REGIONAL DISTRICT OF NANAIMO

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Water Service Area Annual Report 2013

French Creek Water Service Area

June 2014

REGIONAL DISTRICT OF NANAIMO
Water & Utility Services Department
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water SMART zero waste

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1. Introduction

The following annual report describes the French Creek Water Service Area and summarizes the water quality and production data from 2013. This report also includes a summary of inquiries and complaints, completed and proposed maintenance activities, the Emergency Response Plan, and the Cross Connection Control Program.

This report is to be submitted to Island Health by the Spring of 2014.

2. French Creek Water Service Area

The French Creek Water Service Area was established in 1980 and comprises an area west of Drew Road and south of the Island Highway between the City of Parksville and the Town of Qualicum Beach. There are 236 water service connections in the French Creek Water System. The water source comes from a series of groundwater wells located within the Sandpiper subdivision. The water supply is chlorinated and stored in one reservoir. In the event of a power failure or water system emergency, back-up water supply is immediately provided by the Town of Qualicum Beach through a pressure-sensing valve located on Ormonde Road. A map of the French Creek Water Service Area is provided in Appendix A for reference.

2.1 Groundwater Wells

Six groundwater production wells are present in the French Creek Water Service Area.

Well / Name	Well Depth	In Use	Wellhead Protection	Treated/Untreated with Chlorine
#1	39.6 m	No	Yes	n/a
#2	40.5 m	Yes	Yes	Treated
#4	40.2 m	Yes	Yes	Treated
#5	50.3 m	No	Yes	n/a
#6	52.4 m	No	Yes	n/a
#7	39.6 m	Yes	Yes	Treated

French Creek Well #1 was converted to a monitoring well in 2013 due to low production and high iron levels. Wells #5 and #6 are temporarily not in use due to elevated levels of iron and manganese.

2.2 Reservoirs

One service reservoir (steel construction) is present at 1225 Sunrise Drive, Parksville, B.C. and has a capacity of 364 m^3 (80,000 imperial gallons).

2.3 Distribution System

The water distribution system in the French Creek Water Service Area is summarized in the table below. Fire hydrants (68) are located throughout the water service area.

Watermain Material	Length of mains in service area	Prevalence in service area
Asbestos-concrete:		
150mm or smaller	3.5 km	52%
200mm or larger	0.8 km	12%
PVC:		
150mm or smaller	0.9 km	14%
200mm or larger	1.5 km	22%

Note: 'PVC' is poly-vinylchloride (plastic)

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	RDN (in-house) Laboratory	Total coliforms, E.Coli Temperature, pH, Conductivity Chlorine residual, Salinity, TDS Monthly- Iron and Manganese
Monthly	BC Centre for Disease Control	Total coliforms, E.Coli
Annual Source Water Testing (every Fall)	North Island Labs	Complete potability testing of raw well water, including T-Ammonia
Annual System Water Testing (every Spring)	North Island Labs	Complete potability testing of distribution system, including T-Ammonia

4. Water Quality - Source Water and Distribution System

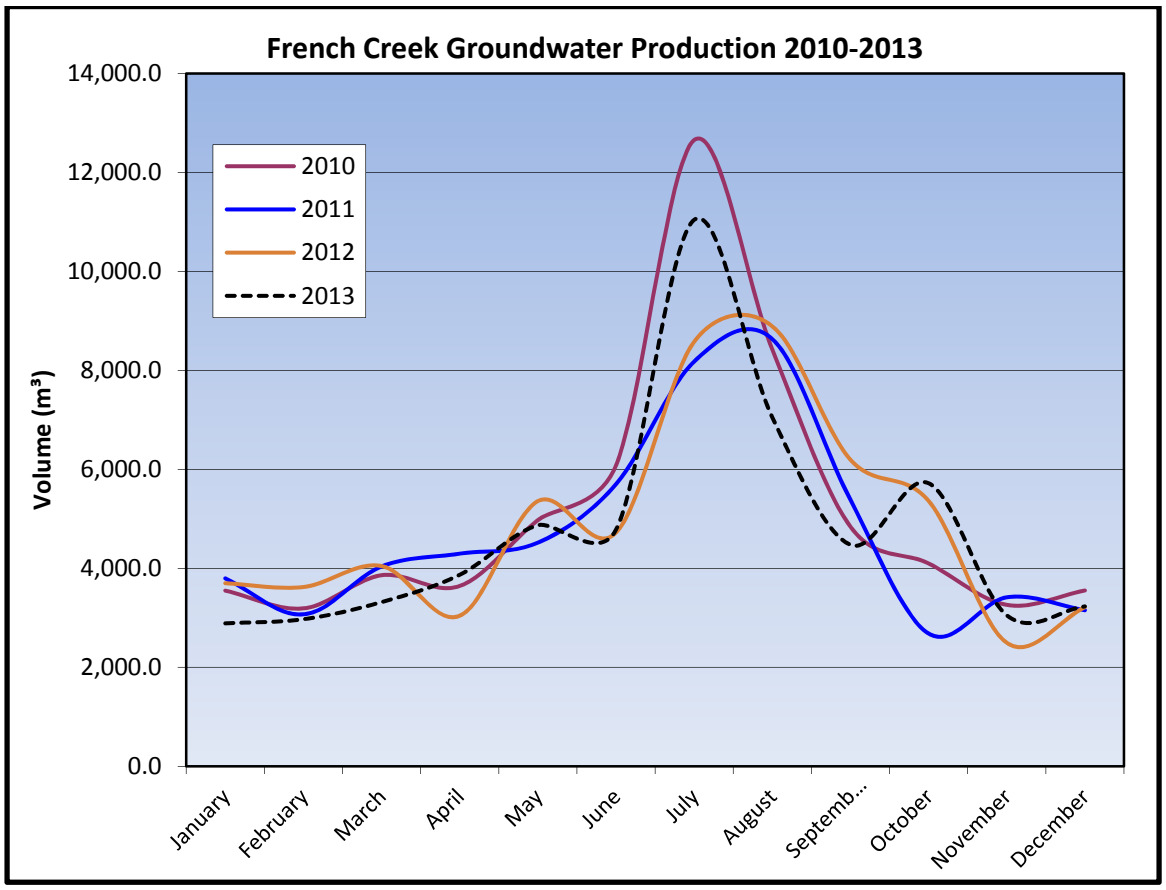
Up-to-date water quality reports and lab data are posted monthly on the RDN website at www.rdn.bc.ca in the Services section, under "Water & Utility Services" then "WaterSmart Communities". Tables of water quality testing results for both the source water and distribution system are provided at the end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

5. Water Quality Inquiries and Complaints

A few complaints and inquiries were received from the French Creek water service area in 2013, and were typically related to isolated incidents of iron discolouration in the water.

6. Groundwater Production and Consumption

The monthly groundwater production in the French Creek Water Service Area for the past 4 years is shown in the chart below. Groundwater production in 2013 was higher during summer months than during previous years, except for 2010. Lower than average groundwater production was recorded between January and March 2013, while higher than average groundwater production was also recorded during October 2013.



Consumption

In the Fall/Winter of 2013, the average usage per home in French Creek was 0.41 cubic metres per day (90 imperial gallons). In the summer, the average water usage was 0.92 cubic metres per day (202 imperial gallons). Based on these figures, the annual consumption per capita is estimated to be 243 L/day (based on 2.4 people per household). This consumption is 9% less than the RDN system average of 276 L/day/capita for 2013.

7. Maintenance Program

Weekly 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 twice annually: once in the Spring and once in the Fall.

Fire hydrants are serviced once per year (either 'A-level' or 'B-level' maintenance). The water storage reservoir is drained and cleaned once every two years.

Twenty-four hour on-call coverage is in place to respond to water system emergencies and alarms.

French Creek Main Pumphouse and Reservoir

8. Water Service Area Projects

8.1 2013 Completed Studies & Projects

- Updated Standard Operating Procedures;
- Reviewed water treatment costs (for iron & manganese);
- Enforced the outdoor sprinkling regulations;
- Drained and cleaned the water storage reservoir;
- Completed annual fire hydrant maintenance;
- Carried out a comprehensive water conservation campaign (Team WaterSmart);
- Updated and improved the RDN website at www.rdn.bc.ca;
- Utilized the Auto E-message service to notify member residents of water service disruptions and upcoming maintenance activities;
- Applied the low-flush toilet incentive;
- Applied a rainwater harvesting incentive (rain barrels);
- Maintained a high level of water quality;
- Maintained excellent customer complaint and service request response times;
- Continued quality control through regular testing and monitoring of our water systems; and,
- Completed additional educational programs.

8.2 2014 Proposed Projects & Upgrades

- Continue to offer a low-flush toilet and rainwater harvesting (rain barrel) incentive.
- Utilize the Auto E-message service to notify member residents of water service disruptions and upcoming maintenance activities;
- Maintain a high level of water quality;
- Maintain excellent customer complaint and service request response times;
- Continue quality control through regular testing and monitoring of our water systems; and,
- Complete additional educational programs.

9. 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, and pump failure. The ERP was reviewed and updated in 2012, 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.

10. Cross Connection Control

A formalized Cross Connection Control Program was initiated in 2007. Cross connection controls in-place include dual check valves at each service connection, fire hydrant use permits, and water supply bylaws noting discontinued service if a threat to the water supply is perceived by staff.

In 2008, a review and comparison of successful cross-connection control programs in other small Water Service Areas nearby was undertaken. A database of commercial customers was set-up in order to keep track of the maintenance history of testable backflow prevention assemblies at each site. Three RDN Operations staff achieved Backflow Prevention Tester's certification.

In 2012, *Regional District of Nanaimo Water Use Regulation Bylaw No. 1654, 2012* was adopted which includes enhanced cross connection control and backflow protection wording. A separate Cross Connection Control bylaw was deemed not to be required.

11. Closing

An annual report for the year 2014 will be prepared and submitted to Island Health in the Spring of 2015. Annual reports are also available on our website at www.rdn.bc.ca in the SERVICES section, under Water & Utility Services then WaterSmart Communities.

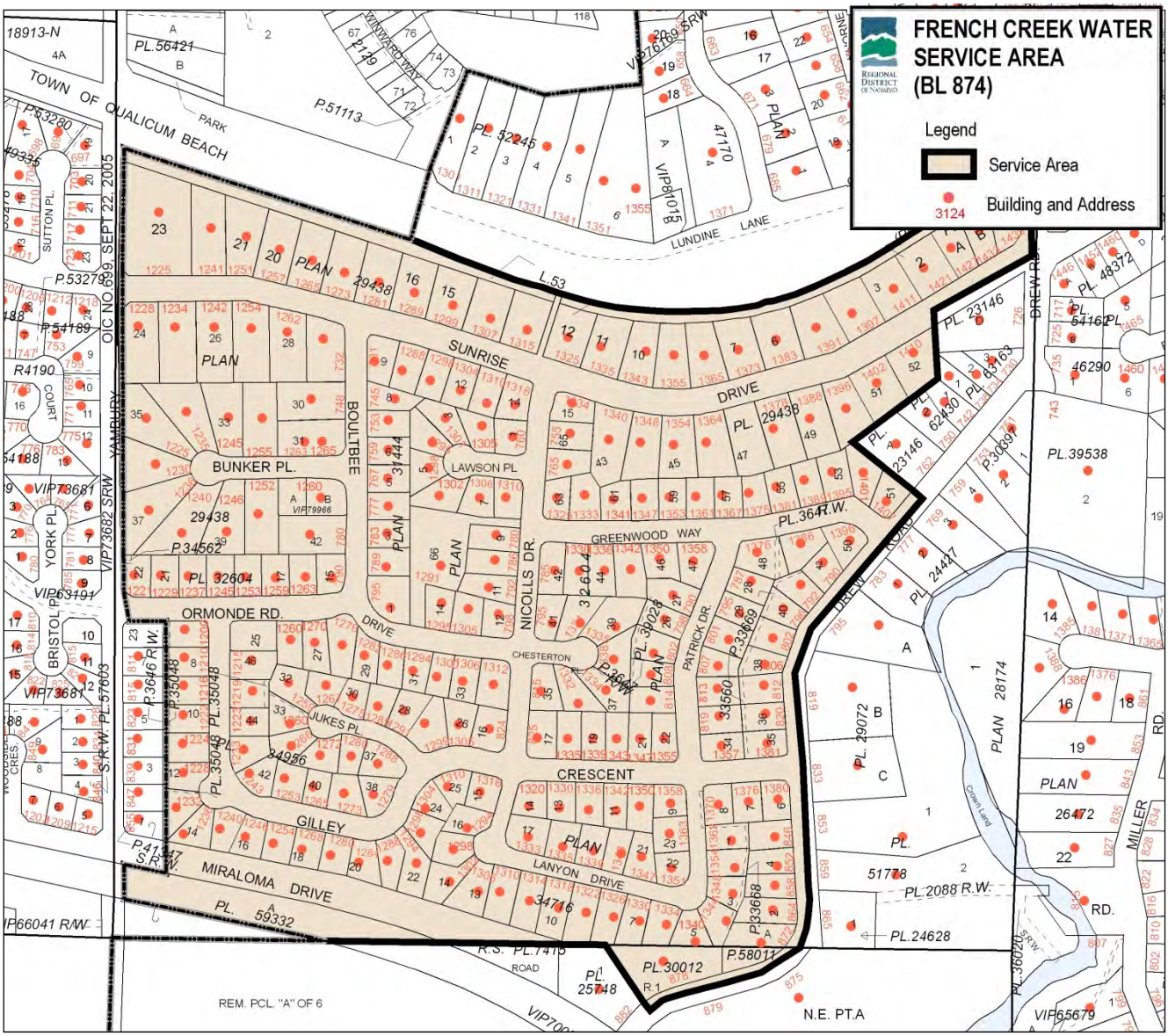
APPENDIX A

MAP OF FRENCH CREEK

WATER SERVICE AREA

FRENCH CREEK

WATER SERVICE AREA



APPENDIX B

WATER QUALITY TESTING RESULTS

French Creek Raw Water Analysis Results

Well #2: Behind 1221 Ormonde Road

Canadian Drinking Water Guidelines Package

CDWG=Canadian Drinking Water Guidelines MAC=Maximum Acceptable Concentration AO= Asthetic Objective

