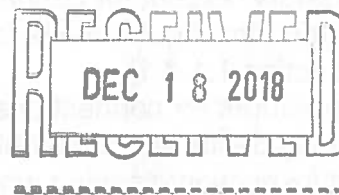


**From:** Municipal Drinking Water Licensing Program (MECP) <MDWLP@ontario.ca>  
**Sent:** Tuesday, December 18, 2018 11:42 AM  
**To:** trenaude@petawawa.ca; susan-nwi@telus.blackberry.net; NKodousek@regionofwaterloo.ca; Flinfante@regionofwaterloo.ca; wjaques@westperth.com; gsandhu@georgina.ca; mharris@strathroy-caradoc.ca; caroline.rigutto@uclg.on.ca; Chris.Morrison@uclg.on.ca; Erin.Mulder@uclg.on.ca; pmclennan@gamsby.com; Roxanne St. Germain; Barry Turcotte; adecast@toronto.ca; gwillia4@toronto.ca; ccameron@townshipofsevern.com; publicworks@muskoka.on.ca; cevans@muskoka.on.ca; eodonnell@townofbwg.com; bfreeland@villageofwestport.ca; nbresee@villageofwestport.ca; sbryce@villageofwestport.ca; jane.dupuis@greatersudbury.ca; Kirk.Albert@tpsgc-pwgsc.gc.ca; Daniel.Lamothe@tpsgc-pwgsc.gc.ca  
**Subject:** FW: Request for Comments: Proposed Revisions to the MECP Watermain Disinfection Procedure (November 2015)  
**Attachments:** Watermain Disinfection Procedure - Draft October 2018.docx

File ☒ Incoming ☐ Other  
 Mayor ☐  
 Council ☒ ☐ A  
 CAO ☒  
 Building ☐  
 Finance ☐ S ☐ C  
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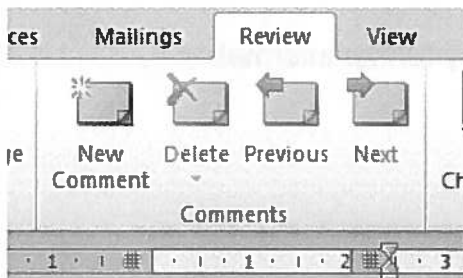


**From:** Ahmed, Aziz (MECP)  
**Sent:** December-07-18 2:36 PM  
**Cc:** 'MacDougald, Clayton'; Waller, Monique/KWO <Monique.Waller@jacobs.com> (Monique.Waller@jacobs.com); Meteer, Laura; Sonya Semanuk; 'Brittany.Hallam@greatersudbury.ca'; 'Ben Percy - GM BluePlan'; 'Latorre, Sandra/TOR'; 'Koc, Oya'; giovanni.cautillo@gtswca.org; amy.martin@guelph.ca; Hetherington, Stephen (MECP); Mark Knight; Smith, Jim (MECP); Dumancic, Robert (MECP); Wilson, Penny; Fletcher, Tim (MECP); Mahmood, Mansoor (MECP); Cressman, Charlene (MECP)  
**Subject:** Request for Comments: Proposed Revisions to the MECP Watermain Disinfection Procedure (November 2015)

I am pleased to provide you with proposed amendments to the ministry's Watermain Disinfection Procedure (WDP, 2015), for your comment. Please submit all comments in accordance with the instructions below, by inserting using Microsoft Word into the draft document, and submitting to [mdwlp@ontario.ca](mailto:mdwlp@ontario.ca), by **January 24<sup>th</sup>, 2019**.

#### For Office 2010 & 2016

- Highlight the text over which you would like to insert your comment
- Select the "Review" tab on the overhead menu on Word, and select "New Comment"



The amendments were developed with a large stakeholder group composed of municipal representatives, the OWWA/OMWA, OCWA and ministry staff, and their contributions were essential to revising the WDP. The 2015 WDP focussed on addressing procedures for watermain breaks/emergency repairs, while retaining most of ANSI/AWWA C651 (Standard For Disinfecting Watermains) for new watermain

construction. The need for amendments to the 2015 WDP were identified through a number of requests for clarification and relief related to new/planned watermain construction and replacement, which is the primary focus of the proposed changes summarized below:

- WDP applies to temporary watermains and service pipes greater than 100 mm dia. (both breaks and new mains) (refer to Preface)
- Flushing requirements for temporary sources of water supply, and lead sampling requirements for non-NSF/ANSI 61/372 hydrants used as temporary source of water supply to a new watermain. (Refer to Section 1.1)
- Requirements for certified operator and use of certified chemicals (Refer to Preface)
- Backflow prevention shall be accomplished by an air gap or CSA-approved reduced pressure (RP) backflow preventer (DCVA are not acceptable). Testing requirements for RPs. (refer to Section 1.1.1)
- Alternative flushing allowance when scouring velocity not practical (refer to Section 1.1.2)
- Clarification on slug disinfection test requirements (refer to Section 1.1.2, example 3)
- Requirement for chlorine residual testing for new watermains during microbial sampling (refer to Section 1.1.3)
- Backflow prevention mandatory, except for connections (refer to section 1.1.4)
- Exceptions from certified operator requirements for installation/disinfection of connections less than one pipe length (refer to Section 1.1.4.1)
- Expedited disinfection procedures for connections greater than one pipe length if connection crosses transportation corridor or may destabilize thrust block (refer to Section 1.1.4.2)
- Requirements for planned inspection/cleaning when watermain remains in service (refer to Section 1.3)
- Requirement for certified operator/supervision during live tapping (refer to Section 1.5)
- New section for re-commissioning watermains isolated from distribution systems (refer to Section 1.7)
- For watermain emergency repairs, all breaks classified as Category 2 (evident or suspected contamination) unless OIC classifies as Category 1 (no evident or suspected contamination) (refer to Section 2.1)
- Documentation requirements – separate requirements for new watermains and watermain breaks (refer to Section 3.1 and 3.2)
- New Appendix A – pictures relevant to new watermain.
- Definitions have been moved to Appendix G and defined words are in italics throughout the document. New definitions for acceptable disinfectant concentration, connection, directly supervised, and water quality analyst. Updated definitions for backflow prevention and flushing.

The goal of the amendments is to provide clarity regarding disinfection procedures, and workable options to address issues of constructability, traffic obstruction and worker safety. Once the comment period passes, the working group will meet to consider all submissions, prior to finalization of the document. Until such time, the version referenced in your drinking water works permit will continue to be in effect for compliance purposes.

We look forward to your comments, and please contact me if you need any further information.

Aziz

Aziz S. Ahmed, P.Eng. | Manager

Licensing and Approvals Section, Environmental Assessment and Permissions Branch | Environmental Assessment and Permissions Division

Ministry of the Environment, Conservation and Parks | 40 St. Clair Ave. West, 2<sup>nd</sup> Floor, Toronto, ON M4V 1M2

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Ontario

**Watermain Disinfection Procedure  
Draft (October 1, 2018)**

**FOR DISCUSSION PURPOSES ONLY**

Ministry of the Environment, Conservation and Parks  
Environmental Assessment and Permissions Division  
201X

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## 1 Preface

2 This watermain disinfection procedure is a supporting document for Ontario legislation and regulations  
3 related to drinking water. The Drinking Water Works Permit (DWWP) Schedule B, Condition 2.3 ("DWWP  
4 Condition 2.3") adopts this procedure by reference. Where this procedure makes reference to  
5 ANSI/AWWA Standard C651 "Disinfecting Water Mains", the most current version of the standard shall  
6 be used. Definitions listed in Appendix G are capitalized and italicized throughout this procedure.

7 *Service Pipes* of 100 mm diameter and greater shall be considered as watermains for the purposes of  
8 this procedure. The requirements in this procedure also apply to temporary watermains.

9 Operating authorities shall use *Certified Operators* for activities that must be performed by a *Certified*  
10 *Operator* or may use a *Water Quality Analyst* for sampling and testing if permitted through regulation.  
11 Watermains that form part of a drinking water system can only be *Isolated* and placed into service by  
12 *Certified Operators*. Activities performed on *Isolated* watermains are not required to be performed by  
13 *Certified Operators*.

14 Chemicals used for disinfection shall meet the requirements of Schedule B, Condition 14.1 of the current  
15 Municipal Drinking Water Licence.

16 Operating authorities may use best management practices that exceed the minimum requirements in  
17 this procedure.

1 **1. Addition, Modification, Replacement, Extension and Planned Maintenance**

2  
3 **1.1. New Watermains**

4 For watermains, including temporary watermains, which are added to, modified, re-aligned,  
5 replaced or extended within a drinking water system, operating authorities shall ensure that the  
6 requirements of ANSI/AWWA Standard C651 are followed as modified by this procedure.

7 Any temporary source of water supply to a new watermain shall be *Flushed* prior to use as water  
8 source. When an operating authority is considering using a hydrant which is not NSF 61/372  
9 certified to supply water to a new watermain, the operating authority shall ensure, prior to using  
10 the hydrant, that a lead sample is obtained from the hydrant after it has been *Flushed* and that the  
11 lead sample results are below the standard from Schedule 2 of Ontario Regulation 169/03. The  
12 reporting and corrective actions of Schedule 16 and the applicable Schedule 17 or 18 of O. Reg.  
13 170/03 shall apply. If the results of the resample exceed the standard, another source of the  
14 drinking water will have to be used.

