



AGENDA

**Committee of the Whole
to be held on January 7, 2025 at 1 p.m.
977 South Maquinna Drive in Council Chambers and by electronic means**

Remote Access

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Call to Order

Land Acknowledgement

Mayor Davis will acknowledge and respect that we are meeting upon Mowachaht/Muchalaht territory.

Introduction of Late Items

None.

Approval of the Agenda

Business Arising H 1 Wellhead Protection Plan Update- 2024 Drinking Water Quality Monitoring Report and Lab Results.

Adjournment

TECHNICAL MEMO

To Mark Tatchell, CAO Alisa Vanderberg, Director of Operations Village of Tahsis Municipal Office	From Mark DeGagne, P.Eng. McElhanney Ltd.
Re 2024 Water Quality Monitoring	Date September 27, 2024

1. Introduction

The Village of Tahsis supplies potable water to its year-round residents and seasonal visitors by means of the Production Well, which was installed in 2016. A Wellhead Protection Plan (WPP) was developed in 2019, with the goal of preventing contaminants from entering the water source. Such source protection can be verified by undertaking water quality monitoring events on an ongoing basis. A dataset compiled using data from this and previous monitoring events will provide information about water quality over time.

McElhanney Ltd. ('McElhanney') is pleased to provide this technical memorandum to the Village of Tahsis (the 'Client'). With the objective of verifying source protection, the document contained herein summarizes and evaluates the field and laboratory data collected from the water source and its capture zone during the 2024 Water Quality Monitoring Event.

2. Background

The Production Well, owned by the Client and installed in 2016, services a year-round population of approximately 400, which fluctuates seasonally. The maximum recommended pumping rate is 4000m³/day. The wellhead and chlorination system are enclosed within a secured wellhouse in a secured yard. The Production Well capture zone overlaps a suspected historical landfill site, which is believed to primarily contain wood waste generated by sawmill operations. Monitoring wells have been installed as sentinels to detect potential water quality issues before they reach the Production Well.

The 2024 Water Quality Monitoring involved the field measurement of groundwater levels, field measurement of groundwater physical parameters, collection of groundwater samples for laboratory analysis and evaluation of data.

McElhanney

1196 Dogwood Street, Campbell River BC Canada, V9W 3A2
Tel. 250-287-7799 | Fax. 1-855-407-3895 | www.mcelhanney.com

The monitoring locations, shown below in *Figure 1*, were Monitoring Well 1 (Shallow and Deep), Monitoring Well 2 (Shallow and Deep), Test Well 2 and the Production Well.

Figure 1: Monitoring Locations in Tahsis, BC



Each monitoring location has, at various times, been assigned provincial, field and laboratory identifiers; for consistency, *Table 1*, below, provides a summary.

Table 2: Monitoring Location ID Summary

Monitoring Location	Well ID	Field ID	Lab ID
Monitoring Well 1, Shallow Deep	43938	MW20-01S	C447360_CQC099
	43937	MW20-01D	C447360_CQC100
Monitoring Well 2, Shallow Deep	43936	MW20-02S	C447360_CQC101
	43935	MW20-02D	C447360_CQC102
Test Well 2	41468	TW2	C447360_CQC103
Production Well	41469	PW	C447360_CQC104



3. Scope of Work

The following outlines the scope of work completed by McElhanney for the 2024 Water Quality Monitoring Event:

- Field measurement of groundwater levels at Monitoring Well 1 (Shallow and Deep), Monitoring Well 2 (Shallow and Deep) and Test Well 2
- Field measurement of the following groundwater physical parameters at all monitoring locations
 - Water level
 - Temperature
 - pH
 - Conductivity
 - Dissolved oxygen
- Groundwater sample collection for analysis by Bureau Veritas (the ‘Laboratory’) at all monitoring locations
- Submission of the groundwater samples to the Laboratory, located in Burnaby, BC for analysis of the following physical parameters and potential contaminants of concern (PCOCs):

<ul style="list-style-type: none"> ○ Turbidity ○ Conductivity ○ pH ○ Anions ○ Nutrients ○ Total and dissolved metals ○ Polycyclic aromatic hydrocarbons (PAHs) 	<ul style="list-style-type: none"> ○ Polychlorinated biphenyls (PCBs) ○ Resin and fatty acids (RAFA) ○ Organochlorine (OC) pesticides ○ Organophosphate (OP) pesticides ○ Phenoxyalkyl acid (PA) pesticides/herbicides ○ Microbiology
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- Evaluation of results and preparation of this technical memorandum.

