REGIONAL DISTRICT OF NANAIMO

Water Service Area Annual Report 2018

Whiskey Creek Water Service Area

June 2019

REGIONAL DISTRICT OF NANAIMO
Water & Utility Services Department
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1. Introduction

The following annual report describes the Whiskey Creek Water Service Area and summarizes the water quality and production data from 2018. This report also includes a summary of inquiries and complaints, completed and proposed maintenance activities, Operator Certification, the Emergency Response Plan, and the Cross Connection Control Program.

This report is to be submitted to Island Health by the spring of 2019.

2. Whiskey Creek Water System

The Whiskey Creek water system was constructed in the 1970s and was initially operated by the subdivision developer, Westerlea Estates Ltd. The water system is located eight kilometres southwest of Qualicum Beach on the south side of Highway 4. There are 124 residential lots connected to the water system. In January 2011, the ownership and operation of the Whiskey Creek Water District was transferred to the RDN. A map of the Whiskey Creek Water Service Area is provided in Appendix A for reference.

2.1 Source Water

Two water licenses allow surface water to be extracted from nearby Crocker Creek. An emergency backup generator is available in the event of a power failure. Water from Crocker Creek is temporarily stored in a raw water storage pond next to the pumphouse on Hebert Road. Perforated pipe under the bed of the pond carries water into a concrete wet well containing two submersible pumps. These pumps deliver water through a pressure filter to a water storage reservoir. The water is dosed with a polymer upstream of the filter and then chlorinated. Drinking water is then pumped into the water system via two booster pumps.

2.2 Reservoirs

One service reservoir (concrete) is present at 979 Poplar Way, and has a capacity of 195 m^3 (43,000 imperial gallons).

2.3 Distribution System

The water distribution system in Whiskey Creek is summarized in the table below. There are 9 fire hydrants and 4 flush-outs in the system.

Watermain Material	Length of mains in Whiskey Creek Water Service Area	Prevalence in Water Service Area
Asbestos-concrete:		
100mm or smaller	1,280 m	40%
150mm or larger	1,920 m	60%

3. Water Sampling and Testing Program

Water sampling and testing is carried out weekly in the distribution system. The following table includes a summary of all testing:

Timing	Location	Tests
Weekly	BC Centre for Disease Control	Total coliforms, E.Coli
Weekly	RDN (in-house) Laboratory	Total coliforms, E.Coli Temperature, pH, Conductivity TDS, Chlorine residual, Salinity Monthly- Total Iron and Manganese
Quarterly	Bureau Veritas (formerly Maxxam)	Trihalomethanes (THMs), Total coliforms, and E.Coli tested at the reservoir site and 844 Carson Rd.
Annual Source Water Testing (every Fall)	Bureau Veritas (formerly Maxxam)	Complete potability testing of raw source water incl. tannins and lignins
Annual System Water Testing (every Spring)	Bureau Veritas (formerly Maxxam)	Complete potability testing of distribution system water

4. Water Quality - Source Water and Distribution System

Up-to-date water quality reports and lab data are posted monthly on the RDN website at www.rdn.bc.ca in the REGIONAL SERVICES section, under "Water & Utility Services" then "WaterSmart Communities". Tables of water quality testing results for both the source water and distribution system are provided at the end of this report under Appendix B.

The turbidity of water in the distribution system is closely monitored with an online turbidity meter and alarm. Occasionally, during high turbidity events, such as heavy rainfall in/near Crocker Creek, the filtration system cannot effectively filter the surface water. In these cases, the surface water intake is temporarily shut down while drinking water is trucked-in from another RDN water system nearby to top up the water storage reservoir until the high turbidity event passes.

5. Water Quality Inquiries and Complaints

A few inquiries were received from the Whiskey Creek water service area in 2018 and were typically related to water billing.

