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TSAWWASSEN FIRST NATION

2021 Drinking Water Quality Monitoring Report

JULY 2022

Executive Summary

Tsawwassen First Nation (TFN) provides this report in fulfillment of the Drinking Water Protection Act, Section 15. This report outlines a summary of water quality testing results, water flows, as well as, system improvement actions, and plans.

A total of 60 samples were taken from the water distribution system during 2021 for Escherichia Coli, and total coliforms analyses. Quarterly samples were taken for disinfection by-products, and semi-annual samples were taken for metals and vinyl chloride. No samples exceeded the limits set out in the Drinking Water Protection Act and Regulation and the Guidelines for Canadian Drinking Water Quality. TFN is committed to delivery of water of the highest quality and will continue to make the necessary investments to ensure its continued success.

Any questions regarding this report can be directed to Michael Murphy, Utilities Supervisor, at 604.868.3550 or mmurphy@tsawwassenfirstnation.com.

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1.0 Introduction

This report provides a summary of the Drinking Water Quality Monitoring Program during the 2021 calendar year for Tsawwassen First Nation's (TFN) Distribution System.

The supply of drinking water is governed by the Drinking Water Protection Regulation (pursuant to the Drinking Water Protection Act) and requires suppliers in British Columbia to:

1. Develop a process to notify the Drinking Water Officer (DWO) of situations or conditions that render or could render the water unfit to drink.
2. Implement a plan for collecting, shipping, and analyzing drinking water samples in compliance with the directives set by the DWO.
3. Implement a plan for reporting monitoring results to the DWO and to water users, including the preparation of an annual report.

TFN is required to hold an annual Operating Permit to monitor the water quality in the distribution system. Section 4 of this report provides a summary of the test results for 2021.

The 2021 Drinking Water Quality Monitoring Report provides a summary of TFN's water distribution system and discusses the monitoring results, performance, and improvements of the system.

2.0 Water Distribution System

An overview of the existing TFN water distribution system is available in Appendix A as a distribution map. The system services residential, commercial, and operation sites on TFN lands. Water quality is monitored at five sampling sites throughout the distribution network, summarized in Table 1:

Table 1 Sampling Locations

Site	Location	Category	Flow Category	Description
W-1	101 Tsatsu Shores, Tsatsu Condo	Strata Residence	Dead End	Kitchen Sink
W-2	1926 Tsawwassen Drive Band Office	TFN Facility	Medium	Lunchroom Tap
W-3	4515 Salish Sea Way	TFN Facility	Medium	Plant Lab Tap
W-4	4786 Fisherman way	TFN Sample Point	Medium	Sample Station
W-5	Falcon Way, Lands Office	TFN Facility	Dead End	Kitchen Sink

Drinking water is supplied to TFN by Metro Vancouver and the Corporation of Delta. Two primary connections to the Metro Vancouver South Delta 350mm trunk watermain are located along 52nd Street. Two additional connections to a 450mm trunk main owned by Delta are located on Highway 17.

The connection south of Salish Sea Drive services the Big Splash Waterpark, while the connection at Tsawwassen Drive north of highway 17 is a back up. There are also two areas where TFN is directly serviced by Delta's water system located at Pacific Drive and Tsawwassen Beach Road. The areas serviced by Delta are not part of this monitoring report as their operation and maintenance is provided by the Corporation of Delta.

The main distribution system is comprised of pipes ranging in size from 150mm diameter to 500mm and consists of PVC and HDPE materials.

3.0 Testing and Monitoring

Drinking water quality varies from place to place and is dependent on the condition of the source water and the degree of treatment it receives. As a result, water quality monitoring is performed throughout all stages of its supply from source to tap. While Metro Vancouver carries out testing of water at the source and after treatment, TFN's Drinking Water Quality Monitoring Program (DWQMP) is focused on the water quality within our own distribution system. No additional treatment is provided to the water at TFN.

The DWQMP consists of routine monitoring to obtain an accurate overview of water quality within the distribution system. The program also includes non-routine monitoring for handling complaints and emergency situations. Monitoring includes two components: safe, representative collection of the sample, and accurate laboratory analysis. The analyses are performed by the BCCDC Public Health Laboratory and by the Metro Vancouver Water Laboratory.