4. Methodology

McElhanney completed the 2024 Water Quality Monitoring in general accordance with the procedures outlined in applicable sections of the BC Ministry of the Environment and Climate Change Strategy (ENV) *British Columbia Field Sampling Manual (BCFSM)*¹. A similar methodology to previous water quality monitoring events was utilized to maintain continuity and consistency in the data provided, although surface water quality was not investigated during this event.

All activities conducted as part of the groundwater monitoring program were completed by trained and qualified personnel, and the project was managed in accordance with McElhanney’s certified ISO 9001 program. The Laboratory is certified with the Canadian Association for Laboratory Accreditation (CALA) and performs its analytical services under auditable quality assurance / quality control (QA/QC) standards. Summary analytical tables prepared for this report were verified to be true with original analytical records.

¹ British Columbia, Ministry of Environment and Climate Change Strategy, *The British Columbia Field Sampling Manual* (ENV: 2024).



The monitoring wells were purged with tubing and a foot valve and allowed to recharge overnight prior to field measurement of physical parameters and sample collection, and water levels were measured before and after sampling. Physical parameters were measured at each monitoring location using a calibrated YSI Professional Plus multi-parameter meter.

Groundwater samples were collected in sterilized, preserved, pre-labelled containers prepared and supplied by the Laboratory. The samples were then packed in an insulated cooler with ice packs and transported with a Chain of Custody to the Laboratory within the prescribed holding time. Disposable nitrile gloves were worn while collecting the water samples and changed between locations to prevent cross-contamination. New disposable tubing and foot valves were used to prepare the wells for sampling. New disposable tubing was installed where a low-flow peristaltic pump was used during sample collection. Any sampling / monitoring apparatus reused between monitoring locations was decontaminated between uses.

Health Canada's (HC) *Guidelines for Canadian Drinking Water Quality*² for Maximum Allowable Concentration (MAC) and Aesthetic Objective (AO) were applied to the laboratory results; the most stringent of these was applied to evaluate source protection for the Production Well. These guidelines are applied to drinking water supplies throughout Canada in which contaminants have been found or could be expected to be found in a concentration which could lead to adverse health effects in humans.

5. Field Observations

The 2024 Water Quality Monitoring was completed by McElhanney on June 25, 2024. The weather was overcast with an average ambient outdoor temperature of 15.0°C. The photographs on the following page illustrate the site conditions and monitoring apparatus at Monitoring Well 1, Monitoring Well 2, Test Well 2 and the Production Well. Water samples were collected from the monitoring locations for laboratory analysis, and the samples were observed to be clear with little to no suspended sediments.

² Health Canada, *Guidelines for Canadian Drinking Water Quality* (HC:2024).



Photo 1: Monitoring Well 1 (MW20-01D)



Photo 2: Monitoring Well 2 (MW20-02D)



Photo 3: Test Well 2 (TW2)



Photo 4: Production Well (PW)



Water levels were recorded as a depth below the apparent ground surface in metres before and after well sampling and are summarized below in *Table 2*. Physical parameters were measured at the time of sample collection and are summarized below in *Table 2*; the values of each parameter have been averaged from stabilized field measurements.

Table 2: Field Measured Water Levels and Physical Parameters

Parameter	MW20-01	MW20-01	MW20-02	MW20-02	TW2	PW
	Shallow	Deep	Shallow	Deep		
Water Level (m), Before / After	4.55 / 4.70	4.28 / 4.37	5.42 / 5.48	5.15 / 5.20	3.17 / 3.28	N/A
Temperature (°C)	8.3	8.4	7.9	8.0	9.2	9.2
pH	7.51	8.42	5.87	6.99	7.52	6.48
Conductivity (µS/cm)	88.5	77.7	51.6	76.7	132.6	91.1
Dissolved Oxygen (mg/L)	11.88	0.45	1.64	8.03	0.35	6.59

6. Laboratory Analysis

The samples were received by the Laboratory on June 26, 2024 for analysis of those parameters outlined in *Section 3* of this report. Laboratory results are summarized and compared to the *Guidelines for Canadian Drinking Water Quality* in *Table 4, Attachment A*. If identified, any exceedances of the guidelines are highlighted within the attached table. The Certificate of Analysis (COA), including test results, quality control results and Chain of Custody (COC) supplied by the Laboratory have been included in *Attachment B*.