OG= Operational Guidance Value

Red font indicates non-compliance with Canadian Drinking Water Guidelines

Parameter	Water Quality Guidelines				16-Oct	22-Oct	26-Oct	19-Oct	24-Oct	24-Oct	8-Oct	14-Oct	27-Oct	26-Oct	29-Oct	31-Oct			
	Units	CDWG		2000	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013			
Total Ammonia (N)	mg/L												0.25		0.24	0.24			
Color-Apparent	CU			<5	4	<5	<5	6	<5	<5	<5	13	<5	<5	8	7			
Conductivity	uS/cm			267	289	285	294	283	285	280	315	299	282	299	293	328			
TDS	mg/L	≤500	AO	179	160	180	180	164	6	247	186	198	168	21	172	184			
Hardness ($CaCO_3$)	mg/L	80-100	AO	**132.7**	**124.2**	**134.0**	**140.0**	**130.0**	**63.0**	**130.0**	**150.0**	**150**	**120.0**	**140**	**130**	**160**			
pH	pH units	6.5-8.5	AO	8.11	8.14	7.90	8.10	8.10	8.20	8.08	7.90	8.2	8.20	7.5	8.1	8.1			
Turbidity	NTU's	5	MAC	0.29	0.11	0.54	<0.50	<0.50	<0.50	<0.50	<0.50	<0.5	<0.5	<0.5	0.8	0.6			
Alkalinity	mg/L			126	132	130	140	140	130	130	120	130	130	130	130	140			
Chloride	mg/L	≤250	AO	2.7	2.58	3.3	3.3	3.1	3.3	3.7	5	3.8	3.2	4.2	4.3	5.8			
Fluoride	mg/L	1.5	MAC	0.17	0.13	<0.60	<1.00	<1.00	<1.00	<1.00	<1.00	<1.0	<1.0	0.1	0.12	0.11			
Sulfate	mg/L	500	AO	14.89	12.88	1.70	16.50	11.80	9.60	9.70	21.30	19.1	13.40	18.2	17.4	23.6			
Nitrate (N)	mg/L	10	MAC	<0.002	<0.01	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.1	<0.1	<0.01	<0.05	<0.05			
Nitrite (N)	mg/L	1	MAC	<0.006	<0.01	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.1	<0.1	<0.01	<0.05	<0.05			
T-Aluminum	mg/L	0.100	OG	0.015	0.009	<0.005	0.010	0.046	<0.01	0.009	0.013	<0.005	<0.005	<0.005	0.003	<0.005			
T-Antimony	mg/L	0.006	MAC		<0.0002	<0.0002	<0.0002	<0.0002	0.0004	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0001	<0.0002			
T-Arsenic	mg/L	0.010	MAC	<0.01	<0.0002	<0.0002	<0.0002	0.0002	<0.0004	0.0002	<0.0002	0.0003	<0.0002	<0.0002	0.00012	0.0002			
T- Barium	mg/L	1.0	MAC	0.0147	0.015	0.015	0.016	0.015	0.020	0.016	0.018	0.016	0.014	0.015	0.0157	0.018			
T-Beryllium	mg/L													<0.00004	<0.00005	<0.00004			
T-Bismuth	mg/L													<0.001	<0.0001	<0.0010			
T-Boron	mg/L	5.0	MAC	<0.002	1.015	0.018	0.022	0.020	0.022	0.021	0.021	0.019	0.020	0.017	0.02	0.018			
T-Cadmium	mg/L	0.005	MAC	<0.0006	<0.00001	<0.00001	<0.00001	<0.00001	<0.00002	0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0.00001	<0.00001			
T-Calcium	mg/L			32.7	29.8	32.1	34.2	32.2	15.4	30.8	36.2	35.8	30.7	34.5	33.2	38.6			
T-Chromium	mg/L	0.05	MAC	<0.0009	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.0005	<0.0004	<0.0004	<0.0004	<0.0004	<0.0005	<0.0004			
T-Cobalt	mg/L													0.00002	<0.0001	0.00004			
T-Copper	mg/L	≤1.0	AO	0.002	0.010	0.002	0.002	0.015	<0.002	0.005	0.005	0.001	0.002	<0.001	0.0009	<0.001			
T-Iron	mg/L	≤0.3	AO	0.142	<0.1	0.2	0.1	0.1	<0.1	0.1	0.1	0.124	0.072	0.105	0.158	0.169			
T-Lead	mg/L	0.010	MAC	<0.002	0.0005	0.0001	0.0001	0.0018	<0.0002	0.0012	0.0003	<0.0001	0.0002	0.0002	0.0001	<0.0001			
T-Lithium	mg/L											<0.001	<0.001	<0.001	<0.0005	<0.001			
T-Magnesium	mg/L			12.4	12.1	13.0	13.7	11.8	6.0	11.7	14.0	13.8	11.6	13.1	12.5	14.7			
T-Manganese	mg/L	≤0.05	AO	**0.132**	**0.126**	**0.125**	**0.132**	**0.130**	**0.060**	**0.119**	**0.137**	**0.127**	**0.125**	**0.13**	**0.134**	**0.151**			
T-Mercury	mg/L	0.001	MAC	<0.0001	<0.0002	<0.0002	<0.0002	<0.0001	<0.0001	<0.0001	<0.01	<0.01	<0.00001	<0.00001	<0.0001	<0.00001			
T-Molybdenum	mg/L													0.0007	0.00087	0.0007			
T-Nickel	mg/L											0.001	<0.001	<0.001	<0.0002	<0.001			
T-Phosphorus	mg/L											0.304	0.291	0.287					
T-Potassium	mg/L			2.1	2.0	2.2	2.3	2.3	1.1	2.2	2.3	2.3	2.2	2.2	2.5	2.56			
T-Selenium	mg/L	0.01	MAC	<0.004	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	<0.0002	<0.0006	<0.0006	<0.0006	<0.0006	<0.0001	<0.0006			
T-Silicon	mg/L													9.64	11.3	10.2			
T-Silver	mg/L											<0.00001	<0.00001	<0.00001	<0.00001	<0.00001			
T-Sodium	mg/L	≤200	AO	8.3	7.90	7.90	8.60	9.00	4.50	8.80	8.69	9.41	16.00	8.95	9.9	10.9			
T-Strontium	mg/L													0.132	0.131	0.159			
T-Thallium	mg/L													<0.00001	<0.00001	<0.00001			
T-Tin	mg/L													<0.0001	<0.0001	0.0001			
T-Titanium	mg/L													<0.001	<0.0005	<0.0010			
T-Uranium	mg/L	0.02	MAC	<0.06	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.0005	<0.0004	<0.0004	<0.0004	<0.0004	<0.00001	<0.0004			
T-Vanadium	mg/L													0.0002	0.0002	0.0002			
T-Zinc	mg/L	≤5.0	AO	0.0367	0.031	0.021	0.029	0.026	0.007	0.074	0.016	0.013	0.011	0.006	0.0264	0.016			
Total Coliform	cfu/100ml	<1	MAC	***163**			***50**	<1	<1	<1	<1	<1	<1.0	<1.0	<1.0	<1.0			
Fecal Coliform	cfu/100ml	<1	MAC	<1			<1	<1	<1	<1	<1								
E.coli	cfu/100ml	<1	MAC						<1	<1	<1	<1	<1.0	<1.0	<1.0	<1.0			

Note: Total coliforms can be an indicator of adverse water quality if the result in the re-sample is confirmed positive. (United States Environmental Protection Agency (EPA), 2008) RDN Water samples are always tested for E.coli bacteria at the same time as Total coliforms to rule out the presence of harmful pathogens.

*Resampled and had <1 for all Coliforms

French Creek Well Water Analysis Results

Well #4: SE of 785 York Place

Canadian Drinking Water Guidelines Package

CDWG=Canadian Drinking Water Guidelines MAC=Maximum Acceptable Concentration AO= Asthetic Objective

OG= Operational Guidance Value

Red font indicates non-compliance with Canadian Drinking Water Guidelines

Parameter	Water Quality Guidelines				16-Oct	22-Oct	26-Oct	19-Oct	24-Oct	24-Oct	8-Oct	14-Oct	27-Oct	26-Oct	29-Oct	31-Oct			
	Units	CDWG		2000	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013			
Total Ammonia (N)	mg/L												0.38		0.32	0.37			
Color-Apparent	CU			<5	4	<5	<5	8	<5	5	<5	14	6	5	8	7			
Conductivity	uS/cm			271	300	310	310	304	295	297	317	289	288	285	280	305			
TDS	mg/L	≤500	AO	182	173	173	190	146	200	193	152	182	168	186	162	180			
Hardness ($CaCO_3$)	mg/L	80-100	AO	**135.9**	**130**	**140**	**150**	**136**	**130**	**130**	**150**	**130**	**120**	**130**	**130**	**140**			
pH	pH units	6.5-8.5	AO	8.06	8.18	7.94	7.8	8.1	8.2	8.15	7.9	8.2	8.1	8.1	8.1	8.1			
Turbidity	NTU's	5	MAC	<0.05	0.1	0.56	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.5	<0.5			
Alkalinity	mg/L			134	143	150	150	150	140	130	150	130	130	130	130	130			
Chloride	mg/L	≤250	AO	2.52	2.49	3.2	3.1	3.5	3.9	3.4	5.2	4.3	3.9	4.6	4.7	5.2			
Fluoride	mg/L	1.5	MAC	0.12	0.13	<0.6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0.1	0.12	0.12			
Sulfate	mg/L	500	AO	7.26	13.62	12	13.6	13.2	11.1	9.9	21.3	12	10.7	10.4	10.8	13.4			
Nitrate (N)	mg/L	10	MAC	<0.002	<0.01	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.01	<0.05	<0.05			
Nitrite (N)	mg/L	1	MAC	<0.006	<0.01	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.01	<0.05	<0.05			
T-Aluminum	mg/L	0.100	OG	0.015	0.005	<0.005	0.006	<0.005	0.006	<0.005	0.01	<0.005	<0.005	<0.005	0.004	0.005			
T-Antimony	mg/L	0.006	MAC		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0001	<0.0002			
T-Arsenic	mg/L	0.010	MAC	<0.01	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.0002	<0.0002	<0.0002	0.00009	<0.0002			
T- Barium	mg/L	1.0	MAC	0.0129	0.013	0.014	0.014	0.014	0.013	0.014	0.017	0.012	0.012	0.012	0.012	0.014			
T-Beryllium	mg/L													<0.00004	<0.00005	<0.00004			
T-Bismuth	mg/L													<0.001	<0.0001	<0.0010			
T-Boron	mg/L	5.0	MAC	<0.002	0.016	0.021	0.024	0.023	0.024	0.024	0.019	0.021	0.021	0.02	0.022	0.023			
T-Cadmium	mg/L	0.005	MAC	<0.0006	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001			
T-Calcium	mg/L			33	30.8	32.9	34.8	33.2	30.8	31.6	36.1	31.7	29.9	31.5	30	33.4			
T-Chromium	mg/L	0.05	MAC	<0.0009	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.003	<0.0004	<0.0004	0.0006	<0.0004	<0.0005	<0.0004			
T-Cobalt	mg/L													0.00002	<0.0001	0.00003			
T-Copper	mg/L	≤1.0	AO	<0.001	0.001	<0.001	0.004	<0.001	0.002	0.002	0.002	<0.001	<0.001	0.002	0.0006	<0.001			
T-Iron	mg/L	≤0.3	AO	0.134	0.1	0.1	0.1	0.1	0.1	0.2	0.08	0.114	0.108	0.109	0.102	0.121			
T-Lead	mg/L	0.010	MAC	<0.002	<0.0001	0.0001	0.0004	0.0002	0.0008	0.0008	0.0002	0.0001	0.0002	0.0001	<0.0001	<0.0001			
T-Lithium	mg/L											<0.001	<0.001	<0.001	<0.0005	<0.001			
T-Magnesium	mg/L			13	12.9	14	14.6	12.8	12.6	12.5	13.9	13.1	11.8	12.8	12.2	13.8			
T-Manganese	mg/L	≤0.05	AO	**0.15**	**0.147**	**0.142**	**0.159**	**0.15**	**0.14**	**0.143**	**0.129**	**0.134**	**0.142**	**0.133**	**0.131**	**0.153**			
T-Mercury	mg/L	0.001	MAC	<0.0001	<0.0002	<0.0002	<0.0002	<0.0001	<0.0001	<0.0001	<0.01	<0.01	<0.00001	<0.00001	<0.0001	<0.00001			
T-Molybdenum	mg/L													0.0004	0.00062	0.0005			
T-Nickel	mg/L											0.001	<0.001	<0.001	<0.0002	<0.001			
T-Phosphorus	mg/L											0.381	0.354	0.352					
T-Potassium	mg/L			2.3	2.3	2.4	2.6	2.5	2.5	2.4	2.2	2.4	2.3	2.2	2.6	2.71			
T-Selenium	mg/L	0.01	MAC	<0.004	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0006	<0.0006	<0.0006	<0.0006	<0.0001	<0.0006			
T-Silicon	mg/L													10.8	12.7	12			
T-Silver	mg/L											<0.00001	<0.00001	<0.00001	<0.00001	<0.00001			
T-Sodium	mg/L	≤200	AO	10.2	9.4	9.6	10.2	10.6	10.2	10	8.57	10.3	16.9	10	10.6	12.6			
T-Strontium	mg/L													0.114	0.118	0.142			
T-Thallium	mg/L													<0.00001	<0.00001	<0.00001			
T-Tin	mg/L													<0.0001	<0.0001	0.0001			
T-Titanium	mg/L													<0.001	<0.0005	<0.0010			
T-Uranium	mg/L	0.02	MAC	<0.06	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0004	<0.0004	<0.0004	<0.0004	<0.00001	<0.0004			
T-Vanadium	mg/L													0.0003	0.0003	0.0004			
T-Zinc	mg/L	≤5.0	AO	0.0107	0.005	0.014	0.015	0.015	0.009	0.043	0.008	0.009	0.02	0.017	0.0106	0.006			
Total Coliform	cfu/100ml	<1	MAC	***39**			<1	<1	<1	<1	<1	<1	<1.0	<1.0	<1.0	<1.0			
Fecal Coliform	cfu/100ml	<1	MAC	<1			<1	<1	<1	<1	<1								
E.coli	cfu/100ml	<1	MAC						<1	<1	<1	<1	<1.0	<1.0	<1.0	<1.0			

