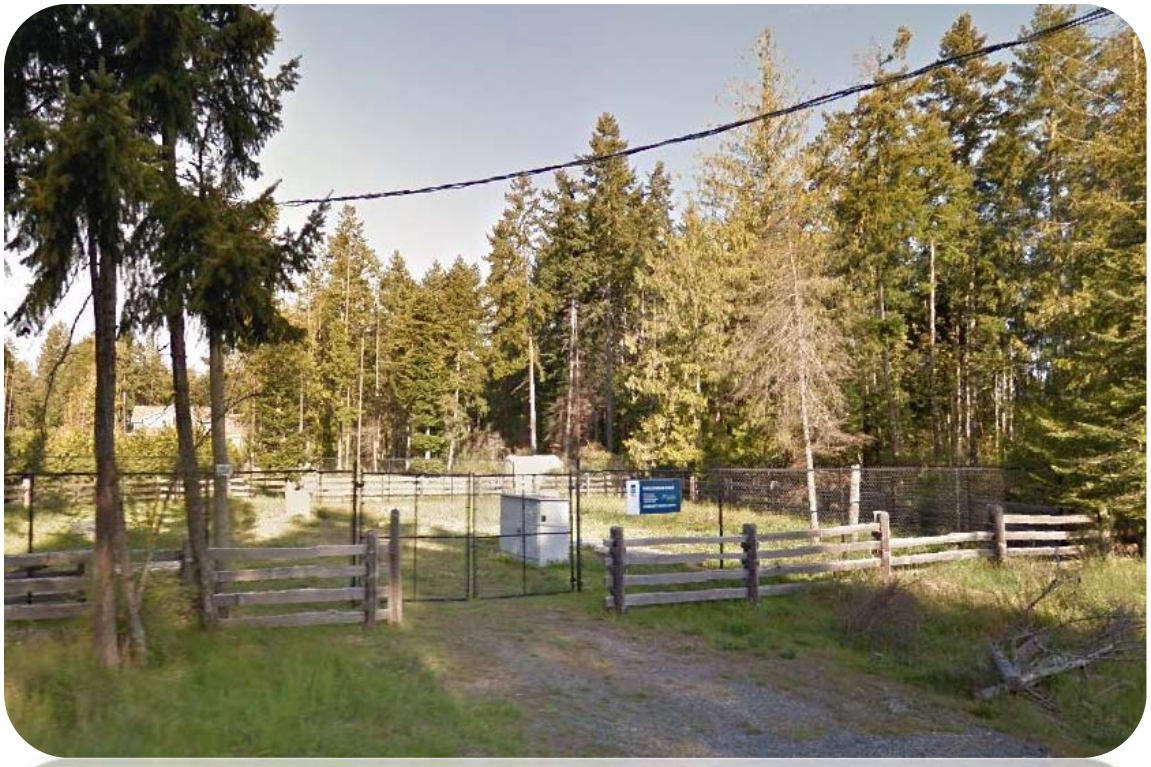
REGIONAL DISTRICT OF NANAIMO

Water Service Area Annual Report 2018



Englishman River Water Service Area

June 2019

REGIONAL DISTRICT OF NANAIMO
Water & Utility Services Department
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1.0 Introduction

The following annual report describes the Englishman River Community 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.

2.0 Englishman River Water Service Area

The Englishman River Community Water Service Area was established in 2003 and comprises an area near the southern boundary of the City of Parksville between the Island Highway and the Englishman River. The water source for the Englishman River Community Water Service Area comes from a series of groundwater wells located nearby. The water source is chlorinated and stored in one reservoir. There are 151 water service connections in the Englishman River Water Service Area. A generator is available for emergency power outages. A map of the Englishman River Water Service Area is provided in Appendix A for reference.

2.1 Groundwater Wells

Groundwater production wells ER #2 and ER #3 are located at 2231 Rascal Lane, Parksville, B.C. Test well PW #1 is located on Peterson Road, and was converted to a monitoring well in 2005. Test Well PW #4 is located on Rivers Edge Drive and was converted to a provincial monitoring well in 2012.

Well / Name	Well Depth	In Use	Wellhead Protection	Treated/Untreated with Chlorine
ER #2	29.3 m	Yes	Yes	Treated
ER #3	32.6 m	Yes	Yes	Treated

2.2 Reservoirs

One dual-chambered concrete service reservoir is present at 890 Stonefly Close and has a capacity of 795 m^3 (175,000 imperial gallons).

2.3 Distribution System

The water distribution system is summarized in the table below. Fire hydrants (24) are located throughout the system.

Watermain Material	Length of mains in service area	Prevalence in Water Service Area
Asbestos-concrete	none	n/a
PVC: 150mm or smaller	3.6 km	28.8%
200mm or larger	8.9 km	71.2%

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

3.0 Water Sampling and Testing Program

Water sampling and testing is carried out weekly in the distribution system. Notably, the chlorine residual levels are tested weekly to ensure the absence of bacterial regrowth in the watermains. 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
Semi-Monthly	BC Centre for Disease Control	Total coliforms, E.Coli
Annual Source Water Testing (every Fall)	Bureau Veritas (formerly Maxxam)	Complete potability testing of raw well water (including T-Ammonia in 2012)
Annual Water System Testing (every Spring)	Bureau Veritas (formerly Maxxam)	Complete potability testing of distribution system (including T-Ammonia in 2012)

4.0 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.

