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Drinking Water Quality Management System

Operational Plan

Operating Authority # 149 – OA2

Township of Selwyn

Lakefield Drinking Water System
and
Woodland Acres Subdivision Distribution System

June 2025; version 1.5
Resolution No. 2024 – 181

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Table of Revisions

Revision #	Date	Section	Change	Approved By
0	May 2024	3,4,6,9,11,13, 16,17,18	Developed OP for Limited Scope Transitional (LST) Audit	A. Tobin
1; version 1.1	Sept & Oct 2024	1,2,5,7,8,10, 12,14,15,19,20,21	Added elements not included in LST Audit	A. Tobin
		6.1.5	Minor edits based on findings from limited scope audit; revised "continually" to "continuously" and added that chlorine level is included in the continuous monitoring.	A. Tobin
		6.2.4	Added continuous monitoring of free chlorine residual and edited to reflect pressure is continuously monitored at Woodland Acres	
		Appendix 1 & 3	Revised position title of "Water and Wastewater Operations Coordinator" to "Operations Lead – Water and Wastewater"	A. Tobin
		Appendix 1	Added "make recommendations to Council…" and "support recommendations to Council…" to the Responsibilities of the CAO and Manager of Financial Services respectively	A. Tobin
		Appendix 1	Revised "authority to make emergency declarations" to "authority to recommend to the Mayor…"	A. Tobin
		9.0	Included reference to Owner (Council) decision-making authority to be made via Council Resolution	A. Tobin
2; version 1.2	October 2024	Title Page	Added resolution number referring to council endorsement of full Operational Plan	A. Tobin
3; version 1.3	November 2024	5, 7, 14, 15, 20, 21	Updated SOP number in "Related Documents" section to reflect new version of SOP	A. Tobin
		7, 15, 21	Added reference to new documents created in response to external audit findings	A. Tobin
				A. Tobin

		Appendix 3	Revised Organizational Chart to clearly identify who is Top Management and who is Owner	
4; version 1.4	January 2025	13	Added SOP 22-002 to related documents	A. Ernst
		Title Page	Revised resolution number from 2024-179 to 2024-181	A. Ernst
		Appendix 1	Added “Member of Top Management as defined to DWQMS” to Responsibilities of Manager of Public Works, Manager of Financial Services, and Chief Administrative Officer and that each shall undertake management Review. Added “Participate in Management Review” to Supervisor Responsibilities.	A. Ernst
		Various sections	Updated SOP #s throughout to reflect most recent versions	A. Ernst
		9.3	Revise “Participation in Management Review” to “Undertake Management Review”	A. Ernst
		16.0 / 17.0 Related Document sections	Moved reference to “Microbiological Sampling” SOP to Element 16 from Element 17	
5; version 1.5	June 2025	8.0	Revised description of critical control points for Woodland Acres and updated SOP references Removed Generator Failure as a critical control point for Lakefield Drinking Water System (SOP-11-002)	A. Ernst
		13.0	Updated SOP reference for Chemical Deliveries – Lakefield WTP	

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1.0 Quality Management System

Purpose

The purpose of this Operational Plan is to describe the Quality Management System developed and implemented by the Township of Selwyn ("Township" or "Selwyn") for the operation of drinking water systems owned by the Corporation of the Township of Selwyn. The policy and procedures outlined in this Operational Plan are in accordance with the requirements of the Drinking Water Quality Management Standard (DWQMS).

Scope

The Operational Plan covers all activities and employees associated with the operation and production of safe drinking water for the Township. This includes the Lakefield Drinking Water System (DWS# 220000488) and the Woodland Acres Subdivision Distribution System (DWS# 210001503). The Operational Plan also covers the associated storage, pumping, and distribution systems. The Operational Plan has been developed to meet the requirements of the DWQMS standard and as a requirement under the Municipal Drinking Water Licensing Program directed by The Safe Drinking Water Act. The Township of Selwyn is the Owner and Operating Authority of the municipal drinking water systems.

2.0 Quality Management System Policy

The Township is committed to managing the drinking water system on behalf of its residents by establishing, maintaining, and continually improving its Quality Management System to always ensure its users have access to clean, safe drinking water. Consumer confidence in drinking water quality shall be achieved through a proactive approach to meet or exceed applicable drinking water legislation, regulations, and standards. Drinking water quality is ensured by a comprehensive risk-based process control system and is staffed by competent employees who are committed to providing reliable, safe drinking water to the Village of Lakefield and the Woodland Acres subdivision.