3.1 Routine Monitoring

The collection of water samples is performed by certified TFN staff and forwarded to a qualified lab for the analysis of Total Coliforms, E. coli, vinyl chloride, and metals. All microbiological and chemical analyses were conducted by laboratories that have been approved by the Canadian Association of Environmental Analytical Laboratories or an equivalent certification program. Results of the analyses are reported by the Fraser Health Authority.

3.2 Sampling Parameters

The significance of the parameters is briefly discussed below. Further details can be found by accessing the supporting documents of the Guidelines for Canadian Drinking Water Quality (GCDWQ) through the following web site, http://www.hc-sc.gc.ca/ewh-semt/water-eau/drink-potab/guide/index-eng.php, or by contacting Health Canada at (613) 957-2991.

Total Coliforms and E. Coli

One of the primary concerns in water quality is the growth of coliform bacteria. The presence of total coliforms could indicate that treatment is inadequate, the distribution system is experiencing regrowth, or infiltration to the system is occurring. Escherichia coli, (a species in the fecal coliform group) is a definite indicator of the presence of contamination within the distribution system.

Vinyl Chloride and Metals

Samples for Metals and Vinyl chloride are taken twice per year. Vinyl chloride is a manufactured substance that does not occur naturally, however, it can be formed in the environment when other manufactured substances are broken down by certain microorganisms. Vinyl chloride can enter the

environment from manufacturing or processing plants which release to the air or into wastewater. This substance is harmful to humans in that it is carcinogenic and causes damage to the liver and central nervous system. Metals are usually present in trace amounts in natural waters, but many of them are toxic even at low concentrations. Quarterly, samples were taken for metals in our drinking water. Neither vinyl chloride or metals samples exceeded the MAC or AO for drinking water quality.

3.3 Sampling Locations & Frequency

Sampling locations throughout TFN are detailed in Table 1 of Section 2. The distribution system map is available in Appendix A while Appendix B contains the results of the testing conducted throughout the year.

In 2018, the sampling sites were amended by Fraser Health to reduce the number of residential homes on the sampling program. There is now only one "residence" within the sampling program, which is crucial as it is a dead end in the system.

One sample is taken from each location in Table 1 per month with a required minimum of four samples per month as directed by Schedule B of the Drinking Water Protection Regulation.

3.4 Non-routine Monitoring

Consumer complaints are recorded so that water quality concerns can be tracked and responded to efficiently. The parameters to be sampled for depend on the nature of the complaint. In any emergency, the procedures outlined in the TFN Emergency Response Plan were followed. There were no reported events in 2020 that required emergency sampling.

4.0 Water Quality Results

There were 60 samples collected from the water distribution system in 2021. No samples exceeded the limits set out in the BC Drinking Water Protection Regulation (BCDWPR) and the GCDWQ. The sample analysis results are summarized in Table 2 below.

4.1 Coliform and Escherichia Coli Results

The BCDWPR requires that (1) no sample should contain fecal coliform and Escherichia coli (E. Coli) and that (2) samples should contain more than 10 total coliforms per 100 millilitre or not more than 10% of samples from the distribution system in each calendar month should show the presence of total coliform Bacteria.

Of the 60 samples analysed for microbiological criteria in 2021, no E. coli or total coliforms were detected. All colony forming units (CFU) were reported as <1 CFU/100mL. Therefore, all samples met the water quality requirements of the BCDWPR.

Table 2 Coliform Testing Results

Sample Station	Samples Tested	Total Coliform CFU/100mL			E. Coli CFU/100mL			Positive Coliform Tests	Positive E. Coli Tests
		Low	Average	High	Low	Average	High		
W-1	12	<1	N/A	<1	<1	N/A	<1	None	None
W-2	12	<1	N/A	<1	<1	N/A	<1	None	None
W-3	12	<1	N/A	<1	<1	N/A	<1	None	None
W-4	12	<1	N/A	<1	<1	N/A	<1	None	None
W-5	12	<1	N/A	<1	<1	N/A	<1	None	None

4.2 Sample Range and Chlorine Residual Results

The following Table 3 details the samples obtained throughout the 2021 year and their respective free chlorine residual results in mg/L:

