



**RICHARDS LANDING
DRINKING WATER SYSTEM
WATERWORKS # 220007212**

**ANNUAL & SUMMARY
REPORTS 2015**



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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, 2015.

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 Richards 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 2015 include:

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

2015 Expenditures

During the year of 2015, expenses were incurred to maintain treatment and distribution functions:

- UV supplies (lamps, sleeves, sensor).
- Purchased standby Well pump.

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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	EC/TC/HPC	1	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	104	0 - 3	0 - 43	N/A	N/A
Treated	52	0	0 - 0	52	0 - 43
Distribution	100	0	0 - 0	37	0 - 147

Operational Checks and Testing

Operational testing is completed as per Schedules 6 & 7 of O.Reg. 170/03 pertaining to 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 a 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	0.19	0 - 2.04	0.21	0 - 2.03
February	0.15	0 - 2.04	0.19	0 - 2.03
March	0.13	0 - 2.04	0.20	0 - 2.03
April	0.12	0 - 2.04	0.18	0 - 2.03
May	0.11	0 - 2.04	0.16	0 - 2.03
June	0.09	0 - 2.04	0.14	0 - 2.03
July	0.10	0 - 2.04	0.14	0 - 2.03
August	0.11	0 - 2.04	0.12	0 - 2.03
September	0.10	0 - 2.04	0.14	0 - 2.03
October	0.15	0 - 2.04	0.23	0 - 2.03
November	0.14	0 - 2.04	0.16	0 - 2.03
December	0.31	0 - 2.04	0.20	0 - 2.03

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Table 3: Treated Chlorine Residuals

Month	Average Chlorine Residual (mg/L)	Chlorine Residual Range (mg/L)
January	1.21	0.21 - 1.41
February	1.21	0.31 - 1.61
March	0.99	0.27 - 1.76
April	1.21	0.22 - 1.33
May	1.10	0.39 - 1.25
June	1.09	0.17 - 1.31
July	1.20	0.23 - 1.47
August	1.10	0.47 - 1.34
September	0.93	0.14 - 1.13
October	1.05	0.18 - 1.39
November	1.23	0.34 - 1.40
December	0.94	0.15 - 1.39

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 and THM's. Schedule 15.1 outlines the requirements for semi-annual lead testing (2 periods per year). Richards Landing Lead sampling follows the reduced sampling requirements every third year.

Table 4: Schedule 23 - Inorganics

Parameter	Sample Date	Result Value (ug/L)	Units	ODWS
Antimony	04-May-15	0.06	ug/L	6
Arsenic	04-May-15	<0.2	ug/L	25
Barium	04-May-15	15.3	ug/L	1000
Boron	04-May-15	28.4	ug/L	5000
Cadmium	04-May-15	<0.003	ug/L	5
Chromium	04-May-15	0.31	ug/L	50
Fluoride	04-May-15	0.07	mg/L	1.5
Mercury	04-May-15	0.01	ug/L	1
Selenium	04-May-15	<1	ug/L	10
Sodium	04-May-15	37.7	mg/L	20
Uranium	04-May-15	0.35	ug/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 and would require notifications if exceeded.

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Table 5: Nitrite/ Nitrate Results

Date	ODWS	23-Feb-15	4-May-15	20-Jul-15	3-Nov-15
Unit	mg/L	mg/L	mg/L	mg/L	mg/L
Nitrite	1.0	<0.003	<0.003	<0.003	<0.003
Nitrate	10	1.32	1.19	1.26	1.22

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



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Table 6: Schedule 24 - Organics

