Annual Report

Rolley Lake Water System

located in Rolley Lake Provincial Park

for the period:

January 1, 2025 to December 31, 2025

This water system is owned by:

The BC Ministry of Environment and Parks

and operated by:

Alouette Park Management Ltd.

Questions or requests for further information about this report should be directed to:

Alouette Park Management Ltd.

PO Box 206

Maple Ridge, BC V2X 7G1

(604) 466-8325

info@alouetteparks.ca

This report was prepared on:

October 15, 2026

This annual report contains a summary of Bacteriological Water Quality Results for the Rolley Lake Water System during the period described above, and any other information required by the Environmental Health Officer.

DRINKING WATER SYSTEM ANNUAL REPORT

Reporting Period:	January 1st to December 31st , 2025 (year)
Water System	Rolley Lake Provincial Park - Rolley Lake Water System
Water System Owner	Ministry of Environment and Climate Change Strategy
Primary Contact Name (Operator or Manager)	Jamie Hall, Alouette Park Management Ltd.
Phone Number (Operator or Manager)	(604) 466-8325
E-mail (Operator or Manager)	office@alouetteparks.ca

DESCRIBE YOUR WATER SUPPLY SYSTEM

What is the Source(s) of Raw Water?

☒ Deep Well ☐ Shallow Well ☐ Surface Water ☐ Other

If other, specify details:

Does the Drinking Water System have Primary Disinfection? ☐ Yes ☒ No

☐ Chlorination ☐ Ultraviolet Light ☐ Ozone ☐ Other

If other, specify details:

Does the Drinking Water System have Secondary Disinfection? ☐ Yes ☒ No

☐ Chlorination ☐ Other

If other, specify details:

Does the Drinking Water System have Filtration? ☐ Yes ☒ No

Check all boxes that apply

☐ Cartridge Filter(s) ☐ Carbon Filter ☐ Sand Filtration ☐ Reverse Osmosis ☐ Other

If other, specify details:

PUBLIC REPORTING

Emergency Response & Contingency Plan (ERCP)

Is your ERCP up to Date? ☒ Yes ☐ No

How do you Inform the System Users of the ERCP?

☐ Hand Delivered ☐ Bulletin Board ☐ Newspaper ☐ Utility Bill Insert ☒ Website

☒ Other (specify details) Referral to website when telephone/email enquiries received at business office

Drinking Water System Annual Report

How do you Inform the System Users of the Annual Report?

☐ Hand Delivered ☐ Bulletin Board ☐ Newspaper ☐ Utility Bill Insert ☒ Website

☒ Other (specify details) Referral to website when telephone/email enquiries received at business office

COMPLIANCE WITH OPERATING PERMIT

List the conditions of your Operating Permit (Contact the DWO for a copy if needed):

Are you in compliance with your Operating Permit? ☒ Yes ☐ No

BACTERIOLOGICAL TESTING AND DRINKING WATER PROTECTION REGULATION WATER QUALITY STANDARDS

How many bacteriological samples were collected during this reporting period? 28

What is the minimum required sampling frequency for this system? (#samples/month) Once every 2 weeks

Additional sampling details: sampling conducted in 2 locations - pumphouse and water tap near washrooms

Was the minimum required sampling frequency achieved? ☒ Yes ☐ No

Comments:

Bacteriological summary attached to this report? ☒ Yes ☐ No

If no, how do the users of the system view the results?

WATER QUALITY STANDARDS FOR POTABLE WATER

Parameter:	***Standard:***	**Did this system meet standard?**	
Escherichia coli (for all samples)	No detectable *Escherichia coli* per 100ml	☒ Yes	☐ No
Total Coliform Bacteria *(if only 1 sample collected in a 30 day period)*	No detectable total coliform bacteria per 100ml	☐ Yes	☐ No
Total Coliform Bacteria *(if more than 1 sample collected in a 30 day period)*	No more than 10% of samples contain total coliform bacteria, **and** No sample has more than 10 total coliform bacteria per 100ml	☒ Yes	☐ No

If the system did not meet any of above Drinking Water Protection Regulation standards, record the results in the table below; attach additional sheets if necessary.

Date	TC/100ml	E.coli/100ml	Reason	Corrective Action

CHEMICAL SAMPLING COMPLETED DURING THIS REPORTING PERIOD

Was any chemical sampling conducted during reporting period? ☒ Yes ☐ No

If no, when were the last chemical samples conducted for this system?

(date) ☐ Don't Know ☐ Never

If yes, did all water samples meet the Guidelines for Canadian Drinking Water Quality?

☒ Yes ☐ No

If any water samples did not meet the Guidelines for Canadian Drinking Water Quality, record the results in the table below; attach additional sheets if necessary.

Parameter	Result	Corrective Action / Treatment / Comments

ADDITIONAL TESTING

Does the system have analyzers for continuous monitoring? ☐ Yes ☒ No

If yes, check all boxes that apply:

☐ Chlorine ☐ Turbidity ☐ Other (details)

Are the results available on request?

If any additional testing or sampling was conducted, record results in the table below; attach additional sheets if necessary.

Additional Testing & Reason for Sampling	Corrective Action Taken

WATER QUALITY COMPLAINTS

Were there any water quality complaints in this reporting period? (e.g. taste, odour, colour etc.) ☐ Yes ☒ No

If yes, complete the table below; attach additional sheets if necessary.

Date	Water Quality Complaint	Corrective Action / Treatment

OPERATIONAL PROBLEMS

Were there any operational problems during this reporting period? (e.g. insufficient water supply, malfunction of disinfection equipment, line breaks, elevated turbidity etc.). ☐ Yes ☒ No

If yes, complete the table below; attach additional sheets if necessary.

Incident Date	Type of Operational Problem	Corrective Action Taken

MAJOR UPGRADES/REPAIRS & EXPENSES

Were there any major upgrades/repairs or any major costs incurred during this reporting period? ☒ Yes ☐ No

If yes, complete the table below; attach additional sheets if necessary.

Major Upgrades/Expenses	Details
Improvements required by DWO	
Additions/changes to system	Four water taps added to existing distribution lines around campground.
Purchase or install new equipment	Watts backflow preventers installed on all water stand posts.
Equipment repair or replacement	
Annual maintenance of system	
Specialist report	
Other	

FUTURE IMPROVEMENTS

Are there any plans for future improvements? ☒ Yes ☐ No

If yes, complete the table below; attach additional sheets if necessary.

