**ATTACHMENT A**

# VILLAGE OF BELCARRA

# DRINKING WATER QUALITY ANNUAL REPORT

# 2022

**Submitted: June 5, 2023**

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## INTRODUCTION

This report is prepared by the Village of Belcarra (Belcarra) under the Water Quality Monitoring and Reporting Plan for the Metro Vancouver (MV) and Member Municipalities. The purpose of the report is to provide Belcarra water consumers and the Medical Health Officer (MHO) with drinking water sampling test results for 2022, and to present background information on Belcarra concerning water supply, treatment, and specific measures being taken to protect and enhance drinking water quality as per requirements under the Drinking Water Protection Act.

## A. GENERAL DESCRIPTION

Belcarra delivers potable water to its customers via a waterworks distribution system incorporating approximately 11 Km of water mains, one high pressure zone, one low pressure zone, a pumping station, and a water storage reservoir. As of December 31, 2022, the water distribution system provides water to 191 of a possible 270 parcels.

From January 1, 2022 to December 27, 2022, there was 3,148,430 cubic feet (89,153.6 cubic meters) of water used in Belcarra. This compares to 2021 total water usage of 2,743,000 cu/ft (77,673 cubic meters), indicating an increase of 405,430 cu/ft (11,480 cubic meters). The primary use is residential domestic consumption, however there is one commercial water connection installed in Belcarra Park for public washrooms, irrigation system, and drinking fountains.

In January of 2021 staff began monitoring water usage for Belcarra Park in order to track total volume and monthly consumption patterns. On December 31, 2021 to December 30, 2022 Belcarra Park utilized 3,238 Cu/Meters

All Belcarra water is purchased from the Greater Vancouver Water District (GVWD), through the District of North Vancouver (DNV).

## B. WATER DISTRIBUTION SYSTEM – Village of Belcarra

### 1. General

The Belcarra water distribution system is comprised of four networks, these are further described as:

- Village of Belcarra Marine Crossing Mains
- Reservoir Supply Main
- Low Pressure Distribution Zone
- High Pressure Zone on Main Avenue and Bedwell Bay Road

For the purposes of water quality monitoring and reporting in Belcarra, the location where water is drawn from the GVWD transmission system into the DNV system are considered “sources” for the Belcarra system.

A map of the overall water system showing the gravity and pressure zones and water quality sampling site locations is included (See Appendix A).

### 2. Belcarra Water Quality Testing

Sample tests are performed monthly by Belcarra staff, and twice a month from April to September. A minimum of four to five of the 13 sample stations are tested each month, with all 13 sample stations being tested over a three-month period.

Samples are delivered to the Metro Vancouver laboratory for analysis and reporting. Standard bacteriological parameters analysed by the Metro Vancouver laboratory are Total Coliform, E. coli and Heterotrophic Plate Count (HPC).

The Fraser Health Authority (FHA) may take random samples from; selected sites, or areas where water quality complaints have originated, or where waterworks construction or maintenance activities are underway.

Locations of water quality sampling points in the Belcarra system are based on a guideline provided by the Regional Medical Health Officers as follows:

i. One sampling point at "source" (supply from GVWD/DNV)
ii. Twelve sampling points at system dead-ends or near dead-ends

Sampling frequency was completed in accordance with the recommendations provided by the Fraser Health Authority.

A table showing the Schedule for Sampling and Reporting is included (See Appendix C).

(a) Physical Parameters

Water temperature and turbidity are measured for all samples and collected for bacteriological testing and are reported in the overall microbiology test results from the Metro Vancouver laboratory. Turbidity is measured in Nephelometric Turbidity Units (NTUs). Health Canada Guidelines for Canadian Drinking Water Quality sets the Aesthetic Objective for water temperature at less than or equal to 15 degrees Celsius and an upper limit of 1 NTU for turbidity. Taste, odour and turbidity are monitored on a complaint basis.

(b) Chemical Parameters

In 2022, chemical monitoring in the water distribution system was conducted for the following:

i. **Free chlorine residual** – The presence of free chlorine: A sufficient amount of chlorine was initially added to the water to inactivate the bacteria and some viruses that cause diarrheal disease; and protect the water from recontamination during storage. The presence of free chlorine in drinking water is correlated with the absence of disease-causing organisms, and thus is a measure of the potability of water.

ii. **Haloacetic acids (HAA's)** – are a type of chlorination disinfection by-product (CDBP) that are formed when the chlorine used to disinfect drinking water reacts with naturally occurring organic matter (NOM) in water. Haloacetic acids are a relatively new disinfection by-product.

iii. **Trihalomethanes (THM's)** – THM's are disinfection by-products. formed when chlorine or bromine interacts with the natural organic materials found in water.

iv. **pH** – Power of Hydrogen. pH is a measurement under the Aesthetic Objective guidelines, with the optimal range of values between 6.5 – 8.5 pH.

v. **Metals** – The EPA has set maximum contaminant levels (MCL) for metals including arsenic, barium, cadmium, chromium, lead, copper, mercury, selenium, nickel, thallium, antimony, and beryllium. This means that public water supplies are monitored for these metals regularly.

