Drinking Water Quality Management System

Operational Plan For Stirling-Rawdon Drinking Water System

TABLE OF REVISIONS

Rev Level	Date	Section	Change	Approved by
1	Sept 4 2018	6.1.2	Changed Treated Water Standpipe address from # 221 to 237 Baker St. to reflect new address changes.	Matthew Richmond
2	Oct 19 2018	7.0 & 8.0	Made changes to risk assessment outcomes to reflect DWQMS version 2.0 hazardous events.	Matthew Richmond
3	Jan 30 2019	7.0 & 8.0	Made changes to risk assessment outcomes to reflect DWQMS version 2.0 hazardous events.	Matthew Richmond
4	Nov 26, 2019	5.7	Changed MOECC to MOECP	Matthew Richmond
4	Nov 26, 2019	5.10	Changed risk assessment outcomes to be reviewed every calendar.	Matthew Richmond
4	Nov 26, 2019	Appendix 1	Updated water infrastructure map to reflect recent growth	Matthew Richmond
5	Jan 21, 2020	Changes to footer of pages.	Updated footer and OP revision #	Matthew Richmond
5	Jan 21, 2020	8.1	Removed backflow prevention as a critical control point.	Matthew Richmond
5	Jan 21, 2020	8.0	Removed distribution chlorine analyzer from	Matthew Richmond

			table two as a critical control point	

5	Jan 21, 2020	9.2.1	Added Bullet to clarify that the CAO position is the owner representative.	Matthew Richmond
6	August 20, 2020	Appendix 1	Updated infrastructure map to reflect additional infrastructure	Matthew Richmond
6	August 20, 2020	6.1.4	Updated infrastructure asset quantities to reflect additional infrastructure	Matthew Richmond
8	Nov 24, 2022	Appendix 1	Updated infrastructure asset quantities to reflect additional infrastructure. Updated Map to reflect new assets.	Matthew Richmond
9	Jan 11, 2023	3.0,4.0, 6.1.1, 8, 9.5 & 20	Updated to reflect the Chief Operator to be the Top Management Rep and the DWQMS Rep to be the responsibility of the Municipal Management Assistant, Also changed process flow diagram to reflect well # 6.	Matthew Richmond/ Tracey Krolicki
10	September 29, 2023	6.1.7	Updated raw water characterization to reflect recent analysis.	Matthew Richmond/ Tracey Krolicki
11	March 4, 2024	3.0	Removed Representative from Top Management and added Mayor as Owner Representative.	Tracey Krolicki

11	March 4, 2024	8.0	Removed Representative from Top Management	Tracey Krolicki
12	December 9, 2024	6.1.4	Updated number of fire hydrants, valves distribution pipe.	Tracey Krolicki/Matthew Richmond
13	January 6, 2026	All	Updated font to Verdana for AODA Standard, Updated water valve, hydrant, watermain quantities. Updated rick assessment and risk assessment outcomes.	Tracey Krolicki/Matthew Richmond
14	September 8, 2026	All	Updated WTP process diagram, adjusted standpipe volume to actual, updated distribution mapping	Matthew Richmond

TABLE OF CONTENTS

1.0 Quality Management System 1
2.0 Quality Management System Policy 1
3.0 Commitment And Endorsement Of Operational Plan 2
4.0 Quality Management System Representative 3
5.0 Document And Record Control 3
6.0 Drinking-Water System 5
7.0 Risk Assessment Procedure 20
8.0 Risk Assessment And Risk Assessment Outcomes Procedure 21
9.0 Organizational Structure, Roles, Responsibilities And Authorities 34
10.0 Competencies 38
11.0 Personnel Coverage 39
12.0 Communication 40
13.0 Essential Supplies And Services 41
14.0 Review And Provision Of Infrastructure 42
15.0 Infrastructure Maintenance, Rehabilitation And Renewal 43
16.0 Sampling, Testing And Monitoring 44
17.0 Measurement & Recording Equipment Calibration Maintenance 45
18.0 Emergency Management 46
19.0 Internal Audit 47
20.0 Management Review 48
21.0 Continual Improvement 49
22.0 Definitions 51
Appendix 1 53
Appendix 2 55

1.0 Quality Management System

Purpose

The purpose of this Operational Plan is to describe in detail the Quality Management System developed and implemented by the Township of Stirling-Rawdon for the operation of the drinking water system in Stirling. The policy and procedures outlined in this Operational Plan are in accordance with the requirements of the Drinking Water Quality Management Standard (DWQMS) Version 2.0.

Scope

The Operational Plan covers all activities and employees associated with the operations and production of safe drinking water for the Township of Stirling-Rawdon. The Operational Plan has been developed to meet the requirements of the DWQMS and as a requirement under the Ontario Drinking Water Licensing Program directed by The Safe Drinking Water Act. For the purpose of the DWQMS the Township of Stirling-Rawdon has been designated as the Owner of the Municipal Drinking Water System.

Related Documents

Drinking Water Quality Management Standard Version 2.0 – Element 1
The Safe Drinking Water Act - 2002

2.0 Quality Management System Policy

The Environmental Department Water Division is committed to managing the drinking water system of The Township of Stirling-Rawdon by providing an efficient and effective system of water mains, treatment plant and elevated standpipe and appurtenances all in accordance with the Ontario Drinking Water Protection Regulations and is committed to the maintenance and continuous improvement of its Drinking Water Quality Management System for the production, treatment and distribution of a safe supply of potable water while striving for the adherence to regulations and maintaining consumer confidence in the Municipal water supply. Consumer confidence in the drinking water quality shall be achieved through a proactive approach to meet applicable drinking water legislation, regulations and standards. Drinking water quality is ensured by competent employees who are dedicated to providing reliable, safe drinking water to the community of Stirling-Rawdon.

3.0 Commitment and Endorsement of Operational Plan

In accordance with section 3.0 of the Drinking Water Quality Management Standard, the Chief Administrative Officer (CAO) and the Mayor, as the representative of the Owner of the drinking water system for the Township of Stirling-Rawdon and Top Management of the Water Division, support the implementation and maintenance of a Drinking Water Quality Management System (DWQMS), as documented in this Operational Plan. This commitment by the Owner and Top Management extends beyond agreement in principle to active participation in the development and/or review of policies that promote continual improvement. Endorsement by the Owner and Top Management acknowledges the need for and supports the provision of sufficient resources to maintain the DWQMS. Communicating the DWQMS is explained in SOP# 8 DWQMS Communication.

OWNER

Township of Stirling-Rawdon — Date: September 22/26

CAO

(Owner Representative)

Township of Stirling-Rawdon — Date: September 22, 2026

MAYOR

(Owner Representative)

TOP MANAGEMENT

Township of Stirling-Rawdon — Date: Sept 22, 2026.

Chief Operator of Water/ Wastewater

(Top Management)

4.0 Quality Management System Representative

Quality Management System Representative

The Municipal Management Assistant for the Township of Stirling-Rawdon was appointed to the role of the Quality Management System Representative and QMS Implementation Lead. As the QMS Representative, the Municipal Management Assistant has both the responsibility and authority to:

- Ensure that the processes and procedures required by the DWQMS are established, implemented and maintained;
- Ensure that the most current version of documents required by the DWQMS are in use at all times;
- Ensure that all personnel are aware of applicable current regulatory requirements within the operation of the drinking water system;
- Ensure the promotion of awareness and the effectiveness of the DWQMS throughout the operating authority;
- Report to Top Management on the performance of the QMS and any need for improvement.

5.0 Document and Record Control

The Township of Stirling-Rawdon has established a number of document and records control procedures that describe how documents required by the quality management system (QMS) are kept current, legible, readily identifiable, retrievable, stored, protected, retained, and disposed of.

Additionally, The Township of Stirling-Rawdon describes how records are kept legible, readily identifiable, retrievable, as well as stored, protected, retained and disposed of. The documents and record control procedure is detailed in SOP# 09

Documents in the scope of this procedure are:

- Operational Plan
- Drinking Water Policy
- Standard Operating Procedures relating to the DWQMS
- WTP Operator and Maintenance Manual
- WTP Emergency Response Plans
- WTP and Water Distribution Forms
- Training material for DWQMS
- Water Treatment Process Schematic
- Document and Records Control Retention Schedule

Records in the scope of this procedure are:

- Operator Certificates
- Municipal Drinking Water Licence and Drinking Water Works Permit (Licenses and Certificates)
- Laboratory testing results (Internal and External)
- Monitoring records
- Legislative Regulations
- Associated meeting minutes
- Operator log book

Related Documents

Drinking Water Quality Management Standard - Element 5

SOP-09 Document and Record Control

Document Change Control Procedure

The document and records control procedure are outlined in detail in the SOP-09.

6.0 Drinking-Water System

Purpose

The purpose of this procedure is to describe the drinking water system owned and operated by the Township of Stirling-Rawdon Water and wastewater Department. This outline documents a description of the drinking water system as prescribed by the DWQMS.

Scope

The Township of Stirling-Rawdon has ownership, full command and control of the municipal drinking water system, including the treatment plant, storage, trunk and distribution water mains, appurtenances and individual water services up to the private property line. Water meters within the buildings, used as consumption measurement devices for billing purposes, are also owned by the Municipality.

Responsibilities and Authorities

It is the responsibility of the QMS Representative to ensure that this procedure is kept up-to-date. Any changes to the drinking water system must be changed in accordance with the document control procedures shown in SOP#9 Document and Records Control of the DWQMS.

Related Documents

Drinking Water Quality Management Standard – Element 6
Document and Records Control SOP#9

Procedure

6.1 Stirling

6.1.1 Water Treatment Plant

The water treatment plant (WTP) is owned by the Township of Stirling-Rawdon. The Stirling groundwater well supply system is a Class 1 Facility consisting of four active wells. Well 1 is a 1.5 diameter corrugated steel pipe 6.1 meters deep, the well was dug in 1958 and is located in the control building which measures 4.8 meters wide and 6.9 meters long equipped with a submersible pump rated at 1,296 m3/d at a total dynamic head of 71 meters with an 18.7 kW motor with a compound flow meter and piping.

