

***Drinking Water Quality Management System***

# **Operational Plan**

For the Peterborough Municipal  
Drinking Water System



**Operating Authority # 145-OA1**

*June 13, 2018, Revision 11*

## TABLE OF REVISIONS

Rev Level	Date	Section	Change	Interim Approval by
1	December 2008	4.0	remove DWQMS implementation chart	D.W. Stiver
		6.2	Remove “reservoir”, duplicate word	
		6.8	Add Owner of TSEL	
		9.2	Remove ‘practice’ from last bullet	
		10.0	Remove reference to matrix & H09-02, change name of SOP-02-114	
		11.0	Change name of SOP-02-117	
		12.0	Change number of SOP-02-003	
		13.0	Update essential supplier list to include BW46, SCADA, remove calibration	
		21.0	Change number of SOP-02-013	
		Appendix 1	Change WTP Relief Operator & Add ORO requirement	
2	February 2010	3.0	Remove G. Stevenson’s name	D.W. Stiver
		5.0	Remove training material from controlled document list	
		6.1	Remove activated silica	
		9.2	Change approve to review of 5 – 10 year plans	
		10.0	Remove Assistant Superintendent position	
		13.0	remove BW-46 from essential supplier list	
		Appendix 1	Replace Assistant Superintendent with Supervisor	
3	December 2010	3.0	Change the name of the Chair’s position (Owner)	D.W. Stiver

Rev Level	Date	Section	Change	Interim Approval by
			Change SOP-02-110 name to Filtered Water turbidity	
		20.0	Add "Top Management shall ensure a management review is conducted every 12 months"	
		21.0	Update related documents to correct SOP-02-107 reference	
4	November 2011	3.0	Change the President's name	D.W. Stiver
5	September 2014	6.1	Update Schematic A2392	
		11.0	Added SOP-02-163	
6	December 2015	3.0, 9.4, 10.0 & Chart 1	Changed job title to Manager of Water Utility	
7	February 2016	Front Page	Update to include DWS name as per MOECC	D.W. Stiver
8	March 2016	Each Page	Changed Footer to include date as per MOECC	D.W. Stiver
9	September 20, 2016	3.0	Update names and titles for signatories	P.J. Devlin
		4.0	Changed QMS Representative	
		Entire document	Change Superintendent to Manager	
10	October 19, 2016	20	Updated Responsibilities & Authorities for Management Review	Owner
11	June 13, 2018		Update Schematic A 2392	Owner

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## 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 Peterborough Utilities Services Inc. (PUSI) for the operation of the drinking water system owned by the City of Peterborough. 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 operations and production of safe drinking water for the City of Peterborough. The system is limited to the Water Treatment Plant located at 1230 Water Street North, Peterborough, Ontario as well as 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 Ontario Water Licensing Program directed by The Safe Drinking Water Act. For the purpose of the DWQMS the Peterborough Utilities Commission has been designated as the Owner of the Municipal Drinking Water System. In order to simplify references each element of the DWQMS corresponds to the section number within this Operational Plan.

### Related Documents

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

## 2.0 Quality Management System Policy

Peterborough Utilities Services Inc. is committed to managing the drinking water system on behalf of the Peterborough Utilities Commission for the City of Peterborough by effectively establishing, maintaining and continually improving its Drinking Water Quality Management System to help ensure its customers clean, safe drinking water at all times. Consumer confidence in the 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 that is staffed by competent employees who are dedicated to providing reliable, safe drinking water to the City of Peterborough.

### 3.0 Commitment and Endorsement of Operational Plan

In accordance with section 3.0 of the Drinking Water Quality Management Standard, the Peterborough Utilities Commission, as the owner of the drinking water system and Top Management of the Peterborough Utilities Services Inc., 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.

#### OWNER

*Signature on Original*

\_\_\_\_\_  
 Peterborough Utilities Commission  
 Chair  
 Daryl Bennett (Owner)

June 28, 2018

\_\_\_\_\_  
 Date

#### TOP MANAGEMENT

*Signature on Original*

\_\_\_\_\_  
 Peterborough Utilities Services Inc.  
 President & CEO  
 John Stephenson

*Signature on Original*

\_\_\_\_\_  
 Peterborough Utilities Services Inc.  
 Vice President Water Utility Services  
 Patrick J. Devlin

*Signature on Original*

\_\_\_\_\_  
 Peterborough Utilities Services Inc.  
 Manager Water Utility  
 Michael Meyers

*Signature on Original*

\_\_\_\_\_  
 Peterborough Utilities Services Inc.  
 Manager Water Treatment Plant  
 René Gagnon

## 4.0 Quality Management System Representative

The Water Utility Quality Assurance Coordinator, Peterborough Utilities Services Inc. was appointed to the role of the Quality Management System Representative. As the QMS Representative, the Water Utility Quality Assurance Coordinator has both 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 in use at all time;
- 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;
- The Vice President Water Utility Services 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 Peterborough Municipal Water System. Proper maintenance of documents and records is critical for conformance with the Drinking Water Quality Management Standard and for compliance with drinking water legislation.