## 3. Results

Test results for bacteria, temperature, turbidity, and chlorine residual are compiled for each sample site.

- Belcarra Bacteria counts

A table of results of bacteriological testing of Sample Station Readings of E. coli, HPC, Total Coliform from January to December is attached (See Appendix D).

Metro Vancouver's analysis of HPC confirmed that out of 90 samples submitted, 3 samples exceeded Metro Vancouver's threshold of 500 CFU/ml. All samples were taken from dead end water mains and can be adversely affected by the water age and usage at these dead-end locations. All mains with samples over the threshold were flushed to improve the water quality in those locations.

Metro Vancouver reported that all samples collected in 2022 satisfied the bacteriological requirements of the BC Drinking Water Protection Regulation.

- Belcarra Physical Parameters

In 2022, 90 samples were tested for turbidity levels in the Belcarra water distribution system and no samples were greater than 5.0 NTU. Water temperatures ranged from a January low of 1.7° C to an August high of 21.9° C.

- Belcarra Chemical Parameters

i. Belcarra water comes from GVWD/DNV where it is received at the Michael Rosen water station. The chlorine residual at that location averages 0.62 mg/l. The water then supplies Tatlow Reservoir and then gets distributed throughout the municipality where other samples are taken at various locations.

90 samples were taken at various end of the run locations. Out of the 90 samples, none were below the minimum chlorine residual concentration of 0.2 mg/l.

As stated in the previous report, a real time chlorine monitoring station was installed in the Tatlow facility which sends an alarm to all our water service technicians when the system senses a low chlorine reading.

ii. **Haloacetic Acids (HAA's)** – Haloacetic Acids (HAA)
In Belcarra all **8** of the 2022 samples taken were below the MAC of 80 ppb/mL for this parameter (See Appendix E).

iii. **Trihalomethanes (THMs)** – Trihalomethanes (THMs)
All **8** of the 2022 samples taken in Belcarra all were below the MAC of 100 ppb/mL for this parameter (See Appendix E).

i. **pH** – All **8** of the samples taken in 2022 were within the Aesthetic Objective guidelines of between **6.5** and **8.5** pH (See Appendix E).

ii. **Metals** – a total of **4** for metals, including copper, lead, and zinc, were collected in 2022 for Metro Vancouver Metals Sampling Program for Belcarra (See Appendix F). All the metals tested were under the recommended maximum allowable Guideline Limits.

**4. Challenges**

Keeping chlorine residuals above the 0.20 mg/L is critical for maintaining a healthy and safe water distribution system in our municipality. The combination of cold-water temperatures and ensuring there is no water stagnation in dead end lines help to keep chlorine residuals above 0.20 mg/L.

**Work Program 2022**

- Water sampling ports are installed at the water main ends, and at dead-end branch lines. They are opened to allow additional waterflow as an operational means to move water through the lines thereby helping to maintain the quality of water in these low waterflow areas. However, in extreme cold conditions during winter the testing ports are shut down and drained to prevent freezing.
- A total of 5 new water service connection applications were applied for and pending completion in 2022.
- 50% of the hydrants were flushed in Belcarra and in addition to routine flushing, Public Works Department monitors the HPC results and performs additional flushing through the sample ports and fire hydrants when HPC readings are greater than 500 CFU/ml.
- 50% of the hydrants received tear downs and service. The municipality gets divided into two zones for hydrant servicing; one zone gets a tear down and service, while the second zone receives a hydrant flushing. Each year the services gets switched from the first zone to the second zone.
- A SCADA system upgrade has been completed which included new software programming, a new laptop at the Village Hall and a computer station in the Tatlow building. This was team project completed by both WSP and Sea To Sky Network Solutions.

- Reconditioned the flow control valve and the check valve at Strathcona Station.
- Replaced the remote transmission unit at Midden Station.
- A Water Model Study was conducted and completed in September of 2022 that was reported to Council by WSP in a regular Council meeting. Recommendations within the report called for a further study that would propose system improvements that would resolve the water deficiencies for firefighting based on the Water Model findings.
- Residential and commercial meter boxes were inspected in May and November for condition and water consumption data.
- Fuel tank scrubbing was completed as part of the yearly maintenance on the generator and the fire pump.
- Additional water sampling is taking place twice a month at every sample port to collect data that will justify increasing the base water level in the Tatlow Reservoir. In 2022 the base water level was at 65%.
- In May of 2022, both Tatlow and Dutchman reservoir were inspected. Inspection report indicated the reservoirs are in good condition with 2-3 cm of sediment in the Tatlow Tank.

## C. INCIDENTS/SIGNIFICANT COMPLAINTS

- No Potable water related complaints recorded.

## D. GENERAL WATER ADVISORIES

No water advisories have been issued to date in Belcarra.

## E. OPERATOR TRAINING/QUALIFICATIONS

Belcarra currently has two water distribution system operators. One Level 1 Certified Operator, and one level 2 Certified Operator from the EOCP, keeping Belcarra in full compliance with provincial regulations. In addition, all public works staff have completed and passed the courses required for level 2 operators' certification. Staff maintain an ongoing education program to ensure staff stay current and continue to improve their knowledge base.

