



**Ministry of the Environment and Climate Change**

**CASSELMAN DRINKING WATER SYSTEM  
Inspection Report**

<b>Site Number:</b>	210001219
<b>Inspection Number:</b>	1-FMABK
<b>Date of Inspection:</b>	Dec 11, 2017
<b>Inspected By:</b>	Christina Des Rochers

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**OWNER INFORMATION:**

<b>Company Name:</b>	CASSELMAN, THE CORPORATION OF THE VILLAGE OF	<b>Unit Identifier:</b>	
<b>Street Number:</b>	751		
<b>Street Name:</b>	ST. JEAN St		
<b>City:</b>	CASSELMAN		
<b>Province:</b>	ON	<b>Postal Code:</b>	K0A 1M0

**CONTACT INFORMATION**

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**INSPECTION DETAILS:**

<b>Site Name:</b>	CASSELMAN DRINKING WATER SYSTEM
<b>Site Address:</b>	832 LAVAL ST CASSELMAN K0A 1M0
<b>County/District:</b>	Casselman
<b>MOECC District/Area Office:</b>	Cornwall Area Office
<b>Health Unit:</b>	EASTERN ONTARIO HEALTH UNIT
<b>Conservation Authority:</b>	
<b>MNR Office:</b>	
<b>Category:</b>	Large Municipal Residential
<b>Site Number:</b>	210001219
<b>Inspection Type:</b>	Unannounced
<b>Inspection Number:</b>	1-FMABK
<b>Date of Inspection:</b>	Dec 11, 2017
<b>Date of Previous Inspection:</b>	

**COMPONENTS DESCRIPTION**

<b>Site (Name):</b>	MOE DWS Mapping	<b>Sub Type:</b>	
<b>Type:</b>	DWS Mapping Point		

<b>Site (Name):</b>	RAW WATER
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**Type:** Source **Sub Type:** Surface

**Comments:**

The Casselman Water Treatment Plant draws water from the South Nation River. The intake crib is located in the middle of the river at a depth of 7 m below mean river level. Raw water is drawn through a wire mesh screen at the intake and flows into a raw water well (equipped with three low lift pumps, an inlet gate and removable screens) situated below the water treatment plant.

**Site (Name):** TREATED WATER

**Type:** Treated Water POE

**Sub Type:** Treatment Facility

**Comments:**

The Casselman Water Treatment Plant is located at 832 Laval Street, Casselman, Ontario.

At the treatment plant raw water from the South Nation River flows into a raw water well where it receives potassium permanganate. Water is fed through the raw water header where it may receive sodium hydroxide (no longer in use), an injection of aqueous chlorine solution (mix of chlorine gas and treated water), and receives coagulant upstream of the in-line static mixer.

Water is then pumped into one of two Actiflo® process units that provide coagulation, flocculation, clarification, and filtration. Effluent from the Actiflo® units is then directed to the filtered water holding tank from which it is pumped through a header pipe that receives an injection of aqueous chlorine solution (mix of chlorine gas and treated water).

The chlorinated water is then directed through one of two parallel UV reactors. Water then flows to a 415 m3 baffled clearwell located beneath the treatment plant, and a 440 m3 clearwell located adjacent to the main building where it is pumped alternately by three high lift vertical turbine high lift pumps into the distribution system. Chemical Feed Systems include:

- i) Coagulant Feed System consisting of four 5000 L capacity polyethylene coagulant storage tanks; 2 variable speed metering pumps to feed alum into the raw water header upstream of the in-line static mixer;
- ii) Polymer Feed System consisting of one 2270 L polyethylene solution storage tank and mixer with 3 variable speed metering pumps to feed polymer into the injection tank, coagulation tank and hydrocyclone on the treatment units;
- iii) Chlorination System consisting of 2 wall mounted vacuum chlorinators with automatic switchover regulators to draw chlorine gas from cylinders and blend with treated water to create an aqueous chlorine solution for feeding into the raw water header and the filtered water header.

GPS coordinates: NAD 83, Zone 18, 0492370 E / 5017559 N.

**Site (Name):** DISTRIBUTION SYSTEM

**Type:** Other

**Sub Type:** Other

**Comments:**

The distribution system consists of approximately 20 km of PVC watermains that were installed in 1976 and 1977. The system supplies water to approximately 1000 service connections that serve a population of approximately 2,835. The operating authority reports that there were 128 hydrants installed on the system.

**Site (Name):** WATER TOWER

**Type:** Other

**Sub Type:** Reservoir

**Comments:**

A 1,575 cubic meter capacity elevated storage tank is located at 758 Breboeuf Street. It is a steel tank that sits atop a concrete pedestal.

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GPS coordinates: NAD 83, Zone 18, 0493526 E / 5017933 N.

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## INSPECTION SUMMARY:

### Introduction

- The primary focus of this inspection is to confirm compliance with Ministry of the Environment and Climate Change (MOECC) legislation as well as evaluating conformance with ministry drinking water related policies and guidelines during the inspection period. The ministry utilizes a comprehensive, multi-barrier approach in the inspection of water systems that focuses on the source, treatment and distribution components as well as management practices.

This drinking water system is subject to the legislative requirements of the Safe Drinking Water Act, 2002 (SDWA) and regulations made therein, including Ontario Regulation 170/03, "Drinking Water Systems" (O.Reg. 170/03). This inspection has been conducted pursuant to Section 81 of the SDWA.