Table 3 Sample Range and Chlorine Residual (mg/L) Results

Date	W-1 Tsatsu Shores	W-2 1926 Tsawwassen Drive	W-3 4515 Salish Sea Way	W-4 4786 Fisherman Way	W-5 2460 Falcon Way
January 21, 2021	0.67	0.65	0.72	0*	0.63
February 23, 2021	0.67	0.45	0.76	0.35	0.69
March 18, 2021	0.63	0.60	0.70	0.28	0.51
April 22, 2021	0.52	0.55	0.71	0.68	0.72
May 20, 2021	0.55	0.42	0.65	0.64	0.51
June 17, 2021	0.53	0.56	0.62	0.85	0.67
July 15, 2021	0.54	0.39	0.62	0.54	0.58
August 19, 2021	0.63	0.61	0.70	0.67	0.67
September 16, 2021	0.63	0.52	0.64	0.61	0.69
October 21, 2021	0.47	0.44	0.58	0.52	0.57
November 18, 2021	0.71	0.94	0.96	0.60	0.87
December 9, 2021	0.65	0.55	0.66	0.68	0.81

5.0 Flow Data

The total annual flow for 2021 to TFN was 436, 195m^3. Compared to 2020's water usage, this is an increase of 65, 393 m^3. There are two flow meters along 52nd Avenue which indicate total flow received from Metro Vancouver. The chart below demonstrates the monthly water usage comparison between 2020 and 2021:

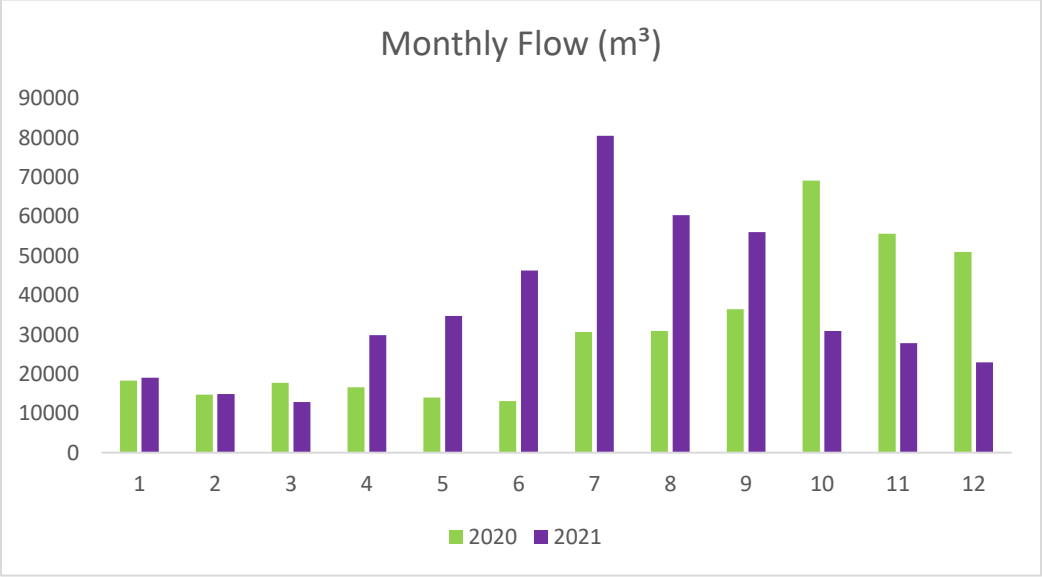

Figure 1 Monthly Water Usage 2020/2021

6.0 Upgrades and Improvements

In February 2021 a significant water leak was found at a 90° bend on 20" HDPE pipe at Canoe Pass Way and 52nd Street. It was discovered that a gasket had failed at a flange, likely due to settling of the pipe and/or poor alignment. Parts took approximately 2 weeks to arrive, however during this time only one fire hydrant was put out of service and no consumers were affected. Upon repair the flange was eliminated and a restraining coupling was put in its place. The pipe was correctly realigned and a thrust block was added to improve the integrity of this section of watermain.

In 2021, various construction projects have added growth to our community and water system. More townhomes and homes have brought greater population and demand to areas which have otherwise been low water use zones.

In 2022, there will be even more townhomes, apartments and detached homes becoming occupied, including Phase 1 of three six story apartment buildings.

Construction of townhomes, apartments, and detached home developments have brought greater population and increased demand to areas which have otherwise been low water use zones. This has aided in ensuring water quality by eliminating stagnant sections of watermain.

Two Utility Operators were hired in 2019, which has aided in the implementation and roll-out of a new maintenance program, Lucity. While still in the development phases, procedures have been put forth through Lucity that include dead end flushing on a semi-annual basis (once in early spring and then again in the late fall) and sample collection work orders. Safe Operating Procedures for dealing with customer complaints, representative sample collection, and effective flushing have been developed as well and will ensure water quality within TFN is of the highest standard.

