

1. Incidents of Regulatory Non-Compliance: Water

The following Incidents of Regulatory Non-Compliance with the terms and conditions of the Drinking Water Works Permit or the Municipal Drinking Water License, O.Reg 170/03 – Drinking Water Systems and O.Reg 169/03 – Ontario Drinking Water Quality Standards are noted:

Chatham Water

- Distribution Bacteriological Sample Results
 - Jun 23: 4 Total Coliforms cfu/100mL
 - Jun 28: 11 Total Coliforms cfu/100mL
- Distribution Free Chlorine Residual
 - Nov 19: 0.04 mg/L

Clearville Water

- Distribution Bacteriological Sample Result
 - Jun 16: 4 Total Coliforms cfu/100mL

Leamington (Wheatley) Water

- Distribution Bacteriological Sample Result
 - Jun 16: 12 Total Coliforms cfu/100mL

Ridgetown Water

- Distribution Bacteriological Sample Results
 - Aug 11: 1 Total Coliform cfu/100mL
 - Oct 27: 2 Total Coliforms cfu/100mL

South Chatham-Kent Water

- Distribution Bacteriological Sample Results
 - Jun 23: 5 Total Coliforms cfu/100mL
 - Sep 29: 3 Total Coliforms cfu/100mL

Wallaceburg Water

- Distribution Free Chlorine Residual
 - Sep 28: 0.03 mg/L

2. Incidents of Regulatory Non-Compliance: Wastewater

The following incidents of Regulatory Non-Compliance with the terms and conditions of the Environmental Certificates of Approval (ECA - Provincial), and the Wastewater Systems Effluent Regulation (WSER - Federal), are noted:

Chatham Wastewater

- Peak Instantaneous Flow Rate Exceedance
 - Mar 26: 79,593 m³/day (72,000 m³/day)
- Final Effluent E.Coli Geometric Mean
 - Jun: 610 cfu/100 mL, Monthly Average (Limit 200 cfu/100 mL)

Clearville Wastewater

- Final Effluent Total Phosphorus Concentration
 - May: 0.90 mg/L, Monthly Average (Limit 0.7 mg/L)

Dresden Wastewater

- Final Effluent CBOD₅ Concentration (ECA)
 - Sep: 78 mg/L, Monthly Average (Limit 25 mg/L)
- Final Effluent CBOD₅ Concentration (WSER)
 - Quarter 3: 27 mg/L, Quarterly Average (Limit 25 mg/L)
- Final Effluent CBOD₅ Loading
 - Sep: 318 kg/day, (Limit 113 kg/day)
- Final Effluent Total Phosphorus Concentration
 - Sep: 6.5 mg/L, Monthly Average (Limit 1.0 mg/L)
 - Oct: 1.2 mg/L, Monthly Average (Limit 1.0 mg/L)
- Final Effluent Total Phosphorus Loading
 - Sep: 27 kg/day, (Limit 4.5 kg/day)
- Final Effluent Total Suspended Solids Concentration (ECA)
 - Sep: 229 mg/L, Monthly Average (Limit 25 mg/L)
 - Oct: 41 mg/L, Monthly Average (Limit 25 mg/L)

- Final Effluent Total Suspended Solids Concentration (WSER)
 - Quarter 3: 78 mg/L, Quarterly Average (Limit 25 mg/L)
- Final Effluent Total Suspended Solids Loading
 - Sep: 934 kg/day, (Limit 113 kg/day)
- Final Effluent E.Coli Geometric Mean
 - Sep: 10,906 cfu/100 mL, Monthly Average (Limit 200 cfu/100 mL)
 - Oct: 500 cfu/100 mL, Monthly Average (Limit 200 cfu/100 mL)

Ridgetown Wastewater

- Final Effluent Total Ammonia Concentration
 - Feb: 12.65 mg/L, Monthly Average (Limit 5.0 mg/L, receiving stream <12°C)
- Final Effluent Total Ammonia Loading
 - Feb: 18.73 kg/day, (Limit 11.74 kg/day, receiving stream <12°C)

Wheatley Wastewater

- Final Effluent Total Suspended Solids Concentration (WSER)
 - Quarter 4: 35 mg/L, Quarterly Average (Limit 25 mg/L)