Well 3 is a 250 mm diameter, 12.0 meter deep drilled groundwater well which was constructed in 1985. This well is located 60 meters southwest of the intersection of Holly Drive and Elizabeth Street, 10 meters southwest of the pumping station, equipped with a submersible pump which is rated at 1,296 m3/d at a 71 meter total dynamic head with an 18.7 kW motor, a 100 mm diameter water main connected to a common header in the pumping station with a compound flow meter.

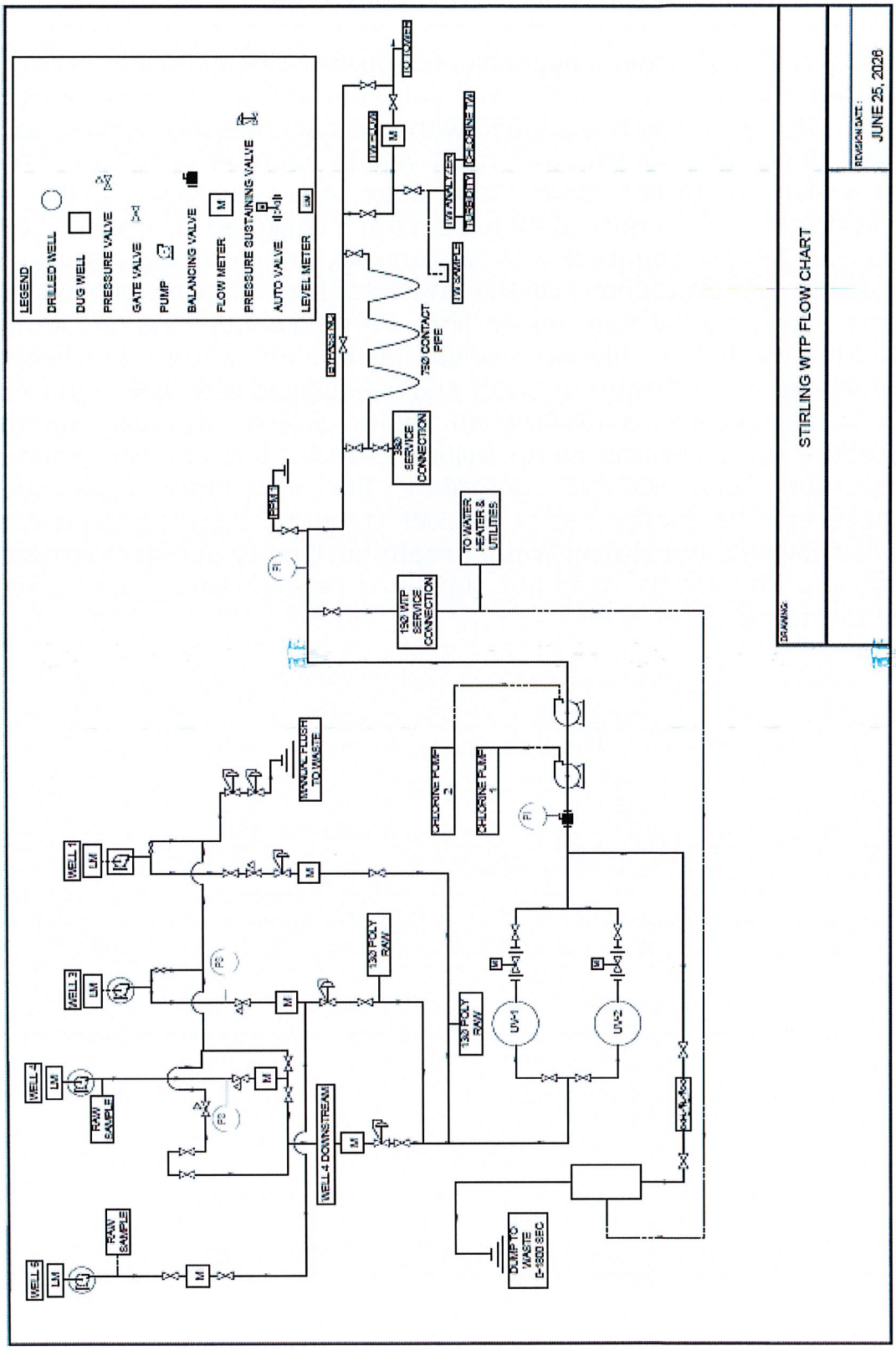
Wells 4&5 were both constructed in 1991 and are groundwater wells. Well 4 consists of a 200 mm diameter, 13.1 meter deep drilled groundwater well located approximately 155 meters southwest of the intersection of Holly Drive and Elizabeth Street, 110 meters southwest of the pumping station on the edge of the Rawdon Creek Valley equipped with a submersible pump rated at 1944 m3/d at a total dynamic head of 71 meters with a 22.4 kW electric motor connected to the pumping station by a 150 mm diameter water main and flow meter. Well 5 was decommissioned by a licensed well contractor on November 27, 2025.

Well 6 was constructed in December 2017 and consists of a 150 mm diameter casing, 13.6 meter deep drilled groundwater well located approximately 160 meters southwest of the intersection of Holly Drive and Elizabeth St, 115 meters southwest of pumping station. The well is equipped with a submersible pump rated at 650 m3/d at a total dynamic head of 71 meters with a 11.2 kW electric motor. The well is connected

to the pumping station via a 75 mm diameter water main and flow meter. The well is equipped with a level probe for measurement.

This facility utilizes sodium hypochlorite consisting of a 200 liter capacity tank, two chemical feed pumps (one duty, one standby) with a capacity of 4.80 L/h. The panel is equipped with two backpressure valves, each set at 120 psi, and two pressure relief valves, each set at 140 psi. Two ultra violet disinfection units (one duty, one standby) capable of supplying a minimum dose of 40 mJ/cm2 at a designed flowrate of 1866 L/min (31.25 L/S) complete with all controls, monitors and alarms. As well as two particle counters on the raw water line complete with system bypass valve. This system has on-line, alarmed continuous monitoring of treated water free chlorine residual, distribution water free chlorine residual and treated water turbidity and is equipped with well pump lock outs in the event of a disinfection failure. SOP# 23 deals with the procedure for a chlorine pump failure. SOP# 14 deals with Primary Disinfection and SOP#15 describes the secondary disinfection procedures. The facility has a 160kW stand-by diesel generator to provide power to the Stirling Water Treatment Facility during emergency situations. This facility does not supply or receive water to and from other systems.

Process Flow Chart Stirling Water Treatment Facility



6.1.2 Water Storage Tanks and Reservoirs

Treated water is stored at an elevated standpipe located at # 237 Baker Street in Stirling. The water storage capacity in the standpipe is 2054 m^3 (2.054 ML).

6.1.3 Water Booster Stations

There are no individual pressure zones in Stirling. The distribution system of the town is supplied from the WTP's well pumps or from the standpipe if the pumps are cycled off. Post-chlorination is done before the water leaves the plant.

6.1.4 Water Distribution Piping System

The Stirling Water Distribution System consists of 949 service connections, 97 fire hydrants, 258 main and hydrant valves, and water mains ranging from 150mm to 300mm in diameter. The water mains total distance end to end is 18.23 kilometers. Its material varies between PVC, Cast Iron and Ductile Iron.

6.1.5 Monitoring

The following parameters are monitored on a continuous basis at the WTP:

- Treated Flow
- Raw water flows
- Treated Water Turbidity
- Chlorine residuals Pre/ Post
- Water standpipe level
- Treated Water Pressure
- UV dosage and functions

6.1.6 Raw Water Supply

The Stirling WTP draws its water from a field of groundwater wells that are deemed GUDI with effective in-situ. There are four wells in use and produce sufficient water for the community at present in accordance with Drinking Water Works Permit Number 167-201 dated September 1, 2026 and the Drinking Water Licence Number 167-101. Raw water characteristics show elevated concentrations of manganese and colour however, it would appear that chlorine oxidation of iron/manganese is achievable, since the water distribution system does not show the presence of iron/manganese or high turbidity's which exceed the ODWS allowance of 5 NTU at ultimate point of use within the distribution system. Raw water is sampled from the raw water sample lines on each corresponding well.

6.1.7 General Characteristics of Raw water

A brief description of the water characteristics for Inorganic Parameters as outlined below in the table. The summary provides an overview of 2022.

Inorganic Parameters							
Parameter	Units	Sample Date	Sample Location	Result Value	MAC	Excedance	
						MAC	1/2 MAC
Antimony	ug/L	Oct 11/22	TW	0.60	6	No	No
Arsenic	ug/L	Oct 11/22	TW	0.30	25	No	No
Barium	ug/L	Oct 11/22	TW	296	1000	No	No
Boron	ug/L	Oct 11/22	TW	32	5000	No	No
Cadmium	ug/L	Oct 11/22	TW	0.003	5	No	No
Chromium	ug/L	Oct 11/22	TW	0.14	50	No	No
Mercury	ug/L	Oct 11/22	TW	0.01	1	No	No
Selenium	ug/L	Oct 11/22	TW	0.33	5	No	No
Uranium	ug/L	Oct 11/22	TW	1.620	20	No	No
Fluoride	mg/L	May 15/18	TW	0.13	1.5	No	No
Nitrite	mg/L	Jan 18/22	TW	0.003	1.0	No	No
Nitrite	mg/L	Apr 5/22	TW	0.003	1.0	No	No
Nitrite	mg/L	Aug 12/22	TW	0.003	1.0	No	No
Nitrite	mg/L	Oct 11/22	TW	0.003	1.0	No	No
Nitrate	mg/L	Jan 18/22	TW	0.768	10.0	No	No
Nitrate	mg/L	Apr 5/22	TW	1.16	10.0	No	No
Nitrate	mg/L	Aug 12/22	TW	1.64	10.0	No	No
Nitrate	mg/L	Oct 11/22	TW	1.43	10.0	No	No

A brief description of water characteristics for Organic Parameters as outlined below in the table. The summary provides an overview of 2022.