3.0 Commitment and Endorsement of Operational Plan

In accordance with section 3.0 of the Drinking Water Quality Management Standard, the Township of Selwyn, as the Owner of the drinking water systems, supports the implementation and maintenance of a Quality Management System (QMS), as documented in this Operational Plan. This commitment by Council and Top Management of the Township involves:

- ensuring that a QMS is in place that meets the requirements of the DWQMS,

- ensuring that the Operating Authority is aware of all applicable legislative and regulatory requirements,
- communicating the QMS according to the procedure for communications,
- determining, obtaining, or providing the resources needed to maintain and continually improve the QMS.

Active participation in the development and/or review of policies that promote continual improvement is encouraged. Endorsement by Council, via resolution, and Top Management, by signing below, acknowledges the need for, and supports the provision of, sufficient resources to maintain the QMS.

Top Management

Signed on original

_____ _____

The Corporation of the Township of Selwyn Date

Chief Administrative Officer

Janice Lavalley

Signed on original

_____ _____

The Corporation of the Township of Selwyn Date

Manager of Public Works

Adam Tobin

Signed on original

_____ _____

The Corporation of the Township of Selwyn Date

Manager of Financial Services

R. Lane Vance

4.0 Quality Management System Representative

The Township's Water and Wastewater Supervisor was appointed to the role of the Quality Management System Representative. As the QMS Representative, the Water and Wastewater Supervisor has the responsibility and authority to:

- Ensure that the processes required by the DWQMS are established, implemented, and maintained
- Ensure that the most current version of documents required by the DWQMS are always in use
- Ensure that all personnel are aware of applicable current regulatory requirements regarding the operation of the drinking water system
- Ensure the awareness and the effectiveness of the QMS throughout the operating authority
- Report to Top Management on the performance of the QMS and any need for improvement
- The Manager of Public Works is designated as an alternate QMS Representative

5.0 Document and Record Control

Purpose

The purpose of this procedure is to describe the method used for the control of documents and records for the Lakefield Drinking Water System and the Woodland Acres Subdivision Drinking Water system. Proper maintenance of documents and records is critical for conformance with the DWQMS and for compliance with drinking water legislation.

Scope

This procedure is applicable to the data and documentation described within this Operational Plan as being used or generated during the water treatment and distribution process.

Related Documents

Drinking Water Quality Management Standard - Element 5

SOP-05–003 Document and Record Control

General

Effective control of the issue and changes to data and documentation is essential to DWQMS. Therefore, the Water and Wastewater Supervisor will implement and

maintain a system that exercises these controls throughout the water treatment and distribution process.

Current issues of documents will be made available at all locations where operations affecting the drinking water system are performed.

Procedure

The Document and Records Control Procedure is outlined in detail in the SOP-05-003.

6.0 Drinking Water System

Purpose

The purpose of this procedure is to describe the drinking water systems owned and operated by the Township of Selwyn. This outline documents a description of the drinking water system as prescribed by the DWQMS.

Scope

The Lakefield Drinking Water System and the Woodland Acres Subdivision Drinking Water systems are owned and operated by the Corporation of the Township of Selwyn. This includes the treatment plant, storage and pumping facilities, trunk and distribution water mains, and individual water services up to the private property line. Water meters within buildings, used as consumption measurement devices for billing purposes, are also owned by the Township.

Responsibilities and Authorities

It is the responsibility of the Water and Wastewater Supervisor 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 paragraph 5 of this Operational Plan.

