



## DRINKING WATER WORKS PERMIT

**Permit Number: 168-201**

**Issue Number: 2**

Pursuant to the *Safe Drinking Water Act, 2002*, S.O. 2002, c. 32, and the regulations made thereunder and subject to the limitations thereof, this drinking water works permit is issued under Part V of the *Safe Drinking Water Act, 2002*, S.O. 2002, c. 32 to:

### **The Corporation of the Municipality of Tweed**

**255 Metcalf St.  
Tweed, ON  
K0K 3J0**

For the following municipal residential drinking water system:

### **Tweed Drinking Water System**

This drinking water works permit includes the following:

<b>Schedule</b>	<b>Description</b>
Schedule A	Drinking Water System Description
Schedule B	General
Schedule C	All documents issued as Schedule C to this drinking water works permit which authorize alterations to the drinking water system
Schedule D	Process Flow Diagrams

DATED at TORONTO this 19th day of May, 2016

Signature

Aziz Ahmed, P.Eng.  
Director  
Part V, *Safe Drinking Water Act, 2002*

## Schedule A: Drinking Water System Description

System Owner	The Corporation of the Municipality of Tweed
Permit Number	168-201
Drinking Water System Name	Tweed Drinking Water System
Schedule A Issue Date	May 19th, 2016

### 1.0 System Description

- 1.1 The following is a summary description of the works comprising the above drinking water system:

#### Overview

The **Tweed Drinking Water System** services the Village of Tweed and consists of two groundwater wells, a water treatment facility and a water distribution system. The water treatment facility includes an ion exchange unit and a disinfection system utilizing ultraviolet (UV) light and sodium hypochlorite. The distribution system consists of an elevated storage tank and approximately 18.2 km of watermains.

### Tweed Water Treatment Facility

#### Groundwater Supply

##### Well No. 1 (For Emergency Use Only)

Location	351 Hungerford Road (adjacent to elevated water storage tank)
UTM Coordinates	NAD 27: UTM Zone 18: 315376.00 E, 4927669 N
Description	Drilled groundwater well cased in bedrock, a 4m x 4m x 2.5m concrete block well house, and appurtenances
Source Type	Groundwater
Well Dimensions	250 mm diameter, 132 m deep
Well Pump	Submersible well pump with a rated capacity of 15.1 L/s at a TDH of 87.9m to convey raw water from Well No. 1 to the Treatment Facility
Equipment	Pump discharge piping including pump-to-waste connection, raw water flowmeter and flow control valve
	Approximately 875 m of 150 mm diameter watermain from Well No. 1 site to the Treatment Facility
Notes	

**Well No. 3 (Crookston Well)**

Location	430 Crookston Road (54m north of County Road 38, 188 m west of College Street)
UTM Coordinates	NAD 27: UTM Zone 18: 315426.00 E, 4926973.00 N
Description	Drilled groundwater well cased in bedrock, a 14.1m x 7.8m x 3.5m high concrete block treatment plant, and 100mm diameter raw water supply line to the main treatment plant
Source Type	Groundwater under the direct influence of surface water (GUDI) with effective in-situ filtration
Well Dimensions	250mm diameter, 122.2m deep
Well Pump	Submersible well pump with a rated capacity of 18.9 L/s at a TDH of 110m
Equipment	Pump discharge piping from Well No. 3 to the Treatment Facility Pump-to-waste connection, raw water flowmeter, flow control valve, sample line and air release valve
Notes	Located outside on the south west side of the treatment building

**Water Treatment Facility**

Location	430 Crookston Road (54m north of County Road 38, 188 m west of College Street)
UTM Coordinates	NAD 27: UTM Zone 18: 315426.00 E, 4926973.00 N
Description	Houses Ion Exchange unit, UV light disinfection unit, and sodium hypochlorite disinfection system
Notes	

**Ion Exchange System****Ion Exchange Unit**

Description	Ion exchange treatment system for both nitrate and/or uranium removal
Capacity	1,513 m <sup>3</sup> /day
Equipment	One (1) ion exchange unit containing 3.12 m <sup>3</sup> of resin and inlet, outlet and bypass piping Electrically actuated valves and flowmeters to permit blending of raw and treated water
Notes	

**Regeneration System**

Description	Ion exchange regeneration system
Equipment	One (1) 1,200 L capacity brine storage day tank and
	One (1) transfer pump
	One (1) 31 m <sup>3</sup> twin compartment reinforced concrete brine make-up/bulk storage tank, transfer pump and piping to brine day tank
Notes	