### Scope

This procedure is applicable to all data and documentation used or generated during the water treatment and distribution process.

### General

Effective control of the issue and changes to data and documentation is essential to DWQMS. Therefore the Water Utility Quality Assurance Coordinator 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.

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
- Water Treatment Process Schematic (A2392)

Records in the scope of this procedure are:

- Operator Certificates
- Certificate of Approval (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  
Corporate Practice: I35-03 Forms Management  
SOP-02–104 Document and Record Control  
Master List Form Distribution (form # 03064)

#### Document Change Control Procedure

The Document and Records Control Procedure is outline in detail in the SOP-02–104.

## **6.0 Drinking-Water System**

### Purpose

The purpose of this procedure is to describe the Drinking Water System owned by the Peterborough Utilities Commission and operated by Peterborough Utilities Services Inc. This outline documents a description of the drinking water system as prescribed by the DWQMS.

### Scope

The Peterborough Utilities Commission (PUC) is a municipal services board for the City of Peterborough which has ownership and full command and control of



the municipal drinking water system, 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 PUC.

### 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 paragraph 5 of this Operational Plan.

### Related Documents

Drinking Water Quality Management Standard – Element 6  
Operational Plan paragraph 5 Document and Records Control

### Procedure

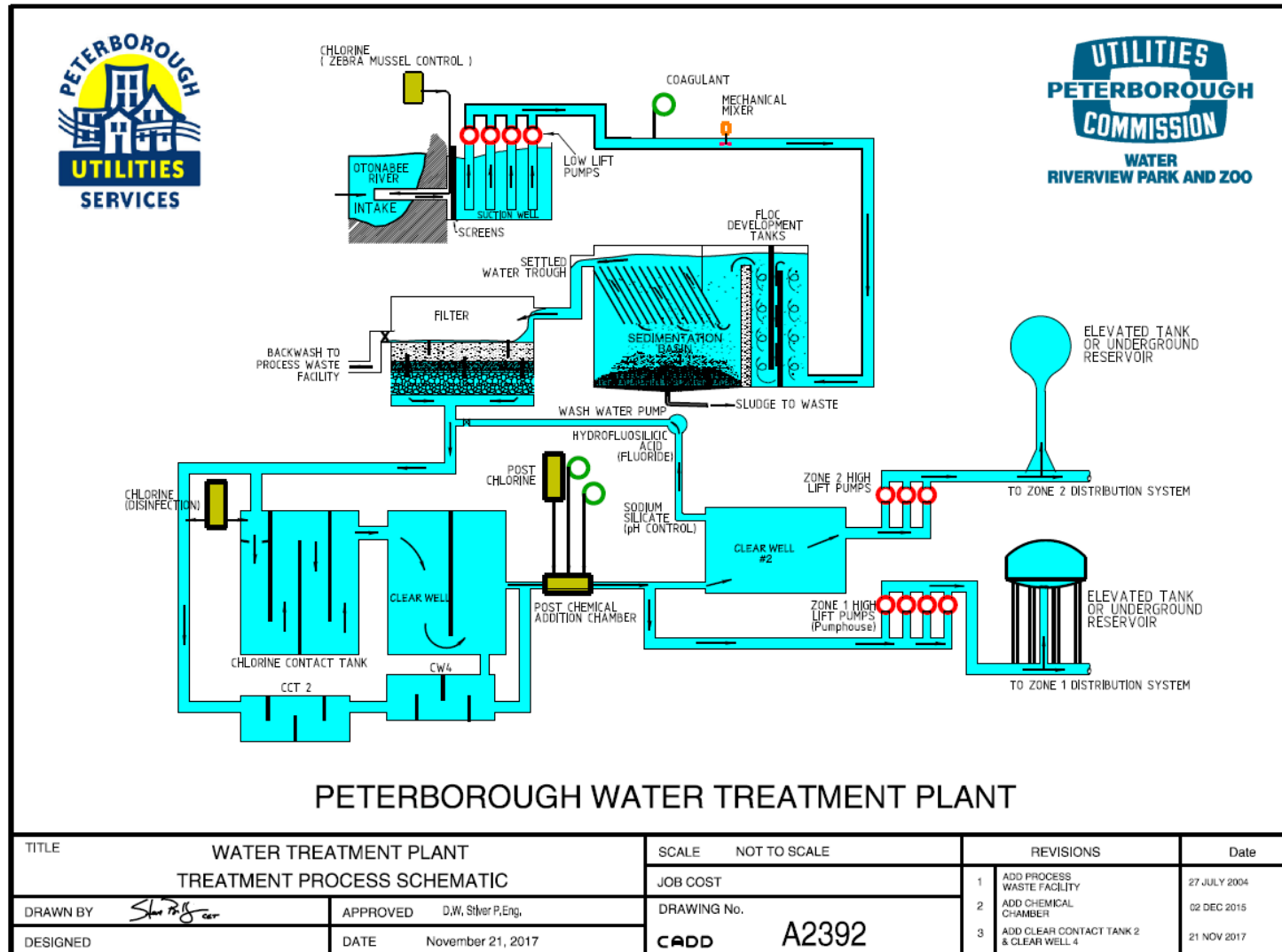
#### *6.1 Water Treatment Plant*

The plant is located on the west shore of the Otonabee River at 1230 Water Street North, Peterborough, adjacent the Riverview Park and Zoo. The plant was initially built in 1922 and expanded in 1952, 1965 and 1995. Dual intakes draw water from the Otonabee River (surface water) into the low lift pumping area where the raw water is coarse screened and pumped into the plant for full treatment. The conventional treatment process includes coagulation, flocculation, sedimentation, filtration and chlorine disinfection ([see Schematic A](#)).

Aluminum sulphate is used as the primary coagulant. Chlorine is used for primary and secondary disinfection. Other chemicals used are sodium silicate (pH control), and fluoride (dental benefits).

The current rated capacity of the plant is 104 ML/day. The Permit to Take Water currently authorizes water taking at 190.68 ML/d (132,743 L/m).

### Schematic A (Water Treatment Plant)



## 6.2 *Water Storage Tanks and Reservoirs*

Treated water is stored at various locations throughout the City of Peterborough in underground reservoirs and elevated storage tanks. Storage is used to supplement supply during times of high water demand and in emergency situations such as firefighting. The water storage capacity in the system is 48.15 Mega Litres (ML) as follows:

◆ Pressure Zone 1	High Street Elevated Tank Clonsilla Avenue Buried Reservoir	22.7 ML
◆ Pressure Zone 2	Towerhill Buried Reservoir	22.7 ML
◆ Pressure Zone 3	Sherbrooke Street Elevated Tank Milroy Drive Elevated Tank	2.75 ML

