Tweed Drinking Water System

Annual Water Report

Reporting period of January 1, 2018 – December 31, 2018

Prepared For: The Corporation of the Municipality of Tweed

Prepared By: Ontario Clean Water Agency
Agence Ontarienne Des Eaux

This report has been prepared to satisfy the annual reporting requirements of the Provincial Regulations and Guidelines established by the Ministry of the Environment in the Province of Ontario including the section 11 and Schedule 22 reports identified in O.Reg 170/03, Drinking Water Systems Regulation and the Permit to Take Water Reports identified in O.Reg 387/04, Water Taking and Transfer Regulation.

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Report Availability

Population Served:	< 10,000
Website where the annual report can be viewed by the public:	www.twp.tweed.on.ca
Alternate location were annual report will be available for inspection and is free of charge:	Municipal Office
How are system users notified that the annual report is available and is free of charge?	Public access/notice via Municipal Website and Bi-weekly Municipal News Column
Number of Designated Facilities served:	None
Has a copy of this report been provided to all Designated Facilities?	N/A
Number of Interested Parties reported to:	N/A
Has a copy of this report been provided to all Interested Parties?	N/A
The following Drinking-Water Systems receive drinking water from this system:	N/A
Has a copy of this report been provided to connected owners?	N/A

Compliance Report Card

Drinking Water System Number:	220001557
System Owner:	The Corporation of the Municipality of Tweed
Operating Authority:	Ontario Clean Water Agency
Drinking Water System Category:	Large Municipal Residential
Reporting Period:	January 1, 2018 – December 31, 2018

Event Summary	# of Events	Date	Details
Ministry of Environment Inspections	1	Oct 25, 2018	Announced-Detailed Drinking Water Inspection - Final Inspection Rating of 97.03%
Ministry of Labour Inspections	0		
DWQMS Audits	1	Jan 11, 2018	Systems Audit – SAI Global
AWQI's	2	June 18, 2018 June 28, 2018	AWQI #139843 AWQI #140101
Non-Compliance	1	Dec 19, 2018	Distribution Maintenance Records
Community Complaints	0		
Spills	0		

Quality Control Measures

The Corporation of the Municipality of Tweed facilities are part of OCWA's operational Trent Valley Hub. The facilities are supported by hub, regional and corporate resources. Operational Services are delivered by OCWA staff that live and work in the surrounding area.

OCWA operates facilities in compliance with applicable regulations. The facility has comprehensive manuals detailing operations, maintenance, instrumentation, and emergency procedures. All procedures are treated as active documents, with annual reviews.

OCWA has additional "Value Added" and operational support services that the Corporation of the Municipality of Tweed benefits from including:

- Access to a network of operational compliance and support experts at the regional and corporate level, as well as affiliated programs that include the following:
  - Quality & Environmental Management System, Occupational Health & Safety System and an internal compliance audit system.
  - Process Data Collection (PDC) and PDM (WISKI) facility operating information repository, which consolidates field data, online instrumentation, and electronic receipt of lab test results for reporting, tracking and analysis.
  - Work Management System (WMS) tracks and reports maintenance activities, and creates predictive and preventative reports.
  - WonderWare wide-area SCADA system allows for process optimization and data logging, process trending, remote alarming and optimization of staff time.
- Client reporting which includes operational data, equipment inventory, financial statements, maintenance work orders, and capital status reports
- Site-Specific Contingency Plans and Standard Operating Procedures
- Use of accredited laboratories
- Access to a network of operational compliance and support experts at the hub, region and corporate level
- Additional support in response to unusual circumstances, and extra support in an emergency.
- Use of sampling schedules for external laboratory sampling

System Process Description

Raw Source

Raw water sources for the Tweed Drinking Water System are from two separate groundwater wells. The main service well is the Crookston Well or Well #3, Well #1 is only utilized as an emergency stand-by well.