7. Results and Discussion

With the exception of laboratory measured pH, which has a 15-minute recommended holding time, no qualifiers were placed on the results from the Laboratory, and the data can be considered reliable for the purposes of this water quality monitoring sample.



Laboratory data from the Production Well and its capture zone has been compared to the *Guidelines for Canadian Drinking Water Quality* for MAC and AO; **no exceedances were noted in the Production Well when data was compared to the most stringent of these guidelines, and it can reasonably be concluded that the measures implemented as part of the WPP have prevented contaminants from entering the water source.**

Comparison of the data for all parameters collected during 2024 Water Quality Monitoring Event to previous monitoring events is beyond the scope of this Technical Memo, but data points in exceedance of the *Guidelines for Canadian Drinking Water Quality* are compared to the Fall 2022 Water Quality Monitoring Event below in *Table 3*:

Table 3: Comparison of 2024 and 2022 Lab Measured Water Quality Results to Most Stringent Guideline

Parameter	Field ID	Lab ID	2024 Result	2022 Result	Guideline
Total Aluminum	MW20-02S	C447360_CQC101	109 µg/L	73.9 µg/L	100 µg/L (AO)
Total Iron	MW20-02S	C447360_CQC101	329 µg/L	145 µg/L	300 µg/L (AO)
	TW2	C447360_CQC104	3180 µg/L	No Data	
Total Manganese	MW20-02S	C447360_CQC101	50.0 µg/L	26.0 µg/L	20 µg/L (AO)
	TW2	C447360_CQC104	54.7 µg/L	No Data	
Dissolved Manganese	MW20-02S	C447360_CQC101	55.9 µg/L	23.9 µg/L	20 µg/L (AO)

The above table shows that water quality is changing over time. To properly assess the influence of background conditions, seasonal variability and changes in groundwater chemistry on water quality over time, regular water quality monitoring will provide a comprehensive dataset. Ideally, this should be compiled for ease of reference. It is recommended that, with the objective of continued verification of source protection, water quality monitoring events continue to be conducted on an ongoing basis.

8. Limitations

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Investigation and Subsurface Risks. The environmental characterization data was collected in general accordance with the standards and methods identified in the document by experienced professionals.



Subsurface conditions between boreholes, monitoring wells, and sampling locations have been based, by necessity, on assumptions of what exists between the actual locations sampled or investigated and may vary significantly from actual site conditions. Interpretations of groundwater levels and flow direction are based on water level measurements at selected monitoring well locations and are expected to fluctuate. Borehole and monitoring well observations indicate the approximate subsurface conditions at those locations only. Even a comprehensive sampling and testing program, implemented in accordance with appropriate equipment by experienced personnel, may fail to detect certain conditions. Actual conditions may vary significantly between the points investigated and all persons making use of this report should be aware of, and accept, this risk. Subsurface sampling may result in unavoidable contamination of certain subsurface areas not known to be previously contaminated such as, but not limited to, a geologic formation, the groundwater or other hydrous body. McElhanney is not responsible for such contamination.

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Effect of Changes. All evaluations and conclusions stated in this report are based on facts, observations, site specific details, legislation and regulations as they existed at the time of the investigation. Some conditions are subject to change over time and the Client recognizes that the passage of time, natural occurrences, and direct or indirect human intervention at or near the site may substantially alter such evaluations and conclusions. Regulatory statutes are also subject to change and interpretation, which may change over time. McElhanney should be requested to re-evaluate the conclusions of this report and to provide amendments as required prior to any reliance upon the information presented herein upon any of the following events: a) any changes (or possible changes) as to the site or regulatory requirements upon which this report was based, or b) new information is discovered in the future during site excavations, building demolition or other activities, or c) additional subsurface investigations or testing conducted by others.



