

Cedars of Tuam Water Service

2021 Annual Report

CRD | Drinking Water

INTRODUCTION

This report provides a summary of the Cedars of Tuam Water Service for 2021. It includes a description of the service, summary of the water supply, demand and production, drinking water quality, operations highlights, capital project updates and financial report.

SERVICE DESCRIPTION

The Cedars of Tuam Water Utility is a rural residential community located on Salt Spring Island. The service was created in 1970 and became a CRD service in 2002. The Cedars of Tuam Water Utility (Figure 1) is comprised of 16 parcels of land and 17 connections to the system.



Figure 1: Cedars of Tuam Water Service

The Cedars of Tuam water system is primarily comprised of:

- One ground water source well
- a water treatment plant (WTP) that has a vortex sand separator and provides disinfection using sodium hypochlorite;
- 1 water reservoir – 46 m³ (10,000 lg);

- 650 meters of water distribution pipe;
- standpipes and gate valves;
- water service connections complete with water meters.

WATER PRODUCTION AND DEMAND

Referring to Figure 2, unfortunately the amount of water extracted (water production) from the ground water in 2021 is unknown. This is the result of inaccurate water meter readings due to sand intrusion of the ground water source. Sand builds up in the meter creating a false under reading. Water demand (customer water billing) for the service totaled 1,389 m³ of water; a 6% decrease from the previous year and a 4% increase from the 5 year rolling average.

