



Blyth Drinking Water System
2021 Operation and Maintenance
Annual Report

PREPARED BY

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TO

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1.0 INTRODUCTION AND BACKGROUND

The purpose of the 2021 Annual Report is to document the operation and maintenance data for the Blyth Drinking Water System for review by the Ministry of the Environment in accordance with O. Reg. 170/03. This report covers January 1, 2021 to December 31, 2021. A copy of this report will be submitted to the owner to be uploaded to the Township's website and can be supplied, free of charge, to interested parties upon request.

2.0 DESCRIPTION OF WATER SYSTEM

The Blyth Drinking Water System (DWS # **220001496**), is characterized as a "secure ground water" system and is classified as a large municipal residential system. The system consists of three wells (1, 2 and 5) with a rated capacity of 2877 m³/day with the inclusion of Well 5 (1728 m³/d), put in operation December 21, 2016. Treatment consists of chlorination (sodium hypochlorite) and iron sequestration (sodium silicate) treatment. The Well 1 and 2 system is located at 201 Thuell St. Well #5 is located in the north east corner of 377 Gypsy Lane. The distribution system serves the community of Blyth with a population of approximately 1000 residents, 450 customer services, with 12.7 km of various size and material water main.

The system is owned by the Corporation of the Township of North Huron and operated by Veolia Water Canada, the Operating Authority.

The Wells 1 and 2 water supply system consists of two drilled wells fitted with pumps capable of pumping the volume specified in the MOE Permit to Take Water. The raw water consistently has substantial naturally occurring hardness and relatively high iron content that requires sequestering to prevent discoloration in the distribution system which is typical of all drilled wells in the area. The raw water also has fluoride concentrations that hover at or just above the maximum allowable concentration in O.Reg 169/03 which is typical of the drilled wells in the area. Chlorine, (a critical process) and an iron sequestering agent are added to the raw water prior to entry into a baffled contact tank that satisfies the chlorine contact time required with adequate chlorine residual to disinfect.

From the contact tank/reservoir the water flows to the high lift building that houses two electrically driven high lift pumps, as well as a diesel engine driven fire pump, that are capable of maintaining adequate system pressure. The water level in the reservoir is maintained by a level controller that starts and stops the well pumps. Also housed in the building is a manually operated standby emergency generator that allows operation of the equipment during extended power interruptions. The building contains cushion tanks that absorb hydraulic shocks and maintain pressure during brief power interruptions. The treated drinking water is monitored for chlorine residual and turbidity by on-line equipment connected to an auto dialer. The monitoring system will alert the on-call operator to respond if the set points are breached. The chlorine and turbidity analysis data levels are stored on a data logger.

The distribution system has no elevated storage and relies on the pumps and cushion tanks to maintain pressure. Critical processes to ensure safe water are adequate chlorination and maintenance of system pressure. The monitors activate an alarm through the auto dialer if the set points are breached.

The raw water has abnormally high chlorine demand, coupled with sequestering agent and high background sodium levels that result in elevated sodium in the treated water just above the maximum allowable concentrations in O.Reg 169/03.

Well # 5 was put into service in December 21, 2016, as a second isolated source. It is a 175 mm drilled well, 83.5 m deep. Well # 5 is equipped with a submersible vertical turbine pump, well level sensor to measure static level and provide well level monitoring. At this stage of development of the system (phase 1 of 3), Well 5 has been designed to operate on a time-of-day basis to run twice per day during peak demand times and controlled with a variable speed drive to maintain the desired pressure set point in the distribution system as well as to provide additional volume of water during periods of high water demand such as fire protection.

Although the well has not been in service long enough to have stabilized within the aquifer to determine average quality, it appears to be lower in fluoride, sodium and iron, chlorine demand with similar hardness and alkalinities.

The well house is equipped with back-up diesel generator, complete with auto transfer, sodium hypochlorite (2) and sodium silicate (2) pumps, a chlorine contact loop, on-line monitoring, alarm generation and auto-dialer.

The well house and its equipment have a daily maximum capacity to deliver 1728 m³ per day to the Blyth community.

The water from Well 5 is pumped through a main header where sodium hypochlorite and sodium silicate are added and directed to a chlorine contact loop to provide adequate chlorine concentration/contact time at maximum flow and before the first consumer.