Note: Total coliforms can be an indicator of adverse water quality if the result in the re-sample is confirmed positive. (United States Environmental Protection Agency (EPA), 2008) RDN Water samples are always tested for E.coli bacteria at the same time as Total coliforms to rule out the presence of harmful pathogens.

*Resampled and had <1 for all Coliforms

French Creek Well Water Analysis Results

Well #5: 1140 Sunrise Drive

Canadian Drinking Water Guidelines Package

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

Red font indicates non-compliance with Canadian Drinking Water Guidelines

Parameter	Water Quality Guidelines																
	Units	CDWG		2000	16-Oct 2002	22-Oct 2003	26-Oct 2004	19-Oct 2005	24-Oct 2006	24-Oct 2007	8-Oct 2008	26-Oct 2011	29-Oct 2012	31-Oct 2013				
Total Ammonia (N)	mg/L												1.64	1.48				
Color-Apparent	CU			25	28	20	25	30	14	18	35	30	32	29				
Conductivity	uS/cm			270	293	321	312	272	258	262	263	264	262	265				
TDS	mg/L	≤500	AO	181	173	167	210	164	190	253	176	188	166	150				
Hardness ($CaCO_3$)	mg/L	80-100	AO	**103.8**	100	**106**	**110**	89	86	86	87	89	85	88				
pH	pH units	6.5-8.5	AO	7.66	7.61	7.62	7.7	8.1	7.8	8.01	7.7	7.9	7.7	7.8				
Turbidity	NTU's	5	MAC	0.43	0.87	1.64	1.8	1.6	1	1.5	0.9	0.7	0.9	0.6				
Alkalinity	mg/L			135	129	150	160	140	130	130	130	130	130	120				
Chloride	mg/L	≤250	AO	7.06	9.5	11.3	10.3	3.1	5.7	5.4	7.2	6.5	6.1	6.1				
Fluoride	mg/L	1.5	MAC	0.14	0.15	<0.6	<1.0	<1.0	<1.0	<1.0	<1.0	0.2	0.16	0.15				
Sulfate	mg/L	500	AO	0.12	0.17	1.8	<2	11.2	<2.0	<2.0	<2.0	<0.2	<0.5	1				
Nitrate (N)	mg/L	10	MAC	<0.002	<0.01	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.01	<0.05	<0.05				
Nitrite (N)	mg/L	1	MAC	<0.006	<0.01	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.01	<0.05	<0.05				
T-Aluminum	mg/L	0.100	OG	0.013	<0.005	<0.005	0.024	0.065	0.011	0.024	0.009	<0.005	0.002	<0.005				
T-Antimony	mg/L	0.006	MAC		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0001	<0.0002				
T-Arsenic	mg/L	0.010	MAC	<0.01	0.0008	0.0009	0.0011	0.001	0.0007	0.0008	0.0005	0.0005	0.00044	0.0004				
T- Barium	mg/L	1.0	MAC	0.0066	0.007	0.008	0.008	0.006	0.007	0.007	0.006	0.005	0.00571	0.006				
T-Beryllium	mg/L											<0.00004	<0.00005	<0.00004				
T-Bismuth	mg/L											<0.001	<0.0001	<0.0010				
T-Boron	mg/L	5.0	MAC	0.02	0.039	0.062	0.07	0.052	0.058	0.056	0.051	0.052	0.058	0.058				
T-Cadmium	mg/L	0.005	MAC	<0.0006	<0.00001	0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0.00001	0.00001				
T-Calcium	mg/L			24.9	23.4	25	27	21.5	20.4	20.8	20.5	21.3	20.4	20.6				
T-Chromium	mg/L	0.05	MAC	<0.0009	<0.0005	<0.0005	<0.0005	0.0005	<0.0005	0.0007	0.0006	<0.0004	<0.0005	0.0004				
T-Cobalt	mg/L											0.00003	<0.0001	0.00004				
T-Copper	mg/L	≤1.0	AO	<0.001	0.003	0.013	<0.001	0.004	<0.001	0.002	0.001	<0.001	0.0015	0.002				
T-Iron	mg/L	≤0.3	AO	**0.882**	**0.9**	**1**	**1.1**	**0.9**	**0.9**	**1.1**	**0.73**	**0.742**	**0.719**	**0.711**				
T-Lead	mg/L	0.010	MAC	<0.002	0.0001	0.0017	0.0002	0.0014	0.0004	0.0006	0.0004	0.0002	0.0002	0.0003				
T-Lithium	mg/L											0.001	0.0008	<0.001				
T-Magnesium	mg/L			10.1	10.1	10.6	11.2	8.5	8.4	8.2	8.69	8.7	8.36	8.79				
T-Manganese	mg/L	≤0.05	AO	**0.256**	**0.246**	**0.235**	**0.271**	**0.211**	**0.198**	**0.205**	**0.182**	**0.194**	**0.192**	**0.2**				
T-Mercury	mg/L	0.001	MAC	<0.0001	<0.0002	<0.0002	<0.0002	<0.0001	<0.0001	<0.0001	<0.01	<0.00001	<0.0001	<0.00001				
T-Molybdenum	mg/L											0.0006	0.00079	0.0007				
T-Nickel	mg/L											<0.001	<0.0002	<0.001				
T-Phosphorus	mg/L											1.02						
T-Potassium	mg/L			2.7	2.6	2.7	2.9	2.6	2.6	2.5	2.4	2.5	2.9	2.79				
T-Selenium	mg/L	0.01	MAC	<0.004	<0.0002	<0.0002	<0.0002	0.0002	<0.0002	<0.0002	<0.0006	<0.0006	<0.0001	<0.0006				
T-Silicon	mg/L											16.7	19.8	18.2				
T-Silver	mg/L											<0.00001	<0.00001	<0.00001				
T-Sodium	mg/L	≤200	AO	23.5	21.8	23	26	21.5	20.6	20.4	20.3	21.9	24.4	24.8				
T-Strontium	mg/L											0.07	0.0734	0.077				
T-Thallium	mg/L											<0.00001	<0.00001	<0.00001				
T-Tin	mg/L											<0.0001	<0.0001	0.0002				
T-Titanium	mg/L											<0.001	0.0008	<0.0010				
T-Uranium	mg/L	0.02	MAC	<0.06	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0004	<0.0004	<0.00001	<0.0004				
T-Vanadium	mg/L											0.0008	0.001	0.001				
T-Zinc	mg/L	≤5.0	AO	0.0049	0.003	0.032	0.027	0.062	0.033	0.047	0.03	0.014	0.0097	0.015				
Total Coliform	cfu/100ml	<1	MAC	***36**	<1		<1	<1	<1	***1**	<1	<1.0	<1.0	<1.0				
Fecal Coliform	cfu/100ml	<1	MAC	<1	<1		<1	<1	<1	<1	<1							
E.coli	cfu/100ml	<1	MAC						<1	<1	<1	<1.0	<1.0	<1.0				

Note: Total coliforms can be an indicator of adverse water quality if the result in the re-sample is confirmed positive. (United States Environmental Protection Agency (EPA), 2008) RDN Water samples are always tested for E.coli bacteria at the same time as Total coliforms to rule out the presence of harmful pathogens.

*Resampled and had <1 for all Coliforms

French Creek Raw Water Analysis Results

Well #6: 1108 Wellington Drive

Canadian Drinking Water Guidelines Package

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

Red font indicates non-compliance with Canadian Drinking Water Guidelines

Parameter	Water Quality Guidelines																
	Units	CDWG		2000	16-Oct 2002	22-Oct 2003	26-Oct 2004	19-Oct 2005	24-Oct 2006	24-Oct 2007	8-Oct 2008	26-Oct 2011	29-Oct 2012	31-Oct 2013				
Total Ammonia (N)	mg/L												1.24	1.06				
Color-Apparent	CU			25	23	19	16	27	11	19	31	26	31	28				
Conductivity	uS/cm			252	247	264	237	226	219	225	224	219	218	220				
TDS	mg/L	≤500	AO	169	147	133	150	220	170	140	162	168	142	138				
Hardness ($CaCO_3$)	mg/L	80-100	AO	97.3	90.2	91	97	83	80	81	84	83	**79**	83				
pH	pH units	6.5-8.5	AO	7.64	7.61	7.56	7.7	7.9	7.8	8	7.6	7.8	7.7	7.7				
Turbidity	NTU's	5	MAC	0.62	0.87	1.3	1.1	1.6	1.8	3	0.9	0.7	0.9	0.8				
Alkalinity	mg/L			121	121	130	130	120	110	110	110	110	110	100				
Chloride	mg/L	≤250	AO	4.05	3.8	5	4.3	4.2	4.5	3.9	5.5	4.3	4	3.9				
Fluoride	mg/L	1.5	MAC	0.14	0.17	<0.6	<1.0	<1.0	<1.0	<1.0	<1.0	0.1	0.16	0.15				
Sulfate	mg/L	500	AO	0.09	<0.2	1.7	<2	<2	<2.0	<2.0	<2.0	<0.2	<0.5	0.8				
Nitrate (N)	mg/L	10	MAC	<0.002	<0.01	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.01	<0.05	<0.05				
Nitrite (N)	mg/L	1	MAC	<0.006	<0.01	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.01	<0.05	<0.05				
T-Aluminum	mg/L	0.100	OG	0.026	<0.005	<0.005	<0.005	<0.005	<0.005	0.007	0.006	<0.005	0.002	<0.005				
T-Antimony	mg/L	0.006	MAC		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0001	<0.0002				
T-Arsenic	mg/L	0.010	MAC	<0.01	0.0015	0.0018	0.0018	0.0022	0.0017	0.0016	0.0014	0.0014	0.00132	0.0013				
T- Barium	mg/L	1.0	MAC	0.0049	0.005	0.006	0.005	0.005	0.005	0.005	0.005	0.004	0.0044	0.005				
T-Beryllium	mg/L											<0.00004	<0.00005	<0.00004				
T-Bismuth	mg/L											<0.001	<0.0001	<0.0010				
T-Boron	mg/L	5.0	MAC	<0.002	0.021	0.034	0.036	0.028	0.032	0.033	0.032	0.03	0.033	0.032				
T-Cadmium	mg/L	0.005	MAC	<0.0006	0.00005	<0.00001	<0.00001	<0.00001	<0.00001	0.00002	<0.00001	<0.00001	<0.00001	<0.00001				
T-Calcium	mg/L			23.1	20.8	21.1	22.8	20	18.8	19.5	19.7	19.7	18.6	19.3				
T-Chromium	mg/L	0.05	MAC	<0.0009	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.001	0.0006	<0.0004	<0.0005	0.0004				
T-Cobalt	mg/L											0.00004	<0.0001	0.00003				
T-Copper	mg/L	≤1.0	AO	<0.001	<0.001	0.001	0.001	0.001	0.002	0.004	0.002	0.001	0.0012	<0.001				
T-Iron	mg/L	≤0.3	AO	**0.773**	**0.8**	**0.9**	**0.9**	**1.2**	**1**	**1.5**	**0.8**	**0.846**	**0.813**	**0.864**				
T-Lead	mg/L	0.010	MAC	<0.002	0.0002	0.0009	0.006	0.0018	0.0013	0.0039	0.0023	0.0007	0.0006	0.0001				
T-Lithium	mg/L											<0.001	0.0006	<0.001				
T-Magnesium	mg/L			9.63	9.3	9.4	9.8	8	7.9	7.9	8.51	8.28	7.87	8.42				
T-Manganese	mg/L	≤0.05	AO	**0.198**	**0.183**	**0.17**	**0.186**	**0.19**	**0.168**	**0.182**	**0.171**	**0.168**	**0.166**	**0.177**				
T-Mercury	mg/L	0.001	MAC	<0.0001	<0.001	<0.0002	<0.0002	<0.0001	<0.0001	<0.0001	<0.01	<0.00001	<0.0001	<0.00001				
T-Molybdenum	mg/L											0.0008	0.00094	0.0008				
T-Nickel	mg/L											<0.001	<0.0002	<0.001				
T-Phosphorus	mg/L											0.889						
T-Potassium	mg/L			2.1	2	2	2.2	1.9	2	2	1.9	1.9	2.2	2.12				
T-Selenium	mg/L	0.01	MAC	<0.004	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.0002	<0.0006	<0.0006	<0.0001	<0.0006				
T-Silicon	mg/L											15.5	18	16.9				
T-Silver	mg/L											<0.00001	<0.00001	<0.00001				
T-Sodium	mg/L	≤200	AO	16.5	18	15.8	16.1	14.4	14.2	14.6	15.3	14.8	16.6	17.2				
T-Strontium	mg/L											0.057	0.0581	0.063				
T-Thallium	mg/L											<0.00001	<0.00001	<0.00001				
T-Tin	mg/L											<0.0001	<0.0001	<0.0001				
T-Titanium	mg/L											0.001	0.0008	<0.0010				
T-Uranium	mg/L	0.02	MAC	<0.06	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0004	<0.0004	<0.00001	<0.0004				
T-Vanadium	mg/L											0.0011	0.0012	0.0011				
T-Zinc	mg/L	≤5.0	AO	0.0137	0.009	0.017	0.015	0.088	0.074	0.398	0.062	0.032	0.0134	0.019				
Total Coliform	cfu/100ml	<1	MAC	***942**	<1		<1	<1	<1	<1	<1	<1.0	<1.0	<1.0				
Fecal Coliform	cfu/100ml	<1	MAC	<1	<1		<1	<1	<1	<1	<1							
E.coli	cfu/100ml	<1	MAC						<1	<1	<1	<1.0	<1.0	<1.0				