7.0 Summary

Tsawwassen First Nation (TFN) provides this report in fulfillment of the Drinking Water Protection Act. This report outlines a summary of water quality testing, monitoring, and improvements for ensuring water quality for the 2021 calendar year.

60 samples were taken from the water distribution system, all of which were compliant with the limits set out in the Drinking Water Protection Regulation Sections 2 and 9, Schedule A and Section 8, Schedule B. Each month, 1 sample was taken at each of the 5 sample points throughout the distribution system, this is above the required minimum of 4 samples per month.

Improvements to the TFN water distribution system in 2021 will aid in maintaining water quality. Administrative and operations measures, controls, and procedures have also been implemented to maintain compliance, exceed regulatory requirements, and ensure clean and safe drinking water is delivered to all consumers within Tsawwassen First Nations' water distribution system.

Appendix A

Distribution Map

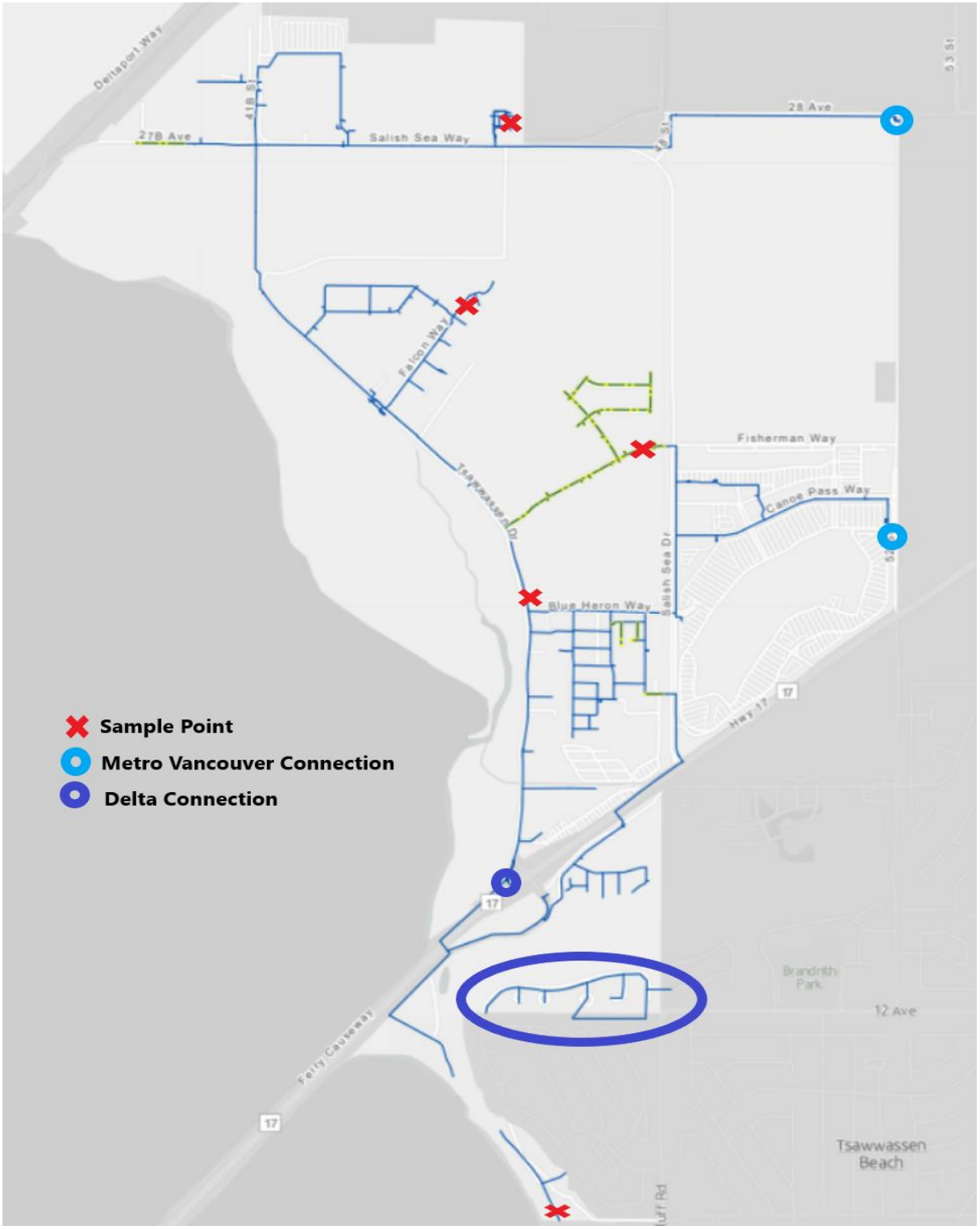

Figure 2 Distribution Map

References

1. British Columbia Drinking Water Protection Act
2. British Columbia Drinking Water Regulation
3. Water Quality Monitoring and Reporting Plan for the GVRD and Member Municipalities
4. Guidelines for Canadian Drinking Water Quality (October 2014)