## 6.3 *Water Pumping Stations*

There are three individual pressure zones in Peterborough. Water supply is pumped from the plant or from the Water Street Pumphouse. Approximately one half of the City's water supply is pumped using water-driven turbine pumps powered by the Otonabee River flow. There are four water booster pumping stations around the city which pump water from lower pressure zones to higher pressure zones. Two of the most critical stations have diesel-powered backup in case of an electrical power outage.

## 6.4 *Water Distribution Piping System*

The water distribution system consists of approximately 408 kilometers of pipe (water mains), 2,069 hydrants and 24,695 individual water services. Hydrants are colour-coded according to the Ontario Fire Code requirements to indicate the available flow rate at a 20 psi residual pressure.

## 6.5 *Monitoring*

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

- ◆ Flow
- ◆ pH
- ◆ Temperature
- ◆ Raw water Flow
- ◆ Turbidity
- ◆ Chlorine dosage and residuals
- ◆ Fluoride

- ◆ Pressure
- ◆ Tank Water Level

### 6.6 *Raw Water Supply*

The watershed area supplying the Otonabee River upstream of the Peterborough Water Treatment Plant is illustrated 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 the municipalities of Smith-Ennismore-Lakefield, the City of Peterborough, Cavan-Millbrook-North Monaghan, and Otonabee-South Monaghan.

The Otonabee River is 45 km 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 kilometers.

The source of raw (untreated) water for Peterborough's drinking water is the Otonabee River. The Otonabee River water is of good quality and can be described as a moderately coloured water of low turbidity. The river water temperature ranges from 0°C (winter) to approximately 27°C (summer). The raw river water is a surface water supply, which means that it is considered to be an unprotected source. Accordingly, we assume that raw water always requires full treatment at the Peterborough Water Treatment Plant to make it drinkable or potable.

### 6.7 *General Characteristics of Raw water*

A brief description of the water characteristics as outlined below in the table:

Parameter	Units	Common Low Value	Normal Value	Common High Value
Turbidity	NTU	0.2	0.6	3.5
Colour	Colour unit	0	13	90
Temperature	°C	0	---	27
Hardness	mg/L CaCO <sub>3</sub>	90	105	250
Dissolved Organic Carbon	µg/L	4.0	5.0	5.6
Alkalinity	µg/L	75	90	95

Parameter	Units	Common Low Value	Normal Value	Common High Value
Sulfate	µg/L	8.0	8.5	9.0
Sodium	µg/L	5.0	6.0	6.5
Geosmin	µg/L	< 5	15	38
MIB	µg/L	< 5	10	25
E.coli	count/100 mL	0	15	200

### 6.8 Connections to other Drinking Water system

The Water Treatment Plant supplies potable water to the Township of Smith-Ennismore-Lakefield's (TSEL) subdivision of Woodland Acres. The subdivision is located off Water Street North on Woodland Drive and is connected directly to the Peterborough Water distribution system. The PUSI is responsible for all aspects of the supply of potable drinking water including distribution, maintenance, system pressure, treatment, monitoring and testing for regulations. The Township of Smith-Ennismore-Lakefield is the 'Owner' of this system as defined by the DWQMS. The distribution system supplies water to approximately 221 homes.