Organic Parameters							
Parameter	Units	Sample Date	Sample Location	Result Value	MAC	Exceedance	
						MAC	1/2 MAC
Alachlor	ug/l	Oct 11/22	TW	0.02	5	No	No
Atrazine + N-dealkylated metabolites	ug/l	Oct 11/22	TW	0.01	5	No	No
Azinphos-Methyl	ug/l	Oct 11/22	TW	0.05	20	No	No
Benzene	ug/l	Oct 11/22	TW	0.32	1	No	No
Benzo (a) pyrene	ug/l	Oct 11/22	TW	0.004	0.01	No	No
Bromoxynil	ug/l	Oct 11/22	TW	0.33	5	No	No
Carbaryl	ug/l	Oct 11/22	TW	0.05	90	No	No
Carbofuran	ug/l	Oct 11/22	TW	0.01	90	No	No
Carbon Tetrachloride	ug/l	Oct 11/22	TW	0.17	5	No	No
Chlorpyrifos	ug/l	Oct 11/22	TW	0.02	90	No	No
Diazinon	ug/l	Oct 11/22	TW	0.02	20	No	No
Dicamba	ug/l	Oct 11/22	TW	0.2	120	No	No
1,2-Dichlorobenzene	ug/l	Oct 11/22	TW	0.41	200	No	No
1,4 - Dichlorobenzene	ug/l	Oct 11/22	TW	0.36	5	No	No
1,2- Dichloroethane	ug/l	Oct 11/22	TW	0.35	5	No	No
1,1- Dichloroethylene	ug/l	Oct 11/22	TW	0.33	14	No	No
Dichloromethane (methylene Chloride)	ug/l	Oct 11/22	TW	0.35	50	No	No
2,4-Dichlorophenol	ug/l	Oct 11/22	TW	0.15	900	No	No
2,4-Dichlorophenoxy acetic acid)2,4-D)	ug/l	Oct 11/22	TW	0.19	100	No	No

Diclofop-methyl	ug/l	Oct 11/22	TW	0.4	9	No	No
Dimethoate	ug/l	Oct 11/22	TW	0.06	20	No	No
Diquat	ug/l	Oct 11/22	TW	1	70	No	No
Diuron	ug/l	Oct 11/22	TW	0.03	150	No	No
Glyphosate	ug/l	Oct 11/22	TW	1	280	No	No
Malathion	ug/l	Oct 11/22	TW	0.02	190	No	No
Metolachlor	ug/l	Oct 11/22	TW	0.01	50	No	No
Metribuzin	ug/l	Oct 11/22	TW	0.02	80	No	No
MCPA	ug/l	Oct 11/22	TW	0.00012	0.1	No	No
Monochlorobenzene Chlorobenzene)	ug/l	Oct 11/22	TW	0.3	80	No	No
Paraquat	ug/l	Oct 11/22	TW	1	10	No	No
PCB	ug/l	Oct 11/22	TW	0.04	3	No	No
Pentachlorophenol	ug/l	Oct 11/22	TW	0.15	60	No	No
Phorate	ug/l	Oct 11/22	TW	0.01	2	No	No
Picloram	ug/l	Oct 11/22	TW	1	190	No	No
Prometryne	ug/l	Oct 11/22	TW	0.03	1	No	No
Simazine	ug/l	Oct 11/22	TW	0.01	10	No	No
Terbufos	ug/l	Oct 11/22	TW	0.01	1	No	No
Tetrachloroethylene	ug/l	Oct 11/22	TW	0.35	10	No	No
2,3,4,6- Tetrachlorophenol	ug/l	Oct 11/22	TW	0.2	100	No	No
Triallate	ug/l	Oct 11/22	TW	0.01	230	No	No
Trichloroethylene	ug/l	Oct 11/22	TW	0.44	50	No	No
2,4,6-Trichlorophenol	ug/l	Oct 11/22	TW	0.25	5	No	No
Trifluralin	ug/l	Oct 11/22	TW	0.02	45	No	No
Vinyl Chloride	ug/l	Oct 11/22	TW	0.17	2	No	No

Trihalomethane Total	ug/l	Jan 18/22	DW	36	100	No	No
	ug/l	Apr 5/22	DW	51	100	No	No
	ug/l	Aug 12/22	DW	40	100	No	No
	ug/l	Oct 12/22	DW	23	100	No	No
	ug/l		DW	RAA= 37.50	100	No	No
Total Haloacetic Acids	ug/l	Jan 18/22	DW	5.3	80	No	No
	ug/l	Apr 5/22	DW	5.9	80	No	No
	ug/l	Aug 12/22	DW	5.3	80	No	No
	ug/l	Oct 12/22	DW	26.1	80	No	No
	ug/l			RAA= 10.65	80	No	No
60 months							
Sodium	mg/l	May 15 2018	TW	29.6	20	Yes	Yes
Fluoride	mg/l	May 15 2018	TW	0.13	1.5	No	No

- MAC = Maximum Acceptable Concentration
- AO/ OG = Aesthetic Objective / Operational Guideline

A brief description of water characteristics for the Microbiological Testing as outlined below in the table. The summary provides an overview of 2022.

Microbiological Testing					
Location	**Number of Samples**	**E.Coli Results (min) - (max)**	**Total Coliform Results (min) - (max)**	**Number of HPC Samples**	**HPC Results**
Raw – RW1	52	0-0	0-67	-	-
Raw – RW3	52	0-0	0-4	-	-
Raw – RW4	52	0-0	0-6	-	-
Raw – RW5	52	0-0	0-5	-	-
Treated - TW	52	0-0	0-0	52	0-1
Distribution - DW	156	0-0	0-0	156	0-20

TC-Total Coliforms
EC-Escherichia coli
HPC-Heterotrophic Plate Count

A brief description of Raw water characteristics as outlined below in the table. The summary provides an overview of samples collected in 2023.

Raw Water Characterization										
Parameter	**Units**	**Sample Date**	**Sample Location**	**Result Value Well #1**	**Result Value Well # 3**	**Result Value Well # 4**	**AO/OG**	**MAC**	**Exceedance**	
									MAC	1/2 MAC
UV Transmittance	%T	May 24/23	RW	92.4	92.1	91.3	-	-	No	No
Alkalinity	mg/L	May 24/23	RW	285	273	278	30-500	-	No	No
Colour	TCU	May 24/23	RW	3	3	3	5	-	No	No
Conductivity	us/cm	May 24/23	RW	877	835	837	-	-	No	No
pH		May 24/23	RW	8.04	8.06	7.97	6.5-8.5	-	No	No
Total Suspended Solids	mg/L	May 24/23	RW	2	3	2	-	-	No	No
Total Dissolved Solids	mg/L	May 24/23	RW	506	463	465	500	-	No	No
Turbidity	NTU	May 24/23	RW	0.25	0.8	0.4	5	1	No	Yes
Sulphide	ug/l	May 24/23	RW	6	6	6	50	-	No	No
Organic Nitrogen	mg/L	May 24/23	RW	0.05	0.05	0.08	0.15	-	No	No
Total Kjeldahl Nitrogen (N)	mg/L	May 24/23	RW	0.05	0.05	0.11	-	-	No	No
Ammonia + Ammonium (N)	mg/L	May 24/23	RW	0.04	0.04	0.04	-	-	No	No
Dissolved Organic Carbon	mg/L	May 24/23	RW	1	2	1	5	-	No	No
Chloride	mg/L	May 24/23	RW	110	94	92	250	-	No	No
Fluoride	mg/L	May 24/23	RW	0.17	0.15	0.15	-	1.5	No	No
Nitrite (as N)	mg/L	May 24/23	RW	0.003	0.003	0.003	-	1	No	No
Nitrate (as N)	mg/L	May 24/23	RW	2.35	2.29	2.02		10	No	No
Sulphate	mg/L	May 24/23	RW	29	30	28	500	-	No	No
Mercury	ug/l	May 24/23	RW	0.01	0.01	0.01		1	No	No
Hardness (CaCO3)	mg/L	May 24/23	RW	389	358	375	80-100	-	No	No
Aluminum	ug/l	May 24/23	RW	2	2	2	100	-	No	No
Silver	ug/l	May 24/23	RW	0.05	0.05	0.05	-	-	No	No
Arsenic	ug/l	May 24/23	RW	0.4	0.3	0.4	-	10	No	No
Boron	ug/l	May 24/23	RW	21	20	19	-	5000	No	No
Barium	ug/l	May 24/23	RW	379	259	306	-	1000	No	No
Beryllium	ug/l	May 24/23	RW	0.007	0.007	0.007	-	-	No	No

Calcium	mg/L	May 24/23	RW	128	117	124	-	-	No	No
Cadmium	ug/l	May 24/23	RW	0.005	0.003	0.003	-	5	No	No
Cobalt	ug/l	May 24/23	RW	0.063	0.041	0.046	-	-	No	No
Copper	ug/l	May 24/23	RW	6.8	6.4	3.6	1000	-	No	No
Chromium	ug/l	May 24/23	RW	0.24	0.12	0.11	-	50	No	No
Iron	ug/l	May 24/23	RW	14	7	7	300	-	No	No
Potassium	ug/l	May 24/23	RW	3.54	2.93	3.08	-	-	No	No
Magnesium	ug/l	May 24/23	RW	16.6	16.1	15.9	-	-	No	No
Manganese	ug/l	May 24/23	RW	1.84	0.8	7.79	50	-	No	No
Molybdenum	ug/l	May 24/23	RW	0.59	0.5	0.54	-	-	No	No
Nickel	ug/l	May 24/23	RW	0.5	0.4	0.4	-	-	No	No
Sodium	mg/L	May 24/23	RW	43.1	37.2	34	200	20	Yes	Yes
Phosphorus	ug/l	May 24/23	RW	0.017	0.02	0.017	-	-	No	No
Lead	ug/l	May 24/23	RW	0.2	0.16	0.05	-	10	No	No
Antimony	ug/l	May 24/23	RW	0.6	0.6	0.6	-	6	No	No
Selenium	ug/l	May 24/23	RW	0.42	0.32	0.29	-	50	No	No
Silicon	ug/l	May 24/23	RW	8080	7230	7910	-	-	No	No
Strontium	ug/l	May 24/23	RW	379	351	371	-	-	No	No
Thallium	ug/l	May 24/23	RW	0.005	0.005	0.005	-	-	No	No
Titanium	ug/l	May 24/23	RW	0.08	0.06	0.05	-	-	No	No
Uranium	ug/l	May 24/23	RW	1.73	1.61	1.55	-	20	No	No
Vanadium	ug/l	May 24/23	RW	0.33	0.28	0.3	-	-	No	No
Zinc	ug/l	May 24/23	RW	5	7	2	5000	-	No	No
Total Coliform	cfu/100ml	May 24/23	RW	0	0	1	-	0	Yes	Yes
E.Coli	cfu/100ml	May 24/23	RW	0	0	1	-	0	Yes	Yes
Heterotrophic Plate Count (HPC)	cfu/100ml	May 24/23	RW	1	0	6	-	-	No	No

A brief description of Raw water characteristics as outlined below in the table. The summary provides an overview of samples collected in 2023.

