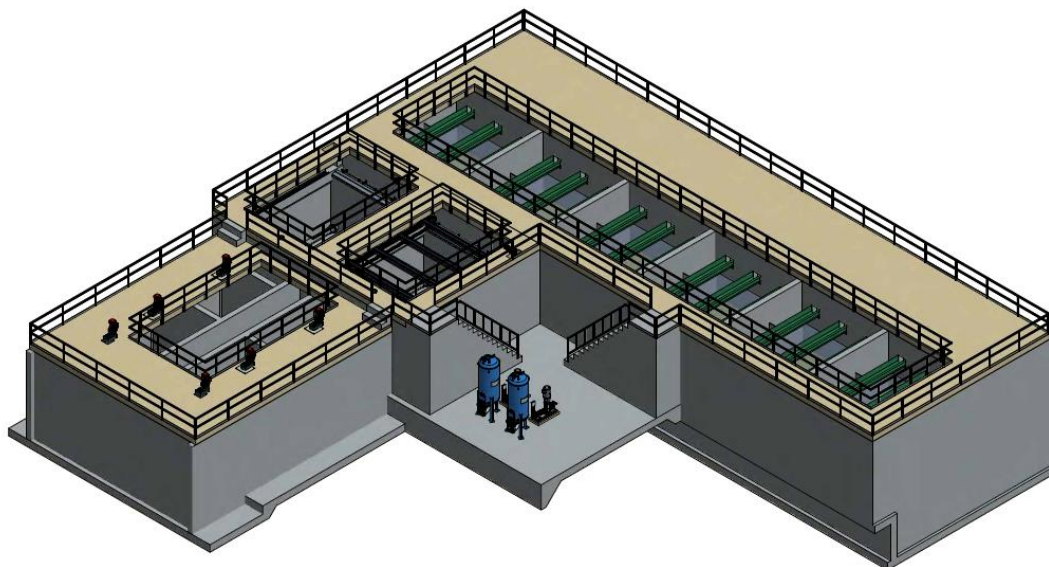




District of Peachland Annual Drinking Water Report – 2018



3D drawing of the DAF and filter train for the new water treatment plant

INTRODUCTION

The District of Peachland is legally required by the *Drinking Water Protection Act* to provide an annual report on their water supply systems. The annual report will provide water system users with an overview of the system, a summary of all water tests performed and an update to any maintenance and/or improvements made to the system.

Facility Name/Number: District of Peachland Water Distribution System (#561)
EOCP Classification: Level III

Facility Name/Number: Peachland Creek Water Treatment Facility (#2288)
EOCP Classification: Level II

Facility Name/Number: Trepanier Creek Water Treatment Facility (#2289)
EOCP Classification: Level II

Facility Name/Number: Okanagan Lake Pumps Water Treatment Facility (#2290)
EOCP Classification: Level II

WATER SOURCES

Water for the District of Peachland is supplied from three surface water sources;

- Peachland Creek
- Trepanier Creek
- Okanagan Lake

It should be noted that in the past, Peachland Creek has sometimes been referred to as “Deep Creek”. As such, any information within this report that notes Deep Creek is ultimately referring to Peachland Creek.

The Peachland Creek system supplies water to all properties accessed from Princeton Avenue as well as those that lie further south. It also supplies the properties accessed from Ponderosa Drive and the downtown area as far north as 11th Street (approximately). The Trepanier system supplies water to the remainder of the properties in the District (from 11th Street north). When the Okanagan Lake pumps are operated in place of the Trepanier Creek Intake, the supply area is identical to the Trepanier system.

The majority of water is supplied from the Peachland Creek (PCI) system (approximately 2/3) with the remainder supplied by the Trepanier Creek (TCI) system (approximately 1/3) or the Okanagan Lake Pumps. The Okanagan Lake Pumps (LPH) are typically operated during spring freshet/runoff to supply less turbid water to the Trepanier system. In 2018, the Okanagan Lake Pumps was active from April 20 – May 24 (spring freshet).

DISTRIBUTION SYSTEM

The District of Peachland currently uses chlorine gas as its primary disinfectant. Chlorine is injected using flow paced technology and is dosed to provide inactivation of bacteria, viruses and protozoan cysts which may be present within the surface water source. District staff maintain a first user residual ranging from 0.9 – 1.2 mg/L (depending on the time of year and clarity of the raw water). At the ends of the system, a chlorine residual target is set at 0.2 mg/L. A residual of chlorine remaining in the distribution system extends a measure of protection against any possible contamination entering the system after initial disinfection.

The distribution system and supply includes:

- 16 pressure reducing stations,
- 1 very high consequence dam (Peachland Lake)
- 1 high consequence dam (Silver Lake)
- 1 significant consequence dam (Glen Lake)
- 4 active reservoirs
- 6 active pump stations
- Approximately 81 km of pipeline

The Water Department is staffed by operators certified through the Environmental Operators Certification Program (EOCP – the association responsible for certification of system operators and classification of water distribution and treatment systems within British Columbia), with their certifications noted below;

- Leadhand: Water Distribution Level IV / Water Treatment Level II
- Water Mechanic: Water Distribution Level II / Water Treatment Level II
- Water Mechanic: Water Distribution Level I

These operators have the capability to monitor the system at all times (24 hours per day, 365 days per year) through the use of the SCADA system (supervisory control and data acquisition). The system is set to alarm if it drifts beyond pre-determined set points, calling the standby operator to alert them. There is an operator on standby at all times.

ROUTINE MAINTENANCE

Fire Hydrants

All municipally owned fire hydrants are inspected, pressure tested and flushed annually. Hydrants undergo a complete tear down and rebuild on an as-needed basis.

Main Valve Exercising

Main valves are exercised at least biennially or on an as-needed basis.

System Flushing

System flushing occurs annually during the fall. Hydrants and blowoffs are used to pass higher velocity water through the system in order to scour any sediment that may have settled in the system over the year.

Pressure Reducing Valves (PRVs)

PRV's are inspected monthly and rebuilt or repaired on an as-needed basis.

WATER MASTER PLAN

In 2007, the then mayor and council adopted the Water Master Plan (WMP), a set of comprehensive upgrades that was anticipated to provide treated water to Peachland in its entirety by the years 2023/24. The WMP was updated in 2015.

If more in-depth information is desired, it is available at the District's website (<http://www.peachland.ca/water-master-plan-2015>)

This year saw some substantial advances towards the provision of filtered water to the entire District of Peachland with an anticipated completion date of Fall 2020. After a preliminary engineering study and tours of different treatment plants around the area, the conventional plant design was determined. It includes a daily capacity of 25 MLD (expandable to 50 MLD) and a 2500 m³ reservoir. The treatment process consists of clarification through the dissolved air flotation (DAF) process, multi-media filtration, ultraviolet (UV) disinfection and chlorination. In consultation with the EOCP, the plant has been pre-classified as a Level IV facility.

