



RICHARDS LANDING
DRINKING WATER SYSTEM
WATERWORKS # 220007212







ANNUAL & SUMMARY
REPORTS 2022



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 Richards Landing Drinking Water System on the system's performance over the past calendar year January 1 to December 31, 2022.

This report encompasses all elements as required by O. Reg. 170/03. Each section explains what is required for the category Large Municipal Residential DWS (as it pertains to the Richards Landing 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 Richards Landing Well Pump house is owned by the Township of St. Joseph.

Richards Landing is located on the northern shore of St. Joseph Island, in the Township of St. Joseph. The Well Pumphouse was constructed in 1994 on the corner of Highway 548 and Lewellyn Street to replace the private well systems previously used in the community of Richard's Landing. The Township of St. Joseph Water Treatment facility is rated as a Class 1 Water Treatment subsystem and is categorized under O. Reg. 170/03 as a Large Municipal Residential system. Approximately 400 of the Township's 1122 residents are provided with potable drinking water from the facility.

The system is comprised of the following equipment:

- Two wells equipped with submersible pumps, one monitoring well, instrumentation and controls
- Disinfection process including two filtration trains each consisting of one 10-micron bag filter system, disinfection facilities (two UV irradiation reactors and a sodium hypochlorite chemical feed system consisting of two chemical feed pumps),
- Corrosion control process including a blended phosphate chemical feed system consisting of two chemical feed pumps
- In-ground storage, four high lift pumps and one fire pump. A diesel generator is located on-site to provide emergency power, and two pressure tanks maintain distribution system pressure during low flow conditions.

The facility design capacity is 912 L/min and the high lift pumps maintain system pressure between 87 and 99 psi (600 to 680 kPa) under normal operating conditions (maximum daily flow).

Chemicals

Chemicals utilized at the Richards Landing Treatment plant during 2022 include:

- Sodium Hypochlorite for primary and secondary disinfection
- Blended Phosphates - Carus 8500™

2022 Expenditures

During the year of 2022, expenses were incurred to maintain treatment and distribution functions:

- ESA services
- 12-month surveillance and 3-year reaccreditation audits (SAI Global)
- UV lamps, sleeves and calibration sensor
- Chlorine analyzer sensors and membrane cap

2022 Drinking Water System Changes

Form 1 – Record of Watermains Authorized as a Future Alteration

- N/A

Form 2 – Record of Minor Modification or Replacements

- New chemical feed pump (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 Large Municipal Residential Systems.

Table 1: Microbiological sampling requirements

Location	Sample Analysis	# samples	Frequency
Raw	EC / TC	1 sample	weekly
Treated	N/A	1 sample	weekly
Distribution	EC / TC/ HPC-25%	8 samples	monthly

Richards Landing 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 village: 1669 Arthur, 1209 Catherine, 1211 Richards, 1250 Margarite. Other locations may be sampled as required.

Table 1a: Microbiological Sample Results

Type	# samples	EC (range)	TC (range)	# samples	HPC (range)
Raw-Well 1	52	0	0 - 196	-	-
Raw-Well 2A	50	0	0 - 90	-	-
Treated	52	0	0	52	0 - 60
Distribution	152	0	0	136	0 - 70

Operational Checks and Testing

Operational testing is completed as per Schedules 6 & 7 of O. Reg. 170/03 for Large Municipal Residential Systems. These checks and testing are completed on site at the water treatment facility by licensed operators. Continuous monitoring analyzers (collecting at minimum 15-minute readings) are utilized for measurement of filter turbidity and chlorine residuals.

Table 2: Monthly Filter Turbidity Results

Month	Filter #1		Filter #2	
	Average (NTU)	Range (NTU)	Average (NTU)	Range (NTU)
January	0.36	0.02 - 2.01	0.22	0.08 - 2.00
February	0.31	0.00 - 2.00	0.16	0.08 - 2.00
March	0.57	0.02 - 2.00	0.17	0.08 - 2.00
April	0.42	0.02 - 2.00	0.13	0.09 - 2.00
May	0.59	0.00 - 2.00	0.44	0.03 - 2.00
June	0.44	0.03 - 2.00	0.24	0.09 - 2.00
July	0.43	0.00 - 2.00	0.27	0.08 - 2.00
August	0.33	0.00 - 2.00	0.26	0.06 - 2.00
September	0.14	0.03 - 2.00	0.17	0.10 - 2.00
October	0.54	0.03 - 2.00	0.19	0.10 - 2.00
November	0.55	0.03 - 2.00	0.24	0.05 - 2.00
December	0.72	0.05 - 2.00	0.30	0.11 - 2.00



Table 3: Treated Chlorine Residuals

Month	Average Chlorine Residual (mg/L)	Chlorine Residual Range (mg/L)
January	1.09	0.65 - 1.24
February	1.38	0.67 - 2.29
March	1.26	0.93 - 1.47
April	1.01	0.24 - 1.30
May	1.29	0.43 - 1.67
June	1.67	1.31 - 1.82
July	1.58	0.12 - 2.08
August	1.51	0.18 - 1.85
September	1.39	0.83 - 1.64
October	1.44	0.90 - 1.73
November	1.22	0.95 - 3.58
December	1.45	0.76 - 1.91

Chlorine residuals are continuously-monitored and data is recorded at a minimum 5-minute intervals.

