



City of North Bay Drinking Water System

Quality Management System Operational Plan

The Corporation of the City of North Bay
Owner and Operating Authority

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Introduction

The use of quality management systems has repeatedly proven to be beneficial to businesses in terms of communication, accountability, quality, efficiency and productivity.

The following recommendations were made by Justice O'Connor in the Part II report of the Walkerton Inquiry,

- Drinking water systems should be operated by authorities that are accredited based on successful third party audits conducted by a certified accrediting body.
- The Ministry of the Environment, in partnership with other relevant stakeholders, should develop a Drinking Water Quality Management Standard against which the third party audits will be conducted.
- All municipalities should prepare Operational Plans describing how the requirements of the Quality Management Standard are achieved.

In conformance with the MOE's prescribed Drinking Water Quality Management Standard, the City of North Bay has developed and implemented an Operational Plan that outlines the processes and procedures for the overall quality management of the drinking-water system.



1. Quality Management System

This Operational Plan addresses the requirements of the Drinking Water Quality Management Standard for the City of North Bay water treatment and distribution system. The City of North Bay is the Owner and Operating Authority for the Waterworks. The Owner is represented by the Council. Top Management of the Operating Authority is represented by the Director of Public Works.

The Quality Management System and its several components are either contained or referred to within the body of the Operational Plan. All internal QMS Procedures, those required by the DWQMS, are reference in this plan and included as appendices.

2. Quality Management System Policy

The Corporation of the City of North Bay Quality Management System Policy

The City of North Bay owns, operates and maintains the North Bay Water Treatment Plant and the City of North Bay Distribution system.

The City of North Bay Water and Waste Water Operations shall:

- Provide consumers with a supply of safe drinking water
- Strive to protect public health, the environment and property in the operation of the drinking-water system
- Maintain and continually improve upon its Quality Management System
- Operate and maintain the drinking-water system in compliance with all applicable legislation and regulations
- Communicate this policy to the Owner, the Operating Authority Personnel and the Public

The Quality Management System Policy shall be posted in a public area of the Municipal offices, Public Works Office, the City website, and the drinking water treatment plant.



3. Commitment and Endorsement

The Owner (represented by the Mayor) and Top Management have endorsed this Operational Plan as evidenced by a Resolution of Council # 2019-235 on the 6th Day of June, 2019, and the dated signature below.

Director of Public Works: Domenic Schiavone (Top Management)

Top Management shall further demonstrate its endorsement of this Operational Plan shall by:

- a.) Ensuring that a QMS that meets the requirements of the DWQMS has been developed, communicated and effectively implemented and that necessary resources are provided for the maintenance and improvement of the same, and
- b.) Ensuring that those responsible for the maintenance and improvement of the QMS and the waterworks are aware of all applicable legislation and regulations are they pertain to the production and delivery of safe drinking water.

4. Quality Management System Representative

The **Senior Facilities and Environment Engineer** (Karin Pratte) has been appointed by Top Management to the role of QMS Representative for Water Treatment.

The **Manager of Operations Water and Wastewater** (Scott Taggart) has been appointed by Top Management to the role of QMS Representative for water distribution.

The QMS Representative has the responsibility and the authority to administer the QMS. Those responsibilities include:

- a.) Ensuring that the processes and procedures required for a QMS that are consistent with the type, size and complexity of the subject waterworks, are documented, implemented and maintained.
- b.) Ensuring that processes and procedures are in place for reporting on the performance of the QMS to Top Management, including any need for improvement.
- c.) Ensuring that a robust Document Control procedure has been developed and implemented to ensure documentation remains current and are readily available.
- d.) Supporting Top Management's commitment by taking action to ensure that all applicable legislation and regulations, and relevant aspects of the QMS are effectively communicated, as appropriate to Public Works personnel.
- e.) Promoting the benefits and value of the QMS to all drinking-water operations stakeholders.

From time-to-time Top Management may assign additional responsibilities that are relevant to the maintenance of the Management System, as conditions warrant, to the QMS Representative.



5. Documents and Record Control

A Document and Records Control Procedure (QMS-01) has been documented and implemented for the City of North Bay drinking-water operations QMS. The procedure can be found in Appendix A. The procedure references a Master List of Documents which can also be found in Appendix A.

The QMS Representatives ensures that current versions of all documents are in use at all times through the development, implementation and regular audit of the Document Control and Records Control Procedure.

The Document and Records Control procedure also ensures that the records required by the DWQMS and the Operational Plan are properly maintained for use, protected, available when and where required, retained and properly disposed of.

6. Drinking Water System

General

The drinking water system consists of a SCADA controlled membrane filtration system with ultraviolet and chlorine disinfection systems, and fluoride addition prior to entry from the high-lift into the distribution system.

The distribution system consists of Ellendale Reservoir, Pump Station and Re-chlorination facility, the Birch's Road Standpipe and Re-chlorination Station, the Judge Avenue Valve Chamber, the CFB Standpipe, the Canadore Pumping Station, Laroque Standpipe, Cedar Heights Booster Station and Airport Standpipe.

The distribution facilities are equipped with continuous water quality monitoring analyzers to ensure sufficient disinfectant residual is maintained.

Standby power is available at all facilities in the event of a power outage.

Raw Water Supply

The Raw water is taken from Trout Lake through a 1200mm polyethylene pipe. The intake is located approximately 300m from the shoreline of Delany Bay at a depth of roughly 21.5m. The Raw water is monitored for pH, temperature, and turbidity.

Fluctuations can occur for many reasons including flooding, water shortages, chemical spills and other abnormal events. Operational challenges for the water treatment plant include blue green algae blooms in the summer. This requires weekly sampling of Microcystin from May 15th to October 15th of each year.

Treatment

The City of North Bay Water Treatment Plant (WTP) is located at 248 Lakeside Drive in North Bay. The WTP services a population of approximately 56,000 with Permit To Take Water of up to 79,500 cubic meters per day.

Raw water enters two parallel well chambers equipped with 2 manual screens, 5 vertical turbine pumps (4 duty and 1 standby) each rated @ 20 ML/day.



Water is pumped through 5 (4 duty and 1 standby) 300 micron feed strainers before the water enters the main treatment plant processing. The main treatment plant processing consists of:

- Primary and secondary membrane filtration (11 pressurized primary membrane rack treating the raw water and 2 secondary pressurized membrane racks treating non-chemical backwash water)
- Primary and secondary UV reactors (3 600mm UV reactors [2 duty and 1 standby] and 2 300mm UV reactors to treat filtered water and backwash)
- Pre and post chlorination (2 baffled chlorine tanks [688 cubic meters and 502 cubic meters])
- Alkalinity adjustment (Chlorine contact tank/High lift pump well junction)
- Corrosion control with control max
- Fluoride addition
- High-lift pumping (2 High lift wells each with a combined capacity of 500 cubic meters. 5 (4 duty and 1 standby) vertical turbine pumps 2 variable speed and 3 constant speed each rated @ 20ML/Day.)

A process schematic has been included in Appendix L to illustrate the flow of raw water through the treatment process and into the distribution system.

Distribution

The treated water is pumped to the distribution system. The distribution facilities can be described as follows:

Ellendale Reservoir, High lift Pumping Station and Re-chlorination Facility. The facility includes a concrete reservoir with capacity of 18,200 cubic meters of water. The facility is equipped with a sodium hypochlorite re-chlorination system, on-line free chlorine analyzer, a generator and high lift pumps.

Birch's Road Standpipe and Re-chlorination Station. The facility includes a 11,775 cubic meter steel water standpipe equipped with sodium hypochlorite re-chlorination, on-line free chlorine analyzer and generator.

CFB Standpipe consists of a 2280 cubic meter standpipe.

Airport Standpipe and Pumping Station consists of a 4,000 cubic meter standpipe and high lift pumping station along with on-line free chlorine analyzer and generator.



Cedar Heights Pumping Station is equipped with high lift pumps and an on-line free chlorine analyzer along with a generator. The Cedar Heights Standpipe consists of a 4,000 cubic meter standpipe.

The distribution system consists of approximately 296kms of pipe servicing 5 pressure zones. Pipes in the system range in size and materials:

- 100mm to 900mm
- Cast iron, ductile iron
- PVC
- Asbestos cement
- Concrete pressure pipe

Pipes in the distribution system are up to 80+ years of age. A Distribution System Diagram can be found in Appendix L.

The Distribution System also consists of 1 reservoirs, 4 standpipes and 3 pumping station which include:

- Ellendale reservoir and pumping station
- CFB Standpipe
- Cedar Heights Pumping Station
- Cedar Heights Standpipe
- Airport Standpipe
- Birch's road standpipe

Downstream Processes

There are no downstream processes that the City of North Bay drinking-water system relies upon.



7. Risk Assessment

A Risk Assessment was conducted on the North Bay drinking water system. The water was followed from the source to the curb-stop to identify potential and actual hazardous events which may in turn present hazards to the process, the equipment, to the water or any combination thereof.

A Risk Assessment Procedure (QMS-02) is located in Appendix B.



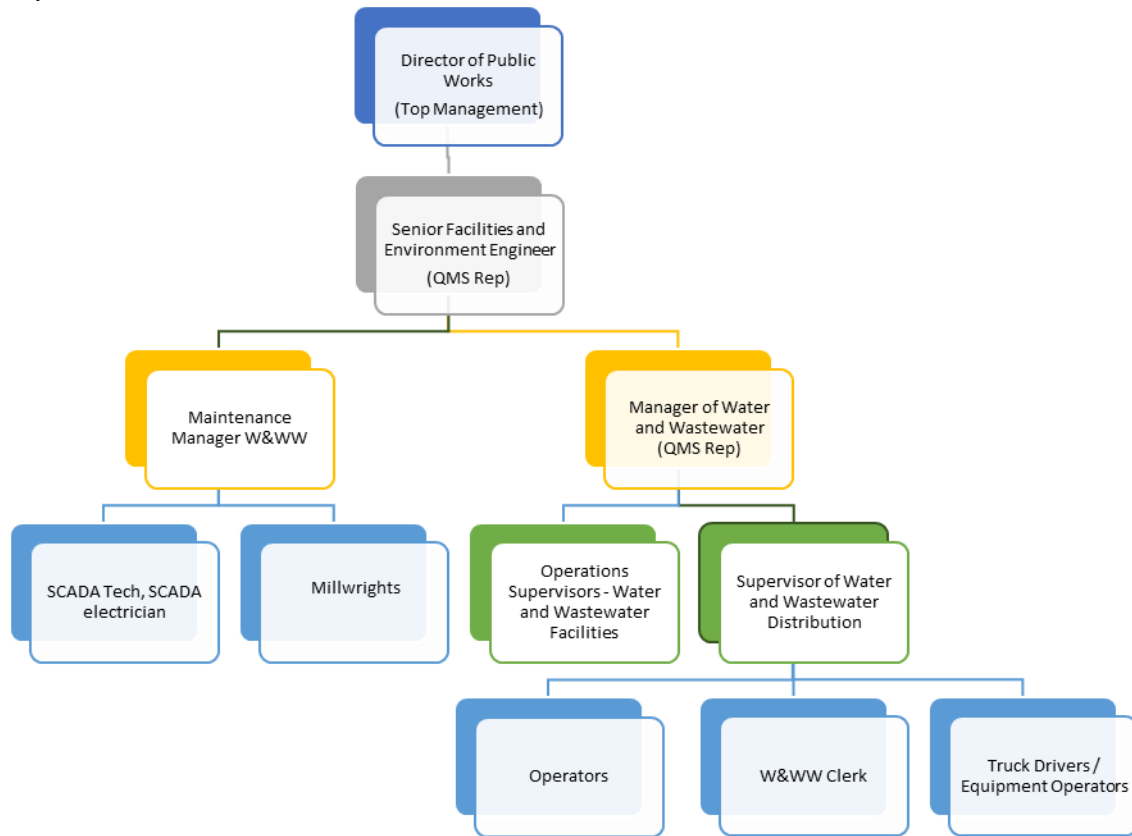
8. Risk Assessment Outcomes

The Risk Assessment Spreadsheet shows the identified hazards and hazardous events, ranked risks, control measures, and reference to monitoring and response procedures. The Risk Assessment Spreadsheet can be found in Appendix B.

