Dorchester Drinking Water System

2023 Summary Report

Presented to Council March 25, 2024

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Summary Report

Background

The delivery of potable water in Ontario is regulated by the Ministry of the Environment, Conservation and Parks (MECP) under the Safe Drinking Water Act. On June 1, 2003 O. Reg. 170/03 came into effect. This regulation prescribes requirements for owners and operators of municipal drinking water systems.

Among the obligations, O. Reg. 170/03 prescribes the need for all owners of licensed water works to produce a Summary Report with the following information:

- The list of requirements of the Act, regulations and the system's approval. It must also note any order that the system failed to meet at any time during the period covered by the report and specify the duration of the failure and describe the measures taken to correct the situation.
- Summary of quantities of water used for the period covered by the report.
- The Summary Report must be presented and accepted by Council by March 31st of each year.

This Regulation also requires the owner to produce an Annual Report that includes the following:

- A system description
- Summary of any adverse water quality reports and corrective actions
- Summary of all required testing results
- Description of any major expenses incurred to install, repair or replace required equipment
- The Annual Report must be completed by February 28th of each year and available to the public

The Dorchester Drinking Water System 2023 - Annual Report was made available to Council on February 12 for information purposes.

Drinking Water System Description

The Dorchester Drinking Water System services about 6,270 people via approximately 2,259 service connections. There are an estimated 47.51 kilometres of watermain located within the village of Dorchester; the oldest being 65 years old. There are 192 municipal hydrants and 16 private property fire hydrants providing fire protection including 285 valves of various sizes throughout the system to control water flow. Water is supplied to the village from the Dorchester Water Treatment Facility through a network of wells, reservoirs, and an elevated storage tank. The treatment process and distribution system are monitored on-line, 24 hours per day by licenced municipal operators through a SCADA (System Control and Data Acquisition) system.

The water treatment facility and water distribution system are both owned and operated by the Municipality of Thames Centre.

Legislation

The following are the primary pieces of legislation that directly affect the operation of the

Dorchester Drinking Water System.

Safe Drinking Water Act

The Safe Drinking Water Act's (SDWA) purpose is to protect human health through the control and regulation of drinking-water systems and drinking-water testing. The Act also has the benefit of gathering in one place all legislation and regulations relating to the treatment and distribution of drinking water.

Highlights of the Act address:

- Accreditation of operating authorities
- Municipal drinking water systems
- Drinking water testing
- Inspections, Compliance and Enforcement

Standard of Care, Section 19, Safe Drinking Water Act

The Standard of Care defines the legal responsibility of the owner and operating authority of a municipal drinking water system. It requires that the owners and operating authorities exercise the level of care, diligence and skill with regard to a municipal drinking water system that a reasonably prudent person would be expected to exercise in a similar situation. Owners and operating authorities must exercise this due diligence honestly, competently and with integrity. Based on the definition of owner in the SDWA, the Municipality of Thames Centre is considered the owner of the Dorchester Drinking Water System.

The three key messages identified for Municipal Councillors are as follows:

It is Your Duty: The Standard of Care is for individuals who have oversight responsibilities for municipal drinking water systems that can extend to Municipal Councillors. There are legal consequences for negligence of financial penalties up to imprisonment for individuals, corporations or both.

Be Informed: Ask questions; Get answers. Councillors do not have to be an expert in drinking water operations, but they do need to be informed about them. Council decisions can have an impact on public health. Councillors should seek advice from those with expertise and act prudently on that advice.

Be Vigilant: Complacency can pose one of the greatest risks to drinking water systems. It is critical that Councillors never take drinking water safety for granted or assume all is well with the drinking water systems under their care and direction. The health of the community depends on diligent and prudent oversight of its drinking water systems.

Ontario Regulation 170/03: Drinking Water Systems Regulation

The Drinking Water Systems Regulation (O. Reg. 170/03) regulates municipal and private water systems that provide water to year-round residential developments. This regulation stipulates treatment equipment usage, operational checks and sampling, chemical and microbiological testing requirements, corrective actions, and reporting requirements.

