Watermain Disinfection Procedure- update 2021

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Background

Safe Drinking Water Act (2002):

- Imposes drinking water standards
- Establishes rules for drinking water systems, facilities and laboratories.
- Ensures reporting of any adverse test results to public health and the ministry.
- All test results are made public.

Drinking Water Licence and Permit

- O. Reg 128/04- Certification of Drinking Water Operators
- O. Reg 169/03- Drinking water quality standards
- O. Reg 170- Water system operational requirements

Watermain disinfection procedure

- AWWA C-651 (2014)
- MOECC- Watermain Disinfection Procedure (2015)
- MECP- Watermain Disinfection Procedure (2020- update)- Effective Feb 1st 2021

"This document outlines procedures for disinfecting water mains as part of an addition, modification, replacement, extension, planned maintenance, or emergency repair in a municipal residential drinking water system. The procedures are required to be followed in order to satisfy conditions imposed by the Director in a drinking water works permit."

Major Changes

- Backflow preventors:
  - Air gap (as defined in CSA Standard B64.10 “Selection and Installation of Backflow Preventers)
  - Certified reduced principle (RP) per CSA B64.10.

  Exception: If a backflow preventer is relocated within the same day, testing is only required for the first installation of the day provided that the backflow preventer is relocated by a *Certified Operator* who will guard against damage during transit and re-installation.
- Microbiological Sample location spacing:
  - For new watermains with limited sampling points available, an alternative method of taking *Microbiological Samples* offered- staged sampling.
- Relining of Watermains:

  Exception: The Operating Authority may allow return to service prior to receiving all satisfactory *Microbiological Sample* results if conditions are met.

- Tapping of Watermains

- All surfaces of the pipe surface at the location of the tap, drill/cutting/tapping bits, surfaces of mainstops, service saddles, tapping sleeves and valves which will come into contact with Drinking Water shall likewise be cleaned and disinfected using a minimum 1% sodium hypochlorite solution immediately prior to installation.
- If any of the disinfected surfaces come into contact with the soil and/or water in the excavation prior to use, the cleaning and disinfection procedure shall be repeated.
- The live tapping (i.e., “wet” tapping) of a watermain that is part of the Drinking Water System must be performed by a Certified Operator; however, a person or contractor who is not a Certified Operator may perform wet taps provided they are being Directly Supervised by a Certified Operator. The Operating Authority shall maintain records of the name of the Certified Operator present for the wet taps.

- Service Pipes: less than 100mm:
  - Complete disinfection not required.
  - Ensure sanitary conditions during installation/repair.
  - Flushing is conducted before placing in service.
- Return to service of Watermains isolated from Distribution System:
  - Requires documented and approved site-specific plan (at minimum):
    - Flushing
    - At least one Microbiological Sample
- Planned watermain Inspection:
  - Equipment dedicated for watermains inspection.
  - Inspection equipment to be cleans and disinfected using min. 1% sodium hypochlorite solution.
  - Drinking water to be used for equipment cleaning and prep of hypo solution.

Connections Greater than One Pipe Length (Generally > 6 m)

- No more Pre-chlorinated Pipe
- Exception: At the discretion of the Operating Authority for the installation and disinfection of Connections greater than one pipe length and up to a total length of 40 m if the Connection:
  - Crosses a transportation corridor, the extended closure of which could result in significant community impacts (e.g., traffic congestion, loss of emergency vehicle access, safety concerns), or
  - Cannot be constructed to within one pipe length of the existing watermain due to the potential for destabilizing an existing thrust block.
  - Pressure test is required.
  - Not to be used to expedite schedule or save on cost.
  - Not to be used for ease of planning/coordination.
  - Significant documentation/approvals required.

Exception Procedure: Connections generally > 6 m

- The new watermain and appurtenances forming the Connection shall be sprayed or hand swabbed with a minimum 1% sodium hypochlorite solution, aboveground or in the excavation, immediately prior to installation.
- A Certified Operator is required perform or witness the installation of the Connection to ensure that sanitary construction practices are followed, and proper disinfection is performed.
- The Connection shall remain Isolated from the existing Drinking Water System, except while being flushed or sampled, until satisfactory results are received from two Microbiological Samples.
- Hydrostatic testing of the Connection shall not be undertaken against the isolating valve until satisfactory results from the Microbiological Samples. Drinking Water shall be used for hydrostatic testing.