Raw Water Characterization									
Parameter	**Units**	**Sample Date**	**Sample Location**	**Result Value Well # 5**	**Result Value Well # 6**	**AO/OG**	**MAC**	**Exceedance**	
								MAC	1/2 MAC
UV Transmittance	%T	May 24/23	RW	91.6	94	-	-	No	No
Alkalinity	mg/L	May 24/23	RW	299	262	30-500	-	No	No
Colour	TCU	May 24/23	RW	3	3	5	-	No	No
Conductivity	us/cm	May 24/23	RW	842	673	-	-	No	No
pH		May 24/23	RW	7.99	7.97	6.5-8.5	-	No	No
Total Suspended Solids	mg/L	May 24/23	RW	2	2	-	-	No	No
Total Dissolved Solids	mg/L	May 24/23	RW	487	378	500		No	No
Turbidity	NTU	May 24/23	RW	0.25	0.7	5	1	No	Yes
Sulphide	ug/l	May 24/23	RW	6	6	50	-	No	No
Organic Nitrogen	mg/L	May 24/23	RW	0.2	0.05	0.15	-	No	No
Total Kjeldahl Nitrogen (N)	mg/L	May 24/23	RW	0.22	0.05	-	-	No	No
Ammonia + Ammonium (N)	mg/L	May 24/23	RW	0.04	0.04	-	-	No	No
Dissolved Organic Carbon	mg/L	May 24/23	RW	1	2	5	-	No	No
Chloride	mg/L	May 24/23	RW	98	57	250	-	No	No
Fluoride	mg/L	May 24/23	RW	0.14	0.14	-	1.5	No	No
Nitrite (as N)	mg/L	May 24/23	RW	0.003	0.003	-	1	No	No
Nitrate (as N)	mg/L	May 24/23	RW	1.93	1.59		10	No	No
Sulphate	mg/L	May 24/23	RW	25	20	500	-	No	No
Mercury	ug/l	May 24/23	RW	0.01	0.01		1	No	No
Hardness (CaCO3)	mg/L	May 24/23	RW	388	315	80-100	-	No	No
Aluminum	ug/l	May 24/23	RW	7	6	100	-	No	No
Silver	ug/l	May 24/23	RW	0.05	0.05	-	-	No	No
Arsenic	ug/l	May 24/23	RW	0.4	0.3	-	10	No	No

Boron	ug/l	May 24/23	RW	21	23	-	5000	No	No
Barium	ug/l	May 24/23	RW	315	205	-	1000	No	No
Beryllium	ug/l	May 24/23	RW	0.007	0.007	-	-	No	No
Calcium	mg/L	May 24/23	RW	129	103	-	-	No	No
Cadmium	ug/l	May 24/23	RW	0.004	0.007	-	5	No	No
Cobalt	ug/l	May 24/23	RW	0.04	0.033	-	-	No	No
Copper	ug/l	May 24/23	RW	4.6	2.5	1000	-	No	No
Chromium	ug/l	May 24/23	RW	0.16	0.37	-	50	No	No
Iron	ug/l	May 24/23	RW	14	22	300	-	No	No
Potassium	ug/l	May 24/23	RW	3.17	2.72	-	-	No	No
Magnesium	ug/l	May 24/23	RW	16.1	14	-	-	No	No
Manganese	ug/l	May 24/23	RW	3.57	0.7	50	-	No	No
Molybdenum	ug/l	May 24/23	RW	0.56	0.71	-	-	No	No
Nickel	ug/l	May 24/23	RW	0.4	1.1	-	-	No	No
Sodium	mg/L	May 24/23	RW	34.9	22.8	200	20	Yes	Yes
Phosphorus	ug/l	May 24/23	RW	0.02	0.016	-	-	No	No
Lead	ug/l	May 24/23	RW	0.1	0.09	-	10	No	No
Antimony	ug/l	May 24/23	RW	0.6	0.6	-	6	No	No
Selenium	ug/l	May 24/23	RW	0.29	0.26	-	50	No	No
Silicon	ug/l	May 24/23	RW	8250	7550	-	-	No	No
Strontium	ug/l	May 24/23	RW	383	289	-	-	No	No
Thallium	ug/l	May 24/23	RW	0.005	0.005	-	-	No	No
Titanium	ug/l	May 24/23	RW	0.17	0.33	-	-	No	No
Uranium	ug/l	May 24/23	RW	1.59	1.4	-	20	No	No
Vanadium	ug/l	May 24/23	RW	0.3	0.32	-	-	No	No
Zinc	ug/l	May 24/23	RW	3	5	5000	-	No	No
Total Coliform	cfu/100ml	May 24/23	RW	0	0	-	0	No	No
E.Coli	cfu/100ml	May 24/23	RW	0	0	-	0	No	No
Heterotrophic Plate Count (HPC)	cfu/100ml	May 24/23	RW	1	64	-	-	No	No

6.1.8 Connections to other Drinking Water system

There are no connections to other drinking water systems in the Stirling Drinking Water System.

6.1.9 Historical, seasonal or common event-driven fluctuations

Type of Fluctuation	Description	Operational Challenges/ Threats
Historical Variation	Some historical data has shown E.coli in raw water wells. Recent analysis has shown the absence of E.coli.	Proper sampling of raw water ensures accurate analysis. The increased E.coli counts would result in isolating the well from the system.
Seasonal Variation	Low water levels from precipitation can cause reduced aquifer levels and threaten the supply volume	Operational changes to optimize the system during low water conditions. Implementation of by-laws to reduce usage.
Seasonal Fluctuation	During the summer months there is a water use increase	Water use by-law is in effect and enforced during periods of low water level advisories.
Event Driven Fluctuation	Upstream spill.	Spill kits are located in town and are complete with containment booms.
Event Driven Fluctuation	Flooding, heavy rainfall or spring runoff will all cause increases in water levels	The treatment plant is equipped with sump pumps to keep up with the potential flooding to the main building.

6.1.10 Critical Upstream/Downstream processes

The Township of Stirling-Rawdon has a large Source Water Protection area which includes different levels of well head protection areas to provide protection to vulnerable areas for groundwater recharge and areas that could introduce surface water contamination to the adjacent Rawdon Creek that passes in close proximity to the water treatment plant. The Township of Stirling-Rawdon has retained the services of Lower Trent Conservation Authority to conduct the risk management inspections required under the Clean Water Act part IV.

7.0 Risk Assessment Procedure

Purpose

The purpose of the risk assessment procedure is to describe the method used for the Township of Stirling-Rawdon water system to analyze risks associated with the drinking water system. This includes a process-based system for risk identification and risk assessment, Critical Control Point (CCP) and CCP threshold limits.

Scope

This procedure is applicable to the risk identification, risk assessment and CCP in the drinking water system including treatment, storage, pumping and distribution.

Related Document

Drinking Water Quality Management Standard -Element 7
SOP-01 Risk Assessment

Risk Assessment Matrix spreadsheets

Procedure

The risk assessment procedure is outlined in detail in SOP-01.

8.0 Risk Assessment and Risk Assessment Outcomes Procedure

1.0 Purpose

To define the process for conducting a drinking water risk assessment and for documenting and reviewing the results of the assessment at the facility and distribution level.

2.0 Scope

Applies to the Township of Stirling-Rawdon drinking water system and includes the identification and assessment of potential hazardous events and hazards that could affect drinking water safety. The Township of Stirling-Rawdon's approach to addressing other potential hazards is set out in the DWQMS or the Emergency Management Plan.

3.0 Responsibility

Chief Operator of Water/Wastewater
Assistant Chief Operator of Water/Wastewater
Top Management
Quality Management System Representative

4.0 Definitions

Drinking Water Health Hazard- means, in respect to a drinking water system,

a) A condition of the system or a condition associated with the system's waters, including anything found in the waters,
   i). that adversely affects, or is likely to adversely affect, the health of the users of the system.
   ii). that deters or hinders, or is likely to deter or hinder, the prevention or suppression of disease, or
   iii). that endangers or is likely to endanger public health,
b) A prescribed condition of the drinking water system, or
c) A prescribed condition associated with the system's water or the presence of a prescribed thing in the waters.

Critical Control Point (CCP)- An essential step or point in the subject system at which control can be applied by the operating authority to

prevent or eliminate a drinking water health hazard or reduce it to an acceptable level.

Hazardous Event- an incident or situation that can lead to the presence of a hazard

Hazard- a biological, chemical, physical or radiological agent that has the potential to cause harm

Control Measure- includes any processes, physical steps or other practices that have been put in place at a drinking water system to prevent or reduce a hazard before it occurs.

Likelihood- the probability of a hazard or hazardous event occurring

Consequence- the potential impact to public health and/or operation of the drinking water system if a hazard/hazardous event is not controlled.

5.0 Procedure

5.1 The Quality Management System Representative assigns personnel to conduct the risk assessment (e.g. Assistant Chief Operator, Operator)

5.2 Using the system's process diagram, identify hazardous events and associated hazards (possible outcomes) that could impact the system's ability to deliver safe drinking water in Table 1 for each activity/process step.

5.3 For each of the hazardous events, specify control measures currently in place at the drinking water system that eliminate the hazard or prevent it from becoming a threat to public health. Some hazards/ hazardous events may have step by step contingency plans associated with them.

5.4 To ensure that potential drinking water health hazards are addressed and minimum treatment requirements as regulated by the SDWA O.Reg. 170/03 and the Procedure for Disinfection of Drinking Water in Ontario are met. The Township of Stirling-Rawdon has established Critical Control Points.

*As a minimum the following must be included as CCPs at the Stirling Drinking Water System.

