2021

ANNUAL WATER REPORT

City of Parksville
Operations

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City of Parksville

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INTRODUCTION

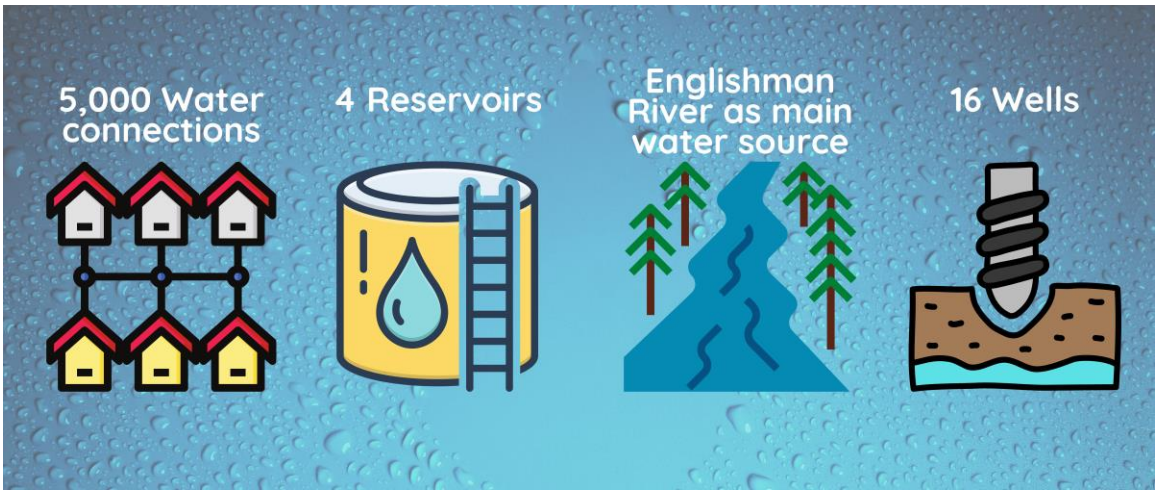
The Annual Water Report is a summary of the City's ongoing efforts to achieve excellence through continued responsible operation, monitoring, evaluation, and management of its water system. The intent is to evaluate the previous year's progress to help determine how to meet current and future needs for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

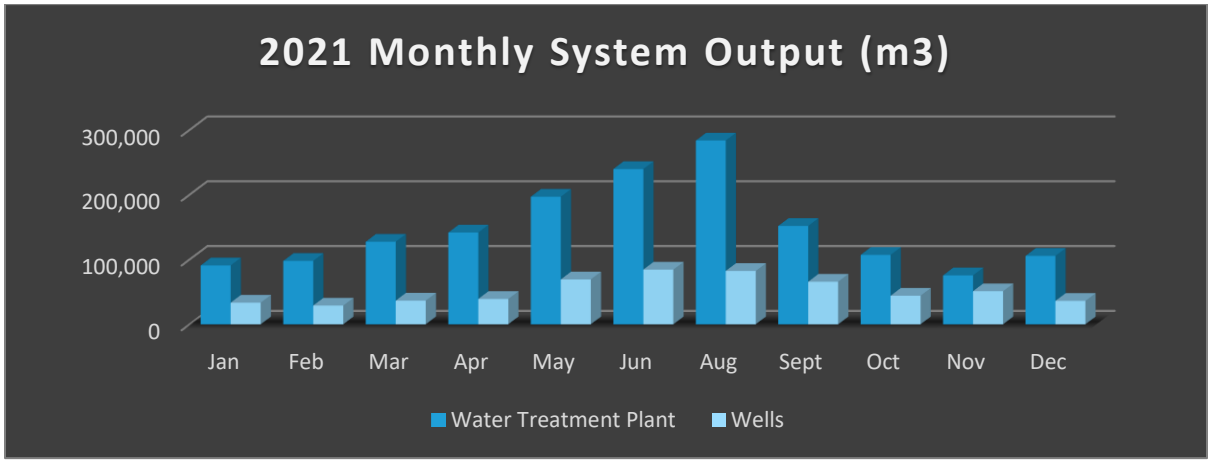
- Arrowsmith Dam through the Englishman River
- Well fields (Springwood and Railway well fields)

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.

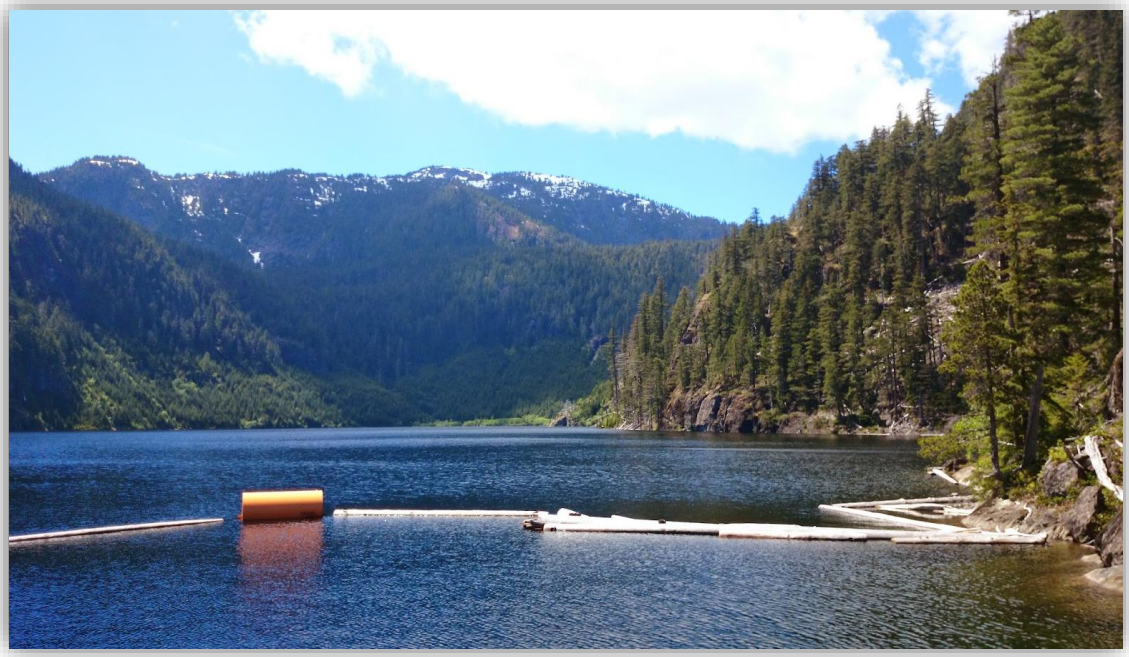
Well water is disinfected with liquid chlorine before pumping to the reservoirs where it is mixed with the treated water from the treatment plant. It is then distributed through the water distribution system.



Arrowsmith Dam

The City of Parksville, the Regional District of Nanaimo, and the Town of Qualicum 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 Operating Curve. The Ministry of Environment, Fisheries and the Arrowsmith Water Service (AWS) developed an operating rule curve 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.



In 2021, temperatures and weather patterns surpassed normal operating conditions. The reservoir level declined earlier than expected due to the extreme heat waves in June. Water was released into the river starting on June 24, 2021, and extended to September 29, 2021. Water conversation was implemented to reserve, prolong, and balance the reservoir volume for July to September while maintaining the river level at 1.3 m^3/s to 1.6 m^3/s per the Provincial Operating Permit. October and November heavy rainfalls replenished the reservoir a month earlier than anticipated. Reservoir lower-level outlets and pipes were fully opened during these times to minimize negative impact from the back-to-back storms.

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. For more information visit

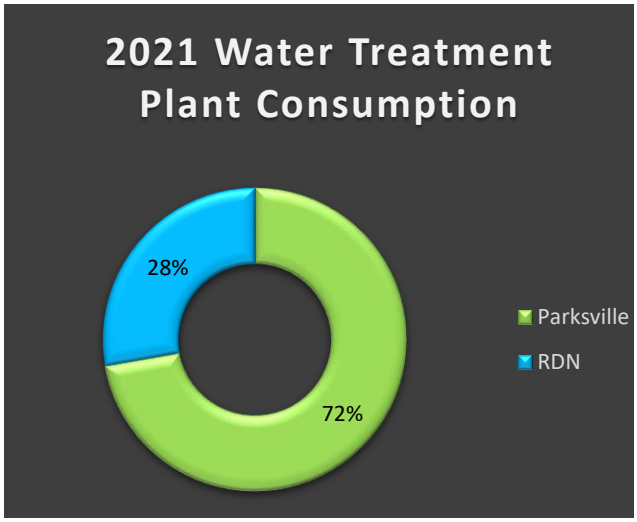
ERWS Intake and Water Treatment Plant

In 2021, the Englishman River Water Treatment Plant produced 1,925,560 m3 of water, in which 1,389,542 m3 was distributed to the City while the remaining was supplied to the RDN (536,018 m3).

