

# Sticks Allison Water System

## 2021 Annual Report

### Introduction

This report provides a summary of the Sticks Allison 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 Sticks Allison is a rural residential development located on the north side of Galiano Island in the Southern Gulf Islands Electoral Area which was originally serviced by a private water utility. In 1996 the service converted to the Capital Regional District (CRD). The Sticks Allison water service (Figure 1) is made up of 38 parcels encompassing a total area of approximately 23 hectares. Of the 38 parcels, 36 were customers connected to the water system in 2021.

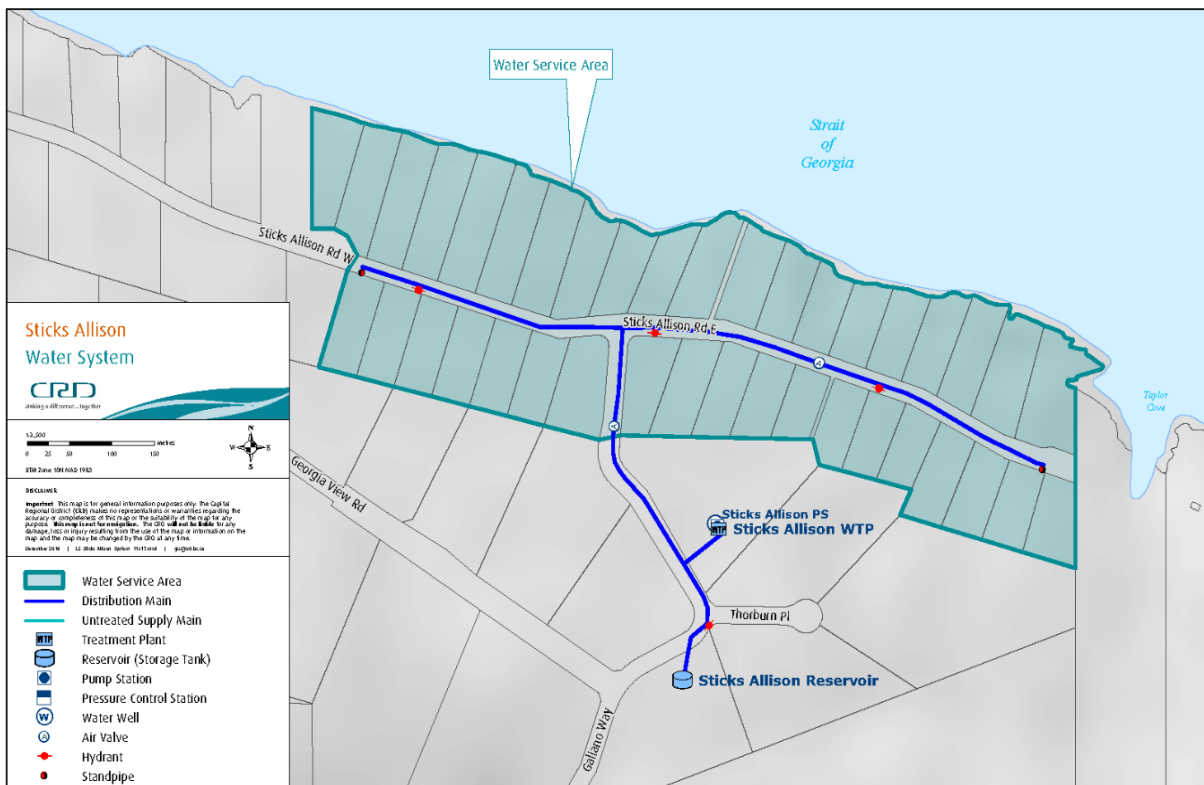


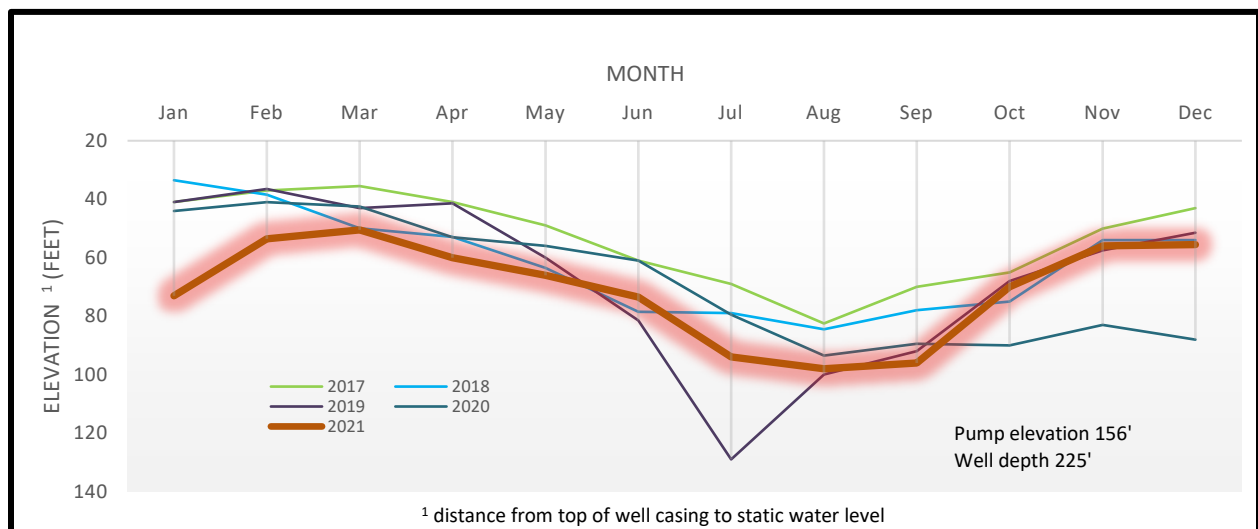
Figure 1: Map of Sticks Allison Water System

The Sticks Allison water system is primarily comprised of:

- One groundwater well, related pumping and control equipment and building.