Related Documents

Drinking Water Quality Management Standard – Element 6

Operational Plan Section 5 – Document and Records Control Procedure

Procedure

6.1 Lakefield Drinking Water System

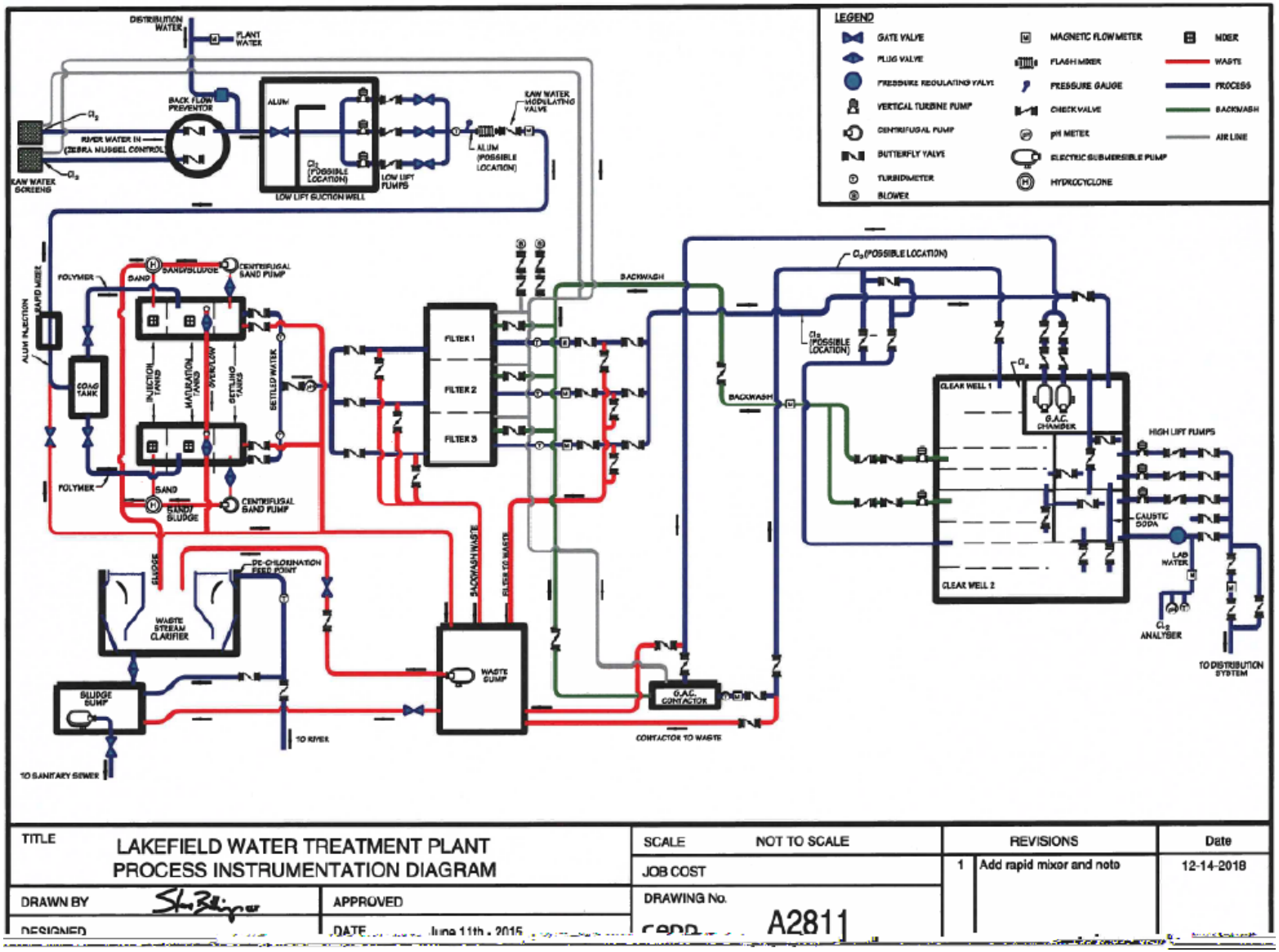
6.1.1 Water Treatment Plant

The Lakefield water treatment plant is located at 13 Water Street North and consists of dual intakes from the Otonabee River, a low-lift pumping system located within the water treatment plant, a conventional treatment plant with chemical coagulation, ballasted flocculation/sedimentation (Actiflo®), dual media filtration, and disinfection. The filters and low-lift pumps have a rated capacity of 3,700 m^3/d. The Actiflo® units have a capacity of 4,500 m^3/d. The plant has a two-celled baffled clearwell with a total capacity of 1,000 m^3, and a high-lift pumping facility discharging to the distribution system. (See Figure 1 for the plant's process schematic). The plant utilizes a granular activated carbon (GAC) contactor on a seasonal basis, to aid in controlling compounds that cause taste and odour issues in warmer temperatures.

Aluminum sulphate is used as the primary coagulant. Free chlorine (applied as liquid sodium hypochlorite) is used for primary and secondary disinfection. Caustic soda (liquid sodium hydroxide) is used for pH adjustment and corrosion control. A dry polymer is converted to aqueous solution on site, and this solution is used as a coagulant aid in the Actiflo® process.

