

Cedar Lane Water Service

2022 Annual Report



INTRODUCTION

This report provides a summary of the Cedar Lane Water Service for 2022. 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 Cedar Lane Water Utility is a rural residential community located on Salt Spring Island. The service was created in 1970 and became a CRD service in 2007. The Cedar Lane Water Utility (Figure 1) is comprised of 37 parcels of land connected to the system with 39 single-family equivalents (SFE) as the use on some parcels represents more than one dwelling.

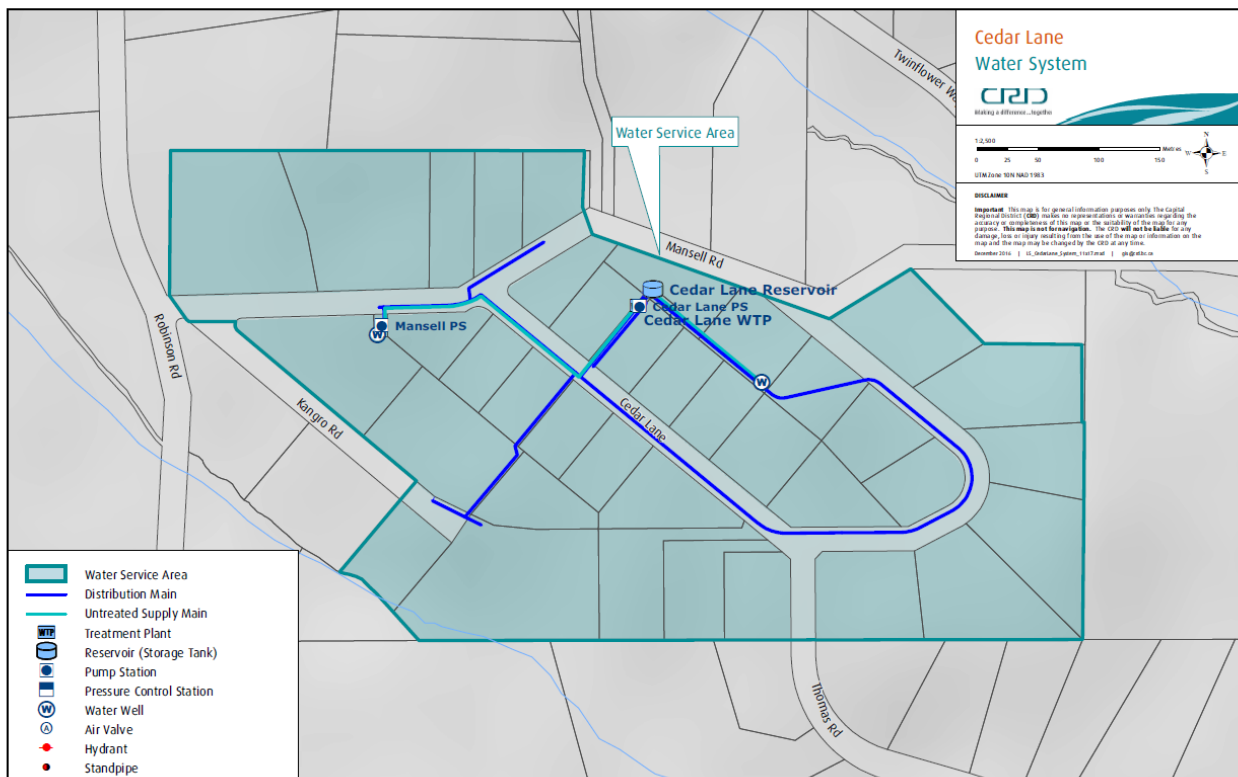


Figure 1: Cedar Lane Water Service

The Cedar Lane water system is primarily comprised of:

- two ground water source wells (#1 and #5)
- a water treatment plant (WTP) that provides primary disinfection with ultraviolet

- (UV) radiation and residual disinfection using sodium hypochlorite
- 1 water reservoir – 136 m³ (30,000 lg)
- 1,260 metres of water distribution pipe
- fire hydrant, standpipes, and gate valves
- water service connections complete with water meters

WATER PRODUCTION AND DEMAND

Referring to Figure 2, 3,233 cubic meters (m³) of water was extracted (water production) from two groundwater wells in 2022; a 5% decrease from the previous year and a 10% decrease in the five-year rolling average. Water demand (customer water billing) for the service totalled 3,226 m³ of water; a 1% increase from the previous year and a 4% decrease in the five-year rolling average.