The water treatment plant was designed with a capacity of up to 16 megalitres per day (ML/d) through intake screens, sand separators, coagulation, fine strainers, primary and secondary ultrafiltration (UF) membranes, ultraviolet (UV) disinfection and chlorination.

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 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, the energy and operating costs exceeded its benefit and therefore, will only be used as needed.

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.

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 currently has 12 production wells (see **Appendix A** for well locations). Springwood Well #7, Railway Well #7 were repaired and reinstated in 2021.

Pump Depth and Production Information (updated Feb. 2022)

Well Name	Pump Intake (m)	Annual Production (m^3)
Springwood Well #1	35.00	Maintenance in Progress Expect to be online in 2022
Springwood Well #3	29.00	34,783
Springwood Well #5	31.33	45,577
Springwood Well #6	31.80	11,393
Springwood Well #7	22.35	129,410
Springwood Well #8	23.71	96,114
Springwood Well #9	Casing Installed For Future Use	Future (50,000 - 90,000)
Springwood Well #10	30.18	53,597
Springwood Well #11	30.42	64,512
Railway Well#1	34.50	40,574
Railway Well#2	33.54	74,130
Railway Well#3	38.46	32,913
Railway Well#4	36.00	29,233
Railway Well#5	36.00	46,808
Railway Well#6	35.00	54,936
Railway Well#7	35.00	21,705
Railway Well #8	35.68	Maintenance in Progress
Industrial Well#8	Irrigation Use Only	Irrigation Use Only

Water Production

The following table provides a summary of the ERWS Water Treatment Plant and groundwater wells production. With the water treatment plant online, the well water was reduced by approximately 50% since 2019.

	2021	2020	2019	2018
Annual Water Consumption (m^3)	2,595,015	2,358,518	2,233,643	2,229,932
Annual Production: Well (m^3)	666,455	720,158	1,141,067	1,141,147
Annual Production: Arrowsmith Dam via Englishman River (m^3)	1,925,560	1,638,360	1,092,575	1,088,785

Water Distribution System

Reservoirs

Treated water from the river and wells is stored in five reservoirs. Reservoirs #1, #2 and #4 are situated at the Springwood Water Complex off Despard Road while Reservoir #5 is located at Top Bridge Park area.

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
3	Top Bridge	-	Concrete	Not in Use*
4	Springwood	4559 m^3 (1,000,000 Imp. gal)	Concrete	1979
5	Top Bridge	4300 m3 (950,000 Imp. gal)	Glass Fused Steel Tank	2007

**Removed from the system after Reservoir No. 5 was constructed (aging infrastructure or end of its service life)*

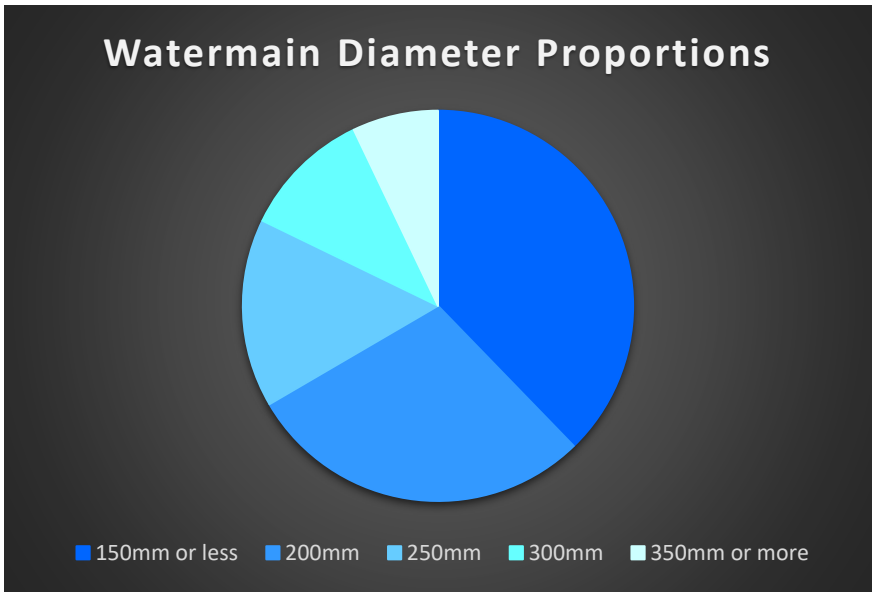
Distribution System

The distribution system consists of 70.9 km of PVC pipe, 9.2 km of ductile iron pipe and 23.45 km of AC (Asbestos Cement) pipe. Sizes range from 100 mm (4") to 400 mm (16"). There are over 600 fire hydrants and one pressure reducing valve (PRV).

Similar to 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 2021. A 2022/2023 assessment through the City's engineering department will be undertaken to support replacement priorities.

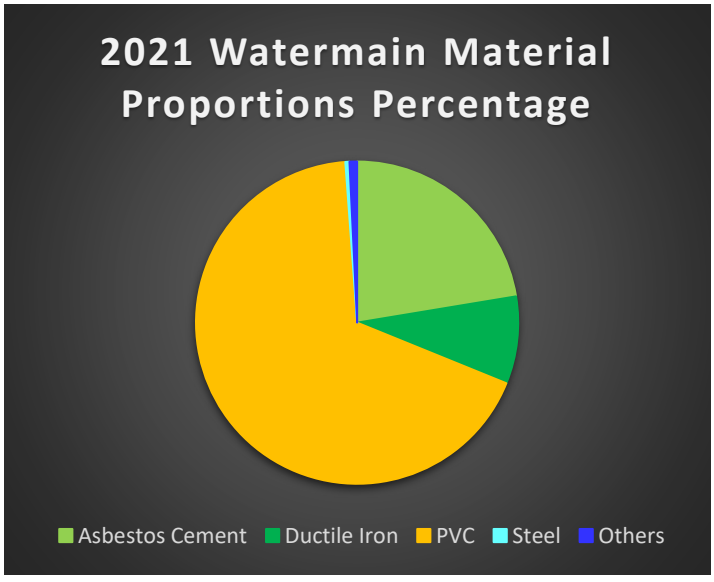
2021 Watermain Diameter Proportions

Diameter	N° of Pipes	Distance (km)	Percentage	Type
150mm or less	663	39.54	37.75 %	Distribution Main 66.59 %
200mm	589	30.21	28.84 %	
250mm	271	16.33	15.6 %	Supply Mains 33.41 %
300mm	203	11.22	10.71 %	
350mm or more	111	7.44	7.1 %	
Total		104.74 km		



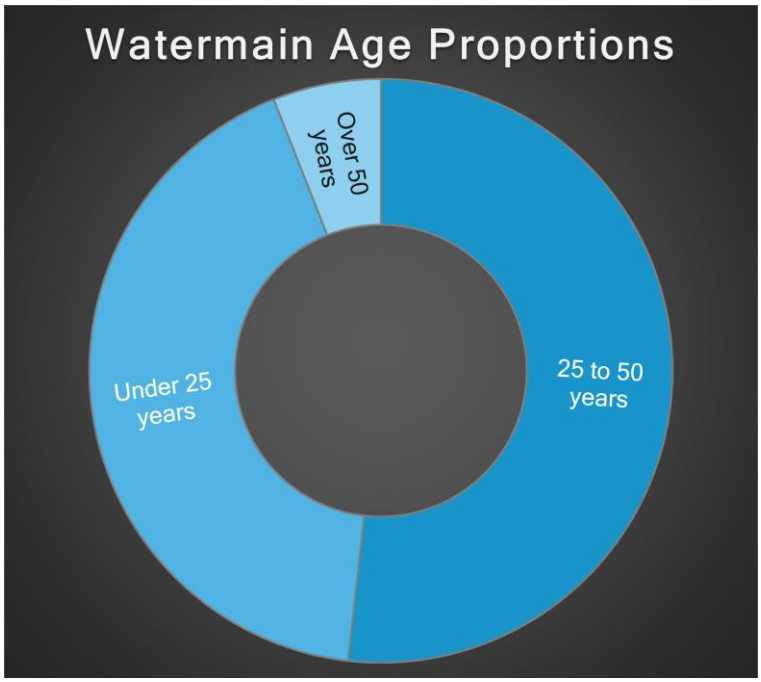
2021 Watermain Material Proportions

Material Type	Distance (km)	Percentage
Asbestos Cement	23.45	22.39 %
Ductile Iron	9.16	8.75%
PVC	70.9	67.69 %
Steel	0.43	0.41 %
Others	0.8	0.76 %
Total	104.74 km	



2021 Watermain Age Proportions

Age	N° of Pipes	Distance (km)	Percentage
Under 25 Years (≥1996)	976	44.2	42.2 %
25 to 50 Years (1971-1995)	781	54.2	51.8 %
Over 50 Years (≤1970)	81	6.3	6 %
Total	104.7 km		

