REGIONAL DISTRICT OF NANAIMO

Surfside #1 Raw Well Water Analysis
3547 Island Highway

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

Green font indicates a value flagged for operational considerations.
Orange font indicates non-compliance with the Aesthetic Objective in the Canadian Drinking Water Guidelines (CDWG)
Red font indicates non-compliance with the Maximum Acceptable Concentration (MAC) in the CDWG

	Units	CDWG		Sept 18 2017	October 25 2018	October 3 2019	October 21 2020	October 21 2021	October 13 2022	August 10 2023
Miscellaneous Inorganics										
Fluoride	mg/L	1.5	MAC	0.026	0.023	<0.05	<0.05	<0.05	<0.05	<0.50
Alkalinity (total as $CaCO_3$)	mg/L			55.3	53.4	53	50	57	50	43
Anions										
Dissolved Sulphate	mg/L	500	AO	6.2	4.8	4.1	4.4	5.1	4.8	10
Dissolved Chloride	mg/L	250	AO	14	11	22	9	14	13	94
Nitrite	mg/L	1	MAC	<0.0050	<0.0050	<0.005	<0.005	<0.005	<0.005	<0.0050
Miscellaneous										
Apparent Colour	Colour Unit			5	5	<5	5	<5	<5	<5
Nutrients										
Total Ammonia	mg/L			<0.020	<0.020	0.045	<0.015	<0.015	<0.015	<0.015
Physical Properties										
Conductivity	µS/cm			170	149	190	140	160	170	440
pH	pH	7.0:10.5	OG	7.56	7.75	**6.95**	7.03	7.01	7.12	**6.56**
TDS	mg/L	500	AO	120	94	130	100	110	100	350
Turbidity	NTU			0.23	<0.10	<0.1	0.13	<0.1	0.1	0.15
Microbiological Parameters										
E.coli	MPN/100mL	<1	MAC	<1.0	<1.0	0	0	0	0	0
Total Coliforms	MPN/100mL	<1	MAC	**17**	<1.0	0	0	0	0	0
Calculated Parameters										
Total Hardness ($CaCO_3$)	mg/L			64.6	60.6	77.4	57.8	62.4	63.2	157
Nitrate	mg/L	10	MAC	0.519	0.525	0.609	0.597	0.482	0.479	0.716
Elements										
Total Mercury	mg/L	0.001	MAC	<0.00001	0.0000053	<0.000002	<0.0000019	<0.0000019	<0.0000019	<0.0000019
Total Metals										
Total Aluminum	mg/L	0.1	OG	<0.003	<0.003	<0.003	<0.003	<0.003	0.003	<0.0030
Total Antimony	mg/L	0.006	MAC	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.00050
Total Arsenic	mg/L	0.01	MAC	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.00010
Total Barium	mg/L	1	MAC	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0010
Total Beryllium	mg/L			<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.00010
Total Bismuth	mg/L			<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0010
Total Boron	mg/L	5	MAC	<0.050	<0.050	<0.05	<0.05	<0.05	<0.05	<0.050
Total Cadmium	mg/L	0.005	MAC	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.000010
Total Chromium	mg/L	0.05	MAC	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0010
Total Cobalt	mg/L			<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.00020
Total Copper	mg/L	1	AO	0.00235	0.00339	0.00301	0.00366	0.00272	0.00293	0.00403
Total Iron	mg/L	0.3	AO	0.0072	0.0067	0.0054	<0.005	<0.005	<0.005	0.0212
Total Lead	mg/L	0.01	MAC	<0.0002	0.00044	0.00041	0.00048	0.00021	<0.0002	0.00021
Total Manganese	mg/L	0.02 0.12	AO MAC	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0017
Total Molybdenum	mg/L			<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0010
Total Nickel	mg/L			<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0010
Total Selenium	mg/L	0.05	MAC	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.00010
Total Silicon	mg/L			7.54	7.37	7.76	7.76	7.69	7.89	8.26
Total Silver	mg/L			<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.000020
Total Strontium	mg/L			0.0463	0.0429	0.0536	0.0406	0.0426	0.0445	0.12
Total Thallium	mg/L			<0.00001	<0.00001	<0.00001	<0.00001	<0.0001	<0.00001	<0.000010
Total Tin	mg/L			<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0050
Total Titanium	mg/L			<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0050
Total Uranium	mg/L	0.02	MAC	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.00010
Total Vanadium	mg/L			<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0050
Total Zinc	mg/L	5	AO	<0.005	<0.005	0.0062	0.0089	0.0085	<0.005	0.0093
Total Zirconium	mg/L			<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.00010
Total Calcium	mg/L			19.4	18.4	23.6	17	18.9	19.1	47.6
Total Magnesium	mg/L			3.92	3.56	4.5	3.5	3.7	3.77	9.23
Total Potassium	mg/L			0.403	0.349	0.389	0.35	0.366	0.368	0.549
Total Sodium	mg/L	200	AO	6.25	5.21	6.64	5.29	5.49	5.66	12.6
Total Sulphur	mg/L			<3.0	<3.0	<3.0	<3	<3	<3	3.7