Chemical Sampling and Testing

Schedule 13 of O. Reg. 170/03 outlines chemical sampling regiments for Large Municipal Residential systems. Schedules 23 (inorganics) and 24 (organics) are collected every 12 months as well as sodium and fluoride every 60 months. This system requires quarterly sampling for Nitrites/Nitrates, THMs, and HAAs. Schedule 15.1 outlines the requirements for semi-annual lead testing (2 periods per year). Richards Landing Lead sampling follows the regulation’s plumbing exemption but monitors the distribution system water quality for changes that may impact lead corrosion.

Table 4: Schedule 23 - Inorganics

Parameter	Sample Date	Result Value (µg/L)	Units	ODWS
Antimony	13-Jun-22	<0.5	µg/L	6
Arsenic	13-Jun-22	2	µg/L	25
Barium	13-Jun-22	19	µg/L	1000
Boron	13-Jun-22	7	µg/L	5000
Cadmium	13-Jun-22	<0.1	µg/L	5
Chromium	13-Jun-22	4	µg/L	50
Fluoride	13-Jun-22	0.23	mg/L	1.5
Mercury	13-Jun-22	<0.1	µg/L	1
Selenium	13-Jun-22	0.6	µg/L	10
Sodium	13-Jun-22	66.8	mg/L	20
Uranium	13-Jun-22	<1	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 with the exception of sodium which has an aesthetic objective (AO) of 200 mg/L but has a limit of 20 mg/L for medical reasons. Notifications are completed to MOH and the residents of the DWS.

Table 5: Nitrite/ Nitrate Results

Date	ODWS	4-Jan-22	4-Apr-22	4-Jul-23	7-Oct-22
Unit	mg/L	mg/L	mg/L	mg/L	mg/L
Nitrite	1.0	<0.05	<0.05	<0.05	<0.05
Nitrate	10	1.59	1.6	1.9	1.72

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

Table 6: Disinfection By-products Results (THM/HAA)

Date	ODWS	Q1	Q2	Q3	Q4	RAA
Unit	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
THM	100	32.1	41.4	29.1	22.8	31.4
HAA	80	41	17	31	37	31.5

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



DWQMS Form 05-12 – Richards Landing DWS Annual & Summary Reports 2022



Table 7: Schedule 24 – Organics

Parameter	Date	Result	Unit	ODWS
Alachlor	13-Jun-22	<0.229	µg/L	5
Atrazine + N-dealkylated metabolites	13-Jun-22	<0.5	µg/L	5
Azinphos-methyl	13-Jun-22	<0.171	µg/L	20
Benzene	13-Jun-22	<0.1	µg/L	5
Benzo(a)pyrene	13-Jun-22	<0.01	µg/L	0.01
Bromoxynil	13-Jun-22	<0.102	µg/L	5
Carbaryl	13-Jun-22	<2	µg/L	90
Carbofuran	13-Jun-22	<2	µg/L	90
Carbon Tetrachloride	13-Jun-22	<0.2	µg/L	5
Chlorpyrifos	13-Jun-22	<0.171	µg/L	90
Diazinon	13-Jun-22	<0.171	µg/L	20
Dicamba	13-Jun-22	<0.089	µg/L	120
1,2-Dichlorobenzene	13-Jun-22	<0.2	µg/L	200
1,4-Dichlorobenzene	13-Jun-22	<0.3	µg/L	5
1,2-Dichloroethane	13-Jun-22	<0.2	µg/L	5
1,1-Dichloroethylene (vinylidene chloride)	13-Jun-22	<0.3	µg/L	14
Dichloromethane	13-Jun-22	<1	µg/L	50
2,4 Dichlorophenol	13-Jun-22	<0.2	µg/L	900
2,4-Dichlorophenoxy acetic acid	13-Jun-22	<0.381	µg/L	100
Diclofop-methyl	13-Jun-22	<0.127	µg/L	9
Dimethoate	13-Jun-22	<0.171	µg/L	20
Diquat	13-Jun-22	<0.2	µg/L	70