5.0 Water Quality Inquiries and Complaints

A few complaints and inquiries were received from the Englishman River Water Service Area in 2018, and were typically related to irrigation leaks and high water bills.

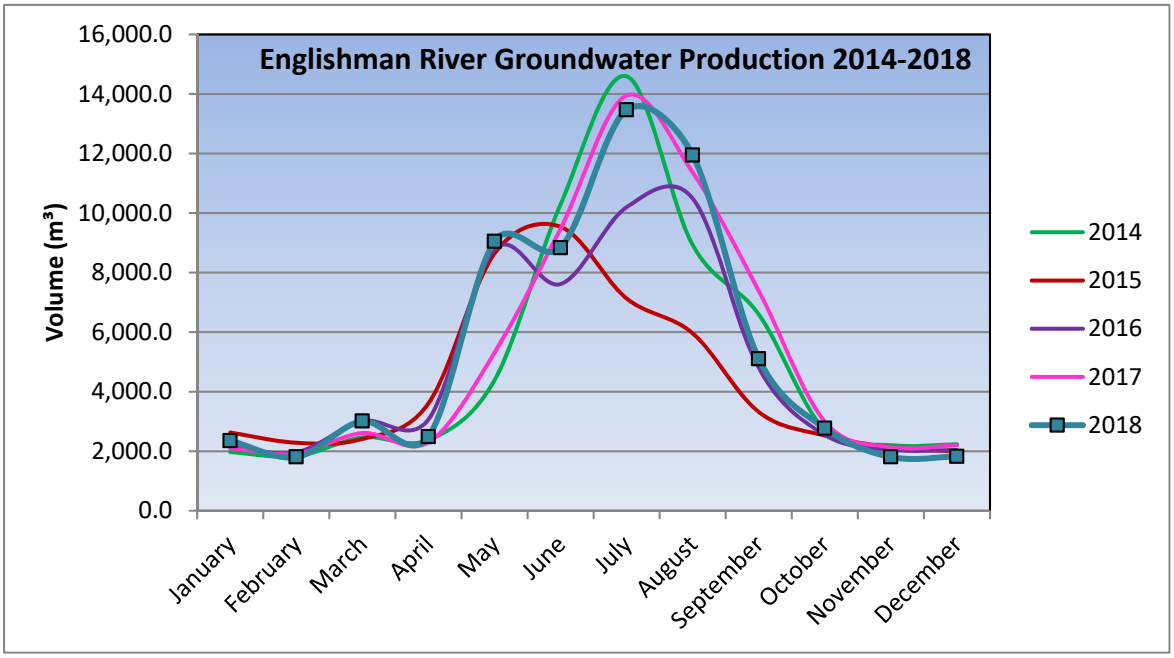
Water Sampling Station on Rascal Lane

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, ever.
High Turbidity Events	None	None, ever.
Equipment Malfunction	None	None.
Water Main Breaks	None	None.
Pump Failures	None	Temp power outages.

6.0 Groundwater Production and Consumption

Monthly groundwater production in the Englishman River Water Service Area for the past 5 years is shown in the chart below. Groundwater production in 2018 was above average in comparison to previous years, likely due to warm weather and the installation of new landscaping in the service area.



In the Fall/Winter of 2018, the average usage per home in the Englishman River Water Service Area was 0.65 cubic metres per day (143 imperial gallons). In the summer, the average water usage was 2.03 cubic metres per day (446.6 imperial gallons). Based on these figures, the annual consumption per capita is estimated to be 465 L/day (based on 2.4 people per household). This consumption is *58% higher* than the average of all the other RDN water systems of 294 L/day/capita for 2018.

7.0 Maintenance Program

A weekly pump station inspection is 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 are serviced once per year (either 'A-level' or 'B-level' maintenance). The water storage reservoir is drained and cleaned as required, every 4-5 years. Twenty-four hour on-call coverage is in place to respond to water system emergencies and alarms.

8.0 Operator Certification

The Regional District Water & Utility Services staff is 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

9.0 Water Service Area Projects

9.1 2018 Completed Studies & Projects

- Corresponded with residents regarding well level and 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

- Continue watermain flushing program and hydrant maintenance;
- Adopt Cross Connection Control Bylaw;
- Implement a Water Systems SCADA Master Plan;
- Review well protection plans;
- 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.

10.0 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.

11.0 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.

12.0 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.

13.0 Closing

An annual report for the year 2019 will be prepared and submitted to Island Health in the Spring of 2020. Annual reports are also available on our website at www.rdn.bc.ca in the REGIONAL SERVICES section, under "Water & Utility Services" then "WaterSmart Communities".