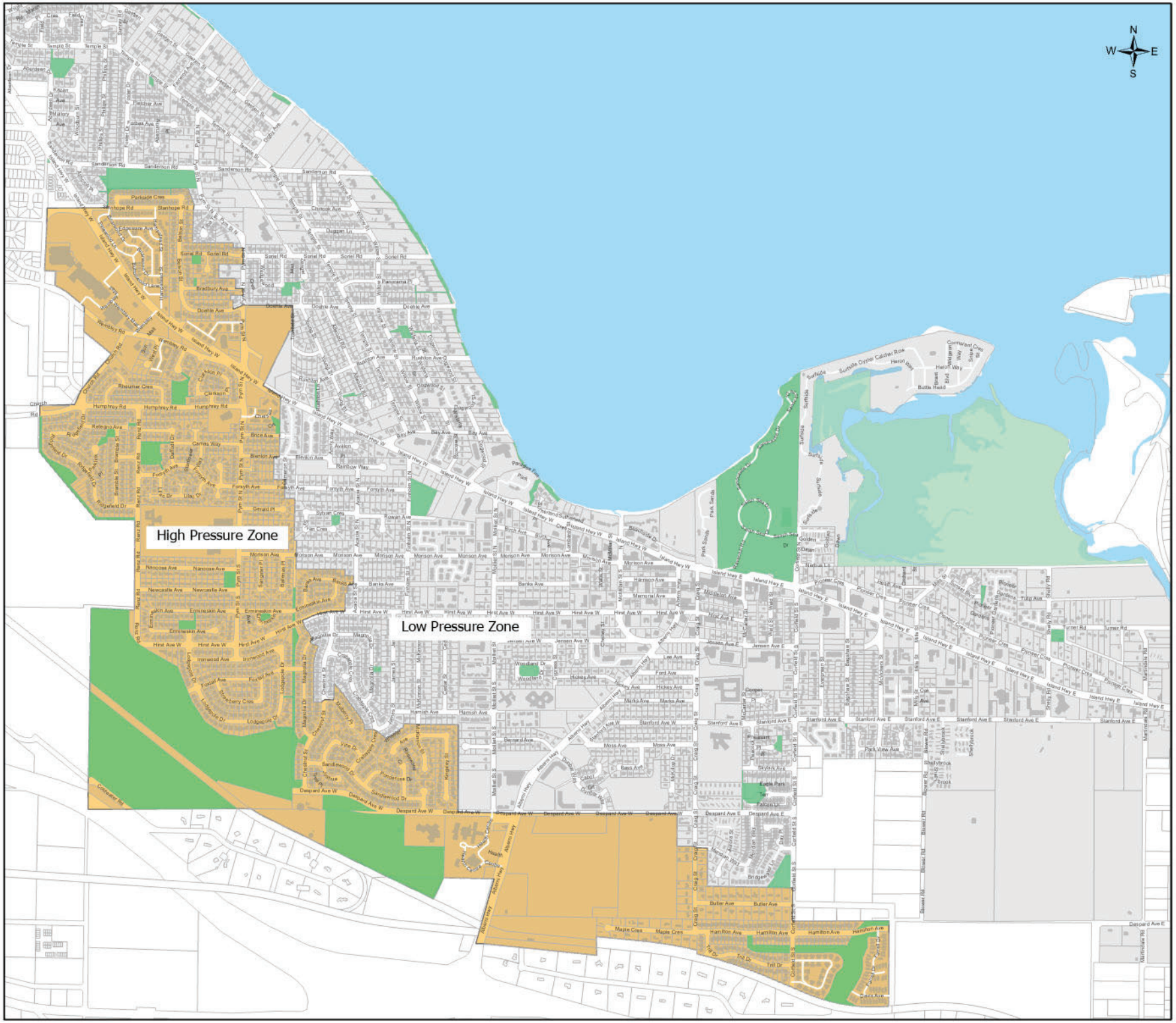


Pressure Zones

The City is divided into two pressure zones known as 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) 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 lower areas, a pressure reducing valve (PRV) was installed to drop the pressure from 80 psi to 60 psi.



City of Parksville

Water Pressure Zones

Legend

- City Park
- The Nature Trust of BC
- Parcels
- HIGH PRESSURE

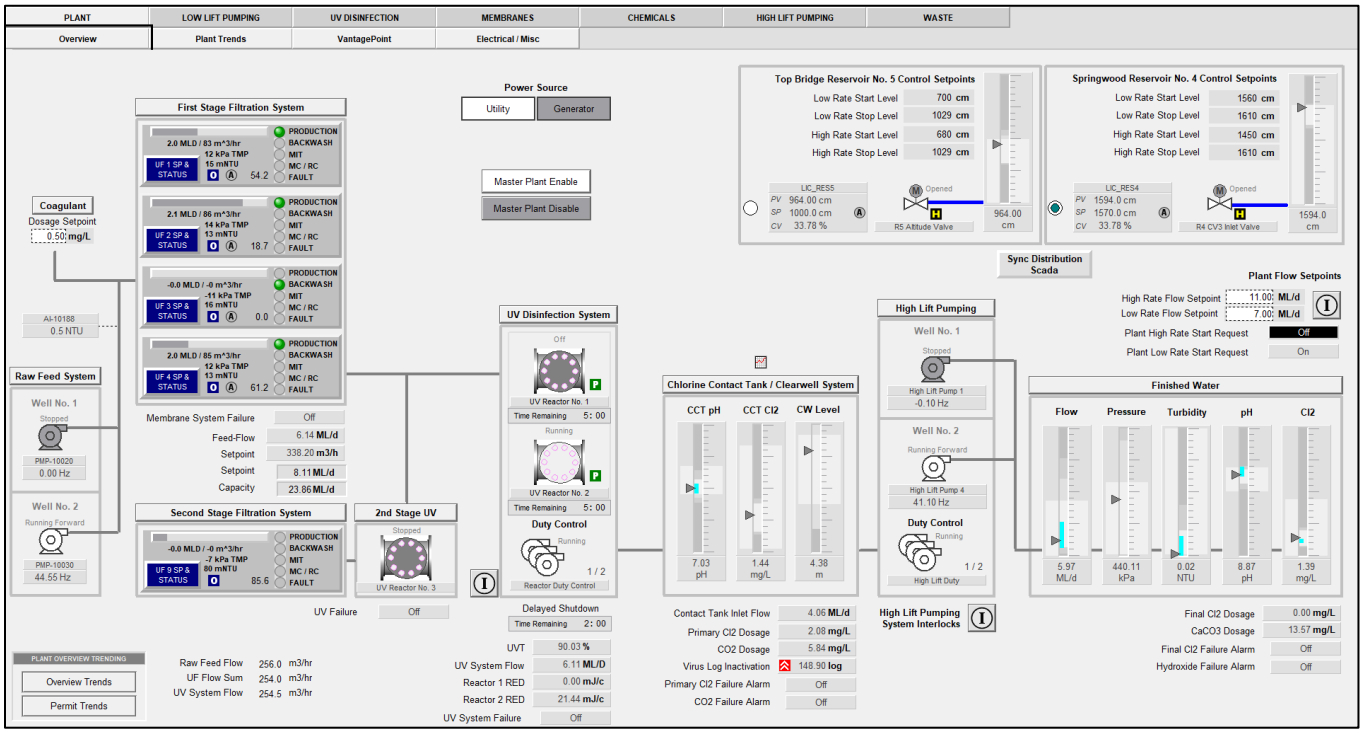
Meters
0 75 150 300 450

Scale: 1:20,000

Date: Jul 18, 2022 2:15 PM

Supervisory Control and Data Acquisition (SCADA) System

The water treatment plant, water distribution system and wells are controlled by a computerized control system called SCADA. This system allows the operators to monitor water treatment plant functions, reservoir levels, the status and flows of pumps, and chlorine residuals. The operator 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 and software will be 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 at the water treatment plant lab to meet regulatory requirements. 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 and a sample from the water treatment plant every month. These samples are tested at the Island Health labs.

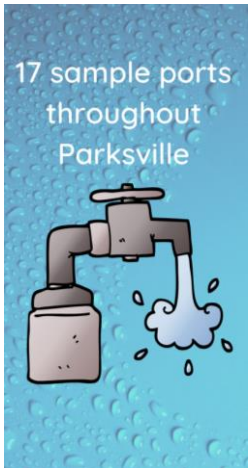
Refer to **Appendix C** for 2021 test results and below link for a detailed list of water samples: *https://www.islandhealth.ca/learn-about-health/drinking-water/water-sampling-results*

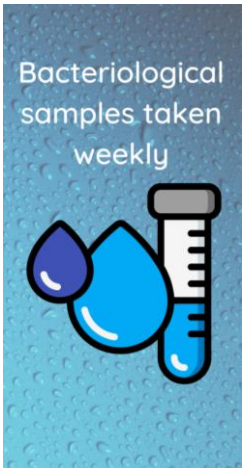
Full Spectrum Analysis

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 metals (iron, manganese), conventional parameters (pH, turbidity, hardness) and disinfection byproducts (Trihalomethane). 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 (CaCO3). The river water is considered "soft" under the guidelines and the well water is "moderate". Hardness levels above 500 mg/l are normally considered unacceptable.





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. A summary of 106 complaints is provided in the below chart.

There were 45 complaints related to water shutoff during watermain tie-ins. Typically, notifications were distributed prior to the construction work; however, residents misplaced the notices or did not receive them.

