

# Casselman Drinking Water System

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Waterworks # 210001219  
System Category – Large Municipal Residential

## Annual Water Report

Prepared For: Municipality of Casselman

Reporting Period of January 1<sup>st</sup> – December 31<sup>st</sup> 2022

Issued: February 22, 2023

Revision: 0

Operating Authority:



This report has been prepared to satisfy the annual reporting requirements in O.Reg 170/03 Section 11 and Schedule 22

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## Report Availability

As Casselman’s drinking water system is considered a large municipal residential system under O. Reg. 170/03, this report must be made available to the public. It can be found at the Casselman Municipal Office (located at 751 St Jean Street, Casselman, Ontario) and on their website (<https://en.casselman.ca>). This system does not serve more than 10,000 residents.

## Compliance Report Card

Compliance Event	# of Events
Ministry of Environment Inspections	1
Ministry of Labour Inspections	0
QEMS External Audit	1 (Re-accreditation Audit)
AWQI’s/BWA	4/0
Non-Compliance	0
Community Complaints	5
Spills	0
Watermain Breaks	0

## System Process Description

### Raw Source

Casselman’s drinking water system draws water from the South Nation River via a submerged 457 mm diameter intake pipe that extends halfway into the river from the shoreline. Raw water is conveyed by the intake pipe to a concrete raw water well located inside the surface water treatment plant. Before entering the raw water well, the water flows through a screen to prevent larger materials from entering the plant.

### Treatment

Three vertical turbine low lift pumps send the raw water to the two Actiflo® tanks. The Actiflo® treatment system is comprised of a coagulation tank, an injection tank, a maturation tank, a settling tank and a filter. Coagulant is added to destabilize the particles in the water and enable them to join other particles to form flocs that can be removed in the subsequent settling and filtration processes. Polymer is added into the injection and maturation tanks to aid in the treatment process. When required, a potassium permanganate solution is added to the raw water tank for manganese removal.

The filtration system is comprised of two mixed media filters (i.e., sand/granular activated carbon gravity filters).

A backwash system is in place to clean the filters. Treated water from the clearwell is pumped upwards through the filter and the effluent is sent to the backwash/residuals handling tank.

The filtered water is conveyed to a holding tank where transfer pumps send the water through an ultraviolet (UV) reactor consisting of two UV disinfection units. The UV radiation inactivates chlorine-resistant pathogens.

A chlorine solution is mixed into the filtered water prior to travelling through the two clearwells in series that have a capacity of 415 m<sup>3</sup> and 440 m<sup>3</sup> respectively. In the clearwell, the water is retained for the required contact time to ensure proper disinfection.

Prior to entering the distribution system by means of the facility's high lift pumps, an ammonium sulphate solution is injected into the water leaving the clearwell. This allows for the formation of a combined chlorine residual. The combined chlorine residual is used to maintain secondary disinfection in Casselman's drinking water distribution system.

### **Distribution**

Three vertical high lift pumps send the water to the distribution system. An analyzer measuring both free and total chlorine residuals is located at the main sewage pumping station, to monitor the combined chlorine residual within the distribution system.

The distribution system consists of an elevated storage tank that has a storage capacity of 1600 m<sup>3</sup> and over 10 km of watermain, ranging in size from 150 mm to 250 mm diameter pipe. The system also includes valves, fire hydrants and service connections with lot line shut-offs. The storage tank provides for peak hour demands and fire flows.

#### **Treatment Chemicals used during the reporting year:**

<b>Chemical Name</b>	<b>Use</b>	<b>Supplier</b>
Potassium Permanganate	Manganese removal	Univar
PAS-08	Coagulant	Kemira
PASS 10	Coagulant	Kemira
PAX-XL6	Coagulant	Kemira
Polymer	Coagulant aid	Solenis
Chlorine Gas	Disinfection	Brenntag
Sodium Hypochlorite	Disinfection	Brenntag
Sodium Hydroxide	pH adjustment	Sodrox
Ammonium Sulphate	Chloramination	Brenntag

