



Township of Perth East
2021 Annual Drinking Water Report
Shakespeare Drinking Water System

The Corporation of the Township of Perth East
25 Mill Street East
P.O. Box 455
Milverton, Ontario
N0K 1M0

February 17, 2022

ATTN: Mrs. Theresa Campbell, CAO

**Re: The Corporation of the Township of Perth East
2021 Shakespeare Drinking Water Annual & Summary Report**

Please find enclosed the Township of Perth East's 2021 Drinking Water Annual Report and Summary Report for the Shakespeare Drinking Water System. The reports are prepared in accordance with Ontario Regulation 170/03 of the Safe Drinking Water Act.

Under Ontario Regulation 170/03, the Annual Report must cover the period from January 1 to December 31 each year and must be prepared by February 28 of the subsequent year. The Annual Report is to be made available free of charge to anyone whom requests a copy.

Ontario Regulation 170/03 additionally requires the preparation of a Summary Report for the preceding year which must be presented to Council no later than March 31.

A copy of the reports will be available at the Township Office at 25 Mill Street East in Milverton in addition to the Township website at www.pertheast.ca.

Any questions or concerns regarding the reports can be directed to Public Works Department.

Sincerely,

A handwritten signature in blue ink that reads "Jake Collings".

Jake Collings, BESC.
Township of Perth East
Operations Coordinator



**The Corporation of the Township of Perth East
2021 Annual Report & Summary Report
Shakespeare Drinking Water System**

Date: February 17, 2022



Part 1 – ANNUAL REPORT (as required by O. Reg. 170/03, Section 11)

Drinking-Water System Number:	260002317
Drinking-Water System Name:	Shakespeare Drinking Water System
Drinking-Water System Owner:	Township of Perth East
Drinking-Water System Category:	Large Municipal Residential
Reporting Period:	January 1, 2021 to December 31, 2021

Complete if your Category is Large Municipal Residential or Small Municipal Residential		Complete for all other Categories	
<i>Does your Drinking-Water System serve more than 10,000 people?</i>	No	<i>Number of Designated Facilities served:</i>	0
<i>Is your Annual Report available to the public at no charge on a web site on the Internet?</i>	Yes	<i>Did you provide a copy of your Annual Report to all Designated Facilities you serve?</i>	N/A
<i>Location where Summary Report required under O. Reg. 170/03 Schedule 22 will be available for inspection:</i>		<i>Number of Interested Authorities you report to:</i>	0
Township of Perth East, Municipal Office 25 Mill Street East, Milverton, Ontario PO Box 455 N0K 1M0		<i>Did you provide a copy of your Annual Report to all Interested Authorities you report to for each Designated Facility?</i>	N/A

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
N/A	N/A

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?
N/A



Indicate how you notified system users that your annual report is available and free of charge:					
Public access/ notice via the web	<input checked="" type="checkbox"/>	Public access/ notice via a newspaper		Public access/ notice via Public Request	<input checked="" type="checkbox"/>
Public access/ notice via Government Office	<input checked="" type="checkbox"/>	Public access/ notice via a Public Library		Public access/ notice via other method	

Describe your Drinking Water System
<p>The Shakespeare Drinking Water system is a Class II Distribution and Supply sub-system owned and operated by the Township of Perth East. The serviced population is approximately 260 and consists of 2.8 kilometers of distribution water mains.</p> <p>The well house facility is situated at 2171 Miller Street in Shakespeare, Ontario. Raw water is conveyed to the well house and treated using liquid sodium hypochlorite which is injected using two (2) chemical feed pumps rated at 14 L/day and single storage tank. Water is then pressurized using six (6) 300L fiberglass pressure tanks and finally transferred to an 8.27m³ concrete chamber for the necessary chlorine contact time on its way to the distribution system.</p> <p>The system water supply consists of two drilled groundwater wells. Well #1 is located at the south end of the site and is comprised of a 85.0 meter deep, 150 mm diameter casing equipped with a submersible pump rated at 410 L/min but restricted to 379.0 L/min with a flow restrictor.</p> <p>Well #2 is located approximately at the north end of the site and is comprised of a 88.4 meter deep 210 mm diameter casing, equipped with submersible pump rated at 378 L/min and is complete with a variable frequency drive (VFD).</p>

List all water treatment chemicals used over this reporting period:
Liquid Chlorine (Sodium Hypochlorite) 6%

Were any significant expenses incurred to?	
Install required equipment:	Yes
Repair required equipment:	No
Replace required equipment:	Yes

Please provide a brief description and a breakdown of monetary expenses incurred:	
Description	Cost
Replacement of Chlorine Pump #2	\$2,750
Installation of new watermain on Byron Street, Tannahill Drive and Andrew Street.	\$147,000



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 Center:

Incident Date	Parameter	Result	Unit of Measure	Corrective Action	Corrective Action Date
There were no incidents over the reporting period for the Shakespeare Drinking Water System.					