15 **1.1.1. Backflow Prevention Requirements for New Watermains**

16 The *Backflow Prevention* provisions within Section 4.8.9 of ANSI/AWWA Standard C651-14 shall  
17 be mandatory for the installation of new watermains.

18 Where required, *Backflow Prevention* for new watermains shall be accomplished by:

- 19
- an air gap as defined in CSA Standard B64.10 "Selection and Installation of Backflow Preventers"; or
  - a CSA-approved reduced pressure (RP) backflow preventer which has been selected,  
22 installed, and tested in accordance with CSA Standard B64.10. Backflow preventers shall  
23 be field tested according to CSA Standard B64.10. Examples of RP backflow preventer  
24 installations are shown in Figures A-1 and A-2, while schematic representations are shown  
25 in Figures A-3 and A-4, respectively, of Appendix A.
- 26

27 **Exception:** If a backflow preventer is relocated within the same day, testing is only required for  
28 the first installation of the day.

29  
30 For the purposes of CSA Standard B64.10, a backflow prevention tester's licence shall be an  
31 Ontario Water Works Association (OWWA) Certified Cross Connection Control Specialist  
32 Certificate or a *Ministry*-approved equivalent. In addition to the list of professionals in Table 1 of  
33 Figure E.1. of CSA Standard B64.10, a *Certified Operator* or a Water Quality Analyst with a  
34 backflow prevention tester's licence shall also be authorized to test, install, relocate, or replace  
35 backflow preventers used in the installation and commissioning of new watermains.  
36

### 1.1.2. Disinfection of New Watermains

For preliminary flushing prior to disinfection, if the requirements of ANSI/AWWA Standard C651 for a scouring velocity of 3.0 ft/sec (0.91 m/sec) are not practical, alternative cleaning consisting of swabbing or flushing 2-3 pipe volumes can be used at the discretion of the operating authority.

Where a watermain is disinfected using the tablet, continuous feed, slug, or spray chlorination method for disinfecting newly constructed watermains as per the procedures in ANSI/AWWA Standard C651, the minimum contact times, initial chlorine concentrations, and maximum allowable decreases in chlorine concentration as listed in Table 1 shall be used. The disinfection method used is at the discretion of the operating authority.

**Exception:** Where copper pipe is used for smaller diameter watermains, disinfection shall be performed using the continuous feed method, with an initial chlorine concentration of  $\geq 50$  mg/L and a minimum 24-hour contact time. Due to the chlorine demand exerted by the copper, the maximum allowable decrease requirement in Table 1 does not apply, and the effectiveness of the disinfection process shall be demonstrated by the *Microbiological Sampling* referred to in Section 1.1.3.

**Table 1: Chlorine Concentrations\* and Contact Times for Disinfecting New Watermains**

Disinfection Method	Minimum Contact Time	Initial Chlorine Concentration	Maximum Allowable Decrease in Chlorine Concentration
Tablet or Continuous Feed	24 hours	$\geq 25$ mg/L	40% of the Initial Chlorine Concentration to a maximum of 50 mg/L
Slug	3 hours	$\geq 100$ mg/L	25 mg/L
Spray	30 minutes	$\geq 200$ mg/L	Measurement Not Required

\* At concentrations over 10 mg/L, measurements of total chlorine and free chlorine shall be deemed equivalent.

The following examples are provided to demonstrate the proper use of Table 1.

#### Example 1

When using the continuous feed method of chlorination with an initial chlorine concentration of 50 mg/L, the maximum allowable decrease in chlorine concentration is 40% of 50 mg/L, or 20 mg/L. Therefore, at least 30 mg/L of chlorine must be present after 24 hours.

#### **Example 2**

When using the continuous feed method of chlorination with an initial chlorine concentration of 150 mg/L, the maximum allowable decrease in chlorine concentration is 50 mg/L, because 40% of 150 mg/L is greater than the maximum allowable decrease of 50 mg/L. Therefore, at least 100 mg/L of chlorine must be present after 24 hours.

#### **Example 3**

When using the slug method of chlorination, with a minimum contact time of 3 hours, the chlorine concentration shall be measured in the slug at the beginning of the disinfection process, as the slug moves through the watermain, and at the point of discharge. If at any point the chlorine concentration has decreased by more than 25 mg/L, the flow shall be stopped and additional chlorine shall be added to restore the chlorine concentration in the slug to not less than its original concentration. For example, if the initial chlorine concentration in the slug is 150 mg/L, then the chlorine concentration must not decrease below 125 mg/L. If the chlorine concentration were to fall below 125 mg/L (a decrease of > 25 mg/L), the flow shall be stopped and chlorine added to restore the chlorine concentration to 150 mg/L.

#### **1.1.3. Microbiological Samples for New Watermains**

The operating authority shall ensure that the *Microbiological Samples* taken in accordance with ANSI/AWWA Standard C651 include as a minimum *Escherichia coli* and Total Coliforms and are tested by a licensed and accredited laboratory. When *Microbiological Samples* are taken from new watermains (including *Connections*) that have not been placed into service, operating authorities shall ensure that additional samples are taken at the same time from the same location and are tested immediately for,

(a) free chlorine residual, if the system provides chlorination and does not provide chloramination; or

(b) combined chlorine residual, if the system provides chloramination.

These *Microbiological Samples* and disinfectant residual tests are not considered drinking water tests for the purpose of the SDWA, and are therefore not reportable. Any person authorized by the owner or operating authority can collect these *Microbiological Samples* and perform the associated disinfectant residual tests.

For new watermain with limited sampling points available, an alternative method of taking *Microbiological Samples* is called staged sampling. Staged sampling shall be performed as follows:

- A flow meter shall be installed to measure flow through the new watermain;
- A sampling point shall be installed at the end of the new watermain (additional sampling points may also be installed along the length of the watermain); and
- Flow shall be established and samples shall be taken from the sampling point(s) at intervals that are calculated to represent the lengths of the watermain as required by ANSI/AWWA C651, based on the pipe size and the measured flow rate.

#### **1.1.4 Connecting New Watermain**

The provisions outlined in Section 4.10 of ANSI/AWWA Standard C651-14 are mandatory, along with the additional requirements prescribed below. The *Backflow Prevention* provisions within Section 4.8.9 of ANSI/AWWA Standard C651-14 are not mandatory for *Connections*.

##### **1.1.4.1 Connections Equal to or Less than One Pipe Length (Generally $\leq 6$ m)**

*Connections* equal to or less than one pipe length (generally  $\leq 6$  m) shall be undertaken in accordance with Section 4.10.1 of ANSI/AWWA Standard C651-14, however 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.

**Exception:** If a *Certified Operator* is not present during the installation and disinfection of the *Connection*, the *Connection* shall remain *Isolated* from the existing drinking water system, except while being flushed or sampled by a *Certified Operator*, until satisfactory results are received from one *Microbiological Sample* taken in accordance with Section 1.1.3 of this procedure from water that has been directed through the *Connection*.

##### **1.1.4.2 Connections Greater than One Pipe Length (Generally $> 6$ m)**

*Connections* greater than one pipe length (generally  $> 6$  m) shall be undertaken in accordance with Section 4.10.2 of ANSI/AWWA Standard C651-14.

**Exception:** 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, etc.), or
- Cannot be constructed to within one pipe length of the existing watermain due to the potential for destabilizing an existing thrust block,

The following procedure may be used 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. Figure A-5 in Appendix A shows a diagram of an example” to help understand this exception.

- The new watermain and *Appurtenances* forming the *Connection* shall be spray disinfected or swabbed with a minimum 1% sodium hypochlorite solution immediately prior to installation.
- 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.
- The *Connection* shall remain *Isolated* from the existing drinking water system, except while being flushed or sampled by a *Certified Operator*, until satisfactory results are received from two *Microbiological Samples* taken in accordance with Section 1.1.3 of this procedure and Section 5.1.1.1 of ANSI/AWWA Standard C651-14.
- Where required by the operating authority, hydrostatic testing of the *Connection* shall not be undertaken against the Isolating valve until satisfactory results from the *Microbiological Samples* referred to above are received. Potable water shall be used for hydrostatic testing.

#### 1.1.4.3 Placing New Watermains into Service

Valves opened to place a new watermain into service shall, in all cases, be operated by a *Certified Operator*. Prior to *Connection*, a *Certified Operator* shall verify an *Acceptable Disinfectant Concentration* in the new watermain. When a watermain is placed into service, *Flushing* through the *Connection* shall continue until an *Acceptable Disinfectant Concentration* is achieved. *Microbiological Samples* taken and disinfectant residual tests performed after a watermain is placed into service are drinking water tests for the purpose of the SDWA and adverse test results are reportable.

#### 1.2. Relining of Watermains

For relining of existing watermains, the conditions of Sections 1.1.2, 1.1.3 and 1.1.4 of this procedure will apply.