Treatment

No treatment exists at the Well #1 pump house. In the event that this standby well is needed to be put into operation, it is designed to pump water to the Well 3 treatment subsystem for further treatment and disinfection. Well #3 subsystem is equipped with submersible pumps ultraviolet light for primary disinfection and sodium hypochlorite for secondary disinfection. Well #3 (Crookston) has a nitrate uranium removal system (ion exchange). The facility is equipped with on-line, alarmed continuous monitoring for treated water free chlorine residual and turbidity and distribution system free chlorine residual. The facility also contains a well pump lock out system in the case of disinfection failure.

Treatment Chemicals used during the reporting year:

Chemical Name	Use	Supplier
Sodium Chloride	Softener	Sifto Canada Corp
Sodium Hypochlorite	Disinfection	Brenntag

Summary of Non-Compliance

Adverse Water Quality Incidents

Date	AWQI #	Cause			Corrective Action Taken
		Parameter	Result	Exceedance of	
June 18, 2018	139843	Loss of Pressure	0.0	0.0	Boil water advisory was put in place. All hydrants within the distribution were flushed; chlorine residuals and two sets of bacti sample were taken 24-48 hours apart at designated locations for representation of the system.
June 28, 2018	140101	Sodium	25.1	20.0	As per Reg. 170/03 the operating authority collected a re-sample and retest of the location.

Non-Compliance

Legislation	requirement(s) system failed to meet	duration of the failure (i.e. date(s))	Corrective Action	Status
N/A				

Non-Compliance Identified in a Ministry Inspection:

Ministry of Environment Inspection Rating: **97.03%**

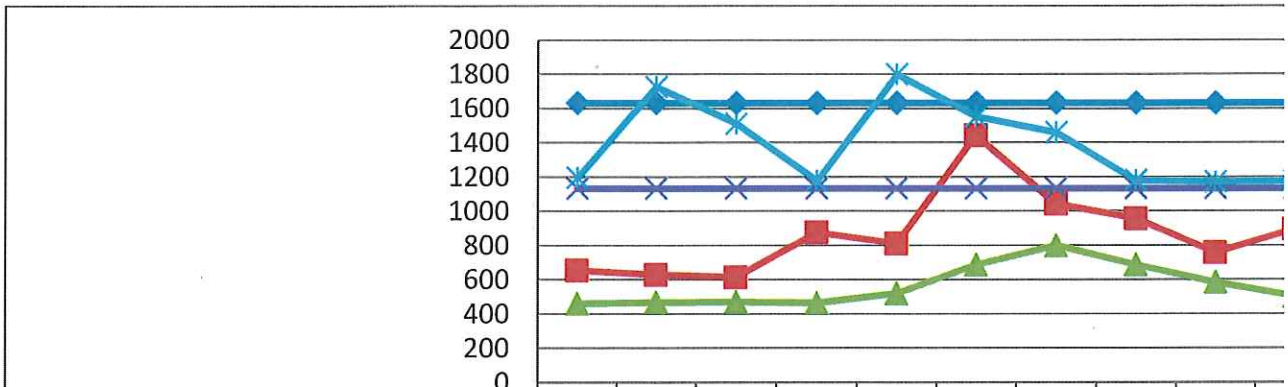
Legislation	requirement(s) system failed to meet	duration of the failure (i.e. date(s))	Corrective Action	Status
Municipal Drinking Water Licence	31(1) No person shall, or (b) use or operate a municipal drinking-water system that was established before or after this section comes into force except under the authority of and in accordance with an approval under this Part or municipal drinking-water licence. 2002, c. 32, s. 31 (1).	August 27th & August 28th	Completion of a distribution maintenance log sheet will be completed by the operation authority and/or the Municipality during any future maintenance activities.	Complete

Flows

The Tweed Drinking Water System is has a rated capacity of 1633 m3/day.

Raw Water Flows – RW3

The Raw Water flows are regulated under the Permit to Take Water.