- Processes necessary to achieve the required log removal or inactivation of pathogens (i.e., chemical and /or UV disinfection system)

•Processes necessary for maintaining a disinfectant residual in the distribution system.

Identify the above processes (as they apply) as mandatory CCPs in the CCP column in Table 1.

5.5 To determine if there are any additional CCPs for the system, evaluate and rank the hazardous events for the remaining activities/ process steps.

5.6 Taking into consideration existing control measures including the reliability and redundancy of equipment, assign each hazardous event a value for the likelihood and a value for the consequence of that event occurring based on the following criteria.

Value	Likelihood of Hazardous Event Occurring
1	**Rare**- Estimated to occur every 50 years or more (usually no documented occurrence at site)
2	**Unlikely**- Estimated to occur in the range of 10 – 49 years
3	**Possible** – Estimated to occur in the range of 1 – 9 Years
4	**Likely** – Occurs monthly to annually
5	**Certain** – Occurs monthly or more frequently

Value	Consequence of Hazardous Event Occurring
1	**Insignificant-** Little or no distribution to normal operations, no impact on public health
2	**Minor-** Significant modification to normal operations but manageable, no impact on public health
3	**Moderate-** Potentially reportable, corrective action required, potential public health impact, disruption to operations is manageable.
4	**Major-** Reportable, system significantly compromised and abnormal operations if at all, high level of monitoring and corrective action required, threat to public health
5	**Catastrophic-** complete failure of system, water unsuitable for consumption.

Multiply the likelihood and consequence values to determine the risk value (ranking) of each hazardous event and record all values in Table

1. Hazardous events with a ranking of 12 or greater are considered high risk.

5.7 Review the hazardous events and ranking documented in Table 1 and identify any activity/ process step as an additional CCP if all of the following criteria are met:
-The associated hazardous event has a ranking of 12 or greater
-The associated hazardous event can be controlled through control measure(s)
-Operation of the control measures can be monitored and corrective actions can be applied in a timely fashion
-Specific control limits can be established for the control measure(s)
-Failure of the control measures would lead to immediate notification of Medical Officer of Health (MOH) or Ministry of The Environment Conservation and Parks (MECP) or both.

5.8 List identified CCPs (required minimum and any additional CCPs established by the risk assessment) in Table 2. Set related critical control limits (e.g., limits for chlorine residual, turbidity, temperature, pH) for each CCP as appropriate.

5.9 Ensure procedures have been developed and implemented at the drinking water system to
-Monitor the critical control limits
-Respond to, report and record deviations from the critical control limits.

List these procedures in Table 2.

5.10 The information recorded in the Summary of Risk Assessment Outcomes is maintained at the facility level on an ongoing basis. At least every calendar year, the QMS Rep. reviews the risk assessment documentation to verify the currency of the information and the validity of the assumptions used in the risk assessment in preparation for the Management Review. The validity of assumptions is based on historical review of the frequency of the hazardous event occurring compared to consequence.

The QMS Rep. and Top Management ensures that a risk assessment is conducted and documented at least once every thirty six months.

Summary of Risk Assessment Outcomes

Table 1: Risk Assessment Table *Mandatory CCPs are not required to be ranked

Activity/ Process Step	Description of Hazardous Event	Possible Outcome (Hazards)	Existing Control Measures	Likelihood	Consequence	Risk Value	CCP ?
Raw Water/ Wells	Source Water Supply Shortfall	Loss of raw water	Backup wells and pumps, with a well probe monitor tied to lockout. SOP# 22 Well Pump Failure. SOP# 19 Risk to Raw Water Supply. Drilling of new wells for future growth.	2	5	10	○ Yes – Mandatory CCP ○ Yes- Additional CCP identified for facility ● No
	Well casing collapse	Loss of raw water	Backup wells and pumps, with a well probe monitor tied to lockout Loss of Service SOP#38.	1	2	2	
	Agricultural run-off	Contamination of aquifer	Weekly sampling program as Sample Calendar, and Well Head Protection Loss of Service SOP#38, Risk to Raw Water Supply SOP#19, SOP#21 Unsafe Water, SOP#31 Provision of an Alternate Water Source.	3	3	9	
	Well Pump Failure	Loss of raw water	Backup wells and pumps, with a well probe monitor tied to lockout, SOP# 22 Well Pump Failure.	3	2	6	

	Chemical Spill/ Contamination impacting source water	Contamination of aquifer	Containment, operational checks, sampling as per Regulations. SOP# 36 Spill Response Transportation Routes, Spill Kit with containment booms.	2	5	10	
Primary Disinfection	UV System Failure	Inadequate CT, AWQI	Backup UV system, automatic switch over, Alarms Lockout, operational checks, on-line monitoring alarms, SOP# 14 Primary Disinfection Failure, scheduled maintenance activities. Spare parts on-site.				● Yes – Mandatory CCP ○ Yes- Additional CCP identified for facility ○ No
Secondary Disinfection	Chlorination system failure	Low chlorine residual, potential for AWQI	Redundancy (1 duty and 1 standby with no flow alarms), Facility lock out, on-line monitoring with alarms, in-house residual testing, operational checks, scheduled maintenance activities, SOP#15 Secondary Disinfection. Chlorine analyzer #1 and #2 failure + low high cl2, Alarm SOP# 23 chlorine pump failure. Calibration of Cl2 Analyzer SOP# 27.				● Yes – Mandatory CCP ○ Yes- Additional CCP identified for facility ○ No

Distribution	Backflow from private plumbing- major industry.	Potential health concerns	Back flow alarms on water meters. Backflow prevention by-law being considered.	2	4	8	○ Yes – Mandatory CCP ○ Yes- Additional CCP identified for facility ● No
Distribution	Sustained Pressure Loss	Ground / surface water infiltration, unknown chlorine residual levels, potential for AWQI	On-site pressure monitoring, Operational checks,SOP#37 Loss of System Pressure, SOP#21 Unsafe water, SOP# 5 Reporting an adverse, SOP#31 Provision of an alternate water source.	3	3	9	
Distribution	Analyzer failure	Unknown chlorine residual levels, potential for AWQI	In-house residual testing, scheduled maintenance activities, operational checks, Alarmed from falcon security and weekly confirmation of calibration. Calibration of Cl2 Analyzer SOP# 27.	2	2	4	
Distribution	Loss of system pressure / Line Break	Ground / surface water infiltration, unknown chlorine residual levels, potential for AWQI	In-house pressure testing and residual testing at strategic points in distribution system. SOP #24 Watermain Break, SOP#37 Loss of System Pressure.	3	2	6	
Distribution	Fire Hydrant Failure	Potential inactivation in the event of a fire. Potential of unsafe drinking water.	Hydrant inspection and testing SOP#20, Valve inspection and maintenance SOP#25, Flushing of Dead End Hydrants SOP#26	3	1	3	

Distribution	Loss of Chlorine residual	Contaminated distribution water, AWQI	Weekly sampling program and residuals, low chlorine alarm. Alarm SOP# 15 CCP Secondary Disinfection. Calibration of Cl2 Analyzer SOP# 27.	2	3	6	
Distribution	Adverse water result in distribution Adverse defined in O.Reg 170/03	Potential of unsafe drinking water, AWQI	Standard Operating Procedures- Sampling Distribution, Hydrant Inspection and Testing SOP# 20, SOP# 21 Unsafe Water, SOP#5 Reporting an Adverse.	2	3	6	
Standpipe	Chemical/Biological contamination at standpipe (vandalism/ terrorism)	Potential or unsafe drinking water	Locks and Fencing, Operational Checks, SOP# 39 Vandalism. SOP# 21 Unsafe Water. SOP # 45 Terrorism	1	5	5	○ Yes – Mandatory CCP ○ Yes- Additional CCP identified for facility ● No
	Structural/ Mechanical failure at standpipe causing low pressure	Potential or unsafe drinking water	Inspections conducted as per regulations. Routine checks by operations. VFD operation with tower isolation.	2	4	8	
Entire System	Power Failure	Loss of system pressure, inability of supply water	Standby Power Diesel Generator Alarm SOP# 34 AC Power Failure, Operational Checks	4	1	4	○ Yes – Mandatory CCP ○ Yes- Additional CCP identified for facility ● No
	Long Term Impacts of Climate Change	Possible loss of water supply.	SOP# 19 Risk to Raw Water Supply. Drilling of new wells for future growth. SOP# 31 Provision of an alternate water source.	3	2	6	

	Extreme Weather Events	Possible loss of water supply, Pressure and disinfection. Potential for AWQI	Split operations staff of union and non-union. Agreement with On-Warn. SOP # 2 Personnel Coverage. Back-up Generators,	3	3	9	
	Critical Shortage of Staff	Possible loss of water supply, Pressure and disinfection. Potential for AWQI	Split operations staff of union and non-union. Agreement with On-Warn. SOP # 2 Personnel Coverage.	1	3	3	
	Sustained extreme temperatures (cold)	Possible loss of water supply. Loss of system pressure, inability of supply water	Agreement with On-Warn. SOP # 2 Personnel Coverage. Back-up Generators, SOP# 31 Provision of an alternate water source. SOP# 19 Risk to Raw Water Supply. SOP# 21 Unsafe Water	2	4	8	
	Sustained extreme temperatures (hot)	Possible loss of water supply. Loss of system pressure, inability of supply water	Agreement with On-Warn. SOP # 2 Personnel Coverage. Back-up Generators, SOP# 31 Provision of an alternate water source. SOP# 19 Risk	2	4	8	

			to Raw Water Supply. Drilling of new wells for future growth. SOP# 21 Unsafe Water				
Communication system	Loss of Communication	Loss of system pressure	Manual operation of the plant, communication alarm, operational checks, 24 hour test signal from Falcon Security. Alarm system failure SOP#30.	4	1	4	◌ Yes – Mandatory CCP ◌ Yes- Additional CCP identified for facility ● No
	Loss of communication between water tower and treatment plant	Loss of system pressure, if tower empties	Manual operation of the plant, communication alarm, operational checks, 24 hour test signal from Falcon Security. Alarm system failure SOP#30 Ability to run plant off of pressure opposed to tower signal.	4	1	4	
Security System	Vandalism	Contamination of treated water	Security on the building, SOP# 39	3	3	9	◌ Yes – Mandatory CCP ◌ Yes- Additional CCP identified for facility

			vandalism. Operational Checks.				● No
Entire System	Cyber Security	Loss of SCADA trending data and process control,	Security on the building, SOP# 39 vandalism. Operational Checks. SOP# 45 Terrorist Threats	3	3	9	○ Yes – Mandatory CCP ○ Yes- Additional CCP identified for facility ● No
Entire System	Terrorism Threat	Vandals could impact water quality in the system, causing increased health concerns	SOP# 45 Terrorist Threats	1	5	5	○ Yes – Mandatory CCP ○ Yes- Additional CCP identified for facility ● No