Drinking Water Quality Management Standard (DWQMS)

The purpose of this Standard is to assist owners and operating authorities in the effective management and operation of their municipal residential drinking water systems. This Standard outlines the requirements for a Quality Management System (QMS) to ensure high quality drinking water. In the development of a QMS, the Operating Authority must create an Operational Plan; this document defines the QMS and will be subject to internal and external audits for accreditation. As referenced in the Standard, the QMS must be embraced by all those with active rolls in the water system, from front line staff to the highest level of management.

Environmental Services staff have developed and implemented a QMS specific to Thames Centre's two drinking water systems. Certification was originally obtained on September 10, 2010. Recertification was successfully achieved in 2013, 2016, 2019, and 2022. The next external certification audit will be carried out in the spring of 2025.

Ontario Regulation 435/07: Financial Plans

The O. Reg. 453/07, requirements dictate that all owners of municipal residential drinking water systems to prepare a Financial Plan that detail the system's financial information projected forward for at least six years. The Financial Plan must include income statements (which set out revenues and expenses), as well as balance sheets (which include financial assets, non-financial assets, total liabilities, cash flow, etc.).

The Financial Plan must then be formally approved by the owner of the municipal system through a resolution of the municipal council. The Financial Plan requires regular updates before every Operating License renewal application (every 5 years). Council report ES-017-11 was submitted and approved by Council on June 13, 2011. This report formed the foundation for the Financial Plan that was then submitted to the Ministry of the Environment, Conservation and Parks (MECP). On May 25, 2020, through council report PW-004-20 the five-year renewal application of the Long Range Financial Plan was presented to Council for acceptance and subsequently submitted to the Province.

Non-Compliances with Legislation

Schedule 22 of Ontario Regulation 170/03 requires that all non-compliance with applicable legislation be discussed in the Summary Report. The Dorchester Drinking Water System has extensive requirements for monitoring and reporting of water quantity and quality. These requirements include proper documentation, analytical testing, adverse incident reporting, corrective actions, and calibration of flow meters and online continuous water quality monitoring instrumentation. The Ministry of the Environment, Conservation, and Parks (MECP) completed their annual drinking water system inspection on December 14, 2023 for the period of December 1, 2022 to December 14, 2023. The following ***"Non-Compliance/Non-Conformance Items"*** section has been taken from the Ministry Drinking Water Inspection Report for the Dorchester Drinking Water System dated January 18, 2024. (attached)

Non-Compliance/Non-Conformance (Legislative):

1. The operations and maintenance manuals did not meet the requirements of the Drinking Water Works Permit and Municipal Drinking Water Licence issued under Part V of the SDWA. The system owner's Operations and Maintenance Manual did not include a contingency plan and procedures with respect to the UVT malfunction event that occurred in September 2023.

Required Action(s):
The system owner and operating authority shall create a contingency plan and procedures with respect to a UVT malfunction.

Action(s) Taken by staff:
After the UVT malfunction event in September 2023, a contingency plan with procedures was created. No further action was required.

2. The owner and operating authority did not endure that the primary disinfection equipment had a recording device that continuously recorded the performance of the disinfection equipment. The Dorchester Drinking Water System is equipped with Ultraviolet (UV) treatment equipment as part of the primary disinfection water treatment process. The Ultraviolet Transmittance (UVT) monitoring equipment tests water quality and relays information to a central computer that automatically adjusts UV dosage depending on the quality of incoming water. Condition 1.6 of the MDWL requires UV Dose, Flow Rate, UV Transmittance & UV Lamp Status to be tested at least every five (5) minutes. In September 2023, the UVT equipment malfunctioned and was unable to perform tests at least every five minutes as required by Condition 1.6 of the MDWL. Certified operators performed mitigating actions to ensure water quality was maintained during this event.

