

Your Project #: LEECH STUDY Your C.O.C. #: 08469169

Attention: Christoph Moch

Capital Regional District Water Department 479 Island Hwy Victoria, BC Canada V9B 1H7

Report Date: 2019/04/22

Report #: R2712499 Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B927514 Received: 2019/04/15, 15:06

Sample Matrix: Drinking Water # Samples Received: 6

		Date	Date		
Analyses	Quantity	Extracted	Analyzed	Laboratory Method	Analytical Method
Hardness Total (calculated as CaCO3) (1)	6	N/A	2019/04/18	BBY WI-00033	Auto Calc
Mercury (Total) by CV	5	2019/04/18	2019/04/18	BBY7SOP-00015	BCMOE BCLM Oct2013 m
Na, K, Ca, Mg, S by CRC ICPMS (total)	6	N/A	2019/04/18	BBY WI-00033	Auto Calc
Elements by CRC ICPMS (total)	6	N/A	2019/04/18	BBY7SOP-00003,	EPA 6020b R2 m

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing. Maxxam is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by Maxxam, results relate to the supplied samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

- * RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
- (1) "Total Hardness" was calculated from Total Ca and Mg concentrations and may be biased high (Hardness, or Dissolved Hardness, calculated from Dissolved Ca and Mg, should be used for compliance if available).



Your Project #: LEECH STUDY Your C.O.C. #: 08469169

Attention: Christoph Moch

Capital Regional District Water Department 479 Island Hwy Victoria, BC Canada V9B 1H7

Report Date: 2019/04/22

Report #: R2712499 Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B927514 Received: 2019/04/15, 15:06

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Debbie Nordbruget, Key Account Specialist

Email: DN ordbruget@maxxam.ca

Phone# (250)385-6112

This report has been generated and distributed using a secure automated process.

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



Capital Regional District Client Project #: LEECH STUDY

TOT. METALS W/ CV HG FOR DRINKING WATER (DRINKING WATER)

Maxxam ID					VN3596	VN3597	VN3598	VN3599	VN3600		
Sampling Date					2019/04/10	2019/04/11	2019/04/11	2019/04/10	2019/04/10		
					14:00	11:45	09:45	10:30	12:20		
COC Number					08469169	08469169	08469169	08469169	08469169		
	UNITS	MAC	AO	OG	CRAGG CREEK	TUNNEL	WEST LEECH	LEECH HEAD	CHRIS CREEK	RDL	QC Batch
Calculated Parameters											
Total Hardness (CaCO3)	mg/L	-	-	-	8.38	7.65	5.64	6.52	7.22	0.50	9382004
Elements	•									•	
Total Mercury (Hg)	ug/L	1	-	-	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.0020	9386247
Total Metals by ICPMS	•									•	
Total Aluminum (AI)	ug/L	-	-	100	69.4	72.1	83.4	117	40.2	3.0	9385566
Total Antimony (Sb)	ug/L	6	-	-	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	9385566
Total Arsenic (As)	ug/L	10	-	-	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	9385566
Total Barium (Ba)	ug/L	1000	-	-	2.2	2.6	3.0	2.9	1.9	1.0	9385566
Total Beryllium (Be)	ug/L	-	-	-	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	9385566
Total Bismuth (Bi)	ug/L	-	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	9385566
Total Boron (B)	ug/L	5000	-	-	<50	<50	<50	<50	<50	50	9385566
Total Cadmium (Cd)	ug/L	5	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	9385566
Total Chromium (Cr)	ug/L	50	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	9385566
Total Cobalt (Co)	ug/L	-	-	-	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	9385566
Total Copper (Cu)	ug/L	-	1000	-	0.60	0.68	0.48	0.64	0.45	0.20	9385566
Total Iron (Fe)	ug/L	-	300	-	14.6	32.1	24.5	68.2	13.2	5.0	9385566
Total Lead (Pb)	ug/L	5	-	-	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	9385566
Total Manganese (Mn)	ug/L	-	50	-	<1.0	<1.0	<1.0	3.5	<1.0	1.0	9385566
Total Molybdenum (Mo)	ug/L	-	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	9385566
Total Nickel (Ni)	ug/L	-	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	9385566
Total Selenium (Se)	ug/L	50	-	1	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	9385566
Total Silicon (Si)	ug/L	-	-	-	1930	2050	2090	1770	2060	100	9385566
Total Silver (Ag)	ug/L	-	-	-	<0.020	<0.020	<0.020	<0.020	<0.020	0.020	9385566
Total Strontium (Sr)	ug/L	-	-	-	10.4	13.3	12.0	10.6	8.2	1.0	9385566
Total Thallium (TI)	ug/L	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	9385566
Total Tin (Sn)	ug/L	-	-	-	<5.0	<5.0	<5.0	<5.0	<5.0	5.0	9385566
Total Titanium (Ti)	ug/L	-	-	-	<5.0	<5.0	<5.0	<5.0	<5.0	5.0	9385566
Total Uranium (U)	ug/L	20	-	-	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	9385566
Total Vanadium (V)	ug/L	-	-	-	<5.0	<5.0	<5.0	<5.0	<5.0	5.0	9385566
Total Zinc (Zn)	ug/L	-	5000	-	<5.0	<5.0	<5.0	<5.0	<5.0	5.0	9385566
Total Zirconium (Zr)	ug/L	-	-	-	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	9385566
Total Calcium (Ca)	mg/L	-	-	-	2.41	2.17	1.61	1.74	1.90	0.050	9383036
Total Magnesium (Mg)	mg/L	-	-	-	0.574	0.544	0.395	0.530	0.598	0.050	9383036
No Fill	No Exceed	lance									