9. Organizational Structure, Roles, Responsibilities and Authorities

Organization Chart

The description of the organizational structure shall be kept current and communicated to the Operating Authority Personnel and the Owner by the QMS Representative.



Key water system roles are listed in Table 9-1, with associated responsibilities, authorities and competencies. This information is communicated as per the Communication Procedure.

Top Management includes: Director of Public Works.

They, along with both QMS representatives, the Operations Manager Water/Wastewater and other staff as required attend the Management Review meeting.

Table 9-1: Roles, Responsibilities, Authorities, Competencies

Role	Responsibility	Authority	Required Competencies
Director of Public Works (Top Management)	- Establish operating procedures and provide guidance and direction to staff to ensure compliance with legislation and regulations - Provide support to the City Engineer, as requested - Establish departmental goals and objectives - Review and approve operational changes - Provide technical guidance - Co-ordinate preparation of budgets - Maintain current knowledge of applicable legislation and regulations - Act in the absence of the City Engineer on issues concerning drinking-water	- Make decisions pertaining to the maintenance and continual improvement of the QMS - Approve changes to operations	- Post-secondary degree in Engineering or Applied Science - Minimum 10 years experience - Working knowledge of the QMS - Extensive knowledge of the principles of drinking-water treatment and distribution - Project Management Certification (desired)
Manager of Operations W&WW (QMS Rep) Maintenance Manager W&WW	- Oversee daily maintenance of water treatment and distribution (including scheduling or programs and work) - Ensure compliance of all reporting supervisors and staff to applicable legislation and regulations - Provide guidance and direction to supervisory staff and operators - Report on the status of	- Authority to undertake the listed responsibilities - Recommend methods, material, equipment and processes to improve operational effectiveness, - To ensure maintenance of a safe workplace	- Post-secondary education - Valid driver's license - Valid operator's certificate - Supervisory experience Municipal construction, Heavy equipment operation - Familiar with: Applicable

	the operations and the QMS to Top Management • Scheduling of training and maintenance of training records • Production and delivery of safe drinking-water to the consumer • Maintenance of the drinking-water system assets • Ensuring a safe working environment and that safe working practices are maintained and followed. • Support budget preparation activities • Monitor expenditures • Maintain current inventory of assets • Facilities maintenance • Point of contact for MOE and MOL inspections •		legislation and regulations for drinking-water systems including the Health & Safety Act and the Highway Traffic Act
Senior Facilities and Environment Engineer (QMS Representative)	• Maintain regulatory compliance • Monitor water quality & demand • Develop, implement and maintain the QMS • Identify needs for improvement in the QMS • Ensure that all personnel are aware of all applicable legislative requirements that are relevant to the operation of the works • Stay up to date on changes to relevant legislative and regulatory requirements • Promote the QMS throughout the Operating Authority • Organize and track	• Scheduling of projects and DWQMS activities • Continual Improvement liaison • Communicate changes in legislation and regulations to all relevant staff • Follow-up on MOE drinking-water reports in support of the Operations Manager • Provide direction to Supervisor(s) and other operations staff as necessary	• Registration as Professional Engineer • Computer literacy • DWQMS Training • Knowledge of drinking-water and other applicable legislation and regulations

	training hours of reporting staff • Coordinate management review and track action plans.		
Operations Supervisor, Water and Wastewater Facilities	• Production and delivery of safe drinking-water to the consumer • Maintenance of the drinking-water system assets • Ensuring a safe working environment and that safe working practices are maintained and followed. • Respond to emergency situations at water and wastewater facilities • Provide input to Engineering	• To undertake the responsibilities as listed and any others as assigned	• Valid water operator's certification • Familiarity with: Safety Drinking Water Act, Occupational Health & Safety Act, Municipal construction, Heavy equipment operation • Supervisory experience (desired) • Strong knowledge of water and wastewater process • Strong knowledge of applicable Legislation and Regulations • Post-secondary education
Supervisor(s), Water and Wastewater	• Maintenance and continual improvement of the QMS • Production and delivery of safe drinking-water to the consumer • Maintenance of the drinking-water system assets • Ensuring a safe working environment and that safe working practices are maintained and followed. • Maintain activity and maintenance records	• To undertake the responsibilities as listed and any others as assigned.	• Valid water operator's certification • Post-secondary education (CEUs) • Familiarity with: Safety Drinking Water Act, Occupational Health & Safety Act, Municipal construction, Heavy equipment operation • Supervisory experience (desired)
Charge Hands	• Planning, supervision	• To undertake the	• Minimum Grade 12

	and co-ordination of work and work crews • Ensure adherence to applicable legislation and regulations during the course of work being performed • Provide direction and guidance to operators • Participate in system maintenance and repairs, as needed • Liaise with other utilities as necessary • Ensure sufficient use and control of City owned materials, services and contracted services • Identify and eliminate risk to workers and the public • Participation in the Duty System	responsibilities as listed and any others as assigned.	or equivalent (may be previous experience) • Valid water operator's certification • Minimum 3 years as an Operator • Clerical ability to complete records and reports • Extensive knowledge of applicable safety regulations and procedures
Operators	• Conduct day-to-day operational duties, maintenance and other activities required, as directed, to ensure the ongoing production and distribution of drinking-water for the City of North Bay • Conduct all assigned activities in compliance with applicable legislation and regulations and in conformance with the QMS • Maintain appropriate certification and accreditation • Provide suggestions and recommendations for the improvement of the QMS • Report to Chargehand(s) and Supervisor(s) on the performance of the drinking-water system	• To undertake the responsibilities as listed and any others as assigned.	• Minimum Grade 12 or equivalent (may be previous experience) • Valid water operator's certification • Minimum 1 year as an OIT • Working knowledge of applicable safety regulations and procedures • Mechanical aptitude • Can comprehend and follow instructions and directions • Clerical ability to complete records and reports

	• Identify and cause to be eliminated any risks to workers and the public • Participate in the Duty System		
W&W/W Clerks	• Provide administrative support to Water and wastewater management and professional staff • Conduct all assigned activities in compliance with applicable legislation and regulations and in conformance with the QMS • Maintain activity and maintenance records • Draft/edit all QMS documents, legal agreements, RFPs, RFIs, tenders and quotes • Ensure that the current versions of documents required by the QMS are in use at all times • Organize and co-ordinates meetings, drafts agendas, and prepares and maintains minutes • Receives, records, distributes and tracks water and wastewater public/customer complains • Maintains records for the department using QMS documents and records procedures and approved corporate Records Management and Information Systems	• To undertake the responsibilities as listed and any others as assigned.	• One Year Post Secondary Diploma in a relevant field or equivalent combination of education and experience • Three to five years progressive relevant experience • Demonstrated ability to respond to a fast-paced changing environment • Demonstrated exceptional planning, organizing and time management • Demonstrated judgement and competency in interpersonal communication • Demonstrated exceptional research, analytical and writing skills • Thorough understanding, including detailed functional knowledge of technology and programs such as: Microsoft Office, Records Management, Relevant financial/information systems, website content management software.





10. Competencies

The Desired Competencies for the City of North Bay personnel who perform duties that directly affect drinking water quality are identified in Table 9-1 (See Element 9 – previous). Training activities to ensure the desired competencies are achieved and maintained are planned and undertaken (see Responsibilities – Manager of Operations).

The QMS Representatives shall ensure that water personnel, are aware of the relevance of their duties and how they affect safe drinking water. This activity may take place during the daily start-up meeting, or through special sessions organized by the QMS Representative.

Operators and Charge-hands are responsible for maintaining their certifications. A training Plan is developed and documented based upon the required training of all operational staff and managers.

All new staff members are required to participate in orientation training.

Supervisors keep the operations staff informed of any changes to procedures.

Records of competency and training are maintained.



11. Personnel Coverage

The requirement for Personnel Coverage is addressed in the procedure (QMS-03) located in Appendix C.

Coverage is provided through a combination of on-site and on-call staffing supplemented by SCADA based alarms and notification.

The normal hours for treatment operations are Monday to Friday 7:30am to 4:00pm for treatment staff. There is an “On-Call” schedule that identifies the On-Call operator for the off-hours.

Water distribution staff provides coverage on weekdays from 7:30am – midnight. Remaining hours are covered by on-call staff.



12. Communications

The Communications Procedure (QMS-04) describes the process for ensuring that relevant aspects of the QMS are communicated between Top Management and the Owner, engineering & public works personnel, suppliers and the public. The procedure is located in Appendix D.



13. Essential Supplies and Services

The Essential Supplies and Services Procedure (QMS-05) contain a list of all supplies and services deemed essential for the treatment and delivery of safe drinking water and their procurement. The procedure is located in Appendix E.



14. Review and Provision of Infrastructure

A procedure for the Review and Provision of Infrastructure (QMS-06) has been developed and implemented.

The Infrastructure Review procedure is included in Appendix F.

15. Infrastructure Maintenance, Rehabilitation and Renewal

Infrastructure Rehabilitation and Renewal

It is from the Infrastructure review that Top Management, in conjunction with input from the Owner, shall establish priorities for the rehabilitation and renewal, as appropriate, of the drinking water infrastructure. The process for managing infrastructure rehabilitation and renewal is documented in the Infrastructure Review Procedure.

Infrastructure Maintenance

The Engineering and Environmental Services, Water and Wastewater Department shall conduct planned and unplanned maintenance on the drinking water systems under its control.

Planned maintenance of treatment equipment, instruments and systems is as per the manufacturer's recommendations and the practical judgment of the Manager of Operations, Supervisors, Charge-hands and Operators. All planned maintenance is scheduled, and conducted by competent operators and/or qualified contractors (i.e. instrument calibration and maintenance, excavation, etc...).

Planned maintenance of the Distribution Systems includes Valve Exercising, Hydrant and Main Flushing.

Unplanned maintenance results from equipment malfunction or breakage. The Manager of Operations Facilities, Operations Manager Distribution and/or Operations Supervisor shall respond to unplanned maintenance requirements during working hours and delegate the necessary staff to the task(s). The On-call operator shall respond during off hours. From time-to-time it may be necessary for the On-Call Operator to request additional labour and/or services. Unplanned maintenance shall be documented.

Rehabilitation and renewal programs are determined annually. The Director Public Works makes recommendations to the City Engineer for such programs based upon the results of Infrastructure Review and the status of existing programs.

The effectiveness of the Infrastructure Maintenance, Rehabilitation and Renewal programs shall be reviewed and discussed during the Management Review



Process. See appendix F for full list of completed, current, and future infrastructure maintenance, rehabilitation, and renewal projects.



16. Sampling, Testing and Monitoring

Sampling

A Sampling, Testing and Monitoring Procedure (QMS-07) has been developed for the drinking water system and is attached in Appendix G.



17. Measurement and Recording Equipment and Maintenance

A Calibration Procedure (QMS-08) has been developed and implemented that conforms to the requirements of the DWQMS and is attached in Appendix H.



18. Emergency Management

The Emergency Management procedure (QMS-09) has been developed and implemented and is located in Appendix I.



19. Internal Audit

Internal Audits

The Internal Audit Procedure (QMS-10) is attached in Appendix J.



20. Management Review

A Management Review Procedure (QMS-11) has been developed and implemented and is attached in Appendix K.

21. Continual Improvement

The City of North Bay has recognized the Quality Management System as a priority and is committed to implementing any changes deemed necessary through annual audit and reviews, owner and employee suggestions/recommendations and consumer input in order to continually make improvements to our drinking water system. A Corrective Action Report Procedure (QMS-12) has been developed and implemented and is attached in Appendix M.