**Exception:** The operating authority may allow return to service prior to receiving satisfactory *Microbiological Sample* results if all of the following conditions are met:

- The local Medical Officer of Health is consulted prior to the commencement of the project and their advice is documented and followed; and
- The watermain is physically *Isolated* from the remainder of the drinking water system through *Backflow Prevention*; and
- *Flushing* of the watermain has been completed and an *Acceptable Disinfectant Concentration* has been restored.

### 1.3. Planned Watermain Inspection and Cleaning

All equipment used for the inspection of watermain shall be dedicated for that purpose only, and shall be suitable for disinfection. Sanitary practices shall be followed to prevent the introduction of *Contaminants* into the watermain. All inspection equipment inserted into a watermain (e.g. electromagnetic, acoustic, or video inspection equipment) shall be cleaned and disinfected using a minimum 1% sodium hypochlorite solution immediately prior to insertion. Potable water shall be used for equipment cleaning and/or preparation of hypochlorite solutions. Disinfectant residual testing shall be performed upon removal of the inspection equipment. *Flushing* shall be performed if an *Acceptable Disinfectant Concentration* was not maintained.

For planned watermain cleaning by swabbing or *Higher Velocity Flushing*, the system can be returned to normal service, defined as having all valves returned to normal operating position, after an *Acceptable Disinfectant Concentration* is achieved at the point of flushing.

For all other types of cleaning (e.g. air scouring, ice pigging, etc.), the operating authority shall develop and implement a site-specific plan for cleaning, disinfection, and sampling in agreement with the local *Ministry* office in consultation with the local Medical Officer of Health.

### 1.4. Planned Maintenance of Appurtenances and Fittings

Section 2 of this procedure for Category 1 watermain breaks shall apply to the installation/replacement/repair of *Appurtenances* and/or fittings. If *Contamination* is evident or suspected, the procedures prescribed under Section 2 of this procedure for Category 2 watermain breaks shall apply.

### 1.5. Tapping of Watermain

Where existing watermain are tapped, the pipe surface at the location of the tap shall be cleaned and disinfected using a minimum 1% sodium hypochlorite solution. Where applicable, the drill/cutting/tapping bits and all 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 not certified as a drinking water operator can perform wet taps provided they are being *Directly Supervised* by a *Certified Operator*.

### 1.6. Service Pipes

1 *Service Pipes* of 100 mm diameter and greater shall be considered as watermains for the purposes of  
2 this procedure, and shall be disinfected and tested in accordance with the requirements of  
3 ANSI/AWWA C651 as modified by this procedure. For *Service Pipes* of diameter less than 100 mm,  
4 operating authorities shall ensure that sanitary conditions are maintained during installation/repair,  
5 and that *Flushing* is conducted prior to placing into service.

## 6 7 **1.7 Re-commissioning Watermains *Isolated* from the Distribution System**

8  
9 Where a section of watermain has been *Isolated* from a drinking water system and an *Acceptable*  
10 *Disinfectant Concentration* within the *Isolated* section was not maintained (e.g., a valved-off stub),  
11 the operating authority shall develop and implement a re-commissioning plan that reflects the time  
12 period of isolation and the associated risks. The plan may include the implementation of Sections  
13 1.1.2 and 1.1.3 of this procedure. At a minimum, the plan must include:

- 14  
15 • *Flushing* through the *Isolated* section of watermain; and
- 16 • Satisfactory test results to be received from at least one *Microbiological Sample* prior to the  
17 *Isolated* watermain being placed into service.

## 18 19 **2. Watermain Disinfection Procedures for Emergency Repairs**

20 This procedure uses a risk management approach to categorize watermain breaks based on the  
21 potential for *Contamination*. The objective of this procedure is to set minimum disinfection  
22 requirements to minimize the potential for drinking water health hazards during emergency/unplanned  
23 repairs resulting from the physical failure of a watermain or *Appurtenance* (a “break”).

### 24 **2.1. Categorization and Public Agency Notification of Watermain Breaks**

25  
26 All breaks shall be classified as Category 2 as per Section 2.1.2 of this procedure unless the *Operator-*  
27 *in-Charge* (OIC) conducts a visual inspection upon completion of the excavation to determine the  
28 nature of the break and classifies it as a Category 1 as per Section 2.1.1. The OIC shall assess the  
29 evidence of *Contamination* or potential *Contamination* of the watermain throughout the repair  
30 procedure and shall reclassify if required.

31  
32 Refer to Appendices B and C for a flowchart and pictures to better understand the criteria to  
33 determine the categories of watermain breaks.

#### 34 35 **2.1.1. Category 1**

36  
37 An OIC may classify watermain breaks with no evident or suspected *Contamination* as Category  
38 1. The steps described in Sections 2.2 and 2.3 of this procedure shall be followed for Category 1  
39 watermain break repairs.  
40

1        *Contamination* is typically not suspected for circumferential breaks or small leaks where flow is  
2        maintained from the break until an *Air Gap* is established and where the *Air Gap* is maintained  
3        during the repair procedure. If, at any time, *Contamination* is evident or suspected, the break  
4        shall be reclassified as Category 2.

#### 6        **2.1.2. Category 2**

8        Watermain breaks with evident or suspected *Contamination* are classified as Category 2.  
9        Watermain repairs involving more than one pipe length (generally  $\geq 6$  m) of replaced pipe are  
10       also classified as Category 2. The steps described in Sections 2.2 and 2.4 of this procedure shall  
11       be followed for Category 2 watermain break repairs.

#### 13       **2.1.3. Public Agency Notification**

##### 15       **2.1.3.1. Category 1**

16       Category 1 watermain breaks are not deemed to be observations of improper disinfection in  
17       accordance with Section 16-4 of Schedule 16 of O. Reg. 170, and are not reportable to the  
18       Spills Action Centre.

19       This procedure does not require that the local Medical Officer of Health be notified of  
20       Category 1 watermain break repairs; however, the local Medical Officer of Health may  
21       exercise his/her option to require such notification. Operating Authorities may choose to  
22       provide notification to, or seek advice from, the local Medical Officer of Health at any time.

##### 23       **2.1.3.2. Category 2**

24       Category 2 watermain breaks are not reportable to the Spills Action Centre unless an  
25       operating authority believes that contaminated water was directed to users. If an operating  
26       authority believes that contaminated water was directed to users, this will constitute an  
27       observation of improper disinfection in accordance with Section 16-4 of Schedule 16 of O.  
28       Reg. 170/03, and the reporting and corrective actions of Schedule 16 and the applicable  
29       Schedule 17 or 18 of O. Reg. 170/03 shall apply.

30       This procedure does not require that the local Medical Officer of Health be notified of  
31       Category 2 watermain break repairs unless an observation of improper disinfection has been  
32       reported as noted above; however, the local Medical Officer of Health may exercise his/her  
33       option to require such notification. Operating authorities may choose to provide notification  
34       to, or seek advice from, the local Medical Officer of Health at any time.

35       Notification to the local *Ministry* office is not required for Category 2 watermain breaks  
36       unless:

- A *Water Advisory* is declared. The local *Ministry* office shall be notified as soon as reasonably possible during business hours. After business hours, the operating authority shall send an e-mail to the e-mail address specified by local *Ministry* office no later than 10 AM the next business day; or
- In the Special Cases described in Sections 2.4.4 and 2.4.5 of this procedure. The local *Ministry* office shall be notified as soon as reasonably possible during business hours. After business hours, the operating authority shall contact the Spills Action Centre as soon as reasonably possible.

## **2.2. Watermain Break Common Disinfection Procedure**

The following steps must be performed for all emergency watermain repairs (Category 1 and Category 2). Examples of typical steps for Category 1, 2 and for special cases are provided in Appendices D, E and F of this procedure respectively. The excavation and dewatering requirements from this section may not apply to repairs of portions of temporary watermain which are above ground.

### **2.2.1. Maintenance of Flow**

The operating authority shall determine if flow can be maintained to the break site until the watermain is excavated. This determination shall be based on risks to worker and public safety, the possibility of property damage, and/or adverse impact to the natural environment.

The operating authority will attempt to maintain flow from the break, where possible, until an *Air Gap* is established. Flow may be reduced by throttling valves while maintaining sufficient flow from the break to minimize the potential for *Contamination*. Flow may be discontinued after an *Air Gap* has been created.

If flow from the break is not maintained before an *Air Gap* is established, the break shall be classified as Category 2.

### **2.2.2. Excavation Dewatering**

Excavation dewatering shall be continued for the duration of the repairs such that the *Air Gap* between the location of the break in the watermain and the water in the excavation is maintained. If the water level in the excavation rises such that the *Air Gap* is not maintained after flow from the break has been discontinued, then the watermain break shall be classified as Category 2.

### **2.2.3. Disinfection of Pipe and Repair Parts**

All surfaces of pipe and repair parts which will come into contact with drinking water shall be disinfected using a minimum 1% sodium hypochlorite solution immediately prior to installation. If any of the disinfected surfaces come into contact with the water and/or soil in the excavation

1 prior to installation, the surfaces shall be cleaned and the disinfection procedure shall be  
2 repeated.