Note: Total coliforms can be an indicator of adverse water quality if the result in the re-sample is confirmed positive. (United States Environmental Protection Agency (EPA), 2008) RDN Water samples are always tested for Fecal coliform bacteria at the same time as Total coliforms to rule out the presence of harmful pathogens.

*Resampled and had <1 for all Coliforms

French Creek Well Water Analysis Results

Well #7: 846 Yambury Road

Canadian Drinking Water Guidelines Package

CDWG=Canadian Drinking Water Guidelines MAC=Maximum Acceptable Concentration AO= Asthetic Objective

OG= Operational Guidance Value

Red font indicates non-compliance with Canadian Drinking Water Guidelines

Parameter	Water Quality Guidelines																	
	Units	CDWG		2000	16-Oct 2002	22-Oct 2003	26-Oct 2004	19-Oct 2005	24-Oct 2006	24-Oct 2007	8-Oct 2008	14-Oct 2009	26-Oct 2011	29-Oct 2012	31-Oct 2013				
Total Ammonia (N)	mg/L												0.23	0.22	0.23				
Color-Apparent	CU			<5	5	<5	<5	7	<5	<5	5	14	<5	5	7				
Conductivity	uS/cm			277	314	338	333	342	316	355	343	319	317	310	357				
TDS	mg/L	≤500	AO	186	160	193	220	300	210	273	210	186	208	194	214				
Hardness ($CaCO_3$)	mg/L	80-100	AO	**142.3**	**139**	**155**	**170**	**160**	**140**	**160**	**160**	**160**	**140**	**140**	**180**				
pH	pH units	6.5-8.5	AO	8.17	8.12	8.05	8.2	8.2	8.3	8.22	8	8.3	8.2	8.2	8.2				
Turbidity	NTU's	5	MAC	0.13	0.24	0.66	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	<0.5	0.5	0.5				
Alkalinity	mg/L			131	142	160	160	160	150	160	160	150	150	140	140				
Chloride	mg/L	≤250	AO	2.13	2.37	2.8	3.4	3	3.4	3.2	4.9	4.3	4.5	5.1	4.4				
Fluoride	mg/L	1.5	MAC	0.12	0.13	<0.6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0.1	0.13	0.1				
Sulfate	mg/L	500	AO	15.22	15.82	17.6	20	18.9	13.1	<2.0	17.4	14.8	15.1	16.6	36.6				
Nitrate (N)	mg/L	10	MAC	<0.002	<0.01	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.01	<0.05	<0.05				
Nitrite (N)	mg/L	1	MAC	<0.006	<0.01	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.01	<0.05	<0.05				
T-Aluminum	mg/L	0.100	OG	0.021	0.006	<0.005	<0.0005	<0.005	0.015	0.021	0.007	<0.005	<0.005	0.003	<0.005				
T-Antimony	mg/L	0.006	MAC		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0001	<0.0002				
T-Arsenic	mg/L	0.010	MAC	<0.01	<0.0002	0.0002	0.0003	0.0003	<0.0002	0.0002	<0.0002	0.0004	<0.0002	0.0001	<0.0002				
T- Barium	mg/L	1.0	MAC	0.0144	0.015	0.017	0.018	0.017	0.015	0.018	0.017	0.016	0.014	0.0141	0.017				
T-Beryllium	mg/L												<0.00004	<0.00005	<0.00004				
T-Bismuth	mg/L												<0.001	<0.0001	<0.0010				
T-Boron	mg/L	5.0	MAC	<0.002	0.014	0.019	0.02	0.019	0.021	0.019	0.018	0.015	0.017	0.02	0.016				
T-Cadmium	mg/L	0.005	MAC	<0.0006	<0.00001	0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0.00001	<0.00001				
T-Calcium	mg/L			35.7	33.7	37.2	41.6	39.8	35	39.3	39.9	37.8	37.7	35.1	42.3				
T-Chromium	mg/L	0.05	MAC	<0.0009	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0004	<0.0004	<0.0004	<0.0005	<0.0004				
T-Cobalt	mg/L												<0.00002	<0.0001	0.00004				
T-Copper	mg/L	≤1.0	AO	<0.001	0.002	<0.001	<0.001	0.001	0.001	0.002	<0.001	<0.001	<0.001	0.0003	<0.001				
T-Iron	mg/L	≤0.3	AO	0.158	<0.1	0.1	0.1	0.1	<0.1	0.2	0.11	0.15	0.12	0.104	0.149				
T-Lead	mg/L	0.010	MAC	<0.002	0.0004	<0.0001	0.0001	0.0002	0.0001	0.0001	0.0004	<0.0001	<0.0001	<0.0001	<0.0001				
T-Lithium	mg/L											<0.001	<0.001	<0.0005	<0.001				
T-Magnesium	mg/L			12.9	13.3	15.2	16.7	14.9	13.3	15.1	15.8	16	14.6	13.6	16.9				
T-Manganese	mg/L	≤0.05	AO	**0.127**	**0.126**	**0.132**	**0.156**	**0.147**	**0.124**	**0.148**	**0.138**	**0.141**	**0.131**	**0.13**	**0.155**				
T-Mercury	mg/L	0.001	MAC	<0.0001	<0.0002	<0.0002	<0.0002	<0.0001	<0.0001	<0.0001	<0.01	<0.01	<0.00001	<0.0001	<0.00001				
T-Molybdenum	mg/L												0.0005	0.0006	0.0006				
T-Nickel	mg/L											<0.001	<0.001	<0.0002	<0.001				
T-Phosphorus	mg/L											0.203	0.228						
T-Potassium	mg/L			2.1	2.1	2.2	2.5	2.4	2.4	2.4	2.4	2.4	2.3	2.6	2.7				
T-Selenium	mg/L	0.01	MAC	<0.004	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0006	<0.0006	<0.0006	<0.00001	<0.0006				
T-Silicon	mg/L												10.6	12.3	11.2				
T-Silver	mg/L											<0.00001	<0.00001	<0.00001	<0.00001				
T-Sodium	mg/L	≤200	AO	9.2	9	8.4	9	9.5	9.9	9	8.49	8.81	9.35	10.4	10.9				
T-Strontium	mg/L												0.133	0.134	0.168				
T-Thallium	mg/L												<0.00001	<0.00001	<0.00001				
T-Tin	mg/L												<0.0001	<0.0001	0.0001				
T-Titanium	mg/L												0.002	<0.0005	<0.0010				
T-Uranium	mg/L	0.02	MAC	<0.06	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0004	<0.0004	<0.0004	<0.00001	<0.0004				
T-Vanadium	mg/L												0.0002	0.0002	0.0002				
T-Zinc	mg/L	≤5.0	AO	0.0782	0.046	0.043	0.01	0.012	0.003	0.012	0.006	0.016	0.002	0.0009	0.005				
Total Coliform	cfu/100ml	<1	MAC	***50**			<1	<1	<1	<1	<1	<1	<1.0	<1.0	<1.0				
Fecal Coliform	cfu/100ml	<1	MAC	<1			<1	<1	<1	<1	<1								
E.coli	cfu/100ml	<1	MAC						<1	<1	<1	<1	<1.0	<1.0	<1.0				

Note: Total coliforms can be an indicator of adverse water quality if the result in the re-sample is confirmed positive. (United States Environmental Protection Agency (EPA), 2008) RDN Water samples are always tested for Fecal coliform bacteria at the same time as Total coliforms to rule out the presence of harmful pathogens.

*Resampled and had <1 for all Coliforms

French Creek Distribution Water Analysis Results

Location: 1228 Sunrise Drive

Canadian Drinking Water Guidelines Package

*samples collected at French Creek Pumphouse

CDWG=Canadian Drinking Water Guidelines MAC=Maximum Acceptable Concentration AO=Aesthetic Objective