Document History

Revision	Date	Description	By
0	02/Nov/2009	Original Release – Dist System OP	K. Morin-Strom
1	27/June/2011	Combine OP for WTP & Dist. System	K. Morin-Strom / S.Taggart
2	16/July/2012	Revised OP for WTP & Dist. System	K. Morin-Strom / S.Taggart
3	16/Nov/2012	Revised OP for WTP & Dist. System after Internal Audit	K. Pratte / S.Taggart
4	21/Nov/2013	Revised OP with new Org. Chart	K.Pratte
5	28/Aug/2014	Revised with new Org. Chart, Positions	K.Pratte
6	24/Sept/2015	Revised with new Org. Chart, Positions	K.Pratte
7	19/Sept/2016	Revised with new Org. Chart, Positions	K.Pratte
8	24/July/2018	Revised with new Org. Chart, Positions	K.Pratte
9	23/Nov/2018	Revised position titles & update internal audit	K.Pratte
10	30/Jul/2019	Revised position titles, with new Org. Chart, & updated with Version 2.0 requirements	K.Pratte
11	16/Dec/2019	Revised Position titles, with	K.Pratte

		new Org. Chart & added W&WW Clerk	
12	5/Jan/2021	Update QMS-1 Removed references to WTP hard copy	R. Morelli
13	22/Oct/2021	Update	K. Pratte
14	01/Jan/2022	Update Org. Chart	K. Pratte
15	14/Dec/2022	Update Org. Chart – Man. Review attendees	K.Pratte

	QMS Procedure	Proc.: QMS-01 Issued: 5-Jan-21 Rev.#: 6 Pages: 1 of 3
Reviewed by: QMS Representative	Approved by: Top Management	

Document and Records Control Procedure

1.0 Purpose

This procedure describes the method for control of QMS documents and records.

2.0 Scope

This procedure applies to all QMS Documents and QMS Records pertaining to the City of North Bay Water Treatment Plant, Facilities and Distribution System.

3.0 Responsibility

W&WW Clerks
Manager of Operations
QMS Rep
All Water Operations Staff

4.0 Definitions

None

5.0 Procedure

- 5.1 Documents and records required by the City of North Bay water & wastewater operations QMS are listed in Master List of Documents & Records (Appendix A).
- 5.2 All internally generated QMS documents are generated in/by electronic media to ensure legibility and control.
 - 5.2.1 Procedure and SOP Templates have been created in order to ensure consistency of format and document identification.
 - 5.2.2 All handwritten records shall be legible and rendered in permanent ink or other non-erasable marker.
- 5.3 All QMS Procedures shall be created and updated by W&WW Clerks, reviewed by the QMS Rep and approved by the Manager of Operations prior to issuance.
- 5.4 Copies of the QMS Operational Plan and associated documents are issue controlled by the QMS Representatives. The most current versions are retained at the following locations:

Hard Copy	Public Works Sewer and Water Office
Soft Copy	City Hall Server

QMS Procedures

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Reviewed by: QMS Representative

Approved by: Top Management

5.5 Write access to the electronic versions of the documents listed in Master List of Documents & Records is limited to the W&WW Clerks, QMS Representatives, Manager of Operations and City of North Bay IT personnel.

5.5.1 Water Operations personnel shall have read only access to the Operational Plan and referenced procedures.

5.6 Changes to documents may be suggested or recommended by Water Operations staff, or as a result of Internal Audits and Management Reviews.

5.6.1 Suggested or recommended changes, when accepted, shall be made to the original soft copy document by the appropriate W&WW Clerk.

5.6.1.1 The W&WW Clerk shall notify relevant staff of the changes via email and ensure that all "obsolete" versions of the changed document are removed from circulation.

5.6.1.2 A hard copy of the document shall be issued for inclusion in the QMS documentation at Public Works.

5.6.1.3 If the obsolete document is being retained for legal or other purposes then it shall be clearly marked as obsolete and segregated from current QMS Documents.

5.6.1.4 If the obsolete document is not being retained, the soft and any hard copies shall be destroyed. Soft copies shall be deleted from the server and hard copies shall be sent for recycling or disposed of by any method chosen by the QMS Representatives.

5.7 Whenever a new QMS document is created, or when an existing QMS document is updated Master List of Documents & Records shall be updated by W&WW Clerk.

5.8 All QMS documentation (Documents and Records) shall be retained in such a manner as to ensure that they are protected.

5.9 QMS records shall be retained for the current year plus two years, unless the retention time is otherwise specified by legislation or regulation (including civic Municipal By-Law).

5.9.1 QMS records shall be retained in such a manner as to prevent damage and deterioration, and to easily accessible to those who may need to reference them.

6.0 Related Documents

Operational Plan

Master List of Documents



QMS Procedures

Proc.: QMS-01
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Pages: 3 of 3

Reviewed by: QMS Representative

Approved by: Top Management

7.0 Revision History

Date	Revision #	Reason for Revision
02-Nov-09	0	Procedure issued – Dist. System
27-Jun-11	1	Combine WTP & Dist. System OP – Transitional Accreditation
16-July-12	2	Updated Operational Plan – Full Scope Accreditation
01-Sept-14	3	Updated Documents and Records Table
22-Aug-18	4	Updated Documents and Record Table, and location of record.
11-Dec- 19	5	Update Documents & Records Procedure to include W&WW Clerks
1-Jan-21	6	Update Documents & Records Procedure to remove reference to the WTP hard copy.



List of QMS Documents & Records Table 1

Proc.: QMS-01
 Issued: 5-Jan-21
 Rev.#: 6
 Pages: 1 of 4

Reviewed by: Scott Taggart

Approved by: Karin Pratte

Type of Document	Location / hardcopy	Location / electronic version	Who is in charge of keeping document current / Managing Record
Internal QMS document			
Operational Plan and associated procedures (QMS Binder)	Public Works	City Hall Server	QMS Rep
QMS Policy	Public Works / City Website / City Hall	City Hall Server	QMS Rep
Essential Supplies and Services List	Public Works	City Hall Server	QMS Rep
Shift / Vacation Schedule	Public Works	City Hall Server	Manager of Operations
Water & Waste Water Organizational Chart	Engineering	City Hall Server	Director of Public Works
Standard Operating Procedures	Public Works/WTP	City Hall Server	Manager of Operations
Operation and Maintenance Draft Budget Proposal	Public Works	City Hall Server	Director of Public Works
Capital Budget Project List	Engineering	City Hall Server	Director of Public Works
Operational Forms (daily rounds sheets, hydrant inspection forms, hydrant flow test, sampling forms, etc.)	Public Works	City Hall Server	Manager of Operations
Complaint Forms (Blank)	Public Works	City Hall Server	Director of Public Works
List of Measurement and Recording Devices (Chlorine/ UV/ PH/ Turbidity Analyzers, Flow Meters)	Public Works	City Hall Server	Manager of Operations



List of QMS Documents & Records Table 1

Proc.: QMS-01
 Issued: 5-Jan-21
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 Pages: 2 of 4

Reviewed by: Scott Taggart

Approved by: Karin Pratte

Type of Document	Location / hardcopy	Location / electronic version	Who is in charge of keeping document current / Managing Record
Internal QMS Audit Protocol	Public Works	City Hall Server	QMS Rep
External QMS Document			
Drinking Water Works Permit	Public Work	City Hall Server	Senior Facilities & Env. Eng
Municipal Drinking Water License	Public Work	City Hall Server	Senior Facilities & Env. Eng
Computer use policy	Information Services Dep.	City Hall Server	Information Services Director
Job Descriptions	Human Resources	City Hall Server	Managing Director of Corporate Services
City of North Bay - Corporate Policies & Procedures manual	Human Resources	City Hall Server	Managing Director of Corporate Services
Permit To Take Water (PTTW)	WTP	City Hall Server	Senior Facilities & Env. Eng
Classification of the WTP and Distribution System	Public Works / WTP	City Hall Server	Senior Facilities & Env. Eng
Maintenance/Equipment Manuals (Installation, Owners and/or Maintenance manuals etc.)	Public Works / WTP	City Hall Server/CMMS	Fleet Supervisor, Manager of Operations
Operator Certificates	Public Works / WTP	City Hall Server	Manager of Operations
Engineering schematics / Plans / Drawings	Engineering / WTP	City Hall Server	City Engineer
Studies (Trout Lake treatability study, Corrosion Control Study etc.)	WTP / Engineering	City Hall Server	Senior Facilities & Env. Eng
Regulations	/	www.e-laws.gov.on.ca	/



List of QMS Documents & Records Table 1

Proc.: QMS-01
 Issued: 5-Jan-21
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 Pages: 3 of 4

Reviewed by: Scott Taggart

Approved by: Karin Pratte

Type of Document	Location / hardcopy	Location / electronic version	Who is in charge of keeping document current / Managing Record
City of North Bay Emergency Plan	Public Works	City Hall Server	Fire Chief
QMS Records			
Facility Operations Logbook(s)	Facility	/	Manager of Operations
Daily, Monthly Data/Rounds Summary Sheets	WTP	City Hall Server	Manager of Operations
SCADA Records	WTP (only trends are kept in hard copy)	WTP Server	Manager of Operations
Abnormal Events Log	WTP	/	Manager of Operations
Visitor Logbook	WTP	/	Manager of Operations
In-house lab results	WTP	City Hall Server	Manager of Operations
AWQI (Adverse Water Quality Incidents)	/	City Hall Server	Manager of Operations
Completed Complaint Sheets	Public Works	City Hall Server	Director of Public Works
Fleet Equipment Maintenance records	Public Works, WWTP	City Hall Server, CMMS	Fleet Supervisor
Infrastructure Maintenance records (hydrant records, directional flush records, annual oil changes etc.)	Public Works / WWTP	City Hall Server, CMMS	Manager of Operations
Time cards	Public Works / WWTP	/	Manager of Operations
Results of calibration	Public Works / WTP	City Hall Server	Manager of Operations
Results of sampling	Public Works	City Hall Server	Manager of Operations



List of QMS Documents & Records Table 1

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Reviewed by: Scott Taggart

Approved by: Karin Pratte

Type of Document	Location / hardcopy	Location / electronic version	Who is in charge of keeping document current / Managing Record
Training records	Public Works / WWTP	City Hall Server	Manager of Operations
List of personnel and certification(s)	Public Works / WTP	City Hall Server	Manager of Operations
Internal & External QMS audit reports	/	City Hall Server	QMS Rep
Inspection reports (Ministry of the Environment, Ministry of Labour)	/	City Hall Server	Manager of Operations
Management Review documentation	/	City Hall Server	QMS Rep
External QMS communication	/	City Hall Server	QMS Rep
Annual Report	/	City Hall Server	Manager of Operations
Record of Emergency Response Training (Mock training sessions, department training sessions)	Public Works / WTP	City Hall Server	Manager of Operations

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Reviewed by: QMS Representative	Approved by: Top Management	

Risk Assessment and Risk Assessment Outcomes Water System

1.0 Purpose

To define the process for conducting a drinking water risk assessment for the City of North Bay Water System and for documenting and reviewing the results of the assessment.

2.0 Scope

This procedure applies to the City of North Bay Water Distribution System and Water Treatment Plant and is limited to the assessment of potential drinking water health hazards. The approach to addressing other potential hazards is set out in QMS-09 Emergency Management.

3.0 Responsibility

Director of Public Works
Manager of Operations
QMS Representative

4.0 Definitions

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

Critical Control Limit (CCL) – The point at which a Critical Control Point is response procedure is initiated

5.0 Procedure

- 5.1 The QMS Representatives shall assemble a team to discuss and identify all potential hazards to the drinking water system owned and operated by the City of North Bay.
- 5.2 Considering the description of the Water Treatment Plant and Distribution System (see element 6), as well as any equipment or activity on the system deemed relevant by the team, identify hazardous events and associated hazards (possible outcomes) that could impact the system's ability to deliver safe drinking water. Document these hazardous events and potential hazards in the Summary of Risk Assessment Outcomes Table for each equipment/activity.
- 5.3 For each of the hazardous events, specify control measures currently in place that eliminate the hazard or prevent it from becoming a threat to public health.

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Reviewed by: QMS Representative		Approved by: Top Management

- 5.4 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 disruption to normal operations, no impact on public health
2	Minor – Significant modification to normal operations but manageable, no impact on public health
3	Moderate – Corrective action required, potential public health impact, disruption to operations is manageable
4	Major – 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 the Summary of Risk Assessment Outcomes Table. Hazardous events with a ranking of 13 or greater are considered high risk.