Table 2: Identified Critical Control Points (CCPs)

CCP	Critical Control Limits	Monitoring Procedures	Response, Reporting and Recording Procedures
UV System – Primary Disinfection	Dosage below 40 mJ/cm2	On-line continuous Monitoring, alarms, well pump lockout	No, reporting necessary because system locks out. Alarm SOP#40.
Sodium Hypochlorite- Secondary Disinfection	Free Chlorine Residual Lockout Pre Alarm 1.25 mg/l with 120 s delay Post Alarm 1.00 mg/l with no delay	On-line continuous monitoring, system check weekly as per sample calendar.	No reporting necessary because system locks out. Secondary Disinfection SOP#15, Chlorine pump failure SOP#23, SOP #21 Unsafe Water

Related Documents

Drinking Water Quality Management Standard - Element 8

SOP-01 Risk Assessment

Procedure

Once a drinking water risk has been defined in paragraph 7 as a CCP it shall be monitored and controlled according to the individual standard operating procedure (SOP). The SOP shall include a description of the associated hazards and risk of the CCP, establish a critical control limit, define procedures to monitor the CCP, document the procedure for a deviation and the associated reports required for a deviation.

If a hazardous event is not considered a CCP then the method to control the hazardous event must be documented on the Risk Analysis.

8.1 Stirling

The following drinking water risks have been identified as a Critical Control Point:

- Primary Disinfection failure UV SOP-14
- Secondary Disinfection Failure SOP-15 (Sodium Hypochlorite)

9.0 Organizational Structure, Roles, Responsibilities and Authorities

Purpose

The purpose of this procedure is to outline the organizational structure of the drinking water system. It is also to define the roles, responsibilities and authorities used to ensure the drinking water system is adequate.

Scope

This procedure is applicable to the outlined roles and responsibilities within the Operational Plan governed by the DWQMS. This covers the entire water treatment and distribution process

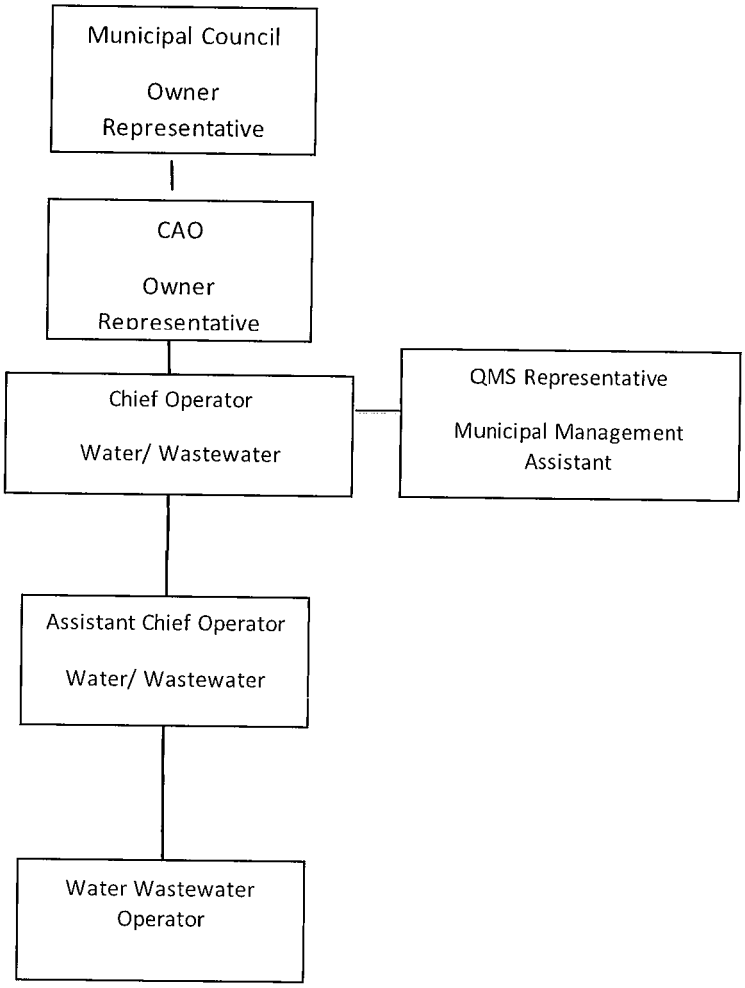
Responsibilities and Authorities

The QMS Representative is responsible for ensuring that the roles and responsibilities outlined in this procedure are reviewed annually to ensure accuracy. This is usually completed as part of the Internal Audit procedure but may be updated as result of organizational or staff changes.

Related Documents

Drinking Water Quality Management Standard - Element 9
Township of Stirling-Rawdon Organizational Chart
SOP-02 Personnel Coverage

9.1 Organizational Structure, Roles, Responsibilities And Authorities



9.2 Responsibility and Authorities - Owner

9.2.1 Chief Administrative Officer

- Ensuring adequate resources to provide operation and maintenance of the drinking water system.
- Approving an annual budget;
- Approving annual water rates;
- Approving 5 and 10-year capital budget predictions;
- Assisting with by-law development
- Owner representative on behalf of Council for the Township of Stirling-Rawdon

9.3 Responsibility and Authority – Chief Operator of Water/Wastewater

The Chief Operator of Water/Wastewater for The Township of Stirling-Rawdon is responsible to operate, maintain and improve the municipal drinking water system through means of progressive work schedules to maintain acceptable maintenance to provide safe drinking water to consumers. All staff will report to the Chief Operator of Water and Wastewater.

9.4 Responsibility and Authorities - Top Management

Top Management is described by the DWQMS as a person, persons or group of people at the highest level within an operating authority that makes decisions respecting the QMS and recommendations to the Owner respecting the drinking water system

It is the responsibility of Top Management to demonstrate a commitment to the implementation of the DWQMS by:

- Ensuring that the QMS is in place and meets the DWQMS.
- Ensuring that the Operating Authority or department is aware of applicable legislations and regulations.
- Participation in the Management Review.
- Determine, obtain or provide the resources needed to maintain and continually improve the QMS.
- To provide annual budget for training, attendance at conferences, workshops, seminars.

Top Management consists of the following persons in The Township of Stirling-Rawdon.:

- Chief Operator of Water/Wastewater

9.5 Responsibility and Authorities - Operational Management and Staff

A detailed description of the key responsibilities and authorities of the Operational and Management Staff are held on file with the Municipal human resources office. The Overall Responsible Operator (ORO) and the Operator in Charge (OIC) duties and responsibilities are described in SOP-02.

9.6 Responsibility and Authorities – QMS Representative

- QMS Representative position is held by the Municipal Management Assistant

The QMS Representative is responsible to

- Ensure that each section of the Drinking Water Quality Management Standard, contained within the Operational Plan is audited at least once every calendar year.
- Maintain documented evidence of the internal audits, including checklists
- Complete audit reports in a timely manner and to ensure that they are communicated to the Chief Operator of Water/ Wastewater
- The QMS Representative will ensure that the internal auditor has received recognized training related to internal auditing. A copy of training certificates will be maintained on the training files.

10.0 Competencies

Purpose

The purpose of this procedure is to describe the competencies of personnel whose job activities directly affect the quality of the drinking water.

Scope

This procedure applies to the personnel identified by this procedure as personnel whose job can directly affect the quality of the drinking water of The Township of Stirling-Rawdon.

Related Documents

Drinking Water Quality Management Standard - Element 10

SOP-02-Personnal Coverage

SOP-11 Competencies.

Competency Checklist for operators

Procedure

The following personnel perform duties that directly affect the quality of the drinking water. The competencies are described in SOP-11.

- Chief Operator of Water/Wastewater
- Assistant Chief Operator of Water/Wastewater
- Operator

10.1 Satisfying competencies

10.1.1 The detailed procedure describing competencies for employees whose job directly affects the drinking water is outlined in SOP-11.

11.0 Personnel Coverage

Purpose

The purpose of this procedure is to document the procedure used at The Township of Stirling-Rawdon, Water Department to ensure that sufficient personnel meeting the outline competencies in the DWQMS are available to perform duties that directly affect the drinking water quality system.

Scope

This procedure applies to the Water Department for the Township of Stirling-Rawdon

General

The Township of Stirling-Rawdon employs licensed operators, all of whom are required to have and maintain licenses (distribution and treatment as well as wastewater treatment and wastewater collection) according to the Certification of Drinking Water System Operators and Water Quality Analysts (O. Reg. 128/04).

Call out for additional staff to cover emergency or sick time is done as per the Water Department on-call schedule.

Related Documents

Drinking Water Quality Management Standard - Element 11

SOP-02 Personal Coverage

Procedure

The detailed procedure to ensure that sufficient competent personnel are available for duties that directly affect drinking water is contained in SOP-11 Competencies.

Collective Agreement

Employment for the WTP and distribution system are jointly operated with Stirling-Rawdon management and union staff and work under the terms and conditions of a collective agreement between The Township of Stirling Rawdon and CUPE Local 9071. During a strike/lock-out business continuity is maintained by the Chief Operator of Water/Wastewater and the Assistant Chief Operator of Water/wastewater.

12.0 Communication

Purpose

The purpose of this procedure is to identify the method for communicating the Quality Management System to all stakeholders.

Scope

The procedure applies to the communication of relevant aspects of the Operational Plan between Top Management and the Owner, Operating Authority Personnel, the public and suppliers that have been identified as essential under Plan (a) of Element 13 of this Standard.

Related Documents

Drinking Water Quality Management Standard – Element 12

SOP-08 Communication

Procedure

The communication procedure is outlined in detail in the SOP-08.