3  
4 If cutting out a section of pipe, the interior surfaces of the cut ends of the existing watermain  
5 shall be disinfected as well, using a minimum 1% sodium hypochlorite solution, swabbed or  
6 sprayed as far as can be practically reached.  
7

#### 8 **2.2.4. Installation of Repair Parts**

9  
10 The repair parts shall be installed while ensuring that *Contaminants* do not enter the watermain.  
11

#### 12 **2.2.5. Post Repair Flushing**

13  
14 *Flushing* shall be conducted following repairs by creating a temporary dead end downstream of  
15 the break through valve operation, and *Flushing* through the location of the repair to a  
16 discharge point. Flushed water may be discharged from a hydrant, plumbing or *Appurtenances*.  
17 Where there is no discharge point to allow for *Flushing*, the operating authority shall tap the  
18 watermain on the downstream side of the break and discharge from that point.  
19

20 *Flushing* shall continue until the discharged water is free from discoloration, and an *Acceptable*  
21 *Disinfectant Concentration* has been restored. Where the repair was performed using a repair  
22 sleeve, and flow was maintained from the break, *Flushing* is not required.  
23

24 Dechlorination of discharged water is required for any water that is directed into surface water  
25 or if the discharge into the natural environment causes or is likely to cause an adverse effect, as  
26 per Condition 10 of Schedule B of the Municipal Drinking Water Licence. The discharged water  
27 is deemed to be a Class II spill for the purposes of O. Reg. 675/98 (Classification and Exemption  
28 of Spills and Reporting of Discharges) made under the Environmental Protection Act. Discharges  
29 of flushed water are also regulated under Condition 4.5 of Schedule C of the Municipal Drinking  
30 Water Licence.  
31

#### 32 **2.2.6. Restoration of Acceptable Disinfectant Concentration and Return to Normal Service**

33  
34 After an *Acceptable Disinfectant Concentration* has been achieved at the point of flushing, the  
35 system can be returned to normal service, defined as having all valves returned to normal  
36 operating position.  
37

### 38 **2.3. Additional Information for Category 1 Watermain Break Repairs**

#### 39 40 **2.3.1. Microbiological Samples (Optional)**

41  
42 There is no requirement for *Microbiological Samples* to be taken following Category 1  
43 watermain break repairs. Where the operating authority chooses to perform *Microbiological*  
44 *Sampling*, the samples shall be deemed drinking water samples within the meaning of O. Reg.

170/03, and the reporting/corrective actions of Schedule 16 and the applicable Schedule 17 or 18 of O. Reg. 170/03 shall apply.

#### 2.4. Additional Requirements for Category 2 Watermain Break Repairs

In addition to the requirements described in Section 2.2 of this procedure, the following steps are required for Category 2 watermain break repairs.

##### 2.4.1. Removal of *Contaminants* from Watermain

Appropriate additional steps shall be undertaken to remove *Contaminants* from the watermain, such as:

- Physical removal of *Contaminants*;
- *Flushing* into the excavation;
- *Higher Velocity Flushing* after repairs where practical and feasible.

##### 2.4.2. Additional Disinfection Procedures

In addition to the steps in Section 2.2.3 of this procedure, site specific disinfection procedures may also be used depending on the severity or nature of the *Contamination*. The steps may include the disinfection procedures for new watermains as per ANSI/AWWA Standard C651.

##### 2.4.3. *Microbiological Samples* (Mandatory)

After the completion of *Flushing* and restoration of an *Acceptable Disinfectant Concentration*, at least one *Microbiological Sample* shall be taken and submitted as soon as reasonably possible, taking into consideration laboratory working hours and transportation timeframes.

The flow shall be directed to ensure that the sample represents water that has passed through the location of the repair. The sampling will typically occur at the point of *Flushing*, and may take place from sampling ports, hydrants, blow-offs, or premise plumbing. All samples shall be considered drinking water samples, taken and tested in accordance with O. Reg. 170/03 requirements. The reporting and corrective actions of Schedule 16 and the applicable Schedule 17 or 18 of O. Reg. 170/03 shall apply.

The watermain may be returned to normal service, defined as having all valves returned to normal operating position, prior to receipt of *Microbiological Sample* results.

##### 2.4.4. Special Case - Sewage *Contamination*

If there is evident or suspected sewage *Contamination* of a watermain, in addition to the steps in Sections 2.2 and 2.4 of this procedure, the operating authority shall develop and implement a plan with site specific procedures for disinfection and sampling. The sampling plan shall include as a minimum taking two sets of *Microbiological Samples* at least 24 hours apart.

Return to normal service is contingent upon the corrective actions and sampling plan being completed to the satisfaction of the local *Ministry* office (in consultation with local Medical Officer of Health). The affected watermain(s) may not be placed into service before the corrective actions and sampling plan are completed unless a *Water Advisory* is declared.

The disinfection requirements for new watermain(s) as per Section 1.1.1 of this procedure may be used based on agreement between the operating authority and the local *Ministry* office (in consultation with the local Medical Officer of Health).

#### 2.4.5. Special Case – Chemical Contamination

If there is evident or suspected chemical *Contamination* of a watermain, in addition to the steps in Sections 2.2 and 2.4 of this procedure, the operating authority shall develop and implement a plan with site specific procedures for disinfection and/or decontamination and sampling. The operating authority shall finalize the plan in agreement with the local *Ministry* office (in consultation with the local Medical Officer of Health).

Return to normal service is contingent upon the corrective actions and sampling plan being completed to the satisfaction of the local *Ministry* office (in consultation with the local Medical Officer of Health). The affected watermain(s) may not be put back in service before the corrective actions and sampling plan are completed unless a *Water Advisory* is declared.

### 3. Documentation

#### 3.1. Documentation for New Watermain(s)

When installing new watermain(s) 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* or Reduced Pressure Backflow Preventer installed by section 4.8.9 of AWWA C651-14.
  - Backflow preventer tested as per Section 1.1.1. of this procedure.
- Swabbing and/or flushing have been completed.
- Disinfection Process:
  - Method of disinfection;
  - Disinfection chemical meets AWWA/ANSI safety criteria standard NSF-60;
  - Disinfection: Date and time started and ended;
  - Chlorine residual at start and end of contact time at each sampling point;
  - Decrease in chlorine concentration in mg/L and/or percentage as required; and
  - For slug chlorination: all chlorine residual test results at each sampling point.
- *Microbiological Sampling* referred to in Section 1.1.3:

- 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* referred to in Section 1.1.4:
  - Date watermain was placed into service.
  - Length of *Connection*.
  - Sanitary conditions and proper disinfection completed.
  - *Connections* less than one pipe length with *Certified Operator* present:
    - Name of *Certified Operator* present for *Connection*.
  - *Connections* less than one pipe length with no *Certified Operator* present:
    - Results of *Microbiological* and disinfectant residual samples.
  - *Connections* under the 40 m exception:
    - Reason why the exception was used.
    - Name of *Certified Operator* present and statement of proper disinfection and sanitary conditions.
    - Results of *Microbiological* and disinfectant residual samples.
  - Disinfectant residual after watermain is flushed and put in service.

### 3.2. Documentation for Watermain Maintenance and Repair

When performing maintenance and repair activities as per Sections 1.4 and 2 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:

- Date.
- Location (e.g. a municipal address).
- Flow maintained at the site until *Air Gap* created.
- Watermain size and material (e.g. 150 mm cast iron).
- No evident or suspected *Contamination* of the watermain was observed before or during the repair process.
- If watermain break, indicate type of watermain break (e.g. circumferential, longitudinal, split bell, spiral, rupture, blow-out, hole, leak at main stops/tapping valves, etc.).
- If planned maintenance, indicate type of planned maintenance (e.g. valve replacement)
- *Air Gap* maintained, once established, throughout the repair process.
- Name of *Operator-in-Charge* who classified the watermain break as Category 1 (if applicable).
- Type of Repair (e.g. clamp, cut out, etc.).
- Pipe and Repair Parts disinfected.
- Post-repair *Flushing* undertaken.
- For Category 2, where additional steps were required under 2.4.1 and 2.4.2, describe these steps.

- For Category 2 – Special Cases, include site specific plan. If chlorine disinfection was used, indicate initial concentration, contact time, final concentration and final concentration as percentage of initial concentration.
- Disinfectant residual on final post repair *Flushing*. If final disinfectant residual is less than 0.2 mg/L free chlorine in a chlorinated system or 1.0 mg/L combined chlorine in a chloraminated system, then provide the location and results of upstream disinfectant residual(s) or by using documented benchmarks for the area.
- *Microbiological Samples* taken (If applicable).
  - Date and location(s) of sample(s) (if applicable, e.g. Chain of custody).
- Date and time of return to normal service.
- *Water Advisory* declared (if applicable): Date and Time.
- Public Agency Notification (if applicable): local *Ministry* office (Date and Time).
- Public Agency Notification (if applicable): Spills Action Centre (Date and Time).
- Public Agency Notification/Direction (if applicable): local Medical Officer of Health (Date and Time).