Parameter	Date	Result	Unit	ODWS
Alachlor	4-May-15	<0.02	ug/L	5
Aldicarb	4-May-15	<0.01	ug/L	9
Aldrin + Dieldrin	4-May-15	<0.01	ug/L	0.7
Atrazine + N-dealkylated metabolites	4-May-15	<0.01	ug/L	5
Azinphos-methyl	4-May-15	<0.02	ug/L	20
Bendiocarb	4-May-15	<0.01	ug/L	40
Benzene	4-May-15	<0.32	ug/L	5
Benzo(a)pyrene	4-May-15	<0.004	ug/L	0.01
Bromoxynil	4-May-15	<0.33	ug/L	5
Carbaryl	4-May-15	<0.01	ug/L	90
Carbofuran	4-May-15	<0.01	ug/L	90
Carbon Tetrachloride	4-May-15	<0.16	ug/L	5
Chlordane (Total)	4-May-15	<0.01	ug/L	7
Chlorpyrifos	4-May-15	<0.02	ug/L	90
Cyanazine	4-May-15	<0.03	ug/L	10
Diazinon	4-May-15	<0.02	ug/L	20
Dicamba	4-May-15	<0.02	ug/L	120
1,2-Dichlorobenzene	4-May-15	<0.41	ug/L	200
1,4-Dichlorobenzene	4-May-15	<0.36	ug/L	5
Dichlorodiphenyltrichloroethane (DDT) + metabolites	4-May-15	<0.01	ug/L	30
1,2-Dichloroethane	4-May-15	<0.35	ug/L	5
1,1-Dichloroethylene (vinylidene chloride)	4-May-15	<0.33	ug/L	14
Dichloromethane	4-May-15	<0.35	ug/L	50
2,4-Dichlorophenol	4-May-15	<0.15	ug/L	900
2,4-Dichlorophenoxy acetic acid	4-May-15	<0.19	ug/L	100
Diclofop-methyl	4-May-15	<0.40	ug/L	9
Dimethoate	4-May-15	<0.03	ug/L	20
Dinoseb	4-May-15	<0.36	ug/L	10

Parameter	Date	Result	Unit	ODWS
Diquat	4-May-15	<1.0	ug/L	70
Diuron	4-May-15	<0.03	ug/L	150
Glyphosate	4-May-15	<1.0	ug/L	280
Heptachlor + Heptachlor Epoxide	4-May-15	<0.01	ug/L	3
Lindane (Total)	4-May-15	<0.01	ug/L	4
Malathion	4-May-15	<0.02	ug/L	190
Methoxychlor	4-May-15	<0.01	ug/L	900
Metolachlor	4-May-15	<0.01	ug/L	50
Metribuzin	4-May-15	<0.02	ug/L	80
Monochlorobenzene	4-May-15	<0.30	ug/L	80
Paraquat	4-May-15	<1.0	ug/L	10
Parathion	4-May-15	<0.02	ug/L	50
Pentachlorophenol	4-May-15	<0.15	ug/L	60
Phorate	4-May-15	<0.01	ug/L	2
Picloram	4-May-15	<1.0	ug/L	190
Polychlorinated Byphenols (PCB)	4-May-15	<0.04	ug/L	3
Prometryne	4-May-15	<0.03	ug/L	1
Simazine	4-May-15	<0.01	ug/L	10
THM (RAA)	4-May-15	35	ug/L	100
Temephos	4-May-15	<0.01	ug/L	280
Terbufos	4-May-15	<0.01	ug/L	1
Tetrachloroethylene	4-May-15	<0.35	ug/L	30
2,3,4,6-Tetrachlorophenol	4-May-15	<0.20	ug/L	100
Triallate	4-May-15	<0.01	ug/L	230
Trichloroethylene	4-May-15	<0.44	ug/L	5
2,4,6-Trichlorophenol	4-May-15	<0.25	ug/L	5
2,4,5-Trichlorophenoxy acetic acid	4-May-15	<0.22	ug/L	280
Trifluralin	4-May-15	<0.02	ug/L	45
Vinyl Chloride	4-May-15	<0.17	ug/L	2

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

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Lead Sampling: The maximum acceptable concentration for lead in drinking water is 10 ug/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			
Distribution			

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 2013. Sample relief extends to 2016.

Compliance

Adverse Water Quality Incidents

During 2015, the Richards Landing DWS reported 1 incident of adverse water quality.

Table 8: Adverse Water Quality Incidents

Date	Incident Reported
5-Dec-15	High turbidity #1 analyzer, caused by instrument failure giving erroneous readings.