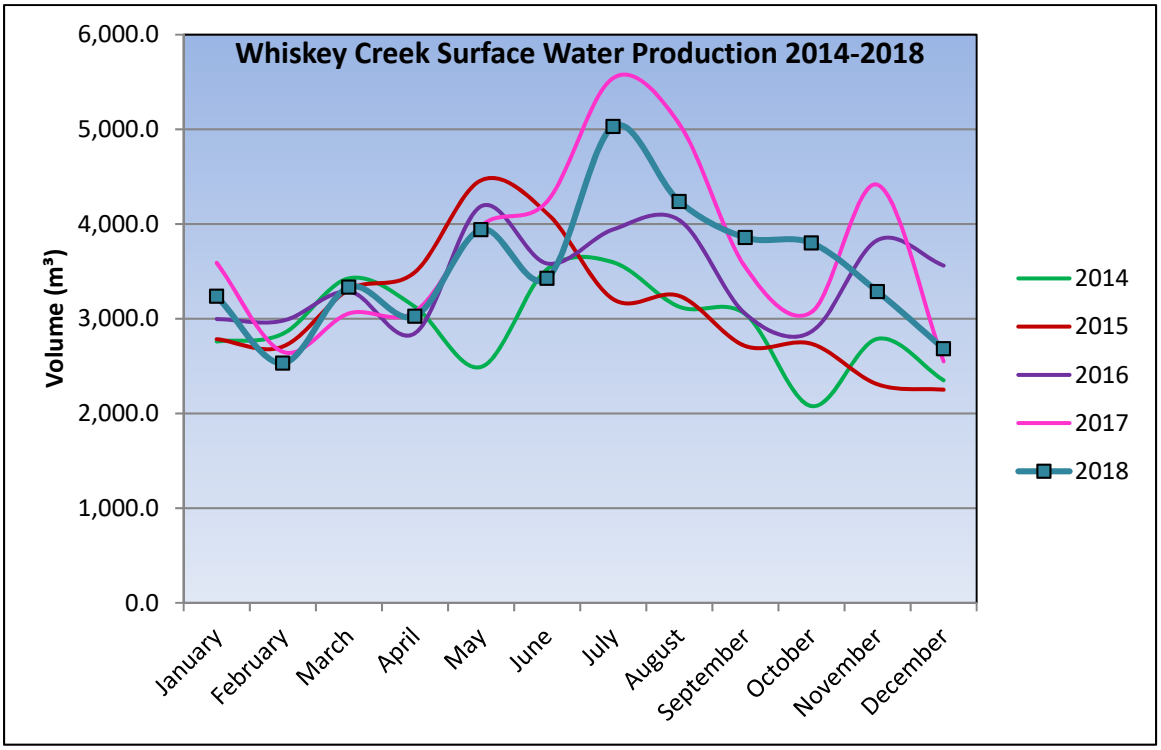
Poplar Way

A summary of the water system incidents in 2018 is given in the table below.

Activity in 2018	Date(s)	History/Notes
Boil Water Advisories	None	None
High Turbidity Events	Spring and Fall	Backwash media, truck-in water
Equipment Malfunction	None	None
Water Main Breaks	None	None
Pump Failures	Monthly	Temp power outages

6. Water Consumption

Monthly water production for the Whiskey Creek Water Service Area for the past 5 years is shown in the chart below. Water production in 2018 was above average in comparison to previous years, with peaks in May and July due to outdoor watering.



Consumption

In the Fall/Winter of 2018, the average usage per home in Whiskey Creek was 0.55 cubic metres per day (120.98 imperial gallons). In the summer, the average water usage was 0.89 cubic metres per day (195.8 imperial gallons). Based on these figures, the annual consumption per capita is estimated to be 232 L/day (based on 2.4 people/household). This consumption is *15% less* than the RDN system average of 294 L/day/capita in 2018.

7. Maintenance Program

Daily pump station inspections are carried out to reduce or eliminate the risk of contamination and system failure, and to ensure the consistent application of chlorine for treatment purposes. Watermains are flushed once annually in the spring. Fire hydrants (9) are serviced once per year (either 'A-level' or 'B-level' maintenance) in the fall. The water intake is cleaned weekly. Twenty-four hour on-call coverage is in place to respond to water system emergencies and alarms.

Fire hydrants in the Whiskey Creek water system cannot be relied on for fire insurance purposes due to insufficient supply and capacity for fire flows. Upgrades to water supply volumes and reservoir storage may be required in the future but would not proceed without community support and financing.

8. Operator Certification

The Regional District Water & Utility Services staff are comprised of one Manager, one Project Engineer, one Engineering Technologist, one Engineering Technician, one Chief Operator, and seven certified operators. The operators receive ongoing training and certification in:

- ✓ Water Treatment
- ✓ Water Distribution
- ✓ Wastewater Collection
- ✓ Cross Connection Control
- ✓ Asbestos Awareness
- ✓ Chlorine Handling
- ✓ WHMIS (Workplace Hazardous Material Information System)
- ✓ TDG (Transportation of Dangerous Goods)
- ✓ Confined Space Awareness
- ✓ Traffic Control
- ✓ Fall Protection
- ✓ First Aid

9. Water Service Area Projects

9.1 2018 Completed Studies & Projects

- Began land negotiations for groundwater well site;
- Corresponded with residents regarding water conservation;
- Completed irrigation checks for high-water users;
- Completed Water Conservation Evaluation Report;
- Advised residents regarding water leak repairs;
- Completed Cross Connection Control Bylaw in draft format;
- Completed regular flushing, reservoir cleaning, and hydrant maintenance projects;
- Enforced outdoor sprinkling regulations;
- Updated the online GIS Water Map update for aquifer and watershed info;
- Maintained a high level of water quality;
- Continued quality control through regular testing and monitoring of water system;
- Began a Water Systems SCADA Master Plan project;
- Initiated New Drinking Water and Watershed Protection Action Plan preparation;
- Began a Water Systems Condition Assessment project.

9.2 2019 Proposed Projects & Upgrades

- Finalize land agreement for groundwater well site;
- Undertake design and construction of road to new well site;
- Drill test wells to find a groundwater source;
- Design/install Drinking Water Source Area Protection signs;
- Continue watermain flushing program and hydrant maintenance;
- Adopt Cross Connection Control Bylaw;
- Implement a Water Systems SCADA Master Plan;
- Begin well protection plan;
- Complete Water Systems Condition Assessment project;
- Begin DWWP Water Conservation Plan development;
- Implement new Drinking Water and Watershed Protection Action Plan;
- Continue to offer numerous water-saving incentives via rebates;
- Develop Cross Connection Control educational material.

