









DESBARATS
DRINKING WATER SYSTEM
WATERWORKS # 210001870

ANNUAL & SUMMARY
REPORTS 2019

Introduction

This Annual and Summary Report has been prepared in accordance with both Schedule 22 and section 11 of Ontario Regulation 170/03. In this manner, the requirements by regulation for each report have been consolidated into a single document. This Report is intended to brief the ownership and consumers of the Desbarats Drinking Water System on the system's performance over the past calendar year January 1 to December 31, 2019.

This report encompasses all elements as required by O. Reg. 170/03. Each section explains what is required for the category Small Municipal Residential DWS (as it pertains to the Desbarats DWS) and how limits were met or if shortfalls were revealed. The last section contains a list of tables and definition of terms identified in this report.

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System Description

The Desbarats water treatment plant is rated as a Class 2 Water Treatment subsystem, and for the purposes of O. Reg. 170/03 it is categorized as a Small Municipal Residential system.

The treatment plant includes two (2) low lift centrifugal pumps, each pump rated at 4.24 L/s that deliver surface water from Lake Huron.

The treatment system includes an Ecodyne Monoplant complete with mechanical flocculation, sedimentation and dual media filtration compartments. The filter portion of the package plant involves a dual media of sand and anthracite and provides for filtering to waste after backwashing. Waste from the clarifier is drained at timed intervals to backwash settling tanks from which supernatant travels by gravity to a diffuser in Lake Huron, located downstream from the intake site.

Post chlorination using sodium hypochlorite is injected after filtration before the clearwell to achieve primary and secondary chlorination. There are three (3) cells to the clearwell (reservoir) with a total storage capacity of 142 cubic meters. There is standby power for continued pumping capacity and plant operations. The system also involves six (6) pre-charged pressure tanks for distribution pressure control.

- There are approximately 276 residents using the system with 110 service connections (93 private residences) and a secondary school with a population of about 600 students. Water is provided to the distribution system through a submarine transmission main

Chemicals

Chemicals utilized at the Desbarats Treatment plant during 2019 include:

- Sodium Hypochlorite for primary and secondary disinfection
- Aluminum Sulphate for coagulation
- Polymer (LT20) as a coagulant aid
- Soda Ash for pH and alkalinity adjustment

2019 Expenditures

During the year of 2019, expenses were incurred to maintain treatment and distribution functions:

- Automated 3-way valve
- Air compressor
- Chemical building ice shield
- Ultrasonic level controller
- Chemical transfer pump
- Filter media (sand and anthracite)
- 12-month surveillance and 3-year reaccreditation audits for DWQMS (SAI Global)

2019 Drinking Water System Changes

Form 1 – Record of Watermains Authorized as a Future Alteration

- n/a

Form 2 – Record of Minor Modification or Replacements

- Chemical metering pumps (2) for sodium hypochlorite

Form 3 – Record of addition, modification or replacement of equipment discharging a contaminant of concern to the atmosphere

- n/a

Water Quality

Microbiological Sampling and Testing

Sampling is conducted weekly for the DWS at the frequencies and locations identified by Schedule 11 of O. Reg 170/03 for Small Municipal Residential Systems.

Table 1: Microbiological sampling requirements

Location	Sample Analysis	# samples	Frequency
Raw	EC / TC	1 sample	monthly
Treated	N/A	-	-
Distribution	EC / TC/ HPC-25%	1 sample	bi-weekly

Desbarats' raw samples are collected from a sample tap from the raw water header. Treated samples are collected from a sample tap from the treated discharge header prior to distribution. Distribution samples are rotated weekly at the following locations representing areas throughout the hamlet: Township Office, Baptist Church, Arena, and Central Algoma Secondary School. Other locations may be sampled as required.

Table 1a: Microbiological Sample Results

Type	# samples	EC (range)	TC (range)	# samples	HPC (range)
Raw	12	0 - 25	0 - 613	-	-
Distribution	26	0	0	26	0 - 1

Operational Checks and Testing

Operational testing is completed as per Schedules 6 & 7 of O. Reg. 170/03 for Small Municipal Residential Systems. These checks and testing are completed on site at the water treatment facility by licensed operators. Continuous monitoring analyzers (collecting 5 minute readings) are utilized for measurement of filter turbidity and chlorine residuals.

