been used for cooling tower:	$18,000

$18,000 savings

2023:	**$19,000**
2024:	**$21,000**
2025:	**$23,000**
2026:	**$26,000**
2027:	**$30,000**

Notes:

1. Additional savings possible with water closets and urinals.
2. Numbers are approximate.

5. Updates: Mechanical permits

vancouver.ca/mechanical-permit

CITY OF VANCOUVER

MUNICIPAL HEAT PUMP CERTIFICATION

Reducing carbon pollution with zero emissions heating

To install a heat pump in Vancouver, you must have a Municipal Heat Pump Certification and be registered, as of July 1, 2022, as a certified heat pump installer.

Certification requirements:

- Applicable industry experience such as Plumbers, Gas Fitters and HVAC Technicians
- Completion of the 'Municipal Heat Pump Certification' exam

6. Updates: Operating permits

vancouver.ca/operating-permit

Source: City of Vancouver.
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CITY OF VANCOUVER **Open Data Portal**

Catalogue | Dashboards | Chart builder | Map builder | Help & API | Contact | vancouver.ca

1,200 records

No active filters

Filters

Search records...

Mechanical system type

Cooling Tower	638
Decorative Water Feature	283
Building Water Treatment System	239
Rainwater Harvesting/Alternative Water Systems	40