- 5.5 Review the hazardous events and rankings documented in the Summary of Risk Assessment Outcomes Table and identify any activity or process step as a CCP if all of the following criteria are met:
- ✓ The associated hazardous event has a ranking of 13 or greater
 - ✓ The associated hazardous event is reduced to an acceptable level 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 (MOE) or both.
- 5.6 List identified CCP (if any) in the CCP Table. Set related critical control limits for each CCP as appropriate.

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5.7 Ensure procedures have been developed and implemented to:

- ✓ Monitor the critical control limits
- ✓ Respond to, report and record deviations from the critical control limits.

List these procedures in the CCP Table.

5.8 The information recorded in the Summary of Risk Assessment Outcomes Table is reviewed at least annually as part of the Management Review process to verify the currency of the information and the validity of the assumptions used in the risk assessment

5.9 The Director of Public Works ensures that a risk assessment is conducted and documented at least once every thirty-six months.

6.0 Related Documents

Summary of Risk Assessment Outcomes Table
QMS-09 Emergency Management

7.0 Revision History

Date	Revision #	Reason for Revision
02-Nov-09	0	Procedure issued – Dist. System
27-Jun-11	1	Combine WTP & Dist. System OP – Transitional Accreditation
16-July-12	2	Updated Operational Plan – Full Scope Accreditation
09-Nov-15	3	Remove Director of Engineering
22-Aug-18	4	Updated Responsibilities
18-Jul-19	5	Added Critical Control Limit Definition
08-Aug-21	6	Updated Responsibility

Summary of Risk Assessment Outcomes

City of North Bay Water Distribution System

Issued: 01-Nov-21
Rev. #: 5
Pages: 1 of 2

Table 1: Risk Assessment Outcome Table

Activity/ Process Step	Description of Hazardous Event	Possible Outcome (Hazards)	Existing Control Measures	Likelihood	Consequence	Risk Value	CCP?
All (watermain, connections, hydrants, valves, construction, etc.)	Vandalism	Contamination Loss of water supply	Emergency management – Site security – By-laws – Provincial and Federal legislation – Response to customer complaint	5	1	5	no
Sampling	Failure to sample (equipment/human error)	Not meeting compliance	Sampling schedule – SOP – Training - Calibration of equipment	3	3	9	no
Maintain adequate disinfection	Loss of chlorine residual, Loss of Secondary disinfection	Contamination	SCADA – Flushing – Looping – Infrastructure upgrades – Sampling – Dead end flushing program	3	3	9	Yes. Mandatory CCP
Pressure zone	Major fire	Contamination/Loss of Pressure	Emergency management – Notification by fire department for major fires, SOP	3	3	9	no
	Sustained pressure loss	Loss of water supply to zone 5	Nowhere in distribution system where it runs off pumps, Cedar Heights Standpipe being installed, Zone 4/5 connection, redundancy.	1	4	4	no
Automated valves PRV	Failure resulting in high or low pressure	Line breaks and/or contamination Loss of water supply	SCADA – Maintenance program – Response to customer complaints – Infrastructure back-ups, checks – Redundant equipments	3	2	6	no
Watermains	Line breaks (freeze/thaw)	Contamination, loss of water supply, loss of pressure	Valves – Crews – Capital plan – Site assessment – Testing – Cathodic protection – Break assessment – MOE Guidelines-Increased use of flexible materials –Capital construction to put mains below frost depth	5	2	10	no
Flushing	Inadequate flushing	Loss of chlorine residual – THM increase	Maintenance program – Continuous flushing lines – Customer complaints – Dead end flushing program – Directional flushing program	2	2	4	no
New subdivision	Substandard materials	Contamination	Approval process – Provincial Standard – City of North Bay Development Standard - Inspection	2	3	6	no

Summary of Risk Assessment Outcomes

City of North Bay Water Distribution System

Issued: 01-Nov-21
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Activity/ Process Step	Description of Hazardous Event	Possible Outcome (Hazards)	Existing Control Measures	Likelihood	Consequence	Risk Value	CCP?
	Poorly installed infrastructure	Contamination	Approval process - Provincial Standard - Infrastructure Inspection	3	3	9	no
Capital construction	Sub-standard construction and commissioning	Contamination	AWWA guidelines – Provincial Standard Inspection – Testing – Training of staff	2	3	6	no
Service connections	Cross Connection	Contamination	– Isolation valves –	3	4	12	no
	Service breaks and loss of pressure	Contamination	Response to customers – Street valves – Repair of City owned portion	3	3	9	no
	Lead service	Lead contamination	Removal and replacement of City owned portion – Sampling – pH adjustment at the plant – Lead sampling program	3	3	9	no

Revision History

Date	Revision #	Reason for Revision
21-May-09	0	Initial risk assessment conducted
13-Sept-12	1	Risk assessment review – no change
10-Sept-15	2	Risk assessment review, Dominic Schiavone, Shawn Remillard, Mitch Jerome, Don Landry, Scott Taggart.
20-Aug-18	3	Risk assessment review, Dominic Schiavone, Scott Taggart, Ken Frederick, Jon Dewey, Karin Pratte, David Euler
7-Jun-21	4	Risk assessment conducted, Dominic Schiavone, Scott Taggart, Ken Frederick, Jon Dewey, Karin Pratte, Lyndsey Bradford
01-Nov-21	5	Added Mandatory Control Limit for secondary disinfection



Summary of Risk Assessment Outcomes – Treatment System

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 Rev.#: 7
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Reviewed by: QMS Representative

Approved by: Director

Table 1: Risk Assessment Table

Activity/ Process Step	Description of Hazardous Event	Possible Outcome (Hazards)	Existing Control Measures	Likelihood	Consequence	Risk Value	CCP?
Raw Water Intake (including back-up chlorination system)	Zebra Muscles	Reduction of water supply	Pre-Chlorination System at Intake.	1	2	2	☐ Yes – CCP ☒ No
	Climate Change	Reduction of water supply /less PTTW	Residential flow meter installation, reduced water usage, low demand, reduction in wasted water, efficiency, study with consultant from Sudbury (asset manager) to create program on the expected effects of climate change and how to mitigate them.	2	3	6	☐ Yes – CCP ☒ No
		THM increase	Residential flow meter installation, reduced water usage, reduction in wasted water, low demand, efficiency, study with consultant from Sudbury (asset manager) to create program on the expected effects of climate change and how to mitigate them.	2	3	6	☐ Yes – CCP ☒ No
	Extreme Weather Events	No water production	SCADA, On-call operator, generator, seismic restraint designed into facilities	2	3	6	☐ Yes – CCP ☒ No
	Blue Green Algae	Water supply contamination	SOP, Monitoring, Sampling, deep cold intake pipe	2	3	6	☐ Yes – CCP ☒ No
	Structural intake failure	Reduction of water supply	Inspections. Monitoring intake flows.	1	5	5	☐ Yes – CCP ☒ No

Summary of Risk Assessment Outcomes – Treatment System

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Approved by: Director

Activity/ Process Step	Description of Hazardous Event	Possible Outcome (Hazards)	Existing Control Measures	Likelihood	Consequence	Risk Value	CCP?
	Spill	Water supply contamination	Monitoring (Turbidity, pH, T, UVT). Observation by public and/or operators. Emergency management. SOP. Liase with source water protection committee.	3	5	15	☐ Yes – CCP ☐ No
	PFOS	Water supply contamination	Testing on-going, liase with health officials	5	1	5	☐ Yes – CCP ☒ No
Membrane Feed System	Contamination of Membrane Feed Well	Water supply contamination	Signage, Alarm system, Controlled entry	2	3	6	☐ Yes – CCP ☒ No
	All Pump failure	Reduction of water supply	5 pumps	1	5	5	☐ Yes – CCP ☒ No
	Wet Well failure	Reduction of water supply	2 redundant tanks	1	5	5	☐ Yes – CCP ☒ No
	Control system failure	No water production	Bypass Installed, SOP	3	5	15	☒ Yes – CCP ☐ No
	Micro Strainers	No water supply	SOP, Redundancy	1	4	4	☐ Yes – CCP ☒ No
Primary Membrane Filtration System (including chemical/air/cleaning/testing system(s))	All Rack Failure	No water production	Bypass Installed, SOP	2	4	8	☐ Yes – CCP ☒ No
	Filter Breakthrough, Filter Clogging	Unfiltered water, Reduction in number of racks available	Redundancy (11 racks). Control system including integrity testing. Continuous turbidity monitoring on each rack with alarm and shutoff set points.	3	2	6	☒ Yes – CCP ☐ No Mandatory CCP

Summary of Risk Assessment Outcomes – Treatment System

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Activity/ Process Step	Description of Hazardous Event	Possible Outcome (Hazards)	Existing Control Measures	Likelihood	Consequence	Risk Value	CCP?
	Compressor/Blower Failure	Cannot operate membrane system. Reduction in water Supply	Redundancy, new compressors, and in house maintenance.	3	4	12	☐ Yes – CCP ☒ No
	Cleaning system failure	Reduction of Water Supply	Redundancy (2 CIP Tanks and 2 of each chemical tank), monitoring.	2	4	8	☐ Yes – CCP ☒ No
Secondary membrane Filtration System (including chemical/air cleaning/testing system(s))	Both Rack Failure	Reduce water production – Increased waste.	Redundancy (2 racks) – Primary backwash tank to be drained. Emergency overflow to the lake, Manual SOP.	3	2	6	☐ Yes – CCP ☒ No
	Filter Breakthrough, Filter Clogging	Unfiltered water, Reduction in number of racks available	Integrity testing, filtrate turbidity monitoring and alarm shut off.	3	2	6	☐ Yes – CCP ☒ No
	Cleaning system failure	Reduce water production – Increased waste.	Redundancy (2 racks) – Primary backwash tank to be drained. Emergency overflow to the lake.	3	2	6	☐ Yes – CCP ☒ No
	Failure of the Secondary UV	Reduce water production – Increased waste.	Redundancy (2 racks) – Primary backwash tank to be drained. Emergency overflow to the lake.	3	2	6	☐ Yes – CCP ☒ No
UV Disinfection System	All 3 Primary UV Failure	Failure to meet primary disinfection (0.5 log removal Giardia). No water production due to control system failure.	Redundancy (3 Units, 1 Duty, 2 Standby), Chlorine can provide 0.5 log Giardia removal.	2	4	8	☒ Yes – CCP ☐ No Mandatory CCP
Chlorine Disinfection System	Failure of equipment (chemical pump failure, tank failure, feed lines, etc.)	Failure to meet primary disinfection.	Redundancy (2 chemical tanks), 5 chlorine pumps, training, maintenance, SOPs, alarming.	2	4	8	☒ Yes – CCP ☐ No Mandatory CCP

Summary of Risk Assessment Outcomes – Treatment System

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Activity/ Process Step	Description of Hazardous Event	Possible Outcome (Hazards)	Existing Control Measures	Likelihood	Consequence	Risk Value	CCP?
	Control system failure.	Failure to meet primary disinfection.	Redundancy. Training. SOPs. Run pumps in manual mode	2	4	8	☐ Yes – CCP ☒ No
	Chlorine Supply Contamination	Failure to meet primary disinfection.	Redundancy, SOP, Training, contracts with chlorine suppliers (essential services).	2	4	8	☐ Yes – CCP ☒ No
	Chlorine Residual Instrumentation Failure	Failure to meet primary disinfection (CT)	Spare parts, alarming, redundancy (chlorine analyzers at both CCTs and HLPW)	2	4	8	☐ Yes – CCP ☒ No
	Chemical Spill	Atmospheric hazard	Ventilation in Chemical room, Chemical containment in room.	2	2	4	☐ Yes – CCP ☒ No
Flow Meters	Failure of Raw Water Flow Meter	Failure to meet PTTW	Redundancy, Calibration and verification yearly	2	4	8	☐ Yes – CCP ☒ No
	Failure of POE Flow Meter	Improper dosing of trim chemical.	Redundancy, Calibration and verification yearly. Dosing of chemical can be operated manually.	3	4	12	☐ Yes – CCP ☒ No