13.0 Essential Supplies and Services

Purpose

The purpose of this procedure is to identify essential suppliers and services that may affect quality of drinking water and to ensure availability of those supplies and services.

Scope

This procedure applies to the following essential supplies and services:

Supply or Service	Stirling
Liquid Chlorine	X
SCADA services	X
Lab Testing Services	X
UV Suppliers	X
Instrumentation/PLC	X
Water Quality Testing Equipment Calibration	X
Flow Meter Calibration	X
Potable Water Haulage	X
On-Call Communications	X
Backup Power Generator Fuel	X

Related Documents

Drinking Water Quality Management Standard – Element 13

SOP-13 Chemical Deliveries to the WTP

SOP-03 Essential Supplies and Services

Critical supplies and services list

The procedure by which the Water Department ensures the quality and availability of essential supplies and services is outlined in SOP-03.

14.0 Review and Provision of Infrastructure

Purpose

The purpose of this procedure is to outline the method used at The Township of Stirling-Rawdon to annually review the infrastructure of the drinking water systems. This review shall determine if the infrastructure is adequate to operate and maintain the drinking water system. Considerations of the outcomes of the risk assessment document are detailed in the infrastructure review annually

Scope

This procedure applies to the infrastructure relating to the provision of drinking water.

Related Documents

Drinking Water Quality Management Standard - Element 14

Management Review

SOP-12 DWQMS Infrastructure

Risk Assessment Outcomes SOP # 1

Procedure

The infrastructure is reviewed annually during the management review process outlined in the Operational Plan, additional details on the review and provision of infrastructure are provided in SOP-12. Considerations of the outcomes of the risk assessment document are detailed in the infrastructure review annually and are reviewed in the Management Review.

15.0 Infrastructure Maintenance, Rehabilitation and Renewal

Purpose

The purpose of this procedure is to summarize the infrastructure capital program used by the Township of Stirling-Rawdon in order to maintain the drinking water system's infrastructure maintenance, rehabilitation and renewal programs for the Stirling Drinking Water System

Related Documents

Drinking Water Quality Management Standard - Element 15

SOP-12 DWQMS Infrastructure

Asset Management Plan

Procedure

A summary of the Township of Stirling-Rawdon, Water Department infrastructure maintenance program of rehabilitation and renewal is described in SOP-12.

16.0 Sampling, Testing and Monitoring

Purpose

The purpose of the following procedure is to describe the sampling and monitoring and testing activities for the treatment and distribution system to ensure compliance to applicable drinking water legislation and for the provision of safe drinking water.

Scope

This procedure is applicable to the water treatment plant and water distribution operations.

Related Documents

Drinking Water Quality Management Standard – Element 16

Water Treatment Plant Operator and Maintenance Manual

Water Treatment Plant Laboratory Analysis Lab Sheets

SOP-04 Sampling and Monitoring

SOP 05 Procedure to Respond to Adverse Water Quality Result

Procedure

The procedure developed to meet the requirements of Element 16; Sampling, Testing and Monitoring are described in SOP-04.

17.0 Measurement & Recording Equipment Calibration Maintenance

Purpose

The purpose of this procedure is to describe the process used to calibrate and maintain measuring and recording devices used within the water treatment process.

Scope

This procedure is applicable to the measuring and recording devices used by the Water Treatment Plant for monitoring of raw and potable drinking water from the raw source, through treatment, storage, pumping and distribution.

Related Documents

Drinking Water Quality Management Standard – Element 17

SOP-04 Sampling and Monitoring Procedure

Instrumentation manuals

Procedure

The procedure that describes activities for the calibration and maintenance of measurement and recording equipment is outlined in SOP-04.

18.0 Emergency Management

Purpose

This purpose of this procedure is to describe the process to maintain a state of emergency preparedness for the drinking water system that includes

a) a list of potential emergency situations or service interruptions,

b) processes for emergency response and recovery,

c) emergency response training and testing requirements,

d) Owner and Operating Authority responsibilities during emergency situations,

e) references to municipal emergency planning measures as appropriate, and

f) an emergency communication protocol and an up to date list of emergency contacts.

Scope

The Emergency Preparedness and Response Standard Operating Procedure SOP# 16 includes a list of potential emergency situations or service interruptions for the water treatment and water distribution system along with responses to deal with items listed above (items a-f). The Township of Stirling-Rawdon also has an independent Emergency Plan that can be used in conjunction with the Water Departments SOP#16 Emergency Preparedness and Response Procedure.

Related Documents

Drinking Water Quality Management Standard - Element 18
SOP-16 Emergency Preparedness and Response
Township of Stirling-Rawdon Emergency Plan
SOP-42 Activation of OnWARN

Procedure

The emergency management procedure is outlined in SOP-16.

19.0 Internal Audit

Purpose

The purpose of the Internal Audit procedure is to describe the method used at The Township of Stirling-Rawdon, water department to verify conformance to the Operational Plan and to the Drinking Water Quality Management Standard. Internal auditing is a tool to be used to be proactive and continually improve the water quality management system.

Scope

This procedure is applicable to the Township of Stirling-Rawdon Water System operations that are described within this Operational Plan.

Related Documents

Drinking Water Quality Management Standard - Element 19

Continual Improvement of Operational Plan

SOP-07 Internal Audit Procedure

Procedure

The Internal Audit Procedure is outlined in detail in the SOP-07.

20.0 Management Review

Purpose

The purpose of this management review procedure is to outline the method used at The Township of Stirling-Rawdon, water department to evaluate the continuing suitability, adequacy and effectiveness of the Drinking Water Quality Management System.

Scope

The scope of this procedure includes management activities, water treatment plant operations and water distribution activities identifed in the Opertational Plan.

Responsibilities and Authorities

The Municipal Management Assistant is also the QMS Representative and responsible for ensuring that detailed and comprehensive reviews are carried out by competent, independent auditors and for ensuring that the necessary documentation and records are maintained and made available for review by Management.

The QMS Representative is responsible to communicate the results of the management review to the owner.

Related Documents

Drinking Water Quality Management Standard – Element 20

SOP-06 Management Review

Procedure

The management review procedure is outlined in detail in the SOP-06.

21.0 Continual Improvement

Purpose

The purpose of this procedure is to describe the system used at The Township of Stirling-Rawdon to continually improve the effectiveness of the DWQMS by initiating timely corrective action on deficiencies identified in the drinking water QMS and to take preventative action where potential problems are identified.

Scope

Continuous improvement of the QMS shall be achieved by:

Tracking Continuous Improvement

- Review and document all continuous improvements in the annual management review summary report.
- Continual improvements to be reviewed at the annual management review meeting
- Continual improvement will be tracked on the continual improvement tracking sheet.

Implementing Best Practices

- Review and consider best practice recommendations from MECP every 36 months with Top Management at the annual management review meeting and document in meeting minutes.

Identify and Management of Corrective Actions

- Corrective Action Request form will identify;
  - The root cause of an identified non-conformity
  - The actions that will be taken to correct the non-conformity and prevent the non-conformity from re-occurring.

Identifying and Implementing Preventative Actions to Eliminate Potential Non-Conformities

- Corrective Action Request forms will identify;
  - The potential non-conformities that are identified to determine if preventative actions may be necessary

- The outcome of the review, including the action(s) if any, that will be taken to prevent a non-conformity from occurring
-The action(s) taken to prevent a non-conformity, verifying that they are implemented and are effective in preventing the occurrence of the non-conformity.

All potential non-conformities will be documented in the annual summary report and reviewed. A review will also take place during the annual DWQMS Management Review Meeting.

Related Documents

Drinking Water Quality Management Standard – Element 21

DWQMS Management Review Meeting

SOP-10 Continual Improvement

Corrective Action Request

Corrective Action Log Sheet

Continual Improvement Tracking Sheet

Procedure

The corrective action (Continual Improvement) procedure is outlined in detail in the SOP-10.