- Disinfection process equipment (ultraviolet light and chlorine).
- One steel storage tank (total volume is 90 cubic meters).
- Distribution system (1,400 meters of water mains).
- Other water system assets: 36 service connections and meters, four hydrants, two standpipes, 10 gate valves, Supervisory Control and Data Acquisition (SCADA) system and auxiliary generator.

## Water Supply

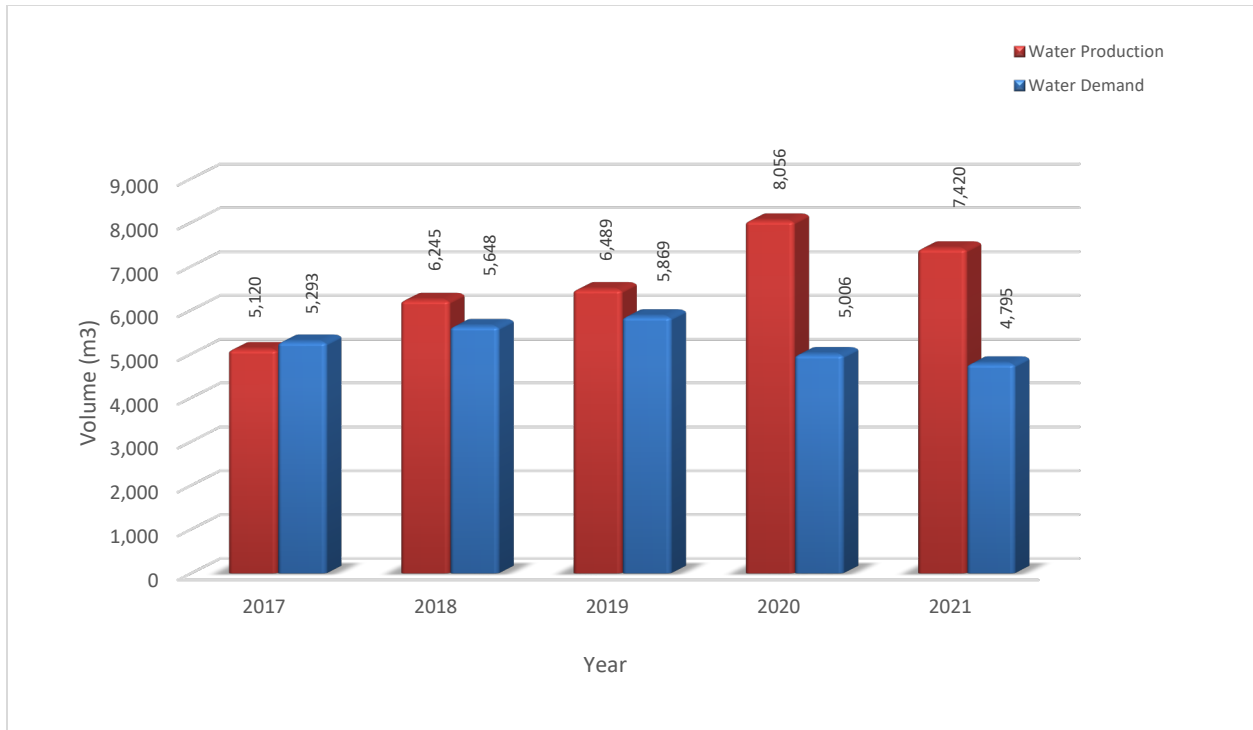
Groundwater supply monthly water levels are highlighted for 2021 in Figure 2. Groundwater levels for the most part during 2021 are within the typical historical range. However, aquifer water levels in January and February were historically low but recovered to typical levels in March. The lower aquifer levels during this period is the result of a water system leak that placed additional water demand on the aquifer.



