

Surfside Water System

2020 Annual Report

CRD | Drinking Water

Introduction

This report provides a summary of the Surfside Park Estates Water Service for 2020 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. 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 2020; an increase of two connections from the previous year.

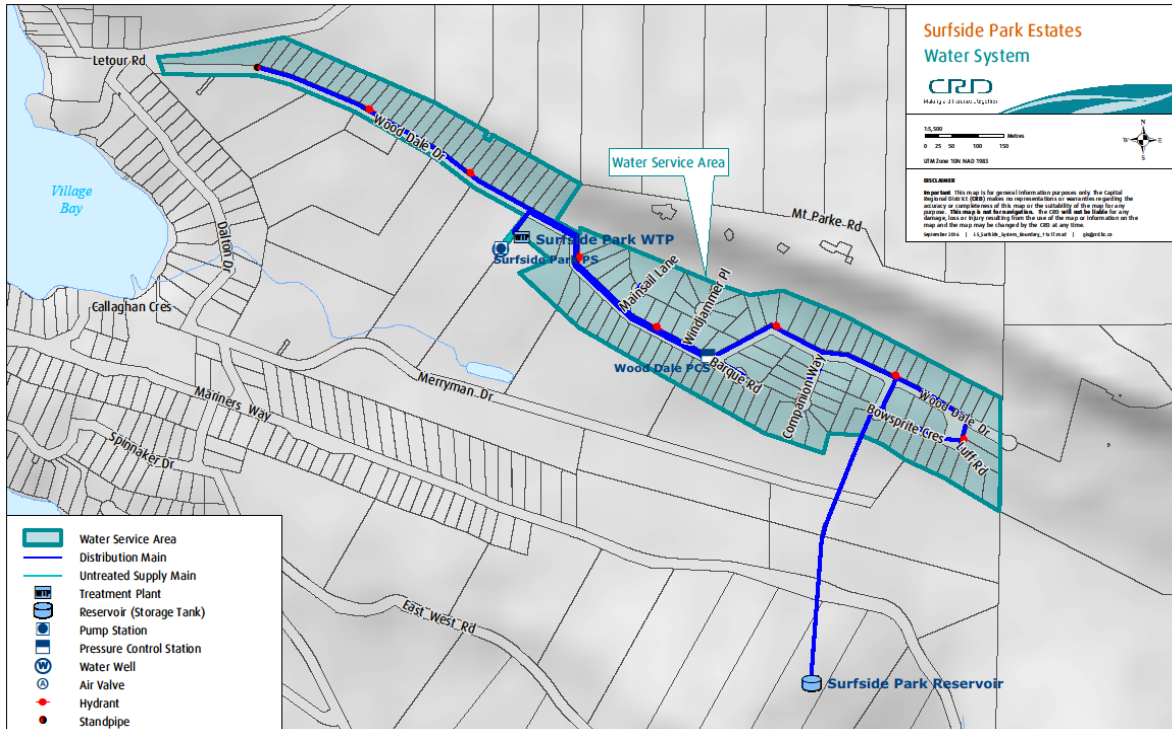


Figure 1: Surfside Park Estates Water Service.

The Surfside water system is primarily comprised of:

- One ground water 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 metres);
- Distribution system (3,800 m of water mains);
- Other water system assets: 68 service connections and water meters, 5 hydrants, 3 standpipes, 30 gate valves, 1 air release valve, SCADA system and mobile generator.

Water Supply

Ground water supply monthly water levels are highlighted for 2020 in Figure 2. Ground water levels for 2020 are within the typical historical range for the service.