Water Source Area Protection sign on Hebert Rd.

10. Emergency Response Plan

The Regional District Emergency Response Plan (ERP) contains procedures and contact information to efficiently respond to water system emergencies such as contamination of water supply, loss of supply, pump failure, and drought management. The ERP was reviewed and updated in 2018, and copies are available on our website, at each RDN office, in each pumphouse, and in each Water Services vehicle. A copy of the ERP is also attached to this report in Appendix C.

11. Cross Connection Control

In 2017, a more robust Cross Connection Control Plan was prepared that fully defines the CCC program, including standard operating procedures, plumbing code references, reporting procedures, survey schedules, backflow prevention standards, detailed installation schematics, blank test forms, testing reminders, and non-compliance letters. A minimum of two RDN Operators are certified in Backflow Assembly Testing at all times. The RDN Manager of Water Services is the designated Cross Connection Control Manager.

In 2019, a stand-alone Cross Connection Control Bylaw will be adopted that contains definitions, authorizations, applications, liability, rules, regulations, testing requirements, and reporting requirements. The bylaw will address retrofits, prohibitions, special circumstances, reclaimed water use, alternate water sources, failure to comply, inspections, testing, offences, penalties and more. A webpage will be established on the Water Services website that will educate RDN customers about cross connections and list the relevant links to current standards and resources.

Water Intake Location and Pumphouse

12. Cyber Security

The RDN uses a multi-level approach to cyber-security. Corporate network security is employed via a universal threat management gateway that implements various methods of data security, which includes daily definition updates to block known cyber threats. In addition, all RDN PC's are protected with anti-virus software. RDN water systems are connected to the corporate network via IP-Sec VPN's for remote management by information technology and equipment operators. Future infrastructure upgrades will see our water systems located on segregated networks to limit the vulnerability from cybersecurity threats.

13. Closing

An annual report for the year 2018 will be prepared and submitted to Island Health in the Spring of 2019. Annual reports are also available on our website at: https://www.rdn.bc.ca/whiskey-creek.

Infiltration Pond on Crocker Creek

APPENDIX A

MAP OF WHISKEY CREEK

WATER SERVICE AREA

WHISKEY CREEK WATER SERVICE AREA

APPENDIX B

WATER QUALITY TESTING RESULTS

WHISKEY CREEK WATER SERVICE AREA

Facility Location:
979 Poplar Way
Qualicum Beach

Facility Information: Facility Type: DWC

Facility Sampling History:

Location	Date	Total Coliform	E. Coli
3537 Harris Crescent	18-Dec-2018	L1	L1
844 Carson Road, Whiskey Creek	10-Dec-2018	L1	L1
3533 Hebert Road	3-Dec-2018	L1	L1
3564 Foxglove Road, Whiskey Creek	3-Dec-2018	L1	L1
844 Carson Road, Whiskey Creek	27-Nov-2018	L1	L1
3564 Foxglove Road, Whiskey Creek	19-Nov-2018	L1	L1
3537 Harris Crescent	14-Nov-2018	L1	L1
3533 Hebert Road	7-Nov-2018	L1	L1
3533 Hebert Road	7-Nov-2018	L1	L1
844 Carson Road, Whiskey Creek	23-Oct-2018	L1	L1
3564 Foxglove Road, Whiskey Creek	15-Oct-2018	L1	L1
3537 Harris Crescent	9-Oct-2018	L1	L1
3533 Hebert Road	1-Oct-2018	L1	L1
844 Carson Road, Whiskey Creek	24-Sep-2018	L1	L1
3564 Foxglove Road, Whiskey Creek	17-Sep-2018	L1	L1
3537 Harris Crescent	10-Sep-2018	L1	L1
3533 Hebert Road	5-Sep-2018	L1	L1
844 Carson Road, Whiskey Creek	29-Aug-2018	L1	L1
3564 Foxglove Road, Whiskey Creek	20-Aug-2018	L1	L1
3537 Harris Crescent	13-Aug-2018	L1	L1
3533 Hebert Road	7-Aug-2018	L1	L1
844 Carson Road, Whiskey Creek	24-Jul-2018	L1	L1
3564 Foxglove Road, Whiskey Creek	16-Jul-2018	L1	L1
3537 Harris Crescent	9-Jul-2018	L1	L1
3533 Hebert Road	3-Jul-2018	L1	L1
844 Carson Road, Whiskey Creek	25-Jun-2018	L1	L1