### 6.9 Historical, seasonal or common event-driven fluctuations

Type of Fluctuation	Description	Operational Challenges/ Threats
Historical Variation	Introduction of zebra mussels into source water have decreased the level of turbidity. The penetration of sunlight further into the water column allows deep-water algae to proliferate.	Algae and zebra mussel decay can cause geosmin and 2MIB formation. These are known to cause taste and odour complaints.
Seasonal Variation	With warmer source water there is an increase in taste and odour complaints.	Filtration consideration geosmin and 2MIB.
Seasonal Fluctuation	During the summer months there is a water use increase of around 30%, as a result the plant is running at 75% of the rated capacity (104ML/Day)	Summer lawn water restrictions are in place to promote conservation. The situation needs to be monitored seasonally to ensure that if coupled with low precipitation that water requirements are met.

Type of Fluctuation	Description	Operational Challenges/ Threats
Event Driven Fluctuation	Frazil ice can occur on very cold and clear winter nights before the river freezes over.	The ice can clog the intake pipes during the night. To prevent the clogging of the intake pipes it may be necessary to adjust the pump speed according to the O & M Manual.
Event Driven Fluctuation	Upstream spill.	A short term water treatment plant shut down can occur provided that the WTP is notified by outside sources in a timely manner and that the contamination is not drawn into the treatment system.
Event Driven Fluctuation	Low amount of precipitation may cause Trent Severn Waterway (TSW) to reduce flow (min level 15-17 m <sup>3</sup> /s) of water shed to maintain river and lake levels, this will decrease our flow, generally the TSW does this drastically.	We need to be aware of drastic flow reductions to maintain raw water flows into the plant for treatment.
Event Driven Fluctuation	Flooding, heavy rainfall or spring runoff will all cause large increases in turbidity.	The treatment of the drinking water would need to be altered to adjust for the increased turbidity. Increases in coagulant and chlorine levels as well as reducing the treatment speed to allow for greater reaction time will reduce the turbidity to normal plant effluent levels.

6.10 *Operational Challenges and Threats*

6.10.1 **Threats**

From a water quality health perspective (not considering aesthetics), the key threats expected and contingencies for the Otonabee River are:

- E.coli
  - Proper operation of the treatment multi-barriers are expected to eliminate threat
- Cryptosporidium
  - Proper operation of the treatment sedimentation and chemically assisted filtration barriers are expected to eliminate threat
- Disinfection By-Products
  - Optimization of processes to minimize organic content of water prior to disinfection using free chlorine

## 7.0 Risk Assessment Procedure

### Purpose

The purpose of the Risk Assessment Procedure is to describe the method used for the Peterborough Municipal 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 Critical Control Points in the drinking water system including treatment, storage, pumping and distribution.

### Related Document

Drinking Water Quality Management Standard -Element 7  
SOP-02-106 Risk Assessment

### Procedure

The Risk Assessment Procedure is outline in detail in the SOP-02-106.

## 8.0 Risk Assessment Outcomes Procedure

### Purpose

The purpose of this procedure is to detail the outcomes from the Risk Analysis procedure in paragraph 8 of this Operational Plan. The results include a list of ranked hazards with appropriate control measures, Critical Control Point's,

Control limits for CCP's, monitoring methods and method used for recoding and reporting deviation from CCP limits.

### Scope

This procedure is applicable to the risks identified by the Risk Analysis process as outlined in paragraph 7 of this Operational Plan, which covers the drinking water system including treatment, storage, pumping and distribution.

### Related Documents

Drinking Water Quality Management Standard - Element 8  
SOP-02-106 Risk Assessment

### 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. The SOP's 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 a Critical Control Point:

- |                                  |            |
|----------------------------------|------------|
| ▪ Loss of Coagulant              | SOP-02-112 |
| ▪ Primary Disinfection failure   | SOP-02-111 |
| ▪ Secondary Disinfection Failure | SOP-02-109 |
| ▪ Filtered Water Turbidity       | SOP-02-110 |
| ▪ Chemical Supply Contamination  | SOP-02-113 |

If a hazardous event is not considered a CCP then the method to control the hazardous event must be documented on the Risk Analysis Matrix (Appendix to SOP-02-106).

## **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 as well as the inter-relation between Quality Assurance and Material Management.

## Responsibilities and Authorities

The Water Utility Quality Assurance Coordinator 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 paragraph 19.0 but may be updated as result of organizational or staff changes.

## Related Documents

Drinking Water Quality Management Standard - Element 9  
Peterborough Utility Service Inc Organizational Chart  
SOP-02-008 Operator-In-Charge and Overall Responsible Operator Designation

### *9.1 Water Treatment and Distribution Organizational Chart*

The most current version of the PUSI Organizational Chart can be found on company intranet site.