Future Upgrades or Improvements	Estimated Date of Completion
Additional distribution lines/water taps being installed winter 2025/26	30-Apr-2026

DATE COMPLETED:	15-Oct-2026	**COMPLETED BY:**	Jamie Hall

fraserhealth

DRINKING WATER INSPECTION REPORT
Health Protection

7054

FACILITY NAME:	INSPECTION DATE (yyyy/mmm/dd):	TIME SPENT:
Kolley Lake Water System	2025 / April / 3	2.0
FACILITY ADDRESS: 13100 Bell Ave., Mission	NEXT INSPECTION DATE (yyyy/mmm/dd): 2026 / Apr. / 15	
☐ NEW PERSON IN CHARGE: James Hall, Alouette Parks Management	☐ New Tel: [redacted] ☐ New Fax: ( ) (cell)	
☐ NEW EMERGENCY CONTACT: Brandon Schofield	☐ New Tel: [redacted] ☐ New Fax: ( ) (cell)	

FACILITY TYPE:

- ☐ WS1 (300+ connections)
- ☐ WS2 (15 – 300 connections)
- ☑ WS3 (2 – 14 connections)
- ☐ WS4 (1 public connection)
- ☐ WS9 (other)

INSPECTION TYPE:

- ☐ Initial
- ☑ Routine
- ☐ Follow Up
- ☐ Consultation
- ☐ Sampling
- ☐ Investigation
- ☐ Follow Up to Lab Report
- ☐ Water Quality Complaint
- ☐ Water Borne Illness Complaint

ACTION TAKEN:

ADMINISTRATIVE

- ☑ Information Provided
- ☐ No Action Required
- ☐ Permit Issued
- ☐ Rescind Public Notification _____

ENFORCEMENT

- ☐ Require Corrections
- ☐ Ticket Issued
- ☐ Written Order
- ☐ Order Public Notification _____

OTHER INFORMATION:

(complete for Routine Inspection)

	COMPLY Yes	No	N/A
EOCP (operator certification)	☐	☐	☑
Acceptable SWS Training	☑	☐	
ERCP (emergency plan)	☑	☐	
Annual Report Provided to Users	☑	☐	

HAZARD RATING FOR YOUR FACILITY: ☐ High ☐ Moderate ☑ Low

Follow Up to "Critical" Violations Noted on Previous Inspections (if applicable)

Code	Corrected?	Code	Corrected?
	☐ Yes ☐ No		☐ Yes ☐ No
	☐ Yes ☐ No		☐ Yes ☐ No
	☐ Yes ☐ No		☐ Yes ☐ No

Code	Explanation of Violations, Recommendations or Comments	(✓) Corrected During Insp.	Date To Be Corrected By
	Review of bacteriological sampling in 2024 & pre-season opening in 2025 to date. All laboratory results demonstrate compliance with sampling frequency & water quality guidelines. Range reports provided to the operator.		
	Well head capped, locked with good stickup (>2ft) locked treatment/pump shed. Landscaped to ensure water drainage away from well.		
	Chemical analyses for health-based parameters due in 2025. Information provided to operator.		

RECEIVED BY (Signature): [signature]

PRINTED NAME: Mark James Hall

EHO (Signature): [signature]

EHO PRINTED NAME: Heather Slater

Print Shop #254978 Revised: 20 September 2011 WHITE: Owner / Operator YELLOW: Data Entry

Sample Range Report

Facility Name: Rolley Lake Provincial Park Water System
Date Range: Apr 1 2025 to Oct 7 2026

Operator: Park Operator
Alouette Park Management
PO Box 206
Maple Ridge, BC

28 samples collected from April 1 to October 7, 2025. Counts are reported per 100 mL; LT1 means less than 1.

Sampling site	Collection date	Collection time	Total Coliform per 100 mL	E. Coli per 100 mL	Fecal Coliform
Pumphouse	Apr 1, 2025	10:05 AM	LT1	LT1	
Wash House Tap Stand	Apr 1, 2025	10:15 AM	LT1	LT1	
Wash House Tap Stand	Apr 2, 2025	11:00 AM	LT1	LT1	
Pumphouse	Apr 2, 2025	1:20 PM	LT1	LT1	
Wash House Tap Stand	Apr 9, 2025	10:16 AM	LT1	LT1	
Pumphouse	Apr 9, 2025	10:30 AM	LT1	LT1	
Pumphouse	Apr 22, 2025	8:16 AM	LT1	LT1	
Wash House Tap Stand	Apr 22, 2025	8:25 AM	LT1	LT1	
Wash House Tap Stand	Apr 26, 2025	8:17 AM	LT1	LT1	
Pumphouse	May 6, 2025	8:24 AM	LT1	LT1	
Pumphouse	May 20, 2025	8:11 AM	LT1	LT1	
Wash House Tap Stand	May 20, 2025	8:18 AM	LT1	LT1	
Pumphouse	Jun 3, 2025	8:18 AM	LT1	LT1	
Wash House Tap Stand	Jun 3, 2025	8:24 AM	LT1	LT1	
Wash House Tap Stand	Jun 17, 2025	10:10 AM	LT1	LT1	
Pumphouse	Jul 2, 2025	9:40 AM	LT1	LT1	
Wash House Tap Stand	Jul 2, 2025	9:45 AM	LT1	LT1	
Wash House Tap Stand	Jul 15, 2025	9:28 AM	LT1	LT1	
Pumphouse	Jul 29, 2025	9:35 AM	LT1	LT1	
Wash House Tap Stand	Jul 29, 2025	9:45 AM	LT1	LT1	
Pumphouse	Aug 12, 2025	9:01 AM	LT1	LT1	
Wash House Tap Stand	Aug 12, 2025	9:05 AM	LT1	LT1	
Wash House Tap Stand	Aug 26, 2025	9:15 AM	LT1	LT1	
Pumphouse	Aug 26, 2025	9:20 AM	LT1	LT1	
Wash House Tap Stand	Sep 10, 2025	8:30 AM	LT1	LT1	
Wash House Tap Stand	Sep 23, 2025	10:50 AM	LT1	LT1	
Wash House Tap Stand	Oct 7, 2025	6:30 AM	LT1	LT1	
Pumphouse	Oct 7, 2025	6:40 AM	LT1	LT1	
Total Positive:			0	0	0

Samples that contain total coliform:	0	
Samples that contain e. coli:	0	
Samples that contain fecal coliform:	0	
Number of consecutive samples that Contain total coliform:	0	
Number of samples that contain total Coliform in last 30 days:	0	
Total number of samples:	28	

Sample Range Report prepared by Park Operator, no report provided by Fraser Health for this period.

Element
#104, 19575-55 A Ave.
Surrey, British Columbia
V3S 8P8, Canada

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E: info.vancouver@element.com
W: www.element.com

Analytical Report

Bill To: Alouette Park Management
24480 Fern Cres
Maple Ridge, BC, Canada
Attn: James Hall
Sampled By:
Company:

Project ID:
Project Name: Golden Ears Provincial Park
Project Location:
LSD:
P.O.: 1822797
Proj. Acct. code:

Lot ID: **1822797**
Control Number:
Date Received: Jun 19, 2025
Date Reported: Jun 25, 2025
Report Number: 3150260
Report Type: Final Report

Reference Number	1822797-4
Sample Date	June 19, 2025
Sample Time	11:45
Sample Location	
Sample Description	Rolley Lake WS / 9.4°C
Sample Matrix	Drinking Water

