# Lyall Harbour/Boot Cove Water Service

2021 Annual Report

CRD | Drinking Water

## Introduction

This report provides a summary of the Lyall Harbour/Boot Cove 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 Lyall Harbour/Boot Cove is primarily a rural residential development with community and commercial properties located on Saturna Island in the Southern Gulf Islands Electoral Area which was originally serviced by a private water utility and in 1978 the service converted to the Capital Regional District (CRD). The Lyall Harbour/Boot Cove water service is made up of 171 parcels (Figure 1) encompassing a total area of approximately 100 hectares. Of the 171 parcels, 151 properties (164 Single Family Equivalent's) are connected to the water system.

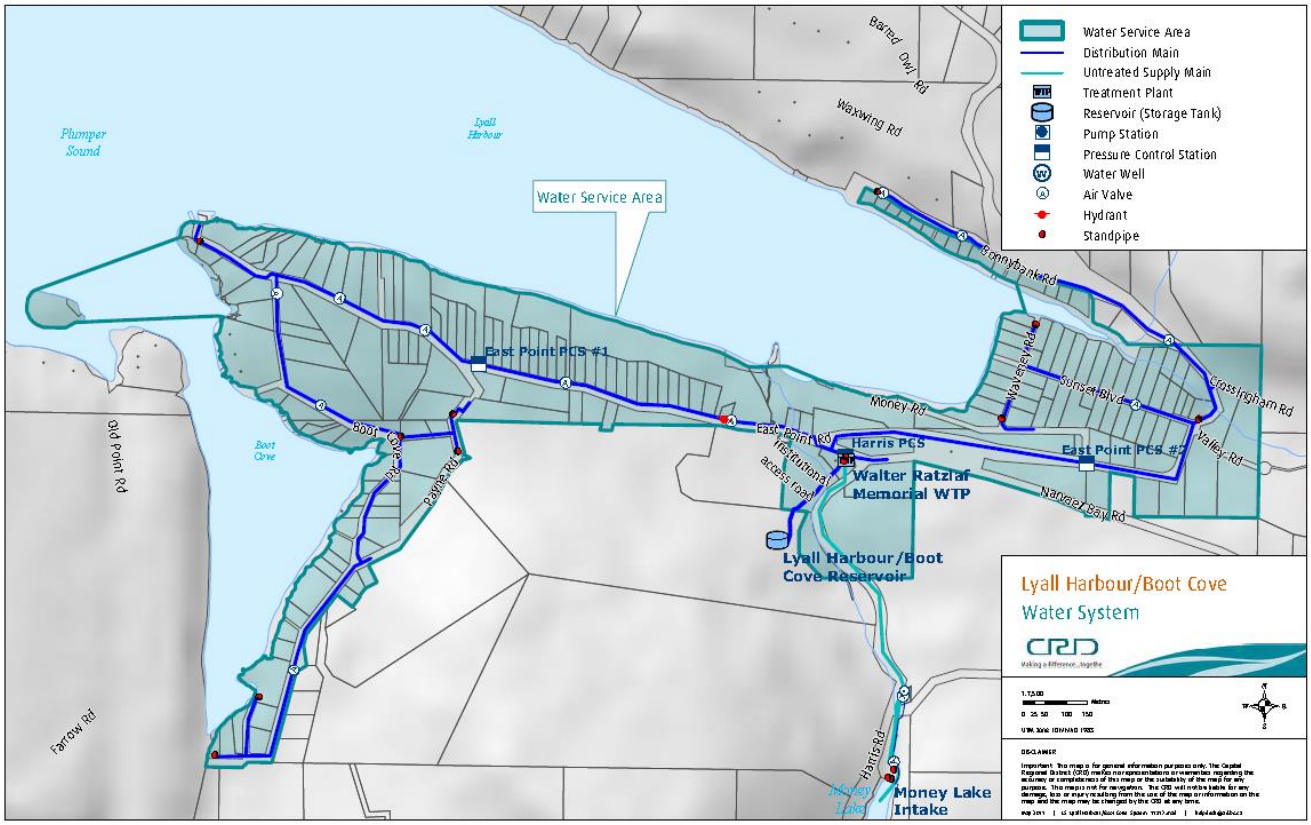


***Figure 1: Map of Lyall Harbour/Boot Cove Water System***

The Lyall Harbour/Boot Cove water system is primarily comprised of:

- Two raw water sources:
  - Money Lake, a small, impounded, surface water body that lies within a 94 hectare (230 acre) watershed on private land.
  - Ground water spring (seepage pit) located near the base of Money Lake Dam.
- One earthen dam structure, Money Lake Dam No. 1.
- Treatment equipment including ozonation (currently offline), two stages of filtration (granular and absorption), ultraviolet light disinfection and chlorine disinfection.
- One steel storage tank (total volume 136 cubic meters or 36,000 US gallons).
- Supervisory Control and Data Acquisition (SCADA) system.
- Distribution system and supply pipe network (8,390 meters of water mains).
- Other water system assets: 151 service connections and meters, three pressure reducing valve stations, 50 gate valves, 12 standpipes and a small auxiliary generator.