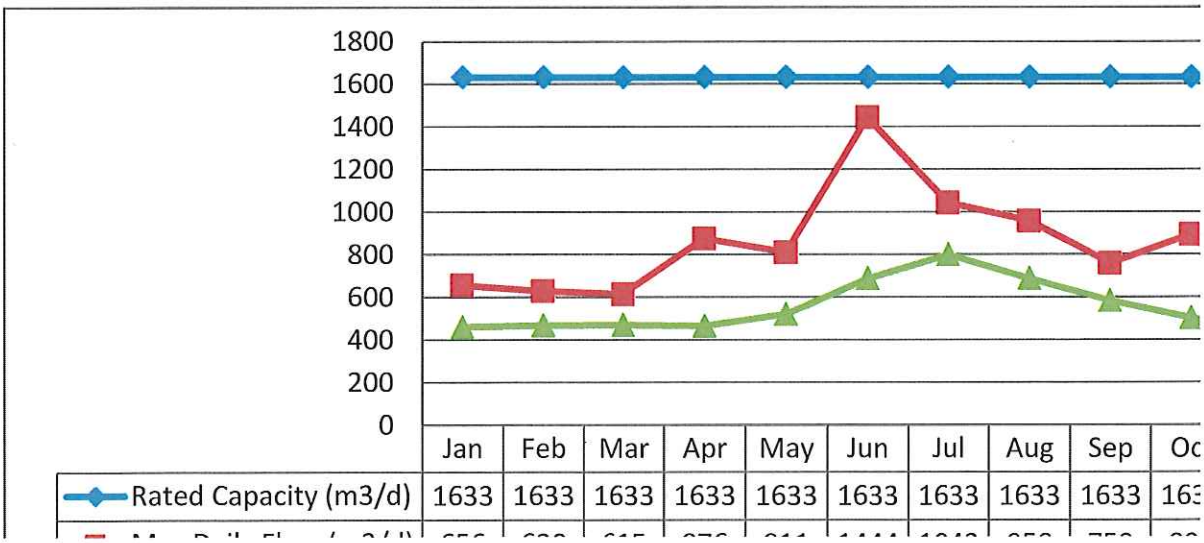


	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	C
PTTW Max Allowable (m3/d)	1633	1633	1633	1633	1633	1633	1633	1633	1633	1(
Max Flow (m3/d)	656	630	615	876	811	1444	1043	958	759	8
Avg (m3/d)	461	468	470	465	520	688	800	688	584	5
PTTW Max Allowable Peak Flow	1134	1134	1134	1134	1134	1134	1134	1134	1134	1(

The above table shows there were exceedances in instantaneous peak flow rate (L/min) these occurrences were caused during pump start-up/pump to waste. The significant spike in May was due to scheduled Flow Meter calibration. The significant spike in June was due to a low pressure within the distribution system, which resulted in re-filling the water tower.

Treated Water Flows - TW

The Treated Water flows are regulated under the Municipal Licence.



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oc
Rated Capacity (m3/d)	1633	1633	1633	1633	1633	1633	1633	1633	1633	163

Regulatory Sample Results Summary

- RW1 =Raw Water Well 1
- RW3 = Raw Water Well 3
- TW=Treated Water
- DW=Distribution Water

Microbiological Testing

Location	Number of Samples	E.coli Results (min) - (max)	Total Coliform Results (min) – (max)	Number of HPC Samples	HPC Results (min) - (max)
Raw Water – RW 1	52	0 - 0	0 - 2	~	~
Raw Water – RW 3	52	0 - 0	0 - 1	~	~
Treated Water - TW	53	0 - 0	0 - 0	51	0 – 1
Distribution - DW	135	0 - 0	0 - 0	130	0 - 42

Operational Testing

On-Line

Parameter	Range of Results (min # - max #)
Treated Free Chlorine	0.00 – 9.64 mg/L*
Distribution Free Chlorine	0.0 – 4.99 mg/L*
Treated Water Fluoride	Fluoride is not added at this facility

*Instrument spikes and dips recorded by on-line instrumentation were a result of air bubbles and various maintenance and calibration activities. Power interruptions may also cause an instrument reading to drop to zero. All events are reviewed for compliance with O. Reg. 170/03 and if warranted, are reported to the Ministry of Environment as Adverse Water Quality Incidents