**Figure 2: Sticks Allison Monthly Groundwater Water Level**

## Water Production and Demand

Referring to Figure 3, 7,420 cubic meters of water were extracted (water production) from the ground water source in 2021. This is an 8% decrease from the previous year and a 14% increase from the five year average. Water demand (customer water billing) for the service totaled 4,795 cubic meters of water; a 4% decrease from the previous year and a 12% decrease from the five year average.

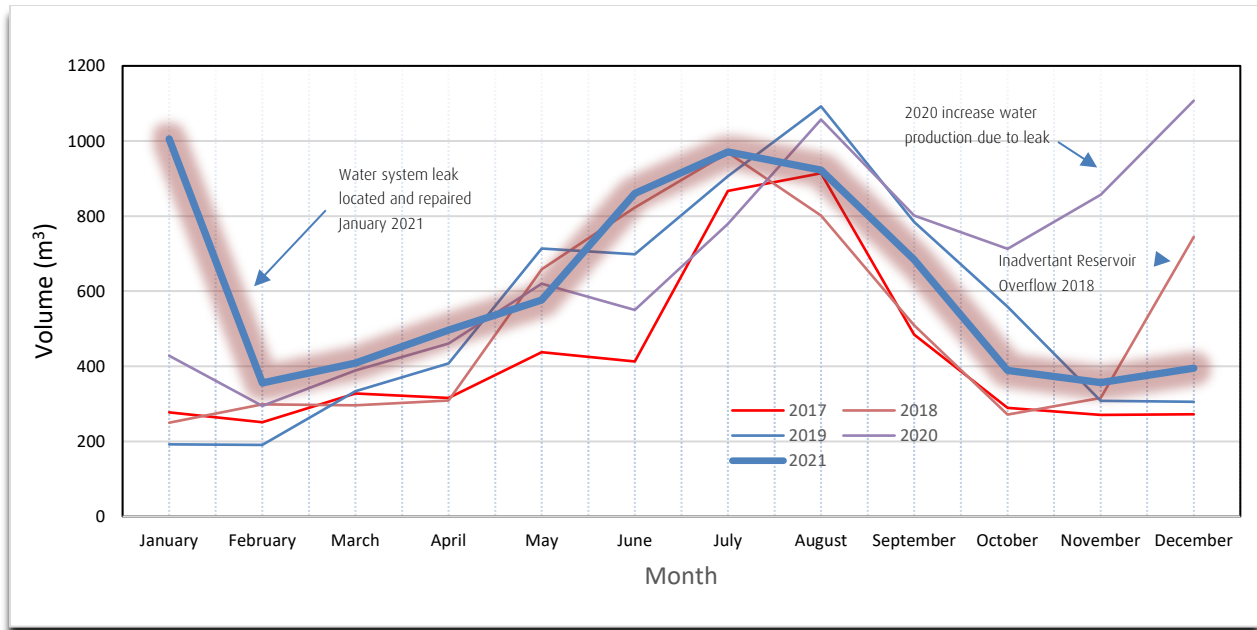


**Figure 3: Sticks Allison Water Service Annual Water Production and Demand**

The difference between annual water production and annual 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 (2,625 cubic meters) represents approximately 35% of the total water production for the service area. However, approximately 80 cubic meters can be attributed to operational use resulting in a non-revenue water volume of approximately 34%. Historically, non-revenue water for the service has been about 8%. The higher percentage of non-revenue water for 2021 is the result of a significant water system leak which was located and repaired in early 2021. However, this leak represents only a portion of the non-revenue water in 2021 and there are likely additional leaks on the water system that require further investigation.

