



VAL HARBOUR WATER WORKS

2019 Water Quality Summary
Report



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1 INTRODUCTION

The Val Harbour Water Works (Water Works) serves the Val Harbour subdivision located on Lot 24, Concession 7. The development consists of 74 residential lots fronting Barnstable Bay on the east side of Lake Simcoe. A total of 65 lots were connected in 2019, serving an estimated population of 169 residents (based on the Township of Ramara's average population of 2.6 people per dwelling).

This report provides a description of the Water Works and summarizes the monitoring program, water quality, water consumption, chemical usage, and system repairs, and maintenance completed in 2019.

This report also summarizes the Water Works compliance status with the Safe Drinking Water Act (SDWA), the Ministry of the Environment, Conservation and Parks (MECP) Drinking Water Works Permit (DWWP) and the MECP Municipal Drinking Water License (MDWL). This annual report summary was prepared for presentation to the Township of Ramara Council as required by Ontario Regulation 170/03 - Drinking Water Systems (O. Reg. 170/03), Schedule 22.

2 APPROVALS

The Water Works are approved under DWWP No. 147-205 Issue No. 2 and MDWL No. 147-105 Issue No. 3.

Table 1 summarizes all approvals issued since 1973.

Table 1: Summary of Approvals

Date Issued	Approval Number	Description
June 9, 2017	147-105 Issue No. 3	MDWL Issue No. 3. Replaces and revokes MDWL Issue No. 2.
July 20, 2016	147-105 Issue No. 2	MDWL Issue No. 2. Replaces and revokes MDWL Issue No. 1
July 20, 2016	147-205 Issue No. 2	DWWP Issue No. 2. Replaces and revokes DWWP Issue No. 1
August 4, 2011	147-105 Issue No. 1	MDWL Issue No. 1. Replaces and revokes # 5978-8B2L2R.
August 3, 2011	147-205 Issue No. 1	DWWP Issue No. 1. Replaces and revokes # 5978-8B2L2R.
November 19, 2010	5978-8B2L2R	Amendment for addition of Well No. 3R. Replaces and revokes # 1287-6EVNUR
August 11, 2005	1287-6EVNUR	Amendment for as-constructed operating conditions. Replaces and revokes # 8283-5VTMNH
March 3, 2004	8283-5VTMNH	Approves upgrades and extends upgrade deadline. Replaces and revokes # 7668-5JRSAT
February 28, 2003	7668-5JRSAT	Removes GUDI study requirement. Replaces and revokes # 6623-59WJPW
February 13, 2003	6623-59WJPW	Amendment to extend deadline for upgrades.
May 14, 2002	6623-59WJPW	Extends deadline for GUDI study. Replaces and revokes # 6482-56WSGX
February 1, 2002	6482-56WSGX	Requires continuous analyzers to be installed. Replaces and revokes # 0457-53VJZ3
January 16, 2002	0457-53VJZ3	Consolidated Certificate of Approval.
June 15, 1973	7-0256-73-006	Approval for watermains, a building and appurtenances

Permit to Take Water (PTTW) No. 7653-87TS7U was issued on August 4, 2010 and expires on December 31, 2020. The PTTW allows for the following maximum rates and amounts of water taking:

	<u>Maximum Rate</u>	<u>Amount/Day</u>
Well No. 1	47 L/min (10 gpm)	67, 680 L/d
Well No. 2	97 L/min (21 gpm)	139, 680 L/d
Well No. 3R	150 L/min (33 gpm)	207, 360 L/d

The permit allows for the wells to be operated individually or simultaneously, but the maximum combined daily taking must not exceed 216,000 L/d.

3 DESCRIPTION OF WATER WORKS

The following sections describe the facilities as they operated in 2019.

3.1 WATER SOURCE

The Val Harbour Water Works utilized three wells in 2019:

- Well No. 1 is located 200 m west of the Water Works building and is equipped with a 45 L/min (10 gpm) submersible pump. The well is 18.9 m deep and is sleeved with a 150 mm diameter steel casing.
- Well No. 2 is located on the Water Works building site adjacent to Edgehill Road and is equipped with a 97 L/min (21.3 gpm) submersible pump. The well is 15.6 m deep and is sleeved with a 150 mm steel casing.
- Well No. 3R is located 200 m east of the Water Works building and is equipped with a 144 L/min (32 gpm) submersible pump. The well is 16.45 m deep and is 168 mm in diameter.

3.2 WATER TREATMENT

1. Raw water is injected with sodium hypochlorite for primary disinfection and then sent to the storage reservoirs. The reservoirs provide the necessary contact time for primary disinfection and the storage volume to meet the peak hour demand of the development. High lift pumps (one duty, one stand-by, one spare), pump the water from the reservoir to the distribution system. If required, sodium hypochlorite is added to the water leaving the Water Works to ensure a satisfactory level of secondary disinfection is maintained in the distribution system. The components of the treatment process are described below.
2. Each well line is fitted with a flow control valve to limit the peak flow rate to 47 L/min, 97 L/min, 144 L/min for Wells No. 1, No. 2, and No. 3R respectively.