Location	Date	Total Coliform	E. Coli
3564 Foxglove Road, Whiskey Creek	18-Jun-2018	L1	L1
3537 Harris Crescent	11-Jun-2018	L1	L1
3533 Hebert Road	5-Jun-2018	L1	L1
844 Carson Road, Whiskey Creek	22-May-2018	L1	L1
3564 Foxglove Road, Whiskey Creek	14-May-2018	L1	L1
3533 Hebert Road	7-May-2018	L1	L1
3537 Harris Crescent	1-May-2018	L1	L1
844 Carson Road, Whiskey Creek	24-Apr-2018	L1	L1
3564 Foxglove Road, Whiskey Creek	16-Apr-2018	L1	L1
3537 Harris Crescent	9-Apr-2018	L1	L1
3533 Hebert Road	4-Apr-2018	L1	L1
844 Carson Road, Whiskey Creek	27-Mar-2018	L1	L1
3564 Foxglove Road, Whiskey Creek	20-Mar-2018	L1	L1
3537 Harris Crescent	12-Mar-2018	L1	L1
3533 Hebert Road	5-Mar-2018	L1	L1
844 Carson Road, Whiskey Creek	27-Feb-2018	L1	L1
3564 Foxglove Road, Whiskey Creek	20-Feb-2018	L1	L1
3537 Harris Crescent	14-Feb-2018	L1	L1
3533 Hebert Road	5-Feb-2018	L1	L1
844 Carson Road, Whiskey Creek	22-Jan-2018	L1	L1
3564 Foxglove Road, Whiskey Creek	15-Jan-2018	L1	L1
3537 Harris Crescent	8-Jan-2018	L1	L1
3533 Hebert Road	2-Jan-2018	L1	L1

Interpreting Sample Reports

In VIHA, the results of drinking water sampling are reported using the following coding system:

L1 Less than 1 (no detectable bacteria) - Meaning: No bacteria present
OG Overgrown - Meaning: Too many background bacteria to give an accurate count
EST Estimated Count
A Sample not tested; Too long in transit
C Sample leaked/broken in transit
D Sample not tested; No collection date given
T Sample submitted unsatisfactory. Exceeded 30 hours holding time, please resample.
NS No sample received with requisition

REGIONAL DISTRICT OF NANAIMO

Whiskey Creek Distribution Water Analysis
979 Poplar Way

CDWG=Canadian Drinking Water Guidelines
OG= Operational Guidance Value
MAC=Maximum Acceptable Concentration
AO= Asthetic Objective.

water SMART zero waste

Red font indicates non-compliance with Canadian Drinking Water Guidelines

	Units	CDWG		May 13 2014	March 25 2015	May 19 2015	May 10 2016	May 8 2017	May 7 2018
Miscellaneous Inorganics									
Fluoride	mg/L	1.5	MAC	<0.05	0.015	0.034	0.026	0.026	0.025
Alkalinity (total as $CaCO_3$)	mg/L			28	21.5	32	32.7	31.1	27.1
Anions									
Dissolved Sulphate	mg/L	500	AO	3.2	3.23	2.76	2.91	2.82	3.9
Dissolved Chloride	mg/L	250	AO	18.7	18	12	12	12	12
Nitrite	mg/L	1	MAC	<0.05	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Miscellaneous									
Apparent Colour	Colour Unit			<5	<5	<5	10	10	10
Nutrients									
Total Ammonia	mg/L			<0.02	0.0059	0.0057	0.0096	0.12	<0.020
Physical Properties									
Conductivity	µS/cm			131	114	111	105	105	103
pH	pH	7.0:10.5	AO	6.9	7.03	7.67	7.56	7.62	7.53
TDS	mg/L	500	AO	102	84	80	52	80	56
Turbidity	NTU			<0.5	0.27	0.17	0.14	0.19	0.17
Microbiological Parameters									
E.coli	MPN/100mL	<1	MAC	<1.0	<2	<1.0	<1.0	<1.0	<1.0
Total Coliforms	MPN/100mL	<1	MAC	<1.0	<2	<1.0	<1.0	<1.0	<1.0
Calculated Parameters									
Total Hardness ($CaCO_3$)	mg/L			43	35.2	40.8	34.4	42.9	35.7
Nitrate	mg/L	10	MAC	0.09	0.076	0.066	0.072	0.071	0.067
Elements									
Total Mercury	mg/L	0.001	MAC	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.000002
Total Metals									
Total Aluminum	mg/L	0.1	OG	0.304	0.385	0.302	0.126	0.256	0.123
Total Antimony	mg/L	0.006	MAC	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Total Arsenic	mg/L	0.01	MAC	<0.00025	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Total Barium	mg/L	1	MAC	0.00141	<0.001	<0.001	<0.001	<0.001	<0.001
Total Beryllium	mg/L			<0.00025	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Total Bismuth	mg/L			<0.0005	<0.001	<0.001	<0.001	<0.001	<0.001
Total Boron	mg/L	5	MAC	<0.010	<0.05	<0.050	<0.050	<0.050	<0.050
Total Cadmium	mg/L	0.005	MAC	<0.00005	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Total Chromium	mg/L	0.05	MAC	<0.0025	<0.001	<0.001	<0.001	<0.001	<0.001
Total Cobalt	mg/L			<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002
Total Copper	mg/L	1	AO	0.01	0.0007	0.00983	0.0059	0.00521	0.00931
Total Iron	mg/L	0.3	AO	0.044	0.017	0.0245	<0.005	0.0114	0.0079
Total Lead	mg/L	0.01	MAC	0.0014	<0.0002	0.00051	0.00021	0.00028	0.00095
Total Manganese	mg/L	0.05	AO	<0.0050	0.0047	0.0031	0.0023	0.0028	0.0024
Total Molybdenum	mg/L			<0.00025	<0.001	<0.001	<0.001	<0.001	<0.001
Total Nickel	mg/L			<0.0010	<0.001	<0.001	<0.001	<0.001	<0.001
Total Selenium	mg/L	0.05	MAC	<0.0005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Total Silicon	mg/L			8.82	8.65	9.43	8.96	10.4	8.55
Total Silver	mg/L			<0.00025	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002
Total Strontium	mg/L			0.0239	0.0203	0.0231	0.0215	0.0233	0.0229
Total Thallium	mg/L			<0.00005	<0.00005	<0.00005	<0.00005	<0.00001	<0.00001
Total Tin	mg/L			<0.0005	<0.005	<0.005	<0.005	<0.005	<0.005
Total Titanium	mg/L			<0.0025	<0.005	<0.005	<0.005	<0.005	<0.005
Total Uranium	mg/L	0.02	MAC	<0.00005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Total Vanadium	mg/L			0.0008	<0.005	<0.005	<0.005	<0.005	<0.005
Total Zinc	mg/L	5	AO	0.024	<0.005	0.0084	<0.005	0.0062	0.0056
Total Zirconium	mg/L				<0.0005	<0.0005	<0.0005	<0.0001	<0.0001
Total Calcium	mg/L			12	9.29	11.2	9.01	11.5	9.52
Total Magnesium	mg/L			3.06	2.93	3.13	2.88	3.42	2.9
Total Potassium	mg/L			<0.5	0.127	0.137	0.134	0.233	0.173
Total Sodium	mg/L	200	AO	9.4	7.08	6.14	6.07	6.95	5.75
Total Sulphur	mg/L					<3.0	<3.0	<3.0	<3.0