This report is based on a "focused" inspection of the system. Although the inspection involved fewer activities than those normally undertaken in a detailed inspection, it contained critical elements required to assess key compliance issues. This system was chosen for a focused inspection because the system's performance met the ministry's criteria, most importantly that there were no deficiencies as identified in O.Reg. 172/03 over the past 3 years. The undertaking of a focused inspection at this drinking water system does not ensure that a similar type of inspection will be conducted at any point in the future.

This inspection report does not suggest that all applicable legislation and regulations were evaluated. It remains the responsibility of the owner to ensure compliance with all applicable legislative and regulatory requirements.

This inspection covers the period from November 20, 2016 to December 11, 2017. Specifically this inspection examines compliance with Municipal Drinking Water Licence (MDWL) #173-101 and Drinking Water Works Permit (DWWP) #173-201, in addition to relevant Ministry of the Environment and Climate Change (MOECC) legislation as addressed in specific inspection questions.

The inspection began December 11, 2017 when the physical inspection of Casselman Drinking Water System (DWS) was conducted consisting of a visual inspection of the treatment facility, including instrumentation and controls. Inspection interviews and review of operational information and log books also took place at that time.

During the inspection review period operational responsibility for the Casselman DWS was held by the owner, The Corporation of the Village of Casselman (Village). As of January 1, 2018, operational responsibility is held by the Ontario Clean Water Agency (OCWA).

The Casselman water treatment plant was classified as a Class II Water Treatment Subsystem on November 26, 2015.

Additional review of documentation and information relevant to the inspection were conducted at MOECC offices.

### Capacity Assessment

- There was sufficient monitoring of flow as required by the Municipal Drinking Water Licence or Drinking Water Works Permit issued under Part V of the SDWA.

MDWL #173-101 Schedule C, 2.0 Flow Measurement and Recording Requirements states:

2.1 For each treatment subsystem identified in column 1 of Table 1 and in addition to any other flow measurement and recording that may be required, continuous flow measurement and recording shall be undertaken for:

### Capacity Assessment

2.1.1 The flow rate and daily volume of treated water that flows from the treatment subsystem to the distribution system: \*

2.1.2 The flow rate and daily volume of water that flows into the treatment subsystem.

Casselman DWS is equipped with two raw water flow meters, one located on each inlet line to the two treatment trains, one flow meter located post-filter measuring the flow volume of filtered water entering the filtered water holding tank, and one treated water flow meter located past the highlift pumps.

Additionally, each of the two filters are equipped with a filtered water flow meter.

- **The owner was in compliance with the conditions associated with maximum flow rate or the rated capacity conditions in the Municipal Drinking Water Licence issued under Part V of the SDWA.**

MDWL #173-101 Schedule C, 1.0 Performance Limits, 1.1 Rated Capacity states that the maximum daily volume of treated water that flows from the treatment subsystem to the distribution system shall not exceed 3,182 m<sup>3</sup>/day.

This flow was exceeded on November 1, 2016 when the daily flow was recorded as 3,283 m<sup>3</sup>/day. This exceedance of the rated capacity is a result of the start of the fall flushing program.

The maximum daily treated flow into the distribution system during normal operation in inspection review period was 3,114 m<sup>3</sup>/day.

### Treatment Processes

- **The owner had ensured that all equipment was installed in accordance with Schedule A and Schedule C of the Drinking Water Works Permit.**
- **Records did not indicate that the treatment equipment was operated in a manner that achieved the design capabilities required under Ontario Regulation 170/03 or a Drinking Water Works Permit and/or Municipal Drinking Water Licence issued under Part V of the SDWA at all times that water was being supplied to consumers.**

Filter effluent turbidity is monitored continuously at both filters and coagulant dosing is trended continuously via SCADA.

The Ultraviolet (UV) light reactor system used for primary disinfection provided a minimum dose of 40 mJ/cm<sup>2</sup> at all times water was distributed to users.

The filter effluent turbidity however, failed to meet the performance criterion of less than or equal to 0.3 NTU in 95% of the measurements each month. Filter effluent efficiency, as calculated by the SCADA system, was presented as 94.88% for April 2017.

The number of significant digits in the 95% measurements is a function of the number of turbidity measurements in a month and not a function of the precision or sensitivity of the turbidimeter and as such, any number below 95%, including values between 94.5% and 94.99%, cannot be deemed to meet the 95% filter effluent criterion.

Further issues with turbidity measurements are discussed later in this report.

- **Records confirmed that the water treatment equipment which provides chlorination or chloramination for secondary disinfection purposes was operated so that at all times and all locations in the distribution system the chlorine residual was never less than 0.05 mg/l free or 0.25 mg/l combined.**

### Treatment Processes

- **The primary disinfection equipment was equipped with alarms or shut-off mechanisms that satisfied the standards described in Section 1-6 (1) of Schedule 1 of Ontario Regulation 170/03.**

The UV reactors in the Casselman DWS are equipped with alarms and lockouts which initiate a plant shutdown in the event that the UV dose drops below the required 40 mJ/cm<sup>2</sup>.

### Treatment Process Monitoring

- **Primary disinfection chlorine monitoring was conducted at a location approved by Municipal Drinking Water Licence and/or Drinking Water Works Permit issued under Part V of the SDWA, or at/near a location where the intended CT has just been achieved.**

- **Continuous monitoring of each filter effluent line was being performed for turbidity.**

- **The secondary disinfectant residual was measured as required for the distribution system.**

Secondary disinfectant residual in the distribution system is monitored continuously via online analyzer located at the Casselman Sewage Pumping Station.