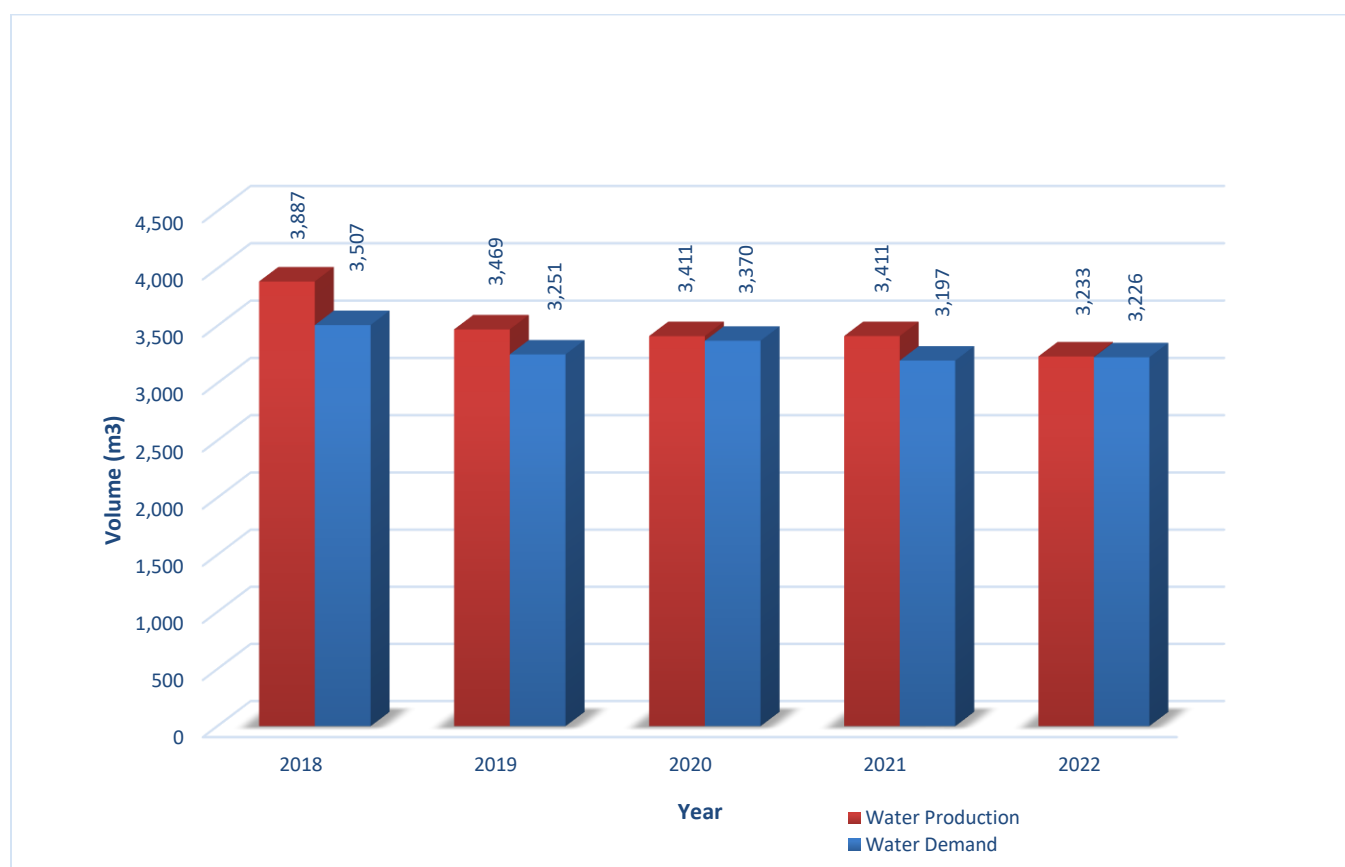


Figure 2: Cedar Lane Water Service Annual Water Production and Demand

Water production by month for the past five years is shown in Figure 3. Water consumption, for most water systems, is greatest during the summer months. Water usage for Cedar Lane is fairly consistent throughout the year likely the result of conservative indoor and outdoor water use.