REGIONAL DISTRICT OF NANAIMO

Whiskey Creek Surface Water Analysis
3474 Hebert Road-Crocker Creek

CDWG=Canadian Drinking Water Guidelines
OG= Operational Guidance Value
MAC=Maximum Acceptable Concentration
AO= Asthetic Objective.

water SMART zero waste

Red font indicates non-compliance with Canadian Drinking Water Guidelines

	Units	CDWG		November 4 2014	March 25 2015	October 26 2015	October 12 2016	September 18 2017	October 25 2018
Miscellaneous Inorganics									
Fluoride	mg/L	1.5	MAC	0.05	0.025	0.037	0.025	0.039	0.033
Alkalinity (total as $CaCO_3$)	mg/L			36	32.1	44.1	38.6	46.2	42.8
Anions									
Dissolved Sulphate	mg/L	500	AO	1.5	<0.50	<0.50	<1.0	<1.0	<1.0
Dissolved Chloride	mg/L	250	AO	3	2.7	2.3	2.6	2.3	3
Nitrite	mg/L	1	MAC	0.07	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Miscellaneous									
Apparent Colour	Colour Unit			120	70	20	50	15	15
Tannins & Lignins	mg/L			2.5		0.2	0.86	0.75	0.43
Nutrients									
Total Ammonia	mg/L			<0.02	0.068	0.02	0.063	<0.020	<0.020
Physical Properties									
Conductivity	µS/cm			84	75	93.4	89.3	90.6	93
pH	pH	7.0:10.5	OG	7	7.44	7.8	7.68	7.76	7.74
TDS	mg/L	500	AO	78	70	70	86	88	72
Turbidity	NTU			1.3	0.56	0.24	0.23	0.15	0.17
Microbiological Parameters									
E.coli	MPN/100mL	<1	MAC	34.4	2	<1.0	<1.0	<1.0	1
Total Coliforms	MPN/100mL	<1	MAC	165.2	86	200.5	144.5	380	34
Calculated Parameters									
Total Hardness ($CaCO_3$)	mg/L			42	35	40.3	40.4	39.9	41
Nitrate	mg/L	10	MAC	0.13	0.072	0.066	0.128	0.028	<0.020
Elements									
Total Mercury	mg/L	0.001	MAC	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0.0000077
Total Metals									
Total Aluminum	mg/L	0.1	OG	0.145	0.0912	0.0242	0.0494	0.0131	0.0162
Total Antimony	mg/L	0.006	MAC	<0.0001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Total Arsenic	mg/L	0.01	MAC	0.0002	0.00013	<0.0001	<0.0001	<0.0001	<0.0001
Total Barium	mg/L	1	MAC	0.00098	<0.001	<0.001	<0.001	<0.001	<0.001
Total Beryllium	mg/L			<0.00005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Total Bismuth	mg/L			<0.0001	<0.001	<0.001	<0.001	<0.001	<0.001
Total Boron	mg/L	5	MAC	0.004	<0.05	<0.05	<0.050	<0.050	<0.050
Total Cadmium	mg/L	0.005	MAC	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Total Chromium	mg/L	0.05	MAC	0.0009	<0.001	<0.001	<0.001	<0.001	<0.001
Total Cobalt	mg/L			<0.0001	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002
Total Copper	mg/L	1	AO	0.0112	0.00379	0.00344	0.00451	0.00168	0.00206
Total Iron	mg/L	0.3	AO	0.227	0.0983	0.0595	0.0863	0.0255	0.0395
Total Lead	mg/L	0.01	MAC	0.0006	0.00021	0.00022	0.0003	<0.0002	<0.0002
Total Manganese	mg/L	0.05	AO	0.015	0.0063	0.0043	0.0032	<0.001	0.0019
Total Molybdenum	mg/L			0.00014	<0.001	<0.001	<0.001	<0.001	<0.001
Total Nickel	mg/L			0.0003	<0.001	<0.001	<0.001	<0.001	<0.001
Total Selenium	mg/L	0.05	MAC	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Total Silicon	mg/L			8.44	9.03	10.4	8.27	8.79	8.9
Total Silver	mg/L			<0.00005	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002
Total Strontium	mg/L			0.0261	0.0203	0.0239	0.023	0.0227	0.024
Total Thallium	mg/L			<0.00001	<0.00005	<0.00005	<0.00005	<0.00001	<0.00001
Total Tin	mg/L			0.0004	<0.005	<0.005	<0.005	<0.005	<0.005
Total Titanium	mg/L			0.0052	<0.005	<0.005	<0.005	<0.005	<0.005
Total Uranium	mg/L	0.02	MAC	<0.00001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Total Vanadium	mg/L			0.0026	<0.005	<0.005	<0.005	<0.005	<0.005
Total Zinc	mg/L	5	AO	0.0101	<0.005	0.0125	<0.005	<0.005	<0.005
Total Zirconium	mg/L				<0.0005	<0.0005	<0.0005	<0.0001	<0.0001
Total Calcium	mg/L			11.9	9.22	10.9	10.4	10.2	10.9
Total Magnesium	mg/L			3.02	2.92	3.15	3.49	3.48	3.35
Total Potassium	mg/L			0.1	0.135	0.161	0.109	0.131	0.139
Total Sodium	mg/L	200	AO	2.9	2.65	3.12	3.13	3.15	3.22
Total Sulphur	mg/L				<3.0	<3.0	<3.0	<3.0	<3.0