## Water Supply

Referring to Figure 2 below, Money Lake monthly water levels are highlighted for 2021. Water supply levels for the year are slightly lower than 2020 but greater than historical levels. It is important to note that water supply levels in Money Lake, prior to 2008, were historically lower during the summer period. An upgrade to mitigate the low water levels involved the installation of a groundwater seepage spring recirculation pumping system. Excess water from the seepage spring is pumped back to Money Lake in order to keep the Lake as full as possible. The groundwater seepage spring water level is not monitored; however the seepage spring weekly flow rate is monitored to confirm production rate. The seepage spring typically provides 100% of the winter water system demand for the community. Money Lake water is used periodically to supplement seepage spring flows, typically during the summer dry period.

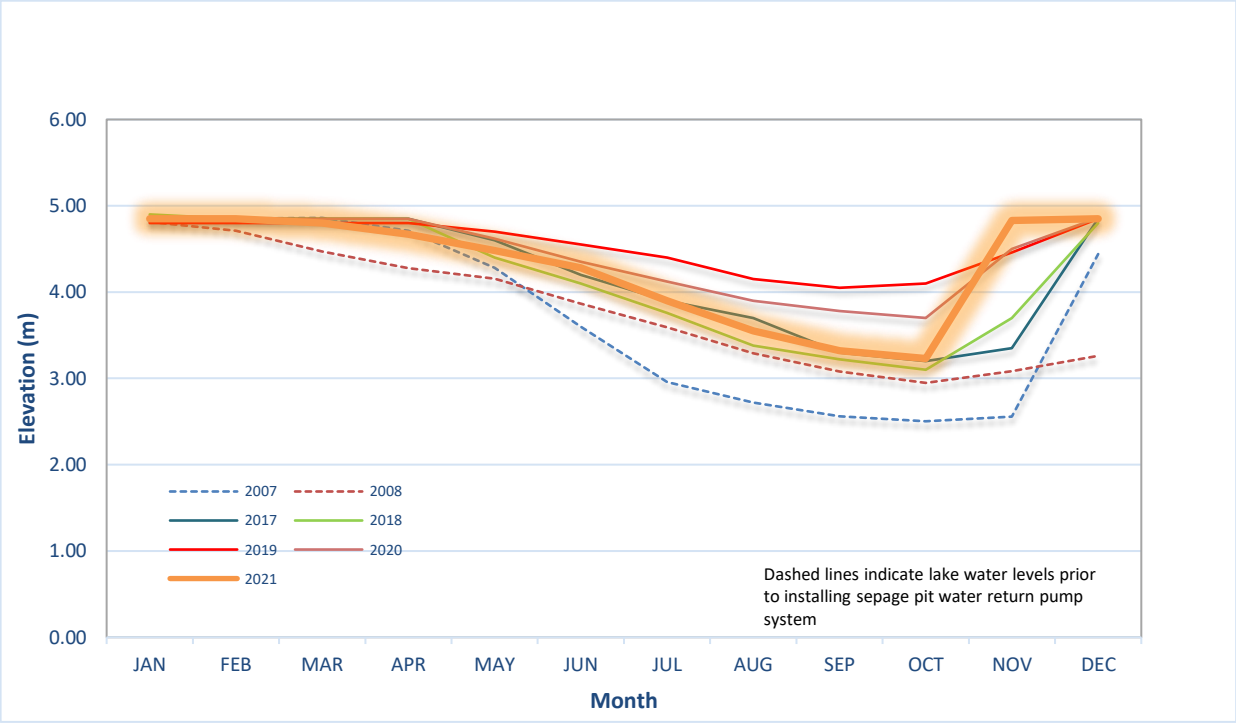


***Figure 2: Money Lake Monthly Water Level***

## Water Production and Demand

Referring to Figure 3, 27,061 cubic meters of water was extracted (water production) from the seepage spring and Money Lake Reservoir in 2021; a 16% increase from the previous year and a 10% increase from the five year average. Water demand (customer water billing) for the service totaled 21,519 cubic meters of water; an 11% increase from the previous year and a 23% increase from the five year average.