Required Action(s):
The system owner shall ensure that UVT tests are performed in accordance with Condition 1.6.2 under Schedule C in the MDWL. The system owner is reminded that a written application may be submitted to the MECP's Permissions Branch with respect to amending UVT monitoring conditions in MDWL. However, conditions written in the most current MDWL issued by the ministry shall be complied with at all times.

Action(s) Taken by staff:
The UVT Response Procedure (ES-DWS-SOP-004-004) was created. During the MDWL renewal in 2025 staff will make an application for concessions during the event of a UVT failure.

Non-Compliance/Non-Conformance (Best Management Practices):

1) It is strongly recommended that the individuals who exercise decision-making authority over the Dorchester Drinking Water System implement further disinfection byproduct reduction measures forthwith.

Recommended Action:
In 2020, the Province of Ontario implemented sampling and testing requirements for haloacedic acids (HAA). The Ontario Drinking Water Quality Standards prescribes a Running Annual Average (RAA) limit for HAA. To reduce disinfection by-products in the Dorchester Drinking Water System, the services of third party consultants were obtained to evaluate source water, operational, and treatment options. At the time of the site inspection, exploratory wells had been drilled in search of improved source water quality, operations staff implemented recommended operational changes, and a bench scale study that included new filtration treatment equipment was performed. Test results demonstrate that the RAA for HAA during this inspection period were marginally below the limit prescribed by the Ontario Drinking Water Quality Standards.

Action(s) Taken by staff:
Since 2022, staff has taken various actions in an attempt to reduce the THM and HAA levels in the Dorchester Drinking Water System. THMs and HAAs are formed when chlorine reacts with naturally occurring organics in the source water. Through increased water testing, wells that are higher in naturally occurring organics were identified and staff have limited their use when possible. An increase distribution flushing program moves water through the system and does not allow water to 'sit' where THMs and HAAs can be formed. The Walkerton Clean Water Centre (WCWC) ran a pilot project to reduce the natural organic matter and lower the disinfection by-products (THMs and HAAs) from October 2022 to the presentation of their final report in November 2023. Stantec Consulting, using the WCWC data, is drafting a report with THM and HAA reduction options. That report is scheduled to be delivered before the end of the first quarter in 2024 and will contain recommend options along with cost estimates that will be presented to Council for future budget considerations. Currently, staff updates the Middlesex-London Health Unit and MECP every quarter to the THM/HAA sample results and the status of the THM/HAA reduction projects.

A copy of the 2023 Dorchester Drinking Water System Inspection Report is attached.

Testing Results

Summary of reports made to the Ministry under subsection 18(1) of the Safe Drinking-Water Act or Schedule 16-4 of O.Reg.170/03:
ADVERSE WATER QUALITY INCIDENTS (AWQI)

AWQI #	DATE 2023	LOCATION	PARAMETER	RESULT	MECP CRITERIA	CORRECTIVE ACTION
There were no Adverse Water Quality Incidents in 2023.						

Permit to Take Water, Drinking Water Works Permit, and Municipal Drinking Water Licence

The Dorchester Drinking Water System has restrictions on instantaneous flow rates (peak flow rates) and maximum daily flow volumes. These limits are identified in the Amended PTTW No. 4304-AABHQE, the Drinking Water Works Permit 059-202, and the Municipal Drinking Water Licence 059-102.

There was one (1) permit exceedance in 2023. On June 20, 2023, the total permitted effluent flow was exceeded due the Thames Centre Fire Department training on a fire hydrant at the Dorchester Water Treatment Facility.