## Summary of Non-Compliance

### Adverse Water Quality Incidents

Date	AWQI #	Parameter	Value	Limit	Legislation
Q1 2022	N/A	THM	118.75 µg/L	100 µg/L	O. Reg. 170/03
Q2 2022	N/A	THM	108.75 µg/L	100 µg/L	O. Reg. 170/03
October 2022	160560	Filter Effluent Turbidity < 0.3 NTU	36.19 % < 0.3 NTU	Min. 95 % < 0.3 NTU	O. Reg. 170/03
November 2022	160915	Filter Effluent Turbidity < 0.3 NTU	72.31 % < 0.3 NTU	Min. 95 % < 0.3 NTU	O. Reg. 170/03

### Non-Compliance

Legislation	requirement(s) system failed to meet	duration of the failure (i.e. date(s))	Corrective Action	Status
None to Report				

### Non-Compliance Identified in a Ministry Inspection:

Legislation	requirement(s) system failed to meet	duration of the failure (i.e. date(s))	Corrective Action	Status
None to Report				

## Flows

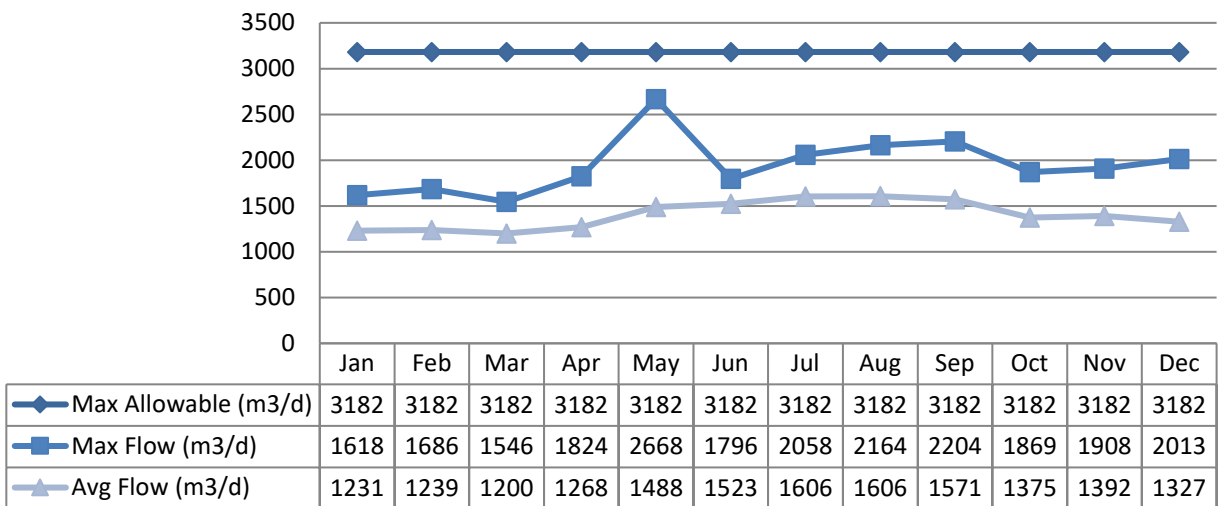
In 2022, Casselman’s drinking water system operated on average under half the rated capacity.

### Raw Water Flows

Raw Water flows are regulated under the Permit to Take Water (PTTW). Raw flow data from 2022 was submitted to the Ministry electronically under Permit #6067-9EGMS2 (expires December 31<sup>st</sup>, 2023). The submission confirmation can be found attached in Appendix A.