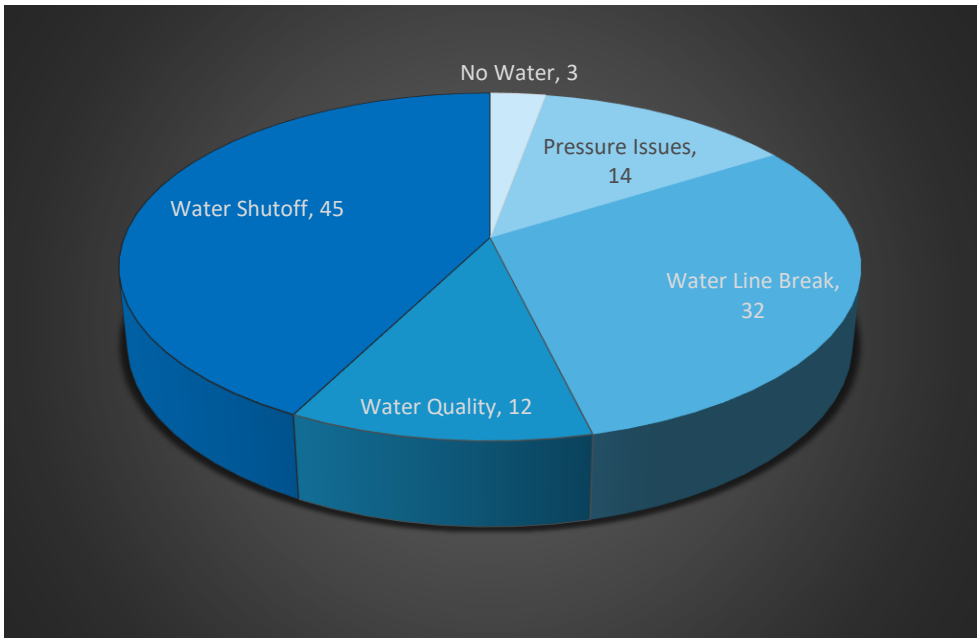
There were 32 calls related to water leaks and most were from services or water meters. Repairs were carried out accordingly.

Approximated 14 complaints were from pressure drop and 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 12 water quality complaints and 5 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 2 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 4 calls related to water hardness. Mostly contributed to new homeowners from other municipalities who are used to different water composition. There was also 1 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 inconvenient breakdowns.

Distribution

- Conduct watermains flushing between March 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. Paint hydrants as needed
- Test and repair backflow prevention devices if needed

Wells

- Rehabilitate one to two wells per year as needed
- Inspect and replace pumps and motors as needed
- Refill Springwood Well #1 chlorine tank as needed
- Complete water sampling and testing as per regulations

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 accordingly. Flush and clean the line when not in use
- Monitor strainer's differential pressure and check for leaks. Conduct service and maintenance as needed 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 ensuring it meets log removal. Service the instrument as necessary to improve performance
- Service the ultraviolet units twice a year
- Service chlorine analyzer

UV Units at the Water Treatment Plant

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

PROGRAMS

Cross Connection Control Program

The Cross Connection Program is currently addressing medium and high hazard water use. These include industrial, commercial, and institutional (ICI) users. Each ICI user will be assessed for potential risk to the water system. Any costs associated with installation, replacement and testing of an approved backflow device will be borne by the property owner.

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 send the annual test report to the utilities technician at the City of Parksville. The utilities technician reviews the test reports to ensure it is following the guidelines.

City staff remain watchful for potential cross connections around the City and problems are reported to the utilities technician.

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 has three Emergency Response Plans (ERP) pertaining to the water system, which 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 plans are updated annually.

Watershed Protection Program

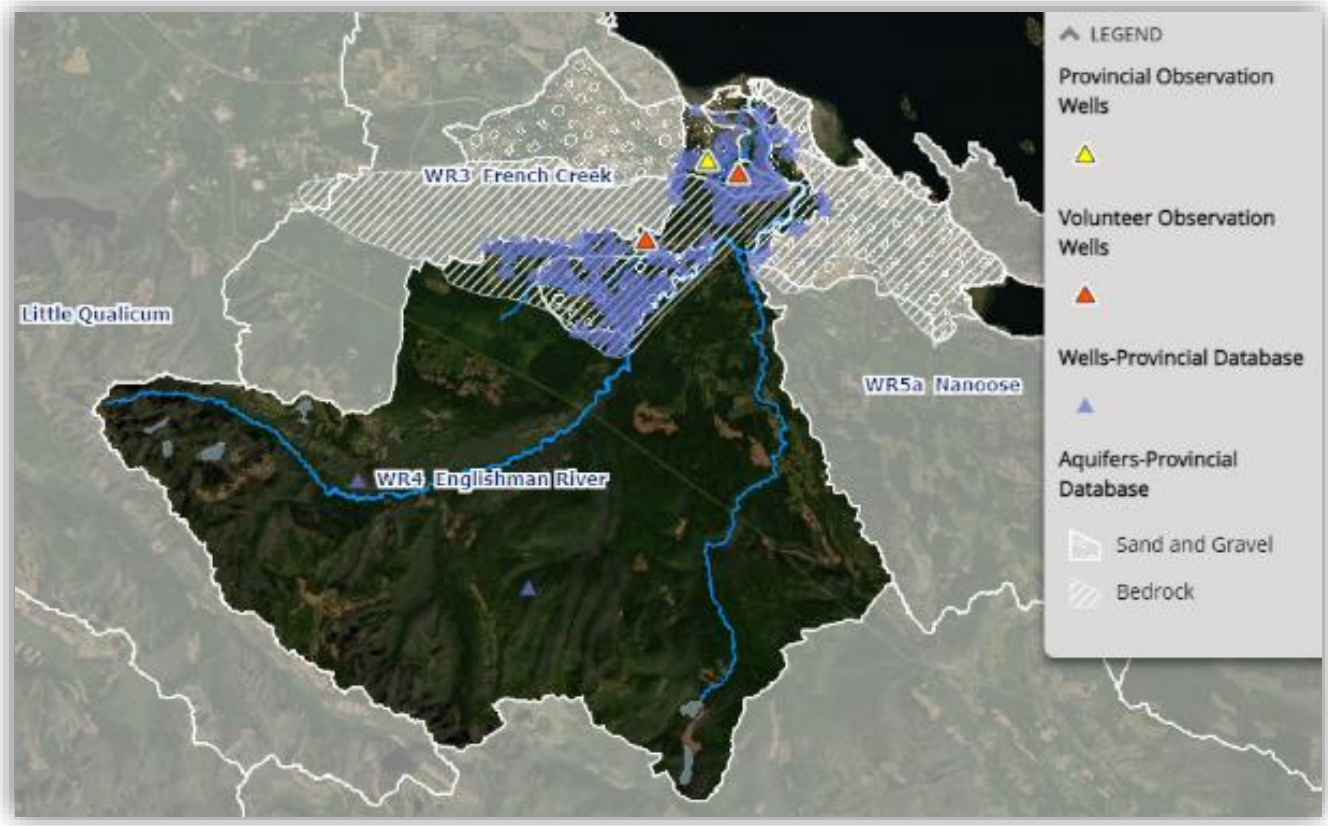
The Englishman River flows in an easterly direction from Mount Arrowsmith and discharges into the Salish Sea, north of Craig Bay. The highest elevation in the watershed is Mount Arrowsmith, at 1819 metres it is an important watershed and has a drainage area of 324 km^2.

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. 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. This consists of maintaining adequate flow in the river to support fish mitigation and habitat.

Aquifers in our watershed were showing signs of stress; however, with the commissioning of the water treatment plant and recent intense rainfalls, water levels in Aquifer 216 are recovering over the past couple of years. Aquifer 220, still not fully recovered, is seeing minimal improvement.

Englishman River Watershed



PROJECTS AND IMPROVEMENTS

2021 Operations Projects and Improvements

- Fixed Springwood Well #7 and Railway Well #7 in January 2021
- Replaced 104 residential water meters (3/4" size)
- Continue to update the water meter route maps to improve efficiency
- Updated HMI/SCADA system to suit the needs of the water treatment plant staff and improve service. The works consisted of:
    - Sulfuric Acid pump control added
    - Generator transfer switch fixed
    - Plant enable and disable option for starting/stopping the WTP added
    - New trending package added
    - New alarm autodials added
- Continue with the construction of the Residual Handling Dewatering System (Geobag). Construction is completed
- Installed new backflow preventers in the water treatment plant to protect service water
- Resolved UV overheating issues by diagnosing and preventing air trapping in the UV reactors
- Installed pond overflow pipe to prevent water backing up to the plant and clearwell
- Developed critical spare parts list. Purchased storage shelving units in preparation for spare parts

2021 Engineering Capital and Development Improvement Projects

- Installed and renewed water mains at:
    - Pym Street: 260m - 300mm diameter pipe
    - Forsyth: 150m- 200mm diameter pipe
    - Hirst: 160m - 200mm diameter pipe
    - Memorial: 220m - 200mm diameter pipe
    - Bagshaw: 350m - 200mm diameter pipe
    - Lombardy and 249 Finholm subdivision

2022 Operations Projects and Improvements

- Expand the Cross-Connection Control Program
- Carryout the Englishman River 5-Year Fish Monitoring Program
- Retain consultant to complete Arrowsmith Dam Safety Review (completed every 10 years)
- Commission the Residual Handling Dewatering System (Geobag)
- Rehabilitate Railway Well #8 to increase water productivity
- Continue the Water Meter Replacement Program
- Continue working with engineers and contractors to diagnose and resolve issues at the water treatment plant. System optimization to follow thereafter
- Retain consultant for Determining Groundwater at Risk of Containing Pathogens (GARP) Study
- Construct permanent operations yard railway crossing
- Re-wire Springwood Well #1
- Upgrade distribution SCADA system
- Upgrade Arrowsmith Dam instrumentation and security infrastructure:
    - Power supply, solar power and charging station
    - Camera upgrade
    - New piezometer reader unit

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 higher 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.