Microbiological testing done under Schedule 10, 11 or 12 of O. Reg. 170/03 during this reporting period:

Description	Number of Samples	Range of E.coli Or Fecal Results (min. #) – (max. #)	Range of Total Coliform Results (min. #) – (max. #)	Range of HPC Results (min. #) – (max. #)	Range of Background Results (min. #) – (max. #)
Well # 1 - Raw	52	0-0	0-0	N/A	0-1
Well # 2 - Raw	52	0-0	0-1	N/A	0-3
Treated	52	0-0	0-0	0-1	0-0
Fire Department	52	0-0	0-0	0-3	0-0
Blow Off #1	52	0-0	0-0	0-1	0-0

Operational testing done under Schedule 7, 8 or 9 of O. Reg. 170/03 during the reporting period:

Description	Number of Grab Samples	Range of Results (min. #) – (max. #)
Turbidity (NTU)		
Turbidity – Well #1	12	0.05 - 0.53 NTU
Turbidity – Well #2	12	0.18 - 0.52 NTU
Chlorine Residual (mg/L)		
Chlorine – Point of Entry (POE)	8760	0.06* - 2.81* mg/L

* Values due to operator maintenance on chlorine analyzer

Summary of additional testing & 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
N/A				



Summary of Inorganic parameters tested during this reporting period or the most recent sample results:				
Shakespeare – Treated Water				
Parameter	Sample Date	Result Value	Unit of Measure	Exceedance
Antimony	Aug. 13/19	None Detected	µg/L	No
Arsenic	Jan. 4/21	13.1	µg/L	Yes
Arsenic	Feb. 1/21	12.8	µg/L	Yes
Arsenic	Mar. 1/21	14.6	µg/L	Yes
Arsenic	Apr. 7/21	12.7	µg/L	Yes
Arsenic	May 3/21	14.5	µg/L	Yes
Arsenic	Jun. 1/21	13.9	µg/L	Yes
Arsenic	Jul. 5/21	14.4	µg/L	Yes
Arsenic	Aug. 3/21	13.0	µg/L	Yes
Arsenic	Sep. 13/21	13.2	µg/L	Yes
Arsenic	Oct. 4/21	13.5	µg/L	Yes
Arsenic	Nov. 4/21	12.1	µg/L	Yes
Arsenic	Dec. 6/21	14.5	µg/L	Yes
Barium	Aug. 13/19	85	µg/L	No
Boron	Aug. 13/19	None Detected	µg/L	No
Cadmium	Aug. 13/19	None Detected	µg/L	No
Chromium	Aug. 13/19	None Detected	µg/L	No
Mercury	Aug. 13/19	None Detected	µg/L	No
Selenium	Aug. 13/19	None Detected	µg/L	No
Sodium	Feb. 13/20	11.2	mg/L	No
Uranium	Aug. 13/19	None Detected	µg/L	No
Fluoride	Feb. 13/20	0.81	mg/L	No
Nitrite	Feb. 10/21	None Detected	mg/L	No
Nitrite	May 19/21	None Detected	mg/L	No
Nitrite	Aug. 16/21	None Detected	mg/L	No
Nitrite	Nov. 16/21	None Detected	mg/L	No
Nitrate	Feb. 10/21	None Detected	mg/L	No
Nitrate	May 19/21	None Detected	mg/L	No
Nitrate	Aug. 16/21	None Detected	mg/L	No
Nitrate	Nov. 16/21	None Detected	mg/L	No



Summary of Lead testing under Schedule 15.1 during this reporting period:			
Location Type	Number of Samples	Range of Lead Results (min. #) – (max. #)	Number of Exceedances
Plumbing	N/A	N/A	N/A
Distribution	N/A	N/A	N/A

* Shakespeare qualified for reduced lead sampling in 2021.