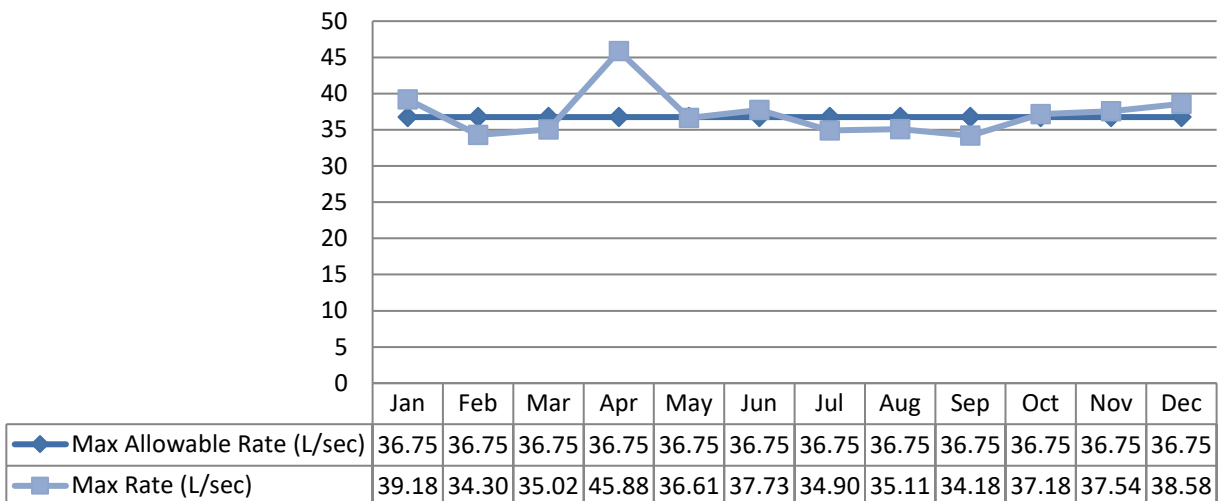
#### Raw Flows

##### Max. Allowable – PTTW



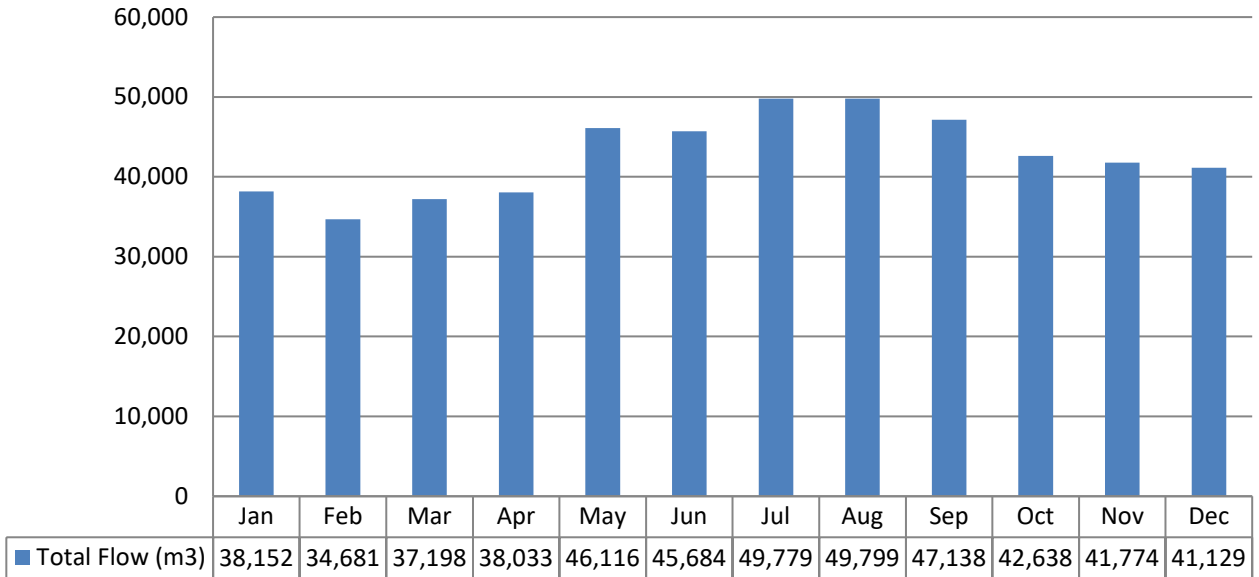
#### Maximum Raw Flows