The rated capacity of the water treatment plant is 3,594 m^3/day. The Permit to Take Water (#5485-BGRRST; valid until October 8, 2029) currently authorizes water taking at 2,500 L/m (3,594 m^3/day). The system is classified as Water Treatment 2, Water Distribution 2.

Figure 1 - Lakefield Water Treatment Plant Process Schematic



6.1.2 Water Storage Tanks and Reservoirs

Storage is used to supplement supply during times of high water-demand and in emergency situations such as firefighting. Treated water is stored at two distribution system reservoirs:

- The standpipe located at 121 Strickland Street, providing 2700m^3 total volume and 900m^3 effective volume. This is currently off-line.
- The elevated tank located at 3362 Lakefield Road, providing 2750m^3 total volume and 2750m^3 effective volume.

6.1.3 Water Pumping Stations

There is a water booster pumping station at the corner of Strickland Street and Rolliston Street. It is in a locked vault, below grade, at approximately 4 Rolliston Street.

This station has the capability, when required, to pump water from the lower pressure zone to the higher-pressure zone. Currently this station is off-line as adequate pressure is being maintained by the level of the elevated tank.

6.1.4 Water Distribution System – Lakefield

The water distribution system consists of approximately 22 km of watermains, 110 hydrants, and 1100 individual water service connections.

6.1.5 Monitoring – Lakefield

The following parameters are continuously monitored at the Lakefield Water Treatment Plant:

- Raw water flow
- Treated water flow
- pH
- Turbidity
- Pressure
- Elevated tank water level
- Standpipe water level
- Chemical tank levels
- Free chlorine residual of clearwell, treated water, and elevated tank

6.1.6 Raw Water Supply

The watershed area supplying the Otonabee River upstream of the Lakefield Water Treatment Plant is shown in Appendix 2.

The watershed covers a portion of the Haliburton Highlands and extends as far north as Algonquin Park. This diverse watershed traverses the Oak Ridges Moraine, Peterborough Drumlin Field, Canadian Shield, and the Kawartha and Haliburton Lakes.

The Otonabee River originates in Lakefield at the outlet of Lake Katchewanooka and flows south to Rice Lake. The river flows through Selwyn, the Village of Lakefield, Cavan-Millbrook-North Monaghan, and Otonabee-South Monaghan.

The Otonabee River is 45 kilometres in length and has 25 tributaries including Jackson Creek, Meade Creek, Bears Creek, and Squirrel Creek. The Otonabee River drains an area of approximately 945 square kilometres.

The source of raw (untreated) water for Lakefield's drinking water is the Otonabee River at the discharge of Lake Katchewanooka. The Otonabee River water is of good quality and can be described as moderately coloured water of low turbidity. The river water temperature ranges from 0°C (winter) to approximately 29°C (summer). The raw river water is a surface water supply, which means that it is an unprotected source. Accordingly, the raw water requires full treatment at the Lakefield Water Treatment Plant to make it safe for human consumption.

Staff at the Lakefield water treatment plant, the Otonabee Region Conservation Authority (ORCA), and the Peterborough County-City Health Unit (beaches only) monitor the river water quality. The watershed is protected by planning and approvals processes through the Township and ORCA. Since 1988, ORCA has monitored water quality in the Otonabee watershed under the Watershed 2000 program and the Provincial Water Quality Monitoring Network.

6.1.7 General Characteristics of Raw Water

The source of raw water is the Otonabee River. A brief description of the water characteristics as described in the First Engineers' Report for the Township of Selwyn, dated January 2001:

Parameter	Unit	Common Low Value	Common High Value
Turbidity	NTU	0.42	2.74
Colour	TCU	<5	23
pH	No unit	7.7	8.5
Alkalinity	mg/L	66	93

		the WTP is notified by outside sources about the contamination in a timely manner, and that the contamination has not been pumped into the treatment system.
Event-Driven Fluctuation	Flooding and heavy rainfall may result in large increases in turbidity.	The treatment strategy would need to be altered to adjust for the increased turbidity. Increases in coagulant and chlorine dosages, and reducing the treatment speed to allow for greater reaction time may reduce the turbidity to normal plant effluent levels.

