City of Parksville

2015 Annual Water Report

February 2016

CITY OF PARKSVILLE

1116 Herring Gull Way
Parksville, BC
V9P 1R2

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1.0 Introduction

All water suppliers, under their Operating Permit and conditions, are required to provide an annual report to their users with information such as explanation of water source, water test results, maintenance programs and improvements to the water system. The following document summarizes these requirements. City of Parksville operating conditions are shown in Appendix G.

This report has been submitted to Island Health and it can be found on the City of Parksville Website. www.Parksville.ca.

2.0 Parksville Water System

The City of Parksville has approximately 4,500 water connections serving over 11,000 permanent and seasonal residents as well as supplying water to the Regional District of Nanaimo (Nanoose Bay Peninsula system) in the summer months.

These users get their drinking water from three sources.

- Englishman River
- Springwood Well Field
- Railway Well Field

The water is treated using either liquid or gaseous chlorine and stored in four reservoirs at both ends of the City.

Springwood Well #8

2.1 Groundwater Wells

The City's groundwater is pumped from a confined quadra sands aquifer that runs underground alongside the railway tracks from Trill Drive to the City's boundary in the southwest. The City currently has 16 production wells ranging from 2.0 l/s (25.23 IGPM) to 8.6 l/s (113.5 IGPM). See **Appendix A** for Well locations.

Well Name	Pump intake (m)	Production (l/s)
Springwood Well #1	22.8	2.63
Springwood Well #3	30.36	3.57
Springwood Well #5	30.52	5.01
Springwood Well #6	31.8	2.55
Springwood Well #7	22.35	3.27
Springwood Well #8	23.71	8.43
Springwood Well #9	Under construction	Under construction
Springwood Well #10	32.18	5.48
Springwood Well #11	30.42	6.72
Railway Well#1	35	3.15
Railway Well#2	34.15	4.32
Railway Well#3	38.46	1.46
Railway Well#4	35.67	2.21
Railway Well#5	36	5.63
Railway Well#6	35	6.27
Railway Well#7	35	2.77
Railway Well #8	35.68	3.64
Industrial Well#8	-	-

Pump Depth and Production Information

2.2 River Intake

Between May and October the City pumps water from the Englishman River at a maximum rate of 105 l/s (1390 IGPM) to keep up with summer demands. The water in the Englishman river is partially supplied from the Arrowsmith Dam. The Ministry of Environment, Fisheries and the Arrowsmith Water Service (AWS) developed an operating rule curve in an effort to conserve reservoir storage water for critical fisheries rearing periods. A minimum flow is released into the river based on this curve between June 1st and October 31st.

2.3 Arrowsmith Dam

The City of Parksville, the Regional District of Nanaimo, and the Town of Qualicum are partners in the Arrowsmith Water Service (AWS). A concrete gravity dam is located at Arrowsmith Lake approximately 19km south of Parksville. It was commissioned in September of 2000. The dam has a capacity of 9,000,000 m^3 and is operated and maintained by City of Parksville staff. Water is released to the Englishman river through two pipes, a 900 mm and a 600 mm with flows and lake levels monitored by the City's Supervisory Control and Data Acquisition (SCADA) system.

See **Appendix B** for Arrowsmith Dam Lakes Levels 2015.

2.4 Reservoirs

Water that has been pumped either from the ground or from the river is stored in four reservoirs. Reservoirs numbers 1, 2 and 4 are located in the Springwood Water Complex on Despard Road. These three are concrete with two being partially below ground and one above. Storage capacities are:

- Reservoir #1 - 616 m^3 (135,500 Imp. gal).
- Reservoir #2 - 2023 m^3 (445,000 Imp. gal)
- Reservoir #4 - 4559 m^3 (1,000,000 Imp. gal).