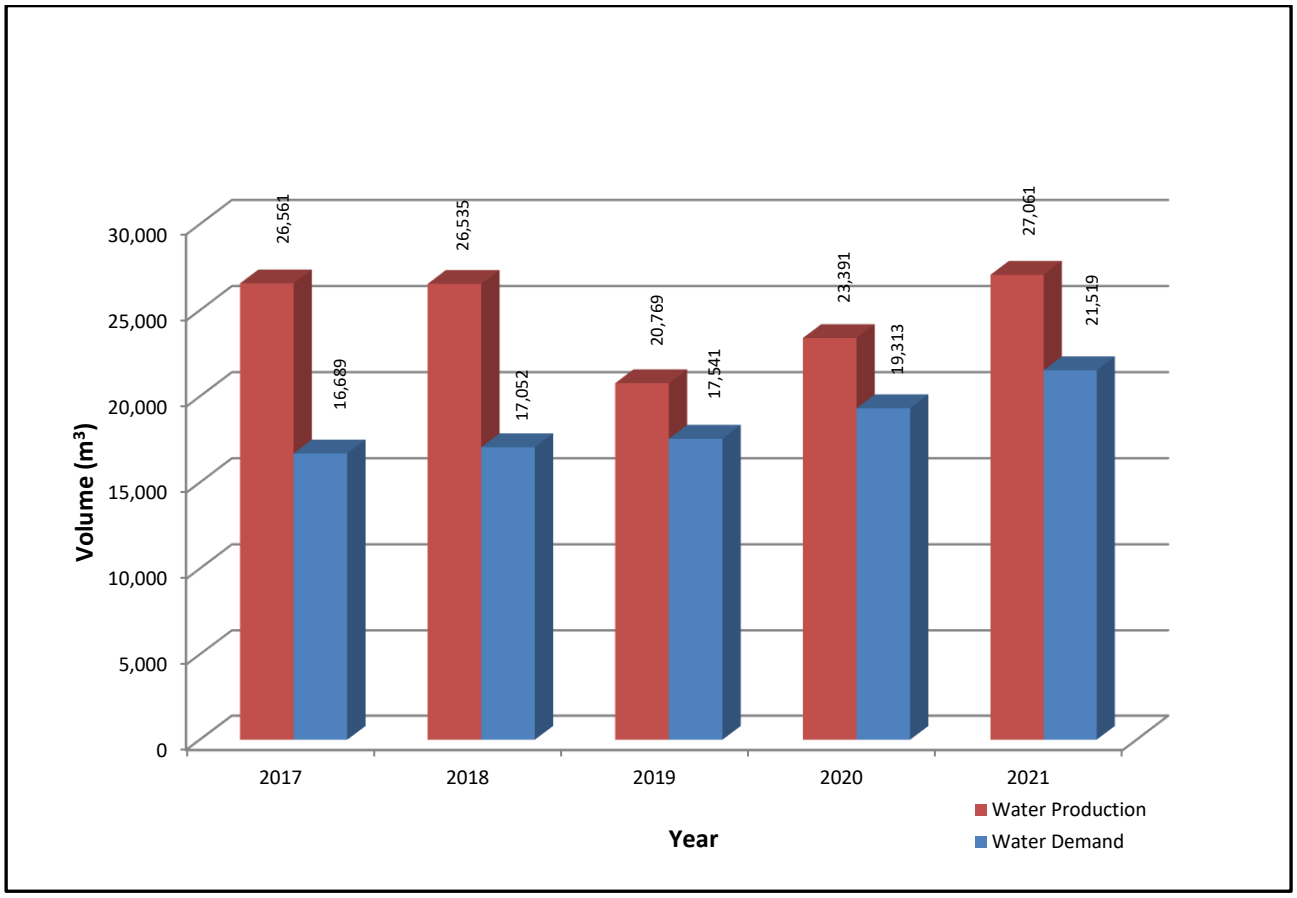


***Figure 3: Lyall Harbour/Boot Cove Water System Annual Water Production and Demand***

The difference between annual water production and annual customer 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 (5,542 cubic meters) represents about 21% of the total water production for the service area. However, almost 12% of the non-revenue water can be attributed to operational use which includes water main flushing to keep chlorine residuals at acceptable levels at the extremities of the water system and water treatment filtration system backwashing activities. Therefore, the non-revenue water associated with system losses is approximately 8% which is considered acceptable for small water systems.

Figure 4 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 Lyall Harbour/Boot Cove water system.