**Backwash System**

Description	Ion exchange back flush system with softened water after every 9999 m <sup>3</sup>
Equipment	One (1) water softener with rated capacity of 100 L/min, and discharge piping to wastewater holding tank
	One (1) 3,100 L capacity softened water storage tank
	One (1) transfer pump
	One (1) 29.3 m <sup>3</sup> reinforced concrete wastewater holding tank equipped with a gravity outlet and 50 mm diameter outlet orifice to limit the maximum discharge rate to 3.0 L/s
Notes	The backwash water discharged to the sanitary sewer

**Disinfection****Ultraviolet (UV) Light Units**

Description	UV light for primary disinfection
Capacity	18.9 L/s, each
Equipment	Two (2) UV light reactors (one duty and one standby)
	UV intensity sensor, a portable UV transmittance photometer and manual cleaning facilities
Notes	Minimum UV dose of 40 mJ/cm <sup>2</sup>

**Chlorination**

Description	A sodium hypochlorite feed system for secondary disinfection
Equipment	One (1) solution tank
	Two (2) metering pumps
	A 17 m <sup>3</sup> capacity (750 mm diameter) chlorine contact pipe located prior to the distribution system to provide chlorine contact time
	One pre-chlorine and one post-chlorine residual analyzers/recorder and treated water sample line
Notes	

## Instrumentation and Control

Description	An instrumentation and control system
Instrumentation Equipment	Backflow preventers on the plant service connection at the main header and on the treated water sample connection from the end of the chlorine contact pipe in the Well No. 3 building
Notes	

## Emergency Power

### Standby Power Supply

Description	One (1) 80 kilowatts standby diesel generator set to provide power for the drinking-water facility during emergency situations
Notes	The standby diesel generator is located outside on the north west end of the treatment building

## Elevated Storage Tanks

### Tweed Elevated Storage Tank

Location	351 Hungerford Road (adjacent to Well No. 1)
UTM Coordinates	NAD 27: UTM Zone 18: 315428.00 E, 4927580 N
Description	Elevated water storage tank
Capacity	1,370 m <sup>3</sup>
Equipment	Chlorine residual analyzer/recorder
Notes	

## Watermains

1.2 Watermains within the distribution system comprise:

1.2.1 Watermains that have been set out in each document or file identified in column 1 of Table 1.

<b>Table 1: Watermains</b>	
<b>Column 1 Document or File Name</b>	<b>Column 2 Date</b>
Tweed Distribution Map.pdf	January 28, 2016

1.2.2 Watermains that have been added, modified, replaced or extended further to the provisions of Schedule C of this drinking water works permit on or after the date identified in column 2 of Table 1 for each document or file identified in column 1.

1.2.3 Watermains that have been added, modified, replaced or extended further to an authorization by the Director on or after the date identified in column 2 of Table 1 for each document or file identified in column 1.

## Schedule B: General

System Owner	The Corporation of the Municipality of Tweed
Permit Number	168-201
Drinking Water System Name	Tweed Drinking Water System
Schedule B Issue Date	May 19th, 2016

### 1.0 Applicability

- 1.1 In addition to any other requirements, the drinking water system identified above shall be altered and operated in accordance with the conditions of this drinking water works permit and the licence.
- 1.2 The definitions and conditions of the licence shall also apply to this drinking water works permit.

### 2.0 Alterations to the Drinking Water System

- 2.1 Any document issued by the Director as a Schedule C to this drinking water works permit shall provide authority to alter the drinking water system in accordance, where applicable, with the conditions of this drinking water works permit and the licence.
- 2.2 All Schedule C documents issued by the Director for the drinking water system shall form part of this drinking water works permit.
- 2.3 All parts of the drinking water system in contact with drinking water which are:
  - 2.3.1 Added, modified, replaced, extended; or
  - 2.3.2 Taken out of service for inspection, repair or other activities that may lead to contamination,shall be disinfected before being put into service in accordance with a procedure approved by the Director or in accordance with the applicable provisions of the following documents:
  - a) The ministry's Watermain Disinfection Procedure, effective December 15, 2016;
  - b) AWWA C652 – Standard for Disinfection of Water-Storage Facilities;
  - c) AWWA C653 – Standard for Disinfection of Water Treatment Plants; and
  - d) AWWA C654 – Standard for Disinfection of Wells.
- 2.4 The owner shall notify the Director within thirty (30) days of the placing into service or the completion of any addition, modification, replacement or extension of the drinking water system which had been authorized through:
  - 2.4.1 Schedule B to this drinking water works permit which would require an alteration of the description of a drinking water system component described in Schedule A of this drinking water works permit;