APPENDIX A

Tools to determine compliance with New Watermain requirements - Pictures

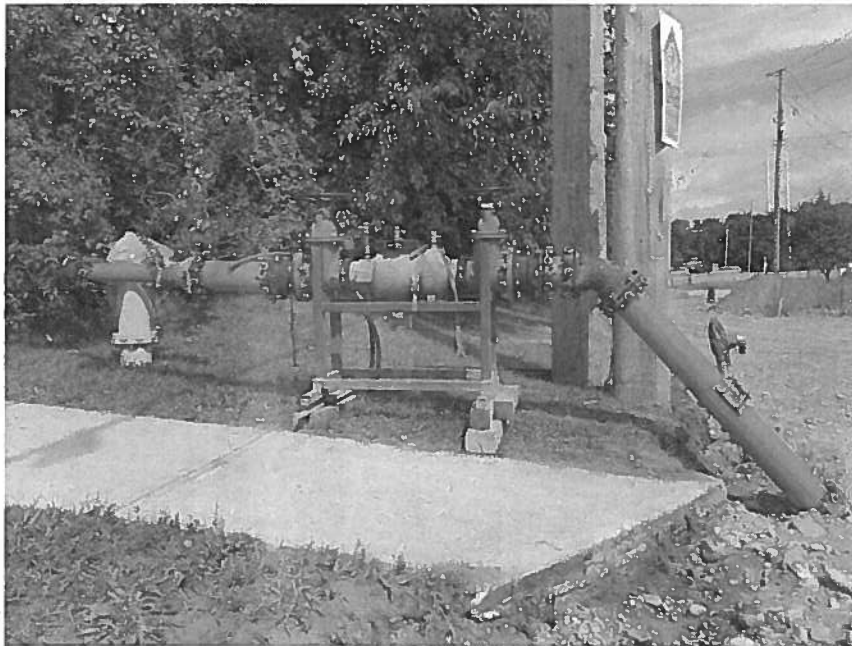


Figure A-1: Temporary connection from hydrant with *Backflow Prevention* with a CSA approved reduced pressure backflow preventer.



Figure A-2: Temporary connection from watermain with *Backflow Prevention* with a CSA approved reduced pressure backflow preventer

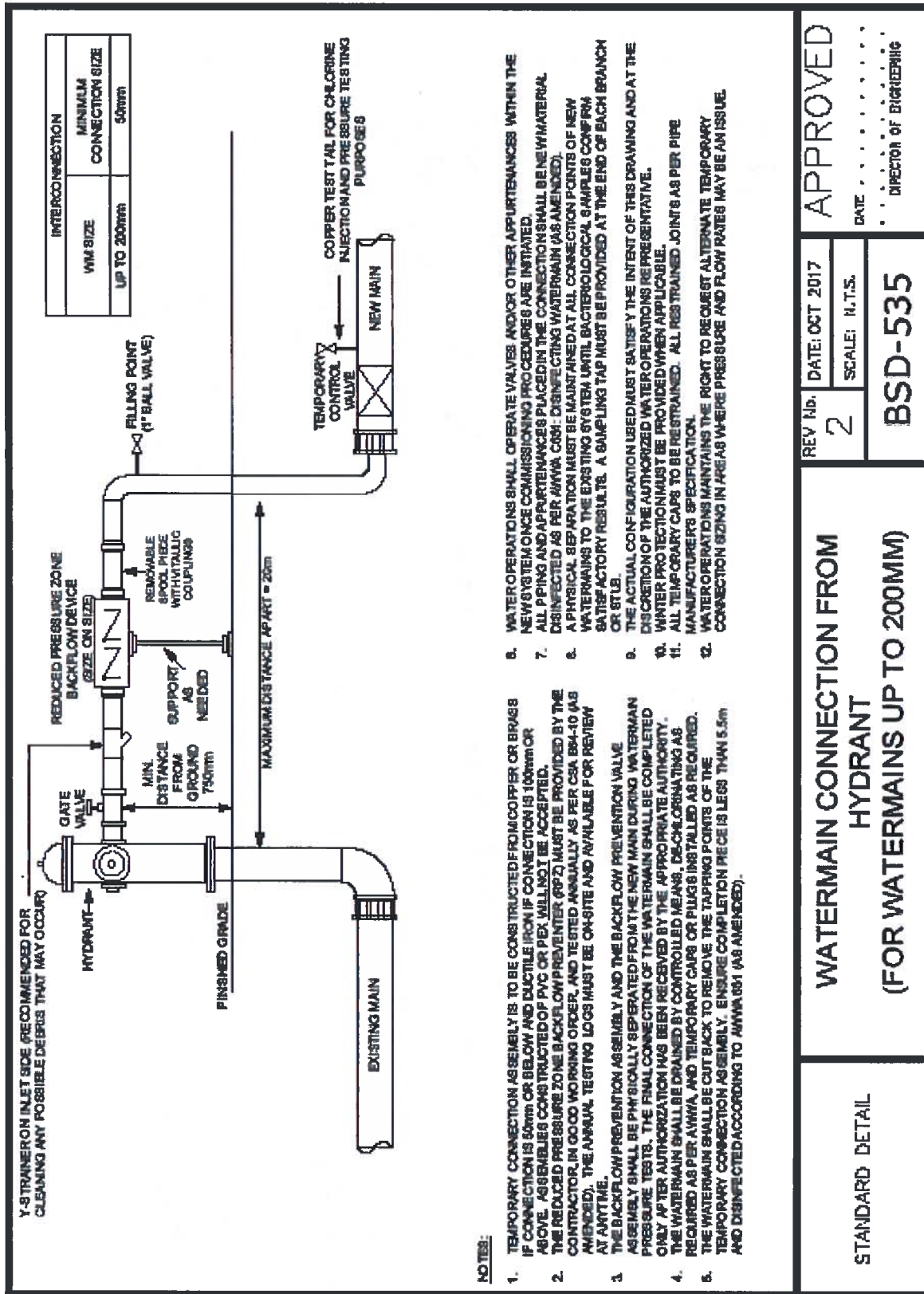


Figure A-3: Schematic of temporary connection from hydrant with Backflow Prevention with a CSA approved reduced pressure backflow preventer.

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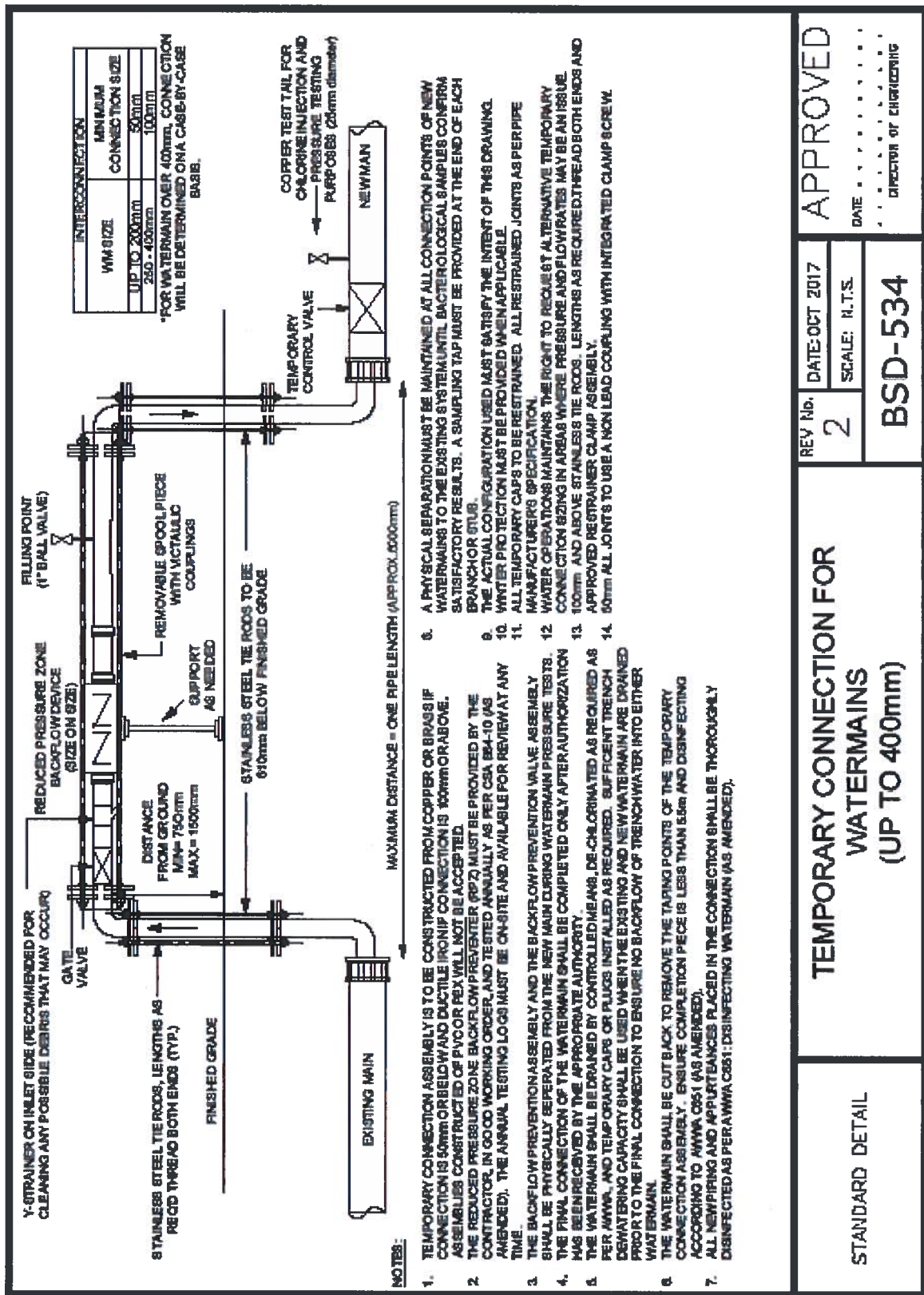


Figure A-4: Schematic of temporary connection from watermain with Backflow Prevention with a CSA approved reduced pressure backflow preventer.