Current system status

Active	957
Inactive	243

Voluntary participant

N	1,175
Y	25

Marker colour

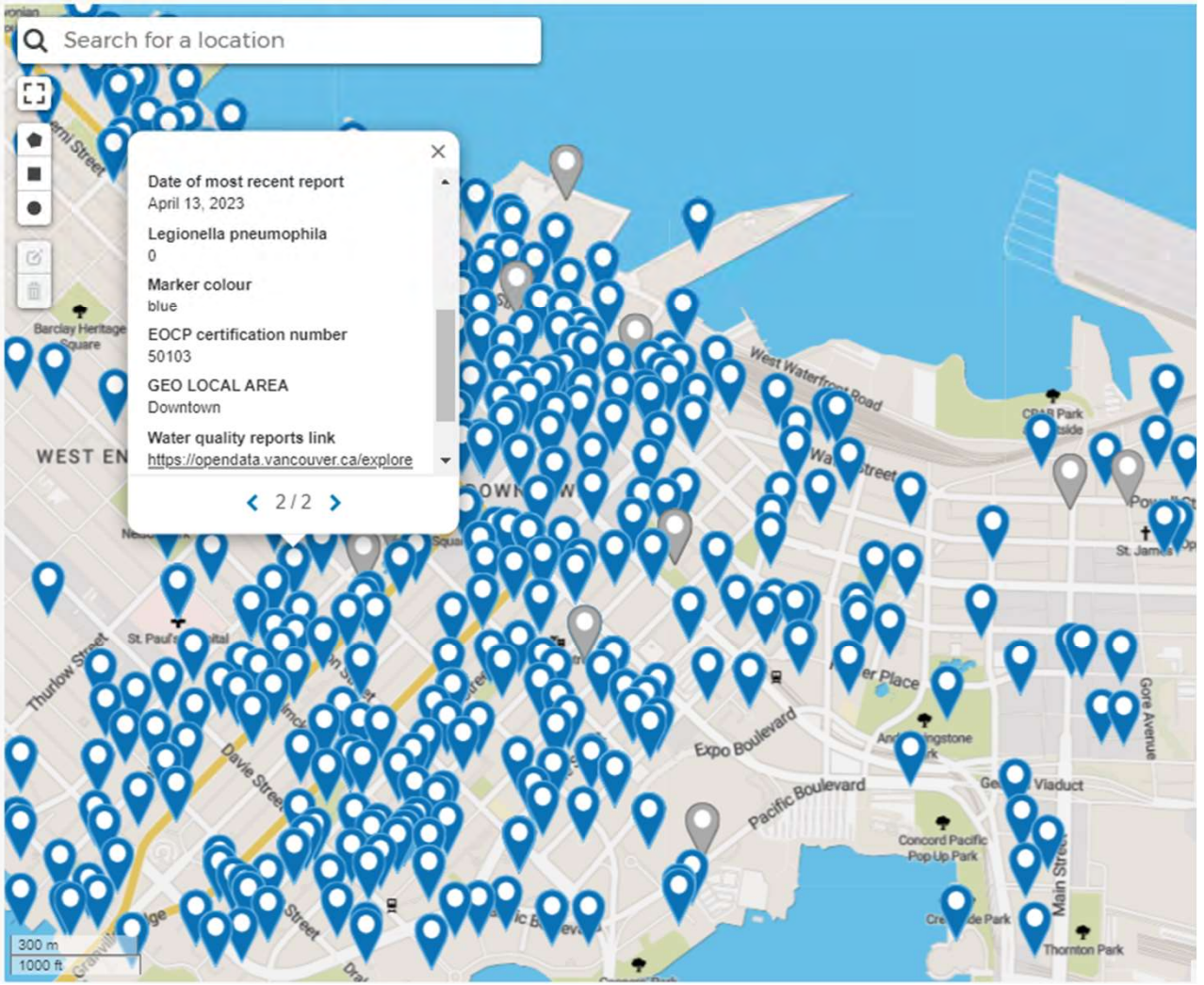
blue	1,175
grey	25

GEO LOCAL AREA

Downtown	581
Fairview	138

Issued operating permits – water systems

Information | Table | Analyze | Coloured markers | Export | API



6. Updates: Operating permits

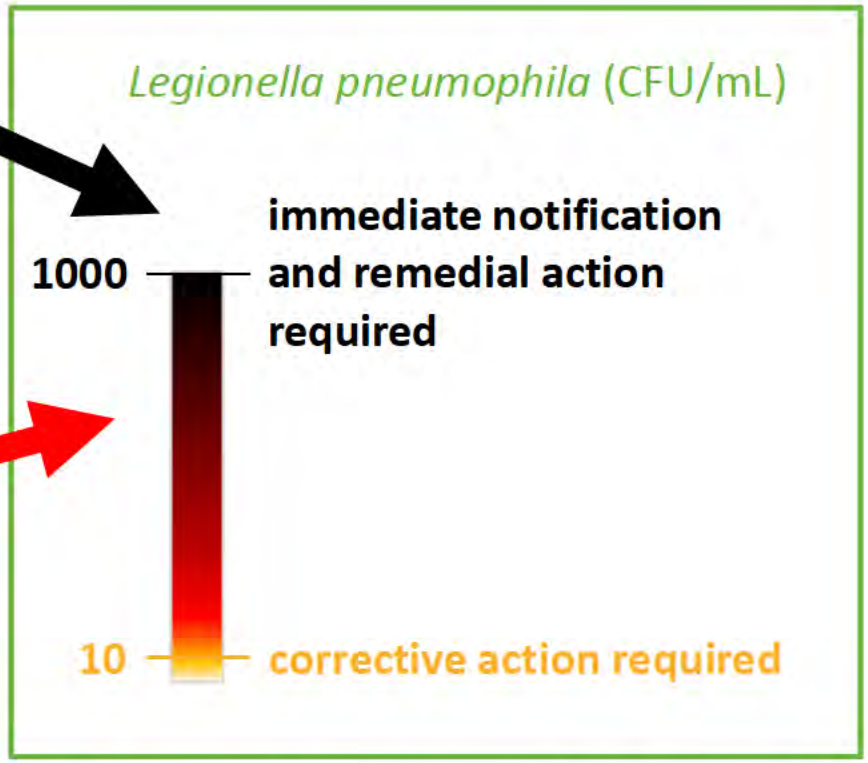
6 cooling towers

>1500
>1500
1875
1800
1245
1015

24 cooling towers

+ 880	+ 750	+ 600	+ 230
200	+ 180	+ 180	+ 180
120	115	+ 70	51
36	33	+ 30	+ 30
+ 30	25	25	+ 20
15	10	10	10

2021 cooling tower results



"**50 CFU/mL** should be considered an "action level" … a concentration high enough to warrant **serious concern** and **trigger remediation**."