3. Deviations from Critical Control Points: Water

A Critical Control Point is an essential step or point in the system where controls are applied to prevent or eliminate a hazard or to reduce it to an acceptable level. The following incidents of Deviation from Critical Control Points occurred:

Chatham Water

- Secondary Disinfection – Deterioration of Chlorine Residual
 - May 25: 0.13 mg/L on Bothwell St, Chatham
 - Flushing for 22 minutes returned a residual of 1.05 mg/L
 - Jul 27, 0.19 mg/L on Oriole Parkway, Chatham
 - Flushing for 8 minutes returned a residual of 0.45 mg/L

- Jul 28, 0.16 mg/L on Bothwell Street, Chatham
- Flushing for 20 minutes returned a residual of 0.97 mg/L
- Nov 19, 0.04 mg/L on Rivard Line, Chatham-Kent
- Adverse reported
- Flushed until a residual of 0.58 mg/L was achieved
- Bacteriological sampling with satisfactory results

South Chatham-Kent Water

- Filtration - Membrane Breakdown/Failure
 - Apr 26: 2.00 psi/min Pressure Decay Test Results for CMF Unit 102
 - Sonic Pressure Decay Re-Test produced satisfactory results and Unit 102 operating normally. Perhaps the cause of a valve issue.

Wallaceburg Water

- Secondary Disinfection – Deterioration of Chlorine Residual
 - Sep 27, 0.03 mg/L on Grand Ave, Wallaceburg
 - Adverse reported
 - Flushed until a residual of 0.38 mg/L was achieved
 - Bacteriological sampling with satisfactory results

4. Deviations from Critical Control Points: Wastewater

Similar to Drinking Water, a Critical Control Point in wastewater is an essential step or point in the system where controls are applied to prevent or eliminate a hazard or to reduce it to an acceptable level. The following incidents of Deviation from Critical Control Points occurred:

Chatham Wastewater

- Inadequate or Low Chlorine Dosage: > 200 organisms / 100 mL E. Coli in Final Effluent (Single sample, monthly geomean not exceeded)
 - Jan 18: 360 / 100 mL
 - Chlorine dosage increased
 - Jul 05 & 12 > 200 cfu/100 mL
 - Contact chamber out of service for rehabilitation, secondary clarifiers used as contact chamber, chlorine dosing increased

- Inadequate or Low Chlorine Dosage > 200 organisms / 100 mL E. Coli in Final Effluent (Single sample, monthly geometric mean was exceeded)
 - Multiple dates in Jun: > 200 cfu /100 mL
 - Contact chamber out of service for rehabilitation, secondary clarifiers used as contact chamber, chlorine dosing increased

Tilbury Wastewater

- Inadequate or Low Ultra Violet Disinfection: Low UV intensity
 - Mar 29: UV system malfunction triggered a false 'low water level' alarm and forced the shut down of the UV system

5. Effectiveness of the Risk Assessment Process

During the Risk Assessment process, hazards to the drinking water systems and wastewater systems are identified. Control Points & Control Limits are set and Procedures are identified or developed to address the hazards. Each water and wastewater system underwent the Risk Assessment process in 2021 during the period from May to August.

During the Risk Assessment renewals in 2021, the controls were reviewed for accuracy and updated accordingly. The rankings for Consequence, Likelihood and Detectability were reviewed and updated as required. Infrastructure Maintenance, Rehabilitation and Renewals identified were also updated for the relevant infrastructure and associated equipment.

6. Internal and External Audit Results

The Internal Audit process is a self evaluation of the Quality Management System. It ensures that the System has been implemented and provides proof of the effectiveness of the System on an ongoing basis.

Internal Audits are conducted on scheduled days throughout the year. A total of 40 Internal Audits were conducted in 2021 including:

Drinking Water Systems:	8
Public Works:	17
Wastewater Systems:	9
Non-Operations	6

No Open Corrective Action remained to be carried forward into 2022.

The External Audit of the DWQMS, conducted by a third-party contractor, resulted in the issuance of 2 Opportunities for Improvement.