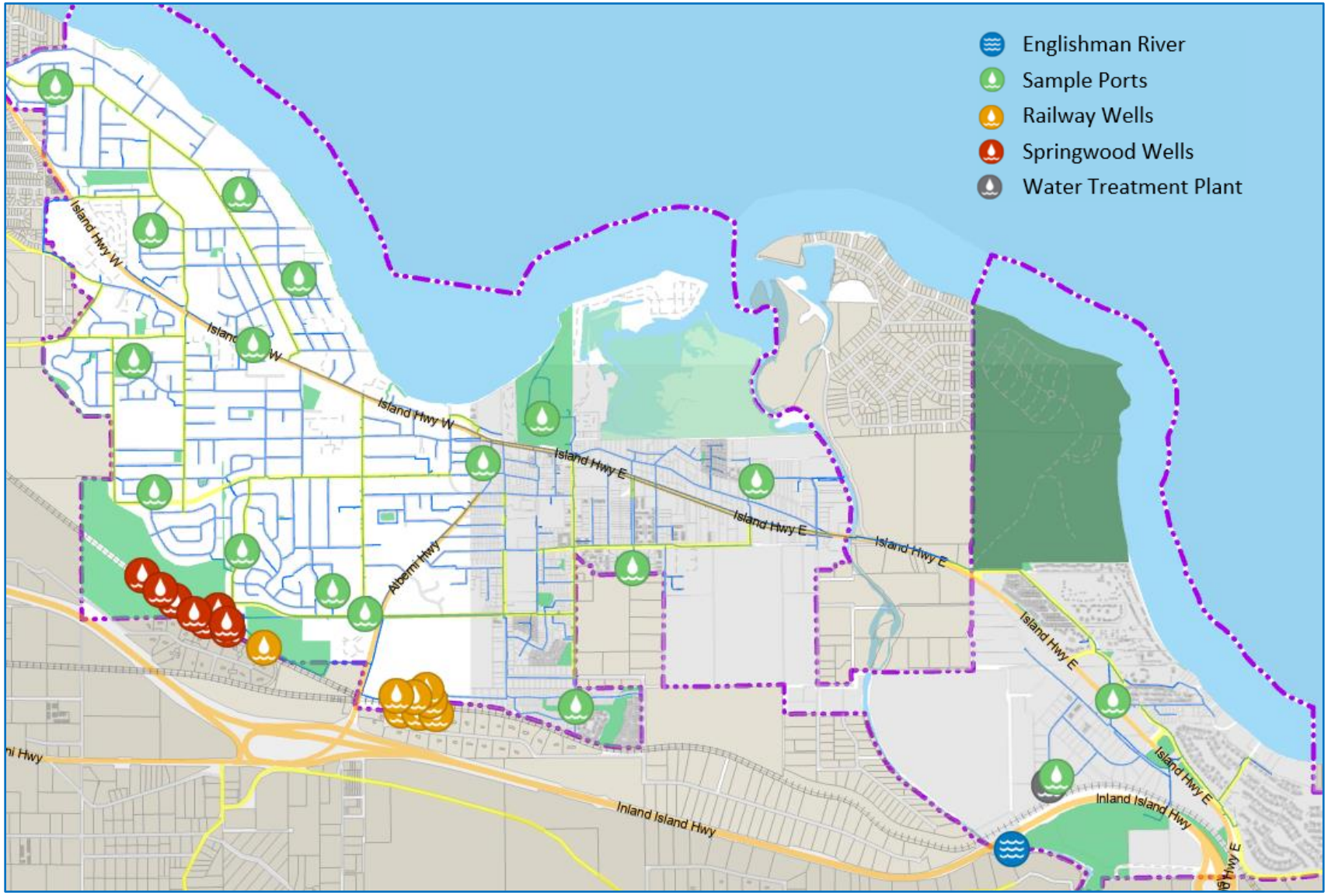
Why does my water sometimes look "milky" and "cloudy"?

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.

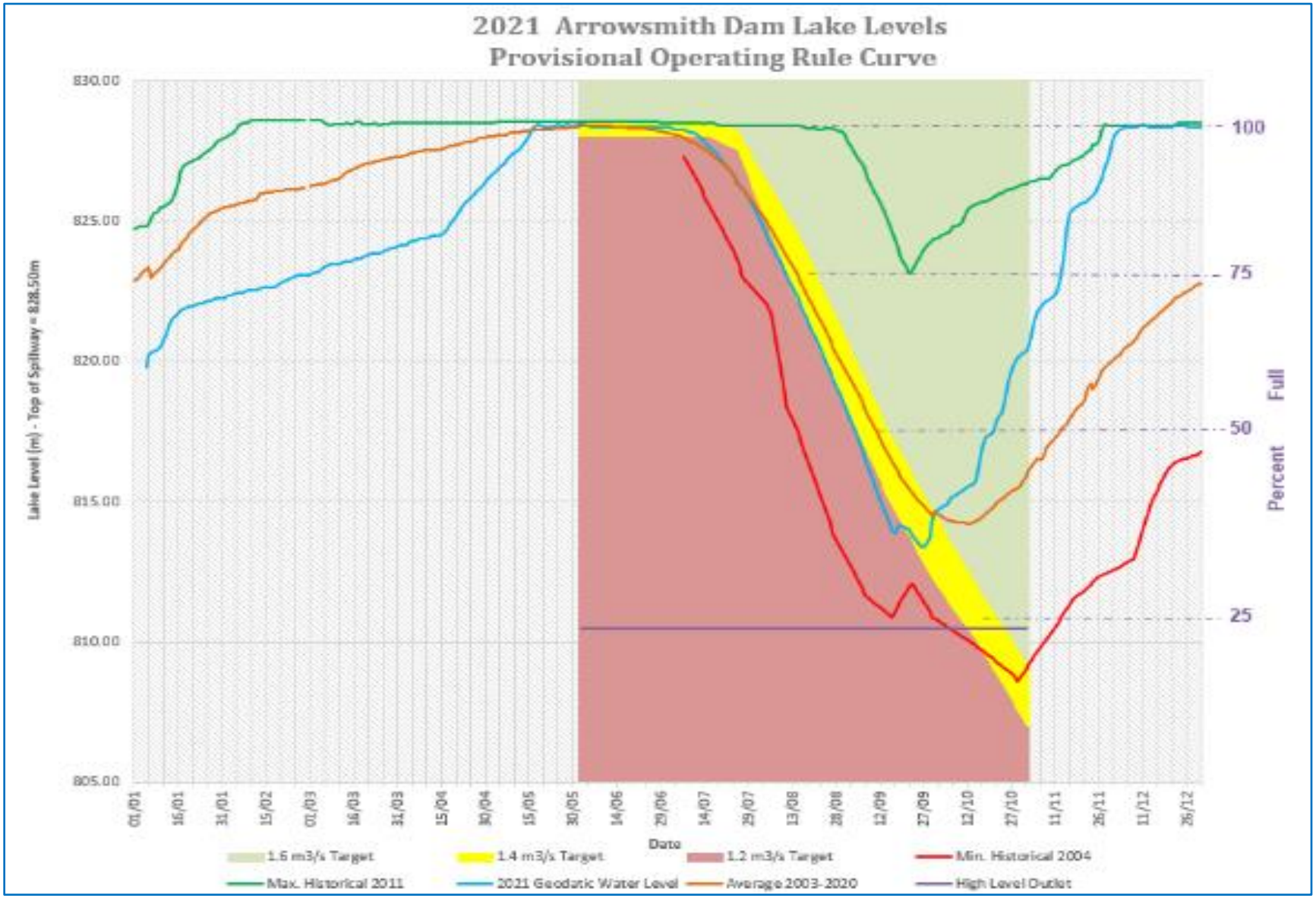
Why do my toilet and bathroom tiles sometimes turn pink?