Analyte		Units	Result	Nominal DL	Guideline Limit	Guideline Comments
Metals Extractable						
Aluminum	Extractable	mg/L	<0.001	0.001	0.1 OG, 2.9 MAC	Below OG
Antimony	Extractable	mg/L	<0.00002	0.00002	0.006	Below MAC
Arsenic	Extractable	mg/L	0.0001	0.0001	0.010	Below MAC
Barium	Extractable	mg/L	0.0027	0.0001	2.0	Below MAC
Boron	Extractable	mg/L	<0.002	0.002	5	Below MAC
Cadmium	Extractable	mg/L	<0.00001	0.00001	0.007	Below MAC
Chromium	Extractable	mg/L	0.00022	0.00005	0.05	Below MAC
Copper	Extractable	mg/L	<0.0005	0.0005	1 AO, 2 MAC	Below AO
Lead	Extractable	mg/L	0.00006	0.00001	0.005	Below MAC
Selenium	Extractable	mg/L	<0.0002	0.0002	0.05	Below MAC
Strontium	Extractable	mg/L	0.062	0.0001	7.0	Below MAC
Uranium	Extractable	mg/L	0.00006	0.00001	0.02	Below MAC
Vanadium	Extractable	mg/L	0.0011	0.00005		
Zinc	Extractable	mg/L	0.013	0.0005	5.0	Below AO
Microbiological Analysis						
Total Coliforms	Enzyme Substrate Test	MPN/100 mL	<1.0	1.0	0 per 100 mL	Below MAC
Escherichia coli	Enzyme Substrate Test	MPN/100 mL	<1.0	1.0	0 per 100 mL	Below MAC
Physical and Aggregate Properties						
Colour	True	Colour units	<5	5		
Turbidity		NTU	0.28	0.1		
Routine Water						
pH			7.32	0.01	7.0-10.5	Within Range
pH - Holding Time			Exceeded			
Temp. of observed pH		°C	22.9			
Electrical Conductivity	at 25 °C	µS/cm	126	1		
Calcium	Extractable	mg/L	15	0.01		
Iron	Extractable	mg/L	0.006	0.004	0.1	Below AO
Magnesium	Extractable	mg/L	3.2	0.02		
Manganese	Extractable	mg/L	<0.001	0.001	0.02 AO, 0.12 MAC	Below AO
Potassium	Extractable	mg/L	0.94	0.04		
Silicon	Extractable	mg/L	12	0.005		
Sodium	Extractable	mg/L	4.0	0.1	200	Below AO
T-Alkalinity	as CaCO3	mg/L	53	5		
Chloride	Dissolved	mg/L	4.75	0.05	250	Below AO
Fluoride	Dissolved	mg/L	<0.01	0.01	1.5	Below MAC
Nitrate - N	Dissolved	mg/L	0.03	0.01	10	Below MAC

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Analytical Report

Bill To: Alouette Park Management
24480 Fern Cres
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Attn: James Hall
Sampled By:
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Project ID:
Project Name: Golden Ears Provincial Park
Project Location:
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Reference Number	1822797-4
Sample Date	June 19, 2025
Sample Time	11:45
Sample Location	
Sample Description	Rolley Lake WS / 9.4°C
Sample Matrix	Drinking Water

Analyte		Units	Result	Nominal DL	Guideline Limit	Guideline Comments
Routine Water - Continued						
Nitrite - N	Dissolved	mg/L	<0.01	0.01	1.0	Below MAC
Sulfate (SO4)	Dissolved	mg/L	0.9	0.1	500	Below AO
Hardness	as CaCO3 (extractable)	mg/L	50	1		
Total Dissolved Solids	Extractable	mg/L	92	1	500	Below AO

Approved by:



Carol Nam, Dipl. T.
Quality Assurance Coordinator

Data have been validated by Analytical Quality Control and Element's Integrated Data Validation System (IDVS).
Generation and distribution of the report, and approval by the digitized signature above, are performed through a secure and controlled automatic process.

Water System Emergency Response Plan for Rolley Lake Provincial Park

Revised April 01, 2025

This Water System Emergency Response Plan identifies the steps that must be taken to respond rapidly and effectively to the potential contamination of our water system.

The steps in the Emergency Response Plan will be immediately implemented whenever there is reason to believe that criminal tampering has occurred to the water system, if the water system may have been contaminated by bacteria or other agents, or if there is an equipment or power failure in the system.

The Park Operator who is on duty and in charge at the time shall be directly responsible to implement the steps outlined in this Emergency Response Plan.

Bacterial Contamination of Water Supply – E. Coli

In the event of bacterial contamination of the water system by E. Coli bacteria, the following steps shall be taken:

1. Contact Fraser Health (FH) Environmental Health Officer for consultation.
2. Issue FH Approved Boil Water Notice by posting signs at all water taps, both at standpipes and in washrooms.
3. Investigate any recent changes to the water system, including assessing the condition of wellhead, pressure tanks, water quality (colour, turbidity), and water pressure.
4. Contact appropriate services for maintenance/repair of the water system. Take any corrective action required. Record actions taken in the water system log book.
5. Resample water supply upon consultation with your Environmental Health Officer.
6. Further action may be required pending resampling results.
7. Boil Water Advisory is to continue until 2 sample results taken not less than 24 hours apart are negative for both E. Coli and total coliform. Environmental Health Officer must provide verbal or written approval prior to rescinding Boil Water Advisory.

Note: If PO is not able to contact staff from Fraser Health PO must issue "Boil Water Notice" immediately.

Bacterial Contamination of Water Supply – Total Coliform

In the event of bacterial contamination of the water supply by coliform:

1. Contact Fraser Health Environmental Health Officer for consultation
    a. If a positive sample is one of consecutive positive samples, or if a high number of totals is detected in the sample, then a Boil Water Notice may be required to be issued.
    b. If the sample is a single isolated positive result then disinfection of the water system may be required followed by resampling after chlorine from disinfection has been flushed out of the system.
2. If required, issue FH Approved Boil Water Notice by posting signs at all water taps, both at standpipes and in washrooms.
3. Investigate any recent changes to the water system, including assessing the condition of wellhead, pressure tanks, water quality (colour, turbidity), and water pressure.
4. Contact appropriate services for maintenance/repair of the water system. Take any corrective action required. Record actions taken in the water system log book.
5. Resample water supply upon consultation with your Environmental Health Officer.
6. Further action may be required pending resampling results.
7. Boil Water Advisory is to continue until 2 sample results taken not less than 24 hours apart are negative for both E. Coli and total coliform. Environmental Health Officer must provide verbal or written approval prior to rescinding Boil Water Advisory.

Loss of Water Source (Pump failure/Power failure)

1. Notify users of interruption of service (i.e. duration of interruption, corrective actions being taken) by posting notices at standpipes and washrooms.
2. Notify Fraser Health Environmental Health Officer.
3. If pressure is very low (less than 20 PSI) or no pressure in the distribution system, the system may need to be flushed or disinfected before returning to normal operation. Consult with Fraser Health Environmental Health Officer to discuss possible corrective actions.

Broken Water Main

1. Reduce pressure (but maintain enough pressure to prevent backflow of water).
2. Call appropriate contact for repairs. Record actions taken in the water system log book.
3. Notify users of interruption of service (i.e. duration of interruption, corrective actions being taken) by posting notices at standpipes and washrooms.
4. Notify Fraser Health Environmental Health Officer.