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- 2.4.2 Any Schedule C to this drinking water works permit respecting works other than watermains; or
- 2.4.3 Any approval issued prior to the issue date of the first drinking water works permit respecting works other than watermains which were not in service at the time of the issuance of the first drinking water works permit.
- 2.5** For greater certainty, the notification requirements set out in condition 2.4 do not apply to any addition, modification, replacement or extension in respect of the drinking water system which:
- 2.5.1 Is exempt from subsection 31(1) of the SDWA by subsection 9.(2) of O. Reg. 170/03;
- 2.5.2 Constitutes maintenance or repair of the drinking water system; or
- 2.5.3 Is a watermain authorized by condition 3.1 of Schedule B of this drinking water works permit.
- 2.6** The owner shall notify the legal owner of any part of the drinking water system that is prescribed as a municipal drinking water system by section 2 of O. Reg. 172/03 of the requirements of the licence and this drinking water works permit as applicable to the prescribed system.
- 2.7** For greater certainty, any alteration to the drinking water system made in accordance with this drinking water works permit may only be carried out after other legal obligations have been complied with including those arising from the *Environmental Assessment Act*, *Niagara Escarpment Planning and Development Act*, *Oak Ridges Moraine Conservation Act, 2001* and *Greenbelt Act, 2005*.

### **3.0 Watermain Additions, Modifications, Replacements and Extensions**

- 3.1** The drinking water system may be altered by adding, modifying, replacing or extending a watermain within the distribution system subject to the following conditions:
- 3.1.1 The design of the watermain addition, modification, replacement or extension:
- a) Has been prepared by a Professional Engineer;
  - b) Has been designed only to transmit water and has not been designed to treat water;
  - c) Satisfies the design criteria set out in the Ministry of the Environment and Climate Change publication "Watermain Design Criteria for Future Alterations Authorized under a Drinking Water Works Permit – June 2012", as amended from time to time; and
  - d) Is consistent with or otherwise addresses the design objectives contained within the Ministry of the Environment and Climate Change publication "Design Guidelines for Drinking Water Systems, 2008", as amended from time to time.



- 3.1.2 The maximum demand for water exerted by consumers who are serviced by the addition, modification, replacement or extension of the watermain will not result in an exceedance of the rated capacity of a treatment subsystem or the maximum flow rate for a treatment subsystem component as specified in the licence, or the creation of adverse conditions within the drinking water system.
  - 3.1.3 The watermain addition, modification, replacement or extension will not adversely affect the distribution system's ability to maintain a minimum pressure of 140 kPa at ground level at all points in the distribution system under maximum day demand plus fire flow conditions.
  - 3.1.4 Secondary disinfection will be provided to water within the added, modified, replaced or extended watermain to meet the requirements of O. Reg. 170/03.
  - 3.1.5 The watermain addition, modification, replacement or extension is wholly located within the municipal boundary over which the owner has jurisdiction.
  - 3.1.6 The owner of the drinking water system consents in writing to the watermain addition, modification, replacement or extension.
  - 3.1.7 A Professional Engineer has verified in writing that the watermain addition, modification, replacement or extension meets the requirements of condition 3.1.1.
  - 3.1.8 The owner of the drinking water system has verified in writing that the watermain addition, modification, replacement or extension meets the requirements of conditions 3.1.2 to 3.1.6.
- 3.2** The authorization for the addition, modification, replacement or extension of a watermain provided for in condition 3.1 does not include the addition, modification, replacement or extension of a watermain that:
- 3.2.1 Passes under or through a body of surface water, unless trenchless construction methods are used;
  - 3.2.2 Has a nominal diameter greater than 750 mm;
  - 3.2.3 Results in the fragmentation of the drinking water system; or
  - 3.2.4 Connects to another drinking water system, unless:
    - a) Prior to construction, the owner of the drinking water system seeking the connection obtains written consent from the owner or owner's delegate of the drinking water system being connected to; and
    - b) The owner of the drinking water system seeking the connection retains a copy of the written consent from the owner or owner's delegate of the drinking water system being connected to as part of the record that is recorded and retained under condition 3.3.