Table A: *PTTW and Municipal Drinking Water Licence Flow Limit Exceedances*

DATE 2023	**DWWP # 059-202 Exceedances** Water Plant rated capacity: 90l/s	**TIME / DURATION**	**EXPLANATION / CORRECTIVE ACTION**
June 20	104.5 l/s	7:23 pm – 7:52 pm, *(29 minutes)*	Fire Department training

Chart 1: *Combined flow rate of the Overburden Production Wells*

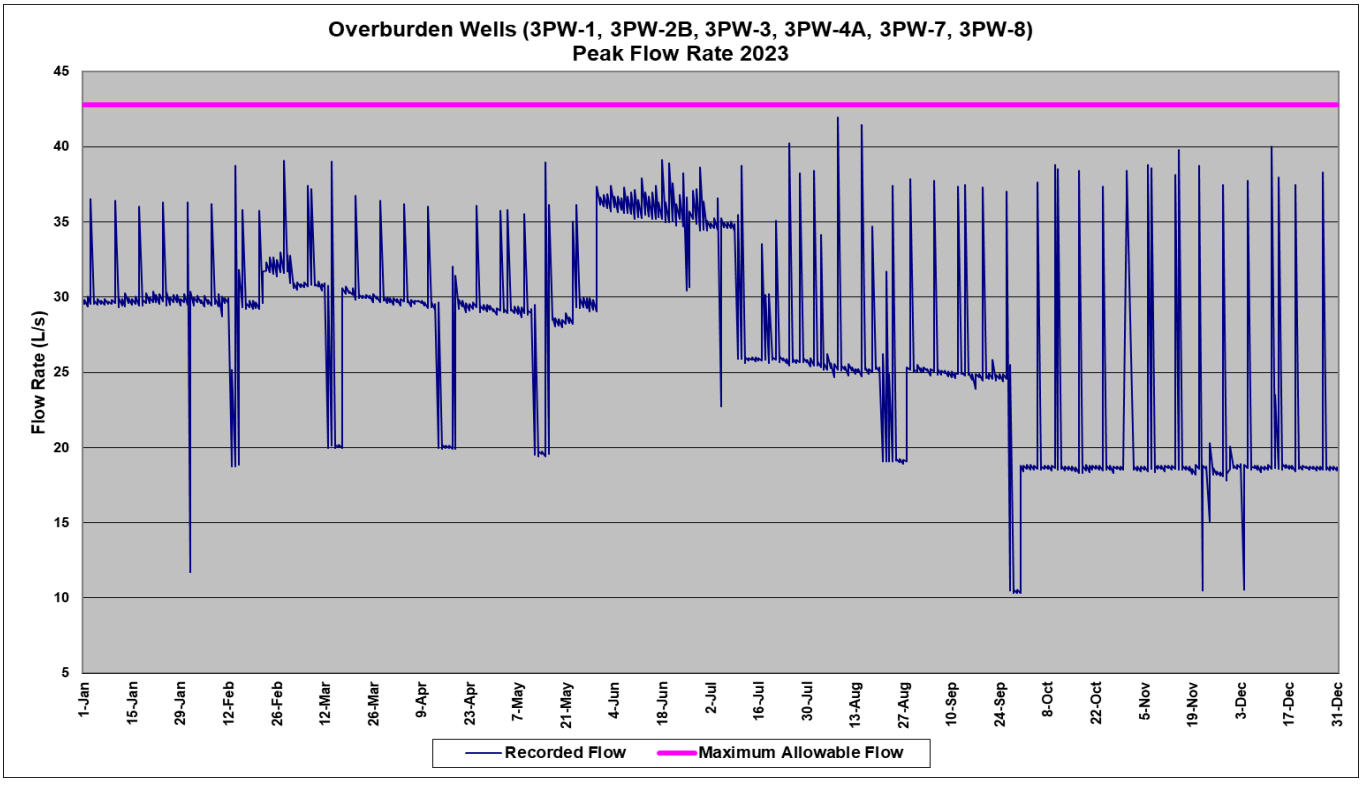


Chart 2: *Total flow rate of Production Well 2PW-1*

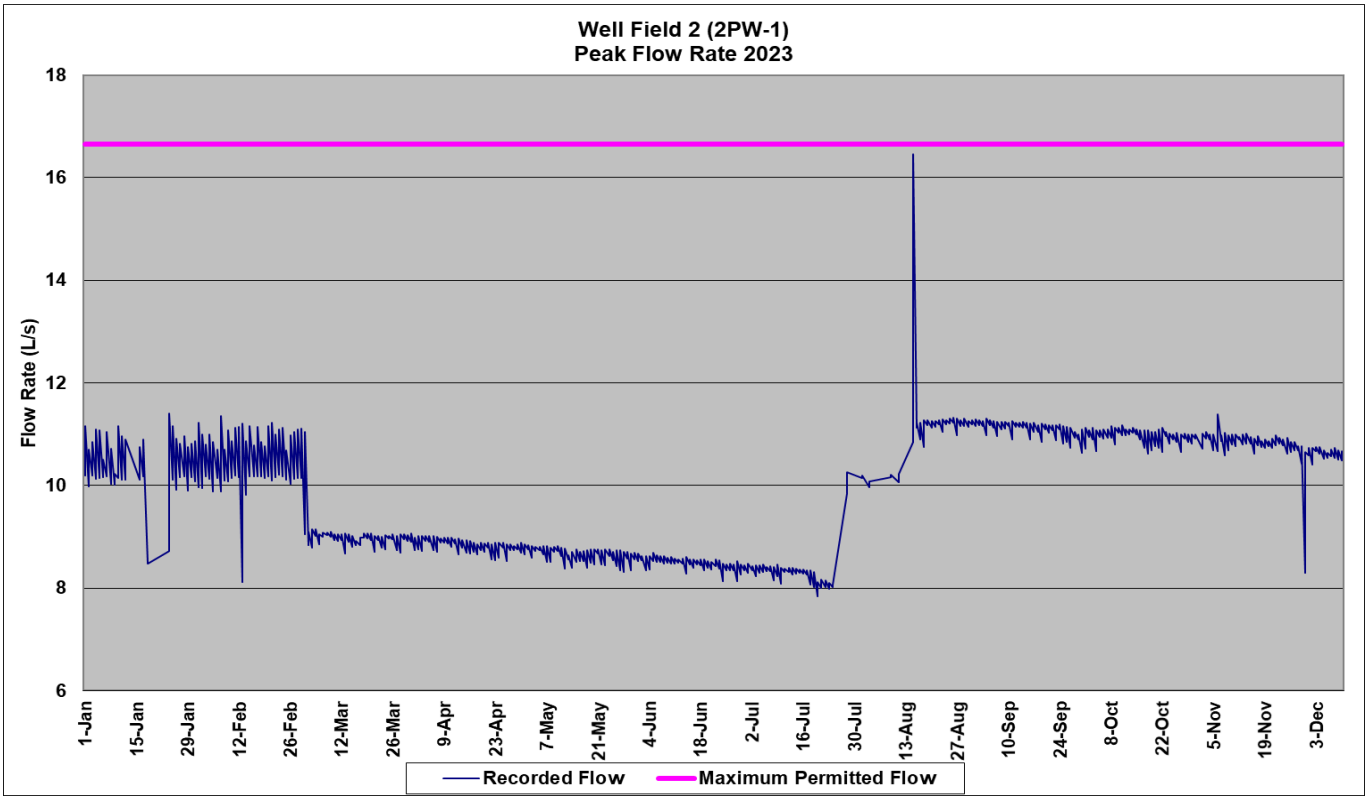
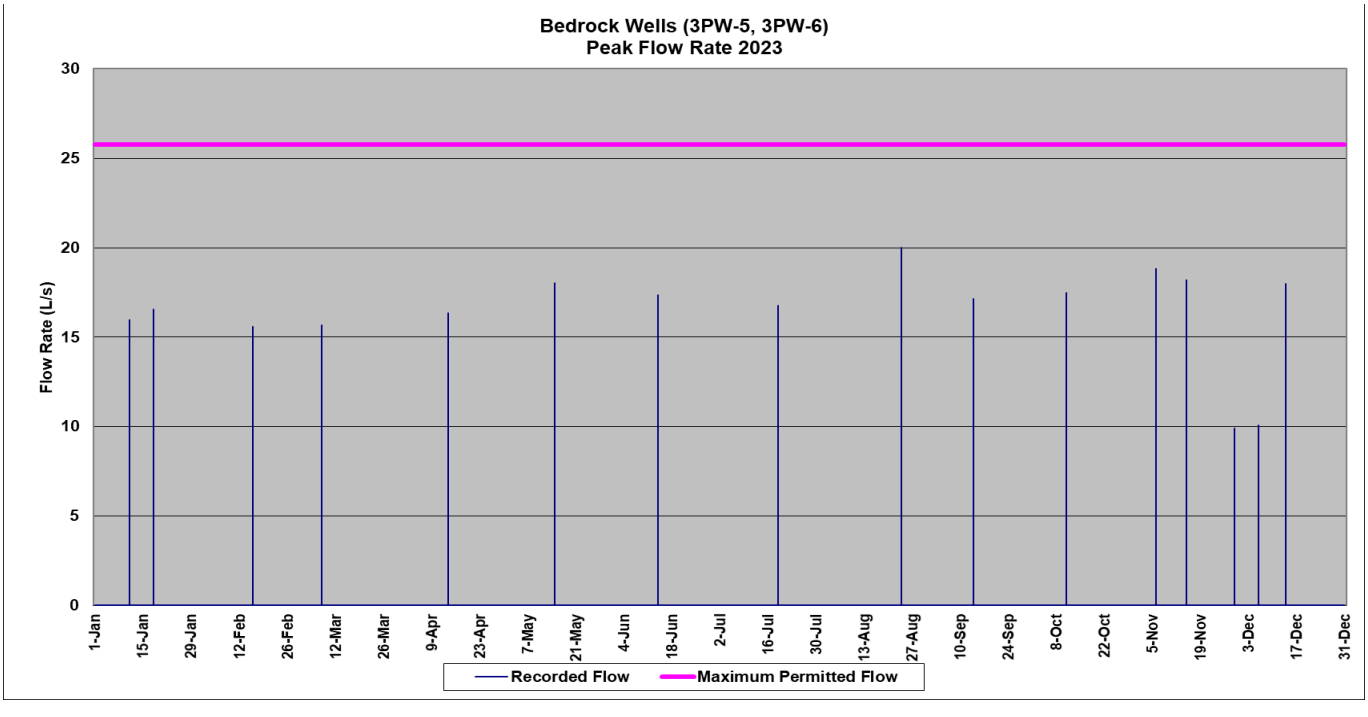