No Fill Grey

Black

No Exceedance

Exceeds 1 criteria policy/level Exceeds both criteria/levels

RDL = Reportable Detection Limit



Capital Regional District Client Project #: LEECH STUDY

TOT. METALS W/ CV HG FOR DRINKING WATER (DRINKING WATER)

Maxxam ID					VN3596	VN3597	VN3598	VN3599	VN3600		
Complian Data					2019/04/10	2019/04/11	2019/04/11	2019/04/10	2019/04/10		
Sampling Date					14:00	11:45	09:45	10:30	12:20		
COC Number					08469169	08469169	08469169	08469169	08469169		
	UNITS	MAC	AO	OG	CRAGG CREEK	TUNNEL	WEST LEECH	LEECH HEAD	CHRIS CREEK	RDL	QC Batch
Total Potassium (K)	mg/L	MAC -	AO -	OG -	<0.050	TUNNEL 0.118	0.166	0.069	<0.050	RDL 0.050	QC Batch 9383036
Total Potassium (K) Total Sodium (Na)		- -	- 200								

No Fill Grey

Black

No Exceedance

Exceeds 1 criteria policy/level

Exceeds both criteria/levels

RDL = Reportable Detection Limit



Capital Regional District Client Project #: LEECH STUDY

TOT. METALS W/ CV HG FOR DRINKING WATER (DRINKING WATER)

Maxxam ID						VN3601		
Sampling Date						2019/04/10		
Sampling Date						11:15		
COC Number						08469169		
		UNITS	MAC	AO	OG	WEEKS OUT	RDL	QC Batch
Calculated Par	ameters							
Total Hardness	(CaCO3)	mg/L	-	-	-	5.90	0.50	9382004
Total Metals b	y ICPMS	•					•	
Total Aluminur	n (Al)	ug/L	-	-	100	161	3.0	9385566
Total Antimony	/ (Sb)	ug/L	6	-	1	<0.50	0.50	9385566
Total Arsenic (A	As)	ug/L	10	-	1	<0.10	0.10	9385566
Total Barium (E	За)	ug/L	1000	-	1	3.4	1.0	9385566
Total Beryllium	(Be)	ug/L	-	-	-	<0.10	0.10	9385566
Total Bismuth ((Bi)	ug/L	-	-	1	<1.0	1.0	9385566
Total Boron (B))	ug/L	5000	-	1	<50	50	9385566
Total Cadmium	(Cd)	ug/L	5	-	-	<0.010	0.010	9385566
Total Chromiur	m (Cr)	ug/L	50	-	-	<1.0	1.0	9385566
Total Cobalt (C	o)	ug/L	-	-	-	<0.20	0.20	9385566
Total Copper (0	Cu)	ug/L	-	1000	-	1.37	0.20	9385566
Total Iron (Fe)		ug/L	-	300	-	122	5.0	9385566
Total Lead (Pb)		ug/L	5	-	-	<0.20	0.20	9385566
Total Mangane	se (Mn)	ug/L	-	50	-	7.0	1.0	9385566
Total Molybde	num (Mo)	ug/L	-	-	-	<1.0	1.0	9385566
Total Nickel (N	i)	ug/L	-	-	-	<1.0	1.0	9385566
Total Selenium	(Se)	ug/L	50	-	1	<0.10	0.10	9385566
Total Silicon (Si	i)	ug/L	-	-	1	1680	100	9385566
Total Silver (Ag	:)	ug/L	-	-	-	<0.020	0.020	9385566
Total Strontiun	n (Sr)	ug/L	-	-	-	10.9	1.0	9385566
Total Thallium	(TI)	ug/L	-	-	-	<0.010	0.010	9385566
Total Tin (Sn)		ug/L	-	-	-	<5.0	5.0	9385566
Total Titanium	(Ti)	ug/L	-	-	-	<5.0	5.0	9385566
Total Uranium	(U)	ug/L	20	-	-	<0.10	0.10	9385566
Total Vanadiun	n (V)	ug/L	-	-	-	<5.0	5.0	9385566
Total Zinc (Zn)		ug/L	-	5000	-	<5.0	5.0	9385566
Total Zirconiun	n (Zr)	ug/L	-	-	-	0.10	0.10	9385566
Total Calcium (Ca)	mg/L	-	-	-	1.61	0.050	9383036
Total Magnesiu	ım (Mg)	mg/L	-	-	-	0.458	0.050	9383036
Total Potassiur	n (K)	mg/L	-	-	-	0.082	0.050	9383036
No Fill	No Exceedan		•	•			•	
Grey	Exceeds 1 cri	teria po	licy/le	vel				
Black	Exceeds both		-					
RDL = Reportal								