Figure 4 below illustrates the monthly water production for 2021 along with the historical water production information. The monthly water production trends are typical for small water systems such as the Sticks Allison water system.



**Figure 4: Sticks Allison Water Service Monthly Water Production.**

## Drinking Water Quality

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

The water system performed well in 2021 and consistently supplied safe drinking water to its customers. The groundwater well produced generally good quality source water. It contained low levels of iron and manganese concentrations, but accumulation effects at the end of the system caused these concentrations to increase. Manganese concentrations were regularly in exceedance of the Guidelines for Canadian Drinking Water Quality (GCDWQ) aesthetic objective at the east end of Sticks Allison Road. Such exceedances can lead to brown/yellow water discoloration. Monthly spot flushes at the system ends were introduced in 2020 as mitigation to prevent these metals from accumulating in higher concentrations that would potentially exceed the maximum acceptable concentration, and/or lead to water customer complaints. However, this level of mitigation was unable to keep the metal concentrations below the aesthetic limits, and during the summer months water conservation considerations often competed with water quality concerns. Therefore, treatment to remove these metals should be considered for this water system. The well water was generally free of indicator bacteria, unlike in 2020, but registered low concentrations of total coliform and *E.coli* bacteria following the extreme rainfall event on November 14 and 15. This could be an indication of surface water influence on the groundwater supplying the well.

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

#### Raw Water:

- The Sticks Allison well water was, unlike 2020, generally free of indicator bacteria. Only one raw water sample from November 17 contained total coliform and *E.coli* bacteria. This was likely a response to the severe rainfall event on November 14 and 15 and indicates that the raw water quality is influenced by a rapid aquifer recharge rate.
- The raw water had a median manganese concentration of 12.6 µg/L which is lower than in the previous year and also lower than the aesthetic objectives in the GCDWQ. Iron concentrations were much lower than in 2020 and well below the aesthetic objective.
- The raw well water had a median pH of 7.7 and was soft with a median hardness of 30.2 mg/L (CaCO<sub>3</sub>)
  - The raw water turbidity was consistently under 1 Nephelometric Turbidity Unit (NTU) with an annual median of 0.35 NTU.

#### Treated Water:

- The treated water was safe to drink and free of *E.coli* and generally free of total coliform bacteria. On May 24, a treated water sample registered 64 CFU/100mL total coliform bacteria. An immediate resample was free of any bacteria and confirmed that the water remained safe to drink. A sampling error was likely the cause of this incident.
- The treated water turbidity was consistently below 1 NTU with an annual median of 0.38 NTU.
- The manganese concentrations in the distribution system regularly exceeded the aesthetic limits in the GCDWQ at the east end of Sticks Allison Road. While the manganese concentrations exceeded the aesthetic limit, they never reached the health limit. Iron concentrations were also elevated through accumulation effects but remained below the aesthetic limit. It is expected that the west end of Sticks Allison Road experienced similar concentrations but this was not tested. No customer complaints were received. Regular spot flushes were carried out by the operators.
- The annual average levels of the disinfection by-product total trihalomethanes (TTHM) were well below the maximum allowable concentration.
- The free chlorine residual concentrations in the distribution system ranged from 0 to 1.47 mg/L with a median of 0.21 mg/L indicating that on occasion the secondary disinfection could be insufficient at the ends of the system. Staff will try to balance the need for proper secondary disinfection and the risk of disinfection by-product formation through higher chlorine levels.

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:

- Significant water system leak investigation and repairs that occurred in early January near 109 Sticks Allison Road.

- Corrective maintenance and performance optimization on the chlorine dosing and chlorine analyzer equipment.
- Corrective maintenance/repairs to water treatment plant/pumping station piping due to freezing during a significant cold weather event.

## Capital Projects Updates

The Capital Projects updates for 2021 include:

- Tank Water Level Equipment was completed.
- Back Generator Equipment was completed.

## 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. 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.

As of December 31, 2021, the accumulated deficit was \$9,984 for Sticks Allison Water Service. In alignment with Local Government Act Section 374 (11), if actual expenditures exceed actual revenues, any deficiency must be included in the next years' financial plan. The financial plan approved by CRD Board on March 16, 2022 incorporated this deficit.