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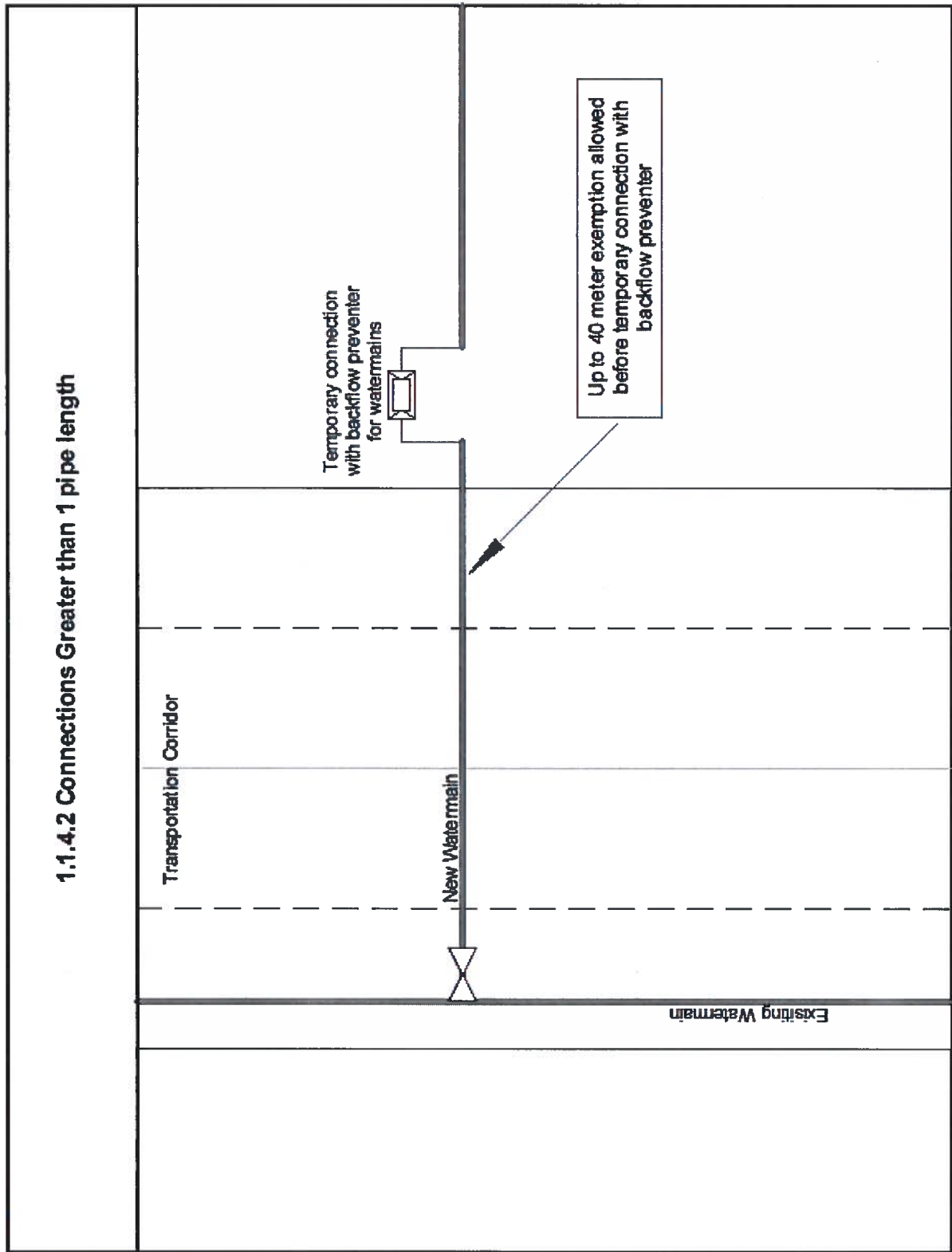


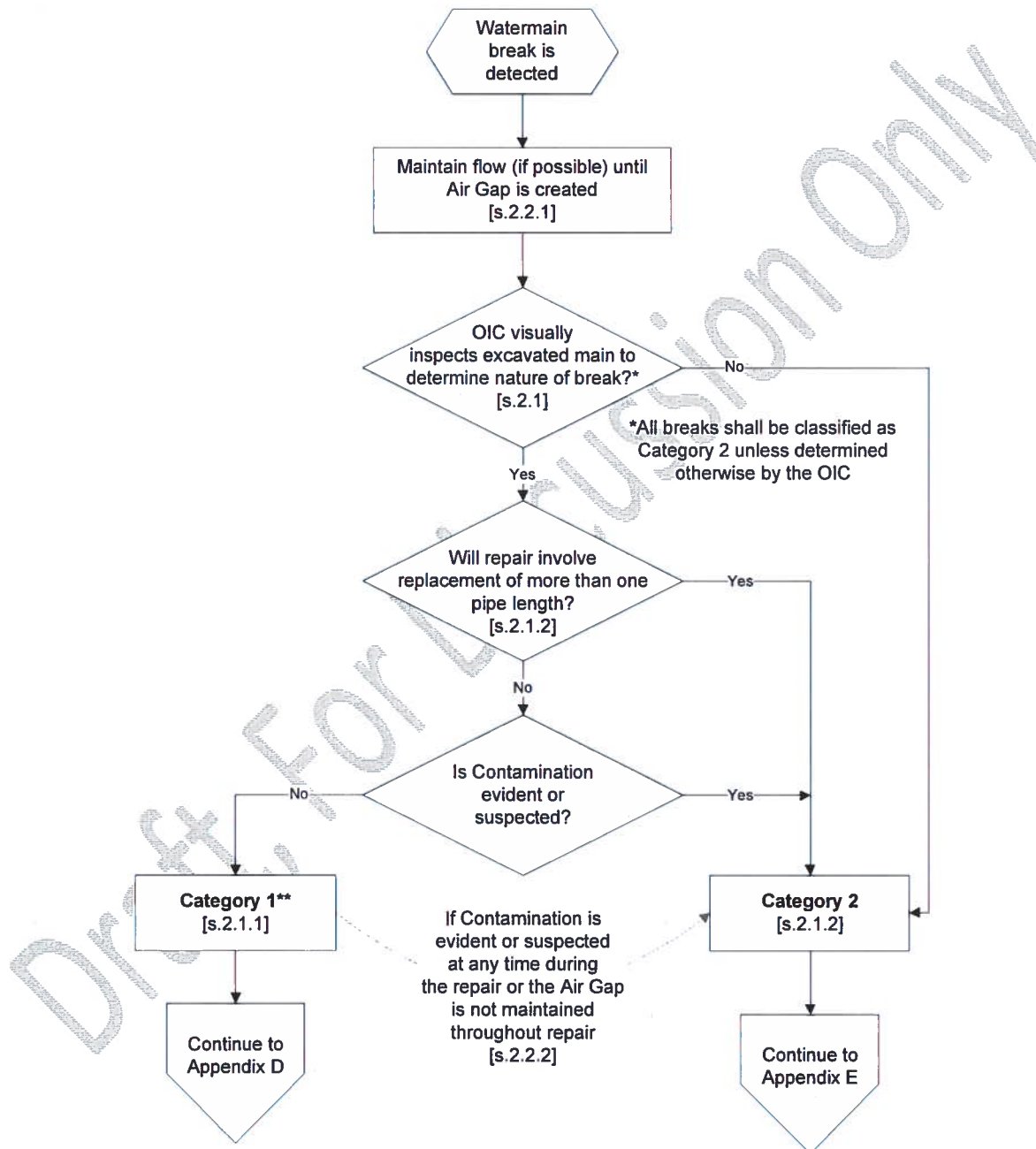
Figure A-5: Example of Exception in Section 1.1.4.2.

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## APPENDIX B

### Tools to Help Determine the Category of Watermain Break - Flowchart

The following flowchart will help determine the categories of watermain breaks.



**\*\*An OIC must remain on-site throughout a Category 1 repair to assess the evidence of Contamination or potential Contamination. If an OIC cannot be present for the duration of the repair, the break shall be reclassified as a Category 2.**

## APPENDIX C

### Tools to Help Determine the Category of Watermain Break - Pictures

Examples of watermain breaks that are typical of Category 1 are included below for illustrative purposes only:



Figure C-1: Circumferential watermain break with flow maintained until after an *Air Gap* was created.