The water quality is monitored and data-logged by a programmable logic controller with breaches of set-points going to an alarm dialer.

Disinfection is achieved on the Blyth well supply through the use of 12% sodium hypochlorite. In the well houses this chemical is added prior to the water entering the chlorine contact reservoir at a suitable dose rate to achieve both primary and secondary disinfection objectives.

The attached distribution system is constructed with a combination of ductile iron, cast iron, PVC and high density polyethylene piping with polyethylene, copper and galvanized steel services. There are no known lead services. There is no elevated storage to maintain pressure and the system pressure is maintained using pressure tanks, 3 high lift pumps (2 electric and a diesel) and 1 variable speed submersible (Well 5).

The system has approximately 45 fire hydrants that with the additional 20L/s flow from the new Well 5 will provide much improved sustained fire flows.

The chlorine dosages range varies with the chlorine demand of the raw water.

The free chlorine residual is monitored at the point of entry to the distribution system, by an on-line chlorine analyzer, with a target residual of > 1.00 mg/l and < 1.30 mg/l.

The Blyth well supply has 1 PTTW (Permit to Take Water) # 6057-A3SJAU with an expiry date of November 30, 2025, which allows 3504.960 cubic meters per day to be pumped from the combined wells.

The Blyth Drinking Water System has maximum flows as specified in the Municipal Drinking Water License (MDWL) 090-101, Issue 3 and Drinking Water Works Permit (DWWP) 090-201, Issue 4. The maximum rated capacity from the combined wells is 2877 cubic meters per day. Authorization to operate Well 5 is in a Form C addendum to the DWWP.

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The pre-chlorine entering the contact facilities and treated water (point of entry to distribution) is monitored by on-line chlorine analyzers.

Typical system pressure ranges from 40 psi at the higher elevations to 85 psi at Wells 1 and 2 which is the lowest elevation of the system.

Well 5 system pressure ranges between 53psi to 65psi under normal operating conditions

3.0 SUMMARY OF WATER QUALITY MONITORING

3.1 Water Treatment Equipment Operation and Monitoring

3.1.1 Point of Entry Chlorine Residual

Chlorine residuals are continuously measured using an online chlorine analyzer and verified for accuracy using hand-held HACH pocket colourimeters which accuracies are verified using known standards. **Table 1** shows the monthly average of free chlorine residual values on the treated water at the point of entry.

3.1.2 Distribution Chlorine Residual

Chlorine residuals in the distribution system are checked daily using a HACH pocket colourimeter. In 2021, 468 distribution chlorine residuals were recorded the results can be found in Table 1

Table 1 – Treated and Distribution Chlorine Residuals for Blyth Drinking Water System ^a

Date	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average	Min	Max	# Samples
Wells 1 &2 Average Treated - mg/L	1.08	1.11	1.15	1.07	1.20	1.14	1.17	1.09	1.11	1.15	1.19	1.02	1.12	1.02	1.20	365
Average Distribution FCR – mg/L	0.97	0.98	0.94	0.91	0.94	0.97	1.04	0.98	1.09	1.09	1.09	0.97	1.00	0.64	1.42	468
Wells 5 Average Treated - mg/L	1.26	1.20	1.14	1.17	1.05	1.20	1.18	1.23	1.40	1.37	1.31	1.23	1.23	1.05	1.40	365

^a – Results collected from January 1, 2021 – December 31, 2021

3.1.3 Turbidity

Treated Turbidity is measured daily using online turbidimeters at Wells 1&2 and weekly using a handheld at well 5. Raw water Turbidities are collected weekly from each well using handheld turbidimeters. **Table 2** provides a summary of raw and treated turbidity results. The maximum turbidity measured in the treated water at wells 1&2 was 1.22 NTU and 0.55 NTU at well 5.