- 3.3** The verifications required in conditions 3.1.7 and 3.1.8 shall be:
- 3.3.1 Recorded on “Form 1 – Record of Watermains Authorized as a Future Alteration”, as published by the Ministry of the Environment and Climate Change, prior to the watermain addition, modification, replacement or extension being placed into service; and
  - 3.3.2 Retained for a period of ten (10) years by the owner.
- 3.4** For greater certainty, the verification requirements set out in condition 3.3 do not apply to any addition, modification, replacement or extension in respect of the drinking water system which:
- 3.4.1 Is exempt from subsection 31(1) of the SDWA by subsection 9.(2) of O. Reg. 170/03; or
  - 3.4.2 Constitutes maintenance or repair of the drinking water system.
- 3.5** The document or file referenced in Column 1 of Table 1 of Schedule A of this drinking water works permit that sets out watermains shall be retained by the owner and shall be updated to include watermain additions, modifications, replacements and extensions within 12 months of the addition, modification, replacement or extension.
- 3.6** The updates required by condition 3.5 shall include watermain location relative to named streets or easements and watermain diameter.

#### **4.0 Minor Modifications to the Drinking Water System**

- 4.1** The drinking water system may be altered by adding, modifying or replacing the following components in the drinking water system:
- 4.1.1 Raw water pumps and treatment process pumps in the treatment system;
  - 4.1.2 Coagulant feed systems in the treatment system, including the location and number of dosing points;
  - 4.1.3 Valves;
  - 4.1.4 Instrumentation and controls, including SCADA systems, and software associated with these devices;
  - 4.1.5 Filter media, backwashing equipment and under-drains in the treatment system; or,
  - 4.1.6 Spill containment works.
- 4.2** The drinking water system may be altered by adding, modifying, replacing or removing the following components in the drinking water system:
- 4.2.1 Treated water pumps and associated equipment;
  - 4.2.2 Re-circulation devices within distribution system storage facilities;

- 4.2.3 In-line mixing equipment;
  - 4.2.4 Chemical metering pumps and chemical handling pumps;
  - 4.2.5 Chemical storage tanks (excluding fuel storage tanks) and associated equipment; or,
  - 4.2.6 Measuring and monitoring devices that are not required by regulation, by a condition in the Drinking Water Works Permit, or by a condition otherwise imposed by the Ministry of the Environment and Climate Change.
- 4.3** The drinking water system may be altered by replacing the following:
- 4.3.1 Raw water piping, treatment process piping or treated water piping within the treatment subsystem;
  - 4.3.2 Fuel storage tanks and spill containment works, and associated equipment; or
  - 4.3.3 Coagulants and pH adjustment chemicals, where the replacement chemicals perform the same function;
    - a) Prior to making any alteration to the drinking water system under condition 4.3.3, the owner shall undertake a review of the impacts that the alteration might have on corrosion control or other treatment processes; and
    - b) The owner shall notify the Director in writing within thirty (30) days of any alteration made under condition 4.3.3 and shall provide the Director with a copy of the review.
- 4.4** Any alteration of the drinking water system made under conditions 4.1, 4.2 or 4.3 shall not result in:
- 4.4.1 An exceedance of a treatment subsystem rated capacity or a treatment subsystem component maximum flow rate as specified in the licence;
  - 4.4.2 The bypassing of any unit process within a treatment subsystem;
  - 4.4.3 A deterioration in the quality of drinking water provided to consumers;
  - 4.4.4 A reduction in the reliability or redundancy of any component of the drinking water system;
  - 4.4.5 A negative impact on the ability to undertake compliance and other monitoring necessary for the operation of the drinking water system; or
  - 4.4.6 An adverse effect on the environment.
- 4.5** The owner shall verify in writing that any addition, modification, replacement or removal of drinking water system components in accordance with conditions 4.1, 4.2 or 4.3 has met the requirements of the conditions listed in condition 4.4.

- 4.6** The verifications and documentation required in condition 4.5 shall be:
- 4.6.1 Recorded on “Form 2 – Record of Minor Modifications or Replacements to the Drinking Water System”, as published by the Ministry of the Environment and Climate Change, prior to the modified or replaced components being placed into service; and
  - 4.6.2 Retained for a period of ten (10) years by the owner.
- 4.7** For greater certainty, the verification requirements set out in conditions 4.5 and 4.6 do not apply to any addition, modification, replacement or removal in respect of the drinking water system which:
- 4.7.1 Is exempt from subsection 31(1) of the SDWA by subsection 9.(2) of O. Reg. 170/03; or
  - 4.7.2 Constitutes maintenance or repair of the drinking water system.
- 4.8** The owner shall update any drawings maintained for the drinking water system to reflect the modification or replacement of the works, where applicable.