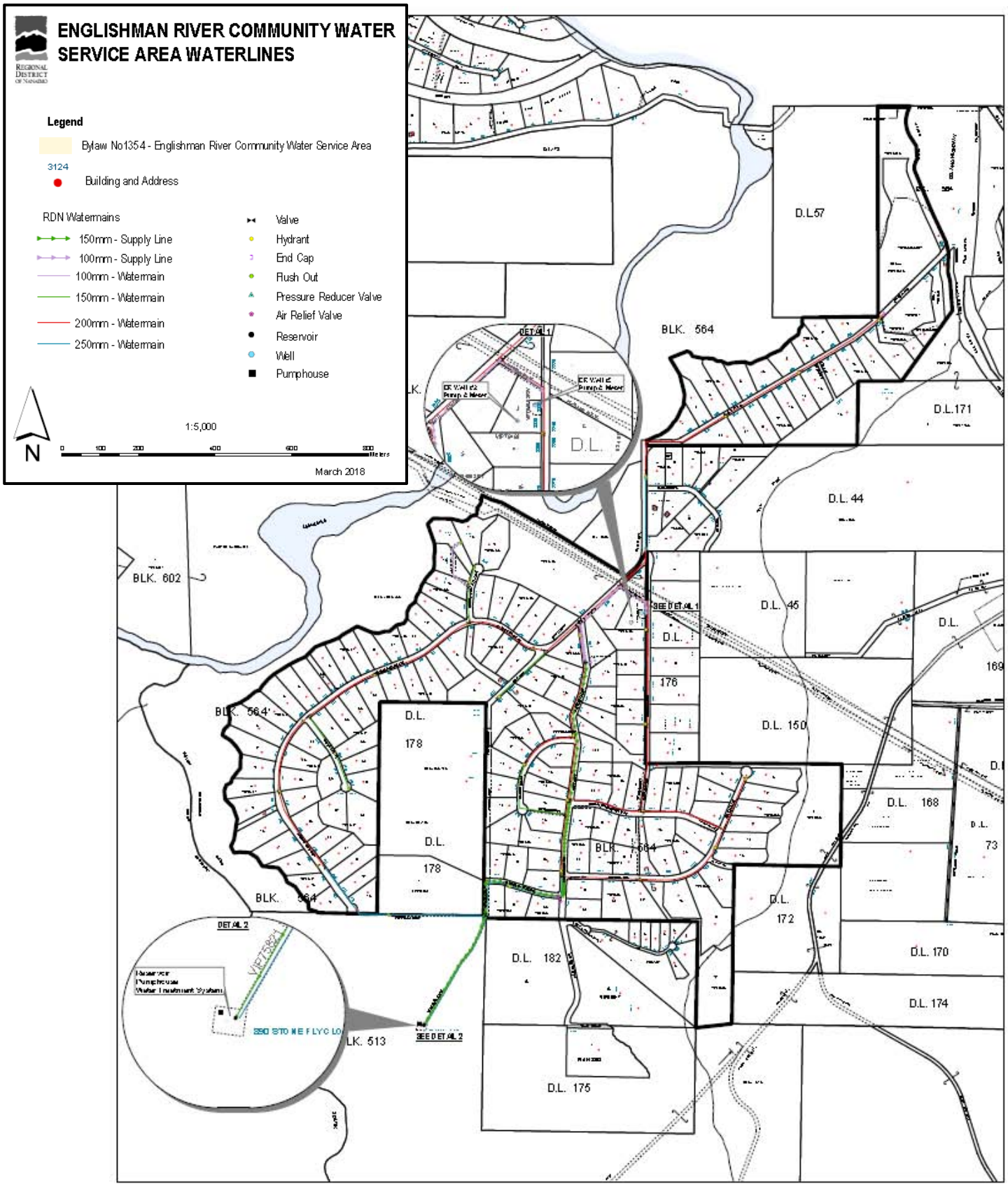
Kaye Road at entrance to River's Edge Subdivision

APPENDIX A

MAP OF ENGLISHMAN RIVER

WATER SERVICE AREA

ENGLISH MAN RIVER WATER SERVICE AREA



APPENDIX B

WATER QUALITY TESTING RESULTS

ENGLISHMAN RIVER COMMUNITY WATER SYSTEM

Facility Location:
#8 1065 Herring Gull Way
Parksville

Facility Information:

Facility Type: DWC

Facility Sampling History:

Location	Date	Total Coliform	E. Coli
2235 Rascal Lane	10-Dec-2018	L1	L1
1969 Kaye Road	3-Dec-2018	L1	L1
2235 Rascal Lane	14-Nov-2018	L1	L1
1969 Kaye Road	7-Nov-2018	L1	L1
2235 Rascal Lane	15-Oct-2018	L1	L1
1969 Kaye Road	9-Oct-2018	L1	L1
1969 Kaye Road	10-Sep-2018	L1	L1
2235 Rascal Lane	5-Sep-2018	L1	L1
1969 Kaye Road	13-Aug-2018	L1	L1
2235 Rascal Lane	7-Aug-2018	L1	L1
2235 Rascal Lane	9-Jul-2018	L1	L1
1969 Kaye Road	3-Jul-2018	L1	L1
2235 Rascal Lane	11-Jun-2018	L1	L1
1969 Kaye Road	5-Jun-2018	L1	L1
1969 Kaye Road	7-May-2018	L1	L1
2235 Rascal Lane	1-May-2018	L1	L1
2235 Rascal Lane	9-Apr-2018	L1	L1
1969 Kaye Road	4-Apr-2018	L1	L1
2235 Rascal Lane	12-Mar-2018	L1	L1
1969 Kaye Road	5-Mar-2018	L1	L1
2235 Rascal Lane	14-Feb-2018	L1	L1
1969 Kaye Road	5-Feb-2018	L1	L1
1969 Kaye Road	8-Jan-2018	L1	L1
2235 Rascal Lane	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

