

2022



ANNUAL WATER REPORT

City of Parksville
Operations

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INTRODUCTION

The Annual Water Report is a summary of the City's ongoing efforts to achieve excellence through continued responsible operation, monitoring, evaluation, and management of its water system. The intent is to evaluate the previous year's progress to help determine how to meet current and future needs for water in the community.

Parksville consistently meets the necessary sustainable delivery of safe, adequate, secure, reliable, and aesthetically pleasing potable water. This report provides information on water source, water test results, maintenance programs, and improvements to the water system. It also helps increase public awareness of water systems and services and enables the community to provide educated input on the direction and focus of future initiatives. With understanding and support from the community, the City can work towards its objectives of enhanced water quality and operational efficiency.

The City is regulated by Island Health for its activities as a potable water supplier. The City must meet the requirements set out in the *BC Drinking Water Protection Act and Regulation*, and *Canadian Drinking Water Guidelines* to maintain its operating permit and manage the community's drinking water system. This report has been submitted to Island Health and is available on the City of Parksville [website](#).

PARKSVILLE WATER SYSTEM

The City of Parksville has about 5,000 water connections serving over 13,650 permanent residents as well as supplying water to the Regional District of Nanaimo (Nanoose Bay Peninsula system). The City has four reservoirs, one at the southeast end near Top Bridge Park and three at Springwood Station on the southwest end of the City.



The City operations targets consist of:

- Carrying out deactivation of micro-organisms through disinfection process
- Meeting or exceeding the Canadian Drinking Water Quality Guidelines
- Having a minimum 0.20 mg/L free chlorine and no positive bacteria results in the distribution system

The City gets water from the following sources:

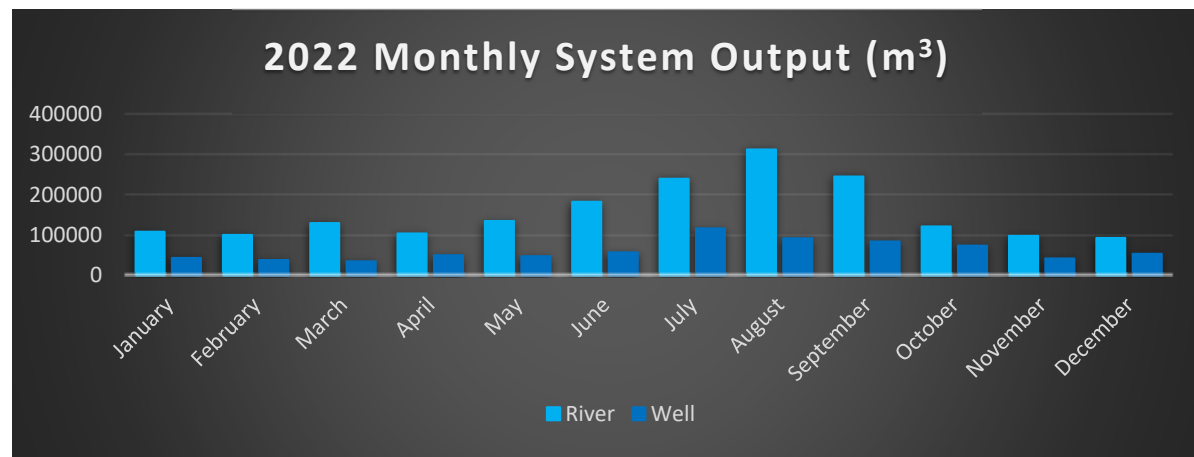
- Arrowsmith Dam through the Englishman River
- Well fields (Springwood and Railway well fields)

The water from the Englishman River goes through the Englishman River Water Treatment Plant, which can produce up to 16 megaliters per day (ML/d) by way of intake screens, sand separators, coagulation, fine strainers, primary and secondary ultrafiltration (UF) membranes, ultraviolet (UV) disinfection and chlorination. The plant focuses on addressing biological contaminants such as bacteria, *Cryptosporidium*, *Giardia*, and viruses.

The water treatment plant meets the 4-3-2-1-0 drinking water objective. Water suppliers are required to reach the goal of:

- 4 log inactivation of viruses
- 3 log removal or inactivation of *Giardia* and *Cryptosporidium*
- 2 treatment processes for all surface drinking water systems
- 1 NTU of turbidity or less, with a target of 0.1 NTU
- 0 total and fecal coliforms and E.Coli.

Well water is disinfected with liquid chlorine before being pumped to the reservoirs where it is mixed with the treated water from the treatment plant. It is then distributed through the water distribution system.



Arrowsmith Dam

The City of Parksville, the Regional District of Nanaimo, and the Town of Qualicum Beach are partners in the Arrowsmith Water Service (AWS). The concrete gravity dam is located at Arrowsmith Lake, about nineteen kilometres (19 km) south of Parksville and commissioned in 2000. The dam has a capacity of 9,000,000 m³ and is operated and maintained by the City of Parksville utilities staff. Water is released to the Englishman River through two pipes, 900 mm and 600 mm in diameter. Flow and lake levels are monitored regularly by staff through the Supervisory Control and Data Acquisition (SCADA) system.

Appendix B shows the Arrowsmith Dam Lake levels. Ministry of Forests, and the Arrowsmith Water Service (AWS) are updating the provisional operating rule to conserve reservoir storage water for critical fisheries rearing periods. A minimum flow is released into the river based on this curve between June and October.



At the end of the summer of 2022 through to the new year, weather conditions were abnormal, with Vancouver Island reaching a level of extreme drought. The reservoir level declined to lower levels than expected due to the lack of precipitation from the beginning of July to December. Water was released into the river starting on July 22, 2022, and staff closed the Dam on November 18, 2022.

The lack of rainfall caused the river flows to be below normal levels.

As shown below, in August, September and October of 2022 the base flow was substantially lower than the historical flow. In September, staff contacted the province to review the reservoir volume and weather forecast as the drought was affecting regular operations. In October, with the reservoir volume was nearing the 25% mark, the province issued an order to reduce the dam release rate to prolong the availability of water to maintain the fish habitat. At this time, well production increased, and Stage 4 water restriction was put in place.

	June	July	August	September	October
Historical Base Flow (2017-2021)	2.0 m ³ /s	0.5 m ³ /s	0.2 m ³ /s	0.3 m ³ /s	1.2 m ³ /s
	6.0 m ³ /s	2.6 m ³ /s	2.4 m ³ /s	11.0 m ³ /s	34.9 m ³ /s
2022 Base Flow	4.4 m ³ /s	1.1 m ³ /s	0.2 m ³ /s	0.1 m ³ /s	0.1 m ³ /s
	20.6 m ³ /s	8.2 m ³ /s	1.0 m ³ /s	0.2 m ³ /s	0.2 m ³ /s

Englishman River Water Service

The Englishman River Water Service is a joint venture between the City of Parksville and the Regional District of Nanaimo, formed to secure a bulk water supply from the Englishman River. This regional partnership supplements existing well supply sources owned and operated by the City of Parksville and Nanoose Bay Peninsula Water Service Area.

Englishman River Water Service joint venture agreement (percentages of interest) is provided below:

- City of Parksville 74%
- Regional District of Nanaimo 26%

More information is available at this [link](#).

ERWS Intake and Water Treatment Plant

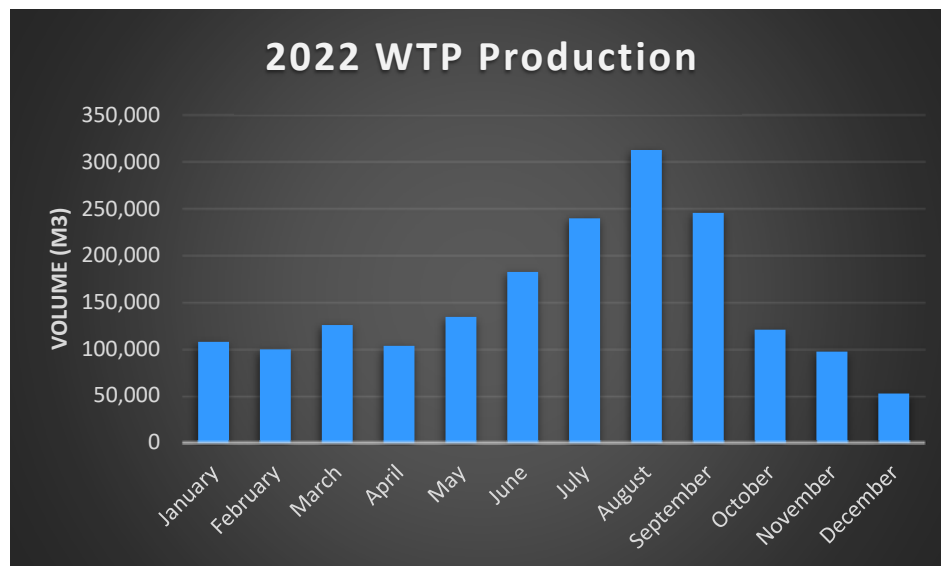
In 2022, the Englishman River Water Treatment Plant produced 1,859,500 m³ of water, in which 1,293,325 m³ was distributed to the City of Parksville while the remaining was supplied to the RDN.

The water treatment plant was designed with a capacity of up to 16 megalitres per day (ML/d), which is the equivalent of 32 million 500ml bottles of water, through intake screens, sand separators, coagulation, fine strainers, primary and secondary ultrafiltration (UF) membranes, ultraviolet (UV) disinfection and chlorination. In 2022, the highest production month was August, with 312,690 m³ of the Englishman River water treated, and the highest production day was August 9 with 11,790 m³ of river water treated. From January to May, and

October to December, the average daily consumption was roughly 3,500 m³ per day, from June to September, the high consumption months, the daily average was roughly 8,000 m³ per day. The permit allows the City of Parksville to withdraw 48 ML/d (48,000m³) daily.

The intake structure has screens to protect fish and other aquatic life from entering the intake, and to keep debris from entering the system. The sand separators remove sand and heavy suspended solids during high turbidity events (turbidity is the cloudiness/haziness of the water).

A coagulant is added to the raw water, during the rainy season, before it gets to the water treatment plant. This allows for sufficient mixing time for particles to clump together for ease of removal at the strainers and membranes. Strainers can remove material greater than 200 microns (0.2mm) in size. The purpose of the strainers is to protect the membranes from heavy solids and large particles.



Ultrafiltration Membranes

Ultrafiltration (UF) membranes are used in a pressure driven separation process where microporous membranes remove contaminants (bacteria, viruses, Cryptosporidium and Giardia) from the water. The process forces water through the UF membranes, leaving contaminants behind. Once enough contaminants accumulate on the feed side of the membrane, a cleaning process occurs to bring the membrane back to a good working pressure. The first stage process recovers approximately 95% of the water. The second stage membrane, when in use, can recover up to 99% of the total water. However, due to operational issues, the second stage membrane was not used in 2022.

Both ultraviolet (UV) and chlorination disinfection processes are used on the finished water. Ultraviolet disinfection inactivates Cryptosporidium, Giardia, and viruses. UV light disinfects water by altering the DNA or RNA of pathogens and destroys their ability to reproduce. Chlorination inactivates viruses. pH adjustment is followed thereafter, from the above steps and before it gets pumped into the reservoirs which then goes to the distribution system. The water is continually sampled to provide water quality assurance and to meet regulatory requirements.



Geobags

The waste water produced from the backwashing of the membranes are treated on site using Geotubes. These dewatering cells, along with the addition of a polymer, bind the small particles from the waste into larger ones that are filtered out. The solids stay in the bags, the water percolates out. When these bags are full the material will be transported to the landfill to be used as cover material.



Groundwater Wells

The City's groundwater is pumped from a confined quadra sands aquifer. The wells run alongside the railway tracks from Trill Drive to the City's boundary in the southwest. The City of Parksville currently has 16 production wells (see **Appendix A** for well locations). Springwood Well #5 will have the meter replaced in 2023, Railway Well #8 will be fixed in 2023.

