

Surfside Water System

2021 Annual Report



Introduction

This report provides a summary of the Surfside Park Estates Water Service for 2021 and 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 community of Surfside is a rural residential development located on Mayne Island in the Southern Gulf Islands Electoral Area which was originally serviced by a private water utility. In 2003 the service converted to the Capital Regional District (CRD). The Surfside Water Service (Figure 1) area is made up of 127 parcels of which 105 parcels can be inhabited encompassing a total area of approximately 25 hectares. Of the 105 parcels, 68 were connected to the water system in 2021; an increase of one connection from the previous year.

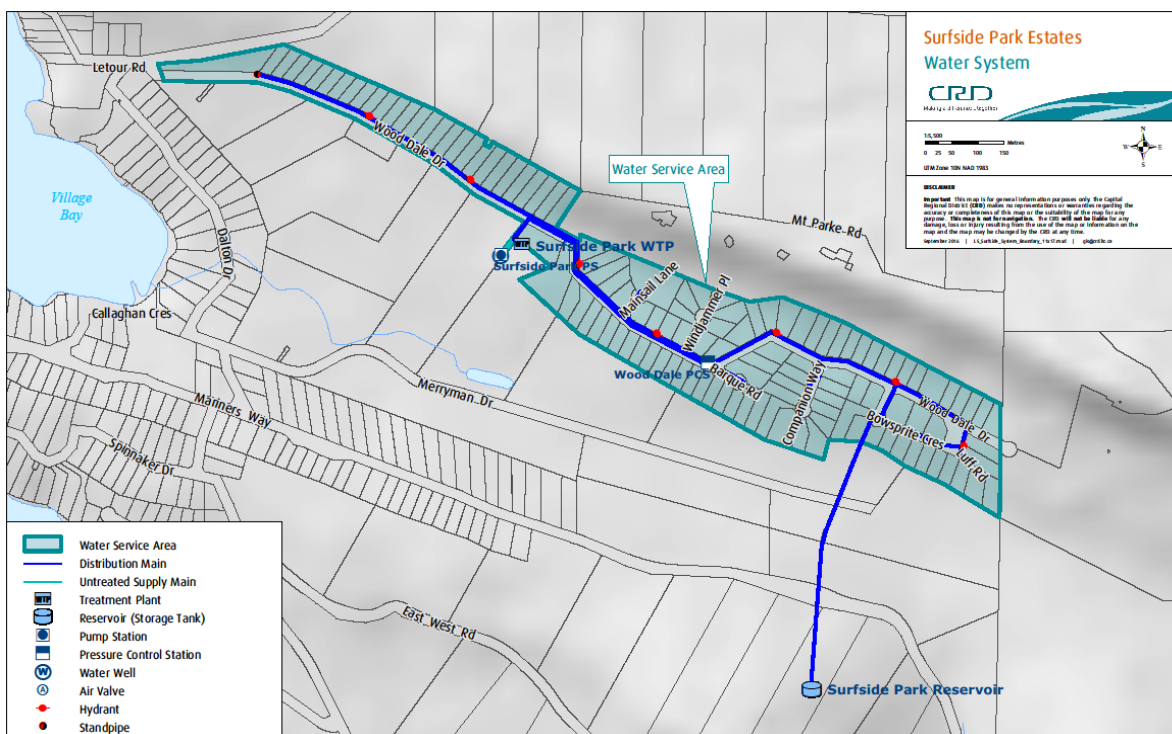


Figure 1: Surfside Park Estates Water Service

The Surfside water system is primarily comprised of:

- One groundwater well, related pumping and control equipment and building.
- Disinfection process equipment (filters, ultraviolet light and chlorine).
- Two steel storage tanks (total volume is 113 cubic meters).
- Distribution system (3,800 meters of water mains).
- Other water system assets: 68 service connections and water meters, five hydrants, three standpipes, 30 gate valves, one air release valve, Supervisory Control and Data Acquisition (SCADA) system and mobile generator.

Water Supply

Groundwater supply monthly water levels are highlighted for 2021 in Figure 2. Groundwater levels for 2021 were observed to be 20% to 30% lower for the period of June to October. These lower aquifer levels are likely the result of increasing drought conditions in which the Province declared level 4 drought conditions for the Southern Gulf Islands on July 9 and then increased this to level 5 August 31.