Source: doi.org/10.17226/25474
National Academies of Sciences, Engineering and Medicine (2019)

Journal of Water & Health

Check for updates

IWA PUBLISHING

Journal of Water and Health Vol 21 No 3, 313 doi: 10.2166/wh.2023.154

Cooling tower *Legionella pneumophila* surveillance results: Vancouver, Canada, 2021

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*Corresponding author. E-mail: phil.white@vancouver.ca

Source: doi.org/10.2166/wh.2023.154

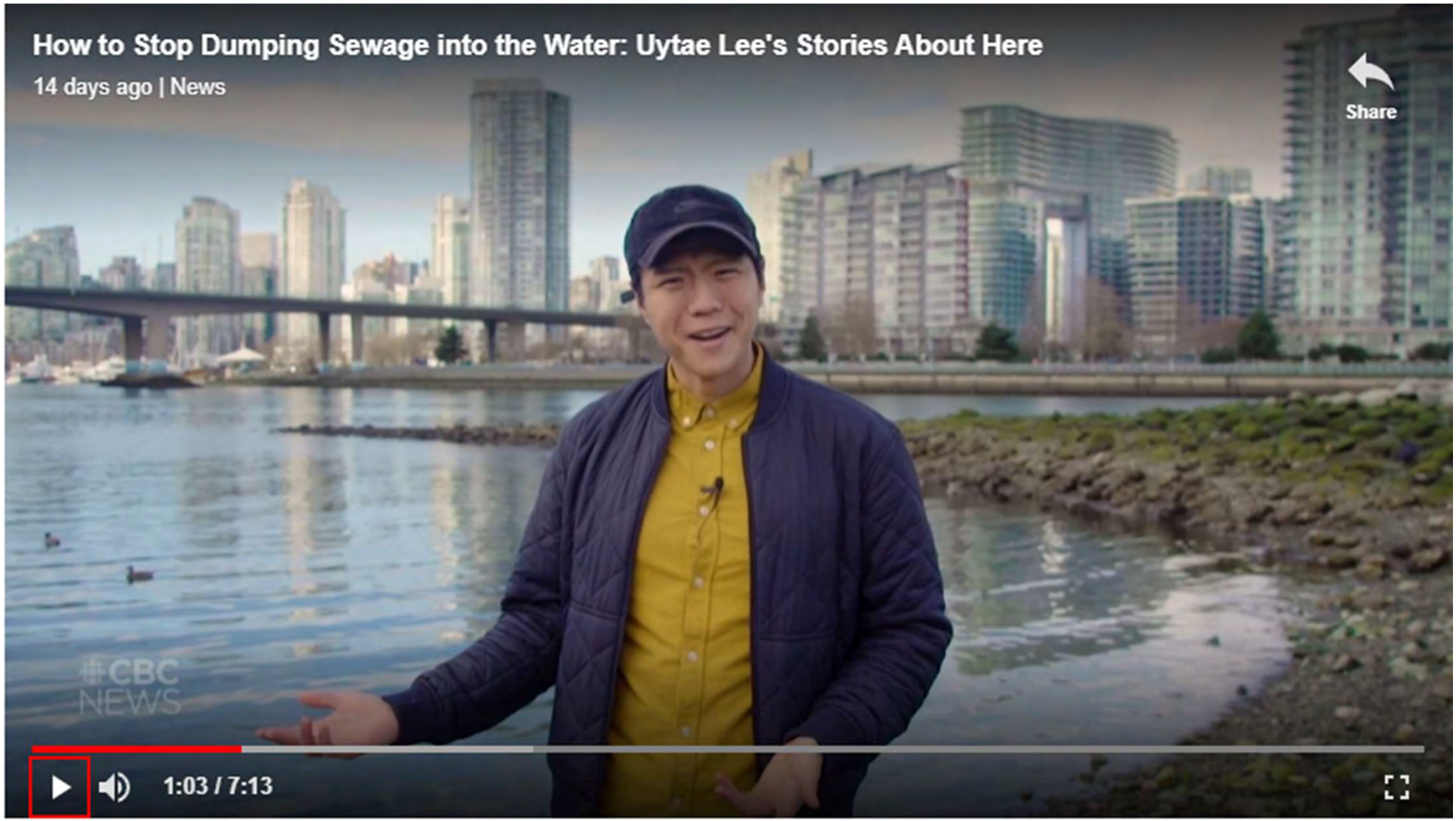
Public Health Ontario | Santé publique Ontario