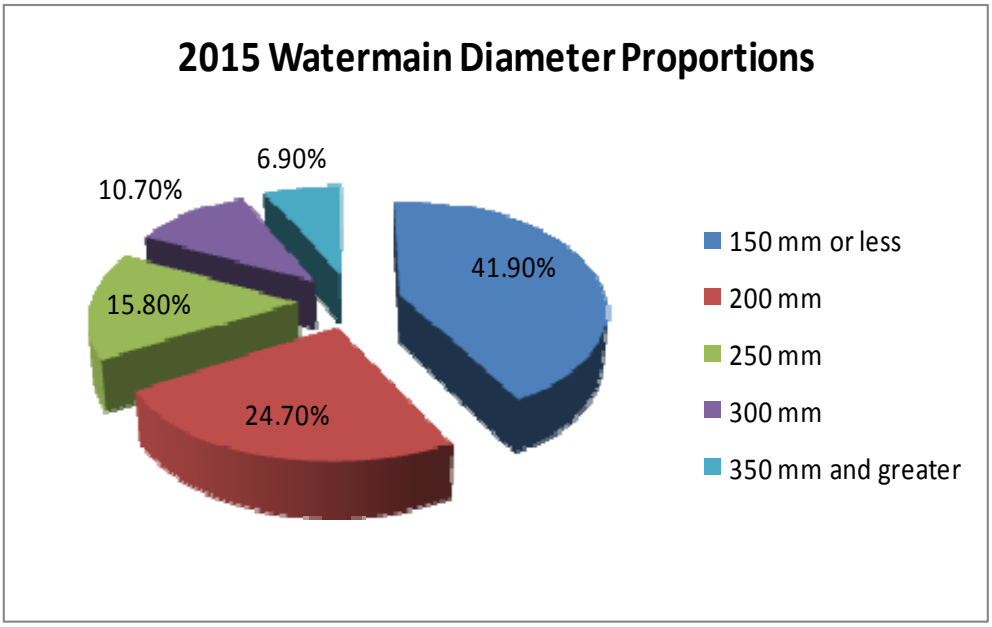
There are two additional reservoirs at the Top Bridge Park area, numbers 3 and 5. Reservoir #5 is a glass fused steel tank, Reservoir #3 is a steel tank although currently not in use. Storage capacities are:

- Reservoir #3 - 671m^3 (148,000 Imp. gal.)
- Reservoir #5 - 4300 m^3 (950,000 Imp. gal).

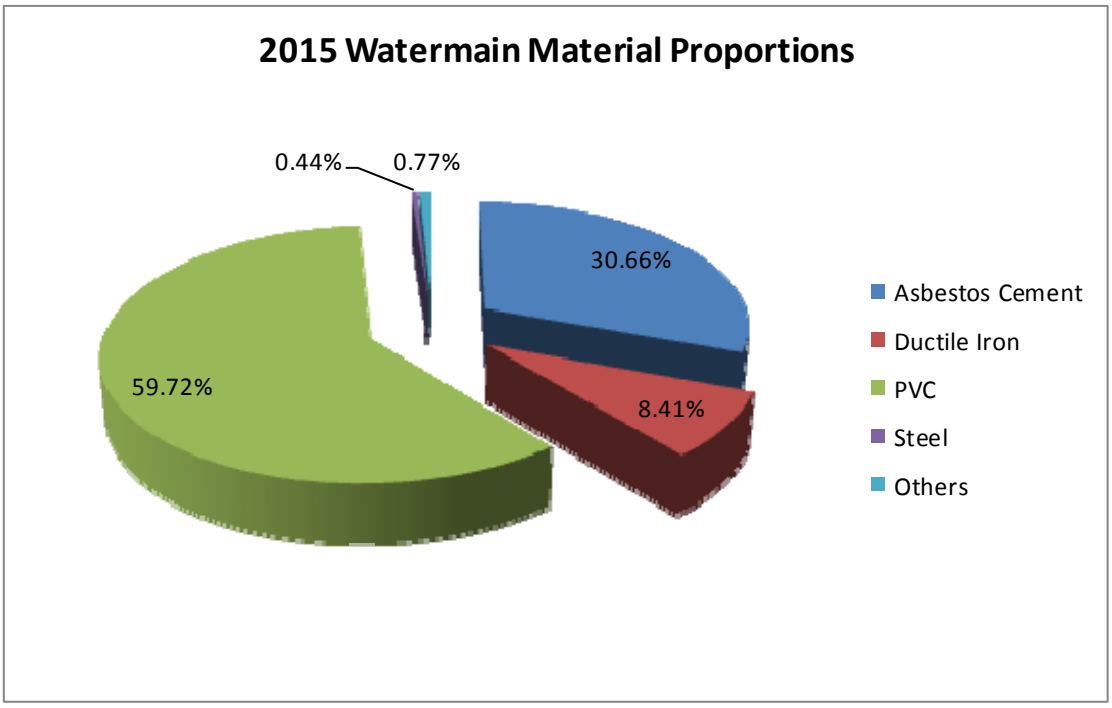
3.0 Distribution System

The distribution system consists of 64.6 km of PVC (plastic) pipe, 9.1 km of Ductile Iron pipe and 33.16 km of AC (Asbestos Cement) pipe. Sizes range from 100mm (4") to 400mm (16").
There are 564 fire hydrants and one Pressure Reducing Valve (PRV).