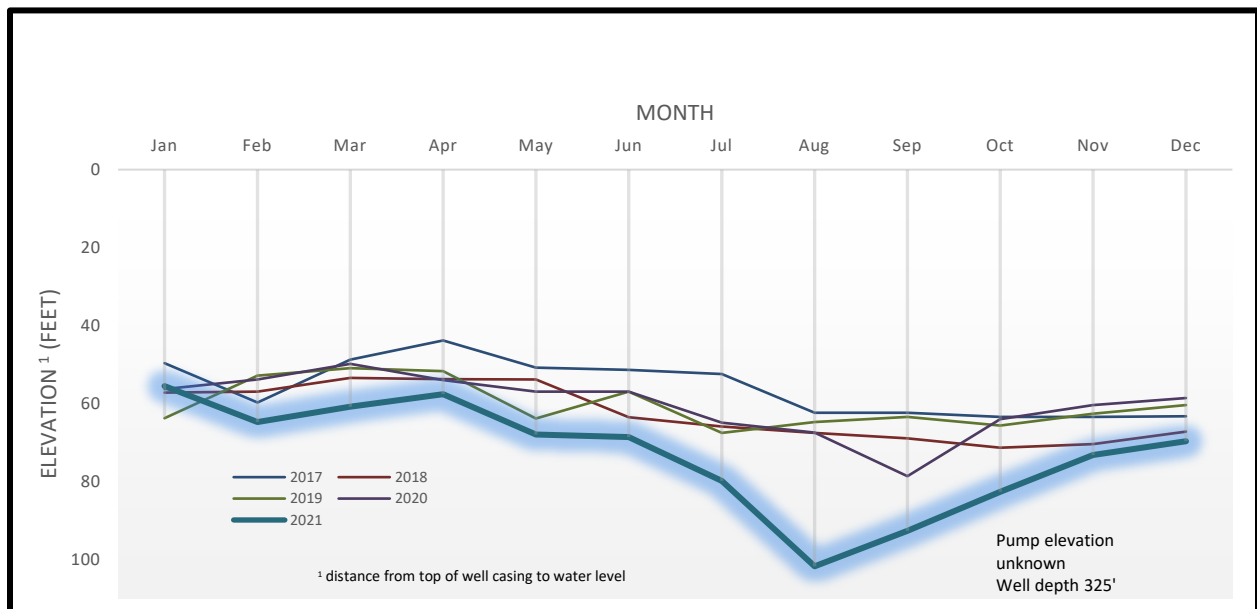


Figure 2: Surfside Park Estates Well #5A Groundwater Supply Monthly Water Level

Water Production and Demand

Referring to Figure 3, 12,450 cubic meters of water was extracted (water production) from the groundwater source (Well #5) in 2021; an 18% increase from the previous year and a 15% increase from the five year average. Water demand (customer water billing) for the service totaled 6,824 cubic meters of water; a 27% increase from the previous year and a 54% increase from the five year average. Water demand increase is primarily attributed to three properties identified in the first quarter of 2021 to have significant leaks on their systems. Property owners were contacted to inform them of their high water consumption. Leak repairs were completed promptly.