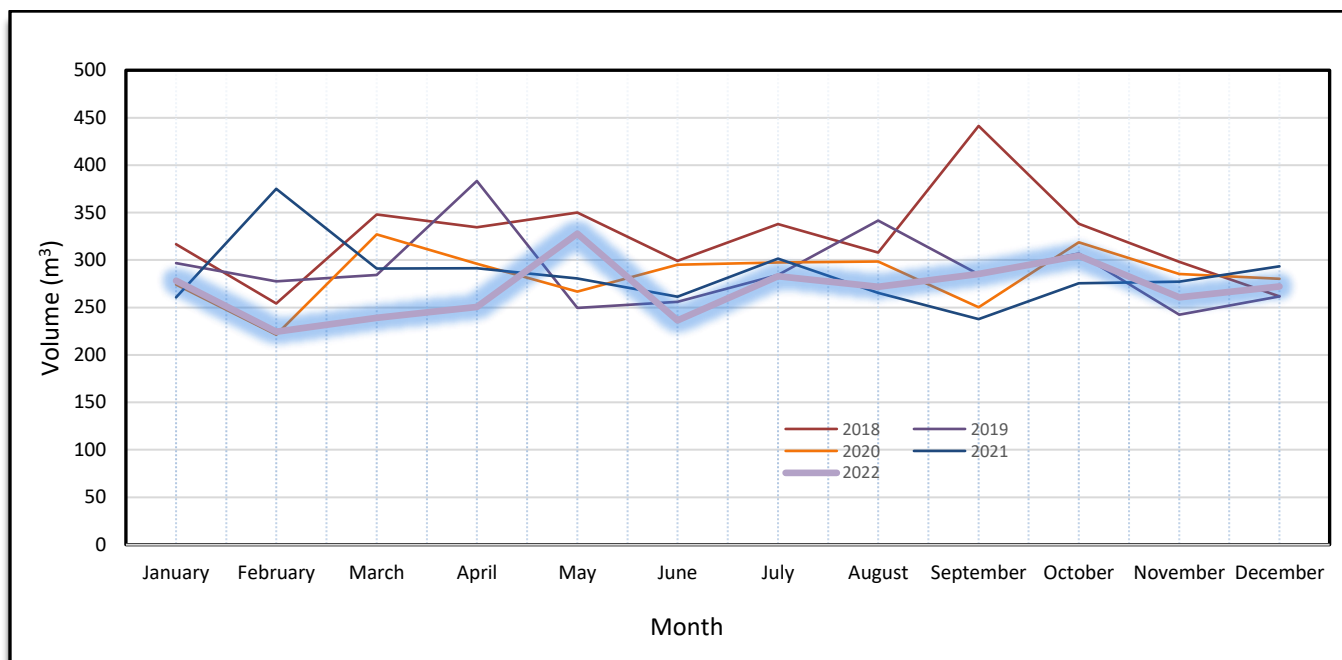


Figure 3: Cedar Lane Water Service Monthly Water Production

The Cedar Lane 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 fire hydrant usage, distribution system maintenance and process water for the treatment plant. Non-revenue water for 2022 is under 1% which is an indicator of a very tight water system with no appreciable leaks.

WATER QUALITY

The analytical results (biological, chemical and physical parameters) of water samples collected in 2022 from the Cedar Lane Water System indicated that the water was biologically safe to drink. Naturally high manganese concentrations in the well water remain insufficiently treated and regularly exceeded the aesthetic limits in most parts of the system, and frequently, in certain parts of the system, the health limits established in the Guidelines for Canadian Drinking Water Quality (GCDWQ). Particularly, areas immediately downstream from the treatment plant are vulnerable to manganese concentrations in exceedance of the health limit. Iron and manganese precipitates have been a significant nuisance problem in parts of the Cedar Lane water system and have caused discolouration of the drinking water. In order to meet the newly introduced health limit for manganese concentrations in drinking water, the existing treatment system must be upgraded, or a new water source must be found. A public advisory for manganese exceedance in the drinking water has been in place since July 2021.