Table 2 – Raw and Treated Water Turbidities for Blyth Drinking Water System ^a

Date	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average	Min	Max	# Samples
Average Well 1 Raw Water Turbidity (NTU)	0.21	0.23	0.19	0.69	0.27	0.28	0.21	0.25	0.24	0.27	0.26	0.29	0.30	0.20	0.70	48
Average Well 2 Raw Water Turbidity (NTU)	0.20	0.30	0.20	0.30	0.00	0.00	0.70	0.40	0.40	0.20	0.30	0.30	0.30	0.00	0.70	40
Average Treated (1&2) Turbidity (NTU)	0.42	0.10	0.09	0.23	0.15	0.22	0.18	0.13	0.12	0.15	0.09	0.08	0.16	0.08	0.42	365
Average Well 5 Raw Water Turbidity	0.21	0.20	0.21	0.24	0.22	0.17	0.21	0.27	0.28	0.28	0.37	0.33	0.25	0.17	0.37	52
Average Treated (5) Turbidity (NTU)	0.24	0.21	0.16	0.18	0.15	0.23	0.17	0.18	0.23	0.20	0.15	0.12	0.18	0.12	0.24	49

^a – Results collected from January 1, 2021 – December 31, 2021

3.2 Microbiological Sampling

3.2.1 Raw Water Samples

Raw water samples are taken every week from each of Well 1, 2 and well 5. In 2021, a total of 157 samples were collected and analyzed for each E. Coli and Total Coliforms. All E. Coli and Total Coliform results obtained were 0 cfu/100 ml in the raw water.

3.2.2 Treated Water (Point of Entry) Samples

One treated water sample from the point of entry is taken every week and analyzed for E. Coli, Total Coliforms and Heterotrophic Plate Count (HPC) at Wells 1, 2 and Well 5. A total of 315 treated water samples were collected and analyzed for the above parameters. Each E. Coli result from the treated water was 0 cfu/100ml. We had one total coliform result from the treated water that was 1 cfu/100 ml. This was an adverse condition on Well 1&2 POE sample and AWQI #154670 was created-samples obtained were clear of any adverse condition and AWQI was closed off. Currently, there is no limit on HPC. 103 samples were found to be safe, with no deteriorating >50. The range of HPC results were <10 - 320 cfu/100 ml.

3.2.3 Distribution System

Distribution samples are collected every week and tested for E.Coli, Total Coliform and for Heterotrophic Plate Count (HPC) in at least 25% of the samples. In 2021, a total of 371 distribution samples were collected and analyzed for the above parameters and all samples were found to be safe. The range of HPC results were <10 - >2000 cfu/100ml with 50 samples being tested.

Table 3 Summary of Microbiological results 2021

Annual Summary of samples								
Location	TC Count	TC Adverse	EC Count	EC Adverse	HPC count	HPC >50	Total # samples	Total non compliant
Raw water	157	1	157	0	N/A	N/A	314	1
Treated Water	105	1	105	0	106	0	315	1
Distribution	159	0	159	0	53	20	371	0
							1000	2

3.3 Chemical Sampling & Testing

3.3.1 Inorganics

One treated water sample is taken every 36 months and tested for inorganics. The most recent sample for the Blyth Drinking Water System was collected on May 11, 2021. All parameters were found to be within compliance. Results from 2021 can be found in **Table 6**.

Table 6 – Schedule 23 Results for Blyth Drinking Water System – ^a

Water Works Name:	Blyth Drinking Water System				
Well No. (if applicable):	Well # 1 # 2 & #5				
Year:	2021				
Serviced Population	1000				
Laboratories Which Performer	SGS Lakefield Research				
Water Works #	220001496				
	Analysis			1/2 MAC	Maximum
	Date	Well #1&2	Well # 5		Allowable Level
Parameter	(MM/DD/YY)	(ug/L)	(ug/L)	(ug/L)	(ug/L)
Schedule 23					
Antimony	May 11-21	9	9	3	6
Arsenic	May 11-21	1.3	2.9	5	10
Barium	May 11-21	140	249	500	1000
Boron	May 11-21	63	61	2500	5000
Cadmium	May 11-21	0.004	0.003	2.5	5
Chromium	May 11-21	0.14	0.4	25	50
Mercury	May 11-21	0.01	0.01	0.5	1
Selenium	May 11-21	0.04	0.04	25	50
Uranium	May 11-21	0.11	0.184	10	20

^a – Samples collected on May 11, 2021.