Examples of Reduced Pressure Principle Backflow Preventer Installations

Temporary connection from a hydrant with Backflow Prevention using a CSA-certified reduced pressure principle (RP) backflow preventer

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Temporary connection from a watermain with Backflow Prevention using a CSA-certified reduced pressure principle (RP) backflow preventer.

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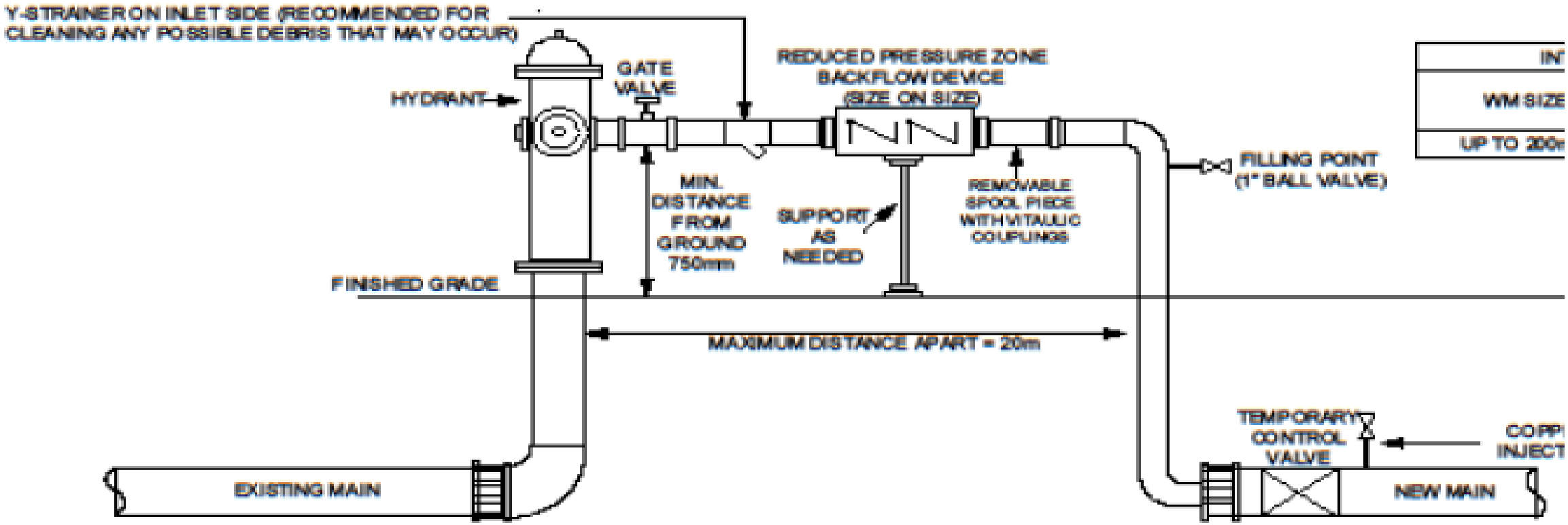
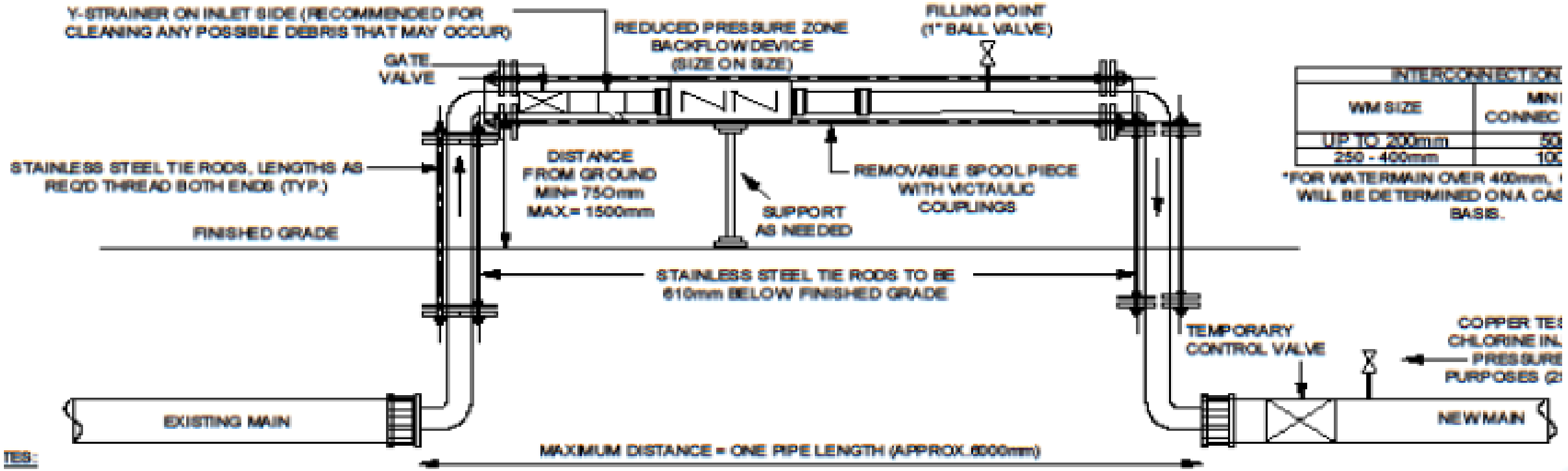
Schematic of temporary connection from hydrant with Backflow Prevention using a CSA-certified reduced pressure principle (RP) backflow preventer.