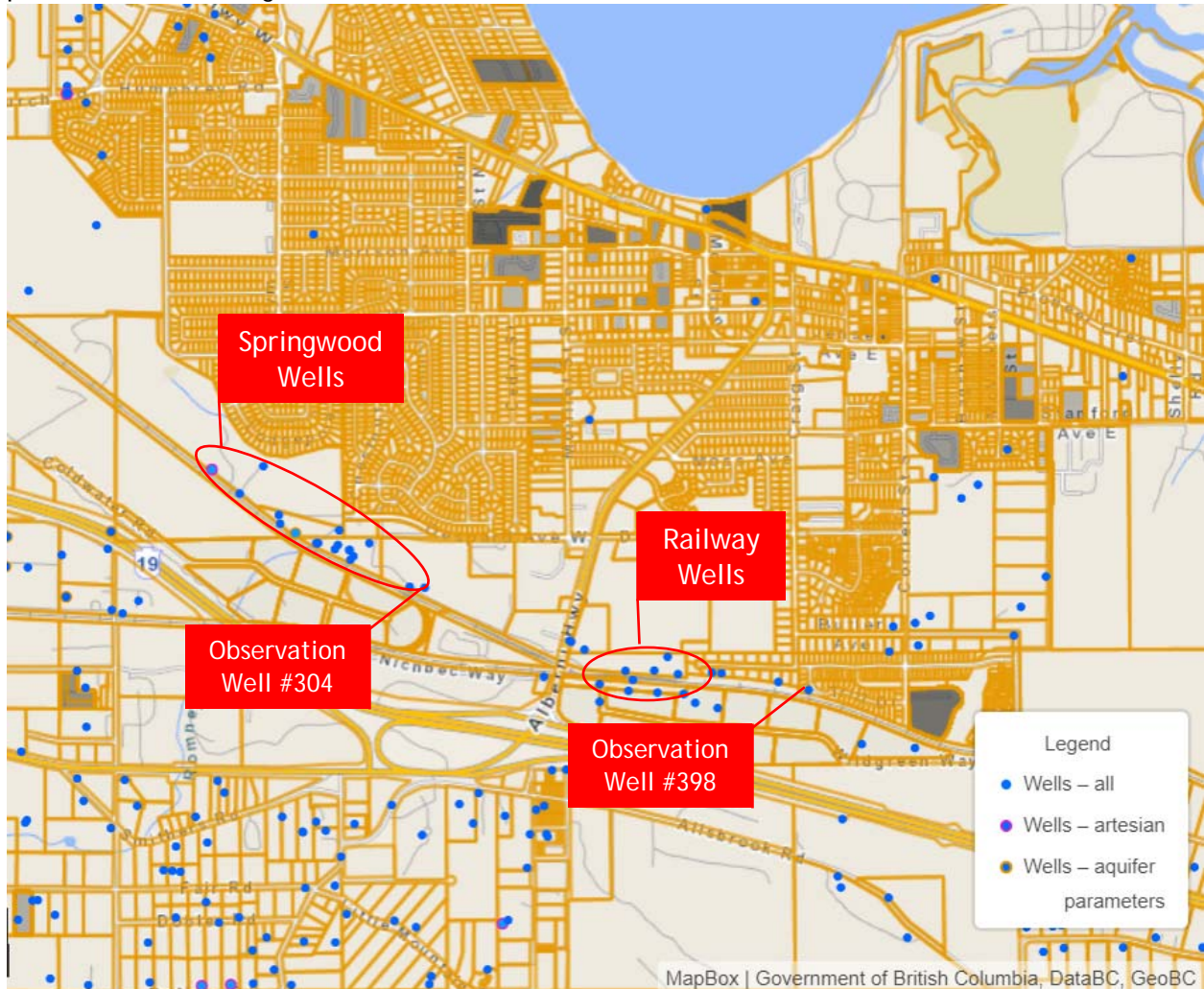
Pump Depth and Production Information (updated Jan. 2023)

Well Name	Pump Intake (m)	2022 Annual Production (m ³)
Springwood Well #1	35.00	3,792
Springwood Well #3	29.00	33,052
Springwood Well #5	31.33	Under Service
Springwood Well #6	31.80	2,618
Springwood Well #7	22.35	188,125
Springwood Well #8	23.71	38,992
Springwood Well #9	Casing Installed	Future Development
Springwood Well #10	30.18	55,043
Springwood Well #11	30.42	78,779
Railway Well#1	34.50	45,242
Railway Well#2	33.54	75,817
Railway Well#3	38.46	31,216
Railway Well#4	36.00	28,370
Railway Well#5	36.00	49,076
Railway Well#6	35.00	78,664
Railway Well#7	35.00	52,304
Railway Well #8	35.68	Under Service
Industrial Well#8	Irrigation Use Only	Irrigation Use Only

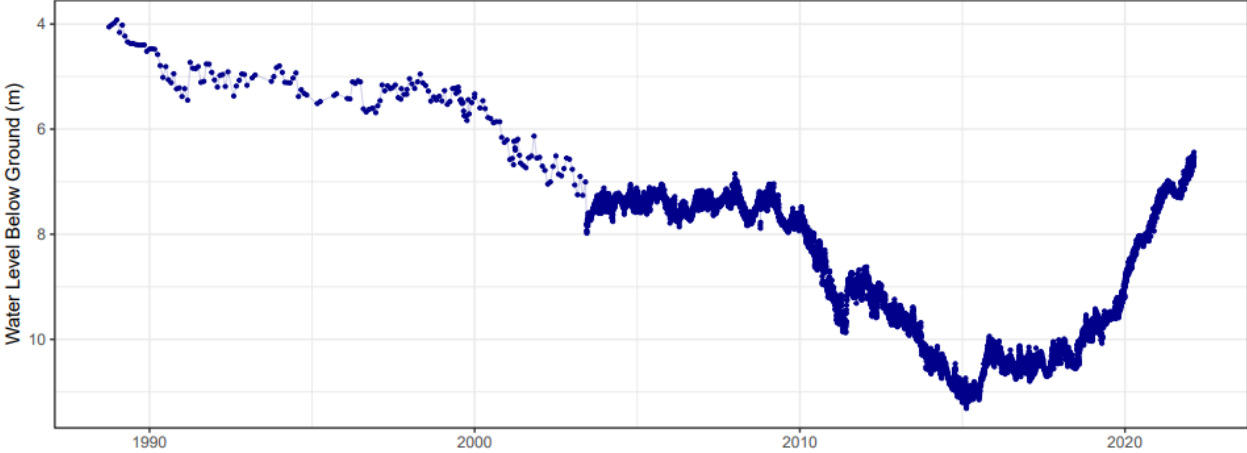
Provincial Monitoring Wells

Observation wells #304 and #398 are showing signs of recovery. These wells are in the same aquifer as the City of Parksville Springwood and Railway Wells.

Location of City wells and observation wells are below, as well as the snapshot of the provincial monitoring wells.



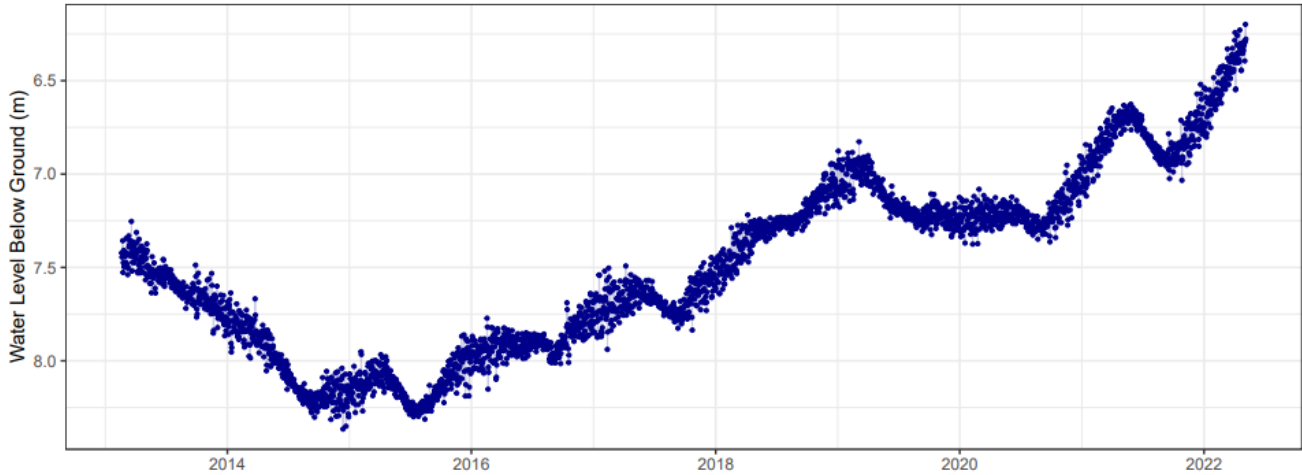
OBS WELL 304
Water Level Snapshot



Note: True data are marked with a dot, the thin line connecting points is a visual aid only and does not represent true observations. The full data set can be downloaded via the BC Data Catalogue or the BC Real-time Water Data tool.



OBS WELL 398
Water Level Snapshot















Note: True data are marked with a dot, the thin line connecting points is a visual aid only and does not represent true observations. The full data set can be downloaded via the BC Data Catalogue or the BC Real-time Water Data tool.



Water Production

The following table provides a summary of the ERWS Water Treatment Plant and groundwater well production. With the water treatment plant online, the well water production was reduced by approximately 40% since 2019 (but overall by ~25%) as more water is pulled from the river during the winter, high river flow months.

2022	2021	2020	2019	
				Annual Water Consumption (m ³)
2,578,157	2,595,015	2,358,518	2,233,643	
				Annual Production: Well (m ³)
718,757	666,455	720,158	1,141,067	
				Annual Production: Arrowsmith Dam via Englishman River (m ³)
1,859,400	1,925,560	1,638,360	1,092,575	

Water Distribution System

Reservoirs

Treated water from the river and wells is stored in four reservoirs. Reservoirs #1, #2 and #4 are located at the Springwood Water Complex on Despard Avenue while Reservoir #5 is located in the Top Bridge Park.

The reservoirs at Springwood are concrete structure with two being partially below ground and one above ground. The Top Bridge Reservoir is a glass fused steel tank.

A summary of the reservoir storage capacity and status is provided in the following table.

Reservoir #4



Summary of Reservoir Capacity

Reservoir No.	Location	Capacity	Type	Date
1	Springwood	616 m ³ (135,500 Imp. gal)	Concrete	1967
2	Springwood	2023 m ³ (445,000 Imp. gal)	Concrete	1968
4	Springwood	4559 m ³ (1,000,000 Imp. gal)	Concrete	1979
5	Top Bridge	4300 m ³ (950,000 Imp. gal)	Glass Fused Steel Tank	2007

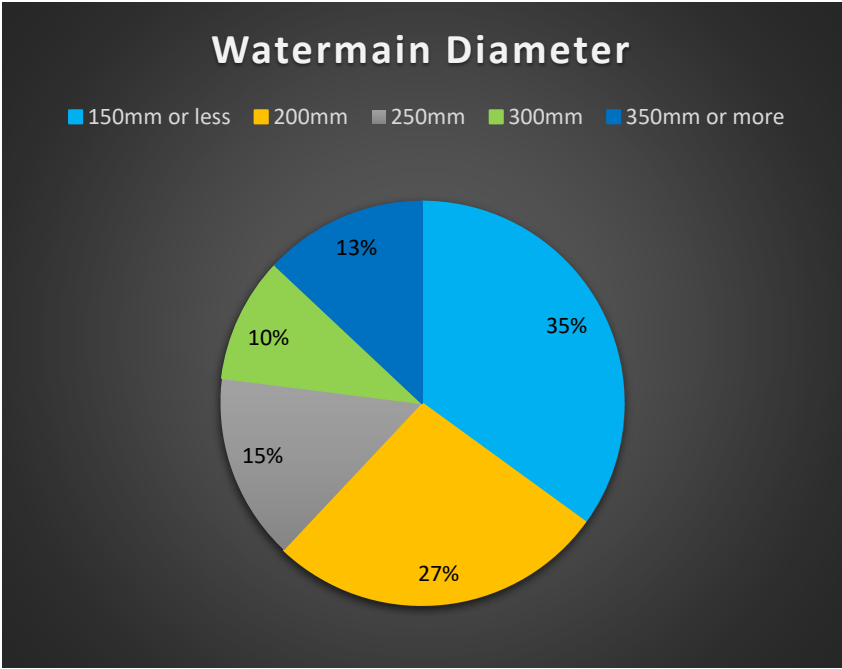
Distribution System

The distribution system consists of 112.42 km of pipe, sizes range from 100 mm (4") to 400 mm (16"). There are 557 fire hydrants and one pressure reducing valve (PRV).

Like other municipalities, the aging infrastructures are being replaced through capital and development works and services. The following shows the size, age, and material of the mains in the Parksville water system in 2022.