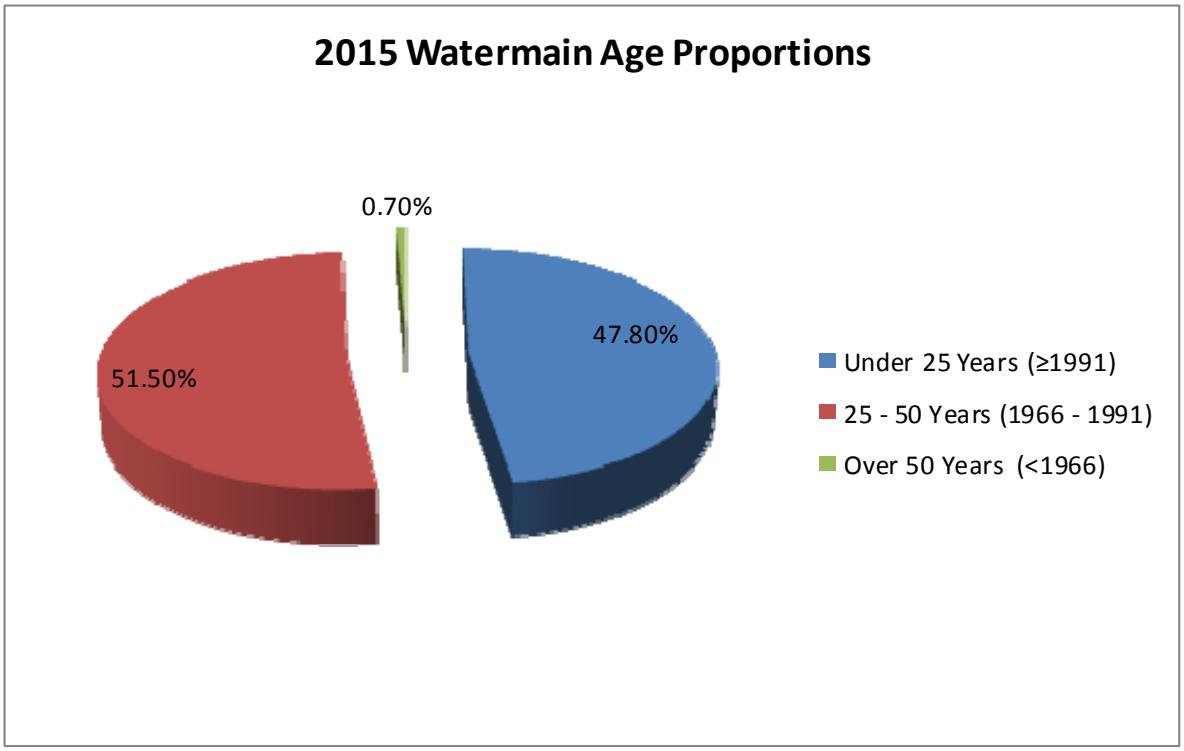
Like all municipalities, the infrastructure is aging and water mains are being replaced through capital improvements and development. The following shows the size, age and material of the mains in the Parksville Water System in 2015. Some of these pipes have been replaced since 2015 but newer data has not yet been updated by the Engineering department.