Criminal Tampering

In the event of suspected criminal tampering with a water system, the PO in direct responsibility charge shall immediately take the following steps:

1. Turn off the water system, and do not turn it back on without consultation with the Fraser Health Environmental Health Officer. Follow all procedures required by FH.
2. Report the occurrence to the Royal Canadian Mounted Police. Phone 911
3. Report the occurrence to BC Parks. Refer to Park Emergency Call-Out List.
4. Document all relevant facts, evidence and circumstances on the BC Parks Complaint Occurrence Form. Record actions taken in the water system log book.

Chemical or Unknown Contaminant Entering the Water Supply

In the event of an occurrence that could potentially contaminate a water system accidentally, or a chemical or unknown contaminant has entered the water supply, the PO in direct responsibility charge shall immediately take the following steps:

1. Contact Fraser Health Environmental Health Officer for consultation. Extensive testing of the water quality may be required.
2. Issue a “Flush Only” notice to all users of the water system.
3. Water may only be used for flushing toilets and may not be used for human consumption, food preparation or sanitation purposes until the contaminant is removed from the water system.
4. Investigates any possible sources of contaminants.
5. Take any corrective action required from the investigation. Record actions taken in the water system log book.
6. Resample water supply upon consultation with Fraser Health Environmental Health Officer.
7. If contamination is still detected, then continue to investigate the source of the contamination and take corrective action as required.
8. If contaminant is no longer detected, consult with Fraser Health Environmental Health Officer to determine when the “Flush Only” notice can be rescinded.
9. **Note: If PO is not able to contact staff from Fraser Health PO must issue a notice to users of the water system immediately.**
10. Report the occurrence to BC Parks. Refer to Park Emergency Call-Out List.
11. Document all relevant facts and circumstances on the BC Parks Complaint Occurrence Form.

Other Threats to the Drinking Water Supply

1. If PO staff become aware of any situation or emergency which may cause a threat to the water supply, immediately notify Fraser Health Environmental Health Officer.
2. Notify all users of the threat to the water supply.
3. Record actions taken in the water system log book.

Water System Turn Off Procedures:

1. Turn off the well water pump.

2. Open the low point drains to drain water from the system. Location of the low point drains are marked on the accompanying map. Opening taps at standpipes will help drain water.

3. Close and lock the toilet / shower building.

4. Wire or screw onto each standpipe tap in the water system a sign that states “Do Not Drink Water”. Locations of all standpipe taps are marked on the accompanying maps.

EMERGENCY RESPONSE PLAN • CONTACT LIST

Personnel Contact • Phone / Cell / Fax Numbers

Operator's Name: Alouette Park Management (604) 466-8325 Email: office@alouetteparks.ca

System Operator: James Hall, President [redacted] james@alouetteparks.ca

Staff : Brandon Schofield, Operations Manager brandon@alouetteparks.ca

Emergency Contact Numbers

Medical Health Officer	(604) 556-5069
Fraser Health	(604) 814-5515
FH Environmental Health Officer	(604) 870-7900 local 647902
Fraser Health After Hours	(604) 527-4806
Provincial Emerg Program	1 800 663-3456
Police	9 1 1 Mission RCMP Non-Emergency: (604) 826-7161
Ministry of Environment	1-888-549-8820 (24-Hr Serious Incident Reporting)
BC Parks: Erin.Kendal (RSO)	(604) 824-2314 (office) (604) 997-4453 (cell)
	Email: Erin.Kendal@gov.bc.ca
Hospital	(604) 826-6261
Fire Department 820-3794	9 1 1 Mission Fire Non-Emergency (604) 820-3793 (604)
B.C. Hydro	1 888 POWERON (1-888-769-3766), or *HYDRO (*49376) cell
Pump Service/Repair	(604) 853-2513 A&H Pumps
	(604) 302-1301 Greg (cell)
	(604) 302-0741 Mike (cell)
Excavation Services	(604) 826-6736 Davies Sand and Gravel
Plumbing Services	(604) 853-2513 A&H Pumps
Bulk Water Hauler	(604) 467-8628 Allied Water Services
Bottled Water Supplier	

BOIL WATER NOTICE

Warning: Boil or Otherwise Treat Your Water Before Using

Date Issued: _____

The Rolley Lake water system supplying this area has been contaminated with potentially harmful bacteria. E. Coli bacteria were found in the water supply on _____.

WHAT SHOULD I DO?

- **DO NOT DRINK** the water without **BOILING FIRST** or otherwise treating the water.
- Boil water for 1 minute (rolling boil). Prefereably use a kettle so as to reduce the risk of burns. Let it COOL before using.
- You can choose to use Bottled Water
- You can obtain drinking water from any of the water taps in Gold Creek Campground, 4km north along the main park road.
- Boiled or bottled water should be used for *DRINKING, COOKING, BRUSHING TEETH, WASHING READY-TO-EAT FOODS AND WASHING DISHES.*
- Store treated water in sanitary containers and keep refrigerated.

OTHER METHODS OF TREATING YOUR WATER

- CHLORINE: Household bleach (5%): Add 2 drops per liter and let stand for 30 minutes
    - If water is cloudy or cold add 4 drops per liter.
- IODINE/CHLORINE TABLETS: see manufacturers' directions
- Note: Brita Water Filters will NOT provide treatment for microbes.

WHAT HAPPENED? WHAT IS BEING DONE?

Bacteria have entered the water system from an unknown source. We are working with the Fraser Health Authority to investigate/resolve this issue. We have disinfected and flushed the water system with chlorinated water, and will be monitoring continuing test results over the next few weeks.

We will inform you when the problem has been corrected and tests show no bacteria and you no longer need to boil your water. We apologize for the inconvenience.

This notice is posted by the Park Operator:

Alouette Park Management Ltd.
(604) 466-8325
info@alouetteparks.ca

DO NOT DRINK THE WATER (FLUSH ONLY)

Date Issued:_____:

An Unknown Contaminant may have been introduced into the Rolley Lake Provincial Park water supply.

What should I do?

- **Do not use the water for** *DRINKING, COOKING, BRUSHING TEETH, WASHING READY TO EAT FOODS & WASHING DISHES OR BATHING*.
- Water can only be used for **FLUSHING TOILETS** at this time.

What happened? What is being done?

_____

_____

_____

_____

_____

_____

How long will this Flush Only last?