Both wells ran very low during the dry summer and fall months. Well #1 exhibited repeatedly elevated turbidity throughout the summer and Well #5 during the wet spring in 2022.

Typical Cedar Lane Water System drinking water quality characteristics for 2022 are summarized as

follows:

- Source water from both wells was free of *E. coli* and total coliform bacteria.
- Well #1 registered periods with elevated turbidity throughout the year. The periods were as usual predominantly during the summer months when the well levels were the lowest. Well #5 had episodes of high turbidity during the spring (up to 4.9 NTU) and slightly elevated turbidity in the summer (up to 1.1 NTU). The treated water turbidity remained under 1 NTU throughout all these events. Therefore, these events have not been a public health concern yet.
- Source water is characterized as hard (136 mg/L CaCO₃).
- Both wells exhibited elevated iron and especially high manganese concentrations.
- Treated water was bacteriologically safe to drink and contained no total coliform or *E.coli* bacteria.
- Free chlorine residual concentrations were acceptable and within the desired range (i.e., 0.30 – 1.93 mg/L)
- Disinfection by-products: annual average trihalomethanes (THM) were well below (30.25 µg/L) the GCDWQ limit of 100 µg/L, haloacetic acids (HAA) were not tested in 2022. Typically, when THM concentrations are low, HAA concentrations are also low.
- Metals were typically below all limits except for elevated manganese concentrations. The median annual manganese concentration of 84 µg/L in the treated water indicates consistent exceedance of the aesthetic objective in the GCDWQ (20 µg/L) and also frequent exceedances of the health limit 120 µg/L. The health concerning exceedances occurred mostly in parts of the system that are immediately downstream of the treatment plant. A public health advisory has been in place since July 2021. CRD staff are working on mitigation strategies for this issue.
- Between June and October, the water temperature was in exceedance of the aesthetic objective (15°C) in the distribution system.

Table 1 and 2 below provide a summary of the 2022 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 during the 2022 operating period:

- Water system leak investigations for several locations within the service area.
- Operational support for manganese water treatment capital project that included collecting and submitting water samples, providing operational data and system information.

CAPITAL IMPROVEMENTS

The following is a summary of the major capital improvements including year ending spending for 2022:

Safe Work Procedures (CE.699.4505): The work scope includes reviewing and developing safe work procedures for operational and maintenance tasks. This project was completed in 2022.

Project	Spending
Budget	\$5,330
Contract	(\$930)
Supplies/Materials	(\$432)
Project Management	(\$3,878)
Expenses	(\$90)
Project Closed	\$0

Back-up Power Design (CE.735.4503): The work scope includes a study to provide back-up power to the service.

Project	Spending
Budget	\$5,000
Project Management	(\$49)
Balance Remaining	\$4,951

Manganese Treatment System Design (CE.780.4501): This work scope includes the preliminary and detailed design for a manganese treatment system for the service. Detailed design is essentially complete with construction scheduled to take place in 2023.

Project	Spending
Budget	\$61,500
Project Management	(\$16,000)
Study and Design	(\$37,451)
Balance Remaining	\$8,049

Public Engagement for Manganese Treatment Project (CE.780.4502): Prepare and conduct public engagement presentations to inform residents of the project to seek their approval.

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

Referendum or AAP for Manganese Treatment Project (CE.780.4503): Undertake a referendum or AAP to borrow funds to carry out the construction of the manganese treatment project.

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

2022 FINANCIAL REPORT

Please refer to the attached 2022 Statement of Operations and Reserve Balances.

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

Expenses include 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 include CRD staff time as well as the costs of equipment, tools, and vehicles. Debt servicing costs are interest and principal payments on long-term debt. Other Expenses include 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). In alignment with Local Government Act Section 374 (11), any deficit must be carried forward and included in the next year's financial plan.