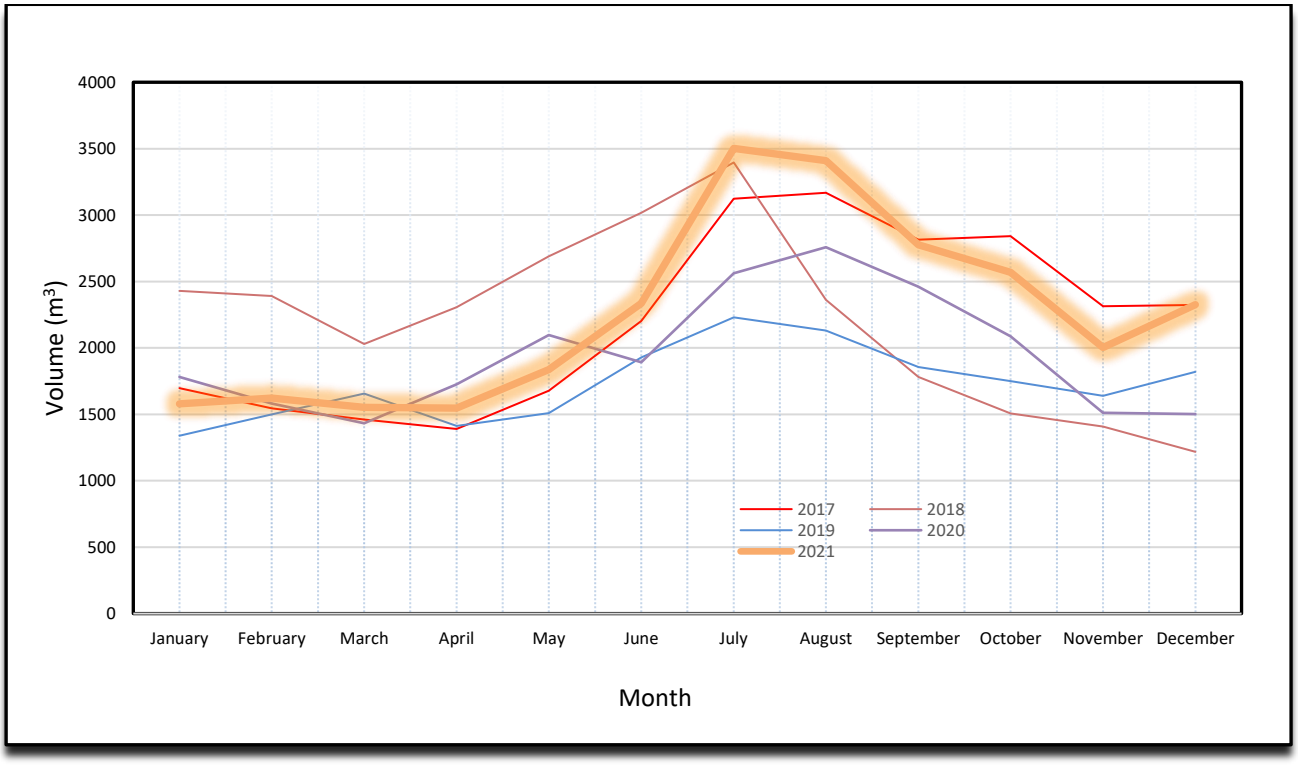


***Figure 4: Lyall Harbour/Boot Cove Water Service Monthly Water Production***

## Drinking Water Quality

The Lyall Harbour/Boot Cove Water System uses predominantly seepage water collected from below the Money Lake dam as the primary raw water source. During the summer months this source is supplemented or completely replaced with flows from Money Lake. During summer and early fall 2021, all source water was supplied by Money Lake only, as the seepage water collection system ran dry. There is sufficient evidence to conclude that the seepage water is hydraulically connected to the lake source.

The Lyall Harbour/Boot Cove Water System had another challenging year in 2021. In total, it was under boil water advisories (BWA) for 192 days throughout the year. The first BWA was a continuation of a turbidity related event that has now developed into an annual pattern which sees the treated water turbidity starting to exceed one Nephelometric Turbidity Unit (NTU) in late fall and remaining above this threshold until the spring; typically until March. In 2021, this turbidity related BWA lasted until March 3. A second turbidity event caused another BWA from August 10 to September 24. On October 9, this aforementioned annual winter turbidity pattern set in again and necessitated another BWA that lasted into 2022. CRD staff have commenced investigations, in collaboration with scientists at the University of Victoria, to study this apparent pattern of increased turbidity readings with the onset of the wet season. There appears to be increasing evidence that dissolved organic matter may interfere with the turbidity readings. This will be studied further in 2022.

Between March and April, Money Lake was subject to an algal bloom by the diatom taxa *Synedra sp.* This bloom increased the risk of adverse taste and odour as well as accelerated filter clogging at the treatment plant. In July and August, Money Lake experienced a strong cyanobacteria bloom. Multiple cyanotoxin tests did not detect microcystin toxins in the raw water during this bloom.

These blooms did not pose a public health risk through the drinking water supplied. The annual average concentration for both regulated disinfection by-products, total Trihalomethanes (TTHM) and Haloacetic Acids (HAA), remained below the maximum acceptable concentration (MAC) in the Guidelines for Canadian Drinking Water Quality (GCDWQ). However, following the extreme rainfall and runoff event on November 14 and 15, one set of disinfection by-product samples tested at (TTHM) or slightly above (HAA) the guideline limits. This is attributable to a sudden influx of natural organic matter in the wake of this extreme weather event. This water system was under a Drinking Water Advisory for elevated disinfection by-products from September 2, 2020 to February 22, 2021. CRD had developed a disinfection by-product management plan with short-term, mid-term and long term action items. The short-term actions were implemented immediately and led to a successive reduction of the disinfection by-product concentrations. CRD remains committed to following through with mid and long-term actions to address this reoccurring issue.

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

Raw Water:

- The raw water exhibited overall low concentrations of total coliform bacteria, with higher concentrations during the summer and early fall months when lake water was the primary water source and water temperatures were high. Throughout most of the year, the raw water entering the treatment plant contained either none or only very low concentrations of *E. coli* bacteria. Only August and September recorded some higher spikes of *E.coli* of up to 20 CFU/100mL.
- The raw water turbidity ranged from 0.2 to 10.6 NTU. The highest raw water turbidity period was during fall and winter (October to January) coinciding with the wet season. It is suspected that a higher concentration of dissolved organic matter during the wet season is a factor in the higher turbidity measurements. The median annual raw water turbidity was higher than last year with 3.69 NTU, likely due to a significant increase in turbidity sampling and testing during the adverse turbidity events throughout the year. During the spring and summer months the raw water turbidity was consistently low between 1 and 2 NTU.
- No *Giardia* cysts and no *Cryptosporidium* oocysts were detected in two sample sets in 2021.
- The raw water had naturally high concentrations of iron and manganese especially during the summer and fall season. Elevated iron and manganese concentrations are typically released during the fall turnover event in Money Lake and can be compounded by the ground passage of the seepage water. Iron concentrations were especially high following the extreme weather event on November 14 and15.
- The raw water was slightly hard (median hardness 41.2 mg/L $CaCO_3$).
- The natural total organic carbon (TOC) in the source water was relatively high (median 5.25 mg/L).