### *9.2 Responsibility and Authorities - Owner*

#### **9.2.1 The City of Peterborough**

Since 1914, the City has delegated full control of the municipal water system to the Peterborough Utilities Commission. The City's role is to provide oversight for the PUC's operation, pass applicable by-laws and approve development charges.

#### **9.2.2 Peterborough Utilities Commission - Owner**

The Peterborough Utilities Commission (PUC) is a municipal services board for the City of Peterborough which has ownership and full command and control of the municipal drinking water system, 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 PUC.

The Peterborough Utilities Commission shall establish service levels and expectations by means of:

- ◆ Having a contract with Peterborough Utilities Services Inc. to manage operate, maintain, replace and rehabilitate the water system facilities;
- ◆ Approving an annual budget;
- ◆ Approving annual water rates;
- ◆ Review 5 and 10-year capital budget predictions;
- ◆ Establishing bylaws and policies.

The PUC shall monitor service levels and expectations by means of:

- ◆ Holding regular public Commission meetings to receive reports, communications and delegations;
- ◆ Reviewing quarterly financial and year-end statements;
- ◆ Receiving monthly operating reports.

### *9.3 Responsibility and Authorities - Operating Authority*

Peterborough Utilities Services Inc. (PUSI) is an Ontario Business Corporation registered private company, part of the Peterborough Utilities Group of Companies, with the City of Peterborough as the sole shareholder. PUSI has a written contract with the PUC to operate, maintain and improve the municipal drinking water system under the PUC's ownership. All operating and management staff directly responsible for the water system are employed by PUSI.

### *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 (PUSI) is aware of applicable legislations and regulations.
- Communication according to paragraph 12.0.
- Participation in the Management Review as per paragraph 20.0.
- Determine, obtain or provide the resources needed to maintain and continually improve the QMS.
- Encourage participation in industry associations and committees (AWWA, AWWARF, OMWA, OWWA.)

- To provide annual budget for training, attendance at conferences, workshops, seminars.

Top Management consists of the following persons in Peterborough Utilities Services Inc.:

- President & CEO
- Vice – President Water Utility
- Manager Water Utility
- Manager Water Treatment Plant

#### 9.5 *Responsibility and Authorities - Operational Management and Staff*

[Chart 1](#) in the Appendix gives a detailed description of the Key Responsibilities and Authorities of the Operational and Management Staff.

## 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 Peterborough.

### Related Documents

Drinking Water Quality Management Standard - Element 10  
H09-02 Continued Education Expense Reimbursement.  
SOP-02-008 Operator-In-Charge and Overall Responsible Operator Designation  
SOP-02-114 Satisfying Competencies.

### Procedure

The following personnel perform duties that directly affect the quality of the drinking water. The competencies are described in SOP-02-114.

- Water Treatment Operator
- Water Distribution Operator
- Manager Water Treatment and Supervisor Water Treatment
- Manager Water Utility and Water Distribution Supervisor

### 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-02-114.

## 11.0 Personnel Coverage

### Purpose

The purpose of this procedure is to document the procedure used at PUSI to ensure that sufficient personnel meeting the outline competencies in paragraph 10 are available to perform duties that directly affect the drinking water quality system.

### Scope

This procedure applies to water treatment and distribution system for the city of Peterborough

### General

Peterborough Utilities Service Inc. employs licensed operators, all of whom are required to have and maintain licenses (distribution or treatment or Water Quality Analyst) 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 "Standby Schedule". The schedule is prepared weekly by payroll. Each department submits information based on their department's annual standby schedule. This information is collated into a single document for the after hours call out through the answering service.

### Related Documents

Drinking Water Quality Management Standard - Element 11  
Operational Plan paragraph 10, Competencies  
SOP-02-008 Operator-In-Charge and Overall Responsible Operator Designation  
SOP-02-163 Lakefield Operator-In-Charge and Overall Responsible Operator Designation  
SOP-02-116 Personnel Coverage  
SOP-02-117 Business Continuity

### Procedure

The detailed procedure to ensure that sufficient competent personnel are available for duties that directly affect drinking water is contained in SOP-02-116.

### Collective Agreement

Employment for the WTP and distribution system is according to the terms and conditions of a collective agreement between Peterborough Utilities Services Inc. and IBEW Local 636. During a strike/lock-out the business continuity is maintained according to SOP-02-117 Business Continuity – Water Utility.

## **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, suppliers and the public.

### Related Documents

Drinking Water Quality Management Standard – Element 12  
SOP-02-102 DWQMS Communication

### Procedure

The Communication Procedure is outline in detail in the SOP-02-102.

## **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:

- Chlorine Gas
- Aluminum Sulphate
- Laboratory Services
- SCADA Services

### Related Documents

Drinking Water Quality Management Standard – Element 13  
SOP-03-005 Chemical Deliveries to the WTP  
SOP-02-115 Essential Supplies and Services

### Critical supplies and services list

The procedure by which PUSI ensures the quality and availability of essential supplies and services are outlined in SOP-02-115.