3.3.2 Lead

- Schedule 15.1 of Ontario Regulation 170/03 requires that samples be taken during two seasons: once between December 15 and April 15 and once between June 15 and October 15. The Maximum Allowable Concentration for Lead is 10 ug/L. In 2021 Samples were collected on March 23, 2021. The Second set of samples were collected on October 4, 2021 and were below the MAC. 2021 results can be found in **Table 7**.

Table 7 – Lead Sampling Program Distribution Results for Blyth Drinking Water System ^a

Lead Blyth Water 2021					
Date	Location	Alk mg/L	Lead ug/L	Field pH	Lead MAC 10 ug
Mar 23-21	DW Blowoff Dinsley St W end		0.17		
	DW Blowoff Dinsley St W end	200		6.98	
	Sample Station Dinsley st.		0.16		
	Sample Station Dinsley st.	203		6.96	
Oct 4-21	Yard Hydrant Drummond & Coombs		0.1		
	Yard Hydrant Drummond & Coombs	230		7.98	
	Yard Hydrant Gypsy & Dinsley		0.11		
	Yard Hydrant Gypsy & Dinsley	221		7.92	
	Min	200	0.1	6.96	
	Max	230	0.17	7.98	
	Average	213.5	0.1	7.46	

^a – Samples collected on March 23,2021 and Oct 4, 2021 respectively.

3.3.3 Organics

One treated water sample is taken every 36 months and tested for organics. The sample for the Blyth Drinking Water System was collected on May 11, 2021 for analysis of organics as listed in Schedule 24. All parameters were found to be within compliance. 2021 sample results can be found in **Table 8**.

Table 8 – Schedule 24 Results for Blyth Drinking Water System ^a

Water Works Name:					Blyth Drinking Water System
Well No. (if applicable):					Well # 1, # 2 & #5
Year:					2021
Serviced Population					1000
Laboratories Which Performer Analyses:					SGS Lakefield Research
Water Works #					220001496
	Analysis				Maximum
	Date	Well #1&2	Well # 5		Allowable Level
Parameter	(MM/DD/YY)	(ug/L)	(ug/L)		(ug/L)
Schedule 23 & 24					
Benzene	May 11-21	0.32	0.32	<MDL	1
Carbon Tetrachloride	May 11-21	0.17	0.17	<MDL	2
1,2-Dichlorobenzene	May 11-21	0.41	0.41	<MDL	200
1,4-Dichlorobenzene	May 11-21	0.36	0.36	<MDL	5
1,1-Dichloroethylene	May 11-21	0.33	0.33	<MDL	14
1,2-Dichloroethane	May 11-21	0.35	0.35	<MDL	5
Dichloromethane	May 11-21	0.35	0.35	<MDL	50
Monochlorobenzene	May 11-21	0.3	0.3	<MDL	80
Tetrachloroethylene	May 11-21	0.35	0.35	<MDL	10
Trichloroethylene	May 11-21	0.44	0.44	<MDL	5
Vinyl Chloride	May 11-21	0.17	0.17	<MDL	1
Diquat	May 11-21	1	1	<MDL	70
Paraquat	May 11-21	1	1	<MDL	10
Glyphosate	May 11-21	1	1	<MDL	280
Polychlorinated Biphenyls	May 11-21	0.04	0.04	<MDL	3
Benzo(a)pyrene	May 11-21	0.004	0.004	<MDL	0.01
Alachlor	May 11-21	0.02	0.02	<MDL	5
Atrazine+N-dealkylated metab	May 11-21	0.01	0.01	<MDL	5
Atrazine	May 11-21	0.01	0.01	<MDL	
De-ethylated atrazine	May 11-21	0.01	0.01	<MDL	
Azinphos-methyl	May 11-21	0.05	0.05	<MDL	20