Notes below about pH (2015) from https://www.canada.ca/content/dam/hc-sc/migration/hc-sc/ewh-semt/alt_formats/pdf/pubs/water-eau/sum_guide-res_recom/summary-table-EN-2020-02-11.pdf

Type	Parameter (published, reaffirmed)	MAC (mg/L)	Other value (mg/L)	Common sources of parameter in water	Health considerations	Comments
Treatment-related	pH (2015)	None	7.0-10.5	Not applicable	Not applicable	The control of pH is important to maximize treatment effectiveness, control corrosion and reduce leaching from distribution system and plumbing components.

REGIONAL DISTRICT OF NANAIMO

Surfside #2 Raw Well Water Analysis
3547 Island Highway *resampled Metals only

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

Green font indicates a value flagged for operational considerations.
Orange font indicates non-compliance with the Aesthetic Objective in the Canadian Drinking Water Guidelines (CDWG)
Red font indicates non-compliance with the Maximum Acceptable Concentration (MAC) in the CDWG

	Units	CDWG		Sept 18 2017	October 25 2018	October 3 2019	October 21 2020	October 21 2021	October 13 2022	August 10 2023
Miscellaneous Inorganics										
Fluoride	mg/L	1.5	MAC	0.023	0.02	<0.05	<0.05	<0.05	<0.05	<0.50
Alkalinity (total as $CaCO_3$)	mg/L			56.6	49.6	49	48	53	51	37
Anions										
Dissolved Sulphate	mg/L	500	AO	9.8	5.8	6.4	5.3	5	7.7	38
Dissolved Chloride	mg/L	250	AO	32	11	47	9.9	16	31	320
Nitrite	mg/L	1	MAC	<0.0050	<0.0050	<0.005	<0.005	<0.005	<0.005	<0.0050
Miscellaneous										
Apparent Colour	Colour Unit			5	<5.0	<5.0	5	<5	<5	<5
Nutrients										
Total Ammonia	mg/L			<0.020	<0.020	0.058	<0.015	<0.015	<0.015	<0.015
Physical Properties										
Conductivity	µS/cm			243	142	270	150	160	240	1300
pH	pH	7.0:10.5	OG	7.51	7.51	7.38	6.99	7.07	7.08	6.39
TDS	mg/L	500	AO	170	74	160	100	140	170	830
Turbidity	NTU			<0.10	0.1	<0.1	0.17	<0.1	0.12	0.1
Microbiological Parameters										
E.coli	MPN/100mL	<1	MAC	<1.0	<1.0	0	0	0	0	0
Total Coliforms	MPN/100mL	<1	MAC	<1.0	<1.0	0	0	0	0	0
Calculated Parameters										
Total Hardness ($CaCO_3$)	mg/L			85.2	55.4	96.8	54.8	39.5	83.6	402
Nitrate	mg/L	10	MAC	0.463	0.498	0.542	0.525	0.424	0.404	0.618
Elements										
Total Mercury	mg/L	0.001	MAC	<0.00001	0.0000044	<0.000002	<0.0000019	<0.0000019	<0.0000019	<0.0000019
Total Metals										
Total Aluminum	mg/L	0.1	OG	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.0030
Total Antimony	mg/L	0.006	MAC	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.00050
Total Arsenic	mg/L	0.01	MAC	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.00010
Total Barium	mg/L	1	MAC	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.004
Total Beryllium	mg/L			<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.00010
Total Bismuth	mg/L			<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0010
Total Boron	mg/L	5	MAC	<0.050	<0.050	<0.050	<0.05	<0.05	<0.05	<0.050
Total Cadmium	mg/L	0.005	MAC	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0.000012
Total Chromium	mg/L	0.05	MAC	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0010