## **14.0 Review and Provision of Infrastructure**

### Purpose

The purpose of this procedure is to outline the method used at PUSI to annually review the infrastructure of the drinking water system. This review shall determine if the infrastructure is adequate to operate and maintain the drinking water system.

### Scope

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

### Related Documents

Drinking Water Quality Management Standard - Element 14  
Paragraph 20 Management Review  
SOP-02-118 DWQMS Infrastructure

### Procedure

The infrastructure is reviewed annually during the Management Review process outlined in paragraph 20 of the Operational Plan, additional details on the review and provision of infrastructure are provided in SOP-02-118.

## **15.0 Infrastructure Maintenance, Rehabilitation and Renewal**

### Purpose

The purpose of this procedure is to summarize the Capital Planning Approach that PUSI uses in order to maintain the City of Peterborough's drinking water system's infrastructure maintenance, rehabilitation and renewal programs.

### Related Documents

Drinking Water Quality Management Standard - Element 15  
SOP-02-118 DWQMS Infrastructure  
5-10 Year Capital Forecast

### Procedure

A summary of PUSI's infrastructure maintenance program of rehabilitation and renewal is described in SOP-02-118.

## **16.0 Sampling, Testing and Monitoring**

### Purpose

The purpose of the following procedure is to describe the sampling and monitoring and testing activities at the WTP 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 Book  
SOP-02-103 Sampling and Monitoring  
SOP 02-009 Procedure to Respond to Adverse Water Quality Results  
Daily Lab Analysis – Rounds (form # 03041)  
Sample Time (form # 03022)  
Daily Lab Analysis (form # 03085)

### Procedure

The procedure developed to meet the requirements of element 16; Sampling, Testing and Monitoring are described in SOP-02-103.

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

### Related Documents

Drinking Water Quality Management Standard – Element 17  
SOP-02-103 Sampling and Monitoring Procedure  
Instrumentation manuals

### Procedure

The procedure that described PUSI activities for the calibration and maintenance of measurement and recording equipment is outlined in SOP-02-103.

## 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.

### Scope

This procedure shall include all potential emergency situations or service interruptions for the water treatment and water distribution system for the City of Peterborough.

### Related Documents

Drinking Water Quality Management Standard – Element 18  
SOP-02-108 Emergency Preparedness and Response  
Municipal Emergency Plan for City of Peterborough



### Procedure

The Emergency Management procedure is outlined in SOP-02-108.

## **19.0 Internal Audit**

### Purpose

The purpose of the Internal Audit procedure is to describe the method used at PUSI to verify conformance to the Operational Plan and to the Drinking Water Quality Management System. Internal auditing is also a tool to be used to be proactive and continually improve the water quality management system.

### Scope

This procedure is applicable to the City of Peterborough Drinking Water System operations that are described within this Operational Plan.

### Related Documents

Drinking Water Quality Management Standard – Element 19  
Continual Improvement paragraph 21 of Operational Plan  
SOP-02-101 Internal Audit Procedure

### Procedure

The Internal Audit Procedure is outlined in detail in the SOP-02-101.

## **20.0 Management Review**

### Purpose

The purpose of this Management Review Procedure is to outline the method used at the Peterborough Utilities Services Inc. 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 identified in the Operational Plan.

### Responsibilities and Authorities

The Water Utility Quality Assurance Coordinator is responsible to the VP Water Utility Services for ensuring that the necessary documentation and records are maintained and made available for review by Management.

The DWQMS Representative is responsible to communicate the results of the Management Review to Top Management.

Top Management shall ensure a management review is conducted every 12 months

### Related Documents

Drinking Water Quality Management Standard – Element 20  
Operational Plan paragraph 21 Continual Improvement  
SOP-02-100 Management Review

### Procedure

The Management Review Procedure is outline in detail in the SOP-02–100.

## **21.0 Continual Improvement**

### Purpose

The purpose of this procedure is to describe the system used at Peterborough Utilities Commission to continually improve the effectiveness of the DWQMS by initiating timely corrective action on deficiencies identified in the Drinking Water Quality Management System, and to take preventative action where potential problems are identified.

### Scope

This procedure applies to the correction of actual or potential non-conformities in the drinking water QMS, or other systemic problems affecting the drinking water quality.