Figure C-2: Corrosion hole leak in a watermain with flow maintained until after an *Air Gap* was created.

Examples of watermain breaks that are typical of Category 2 are included below for illustrative purposes only:



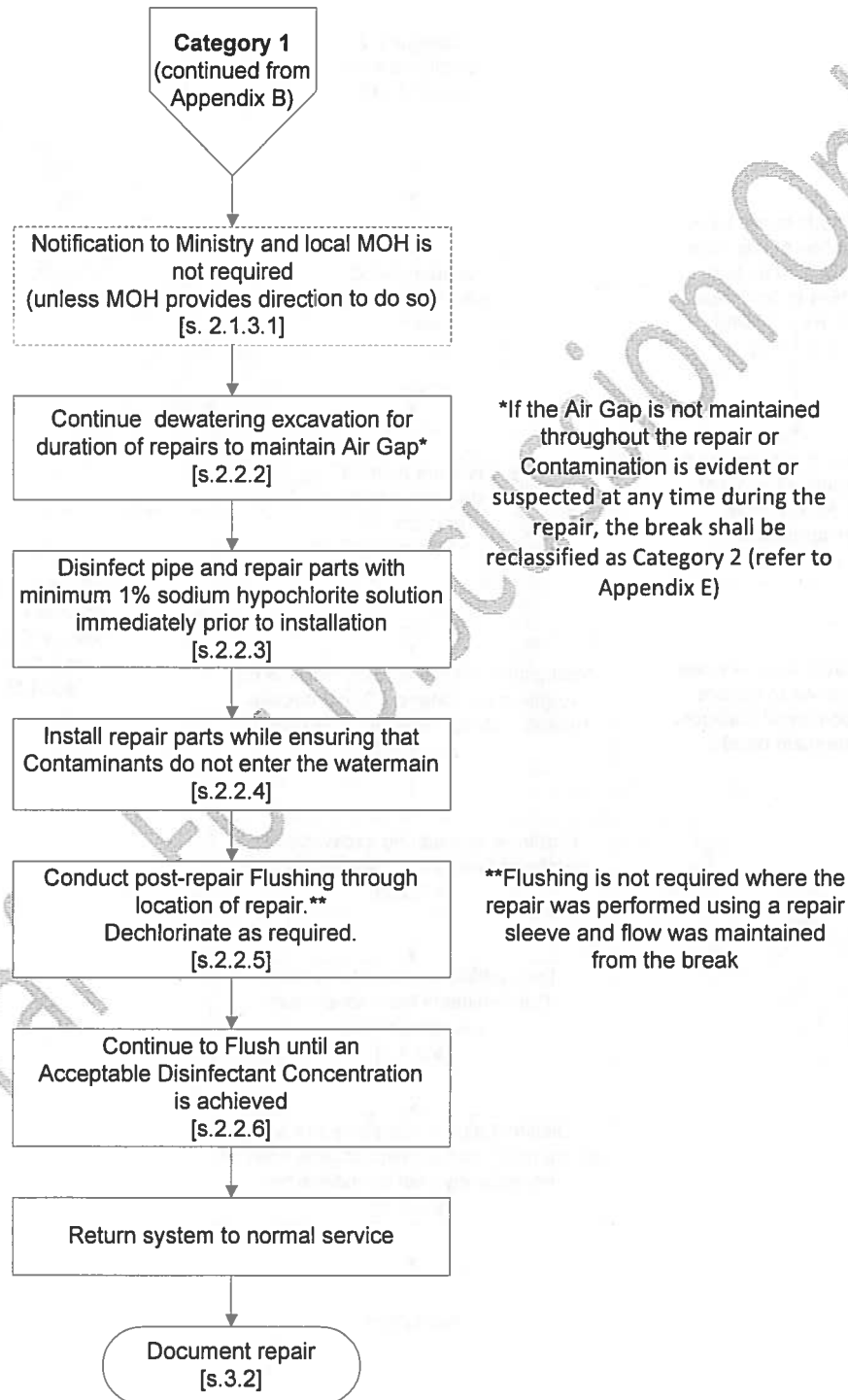
Figure C-3: Longitudinal watermain break with evident *Contamination*.



Figure C-4: Spiral watermain break with evident *Contamination*.

## APPENDIX D – CATEGORY 1 FLOWCHART

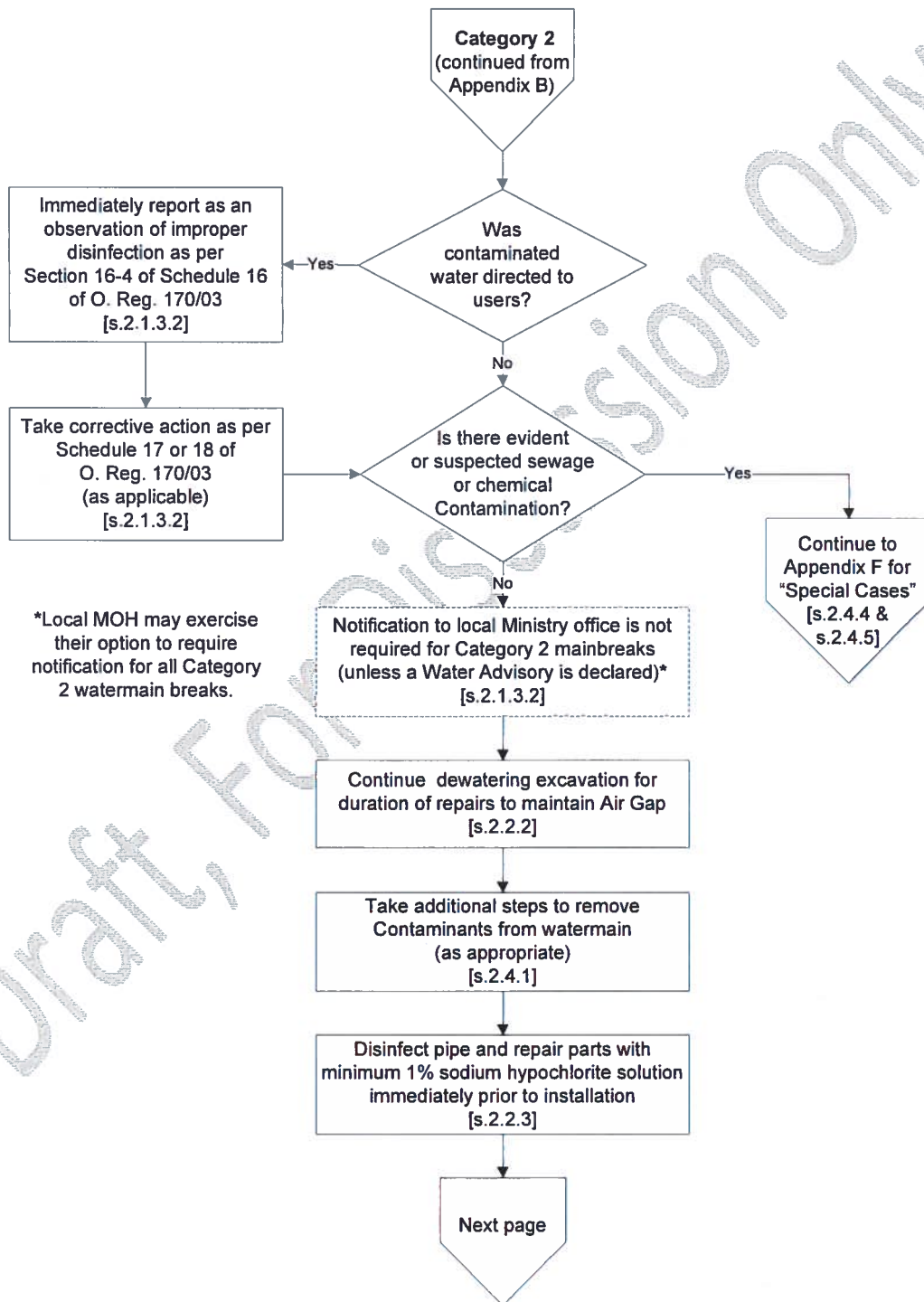
The following flowchart is an example of the typical steps required for **Category 1** watermain breaks  
**Note:** These steps also apply to the planned maintenance of watermain *Appurtenances* and fittings (refer to Section 1.4). Any additional directions given by the *Ministry* and/or the local Medical Officer of Health must be followed.