6.1.10 Operational Challenges and Threats

The primary threats to the safety of the water quality from the Otonabee River are:

- E. coli
  - Proper operation of the treatment process includes multiple barriers that are expected to eliminate this threat

- Cryptosporidium
  - Proper operation of the treatment sedimentation and chemically-assisted filtration systems are expected to eliminate this threat

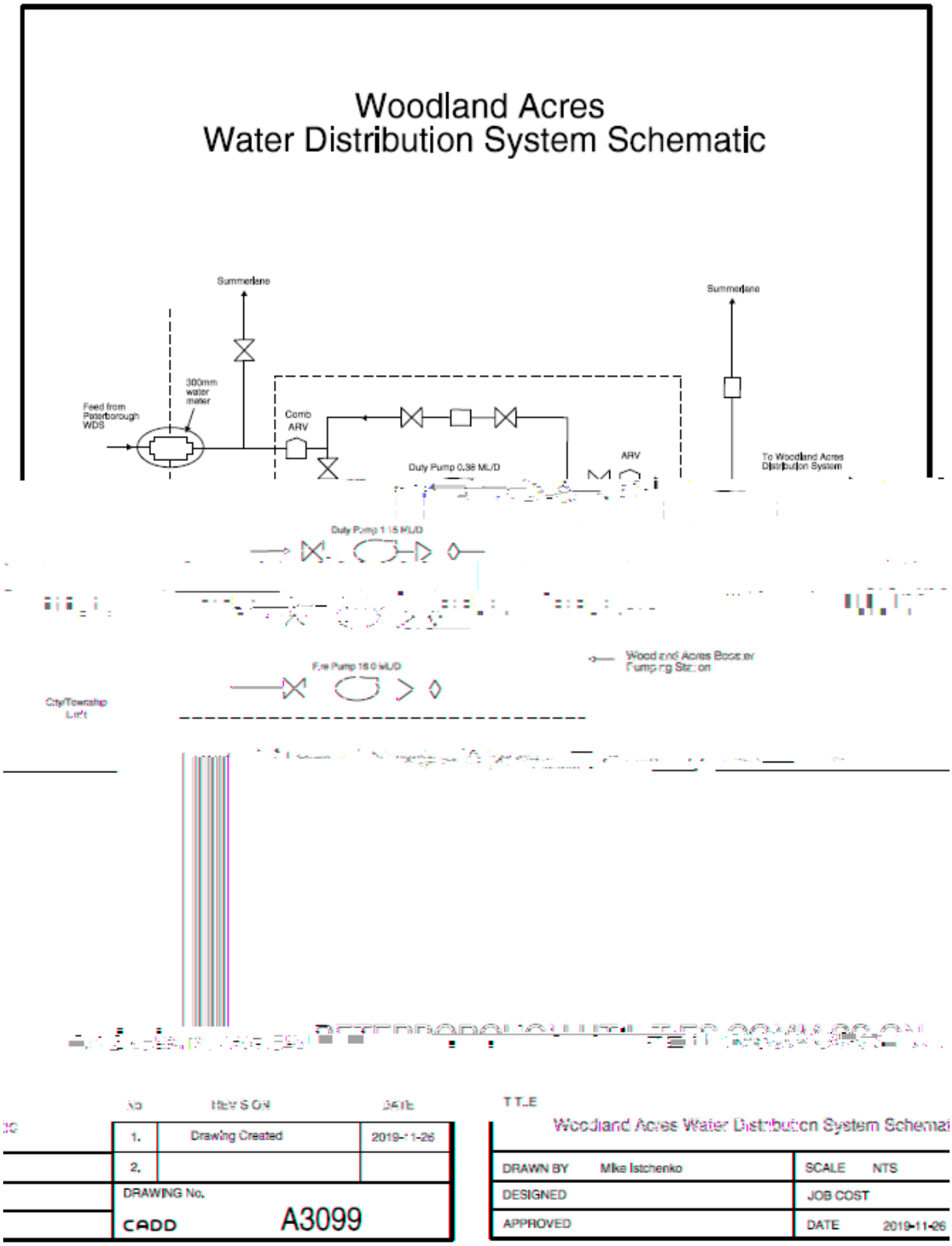
- Disinfection by-products (DBPs)
  - Optimization of processes that minimize the organic content of water before disinfection can minimize production of DBPs

6.2 Woodland Acres Subdivision Distribution System

6.2.1 Drinking Water Supply

The Peterborough Water Treatment Plant supplies potable water to the Township of Selwyn's Woodland Acres subdivision. The subdivision is located off Water

Figure 2 - Woodland Acres Distribution System Process Schematic



Procedure

Once a drinking water risk has been defined in paragraph 7 as a Critical Control Point it shall be monitored and controlled according to the individual Standard Operating Procedure (SOP). The SOPs 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.