We are working with the Fraser Health Authority to investigate/resolve this issue. We are currently:

_____

_____

_____

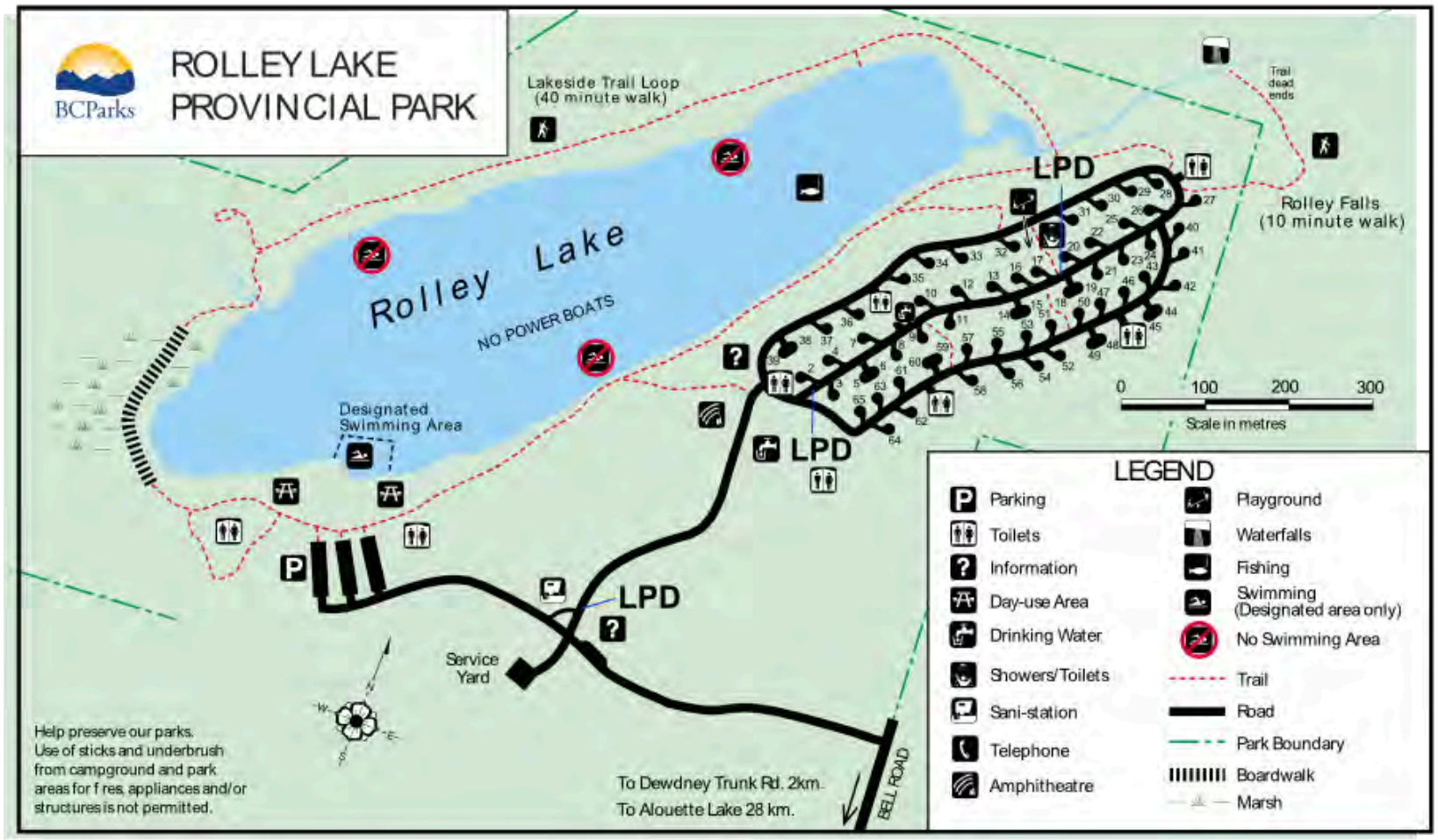
_____

_____

We will inform you when the problem has been corrected and that the flush only notice is no longer in effect.

This notice is posted by Alouette Park Management Ltd., the Park Operator for Rolley Lake Provincial Park.

Date Distributed:_____



LPD - Low Point Drain

WARNING

This water is considered unfit for drinking or domestic use.



BRITISH COLUMBIA

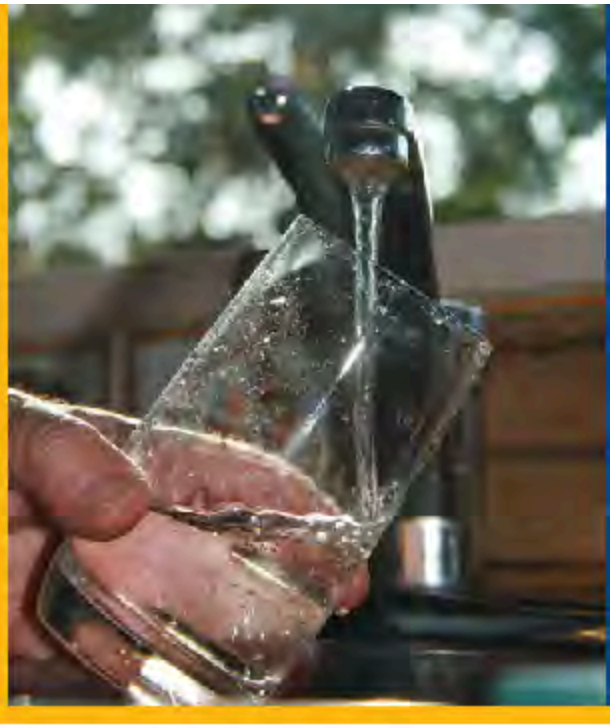
Ministry of Health and
Ministry Responsible for Seniors

Water Well Disinfection

Using the Simple Chlorination Method

Water Stewardship Information Series

BRITISH COLUMBIA
The Best Place on Earth



Well disinfection is used to inactivate or control bacteria populations in a well and the distribution system. There are several methods used to disinfect water wells including simple chlorination, shock chlorination or bulk displacement and a procedure for wells that are difficult to disinfect. This brochure describes the simple chlorination method. For information on the treatment of wells that are hard to disinfect see (www.env.gov.bc.ca/wsd/plan_protect_sustain/groundwater/wells/factsheets/PFRA_well_recovery.pdf).

Are there things I need to do before disinfecting my well?

A well should be tested regularly for water quality. If coliforms or *Escherichia coli (E. coli)* are repeatedly detected in your well water, the first step to take to eliminate them is to look for the following:

- ❑ Are there any potential contamination sources near the well, such as manure or compost piles, septic disposal fields, or hazardous materials storage?
- ❑ Does the ground slope promote drainage of surface water toward the well or ponding of water around the well?
- ❑ Is the well cap missing, cracked or damaged?
- ❑ Does the well cap allow water or vermin to enter into the well?
- ❑ Does the well casing stick up less than 30 cm (12 inches) from the ground surface (see Figure 1) or the floor of the pump house? Can surface or standing water easily flood over the top of the well casing?
- ❑ Is there an unfilled space or gap between the well casing and the ground around the well (see Figure 2) e.g. the surface seal is missing or incomplete?
- ❑ Is the well finished below grade?
- ❑ Are there noticeable cracks in the surface seal around the well casing?

If you answered ***"yes"*** to any of the above questions, fix the problem before proceeding with disinfection. Otherwise the well will continue to be vulnerable to contamination.



Figure 1. Well casing stick up less than 30 cm (12 inches) from the ground surface



Figure 2. Well with gap between casing and ground – no surface seal

Note: *A registered well driller must be hired to repair or install a surface seal for a well, or to add casing to increase the well stickup.*

Are there any safety precautions to take?

Chlorine is very volatile so it is dangerous to work with in confined areas where vapours can accumulate such as well houses, pits and crawl spaces. Caution should be used when working in these situations – WorkSafeBC rules for confined spaced entry should be followed.