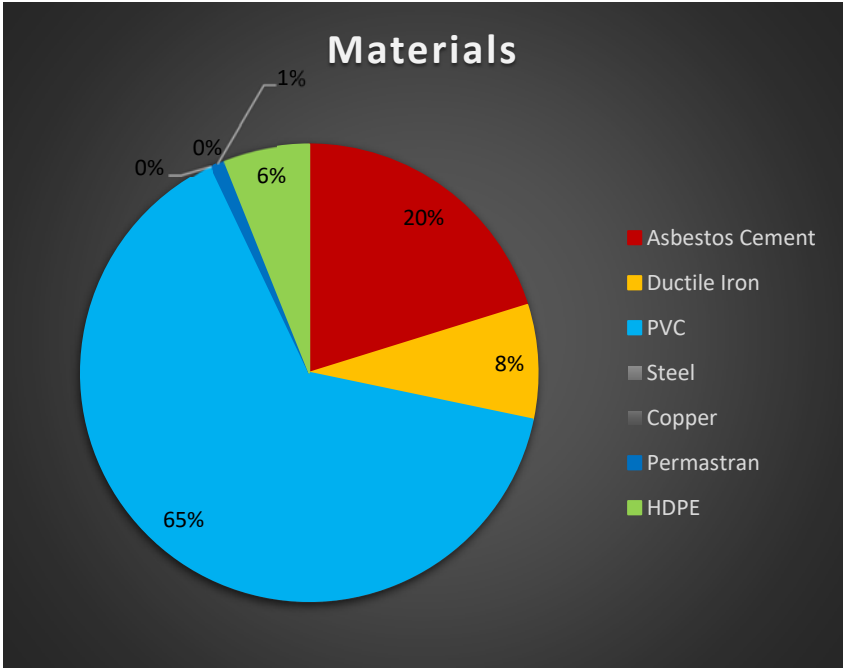
2022 Watermain Diameter Proportions

Diameter	N° of Pipes	Distance (km)	Percentage	Type
150mm or less	676	39.39	35%	Distribution Main 62%
200mm	614	30.5	27%	
250mm	286	16.47	15%	Supply Mains 38%
300mm	209	11.8	10%	
350mm or more	178	14.26	13%	
Total		112.42 km		



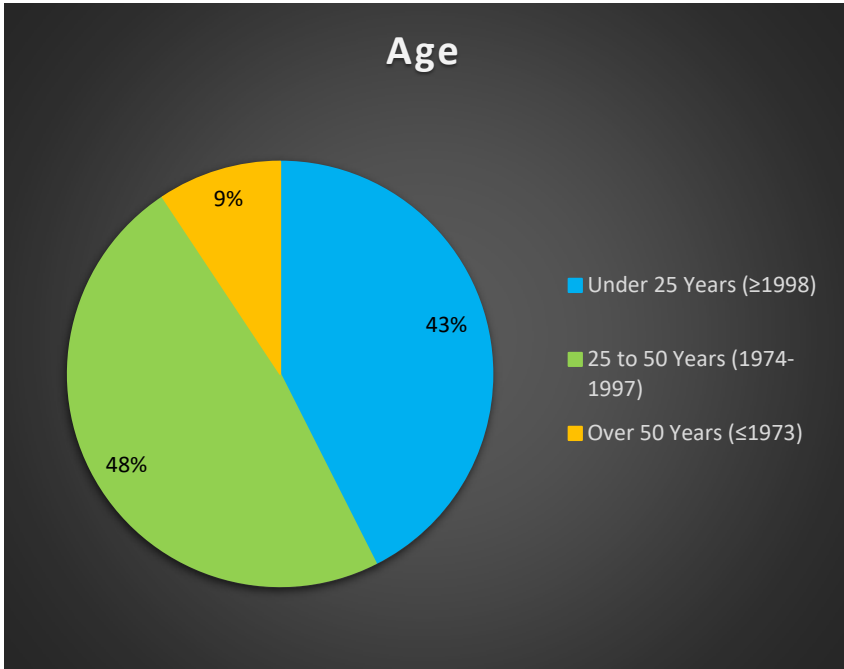
2022 Watermain Material Proportions

Material Type	Distance (km)	Percentage
AC	22.7	20%
Ductile Iron	9.3	8%
PVC	72.2	64%
Steel	0.8	0%
Copper	0.1	0%
Permastran	0.7	1%
HDPE	6.6	6%
Total	112.42km	



2022 Watermain Age Proportions

Age	N° of Pipes	Distance (km)	Percentage
Under 25 Years (≥ 1998)	996	47.83	43%
25 to 50 Years (1974-1997)	847	54.1	48%
Over 50 Years (≤ 1973)	120	10.49	9%
Total	112.42 km		



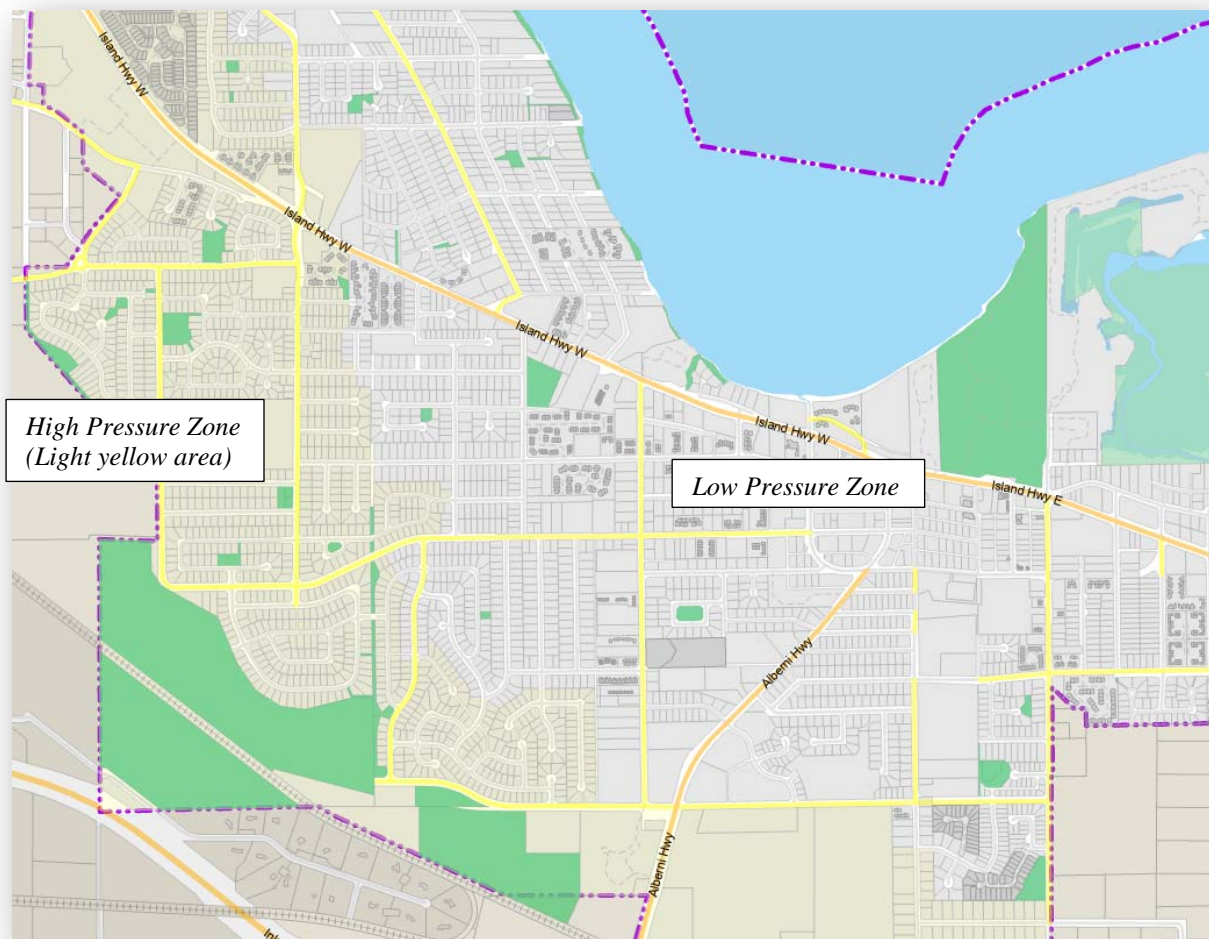
Pressure Zones

The City of Parksville is divided into two pressure zones, a low- and high-pressure systems. The low pressure is gravity-fed based on the elevation of Reservoirs #4 and #5. With the top reservoir water level of 73.74 m above sea level (geodetic), it gives a range of 55 psi to 85 psi throughout the system, depending on the geographic location.

The high-pressure system was developed for areas with higher elevation that do not have sufficient pressures or flows to meet firefighting flows and service pressures. The zone is supplied from four pumps, a 15 hp, two 40 hp and a 100 hp. These pumps are controlled through the SCADA system which automatically monitors flows and turns on however many pumps it needs to meet the flow requirements.

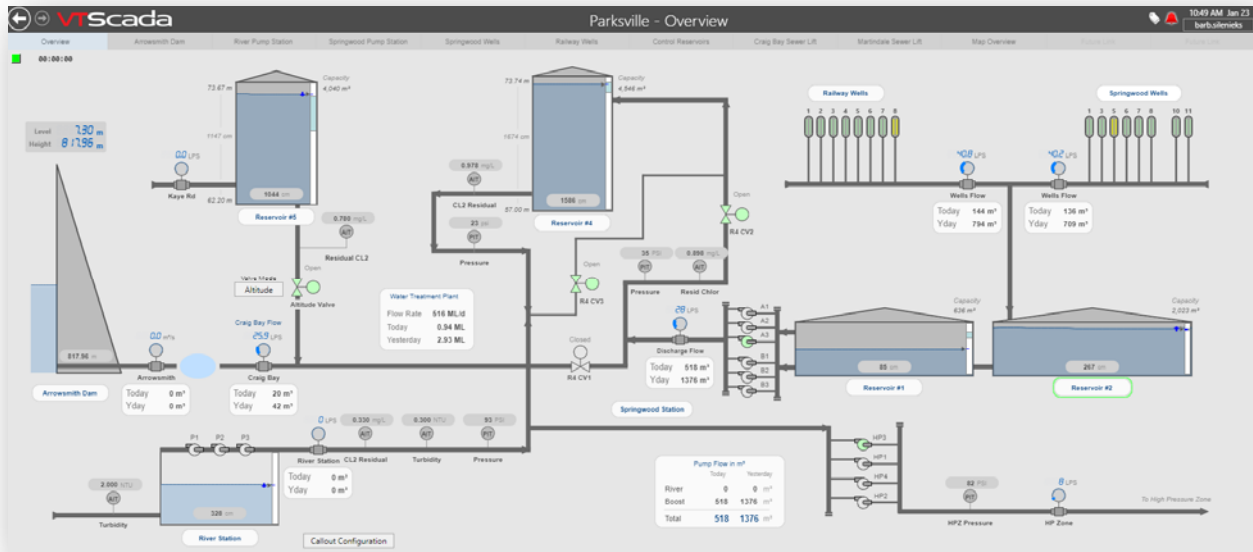
To maintain a balance between high and low pressures but keep a safe pressure in the high-pressure system, a pressure reducing valve (PRV) was installed to drop the pressure from 80 psi to 60 psi.

Pressure Zone Map



Supervisory Control and Data Acquisition (SCADA) System

The water treatment plant, water distribution system and wells are controlled by a supervisory control and data acquisition system (SCADA). This system allows the operators to monitor water treatment plant functions, reservoir levels, the status and flows of pumps, and chlorine residuals. Operators can change set points and check on the system remotely. Alarms are automatically called out to City staff who monitors the system 24 hours a day, 7 days a week. The water distribution SCADA hardware upgrade is to be completed in 2023, and the software was upgraded in 2022 to ensure this critical technology is current and resilient.



WATER QUALITY TESTING AND REPORTING

Sampling and Testing

Testing and sampling are conducted daily in-house for the water treatment plant. Raw water is tested for temperature, turbidity, colour, pH, and UVT. Treated water is tested for free chlorine, turbidity, colour, pH, and UVT.



Bacteriological

As required by Island Health, City staff takes bacteriological samples from 16 test ports (**Appendix A**) around the City of Parksville and a sample from the water treatment plant every month. These samples are tested at the Island Health labs.

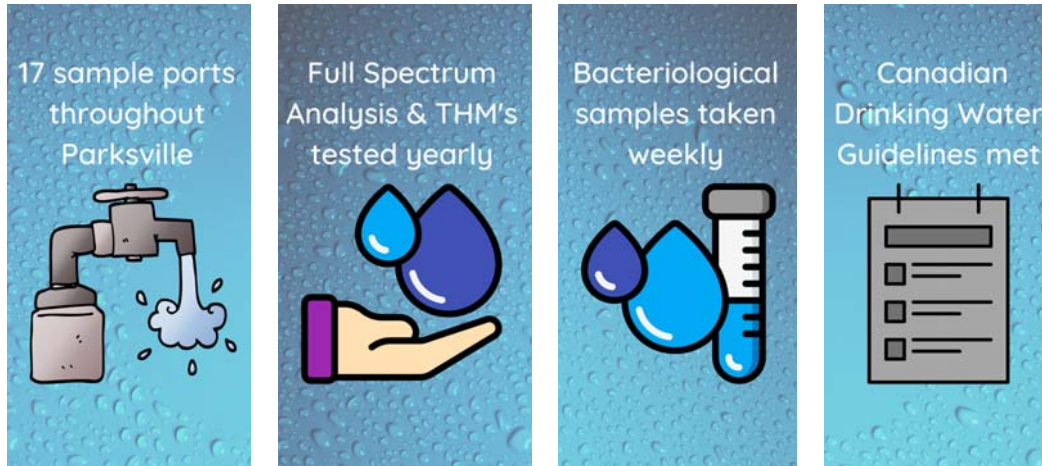
Refer to **Appendix C** for 2022 test results and below link for a detailed list of water samples: <https://www.islandhealth.ca/learn-about-health/drinking-water/water-sampling-results>

Full Spectrum Analysis

In addition to monthly sampling throughout the distribution system, the City also sends samples for a full spectrum analysis to an accredited lab. The results are provided in **Appendix E** which included parameters such as total metals, conventional parameters (pH, turbidity, hardness), and microbiological analysis. All results meet or exceed the Canadian Drinking Water Guidelines.