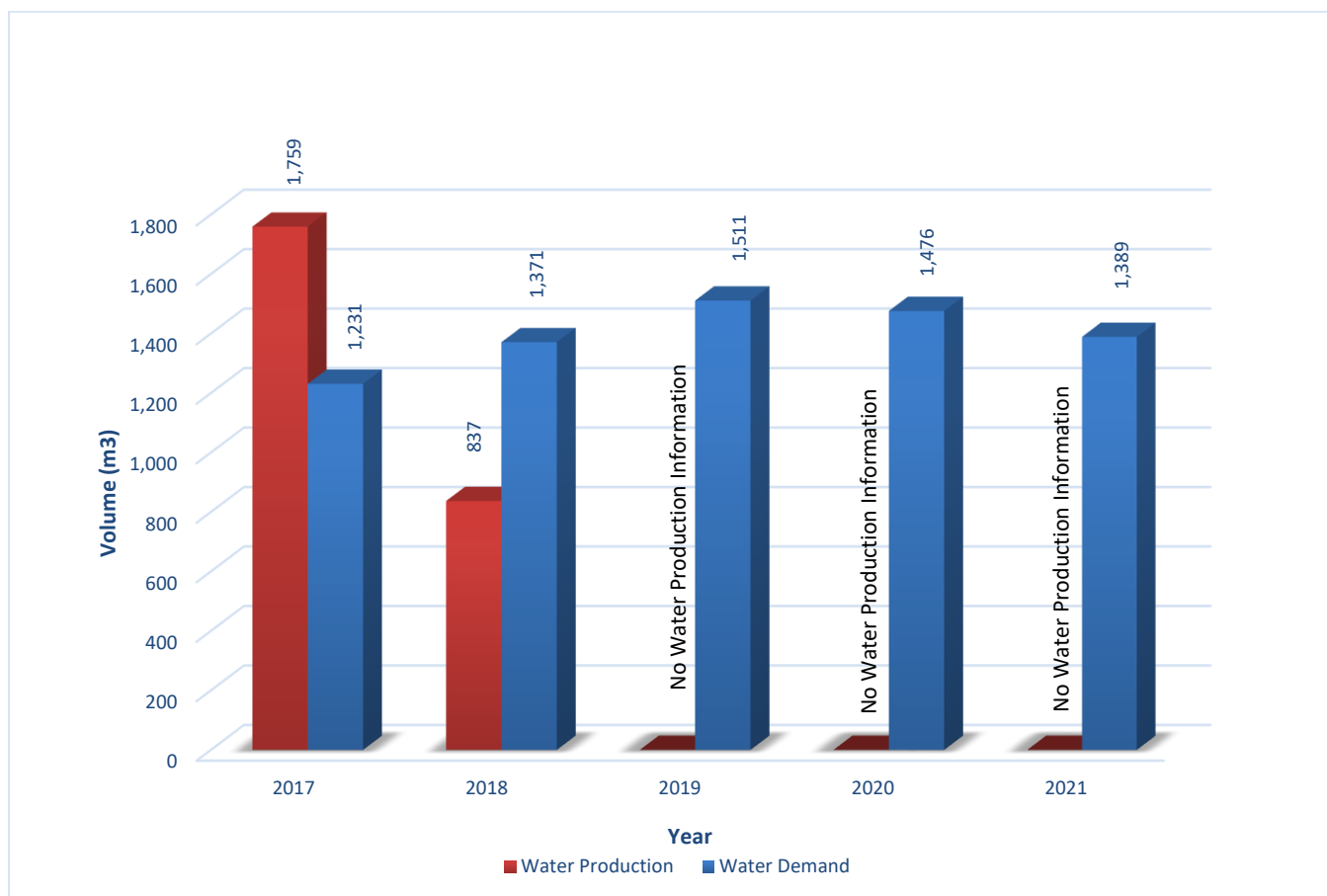


Figure 2: Cedars of Tuam Water Service Annual Water Production and Demand

The Cedars of Tuam Water System is fully metered, and water meters are read quarterly. Water meter information enables water production and consumption to be compared in order to estimate leakage losses in the distribution system. The difference between water produced and water demand (total metered consumption) is called non-revenue water and includes distribution leaks, meter error, and unmetered uses such as standpipe usage, distribution system maintenance and process water for the treatment plant. For 2021, the non-revenue water cannot be calculated due to the erroneous raw water meter production information. This inaccurate water production information will need to be resolved by either replacing the water meter with a different technology that is not influenced by sand or grit in the raw water source or investigating and eliminating the sand intrusion into the well. Capital improvements were planned to be completed in 2021 but are deferred to 2022.

WATER QUALITY

The analytical results (biological, chemical and physical parameters) of water samples collected in 2021 from the Cedars of Tuam Water System indicated that the drinking water was safe to drink and mostly within Guidelines for Canadian Drinking Water Quality (GCDWQ) limits, including disinfection by-products. Only the turbidity in the raw and treated water periodically exceeded 1 NTU throughout the year. The raw water turbidity levels were consistently low and well below 1 Nephelometric Turbidity Units (NTU) until the fall. Indicator bacteria were non-detect until late summer and fall when total coliform were frequently found in the raw water, albeit in low concentrations. The coinciding of increased turbidity levels, appearance of total coliform bacteria and the start of the wet season may be an indication of surface water influence on the groundwater utilized by the well. The well will need to be thoroughly inspected and potentially rehabilitated or replaced with a new well. This would address the current risk of well failure leaving the utility without its only water source.

Typical Cedars of Tuam Water System drinking water quality characteristics for 2021 are summarized as follows:

- Source water from the well was free of *E.coli* bacteria throughout the year but recorded total coliform bacteria in concentrations of up to 12 CFU/100mL between late August and November.
- The raw water turbidity was consistently below 1 NTU throughout the year up until the fall. On October 12 and November 9, raw water samples recorded a turbidity of 3.8 NTU and 4.2 NTU respectively. On December 7, the raw water turbidity had dropped to 0.3 NTU again.
- Manganese concentrations were low throughout the year as usual but iron concentrations increased in the late summer. On November 9, the iron concentrations exceeded the aesthetic objective of 300 µg/L (test result: 679 µg/L). This increase in iron concentration in the late summer / fall has been observed in previous years and seems to coincide with aquifer recharge after the first post-summer rains.
- Treated water was bacteriologically safe to drink all year in 2021, no indicator bacteria were found in any sample.
- The treated water turbidity leaving the treatment plant was generally below 1 NTU during the year. On October 12, the turbidity of the water leaving the treatment plant was recorded with 1.5 NTU. The treated water turbidity in the distribution system was frequently over 1 NTU due to accumulation effects. The highest turbidity in the system was recorded on March 9 at the Roland Road standpipe (south) with 7.4 NTU.
- Disinfection by-product concentrations were well below the GCDWQ limits. Total organic carbon concentrations were very low throughout 2021.
- The median annual free chlorine concentration in the system was an acceptable 0.33 mg/L.

Table 1 and 2 below provide a summary of the 2021 raw and treated water test results.

Water Quality data collected from this drinking water system can be reviewed on the CRD website: <https://www.crd.bc.ca/about/data/drinking-water-quality-reports/>

OPERATIONAL HIGHLIGHTS

The following is a summary of the major operational issues that were addressed by during the 2021 reporting period:

- Emergency trucked in water supply due to low aquifer water resources.

CAPITAL IMPROVEMENTS

Safe Work Procedures (CE.699.4502): The work scope includes reviewing and developing safe work procedures for operational and maintenance tasks.