The completion of this water treatment plant will allow the District to exceed the minimum requirements of the Drinking Water Treatment Objectives for Surface Water Supplies in British Columbia. If the minimum requirements are not met, water users can potentially be at increased risk of illness from protozoan pathogens.

To provide this treated water to the entire District, a second, related project was added to the scope of construction; the installation of a large diameter water main to interconnect the Peachland Creek and Trepanier Creek systems. In spring of 2018, it was announced that the District would receive \$4.9 Million in grant funding (Federal Gas Tax) to complete this interconnect project.

A summary of the anticipated project costs are noted below;

	Total Cost	Grant	Borrowing	Reserves
Water Treatment Plant	\$24 Million	\$6.9 Million	\$9.2 Million	\$7.9 Million
Trepanier Interconnect	\$4.9 Million	\$4.9 Million		

WATER SAMPLING

Drinking water samples are tested weekly for *E.Coli* and total coliforms by Caro Analytical Services in Kelowna. There were no positive bacteriological samples detected in 2018.

District employees monitor and record daily turbidity values along with pH and chlorine levels. Turbidity is one of the main parameters leading to a water quality advisory or a boil water notice. As the turbidity increases over 1 NTU, a water quality advisory is instituted. Similarly, as it increases over 5 NTU, a boil water notice is instituted. For ease of understanding and communication, if one of the sources exceeds the noted thresholds, the entire system is placed on an advisory/notice. Turbidity can affect the number and type of microorganisms that enter a surface water source. As surface waters experience increased flows (ie. spring runoff, major rainfall events, etc), turbidity can fluctuate dramatically and the public is notified accordingly. Records of average daily turbidity values can be found in Appendix IV.

Chlorine concentrations are monitored continuously at 4-5 stations throughout the system (depending on the time of year) as well as daily grab samples at a number of locations to ensure instrument accuracy, allowing CT values to be monitored.

Raw source water samples are also collected annually in order to perform a comprehensive analysis, giving an indication of any changes occurring within the water supplies. It should be noted that all raw sources tested are within the maximum allowable concentration (MAC) limits set out in the Guidelines for Canadian Drinking Water Quality. Lastly, trihalomethanes (THM's) are also tested annually to provide an indication of the level of disinfection byproducts present in the water supply system. The results from the comprehensive and THM analyses are included in Appendices I and II, respectively. The result sheets also indicate the limits or guidelines for each parameter listed.

WATER QUALITY ADVISORIES / BOIL WATER NOTICES / DO NOT USE NOTICE

Water quality advisories and boil water notices are notifications designed to inform the public of possible public health threats. The decision to institute an advisory or notice is made in discussion with staff at the Interior Health Authority (IHA).

A water quality advisory (WQA) is the lowest-level notification and used in situations where the possible public health threat is modest. These advisories are instituted when the turbidity in the water source increases over a value of 1 NTU (nephelometric turbidity units). Details of WQA's issued over the past year are noted below.

A boil water notice (BWN) is a moderate-level notification used in situations where the possible public health threat is one that can be effectively addressed by boiling the water. These notices are typically instituted when the water source turbidity increases over 5 NTU or there is a failure in the disinfection system. Details of BWN's issued over the past year are noted below.

A do not use notice is the highest level of notification. It is used in situations where a significant public health threat exists (ie. Chemical spill, etc). There were no do not use notices issued in 2018.

- April 9/18 - a WQA was initiated due to turbidity values increasing above 1 NTU in the Peachland Creek source (due to spring freshet)
- April 22/18 - with turbidity increasing above 5 NTU, a BWN was initiated

June 14/18 - with turbidity decreasing below 1 NTU, the BWN and WQA were both rescinded

WATER CONSUMPTION

In 2018, there was a total of 2,673.22 ML passing through the District Intakes. A monthly summary of consumption per intake and a graphical percentage comparison is located in Appendix III.

WORKS COMPLETED AND IN PROGRESS

- Dam safety reviews and updates continued on the Peachland and Silver Lake dams.
- A re-alignment of a section of water main was completed on Beach Avenue
- A variety of works were completed in preparation for the construction of the water treatment plant. Some of the more pertinent items are listed below;
 - Equipment selection (clarification/filtration – AWC, UV – Xylem)
 - Site cleared of trees by Rutland Senior Secondary Forestry students
 - Final “for-construction” drawings completed
 - Preliminary site study by Allteck (electricity supply)
 - Extensive design consultation with IHA public health engineers
 - Project tendered and awarded to Maple Reinders

Appendix I – Comprehensive Analyses (Peachland Creek Intake, Trepanier Creek Intake)



CERTIFICATE OF ANALYSIS

REPORTED TO	Peachland, Corporation of the District of 5806 Beach Avenue PEACHLAND, BC V0H 1X7	WORK ORDER	8121515
ATTENTION	Shawn Grundy	RECEIVED / TEMP	2018-12-18 12:30 / 7°C
PO NUMBER		REPORTED	2018-12-28 15:24
PROJECT	General Potability	COC NUMBER	B17216
PROJECT INFO			

Introduction:

CARO Analytical Services is a testing laboratory full of smart, engaged scientists driven to make the world a safer and healthier place. Through our clients' projects we become an essential element for a better world. We employ methods conducted in accordance with recognized professional standards using accepted testing methodologies and quality control efforts. CARO is accredited by the Canadian Association for Laboratories Accreditation (CALA) to ISO 17025:2005 for specific tests listed in the scope of accreditation approved by CALA.

Big Picture Sidekicks



You know that the sample you collected after snowshoeing to site, digging 5 meters, and racing to get it on a plane so you can submit it to the lab for time sensitive results needed to make important and expensive decisions (whew) is VERY important. We know that too.

We've Got Chemistry



It's simple. We figure the more you enjoy working with our fun and engaged team members; the more likely you are to give us continued opportunities to support you.

Ahead of the Curve



Through research, regulation knowledge, and instrumentation, we are your analytical centre for the technical knowledge you need, BEFORE you need it, so you can stay up to date and in the know.