SECURITY MEASURES
Security features at Belcarra include:

- Locked accesses to the reservoir with the ladder removed
- Exterior lighting and fencing for the water receiving building at Midden
- Dual locking mechanisms to enter the Midden and pump station buildings
- Door alarms at Strathcona chamber & kiosk, and Midden & Tatlow buildings
- Alarm at the Strathcona chamber with intrusion alarm indicator sent directly to the Belcarra Water Operator's cell phone
- CCTV cameras at Public Works, Midden building, Tatlow reservoir and pump station
- In 2023 staff anticipate installing chain-link fencing around Tatlow reservoir.

## F. NOTIFICATION AND EMERGENCY RESPONSE PLAN

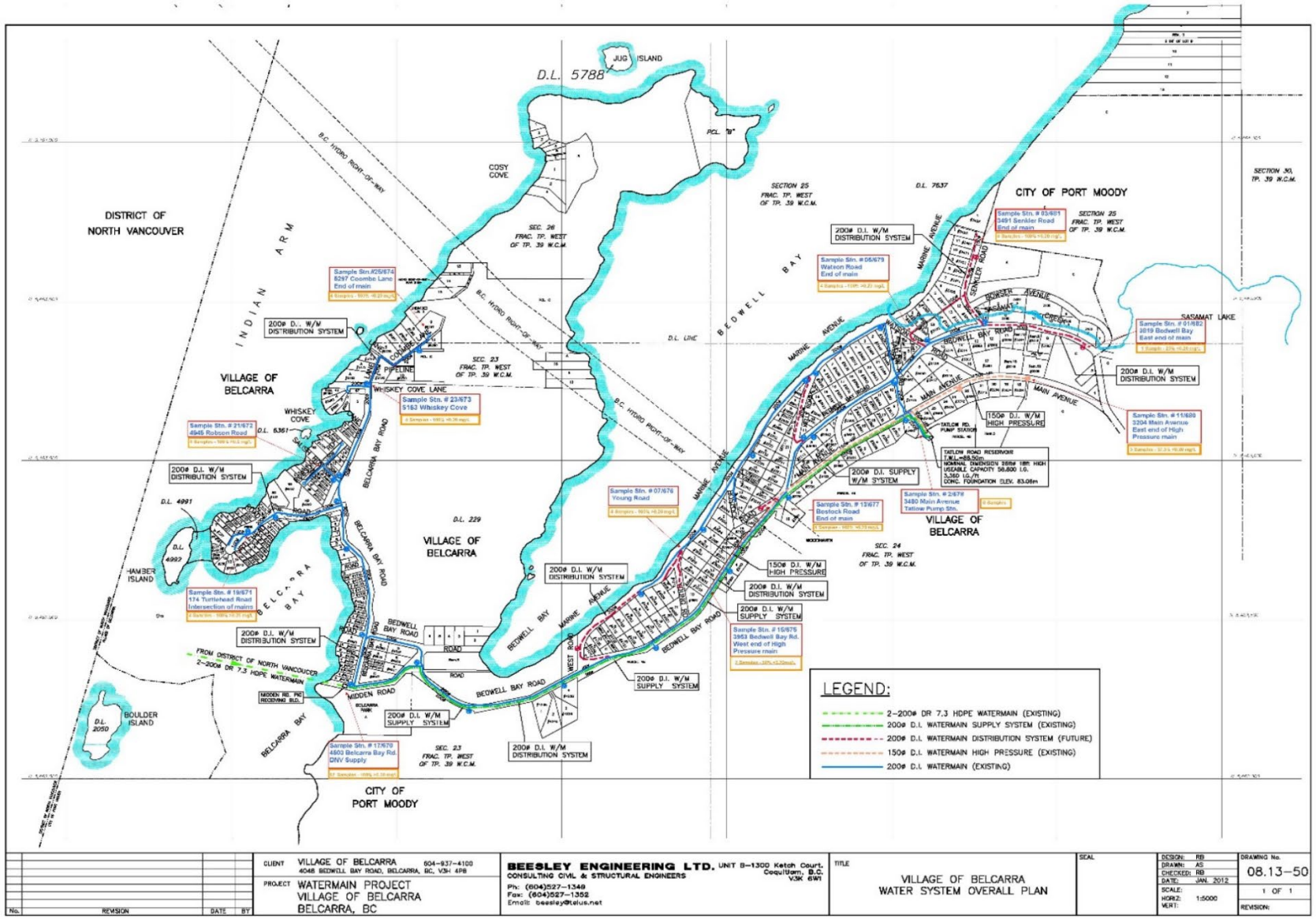
All water system alarms and emergency phone calls from the residents get sent directly to the 'on call' public works staff member who is on duty for the week (24 hr clock). There are three staff members who rotate the duty on a weekly basis.

The on-duty staff member has the ability to view the water control system via SCADA and activate switches from their phone. They will also attend the scene when necessary to control or isolate as needed.