WATER SYSTEM PROBLEMS - WHO TO CALL:

To report any event or to leave a message regarding the Cedar Lane 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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Attachment: [2022 Statement of Operations and Reserve Balances](#)

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

Table 1: 2022 Summary of Raw Water Test Results, Cedar Lane Water System

PARAMETER		2022 ANALYTICAL RESULTS				CANADIAN GUIDELINES	2012 - 2021 ANALYTICAL RESULTS			
Parameter	Units of Measure	Annual Median	Samples Analyzed	Range Minimum Maximum		≤ = Less than or equal to		Samples Analyzed	Range Minimum Maximum	
Name	Measure	Median	Analyzed	Minimum	Maximum		Median	Analyzed	Minimum	Maximum
ND means Not Detected by analytical method used										
Physical Parameters/Biological										
Colour, True	TCU	Last analyzed in 2013				≤ 15 AO	2.785	2	2.49	3.08
Hardness as CaCO ₃	mg/L	136	8	109	177	No Guideline Required	131	60	98.1	188
pH	pH Units	7.1	2	6.9	7.3	7.0-10.5 AO	7.4	44	7	8.6
Total Organic Carbon	mg/L	1.01	8	0.69	1.3		1.15	40	< 0.5	2.35
Turbidity	NTU	0.325	24	0.05	4.9		0.45	119	< 0.14	23
Water Temperature	Degrees C	13	28	10	15	≤ 15 AO	12.5	270	5	17
Microbial Parameters										
Indicator Bacteria										
Coliform, Total	CFU/100 mL	< 1	24	< 1	< 1		< 1	222	< 1	800
<i>E. coli</i>	CFU/100 mL	< 1	24	< 1	< 1		< 1	221	< 1	19
Hetero. Plate Count, 35C (2 day)	CFU/1 mL	Last tested in 2014								
Parasites						No MAC Established				
<i>Cryptosporidium</i> , Total oocysts	oocysts/100 L	Last tested in 2014				Zero detection desirable	<1	1	<1	<1
<i>Giardia</i> , Total cysts	cysts/100 L	Last tested in 2014				Zero detection desirable	<1	1	<1	<1
Metals										
Aluminum	ug/L as Al	< 3	8	< 3	4.9	2900 MAC / 100 OG	< 3	60	< 3	96
Antimony	ug/L as Sb	< 0.5	8	< 0.5	< 0.5	6 MAC	< 0.5	60	< 0.5	< 0.5
Arsenic	ug/L as As	0.325	8	0.17	1.18	10 MAC	0.37	60	0.14	1.64
Barium	ug/L as Ba	7.65	8	4.4	13.3	1000 MAC	9.1	60	4.4	15
Beryllium	ug/L as Be	< 0.1	8	< 0.1	< 0.1		< 0.1	60	< 0.1	< 3
Bismuth	ug/L as Bi	< 1	8	< 1	< 1		< 1	56	< 1	< 1
Boron	ug/L as B	53.5	8	< 50	63	5000 MAC	56	60	< 50	494
Cadmium	ug/L as Cd	< 0.01	8	< 0.01	< 0.01	5 MAC	< 0.01	60	< 0.01	< 0.1
Calcium	mg/L as Ca	41.55	8	32.4	55.4	No Guideline Required	39.65	60	29.1	58.3
Chromium	ug/L as Cr	< 1	8	< 1	< 1	50 MAC	< 1	60	< 1	< 10
Cobalt	ug/L as Co	< 0.2	8	< 0.2	< 0.2		< 0.2	60	< 0.2	< 20
Copper	ug/L as Cu	2.91	8	0.84	4.33	2000 MAC / ≤ 1000 AO	2.12	60	0.46	21.5
Iron	ug/L as Fe	138	8	23.3	2310	≤ 300 AO	113.5	60	11.4	4170
Lead	ug/L as Pb	0.375	8	< 0.2	3.08	5 MAC	< 0.5	60	< 0.2	9.29
Lithium	ug/L as Li	16.45	8	14.5	18.2		17.7	31	14.7	21.4
Magnesium	mg/L as Mg	7.955	8	6.65	9.92	No Guideline Required	7.94	60	6.15	10.8
Manganese	ug/L as Mn	394.5	8	351	507	120 MAC / ≤ 20 AO	397	70	4.1	1140
Molybdenum	ug/L as Mo	< 1	8	< 1	< 1		< 1	60	< 1	< 20
Nickel	ug/L as Ni	< 1	8	< 1	2.1		< 1	60	< 1	< 50
Potassium	mg/L as K	0.2435	8	0.214	0.285		0.257	60	< 0.03	0.44
Selenium	ug/L as Se	< 0.1	8	< 0.1	< 0.1	50 MAC	< 0.1	60	< 0.1	< 0.5
Silicon	mg/L as Si	9865	8	8840	11200		9645	60	7260	11700
Silver	ug/L as Ag	< 0.02	8	< 0.02	< 0.02	No Guideline Required	< 0.02	60	< 0.02	< 10
Sodium	mg/L as Na	51.85	8	40.2	60.9	≤ 200 AO	53.2	60	37.6	78.9
Strontium	ug/L as Sr	442	8	348	531	7000 MAC	401.5	60	294	578
Sulphur	mg/L as S	6.35	8	3.8	7.8		6.45	56	3.7	8.8
Tin	ug/L as Sn	< 5	8	< 5	< 5		< 5	60	< 5	< 20
Titanium	ug/L as Ti	< 5	8	< 5	< 5		< 5	60	< 5	< 10
Thallium	ug as Tl	< 0.01	8	< 0.01	< 0.01		< 0.01	56	< 0.01	< 0.05
Uranium	ug/L as U	< 0.1	8	< 0.1	0.1	20 MAC	< 0.1	56	< 0.1	0.14
Vanadium	ug/L as V	< 5	8	< 5	< 5		< 5	60	< 5	< 10
Zinc	ug/L as Zn	8.45	8	< 5	23.2	≤ 5000 AO	9.3	60	< 1	211
Zirconium	ug/L as Zr	< 0.1	8	< 0.1	< 0.1		< 0.1	56	< 0.1	< 0.5