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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](mailto:IWSAdministration@crd.bc.ca)

**Table 1**

Table 1: 2021 Summary of Raw Water Test Results, Sticks Allison 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									
<b>Physical Parameters</b>									
Carbon, Total Organic	mg/L	Not tested in 2021					5.20	1	5.20 - 5.20
Hardness as CaCO <sub>3</sub>	mg/L	30.2	4	26.6	33.4	No Guideline Required	27.7	15	23.6- 41.3
pH	pH units	7.7	3	7.6	7.8	7.0 - 10.5 AO	7.98	12	7.4 - 8.4
Turbidity	NTU	0.35	12	0.2	0.55		0.25	37	0.12 - 0.95
Water Temperature	°C	10.5	1	10.5	10.5		11.0	83	9.5 - 13.0
<b>Metals</b>									
Aluminum	ug/L as Al	10.75	4	6.0	15.6	2900 MAC / 100 OG	8.7	15	ND - 127
Antimony	ug/L as Sb	ND	4	ND	ND	6 MAC	ND	15	ND - 2.00
Arsenic	ug/L as As	0.55	4	0.45	0.81	10 MAC	0.53	15	ND - 1.29
Barium	ug/L as Ba	ND	4	ND	ND	1000 MAC	ND	15	ND - 11.0
Beryllium	ug/L as Be	ND	4	ND	ND		ND	15	ND
Bismuth	ug/L as Bi	ND	4	ND	ND		ND	10	ND
Boron	ug/L as B	365	4	328	400	5000 MAC	352	15	ND - 440
Cadmium	ug/L as Cd	ND	4	ND	ND	5 MAC	ND	15	ND
Calcium	mg/L as Ca	10.32	4	9.12	11.3	No Guideline Required	9.47	15	6.82 - 15.5
Chromium	ug/L as Cr	ND	4	ND	ND	50 MAC	ND	15	ND
Cobalt	ug/L as Co	ND	4	ND	ND		ND	15	ND
Copper	ug/L as Cu	2.24	4	1.3	2.7	2000 MAC / ≤ 1000 AO	1.69	15	0.65 - 2670
Iron	ug/L as Fe	31.6	4	18.5	36.3	≤ 300 AO	123	15	22.0 - 395
Lead	ug/L as Pb	0.24	4	ND	0.27	5 MAC	ND	15	ND - 0.64
Lithium	ug/L as Li	12.65	4	11.9	13.9		11.7	3	11.6 - 12.2
Magnesium	mg/L as Mg	1.08	4	0.94	1.27	No Guideline Required	1.0	15	0.63 - 1.74
Manganese	ug/L as Mn	12.55	4	8.6	15.5	120 MAC / ≤ 20 AO	26.1	15	3.8 - 84.7
Molybdenum	ug/L as Mo	4.0	4	3.8	4.3		4.7	15	ND - 26.0
Nickel	ug/L as Ni	ND	4	ND	ND		ND	15	ND
Potassium	mg/L as K	0.28	4	0.27	0.30		0.3	15	0.26 - 0.59
Selenium	ug/L as Se	ND	4	ND	ND	50 MAC	ND	15	ND
Silver	ug/L as Ag	ND	4	ND	ND	No Guideline Required	ND	15	ND
Sodium	mg/L as Na	83.05	4	81.3	85.5	≤ 200 AO	85.6	15	3.68 - 101.0
Strontium	ug/L as Sr	42.9	4	38.0	49.0	7000 MAC	40.9	15	27.0 - 65.1
Sulphur	mg/L as S	8.45	4	7.3	9.2		9.1	10	8.1 - 10.6
Tin	ug/L as Sn	ND	4	ND	ND		ND	15	ND
Titanium	ug/L as Ti	ND	4	ND	ND		ND	15	ND
Thallium	ug/L as Tl	ND	4	ND	ND		ND	10	ND
Uranium	ug/L as U	0.11	4	ND	0.22	20 MAC	ND	10	ND
Vanadium	ug/L as V	ND	4	ND	ND		ND	15	ND
Zinc	ug/L as Zn	18.1	4	9.1	34.3	≤ 5000 AO	5.2	15	ND - 63.0
Zirconium	ug/L as Zr	0.12	4	ND	0.13		ND	10	ND - 0.16
<b>-Metallic Inorganic Chemicals</b>									
Silicon	mg/L as Si	6.78	4	6.42	7.42		6.42	15	0.004 - 11.5
<b>Microbial Parameters</b>									
<b>Indicator Bacteria</b>									
Coliform, Total	CFU/100 mL	ND	12	ND	12		ND	118	ND - 15
<i>E. coli</i>	CFU/100 mL	ND	12	ND	2		ND	116	ND
<b>Parasites</b>									
<i>Cryptosporidium</i> , Total oocysts	oocysts/100 L	Not analyzed in 2021				Zero detection desirable	ND	5	ND
<i>Giardia</i> , Total cysts	cysts/100 L	Not analyzed in 2021				Zero detection desirable	ND	5	ND