OG=Operational Guidance Value

Red font indicates non-compliance with Canadian Drinking Water Guidelines

Parameters	Water Quality Guidelines			17-Nov	29-Nov	28-Jun	6-Mar	23-Apr		20-Apr	17-May	22-May	27-May	13-May	19-May	18-May	16-May	5-Jun	
	Units	CDWG		1999*	2000	2001*	2002*	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	
Total Ammonia (N)	mg/L																0.09	0.02	
Color-Apparent	CU	≤15	AO	25	5	37	7	22	39	60	20	7	17	6	14	24	31	37	
Conductivity	uS			279	309	324	281	326	327	311	309	309	312	330	333	316	313	297	
TDS	mg/L	500	AO	172	190	167	153	173	200	150	193	182	208	246	206	210	176	200	
Hardness (CaCO3)	mg/L	80-100	AO	103	115.2	124.9	136	116.3	120	120	140	140	130	200	140	120	140	140	
pH	pH units	6.5-8.5	AO	8.03	7.83	7.72	7.95	7.9	7.8	7.8	8.1	8	8.15	8.2	8.3	8.2	8.3	8.1	
Turbidity	NTU's	5	AO	0.96	0.63	0.85	0.22	0.69	1.3	2.3	0.9	0.6	0.7	0.5	1.1	0.9	1.2	1	
Alkalinity	mg/L			137	135	134	131	138	130	140	150	130	140	140	150	130	140	130	
Chloride	mg/L	250	AO	5.7	6.07	9.2	5.21	10.91	14.4	13	7.2	7.1	7.6	15.2	9.5	8.7	8.7	9.8	
Fluoride	mg/L	1.5	MAC	0.1	0.14	0.12	0.13	0.09	<1.0	<1.0	0.1	<1.0	<1.0	<1.0	<1.0	<1.0	0.11	0.1	
Sulfate	mg/L	≤500	AO	5.1	5	7.61	12.07	6.74	48.6	5.4	11.3	9.9	10.4	4.9	6	14.6	14.6	15.4	
Nitrate (N)	mg/L	10	MAC	0.06	5.89	<.004	0.03	0.06	0.2	<0.1	<0.01	<0.1	<0.1	2.7	0.6	<0.1	<0.05	<0.05	
Nitrite (N)	mg/L	1	MAC	0.05	0.08	<.002	0.03	<0.01	<0.1	<0.1	<0.01	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	<0.05	
T-Aluminum	mg/L	0.100	OG	0.007	0.04	0.017	<.009	<0.005	<0.005	<0.005	<0.005	<0.005	<0.05	<0.005	0.008	<0.005	<0.005	<0.005	
T-Antimony	mg/L	0.006	MAC			<.006	<.006	<0.0002	<0.0005	<0.0002	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
T-Arsenic	mg/L	0.010	MAC		<.01	<.01	<.01	0.0006	0.0007	0.0009	0.0002	<0.0002	<0.001	<0.0002	0.0002	<0.0002	<0.0002	<0.0002	
T-Barium	mg/L	1.0	MAC	0.008	0.01	0.0139	0.0159	0.01	0.015	0.014	0.015	0.016	0.01	0.011	0.016	0.016	0.013	0.015	
T-Beryllium	mg/L																<0.00004	<0.00004	
T-Boron	mg/L	5.0	MAC		0.041	0.036	0.022	0.037	0.039	0.034	0.018	0.023	<0.02	0.013	0.024	0.022	0.023	0.021	
T-Bismuth	mg/L																<0.001	<0.0010	
T-Cadmium	mg/L	0.005	MAC		<.0006	<.0006	<.0006	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.0003	<0.00001	0.00007	<0.00001	<0.00001	<0.00001	
T-Calcium	mg/L				28	29.9	33.3	27.1	28.9	28.2	33.5	34.3	30.6	49.1	33.6	29.4	35.2	34.3	
T-Chromium	mg/L	0.05	MAC		<.0009	<.0009	<.0009	0.0006	<0.0005	<0.0005	<0.0005	<0.0005	<0.003	0.0006	<0.0004	<0.0004	0.0004	<0.0004	
T-Cobalt	mg/L																0.0001	0.00076	
T-Copper	mg/L	≤1	AO		<.001	0.002	<.001	0.004	0.002	0.001	0.002	0.002	<0.005	0.049	0.002	0.001	0.002	0.002	
T-Iron	mg/L	≤0.3	AO	0.2	0.41	0.461	0.203	0.4	0.5	1	0.1	0.1	0.12	0.03	0.094	0.13	0.137	0.125	
T-Lead	mg/L	0.010	MAC		<.002	0.002	<.002	0.0002	0.0002	0.0002	<0.0001	0.0002	<0.0005	0.0008	0.0003	0.0003	0.0001	0.0001	
T-Lithium	mg/L													0.001	<0.001	<0.001	<0.001	<0.001	
T-Magnesium	mg/L		AO	10.4	11	12.2	12.8	11.8	11.9	11.7	12.6	13.6	12.3	17.7	13.4	12.2	13.6	13.4	
T-Manganese	mg/L	≤0.05	AO	0.13	0.17	0.213	0.152	0.174	0.385	0.34	0.124	0.136	0.13	0.0013	0.132	0.114	0.145	0.124	
T-Mercury	mg/L	0.001	MAC		<.0001	<.0001	<.0001	<0.0002	<0.0002	<0.0002	<0.0001	<0.0001	<0.01	<0.01	<0.01	<0.00001	<0.00001	<0.00001	
T-Molybdenum	mg/L																0.0005	0.0006	
T-Nickel	mg/L													0.001	<0.001	<0.001	<0.001	<0.001	
T-Phosphorus	mg/L													0.012	0.302	0.325	0.311		
T-Potassium	mg/L				<4	2.2	204	2.4	2.5	2	2.4	2.3	2.2	1.1	2.6	2.4	2.6	2.68	
T-Selenium	mg/L	0.01	MAC		<.004	0.005	<.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.003	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006	
T-Silicon	mg/L																11.6	11.5	
T-Silver	mg/L													<0.00001	0.00004	0.00001	<0.00001	<0.00001	
T-Sodium	mg/L	≤200	AO		15	20.2	11.9	19.6	21	20	12.5	12.9	13.4	7.72	13.7	14.3	13.2	13.6	
T-Strontium	mg/L																0.132	0.138	
T-Thallium	mg/L																<0.00001	<0.00001	
T-Tin	mg/L																<0.0001	0.0002	
T-Titanium	mg/L																<0.001	<0.0010	
T-Uranium	mg/L	0.02	MAC		<.06	<.06	<.02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.002	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	
T-Vanadium	mg/L																0.0003	0.0003	
T-Zinc	mg/L	≤5	AO		0.0069	0.0027	0.0034	0.005	0.012	0.009	0.004	0.011	<0.005	0.118	0.003	0.003	0.002	0.002	
Total Coliform	cfu/100ml	<1	MAC	<1	<1	<1	n/a	n/a	<1	<1	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	
Fecal Coliform	cfu/100ml	<1	MAC	<1	<1	<1	n/a	n/a	<1	<1	<1	<1							
E.coli	cfu/100ml	<1	MAC								<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	
Tannins & Lignins	mg/l	0.4	AO	n/a	n/a	0.28	<.1	n/a	n/a	n/a	n/a	n/a							
Trihalomethanes	mg/l	0.1	MAC	n/a	n/a	3.1	n/a	n/a	n/a	n/a	0.009	n/a							

Regional District of Nanaimo - Water Services Department

French Creek Water Analysis - 2013 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-13	1381 Gilley	0	0	0	0	10	7.04	0.23	170.7	0.17	355.0	0.07	0.112
10-Dec-13	1228 Sunrise	0	0	0	0	8.5	7.01	0.34	168.4	0.17	351.0		
16-Dec-13	1381 Gilley			0	0	8	7.29	0.17	168.2	0.17	350.0		
30-Dec-13	1381 Gilley			0	0	9	6.81	0.30	171.2	0.17	356.0		
	Average	0	0	0	0	8.9	7.0	0.26	169.6	0.2	353.0	0.07	0.112
	Maximum	0	0	0	0	10	7.29	0.34	171.2	0.17	356	0.07	0.112
	Minimum	0	0	0	0	8	6.81	0.17	168.2	0.17	350	0.07	0.112

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

French Creek Water Analysis - 2013 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)
6-Nov-13	1381 Gilley	0	0	0	0	13	6.95	0.16	172.6	0.17	359.0		
12-Nov-13	1228 Sunrise	0	0	0	0	10	7.10	0.42	168.3	0.17	349.0	0.10	0.150
20-Nov-13	1381 Gilley			0	0	10	6.94	0.06	170.2	0.17	354.0		
25-Nov-13	1228 Sunrise			0	0	9	7.17	0.09	168.4	0.17	351.0		
	Average	0	0	0	0	10.5	7.0	0.18	169.9	0.2	353.3	0.10	0.15
	Maximum	0	0	0	0	13	7.17	0.42	172.6	0.17	359	0.1	0.15
	Minimum	0	0	0	0	9	6.94	0.06	168.3	0.17	349	0.1	0.15

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Regional District of Nanaimo - Water Services Department

French Creek Water Analysis - 2013 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)
2-Oct-13	1381 Gilley	0	0	0	0	15	7.08	0.05	169.7	0.17	353.0	0.08	0.091
9-Oct-13	1228 Sunrise	0	0	0	0	12	7.16	0.34	172.8	0.17	360.0		
15-Oct-13	1381 Gilley			0	0	13	6.93	0.08	176.2	0.17	367.0		
22-Oct-13	1228 Sunrise			0	0	12	7.04	1.10	168.0	0.17	350.0		
28-Oct-13	1381 Gilley			0	0	13	7.36	0.33	172.9	0.17	360.0		
	Average	0	0	0	0	13.0	7.1	0.38	171.9	0.2	358.0	0.08	0.091
	Maximum	0	0	0	0	15	7.36	1.1	176.2	0.17	367	0.08	0.091
	Minimum	0	0	0	0	12	6.93	0.05	168	0.17	350	0.08	0.091

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Regional District of Nanaimo - Water Services Department

French Creek Water Analysis - 2013 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)
4-Sep-13	1381 Gilley	0	0	0	0	16	7.10	0.10	166.7	0.17	347.0	0.09	0.134
9-Sep-13	1228 Sunrise	0	0	0	0	15	7.09	0.58	167.6	0.17	349.0		
16-Sep-13	1381 Gilley			0	0	16	7.52	0.12	169.4	0.17	352.0		
24-Sep-13	1228 Sunrise			0	0	14	7.16	0.36	171.3	0.17	356.0		
	Average	0	0	0	0	15.3	7.2	0.29	168.8	0.2	351.0	0.09	0.134
	Maximum	0	0	0	0	16	7.52	0.58	171.3	0.17	356	0.09	0.134
	Minimum	0	0	0	0	14	7.09	0.1	166.7	0.17	347	0.09	0.134

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Regional District of Nanaimo - Water Services Department

French Creek Water Analysis - 2013 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)
6-Aug-13	1381 Gilley	0	0	0	0	16	7.02	0.22	158.7	0.16	331.0	0.10	0.156
12-Aug-13	1228 Sunrise	0	0	0	0	12	7.13	0.22	160.9	0.16	303.0		
20-Aug-13	1381 Gilley Cres			0	0	16	7.13	0.18	164.1	0.16	343.0		
27-Aug-13	1228 Sunrise			0	0	12	6.92	0.17	165.3	0.16	345.0		
	Average	0	0	0	0	14.0	7.1	0.20	162.3	0.2	330.5	0.10	0.156
	Maximum	0	0	0	0	16	7.13	0.22	165.3	0.16	345	0.1	0.156
	Minimum	0	0	0	0	12	6.92	0.17	158.7	0.16	303	0.1	0.156

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Regional District of Nanaimo - Water Services Department

French Creek Water Analysis - 2013 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)
2-Jul-13	1381 Gilley	0	0	0	0	17	7.09	0.31	158.8	0.16	331.0	0.08	0.090
8-Jul-13	1228 Sunrise	0	0	0	0	12	7.02	0.16	157.4	0.16	326.0		
17-Jul-13	1381 Gilley			0	0	16	7.01	0.13	160.1	0.16	334.0		
22-Jul-13	1228 Sunrise			0	0	12	7.07	0.36	158.2	0.16	330.0		
	Average	0	0	0	0	14.3	7.0	0.24	158.6	0.2	330.3	0.08	0.09
	Maximum	0	0	0	0	17	7.09	0.36	160.1	0.16	334	0.08	0.09
	Minimum	0	0	0	0	12	7.01	0.13	157.4	0.16	326	0.08	0.09

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Regional District of Nanaimo - Water Services Department

French Creek Water Analysis - 2013 Monthly Report

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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)
3-Jun-13	1381 Gilley	0	0	0	0	14	6.99	0.08	146.7	0.15	307.0	0.10	0.120
10-Jun-13	1228 Sunrise	0	0	0	0	14	7.54	0.35	154.9	0.15	323.0		
19-Jun-13	1381 Gilley			0	0	14	7.75	0.07	157.1	0.16	326.0		
25-Jun-13	1228 Sunrise			0	0	14	7.11	0.25	158.9	0.16	330.0		
	Average	0	0	0	0	14.0	7.3	0.19	154.4	0.2	321.5	0.10	0.12
	Maximum	0	0	0	0	14	7.75	0.35	158.9	0.16	330	0.1	0.12
	Minimum	0	0	0	0	14	6.99	0.07	146.7	0.15	307	0.1	0.12

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Regional District of Nanaimo - Water Services Department

French Creek Water Analysis - 2013 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)
8-May-13	1381 Gilley	0	0			11	7.14	0.07	153.6	0.15	320.0	0.09	0.086
14-May-13	1228 Sunrise	0	0			12	7.15	0.44	154.3	0.15	322.0		
21-May-13	1381 Gilley					13	7.17	0.20	156.0	0.16	325.0		
28-May-13	1228 Sunrise			0	0	13	7.45	0.35	155.2	0.15	323.0		
	Average	0	0	0	0	12.3	7.2	0.27	154.8	0.2	322.5	0.09	0.086
	Maximum	0	0	0	0	13	7.45	0.44	156	0.16	325	0.09	0.086
	Minimum	0	0	0	0	11	7.14	0.07	153.6	0.15	320	0.09	0.086

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Regional District of Nanaimo - Water Services Department

French Creek Water Analysis - 2013 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-Apr-13	1381 Gilley	0	0	0	0	9	7.26	0.15	158.9	0.16	331.0	0.07	0.093
9-Apr-13	1228 Sunrise	0	0	0	0	10	7.71	0.36	156.0	0.16	325.0		
17-Apr-13	1381 Gilley			0	0	11	7.14	0.19	158.3	0.16	330.0		
22-Apr-13	1228 Sunrise			0	0	11	7.00	0.61	153.5	0.15	320.0		
	Average	0	0	0	0	10.3	7.3	0.33	156.7	0.2	326.5	0.07	0.093
	Maximum	0	0	0	0	11	7.71	0.61	158.9	0.16	331	0.07	0.093
	Minimum	0	0	0	0	9	7	0.15	153.5	0.15	320	0.07	0.093

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

French Creek Water Analysis - 2013 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)
6-Mar-13	1381 Gilley	0	0	0	0	7	6.84	0.17	151.6	0.15	316.0	0.12	0.066
13-Mar-13	1228 Sunrise	0	0	0	0	10	7.10	0.33	153.6	0.15	320.0		
18-Mar-13	1381 Gilley			0	0	8	7.49	0.19	153.8	0.15	321.0		
25-Mar-13	1228 Sunrise			0	0	8	7.19	0.09	155.1	0.15	324.0		
	Average	0	0	0	0	8.3	7.2	0.20	153.5	0.2	320.3	0.12	0.066
	Maximum	0	0	0	0	10	7.49	0.33	155.1	0.15	324	0.12	0.066
	Minimum	0	0	0	0	7	6.84	0.09	151.6	0.15	316	0.12	0.066

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)

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Comments:

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Regional District of Nanaimo - Water Services Department

French Creek Water Analysis - 2013 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)
6-Feb-13	1381 Gilley	0	0	0	0	8	7.06	0.06	153.9	0.15	320.0	0.04	0.035
12-Feb-13	1228 Sunrise	0	0	0	0	9	7.01	0.29	153.6	0.15	322.0		
20-Feb-13	1381 Gilley			0	0	7	7.03	0.17	152.4	0.15	317.0		
25-Feb-13	1228 Sunrise			0	0	9	7.02	0.81	154.7	0.15	323.0		
	Average	0	0	0	0	8.3	7.0	0.33	153.7	0.2	320.5	0.04	0.035
	Maximum	0	0	0	0	9	7.06	0.81	154.7	0.15	323	0.04	0.035
	Minimum	0	0	0	0	7	7.01	0.06	152.4	0.15	317	0.04	0.035

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)**

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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

French Creek Water Analysis - 2013 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)
8-Jan-13	1228 Sunrise	0	0	0	0	10		0.49				0.11	0.197
16-Jan-13	1381 Gilley	0	0	0	0	7	7.09	0.18	148.1	0.15	309.0		
21-Jan-13	1381 Gilley			0	0	9	6.94	0.85	138.1	0.14	289.0		
28-Jan-13	1228 Sunrise			0	0	9	6.94	0.39	151.1	0.15	312.0		
	Average	0	0	0	0	8.8	7.0	0.48	145.8	0.1	303.3	0.11	0.197
	Maximum	0	0	0	0	10	7.09	0.85	151.1	0.15	312	0.11	0.197
	Minimum	0	0	0	0	7	6.94	0.18	138.1	0.14	289	0.11	0.197

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.