Regional District of Nanaimo - Water Services Department

Whiskey Creek Water Analysis - 2018 Monthly Report

		Health Department		In-House									
Date	Sample Location (Address)	E. coli *	Total Coliform *	E.coli *	Total Coliform *	Temp. (°C)	pH	Free Chlorine Residual (mg/L)	Total Dissolved Solids (mg/L)	Salinity (%)	Conductivity (µS/cm)	Total Iron (mg/L)	Manganese (mg/L)
3-Dec-18	3533 Hebert	0	0	0	0	9	7.21	1.09	72.8	0.07	153.7	0.03	0.000
3-Dec-18	3564 Foxglove	0	0	0	0	10		1.07					
10-Dec-18	844 Carson	0	0	0	0	8	7.28	1.33	62.0	0.06	131.0		
17-Dec-18	3537 Harris	0	0	0	0	9	6.99	1.38	55.1	0.05	116.8		
	Average	0	0	0	0	9.0	7.2	1.22	63.3	0.06	133.8	0.03	0.000
	Maximum	0	0	0	0	10	7.28	1.38	72.8	0.07	153.7	0.03	0.000
	Minimum	0	0	0	0	8	6.99	1.07	55.1	0.05	116.8	0.03	0.000

Red font indicates non-compliance with Canadian Drinking Water Guidelines

Aesthetic Objective for Iron is ≤0.3 mg/L Aesthetic Objective for Manganese is ≤0.05mg/L

*Coliforms are measured in colony forming units (CFU) per 100 millilitres of water (CFU/100mL)

Yellow Column Coliform tests are completed by Health Department

Blue column tests are completed by RDN

Comments:

Iron and manganese are found naturally in drinking water. Levels found in these samples are not a health concern.

Regional District of Nanaimo - Water Services Department

Whiskey Creek Water Analysis - 2018 Monthly Report

		Health Department		In-House									
Date	Sample Location (Address)	E. coli *	Total Coliform *	E.coli *	Total Coliform *	Temp. (°C)	pH	Free Chlorine Residual (mg/L)	Total Dissolved Solids (mg/L)	Salinity (%)	Conductivity (µS/cm)	Total Iron (mg/L)	Manganese (mg/L)
7-Nov-18	3533 Hebert	0	0	0	0	11	6.76	1.22	69.1	0.07	146.0	0.04	0.011
14-Nov-18	3537 Harris	0	0	0	0	10	6.98	1.70	62.6	0.06	133.3		
21-Nov-18	3564 Foxglove	0	0	0	0	11	7.21	1.07	74.7	0.07	157.5		
27-Nov-18	844 Carson	0	0	0	0	10	7.24	1.07	68.2	0.07	144.1		
	Average	0	0	0	0	10.5	7.0	1.27	68.7	0.07	145.2	0.04	0.011
	Maximum	0	0	0	0	11	7.24	1.70	74.7	0.07	157.5	0.04	0.011
	Minimum	0	0	0	0	10	6.76	1.07	62.6	0.06	133.3	0.04	0.011

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1-Oct-18	3533 Hebert	0	0	0	0	13	7.16	1.57	60.1	0.06	127.1	0.02	0.004
9-Oct-18	3537 Harris	0	0	0	0	13	6.86	0.77	61.3	0.06	129.6		
15-Oct-18	3564 Foxglove	0	0	0	0	15	7.04	1.19	64.6	0.06	136.5		
23-Oct-18	844 Carson	0	0	0	0	14	7.16	1.13	61.8	0.06	130.6		
30-Oct-18	3564 Foxglove			0	0	13	7.32	1.11	65.8	0.07	139.2		
	Average	0	0	0	0	13.6	7.1	1.15	62.7	0.06	132.6	0.02	0.004
	Maximum	0	0	0	0	15.0	7.32	1.57	65.8	0.07	139.2	0.02	0.004
	Minimum	0	0	0	0	13	6.86	0.77	60.1	0.06	127.1	0.02	0.004