3. Each well line is fitted with a magnetic water meter to monitor the total daily flow and the peak instantaneous flow taken from each well. A fourth magnetic flow meter monitors the combined raw water flow and provides the 4-20 mA signal to flow pace the sodium hypochlorite injection for primary disinfection.
4. The pump control panel allows the operators to select which well pump is duty and stand-by. Each well can be run individually or with one another. Each well pump has an hour meter to log the number of hours it operates. This control panel also controls the high lift pumps.
5. Sodium hypochlorite is injected in the raw water header for primary disinfection. The feed system consists of two chemical feed pumps, one duty and one standby with automatic switchover in case of duty pump failure, each with an injection point and one chemical solution tank with secondary containment. The injection rate is manually set by the operators or can be flow paced with the combined raw water flow. The chemical feed pump operates with the well pumps.
6. Chlorinated water discharges into two 43,800 L precast concrete treated water reservoirs located below grade to the south and east of the Water Works building. The tanks are normally operated in series but have the necessary piping to be operated individually, if one is taken off-line for maintenance purposes.
7. Three vertical multistage pumps (lead/lag/stand-by) pump the treated water from the reservoir to the distribution system. The operator selects which pump is duty and which pump activates when pressure in the distribution system drops below the 60 psi set point.
8. A 50 mm \varnothing pressure relief valve with built in check valve, allows the high lift pumps to operate continuously. The pressure relief valve is set to open at 80 psi, and returns flow to the reservoirs.
9. Pressure switches are set for an operating range of 60 – 80 psi. The pressure switches are located on the piping just upstream of the connection to the distribution system. When the pressure drops to 60 psi, the second high lift pump is turned on. The second pump shuts off when the pressure reaches 75 psi, with a minimum run time of 1 hour. A low pressure alarm is activated if the pressure drops to 40 psi.
10. Continuous water quality on-line analyzers monitor the free chlorine residual, pH and turbidity of the treated water before it enters the distribution system. The analyzers are logged by the paperless chart recorder and have alarm set points to notify the operators of adverse water quality results.
11. A post sodium hypochlorite chemical feed system can be used for secondary disinfection. The feed system consists of two chemical feed pumps, one duty and one standby with automatic switchover in case of duty pump failure, each with an

injection point and one chemical solution tank with secondary containment. The injection is flow paced with the flow entering the distribution system.

12. A distribution water magnetic flow meter provides a 4-20 mA signal for recording the daily average flow rate, the total daily flow and the peak instantaneous flow rate entering the distribution system on the paperless chart recorder. The 4-20 mA signal is also used to flow pace the secondary disinfection.

3.3 EMERGENCY GENERATOR

A 20 kW propane powered generator is located in a fenced enclosure adjacent to the north side of the Water Works building, to supply power during hydro supply power outages. The generator has sufficient capacity to run the entire Water Works.

3.4 WATER DISTRIBUTION SYSTEM

The distribution system consists of approximately 1,700 m of 100 mm diameter PVC watermain to service the 74 residential lots. The system can be described as a main header pipe running in an east / west direction along Edgehill Drive with four “fingers” extending south along each of the roads, Bonnie Beach Road, Tuppy Drive, Harrys Lane and Leo Crescent.

Six blow-offs are located at the end of each street, for flushing and maintenance purposes. Three sample stations are located at the end of Bonnie Beach Road, Harrys Lane and Leo Crescent.

4 WATER QUALITY MONITORING

4.1 BACTERIOLOGICAL SAMPLING AND RESULTS

The Water Works must be operated in such a manner as to meet the treatment requirements specified in Ontario Regulation 170/03 and Ontario Regulation 169/03.

Appendix A summarizes the sampling and testing requirements in accordance with Schedule 11 of O. Reg. 170/03.

The sampling locations are as follows:

- Raw water: from each well as it enters the Water Works building
- Treated water: after treatment, just before the water leaves the water works building
- Distribution: at a point in the distribution system that is the furthest from the treatment system. THMs, HAAs and lead are to be sampled at a location that is likely to have an elevated concentration.

Six (6) water samples are taken on a weekly basis for microbiological testing: one sample from each well (raw), one sample of the treated water at the Water Works building (treated), and two samples at various locations in the distribution system.

Raw water samples are tested for Total Coliforms, Escherichia coli (E. coli) and background colonies.

Treated and distribution water samples are tested for Total Coliforms, E. coli, Heterotrophic Plate Count (HPC), and background colonies.

All bacteriological testing was performed by the accredited laboratory SGS Lakefield Research Limited (SGS) in Lakefield, Ontario.

The results of the bacteriological analyses are reviewed by the overall responsible operator and kept electronically at the Township office. If a treated or distribution water sample contains Total Coliforms or E.coli, the MECP Spills Action Centre and the Simcoe Muskoka District Health Unit are notified immediately, verbally and in writing. The site is also re-sampled.