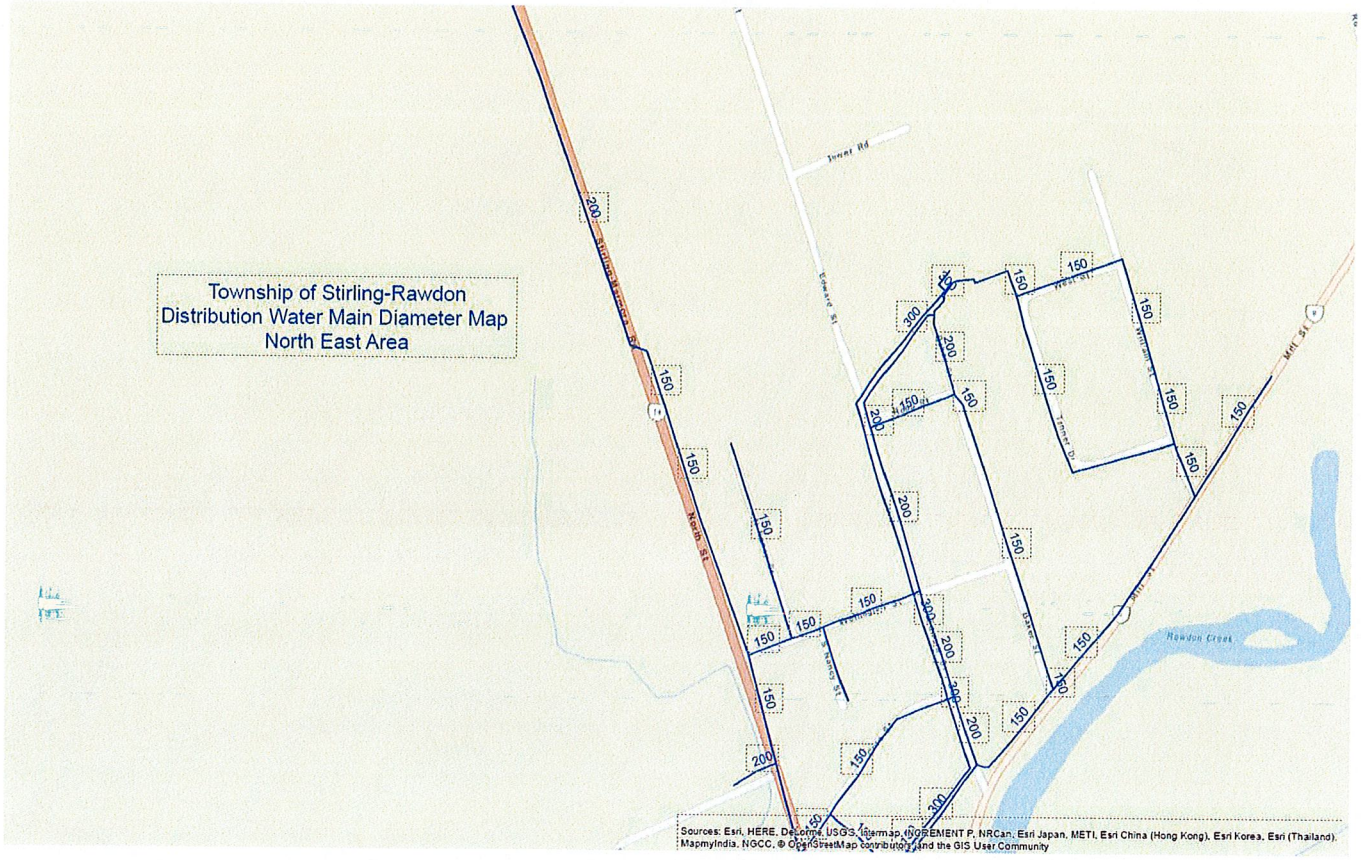
22.0 DEFINITIONS

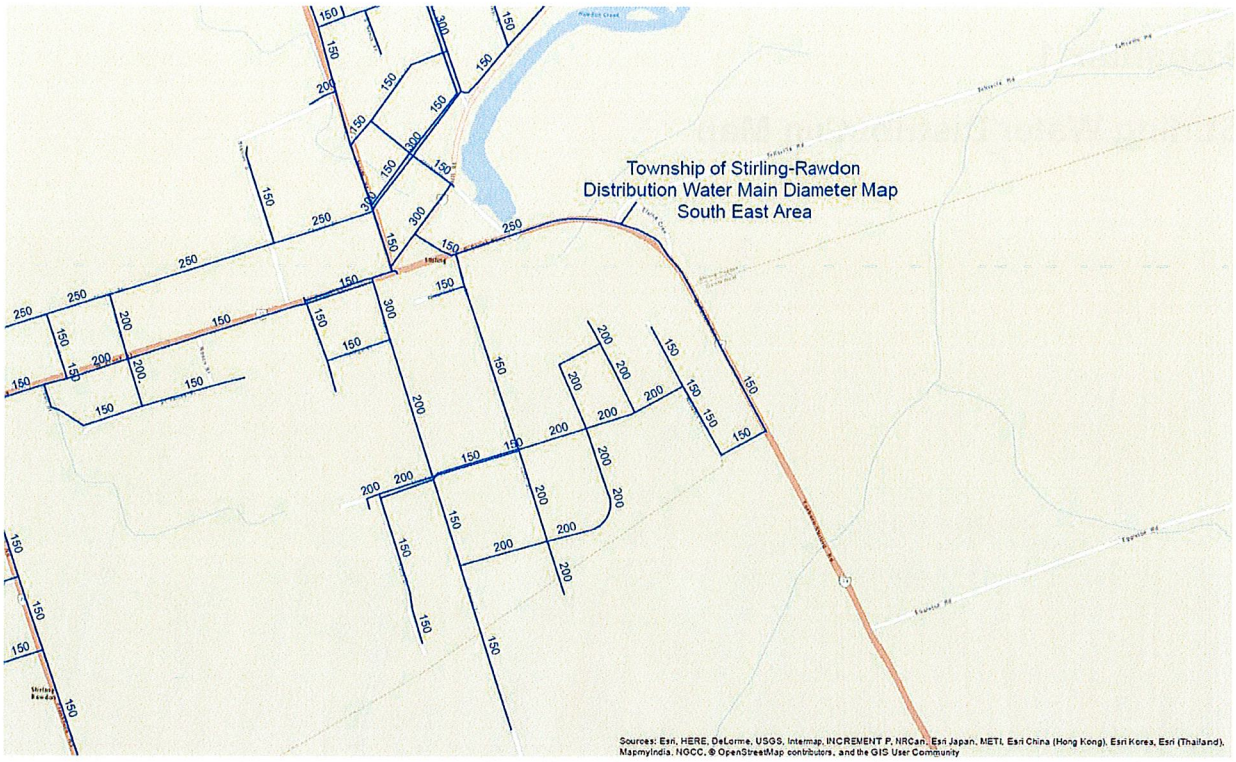
2MIB	2-Methylisorboneol
Alum	Aluminum Sulphate
C	Celsius
Caco3	Calcium carbonate
CAR	Corrective Action Request
CCP	Critical Control Point
CUPE	Canadian Union of Public Employees
DWQMS	Drinking Water Quality Management Standard
GAC	Granular Activated Carbon
km	Kilometer
L	Litre
m	Metre
M3	Cubic metre
ML	Megalitre
ML/day	Mega litre per day
MOECP	Ministry of The Environment Conservation and Parks
NTU	Nephelometric Turbidity Unit
OIC	Operator -in-Charge
ORO	Overall Responsible Operator
PACL	Poly Aluminum Chloride
PSI	Pounds per square inch
QMS	Quality Management System
SCADA	Supervisory Control and Data Acquisition
SOP	Standard Operating Procedure

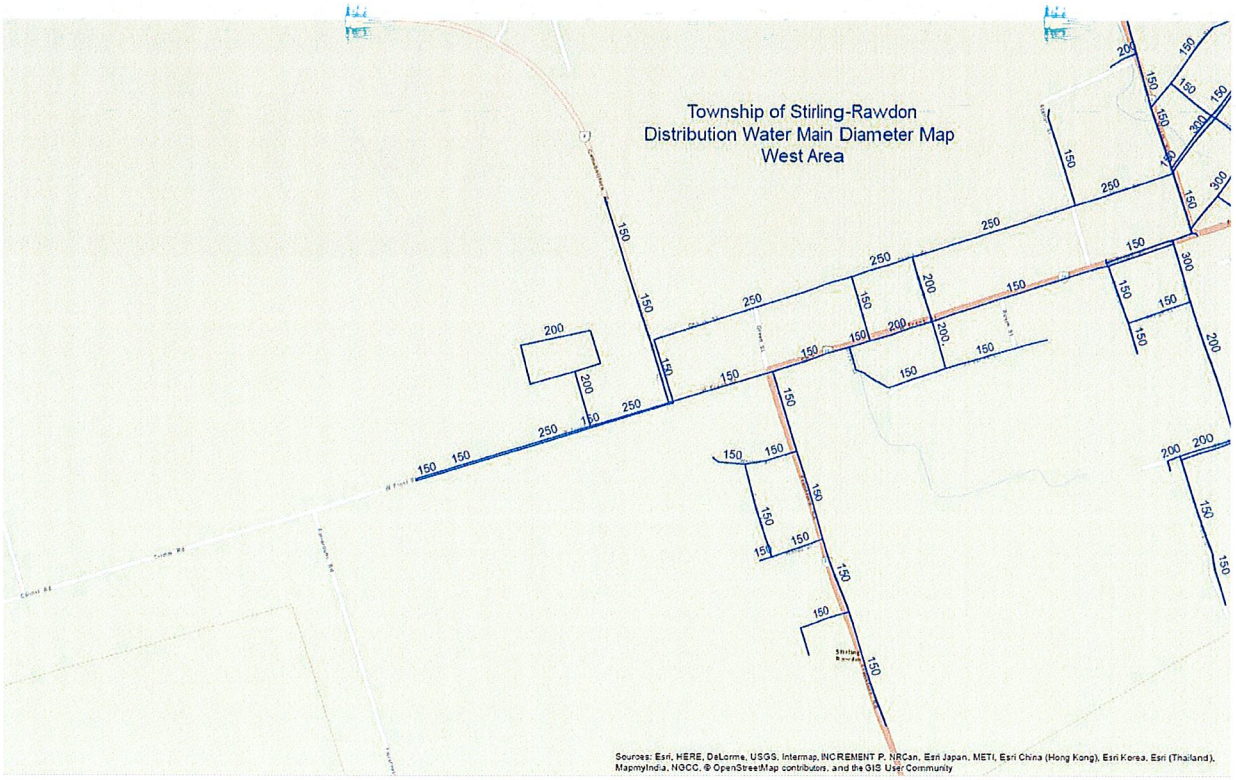
TCU	True Colour Unit
THM	Trihalomethane
TOC	Total Organic Carbon
Ug/L	Microgram per litre
UV	Ultra Violet
WTP	Water Treatment Plant

Appendix 1

Stirling Water Distribution Map




Township of Stirling-Rawdon
Distribution Water Main Diameter Map
South East Area
Sources: Esri, HERE, DeLorme, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), MapmyIndia, NGCC, © OpenStreetMap contributors, and the GIS User Community


Township of Stirling-Rawdon
Distribution Water Main Diameter Map
West Area
Sources: Esri, HERE, DeLorme, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), MapmyIndia, NGCC, © OpenStreetMap contributors, and the GIS User Community

Appendix 2

Schedule "C"

Subject System Description Form
Municipal Residential Drinking Water System

Owner of Municipal Residential Drinking Water System:[1] The Corporation of The Township of Stirling-Rawdon

Name of Municipal Residential Drinking Water System:[2] Stirling Drinking Water System

Subject Systems

Name of Operational Subsystems[3] (if Applicable)	Name of Operating Authority[5]	DWS Number(s)[6]
☒ Check here if the Municipal Residential Drinking Water System is operated by one operating authority. Enter the name of the operating authority in adjacent column[4]	The Township of Stirling-Rawdon	220001566
Operational Subsystem 1:		
Operational Subsystem 2:		
Operational Subsystem 3:		
Operational Subsystem 4:		

Add attachments if there are additional 'Operational Subsystems'

Contact Information[7]

Name	Title	Phone Number	e-mail address
Matthew Richmond	Chief Operator of Water/Wastewater	613-395-3380	wso@stirling-rawdon.com