Total Cobalt	mg/L			<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.00020
Total Copper	mg/L	1	AO	0.00368	0.00277	0.00217	0.00204	0.00263	0.00311	0.00411
Total Iron	mg/L	0.3	AO	0.0087	0.0154	0.0152	0.0097	0.0087	0.0085	0.0111
Total Lead	mg/L	0.01	MAC	0.00104	0.00073	0.00047	0.00023	0.00025	0.00025	0.00034
Total Manganese	mg/L	0.02 0.12	AO MAC	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0011
Total Molybdenum	mg/L			<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0010
Total Nickel	mg/L			<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0010
Total Selenium	mg/L	0.05	MAC	<0.0001	<0.0001	<0.0001	<0.0001	<0.001	<0.0001	<0.00010
Total Silicon	mg/L			7.81	7.03	7.66	7.26	7.29	8.3	8.26
Total Silver	mg/L			<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.000020
Total Strontium	mg/L			0.0651	0.0409	0.0805	0.0413	0.0423	0.0645	0.44
Total Thallium	mg/L			<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.000010
Total Tin	mg/L			<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0050
Total Titanium	mg/L			<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0050
Total Uranium	mg/L	0.02	MAC	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.00010
Total Vanadium	mg/L			<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0050
Total Zinc	mg/L	5	AO	0.0303	0.0107	0.0083	0.0052	0.0138	0.0081	0.0173
Total Zirconium	mg/L			<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.00010
Total Calcium	mg/L			26	16.8	29.7	16.5	18.2	25.1	120
Total Magnesium	mg/L			4.95	3.24	5.48	3.31	3.36	5.07	24.6
Total Potassium	mg/L			0.459	0.314	0.455	0.328	0.339	0.43	1.12
Total Sodium	mg/L	200	AO	12.1	6.41	13.6	7.06	7.12	10.5	63.9
Total Sulphur	mg/L			<3.0	<3.0	<3.0	<3	<3	<3	12.3

Notes below from: https://www.canada.ca/en/health-canada/services/environmental-workplace-health/reports-publications/water-quality/guidelines-canadian-drinking-water-quality-summary-table.html#t2

Type	Parameter (published, reaffirmed)	MAC (mg/L)	Other value (mg/L)	Common sources of parameter in water	Health considerations	Comments
Treatment-related	pH (2015)	None	7.0-10.5	Not applicable	Not applicable	The control of pH is important to maximize treatment effectiveness, control corrosion and reduce leaching from distribution system and plumbing components.
Inorganic chemical	Chloride (1979, 2005)	None	AO: ≤ 250	Naturally occurring (seawater intrusion); dissolved salt deposits, highway salt, industrical effluents, oil well operations, sewage, irrigation drainage, refuse leachates	A guidelines value is not necessary as health effects are not of concern at levels found in drinking water.	Based on taste and potential for corrosion in the distribution system.
Acceptability	Total dissolved solids (TDS) (1991)	None	AO: ≤ 500	Naturally occurring; sewage, urban and agricultural runoff, industrial wastewater	Not applicable	Based on taste; TDS above 500 mg/L results in excessive scaling in water pipes, water heaters, boilers and appliances; TDS is composed of calcium, magnesium, sodium, potassium, carbonate, bicarbonate, chloride, sulphate and nitrate.