Project	Spending
Budget	\$3,000
Contract	(\$558)
Supplies/Materials	(\$102)
Balance Remaining	\$2,340

Water Systems Upgrade (CE.792.1601): The work scope includes replacing a chlorinator, level transducer and flow meter.

Project	Spending
Budget	\$36,000
Project Management	(\$123)
Installation	(\$2,198)
Balance Remaining	\$33,679

Public Engagement for Future Projects (CE.802.8301): Inform and engage public within service area on upcoming projects that will require borrowing for funding.

Project	Spending
Budget	\$5,000
Project Management	(\$0)
Balance Remaining	\$5,000

2021 FINANCIAL REPORT

Please refer to the attached 2021 Statement of Operations and Reserve Balances.

Revenue includes fixed user fees (User Charges), water sales (Sale-Water), interest on savings (Interest earnings), a transfer from the Operating Reserve Fund, and miscellaneous revenue such as late payment charges (Other revenue).

Expenses includes all costs of providing the service. General Government Services includes budget preparation, financial management, utility billing and risk management services. CRD Labour and Operating Costs includes CRD staff time as well as the costs of equipment, tools and vehicles. Other Expenses includes all other costs to administer and operate the water system, including insurance, supplies, water testing and electricity.

The difference between Revenue and Expenses is reported as Net revenue (expenses). Any transfers to or from capital or reserve funds for the service (Transfers to Own Funds) are deducted from this amount and it is then added to any surplus or deficit carry forward from the prior year, yielding an Accumulated Surplus (or deficit) that is carried forward to the following year.

WATER SYSTEM PROBLEMS - WHO TO CALL:

To report any event or to leave a message regarding the Cedars of Tuam Water System, call either:

CRD water system emergency call centre:

1-855-822-4426 (toll free)

1-250-474-9630 (toll)

CRD water system general enquiries (toll free):

1-800-663-4425

When phoning with respect to an emergency, please specify to the operator, the service area in which the emergency has occurred.

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Concurrence	Robert Lapham, MCIP, RPP, Chief Administrative Officer

Attachment: [2021 Statement of Operations and Reserve Balances](#)