FRENCH CREEK WATER SERVICE AREA

Facility Location:
1480 Industrial Way
Parksville

Facility Information:

Facility Type:DWT

Facility Sampling History:

Location	Date	Total Coliform	E. Coli
1228 Sunrise, French Creek WWS, 1228 Sunrise, French Creek BC	10-Dec-2013	L1	L1
1381 Gilley Crescent , 1381 Gilley Crescent, Parksville	3-Dec-2013	L1	L1
1228 Sunrise, French Creek WWS, 1228 Sunrise, French Creek BC	12-Nov-2013	L1	L1
1381 Gilley Crescent , 1381 Gilley Crescent, Parksville	6-Nov-2013	L1	L1
1228 Sunrise, French Creek WWS, 1228 Sunrise, French Creek BC	9-Oct-2013	L1	L1
1381 Gilley Crescent , 1381 Gilley Crescent, Parksville	2-Oct-2013	L1	L1
1228 Sunrise, French Creek WWS, 1228 Sunrise, French Creek BC	9-Sep-2013	L1	L1
1381 Gilley Crescent , 1381 Gilley Crescent, Parksville	4-Sep-2013	L1	L1
1228 Sunrise, French Creek WWS, 1228 Sunrise, French Creek BC	12-Aug-2013	L1	L1
1381 Gilley Crescent , 1381 Gilley Crescent, Parksville	6-Aug-2013	L1	L1
1228 Sunrise, French Creek WWS, 1228 Sunrise, French Creek BC	8-Jul-2013	L1	L1
1381 Gilley Crescent , 1381 Gilley Crescent,	2-Jul-2013	L1	L1

Parksville			
1228 Sunrise, French Creek WWS, 1228 Sunrise, French Creek BC	10-Jun-2013	L1	L1
1381 Gilley Crescent , 1381 Gilley Crescent, Parksville	3-Jun-2013	L1	L1
1228 Sunrise, French Creek WWS, 1228 Sunrise, French Creek BC	14-May-2013	L1	L1
1381 Gilley Crescent , 1381 Gilley Crescent, Parksville	8-May-2013	L1	L1
1228 Sunrise, French Creek WWS, 1228 Sunrise, French Creek BC	9-Apr-2013	L1	L1
1381 Gilley Crescent , 1381 Gilley Crescent, Parksville	3-Apr-2013	L1	L1
1228 Sunrise, French Creek WWS, 1228 Sunrise, French Creek BC	13-Mar-2013	L1	L1
1381 Gilley Crescent , 1381 Gilley Crescent, Parksville	6-Mar-2013	L1	L1
1228 Sunrise, French Creek WWS, 1228 Sunrise, French Creek BC	12-Feb-2013	L1	L1
1381 Gilley Crescent , 1381 Gilley Crescent, Parksville	6-Feb-2013	L1	L1
1381 Gilley Crescent , 1381 Gilley Crescent, Parksville	16-Jan-2013	L1	L1
1228 Sunrise, French Creek WWS, 1228 Sunrise, French Creek BC	9-Jan-2013	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

APPENDIX C

EMERGENCY RESPONSE PLAN

REGIONAL DISTRICT OF NANAIMO

EMERGENCY RESPONSE PLAN

REGIONAL DISTRICT OF NANAIMO

WATER SYSTEMS

water SMART zero waste

REVISION DATE – MARCH 2014

Contents

Prime Responsibilities

- Provide safe drinking water.
- Provide potable water for sanitation purposes.
- Provide water for fire suppression.
- Prevent unnecessary loss of stored water.
- Restore the integrity of the entire water system as soon as possible.
- Maintain integrity and quality of supply.

Emergency Response and Recovery Actions

- Analyze the type and severity of the emergency.
- Provide emergency assistance to save lives.
- Reduce the probabilities of additional injuries or damage.
- Provide situational reporting to appropriate agencies as required.
- Perform emergency repairs based on priority demand.
- Return system to normal levels. (recovery)
- Evaluate response and preparedness plan.
- Revise plan as necessary.
- Provide maps, notices, and direction necessary for water recovery.

Communication Checklist

In an emergency it will be important to contact the key people shown below. This will help reduce confusion and assist in ensuring any important messaging is done so correctly and quickly.

IF REQUIRED, CONTACT E.M.B.C. (formerly P.E.P.) or V.I.H.A. BEFORE MAKING THE FOLLOWING CONTACTS AS PER THE EMERGENCY PLANS

RDN Priority Contacts

MANAGER OF WATER SERVICES	**MIKE DONNELLY** **(250) 390-6560**
MGR. REGIONAL & COMMUNITY UTILITIES	**RANDY ALEXANDER** **(250) 390-6560**
COMMUNICATIONS COORDINATOR	**ADRIENNE MERCER** **(250) 390-4111**
EMERGENCY COORDINATOR	**JANI DREW** **cell (250) 713–2057**

Key Communication Options

Management Support

- Contact Electoral Area Director
- Contact the local radio station and provide a brief message if public health and safety are at risk. Follow up with a press release.

Field Staff Support

- Post notices on household front doors.
- Attach warning signs to existing Water Sprinkling Regulation signs in each community.
- Put up roadside signage at the entrance to the community.

Administrative Support

- Provide information message on the RDN web site & social media.
- Review after hours office and voice mail messaging.
- Provide notification to other RDN staff.

Emergency Contact Numbers

Personnel Contacts

Name	*Position*	*Phone / Cell*
Dave Welz	Chief Operator	(250) 248-4914
Heather Dorken	Operator III	(250) 248-4914
Brian Hale	Operator III	(250) 248-4914
Randy Stearman	Operator II	(250) 248-4914
Brad Lancaster	Operator II	(250) 248-4914
Lyndon Jaworski	Operator II	(250) 248-4914
Kris Hagen	Operator II	(250) 248-4914
Greg Roberts	Operator I	(250) 248-4914
Mike Donnelly	Manager of Water Services	(250) 390-6560
Deb Churko	Engineering Technologist	(250) 390-6560
Jack Eubank	Bylaw Officer *(Emerg. Coord. Alternate- 24hrs)*	(250) 713-4872
Brian Brack	Bylaw Officer (*Emerg. Coord. Alternate- 24hrs)*	(250) 714-3987

Electoral Area Directors

Electoral Area	Director	Phone	E-mail Address
A	Alec McPherson	722-9472	alecmcpherson@shaw.ca
B	Howard Houle	247-8250	howardhoule@yahoo.ca
C	Maureen Young	754-5896	Maureen_young@shaw.ca
E	George Holme	468-7237	gholme@shaw.ca
F	Julian Fell	248-4296	fjfell.at.rdn@gmail.com
G	Joe Stanhope	248-6401	jstanhope@shaw.ca
H	Bill Veenhof	797-6313	bill.veenhof@shaw.ca

Government Agency Contacts

Ministry of Environment	Nanaimo	(250) 751-3100
Department of Fisheries and Oceans	Nanaimo	(250) 754-0230
Emergency Management BC (E.M.B.C.) and Dangerous Goods Spills (formerly PEP)	Victoria	1-800-663-3456
Environmental Health Office (VIHA)	Parksville	(250) 947-8222
Environmental Health Office (VIHA)	Nanaimo	(250) 755-6215
Murray Sexton, Public Health Engineer	Nanaimo	(250) 755-6293
Medical Health Officer	Nanaimo	(250) 740-6988
	or after hours	1-800-204-6166
City of Parksville	Parksville	(250) 248-5412
Chief Operator, Scott Churko		(250) 927-1856 (cell)
Town of Qualicum Beach	Qualicum Beach	(250) 752-6921
District of Lantzville	Lantzville	(250) 390-4006
Superintendent, Fred Spears		(250) 713-0980 (cell)
North Cedar Improvement District	Cedar	(250) 722-3711
Islands Trust Organization (Main office)	Gabriola Isl	(250) 247-2063
Trustee Sheila Malcolmson	Gabriola Isl	(250) 247-8078
Trustee Gisele Rudischer	Gabriola Isl	(250) 247-8795

Emergency Services

Hospital	Nanaimo	(250) 754-2141
	Parksville ph.	(250) 248-2332 (Nan hospital)
	Oceanside Ctr	(250) 951-9550
	Gabriola Clinic	(250) 247-9922
Ambulance	Nanaimo	911 or (250) 758-8181
	Parksville	911 or (250) 248-3511
Police	Nanaimo	911 or (250) 754-2345
	Parksville	911 or (250) 248-6111
	Gabriola Isl	911 or (250) 247-8333
Fire Department	Parksville	911 or (250) 248-3242
	Coombs-Hilliers	911 or (250) 752-2144
	Nanoose Bay	911 or (250) 468-7141
	Qualicum Beach	911 or (250) 752-6921
	Cedar	911 or (250) 722-3122
	Gabriola Isl	911 or (250) 247-5601

Priority Services

BC Hydro (Qualicum Beach number)	(250) 752-8012 or
BC Hydro (Power Outages & Electrical Emergencies)	1-888-769-3766
Telus	(250) 811-2323 or
Telus (Paul McGrath cell 248-0983)	(250) 741-7713 or 741-7716
FortisBC (Teresen Gas)	(250) 248-4880
Shaw Cable (Nanaimo)	(250) 754-5571
CP Rail	1-800-716-9132
French Creek Pollution Control Centre	(250) 248-5794
Chlorine Manufacturer (Brentagg)	1-800-661-1830

Community Contacts

District 69 School Board Office	(250) 248-4241
Nanoose Bay School	(250) 468-7414
Nanoose Children's Centre	(250) 468-1784
Nanoose Place	(250) 468-5339
Nanoose Post Office	(250) 468-7722
Canadian Forces Maritime Experim'l Test Range (CFMETR)	(250) 756-5021 or 468-5004
or	(250) 468-2260 (MP Stn-24hr)
Descanso Bay Reg Park Operator- Jim Demler	(250) 751-5887
Horne Lake Reg Park Operator- Bill Woodhouse	(250) 927-4790

Excavation Services

Shoreline Equipment (Doug Penny)	(250) 468-7759 or 755-9502
C-Lane Contracting (Gord)	(250) 927-9555
Degnen Excavators (Gabriola Isl)	(250) 247-8817

Electrical Contractors

Canem Electric	(250) 468-1887
HPS Power Ltd. (Harvey Sommerfeld)	(250) 821-0415 or 954-7463
TC Trades (Tom Frenette)	(250) 756-0077 or 668-0078
Ron Ruckman (Descanso Bay/Gabriola Isl)	(250) 247-0050

Other Services

Plumbing Services (Maci Motor – Pump Repair)	(250) 248-4423
JC Plumbing (Descanso Bay/Gabriola Isl)	(250) 247-7574 or 713-6700
EPCOR (Parksville)	(250) 951-2460
Sand and Gravel (Ozero)	(250) 752-1482
Sand and Gravel (Luissier & Sons)	(250) 468-9994
Sand and Gravel (Porter Wood)	(250) 248-3693
EMCON Road Maintenance (Gabriola Isl)	(250) 247-9420

Other Services

Pump Trucks (Action Tank Service)	(250) 248-3833
Pump Trucks and Toilet Rentals (A-1 Septic)	(250) 248-4438
Portable Washrooms (Coast Toilet Rentals)	(250) 753-7552
Bulk water supply (BC Water Service)	(250) 954-3628
Bottled water supply (Water Pure & Simple)	(250) 752-1373
Running Water Enterprises (Water Hauling Service)	(250) 947-5197
Woods Water Hauling	(250) 758-2677
Summer Rain Water Delivery (Gabriola Isl)	(250) 247-9136
Fyfe's Well and Water Services	(250) 752-4986 or 248-0830
Red Williams (Water Hauling Service)	(250) 248-5552

Suppliers

Four Star Waterworks (piping)	(250) 954-3546
Hwy Four Rentals (equipment & pumps)	(250) 248-1100
Iritex Pumps and Irrigation – (pumps)	(250) 248-7028
Windsor Plywood (miscellaneous building supplies)	(250) 752-3122
Albertsons Hardware (miscellaneous building supplies)	(250) 248-6888
Robinson Rentals	(250) 753-2465
United Rentals	(250) 758-3911