Legionella Outbreak Investigations: A Practical Approach, Part III

June 8 will describe a cooling tower-associated outbreak investigated by Simcoe-Muskoka District Health Unit

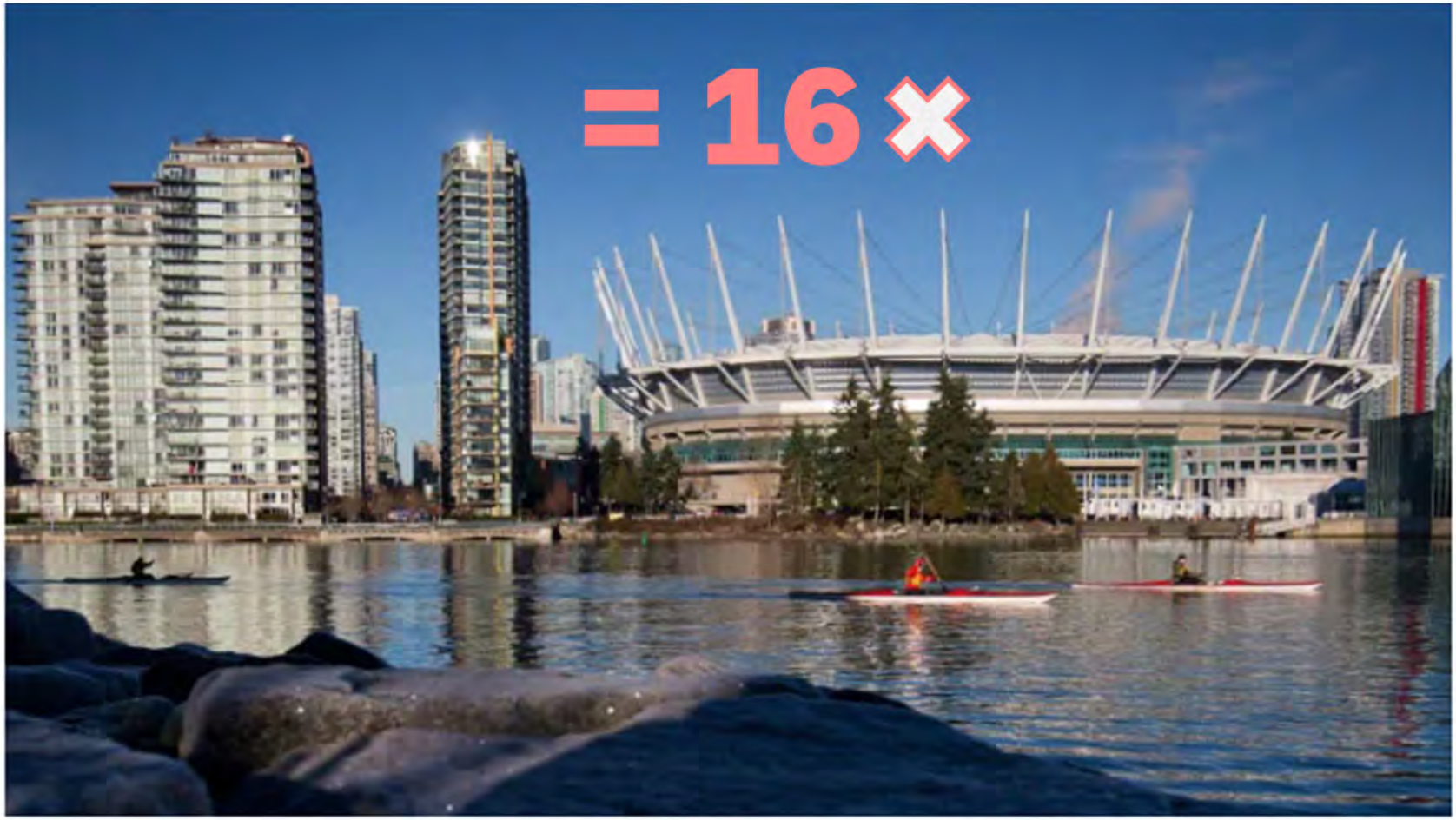
Registration: publichealthontario.ca/en/Education-and-Events/Events#q=1