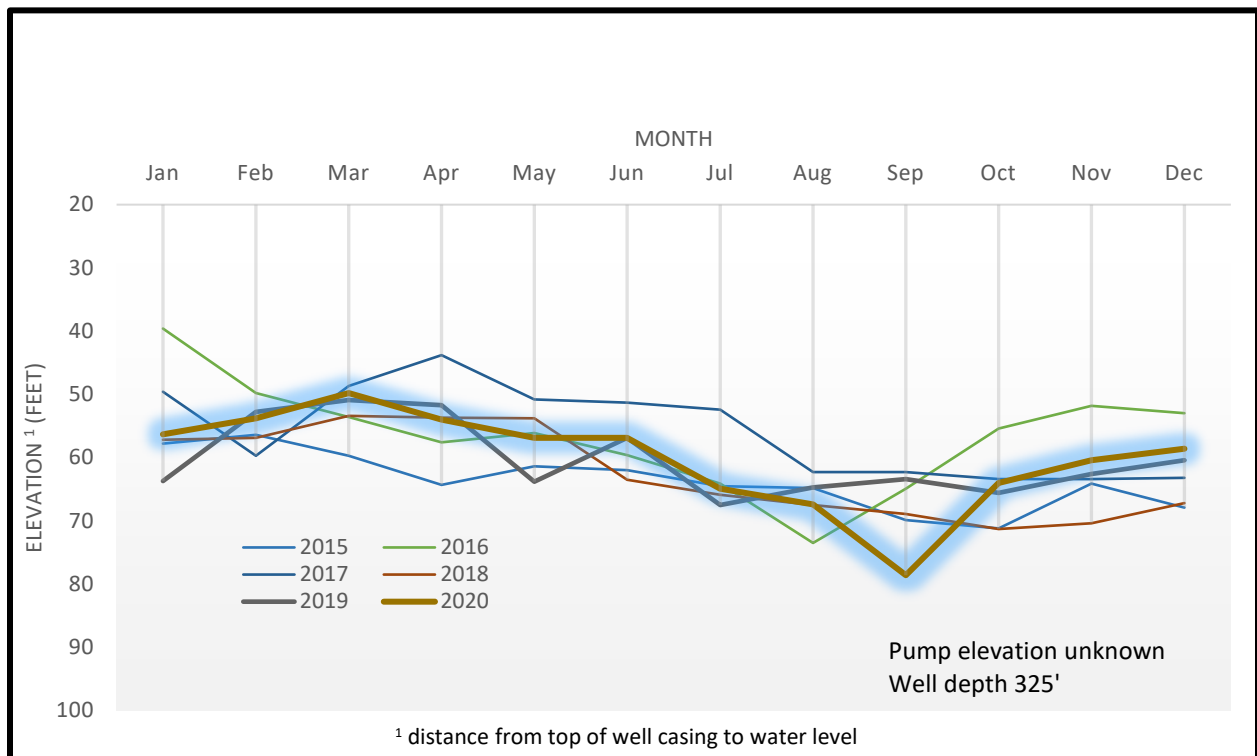


Figure 2: Surfside Park Estates Well #5A Ground Water Supply Monthly Water Level

Water Production and Demand

10,536 cubic meters (m³) of water was extracted (water production) from the ground water source (Well #5) in 2020; a 9% increase from the previous year and a 5% decrease from the five year average (Figure 3). Water demand (customer water billing) for the service totaled 5,387 cubic meters of water; a 21% increase from the previous year and a 27% increase from the five year average.