Treated Water:

- Outside the periods with a BWA, the treated water was bacteriologically safe to drink. Throughout the year, 11 samples from the distribution system tested positive for total coliform bacteria. Subsequent re-samples were negative and confirmed that no actual drinking water contamination occurred. No *E.coli* bacteria were detected in any treated water sample.
- Until the rescind notice for the disinfection by-product advisory on February 22, the water supplied by the system had to be consumed with caution as per instructions provided to the customers.

- The treated water turbidity was regularly > 1 NTU and caused the three periods with BWAs. Investigations are underway to determine if the turbidity measurements could be affected by dissolved organic matter and whether such effect constitutes a risk to the safety of the drinking water or not.
- The treated water TOC was periodically high within a range from 3.9 to 9.7 mg/L. The annual mean was 4.9 mg/L. There is currently no guideline in the GCDWQ for TOC levels, however TOC levels > 2 mg/L indicate a potential for disinfection by-product exceedances. TOC levels > 4 mg/L are usually a precursor for high disinfection by-product concentrations.
- CRD staff were able to reduce the concentrations of both TTHM and HAA in comparison to 2020. The disinfection by-product advisory was rescinded on February 22, 2021. TTHM and HAA disinfection by-product concentrations were consistently below the Health Canada MAC except for one sample on November 24 that registered a HAA concentration of 93 µg/L. However, despite this one adverse result, the annual average concentration of TTHM was 71.3 µg/L and that of HAA was 43.6 µg/L, and therefore both parameters were well below the MAC (100 µg/L and 80 µg/L respectively).
- The treated water had iron concentrations in exceedance of the aesthetic objective in a sample from November 24 following the extreme weather event on November 14 and 15. Elevated iron concentrations are not a health concern but can lead to discolouration of the drinking water which can be a nuisance for the customers. The newly established GCDWQ MAC for aluminum was not exceeded in 2021.

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 also 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:

- Emergency response to water system leaks on:
  - East Point Road
  - Payne Road
- Emergency response to high treated water turbidity due to Money Lake algae bloom that resulted in a boil water advisory for the service.
- Several emergency responses to low reservoir water levels and resulting in leak detection efforts.
- Corrective maintenance on the water treatment plant flow control valve.
- Response and corrective actions to safety concerns and mold developing within the water treatment plant.
- Installation of safe work platforms above the four filter tanks in the water treatment plant. These platforms permit safe worker access for media measurement and media replacement and/or augmentation.
- Filter media was measured in late 2021 and augmented in the four filter tanks in early 2022.

- Corrective maintenance on Money Lake water recirculation line.
- Mold assessment and remediation work at the water treatment plant.
- Replacement of water treatment plant booster pump.
- Troubleshooting and corrective maintenance on the chlorine chemical feed pump and chlorine analyzer equipment.
- Relocation of chemical feed pump due to health and safety concerns.
- Emergency response due to an atmospheric weather event that caused flooding and damage to critical infrastructure.

## Capital Project Updates

The Capital Projects that were started and completed in 2021 included:

1. Installation of access platforms in the water treatment plant to permit safe access to the top of the filters. This work was funded by Community Works Funds.
2. Water treatment plant ventilation and materials upgrade to ensure operations staff have a safe atmosphere in which to work inside the treatment facility. This work was funded by Community Works Funds.

## 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), interest on savings Interest earnings), transfer from 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 cost 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 are 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 $4,737. In alignment with *Local Government Act Section 374 (11)*, if actual expenditures exceed actual revenues, any deficiency must be included in the next year's financial plan. The financial plan approved by the CRD Board on March 16, 2022 incorporated this deficit.

| | |
|---|---|
| Submitted by: | Matt McCrank, M.Sc., P.Eng., Senior Manager, Wastewater Infrastructure Operations |
| | Ian Jesney, P.Eng., Senior Manager, Infrastructure Engineering |
| | Glenn Harris, Ph.D., R.P.Bio., Senior Manager, Environmental Protection |
| | Rianna Lachance, BCom, CPA, CA, Senior Manager, Financial Services |
| Concurrence: | Ted Robbins, BSc, C.Tech, General Manager, Integrated Water Services |