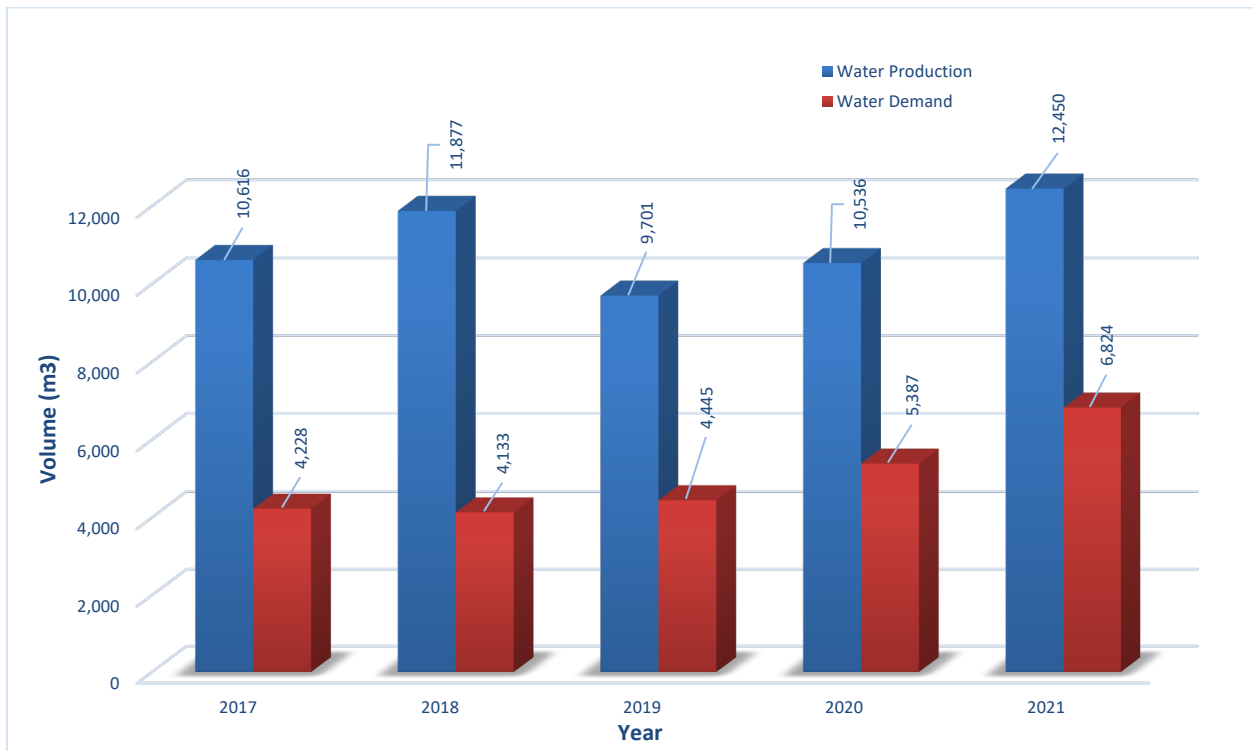


Figure 3: Surfside Park Estates Water Service Annual Water Production and Demand

The difference between annual water production and annual customer water demand is referred to as non-revenue water and can include water system leaks, water system maintenance and operational use (e.g. water main flushing, filter system backwashing), potential unauthorized use and fire-fighting use.

The 2021 non-revenue water (5,626 cubic meters) represents approximately 45% of the total water production for the service area. Approximately 264 cubic meters of water can be attributed to operational use so the remaining amount (43%) of non-revenue water is considered significant for a small water service. It is important to note that leak detection and repair efforts continue to be prioritized for the service. Water system leaks located and repaired in 2021 resulted in a slight reduction of non-revenue water of approximately 3% from the previous year.

Figure 4 below illustrates the monthly water production for 2021 along with the historical water production information for the previous four years. Typically, the monthly water production trend is greatest during the summer period (June to September). However, monthly water production for the most part is consistent throughout the year.