Summary of Organic parameters tested during this reporting period or the most recent sample results:				
Shakespeare – Treated Water				
Parameter	Sample Date	Result Value	Unit of Measure	Exceedance
Volatile Organic Compounds (VOCs)				
Benzene	Aug. 13/19	None Detected	µg/L	No
Carbon Tetrachloride	Aug. 13/19	None Detected	µg/L	No
Monochlorobenzene	Aug. 13/19	None Detected	µg/L	No
1,2-Dichlorobenzene	Aug. 13/19	None Detected	µg/L	No
1,4-Dichlorobenzene	Aug. 13/19	None Detected	µg/L	No
1,2-Dichloroethane	Aug. 13/19	None Detected	µg/L	No
1,1-Dichloroethylene (vinylidene chloride)	Aug. 13/19	None Detected	µg/L	No
Dichloromethane	Aug. 13/19	None Detected	µg/L	No
Ethylbenzene	Aug. 13/19	None Detected	µg/L	No
Tetrachloroethylene (perchloroethylene)	Aug. 13/19	None Detected	µg/L	No
Toluene	Aug. 13/19	None Detected	µg/L	No
Trichloroethylene	Aug. 13/19	None Detected	µg/L	No
Vinyl Chloride	Aug. 13/19	None Detected	µg/L	No
o-xylene	Aug. 13/19	None Detected	µg/L	No
m/p-xylene	Aug. 13/19	None Detected	µg/L	No
Xylenes (Total)	Aug. 13/19	None Detected	µg/L	No
Polycyclic Aromatic Hydrocarbons (PAHs)				
Benzo(a)pyrene	Aug. 13/19	None Detected	µg/L	No
Polychlorinated Biphenyls (PCBs)				
Total Polychlorinated Biphenyls (PCBs)	Aug. 13/19	None Detected	µg/L	No



Pesticides and Herbicides				
Alachlor	Aug. 13/19	None Detected	µg/L	No
Atrazine + N-dealkylated metabolites	Aug. 13/19	None Detected	µg/L	No
Azinphos-methyl	Aug. 13/19	None Detected	µg/L	No
Bromoxynil	Aug. 13/19	None Detected	µg/L	No
Carbaryl	Aug. 13/19	None Detected	µg/L	No
Carbofuran	Aug. 13/19	None Detected	µg/L	No
Chlorpyrifos	Aug. 13/19	None Detected	µg/L	No
Diazinon	Aug. 13/19	None Detected	µg/L	No
Dicamba	Aug. 13/19	None Detected	µg/L	No
2,4-Dichlorophenol	Aug. 13/19	None Detected	µg/L	No
2,4-Dichlorophenoxy acetic acid (2,4-D)	Aug. 13/19	None Detected	µg/L	No
Diclofop-methyl	Aug. 13/19	None Detected	µg/L	No
Dimethoate	Aug. 13/19	None Detected	µg/L	No
Diquat	Aug. 13/19	None Detected	µg/L	No
Diuron	Aug. 13/19	None Detected	µg/L	No
Glyphosate	Aug. 13/19	None Detected	µg/L	No
Malathion	Aug. 13/19	None Detected	µg/L	No
Metolachlor	Aug. 13/19	None Detected	µg/L	No
Metribuzin	Aug. 13/19	None Detected	µg/L	No
Paraquat	Aug. 13/19	None Detected	µg/L	No
Pentachlorophenol	Aug. 13/19	None Detected	µg/L	No
Phorate	Aug. 13/19	None Detected	µg/L	No
Picloram	Aug. 13/19	None Detected	µg/L	No
Prometryne	Aug. 13/19	None Detected	µg/L	No
Simazine	Aug. 13/19	None Detected	µg/L	No
Terbufos	Aug. 13/19	None Detected	µg/L	No
2,3,4,6-Tetrachlorophenol	Aug. 13/19	None Detected	µg/L	No
Triallate	Aug. 13/19	None Detected	µg/L	No
2,4,6-Trichlorophenol	Aug. 13/19	None Detected	µg/L	No
Trifluralin	Aug. 13/19	None Detected	µg/L	No
2 methyl-4-chlorophenoxyacetic acid (MCPA)	Aug. 13/19	None Detected	µg/L	No



Haloacetic Acids (HAAs)				
HAA (Total) Quarter 1	Feb. 10/21	3.4	µg/L	No
HAA (Total) Quarter 2	May 19/21	3.3	µg/L	No
HAA (Total) Quarter 3	Aug. 16/21	5.6	µg/L	No
HAA (Total) Quarter 4	Nov. 16/21	2.2	µg/L	No
Trihalomethanes (THMs)				
THM (Total) Quarter 1	Feb. 10/21	4.1	µg/L	No
THM (Total) Quarter 2	May 19/21	4.7	µg/L	No
THM (Total) Quarter 3	Aug. 16/21	14.0	µg/L	No
THM (Total) Quarter 4	Nov. 16/21	4.0	µg/L	No