Additionally, distribution chlorine residual is tested during routine microbiological sampling.

- **Operators were examining continuous monitoring test results and they were examining the results within 72 hours of the test.**

Review of system logbooks confirms that continuous monitoring data are reviewed daily (every 24 hours), including weekends and statutory holidays.

- **All continuous monitoring equipment utilized for sampling and testing required by O. Reg. 170/03, or Municipal Drinking Water Licence or Drinking Water Works Permit or order, were equipped with alarms or shut-off mechanisms that satisfy the standards described in Schedule 6.**

Turbidity, on each of two filter effluent lines, and UV dose are continuously monitored. If turbidity exceeds 0.80 NTU or UV dose drops below 40 mJ/cm<sup>2</sup> an alarm is triggered and the interlock systems immediately shut down the production of water.

- **Continuous monitoring equipment that was being utilized to fulfill O. Reg. 170/03 requirements was performing tests for the parameters with at least the minimum frequency specified in the Table in Schedule 6 of O. Reg. 170/03 and recording data with the prescribed format.**

- **All continuous analysers were calibrated, maintained, and operated, in accordance with the manufacturer's instructions or the regulation.**

Online chlorine and raw, filtered, transfer, and backwash flowmeters were most recently calibrated by Franklin Empire on July 6, 2017.

Online turbidity analyzers were most recently calibrated by HACH Service Plus on November 21, 2017.

Bench-top and handheld turbidimeters, colourimeters, spectrophotometers, and pH meters were most recently calibrated by HACH Service Plus on June 20, 2017.

### Operations Manuals

- **The operations and maintenance manuals contained plans, drawings and process descriptions sufficient**



### Operations Manuals

for the safe and efficient operation of the system.

- **The operations and maintenance manuals met the requirements of the Drinking Water Works Permit and Municipal Drinking Water Licence issued under Part V of the SDWA.**

MDWL #173-101, Schedule B 16.0 Operation and Maintenance Manual requires,

16.2.1 The requirements of this licence and associated procedures;

16.2.2 The requirements of the drinking water works permit for the drinking water system;

16.2.3 Procedures for monitoring and recording the in-process parameters necessary for the control of any treatment subsystem and for assessing the performance of the drinking water system;

16.2.4 Procedures for the operation and maintenance of monitoring equipment;

16.2.5 Contingency plans and procedures for the provision of adequate equipment and material to deal with emergencies, upset conditions and equipment breakdown;

16.2.6 Procedures for dealing with complaints related to the drinking water system, including the recording of the nature of the complaint and any investigation and corrective action taken in respect of the complaint;

### Logbooks

- **Records or other record keeping mechanisms confirmed that operational testing not performed by continuous monitoring equipment was being done by a certified operator, water quality analyst, or person who suffices the requirements of O. Reg. 170/03 7-5.**

### Security

- **The owner had provided security measures to protect components of the drinking water system.**

The Casselman water treatment plant, water tower, and sewage pumping station (housing the online distribution chlorine residual analyzer) are equipped with contact alarms and mechanical locks. In addition, the treatment facility is fenced and monitored by Ranguard Security from Cornwall, Ontario.

### Certification and Training

- **The overall responsible operator had been designated for each subsystem.**

The current overall responsible operator (ORO) holds Water Treatment IV and Water Distribution II licences.

- **Operators in charge had been designated for all subsystems which comprised the drinking-water system.**

Operator in charge (OIC) duties are assigned rotationally, based on scheduling needs, to all operators meeting the required levels of certification.

- **All operators possessed the required certification.**

- **Only certified operators made adjustments to the treatment equipment.**

### Water Quality Monitoring

**Water Quality Monitoring**

- **All microbiological water quality monitoring requirements for distribution samples were being met.**

O. Reg. 170/03 10-2 states:

10-2. (1) The owner of a drinking water system and the operating authority for the system shall ensure that,

(a) if the system serves 100,000 people or less, at least eight distribution samples, plus one additional distribution sample for every 1,000 people served by the system, are taken every month, with at least one of the samples being taken in each week; and

(2) The owner of the drinking water system and the operating authority for the system shall ensure that each of the samples taken under subsection

(1) is tested for,

(a) *Escherichia coli*; and

(b) total coliforms.

(3) The owner of the drinking water system and the operating authority for the system shall ensure that at least 25 per cent of the samples required to be taken under subsection (1) are tested for general bacteria population expressed as colony counts on a heterotrophic plate count.

Based on current population, Casselman DWS is required to collect a minimum of eleven samples per month, with at least one sample collected each week.

A minimum of twelve samples per month, habitually three samples per week, are collected from Casselman DWS distribution system and analyzed as required, including one of every three weekly samples analyzed for heterotrophic plate count.

- **All microbiological water quality monitoring requirements for treated samples were being met.**

O. Reg. 170/03 10-3 states:

10-3. The owner of a drinking water system and the operating authority for the system shall ensure that a water sample is taken at least once every week and tested for,

(a) *Escherichia coli*;

(b) total coliforms; and

(c) general bacteria population expressed as colony counts on a heterotrophic plate count.

Samples were collected and analyzed as required during the inspection review period.

- **All inorganic water quality monitoring requirements prescribed by legislation were conducted within the required frequency.**

Per O. Reg. 170/03, sampling frequency for any parameter of Schedule 23, provided previous sample results have not exceeded one-half MAC, is one sample every 12 months for a surface water system.

