North Shore Water Utility Nelson Ltd. (NSWU)

2024
Annual Report

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1.0 Introduction

As part of the conditions outlined in the Interior Health Authority Operating Permit for the North Shore Water Utility Nelson Ltd. (NSWU), this document will summarize and report the operations and maintenance of the utility in 2024 under the management of AquaDiversities Waterworks Inc. (Aqua).

Future treatment upgrades plans and customer feedback has also been included in this report. In an effort to provide transparency and inform the customers of the utility, this report will be posted on the NSWU website at http://northshorewaterutility.com.

Since September 2014 Aqua has owned and operated NSWU (a private water utility) under the *Water Utility Act.* The act regulates utilities to ensure the provision of safe and adequate water service at rates that are fair, reasonable and sufficient to operate their water systems sustainably.

2.0 Water System Overview

NSWU has been in operation since 1978 and services 138 residential connections and 10 commercial connections that includes two motels, commercial buildings and a school).

2.1 Source Description

The surface water that supplies NSWU comes from two parallel sources consisting of high flow springs exiting the steep mountainside. They are known as Sutherland Creek and Collin Spring/Isaac Creek. Each of the sources has a wooden frame structure built over the spring to protect the intake infiltration galleries. These intakes supply the two 20,000 imperial gallon reservoirs (one located at each source). Flow to the reservoirs is controlled by an on-demand system of level switches and actuating valves. Access to each reservoir is contained within a building that houses the treatment components of the system and is locked to prevent unauthorized access. Both reservoirs are at the same elevation, providing gravity flow to the distribution system. In the high consumption summer months, both reservoirs are utilized to meet the demand of the consumers. For the majority of the year, the Collin Spring/Isaac Creek reservoir provides sufficient supply to meet the demand.

2.2 Regulatory Requirements

Interior Health Authority (IHA) is the regulatory agency for the NSWU. In British Columbia, water quality standards for potable water are regulated by *Drinking Water Protection Act* (2001), which provides the basic, minimum framework towards goals for drinking water treatment for pathogens in surface water supply systems. Specific water quality standards, monitoring schedules, applicability and recommended treatments are outlined in the *Drinking Water Protection Regulation* (2003). The objectives outlined in the *Guidelines for Canadian Drinking Water Quality* (Health Canada 2012) as well as the *Drinking Water Treatment Objectives for Surface Water Supplies in British Columbia* (2012) are used to provide the treatment parameters for the treatment objectives implemented by the IHA. All results are reported to IHA to ensure compliance.

2.3 Treatment System Description

The system utilizes NSF approved chlorination disinfection to maintain the recommended operational range within the distribution system as outlined in the *Guidelines for Canadian Drinking Water Quality*. Each reservoir building houses a chemical dosing pump that doses 12% sodium hypochlorite (chlorine) proportionally to the flow of water being delivered to the reservoir. Aqua maintains the minimum level of chlorine required to ensure safe drinking water while preserving aesthetic quality.

2.4 Delivery and Distribution

The system provides potable water to approximately 2.5 km of distribution system main via gravity flow. The distribution system is comprised primarily of 6" diameter PVC, with some 2" and 4" diameter pipe. There are 11 fire hydrants and one standpipe that are utilized for system flushing. Each house has a curb stop valve connected to the main, which allows for isolation of the residence. In 2019 an extension of the NSWU was completed with an additional five new connections along a 6" main which included three new hydrants. In June 2024, the service connection under highway 3A was upgraded to 6" C900 PVC in line with municipal standard.

3.0 Consumption Data

As part of a pilot project, a totalizing non-intrusive (bolted to outside of pipe) flow meter was installed at Isaac Creek. Average daily consumption and average flow (m^3/hour) was reported monthly since installation.

The following flow information was extrapolated for 2024:

- Average daily consumption from January 1st – December 31st = 210.82 m^3/day
- Average daily flow = 8.7 m^3/hour
- Total flow in 2024 = 76,948 m^3

This is an increase over 2023 consumption of: 22.1 m^3/day, 0.9 m^3/hour and overall total flow decrease of 8,169 m^3.

4.0 Operational Improvements and Capital Upgrades

4.1 Improvements to Date

Since 2014 and throughout 2024, Aqua has worked diligently to ensure safe drinking water to the consumers of NSWU while making improvements to the aging infrastructure and acquiring/documenting increased knowledge on the system.