					Maximum
		Well #1&2	Well # 5		Allowable Level
Parameter		(ug/L)	(ug/L)		(ug/L)
Carbaryl	May 11-21	0.05	0.05	<MDL	90
Carbofuran	May 11-21	0.01	0.01	<MDL	90
Chlorpyrifos	May 11-21	0.02	0.02	<MDL	90
Diazinon	May 11-21	0.02	0.02	<MDL	20
Dimethoate	May 11-21	0.06	0.06	<MDL	20
Diuron	May 11-21	0.03	0.03	<MDL	150
Malathion	May 11-21	0.02	0.02	<MDL	190
Metolachlor	May 11-21	0.01	0.01	<MDL	50
Metribuzin	May 11-21	0.02	0.02	<MDL	80
Phorate	May 11-21	0.01	0.01	<MDL	2
Prometryne	May 11-21	0.03	0.03	<MDL	1
Simazine	May 11-21	0.01	0.01	<MDL	10
Terbufos	May 11-21	0.01	0.01	<MDL	1
Triallate	May 11-21	0.01	0.01	<MDL	230
Trifluralin	May 11-21	0.02	0.02	<MDL	45
2,4-dichlorophenoxyacetic acid	May 11-21	0.19	0.19	<MDL	100
Bromoxynil	May 11-21	0.33	0.33	<MDL	5
Dicamba	May 11-21	0.2	0.2	<MDL	120
Diclofop-methyl	May 11-21	0.4	0.4	<MDL	9
MCPA	May 11-21	0.00012	0.00012	<MDL	0.1
Picloram	May 11-21	1	1	<MDL	190
2,4-dichlorophenol	May 11-21	0.15	0.15	<MDL	900
2,4,6-trichlorophenol	May 11-21	0.25	0.25	<MDL	5
2,3,4,6-tetrachlorophenol	May 11-21	0.2	0.2	<MDL	100
Pentachlorophenol	May 11-21	0.15	0.15	<MDL	60

^a – Samples collected on May 11, 2021.

3.3.4 Trihalomethanes

One distribution sample is taken every three months from a point in the distribution system and tested for Trihalomethanes (THMs). In 2021, samples were collected during the months of January, April, July and October. The Ontario Drinking Water Quality Standard (ODWQS) has set a Maximum Allowable Concentration (MAC) of 100 µg/L for this parameter and it is expressed as a running annual average. In 2021, the average THM was found to be 13.8 µg/L, which is within compliance. Refer to **Table 9** for the summary of trihalomethane results.

3.3.5 Nitrate & Nitrite

One treated water sample is taken every three months and tested for nitrate and nitrite. In 2021, samples were collected during the months of January, April, July and October. The Ontario Drinking Water Quality Standard (ODWQS) has set a Maximum Allowable Concentration (MAC) of 1 mg/L for nitrites and 10 mg/L for nitrates. The results were found to be within compliance. Refer to **Table 9**.

Table 9 – Nitrate, Nitrite and THM Results at Blyth Drinking Water System ^a

Treated Drinking Water - Nitrites and Nitrates				POE Well 1& 2					O.Reg 169	
Date	Jan 19-21	Apr 13-21	July 6-21	Oct 5-21	Min	Max	Avg	MAC	1/2 MAC	
NO2	< 0.003	< 0.003	< 0.003	< 0.003	0.003	0.003	0.003	1	0.5	
NO3	< 0.006	< 0.025	< 0.008	< 0.01	0.006	0.025	0.012	10	5	
NO2+NO3	< 0.006	< 0.025	< 0.008	< 0.01	0.006	0.025	0.012	10	5	

Treated Drinking Water - Nitrites and Nitrates				POE Well 5					O.Reg 169	
Date	Jan 19-21	Apr 13-21	July 6-21	Oct 5-21	Min	Max	Avg	MAC	1/2 MAC	
NO2	< 0.003	< 0.003	< 0.003	< 0.003	0.003	0.003	0.003	1	0.5	
NO3	< 0.01	< 0.011	< 0.01	< 0.008	0.008	0.010	0.010	10	5	
NO2+NO3	< 0.01	< 0.011	< 0.01	< 0.008	0.008	0.010	0.010	10	5	

Distribution Drinking Water - Trihalomethanes									
Date	Jan 19-21	Apr 13-21	July 6-21	Oct 5-21	Min	Max	Average	MA C	1.2 MAC
THMs (total)	15	12	15	13	12.0	15.0	13.8	100	50
Bromodichloromethane	2.6	2.2	2.7	1.8	1.8	2.7	2.3		
Bromoform	0.34	0.34	0.34	0.34	0.340	0.340	0.340		
Chloroform	12	9.6	12.0	11.0	9.6	12.0	11.2		
Dibromochloromethane	0.67	0.60	0.71	0.37	0.37	0.71	0.59		