Schematic of temporary connection from watermain with Backflow Prevention using a CSA-certified reduced pressure principle backflow



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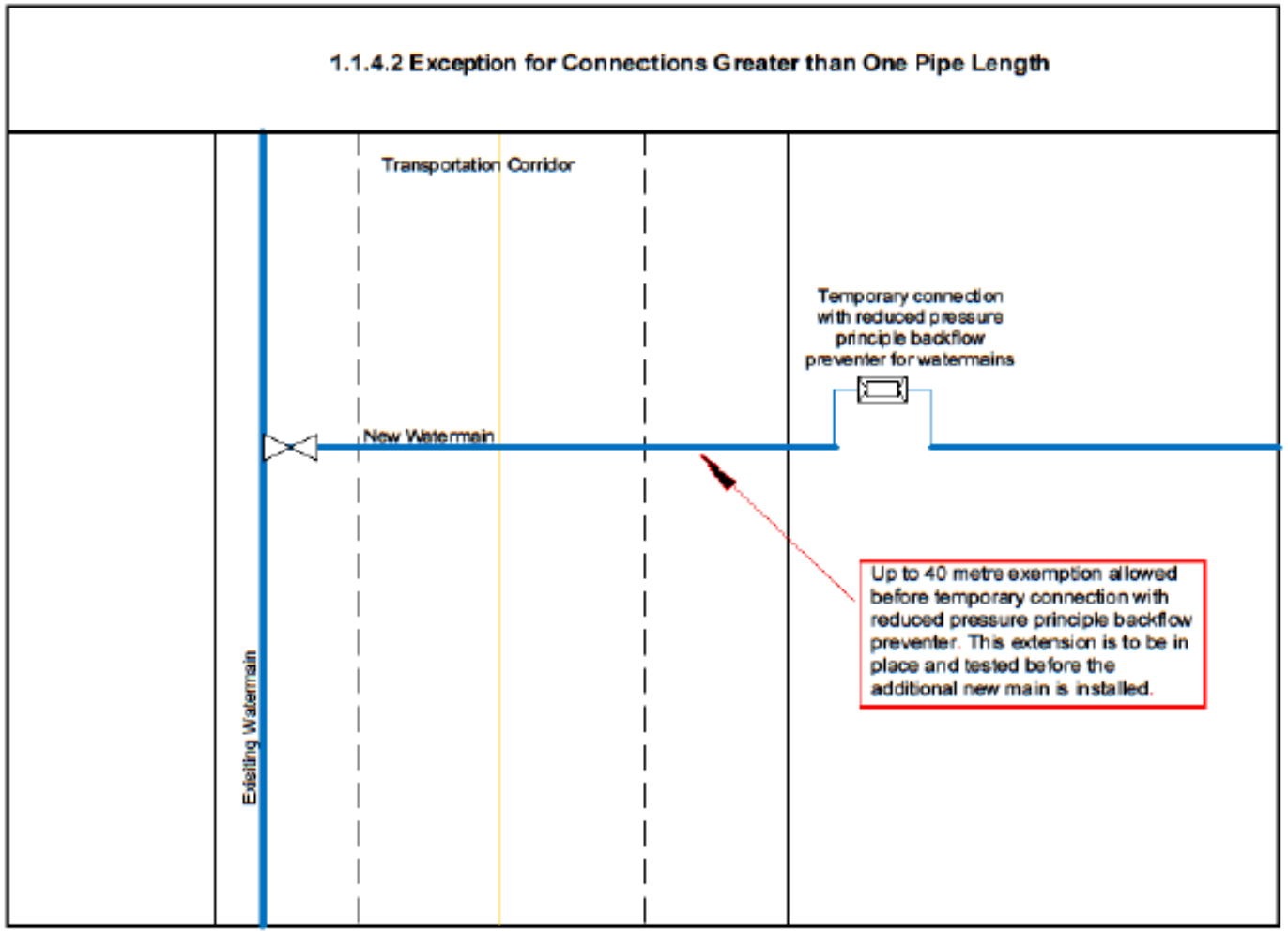
Example of Exception: Connections > One pipe length