Englishman River Distribution Water Analysis
1969 Kaye Road

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	May 19 2015	May 10 2016	May 8 2017	May 7 2018	
Miscellaneous Inorganics									
Fluoride	mg/L	1.5	MAC	0.1	0.093	0.087	0.096	0.09	
Alkalinity (total as $CaCO_3$)	mg/L			130	123	133	134	124	
Anions									
Dissolved Sulphate	mg/L	500	AO	8.2	8.09	7.98	8.52	9.6	
Dissolved Chloride	mg/L	250	AO	54.5	62	65	70	79	
Nitrite	mg/L	1	MAC	<0.05	<0.0050	<0.0050	<0.0050	<0.0050	
Miscellaneous									
Apparent Colour	Colour Unit			<5	<5	10	10	10	
Nutrients									
Total Ammonia	mg/L			<0.02	0.018	0.0097	0.085	<0.020	
Physical Properties									
Conductivity	µS/cm			440	464	483	480	503	
pH	pH	7.0:10.5	AO	8.2	8.17	8.19	8.23	8.17	
TDS	mg/L	500	AO	254	242	264	316	264	
Turbidity	NTU			<0.5	0.19	0.2	0.16	0.24	
Microbiological Parameters									
E.coli	MPN/100mL	<1	MAC	<1.0	<1.0	<1.0	<1.0	<1.0	
Total Coliforms	MPN/100mL	<1	MAC	<1.0	<1.0	<1.0	<1.0	<1.0	
Calculated Parameters									
Total Hardness ($CaCO_3$)	mg/L			170	171	173	221	176	
Nitrate	mg/L	10	MAC	<0.05	<0.020	<0.020	<0.020	<0.020	
Elements									
Total Mercury	mg/L	0.001	MAC	<0.00001	<0.00001	<0.00001	<0.00001	<0.000002	
Total Metals									
Total Aluminum	mg/L	0.1	OG	<0.025	<0.003	<0.003	<0.003	<0.003	
Total Antimony	mg/L	0.006	MAC	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
Total Arsenic	mg/L	0.01	MAC	0.00171	0.00159	0.00163	0.00192	0.00164	
Total Barium	mg/L	1	MAC	0.0264	0.0278	0.03	0.0349	0.0305	
Total Beryllium	mg/L			<0.00025	<0.0001	<0.0001	<0.0001	<0.0001	
Total Bismuth	mg/L			<0.0005	<0.001	<0.001	<0.001	<0.001	
Total Boron	mg/L	5	MAC	0.051	<0.05	0.052	0.064	0.064	
Total Cadmium	mg/L	0.005	MAC	<0.00005	<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	
Total Cobalt	mg/L			<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	
Total Copper	mg/L	1	AO	0.0043	0.0015	0.00237	0.00616	0.00523	
Total Iron	mg/L	0.3	AO	0.031	0.024	0.0148	0.0167	0.0117	
Total Lead	mg/L	0.01	MAC	0.0006	0.0004	<0.0002	<0.0002	<0.0002	
Total Manganese	mg/L	0.05	AO	0.011	0.0169	0.0174	0.0084	0.0095	
Total Molybdenum	mg/L			0.00093	<0.001	<0.001	0.0012	<0.001	
Total Nickel	mg/L			<0.0010	<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	
Total Silicon	mg/L			6.77	6.86	7.4	9.3	7.25	
Total Silver	mg/L			<0.00025	<0.00002	<0.00002	<0.00002	<0.00002	
Total Strontium	mg/L			0.302	0.316	0.359	0.396	0.389	
Total Thallium	mg/L			<0.00005	<0.00005	<0.00005	<0.00001	<0.00001	
Total Tin	mg/L			<0.0005	<0.005	<0.005	0.005	<0.005	
Total Titanium	mg/L			<0.0025	<0.005	<0.005	0.005	<0.005	
Total Uranium	mg/L	0.02	MAC	0.00033	0.00034	0.00035	0.00039	0.00032	
Total Vanadium	mg/L			<0.0005	<0.005	<0.005	<0.005	<0.005	
Total Zinc	mg/L	5	AO	0.0246	<0.005	<0.005	<0.005	<0.005	
Total Zirconium	mg/L				<0.0005	<0.0005	<0.0001	<0.0001	
Total Calcium	mg/L			42.2	44.8	43	56.5	44.7	
Total Magnesium	mg/L			14.9	14.3	15.9	19.4	15.5	
Total Potassium	mg/L			1.2	1.31	1.45	1.78	1.4	
Total Sodium	mg/L	200	AO	22.1	20.9	23.6	29.6	25.1	
Total Sulphur	mg/L				<3.0	3.2	3.5	<3.0	