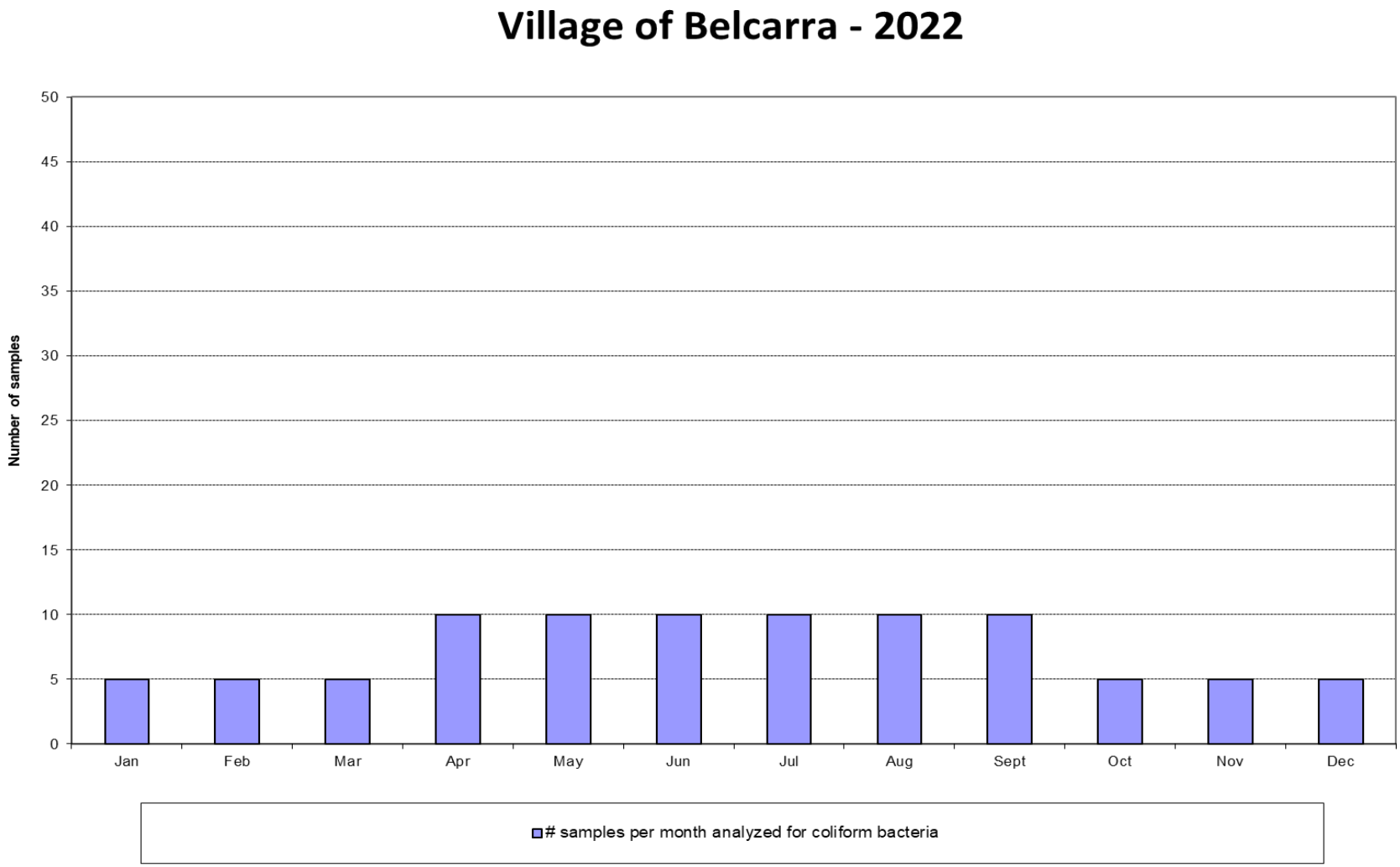
Staff may also utilize a list of contractors that was established for emergency call ins for major line breaks, electrical service, valves, fire pump, and monitoring.

# Appendix A

## Map of Belcarra Water System, Sampling Site Locations and Pressure Zone



**Appendix B**


Village of Belcarra - 2022
Number of samples
50
45
40
35
30
25
20
15
10
5
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sept
Oct
Nov
Dec
# samples per month analyzed for coliform bacteria

Appendix C

Schedule for Belcarra Sampling and Reporting for 2022

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **DISTRIBUTION SYSTEM SAMPLING** | | | | | | | | | | | | |
| Temperature, E. coli, HPC,<br>Total Coliform, Turbidity, &<br>Free Chlorine Residuals (Monthly) | X | X | X | X<br>X | X<br>X | X<br>X | X<br>X | X<br>X | X<br>X | X | X | X |
| HAA's, THM's, pH (Quarterly) | | X | | | X | | | X | | | | X |
| Metals: Copper, Lead, Zinc | | | | X | | | | | | X | | |
| | | | | | | | | | | | | |
| **NOTIFICATION** | | | | | | | | | | | | |
| 2022 Annual Report: | | | | | | | | | | | | |
| Annual Report sent to MHO | | | | | | X | | | | | | |
| MHO to send Council response | | | | | | X | | | | | | |
| Staff Report to Council | | | | | | X | | | | | | |
| Posted on Web | | | | | | X | | | | | | |