The most recent samples for analysis of Schedule 23 parameters were collected April 18, 2017 and the previous sample was collected on April 21, 2016.

**Water Quality Monitoring**

These dates satisfy the requirements of the regulation.

- **All organic water quality monitoring requirements prescribed by legislation were conducted within the required frequency.**

Per O. Reg. 170/03, sampling frequency for any parameter of Schedule 24, provided previous sample results have not exceeded one-half MAC, is one sample every 12 months for a surface water system.

The most recent samples for analysis of Schedule 24 parameters were collected April 18, 2017 and the previous sample was collected on April 21, 2016.

These dates satisfy the requirements of the regulation.

- **All haloacetic acid water quality monitoring requirements prescribed by legislation are not being conducted within the required frequency and at the required location.**

No samples have been collected for the analysis and monitoring of haloacetic acid (HAA) levels.

O. Reg. 170/03 13-6.1 states:

(1) The owner of a drinking water system that provides chlorination or chloramination and the operating authority for the system shall ensure that at least one distribution sample is taken in each calendar quarter, from a point in the drinking water systems distribution system, or plumbing that is connected to the drinking water system, that is likely to have an elevated potential for the formation of haloacetic acids.

(2) The owner of the drinking water system and the operating authority for the system shall ensure that each of the samples taken under subsection (1) is tested for haloacetic acids.

Section 13-6.1 came into force on January 1, 2017. Prior to this date, the MOECC notified all owners and operating authorities of the upcoming changes and new requirements.

It is the responsibility of the drinking water system owner and operating authority to be aware of and fulfill all regulatory requirements.

The operating authority of the Casselman DWS shall immediately commence HAA sampling in accordance with the regulation.

Analytical results shall be provided to the undersigned inspector no later than March 31, 2018.

- **All trihalomethane water quality monitoring requirements prescribed by legislation were conducted within the required frequency and at the required location.**

O. Reg. 170/03 13-6 states:

(1) The owner of a drinking water system that provides chlorination or chloramination and the operating authority for the system shall ensure that at least one distribution sample is taken in each calendar quarter, from a point in the drinking water system's distribution system, or plumbing that is connected to the drinking water system, that is likely to have an elevated potential for the formation of trihalomethanes.

(2) The owner of the drinking water system and the operating authority for the system shall ensure that each of the samples taken under subsection (1) is tested for trihalomethanes.

Samples were collected as required during the inspection review period on January 30, April 10, June 26 (resample

### Water Quality Monitoring

collected June 30), and October 30, 2017.

- **All nitrate/nitrite water quality monitoring requirements prescribed by legislation were conducted within the required frequency for the DWS.**

O. Reg. 170/03 13-7 states:

The owner of a drinking water system and the operating authority for the system shall ensure that at least one water sample is taken every three months and tested for nitrate and nitrite.

Samples were collected as required during the inspection review period on January 30, April 10, June 26, and October 30, 2017.

- **All sodium water quality monitoring requirements prescribed by legislation were conducted within the required frequency.**

O. Reg. 170/03 Schedule 13-8 requires sampling and analysis of sodium every 60 months.

A sample was collected for sodium analysis on January 5, 2015 and a resample due to exceedance of the standard was collected on January 13, 2015.

A sample for the analysis of sodium is next required to be collected within 90 days of January 5, 2020.

- **All fluoride water quality monitoring requirements prescribed by legislation were conducted within the required frequency.**

O. Reg. 170/03 Schedule 13-9 requires sampling and analysis of fluoride every 60 months.

A sample for analysis of fluoride was collected on April 14, 2015.

A sample for the analysis of fluoride is next required to be collected within 90 days of April 14, 2020.

- **All water quality monitoring requirements imposed by the Municipal Drinking Water Licence and Drinking Water Works Permit were being met.**

MDWL #173-101 Schedule C: System Specific Conditions, 1.0 Performance Limits, 1.5 Residue Management, identifies that the annual average of suspended solids in the effluent discharged from the waste residual management works shall not exceed 25 mg/L.

Further, 4.0 Additional Sampling, Testing and Monitoring, Environmental Discharge Parameters requires that manual composite samples (meaning at least three grab samples taken during a discharge event) be collected monthly for analysis of suspended solids from the point of discharge of the works.

Samples are collected as required for both filter backwash and Actiflo clarifier supernatant.

The annual averages of suspended solids discharged from the Actiflo supernatant and filter backwash systems in 2017 are 5.8 mg/L and 3.4 mg/L respectively.

- **Records confirmed that chlorine residual tests were being conducted at the same time and at the same location that microbiological samples were obtained.**

### Water Quality Assessment

- **Records did not show that all water sample results taken during the inspection review period did not**

### Water Quality Assessment

exceed the values of tables 1, 2 and 3 of the Ontario Drinking Water Quality Standards (O.Reg. 169/03).

A single sample result of 227 mg/L, collected on June 29, 2017 resulted in an exceedance of the rolling annual average (RAA) limit of 100 mg/L for THMs.

### Reporting & Corrective Actions

- **Corrective actions (as per Schedule 17) had been taken to address adverse conditions, including any other steps that were directed by the Medical Officer of Health.**

A resample for analysis of THM was collected on June 30, 2017 in response to the exceedance of the RAA limit of 100 mg/L.