2015 Watermain Diameter Proportions				
Diameter	**No Pipes**	**Distance (km)**	**Percentage**	**Type**
150 mm or less	765	45.3	41.9%	Distribution Mains 66.6%
200 mm	531	26.67	24.7%	
250 mm	283	17.11	15.8%	Supply Mains 33.4%
300 mm	206	11.62	10.7%	
350 mm and greater	110	7.47	6.9%	
Total:	1895	=108.17 km		



2015 Watermain Material Proportions		
Material Types	**Distance (km)**	**Percentage**
Asbestos Cement	33.16	30.66%
Ductile Iron	9.1	8.41%
PVC	64.6	59.72%
Steel	0.48	0.44%
Others	0.83	0.77%
Total:	108.17	km



2015 Watermain Age Proportions			
Age	**No Pipes**	**Distance (km)**	**Percentage**
Under 25 Years (≥1991)	1035	51.73	47.8%
25 - 50 Years (1966 - 1991)	840	55.72	51.5%
Over 50 Years (<1966)	20	0.72	0.7%
Total:	1895	108.17	km

3.1 Pressure Zones

The City is divided into two pressure zones. A low pressure and a high pressure. The low pressure is a gravity fed system based on the elevation of Reservoir #4 and Reservoir #5. A top water level of 73.74m 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 initially was developed for higher elevation regions of the city that didn't have sufficient pressures or flows to meet fire fighting flows. This high pressure zone has been expanded to areas furthest from the pump stations that lose pressure and flow due to line losses. In order to maintain a balance between high and low pressures but still keep a safe pressure in the lower areas, a PRV was installed to drop the pressure from 80psi to 60psi.

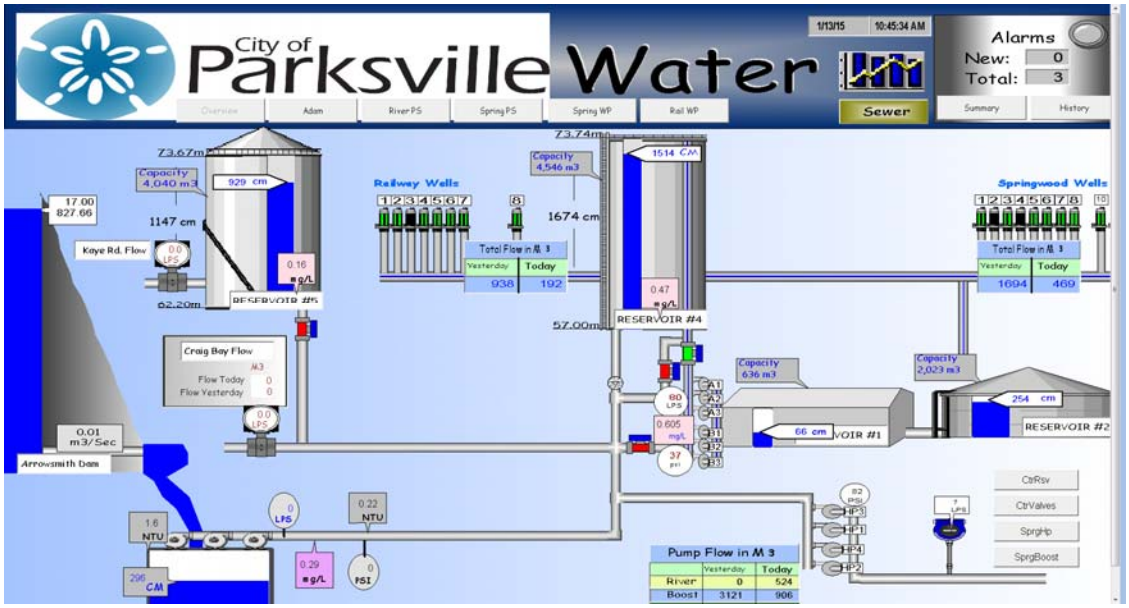
The high pressure water in this zone is supplied from four pumps, a 15hp, 2-40hp and a 100 hp. These pumps are controlled through the SCADA system that automatically watches flows and switches on however many pumps it needs to meet the flow requirements.

See **Appendix C** for Map of Pressure Zone Boundaries.