Rates

##### Max. Allowable Rate – PTTW 36.75 L/sec

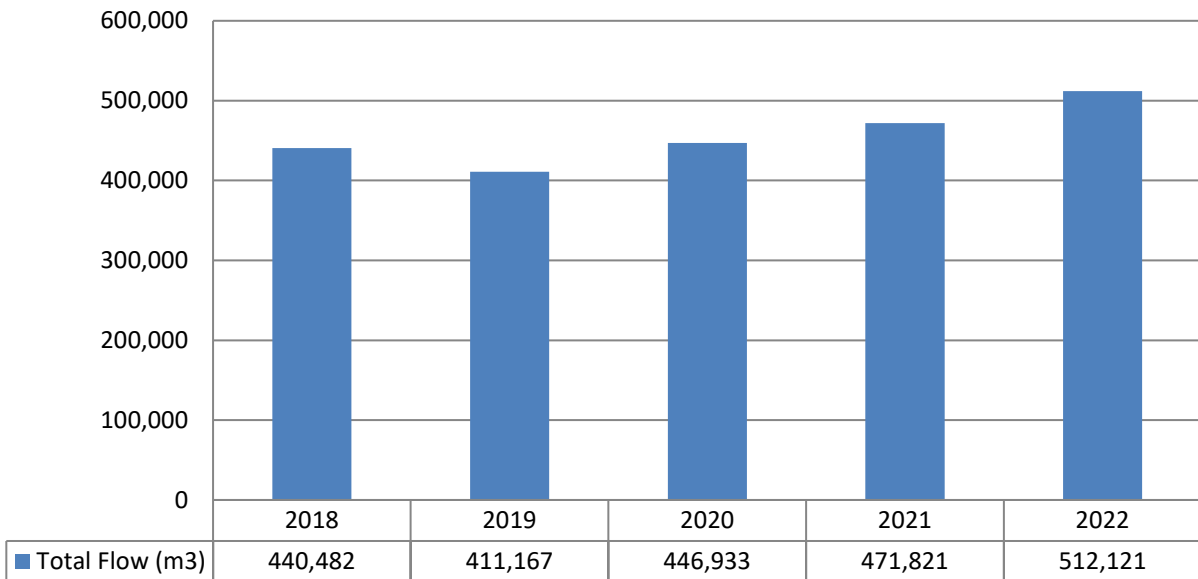


\*Brief spikes (less than 1 minute) above 36.75 L/sec.