The following drinking water risks have been identified as Critical Control Points for the Lakefield Drinking Water System:

- Loss of Coagulant or Coagulant Aid SOP-02-002
- High Filter Turbidity SOP-12-002
- Primary / Secondary Disinfection Failure SOP-13-002

The following drinking water risks have been identified as Critical Control Points for the subdivision of Woodland Acres

- Positive System Pressure – (Critical Control Point – Woodland Acres SOP-23-003)
- Secondary Disinfection – (Critical Control Point – Woodland Acres SOP-23-003 & Primary / Secondary Disinfection Failure SOP-13-002)

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

Related Documents

SOP-02-002 Critical Control Point – Coagulant and Coagulant Aid

SOP-12-002 Critical Control Point – Filtered Water Turbidity

SOP-13-002 Critical Control Point – Primary and Secondary Disinfection

SOP-23-003 Critical Control Point – Woodland Acres

9.0 Organizational Structure, Roles, Responsibilities and Authorities

Purpose

The purpose of this procedure is to outline the organizational structure of the drinking water systems. 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 as well as the interrelation with Quality Assurance.

Responsibilities and Authorities

Township Council exercises decision-making authority that may impact the drinking water systems via Council Resolution.

The Water & Wastewater Supervisor is responsible to ensure 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 in section 19.0 but may be updated as result of organizational or staff changes.

Related Documents

Drinking Water Quality Management Standard - Element 9

Township of Selwyn Organizational Chart

SOP-18-002 Operator-In-Charge and Overall Responsible Operator Designation Lakefield

9.1 Organizational Chart for Township of Selwyn

See Appendix 3 for the most current version of the Township's organizational chart for the water department.

9.2 Responsibilities and Authorities – Owner & Operating Authority

9.2.1 The Corporation of the Township of Selwyn

The Corporation of the Township of Selwyn has ownership, command and control, and is the operating authority of the Lakefield Drinking Water System and the Woodland Acres Subdivision Distribution System municipal drinking water systems, including the treatment plant, storage and pumping facilities, trunk and distribution water mains 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 Township.

The Township shall establish service levels and expectations by means of:

- Ensuring that all water provided by the system to the point where the system is connected to a user's plumbing system meets the requirements of the prescribed drinking water quality standards
- Operating the drinking water systems, at all times in which they are in service in accordance with the requirements of the Safe Drinking Water Act
- Maintaining the systems in a fit state of repair
- Satisfying the requirements of the standards prescribed for the class of system to which they belong
- Approving an annual budget
- Endorsing the Operational Plan
- Approving annual water rates
- Approving 5- and 10-year capital budget predictions
- Establishing by-laws and policies

9.3 Responsibilities 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 makes 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:

-

Scope

This procedure applies to water treatment and distribution systems for the Lakefield Drinking Water System and the Woodland Acres Subdivision Distribution System.

Related Documents

Drinking Water Quality Management Standard - Element 11

SOP-18-002 Designation of Overall Responsible Operator and Operator in Charge

SOP-10-002

Related Documents

Drinking Water Quality Management Standard – Element 12

SOP-03-002 – Drinking Water Quality Management System (DWQMS) Communication

13.0 Essential Suppli

14.0 Review and Provision of Infrastructure

Purpose

The purpose of the following procedure is to describe the sampling, monitoring, and testing activities at the WTP and in the distribution systems 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

SOP-16-002 Sampling, Monitoring, and Calibration

SOP-17-002 Microbiological Sampling Procedure

SOP 26-002 Response to Adverse Water Quality Results

Procedure

The procedure was developed to meet the requirements of Element 16; Sampling, Testing and Monitoring are described in SOP-16-001.

17.0 Measurement and 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, in-process and potable drinking water from intake, through treatment, storage, pumping and distribution.

Related Documents

Scope

Applies to operation of the Lakefield Drinking Water System and the Woodland Acres Subdivision Distribution System.

Related Documents

Drinking Water Quality Management Standard – Element 19

Continual Improvement – section 21 of Township Operational Plan

SOP-04-002 – Internal Audit

Procedure

As described in SOP-04-002 – Internal Audit.

20.0 Management Review

Purpose

Outline the method used at the Township of Selwyn to evaluate continuing suitability, adequacy, and effectiveness of the Drinking Water Quality Management System.