Annual Drinking Water System Inspection

The annual DWS inspection took place on June 8, 2015 by MOECC Drinking Water inspector Stephen Rouleau. Zero non-conformances and no additional recommendations and best practice were identified.

The DWS received a final inspection rating of 100%.

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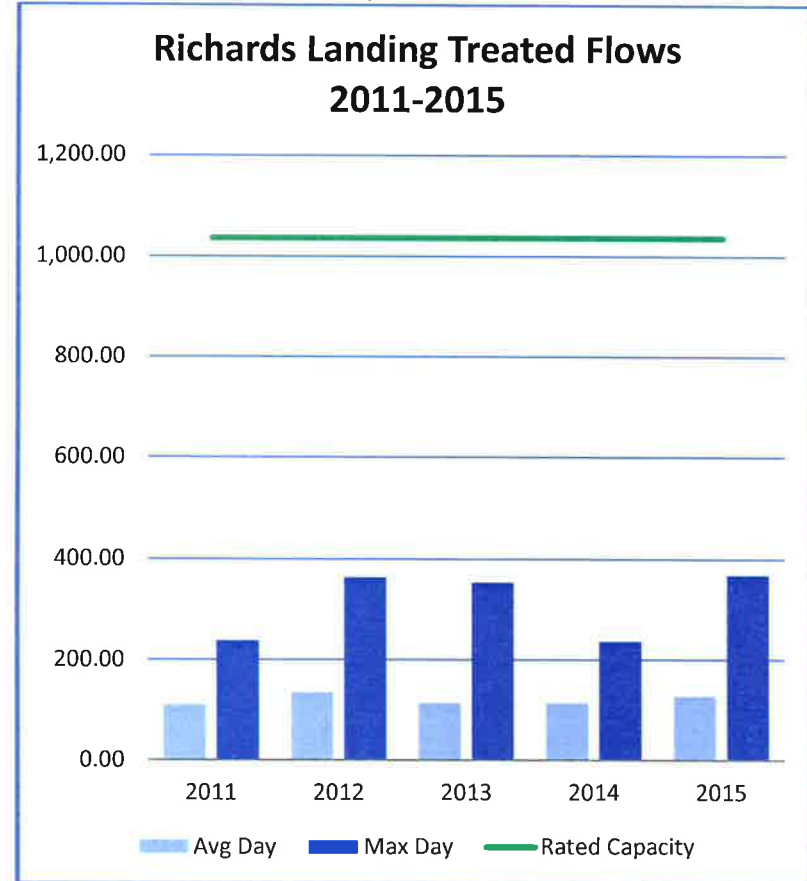
Flows

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 365 m³, 35.2 % 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 368 m³/d, 36.4 % of the rated capacity.

The Richards Landing WTP treated and distributed a total of 46,517 m³ during the year of 2015. The average day treated flow demand was 127 m³/d, and maximum day flow was 368 m³/d on Aug 15, 2015.

Chart 1: Five year Flow Comparison



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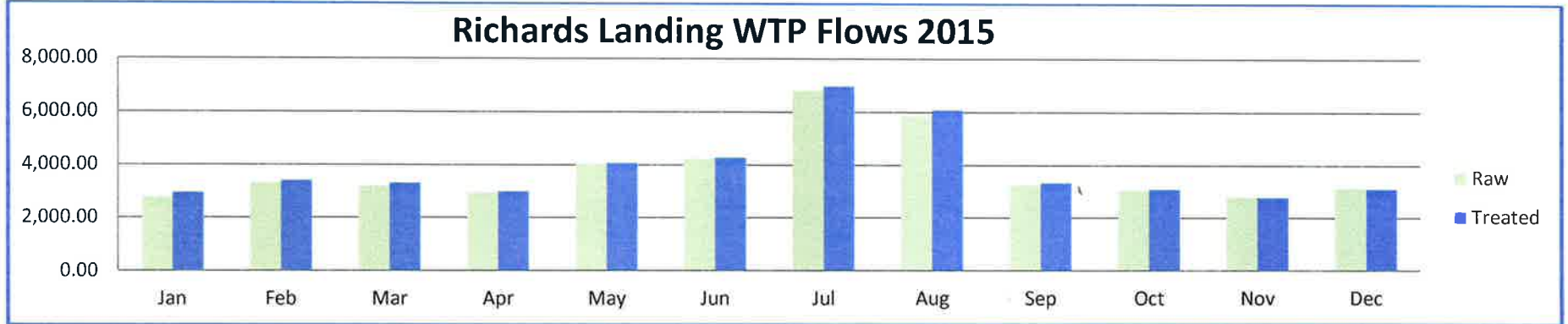