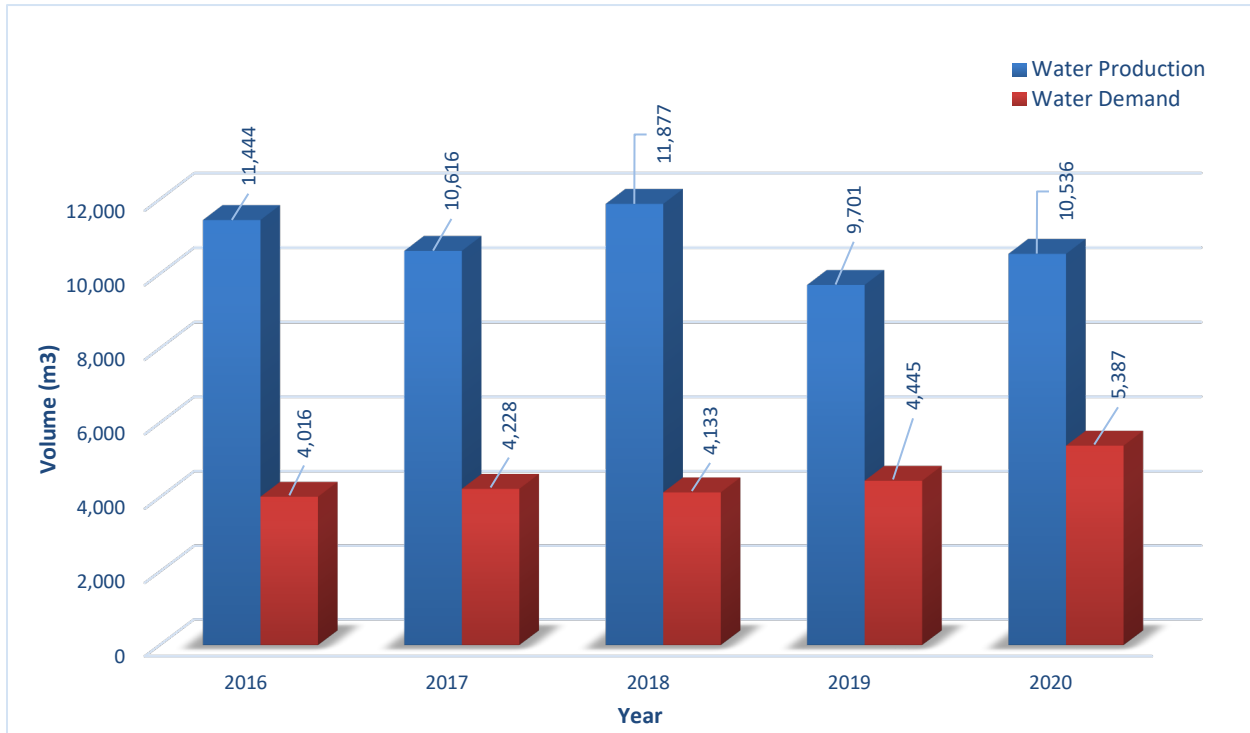


Figure 3: Surfside Park Estates Water Service Annual Water Production and Demand.

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 2020 non-revenue water (5,149 cubic meters) represents approximately 49% 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 (46%) 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 2020 resulted in the reduction of non-revenue water by approximately 5% from the previous year. Additional leak detection efforts are planned for the service in 2021.

Figure 4 below illustrates the monthly water production for 2020 along with the historical water production information. Typically, the monthly water production trend is greatest during the summer period (June – Sept).

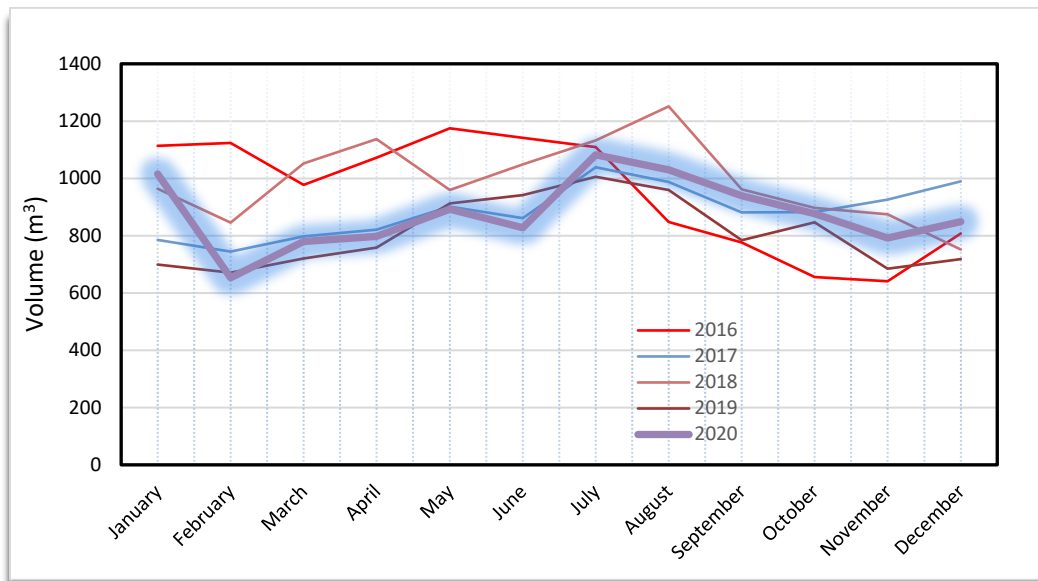


Figure 4: Surfside Park Estates Water Service Monthly Water Production.

Drinking Water Quality

Staff carried out 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 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 2020 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 2020. All treated water samples tested negative for *E.coli* or total coliform bacteria in 2020. The raw water exhibited consistently high arsenic concentrations as well as elevated manganese concentrations but 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 2020:

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 49.5 to 75.5 µg/L. Manganese had a median concentration of 46 µg/L.
- The raw water turbidity was low with a median of 0.40 NTU.
- The raw water was slightly hard (median hardness 39.6 mg/L (CaCO₃)).
- The median pH was 7.