The source water is aesthetically acceptable as set by the "Guidelines for Canadian Drinking Water Summary Table". Aesthetic qualities apply to certain substances or characteristics such as high iron content which will stain fixtures red or manganese which will stain black.

Hardness in the water comes from calcium carbonate (CaCO_3). The river water is considered "soft" under the guidelines and the well water is "moderate".



Trihalomethane Analyses

The City also takes trihalomethanes (THMs) samples four times a year. THMs are disinfection by-products that form when chlorine is added to water containing elevated levels of natural organic matter. Refer to **Appendix D** for the results, which are within the maximum acceptable concentration (MAC) of 0.1 mg/L set by the Canadian Drinking Water Quality Guidelines.

COMPLAINTS AND INCIDENTS

Water complaints are generally from loss of flow, low service pressures, water service or main leaks, and water quality.

There were 62 calls related to water shutoff, where majority of the calls were during watermain tie-ins. Notifications are distributed prior to the construction work.

There were 11 calls related to water leaks and most were from services or water meters. Repairs were carried out accordingly.

There were 11 complaints from pressure drop and generally the cause for those were from faulty PRV (responsibility of the homeowner). There were a few pressure-drop instances where staff had to flush the line to clear debris.

There were 8 water quality complaints, and a few occurred during watermain flushing and fire hydrant maintenance. Residents noticed “brown or dirty” water and crews responded by either re-flushing the mains through a hydrant or a flush out at a location closest to the dead end or advising the homeowner to run an outside tap for a few minutes to clear the water.

There were complaints about the taste of chlorine in the water. Chlorine residuals are tested weekly throughout the system and are kept at a safe level.

There were two calls related to water hardness. Mostly contributed to new homeowners from other municipalities who are used to different water composition. There was also a call concerning buildup in washing machines and toilet bowls although the water is only considered “moderately hard” on the hardness scale.

ROUTINE MAINTENANCE PROGRAM

Routine maintenance and inspection of the water system can help protect water quality, ensure everything is operating properly, protect and prolong the life of the system, ensure that the system operates efficiently, and reduce the risk of costly and disruptive malfunctions.

Distribution

- Conduct watermain flushing between February and April using unidirectional flushing method
- Clean air relief valves
- Clean fire line meters
- Carry out Fire Hydrant Service Program. Fire hydrants are completely disassembled and inspected on a three-year rotation. Hydrants are painted as needed
- Test and repair backflow prevention devices if needed

Wells

- Rehabilitate as needed
- Inspect and replace pumps and motors as needed
- Refill Springwood Well #1 chlorine tank
- Complete water sampling and testing as per regulations
- Calibrate flow meters and level transducers

Old River Intake

- Calibrate turbidity analyzers to validate and improve accuracy

Reservoirs

- Clean reservoirs. Conventional method is used for Reservoirs #1 and #2. Reservoirs #4 and #5 cleaning are completed using divers every five years
- Clean sustaining valves monthly

Pump Stations

- Check pumps and chlorination system
- Calibrate chlorine analyzers and turbidimeters

Springwood Pump Station



Water treatment Plant

Raw Water Pump Station

- Clean intake structure from debris buildups
- Service pumps, air burst, sand separator, and analyzers
- Record power consumption usage and test power generator monthly

Strainers and Coagulant (pretreatment system)

- Monitor and ensure coagulant dosing is carrying out properly. Flush and clean the line when not in use
- Monitor strainer's differential pressure and check for leaks. Service and conduct maintenance to improve system performance

Strainers at the Water Treatment Plant



Membrane System

- Check blowers and backwash pumps
- Carryout maintenance and recovery cleans for ultrafiltration membrane trains
- Service turbidity analyzers

Disinfection System

- Monitor the ultraviolet transmittance trend to ensure it meets log removal. Service the instrument as necessary to improve performance
- Service the ultraviolet units twice a year
- Service chlorine analyzer

Finished Water System

- Service and conduct vibration monitoring for high lift pumps

Chemical and Auxiliary Systems

- Inspect and repair leaks from chemical skids
- Check and service exhaust fans
- Inspect and test eyewash station monthly
- Check chemical tank levels monthly and refill as needed

Mechanical and Electrical Equipment

- Clean and service motor control centre (MCC), variable frequency drives, backup batteries
- Exercise and adjust valves as needed

UV Units at the Water Treatment Plant



PROGRAMS

Cross Connection Control Program

The Cross Connection Program aims to protect the water supply system by identifying and addressing potential hazards from industrial, commercial, and institutional users. Property owners are responsible for any cost related to the installation, replacement, and testing of approved backflow devices.

A tracking program called FAST is used to track over 500 registered devices around the City (both City-owned and privately-owned devices). Property owners are required to submit an annual test report to the City.

Commonly used backflow preventers



Reduced Pressure Assembly (RP): Used for severe hazard application such as properties with wells, medical facilities, auto body shop, auto repair shop, carwash, RV hookup locations and dump stations, etc.



Double Check Valve Assembly (DCVA): Used for moderate or minor hazard applications such as irrigation systems, apartment buildings, dealerships, arena, restaurant, office building, etc.



Hose Connection Vacuum Breaker (HCVB): Used for minor hazards only on hose bibs. HCVB is effective against backflow caused by back siphonage and low head pressure due to terminal end of a hose being elevated above the HCVB. All hose bibs must have a HCVB installed.

Emergency Response Program

The City of Parksville has three Emergency Plans pertaining to the water system, Dam Emergency Plan, Water Distribution Emergency Plan, and Water Treatment Plant Emergency Plan. This is to ensure the safety and security of its water system. All plans are all part of the corporate emergency framework. These documents outline the strategies to deal with events such as contamination of water supply, pump failures, and turbidity events. The Arrowsmith Dam Emergency Plan was revised in 2022.

Watershed Protection Program

The Englishman River flows in an easterly direction from Mount Arrowsmith and discharges into the Salish Sea, north of Craig Bay. The highest elevation in the watershed is Mount Arrowsmith, at 1819 metres and has a drainage area of 324 km².

The South Englishman River, Swane Creek, Morison Creek, Shelly Creek, and Centre Creek all drain into the Englishman River. The Englishman River is an important fisheries river and through the Arrowsmith Water Service, provides water supply for the City of Parksville and the Nanoose Peninsula. Water is stored behind a dam at Arrowsmith Lake and released as needed as per the Ministry of Forests Provisional Operating Rule. Fish in the Englishman River

includes trout, steelhead, and salmon. The Englishman River is identified as a 'sensitive stream' requiring special management attention under the *Fisheries Protection Act*.

Englishman River Watershed



PROJECTS AND IMPROVEMENTS

2022 Operations Projects and Improvements

- Re-wired Springwood Well #1
- Continued replacement of residential water meters (3/4" size)
- Distribution SCADA System was upgraded
- Added an Operator Level 2 to the Water treatment Plant
- Optimized HMI/SCADA system to suit the needs of the water treatment plant staff and improve services including strainer cleaning and strainer auto flush
- Replaced piping for the sulphuric acid skid
- Installed a new sampling location for the UV system
- Improved valve spare parts list for the Water Treatment Plant
- Installed a new turbidity meter in the Englishman River upstream of the intake
- Purchased new piezometer reader
- Cleaned secondary waste tank
- Installed a temporary coagulant supply line
- Repaired log boom at the dam
- Cleared debris from the dam spillway

2023 Operations Projects and Improvements

- Continue with the Englishman River 5-Year Fish Monitoring Program
- Continue to update the water meter route maps to improve efficiency
- Consultant to complete:
 - Water Master Plan
 - Arrowsmith Dam Safety Review
 - Groundwater at Risk of Containing Pathogens study for the Railway Wells
- Replace the motor and pump at Railway Well #8
- Continue with the Water Meter Replacement Program
- Install 6" fire screen at a resort and replace chamber lid
- Install 3" water connection at Resort Way
- Start a preventative maintenance program for valves and actuators at the WTP and the raw water pump station
- Continue optimization work for the SCADA system
- Relocate chlorine day tank at Springwood Well #1 to an outside building

- Flush all groundwater wells
- Re-plumb carrier water line for the coagulant system
- Increase sampling program and check that the corrosion control methods are working
- Continue testing Geobag to improve its use

FREQUENTLY ASKED QUESTIONS

Water Pressure

My water pressure is too high. What can I do?

It is a good practice to install a pressure reducing valve (PRV) to control the pressure in your home or business. PRV's are required for buildings where pressure is expected to be greater than 80 psi.

What is a pressure reducing valve? Do I have a PRV? Where would it be? What does it look like?

A pressure reducing valve is an assembly installed in a plumbing system to regulate water pressure. Most homes should be equipped with a PRV as per the BC Plumbing Code.

To locate or to determine if you have a PRV, first locate where your water service line comes into your home or business. There should be a water shutoff valve and the water piping could branch out with one going to the outdoor tap and the other leading into the internal plumbing; a PRV would be located right before it splits up. It may be in a crawl space or near your hot water tank.



Household PRV's are about 3" tall and generally look like this:

I don't have a PRV. How do I find out if I need one?

If you are experiencing significant pressure fluctuations or water flow from fixtures appear lower than normal, you may need a PRV. Contact a plumber to inspect and carryout the work accordingly.

How do I know if my existing PRV has failed?

The most common signs that a PRV is beginning to fail are:

- Water pressure surges
- Noted increase/decrease in pressure at fixtures
- Flow rate of fixtures is higher than flow rating for fixture.
- Frequent leaks or dripping faucets (high water pressure can wear out valves and cause leaks)
- Sudden loss of water pressure (an adjustment to the PRV may resolve the issue)
- Unexplained loss of water flow (an adjustment to the PRV may resolve the issue)

Can my PRV be adjusted or repaired?

You can contact a plumber to have your PRV adjusted or repaired. However, if your PRV is older, it may be difficult or impossible to adjust. You should then consider replacing your PRV.

Water Leaks

How do I know if I have a water leak?

Drainage problems are often mistaken for water leaks. If water is coming out of the ground after heavy or continuous rainfall, it is unlikely to be a water leak. If the weather has been dry, the water coming up is likely a water leak.

Is the leak on my property or the City's?

Leaks that are between the water main and property lines are the City's responsibility. Crews will turn off the water at the property shut-off valve to determine where the leak is. If the leak stops after closing the property shut-off valve, then the leak is on the homeowner's side. The City does not repair leaks on private property. Various local plumbing companies provide this service.

Watermain Flushing

How will water main flushing affect me?

Usually, you will not be aware that flushing is even taking place in your neighborhood. Flushing is generally conducted during work hours. However, to minimize service disruption to the downtown core and/or highly developed areas, nighttime flushing is also carried out by our crew.

When flushing is underway, short periods of low pressure and discoloured water may occur. Both will be temporary and water remains safe to use and drink. Please minimize your water use if discoloured water is noticed as the sediments may stain your laundry or plug your household PRV. To clear your water lines, turn on your cold water tap until the water runs clear.

Why is my water cloudy after flushing?

Water is cloudy when air gets in it and makes tiny bubbles. These bubbles are harmless and will disappear once the water sits for a few minutes.

Water Quality

How will this affect me?

Usually, you will not be aware that flushing is even taking place in your neighbourhood. Flushing is generally conducted between February and April.

How would people be notified if a water quality problem arose?

If the quality of our drinking water presented a health risk, the City would immediately issue a notice to the community through the media and other available resources. The City would

coordinate with all available agencies such as Island Health, RDN, and the fire department to ensure the community is aware of any health risks.

How do I know my water is safe to drink?

To ensure our drinking water is clean and safe to drink, the City monitors the source waters and the distribution system with both online instrumentation at points of disinfection and a comprehensive sampling program. Weekly samples are taken at various locations throughout the City and submitted to Island Health for bacterial analysis. As well, the City tests for water quality according to the *BC Drinking Water Protection Act* and *Guidelines for Canadian Drinking Water Quality*.

Why does my water sometimes look brown?

Brown water from your tap is usually caused by a change to the normal flow in a watermain. The change can occur from opening or closing a watermain valve, opening a fire hydrant, or a watermain break. The brown colour is from normal sediment in the pipes coming off the bottom and flowing with the water to your tap. Try flushing out the brown water by running your cold water for 10 to 15 minutes. If the brown water doesn't clear, it may be caused by old, rusty pipes inside the building or from a failing hot water tank.