Parameter	Date	Result	Unit	ODWS
Diuron	13-Jun-22	<8	µg/L	150
Glyphosate	13-Jun-22	<20	µg/L	280
Malathion	13-Jun-22	<0.171	µg/L	190
2-Methyl-4-Chlorophenoxyacetic Acid (MCPA)	13-Jun-22	<6.36	µg/L	100
Metolachlor	13-Jun-22	<0.114	µg/L	50
Metribuzin	13-Jun-22	<0.114	µg/L	80
Monochlorobenzene	13-Jun-22	<0.5	µg/L	80
Paraquat	13-Jun-22	<0.2	µg/L	10
Pentachlorophenol	13-Jun-22	<0.3	µg/L	60
Phorate	13-Jun-22	<0.114	µg/L	2
Picloram	13-Jun-22	<0.089	µg/L	190
Polychlorinated Byphenols (PCB)	13-Jun-22	<0.06	µg/L	3
Prometryne	13-Jun-22	<0.0571	µg/L	1
Simazine	13-Jun-22	<0.171	µg/L	10
Terbufos	13-Jun-22	<0.114	µg/L	1
Tetrachloroethylene	13-Jun-22	<0.3	µg/L	30
2,3,4,6-Tetrachlorophenol	13-Jun-22	<0.3	µg/L	100
Triallate	13-Jun-22	<0.114	µg/L	230
Trichloroethylene	13-Jun-22	<0.2	µg/L	5
2,4,6-Trichlorophenol	13-Jun-22	<0.2	µg/L	5
Trifluralin	13-Jun-22	<0.114	µg/L	45
Vinyl Chloride	13-Jun-22	<0.1	µg/L	2

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



Lead 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 8: Community Lead Monitoring

Location Type	Alkalinity, mg/L	pH
Distribution	330	7.2

Based on historical results Richards Landing DWS is exempt for the plumbing lead sampling program, however monitoring of distribution alkalinity and pH every winter and summer collection periods and Lead every 3 years is required.

Compliance

Adverse Water Quality Incidents

During 2022, the Richards Landing DWS reported zero incidents of adverse water quality.

Annual Drinking Water System Inspection

The last annual DWS inspection took place on October 13, 2022 by MECP Drinking Water inspector Mark Kowalyk. Zero non-conformances and zero additional recommendations and best practice were identified.

The DWS received a final inspection rating of 100%

Flows

The Permit to Take Water authorizes the municipality to draw water from the wells at a rate not to exceed 1,037 m³/d.

The maximum daily volume taken was 419 m³, 40.4% of the permit limit.

Municipal Drinking Water Licence: 205-101 specifies a maximum rated flow of 1,011 m³/d.

The max flow rate reported was 313 m³/d, 31.0% of the rated capacity.

The Richards Landing WTP treated and distributed a total of 39,775 m³ (39.8 ML) during the year of 2022. The average day treated flow demand was 109 m³/d, and maximum day flow of 313 m³ on July 17, 2022.