Prepare the chlorine solution outside in a well-ventilated area and wear appropriate safety clothing and equipment to protect your eyes and skin from splashes and spills.

If you have any concerns or need help with disinfecting your well contact a registered well driller or pump installer.

What are the limitations of the simple chlorination method?

Simple chlorination only eliminates the bacteria present in the well, on the pumping equipment or in the distribution system. It will not kill bacteria in the aquifer beyond the immediate location of the well. If there is some external source of contamination, the problem will only be solved temporarily. A well must be protected from contamination through proper siting, construction and maintenance.

Nuisance bacteria such as iron-related or sulphate-reducing bacteria are often found in groundwater and water wells. If uncontrolled, these bacteria can colonize the intake area of a well. The colonies form a sticky, slimy substance called biofilm (see Figure 3 below) which can reduce well production and degrade water quality. Also, minerals in groundwater can settle out and accumulate on well screens over time. The simple chlorination method is not effective in penetrating or removing biofilm and mineral build-up. To prevent the accumulation of biofilm and minerals regular disinfection of the well is recommended in cases where bacteria have been detected.



Figure 3. Biofilm on well wiring

If the well has never or infrequently been disinfected or coliforms or *E. coli* continue to be detected in the water, hire a registered driller or pump installer to remove the pump and clean the casing and screen before repeating disinfection using either the shock chlorination procedure or the procedure for hard to disinfect wells.

What are the steps for disinfecting a water well?

STEP 1 – Before beginning

Notify all users of the well not to drink the water or bathe in it while the strong solution of chlorine is present in the system and to store sufficient water for use during a 12-hour period.

Bypass or disconnect any carbon filters or water treatment devices before disinfecting. Carbon filters will remove the chlorine from the water – distribution pipes located past these filters will not be disinfected if the filters are not removed.

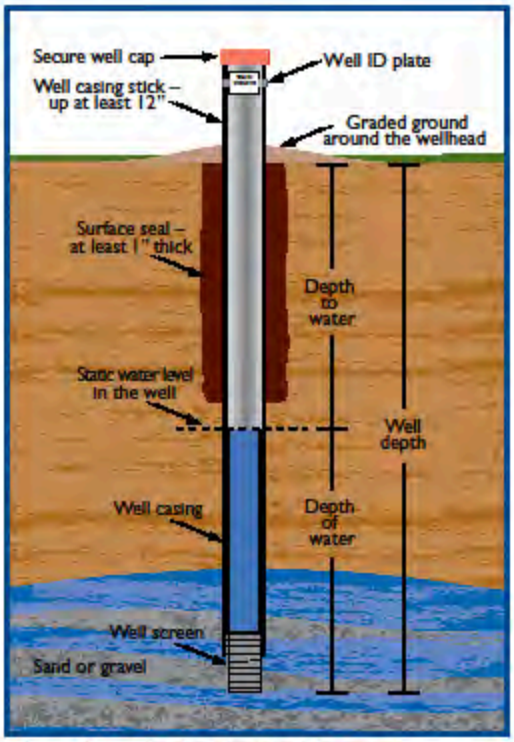


Figure 4. Cross-section of well showing main features and measurements

STEP 2 – Determine the diameter of the well, depth of water in the well and the pH of the well water

Measure or check the driller's well construction report to determine the diameter and depth of the well and the static water level. The depth of water = well depth – static water level (see Figure 4). If this information is not available contact a registered well driller or pump installer for help.

Test the pH of the well water. Ideally, the pH should be 7 or less. If it is above 7, add one litre of vinegar or citric acid to the well and re-test the pH in the well water before proceeding.

STEP 3 – Add chlorine solution to the well

Estimate the amount of domestic bleach (Table 1) or chlorine tablets or powder (Table 2) needed.

a. **For wells without a pump (e.g. new well) using domestic bleach**
Mix the volume of bleach needed with at least 45 litres (10 gallons) of water. Pour the solution into the well and leave it for approximately 12 hours. When the pump is installed, pump for at least one hour to remove the chlorine solution.

b. **For wells with a pump using domestic bleach**
Turn off power to the pump. Mix the volume of bleach needed with at least 45 litres (10 gallons) of water. Remove the well cap and lift the wires out and pull to one side. Clean the cap to remove debris, dirt and oil and place in a clean container. Pour or siphon the chlorine solution into the well between the drop pipes (pipes that carry water from a pump in a well to the surface) or pour the solution directly into the well. Some wells have a sanitary seal (see Figure 5) with either an air vent or plug that can be removed to add the chlorine mixture – contact a registered well driller or pump installer for assistance if required.

Caution: *Do not remove any of the bolts in the top of the sanitary well seal.*

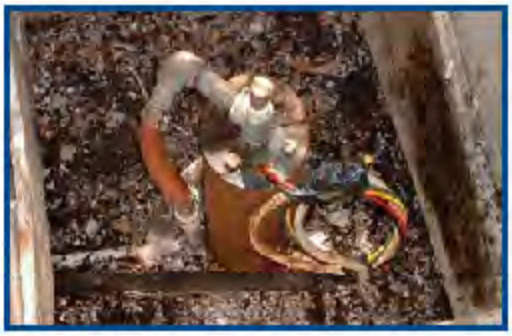


Figure 5. Well with sanitary seal type cap



Figure 6. Well fitted with pitless adapter, cap has space for wiring

If possible, mix the water in the well by attaching a clean hose to a nearby water tap or hydrant, placing the other end of the hose into the top of the well casing, and then running the water from the well through the hose and back into the well. Note: the power to the pump will need to be turned back on. After mixing, let the water stand in the well for a couple hours before proceeding to the next step.

c. **For wells with a pump using chlorine tablets or powder**
Dissolve the required weight of tablets or powder in warm water, remove the well cap, pour the solution into the well, mix if possible and let stand for two hours (see instructions above).

STEP 4 – Move the chlorinated water into the distribution system

Turn the pump(s) on. Open all water taps one at a time, including outside hose bibs and cold and hot water taps. Flush toilets and fill washing machines and dishwashers. Allow the water to run until a chlorine smell is detected from each faucet or there is a slippery feeling to the water, then turn off each tap. Open the valve or plug at the top of the pressure tank just before stopping the pump to allow the solution to contact the entire inside surface of the tank. Then close the valve or plug. Back flush any water softener devices and all water filters (except carbon filters). Replace carbon filters to avoid reintroducing bacteria into the system. Plumbing grit and solid mineral particles may form during disinfection and may clog faucet aerators, flush valves and equipment using filters. Faucet aerators may need to be removed if clogging occurs. If a strong chlorine odour is not present, return to step 3, add half the amount of chlorine used for the initial treatment to the well and repeat step 4.

Replace the well cap and leave the chlorine solution in the distribution system for at least 12 hours.

STEP 5 – Flush the chlorine out of the well and distribution system

Open an outside tap and run the chlorinated water from the well to an area where plants won't be harmed. Do not run the water into your septic system as the chemicals and the amount of water required to flush the system may overload or damage the septic system. Do not drain the water into a stream, ditch or storm drain that connects with any fish-bearing streams.