- **All required notifications of adverse water quality incidents were not immediately provided as per O. Reg. 170/03 16-6.**

With respect to failing to meet the filter effluent criterion for April 2017, a verbal report and corrective actions should have been undertaken as per O. Reg. 170/03 17-3. As the owner/operating authority had not identified the adverse result, no verbal notification or corrective action was undertaken.

The owner and operating authority shall immediately update any standard operating procedures (SOPs) available for operator use to clearly identify results for filter effluent criteria that would indicate an adverse result requiring corrective action. A copy of this SOP and records demonstrating that all operators working within the Casselman DWS have reviewed the updated document are to be provided to the undersigned inspector by February 28, 2018

- **Where required continuous monitoring equipment used for the monitoring of chlorine residual and/or turbidity triggered an alarm or an automatic shut-off, a qualified person responded in a timely manner and took appropriate actions.**
- **When the primary disinfection equipment, other than that used for chlorination or chloramination, has failed causing an alarm to sound or an automatic shut-off to occur, a certified operator responded in a timely manner and took appropriate actions.**

Logbooks clearly demonstrate that certified operators responded as required to all instances when the UV disinfection system was in alarm.

### Other Inspection Findings

- **The following instance(s) of non-compliance were also noted during the inspection:**

Filter effluent performance is continuously monitored in the Casselman DWS and presented in daily (operational) and monthly (regulatory compliance) summaries.

In accordance for the Procedure for Disinfection of Drinking Water In Ontario, in order to be considered to meet the required log removal of pathogens, a performance criterion of filtered water turbidity of less than or equal to 0.3 NTU in 95% of measurements each month must be met at all times.

The monthly regulatory assessment of filter performance for October 2017 shows a monthly filter efficiency of 100% however daily maximums on both filters showed values above 0.3 NTU. With values greater than 0.3NTU, the monthly percentage cannot be 100%.

This situation is also noted on individual dates throughout the year; while filter efficiencies are presented at 100%, the daily maximums for turbidity readings are greater than 0.3 NTU.

### Other Inspection Findings

Village staff report that filter effluent turbidity readings are recorded to SCADA every 2-3 seconds, while the calculated efficiency value is recorded every 6 seconds. Village staff suggest that this mismatched polling frequency would account for the discrepancy between maximum readings and percent efficiency. While this is the probable cause of the numerical discrepancy, it also suggests that monitoring and evaluation of filter performance is not being performed in accordance with the MOECC's Filtration Process Technical Bulletin (<https://www.ontario.ca/page/filtration-processes-technical-bulletin>).

The owner and operating authority shall undertake a review of the requirements of the Filtration Process Technical Bulletin and implement any changes as deemed necessary to the SCADA system in order to ensure accurate assessment and reporting of the filter effluent quality.

A report on the resolution of the SCADA reporting issues, including findings from the review and actions taken to resolve the issue, shall be provided to the undersigned Water Inspector by no later than March 31, 2017.

- **The following items are noted as being relevant to the Drinking Water System:**

1. The source water for the Casselman DWS, South Nation River, contains chronically elevated levels of organic nutrients. Elevated levels of organic compounds combined with free chlorine in the distribution system result in the production of THMs at levels above the ODWQS.

Village of Casselman staff report that implementation of a chloramination system for the purposes of secondary disinfection in order to reduce the formation of THMs in the distribution system will be completed in 2018.

## NON-COMPLIANCE WITH REGULATORY REQUIREMENTS AND ACTIONS REQUIRED

This section provides a summary of all non-compliance with regulatory requirements identified during the inspection period, as well as actions required to address these issues. Further details pertaining to these items can be found in the body of the inspection report.

1. **Records did not indicate that the treatment equipment was operated in a manner that achieved the design capabilities required under Ontario Regulation 170/03 or a Drinking Water Works Permit and/or Municipal Drinking Water Licence issued under Part V of the SDWA at all times that water was being supplied to consumers.**

The filter effluent turbidity however, failed to meet the performance criterion of less than or equal to 0.3 NTU in 95% of the measurements each month. Filter effluent efficiency, as calculated by the SCADA system, was presented as 94.88% for April 2017.

**Action(s) Required:**

Having been made aware of the filter effluent turbidity criterion, the owner and operating authority shall ensure that turbidity data are appropriately assessed for compliance with requirements and non-compliant circumstances are reported as required.

2. **All haloacetic acid water quality monitoring requirements prescribed by legislation are not being conducted within the required frequency and at the required location.**

No samples have been collected for the analysis and monitoring of haloacetic acid (HAA) levels.

O. Reg. 170/03 13-6.1 states:

(1) The owner of a drinking water system that provides chlorination or chloramination and the operating authority for the system shall ensure that at least one distribution sample is taken in each calendar quarter, from a point in the drinking water systems distribution system, or plumbing that is connected to the drinking water system, that is likely to have an elevated potential for the formation of haloacetic acids.

(2) The owner of the drinking water system and the operating authority for the system shall ensure that each of the samples taken under subsection (1) is tested for haloacetic acids.

Section 13-6.1 came into force on January 1, 2017. Prior to this date, the MOECC notified all owners and operating authorities of the upcoming changes and new requirements.

**Action(s) Required:**

The operating authority of the Casselman DWS shall immediately commence HAA sampling in accordance with the regulation.

Analytical results shall be provided to the undersigned inspector no later than March 31, 2018.