Capital Regional District Client Project #: LEECH STUDY

TOT. METALS W/ CV HG FOR DRINKING WATER (DRINKING WATER)

Maxxam ID					VN3601		
Sampling Date					2019/04/10		
Sampling Date					11:15		
COC Number					08469169		
	UNITS	MAC	AO	OG	WEEKS OUT	RDL	QC Batch
Total Sodium (Na)	mg/L	-	200	-	1.46	0.050	9383036
Total Sulphur (S)	mg/L	-	-	-	<3.0	3.0	9383036

No Fill Grey

Black

No Exceedance

Exceeds 1 criteria policy/level Exceeds both criteria/levels

RDL = Reportable Detection Limit



Capital Regional District Client Project #: LEECH STUDY

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	7.3°C
-----------	-------

MAC,AO,OG: The guidelines that have been included in this report have been taken from the Canadian Drinking Water Quality Summary Table, February 2017 and the Guideline Technical Document – Lead, March 2019.

Criteria A = Maximum Acceptable Concentration (MAC) / Criteria B = Aesthetic Objectives (AO) / Criteria C = Operational Guidance Values (OG) It is recommended to consult these guidelines when interpreting your data since there are non-numerical guidelines that are not included on this report.

Turbidity Guidelines:

- 1. Chemically assisted filtration: less than or equal to 0.3 NTU in 95% of the measurements or 95% of the time each month. Shall not exceed 1.0 NTU at any time.
- 2. Slow sand / diatomaceous earth filtration: less than or equal to 1.0 NTU in 95% of the measurements or 95% of the time each month. Shall not exceed 3.0 NTU at any time.
- 3. Membrane filtration: less than or equal to 0.1 NTU in 99% of the measurements made or at least 99% of the time each calendar month. Shall not exceed 0.3 NTU at any time.
- 4. To ensure effectiveness of disinfection and for good operation of the distribution system, it is recommended that water entering the distribution system have turbidity levels of 1.0 NTU or less.

Measurement of Uncertainty has not been accounted for when stating conformity to the selected criteria, where applicable.

Results relate only to the items tested.