Monthly Total Raw Flow Comparison



Annual Total Raw Flow Comparison

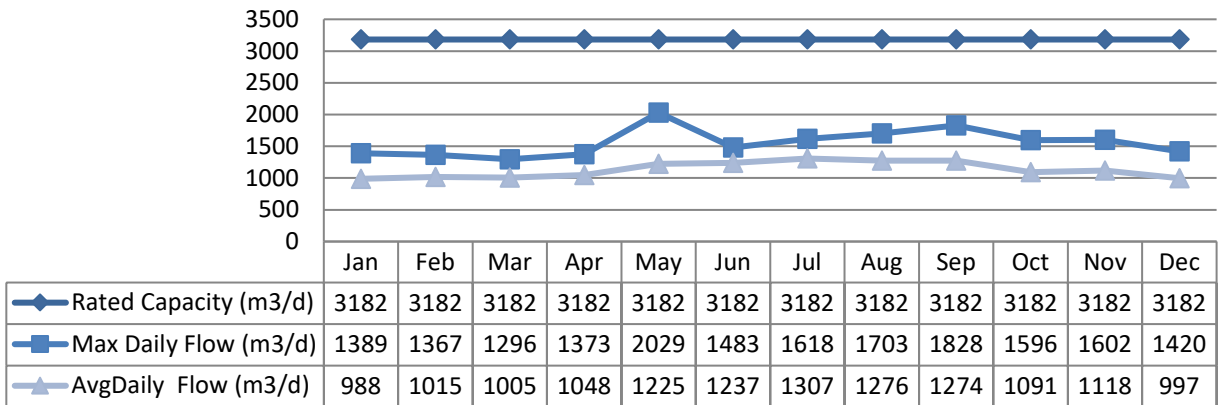


**Treated Water Flows**

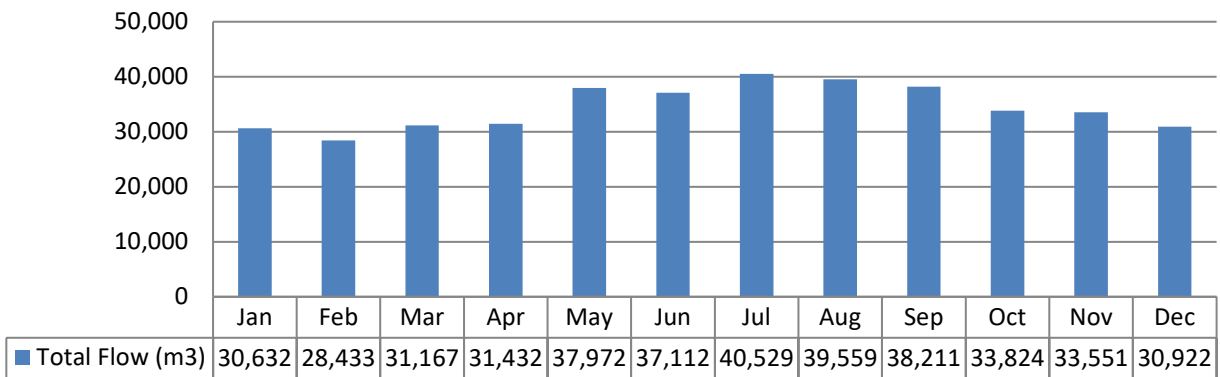
The Treated Water flows are regulated under the Municipal Drinking Water Licence (MDWL).

**Treated Flows**

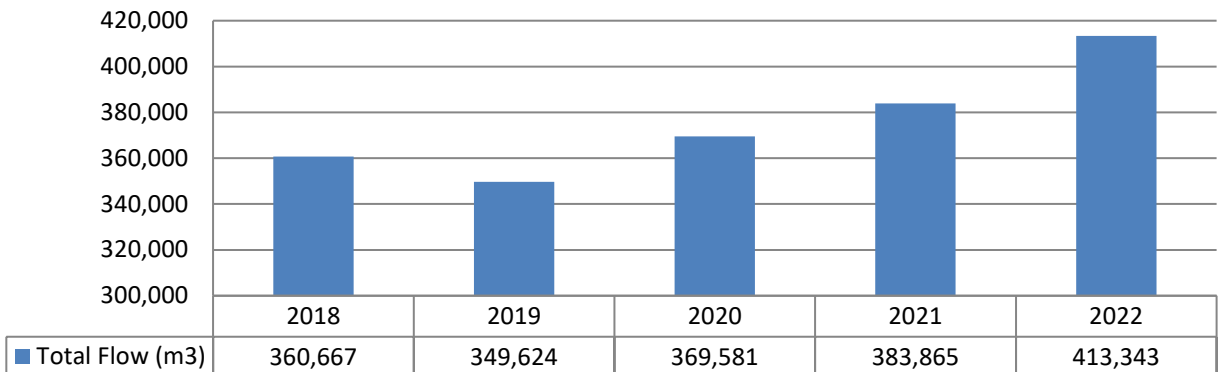
Rated Capacity – MDWL



**Monthly Total Treated Flow Comparison**



**Annual Total Treated Flow Comparison**





## Regulatory Sample Results Summary

### Microbiological Testing

	No. of Samples Collected	Range of E.Coli Results		Range of Total Coliform Results		Range of HPC Results	
		Min	Max	Min	Max	Min	Max
Raw Water	52	0	117	2	17600	n/a	n/a
Treated Water	52	0	0	0	0	< 2	60
Distribution Water	156	0	0	0	0	< 2	158

### Operational Testing

	No. of Samples Collected	Range of Results	
		Minimum	Maximum
Turbidity, On-Line (NTU) – Filter 1	8760	0.03	0.96
Turbidity, On-Line (NTU) – Filter 2	8760	0.01	0.92
Turbidity, On-Line (NTU) - TW	8760	0.08	3.33
Free Chlorine Residual, On-Line (mg/L) - TW	8760	0.25	2.94
Free Chlorine Residual, In-House (mg/L) - TW	195	0.80	3.25
Combined Chlorine Residual, On-Line (mg/L) - DW	8760	0.41	3.58*
Combined Chlorine Residual, Field (mg/L) - DW	156	0.76	2.61
UV Intensity (mJ/cm <sup>2</sup> )	8760	52	n/a

NOTE: Spikes recorded by on-line instrumentation may result from air bubbles, power flicks and various maintenance/calibration activities. All spikes are reviewed for compliance with O. Reg. 170/03

\*Combined Chlorine Residual SPS 1 – Distribution Water registered above 3 mg/L for a short period. Analyzer reading high. Max. combined chlorine residual leaving the plant was 2.68 mg/L during this period.