Upgrades and improvements made to the NSWU in 2024 include:

- Roof repairs to the Sutherland Intake building;
- Improving drainage and maintaining the access road to the Isaac Creek and Sutherland Creek reservoirs;
- Compiling information on the collection, storage, usage, and distribution system of the utility. Updates to the comprehensive base map of the system as more information becomes available; and
- Updating online database of curb stops and isolation valves.

Operational tasks completed on the NSWU in 2024 include but are not limited to:

- Conducting routine chlorine residual and turbidity monitoring; routine bi-monthly microbiological sampling and submitting a monthly report to the Environmental Health Officer;
- Maintaining/implementing a Water Conservation Program with established procedures for administering water restrictions, as well as water conservation tips for users;
- Routinely clean and inspect storage reservoirs;
- Hydrant maintenance, exercising and greasing;
- Create inventory of all hydrants;
- Distribution system flushing; and
- Exercising of all main control isolation valves.

4.2 Future Operational Improvements

- Upgrading the Sutherland reservoir to have continuous monitoring similar to Issac reservoir.
- Add an air admittance valve to the distribution system to prevent negative pressure.
- Remove and cap the drain-back curb top valve.

5.0 Water Quality Monitoring Program

A Water Quality Monitoring Program provides established schedules for systematic, routine sampling to ensure that the parameters outlined in the *Guidelines for Canadian Drinking Water Quality* are maintained. The NSWU monitoring program has been developed with the approval of the EHO.

5.1 Parameters for Water Quality Monitoring

Parameters for water quality monitoring applicable to treatment currently being implemented at NSWU are summarized in **Table No. 1** below, with the exception of chemical parameters which can be found in the following link: http://www.hc-sc.gc.ca/ewh-semt/pubs/water-eau/sum_guide-res_recom/index-eng.php#t2.

Table No. 1 - Water Quality Standards for Potable Water

Parameter	Standard
Fecal Coliform Bacteria	No detectable fecal coliform bacteria per 100 ml
Escherichia Coli (E. Coli)	No detectable E. Coli per 100 ml
Total Coliform Bacteria	At least 90% of samples have no detectable total coliform bacteria per 100 ml and no sample has more than 10 total coliform bacteria per 100 ml.
Turbidity	Less than or equal to 1 Nephelometric Turbidity Unit (NTU)
Chlorine Residual	Greater than or equal to 0.2 mg/L at the end of the distribution system.

5.2 Real-time Monitoring

Real-time monitoring is data collected by the operators on an interval determined by the local EHO for turbidity and chlorine residual to ensure they are within drinking water quality standards. In house data is collected (NTU and Cl2) are collected three times per week at one or both reservoirs, depending on operation, and at two locations at the ends of the distribution system twice per week. The system is also monitored remotely on a daily basis. Results are forwarded to the EHO in the Operator Log Sheets as part of the Monthly Report. Any sample results that fall outside of the standards are immediately addressed in accordance to the procedures outlined in the ERP.

Table No. 2 - Real-time Monitoring Results

Parameter	No. of Samples Taken (2024)	Range	Samples Outside of Standards
Raw Turbidity (Reservoir)	156	0.11 – 1.67 NTU	N/A
Chlorine Residual Distribution- 570 Johnstone Rd.	104	0.2 – 1.04mg/L	0
Chlorine Residual Distribution –Main Jet	104	0.36 – 1.36mg/L	0
Chlorine Residual Reservoir	156	0.28 – 1.02mg/L	0

5.3 Microbiological Monitoring

Microbiological monitoring occurs through bi-weekly sample collections at two locations in the distribution system. These samples are sent to a provincially accredited lab and tested for total and fecal coliforms. **Table No. 2** outlines the number of samples and results from this monitoring. Samples collected that exceed the parameters are immediately reported to the EHO and responded to in accordance to the procedures outlined in the ERP.

Table No. 3 - Microbiological Monitoring Results

Parameter	Number of Samples	Number of Exceedances
E. Coli	26	0
Total Coliform	26	0

5.4 Chemical Monitoring

A comprehensive chemical analysis is recommended every three years to ensure there are no exceedances to the Maximum Allowable Concentration (MAC) as defined in *Guidelines for Canadian Drinking Water Quality*. A routine comprehensive chemical analysis was performed at both intakes was conducted in August 2024 and included Trihalomethanes and Halo Acetic Acid testing. Full chemical analysis results can be found on the NSWU website at http://northshorewaterutility.com.