Table 2: Monthly Filter Turbidity Results

Month	Avg turbidity (NTU)	Range (NTU)	Monthly Filter Efficiency
January	0.08	0.04 - 0.24	100
February	0.11	0.04 - 0.50	99.86
March	0.10	0.04 - 0.63	98.28
April	0.14	0.04 - 1.53	95.02
May	0.10	0.05 - 0.58	99.13
June	0.08	0.04 - 0.34	99.81
July	0.05	0.04 - 0.14	100
August	0.04	0.03 - 0.08	100
September	0.07	0.03 - 0.34	99.97
October	0.08	0.05 - 0.94	99.91
November	0.11	0.04 - 0.29	100
December	0.14	0.05 - 0.39	99.60

Filter Efficiency is monitored by tracking the turbidity readings above and below 0.30 NTU during filter run time. Desbarats maintained filter compliance each month above 95%, the required limit for dual media filtration to achieve necessary filtration credits for primary disinfection.

Table 3: Chlorine Residuals

Month	Average Chlorine Residual (mg/L)	Chlorine Residual Range (mg/L)
January	1.56	1.02 - 2.44
February	1.48	1.17 - 2.09
March	1.61	1.18 - 2.17
April	1.51	1.14 - 1.94
May	1.45	1.14 - 2.14
June	1.32	0.98 - 1.79
July	1.45	0.83 - 2.37
August	1.52	0.98 - 2.31
September	1.52	1.10 - 1.97
October	1.64	0.79 - 2.55
November	1.56	1.09 - 2.26
December	1.55	1.12 - 2.18

Chlorine residuals are continuously monitored, and data is recorded on 5-minute intervals.

Chemical Sampling and Testing

Schedule 13 of O. Reg. 170/03 outlines chemical sampling requirements for Small Municipal Residential systems. Schedules 23 (inorganics) and 24 (organics) are collected every 60 months as well as sodium and fluoride. This system requires quarterly sampling for Nitrites/Nitrates, THM's and HAA's. Schedule 15.1 outlines the requirements for semi-annual lead testing (2 periods per year). Desbarats' lead sampling follows the reduced sampling requirements every third year.

Table 4: Schedule 23 - Inorganics

Parameter	Sample Date	Result (µg/L)	Units	ODWS
Antimony	8-Jan-18	<0.60	µg/L	6
Arsenic	8-Jan-18	<1.0	µg/L	25
Barium	8-Jan-18	<10	µg/L	1000
Boron	8-Jan-18	<50	µg/L	5000
Cadmium	8-Jan-18	<0.10	µg/L	5
Chromium	8-Jan-18	<1.0	µg/L	50
Fluoride	8-Jan-18	<0.020	mg/L	1.5
Mercury	8-Jan-18	<0.10	µg/L	1
Selenium	8-Jan-18	<1.0	µg/L	10
Sodium	8-Jan-18	5.05	mg/L	20
Uranium	8-Jan-18	<2.0	µg/L	20

All results for inorganic parameters are within the maximum acceptable concentrations (MAC) of the Ontario Drinking Water Quality Standards as defined in O. Reg. 169/03. No result is above the half MAC.

Table 5: Nitrite/ Nitrate Results

Date	ODWS	07-Jan-19	15-Apr-19	08-Jul-19	07-Oct-19
Unit	mg/L	mg/L	mg/L	mg/L	mg/L
Nitrite	1.0	<0.010	<0.010	<0.010	0.016
Nitrate	10	0.356	0.358	0.283	1.30

All quarterly results for Nitrites and Nitrates are well below ODWS.

Table 5a: THM/HAA Results

Date	ODWS	Q1	Q2	Q3	Q4	RAA
Unit	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
THM	100	9.2	10.6	32.8	11.3	16.0
HAA	80	8.7	8.4	17.8	8.2	10.8

ODWS established a MAC of 80 for HAAs effective January 1, 2020.