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
Arsenic	13.1	µg/L	Jan. 4/21
Arsenic	12.8	µg/L	Feb. 1/21
Arsenic	14.6	µg/L	Mar. 1/21
Arsenic	12.7	µg/L	Apr. 7/21
Arsenic	14.5	µg/L	May 3/21
Arsenic	13.9	µg/L	Jun. 1/21
Arsenic	14.4	µg/L	Jul. 5/21
Arsenic	13.0	µg/L	Aug. 3/21
Arsenic	13.2	µg/L	Sep. 13/21
Arsenic	13.5	µg/L	Oct. 4/21
Arsenic	12.1	µg/L	Nov. 4/21
Arsenic	14.5	µg/L	Dec. 6/21
Fluoride	0.81	mg/L	Feb. 13/20
Sodium	11.2	mg/L	Feb. 19/20



Part 2 – SUMMARY REPORT (as required by O. Reg. 170/03, Schedule 22)

Non-Compliance with Legislations, Regulations, Approvals & Orders		
<p>The MECP conducted an announced routine inspection of the Shakespeare Drinking Water System on September 28, 2021. During this period, it was determined that the Facility was operated in full compliance with the Act, the regulations and the Facility’s Municipal Drinking Water Licence, Drinking Water Works Permit and Permit to Take Water, save and except for the following:</p>		
<i>Requirement</i>	<i>Duration of Failure</i>	<i>Measures to Correct the Failure</i>
* There were no non compliances over the reporting period in 2021.		

Well #1						
System Capability Assessment						
Month	Average Flow (m ³ /day)	Maximum Flow (m ³ /day)	Total Monthly Flow (m ³)	Maximum Flow Rate (L/min)	Approved Flow Rate (L/min)	System Capacity (m ³ /day)
January	30.94	38.72	959.22	322	379	545.76
February	30.34	37.88	849.56	320		
March	31.87	39.46	988.12	321		
April	32.51	43.91	975.16	321		
May	44.41	68.63	1376.69	323		
June	43.77	58.58	1313.17	308		
July	37.66	49.59	1167.37	339		
August	43.93	55.69	1361.74	308		
September	37.65	43.94	1129.51	322		
October	35.24	51.66	1092.42	311		
November	38.12	46.92	1143.64	310		
December	44.83	71.15	1389.84	310		
<i>Average</i>	37.61		1145.54	318		
<i>Maximum</i>		71.15	1389.84	339		
<i>% of Capacity</i>	6.89	13.04				



Well #2						
System Capability Assessment						
Month	Average Flow (m ³ /day)	Maximum Flow (m ³ /day)	Total Monthly Flow (m ³)	Maximum Flow Rate (L/min)	Approved Flow Rate (L/min)	System Capacity (m ³ /day)
January	35.27	44.61	1093.48	282	379	545.76
February	34.76	44.16	973.16	281		
March	36.61	46.25	1135.00	280		
April	37.26	51.43	1117.67	280		
May	51.21	76.41	1587.41	292		
June	48.29	65.38	1448.58	278		
July	41.76	55.69	1294.70	272		
August	46.71	57.39	1448.14	314		
September	39.36	45.89	1180.80	273		
October	36.73	55.78	1138.63	277		
November	41.37	51.52	1241.21	280		
December	49.68	81.83	1540.08	281		
<i>Average</i>	41.58		1266.57	283		
<i>Maximum</i>		81.83	1587.41	314		
<i>% of Capacity</i>	7.62	14.99				



Combined					
Month	Average Flow (m ³ /day)	Maximum Flow (m ³ /day)	Total Monthly Flow (m ³)	Approved Flow Rate (L/min)	System Capacity (m ³ /day)
January	66.21	83.33	2052.7	Well 1: 379 Well 2: 379	545.76
February	65.10	82.04	1822.72		
March	68.48	85.71	2123.12		
April	69.77	95.34	2092.83		
May	95.62	145.04	2964.1		
June	92.06	123.96	2761.75		
July	79.42	105.28	2462.07		
August	90.64	113.08	2809.88		
September	77.01	89.83	2310.31		
October	71.97	107.44	2231.05		
November	79.49	98.44	2384.85		
December	94.51	152.98	2929.92		
<i>Average</i>	79.19		2412.11		
<i>Maximum</i>		152.98	2964.1		
<i>% of Capacity</i>	14.51	28.03			