## **5.0 Equipment with Emissions to the Air**

- 5.1** The drinking water system may be altered by adding, modifying or replacing any of the following drinking water system components that may discharge or alter the rate or manner of a discharge of a compound of concern to the atmosphere:
- 5.1.1 Any equipment, apparatus, mechanism or thing that is used for the transfer of outdoor air into a building or structure that is not a cooling tower;
  - 5.1.2 Any equipment, apparatus, mechanism or thing that is used for the transfer of indoor air out of a space used for the production, processing, repair, maintenance or storage of goods or materials, including chemical storage;
  - 5.1.3 Laboratory fume hoods used for drinking water testing, quality control and quality assurance purposes;
  - 5.1.4 Low temperature handling of compounds with a vapor pressure of less than 1 kilopascal;
  - 5.1.5 Maintenance welding stations;
  - 5.1.6 Minor painting operations used for maintenance purposes;
  - 5.1.7 Parts washers for maintenance shops;
  - 5.1.8 Emergency chlorine and ammonia gas scrubbers and absorbers;
  - 5.1.9 Venting for activated carbon units for drinking water taste and odour control;
  - 5.1.10 Venting for a stripping unit for methane removal from a groundwater supply;
  - 5.1.11 Venting for an ozone treatment unit;

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- 5.1.12 Natural gas or propane fired boilers, water heaters, space heaters and make-up air units with a total facility-wide heat input rating of less than 20 million kilojoules per hour, and with an individual fuel energy input of less than or equal to 10.5 gigajoules per hour; or
- 5.1.13 Emergency generators that fire No. 2 fuel oil (diesel fuel) with a sulphur content of 0.5 per cent or less measured by weight, natural gas, propane, gasoline or biofuel, and that are used for emergency duty only with periodic testing.
- 5.2** The owner shall not add, modify or replace a drinking water system component set out in condition 5.1 for an activity that is not directly related to the treatment and/or distribution of drinking water.
- 5.3** The emergency generators identified in condition 5.1.13 shall not be used for non-emergency purposes including the generation of electricity for sale or for peak shaving purposes.
- 5.4** The owner shall prepare an emission summary table for nitrogen oxide emissions only, for each addition, modification or replacement of emergency generators identified in condition 5.1.13.

### Performance Limits

- 5.5** The owner shall ensure that a drinking water system component identified in conditions 5.1.1 to 5.1.13 is operated at all times to comply with the following limits:
- 5.5.1 For equipment other than emergency generators, the maximum concentration of any compound of concern at a point of impingement shall not exceed the corresponding point of impingement limit;
- 5.5.2 For emergency generators, the maximum concentration of nitrogen oxides at sensitive populations shall not exceed the applicable point of impingement limit, and at non-sensitive populations shall not exceed the Ministry of the Environment and Climate Change half-hourly screening level of 1880 ug/m<sup>3</sup> as amended; and
- 5.5.3 The noise emissions comply at all times with the limits set out in publication NPC-300, as applicable.
- 5.6** The owner shall verify in writing that any addition, modification or replacement of works in accordance with condition 5.1 has met the requirements of the conditions listed in condition 5.5.
- 5.7** The owner shall document how compliance with the performance limits outlined in condition 5.5.3 is being achieved, through noise abatement equipment and/or operational procedures.
- 5.8** The verifications and documentation required in conditions 5.6 and 5.7 shall be:
- 5.8.1 Recorded on "Form 3 – Record of Addition, Modification or Replacement of Equipment Discharging a Contaminant of Concern to the Atmosphere", as published by the Ministry of the Environment and Climate Change, prior to the additional, modified or replacement equipment being placed into service; and

5.8.2 Retained for a period of ten (10) years by the owner.

**5.9** For greater certainty, the verification and documentation requirements set out in conditions 5.6 and 5.8 do not apply to any addition, modification or replacement in respect of the drinking water system which:

5.9.1 Is exempt from subsection 31(1) of the SDWA by subsection 9.(2) of O. Reg. 170/03; or

5.9.2 Constitutes maintenance or repair of the drinking water system.

**5.10** The owner shall update any drawings maintained for the works to reflect the addition, modification or replacement of the works, where applicable.