Opportunities for Improvement:

Element 5 – Document & Records Control

- Consider including revision history within a revised document to show what has been changed (i.e. a revision table, highlighting the revised sections, etc)
 - The vendor of the Electronic Document Management Software (EDMS) is preparing a report for this purpose in the EDMS.

Element 21 – Continual Improvement

- Section 5.2 of the Continual Improvement Procedure does not include the potential for Preventative Action Requests (PARs) and Opportunities for Improvement (OFIs) to be audit findings from an Internal Audit.
 - Procedure updated to include the above.

7. Results of Emergency Response Testing

The annual CK PUC Mock Emergency was conducted in the form of a Cyber Attack to a Third-Party Laboratory services provider, utilized by the CK PUC for the submission and analysis of water and wastewater samples.

On Monday November 23, 2021, Chatham Kent Public Utilities Commission's Manager of Compliance and Quality Standards was contacted by Bureau Veritas Project Manager of Drinking Water & Waste Water, to make the CK PUC aware of the cyber attack that impacted the entire Bureau Veritas (BV) global operations.

Despite the cyber attack to the BV operations, The Chatham Kent PUC was able to quickly pivot and redirect samples to an alternate laboratory for the duration, without a gap in required sampling or any missed samples

Due to the fact that the Chatham Kent PUC has elected to run two 3rd party labs, one for drinking water microbiological samples and another lab specifically for water and wastewater chemistry parameters, we were very prepared for a temporary switch away from BV to Caduceon Labs.

8. Operational Performance: Water

There were no significant operating problems encountered during this reporting period.

9. Operational Performance: Wastewater

No significant operating problems were encountered during this reporting period, with the following exceptions:

Dresden Wastewater:

Exceedances of multiple ECA parameters of the plant effluent occurred in September and October 2022.

These exceedances were as a result of an increased volume of flows and increased raw sewage concentrations, from a local food processing facility during the seasonal production operations. Issues with the food processing facilities on-site sewage handling works lead to high flows directed to the Dresden Wastewater Plant, along with heavy precipitation received through the underdrains of their spreading field, to the discharge chamber. The increased raw sewage volumes with increased concentrations resulted in a large hydraulic surcharge to the treatment plant and washed out the biological activity and solids.

Additional sampling and monitoring was put in place during this event and the PUC worked closely with the local food processing facility to address these issues.

10. Raw Water Supply & Drinking Water Quality Trends

Raw Water Supply:

Ridgetown Water

- Hitch Well, and Scane Wells 4 & 5 show a steady increasing trend in raw water turbidity.

Lake Erie:

The monthly average temperature of the incoming lake water at the South CK and Wheatley Water Treatment plant intakes has risen approximately 1.5 °C from 2008 to 2021.

Treated Drinking Water Trends:

- With respect to treated drinking water trends, demand increased in 2021, with the highest treated water flows since 2008
- 2021 production totalled 18,542,518 m³, up approximately 5 % from 17,644,190 m³ the previous year.
- No exceedances of the Running Annual Average Limit for Trihalomethanes or Haloacetic Acids, disinfection by-products, occurred during this reporting period.

11. Raw Wastewater Influent & Effluent Quality Trends

Raw Wastewater Influent:

- With respect to raw wastewater influent trends, flows were down slightly in 2021.
- 2021 collection totalled 13,893,764 m³, down approximately 3 % from 14,270,739 m³ the previous year.

Chatham Wastewater

- Total sludge dewatered decreased again in 2021 due to plant optimization, resulting in lower sludge production

Mitchell's Bay Wastewater

- Raw wastewater influent flows continue to be above typical values due to increased lake levels and the water table, however have decreased in 2021. Collection System rehabilitation efforts have reduced infiltration, resulting in a reduction of flow to the lagoons.

Wallaceburg WW

- Higher Sydenham River levels contributed to increase infiltration into the collection system in 2019 & 2020. The river levels decreased in 2021, resulting in reduced infiltration, resulting in a reduction of flow to the wastewater treatment plant.

12. Status of Action Items Identified between Reviews

Ministry of Environment, Conservation & Parks – SCADA Technical Bulletin:

- Making changes to supervisory control and data acquisition systems in municipal residential drinking water systems

- SCADA PLC Maintenance & Programming – Procedure & Checklist updated with requirements
- Reviewed requirements of bulletin and procedure revisions with applicable staff

QMS Awareness Sessions

- QMS Representative conducted sessions with applicable staff with regards to relaying the requirements and responsibilities for the completion of Commissioning Checklists for Wells and Water Storage & Water Treatment facilities.