Documentation for New Watermains

When installing new watermains as per Section 1.1 of this procedure, the Operating Authority shall maintain records of the following information as a minimum. The information shall be retained as per the record-keeping requirements of Section 27 of O. Reg. 128/04. This section does not require that all of the information be recorded on a single form:

- Backflow Prevention:
  - Air gap (as defined in CSA Standard B64.10 “Selection and Installation of Backflow Preventers) or Reduced Pressure Principle Backflow Preventer installed as per Section 4.8.9 of ANSI/AWWA Standard C651; and
  - Backflow preventer test certification
- Pre-disinfection swabbing and/or flushing have been completed
- Disinfection Process:
  - Method of disinfection;
  - Disinfection chemical meets the requirements of both the AWWA and NSF/ANSI/CAN 60 Standards.
  - Date and time disinfection started and ended;
  - Chlorine concentration at start and end of contact time at each sampling point; and
  - Decrease in chlorine concentration in mg/L and/or percentage as applicable.

Documentation for New Watermains- Contd.

- Microbiological Sampling
  - Schematic or drawing showing approximate location where Microbiological Samples were taken;
  - Microbiological and disinfectant residual sample results; and
  - For staged sampling: flow rate, time each sample was taken and calculated length.
- Connections
  - Length of Connection;
  - Confirmation whether sanitary construction practices were followed;
  - Confirmation that proper disinfection was performed;
  - Name of Certified Operator present for the installation of the Connection if required;
  - Results of Microbiological and disinfectant residual samples if required;
  - Reason for using the exception under s. 1.1.4.2 (if used);
  - Disinfectant residual after watermain is flushed and put in service; and
  - Date and time watermain was placed into service.

Pre-chlorinated pipes-Timelines

- 2005
  - AWWA C-651 mandated by Ministry (then MOE) as watermain disinfection guidelines requirement under the City's water works permit.
  - Exemption identified as 1 length of pipe (6m/18ft) can be field disinfected to perform connections between live and new watermains. Bacteriological samples are not required.

- 2006
  - Water distribution procedures and City construction specifications updated, and make reference to exemption up to 18m- can be field chlorinated- per AWWA C-651???
  - City Spec W-50 makes reference to City staff preforming all work as part of the service connection on the right-of-way.
  - City procedure made exemption to include enough pipe to perform connection from live watermain to ROW limit- regardless of the length. Pressure test and bacteriological sampling was not performed.

- 2012
  - Identified that the requirement exceeded the exemption length per AWWA C-651.
  - Process was changed to disinfect pipe and store at Clyde yard, delivered to site (when requested) and make connection by City staff. It was misunderstood that certified water distribution operators were exempt from the Ministry mandate. This concept was termed pre-chlorinated pipe.
  - Use of perchlorinated pipe was meant to be used in very high traffic impact areas- however was being requested and used in any connections required on the right-of-way- regardless of any traffic impact.
  - with use of perchlorinated pipe- Pressure tests and bacteriological sampling was not performed.

- 2018
  - In anticipation or the Ministry's Watermain disinfection procedure release- the City met with the Ministry working group to confirm if the pre-disinfection pipe connection concept met the basic requirement for disinfection for watermains. We were advised that it did not- but were allowed to continue the practice till the new procedure was effected.

Watermain Disinfection Connection Guideline

Prepared For:

Prepared By:

Robinson Consultants Inc.
Consulting Engineers

Our Project No. 21004
February 2021

Q&A

1. Why does the procedure apply to Service Pipes of 100 mm diameter and greater?

- Service Pipes under 100 mm are typically continuous pipes without bell & spigot joints, and are therefore less prone to contamination during installation. Higher flushing velocities are also more easily obtained.
- Service Pipes under 100 mm, including their appurtenances and fittings, are to be installed using sanitary procedures and flushed, though Operating Authorities may require additional steps as they see fit.
- This procedure does not apply to service pipes on private property, which are regulated under the Building Code, however Operating Authorities may choose to require the procedure to be carried out to disinfect service pipes on private property

2. Why are we not allowed to use a Double Check Valve Assembly (DCVA) backflow preventer for new watermains?

- In Chapter 7 of the Report of the Walkerton Inquiry, A Strategy for Safe Drinking Water, the Hon. Dennis O'Connor states that "as part of their comprehensive distribution system program, water providers should have active programs, working together with building inspectors and public health agencies, to detect and deter cross-contamination"
- Meet the intent of CAN/CSA-B64.10-11 CAN/CSA-B64.10.1-11 Standard and City of Ottawa Backflow prevention By-Laws.
- Backflow preventer failures could be easily detected by the discharge of water from a reduced pressure principle (RP) backflow preventer.