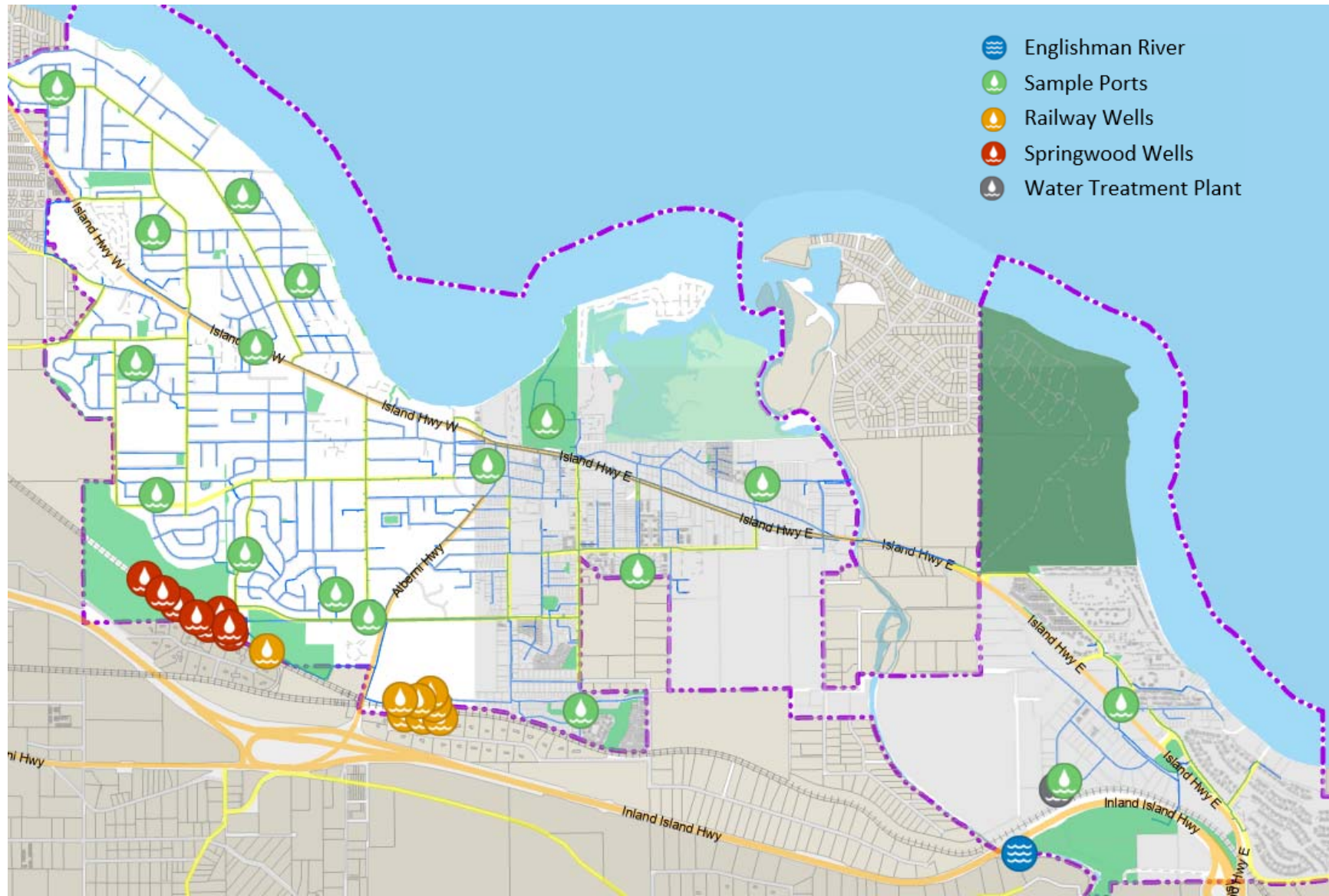
Why does my water sometimes look "milky" and "cloudy"?

Cloudy water is usually the result of air in the watermains. Air may be introduced into the mains during repairs or from opening fire hydrants. Although it is temporary, it may take several hours for the air to dissipate. To check, fill a glass of water and leave it on the counter for a few minutes. The water should clear. This type of cloudy water is safe to drink.

Why do my toilet and bathroom tiles sometimes turn pink?

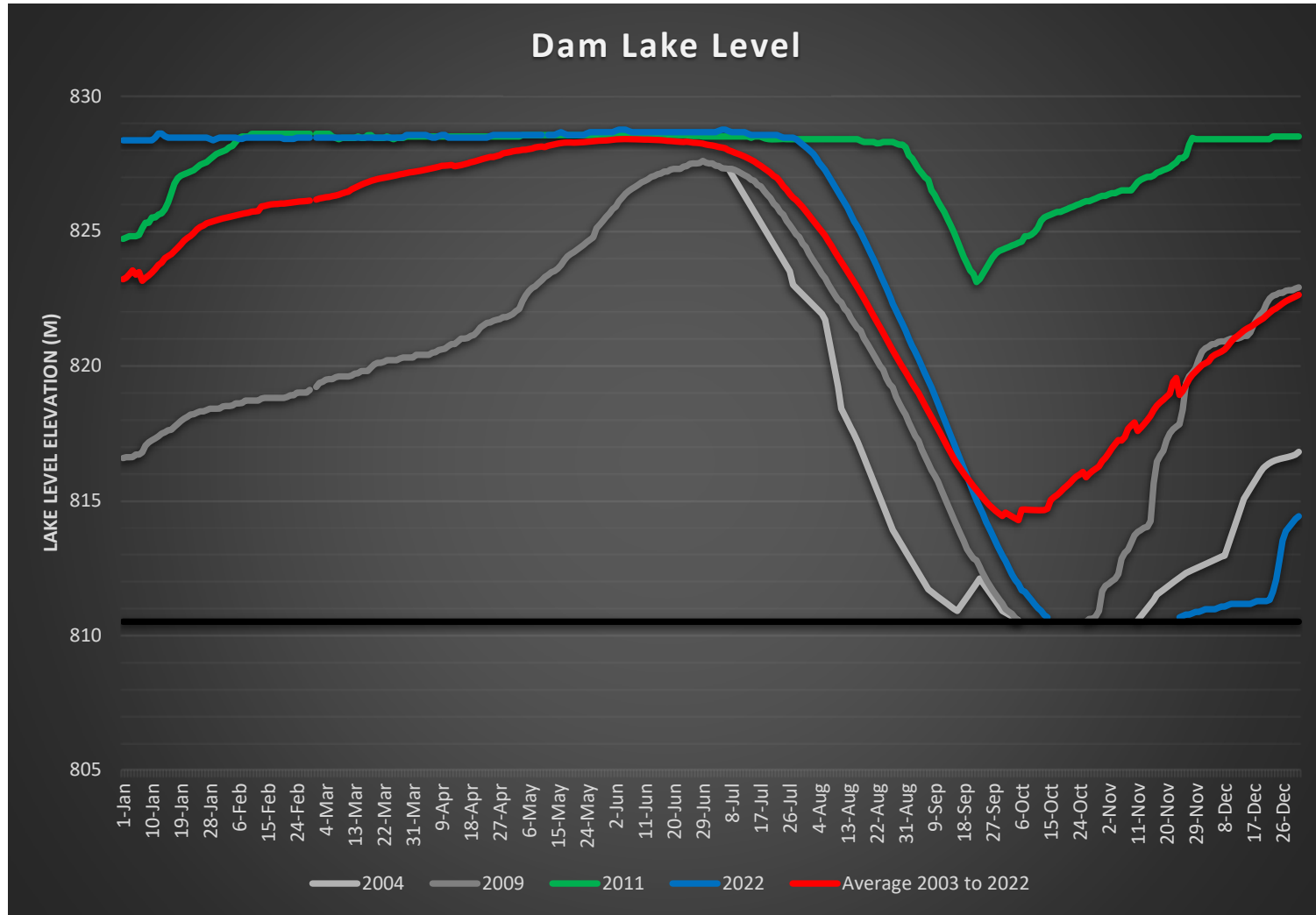
According to the American Water Works Association (AWWA), the pink residue is likely associated with naturally occurring airborne bacteria that produces a pinkish film and sometimes a dark gray film, on surfaces that are regularly moist, including toilet bowls, showerheads, sink drains and tiles. The problem is more common in humid regions. Regular cleaning is the best solution to keep these surfaces free from the bacterial film.

Appendix A - Water Source and Sampling Map



Appendix B - Dam Lake Levels

The logger is set to read the lake level only until the High-level outlet elevation, shown below as the purple line.



Appendix C - 2021 Bacteriological Results

Target: LT1 – Less than 1 (no detectable bacteria)

QRWRT- Sample exceeded 30 hours from time of collection, results may not be valid.

Location	Date	Total Coliform	E.Coli
1247 Arbutus Road	January 5, 2022	QRWRT	QRWRT
Island Highway by Temple	January 5, 2022	QRWRT	QRWRT
770 Soriel	January 5, 2022	QRWRT	QRWRT
271 Chestnut	January 5, 2022	QRWRT	QRWRT
Works Yard	January 10, 2022	LT1	LT1
Top of Corfield	January 10, 2022	LT1	LT1
401 Moilliet	January 10, 2022	LT1	LT1
613 Chinook	January 10, 2022	LT1	LT1
1247 Arbutus Road	January 11, 2022	LT1	LT1
Island Highway by Temple	January 11, 2022	LT1	LT1
770 Soriel	January 11, 2022	LT1	LT1
271 Chestnut	January 11, 2022	LT1	LT1
330 Park View	January 18, 2022	LT1	LT1
450 Wisteria	January 18, 2022	LT1	LT1
Community Park	January 18, 2022	LT1	LT1
Daffodil at Camas	January 18, 2022	LT1	LT1
851 Temple	January 25, 2022	LT1	LT1
378 Kingsley	January 25, 2022	LT1	LT1
1247 Arbutus Road	February 2, 2022	LT1	LT1
Island Highway by Temple	February 2, 2022	LT1	LT1
770 Soriel	February 2, 2022	LT1	LT1
271 Chestnut	February 2, 2022	LT1	LT1
Works Yard	February 8, 2022	LT1	LT1
Top of Corfield	February 8, 2022	LT1	LT1
401 Moilliet	February 8, 2022	LT1	LT1
613 Chinook	February 8, 2022	LT1	LT1
450 Willow	February 15, 2022	LT1	LT1
Community Park	February 15, 2022	LT1	LT1
Daffodil at Camas	February 15, 2022	LT1	LT1
330 Park View	February 22, 2022	LT1	LT1
851 Temple	February 22, 2022	LT1	LT1
378 Kingsley	February 22, 2022	LT1	LT1
1247 Arbutus Road	March 1, 2022	LT1	LT1
Island Highway by Temple	March 1, 2022	LT1	LT1
271 Chestnut	March 1, 2022	LT1	LT1
770 Soriel	March 1, 2022	LT1	LT1

Location	Date	Total Coliform	E.Coli
Top of Corfield	March 8, 2022	LT1	LT1
613 Chinook	March 8, 2022	LT1	LT1
Works Yard	March 8, 2022	LT1	LT1
401 Moilliet	March 15, 2022	LT1	LT1
Community Park	March 15, 2022	LT1	LT1
450 Wisteria	March 22, 2022	LT1	LT1
330 Park View	March 22, 2022	LT1	LT1
Daffodil at Camas	March 22, 2022	LT1	LT1
378 Kingsley	March 29, 2022	LT1	LT1
851 Temple	March 29, 2022	LT1	LT1
1247 Arbutus Road	April 5, 2022	LT1	LT1
Island Highway by Temple	April 5, 2022	LT1	LT1
770 Soriel	April 5, 2022	LT1	LT1
271 Chestnut	April 5, 2022	LT1	LT1
Works Yard	April 12, 2022	LT1	LT1
Top of Corfield	April 12, 2022	LT1	LT1
401 Moilliet	April 12, 2022	LT1	LT1
613 Chinook	April 12, 2022	LT1	LT1
Community Park	April 19, 2022	LT1	LT1
450 Wisteria	April 19, 2022	LT1	LT1
Daffodil at Camas	April 19, 2022	LT1	LT1
378 Kingsley	April 27, 2022	LT1	LT1
330 Park View	April 27, 2022	LT1	LT1
851 Temple	April 27, 2022	LT1	LT1
1247 Arbutus Road	May 3, 2022	LT1	LT1
Island Highway by Temple	May 3, 2022	LT1	LT1
271 Chestnut	May 3, 2022	LT1	LT1
770 Soriel	May 3, 2022	LT1	LT1
1247 Arbutus Road	June 7, 2022	LT1	LT1
Island Highway by Temple	June 7, 2022	LT1	LT1
770 Soriel	June 7, 2022	LT1	LT1
271 Chestnut	June 7, 2022	LT1	LT1
Works Yard	June 14, 2022	LT1	LT1
Top of Corfield	June 14, 2022	LT1	LT1
401 Moilliet	June 14, 2022	LT1	LT1
613 Chinook	June 14, 2022	LT1	LT1
Community Park	June 21, 2022	LT1	LT1
450 Wisteria	June 21, 2022	LT1	LT1
Daffodil at Camas	June 21, 2022	LT1	LT1
330 Park View	June 28, 2022	LT1	LT1
378 Kingsley	June 28, 2022	LT1	LT1
851 Temple	June 28, 2022	LT1	LT1