Media Services

Adrienne Mercer, RDN Communications Coordinator	1-877-607-4111 or 713-1075
Radio Station (CKWV) Nanaimo and Parksville	(250) 758-1131
TV Station (CHEK)	(250) 383-2435
Newspaper (PQ News and The Weekender)	(250) 248-4341
The Oceanside Star	(250) 954-0600
Nanaimo Daily News / Harbour City Star	(250) 729-4212
Gabriola Sounder	(250) 247-9337

Emergency Response Plans

Contamination of Source (Turbidity Events over 1 NTU, Spills, Accidents, Vandalism)

Actions:

- Notify Environmental Health Officer (VIHA) (Ph. 250-947-8222 or after-hours Medical Health Officer at 1-800-204-6166)
- Shut down pump
- Notify E.M.B.C. (Emergency Management BC) (formerly PEP)
- Notify all users if necessary under direction of Health Unit
- Contact government agencies for advice and assistance
- Contact local media for public service announcements
- Post signs and deliver notices to homes and businesses. (See attached samples)
- Arrange alternate source if necessary – i.e., bottled or bulk water
- Advise RDN supervisory personnel
- Advise local fire dept not to use fire hydrants

Contacts:

- Environmental Health Office (VIHA)
- E.M.B.C. (Emergency Management BC) (formerly PEP), RCMP
- Ministry of Environment
- All schools and community centers – see *"Priority Contacts"* List
- RCMP if there has been vandalism

Loss of Source (Loss Of Reservoir or Supply Lines)

Actions:

- Ensure pumps are shut off. (To protect pump)
- Notify all users
- Contact government agencies for advice and assistance
- Arrange alternate source – i.e., bottled water, bulk water, storage tank
- Advise RDN supervisory personnel if necessary

Contacts:

- Environmental Health Office (VIHA) and Ministry of Environment

Emergency Response Plans Cont'd

Broken Water Main

Actions:

- Shut pump off when backflow conditions have been prevented
- Call for repairs as required – i.e. excavator, backhoe
- Notify all users of interruption of service
- Advise Environmental Health Officer (VIHA)
- Arrange alternate source if necessary
- Advise RDN supervisory personnel

Contacts:

- Environmental Health Office (VIHA)

Chlorination Failure

Actions:

- Advise Environmental Health Officer (VIHA)
- Shut off well pumps. Monitor reservoir levels.
- Notify all users to boil water for two minutes or take other disinfection procedures in accordance with recommendations of local health officials
- Post signs or deliver notices if necessary. (See attached samples)
- Arrange chlorinator repairs
- Arrange for alternate disinfection if necessary
- Advise RDN supervisory personnel

Contacts:

- Environmental Health Office (VIHA)
- Chlorinator manufacturer

Pump Failure

Actions:

- Notify all users of interruption of service
- Call for repairs: pump manufacturer if necessary
- Advise Environmental Health Officer (VIHA) (if interruption is not short term)
- Arrange alternate source if necessary – bottled or bulk water, etc.
- Advise RDN supervisory personnel if necessary

Contacts:

- Environmental Health Office (VIHA)

Emergency Response Plans Cont'd

Power Failure

Actions:

- Call BC Hydro. Find out when power will be restored
- Start back-up generator or arrange to get one
- Notify all users about interruption of service if backup not capable of maintaining supply
- Post signs or deliver notices if necessary. (See attached samples)
- Advise Environmental Health Officer (VIHA)
- Arrange alternate source if necessary – bottled or bulk water, etc.
- Arrange for alternate disinfection at Descanso Bay and Horne Lake Reg Parks
- Advise RDN supervisory personnel

Contacts:

- Environmental Health Office (VIHA)

Backflow or Back Siphonage

Actions:

- Advise Medical Health Officer at Environmental Health Office (VIHA)
- Notify all users to boil water for two minutes or take other disinfection procedures in accordance with recommendations of local health officials. (See attached samples)
- Purge and disinfect lines as directed, after corrections have been made
- Post signs or deliver notices if necessary. (See attached samples)
- Advise RDN supervisory personnel

Contacts:

- Environmental Health Office (VIHA)

Bacteria Count (RDN Lab)

Actions:

- Advise Medical Health Officer Environmental Health Office (VIHA)
- Follow procedures in accordance with recommendations of local health officials
- Post signs or deliver notices if necessary. (See attached samples)
- Check if UV unit is working at Descanso Bay Reg Park, clean the UV bulb
- Arrange for alternate disinfection at Descanso Bay Reg Park if the UV unit is not working
- Advise RDN supervisory personnel

Contacts:

- Environmental Health Office (VIHA)

Emergency Response Plans Cont'd

Flood Conditions:

Actions:

- Notify Environmental Health Officer (VIHA) (Ph. 250-947-8222 or after-hours Medical Health Officer at 1-800-204-6166)
- Notify all users regarding the potential for water contamination, loss of pump, power, etc, Users should be advised to store some drinking water in advance, and to boil any suspect water for two minutes or disinfect with chlorine when flood conditions exist
- Phone government contacts
- Contact local media for public service announcement when customers can not be reached by phone
- Post signs or deliver notices if necessary. (See attached samples)
- Arrange alternate source if possible – i.e. bottled water, bulk hauler or storage tank
- Advise RDN supervisory personnel

Contacts:

- Environmental Health Office (VIHA), E.M.B.C. (Emergency Management BC) (formerly PEP), and Ministry of Environment

APPENDICES

SAMPLE

NOTICE

Boil Water Advisory

Effective date: _____

Please note that all water used for domestic purposes (drinking, cooking, etc.) should be boiled before consumption. The boiling should be at a rolling boil and for a minimum of one minute.

RDN Water Services staff are continually monitoring the water supply system and will provide updates as they become available.

Watch for information updates at www.rdn.bc.ca (Water Services) and listen to your local radio station for more information.

This advisory will be in effect until further notice.

For further information contact the

Regional District of Nanaimo at:
1-877-607-4111 or 1-250-390-4111
Water Services Field Office: 1-250-248-4914

BOIL WATER ADVISORY INFORMATION FOR THE GENERAL PUBLIC DURING A BOIL WATER ADVISORY CAUSED BY: INADEQUATE DISINFECTION

This information is provided as a guide to help individuals reduce the risk of becoming ill from ingesting non-potable water. Individuals who follow these guidelines will greatly reduce their chance of becoming ill.

What is a Boil Water Advisory?

A Boil Water Advisory is a public announcement advising water system users that they should boil their tap water for drinking and other domestic purposes. It is an advisory intended to protect the Publics' health from waterborne infectious agents that could be present or are known to be present in the community's drinking water supply.

What is the difference between a Boil Water Advisory and a Boil Water Order?

A Boil Water Advisory is a notice issued to the public as a health warning. In most cases it is the water supplier who notifies the public.

A Boil Water Order is legal document issued to the water supplier by the Health Authority requiring the water supplier to notify the public of a boil water advisory.

What are the health risks during a Boil Water Advisory?

The health risks are associated with ingesting water that contains microbiological agents that can cause disease. These pathogenic (disease causing) agents could include *Giardia, Cryptosporidia, E. coli, Campylobacter, Salmonella* and *Hepatitis A*. Boiling tap water for one minute is sufficient to destroy pathogens that could be present in the water.

There are numerous factors that influence whether a person becomes ill. First, there must be pathogens present in the water you consume. Not every glass of water is likely to contain pathogens. Even if the water you consume contains pathogens, those pathogens that are present must be viable. That is, they must be in a state where they can cause an illness and they must be present in large enough numbers to cause an illness. The number of pathogens needed to cause illness depends on the type of pathogen present, a person's size, age, and immune status.

The incubation period (time for symptoms to develop) will vary depending on the type of pathogen. For example, Giardia (beaver fever) could take up to four weeks to develop symptoms whereas E. coli could take up to ten days and as little as two days. For more information on waterborne diseases go to the following BC Health File;

http://www.bchealthguide.org/healthfiles/hfile49a.stm

Any persons believing that they are ill should see their doctor. Patients are sometimes requested to submit samples for laboratory analysis to assist in waterborne outbreak investigations.

It is important to note that Boil Water Advisories are specific to microbiological threats. They are not appropriate to address threats from chemical contamination. Boiling chemically contaminated water will only result in the chemical becoming more concentrated or release the chemical into the air where it could be inhaled.

When there is a threat to a water supply from a chemical contaminated a more appropriate public health advisory of "Do Not Drink the Water" would be issued.

What am I trying to kill when I'm boiling the water?

Boiling water is recommended to kill pathogenic microbes that may be present in contaminated water. Bacteria such as E. coli and Salmonella are killed rapidly at temperatures over 60°C and a temperature of 72.4°C for 1 minute is needed to inactivate cryptosporidium. *Hepatitis A* and *Norovirus* are rapidly inactivated at temperatures above 65°C.

Based on the above information there is no need to boil water for prolonged periods of time. Although heating water to boiling is not needed it is the only end point easily recognized by the public without the use of thermometers. It is therefore recommended that the public bring the water to a roiling boil for one minute to ensure that all pathogens have been inactivated.

One minute should be added to the above boiling times if the water is cloudy or highly colored to ensure proper mixing and that all pathogens have been exposed to the high temperature. When boiling water at altitudes above 2000m (6,500 ft), water should be boiled for 2 minutes.

How can the water become contaminated?

The water can become contaminated in a variety of ways.
Some of these include:

- Heavy rainfall can wash contaminants into the water source
- Accidental spills in the water supply
- Breakdown of the disinfection process
- Break in water supply mains
- Vandalism
- Connections within the water system between potable and non-potable piping.

Is it necessary to boil all the water in the home during a boil water advisory?

No, it is not necessary to boil all your water. Water used for bathing, showering, laundry, toilet flushing and mopping of floors does not need to be boiled. During bathing, young children should be cautioned against swallowing the bath water or alternatively young children could be sponge bathed.

All other water should be boiled. Simply put, any water that has a chance of being ingested should be boiled. This would include water used for drinking, beverage concentrates, ice cubes, washing fruits and vegetables, or brushing teeth.

Severely immune-compromised individuals should always boil their tap water for the purposes above. See the link to BC Health Files number 56, December 2003.

http://www.bchealthguide.org/healthfiles/hfile56.stm.

Infant formulas should always be prepared by using boiled tap water or bottled water that is boiled. See the link to BC Health Files number 69b, May 2006.

http://www.bchealthguide.org/healthfiles/hfile69b.stm.

Drinking water for pets including dogs, cats, birds and reptiles should also be boiled.

How should tap water be boiled properly?

Tap water should be boiled for at least one minute. Use any clean pot or kettle. Kettles that have automatic shut offs are acceptable.

How should tap water be boiled properly? *(continued)*

Health Canada suggests that microwave ovens can also be used using microwave-safe containers but cautions against forming superheated water (water heated above its boiling point without the formation of steam). When using microwaves, Health Canada suggests inserting a glass rod, wooden or plastic spoon in the container to prevent forming superheated water.

After boiling, let the water cool by leaving it on the counter or in the refrigerator in covered containers. Once the water is boiled, it can be stored in food grade containers at room temperature or in the refrigerator.

Shaking the water in the container or pouring the water between two containers and/or adding a pinch of salt can bring back flavor after boiling.

Are there alternatives to boiling water?

Yes, there are. Although there are alternatives, not all of them will be feasible or practical in all situations. In part, it will depend on how much water you need and what you need it for. Safe alternatives to boiling water include:

- Using commercially prepared bottled water
- Obtaining water from an approved source that is not on a boil water advisory, or
- Using bleach to disinfect small quantities of tap water. See the following chart or website for a guide to using bleach.

http://www.bchealthguide.org/healthfiles/hfile49b.stm

Disinfection using unscented household bleach (5% chlorine) works best with warm water. Add bleach to the water, shake or stir for thorough mixing and then let it stand for at least 30 minutes before drinking.

Gallons of water to disinfect (equivalent shown in brackets)	Amount of Household bleach (5%) to add*
1 gal. (4.5 litres)	2 drops (0.18 mL)
2 ½ gal. (10 litres)	5 drops (0.4 mL)
5 gal. (23 litres)	11 drops (0.9 mL)
10 gal. (45 litres)	22 drops (1.8 mL)
22 gal. (100 litres)	¾ teaspoon (4 mL)
45 gal. (205 litres)	1 ½ teaspoons (8 mL)
50 gal. (230 litres)	1 ¾ teaspoons (9 mL)
100 gal. (450 litres)	3 ½ teaspoons (18 mL)
220 gal. (1000 litres)	8 teaspoons (40 mL)
500 gal. (2200 litres)	6 tablespoons (90 mL)
1000 gal. (4550 litres)	6 ½ ounces or 12 tablespoons (180 mL)

A slight chlorine odour should still be noticeable at the end of the 30-minute waiting period if you have added enough bleach. If not, repeat the dosage and allow the water to stand an additional 15 minutes. If the water has too strong a chlorine taste, allow the water to stand exposed to the air for a few hours or pour it from one clean container to another several times.

The disinfection action of bleach depends as much on the waiting time after mixing as to the amount used. The longer the water is left to stand after adding bleach, the more effective the disinfection process will be.