Scope

Includes management activities, water treatment plant operations, and water distribution operations identified in this Operational Plan.

Responsibilities and Authorities

The DWQMS Representative is responsible to the CAO of the Township of Selwyn for ensuring that detailed and comprehensive reviews are undertaken in accordance with this procedure.

The DWQMS Representative is responsible to the Manager of Public Works for ensuring that the necessary documentation and records are maintained and made available for review by Management.

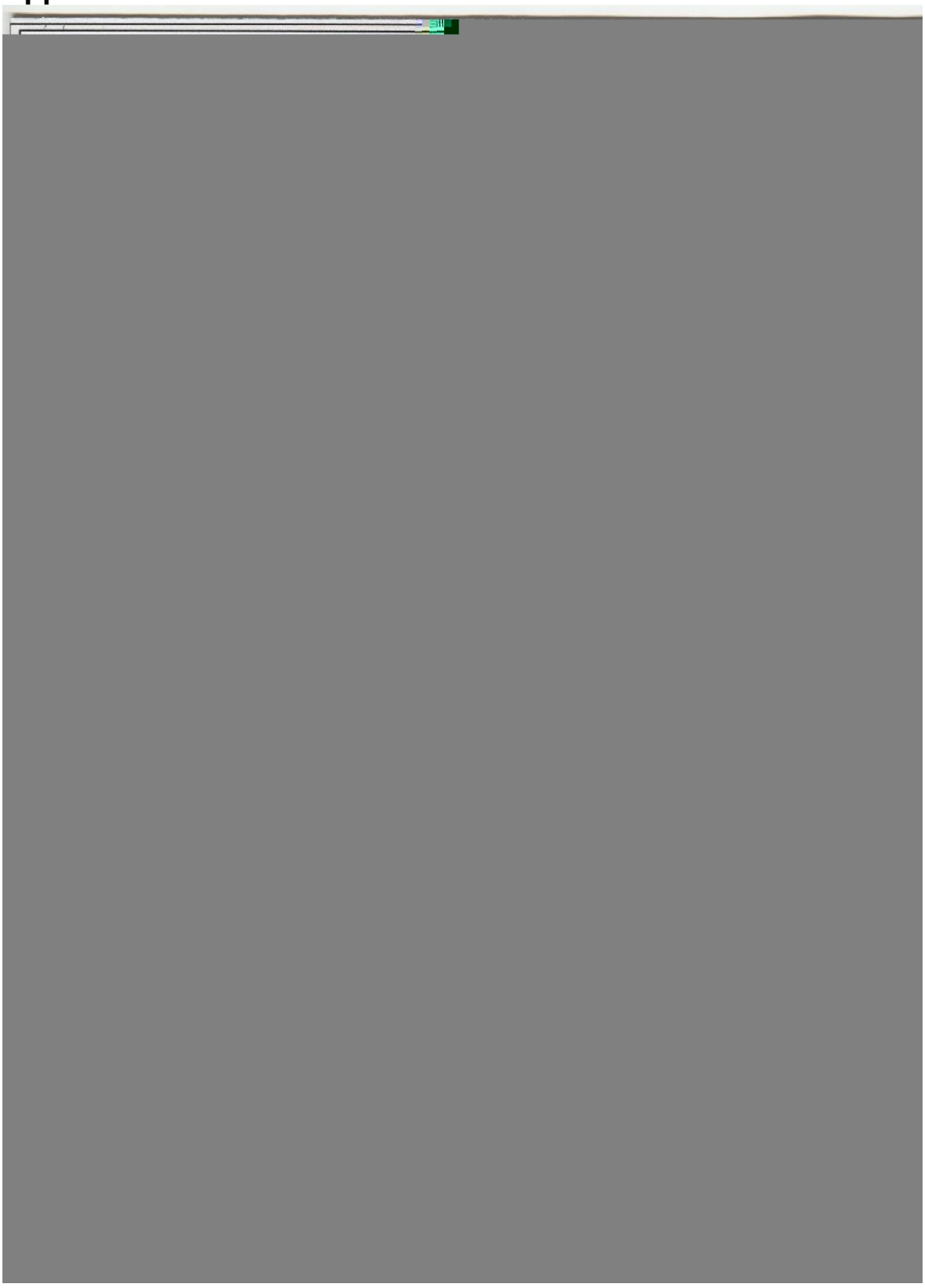
The Manager of Public Works is responsible for communicating the results of the Management Review to the Owner.