**Table 2**

Table 2: 2021 Summary of Treated Water Test Results, Sticks Allison Water System									
PARAMETER		2021 ANALYTICAL RESULTS				CANADIAN GUIDELINES	2011-2020 RESULTS		
Parameter Name	Units of Measure	Annual Median	Samples Analyzed	Range Min. Max.		≤ = Less than or equal to	Median	Samples Analyzed	Range Min.-Max.
ND means Not Detected by analytical method used									
<b>Physical Parameters</b>									
Carbon, Total Organic	mg/L as C	2.75	4	2.3	2.8		2.56	18	1.08 - 5.95
Hardness as CaCO3	mg/L	33.1	4	29.7	37.6		32.7	12	29.8 - 37.6
pH	No Units	7.65	4	7.6	7.9		8.0	12	7.82 - 8.30
Turbidity	NTU	0.38	12	0.25	0.55	>1 MAC	0.28	74	0.20 - 4.8
Water Temperature	°C	9.0	85	4.0	15.0	≥15 AO	11.0	2762	0.0 - 22.0
<b>Microbial Parameters</b>									
<b>Indicator Bacteria</b>									
Coliform, Total	CFU/100 mL	ND	47	ND	64	0 MAC	ND	296	ND - 8
<i>E. coli</i>	CFU/100 mL	ND	47	ND	ND	0 MAC	ND	292	ND
Hetero. Plate Count, 7 day	CFU/1 mL	110	8	30	370	No Guideline Required	50	47	ND - 260
<b>Disinfectants</b>									
<b>Disinfectants</b>									
Chlorine, Free Residual	mg/L as Cl2	0.21	85	0	1.47	3.0 MAC	0.40	2794	ND - 1.88
Chlorine, Total Residual	mg/L as Cl2	0.23	85	0.03	1.48		0.42	2798	0.17 - 1.98
<b>Disinfection By-Products</b>									
<b>Trihalomethanes (THMs)</b>									
Bromodichloromethane	ug/L	9.6	4	7.5	11.0		15	20	6.40 - 19.3
Bromoform	ug/L	ND	4	ND	1.1		ND	20	ND - 1.30
Chloroform	ug/L	15.5	4	11.0	23.0		19	20	7.4 - 33.0
Chlorodibromomethane	ug/L	3.3	4	2.5	8.8		7	20	ND - 11.3
Total Trihalomethanes	ug/L	32.0	4	23.0	35.0	100 MAC	41	19	18.0 - 59.3
<b>Haloacetic Acids (HAAs)</b>									
<b>HAA5</b>									
HAA5	ug/L	6.6	4	ND	16.0	80 MAC			
<b>Metals</b>									
Aluminum	ug/L as Al	26.95	4	17.2	39.4	2900 MAC / 100 OG	18.7	12	5.00 - 34.8
Antimony	ug/L as Sb	ND	4	ND	ND	6 MAC	ND	12	ND
Arsenic	ug/L as As	0.57	4	0.51	0.64	10 MAC	0.63	12	0.55 - 0.89
Barium	ug/L as Ba	1.35	4	1.2	1.5	1000 MAC	1.3	12	ND - 2.20
Beryllium	ug/L as Be	ND	4	ND	ND		ND	12	ND
Bismuth	ug/L as Bi	ND	4	ND	ND		ND	12	ND
Boron	ug/L as B	362	4	319	400	5000 MAC	367.5	12	333 - 388
Cadmium	ug/L as Cd	ND	4	ND	ND	5 MAC	ND	12	ND
Calcium	mg/L as Ca	11.6	4	10.7	13.3	No Guideline Required	11.7	12	10.8 - 14.1
Chromium	ug/L as Cr	ND	4	ND	ND	50 MAC	ND	12	ND
Cobalt	ug/L as Co	ND	4	ND	ND		ND	12	ND
Copper	ug/L as Cu	29.5	4	14.2	39.4	2000 MAC / ≤ 1000 AO	9.22	12	0.87 - 46.2
Iron	ug/L as Fe	173.5	4	119	241	≤ 300 AO	243.5	12	132.0 - 747.0
Lead	ug/L as Pb	1.28	4	0.93	1.56	5 MAC	0.54	12	0.22 - 2.32
Lithium	ug/L as Li	12.8	4	12.0	13.3		12.2	4	11.5 - 12.6
Magnesium	mg/L as Mg	0.98	4	0.75	1.07	No Guideline Required	0.74	12	0.48 - 1.3
Manganese	ug/L as Mn	71.7	4	39.4	88.8	120 MAC / ≤ 20 AO	77.6	12	26.5 - 200.0
Molybdenum	ug/L as Mo	2.55	4	2.5	2.6		4.00	12	1.0 - 5.6
Nickel	ug/L as Ni	ND	4	ND	ND		ND	12	ND
Potassium	mg/L as K	0.29	4	0.28	0.30		0.31	12	0.27 - 0.35
Selenium	ug/L as Se	ND	4	ND	ND	50 MAC	ND	12	ND
Silicon	ug/L as Si	6970	4	6770	7530		6770	12	6340 - 7740
Silver	ug/L as Ag	ND	4	ND	ND	No Guideline Required	ND	12	ND
Sodium	mg/L as Na	81.8	4	79.6	87.0	≤ 200 AO	85	12	81.2 - 92.0
Sulphur	ug/L as S	8.3	4	7.0	9.4		9.45	12	7.9 - 11.6
Strontium	ug/L as Sr	49.8	4	46.3	57.8	7000 MAC	51.4	12	46.6 - 60.3
Tin	ug/L as Sn	ND	4	ND	ND		ND	12	ND
Thallium	ug/L as Tl	ND	4	ND	ND		ND	12	ND
Titanium	ug/L as Ti	ND	4	ND	ND		ND	12	ND
Uranium	ug/L as U	0.11	4	ND	0.16	20 MAC	ND	12	ND - 0.11
Vanadium	ug/L as V	ND	4	ND	ND		ND	12	ND
Zinc	ug/L as Zn	25.95	4	15.3	34.1	≤ 5000 AO	11.4	12	5.90 - 23.2
Zirconium	ug/L as Zr	0.21	4	0.13	0.27		0.17	12	ND - 0.37