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Activity/ Process Step	Description of Hazardous Event	Possible Outcome (Hazards)	Existing Control Measures	Likelihood	Consequence	Risk Value	CCP?
	Failure of UV flow meters.	Improper UV dosing, improper dosing of chemicals.	Redundancy, Calibration and verification yearly. Dosing of chemical can be operated manually.	2	3	6	☐ Yes – CCP ☒ No
High Lift Pumps (5) / Wells (2)	All pumps failure	No water supply	Redundancy (5 pumps). Maintenance.	1	5	5	☐ Yes – CCP ☒ No
Standby power	Failure during a power failure	No water supply	Regular testing and maintenance. Water storage. UPS for the control system. SOP	3	5	15	☒ Yes – CCP ☐ No
UPS	UPS Failure	No water Supply	UPS can be bypassed.	3	2	6	☐ Yes – CCP ☒ No
Fluoridation System	Overdosing	Health hazard	Continuous online monitoring, alarms. Shut down. SOP.	2	4	8	☐ Yes – CCP ☒ No
	Chemical Contamination	Failure to dose Fluoride	Continuous online monitoring, alarms. Shut down. SOP. Allowance from Health Unit to have fluoride off for 90 days.	3	2	3	☐ Yes – CCP ☒ No

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Activity/ Process Step	Description of Hazardous Event	Possible Outcome (Hazards)	Existing Control Measures	Likelihood	Consequence	Risk Value	CCP?
	Chemical Spill	Atmospheric hazard	Ventilation in Fluoride room, Chemical containment in room.	2	2	4	☐ Yes – CCP ☒ No
Sodium Hydroxide	Dosing Failure	Health Hazard, reduced water supply .	Continuous online monitoring, alarms. SOP.	2	4	8	☐ Yes – CCP ☒ No
	Chemical Contamination	Failure to perform CIP	Continuous online monitoring, alarms. SOP. contracts with chlorine suppliers (essential services).	2	3	6	☐ Yes – CCP ☒ No
	Chemical Spill	Atmospheric hazard	Ventilation in Sodium Hydroxide room, Chemical containment in room.	2	2	4	☐ Yes – CCP ☒ No
Zinc Chloride	Dosing Failure	Health Hazard	Check draw downs. Stop dosing for extended period no issue.	2	4	8	☐ Yes – CCP ☒ No
	Chemical Contamination	Failure to Dose	Contracts with suppliers. Stop dosing for extended period no issue.	2	3	6	☐ Yes – CCP ☒ No
Overall control system/SCADA/PLC	Failure	No water supply	Water storage, Bypass SOP, spare parts.	3	5	15	☒ Yes – CCP ☐ No
Waste Water Disposal System	Failure	Environmental Impacts	Redundancy (2 waste pumps), alarming.	3	2	6	☐ Yes – CCP ☒ No



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Activity/ Process Step	Description of Hazardous Event	Possible Outcome (Hazards)	Existing Control Measures	Likelihood	Consequence	Risk Value	CCP?
OTHER WATERWORKS							
Birchs Road Standpipe and Rechlorination Station	Standpipe out of service (Valve failure, etc.)	Reduced redundancy of water storage.	Redundancy (Pressure sustaining valve and by-pass). Maintenance. SOP, run valve in pressure control.	3	2	6	☐ Yes – CCP ☒ No
	Failure of rechlorination	Failure to meet secondary disinfection	Redundancy (2 pumps). Maintenance, Monitoring, Spare parts.	2	3	6	☒ Yes – CCP ☐ No Mandatory CCP
	Generator Failure	Loss of secondary disinfection. Loss of communication with repeater site	Regular testing and maintenance, alarms.	3	2	6	☐ Yes – CCP ☒ No
	Communication Failure	Loss of Communication to other facilities, reduced knowledge of system	SCADA, alarming, spare parts., pressure until mode from Judge.	3	2	6	☐ Yes – CCP ☒ No
Ellendale Reservoir, High lift Pump Station and Rechlorination Facility (2 systems, 1 for each zone)	Failure of rechlorination	Failure to meet secondary disinfection	Redundancy (2 pumps). Maintenance. Monitoring. Spare parts. SOP.	3	4	12	☒ Yes – CCP ☐ No Mandatory CCP
	Failure of Generator	No Water on Airport Hill	Regular testing and maintenance, spare parts.	2	5	10	☐ Yes – CCP ☒ No



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Reviewed by: QMS Representative

Approved by: Director

Activity/ Process Step	Description of Hazardous Event	Possible Outcome (Hazards)	Existing Control Measures	Likelihood	Consequence	Risk Value	CCP?
	Control system failure	Multiple consequences to city water system (pressure, storage, production). Loss of water supply. Failure to meet secondary disinfection	Ability to operate manually. Specialized technicians and contractors. Spare parts.	3	4	12	☐ Yes – CCP ☒ No
	Communications system failure		Communication triangle. Ability to operate manually. True Steel alarm for low water level	3	3	9	☐ Yes – CCP ☒ No
	Pumps failure		Pump redundancy and new pumps	1	5	5	☐ Yes – CCP ☒ No
	Structural failure		Inspection. Maintenance program.	2	5	10	☐ Yes – CCP ☒ No
	Contamination of Reservoir	Water supply contamination	Camera's, signage, true steel.	2	4	8	☐ Yes – CCP ☒ No
	Pipe Break/Flood Drywell	No Water to Airport Hill	Float Inside, Alarm, On-call.	2	5	10	☐ Yes – CCP ☒ No
Judge Avenue Valve Chamber	Control valve failure	Loss of pressure – Over pressure	Redundancy (By-pass valve). SCADA monitoring.	2	4	8	☐ Yes – CCP ☒ No



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Approved by: Director

Activity/ Process Step	Description of Hazardous Event	Possible Outcome (Hazards)	Existing Control Measures	Likelihood	Consequence	Risk Value	CCP?
CFB North Bay Reservoir, Pump Station and Rechlorination Facility	Failure of genset at CFB during power failure	Loss of SCADA, building freeze	Maintenance, testing. Alarms.	2	3	6	☐ Yes – CCP ☒ No
	Control system failure	Loss of water supply	Ability to operate manually. Specialized technicians and contractors. Spare parts.	3	4	12	☐ Yes – CCP ☒ No
Airport standpipe and booster pumping station and Rechlorination Facility (under construction)	Pump Failure	Loss of Pressure / Water Supply	Redundancy, alarming	2	4	8	☐ Yes – CCP ☒ No
	No Chlorine Residual	Failure to meet secondary disinfection	Monitoring, alarming, SOP, dosing pumps	1	4	4	☒ Yes – CCP ☐ No Mandatory CCP
	Control System Failure	Loss of water pressure / Water Supply	Monitoring, alarms, on-call, spare parts	3	4	12	☐ Yes – CCP ☒ No
	Generator Failure	Loss of water supply	Regular testing and maintenance, alarms, on-call	2	5	10	☐ Yes – CCP ☒ No
Cyber Security	Cyber security breach	Loss of access to water plant control system	Two factor authentication for remote access. Fire Wall. Building Security System.	2	5	10	☐ Yes – CCP ☒ No
Telemetry System	Failure of system	Reduced knowledge of system, compliance	Spare parts, Trueteel alarms, backup cellular, SOPs, training	4	4	16	☒ Yes – CCP ☐ No



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Pages: 10 of 11

Reviewed by: QMS Representative

Approved by: Director

Activity/ Process Step	Description of Hazardous Event	Possible Outcome (Hazards)	Existing Control Measures	Likelihood	Consequence	Risk Value	CCP?
Cedar Heights Pumping Station and Larocque Standpipe	Control system failure	Loss of water supply / water pressure	Monitoring, alarms, on-call, standpipe pressure available	3	4	12	☐ Yes – CCP ☒ No
	Loss of Chlorine Residual	Failure to meet secondary disinfection	Monitoring, alarming, SOP	4	3	12	☒ Yes – CCP ☐ No Mandatory CCP
	Failure of pumps	Loss of pressure	Redundancy, standpipe	2	4	8	☐ Yes – CCP ☒ No
	Genset failure during power failure	Loss of supply	Maintenance, testing. Alarms.	2	5	10	☐ Yes – CCP ☒ No

Revision History

Date	Revision #	Reason for Revision
21-May-09	0	Initial risk assessment conducted
07-Sept-12	1	Risk Assessment conducted by Karin Pratte, David Euler, Ken Frederick, Mitch Jerome
20-08-15	2	Risk Assessment conducted by Karin Pratte, Ken Frederick, Mitch, Jerome, Lowell McConnell, Domenic Schiavone
20-08-18	3	Risk Assessment conducted by Karin Pratte, Ken Frederick, Jon Dewey, Domenic Schiavone, Scott Taggart, David Euler.



Summary of Risk Assessment Outcomes – Treatment System

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Approved by: Director

16-July-20	4	Cedar Heights Pumping Station and Larocque Standpipe risk assessment added by Karin Pratte, Domenic Schiavone, Ken Frederick, Jon Dewey, Scott Taggart
07-June-21	5	Risk Assessment conducted by Karin Pratte, Ken Frederick, Jon Dewey, Scott Taggart, Domenic Schiavone, Lyndsey Bradford
01-Nov-21	6	Added Mandatory CCP to the risk assessment outcomes.
11-Jan-23	7	Risk Assessment conducted for Cyber Security Risk by Karin Pratte, Scott Taggart, Domenic Schiavone, Ken Frederick and consulting with Information Systems department



Critical Control Points Table

Proc.: QMS-02
 Issued: 14-Dec-22
 Rev.#: 7
 Pages: 1 of 1

Reviewed by: QMS Representative

Approved by: Director

CCP	Critical Control Limits	Compliance Limits	Monitoring Procedures	Response, Reporting and Recording Procedures
Raw Water Intake – Spill Contamination	Water Supply Contamination	Depending on the spill - refer to O.Reg 169/03	SCADA/continuous monitoring	See: SOP – Spill in Trout Lake – Water Supply Contamination
Mandatory CCP: Primary Disinfection: Membrane Filtration	Filtered water turbidity >0.08NTU 99% of readings in a month of filtered water turbidity>0.1NTU	Filtered water turbidity >0.1NTU 99% of readings in a month of filtered water turbidity>0.1NTU	SCADA/continuous monitoring, alarm set points.	See: -Adverse Water Quality Reporting
Mandatory CCP: Primary Disinfection: UV Inactivation	Primary UV 10mJ/cm2 Secondary UV 15 mJ/cm2	Primary UV 10mJ/cm2 Secondary UV 15 mJ/cm2	SCADA/continuous monitoring, alarm set points.	See: -Adverse Water Quality Reporting
Mandatory CCP: Primary Disinfection: Chlorination	Log Virus Inactivation <5.5log Treated free chlorine residual <0.8	Log Virus Inactivation <4log Treated free chlorine residual <0.05	SCADA/continuous monitoring, alarm set points.	See: -Adverse Water Quality Reporting
Mandatory CCP: Secondary Disinfection	Free chlorine residual <0.2	Free chlorine residual <0.05	SCADA/continuous monitoring, alarm set points.	See: -Adverse Water Quality Reporting
Membrane Feed System – Control System Failure	No water supply	No water supply	SCADA/continuous monitoring	See: -WTP Bypass SOP
Overall Control System Failure WTP	No water supply	No water supply	SCADA/continuous monitoring	See: -WTP Bypass SOP
Telemetry System Failure	Reduced knowledge of system, untreated water	Reduced knowledge of system, untreated water	SCADA/On-call/Alarm	See: -Adverse Water Quality Reporting
Standby Power – Failure during a power failure	No water supply	No water supply	SCADA/On-call/Alarm	See: -WTP Generator Failure SOP

Revision History

Date	Revision #	Reason for Revision
21-May-09	0	Initial risk assessment conducted
13-Sept-12	1	Risk Assessment conducted
16-Nov-12	2	Mandatory Critical Control Point include after internal audit
10-Sept-15	3	Added Cross Connection CCP after risk assessment review
20-Aug-18	4	Removed Cross Connection, Airport Standpipe Control system Failure, and Canadore Pumping Station Control System Failure. Added Standby Power failure during a power failure after risk assessment review.
7-Jun-21	5	Risk Assessment conducted
01-Nov-21	6	Updated CCL & added compliance limit / Membrane Feed System Control System Failure & Telemetry System Failure Added
14-Dec-22	7	Updated Title to Critical Control Points Table

	QMS Procedure	Proc.: QMS-03 Issued: 6-Aug-21 Rev.#: 5 Pages: 1 of 2
Reviewed by: QMS Representative	Approved by: Director	

Personnel Coverage

1.0 Purpose

This procedure describes the process for ensuring that sufficient and competent personnel are available for duties that directly affect drinking water quality.