REGIONAL DISTRICT OF NANAIMO

Englishman River Well PW2 Water Analysis
2231 Rascal Lane

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		October 16 2014	October 27 2015	October 12 2016	September 20 2017	October 29 2018	
Miscellaneous Inorganics									
Fluoride	mg/L	1.5	MAC	0.12	0.086	0.076	0.08	0.09	
Alkalinity (total as $CaCO_3$)	mg/L			120	126	122	127	126	
Anions									
Dissolved Sulphate	mg/L	500	AO	8.1	8.38	8.4	7.8	6.8	
Dissolved Chloride	mg/L	250	AO	34.9	36	44	56	56	
Nitrite	mg/L	1	MAC	<0.05	<0.0050	<0.0050	<0.0050	<0.0050	
Miscellaneous									
Apparent Colour	Colour Unit			<5	10	5	5	5	
Nutrients									
Total Ammonia	mg/L			0.04	0.062	0.097	0.049	0.045	
Physical Properties									
Conductivity	µS/cm			363	383	402	442	446	
pH	pH	7.0:10.5	OG	8.1	8.06	8.21	8.23	8.17	
TDS	mg/L	500	AO	238	220	240	248	266	
Turbidity	NTU			<0.5	0.12	0.18	0.15	0.18	
Microbiological Parameters									
E.coli	MPN/100mL	1	MAC	<1.0	<1.0	<1.0	<1.0	<1.0	
Total Coliforms	MPN/100mL	1	MAC	<1.0	<1.0	<1.0	<1.0	<1.0	
Calculated Parameters									
Total Hardness ($CaCO_3$)	mg/L			150	153	155	172	169	
Nitrate	mg/L	10	MAC	<0.05	<0.020	<0.020	<0.020	<0.020	
Elements									
Total Mercury	mg/L	0.001	MAC	<0.00001	<0.00001	<0.00001	<0.00001	<0.000002	
Total Metals									
Total Aluminum	mg/L	0.1	OG	0.03	<0.003	<0.003	<0.003	<0.003	
Total Antimony	mg/L	0.006	MAC	<0.0001	<0.0005	<0.0005	<0.0005	<0.0005	
Total Arsenic	mg/L	0.01	MAC	0.00181	0.00191	0.00178	0.00182	0.00172	
Total Barium	mg/L	1	MAC	0.0234	0.0248	0.025	0.0263	0.0263	
Total Beryllium	mg/L			<0.00005	<0.0001	<0.0001	<0.0001	<0.0001	
Total Bismuth	mg/L			<0.0001	<0.001	<0.001	<0.001	<0.001	
Total Boron	mg/L	5	MAC	0.043	<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	
Total Chromium	mg/L	0.05	MAC	<0.0005	<0.001	<0.001	<0.001	<0.001	
Total Cobalt	mg/L			<0.0001	<0.0005	<0.0005	<0.0002	<0.0002	
Total Copper	mg/L	1	AO	0.0006	0.00182	0.0009	0.00043	0.00137	
Total Iron	mg/L	0.3	AO	0.041	0.0145	0.032	0.0058	0.0247	
Total Lead	mg/L	0.01	MAC	0.0002	0.00028	<0.0002	<0.0002	0.00037	
Total Manganese	mg/L	0.05	AO	0.027	0.029	0.0286	0.0311	0.0311	
Total Molybdenum	mg/L			0.00127	0.0011	0.0013	0.0012	0.0014	
Total Nickel	mg/L			<0.0002	<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	
Total Silicon	mg/L			6.58	6.73	6.15	7.3	6.9	
Total Silver	mg/L			<0.00005	<0.00002	<0.00002	<0.00002	<0.00002	
Total Strontium	mg/L			0.265	0.289	0.301	0.317	0.315	
Total Thallium	mg/L			<0.00001	<0.00005	<0.00005	<0.00001	<0.00001	
Total Tin	mg/L			0.0005	<0.005	<0.005	<0.005	<0.005	
Total Titanium	mg/L			0.0017	<0.005	<0.005	<0.005	<0.005	
Total Uranium	mg/L	0.02	MAC	0.00032	0.00029	0.00032	0.00032	0.00032	
Total Vanadium	mg/L			0.0005	<0.005	<0.005	<0.005	<0.005	
Total Zinc	mg/L	5	AO	0.0069	0.0069	0.0095	<0.005	0.0091	
Total Zirconium	mg/L				<0.0005	<0.0005	<0.0001	<0.0001	
Total Calcium	mg/L			38.2	38.6	38.3	43.1	43.8	
Total Magnesium	mg/L			13.1	13.7	14.4	15.6	14.4	
Total Potassium	mg/L			1.3	1.3	1.28	1.34	1.35	
Total Sodium	mg/L	200	AO	15.3	16.1	16.4	18	17.4	
Total Sulphur	mg/L				3.8	<3.0	<3.0	<3.0	