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 0.14 NTU.
- The arsenic concentration after treatment was always below the maximum allowable concentration (MAC) of 10 µg/L. The annual median arsenic concentration was 3.31 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 were well below the MAC.
- The free chlorine residual concentrations ranged from 0.19 to 1.39 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 2020 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 is 2020.
- Ongoing leak detection and repair program (Capital Work).

Capital Projects Update

The Capital Projects that were in progress or completed in 2020 included:

- Replacement of the water service at 344 and 346 Wood Dale Drive was completed by CRD staff.
- Leak Detection Program & Repairs is still ongoing with CRD Operations staff and will be completed within budget in 2021.
- The Water PRV Chamber Hatch Replacement is still in progress and is to be completed in 2021 within budget.

Financial Report

Please refer to the attached 2020 Statement of Operations. 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 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. Debt servicing costs are interest and principal payments on long term debt. 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 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: 2020 Financial Summary (Statement of Operations)

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

Table 1

| Table 1: 2020 Summary of Raw Water Test Results, Surfside Water System | | | | | | | | | |
|--|------------------|-------------------------|------------------|--------------------------|-------|---------------------------|-------------------|------------------|--------------------------|
| PARAMETER | | 2020 ANALYTICAL RESULTS | | | | CANADIAN GUIDELINES | 2010-2019 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 | 39.6 | 4 | 29.9 | 60.3 | No Guideline Required | 45 | 31 | 5.40 - 73.0 |
| Turbidity | NTU | 0.4 | 5 | 0.3 | 0.75 | | 0.36 | 20 | 0.12- 1.34 |
| Water Temperature | deg C | 6.4 | 13 | 5.7 | 7.2 | 15°C AO | 10.2 | 105 | 6.0 - 21.6 |
| pH | pH units | 7 | 3 | 7 | 7.1 | AO pH 7.0 - 10.5 | 8.74 | 26 | 7.97 - 9.14 |
| Total Organic Carbon | mg/L | 0.38 | 4 | ND | 3.4 | | 0.83 | 13 | ND - 4.89 |
| Metals | | | | | | | | | |
| Aluminum | ug/L as Al | 12.30 | 4 | 10.9 | 17.7 | 2900 MAC / 100 OG | 17.7 | 31 | ND - 71.0 |
| Antimony | ug/L as Sb | ND | 4 | ND | 0 | 6 MAC | ND | 31 | ND - 0.0 |
| Arsenic | ug/L as As | 54.4 | 12 | 35 | 61 | 10 MAC | 51.5 | 143 | ND - 88.3 |
| Barium | ug/L as Ba | 59.15 | 4 | 49.5 | 75.5 | 1000 MAC | 60.2 | 31 | 28.0 - 212.0 |
| Beryllium | ug/L as Be | ND | 4 | ND | 0 | | ND | 31 | ND - 0.0 |
| Bismuth | ug/L as Bi | ND | 4 | ND | 0 | | ND | 20 | ND - 0.0 |
| Boron | ug/L as B | 1570 | 4 | 846 | 1840 | 5000 MAC | ND | 31 | ND - 1740 |
| Cadmium | ug/L as Cd | ND | 4 | ND | 0.14 | 5 MAC | ND | 31 | ND - 0.02 |
| Calcium | mg/L as Ca | 12.9 | 4 | 9.76 | 19.6 | No Guideline Required | 14.6 | 31 | 1.9 - 22.9 |
| Chromium | ug/L as Cr | ND | 4 | ND | 0 | 50 MAC | ND | 31 | ND - 0.0 |
| Cobalt | ug/L as Co | ND | 4 | ND | 0 | | ND | 31 | ND - 30.0 |
| Copper | ug/L as Cu | 0.39 | 4 | ND | 7.15 | 2000 MAC / ≤ 1000 AO | 0.91 | 31 | ND - 52.0 |
| Iron | ug/L as Fe | 26.55 | 4 | 22.1 | 29 | ≤ 300 AO | 30.1 | 32 | ND - 166 |
| Lead | ug/L as Pb | ND | 4 | ND | 3.11 | 5 MAC | ND | 31 | ND - 3.51 |
| Lithium | ug/L as Li | 63 | 4 | 50.40 | 67.80 | | 62.3 | 4 | 56.0 - 70.5 |
| Magnesium | mg/L as Mg | 1.82 | 4 | 1.34 | 2.76 | No Guideline Required | 2.03 | 31 | 0.16 - 3.84 |
| Manganese | ug/L as Mn | 46.25 | 4 | 28.2 | 76.4 | 120 MAC / ≤ 20 AO | 41.6 | 33 | ND - 102.0 |
| Molybdenum | ug/L as Mo | ND | 4 | ND | 0 | | ND | 31 | ND - 0.0 |
| Nickel | ug/L as Ni | ND | 4 | ND | 2.3 | | ND | 31 | ND - 1.0 |
| Potassium | mg/L as K | 1.86 | 4 | 1.83 | 1.88 | | 1.96 | 31 | 1.58 - 3.73 |
| Selenium | ug/L as Se | ND | 4 | ND | 0 | 50 MAC | ND | 31 | ND - 0.75 |
| Silicon | ug/L as Si | 7010 | 4 | 6930 | 8490 | | 7,160 | 31 | 912 - 12800 |
| Silver | ug/L as Ag | ND | 4 | ND | 0 | No Guideline Required | ND | 31 | ND - 0.02 |
| Sodium | mg/L as Na | 118.5 | 4 | 91.4 | 124 | ≤ 200 AO | 123 | 31 | 13.10 - 214.0 |
| Strontium | ug/L as Sr | 293 | 4 | 219 | 410 | 7000 MAC | 268 | 31 | 0.31 - 463.0 |
| Sulfur | mg/L as S | 15.7 | 4 | 11.70 | 17.6 | | 17.2 | 20 | 13.5 - 22.0 |
| Thallium | ug/L as Tl | ND | 4 | ND | 0 | | ND | 31 | ND - 0.0 |
| Tin | ug/L as Sn | ND | 4 | ND | 0 | | ND | 31 | ND - 0.0 |
| Titanium | ug/L as Ti | ND | 4 | ND | 0 | | ND | 31 | ND - 0.0 |
| Uranium | ug/L as U | ND | 4 | ND | 0 | 20 MAC | ND | 20 | ND - 0.0 |
| Vanadium | ug/L as V | ND | 4 | ND | 0 | | ND | 31 | ND - 0.0 |
| Zinc | ug/L as Zn | ND | 4 | ND | 52.7 | ≤ 5000 AO | ND | 31 | ND - 185.0 |
| Zirconium | ug/L as Zn | ND | 4 | ND | 0.0 | | ND | 20 | ND - 0.0 |
| Microbial Parameters | | | | | | | | | |
| Indicator Bacteria | | | | | | | | | |
| Coliform, Total | CFU/100 mL | ND | 12 | ND | 0 | | 0 | 114 | 0 - 1 |
| <i>E. coli</i> | CFU/100 mL | ND | 12 | ND | 0 | | 0 | 114 | 0 - 28 |
| Heterotrophic bacteria, 7 day | CFU/mL | Not analyzed in 2020 | | | | | ND | 1 | ND - ND |
| Parasites | | | | | | | | | |
| <i>Cryptosporidium</i> , Total oocysts | oocysts/100 L | Last tested in 2015 | | | | Zero detection desirable | 0 | 8 | 0 - 0.40 |
| <i>Giardia</i> , Total cysts | cysts/100 L | Last tested in 2015 | | | | Zero detection desirable | 0 | 8 | 0 |