### Inorganic Parameters

These parameters are tested as a requirement under O. Reg. 170/03. Sodium and Fluoride are required to be tested every 60 months. Nitrate and Nitrite are tested quarterly and the metals are tested annually as required under O. Reg. 170/03. In the event any parameter exceeds half the maximum allowable concentration the parameter is required to be sampled quarterly.

- MAC = Maximum Allowable Concentration as per O. Reg. 169/03
- MDL = Below the laboratory detection level

	Sample Date (yyyy/mm/dd)	Sample Result	MAC	No. of Exceedances	
				MAC	1/2 MAC
<b>Treated Water</b>					
Antimony: Sb (ug/L) - TW	2022/04/11	<MDL 0.1	6.0	No	No
Arsenic: As (ug/L) - TW	2022/04/11	0.1	10.0	No	No
Barium: Ba (ug/L) - TW	2022/04/11	43.0	1000.0	No	No
Boron: B (ug/L) - TW	2022/04/11	22.0	5000.0	No	No
Cadmium: Cd (ug/L) - TW	2022/04/11	<MDL 0.02	5.0	No	No
Chromium: Cr (ug/L) - TW	2022/04/11	<MDL 2.0	50.0	No	No

	Sample Date (yyyy/mm/dd)	Sample Result	MAC	No. of Exceedances	
				MAC	1/2 MAC
Mercury: Hg (ug/L) - TW	2022/04/11	<MDL 0.02	1.0	No	No
Selenium: Se (ug/L) - TW	2022/04/11	<MDL 1.0	50.0	No	No
Uranium: U (ug/L) - TW	2022/04/11	0.13	20.0	No	No
<b>Additional Inorganics</b>					
Fluoride (mg/L) - TW	2020/06/01	<MDL 0.1	1.5	No	No
Nitrite (mg/L) - TW	2022/01/04	<MDL 0.1	1.0	No	No
Nitrite (mg/L) - TW	2022/04/04	<MDL 0.1	1.0	No	No
Nitrite (mg/L) - TW	2022/07/04	<MDL 0.1	1.0	No	No
Nitrite (mg/L) - TW	2022/10/03	<MDL 0.1	1.0	No	No
Nitrate (mg/L) - TW	2022/01/04	5.0	10.0	No	Yes
Nitrate (mg/L) - TW	2022/04/04	3.7	10.0	No	No
Nitrate (mg/L) - TW	2022/07/04	2.4	10.0	No	No
Nitrate (mg/L) - TW	2022/10/03	2.1	10.0	No	No
*Sodium: Na (mg/L) - TW	2020/04/20	36.5	20*	N/A	N/A

\*There is no "MAC" for Sodium. The aesthetic objective for sodium in drinking water is 200 mg/L. The local Medical Officer of Health should be notified mg/L when the sodium concentration exceeds 20 mg/L so that this information may be communicated to local physicians for their use with patients on sodium restricted diets.

#### Schedule 15 Sampling:

The Schedule 15 Sampling is required under O. Reg. 170/03. This system is under a reduced sampling schedule. No plumbing samples were collected.

Distribution System	Number of Sampling Points	Number of Samples	Range of Results		MAC (µg/L)	Number of Exceedances
			Minimum	Maximum		
Alkalinity (mg/L)	5	5	158	216	n/a	n/a
pH	5	5	7.0	7.6	n/a	n/a
Lead (µg/L)	5	5	0.03	0.15	10	0

#### Organic Parameters

These parameters are tested annually as a requirement under O. Reg. 170/03. In the event any parameter exceeds half of the maximum allowable concentration the parameter is required to be sampled quarterly.

- MAC = Maximum Allowable Concentration as per O. Reg. 169/03
- MDL = Below the laboratory detection level

	Sample Date (yyyy/mm/dd)	Sample Result	MAC	Number of Exceedances	
				MAC	1/2 MAC
<b>Treated Water</b>					
Alachlor (ug/L) - TW	2022/04/11	<MDL 0.3	5.0	No	No
Atrazine + Metabolites (µg/L) - TW	2022/04/11	<MDL 0.5	5.0	No	No
Azinphos-methyl (ug/L) - TW	2022/04/11	<MDL 1.0	20.0	No	No
Benzene (ug/L) - TW	2022/04/11	<MDL 0.5	1.0	No	No