Chart 3: *Combined flow rate of the Bedrock Production Wells*



Production Well Maintenance

Routine (weekly) well inspections conducted by Thames Centre staff, in accordance with the Dorchester Well Inspection and Maintenance Plan, indicate all drinking water supply

wells were in compliance. Wells are maintained in accordance with O. Reg. 903, (made under the Ontario Water Resources Act).

The Dorchester drinking water system consists of nine (9) production wells. A major challenge of utilizing a groundwater supply, especially shallow overburden wells, is the fact that groundwater is highly mineralized, which if not addressed, leads to a combination of corrosive and mineral encrusting (scale) related issues. The accumulation of scale and mineral deposits over time, specifically across the well screen and around the pump intake screen, has led to a restriction in groundwater flow and a drop in well productivity. It should be understood that these processes are natural and that routine well maintenance must be considered if this resource is to be utilized in a sustainable manner. Two (2) production wells received maintenance in 2023. The scope of work included testing, and pumping equipment inspection/servicing of production wells 2PW-1 and 3PW-8. These procedures, conducted by licenced well contractors, have been successfully used on other Dorchester overburden wells in the past.

Table B*: Production Well Maintenance Summary*

PRODUCTION WELL	OUT OF SERVICE DURATION	REASON FOR MAINTENANCE	CORRECTIVE ACTION / RESULTS (data collected from Inspection Report)
2PW-1	July 24 – July 28	preventative maintenance	Well rehabilitation, pump test, cleaning, pump & motor cleaned
3PW-8	July 17 – July 21	preventative maintenance	Well rehabilitation, pump test, cleaning, pump & motor cleaned

Water Usage

From January 1st to December 31st the Dorchester Water Distribution System received a total of 502,209 m3 of water from Dorchester Water Treatment Facility. This compares to 476,313 m3 from the previous year (an increase of 0.054%).