For questions related to this Annual Report please email saltspring@crd.bc.ca

Table 1: 2021 Summary of Raw Water Test Results, Cedars of Tuam Water System

PARAMETER		2021 ANALYTICAL RESULTS				CANADIAN GUIDELINES	2011 - 2020 RESULTS		
Parameter Name	Units of Measure	Annual Median	Samples Analyzed	Range Minimum Maximum		≤ = Less than or equal to	Median	Samples Analyzed	Range Minimum-Maximum
ND means Not Detected by analytical method used									
Physical Parameters/Biological									
Hardness as CaCO ₃	mg/L	62.15	4	59.4	69.6	No Guideline Required	62.5	20	43.8 - 89.8
Turbidity	NTU	0.3	13	ND	4.2		0.43	40	0.17 - 28.0
pH	pH Units	6.9	8	6.5	7.4	7.0-10.5 AO	6.63	15	6.30 - 7.06
Carbon, Total Organic	mg/L	0.65	2	0.53	0.77		0.87	10	0.50 - 1.09
Water Temperature	Degrees C	11	11	0.0	12.6	≤ 15 AO	11.0	23	9.0 - 16.0
Microbial Parameters									
Indicator Bacteria									
Coliform, Total	CFU/100 mL	ND	15	ND	12		ND	133	ND - 600
<i>E. coli</i>	CFU/100 mL	ND	15	ND	ND		ND	132	ND
Hetero. Plate Count, 7 day	CFU/1 mL	Not tested in 2021					200	41	3630
Parasites									
						No MAC Established			
<i>Cryptosporidium</i> , Total oocysts	oocysts/100 L	Last tested in 2014				Zero detection desirable	0	5	ND
<i>Giardia</i> , Total cysts	cysts/100 L	Last tested in 2014				Zero detection desirable	0	5	ND
Metals									
Aluminum	ug/L as Al	6.6	4	4.3	14	2900 MAC / 100 OG	10.4	21	ND - 142
Antimony	ug/L as Sb	ND	4	ND	ND	6 MAC	ND	21	ND - 1.02
Arsenic	ug/L as As	ND	4	ND	0.13	10 MAC	ND	21	ND
Barium	ug/L as Ba	4.75	4	4.30	5.4	1000 MAC	5.7	21	4.2 - 11.8
Beryllium	ug/L as Be	ND	4	ND	ND		ND	21	ND
Bismuth	ug/L as Bi	ND	4	ND	ND		ND	15	ND
Boron	ug/L as B	88.5	4	ND	189	5000 MAC	57	21	ND - 435
Cadmium	ug/L as Cd	ND	4	ND	ND	5 MAC	ND	21	ND
Calcium	mg/L as Ca	19.35	4	17.4	20.8	No Guideline Required	19.3	21	13.0 - 29.9
Chromium	ug/L as Cr	ND	4	ND	1.2	50 MAC	ND	21	ND
Cobalt	ug/L as Co	ND	4	ND	ND		ND	21	ND
Copper	ug/L as Cu	3.96	4	2.5	4.95	2000 MAC / ≤ 1000 AO	ND	21	2.31 - 45
Iron	ug/L as Fe	39.15	4	17	679	≤ 300 AO	44.1	22	ND - 374
Lead	ug/L as Pb	ND	4	ND	0.22	5 MAC	ND	21	ND - 1.90
Lithium	ug/L as Li	ND	1	ND	ND		ND	5	ND
Magnesium	mg/L as Mg	3.64	4	3.31	4.28	No Guideline Required	3.66	21	2.75 - 5.07
Manganese	ug/L as Mn	1.50	4	ND	10.9	120 MAC / ≤ 20 AO	2.70	21	ND - 6.6
Molybdenum	ug/L as Mo	ND	4	ND	ND		ND	21	ND
Nickel	ug/L as Ni	ND	4	ND	4.3		ND	21	ND
Potassium	mg/L as K	0.83	4	0.63	0.93		0.83	21	0.04 - 1.99
Selenium	ug/L as Se	ND	4	ND	ND	50 MAC	ND	21	ND
Silicon	ug/L as Si	6865	4	6440	7530		6900	21	2210 - 10500
Silver	ug/L as Ag	ND	4	ND	ND	No Guideline Required	ND	21	ND
Sodium	mg/L as Na	17.45	4	15.3	19.2	≤ 200 AO	16.9	21	12.9 - 22.8
Strontium	ug/L as Sr	78.85	4	72.2	83.1	7000 MAC	76	21	51 - 98.4
Sulfur	mg/L as S	ND	4	ND	ND		ND	15	ND
Tin	ug/L as Sn	ND	4	ND	ND		ND	21	ND
Titanium	ug/L as Ti	ND	4	ND	ND		ND	21	ND
Thallium	ug/L as Tl	ND	4	ND	ND		ND	15	ND
Uranium	ug/L as U	ND	4	ND	ND	20 MAC	ND	15	ND
Vanadium	ug/L as V	ND	4	ND	ND		ND	21	ND
Zinc	ug/L as Zn	6.1	4	ND	7.3	≤ 5000 AO	11	21	4 - 177
Zirconium	ug/L as Zr	ND	4	ND	ND		ND	11	ND