	Sample Date (yyyy/mm/dd)	Sample Result	MAC	Number of Exceedances	
				MAC	1/2 MAC
Benzo(a)pyrene (ug/L) - TW	2022/04/11	<MDL 0.006	0.01	No	No
Bromoxynil (ug/L) - TW	2022/04/11	<MDL 0.5	5.0	No	No
Carbaryl (ug/L) - TW	2022/04/11	<MDL 3.0	90.0	No	No
Carbofuran (ug/L) - TW	2022/04/11	<MDL 1.0	90.0	No	No
Carbon Tetrachloride (ug/L) - TW	2022/04/11	<MDL 0.2	2.0	No	No
Chlorpyrifos (ug/L) - TW	2022/04/11	<MDL 0.5	90.0	No	No
Diazinon (ug/L) - TW	2022/04/11	<MDL 1.0	20.0	No	No
Dicamba (ug/L) - TW	2022/04/11	<MDL 1.0	120.0	No	No
1,2-Dichlorobenzene (ug/L) - TW	2022/04/11	<MDL 0.5	200.0	No	No
1,4-Dichlorobenzene (ug/L) - TW	2022/04/11	<MDL 0.5	5.0	No	No
1,2-Dichloroethane (ug/L) - TW	2022/04/11	<MDL 0.5	5.0	No	No
1,1-Dichloroethylene (ug/L) - TW	2022/04/11	<MDL 0.5	14.0	No	No
Dichloromethane (Methylene Chloride) (ug/L) - TW	2022/04/11	<MDL 5.0	50.0	No	No
2,4-Dichlorophenol (ug/L) - TW	2022/04/11	<MDL 0.2	900.0	No	No
2,4-Dichlorophenoxy acetic acid (2,4-D) (ug/L) - TW	2022/04/11	<MDL 1.0	100.0	No	No
Diclofop-methyl (ug/L) - TW	2022/04/11	<MDL 0.9	9.0	No	No
Dimethoate (ug/L) - TW	2022/04/11	<MDL 1.0	20.0	No	No
Diquat (ug/L) - TW	2022/04/11	<MDL 5.0	70.0	No	No
Diuron (ug/L) - TW	2022/04/11	<MDL 5.0	150.0	No	No
Glyphosate (ug/L) - TW	2022/04/11	<MDL 25.0	280.0	No	No
Malathion (ug/L) - TW	2022/04/11	<MDL 5.0	190.0	No	No
Metolachlor (ug/L) - TW	2022/04/11	<MDL 3.0	50.0	No	No
Metribuzin (ug/L) - TW	2022/04/11	<MDL 3.0	80.0	No	No
Monochlorobenzene (Chlorobenzene) (ug/L) - TW	2022/04/11	<MDL 0.5	80.0	No	No
Paraquat (ug/L) - TW	2022/04/11	<MDL 1.0	10.0	No	No
PCB (ug/L) - TW	2022/04/11	<MDL 0.05	3.0	No	No
Pentachlorophenol (ug/L) - TW	2022/04/11	<MDL 0.2	60.0	No	No
Phorate (ug/L) - TW	2022/04/11	<MDL 0.3	2.0	No	No
Picloram (ug/L) - TW	2022/04/11	<MDL 5.0	190.0	No	No
Prometryne (ug/L) - TW	2022/04/11	<MDL 0.1	1.0	No	No
Simazine (ug/L) - TW	2022/04/11	<MDL 0.5	10.0	No	No
Terbufos (ug/L) - TW	2022/04/11	<MDL 0.5	1.0	No	No
Tetrachloroethylene (ug/L) - TW	2022/04/11	<MDL 0.5	10.0	No	No
2,3,4,6-Tetrachlorophenol (ug/L) - TW	2022/04/11	<MDL 0.2	100.0	No	No
Triallate (ug/L) - TW	2022/04/11	<MDL 10.0	230.0	No	No
Trichloroethylene (ug/L) - TW	2022/04/11	<MDL 0.5	5.0	No	No
2,4,6-Trichlorophenol (ug/L) – TW	2022/04/11	<MDL 0.2	5.0	No	No
2-Methyl-4chlorophenoxyacetic Acid (ug/L) - TW	2022/04/11	<MDL 10.0	100.0	No	No
Trifluralin (ug/L) – TW	2022/04/11	<MDL 0.5	45.0	No	No
Vinyl Chloride (ug/L) – TW	2022/04/11	<MDL 0.2	1.0	No	No

Distribution samples are tested quarterly for THM's and HAA's in accordance with O. Reg. 170/03.