REGIONAL DISTRICT OF NANAIMO

Englishman River Well PW3 Water Analysis
2231 Rascal Lane

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		October 16 2014	October 27 2015	October 12 2016	September 20 2017	October 29 2018	
Miscellaneous Inorganics									
Fluoride	mg/L	1.5	MAC	0.1	0.082	0.075	0.086	0.094	
Alkalinity (total as $CaCO_3$)	mg/L			130	129	127	131	129	
Anions									
Dissolved Sulphate	mg/L	500	AO	8.6	8.17	8.9	8.2	7.5	
Dissolved Chloride	mg/L	250	AO	67.6	72	83	84	85	
Nitrite	mg/L	1	MAC	<0.05	<0.0050	<0.0050	<0.0050	<0.0050	
Miscellaneous									
Apparent Colour	Colour Unit			<5	5	5	5	5	
Nutrients									
Total Ammonia	mg/L			0.05	0.063	0.11	0.067	0.058	
Physical Properties									
Conductivity	µS/cm			491	506	518	543	554	
pH	pH	7.0:10.5	OG	8.1	8.11	8.19	8.26	8.16	
TDS	mg/L	500	AO	300	272	298	302	326	
Turbidity	NTU			0.6	0.17	0.27	0.15	0.35	
Microbiological Parameters									
E.coli	MPN/100mL	<1	MAC	<1.0	<1.0	<1.0	<1.0	<1.0	
Total Coliforms	MPN/100mL	<1	MAC	<1.0	<1.0	<1.0	<1.0	<1.0	
Calculated Parameters									
Total Hardness ($CaCO_3$)	mg/L			180	189	181	193	182	
Nitrate	mg/L	10	MAC	<0.05	<0.020	<0.020	<0.020	<0.020	
Elements									
Total Mercury	mg/L	0.001	MAC	<0.00001	<0.00001	<0.00001	<0.00001	<0.000002	
Total Metals									
Total Aluminum	mg/L	0.1	OG	<0.005	<0.003	<0.003	0.0031	<0.003	
Total Antimony	mg/L	0.006	MAC	<0.0001	<0.0005	<0.0005	<0.0005	<0.0005	
Total Arsenic	mg/L	0.01	MAC	0.00146	0.00158	0.00157	0.00168	0.00146	
Total Barium	mg/L	1	MAC	0.0313	0.0319	0.0319	0.0336	0.032	
Total Beryllium	mg/L			<0.00005	<0.0001	<0.0001	<0.0001	<0.0001	
Total Bismuth	mg/L			<0.0001	<0.001	<0.001	<0.001	<0.001	
Total Boron	mg/L	5	MAC	0.049	0.055	0.056	0.067	0.068	
Total Cadmium	mg/L	0.005	MAC	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	
Total Chromium	mg/L	0.05	MAC	<0.0005	<0.001	<0.001	<0.001	<0.001	
Total Cobalt	mg/L			<0.0001	<0.0005	<0.0005	<0.0002	<0.0002	
Total Copper	mg/L	1	AO	0.0005	0.0061	0.00069	0.00087	0.00175	
Total Iron	mg/L	0.3	AO	0.029	0.0207	0.0348	0.0385	0.0477	
Total Lead	mg/L	0.01	MAC	0.0003	0.00096	<0.0002	<0.0002	0.00031	
Total Manganese	mg/L	0.05	AO	0.0469	0.0502	0.0478	0.0535	0.0481	
Total Molybdenum	mg/L			0.00095	<0.001	<0.001	<0.001	<0.001	
Total Nickel	mg/L			<0.0002	<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	
Total Silicon	mg/L			6.54	7.31	6.46	7.78	6.97	
Total Silver	mg/L			<0.00005	<0.00002	<0.00002	<0.00002	<0.00002	
Total Strontium	mg/L			0.332	0.349	0.367	0.394	0.357	
Total Thallium	mg/L			<0.00001	<0.00005	<0.00005	<0.00001	<0.00001	
Total Tin	mg/L			<0.0001	<0.005	<0.005	<0.005	<0.005	
Total Titanium	mg/L			<0.0005	<0.005	<0.005	<0.005	<0.005	
Total Uranium	mg/L	0.02	MAC	0.00036	0.00032	0.00035	0.00034	0.00034	
Total Vanadium	mg/L			0.0004	<0.005	<0.005	<0.005	<0.005	
Total Zinc	mg/L	5	AO	0.0037	<0.005	<0.005	<0.005	0.0123	
Total Zirconium	mg/L				<0.0005	<0.0005	<0.0001	<0.0001	
Total Calcium	mg/L			46.2	47.1	45.5	47.4	47.6	
Total Magnesium	mg/L			15.8	17.4	16.3	18.1	15.4	
Total Potassium	mg/L			1.4	1.4	1.43	1.57	1.48	
Total Sodium	mg/L	200	AO	23.5	25.1	27.2	30.8	27.3	
Total Sulphur	mg/L				3.9	<3.0	3.2	3.1	