Location	Date	Total Coliform	E.Coli
1247 Arbutus Road	July 5, 2022	LT1	LT1
Island Highway by Temple	July 5, 2022	LT1	LT1
770 Soriel	July 5, 2022	LT1	LT1
271 Chestnut	July 5, 2022	18	LT1
136 Memorial	July 5, 2022	LT1	LT1
271 Chestnut	July 13, 2022	LT1	LT1
613 Chinook	July 13, 2022	LT1	LT1
Works Yard	July 13, 2022	LT1	LT1
Top of Corfield	July 13, 2022	LT1	LT1
401 Moilliet	July 13, 2022	LT1	LT1
Community Park	July 19, 2022	LT1	LT1
450 Wisteria	July 19, 2022	LT1	LT1
Daffodil at Camas	July 19, 2022	1	LT1
136 Memorial	July 26, 2022	LT1	LT1
330 Park View	July 26, 2022	LT1	LT1
851 Temple	July 26, 2022	LT1	LT1
Community Park	July 26, 2022	LT1	LT1
Daffodil at Camas	July 26, 2022	LT1	LT1
378 Kingsley	July 26, 2022	LT1	LT1
1247 Arbutus Road	August 2, 2022	LT1	LT1
Island Highway by Temple	August 2, 2022	LT1	LT1
770 Soriel	August 2, 2022	LT1	LT1
271 Chestnut	August 2, 2022	LT1	LT1
Top of Corfield	August 10, 2022	LT1	LT1
401 Moilliet	August 10, 2022	LT1	LT1
613 Chinook	August 10, 2022	LT1	LT1
Works Yard	August 10, 2022	LT1	LT1
Daffodil at Camas	August 10, 2022	LT1	LT1
Community Park	August 16, 2022	LT1	LT1
450 Wisteria	August 16, 2022	LT1	LT1
Daffodil at Camas	August 23, 2022	LT1	LT1
330 Park View	August 23, 2022	LT1	LT1
136 Memorial	August 30, 2022	QRWRT	QRWRT
378 Kingsley	August 30, 2022	QRWRT	QRWRT
851 Temple	August 30, 2022	QRWRT	QRWRT
1247 Arbutus Road	September 6, 2022	LT1	LT1
Island Highway by Temple	September 6, 2022	LT1	LT1
770 Soriel	September 6, 2022	LT1	LT1
271 Chestnut	September 6, 2022	LT1	LT1
Works Yard	September 13, 2022	LT1	LT1
401 Moilliet	September 13, 2022	LT1	LT1
613 Chinook	September 13, 2022	LT1	LT1

Location	Date	Total Coliform	E.Coli
Top of Corfield	September 13, 2022	LT1	LT1
Daffodil at Camas	September 20, 2022	LT1	LT1
Community Park	September 20, 2022	LT1	LT1
450 Wisteria	September 20, 2022	LT1	LT1
330 Park View	September 27, 2022	LT1	LT1
136 Memorial	September 27, 2022	LT1	LT1
378 Kingsley	September 27, 2022	LT1	LT1
851 Temple	September 27, 2022	LT1	LT1
1247 Arbutus Road	October 4, 2022	LT1	LT1
Island Highway by Temple	October 4, 2022	LT1	LT1
770 Soriel	October 4, 2022	LT1	LT1
401 Moilliet	October 4, 2022	LT1	LT1
271 Chestnut	October 11, 2022	LT1	LT1
613 Chinook	October 11, 2022	LT1	LT1
Top of Corfield	October 11, 2022	LT1	LT1
Works Yard	October 11, 2022	LT1	LT1
Community Park	October 19, 2022	LT1	LT1
450 Wisteria	October 19, 2022	LT1	LT1
Daffodil at Camas	October 19, 2022	LT1	LT1
330 Park View	October 25, 2022	LT1	LT1
136 Memorial	October 25, 2022	LT1	LT1
378 Kingsley	October 25, 2022	LT1	LT1
851 Temple	October 25, 2022	LT1	LT1
271 Chestnut	November 1, 2022	LT1	LT1
Works Yard	November 1, 2022	LT1	LT1
Top of Corfield	November 1, 2022	LT1	LT1
1247 Arbutus Road	November 8, 2022	LT1	LT1
Island Highway by Temple	November 8, 2022	LT1	LT1
770 Soriel	November 8, 2022	LT1	LT1
613 Chinook	November 16, 2022	LT1	LT1
Community Park	November 16, 2022	LT1	LT1
401 Moilliet	November 16, 2022	LT1	LT1
450 Wisteria	November 22, 2022	LT1	LT1
Daffodil at Camas	November 22, 2022	LT1	LT1
330 Park View	November 22, 2022	LT1	LT1
136 Memorial	November 29, 2022	QRWRT	QRWRT
378 Kingsley	November 29, 2022	QRWRT	QRWRT
851 Temple	November 29, 2022	QRWRT	QRWRT
136 Memorial	December 5, 2022	LT1	LT1
378 Kingsley	December 5, 2022	LT1	LT1
851 Temple	December 5, 2022	LT1	LT1
271 Chestnut	December 6, 2022	LT1	LT1

Location	Date	Total Coliform	E.Coli
330 Park View	December 6, 2022	LT1	LT1
770 Soriel	December 6, 2022	LT1	LT1
Daffodil at Camas	December 6, 2022	LT1	LT1
1247 Arbutus Road	December 6, 2022	LT1	LT1
Island Highway by Temple	December 6, 2022	LT1	LT1
613 Chinook	December 13, 2022	LT1	LT1
401 Moilliet	December 13, 2022	LT1	LT1
Top of Corfield	December 13, 2022	LT1	LT1
Works Yard	December 13, 2022	LT1	LT1

Appendix D - 2022 Trihalomethanes (THMs) Results

2022	Community Park				Temple			
	March	June	August	November	March	June	August	November
Total THM (mg/L)	0.051	0.061	0.034	0.67	0.045	0.065	0.037	0.04
Bromodichloromethanes (mg/L)	0.006	0.005	0.007	0.01	0.006	0.006	0.009	0.009
Bromoform (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chloroform (mg/L)	0.042	0.005	0.024	0.055	0.036	0.057	0.026	0.027
Dibromochloromethane (mg/L)	0.003	0.001	0.003	0.002	0.003	0.002	0.002	0.004
Toluene-d8 (%)	99	103	98	102	99	103	98	99
4-Bromofluorobenzene (%)	98	99	105	101	99	96	96	97
2022	Ermineskin				Public Works			
	March	June	August	November	March	June	August	November
Total THM (mg/L)	0.032	0.055	0.036	Not tested	0.074	0.112	0.078	0.069
Bromodichloromethanes (mg/L)	0.004	0.004	0.007	Not tested	0.004	0.003	0.011	0.009
Bromoform (mg/L)	0.001	<0.001	<0.001	Not tested	<0.001	<0.001	<0.001	<0.001
Chloroform (mg/L)	0.023	0.05	0.027	Not tested	0.07	0.109	0.066	0.06
Dibromochloromethane (mg/L)	0.004	0.001	0.002	Not tested	<0.001	<0.001	0.001	<0.001
Toluene-d8 (%)	97	103	100	Not tested	99	104	97	106
4-Bromofluorobenzene (%)	103	99	99	Not tested	102	95	97	110
2022	Water Treatment Plant							
	March	June	August	November				
Total THM (mg/L)	0.047	0.041	0.023	0.034				
Bromodichloromethanes (mg/L)	0.002	0.002	0.004	0.005				
Bromoform (mg/L)	<0.001	<0.001	<0.001	<0.001				
Chloroform (mg/L)	0.045	0.039	0.019	0.029				
Dibromochloromethane (mg/L)	<0.001	<0.001	<0.001	<0.001				
Toluene-d8 (%)	93	104	98	104				
4-Bromofluorobenzene (%)	97	98	100	101				

Results are within the maximum acceptable concentration (MAC) of 0.1 mg/L set by the Canadian Drinking Water Quality Guidelines.

Appendix E - Full Spectrum Report



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Report Transmission Cover Page

Bill To: City of Parksville 1116 Herring Gull Way Parksville, BC, Canada V9P 1R2	Project ID: Project Name: Full Spectrum Project Location: LSD: P.O.: S22-5095 Proj. Acct. code:	Lot ID: 1579675 Control Number: Date Received: Jun 21, 2022 Date Reported: Jun 27, 2022 Report Number: 2760003
Attn: Accounts Payable Sampled By: Barbara Silenieks Company: City of Parksville		

Contact	Company	Address
Accounts Payable	City of Parksville	1116 Herring Gull Way Parksville, BC V9P 1R2 Phone: (250) 951-2489 Fax: Email: ap@parksville.ca
Delivery	Format	Deliverables
Email - Single Deliverable	PDF	Invoice
Barbara Silenieks	City of Parksville	1116 Herring Gull Way Parksville, BC V9P 1R2 Phone: (250) 951-2489 Fax: Email: bsilenieks@parksville.ca
Delivery	Format	Deliverables
Email - Single Deliverable	PDF	COA
Email - Single Deliverable	PDF	COC / Test Report
Email - Single Deliverable	Standard Crosstab Without Tabs	Test Report

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Analytical Report

Bill To: City of Parksville
1116 Herring Gull Way
Parksville, BC, Canada
V9P 1R2
Attn: Accounts Payable
Sampled By: Barbara Silenieks
Company: City of Parksville

Project ID:
Project Name: Full Spectrum
Project Location:
LSD:
P.O.: S22-5095
Proj. Acct. code:

Lot ID: **1579675**
Control Number:
Date Received: Jun 21, 2022
Date Reported: Jun 27, 2022
Report Number: 2760003

		Reference Number	1579675-1	1579675-2	1579675-3	
		Sample Date	Jun 20, 2022	Jun 20, 2022	Jun 20, 2022	
		Sample Time	09:40	09:05	09:15	
		Sample Location				
		Sample Description	River / / 5.4 °C	Public Works Yard / 5.4 °C	Water Treatment Plant / 5.4 °C	
		Matrix	Water	Water	Water	
Analyte		Units	Results	Results	Results	Nominal Detection Limit
Inorganic Nonmetallic Parameters						
Cyanide	Total	mg/L	<0.002	<0.002	<0.002	0.002
Metals Total						
Calcium	Total	mg/L	6.8	6.7	6.7	0.01
Magnesium	Total	mg/L	0.76	0.71	0.79	0.02
Potassium	Total	mg/L	0.07	0.06	<0.04	0.04
Silicon	Total	mg/L	2.0	2.0	2.0	0.005
Sodium	Total	mg/L	2.3	9.2	9.4	0.1
Digestion	Preparation		Field Pres, digest as total Hg	Field Pres, digest as total Hg	Field Pres, digest as total Hg	
Mercury	Total	mg/L	<0.00001	<0.00001	<0.00001	0.00001
Microbiological Analysis						
Total Coliforms	Enzyme Substrate Test	MPN/100 mL	1553.1	<1.0	<1.0	1.0
Escherichia coli	Enzyme Substrate Test	MPN/100 mL	12.0	<1.0	<1.0	1.0
Physical and Aggregate Properties						
Colour	True	Colour units	9	<5	<5	5
Turbidity		NTU	0.40	<0.10	0.25	0.1
Routine Water						
Digestion	Dissolved		Field filtered and Pres Dissol Exceeded	Field filtered and Pres Dissol Exceeded	Field filtered and Pres Dissol Exceeded	
pH - Holding Time						
pH	at 25 °C		7.26	7.51	7.55	0.01
Electrical Conductivity		µS/cm at 25 °C	55	86	88	1
T-Alkalinity	as CaCO3	mg/L	20	31	31	5
Chloride	Dissolved	mg/L	3.81	6.34	6.44	0.05
Fluoride	Dissolved	mg/L	0.05	<0.01	<0.01	0.01
Nitrate - N	Dissolved	mg/L	<0.01	<0.01	<0.01	0.01
Nitrite - N	Dissolved	mg/L	<0.01	0.02	0.02	0.01
Sulfate (SO4)	Dissolved	mg/L	0.9	1.0	1.0	0.1
Hardness	as CaCO3 (dissolved)	mg/L	18	17	18	5
Total Dissolved Solids	Calculated	mg/L	31	46	47	1
Langelier Index			-2.0	-1.6	-1.5	
Trace Metals Total						
Aluminum	Total	mg/L	0.047	0.020	0.016	0.001
Antimony	Total	mg/L	0.00003	<0.00002	<0.00002	0.00002
Arsenic	Total	mg/L	0.0002	0.0002	0.0001	0.0001
Barium	Total	mg/L	0.0036	0.0032	0.0035	0.0001
Boron	Total	mg/L	0.007	0.007	0.008	0.002
Cadmium	Total	mg/L	<0.00001	<0.00001	<0.00001	0.00001