	Sample Year	Sample Result	MAC	Number of Exceedances	
				MAC	1/2 MAC
<b>Distribution Water</b>					
Trihalomethane (THM): Total (ug/L) Annual Running Average - DW	2022	96.0	100	No	Yes
Haloacetic Acid (HAA): Total (ug/L) Annual Running Average - DW	2022	72.1	80	No	Yes

### Additional Legislated Samples

As per Casselman's Municipal Drinking Water Licence, monthly samples are required to monitor total suspended solids in the backwash water and supernatant tank.

Parameter	Annual Average TSS Concentration (mg/L)	Annual Average TSS Concentration Limit (mg/L)
Backwash water	8.8	25
Supernatant	10.0	25

As per Casselman's Municipal Drinking Water Licence, quarterly samples are required to monitor NDMA at the furthest point in the distribution system.

Parameter	Date	Result (ug/L)	MAC (ug/L)	Exceedance
NDMA	2022/01/04	< 0.0008	0.009	No
	2022/04/04	< 0.0008	0.009	No
	2022/07/04	0.0012	0.009	No
	2022/10/03	< 0.0009	0.009	No

## Maintenance Summary

### Water Treatment Plant Maintenance

Date	Description
January	Replaced Low lift pump #101
	Backflow preventer inspection
	Completed repair identified during the most recent ESA inspection
	Fire Extinguisher inspection
	Replacement of all heaters and furnace at WTP
February	Polymer motor repaired and re-installed
	New water heater WTP
March	Reinstall Low lift pump #101
April	Cleaned Raw water, back wash and supernatant tank WTP
	Replaced actuator and valve on FV-2107 Actiflo #1 filter effluent
	Purchased new UV reference sensor
May	Started dosing of Potassium Permanganate
	Chlorination system maintenance
June	Roof repair WTP
	Added low filter effluent turbidity alarms on Actiflo #1 and #2
July	Lifting device inspections
August	Manganese dioxide pilot on site
September	QEL Calibration / Testing of Chlorine Monitoring System
October	Fire Extinguisher inspection
November	Filter #1 effluent valve calibrated
	Inspection of raw water intake structure
	Flow meter calibration/verification by Capital Controls
	Replaced High lift #1 check valve and air relief valve
	Replaced problematic turbidity analyser (temporary replacement)
	Backflow preventer inspection
	Stopped dosing of Potassium Permanganate
December	Purchased new chlorine analyser for installation at WTP
	Purchased new turbidity analyser for installation at WTP
	HACH Instrumentation Inspection/calibration

**Distribution Maintenance**

<b>Date</b>	<b>Description</b>
January	Replaced broken water meter
April	2 Hydrant Rebuilds
	Water service repair on Gagné Street
May	5 Main valve repairs on Laurier St
	1 Main valve on Laurier & Brébeuf St
	1 Main valve repair on Brébeuf & St-Isidore St
	Pressure test of hydrant for Ford plant
	Spring distribution system flushing
June	1 Water service repair on Principale St
	Commissioned Phase 1 for Cassel Homelands
July	Commissioned Phase 2 for Cassel Homelands
August	Hydrant valve repair on Principale and Lafleche St
September	10 Stand post repairs
October	Repaired hydrant lateral on Argile St
	1 Stand-post repair on Rue Des Pins
	Repaired service hit by contractor on Laurier St
	Fall distribution system flushing and winterising
December	5 hydrant rebuilds
	2 Stand post repairs on Cartier St & Brébeuf St

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## **Appendix A - WTRS Submission Confirmation**



**Water Taking Data submitted successfully.**

**Confirmation:**

Thank you for submitting your water taking data online.

Permit Number: 6067-9EGMS2  
Permit Holder: THE CORPORATION OF THE VILLAGE OF CASSELMAN.  
Received on: Feb 10, 2023 9:33 AM

This confirmation indicates that your data has been received by the Ministry, but should not be construed as acceptance of this data if it differs from that specified on the Permit Number, assigned to the Permit Holder stated above.

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NORTH2 DUNDAS2 | 2023/02/10  
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