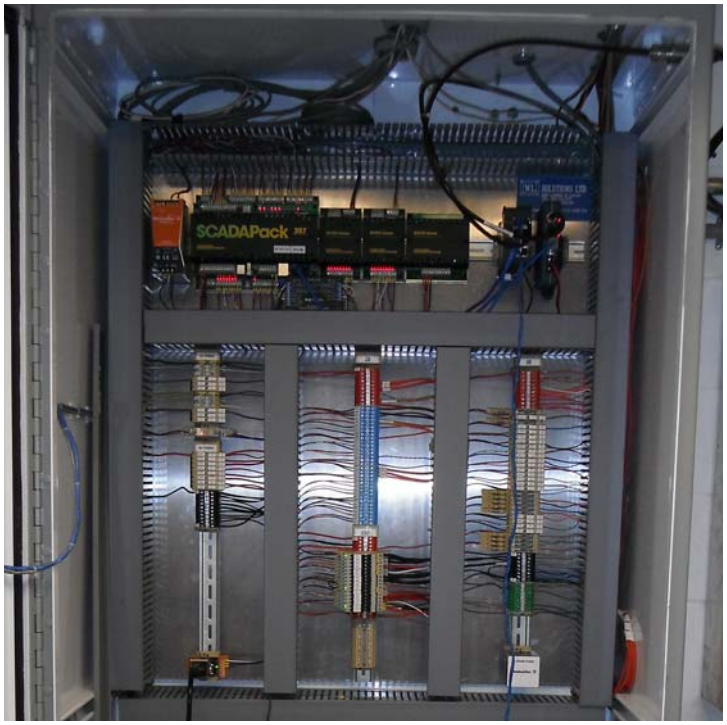
Springwood Pump Station

4.0 SCADA (Supervisory Control and Data Acquisition)

The water system and sewer pump stations are controlled by a computerized control system called SCADA. This system allows the Operators to monitor reservoir levels, the status and flows of pumps, and monitor chlorine residuals. The operator can change set points and monitor the system remotely. Alarms are automatically called out to City staff that monitors the system 24 hours a day, 7 days a week.



SCADA system



5.0 Water Sampling and Testing

5.1 Bacteriological

As required by the Island Health, City staff take weekly bacteriological samples to be tested for Total Coliforms and e-Coli Bacteria. There are 16 dedicated sampling sites throughout the city.

See **Appendix D** for 2015 test results (L1 means Less than 1 - no detectable bacteria - Acceptable).

5.2 Full Spectrum Analysis

In addition to weekly sampling throughout the distribution system, the City also sends samples from the source waters once per year, in the Fall, for a full spectrum analysis. As seen in Appendix E, parameters such as metals (iron, manganese) conventional parameters (pH, Turbidity, Hardness) and disinfection byproducts (Trihalomethane) are tested.

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.

All parameters meet the Canadian Drinking Water Guidelines.

See **Appendix E** for the 2015 Full Spectrum Analysis of the Parksville Water System Source Water. Note: The water tested is in it's Raw form before any type of treatment.

5.3 Trihalomethane Analyses

The City also take Trihalomethanes (THMs) samples, which are disinfection by-products that form when chlorine is added to water that contains elevated levels of natural organic matter.

See **Appendix F** for the Trihalomethane results.

1116 Herring Gull Way sampling site

6.0 Water Quality Complaints & Incidents

The Operations Department had few water quality complaints throughout 2015. During water main flushing and fire hydrant maintenance there were a few calls related to "brown or dirty" water. City of Parksville crews would either re-flush the mains through a hydrant or flushout at a location closest to the dead end or advise the homeowner that running an outside tap for a few minutes would clear up the problem.

On New Year's Eve there was a high pressure main break on Despard Avenue. City crews worked through the night to repair the main. A couple of calls came in regarding dirty water as a result of the high velocities of the break.

There were occasional complaints about the taste of chlorine in the water. Chlorine residuals are tested weekly throughout the system and are kept at a safe level. Besides recommending a filter to remove the chlorine within the home, not much can be done about it.

There were a few hardness related complaints mostly contributed to new homeowners from other municipalities who are used to different water composition. There were also a few calls concerning build up in washing machines and dishwashers although the water is only considered "Moderately Hard" on the Hardness Scale. This rating drops throughout the summer when the river supply (soft water) is mixed with the well supply.

Some of the complaints in 2015 were related to pressure drop. The cause for most of the pressure drop complaints were from a faulty PRV (responsibility of the home owner).

Despard Av water main break

Clay Bank at Englishman River

7.0 Englishman River Water Service Joint Venture Agreement

In June 2011, the partners in the Arrowsmith Water Service (AWS) renewed a revised AWS joint venture agreement. The agreement now addresses governance and funding of the bulk water service without referencing participation in the next phase of capital infrastructure. This change addresses Qualicum Beach's interest in not wishing to cost share in the water intake, treatment plant and distribution infrastructure at this time.