All treated water bacteriological test results met the Ontario Drinking - Water Quality Standards of Ontario Regulation 169/03 (O. Reg. 169/03) Schedule 1 microbiological requirements.

A summary of microbiological testing can be found in Appendix C.

4.2 FREE CHLORINE RESIDUAL MONITORING AND RESULTS

In order to provide the required primary disinfection in accordance with the MECP's Procedure for Disinfection of Drinking Water in Ontario, an adequate CT value must be maintained. The CT value is the effective disinfectant contact time (T) multiplied by the free chlorine residual (C).

A CT value of 6 is needed to provide 2-log inactivation of viruses, based on a pH range of 6 to 9 and a water temperature of 0.5°C. The effective contact time is determined from the available contact volume, the baffling factor and the rated capacity of the Water Works. Under regular operating conditions, a minimum free chlorine residual above 0.4 mg/L should be maintained in the treated water to ensure a CT of 6.

Free chlorine residuals at the Water Works building are monitored using the continuous analyzer, to verify the free chlorine residual is maintained within the operation limits of 0.4 mg/L to 4.0 mg/L. In 2019, free chlorine residual ranged between 0.0 mg/L and 3.53 mg/L. When the continuous analyzer measured a free chlorine residual outside of the operation limits, the on-duty operators compared the results with those of a hand-held analyzer.

The on-duty operator also confirmed all Water Works equipment was operating normally at the time to verify a triggered alarm was a non-reportable event. All measurements recorded outside the operation limits in 2019 were caused by testing of alarm set-points, a short term power failure, regular maintenance or cleaning. The continuous analyzer was re-calibrated as required. Hand-held measurements of free chlorine residual ranged between 0.73 mg/L and 1.97 mg/L. Free chlorine residuals were therefore maintained above 0.4 mg/L at all times and a CT of 6 was achieved.

Free chlorine residuals in the distribution system are monitored as required by O. Reg. 170/03, Schedule 7. The operator uses a portable Hach Chlorine Residual Meter to verify if the free chlorine residual is maintained within the operation limits of 0.2 mg/L to 4.0 mg/L. Free chlorine residuals in the distribution system ranged between 0.44 mg/L and 1.64 mg/L.

Free chlorine residual monitoring results are summarized in Table 2.

Table 2: Val Harbour - 2019 Free Chlorine Residuals

Month	Water Works				Distribution System	
	Continuous Analyser		Hand-held Instrument (Daily)			
	Min*	Max	Min	Max	Min	Max
January	-0.25	3.53	0.73	1.73	0.53	1.42
February	0.11	1.68	0.81	1.49	0.61	1.16
March	0.77	1.26	0.81	1.18	0.47	0.92
April	0.39	2.08	1.01	1.51	0.44	1.12
May	0.66	1.74	0.73	1.60	0.53	1.07
June	-0.06	2.61	1.33	1.97	0.62	1.11
July	0.58	1.88	1.40	1.58	0.72	1.04
August	0.58	1.62	1.55	1.56	0.52	1.41
September	0.91	1.65	1.36	1.56	1.01	1.13
October	1.03	1.60	1.31	1.58	1.03	1.64
November	-0.06	1.89	1.48	1.65	1.21	1.36
December	1.27	1.52	1.35	1.42	1.01	1.02

*Low chlorine alarm test or non-reportable event

4.3 PHYSICAL/CHEMICAL TESTING RESULTS

4.3.1 Raw Water

A quarterly raw water sampling program was initiated in 2006 to test for the major ions, nitrite and nitrate from each well. The intent of the program is to permit trend analysis of the results by a hydrogeologist for all future studies pertaining to source water protection for the municipal water supply wells.

The quality of raw water from Val Harbour Wells No. 1, 2 and 3R was tested by SGS in February, May, August and November of 2019.

A full characterization of the physical/chemical quality of the raw water from Val Harbour wells was last completed in March 2001. Raw water quality laboratory results for 2019 are summarized in Appendix B.

The aesthetic objectives specified in Table 4 of the Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines (June 2003) (ODWS) were exceeded for:

- Hardness (CaCO₃): all samples from Wells Nos. 1, 2 and 3R.
- Iron: February sample from Well No. 3R.

Except for the August sample from Well No. 3R, all samples taken from Wells Nos. 1, 2 and 3R had concentrations of sodium above 20 mg/L.

Hand-held measurements of turbidity ranged from:

- 0.17 NTU – 1.60 NTU in Well No. 1; and
- 0.19 NTU – 0.57 NTU in Well No. 2; and
- 0.17 NTU – 2.67 NTU in Well No. 3R.

4.3.2 Treated Water

Treated water quality was tested in February, May, August, and November of 2019 for nitrate and nitrites. Distribution water was tested for trihalomethanes (THMs) and haloacetic acids (HAAs) in February, May, August and November.

Treated water quality laboratory results are summarized in Table 3 and are available upon request. Treated water quality met the specifications in O. Reg. 169/03, Schedule 2, and the AO/OG in the ODWS.