Regional District of Nanaimo - Water Services Department

Englishman River 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	1969 Kaye	0	0	0	0	9	7.93	0.62	263.0	0.26	545.0	0.02	0.008
10-Dec-18	2235 Rascal	0	0	0	0	8	8.05	0.64	262.0	0.26	540.0		
17-Dec-18	1969 Kaye			0	0	7	8.12	0.66	259.0	0.26	535.0		
	Average	0	0	0	0	8.0	8.0	0.64	261.3	0.26	540.0	0.02	0.008
	Maximum	0	0	0	0	9	8.12	0.66	263.0	0.26	545.0	0.02	0.008
	Minimum	0	0	0	0	7	7.93	0.62	259.0	0.26	535.0	0.02	0.008

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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

Englishman River 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	1969 Kaye	0	0	0	0	11	8.01	0.51	262.0	0.26	541.0	0.00	0.011
14-Nov-18	2235 Rascal	0	0	0	0	10	8.22	0.70	263.0	0.26	544.0		
19-Nov-18	1969 Kaye			0	0	9	8.07	0.66	263.0	0.26	543.0		
27-Nov-18	2235 Rascal			0	0	9	8.34	0.65	262.0	0.26	541.0		
	Average	0	0	0	0	9.8	8.2	0.63	262.5	0.26	542.3	0.00	0.011
	Maximum	0	0	0	0	11	8.34	0.70	263.0	0.26	544.0	0.00	0.011
	Minimum	0	0	0	0	9	8.01	0.51	262.0	0.26	541.0	0.00	0.011

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Englishman River Water Analysis - 2018 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)
1-Oct-18	2235 Rascal			0	0		8.25	1.68	272.0	0.27	561.0	0.01	0.031
9-Oct-18	1969 Kaye	0	0	0	0	14	7.85	1.29	271.0	0.27	559.0		
15-Oct-18	2235 Rascal	0	0	0	0	12	8.19	0.62	266.0	0.26	549.0		
22-Oct-18	1969 Kaye			0	0	13	8.18	0.50	267.0	0.27	551.0		
30-Oct-18	2235 Rascal			0	0	11	8.29	0.54	266.0	0.26	548.0		
	Average	0	0	0	0	12.5	8.2	0.93	268.4	0.27	553.6	0.01	0.031
	Maximum	0	0	0	0	14	8.29	1.68	272.0	0.27	561.0	0.01	0.031
	Minimum	0	0	0	0	11	7.85	0.5	266.0	0.26	548.0	0.01	0.031

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Regional District of Nanaimo - Water Services Department

Englishman River 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	2235 Rascal	0	0	0	0	14	7.93	0.34	272.0	0.27	562.0	0.01	0.057
10-Sep-18	1969 Kaye	0	0	0	0	15	8.06	0.45	270.0	0.27	556.0		
17-Sep-18	2235 Rascal			0	0	15	8.28	0.45	271.0	0.27	558.0		
24-Sep-18	1969 Kaye			0	0	14	8.29	0.44	272.0	0.27	561.0		
	Average	0	0	0	0	14.5	8.1	0.42	271.3	0.27	559.3	0.01	0.057
	Maximum	0	0	0	0	15	8.29	0.45	272.0	0.27	562.0	0.01	0.057
	Minimum	0	0	0	0	14	7.93	0.34	270.0	0.27	556.0	0.01	0.057

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Regional District of Nanaimo - Water Services Department

Englishman River 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	2235 Rascal	0	0	0	0	16	7.85	0.52	272.0	0.27	559.0	0.02	0.042
13-Aug-18	1969 Kaye	0	0	0	0	15.5	7.70	0.69	267.0	0.27	548.0		
20-Aug-18	2235 Rascal			0	0	13	7.88	0.72	266.0	0.27	549.0		
29-Aug-18	1969 Kaye			0	0	15	7.92	0.60	271.0	0.27	560.0		
	Average	0	0	0	0	14.9	7.8	0.63	269.0	0.27	554.0	0.02	0.042
	Maximum	0	0	0	0	16	7.92	0.72	272.0	0.27	560.0	0.02	0.042
	Minimum	0	0	0	0	13	7.70	0.52	266.0	0.27	548.0	0.02	0.042

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Regional District of Nanaimo - Water Services Department

Englishman River Water Analysis - 2018 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-Jul-18	1969 Kaye	0	0	0	0	14	7.90	0.70	261.0	0.26	538.0	0.00	0.044
9-Jul-18	2235 Rascal	0	0	0	0	15	7.89	0.65	263.0	0.26	543.0		
16-Jul-18	1969 Kaye			0	0	14	8.02	0.66	265.0	0.26	546.0		
24-Jul-18	2235 Rascal			0	0	14	7.78	0.54	267.0	0.27	552.0		
30-Jul-18	1969 Kaye			0	0	15	8.05	0.78	268.0	0.27	552.0		
	Average	0	0	0	0	14.4	7.9	0.67	264.8	0.26	546.2	0.00	0.044
	Maximum	0	0	0	0	15	8.05	0.78	268.0	0.27	552.0	0.00	0.044
	Minimum	0	0	0	0	14	7.78	0.54	261.0	0.26	538.0	0.00	0.044