Voting of the AWS management board follows a weighted vote system rather than a unanimous vote system to better reflect a governance model that is similar to a regional district governance structure.

The Englishman River Water Service joint venture agreement parallels and complements the Arrowsmith Water Service joint venture agreement; it has only the City of Parksville and the Regional District of Nanaimo as joint venture participants.

The Englishman River Water Service joint venture agreement describes the infrastructure (intake and treatment plant) that will be cost shared by its two joint venture participants, and contains language that gives the option for the Town of Qualicum Beach to join the agreement in the future. While the Town of Qualicum Beach would not be a signatory to the Englishman River joint venture agreement, under the AWS Agreement the town would have the option to "buy in" to this infrastructure at a future date. Qualicum Beach would have the right to do so due to the rights it possesses as a joint venture partner on the AWS water licence for the Englishman River and as joint owner of the Arrowsmith Lake dam and related infrastructure.

Englishman River Water Service joint venture agreement (percentages of interest).

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

For more information visit
www.arrowsmithwaterservice.ca

englishman river
WATER SERVICE

8.0 Routine Maintenance Program

8.1 Distribution

- Water mains are flushed using a unidirectional flushing program
- Air relief valves are cleaned
- Fireline meters are cleaned
- Fire Hydrants are completely disassembled and inspected on a two year rotation
- Paint and brush out around hydrants as needed
- All irrigation backflow prevention devices tested and repaired if needed

8.2 Wells

- Daily security check of all wells
- Rehabilitation of 1-2 wells per year
- Pumps and motors replaced as necessary
- Filling chlorine tank on Springwood Well #1 as needed
- Annual water sampling

8.3 River Intake

- Winter maintenance of chlorination system while off line
- Weekly blowing of air lines through intake screens
- Daily checks of pump flows and chlorine levels
- Monthly calibration of turbidity analyzers

Abandonment of Springwood Well #4

8.4 Reservoirs

- Daily security check of tanks and compounds
- Yearly cleaning of Reservoir #1 and 2.
- Clean Reservoir #4 and 5 using divers every 5 years.
- Sustaining valves cleaned monthly

8.5 Pump Stations

- Daily checks of pumps and chlorination system
- Security checks of compounds
- Bi-Annual calibration of chlorine analyzers and turbidimeters

9.0 2015 Improvements

- Developed a new Cross Connection Control bylaw separate from the Water Service Bylaw.
- Springwood well #4 abandoned.
- Updated the Water Works Emergency Response Plan.
- Continued with the water meter replacement program. Finish 1 1/2" and started 1" and 3/4" .
- Continued to update the water meter route maps.
- Replaced motor and pump on Springwood well #8 and Railway well #2.

10.0 2015 Capital Projects

- Replacement of aging water mains (Ermineskin, Temple Street North)
- Started the process to update the unidirectional flushing maps.

11.0 2016 Projects & Improvements

- Continuing to replace aging water mains for better distribution (Banks, Forsyth, Wallis, Gerald Pl., McVickers, Moss Av., Corfield St., and Temple Street South upgrade).
- Continue working on the Cross Connection Control Program and complete new Cross Connection Control bylaw.
- Finish updating the unidirectional flushing maps.
- Complete the Arrowsmith Dam Emergency Response Plan.
- Run the pilot program to demonstrate the UF membrane system performance.
- Train all water works staff on Water Treatment Plant Operations.
- Well rehabilitation for Springwood well #6 and Railway well #1.
- Start permit process for Springwood well #9.
- Continue with water meter replacement program.

Pilot Plant—UF membrane system

12.0 Cross Connection Control Program

Irrigation cross connection

In 2006 the City of Parksville drafted a cross connection control program. Due to shortage of staff, the program was not able to be properly conducted until 2014. Currently, the Utilities Technician (Cross Connection Control Coordinator) is working on the implementation of this program.

The Cross Connection program is addressing high and severe hazard water use processes first. These include Industrial, Commercial and Institutional (ICI) users. Each ICI user will be assessed as to the potential risk to the water system. Any costs associated with installation, replacement and testing of an approved backflow device will have to be covered by the property owner.

A tracking program called FAST is used to track devices around the City (both City owned and privately owned devices). Property owners are required to send the annual test to the Utilities Technician at the City of Parksville.