5.5 Volume Monitoring at Reservoirs

Operators monitor the volumes at the Isaac Creek reservoir closely in order to determine when the reservoir at Sutherland Creek will need to be brought online to supply the increased demand. On June, 25th 2024 the Sutherland reservoir was brough online in anticipation of an increase in summer water demand on the NSWU. It remained on-line until September 17th, 2024. Level 1 Water Conservation Measures (watering restrictions) were in effect from June 7th to September 30th in 2024.

6.0 Water Quality Concerns

Although the water source at NSWU is of pristine quality, seasonal turbidity issues remain a concern, particularly with high precipitation weather events and spring freshet. *The Drinking Water Treatment Objectives for Surface Water Supplies in BC (November 2012)* states the following:

"For non-filtered surface water to be acceptable as a drinking water source supply…turbidity levels of around 1 NTU but not exceeding 5.0 NTU for more than 2 days in a 12-month period should be demonstrated in the absence of filtration."

The NSWU had a Water Quality Advisory (WQA) in place from January 29th to February 14th, and April 2nd to May 21st. The average turbidity throughout the duration of the WQA was 1.32 NTU during January 29th and February 14th and 0.84 NTU during April 20th and May 21st 2024. The WQA can be attributed to an influx of natural organic matter due to heavy amounts of melting snow and heavy rainfall events, it should be noted that chlorine residuals were monitored and maintained daily throughout the WQA period.

In an effort to mitigate turbidity levels above 1 NTU, operators clean both intakes on regular intervals to remove sediment build-up. A flushing program to remove distribution system sedimentation was carried out in the spring of 2024. If in the event the turbidity levels had exceed 5.0 NTU, a Boil Water Advisory would have been posted.

7.0 Major Operational Events

- On June 11th to 13th the Sutherland reservoir building roof structure was replaced with new timber and insulation.
- On July 8th there was a temporary service interruption to Main Jet and Bridgebay Rd customers to repair a leak.
- From July 5th 16th a service branch leaking under the road at 523 Johnstone Rd was replaced.
- On September 16th to 20th a leaky line to a hydrant was replaced as well as the hydrant was moved to a more accessible location, approximately 20 ft across the driveway of 480 Johnstone Road. Time was spent this year updating he database of all current isolations valve and curb stop photos.

Communication methods for emergency repairs as well as routine maintenance included electronic alerts, customer email notification and sandwich boards in residential areas. These notifications will continue to be employed to ensure effective communication to all customers of the NSWU.

8.0 Future Water Treatment

In August 2016 a pilot treatment system project was installed at the Isaac Creek reservoir. This pilot system includes sand filtration, cartridge filtration, ultra-violet treatment, and a totalizing flow meter to the existing chlorination treatment. The pilot remains installed at the time of report writing as it continues to collect necessary information on water quality, water consumption rates, consumable and operating costs, and treatment effectiveness. This accrued knowledge will aid in developing a

long-term plan for installing the water system to achieve treatment levels that meet the *Drinking Water Treatment Objectives for Surface Water Supplies in British Columbia*.

9.0 EOCP Classification and Certification

The Environmental Operators Certification Program (EOCP) classifications are done in accordance with the B.C. Guidelines that were established based on the classification templates developed in conjunction with the Association of Boards of Certification. It is used to determine the level of Operator Certification required to operate and maintain the treatment system and is reclassified every 5 years. NSWU was renewed as a Small Water System by the EOCP in September 2021 and as such requires a certified operator.

10.0 Summary

Throughout the 2024 operating season NSWU water quality results were within the *Maximum Acceptable Concentrations* (MAC) identified in the *Guidelines for Canadian Drinking Water Quality.* Operation and maintenance issues were resolved in a timely manner by AquaDiversities.

Overall, in 2024 the NSWU system was very stable, showing overall excellent water quality. The only concern being the elevated turbidity during periods of high precipitation and spring freshet. Future upgrades to the NSWU are planned for 2026-2029, including potential plans to build a water treatment system. Future upgrades will be implemented to comply with regulatory requirements (IHA) in an effort to provide the customers of the NSWU a safe and sustainable potable water source and a satisfying relationship with the utility.