3. **All required notifications of adverse water quality incidents were not immediately provided as per O. Reg. 170/03 16-6.**

With respect to failing to meet the filter effluent criterion for April 2017, a verbal report and corrective actions should have been undertaken as per O. Reg. 170/03 17-3. As the owner/operating authority had not identified the adverse result, no verbal notification or corrective action was undertaken.

**Action(s) Required:**

The owner and operating authority shall immediately update any standard operating procedures (SOPs) available

for operator use to clearly identify results for filter effluent criteria that would indicate an adverse result requiring corrective action. A copy of this SOP and records demonstrating that all operators working within the Casselman DWS have reviewed the updated document are to be provided to the undersigned inspector by February 28, 2018

**4. The following instance(s) of non-compliance were also noted during the inspection:**

In accordance for the Procedure for Disinfection of Drinking Water In Ontario, in order to be considered to meet the required log removal of pathogens, at all times a performance criterion of filtered water turbidity of less than or equal to 0.3 NTU in 95% of measurements each month must be met.

The monthly regulatory assessment of filter performance for October 2017 shows a monthly filter efficiency of 100% however daily maximums on both filters showed values above 0.3 NTU. With values greater than 0.3NTU, the monthly percentage cannot be 100%.

**Action(s) Required:**

The owner and operating authority shall undertake a review of the requirements of the Filtration Process Technical Bulletin and implement any changes as deemed necessary to the SCADA system in order to ensure accurate assessment and reporting of the filter effluent quality.

A report on the resolution of the SCADA reporting issues, including findings from the review and actions taken to resolve the issue, shall be provided to the undersigned Water Inspector by no later than March 31, 2018.



## **SUMMARY OF RECOMMENDATIONS AND BEST PRACTICE ISSUES**

This section provides a summary of all recommendations and best practice issues identified during the inspection period. Details pertaining to these items can be found in the body of the inspection report. In the interest of continuous improvement in the interim, it is recommended that owners and operators develop an awareness of the following issues and consider measures to address them.

**Not Applicable**

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**SIGNATURES**

Inspected By:

Christina Des Rochers

Signature: (Provincial Officer)



Reviewed &amp; Approved By:

James Mahoney

Signature: (Supervisor)



Review &amp; Approval Date: 31/01/2018

Note: This inspection does not in any way suggest that there is or has been compliance with applicable legislation and regulations as they apply or may apply to this facility. It is, and remains, the responsibility of the owner and/or operating authority to ensure compliance with all applicable legislative and regulatory requirements.

**APPENDIX A**

**INSPECTION RATING RECORD**

**Ministry of the Environment - Inspection Summary Rating Record (Reporting Year - 2017-2018)**

**DWS Name:** CASSELMAN DRINKING WATER SYSTEM  
**DWS Number:** 210001219  
**DWS Owner:** Casselman, The Corporation Of The Village Of  
**Municipal Location:** Casselman

**Regulation:** O.REG 170/03  
**Category:** Large Municipal Residential System  
**Type Of Inspection:** Focused  
**Inspection Date:** December 11, 2017  
**Ministry Office:** Cornwall Area Office

**Maximum Question Rating: 535**

Inspection Module	Non-Compliance Rating
Capacity Assessment	0 / 30
Treatment Processes	21 / 77
Operations Manuals	0 / 28
Logbooks	0 / 14
Certification and Training	0 / 42
Water Quality Monitoring	8 / 124
Reporting & Corrective Actions	21 / 87
Other Inspection Findings	0 / 0
Treatment Process Monitoring	0 / 133
<b>TOTAL</b>	<b>50 / 535</b>

**Inspection Risk Rating** 9.35%

**FINAL INSPECTION RATING:** 90.65%

**Ministry of the Environment - Detailed Inspection Rating Record (Reporting Year - 2017-2018)**

**DWS Name:** CASSELMAN DRINKING WATER SYSTEM  
**DWS Number:** 210001219  
**DWS Owner:** Casselman, The Corporation Of The Village Of  
**Municipal Location:** Casselman  
**Regulation:** O.REG 170/03  
**Category:** Large Municipal Residential System  
**Type Of Inspection:** Focused  
**Inspection Date:** December 11, 2017  
**Ministry Office:** Cornwall Area Office

Non-compliant Question(s)	Question Rating
<b>Other Inspection Findings</b>	
In the event that an issue of non-compliance outside the scope of this inspection protocol is identified, a "No" response may be used if further actions are deemed necessary (and approved by the DW Supervisor) to facilitate compliance.	0
<b>Reporting &amp; Corrective Actions</b>	
Were all required verbal notifications of adverse water quality incidents immediately provided as per O. Reg. 170/03 16-6?	21
<b>Treatment Processes</b>	
Do records indicate that the treatment equipment was operated in a manner that achieved the design capabilities required under Ontario Regulation 170/03 or a DWWP and/or MDWL issued under Part V of the SDWA at all times that water was being supplied to consumers?	21
<b>Water Quality Monitoring</b>	
Are all haloacetic acid water quality monitoring requirements prescribed by legislation conducted within the required frequency and at the required location?	8
<b>TOTAL QUESTION RATING</b>	<b>50</b>

**Maximum Question Rating:** 535

**Inspection Risk Rating** 9.35%

**FINAL INSPECTION RATING:** 90.65%

## **APPENDIX B**

### **INSPECTION RATING RECORD METHODOLOGY**

# APPLICATION OF THE RISK METHODOLOGY USED FOR MEASURING MUNICIPAL RESIDENTIAL DRINKING WATER SYSTEM INSPECTION RESULTS



The Ministry of the Environment (MOE) has a rigorous and comprehensive inspection program for municipal residential drinking water systems (MRDWS). Its objective is to determine the compliance of MRDWS with requirements under the Safe Drinking Water Act and associated regulations. It is the responsibility of the municipal residential drinking water system owner to ensure their drinking water systems are in compliance with all applicable legal requirements.