Table 6: Schedule 24 - Organics

Parameter	Date	Result	Unit	ODWS
Alachlor	8-Jan-18	<0.10	µg/L	5
Atrazine + N-dealkylated metabolites	8-Jan-18	<0.20	µg/L	5
Azinphos-methyl	8-Jan-18	<0.10	µg/L	20
Benzene	8-Jan-18	<0.50	µg/L	5
Benzo(a)pyrene	8-Jan-18	<0.010	µg/L	0.01
Bromoxynil	8-Jan-18	<0.20	µg/L	5
Carbaryl	8-Jan-18	<0.20	µg/L	90
Carbofuran	8-Jan-18	<0.20	µg/L	90
Carbon Tetrachloride	8-Jan-18	<0.20	µg/L	5
Chlorpyrifos	8-Jan-18	<0.10	µg/L	90
Diazinon	8-Jan-18	<0.10	µg/L	20
Dicamba	8-Jan-18	<0.20	µg/L	120
1,2-Dichlorobenzene	8-Jan-18	<0.50	µg/L	200
1,4-Dichlorobenzene	8-Jan-18	<0.50	µg/L	5
1,2-Dichloroethane	8-Jan-18	<0.50	µg/L	5
1,1-Dichloroethylene (vinylidene chloride)	8-Jan-18	<0.50	µg/L	14
Dichloromethane	8-Jan-18	<5.0	µg/L	50
2-4 Dichlorophenol	8-Jan-18	<0.30	µg/L	900
2,4-Dichlorophenoxy acetic acid	8-Jan-18	<0.20	µg/L	100
Diclofop-methyl	8-Jan-18	<0.20	µg/L	9
Dimethoate	8-Jan-18	<0.10	µg/L	20
Diquat	8-Jan-18	<1.0	µg/L	70

Parameter	Date	Result	Unit	ODWS
Diuron	8-Jan-18	<1.0	µg/L	150
Glyphosate	8-Jan-18	<5.0	µg/L	280
Malathion	8-Jan-18	<0.10	µg/L	190
2-Methyl-4-Chlorophenoxyacetic Acid (MCPA)	8-Jan-18	<0.20	µg/L	100
Metolachlor	8-Jan-18	<0.10	µg/L	50
Metribuzin	8-Jan-18	<0.10	µg/L	80
Monochlorobenzene	8-Jan-18	<0.50	µg/L	80
Paraquat	8-Jan-18	<1.0	µg/L	10
Pentachlorophenol	8-Jan-18	<0.50	µg/L	60
Phorate	8-Jan-18	<0.10	µg/L	2
Picloram	8-Jan-18	<0.20	µg/L	190
Polychlorinated Byphenols (PCB)	8-Jan-18	<0.035	µg/L	3
Prometryne	8-Jan-18	<0.10	µg/L	1
Simazine	8-Jan-18	<0.10	µg/L	10
Terbufos	8-Jan-18	<0.20	µg/L	1
Tetrachloroethylene	8-Jan-18	<0.50	µg/L	30
2,3,4,6-Tetrachlorophenol	8-Jan-18	<0.50	µg/L	100
Triallate	8-Jan-18	<0.10	µg/L	230
Trichloroethylene	8-Jan-18	<0.50	µg/L	5
2,4,6-Trichlorophenol	8-Jan-18	<0.50	µg/L	5
Trifluralin	8-Jan-18	<0.10	µg/L	45
Vinyl Chloride	8-Jan-18	<0.20	µg/L	2

All results for the required organic sampling of schedule 24 are below the MAC.

Sampling: The maximum acceptable concentration for lead in drinking water is 10µg/L. This applies to water at the point of consumption since lead is only present as a result of corrosion of lead solder, lead containing brass fittings or lead pipes which are found close to or in domestic plumbing and the service connection to buildings.

Table 7: Community Lead Sampling Results

Location Type	Number of Samples	Range of Lead Results (min#) – (max #)	Number of Exceedances
Plumbing	n/a		
Distribution	n/a		

Lead samples are collected during the two prescribed periods each year (Dec 15 – Mar15 and June 15- Oct 15). Sample results revealed zero exceedances during year 2017, thus relief of sampling is in effect until 2020.

Table 8: Total Suspended Solids – plant process wastewater

Month	Result Value	Unit
January	17	mg/L
February	6	mg/L
March	10	mg/L
April	15	mg/L
May	19	mg/L
June	15	mg/L
July	21	mg/L
August	20	mg/L
September	15	mg/L
October	22	mg/L
November	10	mg/L
December	8	mg/L

The 2019 annual average suspended solids concentration is 14.8 mg/L for plant process water (backwashes, filter to waste, instrumentation flows) released back to the environment, and is under the limit of 25 mg/L as identified in Schedule C of the Municipal Drinking Water Licence.

Compliance

Adverse Water Quality Incidents

During 2019, the Desbarats DWS experienced zero incidents of adverse water quality.