In-House

Parameter	# of grab samples taken	Range of Results (min # - max #)
Raw Well 1 Turbidity	12	0.35 – 1.56 NTU
Raw Well 1 UVT	12	95.7 – 98.5 %
Raw Well 3 Turbidity	12	0.14 - 0.47 NTU
Raw Well 3 UVT	12	95.5 – 98.7 %
Treated Free Chlorine	54	1.36 – 2.6 mg/L
Distribution Free Chlorine	137	0.42 – 2.15 mg/L

Laboratory - Reg. 170/03

Parameter	# of grab samples taken	Range of Results (min # - max #)
Treated Well 3 Uranium	4	4.38-6.49 ug/L
Treated Well 3 Fluoride	4	0.51 – 0.89 mg/L
Distribution Uranium	1	4.38 ug/L

Additional Legislated Samples

Legal Document	Date of Issuance	Parameter		# of grab samples taken	Range of Results (min # - max #)
PTTW # 4464-A9NRHH Section 4 (4.3.1)	May 10, 2016	Raw Well 1	Ammonia	4	0.04 – 0.06 mg/L
			Uranium	4	346 – 449 ug/L
			Nitrate	4	2.40 – 3.35mg/L
			Nitrite	4	0.18 – 0.21 mg/L
		Raw Well 3	Ammonia	4	0.04 – 0.05 mg/L
			Uranium	4	18.9 – 23.7 ug/L
			Nitrate	4	3.54 – 4.27 mg/L
			Nitrite	4	0.003 – 0.003 mg/L

Lead Sampling

The Lead Sampling Program is required under O. Reg 170/03. This system qualified for the plumbing exemption.

Location	Date	Lead	pH	Alkalinity (mg/L) as CACO3
	Limit/Ranges	***10***	***6.5-8.5***	***30-500***
Hydrant #13	10-Apr-17	0.02	7.95	248
Hydrant #88		0.19	7.99	249
Hydrant #13	09-Oct-18	0.08	8.28	268
Hydrant #88		<0.01	8.22	262

Inorganic Parameters

- MAC = Maximum Allowable Concentration as per O. Reg 169/03
- BDL = Below the laboratory detection level
- Note: Fluoride and Sodium are only required to be tested every 60 months.

TREATED WATER	Sample Date	Sample Result	MAC	No. of Exceedances	
				MAC	1/2 MAC
Antimony: Sb (ug/L) - TW3	2018/03/12	0.29	6	No	No
Arsenic: As (ug/L) - TW3	2018/03/12	1.4	25	No	No
Barium: Ba (ug/L) - TW3	2018/03/12	431.0	1000	No	No
Boron: B (ug/L) - TW3	2018/03/12	22.0	5000	No	No
Cadmium: Cd (ug/L) - TW3	2018/03/12	0.005	5	No	No
Chromium: Cr (ug/L) - TW3	2018/03/12	1.01	50	No	No
Mercury: Hg (ug/L) - TW3	2018/03/12	<MDL 0.01	1	No	No
Selenium: Se (ug/L) - TW3	2018/03/12	0.3	50	No	No
Uranium: U (ug/L) - TW3	2018/10/09	5.76	20	No	No
Additional Inorganics					
Uranium: U (ug/L) - TW3	2018/01/08	6.49	20	No	No
Uranium: U (ug/L) - TW3	2018/04/03	4.38	20	No	No
Uranium: U (ug/L) - TW3	2018/07/16	5.48	20	No	No
Uranium: U (ug/L) - TW3	2018/10/09	5.76	20	No	No
Fluoride (mg/L) - TW3	2018/01/08	0.89	1.5	No	Yes
Fluoride (mg/L) - TW3	2018/04/03	0.51	1.5	No	No
Nitrite (mg/L) - TW3	2018/01/08	<MDL 0.003	1	No	No
Nitrite (mg/L) - TW3	2018/04/03	<MDL 0.003	1	No	No
Nitrite (mg/L) - TW3	2018/07/16	<MDL 0.003	1	No	No
Nitrite (mg/L) - TW3	2018/10/09	<MDL 0.003	1	No	No
Nitrate (mg/L) - TW3	2018/01/08	3.69	10	No	No
Nitrate (mg/L) - TW3	2018/04/03	3.78	10	No	No
Nitrate (mg/L) - TW3	2018/07/16	4.23	10	No	No
Nitrate (mg/L) - TW3	2018/10/09	4.06	10	No	No
60 Month Samples					
Fluoride (mg/L) - TW3	2018/06/25	0.67	1.5	No	No
Sodium (mg/L) - TW3	2018/06/25	25.1	20	Yes	Yes