^a – Results collected from Jan 19, 2021, Apr 13, 2021, Jul 6, 2021 and Oct 5, 2021

3.3.6 Sodium

One water sample is collected annually for raw water at Wells 1, 2 and 5 and tested for Sodium due to naturally elevated levels. O. Reg 170/03 has set a Maximum Acceptable concentration (MAC) of 20 mg/L on the Treated Water for Sodium which requires the Medical Office of Health be notified if the concentration exceeds the MAC. The Raw water samples were collected on August 10, 2021 at Wells 1, 2 and 5 (Raw Water), found to be 15.8 mg/L at Well 1, 18.6 at Well 2 and 20.8 at well 5. Treated water samples were collected on January 8, 2018 Well 1&2 POE 23.1mg/L, well 5 POE 22.2mg/L both exceeding the MAC, AWQI #138510 was issued and resamples were collected on January 9, 2018. The resample results were; Well 1&2 POE 22.3mg/L, Well 5 22.5mg/L both still exceeding the 20mg/L MAC. The Huron County Health Unit provided the Township of North Huron with a Notification to be distributed to all water system users.

3.3.7 Fluoride

One water sample is collected annually and tested for Fluoride from the raw water due to naturally elevated levels. The Ontario Drinking Water Quality Standards (ODWQS) have set a MAC of 1.5 mg/L on Treated Water. On August 10, 2021, Raw water samples were collected for this analysis. The samples were found to have a concentration of 1.29 mg/L at Well 1, 1.81 mg/L at Well 2 and 1.47 mg/L at well 5. At well 2 the Fluoride analysis was greater than the treated water MAC 1.5 mg/L. Treated Water samples were collected on January 8, 2018 Samples results were as follows: Well 1&2 POE 1.77mg/L, Well 5 1.46mg/L Well 1&2 POE results were in exceedance of the 1.5mg/ L MAC. AWQI # 1358514 was issued and resamples collected for Well 1&2, the resample result was 1.81mg/L still in exceedance of the 1.5mg/L MAC. The Huron County Health Unit provided the Township of North Huron a Notice to be Distributed to all Water system users.

Raw Water Sodium/Fluoride mg/L			
Date	Location	Fluoride	Sodium
Aug 10-21	Well1	1.29	15.8
Aug 10-21	well2	1.81	18.6
Aug 10-21	well5	1.47	20.8
Treated MAC		1.5	20
	Min	1.29	15.8
	Max	1.81	20.8
	Average	1.5	18.4

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Treated Water POE Sodium/Fluoride mg/L			
Date	Location	Fluoride	Sodium
Jan 8-18	Well 1&2	1.77	23.1
	Well 5	1.46	22.2
Jan 11-18	Well 1&2	1.81	22.3
	Well 5		22.5
Resamples showed still above Mac- HCHU issued notice to be distributed to all rate payers notifying them of the high sodium and Fluoride results			
	MAC	1.5	20
	Min	1.46	22.2
	Max	1.81	23.1
	Average	1.68	22.53

3.3.8 Strontium and Calcium

Veolia was required by HPPC to complete a one year sampling program due to elevated levels of strontium. Although there is no MAC within the Ontario Drinking Water Standards, exceedances of this parameter were identified under the Canadian Drinking Water Quality Guidelines -7mg/L. Samples were collected quarterly. The results can be found in **Table 10**. At the end of the program HPPC handed out a notice to the residence of Blyth.

Table 10 – “Strontium and Calcium Results at Blyth Drinking Water System ^a

Strontium and Calcium sample results			
Date	Location	Strontium ug/L	Calcium
Apr 27-21	Well 1 RW	47200	143
	Well 2 RW	54100	152
	Well 5 RW	41000	131
	Well 1&2 POE	48800	45.6
	298 Hamilton	42200	46.1
Jul 6-21	Well 1 RW	43100	
	Well 2 RW	52400	
	Well 5 RW	38600	
Oct 5-21	Well 1 RW	40900	205
	Well 2 RW	55800	232
	Well 5 RW	40900	204
	Well 1&2 POE	46800	46.2
	298 Hamilton St	41600	43
	Well 5 POE	36900	45.4
Amount		14	11
Min		36900	43
Max		55800	232
Average		45021.4	117.6

4.0 WATER AND CHEMICAL USAGE

4.1 Chemical Usage

Refer to **Table 11**. From January 1, 2021 to December 31, 2021, 878.4kg of chlorine (in 12% sodium hypochlorite) was used to ensure proper disinfection in the distribution system with an average dosage of 5.00 mg/L.