Table 2

| Table 2: 2020 Summary of Treated Water Test Results, Surfside Water System | | | | | | | | | |
|--|------------------|-------------------------|------------------|--------------------------|--------|---------------------------|-------------------|------------------|--------------------|
| PARAMETER | | 2020 ANALYTICAL RESULTS | | | | CANADIAN GUIDELINES | 2010-2019 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 | 32.2 | 8 | 28 | 44.2 | | 36 | 26 | 25.1 - 55.9 |
| pH | pH units | 7 | 4 | 7 | 7 | AO pH 7.0 -10.5 | 8.52 | 16 | 8.17 - 8.70 |
| Turbidity | NTU | 0.14 | 11 | ND | 0.28 | | 0.15 | 67 | ND - 1.32 |
| Total Organic Carbon | mg/L | 0.11 | 12 | ND | 0.25 | | 0.52 | 20 | ND - 1.51 |
| Water Temperature | deg C | 6.4 | 109 | 5.1 | 7.4 | 15°C AO | 10.2 | 973 | 0.0 - 24.2 |
| Microbial Parameters | | | | | | | | | |
| Indicator Bacteria | | | | | | | | | |
| Coliform, Total | CFU/100 mL | ND | 59 | ND | 0 | 0 MAC | 0 | 219 | 0 - 1 |
| <i>E. coli</i> | CFU/100 mL | ND | 59 | ND | 0 | 0 MAC | 0 | 219 | ND - 0 |
| Hetero. Plate Count, 7 day | CFU/1 mL | Not tested in 2020 | | | | No Guideline Required | ND | 43 | ND - 940 |
| Disinfectants | | | | | | | | | |
| Disinfectants | | | | | | | | | |
| Chlorine, Free Residual | mg/L as Cl2 | 0.62 | 110 | 0.19 | 1.39 | | 0.64 | 1045 | 0.10 - 1.51 |
| Chlorine, Total Residual | mg/L as Cl2 | 0.71 | 85 | 0.22 | 1.33 | | 0.62 | 1045 | 0.12 - 1.87 |
| Disinfection By-Products | | | | | | | | | |
| Disinfection Byproducts | | | | | | | | | |
| Bromodichloromethane | ug/L | 3.7 | 8 | 1.1 | 6.1 | | 4.6 | 21 | 1.3 - 18.0 |
| Bromoform | ug/L | 5.5 | 8 | 2.1 | 11 | | 8.7 | 21 | 1.9 - 12.0 |
| Chloroform | ug/L | 1.8 | 8 | 1 | 5.3 | | 2.3 | 21 | ND - 10.0 |
| Chlorodibromomethane | ug/L | 5.4 | 8 | 1.5 | 12 | | 8.3 | 21 | 1.8 - 14.0 |
| Total Trihalomethanes | ug/L | 18 | 8 | 5.7 | 31 | 100 MAC | 24.5 | 20 | 6.10 - 50.0 |
| Metals | | | | | | | | | |
| Aluminum | ug/L as Al | 3.3 | 8 | ND | 6.5 | 2900 MAC / 100 OG | 4.3 | 25 | ND - 25.9 |
| Antimony | ug/L as Sb | ND | 8 | ND | 0 | 6 MAC | ND | 25 | ND - 0.0 |
| Arsenic | ug/L as As | 3.31 | 15 | 1.49 | 7.9 | 10 MAC | 4.77 | 138 | ND - 31.0 |
| Barium | ug/L as Ba | 44.4 | 8 | 23.50 | 57.3 | 1000 MAC | 50.7 | 25 | 3.2 - 69.9 |