Annual Drinking Water System Inspection

The annual DWS inspection took place on Oct 30, 2019 by MECP Drinking Water inspector Shelley Baggio. 1 non-compliance and 4 additional recommendations and best practices were identified. The DWS received a final inspection rating of 99.32%

The following table identifies any non-compliance with requirement of the Act, the regulations, the system’s approval, drinking water works permit, municipal drinking water license and any orders applicable to the system that were not met at any time during the period covered by the report.

Table 9: Non-compliances identified during Annual DWS Inspection

Non-compliance	Logbooks were not properly maintained and/or did not contain the required information.
Action	Section 25 to 27 of O.Reg 128/04 outline the duties and responsibilities of an operator in charge and the requirements for record keeping (recording information in a logbook). Training should be provided to remind operators of these requirements.
Corrective Actions	Review of regulatory requirements was reviewed with applicable staff. Logbook training review for the Department to be held in Q1 of 2020.

Flows

The Permit to Take Water authorizes the municipality to draw water from Lake Huron at a rate not to exceed 547.2 m³/d. The maximum daily volume taken was 142 m³, 25.9 % of the permit limit.

Municipal Drinking Water Licence: 275-201 specifies a maximum intake capacity of 366 m³/d. The max flow rate reported was 119m³/d, 32.5% of the rated capacity. The Desbarats WTP treated and distributed a total of 25,789 m³ during the year of 2019. The average day treated flow demand was 70.6 m³/d, and maximum day flow was 119 m³/d on October 6, 2019.

Chart 1: Five-year Flow Comparison

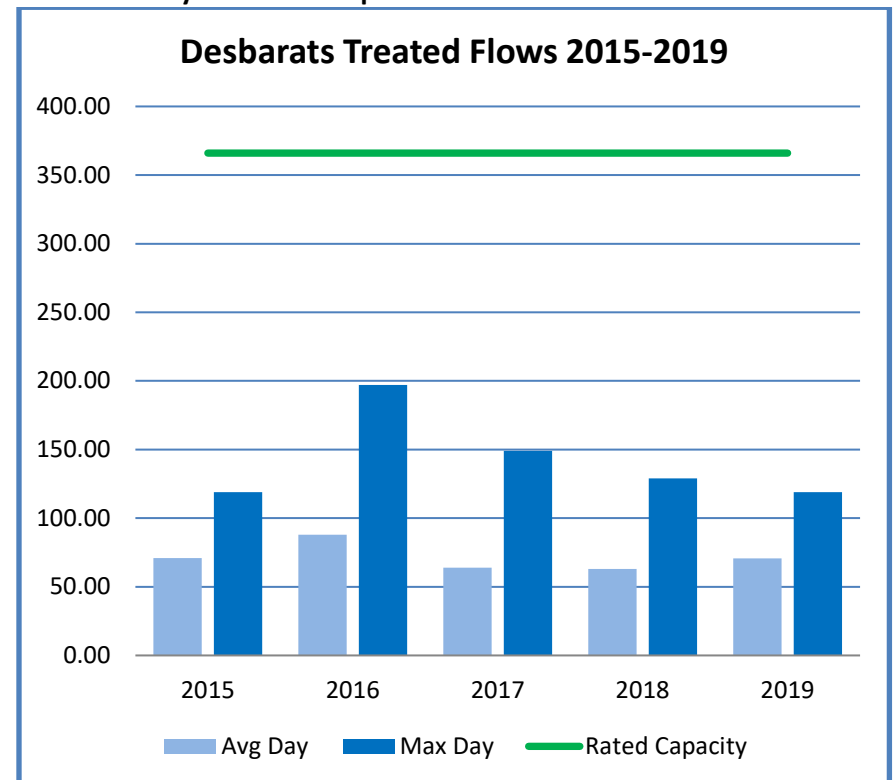
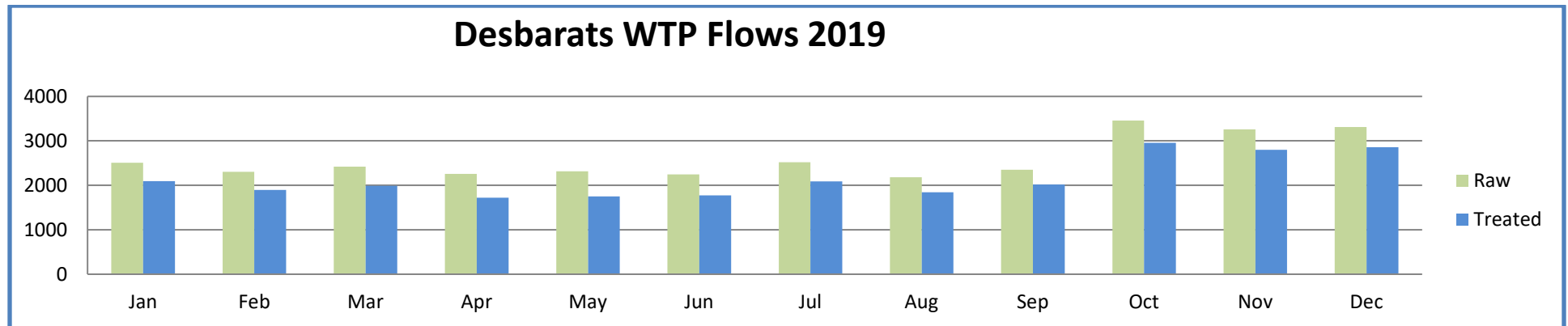