9. Closing

We trust that the contents of this report meet your needs at this time. If you have any questions or require further information, please contact the undersigned.

Respectfully,

McElhanney Ltd.

Prepared by:



Chris Wall, CTech, P.Ag.
cwall@mcelhanney.com
 778-560-2008

Reviewed by:



Mark DeGagne, P.Eng.
mdegagne@mcelhanney.com
 778-560-2001

PERMIT TO PRACTICE

▲ McElhanney Engineering Services Ltd
PERMIT NUMBER: 1003861
 Engineers and Geoscientists of BC

Attachment A - Result Summary Table

Table 4: Comparison of Lab Measured Water Quality Results to Guidelines for Canadian Drinking Water Quality

Attachment B - Laboratory Certificate of Analysis

Certificate of Analysis
Quality Control Results
Chain of Custody



Attachment A

Result Summary Table



Table 4: Comparison of Lab Measured Water Quality Results to Guidelines for Canadian Drinking Water Quality

Location ID		Guidelines for Canadian Drinking Water ³							
Sample ID				MW20-01D	MW20-01S	MW20-02D	MW20-02S	PW	TW2
Sample Collection Date	Unit	Maximum Allowable Concentration (MAC)	Aesthetic Objective (AO)	25 Jun 2024	25 Jun 2024	25 Jun 2024	25 Jun 2024	25 Jun 2024	25 Jun 2024
Laboratory ID				C447360_CQC100	C447360_CQC099	C447360_CQC102	C447360_CQC101	C447360_CQC104	C447360_CQC103
Matrix				Water	Water	Water	Water	Water	Water
Biological:									
E. Coli	cfu/100 mL	-	-	<1	<1	<1	<1	<1	<1
Total Coliforms	cfu/100 mL	-	-	<1	<1	<1	<1	<1	7
Physical Parameters:									
Hardness as CaCO ₃	ug/L	#2	-	39,200	38,200	33,200	17,700	39,900	23,200
Hardness as CaCO ₃ (filtered)	ug/L	#2	-	47,300	42,100	35,300	19,700	43,200	25,200
pH (Lab)	-	-	7-10.5	7.95	7.23	7.02	6.29	7.07	7.46
Inorganics:									
Alkalinity (Total) as CaCO ₃	ug/L	-	-	42,000	41,000	33,000	21,000	39,000	34,000
Alkalinity (Bicarbonate)	ug/L	-	-	52,000	50,000	40,000	25,000	48,000	41,000
Alkalinity (Carbonate)	ug/L	-	-	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000
phenolphthalein alkalinity	ug/L	-	-	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000
Ammonia as N	ug/L	-	-	<15	<15	<15	<15	<15	15
Electrical Conductivity (Lab)	uS/cm	-	-	97	90	76	47	92	130



Fluoride	ug/L	1,500	-	<50	<50	<50	<50	<50	<50
Hydroxide	ug/L	-	-	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000
Nitrate (as N)	ug/L	10,000	-	32	60	39	<20	60	<20
Nitrite (as N)	ug/L	1,000	-	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Nitrite + Nitrate as N	ug/L	-	-	32	60	39	<20 ^{#5}	60	<20
Sulphate	ug/L	-	500,000	3,800	2,100	2,000	<1,000	3,100	7,800
Turbidity (Lab)	NTU	-	-	3.7	0.22	0.49	0.88	<0.10	17
Salinity & Routine:									
Chloride, Soluble Ion	ug/L	-	250,000	1,300	<1,000	1,300	1,100	<1,000	13,000
Total Metals:									
Aluminium	ug/L	2,900	100	90.6	21.9	8.8	109	<3.0	10.0
Antimony	ug/L	6	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Arsenic	ug/L	10	-	0.27	0.20	0.41	<0.10	<0.10	3.46
Barium	ug/L	2,000	-	1.3	<1.0	<1.0	<1.0	<1.0	<1.0
Beryllium	ug/L	-	-	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Bismuth	ug/L	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Boron	ug/L	5,000	-	<50	<50	<50	<50	<50	<50
Cadmium	ug/L	7	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Calcium	ug/L	-	-	12,800	12,800	10,900	5,490	13,000	7,250
Chromium (III+VI)	ug/L	50	-	<1.0	<1.0	<1.0	<1.0	<1.0	20.2
Cobalt	ug/L	-	-	<0.20	<0.20	<0.20	0.83	<0.20	0.96
Copper	ug/L	2,000	1,000	<0.50	<0.50	<0.50	2.03	29.1	4.00
Iron	ug/L	-	300	93	38	17	329	<10	3,180
Lead	ug/L	5	-	0.25	<0.20	<0.20	<0.20	0.28	<0.20
Lithium	ug/L	-	-	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Magnesium	ug/L	#2	-	1,740	1,500	1,430	963	1,790	1,230
Manganese	ug/L	120	20	7.6	<1.0	1.5	50.0	<1.0	54.7
Molybdenum	ug/L	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	1.9
Nickel	ug/L	-	-	<1.0	<1.0	<1.0	<1.0	3.0	2.2
Potassium	ug/L	-	-	159	98	82	78	99	422
Selenium	ug/L	50	-	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10