13.Changes that could affect the Quality Management Systems

Director's Directions for Minimum Requirements for Operational Plans (DWQMS):

- Proposed updates came into effect May 11, 2021.
- Operational Plans must be updated with the new minimum requirements by Apr 1, 2022.
Included in the new requirements:
 1. A procedure for version control of the operational plans.
 2. A version number and/or revision date is recorded on or otherwise embedded in every electronic copy of the plans.
 3. Where the operational plans are stored and maintained as separate files, an up-to-date list or index is maintained of all documents that are part of the operational plan, including the document version numbers and dates.
 4. A title that includes the name of the municipal residential DWS(s), Municipal Drinking Water Licence numbers, operational subsystems to which the plans apply.
 5. A completed copy of the Subject System Description Form in Schedule "C" that includes the name of the municipal residential drinking water system(s), municipal drinking water licence number(s), and if applicable the operational subsystem, to which the plans apply.
 6. The owner shall make the operational plans available for viewing by the public at the principal office of the owner and/or on a website that is accessible to the public.
 - Implementation of the above requirements completed, if not already identified or in effect.

Harmful Algal Bloom (HAB) Monitoring, Reporting & Sampling Plan (DWQMS):

- New requirement in the renewed Municipal Drinking Water Licence, previously followed Ministry directives.
 - HAB Monitoring, Reporting & Sampling Plan prepared based off previous protocol incorporating new MDWL requirements.
 - New logsheets created for documentation of monitoring.

- Staff Education sessions completed. This is a requirement of the MDWL to train staff prior to each HABs monitoring season (Jun to Oct).

Consolidated Linear Infrastructure (CLI) Environmental Compliance Approvals (ECA's) (WWQMS):

- Consolidated Linear Infrastructure Permissions Approach (CLI) will streamline the current permissions framework for low-risk sewage works through consolidating approvals for linear infrastructure (e.g. sanitary collection, stormwater works).
- One Environmental Compliance Approval (ECA) will provide approval for all municipal stormwater works in one area, and one ECA will provide approval for all municipal sanitary sewage works in one area, i.e. municipality.
 - Application to be completed and submitted by Jan 21, 2022

Accreditation Authority Purchase (DWQMS):

- SAI Global (our accreditation authority) is now owned by Intertek.
 - No changes to services expected or experienced to date.

Compliance Science Server/Cloud:

- Compliance Science, the EDMS, has moved its server to Microsoft Azure from their former service provider
 - No differences noticed for the services provided in relaying of applicable documentation to staff or brought forward from staff

14.Consumer Feedback

2021 Drinking Water feedback received as complaints.

SYSTEM	TASTE & ODOR	COLOUR	LOW PRESSURE	OTHER
Bothwell	0	3	0	1
Chatham	7	21	6	9
North Kent	0	1	0	0
Ridgetown	0	5	1	0
South	6	1	3	2
Thamesville	0	0	0	0
Tilbury	0	1	0	0
Wallaceburg	2	5	2	3
Wheatley	3	6	1	2
TOTALS	18	43	13	17

15. Resources Needed to Maintain the Quality Management System

1. Electronic Document Management System
 - a. Software
 - b. Annual Maintenance
 - c. On site backup of every document
2. Quality Management System Representative
 - a. Wages
 - b. Workstation
3. Administrative Costs
 - a. Travel for Conferences, Meetings
 - b. Stationery, photocopies
4. Internal Auditing Staff
 - a. Captured through Compliance Staff
5. External Audit Fee
 - a. Budgeted annually

16. Results of the Infrastructure Review

Infrastructure Renewal, Rehabilitation and Replacement Projects underway or completed in 2021:

Chatham Water:

Rehabilitation	Filter upgrades for sand filters 2 & 4
Renewal	Filter aid chemical dosing system
Replacement	Galbraith Street, Chatham reconstruction
Replacement	Eighth Street & Water Street, Chatham watermain replacement
Replacement	Wellington Street reconstruction & Lacroix Street, Chatham watermain
replacement	
Replacement	Elizabeth Street, Chatham watermain