NOTE: Bleach does not work well in killing off *Cryptosporidium* parasites.

The amount of bleach needed to kill *Cryptosporidium* makes the water almost impossible to drink. If *Cryptosporidium* is in the water, boiling is the best way to ensure that the water is safe to drink.

I have my own water treatment device do I still need to boil my water?

If the device is designed to improve taste or reduce odour such as an activated carbon filter the answer is **YES** you should still boil your water.

If the device is designed to improve the chemical quality of the water such as reducing the iron content then the answer is **YES** you should still boil your water.

If the device is designed to improve water that is already potable the answer again is **YES** you should still boil your water.

There are numerous filters on the market designed to remove microorganisms and particulates. Most of these filters are not capable of removing viruses. Therefore, you should boil your water if you have a unit that cannot remove viruses.

If the device is designed to disinfect (destroy pathogens) water such as in an ultraviolet light (UV) disinfection unit you **might not** need to boil your water. There are numerous ultraviolet units; some are designed to disinfect raw water and some are designed to disinfect water that has already been disinfected at a central facility. For example, if the unit is classified by the National Sanitation Foundation (NSF) as meeting NSF Standard 55 Class A, it is designed to disinfect raw water. However, if the water within the distribution system is too turbid or cloudy, even a UV unit meeting NSF Standard 55 Class A may not work properly and you should still boil your water.

Reverse osmosis (RO) units are designed to filter water at the molecular level and should provide water that is free of pathogens. Thus, you **do not** have to boil your water if you have a reverse osmosis water treatment device.

There are many types of units on the market each designed to address specific water quality issues. It is recommended that you check with the unit's manufacturer to know exactly what your unit can do.

Can I purchase water from vending machines?

It depends on how the water is treated. Local vending machines that use local water would only be acceptable if the vending machine can kill pathogens that might be present in the water. Check with the store or manufacturer to see if the unit is capable of providing water that is safe to drink.

Warning signs should be posted on vending units that are not capable of providing safe water. Alternatively, the machine should be turned off.

Are there any people or groups of people at higher risk?

Yes. These people include any individual whose immune system is not fully developed or whose immune system is under stress such as infants, the elderly, immune compromised individuals and individuals already suffering from an illness. For more information go to the following BC Ministry of Health websites:

BC Health File: weakened immune systems
http://www.bchealthguide.org/healthfiles/hfile56.stm.

BC Health File: preparing infant formula
http://www.bchealthguide.org/healthfiles/hfile69b.stm.

Boil water or provide an alternative safe supply of water that is used for:

- Drinking purposes- This includes all beverage concentrates such as fruit juice and iced tea
- Food preparation- This includes washing of fruits and vegetables
- Food contact surfaces

Boil water or provide an alternative safe supply of water that is used for: *(continued)*

Food contact surfaces are all those surfaces that food comes into contact with during the food preparation process. These surfaces include counter tops, cutting boards and chopping blocks. Food contact surfaces should be washed with clean water and then sanitized using an acceptable sanitizing agent. Sanitizing agents for food contact surfaces include bleach (12-15 mL of 5% bleach per litre of water), iodophors, quaternary ammonia compounds or hydrogen peroxide (3% solution).

- Oral hygiene (brushing teeth)
- Infant formula; see BC Health File; preparing infant formula at http://www.bchealthguide.org/healthfiles/hfile69b.stm.
- Ice making

It is important to note that freezing does not destroy most pathogens. Bacteria and viruses can survive in frozen products for long periods of time. Discard any ice made from contaminated or potentially contaminated water.

Hand washing

Using warm water and soap should be sufficient. Applying a hand sanitizer after washing with tap water would add an extra barrier of protection.

Dishwashing by hand

Dishes washed by hand should be sanitized for two minutes in a separate sink using a bleach solution (2 mL of bleach per litre of water) after the dishes have been washed and rinsed. The dishes should then be left to **air dry** prior to being used. Attempting to wash and sanitize dishes in the same sink at the same time is not recommended because soap, grease and food particles interfere with the sanitizing process.

Mechanical dishwashers

Most residential home-style dishwashers do not provide a high enough temperature to kill all pathogens. Dishwashing units that reach 82 degrees Celsius (180 Fahrenheit) for twelve seconds (or an equivalent time-temperature relationship) during the final rinse cycle will destroy pathogens.

To optimize the disinfection process while using a residential dishwasher you should consider:

1. Using the highest temperature setting possible.
2. Running dishes through the dishwasher twice.
3. Sanitizing dishes afterwards in a sink containing a weak bleach solution(see dishes washed by hand above).
4. Letting the dishes air dry prior to use

Fruit and vegetable washing

Thoroughly wash all produce with potable water especially those that are going to be eaten raw. This is a common sense practice that should be applied even when there is no public boil water advisory.

Coffee Machines

Coffee machines usually produce water around 70 to 80 degrees Celsius, which is sufficient to destroy pathogens. However, a sufficient amount of time is needed to ensure that all harmful organisms are destroyed. Therefore, let the coffee stand for at least five minutes before drinking.

Home canning

To be safe, postpone home canning until the boil water advisory has been rescinded.

Beer and wine making

To be safe, postpone beer and wine making until the boil water advisory has been rescinded.

When will the Boil Water Advisory be rescinded?

Only when the water supplier can provide potable water will the Health Authority rescind the Boil Water Advisory. Once or more of the following usually achieves confirmation that the water is once again safe to drink.

These include:

- Identifying and fixing the source or sources of the problem,
- Implementing procedures to eliminate or reduce the chance for reoccurrence
- Performing water quality tests
- Flushing and disinfecting distribution lines and water storage facilities

Precautions to consider when the Boil Water Advisory is lifted

- Flush all water-using fixtures for 1 minute
- Run cold-water faucets and drinking fountains for 1 minute before using water
- Drain and flush all ice-making machines in your refrigerator
- Run water softeners through a regeneration cycle
- Drain and refill hot water heaters set below 45 deg C (normal setting is 60 deg C)
- Change any pre-treatment filters (under sink style and refrigerator water filters, carbon block, activated carbon, sediment filters, etc.)

Can I speak to a person in Public Health if I have a question about the Boil water Advisory?

Yes you can. For further information contact Environmental Health Officers at the following locations:

- Victoria
- Nanaimo
- Courtenay
- VIHA 6475 Metral Drive, Nanaimo, BC 250-755-6215
- VIHA 249 West Hirst Avenue, Parksville BC 250-947-8222

After hours Medical Health Officer on call is 1-800-204-6166.

Additional information can be found at the following BC, Canadian and US websites. These are:

BC Health File; how to disinfect drinking water
http://www.bchealthguide.org/healthfiles/hfile49b.stm

BC Health File; weekend immune systems and water-borne infections
http://www.bchealthguide.org/healthfiles/hfile56.stm

BC Health File; waterborne disease in BC
http://www.bchealthguide.org/healthfiles/hfile49a.stm

BC Health File; cryptosporidiois
http://www.bchealthguide.org/healthfiles/hfile48.stm

BC Health File; giardiasis
http://www.bchealthguide.org/healthfiles/hfile10.stm

BC Health File; safely preparing and storing baby formula
http://www.bchealthguide.org/healthfiles/hfile69b.stm

US EPA how to boil water and use bleach
http://www.epa.gov/ogwdw000/faq/emerg.html

US Centre for Disease Control; preventing cryptosporidiosis infection
http://www.cdc.gov/ncidod/dpd/parasites/cryptosporidiosis/default.htm

US Centre for Disease Control; Giardia fact sheet
http://www.cdc.gov/ncidod/dpd/parasites/giardiasis/factsht_giardiasis.htm#prevention

US Centre for Disease Control; Preventing Cryptosporidium; a guide to water filters & bottled water
http://www.cdc.gov/ncidod/dpd/parasites/cryptosporidiosis/factsht_crypto_prevent_water.htm

Information sources for developing this package includes

- BC Ministry of Health
- Health Canada
- Alberta Environmental Health
- Washington State Department of Health
- BC Centre for Disease Control
- US EPA (Environmental Protection Agency)
- US Center for Disease Control
- NSF (National Sanitation Foundation)
- DWO (Drinking Water Officer's) Guide

SAMPLE

NOTICE

Boil Water Order

Effective date: _____

Please note that all water used for domestic purposes (drinking, cooking, etc.) should be boiled before consumption. The boiling should be at a rolling boil and for a minimum of two minutes.

RDN Water Services staff are continually monitoring the water supply system and will provide updates as they become available.

Watch for information updates at www.rdn.bc.ca
(Water Services) and listen to your local radio station for more information.

This order will be in effect until further notice.

For further information contact the

Regional District of Nanaimo at:
1-877-607-4111 or 1-250-390-4111
Water Services Field Office: 1-250-248-4914

SAMPLE

WARNING

This Water is Considered Unfit for Drinking or Domestic Use

Effective date: _____

For further information contact the

Regional District of Nanaimo at:
1-877-607-4111 or 1-250-390-4111
Water Services Field Office: 1-250-248-4914

SAMPLE

NOTICE

Water Supply
Service Interruption

Effective date: _____

Please be advised that your water service may be interrupted or off for periods during the day.

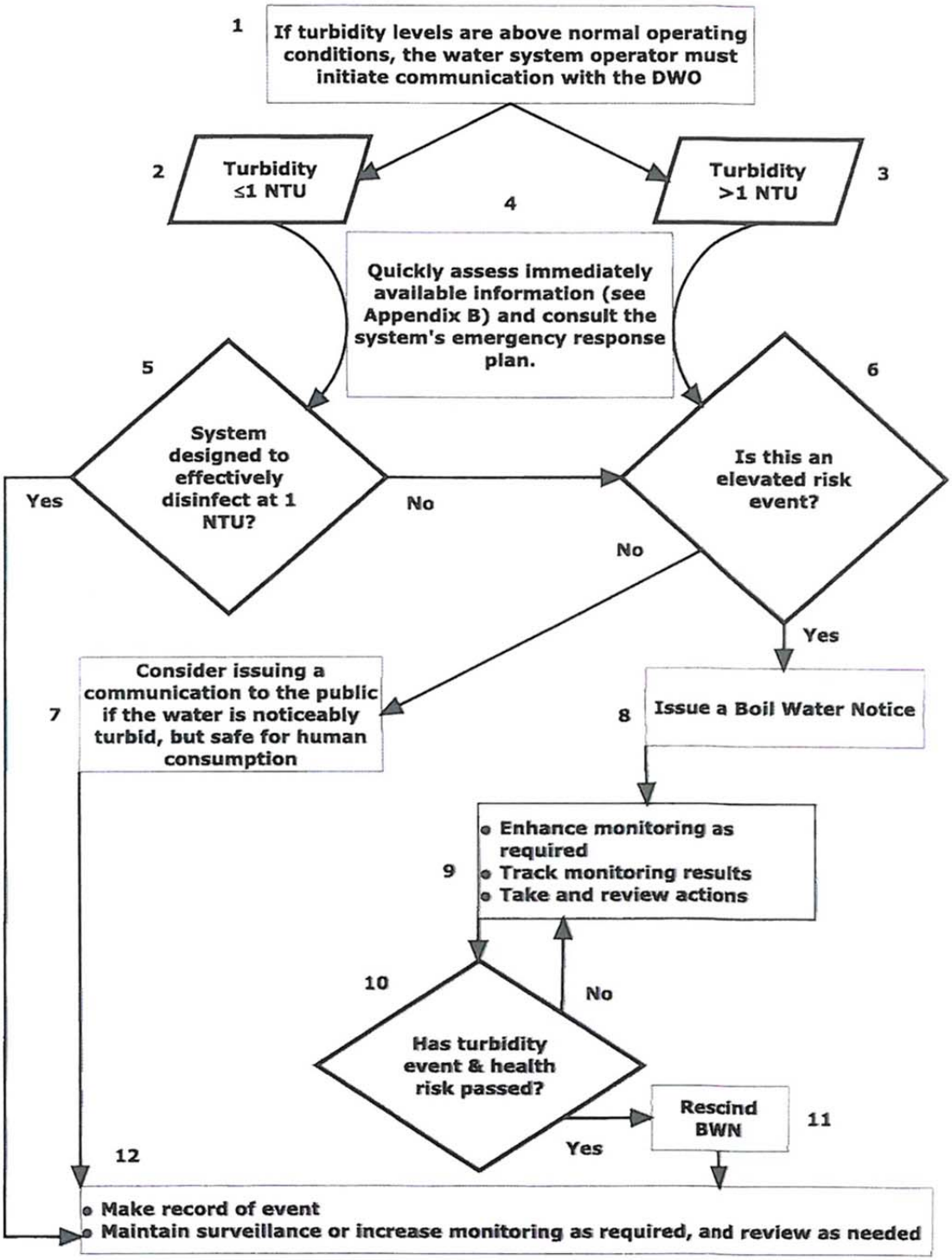
When service is resumed, the water may be discoloured. This is due to disturbed deposits in the pipes and is not harmful.

This advisory will be in effect until further notice.

For further information contact the

Regional District of Nanaimo at:
1-877-607-4111 or 1-250-390-4111
Water Services Field Office: 1-250-248-4914

Decision Tree for Responding to a Turbidity Event in Unfiltered Drinking Water



MAPS

Water Service Areas