*Uranium typically exceeds half of the maximum acceptable concentration (1/2 MAC) as these parameters are considered naturally occurring. To comply with Regulation 170/03 sampling is increased from annually to quarterly. There is no duty to report ½ MAC exceedances; Duty to report only occurs if we exceed the MAC.

Organic Parameters

- MAC = Maximum Allowable Concentration as per O.Reg 169/03
- BDL = Below the laboratory detection level

Parameter	Sample Date	Result Value	MAC	Exceedance	
				MAC	½ MAC
Alachlor (ug/L) - TW3	2018/03/12	<MDL 0.02	5.00	No	No
Atrazine + N-dealkylated metabolites (ug/L) - TW3	2018/03/12	0.04	5.00	No	No
Azinphos-methyl (ug/L) - TW3	2018/03/12	<MDL 0.05	20.00	No	No
Benzene (ug/L) - TW3	2018/03/12	<MDL 0.32	1.00	No	No
Benzo(a)pyrene (ug/L) - TW3	2018/03/12	<MDL 0.004	0.01	No	No
Bromoxynil (ug/L) - TW3	2018/03/12	<MDL 0.33	5.00	No	No
Carbaryl (ug/L) - TW3	2018/03/12	<MDL 0.05	90.00	No	No
Carbofuran (ug/L) - TW3	2018/03/12	<MDL 0.01	90.00	No	No
Carbon Tetrachloride (ug/L) - TW3	2018/03/12	<MDL 0.16	2.00	No	No
Chlorpyrifos (ug/L) - TW3	2018/03/12	<MDL 0.02	90.00	No	No
Diazinon (ug/L) - TW3	2018/03/12	<MDL 0.02	20.00	No	No
Dicamba (ug/L) - TW3	2018/03/12	<MDL 0.2	120.00	No	No
1,2-Dichlorobenzene (ug/L) - TW3	2018/03/12	<MDL 0.41	200.00	No	No
1,4-Dichlorobenzene (ug/L) - TW3	2018/03/12	<MDL 0.36	5.00	No	No
1,2-Dichloroethane (ug/L) - TW3	2018/03/12	<MDL 0.35	5.00	No	No
1,1-Dichloroethylene (ug/L) - TW3	2018/03/12	<MDL 0.33	14.00	No	No
Dichloromethane (Methylene Chloride) (ug/L) - TW3	2018/03/12	<MDL 0.35	50.00	No	No
2,4-Dichlorophenol (ug/L) - TW3	2018/03/12	<MDL 0.15	900.00	No	No
2,4-Dichlorophenoxy acetic acid (2,4-D) (ug/L) - TW3	2018/03/12	<MDL 0.19	100.00	No	No
Diclofop-methyl (ug/L) - TW3	2018/03/12	<MDL 0.4	9.00	No	No
Dimethoate (ug/L) - TW3	2018/03/12	<MDL 0.03	20.00	No	No
Diquat (ug/L) - TW3	2018/03/12	<MDL 1.0	70.00	No	No
Diuron (ug/L) - TW3	2018/03/12	<MDL 0.03	150.00	No	No
Glyphosate (ug/L) - TW3	2018/03/12	<MDL 1.0	280.00	No	No
Malathion (ug/L) - TW3	2018/03/12	<MDL 0.02	190.00	No	No
Metolachlor (ug/L) - TW3	2018/03/12	<MDL 0.01	50.00	No	No
Metribuzin (ug/L) - TW3	2018/03/12	<MDL 0.02	80.00	No	No
Monochlorobenzene (Chlorobenzene) (ug/L) - TW3	2018/03/12	<MDL 0.3	80.00	No	No
Paraquat (ug/L) - TW3	2018/03/12	<MDL 1.0	10.00	No	No
PCB (ug/L) - TW3	2018/03/12	<MDL 0.04	3.00	No	No
Pentachlorophenol (ug/L) - TW3	2018/03/12	<MDL 0.15	60.00	No	No
Phorate (ug/L) - TW3	2018/03/12	<MDL 0.01	2.00	No	No
Picloram (ug/L) - TW3	2018/03/12	<MDL 1.0	190.00	No	No
Prometryne (ug/L) - TW3	2018/03/12	<MDL 0.03	1.00	No	No
Simazine (ug/L) - TW3	2018/03/12	<MDL 0.01	10.00	No	No
Terbufos (ug/L) - TW3	2018/03/12	<MDL 0.01	1.00	No	No