Lead

In accordance with the lead testing requirements of O. Reg. 170/03, Schedule 15.1-5(10), water in the distribution system was tested for lead, alkalinity and pH in March and August, 2019. Lead was below the MAC of 10 ug/L. The laboratory results are summarized in Table 3.

Table 3: Val Harbour – 2019 Lead Testing Results

Date	Location	pH	Alkalinity (mg/L)	Lead (ug/L)
March 11, 2019	Sample Station Bonnie	7.55	249	0.09
August 21, 2019	Sample Station Bonnie	7.54	235	3.49

Maximum Acceptable Concentration for Lead: 10 ug/L

Operational Guideline for Alkalinity: 30-500 mg/L

Operational Guideline for pH: 6.5-8.5

Turbidity

Treated water turbidity was monitored by the continuous analyzer. Measurements ranged from 0.0 NTU to 2.08 NTU. Turbidity readings that were outside the operating range of 0.0 NTU to 1.0 NTU occurred during routine maintenance (continuous analyzer cleaning and calibration) or were caused by air bubbles in the treated water, or failure of the turbidimeter wiper.

Table 4: Val Harbour - 2019 Treated Water Quality Results

Parameter	Feb	May	Aug	Nov	MAC	AO/OG
Nitrite (mg/L)	0.006	<0.003	<0.003	<0.003	1	
Nitrate (mg/L)	2.14	1.170	0.479	1.46	10	
Nitrate + Nitrite (mg/L)	2.15	1.170	0.479	1.46	10	
THM total (Distribution) (µg/L)	10.5	18.6	20.9	23.8	-	
THM (Distribution)* (µg/L)	27.05	24.5	16.27	18.4	100	
HAA total (Distribution) (µg/L)	<5.3	2.8	<5.3	4.2	-	
HAA (Distribution)* (µg/L)	3.68	3.6	1.95	1.8	-	

*Four Quarter Running Average

AO/OG – Aesthetic Objective/Operational Guideline

MAC – Maximum Acceptable Concentration

4.4 WELL LEVEL MONITORING

The static water levels in Wells No.1, 2 and 3R were monitored monthly in 2019. As required in the MDWL a continuous level sensor was installed in Well No. 2. The static well levels, as measured from the top of the well casing are presented in Table 5.

Table 5: Val Harbour - 2019 Supply Wells Static Water Levels

Water Level (m)			
Date	Well No. 1	Well No. 2	Well No. 3R
January 31	5.81	4.70	5.22
February 28	5.82	4.00	5.20
March 29	5.80	3.99	5.15
April 30	5.60	4.02	5.10
May 21	5.76	4.09	5.10
June 18	5.86	4.07	5.12
July 23	5.79	4.18	5.19
August 22	5.74	4.20	5.14
September 23	5.21	4.25	5.05
October 22	5.19	4.71	5.10
November 22	5.21	4.75	5.12
December 20	5.08	4.57	5.09

5 WATER USAGE

5.1 WATER CONSUMPTION AND CHEMICAL USAGE

The average daily water consumption in Val Harbour during 2019 was 31.4 m³/day as shown in Table 6. This corresponds to an estimated per capita average water consumption of 186 L/p/day. A maximum daily demand of 55 m³/day was measured in August, which corresponds to approximately 27% of the system's rated capacity of 207 m³/day. Sodium hypochlorite usage in 2019 is also summarized in Table 6.

The total annual water consumption was 17% lower than in 2018. A summary of the average daily demand (ADD), maximum daily demand (MDD) and the three year (2017 to 2019) historical averages and maximums are presented in Table 7.

Table 6: Val Harbour - 2019 Water Consumption and Chemical Usage

Month	Water Consumption				Sodium Hypochlorite Usage (L)
	Total (m ³)	Average (m ³ /d)	Maximum (m ³ /d)	Minimum (m ³ /d)	
January	895	28.9	36	17	23.69
February	854	30.5	41	26	19.14
March	940	30.3	37	27	23.34
April	1,025	34.2	46	28	25.80
May	916	29.5	50	22	21.82
June	964	32.1	51	21	27.21
July	1,126	36.3	51	25	27.72
August	1,383	44.6	55	37	35.34
September	913	30.4	49	2	24.82
October	796	25.7	32	2	21.56
November	798	26.6	34	20	21.51
December	873	28.2	35	24	20.41
Total	11,483				292.34
Average		31.4			
Min./Max.			55	17	

Total volume of Sodium Hypochlorite for pre-chlorination and post-chlorination.