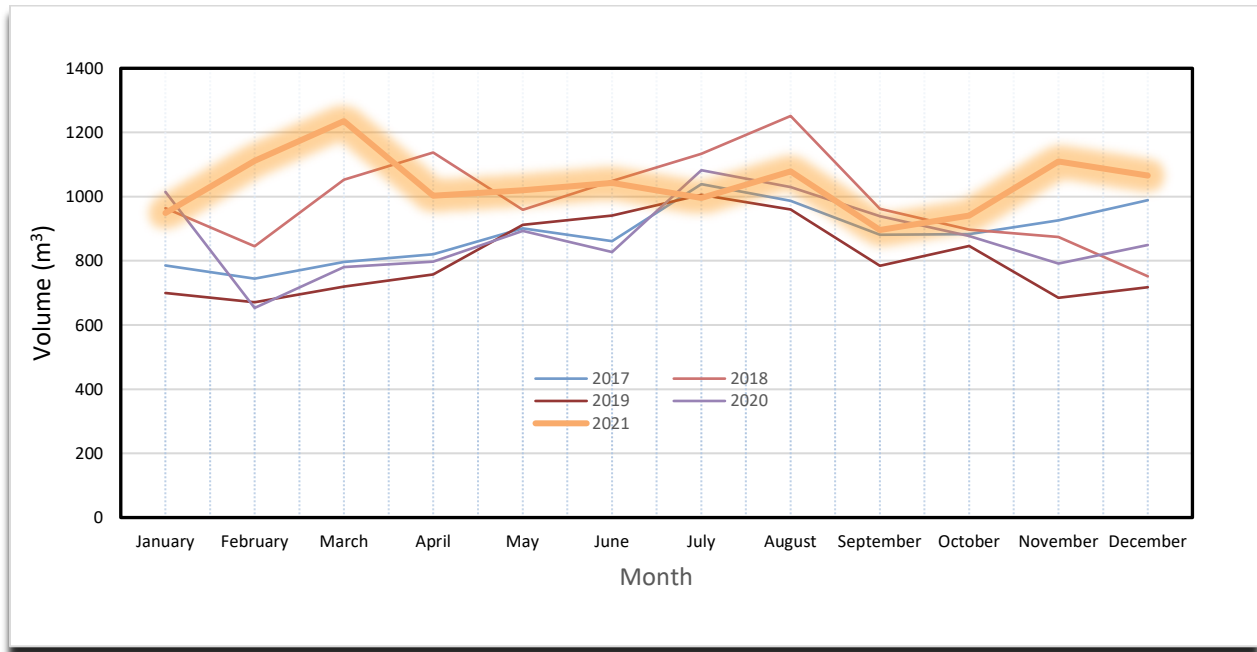


Figure 4: Surfside Park Estates Water Service Monthly Water Production

Drinking Water Quality

Staff completed the water quality monitoring program at Surfside based on the regulatory requirements and system specific risks. Samples were collected at regular frequencies from both the raw water as well as from a number of sampling stations at the treatment plant and in the distribution system. The samples were submitted for various analyses to the CRD’s Water Quality Lab or to external laboratories for special analyses such as disinfection by-products or metals.

The water system performed well in 2021 and consistently supplied drinking water of good quality to its customers. None of the raw water samples tested positive for *E.coli* or total coliform bacteria in 2021. All treated water samples tested negative for *E.coli* or total coliform bacteria in 2021. The raw water exhibited consistently high arsenic concentrations as well as elevated manganese concentrations. The existing treatment successfully reduced these concentrations to levels well below the health related and aesthetic limits in the Guidelines for Canadian Drinking Water Quality.

The data below provides a summary of the water quality characteristics in 2021:

Raw Water:

- Results from Well #5, the primary source, indicated that produced water contained no *E.coli* bacteria and no total coliform bacteria.
- The raw water continued to have naturally high concentrations of arsenic and manganese. The arsenic concentration in the raw water ranged from 32.4 to 91.6 µg/L. Manganese had a median concentration of 32.8 µg/L.
- The raw water turbidity was low with a median of 0.35 Nephelometric Turbidity Unit (NTU).
- The raw water was slightly hard (median hardness 34.5 mg/L (CaCO₃)).

Treated Water:

- The treated water was safe to drink with no *E. coli* or total coliform bacteria in any sample.
- The treated water turbidity was very low with a median of < 0.1 NTU.
- The arsenic concentration after treatment was always below the maximum allowable concentration (MAC) of 10 µg/L. The annual median arsenic concentration was 2.46 µg/L.
- Very low manganese concentrations indicate the effectiveness of the filtration system in terms of arsenic and manganese removal.
- The annual average levels of the disinfection by-product total trihalomethanes (TTHM) were well below the MAC.
- The free chlorine residual concentrations ranged from 0.16 to 2.06 mg/L in the distribution system indicating good secondary disinfection in most parts of the system except for some dead-end sections with older water age.

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 CRD Integrated Water Services staff:

- No significant operational issues to report for the service in 2021.
- Ongoing leak detection and repair program (Capital Work).