Refer to **Table 11** – due to elevated iron content, sodium silicate is used to maintain the iron in a non-oxidized state to prevent excessive discoloration. The average dose rate as active silicate was 4.1mg/L.

Table 11– Chemical Usage at Blyth Drinking Water System ^a

Township of North Huron - Blyth Well Supply - 2021 Chemical Usage Summary														
Well 1					Well 2					Well 5				
Month	Chl'n used (Kg)	Cl Dose	Si (L)	Si Dose	Month	Chl'n used (Kg)	Cl Dose	Si (L)	Si Dose	Month	Chl'n used (Kg)	Cl Dose	Si (L)	Si Dose
January	20.2	5.57	33.62	3.6	January	20.0	5.59	37.63	4.1	January	18.0	4.65	16.30	3.48
February	17.3	5.71	28.91	3.7	February	18.9	5.63	33.26	3.9	February	16.5	4.63	18.1.7	4.23
March	14.7	5.75	22.55	3.4	March	26.8	5.75	50.44	4.2	March	21.4	4.66	23.8	3.8
April	14.4	1.03	6.36	0.6	April	33.8	5.22	63.62	3.8	April	30.6	7.12	24.5	4.37
May	45.2	5.76	71.75	3.6	May	0.0	0.00	0.00	0.0	May	24.6	4.75	50.0	7.62
June	48.3	5.95	85.08	4.0	June	24.9	0.00	0.00	0.0	June	30.8	4.59	38.60	4.00
July	49.9	5.95	91.64	4.2	July	24.9	0.00	0.00	0.0	July	20.2	5.26	36.36	3.9
August	28.4	5.83	55.15	4.3	August	25.2	6.39	35.84	3.6	August	23.8	4.66	23.9	3.76
September	28.5	6.20	48.79	4.1	September	16.1	5.19	33.60	3.8	September	17.7	5.52	33.67	4.0
October	24.6	6.20	41.41	4.1	October	22.0	6.36	33.82	3.8	October	25.3	5.56	21.5	3.67
November	23.5	5.90	42.64	4.1	November	21.6	6.11	32.48	3.6	November	23.0	4.87	22.6	3.88
December	20.2	5.06	45.72	5.1	December	22.8	5.88	165.54	3.5	December	29.6	7.50	225.21	23.9
Total	325.3	64.92	573.59	44.7	Total	256.8	52.11	486.22	34.4	Total	296.3	63.05	755.42	67.0
Min	4.4	1.03	6.36	0.6	Min	0.0	0.00	0.00	0.0	Min	16.5	4.59	33.43	3.5
Max	49.9	6.20	91.64	5.1	Max	33.8	6.39	165.54	4.2	Max	30.8	7.50	225.21	23.9
Avg	27.1	5.41	47.80	3.7	Avg	21.4	4.34	40.52	2.9	Avg	24.7	5.25	62.95	5.6

^a – Results collected from January 1, 2021 – December 31, 2021

4.2 Annual Flows

Permit to Take Water 6057-A3SJAU Compliance Report					
3.2 -Maximum Amount of Taking Permitted					
	Max/Day on Permit	Peak Flow	%of Limit		
Well #1 (in m3)	653 m3	445	68.1	%	
Well #2 (in m3)	1123 m3	313	27.9	%	
Well #5 (in M3)	1728 m3	473	27.4	%	
3.2 - Average Annual Amount of Taking Permitted					
	m3/year	m3/year			
Well #1 (in m3)	238345	55796	23.4	%	
Well #2 (in m3)	409968	35312	8.6	%	
Well #5 (in M3)	630720	57599	9.132261542	%	
Capacity Report					
Total Peak Flow					
	Maximum	Actual	%of Cap		
Capacity (m3/d)	3504	852	24.3	%	
Average Daily flow (m3/Day)	3504	407.4164384	11.62718146	%	

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A summary of the water supplied to the distribution system in 2021 is provided in **Table 12**. This Table provides a breakdown of the monthly flow provided to the distribution system. Flow meters were calibrated in 2021 by Indus Control and were found to be acceptable.