Table 7: Val Harbour Water Works Historical Treated Water Demand

Year	No. of Connections	ADD (m ³ /day)	MDD (m ³ /day)	Rated Capacity (m ³ /day)	Per Capita Consumption (L/p/day)	
					Average	Max
2009	62	41	93	207	254	577
2010	62	41	110	207	252	682
2011	62	37	87	207	232	540
2012	62	35	84	207	216	521
2013	62	31	79	207	195	491
2014	62	30	82	207	188	509
2015	63	31	63	207	190	385
2016	63	32	74	207	195	452
2017	64	30	64*	207	182	385
2018	64	37	89	207	224	536
2019	65	31	55	207	186	325
3 Yr Avg / Max		33	89		197	536

5.2 LAWN WATERING BAN

In 2005 through Bylaw No. 2005.72, the Township established watering restrictions for non-domestic water use, such as lawn watering. Residents are permitted to water their lawns between the hours of 6:00 a.m. and 8:00 a.m., and 7:00 p.m. and 9:00 p.m., on alternating days; even numbered houses on even numbered days and odd numbered houses on odd numbered days. A full watering ban is required if water demands reach 80% of the PTTW maximum daily rate which corresponds to 166 m³/day.

The maximum daily water demand was 55 m³/day in 2019, therefore no full watering bans were implemented in Val Harbour.

5.3 SYSTEM RESERVE CAPACITY

In accordance with MECP Procedure D-5-1, the reserve capacity is calculated by the following formula:

$$\text{Reserve Capacity} = \text{Design Flow} - \text{Committed Flow}$$

Design flow is the maximum permissible flow approved by the MDWL and/or PTTW. Val Harbour Water Works' maximum day rated capacity is 207 m³/day.

The committed flow is the total expected water demand from the existing and proposed connections based on the previous three years of data. The committed number of service connections is 74. The three-year (2017-2019) maximum day per capita water consumption is 536 L/p/day. At this water consumption rate, the committed flow is 103 m³/day.

Therefore, the calculated reserve capacity is 104 m³/day.

6 OPERATION AND MAINTENANCE

6.1 SYSTEM INSPECTION

The water system is inspected annually by the Ministry of Environment, Conservation and Parks (MECP) to confirm compliance with MECP legislation and authorizing documents (the DWWP and MDWL), as well as evaluating conformance with Ministry drinking water-related policies and guidelines. The physical inspection took place on October 8, 2019 with the inspection review period of October 2, 2018 – October 8, 2019.

There were no issues of non-compliance with regulatory requirements identified during the inspection review period.

6.2 SUMMARY OF MAINTENANCE AND REPAIRS

Throughout the year, regular maintenance was completed at the Water Works such as calibrating the chlorine and turbidity analyzers, cleaning chlorine pumps, injectors and lines, and responding to AC power failures.

All flow meters were checked for calibration by a qualified technician in January 2019.

Repairs and regular maintenance were as follows during 2019:

- Replace post pH and chlorine analyser (\$5000)
- Replace well #2 piping (\$1200)
- Repair well #1 piping (\$1000)

6.3 PUBLIC COMPLAINTS

No complaints were received in 2019.

7 WATER WORKS AND OPERATOR LICENSES

The MECP Water Works number is 220010690. The Water Works is categorized as a Small Municipal Residential system.

A summary of the facility operators in 2019 and their level of certification are listed in Table 8.

Table 8: Certified Operators

Operator	Water Treatment Class	License No./ Expiry Date	Water Dist. Class	License No./ Expiry Date
Dave Readman	Class II	12460 / July 31.21	Class II	13530 / July 31.21
Donald O'Connell	Class II	53308 / Feb 28.23	N/A	N/A
Rob Smith	Class III	53310 / Feb 28.23	Class III	96079 / Feb 28.23
Nicholas Leroux	Class III	68579 / July 31.21	Class III	83999 / Mar 31.23
Joe Foley	Class II	87270 / Aug 31.21	N/A	N/A
Kyle Readman	Class I	102762 / Oct 31.21	N/A	N/A

The Operators attended workshops, seminars and training throughout the year to ensure they maintain and enhance their knowledge pertaining to the operation of drinking water systems and remain knowledgeable on current trends in the industry.

Each operator is mandated by Ontario Regulation 128/04 under the Safe Drinking Water Act, 2002 to complete the applicable number of required training hours over a 3-year period in order to renew their licence.

8 COMPLIANCE STATUS

The MECP conducted an inspection of the Water Works on October 8, 2019. The primary focus of this inspection is to confirm compliance with the Ministry of the Environment, Conservation and Parks legislation and authorizing documents, as well as conformance with Ministry drinking water-related policies and guidelines during the inspection review period.

There were no issues of non-compliance with regulatory requirements identified during the inspection review period. No Provincial Officer's Orders were issued in conjunction with this inspection.

In 2019, the Water Works adhered to the sampling and testing requirements of the Safe Drinking Water Act and Municipal Drinking Water Licence. A summary of the minimum sampling and testing frequencies is included in the corresponding water works' Operations and Maintenance Manual.

The Val Harbour Water Works operated in accordance with the DWWP, MDWL, and PTTW during 2019. Based on 2019 treated water quality test results, at no time were residents of Val Harbour at any health risk. All treated and distribution water samples tested were below the maximum acceptable concentrations for all microbiological and chemical parameters, as specified in O. Reg. 169/03, Schedules 1 and 2.