### Related Documents

Drinking Water Quality Management Standard – Element 21  
SOP-02-107 Continual Improvement  
Corrective Action Request (form # 02040)

## Procedure

The Corrective Action (Continual Improvement) Procedure is outline in detail in the SOP-02-107

## **22.0 DEFINITIONS**

Alum	Aluminum Sulphate
AWWA	American Water Works Association
AWWARF	American Water Works Association Research Foundation
CAR	Corrective Action Request
CRA	Condition Rating Analysis
DWQMS	Drinking Water Quality Management Standard
Floc	Combination of fine particulate matter and a chemical coagulant in the water treatment process, which allows for the removal of the particulate matter.
GIS	Geographical Information System
ML/d	Megalitres per day
MOECC	Ministry of Environment & Climate Change
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
PSI	Pounds per Square Inch
PUC	Peterborough Utilities Commission
PUSI	Peterborough Utilities Services Inc.
QMS	Quality Management System
µg/L	Micrograms per Litre
SCADA	Supervisor Control And Data Acquisition
SOP	Standard Operating Procedure
WTP	Water Treatment Plant

## Appendix 1

Chart 1 Responsibilities and Authorities Chart

Category 1		Staff who can have day-to-day direct affect on the water quality reaching the customer's premise	
Position	Key Responsibilities	Key Authorities	
Manager WTP	<ul style="list-style-type: none"> <li>• Regulatory compliance for treated water and operations at the WTP</li> <li>• Monitor water quality and demand</li> <li>• Supervision of operating staff and supervisors</li> <li>• Schedule work, allocate projects and resources, monitor progress</li> <li>• Develop procedures to optimize water quality and reliability</li> <li>• Assist in selecting staff and their training and development</li> <li>• Work safety program</li> <li>• Report issues to the V.P. Water Utility as necessary</li> <li>• ORO (when present during business hours)</li> </ul>	<ul style="list-style-type: none"> <li>• Day-to-day operations of the WTP</li> <li>• Direct supervisors and staff</li> <li>• Overseeing adverse water quality incidences</li> <li>• Develop departmental practices</li> <li>• Administer union agreement</li> <li>• Arrange for training of supervisors and staff</li> <li>• Schedule construction activities as they affect the WTP operations</li> <li>• Expenditures up to \$5000 without supervisor approval</li> </ul>	
Water Treatment Plant Operations & Water Quality Supervisor	<ul style="list-style-type: none"> <li>• Assist with regulatory compliance particularly as it applies to water quality</li> <li>• Assist to monitor water quality and demand</li> <li>• Supervise WQA and other staff</li> <li>• Assume Manager WTP duties and responsibilities when the Manager WTP is absent</li> <li>• Assist in training and development of staff</li> <li>• Report issues to the Manager WTP as necessary</li> <li>• ORO when Manager WTP is absent (when present during business hours)</li> <li>• Purchasing Chemical Suppliers for WTP</li> </ul>	<ul style="list-style-type: none"> <li>• Direct staff in day-to-day operations and maintenance activities</li> <li>• Recommend to the Manager WTP ways to improve water quality and operational effectiveness</li> <li>• Act as Manager WTP when the Manager WTP is absent</li> <li>• Expenditures up to \$1500 without supervisor approval</li> </ul>	

Category 1		
Staff who can have day-to-day direct affect on the water quality reaching the customer's premise		
Position	Key Responsibilities	Key Authorities
Water Treatment Plant Operations & Maintenance Supervisor	<ul style="list-style-type: none"> <li>Supervise staff work, safety and progress</li> <li>Report issues to the Manager WTP as necessary</li> <li>ORO , as required (when present during business hours)</li> </ul>	<ul style="list-style-type: none"> <li>Direct staff in day-to-day operations and maintenance activities</li> <li>Recommend to the Manager WTP ways to improve operational effectiveness</li> <li>Expenditures up to \$1500 without supervisor approval</li> </ul>
WTP Operator	<ul style="list-style-type: none"> <li>Perform specified duties as instructed within established parameters for operating the WTP</li> <li>OIC</li> <li>ORO as assigned (non-business hours)</li> </ul>	<ul style="list-style-type: none"> <li>Operational discretion as delegated by the Manager WTP</li> </ul>
WTP Maintenance Operator	<ul style="list-style-type: none"> <li>Perform specified duties as instructed within established parameters for operating the WTP</li> <li>OIC</li> <li>ORO as assigned (non-business hours)</li> </ul>	<ul style="list-style-type: none"> <li>Operational discretion as delegated by the Manager WTP</li> </ul>
Manager Water Utility	<ul style="list-style-type: none"> <li>Oversee the daily operations and maintenance of the water distribution system</li> <li>Overall daily planning of work related to the operations and maintenance of the water distribution system</li> <li>Coordinate work with capital program</li> <li>Develop procedures to optimize effectiveness of department</li> <li>Assist in selecting staff and their training and development</li> <li>Work safety program</li> <li>Report issues to the V.P. Water Utility as necessary</li> </ul>	<ul style="list-style-type: none"> <li>Day-to-day operations of the Water Distribution Dept.</li> <li>Direct supervisors and staff</li> <li>Overseeing adverse water quality incidences for tests taken by WD staff</li> <li>Develop departmental practices</li> <li>Administer union agreement</li> <li>Arrange for training of supervisors and staff</li> <li>Schedule construction activities as they affect the water distribution operations</li> <li>Expenditures up to \$5000 without supervisor approval</li> </ul>
WD Supervisor	<ul style="list-style-type: none"> <li>Supervise staff work, safety and progress</li> <li>Report issues to the Manager WTP as necessary</li> <li>ORO when Manager Water Utility is absent (when present during business hours)</li> </ul>	<ul style="list-style-type: none"> <li>Direct staff in day-to-day operations and maintenance activities</li> <li>Recommend to the Manager WTP ways to improve operational effectiveness</li> <li>Expenditures up to \$1500 without supervisor approval</li> </ul>