Silicon	ug/L	-	-	2,730	3,090	3,450	3,360	3,530	609
Silver	ug/L	#2	-	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Sodium	ug/L	-	200,000	2,410	1,170	1,140	992	1,330	14,600
Strontium	ug/L	7,000	-	28.3	23.6	18.4	10.3	25.1	38.1
Sulfur (As S)	ug/L	-	-	<3,000	<3,000	<3,000	<3,000	<3,000	3,000
Thallium	ug/L	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Tin	ug/L	-	-	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Titanium	ug/L	-	-	<5.0	<5.0	<5.0	5.4	<5.0	<5.0
Uranium	ug/L	20	-	0.14	<0.10	<0.10	<0.10	<0.10	0.16
Vanadium	ug/L	-	-	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Zinc	ug/L	-	5,000	<5.0	<5.0	<5.0	<5.0	33.1	<5.0
Zirconium	ug/L	-	-	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Dissolved Metals:									
Aluminium	ug/L	2,900	100	11.4	6.0	4.2	74.5	<3.0	<3.0
Antimony	ug/L	6	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Arsenic	ug/L	10	-	0.30	0.24	0.45	<0.10	<0.10	0.74
Barium	ug/L	2,000	-	<1.0	<1.0	1.2	<1.0	2.0	<1.0
Beryllium	ug/L	-	-	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Bismuth	ug/L	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Boron	ug/L	5,000	-	<50	<50	<50	<50	<50	<50
Cadmium	ug/L	7	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Calcium	ug/L	#2	-	15,300	13,800	11,500	6,030	14,000	7,790
Chromium (III+VI)	ug/L	50	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Cobalt	ug/L	-	-	<0.20	<0.20	<0.20	0.88	<0.20	<0.20
Copper	ug/L	2,000	1,000	<0.20	<0.20	1.16	1.78	4.75	0.38
Iron	ug/L	-	300	<5.0	<5.0	<5.0	265	15.6	19.4
Lead	ug/L	5	-	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Lithium	ug/L	-	-	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Magnesium	ug/L	#2	-	2,200	1,830	1,610	1,120	2,010	1,400
Manganese	ug/L	120	20	4.4	<1.0	<1.0	55.9	<1.0	9.6
Molybdenum	ug/L	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	2.1
Nickel	ug/L	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0



Our File: 2221-49210

Phosphorus	ug/L	-	-	13	<10	<10	<10	<10	<10
Potassium	ug/L	-	-	160	107	91	86	112	441
Selenium	ug/L	50	-	0.48	<0.10	<0.10	<0.10	<0.10	<0.10
Silicon	ug/L	-	-	3,000	3,220	3,590	3,630	3,790	356
Silver	ug/L	#2	-	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Sodium	ug/L	-	200,000	2,580	1,330	1,300	1,170	1,500	16,300
Strontium	ug/L	7,000	-	31.6	24.5	17.9	11.0	25.3	39.2
Sulfur (As S)	ug/L	-	-	<3,000	<3,000	<3,000	<3,000	<3,000	<3,000
Thallium	ug/L	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Tin	ug/L	-	-	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Titanium	ug/L	-	-	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Uranium	ug/L	20	-	0.12	<0.10	<0.10	<0.10	<0.10	<0.10
Vanadium	ug/L	-	-	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Zinc	ug/L	-	5,000	<5.0	<5.0	<5.0	<5.0	12.8	<5.0
Zirconium	ug/L	-	-	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Polycyclic Aromatic Hydrocarbons:									
Acenaphthene	ug/L	-	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Acenaphthylene	ug/L	-	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Acridine	ug/L	-	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Anthracene	ug/L	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(a)anthracene	ug/L	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(a)pyrene	ug/L	0.04	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Benzo(b+j)fluoranthene	ug/L	-	-	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Benzo(g,h,i)perylene	ug/L	-	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(k)fluoranthene	ug/L	-	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chrysene	ug/L	-	-	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Dibenz(a,h)anthracene	ug/L	-	-	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Fluoranthene	ug/L	-	-	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020