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, Lyall Harbour / Boot Cove Water System | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **PARAMETER** | | **2021 ANALYTICAL RESULTS** | | | | **CANADIAN GUIDELINES** | **2011-2020 RESULTS** | | |
| Parameter Name | Units of Measure | Annual Median | Samples Analyzed | Range Minimum | Range Maximum | ≤ = Less than or equal to | Median | Samples Analyzed | Range Minimum-Maximum |
| ND means Not Detected by analytical method used | | | | | | | | | |
| **Physical/Biological Parameters** | | | | | | | | | |
| Carbon, Total Organic | mg/L as C | **5.25** | 16 | 3.5 | 9.3 | | 5.1 | 86 | 3.27 - 18.0 |
| Colour, True | TCU | **22.0** | 14 | 11.0 | 19.0 | | 16 | 32 | 12.7 - 35.0 |
| Hardness as $CaCO_3$ | mg/L | **41.2** | 6 | 35.2 | 44.3 | No Guideline Required | 43.1 | 65 | 34.7 -52.2 |
| pH | pH units | **6.8** | 2 | 6.7 | 6.8 | 7.0 - 10.5 AO | 6.9 | 27 | 6.4 - 7.5 |
| Turbidity, Field Tests | NTU | **3.69** | 117 | 0.67 | 10.6 | | 2.46 | 122 | 0.70 - 1.89 |
| Turbidity, Grab Samples | NTU | **1.9** | 15 | 0.2 | 5.1 | | 1.80 | 110 | 0.60 - 20.3 |
| Water Temperature | Degrees C | **11.0** | 105 | 5.0 | 25.5 | 15°C AO | 10.7 | 280 | 4.0 - 25.0 |
| **Metals** | | | | | | | | | |
| Aluminum | ug/L as Al | **134.5** | 6 | 26.1 | 437 | 2900 MAC / 100 OG | 71.6 | 65 | 8.7 - 739 |
| Antimony | ug/L as Sb | **ND** | 6 | ND | ND | 6 MAC | ND | 65 | ND - 0.04 |
| Arsenic | ug/L as As | **0.36** | 6 | 0.26 | 0.67 | 10 MAC | 0.44 | 65 | 0.22 - 7.49 |
| Barium | ug/L as Ba | **2.45** | 6 | 2.2 | 9.1 | 1000 MAC | 3.6 | 65 | 1.47 - 40.4 |
| Beryllium | ug/L as Be | **ND** | 6 | ND | ND | | ND | 65 | ND |
| Bismuth | ug/L as Bi | **ND** | 6 | ND | ND | | ND | 57 | ND - 0.02 |
| Boron | ug/L as B | **ND** | 6 | ND | ND | 5000 MAC | ND | 65 | 1 - 420 |
| Cadmium | ug/L as Cd | **ND** | 6 | ND | 0.06 | 5 MAC | ND | 65 | ND |
| Calcium | mg/L as Ca | **10.3** | 6 | 9.2 | 11.1 | No Guideline Required | 10.9 | 65 | 8.10 - 13.2 |
| Chromium | ug/L as Cr | **ND** | 6 | ND | ND | 50 MAC | ND | 65 | ND - 0.15 |
| Cobalt | ug/L as Co | **ND** | 6 | ND | 0.31 | | ND | 65 | ND - 1.38 |
| Copper | ug/L as Cu | **2.99** | 6 | 2.64 | 4.46 | 2000 MAC / ≤ 1000 AO | 4.7 | 65 | 1.34 - 285.0 |
| Iron | ug/L as Fe | **222** | 6 | 135 | 613 | ≤ 300 AO | 273 | 67 | 25.6 - 1960.0 |
| Lead | ug/L as Pb | **0.30** | 6 | 0.23 | 0.45 | 5 MAC | 0.24 | 65 | ND - 105.0 |
| Lithium | ug/L as Li | **ND** | 6 | ND | ND | | ND | 29 | ND - 20.1 |
| Magnesium | mg/L as Mg | **3.69** | 6 | 2.98 | 4.17 | No Guideline Required | 3.82 | 65 | 3.18 - 4.67 |
| Manganese | ug/L as Mn | **12.55** | 6 | 8.7 | 120 | 120 MAC / ≤ 20 AO | 33.4 | 66 | ND - 1370 |
| Molybdenum | ug/L as Mo | **ND** | 6 | ND | ND | | ND | 65 | ND - 0.07 |
| Nickel | ug/L as Ni | **ND** | 6 | ND | ND | | ND | 65 | ND - 0.35 |
| Potassium | mg/L as K | **0.62** | 6 | 0.54 | 0.74 | | 0.66 | 65 | 0.39 - 1.36 |
| Selenium | ug/L as Se | **ND** | 6 | ND | ND | 50 MAC | ND | 65 | ND |
| Silicon | mg/L as Si | **7.9** | 6 | 5.49 | 8.6 | | 7.29 | 65 | 2.0 - 19.8 |
| Silver | ug/L as Ag | **ND** | 6 | ND | ND | No Guideline Required | ND | 65 | ND |
| Sodium | mg/L as Na | **8.76** | 6 | 8.17 | 9.63 | ≤ 200 AO | 9.2 | 65 | 6.44 - 13.2 |
| Strontium | ug/L as Sr | **92.3** | 6 | 79.8 | 97.4 | 7000 MAC | 96.8 | 65 | 70.0 - 120 |
| Sulfur | mg/L as S | **3.1** | 6 | ND | 3.5 | | ND | 57 | ND - 6.10 |
| Tin | ug/L as Sn | **ND** | 6 | ND | ND | | ND | 65 | 0.05 - 65.0 |
| Titanium | ug/L as Ti | **6.1** | 6 | ND | 22.9 | | ND | 65 | 1.44 - 65.0 |
| Thallium | ug/L as Tl | **ND** | 6 | ND | ND | | ND | 57 | ND - 0.01 |
| Uranium | ug/L as U | **ND** | 6 | ND | ND | 20 MAC | ND | 57 | ND - 0.01 |
| Vanadium | ug/L as V | **ND** | 6 | ND | ND | | ND | 65 | ND - 0.50 |
| Zinc | ug/L as Zn | **9.3** | 6 | ND | 17.1 | ≤ 5000 AO | 8.7 | 65 | ND - 258.0 |
| Zirconium | ug/L as Zr | **0.35** | 6 | ND | 0.57 | | 0.17 | 57 | ND - 0.56 |
| **Microbial Parameters** | | | | | | | | | |
| **Indicator Bacteria** | | | | | | | | | |
| Coliform, Total | CFU/100 mL | **105** | 20 | 6 | 6000 | | 84.5 | 106 | ND - 11 |
| *E. coli* | CFU/100 mL | **ND** | 21 | ND | 20 | | ND | 107 | ND - 10 |
| Hetero. Plate Count, 35C (2 day) | CFU/1 mL | **2200** | 2 | 1100 | 3300 | | 620 | 20 | ND - 2960 |
| **Parasites** | | | | | | | | | |
| *Cryptosporidium* , Total oocysts | oocysts/100 L | **ND** | 2 | ND | ND | Zero detection desirable | 0.30 | 21 | ND - 2.80 |
| *Giardia* , Total cysts | cysts/100 L | **ND** | 2 | ND | ND | Zero detection desirable | ND | 21 | ND |
| **Algal Toxins** | | | | | | | | | |
| Microcystin | ug/L | ND | 2 | ND | ND | 1.5 ug/L MAC | ND | 22 | ND |