QUALITY ASSURANCE REPORT

Capital Regional District Client Project #: LEECH STUDY

		Matrix Sp		Spike	Spiked	Blank	Method E	Blank	RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9385566	Total Aluminum (AI)	2019/04/18	100	80 - 120	98	80 - 120	<3.0	ug/L	16	20
9385566	Total Antimony (Sb)	2019/04/18	100	80 - 120	93	80 - 120	<0.50	ug/L	NC	20
9385566	Total Arsenic (As)	2019/04/18	106	80 - 120	99	80 - 120	<0.10	ug/L	NC	20
9385566	Total Barium (Ba)	2019/04/18	95	80 - 120	92	80 - 120	<1.0	ug/L	14	20
9385566	Total Beryllium (Be)	2019/04/18	96	80 - 120	90	80 - 120	<0.10	ug/L	NC	20
9385566	Total Bismuth (Bi)	2019/04/18	95	80 - 120	97	80 - 120	<1.0	ug/L	NC	20
9385566	Total Boron (B)	2019/04/18	95	80 - 120	85	80 - 120	<50	ug/L	NC	20
9385566	Total Cadmium (Cd)	2019/04/18	103	80 - 120	96	80 - 120	<0.010	ug/L	NC	20
9385566	Total Chromium (Cr)	2019/04/18	98	80 - 120	93	80 - 120	<1.0	ug/L	NC	20
9385566	Total Cobalt (Co)	2019/04/18	98	80 - 120	92	80 - 120	<0.20	ug/L	NC	20
9385566	Total Copper (Cu)	2019/04/18	98	80 - 120	95	80 - 120	<0.20	ug/L	0.67	20
9385566	Total Iron (Fe)	2019/04/18	99	80 - 120	103	80 - 120	<5.0	ug/L	NC	20
9385566	Total Lead (Pb)	2019/04/18	95	80 - 120	98	80 - 120	<0.20	ug/L	NC	20
9385566	Total Manganese (Mn)	2019/04/18	101	80 - 120	97	80 - 120	<1.0	ug/L	NC	20
9385566	Total Molybdenum (Mo)	2019/04/18	97	80 - 120	96	80 - 120	<1.0	ug/L	NC	20
9385566	Total Nickel (Ni)	2019/04/18	98	80 - 120	96	80 - 120	<1.0	ug/L	NC	20
9385566	Total Selenium (Se)	2019/04/18	106	80 - 120	100	80 - 120	<0.10	ug/L	NC	20
9385566	Total Silicon (Si)	2019/04/18	98	80 - 120	100	80 - 120	<100	ug/L	3.1	20
9385566	Total Silver (Ag)	2019/04/18	100	80 - 120	95	80 - 120	<0.020	ug/L	NC	20
9385566	Total Strontium (Sr)	2019/04/18	99	80 - 120	96	80 - 120	<1.0	ug/L	5.1	20
9385566	Total Thallium (TI)	2019/04/18	96	80 - 120	97	80 - 120	<0.010	ug/L	NC	20
9385566	Total Tin (Sn)	2019/04/18	94	80 - 120	93	80 - 120	<5.0	ug/L	NC	20
9385566	Total Titanium (Ti)	2019/04/18	103	80 - 120	97	80 - 120	<5.0	ug/L	NC	20
9385566	Total Uranium (U)	2019/04/18	97	80 - 120	100	80 - 120	<0.10	ug/L	NC	20
9385566	Total Vanadium (V)	2019/04/18	101	80 - 120	95	80 - 120	<5.0	ug/L	NC	20
9385566	Total Zinc (Zn)	2019/04/18	104	80 - 120	99	80 - 120	<5.0	ug/L	NC	20
9385566	Total Zirconium (Zr)	2019/04/18	101	80 - 120	93	80 - 120	<0.10	ug/L	NC	20



QUALITY ASSURANCE REPORT(CONT'D)

Capital Regional District Client Project #: LEECH STUDY

			Matrix	Spike	Spiked	Blank	Method B	lank	RPD)	
Ī	QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
I	9386247	Total Mercury (Hg)	2019/04/18	87	80 - 120	101	80 - 120	<0.0020	ug/L	NC	20

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).



Capital Regional District
Client Project #: LEECH STUDY

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Andy Lu, Ph.D., P.Chem., Scientific Specialist

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



CHAIN OF CUSTODY RECORD

BBY FCD-00077/05 Burnaby: 4606 Canada Way, Burnaby, 8C VSG 1K5. Toll Free (800) 665-8566 08469169 COC#: rurnaroung Time (TAT) Required Project Information (where applicable) Report Information (if differs from invoice) Invoice Information Regular TAT 5 days (Most analyses) Quotation #: **Capital Regional District** Company Name: Company Name: **Capital Regional District** PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS Christoph Moch, Jessica Dupuis, Jennifer Blaney P.O. #/ AFE#: Contact Name: Contact Name: Christoph Moch Rush TAT (Surcharges will be applied) Leech Study Project #: Address: Address: 479 Island Highway Same Day 2 Days Site Location: Victoria, BC PC: V9B 1H7 3 Days 1 Day CM 250-474-9603; JD 250-474-9643; JB 250-474-9680 Site #: 250-474-9603 Phone: Phone: Date Required: cmoch@crd.bc.ca; jdupuis@crd.bc.ca; jblaney@crd.bc.ca Sampled By: cmoch@crd.bc.ca Email: Email: Rush Confirmation #: **Analysis Requested** Special Instructions **Regulatory Criteria** LABORATORY USE ONLY Return Cooler BC CSR Soll BC CSR Water **CUSTODY SEAL** COOLER Y/N TEMPERATURES Other (Specify) CCME (Specify) Intact Ship Sample Bottles Present (Please Specify) MTBE [] BC Water Quality x Drinking Water SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM CODLING MEDIA PRESENT Lab Date Sampled Sampled Matrix Sample Identification COMMENTS (YYYY/MM/DD) Identification 14:00 Waler West Leech 10.30 Head 06:61 01/40/19/00 Cree K 2019/04/10/11:15 B927514_COC weeks 10 MAXXAM JOB# TIME: (HH:MM) DATE: (YYYY/MM/DD) RELINQUISHED BY: (Signature/Print) DATE: (YYYY/MM/DD) TIME: (HH:MM) RECEIVED BY: (Signature/Print) 15:06 19104115 2019/04/15 15:05