Wallaceburg Water:

Replacement	Chlorination System
Replacement	Low Lift Pump, replacement of diesel powered pump with electric pump
Replacement	High Lift Pump, replacement of diesel powered pump with electric pump

Chatham Wastewater:

Renewal	Pump Station # 5 relocation and new pump station construction
Rehabilitation	Main Lift Pump Station, replacement of 2 pumps and piping
Rehabilitation	Bloomfield / Richmond, Chatham sanitary sewer re-lining
Replacement	Galbraith Street, Chatham reconstruction
Replacement	Wellington Street reconstruction & Lacroix Street, Chatham
Rehabilitation	Main Lift Pump Station, replacement of 2 pumps and piping
Rehabilitation	Elizabeth Street, Chatham sewer separation

Mitchell's Bay Wastewater:

Rehabilitation	Main Street, Mitchell's Bay Collection System Relining & Repair
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Tilbury Wastewater:

Replacement	Standby Generator at the Tilbury Wastewater Treatment Plant
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Wallaceburg Wastewater:

Replacement	Standby Generator at the Napier Street Sewage Pump Station
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Wheatley Wastewater:

Replacement	Standby Generator at the Wheatley Wastewater Treatment Plant
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17. Operational Plan Currency, Content and Updates

Annual Review of prescribed Procedures was conducted and all 21 Operational Plan Elements were reviewed by Management. Revisions were completed as necessary.

Document and procedure revisions or creations required by, new Municipal Drinking Water Licences, re-issued of the Drinking Water Works Permits and Watermain Disinfection Procedure were completed and implemented.

The 2017 regulated Water and Wastewater Records were archived at the McGeorge warehouse after remaining on site at the facilities for 3 years. After a period of 12 additional years these records will be released for retrieval or destruction.

The 2005 regulated Water and Records were released for destruction, following a retrieval period issued.

18. Staff Suggestions

Harmful Algal Bloom (HAB) Monitoring, Reporting & Sampling Plan

- During a Harmful Algal Bloom Monitoring, Reporting & Sampling Plan staff training session, a staff member suggested incorporating visual images of blue-green algae in the plan.
 - Reference document of non-toxic and toxic algal images and identification found on the internet, incorporated into plan.

Raw Water Quality Diminished during Lake Inversions:

- Suggestion by staff member to develop procedures for improved documentation of monitoring, sampling, response and actions taken during these events.
 - To be completed and implemented.

Wastewater Pump Station Information Spreadsheet:

- Suggestion by staff member to have existing spreadsheet available on EDMS for reference by staff.
 - To be completed and implemented.

19. Continual Improvement

Procedure Revisions & Development:

- Numerous procedure revisions were completed in 2021 to include new, revised or obsolete content and information, as well as, inclusion of any Quality Management Standard requirements or regulatory requirements from the Municipal Drinking Water Licence, Drinking Water Works Permit, or regulations, bulletins, etc.
- Numerous procedures and documents developed to address needs, where perhaps a procedure or document did not exist or to comply and/or conform to the Quality Management Standard requirements or regulatory requirements from the Municipal Drinking Water Licence, Drinking Water Works Permit, or regulations, bulletins, etc, as well as, CK PUC requirements.

Third-Party Laboratory Services:

- Bacteriological analysis of drinking water samples was completely switched to another laboratory. A reduction in the number of adverse water quality analysis and incidents has been observed, also resulting in a reduction of time and monetary expenses involved with these.
- Bacteriological analysis of wastewater samples is now being conducted by the same laboratory that analyzes the wastewater chemistry samples. This consolidates the reporting of sampling results to the same report for ease of reference and reduction of the amount of reports to process.

Records Retention of Public Works Water Distribution and Wastewater Collection Records:

- PW Records for Water Distribution and Wastewater Collection have previously been retained with the Chatham-Kent Records Department in conjunction with the PW staff. Commencing in 2022, these records will be attained and retained as per the CK PUC Records Retention Procedures, included with the CK PUC records, and in conjunction with the Chatham-Kent Records Department.