Tetrachloroethylene (ug/L) - TW3	2018/03/12	<MDL 0.35	10.00	No	No
2,3,4,6-Tetrachlorophenol (ug/L) - TW3	2018/03/12	<MDL 0.2	100.00	No	No
Triallate (ug/L) - TW3	2018/03/12	<MDL 0.01	230.00	No	No
Trichloroethylene (ug/L) - TW3	2018/03/12	<MDL 0.44	5.00	No	No
2,4,6-Trichlorophenol (ug/L) - TW3	2018/03/12	<MDL 0.25	5.00	No	No
MCAP (ug/L) - TW3	2018/03/12	<MDL 0.12	45.00	No	No
Trifluralin (ug/L) - TW3	2018/03/12	<MDL 0.02	1.00	No	No
Vinyl Chloride (ug/L) - TW3	2018/03/12	<MDL 0.17	100.00	No	No
DISTRIBUTION WATER					
Trihalomethane: Total (ug/L) Annual Average - DW	2018	19.75	100.00	No	No
HAA Total (ug/L) Annual Average - DW	2018	6.85		N/A	N/A

Maintenance Summary

OCWA uses a risk-based preventative maintenance framework that ensures assets are maintained to manufacturer's and/or industry standards. Maintenance is completed using various tools and operational supports.

OCWA uses a Workplace Maintenance System (WMS). WMS is a maintenance tracking system that can generate work orders as well as give summaries of completed and scheduled work. During the year, the operating authority at the facility generates scheduled work orders on a weekly, monthly and annual basis. The service work is recorded in the work order history. This ensures routine and preventive maintenance is carried out. Emergency and capital repair maintenance is completed and added to the system.

Capital projects are listed and provided to the The Corporation of the Municipality of Tweed in the form of a "Capital Forecast". This list is developed by facility staff and provides recommendations for facility components requiring upgrading or improvement.

Preventative/Weekly Maintenance Work Orders Completed	320
Operational Maintenance Work Orders Completed	23
Capital Maintenance Work Orders Completed	3

Maintenance Highlights: major expenses incurred to install, repair or replace required equipment

Annual UV Calibration and Maintenance	$942
Wiring Control Repairs	$645
Generator Battery/Charger Replacement	$676
Compressor Starter Replacement – Emergency Repair	$ 592

QEMS

A Systems Audit was conducted by QMI-SAI Canada Limited on Jan 11, 2018. The Corporation of the Municipality of Tweed's Quality Management System conforms to the Standard.

Water Taking and Transfer Data

Data was submitted electronically on January 7, 2019 to the Ministry of the Environment and Climate Change for the reporting period of January 1, 2018 – December 31, 2018 under Permit to Take Water #4464-A9NRHH.