Fluorene	ug/L	-	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Indeno(1,2,3-c,d)pyrene	ug/L	-	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
1-Methylnaphthalene	ug/L	-	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
2-Methylnaphthalene	ug/L	-	-	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Naphthalene	ug/L	-	-	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Phenanthrene	ug/L	-	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Pyrene	ug/L	-	-	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Quinoline	ug/L	-	-	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Light Molecular Weight PAHs (sum)	ug/L	-	-	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Heavy Molecular Weight PAHs (sum)	ug/L	-	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
PAHs (Sum of total)	ug/L	-	-	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Chlorinated Hydrocarbons:									
Octachlorostyrene	ug/L	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Herbicides:									
Metribuzin	ug/L	80	-	<3	<3	<3	<3	<3	<3
2,4,5-Trichlorophenoxy Acetic Acid	ug/L	-	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
2,4,5-TP (Silvex)	ug/L	-	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
2,4-Dichlorprop	ug/L	-	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
4-(2,4-Dichlorophenoxy) butyric Acid (2,4-DB)	ug/L	-	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Ametryn	ug/L	-	-	<3	<3	<3	<3	<3	<3



Our File: 2221-49210

Atrazine	ug/L	5	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Cyanazine	ug/L	-	-	<3	<3	<3	<3	<3	<3
Dicamba	ug/L	110	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Hedonal	ug/L	100	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Picloram	ug/L	-	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
2-Methyl-4-chlorophenoxyacetic acid	ug/L	350	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Mecoprop	ug/L	-	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Metolachlor	ug/L	-	-	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Prometon	ug/L	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Prometryn	ug/L	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Propazine	ug/L	-	-	<3	<3	<3	<3	<3	<3
Simazine	ug/L	-	-	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Simetryn	ug/L	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Terbutryn	ug/L	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Triallate	ug/L	-	-	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Trifluralin	ug/L	-	-	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Organochlorine Pesticides:									
Aldrin	ug/L	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
a-BHC	ug/L	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Aldrin + Dieldrin	ug/L	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
b-BHC	ug/L	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
d-BHC	ug/L	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Chlordane	ug/L	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Chlordane (cis)	ug/L	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Chlordane (trans)	ug/L	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
2,4-D (BEE)	ug/L	-	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
DDD	ug/L	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
2,4' + 4,4' DDD	ug/L	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
DDE	ug/L	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
4,4-DDE	ug/L	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
DDT	ug/L	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005



Our File: 2221-49210

2,4-DDT	ug/L	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
2,4' + 4,4' DDT	ug/L	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
DDT+DDE+DDD	ug/L	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Dieldrin	ug/L	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Endosulfan	ug/L	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Endosulfan I	ug/L	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Endosulfan II	ug/L	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Endosulfan sulphate	ug/L	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Endrin	ug/L	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Endrin aldehyde	ug/L	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Endrin ketone	ug/L	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
g-BHC (Lindane)	ug/L	-	-	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Heptachlor	ug/L	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Heptachlor epoxide	ug/L	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Methoxychlor	ug/L	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
o,p-DDD	ug/L	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
o,p'-DDE	ug/L	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Oxychlorthane	ug/L	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Toxaphene	ug/L	-	-	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Organophosphorous Pesticides:									
Azinophos methyl	ug/L	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chlorpyrifos	ug/L	90	-	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Demeton-S	ug/L	-	-	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Diazinon	ug/L	-	-	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Dichlorvos	ug/L	-	-	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Dimethoate	ug/L	20	-	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Ethion	ug/L	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Fenthion	ug/L	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Malathion	ug/L	190	-	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Methyl parathion	ug/L	-	-	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0