This document describes the risk rating methodology, which has been applied to the findings of the Ministry's MRDWS inspection

results since fiscal year 2008-09. The primary goals of this assessment are to encourage ongoing improvement of these systems and to establish a way to measure this progress.

MOE reviews the risk rating methodology every three years.

The Ministry's Municipal Residential Drinking Water Inspection Protocol contains 15 inspection modules consisting of approximately 100 regulatory questions. Those protocol questions are also linked to definitive guidance that ministry inspectors use when conducting MRDWS inspections.

[ontario.ca/drinkingwater](http://ontario.ca/drinkingwater)



The questions address a wide range of regulatory issues, from administrative procedures to drinking water quality monitoring. The inspection protocol also contains a number of non-regulatory questions.

A team of drinking water specialists in the ministry assessed each of the inspection protocol regulatory questions to determine the risk (not complying with the regulation) to the delivery of safe drinking water. This assessment was based on established provincial risk assessment principles, with each question receiving a risk rating referred to as the Question Risk Rating. Based on the number of areas where a system is deemed to be non-compliant during the inspection, and the significance of these areas to administrative, environmental, and health consequences, a risk-based inspection rating is calculated by the ministry for each drinking water system.

It is important to be aware that an inspection rating less than 100 per cent does not mean the drinking water from the system is unsafe. It shows areas where a system's operation can improve. The ministry works with owners and operators of systems to make sure they know what they need to do to achieve full compliance.

The inspection rating reflects the inspection results of the specific drinking water system for the reporting year. Since the methodology is applied consistently over a period of years, it serves as a comparative measure both provincially and in relation to the individual system. Both the drinking water system and the public are able to track the performance over time, which encourages continuous improvement and allows systems to identify specific areas requiring attention.

The ministry's annual inspection program is an important aspect of our drinking water safety net. The ministry and its partners share a common commitment to excellence and we continue to work toward the goal of 100 per cent regulatory compliance.

## Determining Potential to Compromise the Delivery of Safe Water

The risk management approach used for MRDWS is aligned with the Government of Ontario's Risk Management Framework. Risk management is a systematic approach to identifying potential hazards, understanding the likelihood and consequences of the hazards, and taking steps to reduce their risk if necessary and as appropriate.

The Risk Management Framework provides a formula to be used in the determination of risk:

$$\text{RISK} = \text{LIKELIHOOD} \times \text{CONSEQUENCE}$$

(of the consequence)

Every regulatory question in the inspection protocol possesses a likelihood value (L) for an assigned consequence value (C) as described in **Table 1** and **Table 2**.

Likelihood of Consequence Occurring	Likelihood Value
0% - 0.99% (Possible but Highly Unlikely)	L = 0
1 – 10% (Unlikely)	L = 1
11 – 49% (Possible)	L = 2
50 – 89% (Likely)	L = 3
90 – 100% (Almost Certain)	L = 4

Consequence	Consequence Value
Medium Administrative Consequence	C = 1
Major Administrative Consequence	C = 2
Minor Environmental Consequence	C = 3
Minor Health Consequence	C = 4
Medium Environmental Consequence	C = 5
Major Environmental Consequence	C = 6
Medium Health Consequence	C = 7
Major Health Consequence	C = 8



The consequence values (0 through 8) are selected to align with other risk-based programs and projects currently under development or in use within the ministry as outlined in **Table 2**.

The Question Risk Rating for each regulatory inspection question is derived from an evaluation of every identified consequence and its corresponding likelihood of occurrence:

- All levels of consequence are evaluated for their potential to occur
- Greatest of all the combinations is selected.

The Question Risk Rating quantifies the risk of non-compliance of each question relative to the others. Questions with higher values are those with a potentially more significant impact on drinking water safety and a higher likelihood of occurrence. The highest possible value would be 32 (4×8) and the lowest would be 0 (0×1).

**Table 3** presents a sample question showing the risk rating determination process.

TABLE 3:							
Does the Operator in Charge ensure that the equipment and processes are monitored, inspected and evaluated?							
Risk = Likelihood × Consequence							
C=1	C=2	C=3	C=4	C=5	C=6	C=7	C=8
Medium Administrative Consequence	Major Administrative Consequence	Minor Environmental Consequence	Minor Health Consequence	Medium Environmental Consequence	Major Environmental Consequence	Medium Health Consequence	Major Health Consequence
L=4 (Almost Certain)	L=1 (Unlikely)	L=2 (Possible)	L=3 (Likely)	L=3 (Likely)	L=1 (Unlikely)	L=3 (Likely)	L=2 (Possible)
R=4	R=2	R=6	R=12	R=15	R=6	R=21	R=16

## Application of the Methodology to Inspection Results

Based on the results of a MRDWS inspection, an overall inspection risk rating is calculated. During an inspection, inspectors answer the questions related to regulatory compliance and input their “yes”, “no” or “not applicable” responses into the Ministry’s Laboratory and Waterworks Inspection System (LWIS) database. A “no” response indicates non-compliance. The maximum number of regulatory questions asked by an inspector varies by: system (i.e., distribution, stand-alone); type of inspection (i.e., focused, detailed); and source type (i.e., groundwater, surface water).