Table 9: Raw and Treated water Flows 2015

2015	Raw Water Flows					Treated Water Flows			
Month	Raw Water (m3)	Minimum Day (m ³ /d)	Maximum Day (m ³ /d)	Average Day (m ³ /d)	% Max. Flow Day of PTTW	Treated Water (m3)	Minimum Day (m ³ /d)	Maximum Day (m ³ /d)	Average Day (m ³ /d)
January	2,791	38	131	90.0	12.6	2,959	83	116	95.5
February	3,338	54	187	119.2	18.0	3,414	89	157	121.9
March	3,202	53	153	103.3	14.8	3,333	96	127	107.5
April	2,971	0	143	99.0	13.8	3,010	90	114	100.3
May	4,052	59	237	130.7	22.9	4,084	94	185	131.7
June	4,251	83	240	141.7	23.1	4,292	114	236	143.1
July	6,813	101	365	219.8	35.2	6,978	123	335	225.1
August	5,874	76	323	189.5	31.1	6,095	102	368	196.6
September	3,257	37	165	108.6	15.9	3,351	90	143	111.7
October	3,078	52	185	99.3	17.8	3,104	78	127	100.1
November	2,812	47	147	93.7	14.2	2,781	81	116	92.7
December	3,150	46	137	101.6	13.2	3,116	81	126	100.5

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Chart 2: Richards Landing WTP Flows 2015





Report Endorsement

Report Availability

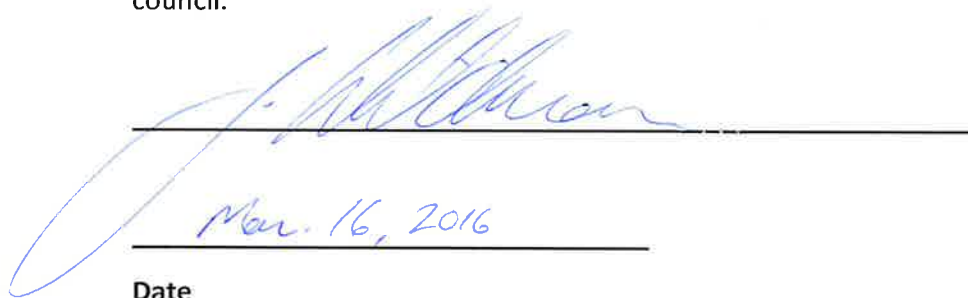
Section 11 of O. Reg. 170/03 defines that this Annual Report must be given, without charge, to every person who requests a copy. Effective steps must also be taken to advise users of water from the system that copies of the report are available, without charge, and of how a copy may be obtained. This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

Township of St. Joseph
P.O. Box 187
1669 Arthur Street
Richards Landing, Ontario Canada
P0R 1J0

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 Richards Landing Drinking Water System encompassing the period of January 1st to December 31st, 2015 has been prepared in accordance to Schedule 22 of O. Reg 170/03. The report has been reviewed and accepted by the Township of St. Joseph council.



Mar. 16, 2016

Date



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:	Five Year Flow Comparison
Chart 2:	Richards Landing WTP Flows 2015

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
HPC	Heterotrophic plate count
m³	Cubic metres
m³/d	Cubic metres per day
mg/L	Milligram per litre (part per million)
ML	Megalitre (1000 m3)
NTU	Nephelometric turbidity unit
O. Reg. 170/03	Ontario Regulation 170/03
PTTW	Permit to take water
SCADA	Supervisory control and data acquisition
TC	Total coliforms
THM	Trihalomethane
ug/L	Microgram per litre (part per billion)
WD	Water distribution
WT	Water treatment
WTP	Water treatment plant

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