Mevinphos (Phosdrin)	ug/L	-	-	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Phorate	ug/L	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Phosmet	ug/L	-	-	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Ronnel	ug/L	-	-	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Terbufos	ug/L	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Pesticides:									
Hexachlorobenzene	ug/L	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Aldicarb	ug/L	-	-	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Bendiocarb	ug/L	-	-	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Carbaryl	ug/L	-	-	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Carbofuran	ug/L	-	-	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Fonofos	ug/L	-	-	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Mirex	ug/L	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
heptachlor & heptachlor epoxide	ug/L	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Parathion	ug/L	-	-	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Polychlorinated Biphenyls:									
Arochlor 1016	ug/L	-	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Arochlor 1221	ug/L	-	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Arochlor 1232	ug/L	-	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Arochlor 1242	ug/L	-	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Arochlor 1248	ug/L	-	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Arochlor 1254	ug/L	-	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Arochlor 1260	ug/L	-	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Arochlor 1268	ug/L	-	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Arochlor 1262	ug/L	-	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
PCBs (Sum of total)	ug/L	-	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Resin/Fatty Acids:									

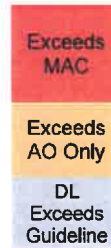


Our File: 2221-49210

9,10-Dichlorostearic acid	ug/L	-	-	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0
Abietic acid	ug/L	-	-	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0
Arachidic acid	ug/L	-	-	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0
Behenic acid	ug/L	-	-	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0
Chlorodehydroabietic acid, 12-	ug/L	-	-	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0
Chlorodehydroabietic acid, 14-	ug/L	-	-	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0
Decanoic acid	ug/L	-	-	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0
Dichlorodehydroabietic acid, 12,14-	ug/L	-	-	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0
Isopimaric acid	ug/L	-	-	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0
Lauric acid	ug/L	-	-	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0
Linoleic acid	ug/L	-	-	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0
Linolenic acid	ug/L	-	-	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0
Myristic acid	ug/L	-	-	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0
Neoabietic acid	ug/L	-	-	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0
Palustric acid	ug/L	-	-	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0
Pimaric acid	ug/L	-	-	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0
Sandaracopimaric acid	ug/L	-	-	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0
Total of fatty acids detected	ug/L	-	-	<72	<72	<72	<72	<72	<72
Total of resin acids detected	ug/L	-	-	<60	<60	<60	<60	<60	<60
Undecanoic acid	ug/L	-	-	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0
Dehydroabietic acid	ug/L	-	-	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0
Hexadecanoic Acid	ug/L	-	-	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0
Octadecanoic Acid	ug/L	-	-	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0
Oleic acid	ug/L	-	-	<6.0	<6.0	<6.0	<6.0	<6.0	<6.0



Colour Key:



Notes:

All concentrations expressed in ug/L unless otherwise indicated

1. BC Drinking Water Protection Regulation, Schedule A: Water Quality Standards for Potable Water, updated 2018
2. BC Source Drinking Water Quality Guidelines (BC SDWQG), updated 2020
3. Health Canada Guidelines for Canadian Drinking Water Quality, updated 2022
 - a. Source Drinking Water Quality Guideline for *E.Coli*: ≤ 10 *E.Coli*/100 mL, minimum of 5 samples → source water sample before treatment. Untreated groundwater must meet the drinking water treatment objective of no detectable *E.Coli*, fecal coliform or total coliform bacteria.
 - b. BC Groundwater Protection Regulation, Schedule A: For 1 sample in a 30 day period, there must be no detectable per 100 mL; for more than 1 sample in a 30-day period, at least 90% of samples must have do detectable coliform bacteria per 100 mL and no sample must have more than 10 coliform bacteria per 100 mL.
 - c. Raw drinking water without treatment for particulates

"<" less than the laboratory reportable detection limit (DL) indicated.

"-" parameter not analyzed and/or a standards does not exist for the parameter

DL - Laboratory detection limit

ND - None detected



Attachment B

Laboratory Certificate of Analysis

Quality Control Results

Chain of Custody