Capital Projects Update

The Capital Projects that were in progress or completed in 2021 include:

- System Review Project – Staff started gathering record documentation to complete the system review, which is to be completed in 2022.

Financial Report

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

Revenue includes parcel taxes (Transfers from Government), fixed user fees (User Charges), and interest on savings (Interest earnings), a transfer 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 include 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 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.

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Attachment: 2021 Statement of Operations and Reserve Balances

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

Table 1

Table 1: 2021 Summary of Raw Water Test Results, Surfside 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									
Hardness as CaCO ₃	mg/L	34.5	4	28.7	41.9	No Guideline Required	42.8	33	18.2 - 73.0
Turbidity	NTU	0.35	9	0.2	0.85		0.43	25	0.12- 1.34
Water Temperature	deg C	6.5	48	5.2	6.8	15°C AO	10.6	126	6.0 - 21.6
pH	pH units	Not analyzed in 2021				AO pH 7.0 -10.5	8.7	27	7.0 - 9.0
Total Organic Carbon	mg/L	0.6	4	ND	0.78		0.83	17	ND - 4.89
Metals									
Aluminum	ug/L as Al	13.5	4	8.1	14.7	2900 MAC / 100 OG	15.9	33	ND - 71.0
Antimony	ug/L as Sb	ND	4	ND	ND	6 MAC	ND	33	ND
Arsenic	ug/L as As	56.2	12	32.4	91.6	10 MAC	42.2	139	ND - 73.5
Barium	ug/L as Ba	53.90	4	47.6	60	1000 MAC	60.2	33	28.0 - 81.0
Beryllium	ug/L as Be	ND	4	ND	ND		ND	33	ND
Bismuth	ug/L as Bi	ND	4	ND	ND		ND	24	ND
Boron	ug/L as B	1670	4	1540	1820	5000 MAC	1680	33	1.25 - 2100
Cadmium	ug/L as Cd	ND	4	ND	ND	5 MAC	ND	33	ND - 0.14
Calcium	mg/L as Ca	11.2	4	9.41	13.6	No Guideline Required	13.8	33	5.91 - 22.9
Chromium	ug/L as Cr	ND	4	ND	ND	50 MAC	ND	33	ND
Cobalt	ug/L as Co	ND	4	ND	ND		ND	33	ND - 30.0
Copper	ug/L as Cu	0.52	4	ND	0.57	2000 MAC / ≤ 1000 AO	0.69	33	ND - 52.0
Iron	ug/L as Fe	20.8	4	15.9	24.7	≤ 300 AO	29.1	34	ND - 102.0
Lead	ug/L as Pb	ND	4	ND	ND	5 MAC	ND	33	ND - 3.51
Lithium	ug/L as Li	62.6	4	61.60	69.10		62.7	8	50.4 - 70.5
Magnesium	mg/L as Mg	1.58	4	1.26	1.95	No Guideline Required	2.01	33	0.83 - 3.84
Manganese	ug/L as Mn	32.8	4	29.9	47.8	120 MAC / ≤ 20 AO	45	35	ND - 102.0
Molybdenum	ug/L as Mo	ND	4	ND	ND		ND	33	ND
Nickel	ug/L as Ni	ND	4	ND	ND		ND	33	ND
Potassium	mg/L as K	1.85	4	1.67	1.9		1.92	33	1.58 - 2.85
Selenium	ug/L as Se	ND	4	ND	1.24	50 MAC	ND	33	ND - 0.75
Silicon	ug/L as Si	7140	4	6950	7550		7,160	33	912 - 12800
Silver	ug/L as Ag	ND	4	ND	ND	No Guideline Required	ND	33	ND
Sodium	mg/L as Na	123.0	4	121	127	≤ 200 AO	123	33	13.10 - 152.0
Strontium	ug/L as Sr	257.8	4	209	277	7000 MAC	281	33	0.31 - 463.0
Sulfur	mg/L as S	17.1	4	15.30	19.5		16.8	33	11.7 - 22.0
Thallium	ug/L as Tl	ND	4	ND	ND		ND	24	ND
Tin	ug/L as Sn	ND	4	ND	ND		ND	33	ND
Titanium	ug/L as Ti	ND	4	ND	ND		ND	33	ND
Uranium	ug/L as U	ND	4	ND	ND	20 MAC	ND	24	ND
Vanadium	ug/L as V	ND	4	ND	ND		ND	33	ND
Zinc	ug/L as Zn	ND	4	ND	ND	≤ 5000 AO	ND	33	ND - 185.0
Zirconium	ug/L as Zn	ND	4	ND	ND		ND	24	ND
Microbial Parameters									
Indicator Bacteria									
Coliform, Total	CFU/100 mL	ND	12	ND	ND		ND	116	ND - 28
<i>E. coli</i>	CFU/100 mL	ND	12	ND	ND		ND	116	ND
Heterotrophic bacteria, 7 day	CFU/mL	Not analyzed in 2021							
Parasites									
<i>Cryptosporidium</i> , Total oocysts	oocysts/100 L	Last tested in 2015				Zero detection desirable	ND	7	ND
<i>Giardia</i> , Total cysts	cysts/100 L	Last tested in 2015				Zero detection desirable	ND	7	ND