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Regional District of Nanaimo - Water Services Department

Whiskey Creek Water Analysis - 2018 Monthly Report

		Health Department		In-House									
Date	Sample Location (Address)	E. coli *	Total Coliform *	E.coli *	Total Coliform *	Temp. (°C)	pH	Free Chlorine Residual (mg/L)	Total Dissolved Solids (mg/L)	Salinity (%)	Conductivity (µS/cm)	Total Iron (mg/L)	Manganese (mg/L)
5-Sep-18	3533 Hebert	0	0	0	0	17	7.32	0.86	51.7	0.05	109.7	0.01	0.006
10-Sep-18	3537 Harris	0	0	0	0	15	7.33	0.71	53.7	0.05	113.8		
17-Sep-18	3564 Foxglove	0	0	0	0	15	7.45	1.33	59.8	0.06	126.4		
24-Sep-18	844 Carson	0	0	0	0	15	7.10	1.18	79.7	0.08	168.1		
	Average	0	0	0	0	15.5	7.3	1.02	61.2	0.06	129.5	0.01	0.006
	Maximum	0	0	0	0	17	7.45	1.33	79.7	0.08	168.1	0.01	0.006
	Minimum	0	0	0	0	15	7.1	0.71	51.7	0.05	109.7	0.01	0.006

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***Coliforms are measured in colony forming units (CFU) per 100 millilitres of water (CFU/100mL)**

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Regional District of Nanaimo - Water Services Department

Whiskey Creek Water Analysis - 2018 Monthly Report

		Health Department		In-House									
Date	Sample Location (Address)	E. coli *	Total Coliform *	E.coli *	Total Coliform *	Temp. (°C)	pH	Free Chlorine Residual (mg/L)	Total Dissolved Solids (mg/L)	Salinity (%)	Conductivity (µS/cm)	Total Iron (mg/L)	Manganese (mg/L)
7-Aug-18	3533 Hebert	0	0	0	0	17	7.09	1.67	53.5	0.05	113.6	0.00	0.011
13-Aug-18	3537 Harris	0	0	0	0	17.5	7.14	0.86	50.9	0.05	107.1		
20-Aug-18	3564 Foxglove	0	0	0	0	18	7.65	0.74	52.4	0.05	110.9		
29-Aug-18	844 Carson	0	0	0	0	16	7.47	1.59	54.4	0.05	115.1		
	Average	0	0	0	0	17.1	7.3	1.22	52.8	0.05	111.7	0.00	0.011
	Maximum	0	0	0	0	18	7.65	1.67	54.4	0.05	115.1	0.00	0.011
	Minimum	0	0	0	0	16	7.09	0.74	50.9	0.05	107.1	0.00	0.011

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Regional District of Nanaimo - Water Services Department

Whiskey Creek Water Analysis - 2018 Monthly Report

		Health Department		In-House									
Date	Sample Location (Address)	E. coli *	Total Coliform *	E.coli *	Total Coliform *	Temp. (°C)	pH	Free Chlorine Residual (mg/L)	Total Dissolved Solids (mg/L)	Salinity (%)	Conductivity (µS/cm)	Total Iron (mg/L)	Manganese (mg/L)
3-Jul-18	3533 Hebert	0	0	0	0	14	7.07	1.33	60.2	0.06	127.3	0.02	0.026
9-Jul-18	3537 Harris	0	0	0	0	15	7.12	1.46	56.1	0.06	118.7		
16-Jul-18	3564 Foxglove	0	0	0	0	16	7.35	1.25	55.9	0.06	118.2		
24-Jul-18	844 Carson	0	0	0	0	15	7.12	1.22	52.5	0.05	111.2		
30-Jul-18	3564 Foxglove			0	0	18	7.20	1.09	53.1	0.05	112.5		
	Average	0	0	0	0	15.6	7.2	1.27	55.6	0.06	117.6	0.02	0.026
	Maximum	0	0	0	0	18	7.35	1.46	60.2	0.06	127.3	0.02	0.026
	Minimum	0	0	0	0	14	7.07	1.09	52.5	0.05	111.2	0.02	0.026

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		Health Department		In-House									
Date	Sample Location (Address)	E. coli *	Total Coliform *	E.coli *	Total Coliform *	Temp. (°C)	pH	Free Chlorine Residual (mg/L)	Total Dissolved Solids (mg/L)	Salinity (%)	Conductivity (µS/cm)	Total Iron (mg/L)	Manganese (mg/L)
5-Jun-18	3533 Hebert	0	0	0	0	13	6.91	1.30	59.9	0.06	114.6		
11-Jun-18	3537 Harris	0	0	0	0	12	7.11	1.72	55.0	0.05	116.3	0.01	0.006
18-Jun-18	3564 Foxglove	0	0	0	0	15	7.32	0.99	56.6	0.06			
25-Jun-18	844 Carson	0	0	0	0	13	7.12	1.18	59.3	0.06	125.6		
	Average	0	0	0	0	13.3	7.1	1.30	57.7	0.06	118.8	0.01	0.006
	Maximum	0	0	0	0	15	7.32	1.72	59.9	0.06	125.6	0.01	0.006
	Minimum	0	0	0	0	12	6.91	0.99	55	0.05	114.6	0.01	0.006