Table 12 – Treated Water Flows for Blyth Drinking Water System

Month	Total Flow m3	Max Daily Flow
January	10985	473
February	9833	470
March	11782	525
April	11043	533
May	12991	765
June	15097	733
July	13572	606
August	13717	595
September	12670	642
October	12717	852
November	12165	563
December	12135	521
Total	148707	7278
Min	9833	470
Max	15097	852
Avg	12392	607

5.0 IMPROVEMENTS TO SYSTEM AND ROUTINE AND PREVENTATIVE MAINTENANCE

The following summarizes water system improvements and routine and preventative maintenance for the Blyth Drinking Water System:

- Hydrant flushing was completed
- There was 1 water main break repaired in the Blyth Distribution
- Generators at wells 1&2 and well 5 serviced and repairs were done as needed
- New well pump installed at well 1

6.0 MINISTRY OF THE ENVIRONMENT INSPECTIONS AND REGULATORY ISSUES

The most recent Ministry of Environment inspection was completed by Matt Shannon on October 7, 2021. The Report was issued on December 14, 2021

There were no non-compliances noted and the final inspection rating was 100%.

Other Findings from the Inspection

The following items are noted as being relevant to the Drinking Water System:
The previous inspection highlighted historical high strontium sampe results at Well #1 and #2. During this inspection it was noted that the Operating Authority had made the Huron Perth Public Health Unit (HPPH) aware of this issue and these results. After discussions with HPPH regarding this parameter, an information letter along with accompanying fact sheet that will be sent to Blyth residents in December.

7.0 Haloacetic Acids

It should be noted that there will be some upcoming changes to Ontario Regulation 170/03 and Ontario Regulation 169/03 that strengthen standards and clarify testing requirements as follows:

January 1, 2020: New standards for HAA5s and HAA5s testing optimization rules for smaller systems will come into effect / require reporting.

In 2021 Samples for HAA5's were collected at the beginning of every quarter, Maximum acceptable concentration for HAA5's is 80 ug/L all samples were compliant to the limit in 2021

- 2021 HAA5 Sample results can be found in Table 13.

Table 13- Haloacetic Acids

HAA5 ug/L								
Date	Location	Total HAA5	Chloroacetic Acid	Bromoacetic Acid	Dichloroacetic Acid	Dibromoacetic Acid	Trichloroacetic Acid	Average
Jan 19-21	166 Dinsley St.	5.3	4.7	2.9	2.6	2	5.3	3.8
	182 Thuell St	5.3	4.7	2.9	3.5	2	5.3	1.2
Apr 12-21	182 Thuell St.	5.3	4.7	2.9	3.5	2	5.3	4.0
	166 Dinsley St.	5.3	4.7	2.9	2.6	2	5.3	3.8
Jul 6-21	166 Dinsley St.	5.3	4.7	2.9	2.6	2	5.3	3.8
	182 Thuell St.	5.3	4.7	2.9	3.0	2	5.3	3.9
Oct 6-21	166 Dinsley St.	5.3	4.7	2.9	2.6	2	5.3	3.8
	182 Thuell St.	5.3	4.7	2.9	3	2	5.3	3.9
	MIN	5.3	4.7	2.9	2.6	2	5.3	1.2
	MAX	5.3	4.7	2.9	3.5	2	5.3	4.0
	AVERAGE	5.30	4.7	2.9	2.93	2	5.30	3.50

7.1.0 EMERGENT ISSUES SUMMARY

Arsenic MAC has been lowered from 25ug/L to 10ug/L review of the sample results between 2015 and 2016 indicates that Arsenic is not likely to be in exceedance of the amended ½ MAC requirements at Wells 1&2, however, concentrations are elevated at Well 5 to near the ½ MAC of 5 ug/L

Historic values of the other parameters (Benzene, Carbon Tetrachloride, and Vinyl Chloride), are all below the amended standards prescribed.

Please Refer to **Table 6** and **Table 8** for 2021 Results which were within the acceptable limits

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Report Completed by: Veolia Water

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