Table 2: 2022 Summary of Treated Water Test Results, Cedar Lane Water System

PARAMETER		2022 ANALYTICAL RESULTS				CANADIAN GUIDELINES	2012 - 2022 ANALYTICAL 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										
Alkalinity, Total	mg/L	Last analyzed in 2012					211	1	211	211
Carbon, Total Organic Colour, True	mg/L as C TCU	1	4	0.84	1.3		1.1	26	< 0.3	2.52
Conductivity @ 25C	uS/cm	Last analyzed in 2009				≤ 15 AO				
Hardness as CaCO ₃	mg/L	138.5	16	132	149	No Guideline Required	143	67	62.9	161
pH	pH units	7.3	1	7.3	7.3	7.0-10.5 AO	7.7	29	7.4	8.1
Turbidity	NTU	0.325	23	< 0.14	0.9	1 MAC and ≤ 5 AO	0.4	37	0.2	0.75
Water Temperature	Degress C	8	98	5	20.5	≤ 15 AO	11.5	667	4	23
Microbial Parameters										
Indicator Bacteria										
Coliform, Total	CFU/100 mL	< 1	48	< 1	< 1	0 MAC	< 1	87	< 1	< 1
<i>E. coli</i>	CFU/100 mL	< 1	48	< 1	< 1	0 MAC	< 1	139	< 1	< 1
Hetero. Plate Count 7 day	CFU/1 mL	Not tested in 2021				No Guideline Required	0.02	2	0.02	0.02
Disinfectants										
Disinfectants										
Chlorine, Free Residual	mg/L as Cl2	0.68	98	0.3	1.93	No Guideline Required	0.65	2735	0.18	2.2
Chlorine, Total Residual	mg/L as Cl ₂	0.79	82	0.35	2.13	No Guideline Required	0.72	2180	0.22	2.2
Disinfection By-Products										
Trihalomethanes (THMs)										
Bromodichloromethane	ug/L	9.9	4	9	11		10.45	29	8.3	15
Bromoform	ug/L	< 1	4	< 1	1.1		< 1	29	< 0.1	1
Chloroform	ug/L	15	4	11	18		13.5	29	5.89	180
Chlorodibromomethane	ug/L	4.85	4	3.9	7		4.6	29	<0.1	8.3
Total Trihalomethanes	ug/L	29.5	4	27	35	100 MAC	31.5	28	20	185
Haloacetic Acids (HAA)										
HAA5	ug/L	Not tested in 2022				80 MAC	6.025	6	0.958	7.4
Metals										
Aluminum	ug/L as Al	< 3	16	< 3	< 3	2900 MAC / 100 OG	< 3	67	< 3	73
Antimony	ug/L as Sb	< 0.5	16	< 0.5	< 0.5	6 MAC	< 0.5	67	< 0.5	< 0.5
Arsenic	ug/L as As	0.28	16	0.24	0.32	10 MAC	0.28	67	0.19	0.819