Appendix D

Belcarra Sample Station Readings of; Chlorine Free, E. coli, HPC, Temperature, Total Coliform, and Turbidity

| Sample Name | Description | Sampled Date | Temperature °C | HPC CFU/mL | Total Coliform CFU/100mLs | Ecoli CFU/100mLs | Turbidity NTU | Chlorine Free mg/L |
|---|---|---|---|---|---|---|---|---|
| BLC-670 | 4503 Belcarra Bay Road | 2022-01-12 10:45 | 7.1 | <2 | <1 | <1 | 0.14 | 0.71 |
| BLC-670 | 4503 Belcarra Bay Road | 2022-02-09 10:00 | 5.8 | 8 | <1 | <1 | 0.17 | 0.67 |
| BLC-670 | 4503 Belcarra Bay Road | 2022-03-08 08:50 | 6.5 | <2 | <1 | <1 | 0.13 | 0.8 |
| BLC-670 | 4503 Belcarra Bay Road | 2022-04-12 09:45 | 7.8 | 14 | <1 | <1 | 0.08 | 0.54 |
| BLC-670 | 4503 Belcarra Bay Road | 2022-04-27 08:55 | 8.5 | 4 | <1 | <1 | 0.09 | 0.59 |
| BLC-670 | 4503 Belcarra Bay Road | 2022-05-10 08:45 | 9.6 | <2 | <1 | <1 | 0.13 | 0.6 |
| BLC-670 | 4503 Belcarra Bay Road | 2022-05-24 10:03 | 10.1 | 4 | <1 | <1 | 0.12 | 0.59 |
| BLC-670 | 4503 Belcarra Bay Road | 2022-06-14 09:15 | 11.8 | 2 | <1 | <1 | 0.14 | 0.62 |
| BLC-670 | 4503 Belcarra Bay Road | 2022-06-29 11:05 | 12.9 | 2 | <1 | <1 | 0.18 | 0.71 |
| BLC-670 | 4503 Belcarra Bay Road | 2022-07-12 09:10 | 12.1 | 2 | <1 | <1 | 0.16 | 0.7 |
| BLC-670 | 4503 Belcarra Bay Road | 2022-07-26 09:15 | 13.3 | 4 | <1 | <1 | 0.14 | 0.89 |
| BLC-670 | 4503 Belcarra Bay Road | 2022-08-09 09:30 | 13.5 | 2 | <1 | <1 | 0.1 | 0.75 |
| BLC-670 | 4503 Belcarra Bay Road | 2022-08-25 09:25 | 15.3 | 70 | <1 | <1 | 0.13 | 0.75 |
| BLC-670 | 4503 Belcarra Bay Road | 2022-09-06 09:45 | 15.6 | 16 | <1 | <1 | 0.13 | 0.59 |
| BLC-670 | 4503 Belcarra Bay Road | 2022-09-27 10:35 | 13.9 | 160 | <1 | <1 | 0.13 | 0.69 |
| BLC-670 | 4503 Belcarra Bay Road | 2022-10-11 09:30 | 14.7 | 72 | <1 | <1 | 0.13 | 0.22 |
| BLC-670 | 4503 Belcarra Bay Road | 2022-11-09 10:00 | 10.3 | 20 | <1 | <1 | 0.14 | 0.37 |
| BLC-670 | 4503 Belcarra Bay Road | 2022-12-14 09:25 | 7.3 | 16 | <1 | <1 | 0.12 | 0.69 |
| BLC-671 | 174 Turtlehead Road | 2022-02-09 10:10 | 5.9 | <2 | <1 | <1 | 0.12 | 0.5 |
| BLC-671 | 174 Turtlehead Road | 2022-04-27 09:05 | 10.1 | <2 | <1 | <1 | 0.11 | 0.47 |
| BLC-671 | 174 Turtlehead Road | 2022-06-14 09:30 | 14.5 | 2 | <1 | <1 | 0.1 | 0.41 |
| BLC-671 | 174 Turtlehead Road | 2022-07-12 09:25 | 16.9 | 4 | <1 | <1 | 0.1 | 0.6 |
| BLC-671 | 174 Turtlehead Road | 2022-09-06 09:50 | 19.2 | 82 | <1 | <1 | 0.13 | 0.4 |
| BLC-671 | 174 Turtlehead Road | 2022-11-09 10:20 | 10.1 | 16 | <1 | <1 | 0.13 | 0.57 |
| BLC-672 | 4945 Robson Road | 2022-02-09 10:20 | 5.8 | 2 | <1 | <1 | 0.11 | 0.6 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| BLC-672 | 4945 Robson Road | 2022-04-27 09:10 | 9.7 | 58 | <1 | <1 | 0.12 | 0.49 |