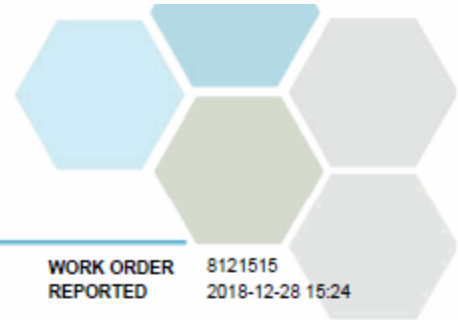
If you have any questions or concerns, please contact me at estclair@caro.ca

Authorized By:

Elish St.Clair, B.Sc., C.I.T.
Client Service Representative

1-888-311-8846 | www.caro.ca

#110 4011 Viking Way Richmond, BC V6V 2K9 | #102 3677 Highway 97N Kelowna, BC V1X 5C3 | 17225 109 Avenue Edmonton, AB T5G 1H7

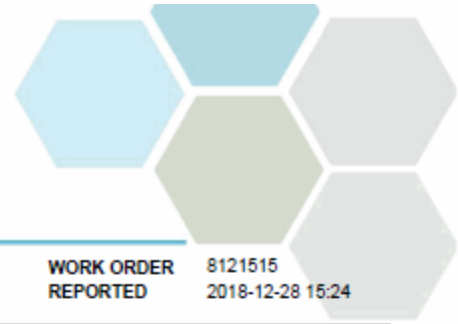


TEST RESULTS

REPORTED TO PROJECT Peachland, Corporation of the District of General Potability

WORK ORDER REPORTED 8121515
2018-12-28 15:24

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
Peachland Creek - Raw (Gabion) (8121515-01) Matrix: Water Sampled: 2018-12-18 08:30						
Anions						
Chloride	3.39	AO ≤ 250	0.10	mg/L	2018-12-20	
Fluoride	0.14	MAC = 1.5	0.10	mg/L	2018-12-20	
Nitrate (as N)	0.017	MAC = 10	0.010	mg/L	2018-12-20	
Nitrite (as N)	< 0.010	MAC = 1	0.010	mg/L	2018-12-20	
Sulfate	15.0	AO ≤ 500	1.0	mg/L	2018-12-20	
Calculated Parameters						
Hardness, Total (as CaCO3)	116	None Required	0.500	mg/L	N/A	
Langelier Index	0.2	N/A	-5.0		2018-12-28	
Solids, Total Dissolved	134	AO ≤ 500	1.00	mg/L	N/A	
General Parameters						
Alkalinity, Total (as CaCO3)	108	N/A	1.0	mg/L	2018-12-19	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	N/A	1.0	mg/L	2018-12-19	
Alkalinity, Bicarbonate (as CaCO3)	108	N/A	1.0	mg/L	2018-12-19	
Alkalinity, Carbonate (as CaCO3)	< 1.0	N/A	1.0	mg/L	2018-12-19	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	N/A	1.0	mg/L	2018-12-19	
Colour, True	7.5	AO ≤ 15	5.0	CU	2018-12-19	
Conductivity (EC)	238	N/A	2.0	µS/cm	2018-12-19	
Cyanide, Total	< 0.0020	MAC = 0.2	0.0020	mg/L	2018-12-20	
pH	8.06	7.0-10.5	0.10	pH units	2018-12-19	HT2
Temperature, at pH	20.6	N/A		°C	2018-12-19	HT2
Turbidity	0.27	OG < 1	0.10	NTU	2018-12-20	
Microbiological Parameters						
Coliforms, Total	22	MAC = 0	1	CFU/100 mL	2018-12-19	
Background Colonies	> 200	N/A	200	CFU/100 mL	2018-12-19	
E. coli	22	MAC = 0	1	CFU/100 mL	2018-12-19	
Total Metals						
Aluminum, total	0.0083	OG < 0.1	0.0050	mg/L	2018-12-23	
Antimony, total	< 0.00020	MAC = 0.006	0.00020	mg/L	2018-12-23	
Arsenic, total	0.00071	MAC = 0.01	0.00050	mg/L	2018-12-23	
Barium, total	0.0273	MAC = 1	0.0050	mg/L	2018-12-23	
Boron, total	0.0067	MAC = 5	0.0050	mg/L	2018-12-23	
Cadmium, total	0.000012	MAC = 0.005	0.000010	mg/L	2018-12-23	
Calcium, total	38.1	None Required	0.20	mg/L	2018-12-23	
Chromium, total	0.00080	MAC = 0.05	0.00050	mg/L	2018-12-23	
Cobalt, total	< 0.00010	N/A	0.00010	mg/L	2018-12-23	
Copper, total	0.00130	AO ≤ 1	0.00040	mg/L	2018-12-23	
Iron, total	0.028	AO ≤ 0.3	0.010	mg/L	2018-12-23	
Lead, total	< 0.00020	MAC = 0.01	0.00020	mg/L	2018-12-23	
Magnesium, total	5.14	None Required	0.010	mg/L	2018-12-23	
Manganese, total	0.00641	AO ≤ 0.05	0.00020	mg/L	2018-12-23	



TEST RESULTS

REPORTED TO PROJECT Peachland, Corporation of the District of General Potability

WORK ORDER REPORTED 8121515
2018-12-28 15:24

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
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Peachland Creek - Raw (Gabion) (8121515-01) | Matrix: Water | Sampled: 2018-12-18 08:30, Continued

Total Metals, Continued

Mercury, total	< 0.000040	MAC = 0.001	0.000040	mg/L	2018-12-23	CTS
Molybdenum, total	0.0123	N/A	0.00010	mg/L	2018-12-23	
Nickel, total	< 0.00040	N/A	0.00040	mg/L	2018-12-23	
Potassium, total	1.56	N/A	0.10	mg/L	2018-12-23	
Selenium, total	< 0.00050	MAC = 0.05	0.00050	mg/L	2018-12-23	
Sodium, total	4.56	AO ≤ 200	0.10	mg/L	2018-12-23	
Strontium, total	0.285	N/A	0.0010	mg/L	2018-12-23	
Uranium, total	0.00210	MAC = 0.02	0.000020	mg/L	2018-12-23	
Zinc, total	< 0.0040	AO ≤ 5	0.0040	mg/L	2018-12-23	

Trepanier Creek - Raw (Weir Block) (8121515-02) | Matrix: Water | Sampled: 2018-12-18 09:20

Anions

Chloride	26.1	AO ≤ 250	0.10	mg/L	2018-12-20	
Fluoride	< 0.10	MAC = 1.5	0.10	mg/L	2018-12-20	
Nitrate (as N)	0.048	MAC = 10	0.010	mg/L	2018-12-20	
Nitrite (as N)	< 0.010	MAC = 1	0.010	mg/L	2018-12-20	
Sulfate	14.6	AO ≤ 500	1.0	mg/L	2018-12-20	

Calculated Parameters

Hardness, Total (as CaCO ₃)	116	None Required	0.500	mg/L	N/A	
Langeller Index	0.08	N/A	-5.0		2018-12-28	
Solids, Total Dissolved	149	AO ≤ 500	1.00	mg/L	N/A	