Barium	ug/L as Ba	6.25	16	4.5	7	1000 MAC	6.5	67	2.9	29
Beryllium	ug/L as Be	< 0.1	16	< 0.1	< 0.1		< 0.1	67	< 0.1	< 3
Bismuth	ug/L as Bi	< 1	16	< 1	< 1		< 1	64	< 1	< 1
Boron	ug/L as B	52.5	16	< 50	55	5000 MAC	53	67	< 50	448
Cadmium	ug/L as Cd	< 0.01	16	< 0.01	< 0.01	5 MAC	< 0.01	67	< 0.01	< 0.1
Calcium	mg/L as Ca	42.85	16	40.7	46.9	No Guideline Required	45.2	67	20.7	51.5
Chromium	ug/L as Cr	< 1	16	< 1	< 1	50 MAC	< 1	67	< 1	< 10
Cobalt	ug/L as Co	< 0.2	16	< 0.2	< 0.2		< 0.2	67	< 0.2	< 20
Copper	ug/L as Cu	15.75	16	10.1	27.9	2000 MAC / ≤ 1000 AO	16.7	67	5.83	48.8
Iron	ug/L as Fe	25.15	16	< 5	52.6	≤ 300 AO	21.7	67	< 5	65
Lead	ug/L as Pb	0.43	16	< 0.2	1.02	5 MAC	0.32	67	<0.2	2.27
Lithium	ug/L as Li	16.25	16	13	17.1		17.1	36	9.4	19.7
Potassium	ug/L as K	0.2535	16	0.243	0.272		0.262	67	0.236	0.467
Magnesium	mg/L as Mg	7.545	16	6.93	8	No Guideline Required	7.6	67	2.71	9.39
Manganese	ug/L as Mn	84.1	16	< 1	208	120 MAC / ≤ 20 AO	79.4	87	< 1	1790
Molybdenum	ug/L as Mo	< 1	16	< 1	< 1		< 1	67	< 1	< 20
Nickel	ug/L as Ni	< 1	16	< 1	< 1		< 1	67	< 1	< 50
Selenium	ug/L as Se	< 0.1	16	< 0.1	< 0.1	50 MAC	< 0.1	67	< 0.1	< 0.5
Silicon	ug/L as Si	9640	16	9190	10100		9710	67	5370	10400
Silver	ug/L as Ag	< 0.02	16	< 0.02	< 0.02	No Guideline Required	< 0.02	67	< 0.02	< 10
Sodium	mg/L as Na	52.45	16	51.3	56.1	≤ 200 AO	53.1	67	25.9	68
Strontium	ug/L as Sr	428	16	399	442	7000 MAC	424	67	196	497
Sulphur	mg/L as S	6.05	16	5.1	7.2		6.4	64	4.8	8.9
Tin	ug/L as Sn	< 5	16	< 5	< 5		< 5	67	< 5	< 20
Titanium	ug/L as Ti	< 5	16	< 5	< 5		< 5	67	< 5	< 10
Thallium	ug/L as Tl	< 0.01	16	< 0.01	< 0.01		< 0.01	64	< 0.01	< 0.05
Uranium	ug/L as U	< 0.1	16	< 0.1	< 0.1	20 MAC	< 0.1	64	< 0.1	< 0.1
Vanadium	ug/L as V	< 5	16	< 5	< 5		< 5	67	< 5	< 10
Zinc	ug/L as Zn	14.1	16	9.9	21.3	≤ 5000 AO	17.4	67	< 1	207
Zirconium	ug/L as Zr	< 0.1	16	< 0.1	< 0.1		< 0.1	64	< 0.1	< 5