Table 10: Raw and Treated Water Flows 2019

2019	Raw Water Flows					Treated Water Flows			
Month	Raw Water (m ³)	Minimum Day (m ³ /d)	Maximum Day (m ³ /d)	Average Day (m ³ /d)	% Max. Flow Day of PTTW	Treated Water (m ³)	Minimum Day (m ³ /d)	Maximum Day (m ³ /d)	Average Day (m ³ /d)
January	2,509	64	106	80.9	19.4	2,093	57	94	67.5
February	2,305	59	116	82.3	21.2	1,896	50	91	67.7
March	2,419	58	95	78.0	17.4	1,991	49	78	64.2
April	2,259	57	96	75.3	17.5	1,720	47	71	57.3
May	2,317	57	92	74.7	16.8	1,748	40	67	56.4
June	2,245	60	88	74.8	16.1	1,776	49	76	59.2
July	2,520	61	126	81.3	23.0	2,086	51	101	67.3
August	2,181	58	95	70.4	17.4	1,845	51	75	59.5
September	2,350	58	93	78.3	17.0	2,019	50	81	67.3
October	3,457	81	142	111.5	25.9	2,958	75	119	95.4
November	3,260	94	138	108.7	25.2	2,797	81	112	93.2
December	3,312	89	133	106.8	24.3	2,860	80	110	92.3

Chart 2: Desbarats WTP Flows 2019



Report Endorsement

Report Availability


Section 11 of O. Reg. 170/03 defines that this Annual Report must be given, without charge, to every person who requests a copy. Effective steps must also be taken to advise users of water from the system that copies of the report are available, without charge, and of how a copy may be obtained. This Annual Report shall be made available for inspection by the public on the Town Office.

Township of Johnson
1 Johnson Drive
Desbarats, ON
P0R 1E0

In accordance with Schedule 22 of O. Reg. 170/03, this Annual Report must be given to the members of the municipal council. Section 19 (Standard of care, municipal drinking-water system) of Ontario's Safe Drinking Water Act also places certain responsibilities upon those municipal officials who oversee an accredited operating authority or exercise decision-making authority over a system.

Report Endorsement

This Summary report for The Desbarats Drinking Water System for the period of January 1st to December 31st, 2019 has been prepared in accordance to Schedule 22 of O. Reg 170/03. The report has been reviewed and accepted by the Township of Johnson council.



Date

Tables, Definition of Terms

Appendix A: List of Tables/ Charts

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Appendix B: Definition of Terms

Acronym	Definition
AWQI	Adverse water quality incident
BWA	Boil Water Advisory
DM	Dual Media
DWQMS	Drinking Water Quality Management Standard
DWS	Drinking water system
EC	E. Coli
HAA	Haloacetic acids
HPC	Heterotrophic plate count
MAC	Maximum Acceptable Concentration
MECP	Ministry of Environment, Conservation and Parks
m³	Cubic metres
m³/d	Cubic metres per day
mg/L	Milligram per litre (part per million)
ML	Megalitre (1000 m ³)
NTU	Nephelometric turbidity unit
ODWS	Ontario Drinking Water Standards
O. Reg. 170/03	Ontario Regulation 170/03
PTTW	Permit to take water
TC	Total coliforms
THM	Trihalomethanes
µg/L	Microgram per litre (part per billion)
WD	Water distribution
WT	Water treatment
WTP	Water treatment plant