When a chlorine smell is no longer present, run the indoor hot and cold water taps to flush out the hot water tank and plumbing (this small amount of chlorine will not harm the septic system). It may take as little as half an hour or as long as four days to completely remove the chlorine odour from the water system.

Do not overpump the well! *If the well is low-yielding or pumps silt or sand, slowly flush the well – watch the water coming from the hose to make sure there is no sediment in it. Over-pumping may worsen the sediment problem. It may be necessary to stop and start the pump if it is losing its prime.*

STEP 6 – Sample the well water

A water sample should be collected for analysis one week after chlorination to verify the water is safe to use. Do not drink the water without boiling it until test results show it is safe to drink. Retest again one month after disinfection to ensure the water is potable.

TABLE 1
Volumes of domestic bleach* needed for a 200 ppm chlorine solution

Well diameter		Domestic bleach* (5-6%) needed per 3 metres (10 feet) of water		
inches	mm	metric	US gallons	other
4	100	100 mL	0.02	5 tbsp
5	130	150 mL	0.04	10 tbsp
6	150	200 mL	0.05	13 tbsp
8	200	360 mL	0.09	1.5 cups
10	250	560 mL	0.15	2.5 cups
12	300	808 mL	0.21	3.5 cups
24	610	3.3 L	0.9	14.6 cups
36	914	7.5 L	2.0	
48	1219	13.3 L	3.5	

***Note:** Domestic bleach has an expiry date and should be used before this date for effective disinfection. Purchase only the amount needed and use it all. Use only unscented plain domestic bleach without fabric softeners or other additives.*

TABLE 2
Dry weight of chlorine tablets* needed for a 200 ppm chlorine solution

Well diameter		Dry weight of chlorine tablets (65-75%) per 3 metres (10 feet) of water	
inches	mm	oz	grams
4	100	0.3	9
5	130	0.5	15
6	150	0.7	20
8	200	1.3	36
10	250	2.0	57
12	300	2.9	82
24	610	11.9	337
36	914	26.7	758
48	1219	47.4	1347

***Note:** Make sure the chlorine tablets are for potable water, e.g. not for swimming pools or hot tubs.*

When should a well be disinfected?

The simple chlorination method is used:

- following construction of a new well,
- following alteration of an existing well,
- following pump installation, maintenance or repair, or
- by homeowners when the well has tested positive for coliforms or *E. coli*.

The bacteria and viruses found in the soil at or near the well site can be picked up on drilling tools, pipes and pumps during construction or servicing of a well. If disease-causing organisms are present they may be introduced into the well. Therefore, every well, after construction or repair, should be disinfected.



For further information

For further information on whether the well water is safe to drink contact your local Health Authority *(look for listings in your local phone directory)*. A list of registered well drillers and pump installers can be found at: www.env.gov.bc.ca/wsd/plan_protect_sustain/groundwater/wells.html#reg.

BRITISH COLUMBIA
The Best Place on Earth

Agriculture and Agri-Food Canada | Agriculture et Agroalimentaire Canada

Photos by Sylvia Kenny, Peter Epp and Greg Farley.

Rolley Lake Water System Well Information

Well Tag Number: 86767

Owner: BC Parks Lower Mainland Region
Address: Rolley Lake Provincial Park – Campground
Area: North Fraser

Well Location: New Westminster Land District
BCGS Number (NAD 27): 092G029133 Well: 3

Class of Well: Water supply
Subclass of Well: Domestic
Status of Well: New
Well Use: Water Supply System
Diameter: 6 inches
Well Depth: 80 feet
Lithology Info Flag: N
File Info Flag: N
Sieve Info Flag: N
Screen Info Flag: N

Well Identification Plate Number: 18769
Plate Attached By: Steve Heggie & Brian Roberts
Where Plate Attached: Well Cap

Production Data at Time of Drilling:
Well Yield: 30 (Drillers Estimate) U.S. Gallons per Minute
Pump Test Info Flag: N
Static Level: 43 feet

Water Quality:
Well Disinfected: N
Water Chemistry Info Flag: N
Site Info (SEAM): N

Water Utility: N
Water Supply System Name: Rolley Lake Water System – District of Mission
Water Supply System Well Name: Rolley Lake Provincial Park Water System

Surface Seal:
Flag: N

Information taken from Province of British Columbia Detailed Well Reco

HealthLinkBC

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Arsenic in Drinking Water

Arsenic is found naturally in the rocks in the earth's crust. It can be found in some drinking water supplies, and wells. Drinking water containing arsenic can have serious short-term and long-term health effects.

How does arsenic get into drinking water?

Arsenic can get into drinking water from natural deposits or runoff from agriculture, mining and industrial processes.

In B.C., natural minerals are the most common sources of arsenic in drinking water.

The amount of arsenic in ground water supplies like wells is usually higher than in surface water supplies such as lakes, streams and rivers.

What are the health effects of arsenic exposure?

Short to medium term (days to weeks) exposure to very high levels of arsenic in drinking water can lead to arsenic poisoning.

Symptoms of exposure to high levels of arsenic include stomach pain, vomiting, diarrhea, and impaired nerve function, which may result in 'pins and needles' sensation or numbness and burning in hands and feet.

Arsenic can also cause skin changes, which include darkening, and wart-like or corn-like growths. These are mostly found on the palms of the hands or bottoms of the feet. Other symptoms can include skin flushing and rashes.

As children tend to drink more water per unit of body weight than adults, they may have more exposure to arsenic in drinking water. As a result children may be at greater risk of illness when higher levels of arsenic are present.

Long-term (years to decades) exposure to even relatively low amounts of arsenic in drinking water can increase your risk of developing certain cancers, including:

- skin,
- lung,
- kidney,
- bladder, and
- liver.

The risk of cancer is the reason for developing the Canadian guideline for arsenic in drinking water. For more information on The Guidelines for Canadian Drinking Water Quality see, www.canada.ca/en/health-canada/services/publications/healthy-living/guidelines-canadian-drinking-water-quality-guideline-technical-document-arsenic.html.

What amount of arsenic causes health effects?

Health Canada set a Maximum Acceptable Concentration (MAC) of 10 micrograms per litre for arsenic in drinking water. This can also be reported as 10 µg/L, or as 0.010 milligrams per litre (mg/L).

This level was set based on the ability to treat water practicably to this level. This amount is still linked with a health risk higher than the level considered to be a very minor risk. For this reason people should consider taking precautions with their drinking water even if the arsenic levels are slightly below the guideline. Data collected in Canada indicates that the levels of arsenic in drinking water is usually less than 0.005 mg\L, but concentrations may be higher in some areas.

How do I know if there is arsenic in my drinking water?

Public drinking water systems are monitored regularly. In drinking water, arsenic has no odor or taste and can only be detected by a chemical test.

Most private wells are not tested routinely for water quality or contaminants. It is the well owner's responsibility to test the water for arsenic. Any well may contain arsenic or other contaminants. Private wells should be tested regularly for water quality.

Contact your local public health unit or environmental health officer for information on the testing process in British Columbia.

For more information about private well water testing, see HealthLinkBC File #05b Should I Get My Well Water Tested?