The annual report required by Ontario Regulation 170/03, Schedule 11 was made available to the public on the Township of Ramara website on February 28, 2020. A copy of the report is included in Appendix C.

APPENDIX A:
Schedule for required sampling

Schedule for required sampling

Frequency	Location		
	Raw Water	Treated water	Distribution
Continuous		Free Chlorine Residual Turbidity	
Weekly	Total Coliforms E. Coli	Total Coliforms E. Coli HPC or background	Free Chlorine Residual (2/week, ≤ 48 hours apart)
Every 2 Weeks			Total Coliforms E. Coli HPC or background (25% of samples)
Monthly	Total Coliforms E. Coli Turbidity (each well)		
Every 3 Months	Major Ions Nitrite Nitrate	Nitrate Nitrite	THMs HAAs
Every 12 Months (2 periods)			Alkalinity* pH*
Every 36 Months (2 periods)			Lead* (Schedule 15.1, Reduced Sampling of dist. System and private residences)
Every 60 Months		Sodium Fluoride Inorganics (Sch. 23) Organics (Sch. 24)	

Notes:

Alkalinity and Field pH sampled twice per 12 month period with quarterly samples in February and August.

Lead sampled twice in every 36 month period.

Bold text items are Ontario Regulation 170/03 testing requirements.

Normal text items are recommended to monitor system performance.

Major Ions: Alkalinity (as CaCO₃), Calcium Chloride, Conductivity, Fluoride, Hardness (as CaCO₃), Iron, Magnesium, Manganese, pH, Potassium, Sodium, and Sulphate

APPENDIX B:
Raw water quality summary

Val Harbour Well No.1,2,3R
Raw Water Quality - 2019
Laboratory Results

Parameter	Treated Water		27-Feb-19			28-May-19			21-Aug-19			27-Nov-19		
	MAC	AO/OG	Well			Well			Well			Well		
			No. 1	No. 2	No. 3R	No. 1	No. 2	No. 3R	No. 1	No. 2	No. 3R	No. 1	No. 2	No. 3R
Alkalinity (as CaCO ₃), mg/L		30 - 500	262	251	273		251	259	253	238	260	258	250	244
Calcium, mg/L			109	78.7	99.6		78.8	70.1	87.3	85	82	119	83.4	87.4
Chloride, mg/L		250	51	38	90		82	40	66	49	17	81	74	31
Colour, TCU		5	<3	<3	<3		<3	<3	<3	3	<3	<3	3	3
Conductivity, uS/cm			746	640	858		772	645	728	641	578	758	712	596
Fluoride, mg/L	1.5		0.08	0.14	0.19		0.12	0.17	0.13	0.15	0.18	0.08	0.12	0.19
Hardness (as CaCO ₃), mg/L		80 - 100	350	303	363		310	278	328	324	312	373	330	340
Iron, ug/L		300	<7	166	327		45	24	<7	17	<7	10	75	<7
Magnesium, mg/L			18.7	25.9	27.7		27.5	25	26.7	27.2	26	18.3	29.5	29.6
Manganese, ug/L		50	0.2	4.64	8.84		2.83	7.99	2.16	2.52	6.22	0.64	3.15	6.46
Nitrate, mg/L	10		6.45	0.609	2.02		1.34	0.744	1.21	0.692	0.113	4.74	1.91	0.294
Nitrite, mg/L	1.0		0.031	0.003	0.016		<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.044
Nitrate + Nitrite, mg/L			6.48	0.612	2.03		1.34	0.744	1.21	0.692	0.113	4.74	1.91	0.338
pH		6.5 - 8.5	8.36	8.4	8.39		8	8.12	8.26	8.33	8.26	7.76	7.9	7.88
Potassium, mg/L			1.8	1.97	2.39		1.7	1.89	1.81	1.84	2.01	1.57	2.1	2.53
Sodium, mg/L	20	200	27.9	30.8	35.8		42.7	21.1	31	28.7	12	47.9	37.1	21.5
Sulphate, mg/L		500	33	34	34		47	31	29	35	26	23	42	29

MAC - Maximum Acceptable Concentration in Treated Water
AO - Aesthetic Objective
OG - Operational Guideline

APPENDIX C:
Annual Report

Part III Form 2
Section 11. ANNUAL REPORT.