Table 2

Table 2: 2021 Summary of Treated Water Test Results, Surfside 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	32.4	8	25	42.8		34.3	34	25.1 - 55.9
pH	pH units	7	1	7	7	AO pH 7.0 -10.5	8.5	20	7 - 8.7
Turbidity	NTU	ND	12	ND	0.2		0.16	79	ND - 1.32
Total Organic Carbon	mg/L	0.52	8	ND	0.65		ND	28	ND - 1.51
Water Temperature	deg C	6.5	200	5.2	6.9	15°C AO	10.5	1210	4.4 - 24.2
Microbial Parameters									
Indicator Bacteria									
Coliform, Total	CFU/100 mL	ND	60	ND	ND	0 MAC	ND	257	ND
<i>E. coli</i>	CFU/100 mL	ND	60	ND	ND	0 MAC	ND	257	ND
Hetero. Plate Count, 7 day	CFU/1 mL	Not tested in 2021				No Guideline Required	ND	43	ND - 940
Disinfectants									
Disinfectants									
Chlorine, Free Residual	mg/L as Cl2	0.52	200	0.16	2.06		0.58	1255	0.10 - 1.73
Chlorine, Total Residual	mg/L as Cl2	0.82	14	0.31	1.31		0.63	1106	0.12 - 1.87
Disinfection By-Products									
Disinfection Byproducts									
Bromodichloromethane	ug/L	3.4	8	1.7	7.5		4.6	29	1.1 - 18.0
Bromoform	ug/L	4.5	8	1.9	9.1		8.4	29	1.9 - 12.0
Chloroform	ug/L	2.1	8	ND	5		2.4	29	ND - 10.0
Chlorodibromomethane	ug/L	4.95	8	3.3	14		9.1	29	1.8 - 14.0
Total Trihalomethanes	ug/L	15	8	8.9	35	100 MAC	22	28	5.7 - 50.0
Haloacetic Acids (HAAs)									
HAA5									
HAA5	ug/L	ND	4	ND	ND	80 MAC	ND	1	ND
Metals									
Aluminum	ug/L as Al	4.5	8	ND	7.4	2900 MAC / 100 OG	4.6	33	ND - 25.9
Antimony	ug/L as Sb	ND	8	ND	ND	6 MAC	ND	33	ND
Arsenic	ug/L as As	2.46	17	ND	8.6	10 MAC	4.66	139	ND - 31.0
Barium	ug/L as Ba	43.4	8	24.10	58.9	1000 MAC	50.4	33	3.2 - 69.9
Beryllium	ug/L as Be	ND	8	ND	ND		ND	33	ND
Bismuth	ug/L as Bi	ND	8	ND	ND		ND	33	ND
Boron	ug/L as B	1785	8	1560	1930	5000 MAC	1750	33	1200 - 1840
Cadmium	ug/L as Cd	ND	8	ND	ND	5 MAC	ND	33	ND
Calcium	mg/L as Ca	10.1	8	7.8	13.4	No Guideline Required	10.4	34	7.62 - 18.0
Chromium	ug/L as Cr	ND	8	ND	ND	50 MAC	ND	33	ND
Cobalt	ug/L as Co	ND	8	ND	ND		ND	33	ND
Copper	ug/L as Cu	2.68	8	2.17	17.9	2000 MAC / ≤ 1000 AO	3.51	33	1.68 - 21.8
Iron	ug/L as Fe	6.35	8	ND	ND	≤ 300 AO	6.7	34	ND - 54.7
Lead	ug/L as Pb	ND	8	ND	0.5	5 MAC	0.3	33	ND - 1.09
Lithium	ug/L as Li	61.95	8	57.2	67.6		61.3	11	54.3 - 71.1
Magnesium	mg/L as Mg	1.75	8	1.34	2.29	No Guideline Required	2.02	34	1.04 - 3.05
Manganese	ug/L as Mn	ND	8	ND	ND	120 MAC / ≤ 20 AO	ND	34	ND - 25.0
Molybdenum	ug/L as Mo	ND	8	ND	ND		ND	33	ND
Nickel	ug/L as Ni	ND	8	ND	ND		ND	33	ND
Potassium	mg/L as K	1.77	8	1.47	1.83		1.8	34	1.60 - 2.16
Selenium	ug/L as Se	ND	8	ND	ND	50 MAC	ND	33	ND
Silicon	ug/L as Si	6805	8	4990	7580		6,890.00	33	2350 - 8950
Silver	ug/L as Ag	ND	8	ND	ND	No Guideline Required	ND	33	ND
Sodium	mg/L as Na	126	8	115	132	≤ 200 AO	125.5	34	102.0 - 142.0
Strontium	ug/L as Sr	265.5	8	215	350	7000 MAC	293	33	171.0 - 399.0
Sulphur	mg/L as S	18.7	8	15.1	20.0		17.9	34	13.8 - 22.4
Thallium	ug/L as Tl	ND	8	ND	ND		ND	33	ND
Tin	ug/L as Sn	ND	8	ND	ND		ND	33	ND
Titanium	ug/L as Ti	ND	8	ND	ND		ND	33	ND
Uranium	ug/L as U	ND	8	ND	ND	20 MAC	ND	33	ND
Vanadium	ug/L as V	ND	8	ND	ND		ND	33	ND
Zinc	ug/L as Zn	8.1	8	ND	39.0	≤ 5000 AO	7.7	33	ND - 59.0
Zirconium	ug/L	ND	8	ND	ND		ND	33	ND