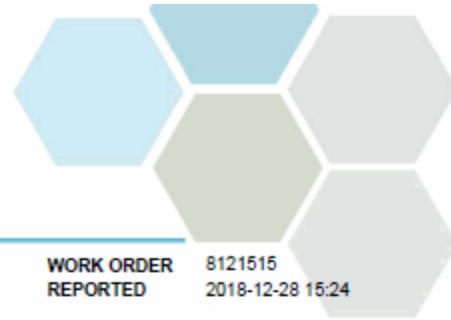
General Parameters

Alkalinity, Total (as CaCO ₃)	90.8	N/A	1.0	mg/L	2018-12-20	
Alkalinity, Phenolphthalein (as CaCO ₃)	< 1.0	N/A	1.0	mg/L	2018-12-20	
Alkalinity, Bicarbonate (as CaCO ₃)	90.8	N/A	1.0	mg/L	2018-12-20	
Alkalinity, Carbonate (as CaCO ₃)	< 1.0	N/A	1.0	mg/L	2018-12-20	
Alkalinity, Hydroxide (as CaCO ₃)	< 1.0	N/A	1.0	mg/L	2018-12-20	
Colour, True	6.8	AO ≤ 15	5.0	CU	2018-12-19	
Conductivity (EC)	280	N/A	2.0	µS/cm	2018-12-20	
Cyanide, Total	< 0.0020	MAC = 0.2	0.0020	mg/L	2018-12-20	
pH	8.03	7.0-10.5	0.10	pH units	2018-12-20	HT2
Temperature, at pH	20.8	N/A		°C	2018-12-20	HT2
Turbidity	0.32	OG < 1	0.10	NTU	2018-12-20	

Microbiological Parameters

Coliforms, Total	≥ 4	MAC = 0	1	CFU/100 mL	2018-12-19	
Background Colonies	> 200	N/A	200	CFU/100 mL	2018-12-19	
E. coli	4	MAC = 0	1	CFU/100 mL	2018-12-19	

Total Metals



TEST RESULTS

REPORTED TO PROJECT Peachland, Corporation of the District of General Potability

WORK ORDER REPORTED 8121515
2018-12-28 15:24

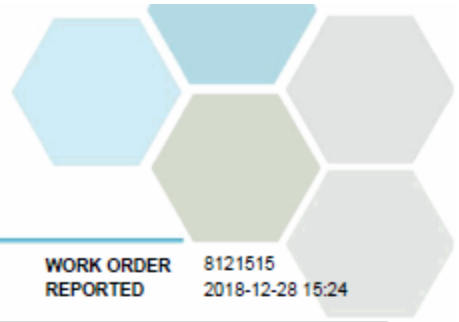
Analyte	Result	Guideline	RL Units	Analyzed	Qualifier
Trepanier Creek - Raw (Weir Block) (8121515-02) Matrix: Water Sampled: 2018-12-18 09:20, Continued					
<i>Total Metals, Continued</i>					
Aluminum, total	0.0081	OG < 0.1	0.0050 mg/L	2018-12-23	
Antimony, total	< 0.00020	MAC = 0.006	0.00020 mg/L	2018-12-23	
Arsenic, total	< 0.00050	MAC = 0.01	0.00050 mg/L	2018-12-23	
Barium, total	0.0614	MAC = 1	0.0050 mg/L	2018-12-23	
Boron, total	0.0050	MAC = 5	0.0050 mg/L	2018-12-23	
Cadmium, total	< 0.000010	MAC = 0.005	0.000010 mg/L	2018-12-23	
Calcium, total	36.5	None Required	0.20 mg/L	2018-12-23	
Chromium, total	< 0.00050	MAC = 0.05	0.00050 mg/L	2018-12-23	
Cobalt, total	< 0.00010	N/A	0.00010 mg/L	2018-12-23	
Copper, total	0.00100	AO ≤ 1	0.00040 mg/L	2018-12-23	
Iron, total	0.028	AO ≤ 0.3	0.010 mg/L	2018-12-23	
Lead, total	< 0.00020	MAC = 0.01	0.00020 mg/L	2018-12-23	
Magnesium, total	5.90	None Required	0.010 mg/L	2018-12-23	
Manganese, total	0.00211	AO ≤ 0.05	0.00020 mg/L	2018-12-23	
Mercury, total	< 0.000040	MAC = 0.001	0.000040 mg/L	2018-12-23	CT5
Molybdenum, total	0.00675	N/A	0.00010 mg/L	2018-12-23	
Nickel, total	< 0.00040	N/A	0.00040 mg/L	2018-12-23	
Potassium, total	1.89	N/A	0.10 mg/L	2018-12-23	
Selenium, total	< 0.00050	MAC = 0.05	0.00050 mg/L	2018-12-23	
Sodium, total	8.82	AO ≤ 200	0.10 mg/L	2018-12-23	
Strontium, total	0.214	N/A	0.0010 mg/L	2018-12-23	
Uranium, total	0.00404	MAC = 0.02	0.000020 mg/L	2018-12-23	
Zinc, total	< 0.0040	AO ≤ 5	0.0040 mg/L	2018-12-23	

Swim Bay - Men's Washroom (8121515-03) | Matrix: Water | Sampled: 2018-12-18 08:45

<i>Calculated Parameters</i>					
Total Trihalomethanes	0.0931	MAC = 0.1	0.00400 mg/L	N/A	
<i>Volatile Organic Compounds (VOC)</i>					
Bromodichloromethane	0.0066	N/A	0.0010 mg/L	2018-12-23	
Bromoform	< 0.0010	N/A	0.0010 mg/L	2018-12-23	
Chloroform	0.0866	N/A	0.0010 mg/L	2018-12-23	
Dibromochloromethane	< 0.0010	N/A	0.0010 mg/L	2018-12-23	
Surrogate: Toluene-d8	94		70-130 %	2018-12-23	
Surrogate: 4-Bromofluorobenzene	73		70-130 %	2018-12-23	

Todd Rd - Men's Washroom (8121515-04) | Matrix: Water | Sampled: 2018-12-18 09:00

<i>Calculated Parameters</i>					
Total Trihalomethanes	0.0394	MAC = 0.1	0.00400 mg/L	N/A	
<i>Volatile Organic Compounds (VOC)</i>					