Drinking-Water System Number:	220010690
Drinking-Water System Name:	Val Harbour Well Supply
Drinking-Water System Owner:	The Corporation of the Township of Ramara
Drinking-Water System Category:	Small Municipal Residential
Period being reported:	January 1, 2019 to December 31, 2019

<p><u>Complete if your Category is Large Municipal Residential or Small Municipal Residential</u></p> <p>Does your Drinking-Water System serve more than 10,000 people? Yes [] No [X]</p> <p>Is your annual report available to the public at no charge on a web site on the Internet? Yes [X] No []</p> <p>Location where Summary Report required under O. Reg. 170/03 Schedule 22 will be available for inspection.</p> <div style="border: 1px solid black; padding: 5px;"> Township of Ramara Municipal Office 2297 Highway 12 Brechin, ON L0K 1B0 </div>	<p><u>Complete for all other Categories.</u></p> <p>Number of Designated Facilities served:</p> <div style="border: 1px solid black; padding: 2px; width: fit-content;">N/A</div> <p>Did you provide a copy of your annual report to all Designated Facilities you serve? Yes [] No []</p> <p>Number of Interested Authorities you report to:</p> <div style="border: 1px solid black; padding: 2px; width: fit-content;">N/A</div> <p>Did you provide a copy of your annual report to all Interested Authorities you report to for each Designated Facility? Yes [] No []</p>
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Note: For the following tables below, additional rows or columns may be added or an appendix may be attached to the report

List all Drinking-Water Systems (if any), which receive all of their drinking water from your system:

Drinking Water System Name	Drinking Water System Number

Did you provide a copy of your annual report to all Drinking-Water System owners that are connected to you and to whom you provide all of its drinking water?

Yes [] No []

*Not applicable

Indicate how you notified system users that your annual report is available, and is free of charge.

- Public access/notice via the web**
- Public access/notice via Government Office**
- Public access/notice via a newspaper**
- Public access/notice via Public Request**
- Public access/notice via a Public Library**
- Public access/notice via other method**

Describe your Drinking-Water System

Val Harbour water supply is from Well No. 1, Well No. 2 and Well No. 3R. Watermains convey the raw water from the wells to the water works building. Raw water is treated with sodium hypochlorite before entering two 43,800 L below grade reservoirs adjacent to the building. The tanks are operated in series to maximize chlorine contact time. Two high lift pumps and one stand-by pump maintain pressure in the distribution system. The third pump is only operated in the event of failure by either duty pump. A sodium hypochlorite injection point is located on the high lift pump discharge. This injection point is currently not utilized, as sufficient free chlorine residuals are observed in the distribution system.

Continuous water quality on-line analyzers monitor the free chlorine residual, pH and turbidity of the treated water before it enters the distribution system. The analyzers are logged continuously by the paperless chart recorder and have alarm set points to notify the operators of adverse water quality results.

The water works is equipped with a 20 kW propane emergency generator. The generator has sufficient capacity to run the entire Water Works. The generator can operate for 5 days at maximum capacity when its fuel tank is full.

List all water treatment chemicals used over this reporting period

Sodium Hypochlorite

Were any significant expenses incurred to?

- Install required equipment
- Repair required equipment
- Replace required equipment

Please provide a brief description and a breakdown of monetary expenses incurred

- Replace post pH and chlorine analyser (\$5000)
- Replace well #2 piping (\$1200)
- Repair well #1 piping (\$1000)

Provide details on the notices submitted in accordance with subsection 18(1) of the Safe Drinking-Water Act or section 16-4 of Schedule 16 of O.Reg.170/03 and reported to Spills Action Centre

Incident Date	Parameter	Result	Unit of Measure	Corrective Action	Corrective Action Date

Microbiological testing done under the Schedule 10, 11 or 12 of Regulation 170/03, during this reporting period.

	Number of Samples	Range of E.Coli Or Fecal Results (min #)-(max #)	Range of Total Coliform Results (min #)-(max #)	Number of HPC Samples	Range of HPC Results (min #)-(max #)
Raw	152	0	0 - 4	0	N/A
Treated	53	0	0	52	0 - 29
Distribution	106	0	0	106	0 - 9

Operational testing done under Schedule 7, 8 or 9 of Regulation 170/03 during the period covered by this Annual Report.

	Number of Grab Samples	Range of Results (min #)-(max #)
Turbidity	8760	0 – 2.07 NTU
Chlorine	8760	0 – 3.53 mg/L
Fluoride (If the DWS provides fluoridation)	N/A	

NOTE: For continuous monitors use 8760 as the number of samples.

NOTE:

When free chlorine residual was measured to be outside of the operating range of 0.4 mg/L to 4.0 mg/L, the results were confirmed by operators as non-reportable events by use of a hand held analyzer. All results obtained outside the operating range were attributed to testing of alarm set-points, short term power failure, regular maintenance or cleaning.

When a turbidity value was recorded to exceed the limit of 1.0 NTU, the results were checked by operators by use of a hand held analyzer. All results obtained outside the objective range were attributed to testing of alarm set-points, short term power failure, regular maintenance or cleaning.

Summary of additional testing and sampling carried out in accordance with the requirement of an approval, order or other legal instrument.