3. What is the difference between “Certified Operator” and a “Licenced Backflow preventor tester”?

- Licenced Backflow tester- Holds an Ontario Water Works Association (OWWA) Certified Cross Connection Control Specialist Certificate
  - Authorised to test, install, relocate, repair and replace backflow preventors.
    - Testing of device required after each installation/relocation.

- Certified Operator- Licenced under the O. Reg 128/04 to operate and maintain a municipal drinking water system.
  - Only authorized to test if holds an holds an Ontario Water Works Association (OWWA) Certified Cross Connection Control Specialist Certificate.
    - Testing of device required only once a day.

4. Can we use different chlorine concentrations/contact times than the ones prescribed in Table 1?

- Different chlorine concentrations/contact times cannot be used without written approval from the Ministry's Approval and Licensing Office. Requests for deviation from Table 1 will be reviewed on a case-by-case basis.

5. Section 1.1.4.1 describes that a Certified Operator is required to witness the installation of the Connection to ensure that sanitary construction practices are followed, and proper disinfection is performed. When does the installation begin and end?

- The Certified Operator is expected to be present when the new watermain is exposed, the new connection pieces are disinfected and installed, and the bedding installed around the pipe.

6. Section 1.1.4.2 - Why was the 40-metre exception created and where can we use it?

- The Ministry worked with a few Operating Authorities to create relief conditions in their Permits which were satisfactorily performed. These conditions were added to the procedure.
- This exception is not meant to be used for typical watermain installation but may be used if the criteria in Section 1.1.4.2 are met. Systems using this exception are required to assume responsibility and document the reason why the exception was used. The Ministry expects the Operation Authority to use due diligence when providing approval for the exemption.

7. What is expected for documentation for “Reason for using the exception” under s. 1.1.4.2.

- it is expected to provide a written description of the reason and sufficient maps/pictures/diagrams to ensure that a Ministry Inspector understands the reason why the exception was applied.

8. What is the 40m exemption approval process in the City of Ottawa.

- Per the City of Ottawa Water By-law- the General Manager Public Works and Environmental Services has been designated the approval authority.

9. So what is wrong with using perchlorinated pipe? Why is the City/Ministry discouraging the use of the 40m exemption?

- Trench Installation- impossible to keep the disinfection integrity.
- Bacteriological sampling requirements.
- Every event of exemption granted requires the Operating Authority to provide reasoning for exemption that will be verified by Ministry Inspector for compliance.
- Any non-compliance events are at a risk of violating O. Reg 170/3- Under the Safe Drinking Water Act.
- As the City's Drinking Water staff are performing the installation- City assumes risk.

9b. When does a microbiological sample or a disinfectant residual test result have to be reported after the watermain has been placed in service?

- Any Microbiological Samples taken and/or disinfectant residual tests performed after a watermain is placed into service are considered as Drinking Water tests for the purpose of the SDWA, and adverse test results are reportable.

10. Is there a limit to the amount of time that a section of existing watermain can be left isolated from a Drinking Water System?

- No one-size-fits-all situation. A watermain that is isolated for a week will be treated very differently than one that was isolated for a year, and an 80-year old watermain will present different challenges than a brand new watermain. That's why the Procedure requires that a site specific plan be developed that reflects the duration of isolation and the associated risks.

11. Who makes the decision to open the valves to place the new watermain in service?

- The Ministry expects that the Operative Authority, after ensuring that the new watermain was disinfected and connected in accordance with the procedure, allows the valves to be opened to place the new watermain in service and ensures that a Certified Operator operates the valves.

12. Connection length is 6.1m- does the pipe need to be commissioned including pressure testing, swabbing and chlorinated?

- Yes

13. Who do we contact to get relief from a section of the Watermain Disinfection Procedure?

- Deviations from this procedure may be requested from the Ministry's Approval and Licensing office on a case-by-case basis by making a written request MDWLP@ontario.ca.

Questions???

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Thank you!!

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