| BLC-672 | 4945 Robson Road | 2022-06-14 09:36 | 14.1 | 36 | <1 | <1 | 0.12 | 0.44 |
| BLC-672 | 4945 Robson Road | 2022-07-12 09:35 | 16.7 | 90 | <1 | <1 | 0.11 | 0.63 |
| BLC-672 | 4945 Robson Road | 2022-09-06 09:55 | 19.9 | 36 | <1 | <1 | 0.11 | 0.67 |
| BLC-672 | 4945 Robson Road | 2022-11-09 10:30 | 10.5 | 16 | <1 | <1 | 0.12 | 0.32 |
| BLC-673 | 5163 Whiskey Cove | 2022-02-09 10:25 | 5.3 | <2 | <1 | <1 | 0.23 | 0.5 |
| BLC-673 | 5163 Whiskey Cove | 2022-04-27 09:15 | 8.8 | <2 | <1 | <1 | 0.11 | 0.47 |
| BLC-673 | 5163 Whiskey Cove | 2022-06-14 09:45 | 13.6 | <2 | <1 | <1 | 0.13 | 0.45 |
| BLC-673 | 5163 Whiskey Cove | 2022-07-12 09:45 | 16.6 | 2 | <1 | <1 | 0.12 | 0.53 |
| BLC-673 | 5163 Whiskey Cove | 2022-09-06 10:05 | 18.8 | 64 | <1 | <1 | 0.14 | 0.49 |
| BLC-673 | 5163 Whiskey Cove | 2022-11-09 10:42 | 10 | 50 | <1 | <1 | 0.15 | 0.26 |
| BLC-674 | 5297 Coombe Lane | 2022-02-09 10:35 | 5.3 | <2 | <1 | <1 | 0.11 | 0.43 |
| BLC-674 | 5297 Coombe Lane | 2022-04-27 09:20 | 9.1 | <2 | <1 | <1 | 0.12 | 0.44 |
| BLC-674 | 5297 Coombe Lane | 2022-06-14 09:50 | 12.8 | 4 | <1 | <1 | 0.23 | 0.26 |
| BLC-674 | 5297 Coombe Lane | 2022-07-12 09:52 | 17.9 | 24 | <1 | <1 | 0.22 | 0.28 |
| BLC-674 | 5297 Coombe Lane | 2022-09-06 10:10 | 18.8 | 62 | <1 | <1 | 0.19 | 0.34 |
| BLC-674 | 5297 Coombe Lane | 2022-11-09 11:00 | 10 | 68 | <1 | <1 | 0.18 | 0.33 |
| BLC-675 | 3953 Bedwell Bay Road | 2022-01-12 11:00 | 7.5 | <2 | <1 | <1 | 0.12 | 0.6 |
| BLC-675 | 3953 Bedwell Bay Road | 2022-04-12 09:55 | 7.7 | 100 | <1 | <1 | 0.11 | 0.46 |
| BLC-675 | 3953 Bedwell Bay Road | 2022-05-24 09:22 | 10 | 2 | <1 | <1 | 0.1 | 0.41 |
| BLC-675 | 3953 Bedwell Bay Road | 2022-07-26 09:50 | 15.2 | 2 | <1 | <1 | 0.16 | 0.46 |
| BLC-675 | 3953 Bedwell Bay Road | 2022-08-25 10:09 | 17.5 | 48 | <1 | <1 | 0.14 | 0.34 |
| BLC-675 | 3953 Bedwell Bay Road | 2022-10-11 10:15 | 15.2 | 58 | <1 | <1 | 0.16 | 0.4 |
| BLC-676 | Young Road | 2022-01-12 11:45 | 2.5 | <2 | <1 | <1 | 0.15 | 0.62 |
| BLC-676 | Young Road | 2022-04-12 10:21 | 8.5 | 32 | <1 | <1 | 0.11 | 0.48 |
| BLC-676 | Young Road | 2022-05-24 09:50 | 12.9 | 4 | <1 | <1 | 0.1 | 0.49 |
| BLC-676 | Young Road | 2022-07-26 10:40 | 17.5 | 40 | <1 | <1 | 0.14 | 0.64 |
| BLC-676 | Young Road | 2022-08-25 10:55 | 21.4 | 76 | <1 | <1 | 0.14 | 0.53 |
| BLC-676 | Young Road | 2022-10-11 11:10 | 16.7 | 64 | <1 | <1 | 0.14 | 0.45 |
| BLC-677 | Bostock Road | 2022-03-08 09:41 | 5.2 | 2 | <1 | <1 | 0.32 | 0.39 |
| BLC-677 | Bostock Road | 2022-05-10 09:30 | 9.6 | <2 | <1 | <1 | 0.1 | 0.55 |
| BLC-677 | Bostock Road | 2022-06-29 11:20 | 12.4 | 190 | <1 | <1 | 0.21 | 0.48 |