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



Appendix C - 2021 Bacteriological Results

LT1 - Less than 1 (no detectable bacteria)

Location	Date	Total Coliform	E.Coli
1247 Arbutus Road	January 5, 2021	LT1	LT1
Island Highway by Temple	January 5, 2021	LT1	LT1
770 Soriel	January 5, 2021	LT1	LT1
271 Chestnut	January 5, 2021	LT1	LT1
Works Yard	January 12, 2021	LT1	LT1
Top of Corfield	January 12, 2021	LT1	LT1
401 Moilliet	January 12, 2021	LT1	LT1
613 Chinook	January 12, 2021	LT1	LT1
186 Shelly	January 19, 2021	LT1	LT1
Community Park	January 19, 2021	LT1	LT1
450 Wisteria	January 19, 2021	LT1	LT1
Daffodil at Camas	January 19, 2021	LT1	LT1
330 Park View	January 26, 2021	LT1	LT1
136 Memorial	January 26, 2021	LT1	LT1
378 Kingsley	January 26, 2021	LT1	LT1
851 Temple	January 26, 2021	LT1	LT1
1247 Arbutus Road	February 2, 2021	LT1	LT1
Island Highway by Temple	February 2, 2021	LT1	LT1
770 Soriel	February 2, 2021	LT1	LT1
271 Chestnut	February 2, 2021	LT1	LT1
Works Yard	February 9, 2021	LT1	LT1
Top of Corfield	February 9, 2021	LT1	LT1
401 Moilliet	February 9, 2021	LT1	LT1
450 Wisteria	February 9, 2021	LT1	LT1
186 Shelly	February 16, 2021	LT1	LT1
Community Park	February 16, 2021	LT1	LT1
613 Chinook	February 16, 2021	LT1	LT1
Daffodil at Camas	February 16, 2021	LT1	LT1
330 Park View	February 24, 2021	LT1	LT1
136 Memorial	February 24, 2021	LT1	LT1
851 Temple	February 24, 2021	LT1	LT1
378 Kingsley	February 24, 2021	LT1	LT1
1247 Arbutus Road	March 2, 2021	LT1	LT1
Island Highway by Temple	March 2, 2021	LT1	LT1
271 Chestnut	March 2, 2021	LT1	LT1
Works Yard	March 9, 2021	LT1	LT1
Top of Corfield	March 9, 2021	LT1	LT1
401 Moilliet	March 9, 2021	LT1	LT1

Location	Date	Total Coliform	E.Coli
770 Soriel	March 9, 2021	LT1	LT1
186 Shelly	March 16, 2021	LT1	LT1
Community Park	March 16, 2021	LT1	LT1
613 Chinook	March 16, 2021	LT1	LT1
330 Park View	March 23, 2021	LT1	LT1
Daffodil at Camas	March 23, 2021	LT1	LT1
450 Wisteria	March 23, 2021	LT1	LT1
136 Memorial	March 30, 2021	LT1	LT1
378 Kingsley	March 30, 2021	LT1	LT1
851 Temple	March 30, 2021	LT1	LT1
1247 Arbutus Road	April 6, 2021	LT1	LT1
Island Highway by Temple	April 6, 2021	LT1	LT1
770 Soriel	April 6, 2021	LT1	LT1
271 Chestnut	April 6, 2021	LT1	LT1
Works Yard	April 13, 2021	LT1	LT1
Top of Corfield	April 13, 2021	LT1	LT1
401 Moilliet	April 13, 2021	LT1	LT1
613 Chinook	April 13, 2021	LT1	LT1
186 Shelly	April 20, 2021	LT1	LT1
Community Park	April 20, 2021	LT1	LT1
450 Wisteria	April 20, 2021	LT1	LT1
Daffodil at Camas	April 20, 2021	LT1	LT1
378 Kingsley	April 22, 2021	LT1	LT1
330 Park View	April 28, 2021	LT1	LT1
136 Memorial	April 28, 2021	LT1	LT1
378 Kingsley	April 28, 2021	LT1	LT1
851 Temple	April 28, 2021	LT1	LT1
1247 Arbutus Road	May 4, 2021	LT1	LT1
Island Highway by Temple	May 4, 2021	LT1	LT1
271 Chestnut	May 4, 2021	LT1	LT1
770 Soriel	May 4, 2021	LT1	LT1
Works Yard	May 11, 2021	LT1	LT1
Top of Corfield	May 11, 2021	LT1	LT1
401 Moilliet	May 11, 2021	LT1	LT1
613 Chinook	May 11, 2021	LT1	LT1
186 Shelly	May 18, 2021	LT1	LT1
Community Park	May 18, 2021	LT1	LT1
450 Wisteria	May 18, 2021	LT1	LT1
Daffodil at Camas	May 18, 2021	LT1	LT1
330 Park View	May 25, 2021	LT1	LT1
136 Memorial	May 25, 2021	LT1	LT1
378 Kingsley	May 25, 2021	LT1	LT1

Location	Date	Total Coliform	E.Coli
851 Temple	May 25, 2021	LT1	LT1
1247 Arbutus Road	June 1, 2021	LT1	LT1
Island Highway by Temple	June 1, 2021	LT1	LT1
770 Soriel	June 1, 2021	LT1	LT1
271 Chestnut	June 1, 2021	LT1	LT1
Works Yard	June 9, 2021	LT1	LT1
Top of Corfield	June 9, 2021	LT1	LT1
401 Moilliet	June 9, 2021	LT1	LT1
613 Chinook	June 9, 2021	LT1	LT1
Community Park	June 15, 2021	LT1	LT1
450 Wisteria	June 15, 2021	LT1	LT1
Daffodil at Camas	June 15, 2021	LT1	LT1
330 Park View	June 15, 2021	LT1	LT1
851 Temple	June 22, 2021	LT1	LT1
136 Memorial	June 29, 2021	LT1	LT1
1247 Arbutus Road	July 6, 2021	LT1	LT1
Island Highway by Temple	July 6, 2021	LT1	LT1
770 Soriel	July 6, 2021	LT1	LT1
271 Chestnut	July 6, 2021	LT1	LT1
Works Yard	July 13, 2021	LT1	LT1
Top of Corfield	July 13, 2021	LT1	LT1
401 Moilliet	July 13, 2021	LT1	LT1
613 Chinook	July 13, 2021	LT1	LT1
186 Shelly	July 21, 2021	LT1	LT1
Community Park	July 21, 2021	LT1	LT1
450 Wisteria	July 21, 2021	LT1	LT1
Daffodil at Camas	July 21, 2021	LT1	LT1
330 Park View	July 27, 2021	LT1	LT1
136 Memorial	July 27, 2021	LT1	LT1
378 Kingsley	July 27, 2021	LT1	LT1
851 Temple	July 27, 2021	LT1	LT1
1247 Arbutus Road	August 3, 2021	LT1	LT1
Island Highway by Temple	August 3, 2021	LT1	LT1
770 Soriel	August 3, 2021	LT1	LT1
271 Chestnut	August 3, 2021	LT1	LT1
Top of Corfield	August 11, 2021	LT1	LT1
401 Moilliet	August 11, 2021	LT1	LT1
613 Chinook	August 11, 2021	LT1	LT1
Works Yard	August 17, 2021	LT1	LT1
186 Shelly	August 17, 2021	LT1	LT1
Community Park	August 17, 2021	LT1	LT1
450 Wisteria	August 24, 2021	LT1	LT1

Location	Date	Total Coliform	E.Coli
Daffodil at Camas	August 24, 2021	LT1	LT1
330 Park View	August 24, 2021	LT1	LT1
136 Memorial	August 31, 2021	LT1	LT1
378 Kingsley	August 31, 2021	LT1	LT1
851 Temple	August 31, 2021	LT1	LT1
1247 Arbutus Road	September 7, 2021	LT1	LT1
Island Highway by Temple	September 7, 2021	LT1	LT1
770 Soriel	September 7, 2021	LT1	LT1
271 Chestnut	September 7, 2021	LT1	LT1
Works Yard	September 15, 2021	LT1	LT1
401 Moilliet	September 15, 2021	LT1	LT1
613 Chinook	September 15, 2021	LT1	LT1
186 Shelly	September 21, 2021	LT1	LT1
Community Park	September 21, 2021	LT1	LT1
450 Wisteria	September 21, 2021	LT1	LT1
Daffodil at Camas	September 21, 2021	LT1	LT1
330 Park View	September 28, 2021	LT1	LT1
136 Memorial	September 28, 2021	LT1	LT1
378 Kingsley	September 28, 2021	LT1	LT1
851 Temple	September 28, 2021	LT1	LT1
1247 Arbutus Road	October 5, 2021	LT1	LT1
Island Highway by Temple	October 5, 2021	LT1	LT1
770 Soriel	October 5, 2021	LT1	LT1
271 Chestnut	October 5, 2021	LT1	LT1
401 Moilliet	October 12, 2021	LT1	LT1
Works Yard	October 12, 2021	LT1	LT1
Top of Corfield	October 12, 2021	LT1	LT1
613 Chinook	October 12, 2021	LT1	LT1
Community Park	October 19, 2021	LT1	LT1
450 Wisteria	October 19, 2021	LT1	LT1
Daffodil at Camas	October 19, 2021	LT1	LT1
330 Park View	October 26, 2021	LT1	LT1
136 Memorial	October 26, 2021	LT1	LT1
378 Kingsley	October 26, 2021	LT1	LT1
851 Temple	October 26, 2021	LT1	LT1
1247 Arbutus Road	November 2, 2021	*Results Not Available**	*Results Not Available**
Island Highway by Temple	November 2, 2021	*Results Not Available**	*Results Not Available**
770 Soriel	November 2, 2021	*Results Not Available**	*Results Not Available**
271 Chestnut	November 2, 2021	*Results Not Available**	*Results Not Available**
Works Yard	November 9, 2021	LT1	LT1
Top of Corfield	November 9, 2021	LT1	LT1
401 Moilliet	November 9, 2021	LT1	LT1