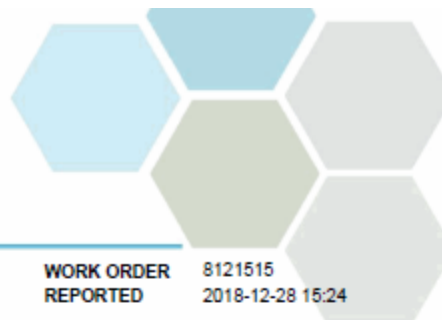
TEST RESULTS

REPORTED TO PROJECT Peachland, Corporation of the District of General Potability

WORK ORDER REPORTED 8121515
2018-12-28 15:24

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
Todd Rd - Men's Washroom (8121515-04) Matrix: Water Sampled: 2018-12-18 09:00, Continued						
<i>Volatile Organic Compounds (VOC), Continued</i>						
Bromodichloromethane	0.0030	N/A	0.0010	mg/L	2018-12-23	
Bromoform	< 0.0010	N/A	0.0010	mg/L	2018-12-23	
Chloroform	0.0364	N/A	0.0010	mg/L	2018-12-23	
Dibromochloromethane	< 0.0010	N/A	0.0010	mg/L	2018-12-23	
Surrogate: Toluene-d8	98		70-130	%	2018-12-23	
Surrogate: 4-Bromofluorobenzene	79		70-130	%	2018-12-23	

Sample Qualifiers:	
CT5	This sample has been incorrectly preserved for Mercury analysis
HT2	The 15 minute recommended holding time (from sampling to analysis) has been exceeded - field analysis is recommended.



APPENDIX 1: SUPPORTING INFORMATION

REPORTED TO PROJECT Peachland, Corporation of the District of General Potability

WORK ORDER REPORTED 8121515
2018-12-28 15:24

Analysis Description	Method Ref.	Technique	Location
Alkalinity in Water	SM 2320 B* (2011)	Titration with H2SO4	Kelowna
Anions in Water	SM 4110 B (2011)	Ion Chromatography	Kelowna
Coliforms, Total in Water	SM 9222 B (2006)	Membrane Filtration / m-Endo Agar	Kelowna
Colour, True in Water	SM 2120 C (2011)	Spectrophotometry (456 nm)	Kelowna
Conductivity in Water	SM 2510 B (2011)	Conductivity Meter	Kelowna
Cyanide, SAD in Water	ASTM D7511-12	Flow Injection with In-Line UV Digestion and Amperometry	Kelowna
E. coli in Water	SM 9222 G (2006)	Membrane Filtration / Nutrient Agar with MUG	Kelowna
Hardness in Water	SM 2340 B* (2011)	Calculation: 2.497 [total Ca] + 4.116 [total Mg] (Est)	N/A
Langelier Index in Water	SM 2330 B (2010)	Calculation	N/A
pH in Water	SM 4500-H+ B (2011)	Electrometry	Kelowna
Solids, Total Dissolved in Water	SM 1030 E (2011)	Calculation: 100 x ([Cations]-[Anions])/([Cations]+[Anions])	N/A
Total Metals in Water	EPA 200.2* / EPA 6020B	HNO3+HCl Hot Block Digestion / Inductively Coupled Plasma-Mass Spectroscopy (ICP-MS)	Richmond
Trihalomethanes in Water	EPA 5030B / EPA 8260D	Purge&Trap / GC-MSD (SIM)	Richmond
Turbidity in Water	SM 2130 B (2011)	Nephelometry	Kelowna

Note: An asterisk in the Method Reference indicates that the CARO method has been modified from the reference method

Glossary of Terms:

RL	Reporting Limit (default)
<	Less than the specified Reporting Limit (RL) - the actual RL may be higher than the default RL due to various factors
>	Greater than the specified Result
>=	Greater than or equal to the specified Result
°C	Degrees Celsius
AO	Aesthetic Objective
CFU/100 mL	Colony Forming Units per 100 millilitres
CU	Colour Units (referenced against a platinum cobalt standard)
MAC	Maximum Acceptable Concentration (health based)
mg/L	Milligrams per litre
NTU	Nephelometric Turbidity Units
OG	Operational Guideline (treated water)
pH units	pH < 7 = acidic, pH > 7 = basic
µS/cm	Microsiemens per centimetre
ASTM	ASTM International Test Methods
EPA	United States Environmental Protection Agency Test Methods
SM	Standard Methods for the Examination of Water and Wastewater, American Public Health Association

General Comments:

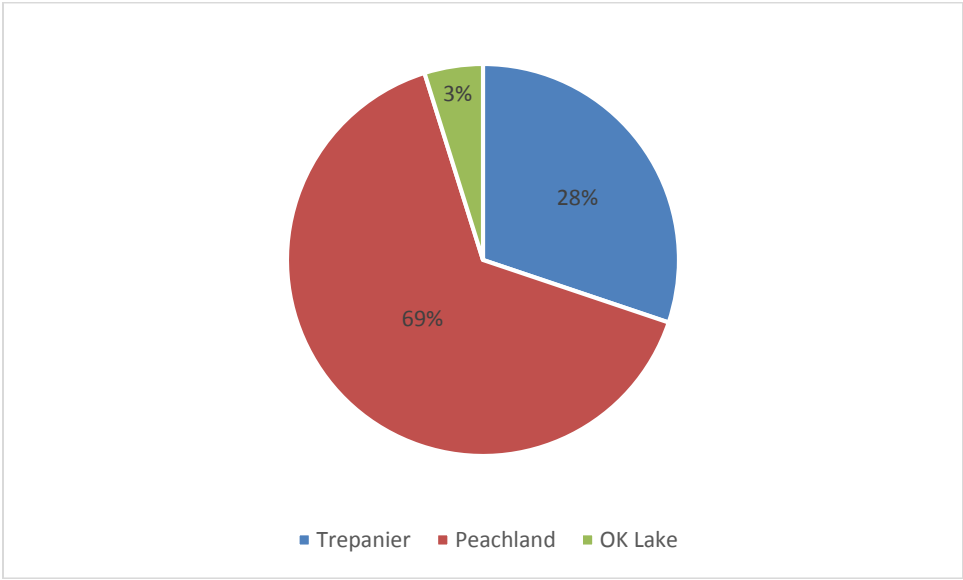
The results in this report apply to the samples analyzed in accordance with the Chain of Custody document. This analytical report must be reproduced in its entirety. CARO is not responsible for any loss or damage resulting directly or indirectly from error or omission in the conduct of testing. Liability is limited to the cost of analysis. Samples will be disposed of 30 days after the test report has been issued unless otherwise agreed to in writing. The quality control (QC) data is available upon request

Appendix II – Trihalomethane Analyses

Please see Appendix I – pp 10-12.