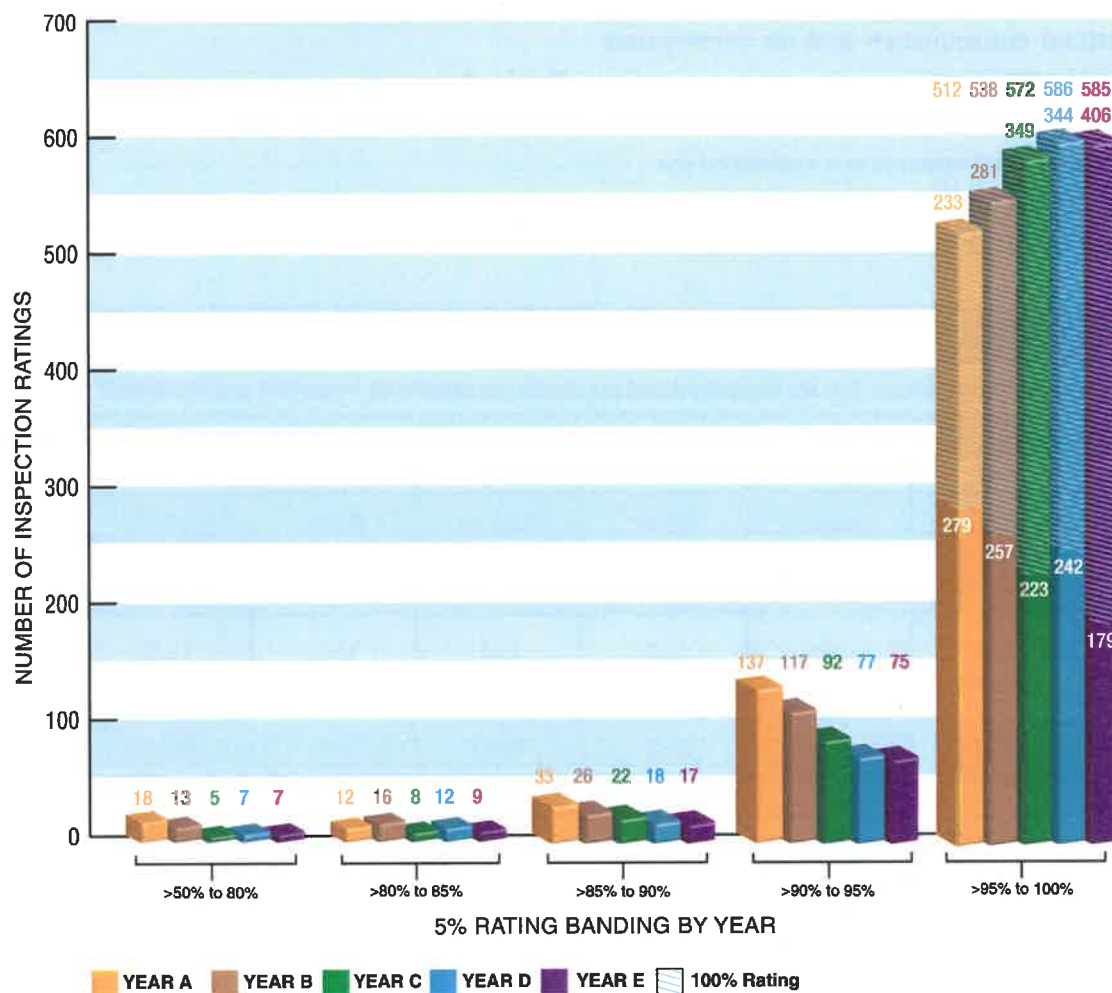
The risk ratings of all non-compliant answers are summed and divided by the sum of the risk ratings of all questions asked (maximum question rating). The resulting inspection risk rating (as a percentage) is subtracted from 100 per cent to arrive at the final inspection rating.

## Application of the Methodology for Public Reporting

The individual MRDWS Total Inspection Ratings are published with the ministry's Chief Drinking Water Inspector's Annual Report.

**Figure 1** presents the distribution of MRDWS ratings for a sample of annual inspections. Individual drinking water systems can compare against all the other inspected facilities over a period of inspection years.

**Figure 1: Year Over Year Distribution of MRDWS Ratings**



## Reporting Results to MRDWS Owners/Operators

A summary of inspection findings for each system is generated in the form of an Inspection Rating Record (IRR). The findings are grouped into the 15 possible modules of the inspection protocol,

which would provide the system owner/operator with information on the areas where they need to improve. The 15 modules are:

- |                         |                                 |  |  |
|-------------------------|---------------------------------|--|--|
| 1. Source               | 5. Treatment Process Monitoring | 9. Logbooks                            | 13. Water Quality Monitoring                       |
| 2. Permit to Take Water | 6. Process Wastewater           | 10. Contingency and Emergency Planning | 14. Reporting, Notification and Corrective Actions |
| 3. Capacity Assessment  | 7. Distribution System          | 11. Consumer Relations                 | 15. Other Inspection Findings                      |
| 4. Treatment Processes  | 8. Operations Manuals           | 12. Certification and Training         |  |

For further information, please visit [www.ontario.ca/drinkingwater](http://www.ontario.ca/drinkingwater)