**Due to the delay at the lab. Once the lab was ready, the samples exceeded the max. holding time; therefore, couldn't be tested*

Appendix D - 2021 Trihalomethanes (THMs) Results

2021	Community Park				Temple			
	February	August	October	December	February	August	October	December
Total THM (mg/L)	0.064	0.035	0.058	0.067	0.033	0.044	0.052	0.04
Bromodichloromethanes (mg/L)	0.008	0.008	0.007	0.004	0.007	0.011	0.007	0.005
Bromoform (mg/L)	<0.001	<0.001	<0.001	0.002	<0.001	<0.001	<0.001	0.002
Chloroform (mg/L)	0.055	0.024	0.049	0.059	0.023	0.03	0.043	0.03
Dibromochloromethane (mg/L)	0.001	0.003	0.002	0.002	0.003	0.003	0.002	0.003
Toluene-d8 (%)	94	104	99	102	96	102	101	101
4-Bromoflurobenzene (%)	89	105	97	100	92	107	99	97
2021	Ermineskin				Public Works			
	February	August	October	December	February	August	October	December
Total THM (mg/L)	0.038	0.04	0.04	0.036	0.063	0.079	0.075	0.061
Bromodichloromethanes (mg/L)	0.006	0.009	0.005	0.004	0.007	0.014	0.005	0.003
Bromoform (mg/L)	<0.001	<0.001	<0.001	0.002	<0.001	<0.001	<0.001	<0.001
Chloroform (mg/L)	0.03	0.028	0.033	0.028	0.056	0.063	0.07	0.058
Dibromochloromethane (mg/L)	0.002	0.003	0.002	0.002	<0.001	0.002	<0.001	<0.001
Toluene-d8 (%)	96	101	103	101	94	102	101	101
4-Bromoflurobenzene (%)	89	102	95	101	91	102	95	13
2021	Water Treatment Plant							
	February	August	October	December				
Total THM (mg/L)	0.031	0.023	0.036	0.024				
Bromodichloromethanes (mg/L)	0.003	0.005	0.003	0.001				
Bromoform (mg/L)	<0.001	<0.001	<0.001	<0.001				
Chloroform (mg/L)	0.028	0.018	0.033	0.023				
Dibromochloromethane (mg/L)	<0.001	<0.001	<0.001	<0.001				
Toluene-d8 (%)	95	98	100	101				
4-Bromoflurobenzene (%)	89	116	98	104				

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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V3S 8P8, Canada

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Report Transmission Cover Page

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.: 4101
Proj. Acct. code:

Lot ID: **1479191**
Control Number:
Date Received: Mar 11, 2021
Date Reported: Mar 17, 2021
Report Number: 2602307

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 Report	PDF	Invoice

Contact	Company	Address
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 Report	PDF	COA
Email - Single Report	PDF	COC / Test Report

Notes To Clients:

- Mar 11, 2021 - Upon receipt, samples 1479191-1-3 had exceeded recommended temperature for bacterial analysis.
- Mar 11, 2021 - Upon receipt, samples 1479191-1-3 had exceeded the 30 hour recommended hold time for microbiology testing. Excess time between sampling and testing may affect the validity of the test result.

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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.: 4101
Proj. Acct. code:

Lot ID: **1479191**
Control Number:
Date Received: Mar 11, 2021
Date Reported: Mar 17, 2021
Report Number: 2602307

Reference Number	1479191-1	1479191-2	1479191-3
Sample Date	Mar 09, 2021	Mar 09, 2021	Mar 09, 2021
Sample Time	09:45	09:25	09:55
Sample Location			
Sample Description	WTP / Water Treatment Plant / 12.6 °C	River Intake / Englishman River / 12.6 °C	PW Yard / Public Works Yard / 12.6 °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	4.8	5.1	5.2	0.01
Magnesium	Total	mg/L	0.73	0.80	0.74	0.02
Potassium	Total	mg/L	0.15	0.20	0.16	0.04
Silicon	Total	mg/L	2.4	2.9	2.5	0.005
Sodium	Total	mg/L	9.2	2.3	10	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	0.00005
Physical and Aggregate Properties						
Colour	True	Colour units	<5	16	<5	5
Turbidity		NTU	<0.10	3.50	<0.10	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		7.90	7.08	7.59	0.01
Electrical Conductivity		µS/cm at 25 °C	79	45	78	1
T-Alkalinity	as CaCO3	mg/L	28	13	27	5
Chloride	Dissolved	mg/L	6.79	3.52	6.86	0.05
Fluoride	Dissolved	mg/L	<0.01	<0.01	<0.01	0.01
Nitrate - N	Dissolved	mg/L	0.04	0.05	0.05	0.01
Nitrite - N	Dissolved	mg/L	<0.01	<0.01	<0.01	0.01
Sulfate (SO4)	Dissolved	mg/L	1.5	1.3	1.6	0.1
Hardness	as CaCO3 (dissolved)	mg/L	16	16	16	5
Total Dissolved Solids	Calculated	mg/L	49	29	48	1
Langelier Index			-1.3	-2.4	-1.6	
Trace Metals Total						
Aluminum	Total	mg/L	0.011	0.33	0.018	0.001
Antimony	Total	mg/L	<0.00002	<0.00002	<0.00002	0.00002
Arsenic	Total	mg/L	<0.0001	0.0002	<0.0001	0.0001
Barium	Total	mg/L	0.0031	0.0050	0.0029	0.0001
Boron	Total	mg/L	0.006	0.007	0.007	0.002
Cadmium	Total	mg/L	<0.00001	<0.00001	<0.00001	0.00001
Chromium	Total	mg/L	0.00006	0.00049	0.00011	0.00005
Copper	Total	mg/L	0.0003	0.0034	0.0043	0.0002

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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.: 4101
Proj. Acct. code:

Lot ID: **1479191**
Control Number:
Date Received: Mar 11, 2021
Date Reported: Mar 17, 2021
Report Number: 2602307

Reference Number	1479191-1	1479191-2	1479191-3
Sample Date	Mar 09, 2021	Mar 09, 2021	Mar 09, 2021
Sample Time	09:45	09:25	09:55
Sample Location			
Sample Description	WTP / Water Treatment Plant / 12.6 °C	River Intake / Englishman River / 12.6 °C	PW Yard / Public Works Yard / 12.6 °C
Matrix	Water	Water	Water

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Trace Metals Total - Continued						
Iron	Total	mg/L	0.006	0.32	0.014	0.002
Lead	Total	mg/L	<0.00001	0.00004	0.00013	0.00001
Manganese	Total	mg/L	0.002	0.006	0.002	0.001
Selenium	Total	mg/L	<0.0002	<0.0002	<0.0002	0.0002
Strontium	Total	mg/L	0.022	0.024	0.022	0.0001
Uranium	Total	mg/L	<0.00001	0.00001	<0.00001	0.00001
Zinc	Total	mg/L	0.0006	0.0011	0.0020	0.0005

Approved by:

Anthony Neumann, MSc
General Manager

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.