Appendix III – 2018 Water Consumption

Month	Volume (UK Gallons)			Volume		
	Trepanier	Peachland Creek	Lake Pumps	Total	m3	ML
January	5,334,500	13,738,000		19,072,500	86,780	86.71
February	5,423,100	13,515,000		18,938,100	86,168	86.09
March	6,063,700	15,598,000		21,661,700	98,561	98.48
April	3,468,200	15,845,000	4,848,000	24,161,200	109,933	109.84
May	11,027,000	41,996,000	14,635,500	67,658,500	307,846	307.58
June	27,978,500	51,566,000		79,544,500	361,927	361.62
July	31,070,300	115,464,000	0	146,534,300	666,731	666.16
August	30,421,400	62,307,000	0	92,728,400	421,914	421.55
September	19,569,400	32,563,000	0	52,132,400	237,202	237.00
October	10,279,800	16,703,000		26,982,800	122,772	122.67
November	5,954,700	12,616,000		18,570,700	84,497	84.42
December	6,398,400	13,643,000		20,041,400	91,188	91.11
TOTALS	162,989,000	405,554,000	19,483,500	588,026,500	2,673,221	2,673.22



Peachland water source use (percentage)

Appendix IV – Turbidity data

	Daily Average Turbidity (NTU)		
	Peachland	Trepanier	OK Lake
01-Jan-18	0.49	0.13	OFF
02-Jan-18	0.48	0.12	OFF
03-Jan-18	0.48	0.18	OFF
04-Jan-18	0.42	0.15	OFF
05-Jan-18	0.35	0.23	OFF
06-Jan-18	0.37	0.13	OFF
07-Jan-18	0.39	0.15	OFF
08-Jan-18	0.38	0.19	OFF
09-Jan-18	0.38	0.25	OFF
10-Jan-18	0.4	0.26	OFF
11-Jan-18	0.35	0.14	OFF
12-Jan-18	0.36	0.14	OFF
13-Jan-18	0.38	0.49	OFF
14-Jan-18	0.37	0.64	OFF
15-Jan-18	0.37	0.47	OFF
16-Jan-18	0.39	0.49	OFF
17-Jan-18	0.36	0.45	OFF
18-Jan-18	0.38	0.5	OFF
19-Jan-18	0.4	0.47	OFF
20-Jan-18	0.36	0.4	OFF
21-Jan-18	0.39	0.37	OFF
22-Jan-18	0.38	0.38	OFF
23-Jan-18	0.37	0.35	OFF
24-Jan-18	0.37	0.38	OFF
25-Jan-18	0.39	0.61	OFF
26-Jan-18	0.36	0.45	OFF
27-Jan-18	0.38	0.49	OFF
28-Jan-18	0.37	0.59	OFF
29-Jan-18	0.38	0.57	OFF
30-Jan-18	0.41	0.45	OFF
31-Jan-18	0.41	0.44	OFF
01-Feb-18	0.41	0.48	OFF
02-Feb-18	0.4	0.44	OFF
03-Feb-18	0.38	0.55	OFF
04-Feb-18	0.38	0.5	OFF
05-Feb-18	0.43	0.37	OFF
06-Feb-18	0.43	0.4	OFF
07-Feb-18	0.4	0.58	OFF
08-Feb-18	0.41	0.57	OFF
09-Feb-18	0.41	0.42	OFF

	Daily Average Turbidity (NTU)		
	Peachland	Trepanier	OK Lake
10-Feb-18	0.42	0.56	OFF
11-Feb-18	0.46	0.69	OFF
12-Feb-18	0.46	0.49	OFF
13-Feb-18	0.46	0.68	OFF
14-Feb-18	0.45	0.59	OFF
15-Feb-18	0.48	0.55	OFF
16-Feb-18	0.48	0.55	OFF
17-Feb-18	0.48	0.44	OFF
18-Feb-18	0.47	0.51	OFF
19-Feb-18	0.49	0.6	OFF
20-Feb-18	0.47	0.55	OFF
21-Feb-18	0.45	0.59	OFF
22-Feb-18	0.46	0.53	OFF
23-Feb-18	0.46	0.52	OFF
24-Feb-18	0.47	0.54	OFF
25-Feb-18	0.48	0.51	OFF
26-Feb-18	0.48	0.43	OFF
27-Feb-18	0.47	0.75	OFF
28-Feb-18	0.4	0.39	OFF
01-Mar-18	0.42	0.43	OFF
02-Mar-18	0.39	0.32	OFF
03-Mar-18	0.41	0.29	OFF
04-Mar-18	0.41	0.29	OFF
05-Mar-18	0.42	0.3	OFF
06-Mar-18	0.42	0.48	OFF
07-Mar-18	0.42	0.35	OFF
08-Mar-18	0.42	0.29	OFF
09-Mar-18	0.44	0.36	OFF
10-Mar-18	0.44	0.36	OFF
11-Mar-18	0.55	0.3	OFF
12-Mar-18	0.71	0.46	OFF
13-Mar-18	0.65	0.43	OFF
14-Mar-18	0.66	0.28	OFF
15-Mar-18	0.78	0.19	OFF
16-Mar-18	0.72	0.15	OFF
17-Mar-18	0.75	0.17	OFF
18-Mar-18	0.7	0.21	OFF
19-Mar-18	0.66	0.3	OFF
20-Mar-18	0.65	0.16	OFF
21-Mar-18	0.65	0.16	OFF

	Daily Average Turbidity (NTU)		
	Peachland	Trepanier	OK Lake
22-Mar-18	0.67	0.24	OFF
23-Mar-18	0.69	0.42	OFF
24-Mar-18	0.7	0.18	OFF
25-Mar-18	0.75	0.17	OFF
26-Mar-18	0.74	0.18	OFF
27-Mar-18	0.68	0.21	OFF
28-Mar-18	0.79	0.2	OFF
29-Mar-18	0.81	0.22	OFF
30-Mar-18	0.83	0.29	OFF
31-Mar-18	0.8	0.26	OFF
01-Apr-18	0.88	0.2	OFF
02-Apr-18	0.9	0.22	OFF
03-Apr-18	0.9	0.18	OFF
04-Apr-18	0.95	0.2	OFF
05-Apr-18	0.93	0.23	OFF
06-Apr-18	0.98	0.69	OFF
07-Apr-18	0.95	0.76	OFF
08-Apr-18	0.99	0.69	OFF
09-Apr-18	2.1	0.68	OFF
10-Apr-18	2.19	0.76	OFF
11-Apr-18	2.8	0.77	OFF
12-Apr-18	2.57	1.14	OFF
13-Apr-18	3.88	0.85	OFF
14-Apr-18	3.33	0.66	OFF
15-Apr-18	2.75	0.83	OFF
16-Apr-18	1.96	0.94	OFF
17-Apr-18	2.62	0.97	OFF
18-Apr-18	4.25	0.94	OFF
19-Apr-18	3.8	0.97	OFF
20-Apr-18	3.61	3.61	0.45
21-Apr-18	4.28	OFF	0.46
22-Apr-18	5.73	OFF	0.52
23-Apr-18	6.32	OFF	0.76
24-Apr-18	4.82	OFF	0.63
25-Apr-18	4.47	OFF	0.62
26-Apr-18	5.14	OFF	0.89
27-Apr-18	5.28	OFF	0.94
28-Apr-18	9.88	OFF	0.63
29-Apr-18	9.73	OFF	0.75
30-Apr-18	8.34	OFF	0.8