Date of legal instrument issued	Parameter	Date Sampled	Result	Unit of Measure

Summary of Inorganic parameters tested during this reporting period or the most recent sample results

Parameter	Sample Date	Result Value	Unit of Measure	Exceedance
Antimony	21-Aug-19	<0.09	µg/L	
Arsenic	21-Aug-19	<0.2	µg/L	
Barium	21-Aug-19	129	µg/L	
Boron	21-Aug-19	59	µg/L	
Cadmium	21-Aug-19	0.003	µg/L	
Chromium	21-Aug-19	0.12	µg/L	
Lead (Distribution)	11-Mar-19	0.09	µg/L	
Lead (Distribution)	21-Aug-19	3.49	µg/L	
Mercury	11-Aug-19	<0.01	µg/L	
Selenium	21-Aug-19	0.07	µg/L	
Sodium	03-Sept-15	26.7	mg/L	
Uranium	21-Aug-19	0.385	µg/L	
Fluoride	15-Aug-17	0.14	mg/L	
Nitrite	21-Nov-19	<0.003	mg/L	
Nitrate	21-Nov-19	0.479	mg/L	

Summary of lead testing under Schedule 15.1 during this reporting period

(applicable to the following drinking water systems; large municipal residential systems, small municipal residential systems, and non-municipal year-round residential systems)

Location Type	Number of Samples	Range of Lead Results (min#) – (max #)	Unit of Measure	Number of Exceedances
Plumbing				
Distribution	2	0.09 – 3.49	ug/L	0

Summary of Organic parameters sampled during this reporting period or the most recent sample results

Parameter	Sample Date	Result Value	Unit of Measure	Exceedance
Alachlor	21-Aug-19	<0.02	µg/L	
Atrazine + N-dealkylated metabolites	21-Aug-19	<0.01	µg/L	
Azinphos-methyl	21-Aug-19	<0.05	µg/L	
Benzene	21-Aug-19	<0.32	µg/L	
Benzo(a)pyrene	21-Aug-19	<0.004	µg/L	
Bromoxynil	21-Aug-19	<0.33	µg/L	
Carbaryl	21-Aug-19	<0.05	µg/L	
Carbofuran	21-Aug-19	<0.01	µg/L	
Carbon Tetrachloride	21-Aug-19	<0.17	µg/L	

Parameter	Sample Date	Result Value	Unit of Measure	Exceedance
Chlorpyrifos	21-Aug-19	<0.02	µg/L	
Diazinon	21-Aug-19	<0.02	µg/L	
Dicamba	21-Aug-19	<0.20	µg/L	
1,2-Dichlorobenzene	21-Aug-19	<0.41	µg/L	
1,4-Dichlorobenzene	21-Aug-19	<0.36	µg/L	
1,2-Dichloroethane	21-Aug-19	<0.35	µg/L	
1,1-Dichloroethylene (vinylidene chloride)	21-Aug-19	<0.33	µg/L	
Dichloromethane	21-Aug-19	<0.35	µg/L	
2-4 Dichlorophenol	21-Aug-19	<0.15	µg/L	
2,4-Dichlorophenoxy acetic acid (2,4-D)	21-Aug-19	<0.19	µg/L	
Diclofop-methyl	21-Aug-19	<0.40	µg/L	
Dimethoate	21-Aug-19	<0.06	µg/L	
Diquat	21-Aug-19	<1.0	µg/L	
Diuron	21-Aug-19	<0.03	µg/L	
Glyphosate	21-Aug-19	<1.0	µg/L	
Malathion	21-Aug-19	<0.02	µg/L	
Metolachlor	21-Aug-19	<0.01	µg/L	
Metribuzin	21-Aug-19	<0.02	µg/L	
Monochlorobenzene	21-Aug-19	<0.30	µg/L	
Paraquat	21-Aug-19	<1.0	µg/L	
Pentachlorophenol	21-Aug-19	<0.15	µg/L	
Phorate	21-Aug-19	<0.01	µg/L	
Picloram	21-Aug-19	<1.0	µg/L	
Polychlorinated Biphenyls(PCB)	21-Aug-19	<0.04	µg/L	
Prometryne	21-Aug-19	<0.03	µg/L	
Simazine	21-Aug-19	<0.01	µg/L	
THM - Quarterly Average (NOTE: Latest annual average)	27-Feb-19 to 27-Nov-19	18.4	µg/L	
Terbufos	21-Aug-19	<0.01	µg/L	
Tetrachloroethylene	21-Aug-19	<0.35	µg/L	
2,3,4,6-Tetrachlorophenol	21-Aug-19	<0.20	µg/L	
Triallate	21-Aug-19	<0.01	µg/L	
Trichloroethylene	21-Aug-19	<0.44	µg/L	
2,4,6-Trichlorophenol	21-Aug-19	<0.25	µg/L	
2-Methyl-4-chlorophenoxy acetic acide	21-Aug-19	<0.00012	µg/L	
Trifluralin	21-Aug-19	<0.02	µg/L	
Vinyl Chloride	21-Aug-19	<0.17	µg/L	

List any Inorganic or Organic parameter(s) that exceeded half the standard prescribed in Schedule 2 of Ontario Drinking Water Quality Standards.

Parameter	Result Value	Unit of Measure	Date of Sample

(Only if DWS category is large municipal residential, small municipal residential, large municipal non residential, non municipal year round residential, large non municipal non residential)

Notes on Additional Sampling

None.