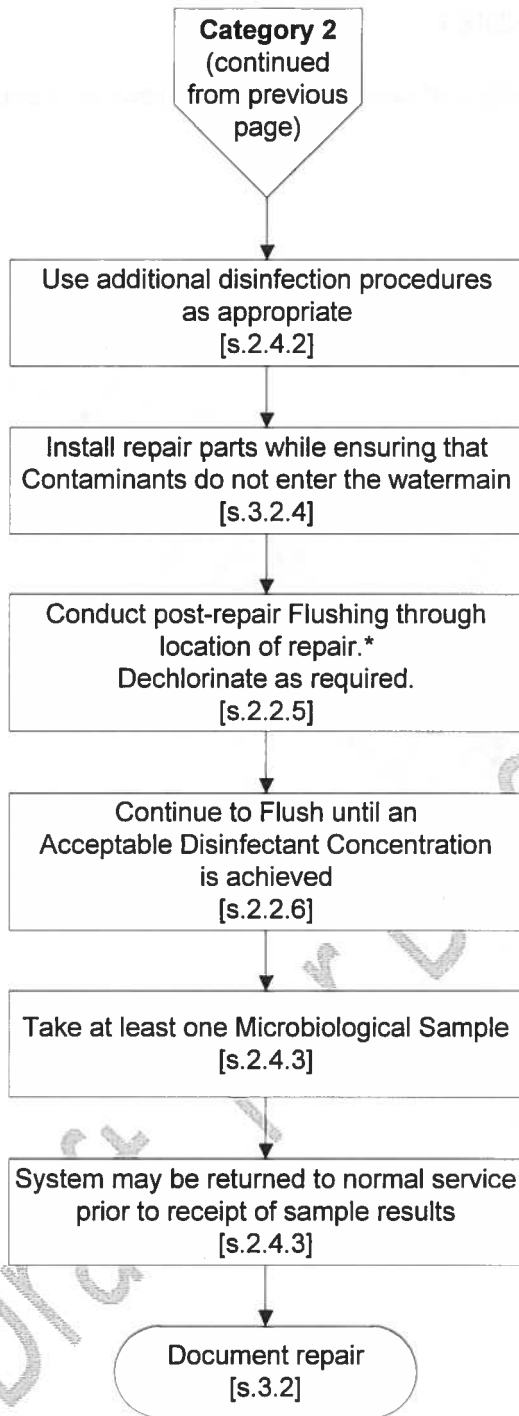


## APPENDIX E

The following flowchart is an example of the typical steps required for **Category 2** watermain breaks.

**Note:** The sequence of actions may be varied as appropriate for the specific situation. Any additional directions given by the *Ministry* and/or the local Medical Officer of Health must be followed.





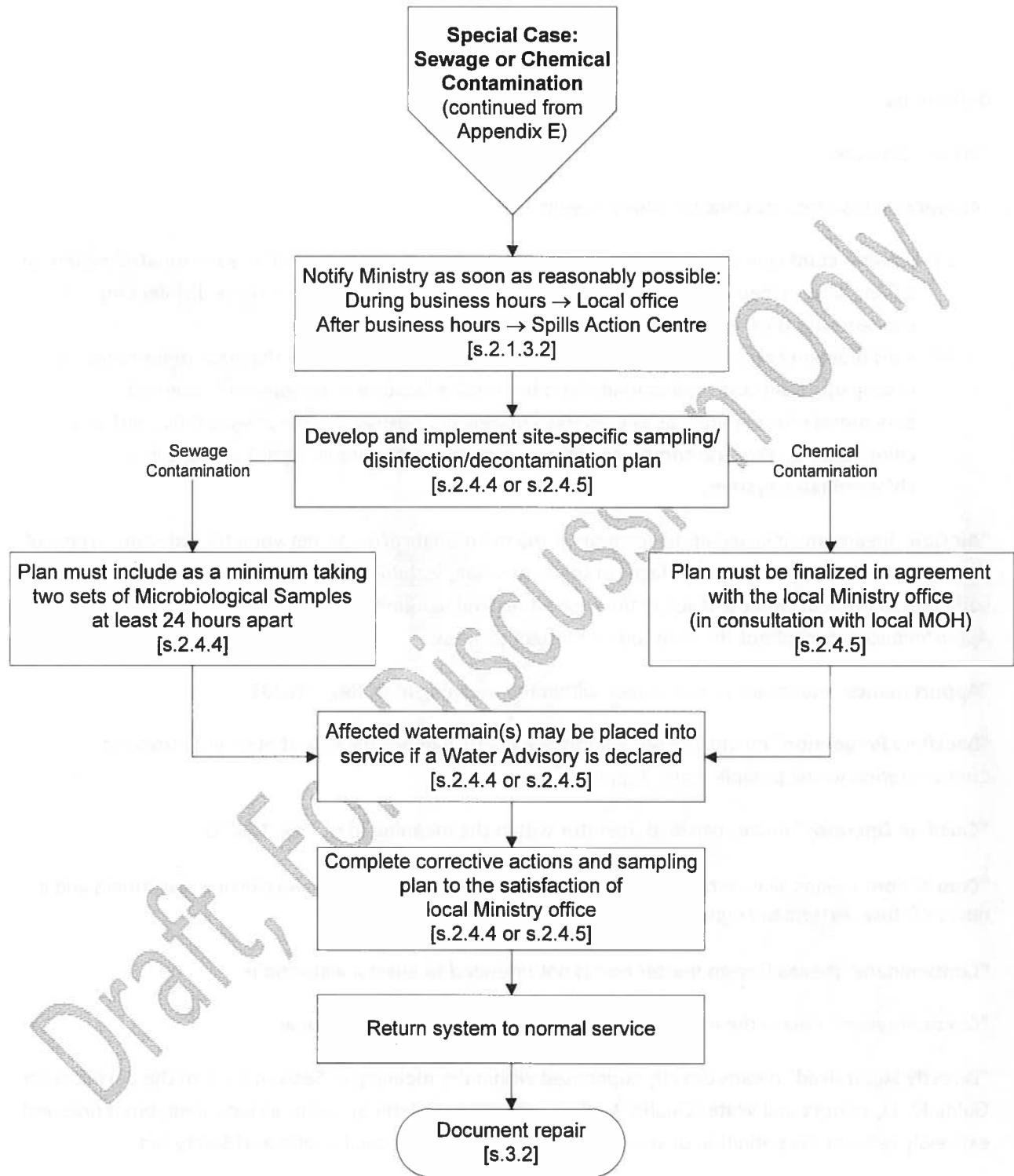
\*Flushing is not required where the repair was performed using a repair sleeve and flow was maintained from the break

## APPENDIX F

1  
2  
3  
4

The following flowchart depicts the requirements for special case *Contamination* (sewage or chemical) as a result of a watermain break.

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## APPENDIX G

### Definitions

In this procedure,

**"Acceptable Disinfectant Concentration"** means:

- a) a disinfectant concentration of at least 0.2 mg/L free chlorine residual in a chlorinated system or 1.0 mg/L combined chlorine residual in a chloraminated system; or, if these disinfectant concentrations cannot be achieved,
- b) a disinfectant concentration that is representative of the residual in the area, determined by testing upstream and downstream from the testing location or by using documented benchmarks for the area, as long as free chlorine concentrations are at least 0.05 mg/L in a chlorinated system and combined chlorine concentrations are at least 0.25 mg/L in a chloraminated system.

**"Air Gap"** means an air space at the location of the maintenance/repair between the exterior surface of the watermain and the interior surfaces of the excavation, including the water in the excavation, sufficient to prevent water and soil in the excavation from contacting the watermain, fittings, or *Appurtenances* throughout the maintenance/repair process.

**"Appurtenance"** means an appurtenance within the meaning of O. Reg. 170/03.

**"Backflow Prevention"** means the prevention of a reversal of normal flow that could introduce *Contamination* to the potable water supply.

**"Certified Operator"** means certified operator within the meaning of O. Reg. 170/03.

**"Connection"** means all watermain and *Appurtenances* installed between an existing watermain and a new or future watermain/*Appurtenance*.

**"Contaminant"** means foreign matter that is not intended to enter a watermain.

**"Contamination"** means the introduction of a *Contaminant* into a watermain.

**"Directly Supervised"** means directly supervised within the meaning of Section 5.1.1 of the Certification Guide for Operators and Water Quality Analysts of Drinking Water Systems, as amended, but it does not expressly refer to the definition of supervisor under the Occupational Health and Safety Act.

**"Flushing"** means valve operation to restore an *Acceptable Disinfectant Concentration* and discharge suspended materials until the water appears clear by flowing water through a section of watermain and out of the system. This definition does not include recharging the watermain or a requirement to achieve scouring velocity within the watermain.

1 **"Higher Velocity Flushing"** means flushing of a watermain with sufficient velocity to discharge settled  
2 materials.

3 **"Isolate"** means operate valves to ensure that there is no flow of water to or from the isolated  
4 watermain section.

5 **"Microbiological Samples"** means water samples taken and tested for *Escherichia coli* and Total  
6 Coliforms by a licensed and accredited laboratory.

7 **"Ministry"** means the Ministry of the Environment, Conservation and Parks.

8 **"Operator-in-Charge"** means an operator-in-charge within the meaning of O. Reg. 128/04.

9 **"Service Pipe"** means a service pipe within the meaning of O. Reg. 170/03.

10 **"Water Advisory"** means a boil or drinking water advisory for the area being serviced by the affected  
11 watermain declared by the local Medical Officer of Health.

12 **"Water Quality Analyst"** means a water quality analyst within the meaning of O. Reg. 170/03.

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