	Daily Average Turbidity (NTU)		
	Peachland	Trepanier	OK Lake
01-May-18	6.54	OFF	0.4
02-May-18	7.3	OFF	0.43
03-May-18	10.87	OFF	0.43
04-May-18	9.38	OFF	0.9
05-May-18	8.05	OFF	0.62
06-May-18	6.58	OFF	0.6
07-May-18	5.96	OFF	0.7
08-May-18	5.52	OFF	0.65
09-May-18	5.42	OFF	1
10-May-18	5.89	OFF	1.2
11-May-18	4.77	OFF	0.8
12-May-18	4.4	OFF	0.8
13-May-18	4.11	OFF	0.85
14-May-18	3.58	3.14	0.8
15-May-18	3.06	4.62	0.6
16-May-18	2.94	4.76	1
17-May-18	2.68	3.73	1.1
18-May-18	2.58	2.19	1.2
19-May-18	2.15	1.59	0.9
20-May-18	2.07	1.33	1.6
21-May-18	1.9	1.06	2
22-May-18	1.74	0.95	1.4
23-May-18	1.84	0.93	1.3
24-May-18	1.54	1.44	0.8
25-May-18	1.41	1.08	OFF
26-May-18	1.35	0.84	OFF
27-May-18	1.3	0.76	OFF
28-May-18	1.29	0.67	OFF
29-May-18	1.28	0.63	OFF
30-May-18	1.22	0.61	OFF
31-May-18	1.51	0.49	OFF
01-Jun-18	1.62	0.51	OFF
02-Jun-18	1.69	0.49	OFF
03-Jun-18	1.62	0.43	OFF
04-Jun-18	1.49	0.4	OFF
05-Jun-18	1.14	0.39	OFF
06-Jun-18	0.86	0.41	OFF
07-Jun-18	0.79	0.44	OFF
08-Jun-18	0.71	0.45	OFF
09-Jun-18	0.74	0.47	OFF

	Daily Average Turbidity (NTU)		
	Peachland	Trepanier	OK Lake
10-Jun-18	0.68	0.42	OFF
11-Jun-18	0.61	0.48	OFF
12-Jun-18	0.57	0.52	OFF
13-Jun-18	0.61	0.59	OFF
14-Jun-18	0.58	0.61	OFF
15-Jun-18	0.53	0.61	OFF
16-Jun-18	0.53	0.7	OFF
17-Jun-18	0.5	0.7	OFF
18-Jun-18	0.49	0.81	OFF
19-Jun-18	0.5	0.8	OFF
20-Jun-18	0.5	0.66	OFF
21-Jun-18	0.58	0.44	OFF
22-Jun-18	0.49	0.46	OFF
23-Jun-18	0.47	0.43	OFF
24-Jun-18	0.47	0.45	OFF
25-Jun-18	0.52	0.8	OFF
26-Jun-18	0.53	0.58	OFF
27-Jun-18	0.49	0.59	OFF
28-Jun-18	0.47	0.61	OFF
29-Jun-18	0.44	0.63	OFF
30-Jun-18	0.45	0.7	OFF
01-Jul-18	0.47	0.75	OFF
02-Jul-18	0.48	0.82	OFF
03-Jul-18	0.49	0.85	OFF
04-Jul-18	0.52	0.61	OFF
05-Jul-18	0.47	0.37	OFF
06-Jul-18	0.47	0.38	OFF
07-Jul-18	0.47	0.31	OFF
08-Jul-18	0.49	0.31	OFF
09-Jul-18	0.49	0.3	OFF
10-Jul-18	0.46	0.32	OFF
11-Jul-18	0.41	0.31	OFF
12-Jul-18	0.42	0.33	OFF
13-Jul-18	0.43	0.37	OFF
14-Jul-18	0.43	0.36	OFF
15-Jul-18	0.43	0.38	OFF
16-Jul-18	0.43	0.4	OFF
17-Jul-18	0.42	0.46	OFF
18-Jul-18	0.43	0.52	OFF
19-Jul-18	0.43	0.3	OFF

	Daily Average Turbidity (NTU)		
	Peachland	Trepanier	OK Lake
20-Jul-18	0.43	0.28	OFF
21-Jul-18	0.41	0.26	OFF
22-Jul-18	0.4	0.25	OFF
23-Jul-18	0.4	0.3	OFF
24-Jul-18	0.4	0.29	OFF
25-Jul-18	0.4	0.27	OFF
26-Jul-18	0.39	0.27	OFF
27-Jul-18	0.4	0.31	OFF
28-Jul-18	0.39	0.34	OFF
29-Jul-18	0.41	0.38	OFF
30-Jul-18	0.42	0.37	OFF
31-Jul-18	0.4	0.4	OFF
01-Aug-18	0.39	0.29	OFF
02-Aug-18	0.45	0.27	OFF
03-Aug-18	0.38	0.24	OFF
04-Aug-18	0.38	0.24	OFF
05-Aug-18	0.37	0.23	OFF
06-Aug-18	0.37	0.26	OFF
07-Aug-18	0.37	0.27	OFF
08-Aug-18	0.35	0.24	OFF
09-Aug-18	0.35	0.26	OFF
10-Aug-18	0.36	0.27	OFF
11-Aug-18	0.43	0.29	OFF
12-Aug-18	0.41	0.4	OFF
13-Aug-18	0.42	0.32	OFF
14-Aug-18	0.38	0.21	OFF
15-Aug-18	0.36	0.2	OFF
16-Aug-18	0.36	0.22	OFF
17-Aug-18	0.49	0.25	OFF
18-Aug-18	0.38	0.22	OFF
19-Aug-18	0.38	0.21	OFF
20-Aug-18	0.39	0.24	OFF
21-Aug-18	0.38	0.21	OFF
22-Aug-18	0.37	0.2	OFF
23-Aug-18	0.37	0.24	OFF
24-Aug-18	0.37	0.21	OFF
25-Aug-18	0.37	0.21	OFF
26-Aug-18	0.38	0.2	OFF
27-Aug-18	0.44	0.24	OFF
28-Aug-18	0.39	0.23	OFF