| BLC-677 | Bostock Road | 2022-08-09 11:25 | 18.4 | 90 | <1 | <1 | 0.15 | 0.55 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| BLC-677 | Bostock Road | 2022-09-27 11:00 | 15.7 | 540 | <1 | <1 | 0.13 | 0.63 |
| BLC-677 | Bostock Road | 2022-12-14 10:00 | 6 | 4 | <1 | <1 | 0.15 | 0.59 |
| BLC-679 | Watson Road | 2022-01-12 11:30 | 3.4 | <2 | <1 | <1 | 0.12 | 0.66 |
| BLC-679 | Watson Road | 2022-04-12 10:15 | 8 | 2 | <1 | <1 | 0.11 | 0.51 |
| BLC-679 | Watson Road | 2022-05-24 09:45 | 12.4 | <2 | <1 | <1 | 0.1 | 0.5 |
| BLC-679 | Watson Road | 2022-07-26 10:15 | 17.8 | <2 | <1 | <1 | 0.1 | 0.51 |
| BLC-679 | Watson Road | 2022-08-25 10:35 | 18 | 6 | <1 | <1 | 0.14 | 0.56 |
| BLC-679 | Watson Road | 2022-10-11 10:50 | 15.7 | 36 | <1 | <1 | 0.16 | 0.48 |
| BLC-680 | 3204 Main Avenue | 2022-01-12 11:20 | 1.7 | <2 | <1 | <1 | 0.26 | 0.43 |
| BLC-680 | 3204 Main Avenue | 2022-03-08 09:30 | 4.2 | 84 | <1 | <1 | 0.79 | 0.24 |
| BLC-680 | 3204 Main Avenue | 2022-04-12 10:05 | 7.1 | 12 | <1 | <1 | 0.72 | 0.23 |
| BLC-680 | 3204 Main Avenue | 2022-05-10 09:20 | 9.6 | 8 | <1 | <1 | 0.17 | 0.37 |
| BLC-680 | 3204 Main Avenue | 2022-05-24 09:33 | 12.2 | <2 | <1 | <1 | 0.26 | 0.25 |
| BLC-680 | 3204 Main Avenue | 2022-06-29 11:30 | 18 | 18 | <1 | <1 | 0.19 | 0.47 |
| BLC-680 | 3204 Main Avenue | 2022-07-26 10:00 | 20.2 | 160 | <1 | <1 | 0.33 | 0.49 |
| BLC-680 | 3204 Main Avenue | 2022-08-09 10:30 | 21.9 | 1500 | <1 | <1 | 0.37 | 0.31 |
| BLC-680 | 3204 Main Avenue | 2022-08-25 11:13 | 19 | 670 | <1 | <1 | 0.31 | 0.58 |
| BLC-680 | 3204 Main Avenue | 2022-09-27 11:15 | 17.2 | <2 | <1 | <1 | 0.96 | 0.2 |
| BLC-680 | 3204 Main Avenue | 2022-10-11 10:40 | 14.6 | 2300 | <1 | <1 | 0.32 | 0.31 |
| BLC-680 | 3204 Main Avenue | 2022-12-14 10:30 | 4.2 | 46 | <1 | <1 | 0.39 | 0.25 |
| BLC-681 | 3491 Senkler Road | 2022-03-08 09:57 | 6.2 | 8 | <1 | <1 | 0.45 | 0.51 |
| BLC-681 | 3491 Senkler Road | 2022-05-10 09:45 | 10.9 | 14 | <1 | <1 | 0.09 | 0.46 |
| BLC-681 | 3491 Senkler Road | 2022-06-29 11:40 | 15.6 | 52 | <1 | <1 | 0.22 | 0.62 |
| BLC-681 | 3491 Senkler Road | 2022-08-09 10:55 | 18 | 52 | <1 | <1 | 0.11 | 0.69 |
| BLC-681 | 3491 Senkler Road | 2022-09-27 11:30 | 16.3 | 300 | <1 | <1 | 0.12 | 0.8 |
| BLC-681 | 3491 Senkler Road | 2022-12-14 10:39 | 5.5 | 56 | <1 | <1 | 0.14 | 0.61 |
| BLC-682 | 3819 Bedwell Bay | 2022-03-08 10:05 | 5.4 | <2 | <1 | <1 | 0.52 | 0.28 |
| BLC-682 | 3819 Bedwell Bay | 2022-05-10 09:00 | 8.7 | 2 | <1 | <1 | 0.12 | 0.47 |
| BLC-682 | 3819 Bedwell Bay | 2022-06-29 11:45 | 15.8 | 20 | <1 | <1 | 0.52 | 0.57 |
| BLC-682 | 3819 Bedwell Bay | 2022-08-09 11:05 | 19.1 | 40 | <1 | <1 | 0.33 | 0.33 |
| BLC-682 | 3819 Bedwell Bay | 2022-09-27 11:40 | 15.7 | 36 | <1 | <1 | 0.14 | 0.68 |
| BLC-682 | 3819 Bedwell Bay | 2022-12-14 10:45 | 5.4 | 10 | <1 | <1 | 0.22 | 0.21 |