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Englishman River 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-Jun-18	1969 Kaye	0	0	0	0	12	7.89	0.85	261.0	0.26	539.0		
11-Jun-18	2235 Rascal	0	0	0	0	12	8.04	0.79	261.0	0.26	538.0	0.00	0.015
18-Jun-18	1969 Kaye			0	0	15	7.72	0.80	264.0	0.26	544.0		
25-Jun-18	2235 Rascal			0	0	13	7.97	0.78	264.0	0.26	544.0		
	Average	0	0	0	0	13.0	7.9	0.81	262.5	0.26	541.3	0.00	0.015
	Maximum	0	0	0	0	15	8.04	0.85	264.0	0.26	544.0	0.00	0.015
	Minimum	0	0	0	0	12	7.72	0.78	261.0	0.26	538.0	0.00	0.015

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Regional District of Nanaimo - Water Services Department

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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)
1-May-18	2235 Rascal	0	0	0	0	10	7.79	0.82	252.0	0.25	520.0		
7-May-18	1969 Kaye	0	0	0	0	10	7.84	0.81	253.0	0.25	523.0	0.03	0.025
14-May-18	2235 Rascal			0	0	11	8.04	0.96	258.0	0.26	533.0		
22-May-18	1969 Kaye			0	0	12	7.95	1.39	261.0	0.26	539.0		
29-May-18	2235 Rascal			0	0	13	7.87	0.83	261.0	0.26	539.0		
	Average	0	0	0	0	11.2	7.9	0.96	257.0	0.26	530.8	0.03	0.025
	Maximum	0	0	0	0	13	8.04	1.39	261.0	0.26	539.0	0.03	0.025
	Minimum	0	0	0	0	10	7.79	0.81	252.0	0.25	520.0	0.03	0.025

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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	1969 Kaye	0	0	0	0	5	7.42	0.69	254.0	0.25	525.0	0.00	0.004
9-Apr-18	2235 Rascal	0	0	0	0	8	7.65	0.71	254.0	0.25	525.0		
16-Apr-18	1969 Kaye			0	0	8	7.53	0.68	252.0	0.25	520.0		
25-Apr-18	2235 Rascal			0	0	9	7.76	0.81	252.0	0.25	520.0		
	Average	0	0	0	0	7.5	7.6	0.72	253.0	0.25	522.5	0.00	0.004
	Maximum	0	0	0	0	9	7.76	0.81	254.0	0.25	525.0	0.00	0.004
	Minimum	0	0	0	0	5	7.42	0.68	252.0	0.25	520.0	0.00	0.004

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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)
5-Mar-18	1969 Kaye	0	0	0	0	6	7.82	0.55	251.0	0.25	519.0	0.00	0.006
12-Mar-18	2235 Rascal	0	0	0	0	6	7.74	0.53	249.0	0.25	515.0		
20-Mar-18	1969 Kaye			0	0	6	7.66	0.67	250.0	0.25	516.0		
27-Mar-18	2235 Rascal			0	0	6	7.82	0.79	252.0	0.25	520.0		
	Average	0	0	0	0	6.0	7.8	0.64	250.5	0.25	517.5	0.00	0.006
	Maximum	0	0	0	0	6	7.82	0.79	252.0	0.25	520.0	0.00	0.006
	Minimum	0	0	0	0	6	7.66	0.53	249.0	0.25	515.0	0.00	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)
5-Feb-18	1969 Kaye	0	0	0	0	6	7.81	0.66	254.0	0.25	524.0	0.00	0.000
14-Feb-18	2235 Rascal	0	0	0	0		7.65	0.66	253.0	0.25	523.0		
20-Feb-18	1969 Kaye			0	0	7	7.51	0.64	250.0	0.25	522.0		
26-Feb-18	2235 Rascal			0	0	6	7.77	1.09	252.0	0.25	520.0		
	Average	0	0	0	0	6.3	7.7	0.76	252.3	0.25	522.3	0.00	0.000
	Maximum	0	0	0	0	7	7.81	1.09	254.0	0.25	524.0	0.00	0.000
	Minimum	0	0	0	0	6	7.51	0.64	250.0	0.25	520.0	0.00	0.000

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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)
2-Jan-18	2235 Rascal	0	0	0	0		7.86	0.74	253.0	0.25	523.0	0.01	0.018
8-Jan-18	1969 Kaye	0	0	0	0	7	7.85	0.78	253.0	0.25	523.0		
15-Jan-18	2235 Rascal			0	0	6	7.70	0.73	251.0	0.25	520.0		
22-Jan-18	1969 Kaye			0	0	7	6.64	0.71	250.0	0.25	518.0		
29-Jan-18	2235 Rascal			0	0	7	7.70	0.70	253.0	0.25	523.0		
	Average	0	0	0	0	6.8	7.6	0.73	252.0	0.25	521.4	0.01	0.018
	Maximum	0	0	0	0	7	7.86	0.78	253.0	0.25	523.0	0.01	0.018
	Minimum	0	0	0	0	6	6.64	0.7	250.0	0.25	518.0	0.01	0.018

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