What can I do if there is arsenic in my drinking water?

Water with arsenic is only a concern if it is being used for drinking or preparing food.

Exposure through breathing and skin contact is not harmful. For example, there are no known health effects from hand washing, bathing or washing clothing in water with arsenic.

If an initial test detects arsenic, even at levels below the guideline, it is important to have a second test done to confirm the results. If your water tests positive for arsenic above the recommended level, you should use another source for drinking water or treat the current source.

There are several treatment devices and options including reverse osmosis filters and distillation. Chlorination and mechanical filters do not remove arsenic from water. Boiling water may increase the concentration of arsenic.

There is no regulatory control over treatment devices for private homes, therefore the well owner must be careful and select an appropriate treatment device that has been certified for the removal of arsenic.

When purchasing a treatment device, you should consider one that has been certified by an organization accredited by the Standards Council of Canada (SCC). The treatment device should meet the following standards:

- NSF/ANSI Standard 62 on drinking water distillation and adsorption systems; or
- Standard 58 on reverse osmosis drinking water treatment systems; or
- Standards 53 on drinking water treatment units – with specific designation for the water quality parameters you are trying to remove (arsenic).

Certification assures that a device works as the manufacturer or distributor claims. Find an up-to-date list of accredited organizations by visiting Standards Council of Canada at www.scc.ca/en/accreditation/product-process-and-service-certification/directory-of-accredited-clients.

For more information on drinking water and treatment options, contact your local environmental health officer.

For More Information

For more information about arsenic and drinking water, visit:

- B.C. Ministry of Environment - Arsenic in Groundwater www2.gov.bc.ca/assets/gov/environment/air-land-water/water/water-wells/as020715_fin3.pdf
- Health Canada – Arsenic in Drinking Water www.canada.ca/en/health-canada/services/healthy-living/your-health/environment/arsenic-drinking-water.html

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January 2017

Preventing Water-Borne Infections For People with Weakened Immune Systems

Who is at higher risk from water-borne infections?

People with very weak immune systems who are at higher risk of certain water-borne diseases include those with:

- HIV infection who have a CD4+ count of less than 100 cells/mm^3;
- lymphoma or leukemia (hematological malignancies) who are being actively treated or have been in remission and off treatment for less than 1 year;
- hematopoietic stem cell transplant recipients; and
- people born with diseases that severely affect their immune systems.

Some people with weakened immune systems, such as those with certain types of cancers or taking certain medications, may not be at higher risk of severe water-borne diseases. These people do not need to take extra precautions with their drinking water.

Ask your doctor or nurse practioner how weak your immune system is, and whether you need to take extra precautions.

How can drinking water become contaminated?

Drinking water can contain different organisms, including bacteria, viruses and parasites, which can cause disease. These organisms can exist in the source water, such as lake water, and survive through treatment, or they can enter the water supply in the distribution system.

Well water can be contaminated if the well is located or constructed in a way that the groundwater it draws from is at risk of containing pathogens (germs) such as a shallow well or a well drilled in fractured rock.

Surface water, such as rivers, lakes and streams, can also contain disease-causing organisms from animal feces.

If you have a weak immune system, you should not drink water from surface sources or groundwater at risk of containing pathogens, unless the water has been treated to remove or inactivate at least 99.9 per cent of parasites (protozoa), 99.99 per cent of viruses and all harmful bacteria.

Most community water systems in B.C. have effective treatment, such as disinfection or chlorination, against bacteria and viruses. However, in many cases, treatment may not provide a 99.9 per cent reduction in infectious parasites. Some water systems and many private supplies have no treatment at all. If the water you drink has not been disinfected, please refer to HealthLinkBC File #49b Disinfecting Drinking Water.

How can I further treat disinfected water?

People with very weak immune systems should consult with their doctor or nurse practitioner and may need to take extra precautions with their drinking water.

Boiling: If your water supply has already been disinfected, bring the water to a full boil to inactivate any *Cryptosporidium* parasites - a major concern for people with weakened

immune systems. For more information, see HealthLinkBC File #48 *Cryptosporidium* Infection.

If the water has not already been disinfected, bring the water to a full boil for at least 1 minute. This will kill or inactivate bacteria, viruses and parasites. At elevations over 2,000 meters (6,500 feet), boil water for at least 2 minutes to disinfect it.

Do not drink or use tap water to brush your teeth, rinse your mouth, mix drinks or make ice cubes without boiling it first.

Please note that boiling water will get rid of viruses, bacteria and parasites but not chemicals which may be found in the water.

Reverse Osmosis (RO): RO is effective against all disease-causing organisms and many chemical contaminants. Unless it has a high capacity, it will only produce small amounts of water and waste a large volume. Speak to a water treatment specialist to see if this is the best option for you.

Ultraviolet (UV) Treatment: UV light will kill many disease-causing organisms, and is effective against almost all parasites. UV will not kill some bacterial spores and some viruses, so it should not be used unless the water supply is at least disinfected. UV treatment units should meet NSF Standard #55A.

Filters: Filters do not remove bacteria and viruses and should not be used unless the water supply is disinfected first.

If you plan to install a drinking water filter in your home, you will need a system labeled as Absolute 1 micron or smaller, and labeled as meeting ANSI/NSF International Standard #53 for removal of parasites.

Jug-type filters, such as a Brita®, which sit in a jug and allow water to trickle through, and some tap-mounted and built-in devices are not an appropriate solution. The jug filter models are not effective in removing many disease-causing organisms.

Can I drink bottled water?

Bottled water in B.C. may or may not have been treated. If you have a very weak immune system, check with the bottling company to find out what treatment, if any, it has had. Bottled water that has been properly treated using one of the methods listed above can be used for drinking, brushing teeth, making ice cubes and for recipes where water is used but not boiled, such as cold soups.

For More Information

For more information, including the level of treatment in your local water system, contact your drinking water purveyor or supplier, or the local environmental health officer or drinking water officer. To find your health authority's drinking water contact visit www2.gov.bc.ca/gov/content/environment/air-land-water/water/water-quality/drinking-water-quality/health-authority-contacts.

For more information about water-borne infections and how to safely disinfect your drinking water, see the following HealthLinkBC Files:

- HealthLinkBC File #49a Water-borne Infections in British Columbia
- HealthLinkBC File #49b Disinfecting Drinking Water
- HealthLinkBC File #69b Feeding Your Baby Formula: Safely Making and Storing Formula

Metals in Drinking Water – a message from Fraser Health

Anytime the water in a particular faucet has not been used for six hours or longer, "flush" your cold-water pipes by running the water until you notice a change in temperature. (This could take as little as five to thirty seconds if there has been recent heavy water use such as showering or toilet flushing. Otherwise, it could take two minutes or longer.) The more time water has been sitting in your home's pipes, the more lead it may contain.

Use only water from the cold-tap for drinking, cooking, and especially making baby formula. Hot water is likely to contain higher levels of lead.

The two actions recommended above are very important to the health of your family. They will probably be effective in reducing lead levels because most of the lead in household water usually comes from the plumbing in your house, not from the local water supply.

Conserving water is still important. Rather than just running the water down the drain you could use the water for things such as watering your plants.