| Beryllium | ug/L as Be | ND | 8 | ND | 0.0 | | ND | 25 | ND - 0.0 |
| Bismuth | ug/L as Bi | ND | 8 | ND | 0.0 | | ND | 25 | ND - 0.0 |
| Boron | ug/L as B | 1600 | 8 | 1440.0 | 2140.0 | 5000 MAC | ND | 25 | ND - 1840 |
| Cadmium | ug/L as Cd | ND | 8 | ND | 0.0 | 5 MAC | ND | 25 | ND - 0.01 |
| Calcium | mg/L as Ca | 10.85 | 8 | 8.49 | 13.9 | No Guideline Required | 10.85 | 26 | 7.62 - 18.0 |
| Chromium | ug/L as Cr | ND | 8 | ND | 0.0 | 50 MAC | ND | 25 | ND - 1.90 |
| Cobalt | ug/L as Co | ND | 8 | ND | 0.0 | | ND | 25 | ND - 0.0 |
| Copper | ug/L as Cu | 2.45 | 8 | 1.68 | 4.23 | 2000 MAC / ≤ 1000 AO | 3.61 | 25 | 1.70 - 21.8 |
| Iron | ug/L as Fe | ND | 8 | ND | 14.0 | ≤ 300 AO | 5.4 | 26 | ND - 54.7 |
| Lead | ug/L as Pb | ND | 8 | ND | 0.30 | 5 MAC | ND | 25 | ND - 1.09 |
| Lithium | ug/L as Li | 61.75 | 8 | 54.3 | 71.1 | | 61.3 | 3 | 59.6 - 66.6 |
| Magnesium | mg/L as Mg | 1.86 | 8 | 1.59 | 2.30 | No Guideline Required | 2.05 | 26 | 1.04 - 3.05 |
| Manganese | ug/L as Mn | ND | 8 | ND | 6.10 | 120 MAC / ≤ 20 AO | ND | 26 | ND - 25.0 |
| Molybdenum | ug/L as Mo | ND | 8 | ND | 0.0 | | ND | 25 | ND - 1.6 |
| Nickel | ug/L as Ni | ND | 8 | ND | 0.0 | | ND | 25 | ND - 2.9 |
| Potassium | mg/L as K | 1.83 | 8 | 1.74 | 1.97 | | 1.8 | 26 | 1.60 - 2.16 |
| Selenium | ug/L as Se | ND | 8 | ND | 0.0 | 50 MAC | ND | 25 | ND - 0.0 |
| Silicon | ug/L as Si | 6835 | 8 | 5100 | 7410 | | 6,910.00 | 25 | 2350 - 8950 |
| Silver | ug/L as Ag | ND | 8 | ND | 0.0 | No Guideline Required | ND | 20 | ND - 0.0 |
| Sodium | mg/L as Na | 122.5 | 8 | 110.0 | 136.0 | ≤ 200 AO | 125.5 | 26 | 102.0 - 142.0 |
| Strontium | ug/L as Sr | 283.5 | 8 | 235.0 | 368.0 | 7000 MAC | 293 | 25 | 171.0 - 399.0 |
| Sulphur | mg/L as S | 16.85 | 8 | 13.8 | 19.7 | | 17.9 | 26 | 14.0 - 22.4 |
| Thallium | ug/L as Tl | ND | 8 | ND | 0.0 | | ND | 25 | ND - 0.0 |
| Tin | ug/L as Sn | ND | 8 | ND | 0.0 | | ND | 25 | ND - 0.0 |
| Titanium | ug/L as Ti | ND | 8 | ND | 0.0 | | ND | 25 | ND - 0.0 |
| Uranium | ug/L as U | ND | 8 | ND | 0.0 | 20 MAC | ND | 25 | ND - 0.0 |
| Vanadium | ug/L as V | ND | 8 | ND | 0.0 | | ND | 25 | ND - 0.0 |
| Zinc | ug/L as Zn | ND | 8 | ND | 5.0 | ≤ 5000 AO | ND | 25 | ND - 59.0 |
| Zirconium | ug/L | ND | 8 | ND | 0.0 | | ND | 25 | ND - 0.0 |