Chart 1: 5-year Production History

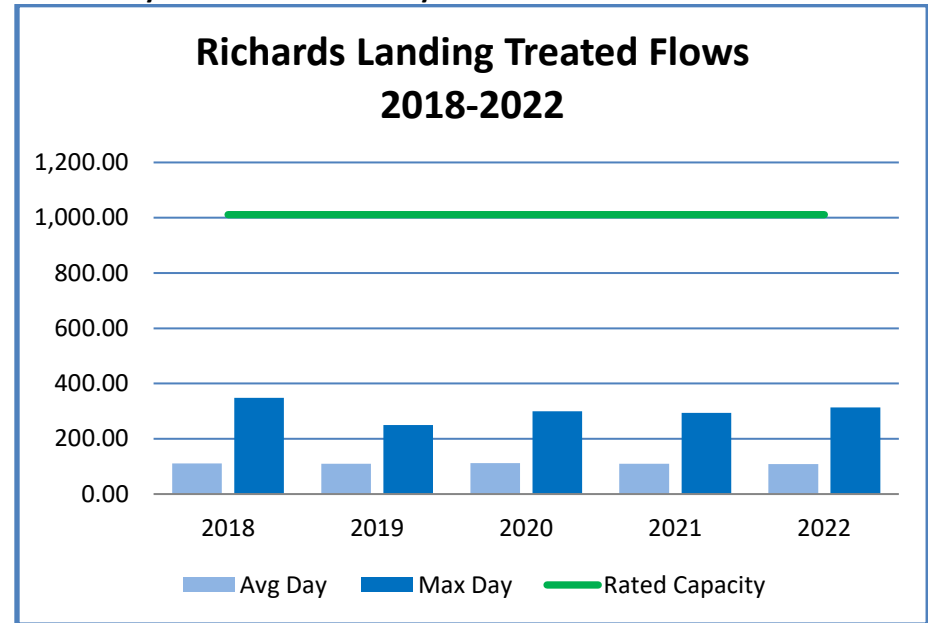
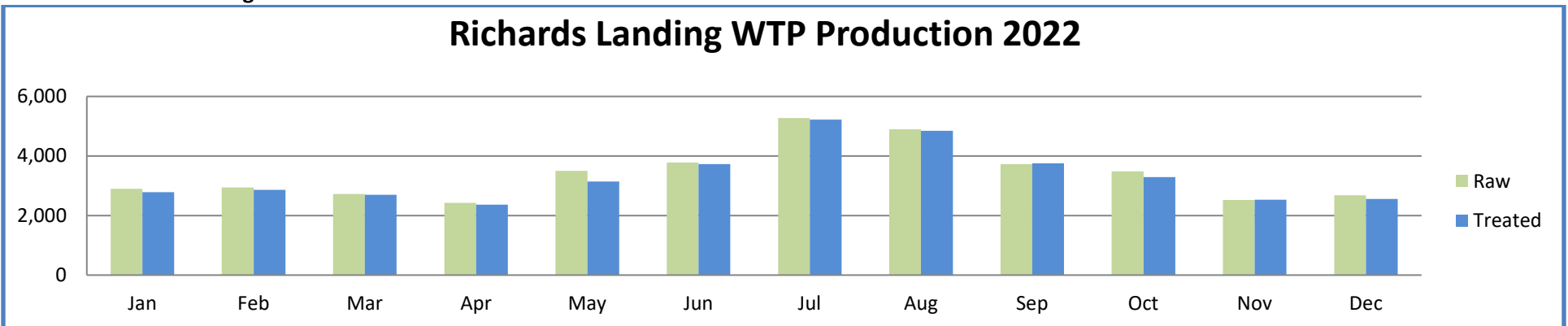




Table 9: Raw and Treated Water Flows 2022

2022	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)	% Max. Flow Day of Rated Capacity
January	2,898	74	151	93	14.6	2,782	74	121	90	12.0
February	2,944	0	209	105	20.2	2,864	80	118	102	11.7
March	2,725	0	191	88	18.4	2,701	69	119	87	11.8
April	2,425	0	181	81	17.5	2,361	71	95	79	9.4
May	3,504	0	226	113	21.8	3,141	79	147	101	14.5
June	3,784	0	349	126	33.7	3,728	96	173	124	17.1
July	5,276	0	419	170	40.4	5,222	108	313	168	31.0
August	4,901	25	265	158	25.6	4,843	112	202	156	20.0
September	3,725	2	222	124	21.4	3,750	105	163	125	16.1
October	3,484	0	221	112	21.3	3,293	80	128	106	12.7
November	2,519	0	277	84	26.7	2,530	77	101	84	10.0
December	2,683	0	144	87	13.9	2,560	74	94	83	9.3

Chart 2: Richards Landing WTP Production 2022





Report Availability

Annual Report

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 St. Joseph
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Richards Landing, Ontario Canada
P0R 1J0


Summary Report

This Summary report for The Richards Landing Drinking Water System for the period of January 1st to December 31st, 2022 has been prepared in accordance to Schedule 22 of O. Reg. 170/03.

In accordance with Schedule 22 of O. Reg. 170/03, this Summary Report has been provided to the Township of St. Joseph.



Tables, Definition of Terms

Appendix	 A: List of Tables/ Charts
Table 1:	Microbiological sampling requirements
Table 1a:	Microbiological Sample Results
Table 2:	Monthly Filter Turbidity Results
Table 3:	Treated Chlorine Residuals
Table 4:	Schedule 23 - Inorganics
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Chart 1:	5-year Production History
Chart 2:	Richards Landing WTP Production 2022

Appendix B: Definition of Terms

Acronym	Definition
AWQI	Adverse water quality incident
DWS	Drinking water system
EC	E. Coli
GUDI	Groundwater under direct influence of surface water
HAA	Haloacetic acids
HPC	Heterotrophic plate count
MAC	Maximum Acceptable Concentration
m³	Cubic metres
m³/d	Cubic metres per day
mg/L	Milligram per litre (part per million)
ML	Megalitre (1,000 m ³)
NTU	Nephelometric turbidity unit
ODWS	Ontario Drinking Water Standards
O. Reg. 170/03	Ontario Regulation 170/03
PTTW	Permit to take water
SCADA	Supervisory control and data acquisition
TC	Total coliforms
THM	Trihalomethane
µg/L	Microgram per litre (part per billion)
WD	Water distribution
WT	Water treatment
WTP	Water treatment plant