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Analytical Report

Bill To: City of Parksville
1116 Herring Gull Way
Parksville, BC, Canada
V9P 1R2
Attn: Accounts Payable
Sampled By: Barbara Silenieks
Company: City of Parksville

Project ID:
Project Name: Full Spectrum
Project Location:
LSD:
P.O.: S22-5095
Proj. Acct. code:

Lot ID: **1579675**
Control Number:
Date Received: Jun 21, 2022
Date Reported: Jun 27, 2022
Report Number: 2760003

	Reference Number	1579675-1	1579675-2	1579675-3	
	Sample Date	Jun 20, 2022	Jun 20, 2022	Jun 20, 2022	
	Sample Time	09:40	09:05	09:15	
	Sample Location				
	Sample Description	River // 5.4 °C	Public Works Yard / 5.4 °C	Water Treatment Plant / 5.4 °C	
	Matrix	Water	Water	Water	
Analyte	Units	Results	Results	Results	Nominal Detection Limit
Trace Metals Total - Continued					
Chromium	Total	mg/L 0.0015	0.0013	0.00009	0.00005
Copper	Total	mg/L 0.0006	0.0032	0.0005	0.0002
Iron	Total	mg/L 0.079	0.021	0.018	0.002
Lead	Total	mg/L 0.00001	0.00020	<0.00001	0.00001
Manganese	Total	mg/L 0.003	0.001	0.001	0.001
Selenium	Total	mg/L <0.0002	<0.0002	<0.0002	0.0002
Strontium	Total	mg/L 0.024	0.024	0.025	0.0001
Uranium	Total	mg/L 0.00001	<0.00001	<0.00001	0.00001
Zinc	Total	mg/L 0.0009	0.0018	<0.0005	0.0005

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Page 3 of 5

Analytical Report

Bill To: City of Parksville 1116 Herring Gull Way Parksville, BC, Canada V9P 1R2	Project ID: Project Name: Full Spectrum Project Location: LSD: P.O.: S22-5095 Proj. Acct. code:	Lot ID: 1579675 Control Number: Date Received: Jun 21, 2022 Date Reported: Jun 27, 2022 Report Number: 2760003
Attn: Accounts Payable Sampled By: Barbara Silenieks Company: City of Parksville		

Analyte	Units	Results	Results	Results	Nominal Detection Limit
Inorganic Nonmetallic Parameters					
Cyanide	Total	mg/L	<0.002	<0.002	0.002
Metals Total					
Calcium	Total	mg/L	42	26	0.01
Magnesium	Total	mg/L	20	12	0.02
Potassium	Total	mg/L	0.89	0.62	0.04
Silicon	Total	mg/L	13	13	0.005
Sodium	Total	mg/L	13	7.2	0.1
Digestion	Preparation		Field Pres, digest as total Hg	Field Pres, digest as total Hg	
Mercury	Total	mg/L	<0.00001	<0.00001	0.00001
Microbiological Analysis					
Total Coliforms	Enzyme Substrate Test	MPN/100 mL	<1.0	<1.0	1.0
Escherichia coli	Enzyme Substrate Test	MPN/100 mL	<1.0	<1.0	1.0
Physical and Aggregate Properties					
Colour	True	Colour units	<5	<5	5
Turbidity		NTU	0.50	0.18	0.1
Routine Water					
Digestion	Dissolved		Field filtered and Pres Dissol Exceeded	Field filtered and Pres Dissol Exceeded	
pH - Holding Time			7.69	7.65	0.01
pH	at 25 °C		428	272	1
Electrical Conductivity		µS/cm at 25 °C	177	101	5
T-Alkalinity	as CaCO ₃	mg/L	18.3	15.6	0.05
Chloride	Dissolved	mg/L	0.05	0.06	0.01
Fluoride	Dissolved	mg/L	1.51	1.43	0.01
Nitrate - N	Dissolved	mg/L	<0.01	<0.01	0.01
Nitrite - N	Dissolved	mg/L	7.9	5.6	0.1
Sulfate (SO ₄)	Dissolved	mg/L	174	111	5
Hardness	as CaCO ₃ (dissolved)	mg/L	246	167	1
Total Dissolved Solids	Calculated	mg/L	0.1	-0.3	
Langelier Index					
Trace Metals Total					
Aluminum	Total	mg/L	0.004	0.001	0.001
Antimony	Total	mg/L	<0.00002	0.00002	0.00002
Arsenic	Total	mg/L	0.0003	0.0002	0.0001
Barium	Total	mg/L	0.011	0.0073	0.0001
Boron	Total	mg/L	0.014	0.010	0.002
Cadmium	Total	mg/L	<0.00001	<0.00001	0.00001

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Analytical Report

Bill To: City of Parksville
 1116 Herring Gull Way
 Parksville, BC, Canada
 V9P 1R2
 Attn: Accounts Payable
 Sampled By: Barbara Sileniks
 Company: City of Parksville

Project ID:
 Project Name: Full Spectrum
 Project Location:
 LSD:
 P.O.: S22-5095
 Proj. Acct. code:

Lot ID: **1579675**
 Control Number:
 Date Received: Jun 21, 2022
 Date Reported: Jun 27, 2022
 Report Number: 2760003

Reference Number	1579675-4	1579675-5			
Sample Date	Jun 20, 2022	Jun 20, 2022			
Sample Time	11:10	10:45			
Sample Location					
Sample Description	Springwood # 5 / 5.4 °C	Springwood # 10 / 5.4 °C			
Matrix	Water	Water			
Analyte	Units	Results	Results	Results	Nominal Detection Limit
Trace Metals Total - Continued					
Chromium	Total	mg/L	0.00031	0.00031	0.00005
Copper	Total	mg/L	0.0012	0.0009	0.0002
Iron	Total	mg/L	0.089	0.012	0.002
Lead	Total	mg/L	0.00063	0.00010	0.00001
Manganese	Total	mg/L	0.038	0.020	0.001
Selenium	Total	mg/L	<0.0002	<0.0002	0.0002
Strontium	Total	mg/L	0.12	0.083	0.0001
Uranium	Total	mg/L	0.00023	0.00006	0.00001
Zinc	Total	mg/L	0.0059	0.0007	0.0005

Approved by: 
 Benjamin Morris, B.Sc
 Operations Manager

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Report Transmission Cover Page

Bill To: City of Parksville 1116 Herring Gull Way Parksville, BC, Canada V9P 1R2	Project ID: Project Name: Full Spectrum Project Location: LSD: P.O.: S22-5095 Proj. Acct. code:	Lot ID: 1597462 Control Number: Date Received: Sep 8, 2022 Date Reported: Sep 14, 2022 Report Number: 2785045
Attn: Accounts Payable Sampled By: Barbara Silenieks Company: City of Parksville		

Contact	Company	Address
Accounts Payable	City of Parksville	1116 Herring Gull Way Parksville, BC V9P 1R2 Phone: (250) 951-2489 Fax: Email: ap@parksville.ca

Delivery	Format	Deliverables
Email - Single Deliverable	PDF	Invoice
Barbara Silenieks	City of Parksville	1116 Herring Gull Way Parksville, BC V9P 1R2 Phone: (250) 951-2489 Fax: Email: bsilenieks@parksville.ca

Delivery	Format	Deliverables
Email - Single Deliverable	PDF	COA
Email - Single Deliverable	PDF	COC / Test Report
Email - Single Deliverable	Standard Crosstab Without Tabs	Test Report

Notes To Clients:

- Sep 09, 2022 - Sample 1597462-2; 8243794: Reduction of analytical volume was necessary for chloride analysis to bring results within the analytical range for sample 1597462-2. Detection limits are adjusted accordingly.

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Analytical Report

Bill To: City of Parksville 1116 Herring Gull Way Parksville, BC, Canada V9P 1R2 Attn: Accounts Payable Sampled By: Barbara Silenieks Company: City of Parksville	Project ID: Project Name: Full Spectrum Project Location: LSD: P.O.: S22-5095 Proj. Acct. code:	Lot ID: 1597462 Control Number: Date Received: Sep 8, 2022 Date Reported: Sep 14, 2022 Report Number: 2785045
-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------

Reference Number		1597462-1	1597462-2	1597462-3		
Sample Date		Sep 06, 2022	Sep 06, 2022	Sep 06, 2022		
Sample Time		10:50	10:30	10:10		
Sample Location						
Sample Description		Railway Well #4 / / 12.3 °C	Railway Well #5 / 12.3 °C	Springwood Well #11 / 12.3 °C		
Matrix		Water	Water	Water		
Analyte	Units	Results	Results	Results	Nominal Detection Limit	
Inorganic Nonmetallic Parameters						
Cyanide	Total	mg/L	<0.002	<0.002	<0.002	0.002
Metals Total						
Calcium	Total	mg/L	34	37	29	0.01
Magnesium	Total	mg/L	16	17	13	0.02
Potassium	Total	mg/L	0.75	0.97	0.70	0.04
Silicon	Total	mg/L	11	11	12	0.005
Sodium	Total	mg/L	7.3	14	8.4	0.1
Digestion	Preparation		Field Pres, digest as total Hg	Field Pres, digest as total Hg	Field Pres, digest as total Hg	
Mercury	Total	mg/L	<0.00001	<0.00001	<0.00001	0.00001
Microbiological Analysis						
Total Coliforms	Enzyme Substrate Test	MPN/100 mL	<1.0	<1.0	<1.0	1.0
Escherichia coli	Enzyme Substrate Test	MPN/100 mL	<1.0	<1.0	<1.0	1.0
Physical and Aggregate Properties						
Colour	True	Colour units	<5	<5	<5	5
Turbidity		NTU	<0.10	<0.10	<0.10	0.1
Routine Water						
Digestion	Dissolved		Lab filtered & preserved Exceeded	Lab filtered & preserved Exceeded	Lab filtered & preserved Exceeded	
pH - Holding Time						
pH	at 25 °C		7.58	7.68	7.48	0.01
Electrical Conductivity		µS/cm at 25 °C	336	407	295	1
T-Alkalinity	as CaCO3	mg/L	126	124	105	5
Chloride	Dissolved	mg/L	17.9	36.9	18.6	0.05
Fluoride	Dissolved	mg/L	0.05	0.05	0.05	0.01
Nitrate - N	Dissolved	mg/L	0.73	1.52	1.50	0.01
Nitrite - N	Dissolved	mg/L	<0.01	<0.01	<0.01	0.01
Sulfate (SO4)	Dissolved	mg/L	11.9	9.2	6.6	0.1
Hardness	as CaCO3 (dissolved)	mg/L	152	166	127	5
Total Dissolved Solids	Calculated	mg/L	198	228	180	1
Langelier Index			-0.2	-0.07	-0.4	
Trace Metals Total						
Aluminum	Total	mg/L	0.004	0.003	0.002	0.001
Antimony	Total	mg/L	0.00006	0.00002	0.00003	0.00002
Arsenic	Total	mg/L	0.0003	0.0005	0.0003	0.0001
Barium	Total	mg/L	0.013	0.021	0.0063	0.0001
Boron	Total	mg/L	0.012	0.017	0.011	0.002
Cadmium	Total	mg/L	0.00082	<0.00001	<0.00001	0.00001

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Analytical Report

Bill To: City of Parksville
 1116 Herring Gull Way
 Parksville, BC, Canada
 V9P 1R2
 Attn: Accounts Payable
 Sampled By: Barbara Silenieks
 Company: City of Parksville

Project ID:
 Project Name: Full Spectrum
 Project Location:
 LSD:
 P.O.: S22-5095
 Proj. Acct. code:

Lot ID: **1597462**
 Control Number:
 Date Received: Sep 8, 2022
 Date Reported: Sep 14, 2022
 Report Number: 2785045

	Reference Number	1597462-1	1597462-2	1597462-3	
	Sample Date	Sep 06, 2022	Sep 06, 2022	Sep 06, 2022	
	Sample Time	10:50	10:30	10:10	
	Sample Location				
	Sample Description	Railway Well #4 / / 12.3 °C	Railway Well #5 / 12.3 °C	Springwood Well #11 / 12.3 °C	
	Matrix	Water	Water	Water	
Analyte	Units	Results	Results	Results	Nominal Detection Limit
Trace Metals Total - Continued					
Chromium	Total	mg/L 0.00043	0.0056	0.00041	0.00005
Copper	Total	mg/L 0.0027	0.0014	0.0018	0.0002
Iron	Total	mg/L 0.005	0.032	0.009	0.002
Lead	Total	mg/L 0.00017	0.00018	0.00022	0.00001
Manganese	Total	mg/L 0.018	0.005	0.023	0.001
Selenium	Total	mg/L 0.0004	<0.0002	<0.0002	0.0002
Strontium	Total	mg/L 0.094	0.10	0.083	0.0001
Uranium	Total	mg/L 0.00028	0.00026	0.00009	0.00001
Zinc	Total	mg/L 0.0049	0.0045	0.0051	0.0005