Table 2: 2021 Summary of Treated Water Test Results, Cedars of Tuam Water System

PARAMETER						2021 ANALYTICAL RESULTS		CANADIAN GUIDELINES		2011-2020 RESULTS	
Parameter Name	Units of Measure	Annual Median	Samples Analyzed	Range Minimum Maximum		≤ = Less than or equal to	Median	Samples Analyzed	Range Min.-Max.		
ND means Not Detected by analytical method used											
Physical Parameters											
Hardness	mg/L as CaCO3	74.45	4	72.5	75.8		75.6	11	49.7 - 91.8		
pH	pH units	7	30	6.6	7.9	AO pH 7.0 - 10.5	6.91	20	6.5 - 7.3		
Turbidity	NTU	0.35	53	ND	7.4		0.88	116	0.27 - 12		
Total Organic Carbon	mg/L	0.6	2	ND	0.7		0.72	15	ND - 3.3		
Water Temperature	deg C	10.7	40	5.3	16.6	≤ 15 AO	11	118	0.0 - 17.0		
Microbial Parameters											
Indicator Bacteria											
Coliform, Total	CFU/100 mL	ND	57	ND	ND	0 MAC	ND	275	ND - 6		
<i>E. coli</i>	CFU/100 mL	ND	57	ND	ND	0 MAC	ND	276	ND		
Hetero. Plate Count, 7 day	CFU/1 mL	40	1	40	40	No Guideline Required	70	2	10 - 130		
Disinfectants											
Disinfectants											
Chlorine, Free Residual	mg/L as Cl2	0.33	110	0	0.87		0.42	1263	0.1 - 2.4		
Chlorine, Total Residual	mg/L as Cl2	0.51	13	0.38	0.88		0.49	1249	0 - 2.5		
Disinfection By-Products											
Disinfection Byproducts											
Bromodichloromethane	ug/L	8.9	2	5.8	12.0		6.2	15	0.61 - 11		
Bromoform	ug/L	1.45	2	1.4	1.5		ND	15	ND - 2		
Chloroform	ug/L	11.2	2	4.4	18		7.01	15	3.8 - 13.0		
Chlorodibromomethane	ug/L	7.3	2	6.2	8.4		5.15	15	ND - 27.8		
Total Trihalomethanes	ug/L	28.5	2	18	39	100 MAC	22	15	8.73 - 49.9		
Haloacetic Acids (HAA)											
HAA5	ug/L	5.45	2	ND	5.9	80 MAC	3.61	1	3.61 - 3.61		
Metals											
Aluminum	ug/L as Al	5.6	4	4.7	30.4	2900 MAC / 100 OG	8.6	11	3.5 - 276.0		
Antimony	ug/L as Sb	ND	4	ND	ND	6 MAC	ND	11	ND		
Arsenic	ug/L as As	0.125	4	ND	0.24	10 MAC	ND	11	ND - 0.62		
Barium	ug/L as Ba	10.9	4	9.10	11.50	1000 MAC	10.2	11	5.4 - 15.8		
Beryllium	ug/L as Be	ND	4	ND	ND		ND	11	ND		
Bismuth	ug/L as Bi	ND	4	ND	ND		ND	10	ND		
Boron	ug/L as B	91.5	4	ND	162	5000 MAC	71	11	ND - 112		
Cadmium	ug/L as Cd	ND	4	ND	ND	5 MAC	ND	11	ND		
Calcium	mg/L as Ca	25.75	4	22.8	27.4	No Guideline Required	27.3	11	14.4 - 35		
Chromium	ug/L as Cr	1.1	4	ND	2.7	50 MAC	1.1	11	ND		
Cobalt	ug/L as Co	ND	4	ND	ND		ND	11	ND		
Copper	ug/L as Cu	7.41	4	2.54	12.8	2000 MAC / ≤ 1000 AO	7.08	11	1.53 - 25.1		
Iron	ug/L as Fe	81.9	4	27.2	172	≤ 300 AO	62.7	11	21.1 - 2440		
Lead	ug/L as Pb	0.46	4	ND	3.09	5 MAC	0.36	11	ND - 5.76		
Lithium	ug/L as Li	ND	1	ND	ND		ND	1	ND		
Magnesium	mg/L as Mg	2.76	4	1.21	3.78	No Guideline Required	2.29	11	1.04 - 4.69		
Manganese	ug/L as Mn	2.3	4	ND	4.2	120 MAC / ≤ 20 AO	1.1	11	ND - 73.0		
Molybdenum	ug/L as Mo	ND	4	ND	ND		ND	11	ND		
Nickel	ug/L as Ni	ND	4	ND	1.8		ND	11	ND		
Potassium	mg/L as K	0.8	4	0.71	0.95		0.86	11	0.74 - 1.17		
Selenium	ug/L as Se	ND	4	ND	ND	50 MAC	ND	11	ND		
Silicon	ug/L as Si	7680	4	6170	7910		7050	11	3690 - 8210		
Silver	ug/L as Ag	ND	4	ND	ND	No Guideline Required	ND	11	ND		
Sodium	mg/L as Na	18.6	4	16.8	20	≤ 200 AO	18.4	11	16.5 - 29.8		
Strontium	ug/L as Sr	81.95	4	73.5	85.5	7000 MAC	82.4	11	61 - 94.5		
Sulphur	mg/L as S	ND	4	ND	ND		ND	10	ND		
Thallium	ug/L as Tl	ND	4	ND	ND		ND	10	ND		
Tin	ug/L as Sn	ND	4	ND	ND		ND	11	ND		
Titanium	ug/L as Ti	ND	4	ND	ND		ND	11	ND - 16.0		
Uranium	ug/L as U	ND	4	ND	ND	20 MAC	ND	10	ND		
Vanadium	ug/L as V	ND	4	ND	ND		ND	11	ND - 16.0		
Zinc	ug/L as Zn	9.95	4	7.8	33	≤ 5000 AO	10.1	11	1 - 54.6		
Zirconium	ug/L	ND	4	ND	ND		ND	10	ND - 0.26		