Appendix B

Sampling Range Reports

Site ID	Location	Date	E. Coli CFU/100mL	HPC CFU/100mL	pH	Temp °C	Total Coliform CFU/100mL	Turbidity NTU
TFN-833	2460 Falcon Way	1/21/2021	<1	84		10.7	<1	0.13
TFN-831	1926 Tsawwassen Drive	1/21/2021	<1	6		11.7	<1	0.12
TFN-830	101 Tsatsu Shores	1/21/2021	<1	2		10.3	<1	0.1
TFN-834	4786 Fisherman Way	1/21/2021	<1	100		10.5	<1	0.31
TFN-832	4515 Salish Sea Way	1/21/2021	<1	<2		11.3	<1	0.11
TFN-834	4786 Fisherman Way	2/23/2021	<1	2		8.4	<1	0.59
TFN-830	101 Tsatsu Shores	2/23/2021	<1	<2		10.2	<1	0.11
TFN-833	2460 Falcon Way	2/23/2021	<1	62		9.9	<1	0.3
TFN-831	1926 Tsawwassen Drive	2/23/2021	<1	<2		12.8	<1	0.29
TFN-832	4515 Salish Sea Way	2/23/2021	<1	4		11.8	<1	0.27
TFN-833	2460 Falcon Way	3/18/2021	<1	<2		10.2	<1	0.16
TFN-831	1926 Tsawwassen Drive	3/18/2021	<1	20		12.5	<1	0.19
TFN-830	101 Tsatsu Shores	3/18/2021	<1	<2		12.8	<1	0.1
TFN-834	4786 Fisherman Way	3/18/2021	<1	14		10	<1	0.25
TFN-832	4515 Salish Sea Way	3/18/2021	<1	<2		9.7	<1	0.16
TFN-833	2460 Falcon Way	4/22/2021	<1	<2	8.7	12.9	<1	0.16
TFN-831	1926 Tsawwassen Drive	4/22/2021	<1	<2	8.2	14.6	<1	0.19
TFN-830	101 Tsatsu Shores	4/22/2021	<1	6	7.7	16.7	<1	0.14
TFN-834	4786 Fisherman Way	4/22/2021	<1	<2	8.4	14.2	<1	0.15
TFN-832	4515 Salish Sea Way	4/22/2021	<1	<2	8	13.7	<1	0.19