# Table 2

| Table 2: 2021 Summary of Treated Water Test Results, Lyall Harbour / Boot Cove Water System | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **PARAMETER** | | **2021 ANALYTICAL RESULTS** | | | | **CANADIAN GUIDELINES** | **2011-2020 ANALYTICAL RESULTS** | | |
| Parameter Name | Units of Measure | Annual Median | Samples Analyzed | Range Min. | Range Max. | ≤ = Less than or equal to | Median | Samples Analyzed | Range Min.-Max. |
| ND means Not Detected by analytical method used | | | | | | | | | |
| **Physical Parameters** | | | | | | | | | |
| Carbon, Total Organic | mg/L as C | **4.90** | 16 | 3.9 | 9.7 | | 4.40 | 128 | 1.10 - 66.9 |
| Colour, True | TCU | **9.00** | 12 | ND | 40.0 | | 6.60 | 26 | 2.0 - 14.0 |
| pH | No units | Not tested in 2021 | | | | 7.0 - 10.5 AO | 6.80 | 18 | 6.3 - 8 |
| Hardness | mg/L as CaCO3 | **43.40** | 8 | 41.5 | 44.6 | | 43.50 | 47 | 37.2 - 50.1 |
| Turbidity | NTU | **0.70** | 20 | 0.25 | 2.90 | 1 MAC and ≤ 5 AO | 1.01 | 174 | 0.18 - 14.0 |
| Turbidity, Field Tests | NTU | **0.65** | 106 | 0.14 | 3.89 | | 0.73 | 167 | 0.16 - 3.31 |
| Water Temperature | Degrees C | **12.0** | 198 | 5.0 | 12.5 | ≤ 15 AO | 12.0 | 1972 | 0.0 - 20.5 |
| **Microbial Parameters** | | | | | | | | | |
| **Indicator Bacteria** | | | | | | | | | |
| Coliform, Total | CFU/100 mL | **ND** | 151 | ND | 14 | 0 MAC | ND | 700 | ND - 206 |
| *E. coli* | CFU/100 mL | **ND** | 152 | ND | ND | 0 MAC | ND | 700 | ND - 0.30 |
| Hetero. Plate Count, 7 day | CFU/1 mL | **3200** | 39 | 10 | 24000 | No Guideline Required | 10 | 68 | ND - 20000 |
| **Algal Toxins** | | | | | | | | | |
| **Algal Toxins** | | | | | | | | | |
| Microcystin | ug/L | Not tested in 2021 | | | | 1.5 ug/L MAC | ND | 3 | ND |
| **Disinfectants** | | | | | | | | | |
| **Disinfectants** | | | | | | | | | |
| Chlorine, Free Residual | mg/L as Cl2 | **0.14** | 192 | 0.01 | 3.00 | No Guideline Required | 0.27 | 2029 | 0.00 - 8.8 |
| Chlorine, Total Residual | mg/L as $Cl_2$ | **0.22** | 77 | 0.02 | 3.50 | No Guideline Required | 0.50 | 1868 | 0.01 - 2.29 |
| **Disinfection By-Products** | | | | | | | | | |
| **Haloacetic Acids** | | | | | | | | | |
| HAA5 | ug/L | **37** | 4 | 11 | 93 | 80 MAC | 72.00 | 21 | ND - 160 |
| **Trihalomethanes (THMs)** | | | | | | | | | |
| Bromodichloromethane | ug/L | **11.5** | 4 | 9.5 | 14.0 | | 15 | 44 | 0.64 - 40.6 |
| Bromoform | ug/L | **ND** | 4 | ND | ND | | ND | 44 | ND |
| Chloroform | ug/L | **56.0** | 4 | 36.0 | 88.0 | | 80.0 | 44 | 7.26 - 250.0 |
| Chlorodibromomethane | ug/L | **1.40** | 4 | 1.1 | 1.60 | | 1.63 | 44 | ND - 31.0 |
| Total Trihalomethanes | ug/L | **69** | 4 | 47.0 | 100 | 100 MAC | 99.5 | 44 | 7.90 - 280 |
| **Metals** | | | | | | | | | |