Category 1		
Staff who can have day-to-day direct affect on the water quality reaching the customer's premise		
Position	Key Responsibilities	Key Authorities
Distribution Operator	<ul style="list-style-type: none"> <li>• Perform specified duties as instructed within established parameters for operating the water distribution system</li> <li>• OIC/ORO as assigned (non-business hours)</li> </ul>	<ul style="list-style-type: none"> <li>• Operational discretion as delegated by the Manager WTP</li> </ul>

Category 2		
Staff who can have day-to-day indirect affect on the water quality reaching the customer's premise		
Position	Key Responsibilities	Key Authorities
Water Quality Analyst	<ul style="list-style-type: none"> <li>• Daily operational water quality testing</li> <li>• Communication of water quality testing results to appropriate management and staff</li> <li>• Customer concern response</li> </ul>	<ul style="list-style-type: none"> <li>• Maintain and calibrate analytical equipment according to manufacturer or industry standards</li> <li>• Respond to customer water quality complaints</li> </ul>
WTP Maintenance Mechanic	<ul style="list-style-type: none"> <li>• Installation, maintenance and troubleshooting of mechanical equipment</li> </ul>	<ul style="list-style-type: none"> <li>• Carry out work in an efficient manner that has minimal impact on operations</li> </ul>
WTP Maintenance Electrician	<ul style="list-style-type: none"> <li>• Installation, maintenance and troubleshooting of electric and electronic equipment</li> </ul>	<ul style="list-style-type: none"> <li>• Carry out work in an efficient manner that has minimal impact on operations</li> </ul>
V.P. Water Utility	<ul style="list-style-type: none"> <li>• Establish water utility capital budget and review/approve annual operating budgets</li> <li>• Monitor regulatory framework and advise managers of important issues</li> <li>• Report to owner</li> <li>• Manage overall budget and expenditures</li> </ul>	<ul style="list-style-type: none"> <li>• Provide day-to-day direction for the water utility</li> <li>• Approve expenditure up to \$50,000 in accordance with purchasing policy</li> <li>• Approve budget changes within the approved budget amount</li> <li>• Authority to declare a water utility emergency</li> </ul>
Water Utility Engineer	<ul style="list-style-type: none"> <li>• Establish distribution system capital program and monitor progress</li> <li>• Contract administration</li> <li>• Coordinate capital work with operating departments</li> </ul>	<ul style="list-style-type: none"> <li>• Manage staff who oversee field activities for distribution system capital program</li> </ul>

Category 3		Staff who can have an occasional indirect effect on the water quality reaching the customer's premise	
Position	Key Responsibilities	Key Authorities	
Senior Engineering Technician	<ul style="list-style-type: none"> <li>• Design of linear infrastructure and associated facilities</li> <li>• Supervise field construction</li> </ul>	<ul style="list-style-type: none"> <li>• Ensure construction activities are in accordance with specifications and standards</li> </ul>	
President & CEO	<ul style="list-style-type: none"> <li>• Corporate direction</li> </ul>	<ul style="list-style-type: none"> <li>• Provide day-to-day direction for the entire corporation</li> <li>• Approve expenditure up to \$250,000 in accordance with purchasing policy</li> <li>• Authority to declare an emergency situation</li> <li>• Authority to alter outside water use restrictions</li> </ul>	
Chief Financial Officer & VP Corporate Services	<ul style="list-style-type: none"> <li>• Corporate direction and overall financial positioning</li> </ul>	<ul style="list-style-type: none"> <li>• Provide day-to-day financial direction for the entire corporation</li> </ul>	
Purchasing and Materials Manager	<ul style="list-style-type: none"> <li>• Arrange for purchase of supplies, equipment and materials</li> </ul>	<ul style="list-style-type: none"> <li>• Establish purchasing criteria and award contracts in consultation with operating departments</li> </ul>	
Water Utility Quality Assurance Coordinator	<ul style="list-style-type: none"> <li>• Development of DW Operational Plans</li> <li>• Internal Audit</li> <li>• Operational plan update and Maintenance</li> <li>• Training on Operational Plan and DWQMS</li> <li>• Liaise with Registrar to schedule audits, respond to audit finding, provide documentation</li> <li>• Management Review</li> <li>• QMS Representative</li> </ul>	<ul style="list-style-type: none"> <li>• Issue Corrective Action</li> <li>• Update Operating Procedures</li> </ul>	



Appendix 2