CAPITAL REGIONAL DISTRICT

SURFSIDE WATER Statement of Operations (Unaudited) For the Year Ended December 31, 2020

| | 2020 | 2019 |
|---|-------------------|----------------|
| Revenue | | |
| Transfers from Government | 27,843 | 33,150 |
| User Charges | 79,866 | 76,344 |
| Other revenue from own sources: | | |
| Interest Earnings | 269 | 145 |
| Transfer from Operating Reserve | - | 1,500 |
| Other Revenue | 1,934 | 4,978 |
| Total Revenue | \$ 109,913 | 116,117 |
| Expenses | | |
| General Government Services | 4,603 | 4,597 |
| Contract for Services | 16,637 | 17,427 |
| CRD Labour and Operating costs | 31,874 | 48,826 |
| Debt Servicing Costs | 3,961 | 16,759 |
| Other Expenses | 14,235 | 20,656 |
| Total Expenses | \$ 71,310 | 108,266 |
| Net revenue (expenses) | 38,604 | 7,851 |
| Transfers to own funds: | | |
| Capital Reserve Fund | 15,000 | 6,011 |
| Operating Reserve Fund | 23,604 | 1,840 |
| 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, 2020

| | Capital Reserve | |
|---|-----------------|---------------|
| | 2020 | 2019 |
| Beginning Balance | 35,820 | 16,013 |
| Transfer from Operating Budget | 15,000 | 6,011 |
| Transfers from Completed Capital Projects | - | 21,372 |
| Transfer to Capital Projects | (2,542) | (8,000) |
| Interest Income | 809 | 423 |
| Ending Balance | 49,087 | 35,820 |

| | Operating Reserve | |
|--------------------------------|-------------------|--------------|
| | 2020 | 2019 |
| Beginning Balance | 4,188 | 3,713 |
| Transfer from Operating Budget | 23,604 | 1,840 |
| Transfer to Operating Budget | - | (1,500) |
| Interest Income | 50 | 135 |
| Ending Balance | 27,842 | 4,188 |