## CAPITAL REGIONAL DISTRICT

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### STICKS ALLISON WATER

#### Statement of Operations (Unaudited)

For the Year Ended December 31, 2021

	2021	2020
<b>Revenue</b>		
Transfers from government	5,000	5,000
User Charges	50,708	49,180
Other revenue from own sources:		
Insurance claim reimbursement	5,457	-
Other revenue	792	1,008
Transfer from Operating Reserve	1,000	2,237
<b>Total Revenue</b>	<b>62,957</b>	<b>57,425</b>
<b>Expenses</b>		
General government services	2,314	2,877
CRD Labour and Operating costs	55,802	40,775
Other expenses	11,424	6,573
<b>Total Expenses</b>	<b>69,540</b>	<b>50,225</b>
<b>Net revenue (expenses)</b>	<b>(6,583)</b>	<b>7,200</b>
Transfers to own funds:		
Capital Reserve Fund	3,401	4,000
Operating Reserve Fund	-	3,200
<b>Annual surplus/(deficit)</b>	<b>(9,984)</b>	<b>-</b>
Accumulated surplus/(deficit), beginning of year	-	-
<b>Accumulated surplus/(deficit), end of year</b>	<b>\$ (9,984)</b>	<b>-</b>

## CAPITAL REGIONAL DISTRICT

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### STICKS ALLISON WATER Statement of Reserve Balances (Unaudited) For the Year Ended December 31, 2021

	Capital Reserve	
	2021	2020
<b>Beginning Balance</b>	10,542	2,688
Transfer from Operating Budget	3,401	4,000
Transfers from Completed Capital Projects	-	3,750
Transfer to Capital Projects	(9,795)	-
Interest Income	102	104
<b>Ending Balance</b>	<b>4,250</b>	<b>10,542</b>

	Operating Reserve	
	2021	2020
<b>Beginning Balance</b>	2,326	1,299
Transfer from Operating Budget	-	3,200
Transfer to Operating Budget	(1,000)	(2,237)
Interest Income	100	64
<b>Ending Balance</b>	<b>1,426</b>	<b>2,326</b>