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Analytical Report

Bill To: City of Parksville
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 Parksville, BC, Canada
 V9P 1R2
 Attn: Accounts Payable
 Sampled By: Barbara Silenieks
 Company: City of Parksville

Project ID:
 Project Name: Full Spectrum
 Project Location:
 LSD:
 P.O.: S22-5095
 Proj. Acct. code:

Lot ID: **1597462**
 Control Number:
 Date Received: Sep 8, 2022
 Date Reported: Sep 14, 2022
 Report Number: 2785045

		Reference Number	1597462-4	1597462-5	1597462-6	
		Sample Date	Sep 06, 2022	Sep 06, 2022	Sep 06, 2022	
		Sample Time	12:00	12:35	11:35	
		Sample Location				
		Sample Description	Works Yard / 12.3 °C	Water Treatment Plant / 12.3 °C	River / 12.3 °C	
Analyte	Matrix	Units	Water Results	Water Results	Water Results	Nominal Detection Limit
Inorganic Nonmetallic Parameters						
Cyanide	Total	mg/L	<0.002	<0.002	<0.002	0.002
Metals Total						
Calcium	Total	mg/L	11	11	11	0.01
Magnesium	Total	mg/L	1.3	1.2	1.3	0.02
Potassium	Total	mg/L	0.13	0.10	0.09	0.04
Silicon	Total	mg/L	2.0	2.0	2.2	0.005
Sodium	Total	mg/L	12	13	5.3	0.1
Digestion	Preparation		Field Pres, digest as total Hg	Field Pres, digest as total Hg	Field Pres, digest as total Hg	
Mercury	Total	mg/L	<0.00001	<0.00001	<0.00001	0.00001
Microbiological Analysis						
Total Coliforms	Enzyme Substrate Test	MPN/100 mL	<1.0	<1.0	>200.5	1.0
Escherichia coli	Enzyme Substrate Test	MPN/100 mL	<1.0	<1.0	9.9	1.0
Physical and Aggregate Properties						
Colour	True	Colour units	<5	<5	<5	5
Turbidity		NTU	<0.10	<0.10	0.61	0.1
Routine Water						
Digestion	Dissolved		Lab filtered & preserved	Lab filtered & preserved	Lab filtered & preserved	
pH - Holding Time			Exceeded	Exceeded	Exceeded	
pH	at 25 °C		7.84	7.95	7.34	0.01
Electrical Conductivity		µS/cm at 25 °C	128	130	97	1
T-Alkalinity	as CaCO3	mg/L	36	38	24	5
Chloride	Dissolved	mg/L	13.7	13.9	11.6	0.05
Fluoride	Dissolved	mg/L	0.03	0.03	0.03	0.01
Nitrate - N	Dissolved	mg/L	0.02	0.02	0.02	0.01
Nitrite - N	Dissolved	mg/L	<0.01	<0.01	<0.01	0.01
Sulfate (SO4)	Dissolved	mg/L	1.5	1.4	1.5	0.1
Hardness	as CaCO3 (dissolved)	mg/L	32	32	32	5
Total Dissolved Solids	Calculated	mg/L	67	69	51	1
Langelier Index			-0.9	-0.8	-1.6	
Trace Metals Total						
Aluminum	Total	mg/L	0.010	0.007	0.030	0.001
Antimony	Total	mg/L	0.00002	<0.00002	<0.00002	0.00002
Arsenic	Total	mg/L	0.0002	0.0002	0.0002	0.0001
Barium	Total	mg/L	0.0059	0.0060	0.0063	0.0001
Boron	Total	mg/L	0.015	0.014	0.013	0.002
Cadmium	Total	mg/L	<0.00001	<0.00001	<0.00001	0.00001

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Analytical Report

Bill To: City of Parksville 1116 Herring Gull Way Parksville, BC, Canada V9P 1R2 Attn: Accounts Payable Sampled By: Barbara Silenieks Company: City of Parksville	Project ID: Project Name: Full Spectrum Project Location: LSD: P.O.: S22-5095 Proj. Acct. code:	Lot ID: 1597462 Control Number: Date Received: Sep 8, 2022 Date Reported: Sep 14, 2022 Report Number: 2785045
-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------

	Reference Number	1597462-4	1597462-5	1597462-6		
Sample Date		Sep 06, 2022	Sep 06, 2022	Sep 06, 2022		
Sample Time		12:00	12:35	11:35		
Sample Location		Works Yard / 12.3 °C	Water Treatment Plant / 12.3 °C	River / 12.3 °C		
	Matrix	Water	Water	Water		
Analyte	Units	Results	Results	Results	Nominal Detection Limit	
Trace Metals Total - Continued						
Chromium	Total	mg/L	0.00013	0.00014	0.0012	0.00005
Copper	Total	mg/L	0.0038	0.0005	0.0006	0.0002
Iron	Total	mg/L	0.016	0.014	0.100	0.002
Lead	Total	mg/L	0.00026	<0.00001	0.00001	0.00001
Manganese	Total	mg/L	0.003	0.005	0.011	0.001
Selenium	Total	mg/L	<0.0002	<0.0002	<0.0002	0.0002
Strontium	Total	mg/L	0.041	0.041	0.042	0.0001
Uranium	Total	mg/L	<0.00001	<0.00001	<0.00001	0.00001
Zinc	Total	mg/L	0.0015	0.0005	<0.0005	0.0005

Approved by:

Max Hewitt
 Operations Manager

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Appendix F - Water System Operating Condition



CITY OF PARKSVILLE
MAR 02 2016
OPERATIONS
HEALTH PROTECTION

PERMIT to OPERATE

A WATER SUPPLY SYSTEM
A Drinking Water System with 301- 10,000 connections

Water System Name: **PARKSVILLE, WWS**
 Premises Number: **1310814**
 Premises Address: **1116 Herring Gull Way
 Parksville, BC
 V9P 2H3**
 Water System Owner: **City of Parksville**

City of Parksville is hereby permitted to operate the above potable water supply system and is required to operate this system in accordance with the Drinking Water Protection Act and in accordance with the conditions set out in this operating permit and conditions established as part of any construction permit.

The water supply system for which this operating permit applies is generally described as:

Service Delivery Area: **Englishman River Water Service Area**
 Source Water: **Multiple wells & Englishman River (May to October)**
 Water Treatment methods are: **None**
 Water Disinfection methods are: **Chlorination (liquid & gas).**
 Number of Connections **301-10,000 Connections - DWT**

Operating conditions specific to this water supply system are in Appendix A.

Date: July 1, 1992

Issued By:
 Environmental Health Officer

**This permit must be displayed
in a conspicuous place and is not transferable**

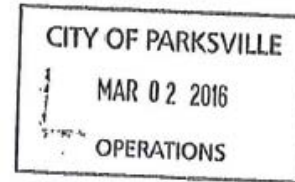


Excellent health and care for everyone,
everywhere, everytime.



March 1, 2016

Mike Squire
Program Manager
Englishman River Water Service
1116 Herring Gull Way
PO Box 1390
Parksville, BC V9P 2H3



Dear Mike:

**Re: Changes to Terms and Conditions of the City of Parksville Water System
Operating Permit**

Please find enclosed an amended operating permit issued under section 8(4) of the *Drinking Water Protection Act* (the "Act"). The terms and conditions are attached as Appendix A (Operational) and Appendix B (Surface Water Treatment Objectives) and are effective **March 1, 2016**.

The terms and conditions, Appendix A dated April, 2009 is hereby rescinded.

In accordance to section 8(1)(b) of the Act, the water supply system must be operated in accordance with these terms and conditions. It is understood that Appendix B timeframes are target dates. Large construction projects may encounter unforeseen delays which may prohibit the completion of the project by the listed dates.

Upon completion of the water treatment plant, this proposed permit will have to be amended to reflect the new works. At that time the City of Parksville will have to request an amendment to their Operating Permit. For example, performance standards for the selected filtration technology would be listed on the Operating Permit but are not reflected in this Permit.

Please also note that water suppliers have various responsibilities under the Act and the *Drinking Water Protection Regulation* (The "Regulation"), beyond those set out as terms and conditions of the operating permit. It is your responsibility to familiarize yourself with the Act and Regulations. See section 2.2 of part A of the *Drinking Water Officer's Guide* for a summary of responsibilities and references to some of the relevant provisions of the Act and Regulation. This is intended for basic information purposes only.

If you have any questions about this operating permit, please do not hesitate to contact me at (250) 947.8222 or by email at bill.wrathall@viha.ca

Health Protection and Environmental Services
489 Alberni Highway, Parksville, BC V9P 1J9

Phone: 250-947-8222
Fax: 250-951-9576

March 1, 2016

Appendix A - Operational

**Water System Operating Permit Terms and Conditions For the Current
City of Parkville Water System**

The permit holder is advised the following Terms and Conditions are in addition to other legislated responsibilities and obligations such as:

- The Drinking Water Protection Act, ([SBC 2001] Chapter 9
 - The Drinking Water Protection Regulation (B.C. Reg. 200/2003 O.C. 508/2003)
1. Adhere to monitoring requirements to ensure the efficacy of disinfection and/or treatment technology. Provide a minimum of 0.2 mg/L of residual disinfectant, measured as *free* chlorine for the water entering the system. The level of residual disinfectant at any point within the distribution system should be at least 0.05 mg/L, measured as *total* or *free* chlorine.

If detectable levels of chlorine are not observed during routine residual analysis in the distribution system, the water supplier shall obtain water samples and have them analyzed for total coliform and *Escherichia coli*, and undertake any necessary steps to return a chlorine residual as *total* and *free* chlorine.
 2. Provide continuous on-line turbidity monitoring of raw water for the Englishman River during drawing periods (May through October or as applicable) to ensure less than or equal to 1 NTU of turbidity in finished water. Ensure the Emergency Response Plan includes appropriate action for turbidity events as detailed in the "*Decision Tree for Responding to a Turbidity Event in Unfiltered Drinking Water*".
 3. Routine surveillance and evaluation of a source water protection program and emergency response plan to identify and respond to any activity that may impact or cause changes to the source water.
 4. Adhere to a sampling program as approved by the Drinking Water Officer and according to BCWWA standards or equivalent. Maintain records of all monitoring conducted. The sampling program is to include, but is not necessarily limited to, the following:
 - Bacteriological testing at representative locations within the distribution system.
 - Chemical testing in accordance with the *Guidelines Canadian Drinking Water Quality* or parameters specified in the *VIIHA Guidelines for Approval of Water Supply Systems*.
 - Chlorine disinfectant concentration testing at representative locations within the distribution system.
 5. Adhere to maintenance and operating procedures as approved by the Drinking Water Officer and abide by BCWWA standards or equivalent. Maintenance and operating procedures shall address but is not necessarily limited to:
 - Source water and intake protection.

March 1, 2016

Appendix B – Surface Water Treatment Objectives

**Water System Operating Permit Terms and Conditions For
City of Parksville Water System**

The permit holder is advised the following Terms and Conditions are in addition to other legislated responsibilities and obligations such as:

- The *Drinking Water Protection Act*, ([SBC 2001] Chapter 9)
- The *Drinking Water Protection Regulation* (B.C. Reg. 200/2003 O.C. 508/2003)

1. Englishman River water source must be treated in accordance with the *Drinking Water Treatment Objectives (Microbiological) for Surface Water Systems in British Columbia* to achieve the following performance standard:
 - 4-log reduction or inactivation of viruses.
 - 3-log reduction or inactivation of *Giardia* and *Cryptosporidium*.
 - Two treatment processes for surface water.
 - Less than or equal to one (1) nephelometric turbidity unit (NTU) of turbidity in finished water.

2. Establish an implementation strategy towards meeting the SWTO's with a projected water treatment plant operational date by September 30, 2018. The following timeframes and critical objectives are identified:
 - December 1, 2016 - Submission of construction permit application(s) for the water treatment plant, intake, pump station and transmission mains.
 - March 31, 2017 - Construction commencement.
 - June 30, 2018 – Construction complete.
 - July 1, 2018 – Commissioning commences.
 - September 30, 2018 – Plant operational.

If unforeseen and/or extenuating circumstances prevent completion of the water treatment plant by September 30, 2018 the water supplier must notify the Environmental Health Officer (EHO), a minimum of 90 days in advance of the deadline, and provide rationale for the delay. Any changes to the operating permit must be approved by the EHO in writing.

3. Provide formal project updates by the following dates:
 - July 29, 2016.
 - January 27, 2017.
 - July 28, 2017.
 - January 31, 2018.

* Project updates may be written or in presentation format.

For questions related to this report, please contact the Operations Department at 250 248-5412