| Aluminum | ug/L as Al | **46.0** | 8 | 7.4 | 138 | 2900 MAC / 100 OG | 18.5 | 47 | 7.30 - 100.0 |
| Antimony | ug/L as Sb | **ND** | 8 | ND | ND | 6 MAC | ND | 47 | ND - 0.04 |
| Arsenic | ug/L as As | **0.37** | 8 | 0.23 | 0.5 | 10 MAC | 0.33 | 47 | 0.20 - 0.80 |
| Barium | ug/L as Ba | **2.8** | 8 | 2.5 | 4.4 | 1000 MAC | 2.2 | 47 | 1.50 - 16.1 |
| Beryllium | ug/L as Be | **ND** | 8 | ND | ND | | ND | 47 | ND |
| Bismuth | ug/L as Bi | **ND** | 8 | ND | ND | | ND | 47 | ND - 0.01 |
| Boron | ug/L as B | **ND** | 8 | ND | ND | 5000 MAC | ND | 47 | ND - 13.0 |
| Cadmium | ug/L as Cd | **ND** | 8 | ND | ND | 5 MAC | ND | 47 | ND - 0.09 |
| Calcium | mg/L as Ca | **10.8** | 8 | 10.5 | 11.1 | No Guideline Required | 11.1 | 47 | 9.55 - 13.2 |
| Chromium | ug/L as Cr | **ND** | 8 | ND | ND | 50 MAC | ND | 47 | ND |
| Cobalt | ug/L as Co | **ND** | 8 | ND | ND | | ND | 47 | ND - 0.01 |
| Copper | ug/L as Cu | **23.6** | 8 | 11.5 | 41.5 | 2000 MAC / ≤ 1000 AO | 31.7 | 47 | 2.14 - 595 |
| Iron | ug/L as Fe | **95.7** | 8 | 55.2 | 341 | ≤ 300 AO | 129 | 49 | 28.8 - 1670.0 |
| Lead | ug/L as Pb | **1.03** | 8 | 0.43 | 2.36 | 5 MAC | 1.59 | 47 | ND - 25.8 |
| Lithium | ug/L as Li | **ND** | 4 | ND | ND | | ND | 18 | ND - 1.74 |
| Magnesium | mg/L as Mg | **3.95** | 8 | 3.7 | 4.29 | No Guideline Required | 3.87 | 47 | 3.20 - 4.53 |
| Manganese | ug/L as Mn | **2.2** | 8 | ND | 13.5 | 120 MAC / ≤ 20 AO | 1.6 | 49 | ND - 26.3 |
| Molybdenum | ug/L as Mo | **ND** | 8 | ND | ND | | ND | 47 | ND - 0.10 |
| Nickel | ug/L as Ni | **ND** | 8 | ND | 2.3 | | 2.0 | 47 | 0.29 - 80.9 |
| Potassium | mg/L as K | **0.62** | 8 | 0.55 | 0.70 | | 0.68 | 47 | 0.48 - 0.96 |
| Selenium | ug/L as Se | **ND** | 8 | ND | ND | 50 MAC | ND | 47 | ND - 0.12 |
| Silicon | mg/L as Si | **6.94** | 8 | 5.48 | 7.99 | | 7.22 | 47 | 2.97 - 8.85 |
| Silver | ug/L as Ag | **ND** | 8 | ND | ND | No Guideline Required | ND | 47 | ND |
| Sodium | mg/L as Na | **11.3** | 8 | 11.2 | 11.9 | ≤ 200 AO | 12.0 | 47 | 9.26 - 15.6 |
| Strontium | ug/L as Sr | **96.4** | 8 | 90.2 | 97.9 | 7000 MAC | 97.3 | 47 | 81.5 - 121.0 |
| Sulfur | mg/L as S | **3.1** | 8 | ND | 3.3 | | ND | 47 | ND - 5.60 |
| Tin | ug/L as Sn | **ND** | 8 | ND | ND | | ND | 47 | ND - 47.8 |
| Titanium | ug/L as Ti | **ND** | 8 | ND | 9.3 | | ND | 47 | 0.79 - 5.30 |
| Thallium | ug/L as Tl | **ND** | 8 | ND | ND | | ND | 47 | ND |
| Uranium | ug/L as U | **ND** | 8 | ND | ND | 20 MAC | ND | 47 | ND - 0.01 |
| Vanadium | ug/L as V | **ND** | 8 | ND | ND | | ND | 47 | ND - 0.48 |
| Zinc | ug/L as Zn | **26.8** | 8 | 12.3 | 49.1 | ≤ 5000 AO | 26.6 | 47 | ND - 102.0 |
| Zirconium | ug/L as Zr | **0.2** | 8 | ND | 0.37 | | 0.14 | 47 | ND - 0.66 |