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Date	Sample Location (Address)	E. coli *	Total Coliform *	E.coli *	Total Coliform *	Temp. (°C)	pH	Free Chlorine Residual (mg/L)	Total Dissolved Solids (mg/L)	Salinity (%)	Conductivity (µS/cm)	Total Iron (mg/L)	Manganese (mg/L)
1-May-18	3537 Harris	0	0	0	0	10	6.91	1.13	52.7	0.05	111.3		
7-May-18	3533 Hebert	0	0	0	0	11	6.84	1.20	54.3	0.05	115.1	0.03	0.003
14-May-18	3564 Foxglove	0	0	0	0	13	6.87	1.61	55.8	0.06	118.2		
22-May-18	844 Carson	0	0	0	0	12	6.84	1.78	55.9	0.06	118.2		
29-May-18	3564 Foxglove			0	0	14	6.97	0.91	53.2	0.05	112.7		
	Average	0	0	0	0	12.0	6.9	1.33	54.4	0.05	115.1	0.03	0.003
	Maximum	0	0	0	0	14	6.97	1.78	55.9	0.06	118.2	0.03	0.003
	Minimum	0	0	0	0	10	6.84	0.91	52.7	0.05	111.3	0.03	0.003

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Date	Sample Location (Address)	E. coli *	Total Coliform *	E.coli *	Total Coliform *	Temp. (°C)	pH	Free Chlorine Residual (mg/L)	Total Dissolved Solids (mg/L)	Salinity (%)	Conductivity (µS/cm)	Total Iron (mg/L)	Manganese (mg/L)
4-Apr-18	3533 Hebert	0	0	0	0	6	6.69	1.24	48.4	0.05	102.8	0.01	0.001
9-Apr-18	3537 Harris	0	0	0	0	8	6.48	1.38	55.2	0.05	116.8		
16-Apr-18	3564 Foxglove	0	0	0	0	9	6.45	1.06	64.2	0.06	135.8		
24-Apr-18	844 Carson	0	0	0	0	9	6.79	1.10	54.5	0.05	115.5		
	Average	0	0	0	0	8.0	6.6	1.20	55.6	0.05	117.7	0.01	0.001
	Maximum	0	0	0	0	9	6.79	1.38	64.2	0.06	135.8	0.01	0.001
	Minimum	0	0	0	0	6	6.45	1.06	48.4	0.05	102.8	0.01	0.001

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5-Mar-18	3533 Hebert	0	0	0	0	6	6.83	1.54	47.6	0.05	101.0	0.02	0.000
12-Mar-18	3537 Harris	0	0	0	0	6	6.66	1.38	48.5	0.05	102.8		
20-Mar-18	3564 Foxglove	0	0	0	0	8	6.79	1.14	50.8	0.05	107.8		
27-Mar-18	844 Carson	0	0	0	0	7.5	6.88	1.28	48.7	0.05	103.3		
	Average	0	0	0	0	6.9	6.8	1.34	48.9	0.05	103.7	0.02	0.000
	Maximum	0	0	0	0	8	6.88	1.54	50.8	0.05	107.8	0.02	0.000
	Minimum	0	0	0	0	6	6.66	1.14	47.6	0.05	101.0	0.02	0.000

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5-Feb-18	3533 Hebert	0	0	0	0	7	6.85	1.78	47.5	0.05	100.6	0.15	0.004
14-Feb-18	3537 Harris	0	0	0	0		6.96	1.08	42.6	0.04	90.6		
20-Feb-18	3564 Foxglove	0	0	0	0	8	6.55	1.63	48.8	0.05	103.5		
27-Feb-18	844 Carson	0	0	0	0	7	6.76	0.75	45.9	0.05	97.2		
	Average	0	0	0	0	7.3	6.8	1.31	46.2	0.05	98.0	0.15	0.004
	Maximum	0	0	0	0	8	6.96	1.78	48.8	0.05	103.5	0.15	0.004
	Minimum	0	0	0	0	7	6.55	0.75	42.6	0.04	90.6	0.15	0.004

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2-Jan-18	3533 Herbert	0	0	0	0		6.58	1.40	58.7	0.06	124.2	0.03	0.017
8-Jan-18	3537 Harris	0	0	0	0	7	6.80	1.07	56.0	0.06	118.5		
15-Jan-18	3564 Foxglove	0	0	0	0	7	6.54	1.49	59.1	0.06	125.2		
22-Jan-18	844 Carson	0	0	0	0	8	6.32	0.97	58.0	0.06	123.1		
29-Jan-18	3564 Foxglove			0	0	7	6.48	1.35	47.9	0.05	101.4		
	Average	0	0	0	0	7	6.5	1.26	55.9	0.06	118.5	0.03	0.017
	Maximum	0	0	0	0	8	6.80	1.49	59.1	0.06	125.2	0.03	0.017
	Minimum	0	0	0	0	7	6.32	0.97	47.9	0.05	101.4	0.03	0.017

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