Definitions

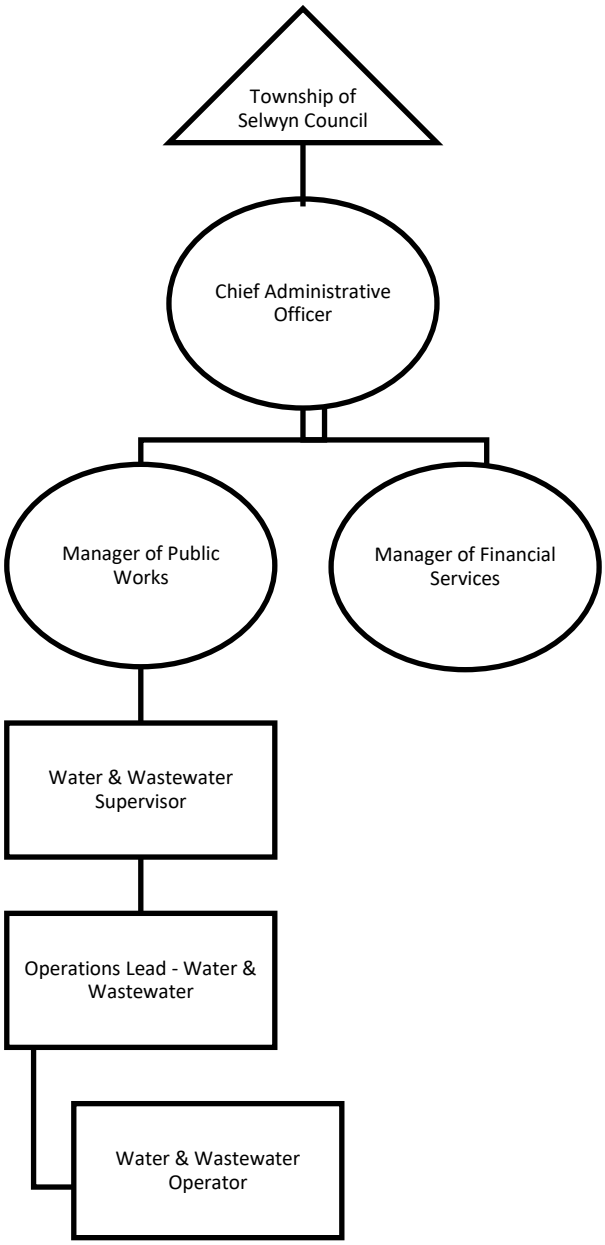
ARV	Air Release Valve
AWWA	American Water Works Association
AWWARF	American Water Works Association Research Foundation
°C	Degrees Celsius
CAO	Chief Administrative Officer
CAR	Corrective Action Request
CCP	Critical Control Point
DWQMS	Drinking Water Quality Management Standard
GAC	Granular Activated Carbon
L/m	Litres per minute
m^3	Cubic meter
m^3/d	Cubic meters per day
mg/L	Milligram per litre
ML/d	Megalitres per day
NTU	Nephelometric Turbidity Unit
O & M	Operation and Maintenance Manual
OIC	Operator-in-Charge
OMWA	Ontario Municipal Water Association
ORO	Overall Responsibility Operator
OWWA	Ontario Water Works Association
PRV	Pressure Reducing Valve
PSI	Pounds per Square Inch
QMS	Quality Management System
µg/L	Micrograms per litre
SCADA	Supervisor Control And Data Acquisition
SOP	Standard Operating Procedure
TCU	True Colour Unit
USgpm	US gallon per minute
WTP	Water Treatment Plant

Operations Lead – Water and Wastewater	• Perform specified duties as instructed within established parameters for operating the WTP • Supervise staff work, safety, and progress • Report issues to the Supervisor or Manager as necessary • ORO as required	• Direct staff in day-to-day operations and maintenance activities • Recommend to the Supervisor ways to improve operational effectiveness
Water & Wastewater Operator	• Perform specified duties as instructed within established parameters for operating the WTP • OIC as assigned • ORO as assigned • Daily operational water quality testing • Communication of water quality testing results to appropriate management and staff • Customer concern response	• Operational discretion as delegated by the Operations Lead – Water and Wastewater

Appendix 2 - Watershed



Appendix 3 – Organizational Chart



Owner is indicated with triangle shape in organizational chart.

Top Management members are indicated with circular shapes in organizational chart.