CAPITAL REGIONAL DISTRICT

SURFSIDE WATER

Statement of Operations (Unaudited)

For the Year Ended December 31, 2021

	2021	2020
Revenue		
Transfers from Government	22,000	27,843
User Charges	81,748	79,866
Other revenue from own sources:		
Interest Earnings	18	269
Transfer from Operating Reserve	5,914	-
Other Revenue	436	1,934
Total Revenue	\$ 110,115	109,913
Expenses		
General Government Services	4,698	4,603
Contract for Services	21,445	16,637
CRD Labour and Operating costs	50,009	31,874
Debt Servicing Costs	-	3,961
Other Expenses	16,962	14,235
Total Expenses	\$ 93,115	71,310
Net revenue (expenses)	17,000	38,604
Transfers to own funds:		
Capital Reserve Fund	15,000	15,000
Operating Reserve Fund	2,000	23,604
Annual surplus/(deficit)	-	-
Accumulated surplus/(deficit), beginning of year	-	-
Accumulated surplus/(deficit), end of year	\$ -	-

CAPITAL REGIONAL DISTRICT

SURFSIDE WATER

Statement of Reserve Balances (Unaudited)

For the Year Ended December 31, 2021

	Capital Reserve	
	2021	2020
Beginning Balance	49,087	35,820
Transfer from Operating Budget	15,000	15,000
Transfers from Completed Capital Projects	273	458
Transfer to Capital Projects	-	(3,000)
Interest Income	857	809
Ending Balance	65,217	49,087

	Operating Reserve	
	2021	2020
Beginning Balance	27,842	4,188
Transfer from Operating Budget	2,000	23,604
Transfer to Operating Budget	(5,914)	-
Interest Income	445	50
Ending Balance	24,374	27,842