## **6.0 Previously Approved Works**

**6.1** The owner may add, modify, replace or extend, and operate part of a municipal drinking water system if:

6.1.1 An approval was issued after January 1, 2004 under section 36 of the SDWA in respect of the addition, modification, replacement or extension and operation of that part of the municipal drinking water system;

6.1.2 The approval expired by virtue of subsection 36(4) of the SDWA; and

6.1.3 The addition, modification, replacement or extension commenced within five years of the date that activity was approved by the expired approval.

## **7.0 System-Specific Conditions**

**7.1** Not Applicable.

## **8.0 Source Protection**

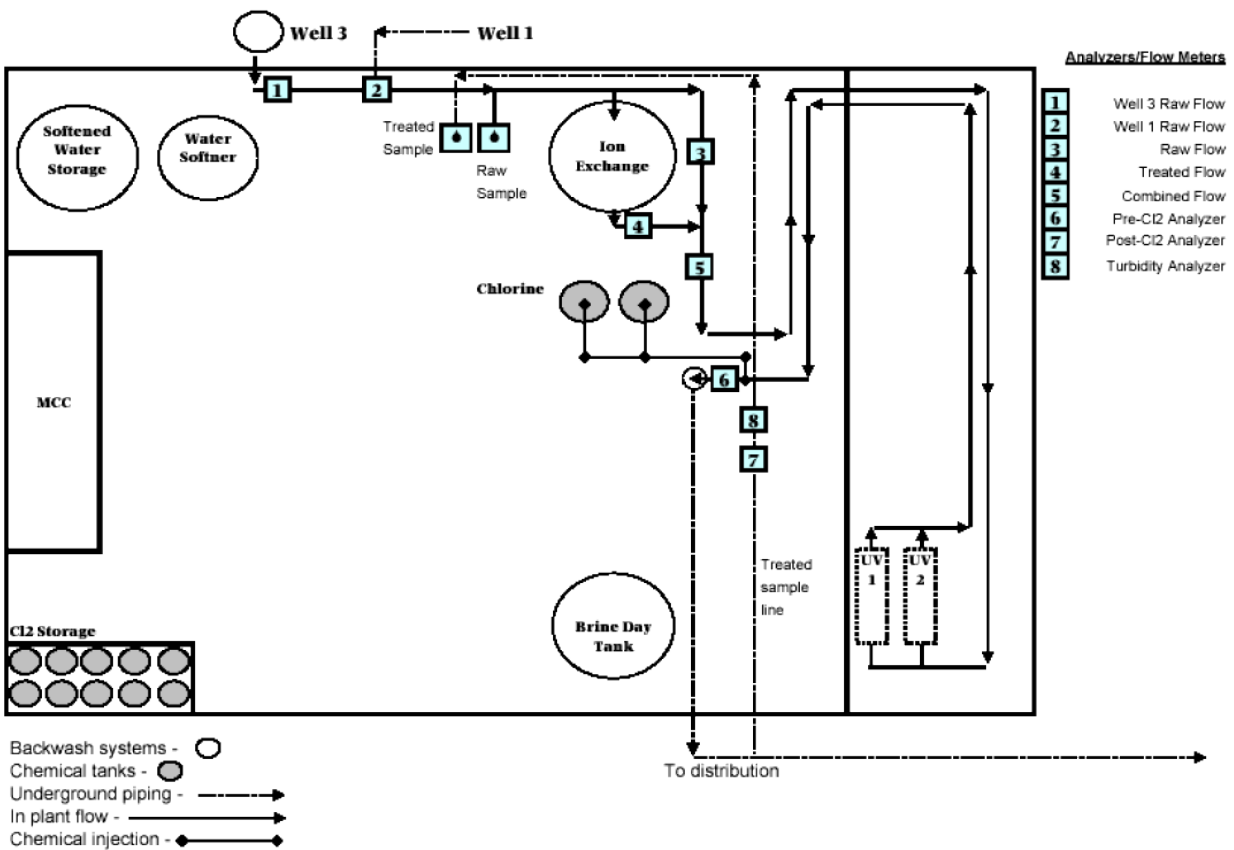
**8.1** Not Applicable.

## Schedule D: Process Flow Diagrams

System Owner	The Corporation of the Municipality of Tweed
Permit Number	168-201
Drinking Water System Name	Tweed Drinking Water System
Schedule D Issue Date	May 19th, 2016

### 1.0 Process Flow Diagrams

#### Tweed Water Treatment Facility



[Source: Operational Plan For the Tweed Drinking Water System, Revision 7, August 13, 2015]