Chart 4: *Dorchester DWS - 2023 Monthly Water Consumption*

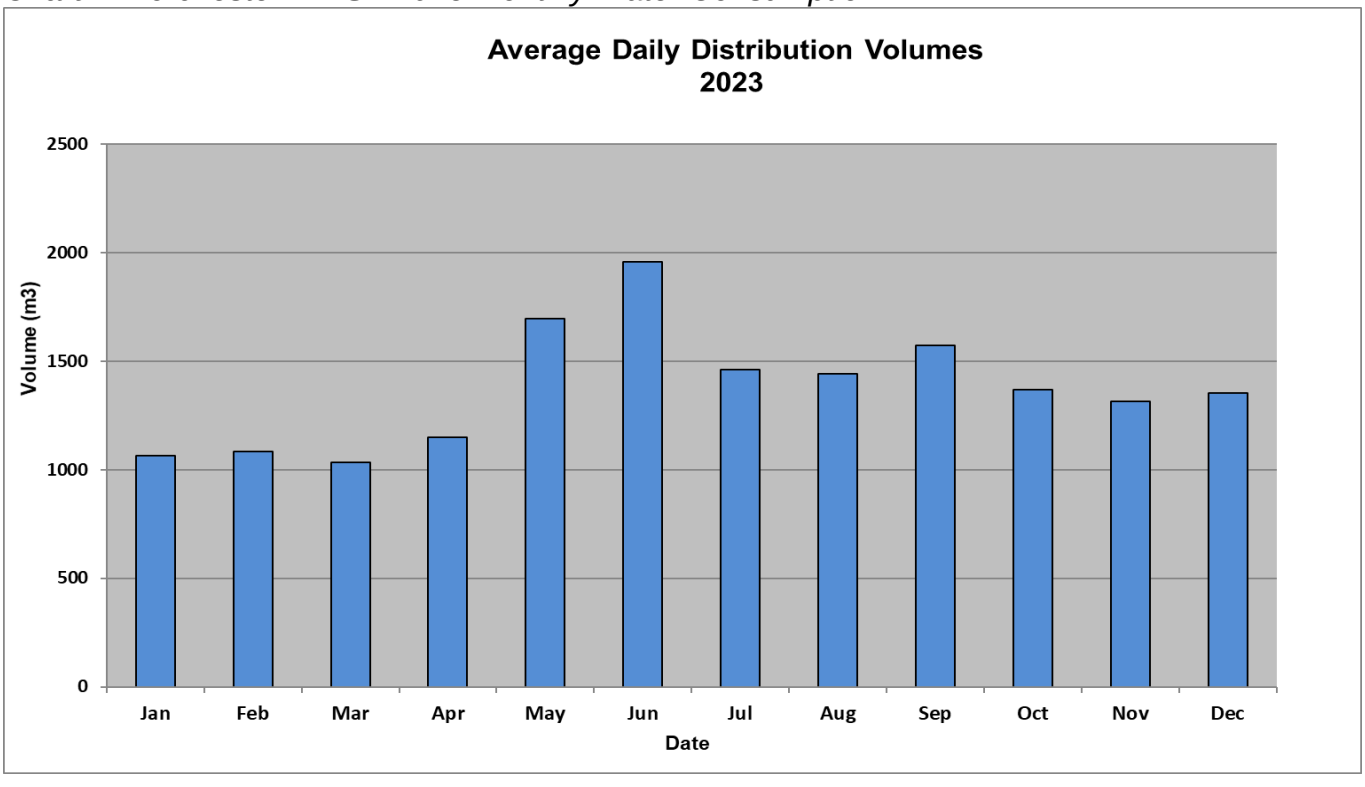
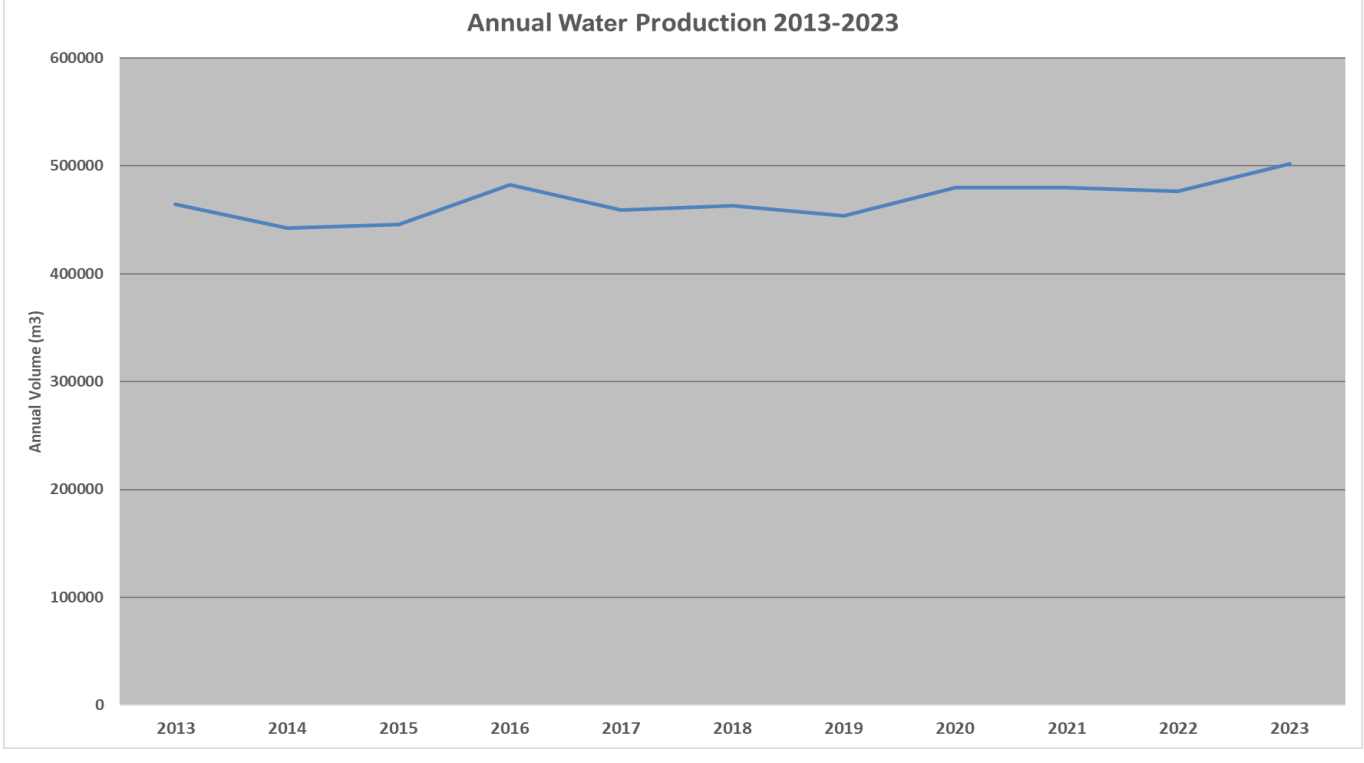


Chart 5: *Dorchester DWS - Annual Water Consumption comparison, 2013 to 2023*



This report is presented based on recorded information taken by the licenced water operators and to the best of my knowledge, it is complete and accurate.

Prepared by:

Kevin Willson
Environmental Services Superintendent

Reviewed by:

Jarrod Craven
Director of Public Works