Appendix E

Metro Vancouver Quarterly THMs, HAAs, and pH Results of Bacteriological Analysis

| Date Sampled | THM (ppb) | | | | | | HAA (ppb) | | | | | | | Extras |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Bromodichloromethane | Bromoform | Chlorodibromomethane | Chloroform | **Total Trihalomethanes** | | Dibromoacetic Acid | Dichloroacetic Acid | Monobromoacetic Acid | Monochloroacetic Acid | Trichloroacetic Acid | **Total Haloacetic Acid** | | pH units pH |
| Feb 14 2022 | <1 | <1 | <1 | 17 | 18 | | <0.5 | 8 | <0.5 | <0.5 | 5.7 | 14 | | 8 |
| Feb14 2022 | <1 | <1 | <1 | 11 | 11 | | <0.5 | 11 | <0.5 | <0.5 | 9.5 | 20 | | 8.1 |
| May 10 2022 | <1 | <1 | <1 | 26 | 27 | | <0.5 | 9.5 | <0.5 | <0.5 | 5.2 | 15 | | 8.2 |
| May 10 2022 | <1 | <1 | <1 | 36 | 37 | | <0.5 | 9.4 | <0.5 | <0.8 | 9.2 | 19 | | **8.2** |
| Aug 25 2022 | <1 | <1 | <1 | 19 | 23 | | <0.5 | 8 | <1 | .6 | 4 | 13 | | 8.2 |
| Aug 25 2022 | 1 | <1 | <1 | 26 | 27 | | <0.5 | 8.8 | <1 | .9 | 5.8 | 15 | | 8.2 |
| Nov 15 2022 | <1 | <1 | <1 | 22 | 28 | | <0.5 | 9.1 | <0.5 | <0.5 | 57 | 16 | | 8.2 |
| Nov 15 2022 | <1 | <1 | <1 | 24 | 30 | | <0.5 | 7 | <0.5 | <0.5 | 8.9 | 16 | | 8.3 |

# Appendix F
## Metro Vancouver Annual Metals Sampling Program

| | |
|---|---|
| **Customer:** | **Village of Belcarra** |
| **Title:** | Municipal Metals May-03/22 |
| **Project Number:** | 215461 |
| **Project Date:** | 3-May-2022 |
| **Project Status:** | Authorized by RSTRACKE |
| **Project Notes:** | |

| Analysis | Units | BLC-670 | BLC-682 |
|---|---|---|---|
| | | 4503 Belcarra Bay Road | 3819 Bedwell Bay |
| | | 5/4/2022 8:50 | 5/4/2022 9:03 |
| | | GRAB | GRAB |
| Aluminum Total | µg/L | 25 | 26 |
| Antimony Total | µg/L | <0.5 | <0.5 |
| Arsenic Total | µg/L | <0.5 | <0.5 |
| Barium Total | µg/L | 2.8 | 3 |
| Boron Total | µg/L | <10 | <10 |
| Cadmium Total | µg/L | <0.2 | <0.2 |
| Calcium Total | µg/L | 9190 | 8550 |
| Chromium Total | µg/L | <0.05 | <0.05 |
| Cobalt Total | µg/L | <0.5 | <0.5 |
| Copper Total | µg/L | 1.4 | 9 |
| Iron Total | µg/L | 5 | 18 |
| Lead Total | µg/L | <0.5 | <0.5 |
| Magnesium Total | µg/L | 199 | 194 |
| Manganese Total | µg/L | 3.5 | 5.2 |
| Mercury Total | µg/L | <0.05 | <0.05 |
| Molybdenum Total | µg/L | <0.5 | <0.5 |
| Nickel Total | µg/L | <0.5 | <0.5 |
| Potassium Total | µg/L | 154 | 171 |
| Selenium Total | µg/L | <0.5 | <0.5 |
| Silver Total | µg/L | <0.5 | <0.5 |
| Sodium Total | µg/L | 1450 | 1520 |
| Zinc Total | µg/L | <3.0 | <3.0 |

Appendix G

Notification for Unusual Situations Potentially Affecting Water Quality

| Situation | Notifying Agency | Agency Notified | Time Frame for Notification |
|---|---|---|---|
| E. coli – positive sample | MV Laboratory or BC Centre for Disease Control | Belcarra and Fraser Health Authority | Immediate |
| Total Coliform over 10 mg/L and no Free Chlorine Residual | Belcarra | Fraser Health Authority | Immediately upon receipt of sample test results |
| Chemical Contamination | Belcarra | Fraser Health Authority | Immediate |
| Turbidity > 5 NTU | MV Laboratory or GVWD Operations | Belcarra and Fraser Health Authority | Immediate |
| GVWD Disinfection failure | GVWD Operations | Belcarra and Fraser Health Authority | Immediate |
| Loss of pressure due to high demand | Belcarra | DNV Operations and Fraser Health Authority | Immediate |
| Water main break in Belcarra, where contamination is suspected | Belcarra | Fraser Health Authority | Immediate |
| Water main break in DNV, where contamination is suspected | DNV | Belcarra and Fraser Health Authority | Immediate |

**REPORT PREPARED BY:**

**Stewart Novak**
**Public Works & Emergency Preparedness Coordinator**

**Village of Belcarra**
**4084 Bedwell Bay Road**
**Belcarra, BC. V3H 4P8**