2.0 Scope

This procedure is applicable to Water Distribution Operations personnel.

3.0 Responsibility

Director Public Works
 Senior Facilities & Environment Engineer
 Facilities Manager
 Manager of Operations
 Operations Supervisor
 Operators/Chargehands

4.0 Definitions

None

5.0 Procedure

5.1 The Manager of Operations ensures that personnel meeting the competencies required for the treatment and distribution of safe drinking water are available.

Normal Duty Hours

5.2 Staff are on duty as follows:

Distribution

5.2.1 Monday to Friday: Shift 1 – 7:30am to 4:00pm (Full staff)
 Shift 2 – 4:00pm to 12:00am (Partial staff)

Treatment

5.2.2 Monday to Friday: 7:30am – 4:00pm (Full staff)

	QMS Procedure	Proc.: QMS-03 Issued: 6-Aug-21 Rev.#: 5 Pages: 2 of 2
Reviewed by: QMS Representative	Approved by: Director	

On-Call Duty Hours

- 5.3 A roster for On-Call Duty Hours (After hours and holidays) is posted by the Manager of Operations for the Distribution Operations and an on-duty rotation is posted by the Manager of Facilities for Treatment Operations.
- 5.3.1 SCADA monitors treatment plant and some distribution system functions during all operational hours. The SCADA system is programmed to send an alarm to duty or on-call operators, as appropriate.
- 5.3.2 A dispatch and answering service are used to notify on-call distribution system operators.
- 5.4 All on-call activities and results of those activities are recorded in the daily Log for Water Distribution Operations.

6.0 Related Documents

Operational Plan QMSD-01

7.0 Revision History

Date	Revision #	Reason for Revision
02-Nov-09	0	Procedure issued – Dist. System
27-Jun-11	1	Combine WTP & Dist. System OP – Transitional Accreditation
16-July-12	2	Updated Operational Plan – Full Scope Accreditation
09-Nov-15	3	Updated Responsibilities
22-Aug-18	4	Updated Responsibilities
6-Aug-21	5	Updated Dept. Titles

	QMS Procedure	Proc.: QMS-04 Issued: 14-Dec-22 Rev.#: 6 Pages: 1 of 2
Reviewed by: QMS Representative	Approved by: Top Management	

Communications

1.0 Purpose

This procedure describes the process for QMS –related communication from Top Management to operating authority personnel, City of North Bay Council (Owner), suppliers and the public.

2.0 Scope

This procedure is applicable to Top Management and the QMS Representative.

3.0 Responsibility

Director of Public Works (Top Management)
QMS Representatives

4.0 Definitions

None

5.0 Procedure

5.1 The QMS Representatives are responsible for identifying relevant aspects of the QMS that require communication to others and for providing that information to Top Management.

Operating Authority Personnel

5.2 Top Management shall communicate or cause to be communicated the relevant aspects of the QMS to all Water Distribution Operations personnel.

5.2.1 Under the direction of Top Management, the QMS Representatives and/or the Manager of Operations shall provide QMS awareness training to all personnel.

5.2.1.1 Training may be conducted on-site or off-site.

5.2.1.2 Training may be conducted during morning start-up meetings, lunch and learn sessions or any other method.

5.2.2 New hires shall receive a copy of the QMS Policy, as a part of their overall orientation. They shall then be instructed either by their immediate supervisor or a QMS Representative as to the aspects of the QMS that are relevant to their work. Orientation Checklist will be provided to new staff via e-mail by W&WW Clerk.

5.3 Records of this communication shall be maintained by the QMS Representatives.



QMS Procedure

Proc.: QMS-04
Issued: 14-Dec-22
Rev.#: 6
Pages: 2 of 2

Reviewed by: QMS Representative

Approved by: Top Management

Owner

5.4 The Owner of the system shall be kept apprised of any relevant aspects during regularly scheduled meetings (Committee) and through the reporting of the results of the Management Review process, on an annual basis.

Suppliers

5.5 Communication of relevant aspects of the QMS to suppliers and service providers is described in the Essential Supplies and Services Procedure (QMS-05).

Public

5.6 A copy of the Operational Plan is made available for viewing to the Public at the Public Works Office. Any additional relevant aspects may be communicated on the City website, or through the media.

6.0 Related Documents

Operational Plan	QMSD-01
Essential Supplies and Services	QMS-06
Management Review	QMS-11
Orientation Training Checklist	

7.0 Revision History

Date	Revision #	Reason for Revision
02-Nov-09	0	Procedure issued – Dist. System
27-Jun-11	1	Combine WTP & Dist. System OP – Transitional Accreditation
16-July-12	2	Updated Operational Plan – Full Scope Accreditation
09-Nov-15	3	Update Responsibilities
01-Sep-20	4	Update Responsibilities
06-Aug-21	5	Updated Location of Operational Plan/ Dept. Title
14-Dec-22	6	Update with Orientation Checklist

	QMS Procedure	Proc.: QMS-05 Issued: 14-Dec-22 Rev.#: 8 Pages: 1 of 3
Reviewed by: QMS Representative	Approved by: Top Management	

Essential Supplies and Services

1.0 Purpose

This procedure describes the method(s) for ensuring procurement and the quality of essential supplies and services.

2.0 Scope

This procedure is applicable to all Water Distribution Operations staff that purchase and/or receive or use essential supplies and services.

3.0 Responsibility

Manager of Operations
Senior Facilities & Environment Engineer
Supervisors of Operations
Operators/Charge hands

4.0 Definitions

Product: The result of a process which is not a service
Service: An activity conducted by another City Department, contracted person, persons or organization
Supplier: An organization or person that provides a product or service that affects drinking water quality

5.0 Procedure

Essential Supplies and Services:

5.1 The Following is a list of Essential Supplies and Services and the method used to ensure procurement:

<u>Product/Service</u>	<u>Method to Ensure Procurement</u>
Distribution Components	Minimum Reorder Point (Inventory Control)
Construction Services	Multiple Sources
Chemicals	Minimum Reorder Point (Inventory Control)
	Contract
Calibration Services	Contract

<u>Product/Service (Cont.d)</u>	<u>Method to Ensure Procurement</u>
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	QMS Procedure	Proc.: QMS-05 Issued: 14-Dec-22 Rev.#: 8 Pages: 2 of 3
Reviewed by: QMS Representative	Approved by: Top Management	

Laboratory Services

Treatment Process Supplies

Multiple Sources

Minimum Order Point (Inventory Control, redundancy in system)

Please refer to QMS-09 Emergency Contact List which includes the detailed Essential Supplies and Services List.

Quality Assurance:

5.2 All products and services that may directly affect drinking water quality shall be subject to one or more of the following in order to assure quality before use:

- NSF, ANSI, ASME, NAS or other Standard
- AWWA(OWWA) Recommendation
- Previous acceptance and use by City of North Bay Water and Water Distribution or other City of North Bay Department
- Use by other Municipal Waterworks (Evidence such as references must be provided)
- Incoming inspection
- Certification of the service provider when specified by regulation (i.e., Laboratory and Calibration Services)
- A review and approval of the product or service providers capability by the Purchasing Department and Top Management.
- Product that does require certification shall meet the requirements of form, fit and function as determined by a licensed Water and Waste Water Services operator. See 5.4.

Product

5.3 All product received shall be inspected prior to use. The inspection process may be visual.

- 5.3.1 Product shall be inspected for conformance to order requirements, including quantity, prior to use. The visual inspection shall ensure that product is in useable condition.
- 5.3.2 Manifests, certificates of analysis, packing slips and other documentation accompanying the product shall be reviewed for conformance to order requirements prior to acceptance.
- 5.3.3 Non-conforming product shall be clearly identified and segregated to avoid unintended use.

Services

5.4 Certifications of organizations that provide services shall be required and maintained on file by the Purchasing Department.

	QMS Procedure	Proc.: QMS-05 Issued: 14-Dec-22 Rev.#: 8 Pages: 3 of 3
Reviewed by: QMS Representative	Approved by: Top Management	

- 5.5 Essential Supplies and Services shall be communicated to Top Management through the procurement / contract execution process
- 5.6 The QMS Representative(s) may request references from all other services relied upon for the maintenance of the infrastructure of the drinking water.

6.0 Related Documents

Operational Plan
QMS-09

7.0 Revision History

Date	Revision #	Reason for Revision
02-Nov-09	0	Procedure issued – Dist. System
27-Jun-11	1	Combine WTP & Dist. System OP – Transitional Accreditation
16-July-12	2	Updated Operational Plan – Full Scope Accreditation
09-Nov-15	3	Updated Responsibilities
22-Aug-18	4	Fixed Spelling
18-Jul-19	5	Added Supplier Definition
6-Aug-21	6	Updated Dept. Title
10-Nov-21	7	Updated to include communication to Top Management
14-Dec-22	8	Include reference to QMS-09

	QMS Procedure	Proc.: QMS-06 Issued: 6-Aug-21 Rev.#: 4 Pages: 1 of 2
Reviewed by: QMS Representative	Approved by: Top Management	

Review and Provision of Infrastructure

1.0 Purpose

This procedure describes the method used to review the adequacy of the drinking water system infrastructure.

2.0 Scope

This procedure is applicable to Water Distribution Operations staff and management.

3.0 Responsibility

Senior Facilities & Environment Engineer
Director of Public Works
Manager of Operations
Supervisors of Operations
Operators/Chargehands

4.0 Definitions

None

5.0 Procedure

Operation and Maintenance Budget

- 5.1 On an annual basis, Top Management, Operations Manager, QMS Representative and Senior Capital Works Engineer conduct a review of the drinking water system's operations to assess its adequacy for the continuing operation and maintenance of the system. The result of the review is used to set the annual operation and maintenance draft budget for the upcoming year.

The review includes assessment of action and activities taken in previous years and input from staff on the need for new activities or adjustments to current activities. The draft budget list is submitted to the Owner for endorsement.

- 5.2 Capital requirements are planned for based on a ten year forecast which gets approved by the Owner on a yearly basis.
- 5.3 On an annual basis, Top Management conduct a review of the drinking water system's infrastructure to set the capital budget for the upcoming year's capital additions, renewal and rehabilitation programs.

	QMS Procedure	Proc.: QMS-06 Issued: 6-Aug-21 Rev.#: 4 Pages: 2 of 2
Reviewed by: QMS Representative	Approved by: Top Management	

The City has completed an asset management review for water infrastructure which is kept current and aids in the capital planning process.

The output of the review is a pre-budget capital requirement list for the upcoming year and a five year capital budget forecast. Items are prioritized by Top Management based on urgency and synergies with other City programs. The pre-budget list is submitted to the Owner for endorsement.

5.4 The QMS Representatives ensure that results of the Operation and Maintenance Budget Review and Capital Budget Review processes are included as input to the Management Review.

5.5 Top Management shall provide recommendations to the Owner concerning Infrastructure Maintenance, Rehabilitation and Renewal.

6.0 Related Documents

Operational Plan

7.0 Revision History

Date	Revision #	Reason for Revision
02-Nov-09	0	Procedure issued – Dist. System
27-Jun-11	1	Combine WTP & Dist. System OP – Transitional Accreditation
16-July-12	2	Updated Operational Plan – Full Scope Accreditation
09-Nov-15	3	Responsibilities Updated
6-Aug-21	4	Updated Responsibilities / Updated Titles

	QMS Procedure	Proc.: QMS-07 Issued: 9-Nov-15 Rev.#: 3 Pages: 1 of 3
Reviewed by: QMS Representative	Approved by: Top Management	

Sampling, Testing and Monitoring

1.0 Purpose

This procedure describes the sampling, testing and monitoring activities that take place for process control and treated drinking water.

2.0 Scope

This Procedure is applicable to all operators.