7. Updates: Plumbing permits



Source: cbc.ca/player/play/2201264195890

38,000,000,000 litres in CSOs (2020)



Source: cbc.ca/news/canada/british-columbia/bc-place-rename-1.5006138

Table 3: Required Documentation at Each Development Stage

	CD-1 Rezoning	Development Permit	Building Permit	Occupancy Permit
Preliminary RWMP	X			
Complete RWMP		X		
Final RWMP			X	
Rainwater Management Agreement		X		
O&M Manual			X	
Rainwater Management Project Summary Form[1]	X	X	X	
Sealed Letter				X

Bulletin

Rainwater Management Bulletin

1. Retain/detain **24 mm** of rainwater in 24 hours.
2. **Peak release rate** no greater post-development than pre-development.
3. Treat 24/48 mm of rainwater (80% total suspended solids removal).

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	CD-1 Rezoning	Development Permit	Building Permit	Occupancy Permit
Prelimina[illegible]	X			
Com[illegible]		X		
[illegible]			X	
[illegible]gement Agreement		X		
O&[illegible]			X	
Rainwater Management Project Summary Form[1]	X	X	X	
Sealed Letter				X

Proposed Jan 2024

Bulletin

Rainwater Management Bulletin

1. Retain/detain **24 mm** of rainwater in 24 hours.
2. **Peak release rate** no greater post-development than pre-development.
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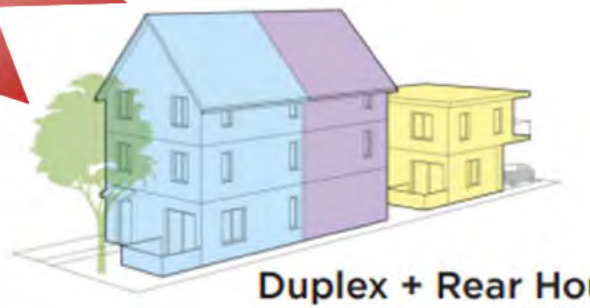
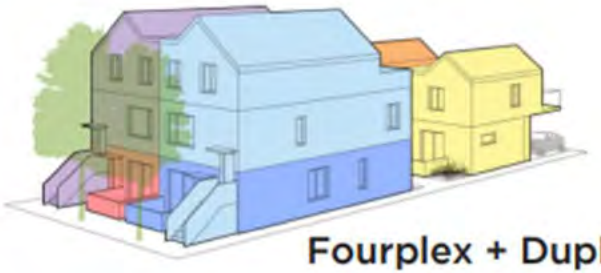
In development

New Multiplex Options
(Illustrative Examples)



Duplex + Rear House
3 Units

Triplex
3 Units



Fourplex + Duplex
6 Units

Source: rezoning.vancouver.ca/applications/mm-rs/summary-handout-2023-02-03-english.pdf

Contact & Questions

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