Site ID	Location	Date	E. Coli CFU/100mL	HPC CFU/100mL	pH	Temp °C	Total Coliform CFU/100mL	Turbidity NTU
TFN-833	2460 Falcon Way	5/20/2021	<1	2	8.5	8.5	<1	0.14
TFN-831	1926 Tsawwassen Drive	5/20/2021	<1	<2	8.5	8.5	<1	0.22
TFN-830	101 Tsatsu Shores	5/20/2021	<1	<2	8.1	8.1	<1	0.14
TFN-832	4515 Salish Sea Way	5/20/2021	<1	<2	8	8	<1	0.16
TFN-834	4786 Fisherman Way	5/21/2021	<1	6	7.9	15.2	<1	0.11
TFN-833	2460 Falcon Way	6/17/2021	<1	6	8.9	16.8	<1	0.12
TFN-831	1926 Tsawwassen Drive	6/17/2021	<1	<2	8.8	19.4	<1	0.11
TFN-830	101 Tsatsu Shores	6/17/2021	<1	<2	8.3	19.3	<1	0.1
TFN-834	4786 Fisherman Way	6/17/2021	<1	<2	8.5	16.9	<1	0.1
TFN-832	4515 Salish Sea Way	6/17/2021	<1	<2	8.7	17.4	<1	0.12
TFN-833	2460 Falcon Way	7/15/2021	<1	<2	8.2	19.3	<1	0.14
TFN-831	1926 Tsawwassen Drive	7/15/2021	<1	22	8.1	20.1	<1	0.28
TFN-830	101 Tsatsu Shores	7/15/2021	<1	2	8	18.4	<1	0.14
TFN-834	4786 Fisherman Way	7/15/2021	<1	<2	7.9	18.6	<1	0.16
TFN-832	4515 Salish Sea Way	7/15/2021	<1	2	8.3	17.4	<1	0.19
TFN-833	2460 Falcon Way	8/19/2021	<1	24		20.4	<1	0.15
TFN-831	1926 Tsawwassen Drive	8/19/2021	<1	6		21.6	<1	0.17
TFN-830	101 Tsatsu Shores	8/19/2021	<1	12		22.1	<1	0.14
TFN-834	4786 Fisherman Way	8/19/2021	<1	<2		20.8	<1	0.12
TFN-832	4515 Salish Sea Way	8/19/2021	<1	<2		18.8	<1	0.2
TFN-833	2460 Falcon Way	9/16/2021	<1	110	9.1	19.1	<1	0.1
TFN-831	1926 Tsawwassen Drive	9/16/2021	<1	100	8.7	20.7	<1	0.19
TFN-830	101 Tsatsu Shores	9/16/2021	<1	<2	8.5	18.4	<1	0.1
TFN-834	4786 Fisherman Way	9/16/2021	<1	<2	8.8	18.9	<1	0.13
TFN-832	4515 Salish Sea Way	9/16/2021	<1	6	8.8	17.4	<1	0.12

Site ID	Location	Date	E. Coli CFU/100mL	HPC CFU/100mL	pH	Temp °C	Total Coliform CFU/100mL	Turbidity NTU
TFN-833	2460 Falcon Way	10/21/2021	<1	72		16.1	<1	0.19
TFN-831	1926 Tsawwassen Drive	10/21/2021	<1	40		16.9	<1	0.29
TFN-834	4786 Fisherman Way	10/21/2021	<1	<2		16	<1	0.19
TFN-830	101 Tsatsu Shores	10/21/2021	<1	6		16.3	<1	0.2
TFN-832	4515 Salish Sea Way	10/21/2021	<1	<2		15.7	<1	0.18
TFN-833	2460 Falcon Way	11/18/2021	<1	1400		12.2	<1	0.14
TFN-831	1926 Tsawwassen Drive	11/18/2021	<1	16		12.1	<1	2.9
TFN-834	4786 Fisherman Way	11/18/2021	<1	2		11.6	<1	0.15
TFN-830	101 Tsatsu Shores	11/18/2021	<1	8		12.5	<1	0.16
TFN-832	4515 Salish Sea Way	11/18/2021	<1	2		15.2	<1	0.12
TFN-833	2460 Falcon Way	12/9/2021	<1	20	8.4	12.9	<1	0.13
TFN-831	1926 Tsawwassen Drive	12/9/2021	<1	32	8.5	13	<1	0.28
TFN-830	101 Tsatsu Shores	12/9/2021	<1	4	8.4	14.7	<1	0.16
TFN-834	4786 Fisherman Way	12/9/2021	<1	8	8.4	12.6	<1	0.24
TFN-832	4515 Salish Sea Way	12/9/2021	<1	<2	8.5	13.9	<1	0.12

Metals in Drinking Water – "Flush" Message

fraserhealth Better health. Best in health care.

February 1, 2021

Water System Operators

Re: Metals in Drinking Water – "Flush" Message in Annual Reports

Fraser Health has recently revised its metals at the tap "Flush" message and we are asking all water systems to please include the following health message with your next annual reports to your users.

Anytime the water in a particular faucet has not been used for six hours or longer, "flush" your cold-water pipes by running the water until you notice a change in temperature. (This could take as little as five to thirty seconds if there has been recent heavy water use such as showering or toilet flushing. Otherwise, it could take two minutes or longer.) The more time water has been sitting in your home's pipes, the more lead it may contain.

Use only water from the cold-tap for drinking, cooking, and especially making baby formula. Hot water is likely to contain higher levels of lead.

The two actions recommended above are very important to the health of your family. They will probably be effective in reducing lead levels because most of the lead in household water usually comes from the plumbing in your house, not from the local water supply.

Conserving water is still important. Rather than just running the water down the drain you could use the water for things such as watering your plants.

If you have any questions, please contact our Drinking Water Program at 604-870-7903.

Sincerely,

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