3.0 Responsibility

Manager of Operations
Senior Facilities & Environment Engineer
Supervisor(s) of Operations
Operators/Chargehands

4.0 Definitions

None

5.0 Procedure

- 5.1 All sampling, monitoring and testing activities are conducted by qualified operating authority personnel (Internal sampling, visual and physical monitoring, and testing), by certified laboratories (external testing) or through the application of SCADA (continuous monitoring).

Sampling

- 5.2 Distribution sampling is conducted on a weekly basis.
 - 5.2.1 The distribution Sampling Schedule is maintained by the Operations Supervisors. Additional sampling may be scheduled to address watermain repairs and tie-ins.
- 5.3 Treatment sampling (raw and treated POE) are conducted on a weekly basis. Sampling schedule is maintained by Manager of Operations.
- 5.4 All sampling is conducted in accordance with all applicable legislation and regulations.

Testing

- 5.5 Tests are conducted by certified operators, or, by an accredited laboratory (See Essential Supplies and Services).

	QMS Procedure	Proc.: QMS-07 Issued: 9-Nov-15 Rev.#: 3 Pages: 2 of 3
Reviewed by: QMS Representative	Approved by: Top Management	

- 5.5.1 Once collected, samples being sent to an accredited laboratory for testing shall be handled and prepared for shipment in such a manner as to ensure traceability (Chain of Custody) and integrity.
- 5.5.2 Samples collected that are to be tested in-house shall follow the appropriate testing method or protocol.
 - 5.5.2.1 Those conducting the tests shall take all necessary steps to ensure that the sample(s) being tested are not contaminated by any outside sources.

Monitoring

- 5.6 The City of North Bay Water Treatment and Distribution System uses SCADA to continuously monitor process parameters and water characteristics (raw, in-process and treated).
 - 5.6.1 At a minimum the following are monitored:
 - Raw and treated water flow rates
 - Raw and treated water temperature and pH
 - Raw and post filtration turbidity
 - Treated water Fluoride content
 - Free chlorine residual (Post contact tank)
 - Free chlorine residual (Treated water)
 - UV transmittance and dose
 - Distribution storage levels
 - Distribution dosing (re-chlorination points) and free chlorine residual
- 5.7 Monitoring also includes visual and physical inspections of distribution appurtenances (Hydrant. Valves, Chambers), storage and boosting facilities.

Reporting

- 5.8 Sampling, Testing and Monitoring results are reported to the owner on an annual basis. If necessary, results may be reported to the owner through the Manager of Operations when conditions warrant. Results of all sampling testing and monitoring activities are retained by the Engineering Department at the WTP and are therefore available to the owner at any time.
- 5.9 Sampling, Testing and Monitoring results are summarised in the Annual Report and are presented as a part of the Management Review process.

6.0 Related Documents

Document and Records Control Procedure	QMS-01
Essential Supplies and Services	QMS-05

	QMS Procedure	Proc.: QMS-07 Issued: 9-Nov-15 Rev.#: 3 Pages: 3 of 3
Reviewed by: QMS Representative	Approved by: Top Management	

7.0 Revision History

Date	Revision #	Reason for Revision
02-Nov-09	0	Procedure issued – Dist. System
27-Jun-11	1	Combine WTP & Dist. System OP – Transitional Accreditation
16-July-12	2	Updated Operational Plan – Full Scope Accreditation
09-Nov-15	3	Updated Responsibilities

	QMS Procedure	Proc.: QMS-08 Issued: 6-Aug-21 Rev.#: 6 Pages: 1 of 2
Reviewed by: QMS Representative	Approved by: Top Management	

Measurement and Recording Equipment Calibration and Maintenance

1.0 Purpose

This procedure describes the process for the calibration and maintenance of measurement and recording equipment.

2.0 Scope

This procedure is applicable to all Water Distribution Operations staff responsible for the calibration and maintenance of measurement and recording equipment.

3.0 Responsibility

Manager of Operations
Senior Facilities & Environment Engineer
Supervisors of Operations
Operators/Chargehands

4.0 Definitions

None

5.0 Procedure

- 5.1 All measurement and recording equipment calibration and maintenance activities must be performed by competent personnel or by a third-party calibration service provider (See Essential Supplies and Services QMS-05).
- 5.2 The Operations Manager establishes and maintains a list of all measurement and recording devices using the Computerized Maintenance Management System.
- 5.3 Calibration and maintenance activities and schedules are carried out as per the original manufacturers manual and managed through the Computerized Maintenance Management System.
- 5.4 When devices are found to be out of tolerance the issue is investigated and necessary changes are made as appropriate.
- 5.5 Any new devices purchases must be added to the Computerized Maintenance Management System by the Water and Wastewater Clerk.
- 5.6 Any measurement device that does not meet specified performance requirements during the calibration process shall be removed from service until repaired or replaced.

	QMS Procedure	Proc.: QMS-08 Issued: 6-Aug-21 Rev.#: 6 Pages: 2 of 2
Reviewed by: QMS Representative	Approved by: Top Management	

- 5.7 Any instrument or device that cannot be calibrated, shall be reported to the Manager of Operations and/or the QMS Representative.
- 5.8 Records of Calibration and maintenance are maintained by the Operations Manager and the Manager, Facilities and Projects and/or in the Daily Logbook(s).

6.0 Related Documents

Operational Plan	QMSD-01
Document and Records Control Procedure	QMS-01
Essential Supplies and Services	QMS-05
Logbook(s)	

7.0 Revision History

Date	Revision #	Reason for Revision
02-Nov-09	0	Procedure issued – Dist. System
27-Jun-11	1	Combine WTP & Dist. System OP – Transitional Accreditation
16-July-12	2	Updated Operational Plan – Full Scope Accreditation
09-Nov-15	3	Updated Responsibilities
19-Dec-19	4	Updated Procedure to remove QMS-08 spreadsheet and add W&WW Clerk
10-Jan-20	5	Update Procedure to include investigation for devices found out of Tolerance
6-Aug-21	6	Updated Dept. Titles

	QMS Procedure	Proc.: QMS-09 Issued: 9-Nov-22 Rev.#: 7 Pages: 1 of 2
Reviewed by: QMS Representative	Approved by: Top Management	

Emergency Management

1.0 Purpose

To describe the procedure for maintaining a state of emergency preparedness for the City of North Bay Water System.

2.0 Scope

This procedure applies to the City of North Bay Water Treatment Plant and Distribution System and is limited to potential emergency situations or service interruptions identified in this procedure.

3.0 Responsibility

Director of Public Works
Senior Facilities & Environment Engineer
Manager of Operations
QMS Rep

4.0 Definitions

None

5.0 Procedure

- 5.1 The Manager of Operations establishes procedures to respond to emergency situations or service interruptions specifically for the water system. The procedures are reviewed and approved by the Director of Public Works and Senior Facilities & Environment Engineer.
- 5.2 Emergency SOPs define the processes for response and recovery for each emergency situation or service interruptions.
- 5.3 The City of North Bay Water Distribution Operations has established a list of potential emergency situations or service interruptions for the Water Treatment Plant and Water Distribution System. These procedures are located in the SOP Binder. A hard copy of the SOP Binder can be found at the WTP and Public Works.

The list of potential emergencies include:

1. Adverse Water Quality Incident (AWQI)
2. Spill into Trout Lake
3. Water Treatment Plant Bypass
4. Watermain Break
5. Strike/lockout or Pandemic

	QMS Procedure	Proc.: QMS-09 Issued: 10-Nov-21 Rev.#: 6 Pages: 2 of 2
Reviewed by: QMS Representative	Approved by: Top Management	

- 5.4 Staff are trained on specific emergency situations as appropriate. Testing of the procedures also provide training. Each emergency procedure must be reviewed at a minimum annually and at least one procedure must be tested each year. All training/testing is documented.

The City of North Bay has a Corporate Emergency Plan which is located at:

<http://www.cityofnorthbay.ca/fire/preparedness/index.asp>

Specific roles and responsibilities related to a particular emergency situation or service interruption, including those of the owner where necessary, are set out in this Plan.

- 5.5 An emergency contact list which includes essential supplies and services is contained within the QMS Binder and is updated at least annually. Procedures for communication during emergency situations or service interruptions are set out in the emergency procedures.

6.0 Related Documents

City of North Bay WTP SOP Binder

City of North Bay Distribution System SOP Binder

City of North Bay Distribution System QMS Binder

City of North Bay Emergency Plan

City Emergency Contact List

7.0 Revision History

Date	Revision #	Reason for Revision
02-Nov-09	0	Procedure issued – Dist. System
27-Jun-11	1	Combine WTP & Dist. System OP – Transitional Accreditation
16-July-12	2	Updated Operational Plan – Full Scope Accreditation
16-Nov-12	3	Updated Operational Plan – After Internal Audit
09-Nov-15	4	Updated Responsibilities
01-April-2020	1	Residential Entry COVID-19
6-Aug-21	5	Updated Responsibility & Dept. Title
10-Nov-21	6	Included Emergency Contact List as related documents
09-Nov-22	7	Included North Bay Distribution System QMS Binder

	QMS Procedure	Proc.: QMS-10 Issued: 18-Jul-19 Rev.#: 4 Pages: 1 of 2
Reviewed by: QMS Representative	Approved by: Top Management	

Internal Audit

1.0 Purpose

To describe the procedure for conducting internal audits that evaluate the conformance of the Quality Management System to the requirements of the Drinking Water Quality Management Standard.

2.0 Scope

Applies to all activities within the scope of the QMS as documented in the Operational Plan for the City of North Bay Water System.

3.0 Responsibility

Top Management
QMS Representative
Internal Auditor(s)

4.0 Definitions

Audit – a systematic and documented internal verification process that involves objectively obtaining and evaluating documents and processes to determine whether a quality management system conforms to the requirements of a standard.

Internal Auditor – person with skills, training and/or experience to conduct an internal audit

Nonconformity – non-fulfillment of a requirement

5.0 Procedure

- 5.1 The QMS Representative in consultation with Top Management ensures that an internal QMS audit of all aspects of the QMS is conducted on an annual basis by internal auditor(s).
- 5.2 In consultation with Top Management and the QMS Representative, the QMS internal auditor(s) establishes the audit criteria and develops the internal audit plan to be used by the internal auditors.

The audit criteria follow the DWQMS requirements and are documented in the audit plan.

Top Management reviews the audit plan annually and updates it as necessary.
- 5.3 The auditor(s) reviews the Operational Plan, the results of previous internal and external QMS audits, the status of corrective and preventive actions and other QMS-related documentation prior to the audit.
- 5.4 The auditor(s) follows the audit protocol and engages in activities that may include asking questions, observing operations and reviewing documents and records.

	QMS Procedure	Proc.: QMS-10 Issued: 18-Jul-19 Rev.#: 4 Pages: 2 of 2
Reviewed by: QMS Representative		Approved by: Top Management

Non-conformities are recorded on the audit report along with any additional comments and suggestions.

- 5.5 The completed audit plan is used to generate a final audit report.

The auditor(s) reviews the report and identified nonconformities with the QMS Representative and Top Management.

The audit report and supporting documentation is retained according to the Document and Record Control Procedure.

- 5.6 When a nonconformity is identified through the internal audit process, an action plan to rectify the issue is developed by the QMS Representative, specifying responsibility and a target date for resolution. The QMS Representative monitors progress of the action plan related to the identified nonconformity until it is fully resolved.

- 5.7 The QMS Representative ensures that results of the audit are included as input to the management review process.

6.0 Related Documents

DWQMS

Internal Audit Report

Internal Audit Action Plan

External Audit Report

7.0 Revision History

Date	Revision #	Reason for Revision
02-Nov-09	0	Procedure issued – Dist. System
27-Jun-11	1	Combine WTP & Dist. System OP – Transitional Accreditation
16-July-12	2	Updated Operational Plan – Full Scope Accreditation
23-Nov-18	3	Removed audit protocol from procedure
18-Jul-19	4	Changes “Internal QMS Audit” to “audit” for V 2.0

	QMS Procedure	Proc.: QMS-11 Issued: 22-Jul-19 Rev.#: 5 Pages: 1 of 2
Reviewed by: QMS Representative	Approved by: Top Management	

Management Review Drinking Water System

1.0 Purpose

To describe the procedure for conducting a Management Review of the QMS.