	Daily Average Turbidity (NTU)		
	Peachland	Trepanier	OK Lake
29-Aug-18	0.38	0.27	OFF
30-Aug-18	0.38	0.28	OFF
31-Aug-18	0.39	0.28	OFF
01-Sep-18	0.38	0.28	OFF
02-Sep-18	0.37	0.29	OFF
03-Sep-18	0.37	0.23	OFF
04-Sep-18	0.39	0.16	OFF
05-Sep-18	0.4	0.16	OFF
06-Sep-18	0.39	0.21	OFF
07-Sep-18	0.37	0.18	OFF
08-Sep-18	0.38	0.17	OFF
09-Sep-18	0.38	0.2	OFF
10-Sep-18	0.46	0.18	OFF
11-Sep-18	0.47	0.17	OFF
12-Sep-18	0.48	0.16	OFF
13-Sep-18	0.44	0.17	OFF
14-Sep-18	0.43	0.19	OFF
15-Sep-18	0.45	0.19	OFF
16-Sep-18	0.48	0.19	OFF
17-Sep-18	0.48	0.2	OFF
18-Sep-18	0.45	0.19	OFF
19-Sep-18	0.46	0.2	OFF
20-Sep-18	0.44	0.38	OFF
21-Sep-18	0.45	0.3	OFF
22-Sep-18	0.59	0.27	OFF
23-Sep-18	0.56	0.24	OFF
24-Sep-18	0.53	0.22	OFF
25-Sep-18	0.48	0.22	OFF
26-Sep-18	0.49	0.22	OFF
27-Sep-18	0.47	0.22	OFF
28-Sep-18	0.48	0.23	OFF
29-Sep-18	0.49	0.3	OFF
30-Sep-18	0.48	0.37	OFF
01-Oct-18	0.53	0.37	OFF
02-Oct-18	0.56	0.37	OFF
03-Oct-18	0.64	0.23	OFF
04-Oct-18	0.65	0.17	OFF
05-Oct-18	0.53	0.18	OFF
06-Oct-18	0.49	0.16	OFF
07-Oct-18	0.45	0.17	OFF

	Daily Average Turbidity (NTU)		
	Peachland	Trepanier	OK Lake
08-Oct-18	0.45	0.19	OFF
09-Oct-18	0.45	0.31	OFF
10-Oct-18	0.56	0.2	OFF
11-Oct-18	0.54	0.17	OFF
12-Oct-18	0.49	0.18	OFF
13-Oct-18	0.46	0.16	OFF
14-Oct-18	0.44	0.18	OFF
15-Oct-18	0.44	0.18	OFF
16-Oct-18	0.44	0.17	OFF
17-Oct-18	0.47	0.17	OFF
18-Oct-18	0.51	0.19	OFF
19-Oct-18	0.43	0.19	OFF
20-Oct-18	0.52	0.18	OFF
21-Oct-18	0.46	0.16	OFF
22-Oct-18	0.46	0.15	OFF
23-Oct-18	0.46	0.16	OFF
24-Oct-18	0.46	0.15	OFF
25-Oct-18	0.45	0.15	OFF
26-Oct-18	0.44	0.15	OFF
27-Oct-18	0.49	0.2	OFF
28-Oct-18	0.49	0.15	OFF
29-Oct-18	0.54	0.17	OFF
30-Oct-18	0.57	0.15	OFF
31-Oct-18	0.52	0.23	OFF
01-Nov-18	0.52	0.25	OFF
02-Nov-18	0.53	0.44	OFF
03-Nov-18	0.58	0.62	OFF
04-Nov-18	0.59	0.48	OFF
05-Nov-18	0.59	0.4	OFF
06-Nov-18	0.57	0.29	OFF
07-Nov-18	0.52	0.26	OFF
08-Nov-18	0.52	0.45	OFF
09-Nov-18	0.49	0.43	OFF
10-Nov-18	0.47	0.51	OFF
11-Nov-18	0.47	0.48	OFF
12-Nov-18	0.47	0.44	OFF
13-Nov-18	0.48	0.56	OFF
14-Nov-18	0.46	0.55	OFF
15-Nov-18	0.45	0.55	OFF
16-Nov-18	0.46	0.56	OFF

	Daily Average Turbidity (NTU)		
	Peachland	Trepanier	OK Lake
17-Nov-18	0.47	0.5	OFF
18-Nov-18	0.47	0.55	OFF
19-Nov-18	0.46	0.5	OFF
20-Nov-18	0.47	0.49	OFF
21-Nov-18	0.49	0.65	OFF
22-Nov-18	0.49	0.56	OFF
23-Nov-18	0.51	0.64	OFF
24-Nov-18	0.51	0.61	OFF
25-Nov-18	0.51	0.59	OFF
26-Nov-18	0.51	0.65	OFF
27-Nov-18	0.51	0.62	OFF
28-Nov-18	0.51	0.58	OFF
29-Nov-18	0.55	0.65	OFF
30-Nov-18	0.5	0.55	OFF
01-Dec-18	0.47	0.58	OFF
02-Dec-18	0.47	0.56	OFF
03-Dec-18	0.47	0.56	OFF
04-Dec-18	0.42	0.55	OFF
05-Dec-18	0.42	0.47	OFF
06-Dec-18	0.44	0.42	OFF
07-Dec-18	0.52	0.46	OFF
08-Dec-18	0.63	0.45	OFF
09-Dec-18	0.6	0.42	OFF
10-Dec-18	0.6	0.39	OFF
11-Dec-18	0.58	0.33	OFF
12-Dec-18	0.61	0.28	OFF
13-Dec-18	0.62	0.27	OFF
14-Dec-18	0.61	0.26	OFF
15-Dec-18	0.61	0.26	OFF
16-Dec-18	0.59	0.26	OFF
17-Dec-18	0.59	0.22	OFF
18-Dec-18	0.53	0.19	OFF
19-Dec-18	0.51	0.2	OFF
20-Dec-18	0.51	0.26	OFF
21-Dec-18	0.51	0.31	OFF
22-Dec-18	0.54	0.34	OFF
23-Dec-18	0.49	0.41	OFF
24-Dec-18	0.53	0.53	OFF
25-Dec-18	0.54	0.48	OFF
26-Dec-18	0.54	0.46	OFF

	Daily Average Turbidity (NTU)		
	Peachland	Trepanier	OK Lake
27-Dec-18	0.65	0.43	OFF
28-Dec-18	0.51	0.42	OFF
29-Dec-18	0.5	0.46	OFF
30-Dec-18	0.52	0.47	OFF
31-Dec-18	0.54	0.48	OFF