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Report Transmission Cover Page

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.:
Proj. Acct. code:

Lot ID: **1509019**
Control Number:
Date Received: Jul 28, 2021
Date Reported: Aug 6, 2021
Report Number: 2645858

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 Report	PDF	Invoice

Contact	Company	Address
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 Report	PDF	COA
Email - Single Report	PDF	COC / Test Report

Notes To Clients:

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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.:
Proj. Acct. code:

Lot ID: **1509019**
Control Number:
Date Received: Jul 28, 2021
Date Reported: Aug 6, 2021
Report Number: 2645858

Reference Number	1509019-1	1509019-2	1509019-3
Sample Date	Jul 27, 2021	Jul 27, 2021	Jul 27, 2021
Sample Time	08:15	08:20	08:35
Sample Location			
Sample Description	PWY / Sample Port / 9.8 °C	WTP / Lab / 9.8 °C	River / Intake / 9.8 °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	12	12	12	0.01
Magnesium	Total	mg/L	1.3	1.4	1.5	0.02
Potassium	Total	mg/L	0.19	0.20	0.23	0.04
Silicon	Total	mg/L	2.2	2.2	2.5	0.005
Sodium	Total	mg/L	14	14	6.0	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	0.00005
Microbiological Analysis						
Total Coliforms	Enzyme Substrate Test	MPN/100 mL	<1.0	<1.0	>2419.6	1.0
Escherichia coli	Enzyme Substrate Test	MPN/100 mL	<1.0	<1.0	27.5	1.0
Physical and Aggregate Properties						
Colour	True	Colour units	<5	<5	<5	5
Turbidity		NTU	<0.10	<0.10	0.36	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		8.36	8.25	7.48	0.01
Electrical Conductivity		µS/cm at 25 °C	137	139	106	1
T-Alkalinity	as CaCO3	mg/L	42	42	27	5
Chloride	Dissolved	mg/L	16.3	16.5	14.6	0.05
Fluoride	Dissolved	mg/L	<0.01	<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	<0.01	<0.01	0.01
Sulfate (SO4)	Dissolved	mg/L	1.4	1.4	1.4	0.1
Hardness	as CaCO3 (dissolved)	mg/L	30	30	31	5
Total Dissolved Solids	Calculated	mg/L	72	72	55	1
Langelier Index			-0.4	-0.5	-1.4	
Trace Metals Total						
Aluminum	Total	mg/L	0.013	0.005	0.021	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	0.0063	0.0069	0.0071	0.0001
Boron	Total	mg/L	0.021	0.018	0.017	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.:
Proj. Acct. code:

Lot ID: **1509019**
Control Number:
Date Received: Jul 28, 2021
Date Reported: Aug 6, 2021
Report Number: 2645858

Reference Number	1509019-1	1509019-2	1509019-3
Sample Date	Jul 27, 2021	Jul 27, 2021	Jul 27, 2021
Sample Time	08:15	08:20	08:35
Sample Location			
Sample Description	PWY / Sample Port / 9.8 °C	WTP / Lab / 9.8 °C	River / Intake / 9.8 °C
Matrix	Water	Water	Water

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Trace Metals Total - Continued						
Chromium	Total	mg/L	<0.00005	<0.00005	0.00006	0.00005
Copper	Total	mg/L	0.0027	0.0005	0.0007	0.0002
Iron	Total	mg/L	0.009	0.007	0.072	0.002
Lead	Total	mg/L	0.00023	<0.00001	<0.00001	0.00001
Manganese	Total	mg/L	0.003	0.003	0.009	0.001
Selenium	Total	mg/L	<0.0002	<0.0002	<0.0002	0.0002
Strontium	Total	mg/L	0.047	0.048	0.048	0.0001
Uranium	Total	mg/L	<0.00001	<0.00001	<0.00001	0.00001
Zinc	Total	mg/L	0.0016	<0.0005	<0.0005	0.0005

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Analytical Report

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Attn: Accounts Payable
Sampled By: Barbara Silenieks
Company: City of Parksville

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

Lot ID: **1509019**
Control Number:
Date Received: Jul 28, 2021
Date Reported: Aug 6, 2021
Report Number: 2645858

Reference Number	1509019-4	1509019-5	
Sample Date	Jul 27, 2021	Jul 27, 2021	
Sample Time	09:40	10:00	
Sample Location			
Sample Description	Springwood # 8 / Well / 9.8 °C	Railway 3 1 / Well / 9.8 °C	
Matrix	Water	Water	

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	38	30		0.01
Magnesium	Total	mg/L	19	15		0.02
Potassium	Total	mg/L	0.98	0.82		0.04
Silicon	Total	mg/L	11	10		0.005
Sodium	Total	mg/L	7.5	7.9		0.1
Digestion	Preparation		Field Pres, digest as total Hg	Field Pres, digest as total Hg		
Mercury	Total	mg/L	<0.00001	<0.00001		0.00005
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	0.40	0.11		0.1
Routine Water						
Digestion	Dissolved		Lab filtered & preserved	Lab filtered & preserved		
pH - Holding Time			Exceeded	Exceeded		
pH	at 25 °C		7.79	7.87		0.01
Electrical Conductivity		µS/cm at 25 °C	366	300		1
T-Alkalinity	as CaCO3	mg/L	152	115		5
Chloride	Dissolved	mg/L	19.7	23.1		0.05
Fluoride	Dissolved	mg/L	<0.01	<0.01		0.01
Nitrate - N	Dissolved	mg/L	1.21	0.36		0.01
Nitrite - N	Dissolved	mg/L	<0.01	<0.01		0.01
Sulfate (SO4)	Dissolved	mg/L	7.2	4.7		0.1
Hardness	as CaCO3 (dissolved)	mg/L	155	119		5
Total Dissolved Solids	Calculated	mg/L	211	173		1
Langelier Index			0.1	-0.03		
Trace Metals Total						
Aluminum	Total	mg/L	0.001	0.001		0.001
Antimony	Total	mg/L	0.00002	0.00002		0.00002
Arsenic	Total	mg/L	0.0003	0.0004		0.0001
Barium	Total	mg/L	0.0074	0.015		0.0001
Boron	Total	mg/L	0.012	0.015		0.002
Cadmium	Total	mg/L	<0.00001	<0.00001		0.00001

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Analytical Report

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Attn: Accounts Payable
Sampled By: Barbara Silenieks
Company: City of Parksville

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

Lot ID: **1509019**
Control Number:
Date Received: Jul 28, 2021
Date Reported: Aug 6, 2021
Report Number: 2645858

Reference Number	1509019-4	1509019-5
Sample Date	Jul 27, 2021	Jul 27, 2021
Sample Time	09:40	10:00
Sample Location		
Sample Description	Springwood # 8 / Well / 9.8 °C	Railway 3 1 / Well / 9.8 °C
Matrix	Water	Water

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Trace Metals Total - Continued						
Chromium	Total	mg/L	0.00087	0.00087		0.00005
Copper	Total	mg/L	0.0009	0.0006		0.0002
Iron	Total	mg/L	0.069	0.011		0.002
Lead	Total	mg/L	0.00011	0.00027		0.00001
Manganese	Total	mg/L	0.012	0.005		0.001
Selenium	Total	mg/L	<0.0002	<0.0002		0.0002
Strontium	Total	mg/L	0.099	0.087		0.0001
Uranium	Total	mg/L	0.00031	0.00031		0.00001
Zinc	Total	mg/L	0.0013	0.0023		0.0005

Approved by:

Max Hewitt
Operations Manager

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.

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Methodology and Notes

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.:
Proj. Acct. code:

Lot ID: **1509019**
Control Number:
Date Received: Jul 28, 2021
Date Reported: Aug 6, 2021
Report Number: 2645858

Method of Analysis

Method Name	Reference		Method	Date Analysis Started	Location
Alk, pH, EC, Turb in water (BC)	APHA	*	Alkalinity - Titration Method, 2320 B	Jul 28, 2021	Element Vancouver
Alk, pH, EC, Turb in water (BC)	APHA	*	Conductivity, 2510 B	Jul 28, 2021	Element Vancouver
Alk, pH, EC, Turb in water (BC)	APHA	*	pH - Electrometric Method, 4500-H+ B	Jul 28, 2021	Element Vancouver
Anions by IEC in water (VAN)	APHA	*	Ion Chromatography with Chemical Suppression of Eluent Cond., 4110 B	Jul 29, 2021	Element Vancouver
Cyanide (Total) in water	US EPA	*	US EPA method, 335.3	Aug 3, 2021	Element Edmonton - Roper Road
Mercury Low Level (Total) in water (VAN)	EPA	*	Mercury in Water by Cold Vapor Atomic Fluorescence Spectrometry, 245.7	Jul 29, 2021	Element Vancouver
Metals SemiTrace (Dissolved) in water (VAN)	US EPA	*	Metals & Trace Elements by ICP-AES, 6010C	Aug 3, 2021	Element Vancouver
Metals SemiTrace (Total) in Water (VAN)	US EPA	*	Metals & Trace Elements by ICP-AES, 6010C	Jul 29, 2021	Element Vancouver
Total and E-Coli - Colilert - DW (VAN)	APHA		Enzyme Substrate Test, APHA 9223 B	Jul 28, 2021	Element Vancouver
Trace Metals (Total) in Water (VAN)	US EPA	*	Determination of Trace Elements in Waters and Wastes by ICP-MS, 200.8	Jul 29, 2021	Element Vancouver
True Color in water (VAN)	APHA	*	Spectrophotometric - Single Wavelength Method, 2120 C	Jul 29, 2021	Element Vancouver
Turbidity - Water (VAN)	APHA	*	Turbidity - Nephelometric Method, 2130 B	Jul 28, 2021	Element Vancouver

** Reference Method Modified*

References

APHA	Standard Methods for the Examination of Water and Wastewater
EPA	Environmental Protection Agency Test Methods - US
US EPA	US Environmental Protection Agency Test Methods

Please direct any inquiries regarding this report to our Client Services group.
Results relate only to samples as submitted.

Appendix F - Water System Operating Condition

VANCOUVER ISLAND health authority

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

Place Decal Here

Excellent health and care for everyone,
everywhere, everytime.

island health

March 1, 2016

CITY OF PARKSVILLE
MAR 02 2016
OPERATIONS

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 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. 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 *VIHA 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

Report by: B. Silenieks