2.0 Scope

Applies to all activities within the scope of the QMS as documented in the Operational Plan for the City of North Bay Water Treatment and Distribution System.

3.0 Responsibility

Top Management
QMS Representative
Manager of Operations

4.0 Definitions

Management Review – a formal (documented) meeting conducted at least once every 12 months by Top Management to evaluate the continuing suitability, adequacy and effectiveness of the City of North Bay's Quality Management System (QMS).

5.0 Procedure

- 5.1 Top Management determines a suitable frequency for Management Review meetings. As a minimum, reviews must be conducted at least once every 12 months.

Management Review meetings will include representative from Top Management, the QMS Representative, the Manager of Operations and other staff as required.
- 5.2 The standing agenda for Management Review meetings is as follows:
 - a) Incidents of regulatory non-compliance,
 - b) Incidents of adverse drinking water tests,
 - c) Deviations from critical control limits and response actions,
 - d) The efficacy of the risk assessment process,
 - e) Internal and third-party audit results,
 - f) Results of emergency response testing,
 - g) Operational performance,
 - h) Raw water supply and drinking water quality trends,
 - i) Follow-up on action items from previous Management Reviews,
 - j) The status of management action items identified between reviews,
 - k) Changes that could affect the QMS,

	QMS Procedure	Proc.: QMS-11 Issued: 22-Jul-19 Rev.#: 5 Pages: 2 of 2
Reviewed by: QMS Representative	Approved by: Top Management	

- l) Consumer feedback,
- m) The resources needed to maintain the QMS,
- n) The results of the infrastructure review,
- o) Operational Plan currency, content and updates, and
- p) Staff suggestions.

The QMS Representative coordinates the Management Review and ensures that the agenda with identified responsibilities is distributed to all participants in advance of the Management Review meeting along with any related reference materials.

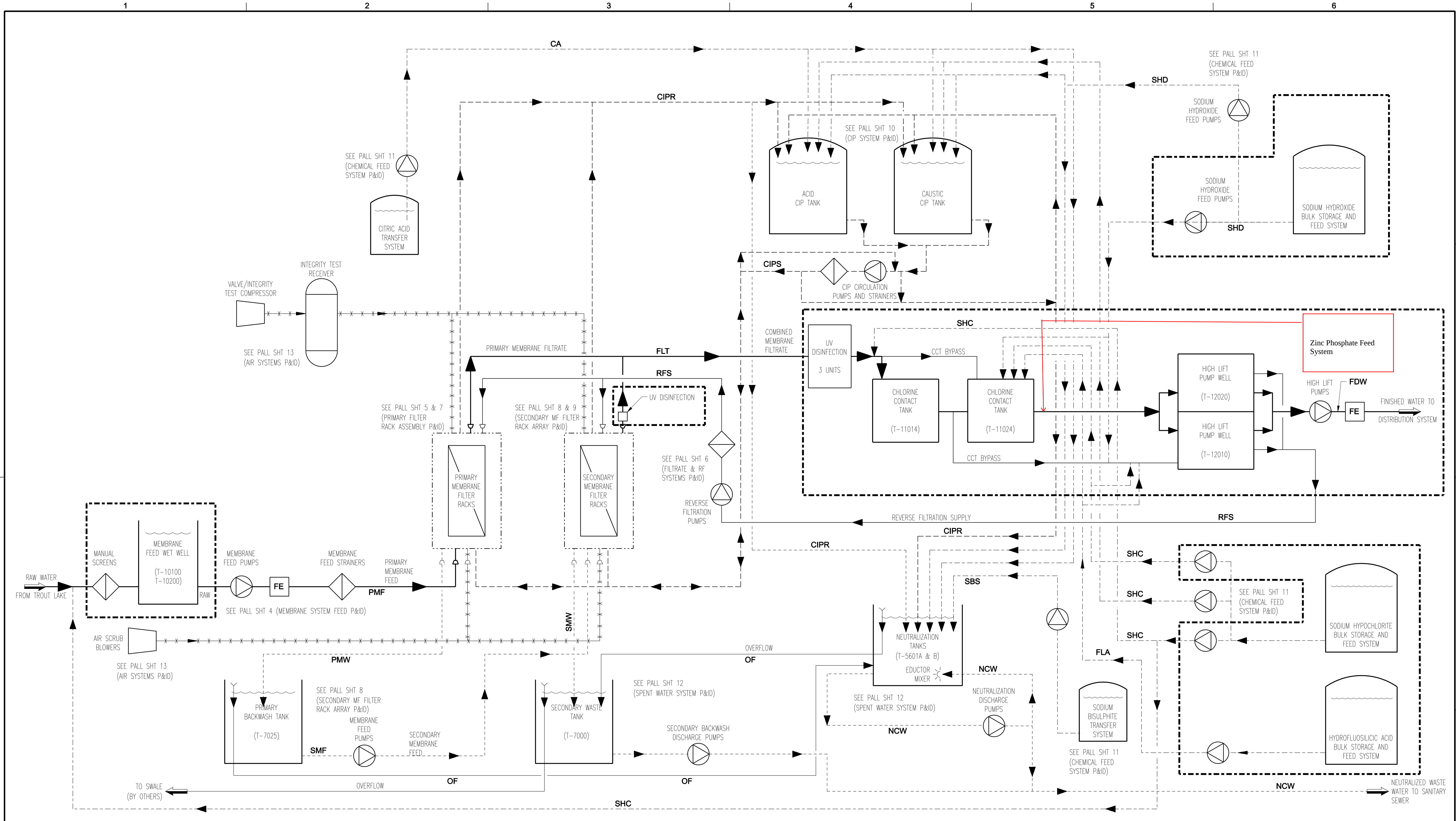
- 5.3 The Management Review participants review all data presented and make recommendations and/or initiate action plans to address identified deficiencies as appropriate.
- 5.4 The QMS Representative ensures that minutes of and action plans resulting from the Management Review meeting are prepared and distributed to the participants. Results of the management review are distributed to the Owner annually with the Water Annual and Summary Reports required by the Safe Drinking Water Act.
- 5.5 The QMS Representative monitors the progress and documents the completion of action plans resulting from the Management Review.

6.0 Related Documents

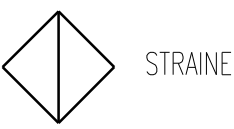
Minutes of the Management Review

7.0 Revision History

Date	Revision #	Reason for Revision
02-Nov-09	0	Procedure issued – Dist. System
27-Jun-11	1	Combine WTP & Dist. System OP – Transitional Accreditation
16-July-12	2	Updated Operational Plan – Full Scope Accreditation
12-Oct-17	3	Management Review Communication to Owner
23-Aug-18	4	Management Review Communication to Owner
22-Jul-19	5	Management Review Communication to Owner



LEGEND :



————— MAIN PROCESS FLOW

————— MISCELLANEOUS PROCESS FLOWS

***** AIR

----- CIP STREAMS

----- WASTE STREAMS

----- CHEMICAL FEEDS

----- CONTRACTOR SUPPLY

----- SEE PALL P&ID DRAWINGS



DSGN	R THORLEY M. BLAIR
DR	R THORLEY
CHK	K. MAINS
APVD	M. BLAIR

NO.	DATE
3	06/03/29
2	05/12/30
1	05/12/05

ISSUED FOR CONSTRUCTION - REVISION PER ADDENDA 1-8
ISSUED FOR TENDER
ISSUED FOR CLIENT REVIEW

REVISION

XXX XXX
BY APVD

VERIFY SCALE
BAR IS 25mm ON
ORIGINAL DRAWING.
0 25mm
IF NOT 25mm ON
THIS SHEET, ADJUST
SCALES ACCORDINGLY.

CH2MHILL

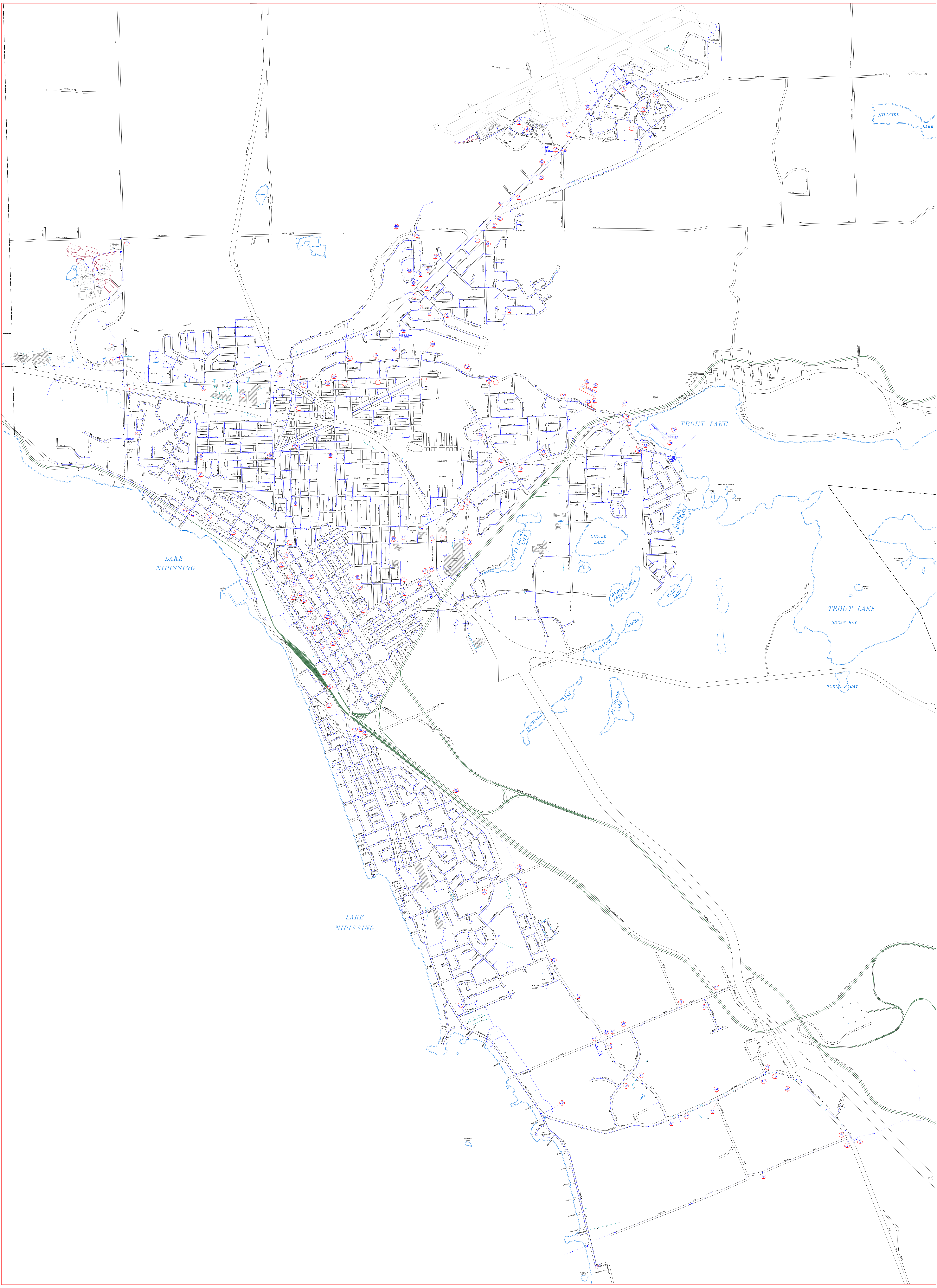


CITY OF NORTH BAY
WATER TREATMENT PLANT

PROCESS
PROCESS FLOW DIAGRAM

SHEET
DWG M0003
DATE MAR 29 2006
PROJ 122373

PLOTTED: 22-DEC-2005 13:42:11 FILE NAME: dn60m0003_122373.dgn



North Bay Water System CORRECTIVE ACTION PLAN:

Date:

Summary of Corrective Actions (CAR)

QMS Element	Description of Corrective Action Request	Corrective Actions Implemented	Action By	Date Completed