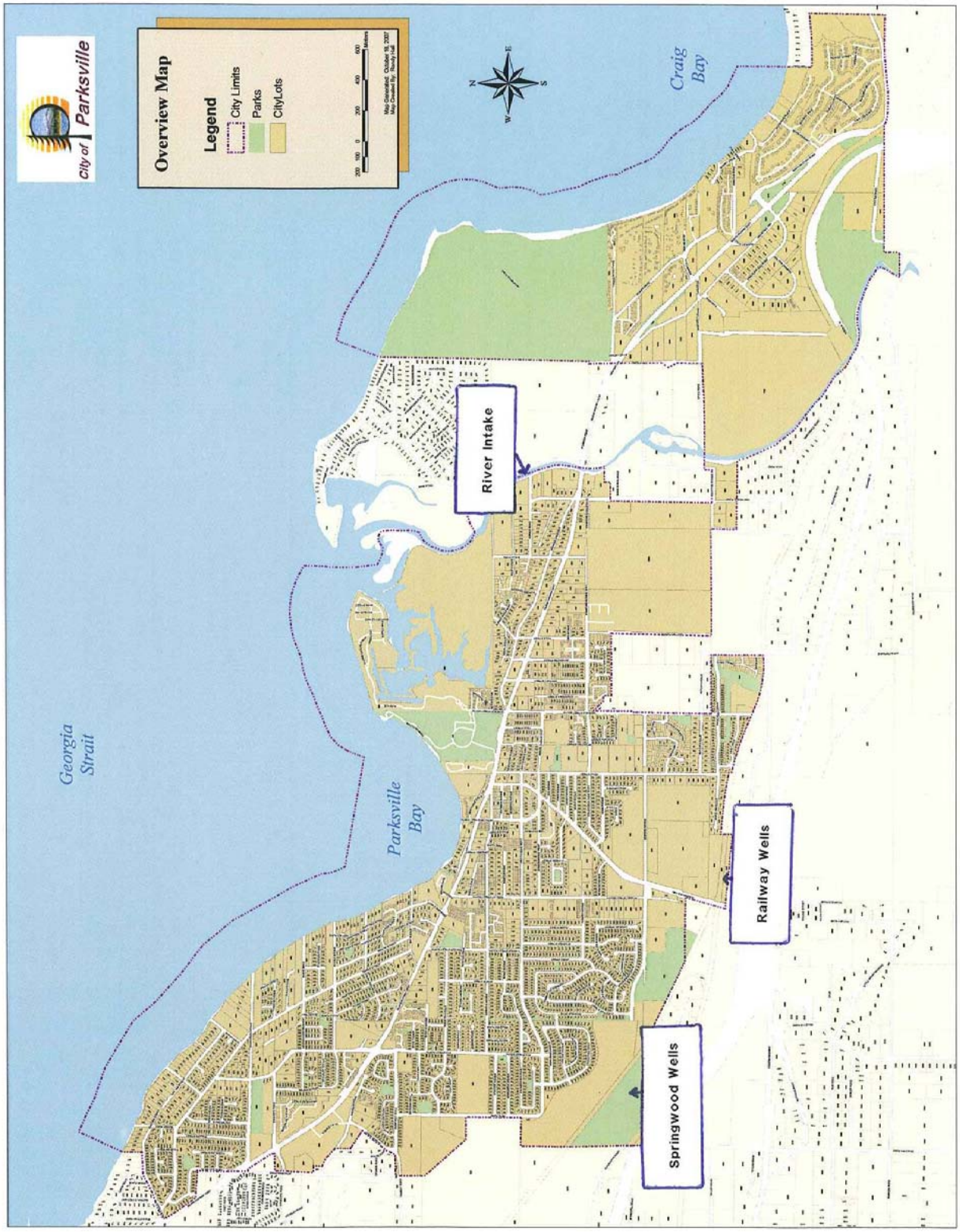
All City owned facilities were assessed and the appropriate backflow preventer were installed. Currently staff is assessing privately owned devices. Due to the large number of ICI users, this assessment may take a couple of years. City staff remains watchful of potential cross connections around the City, and problems are reported to the Utilities Technician.

Arrowsmith Dam - two months of record breaking levels

13.0 Emergency Response Plan

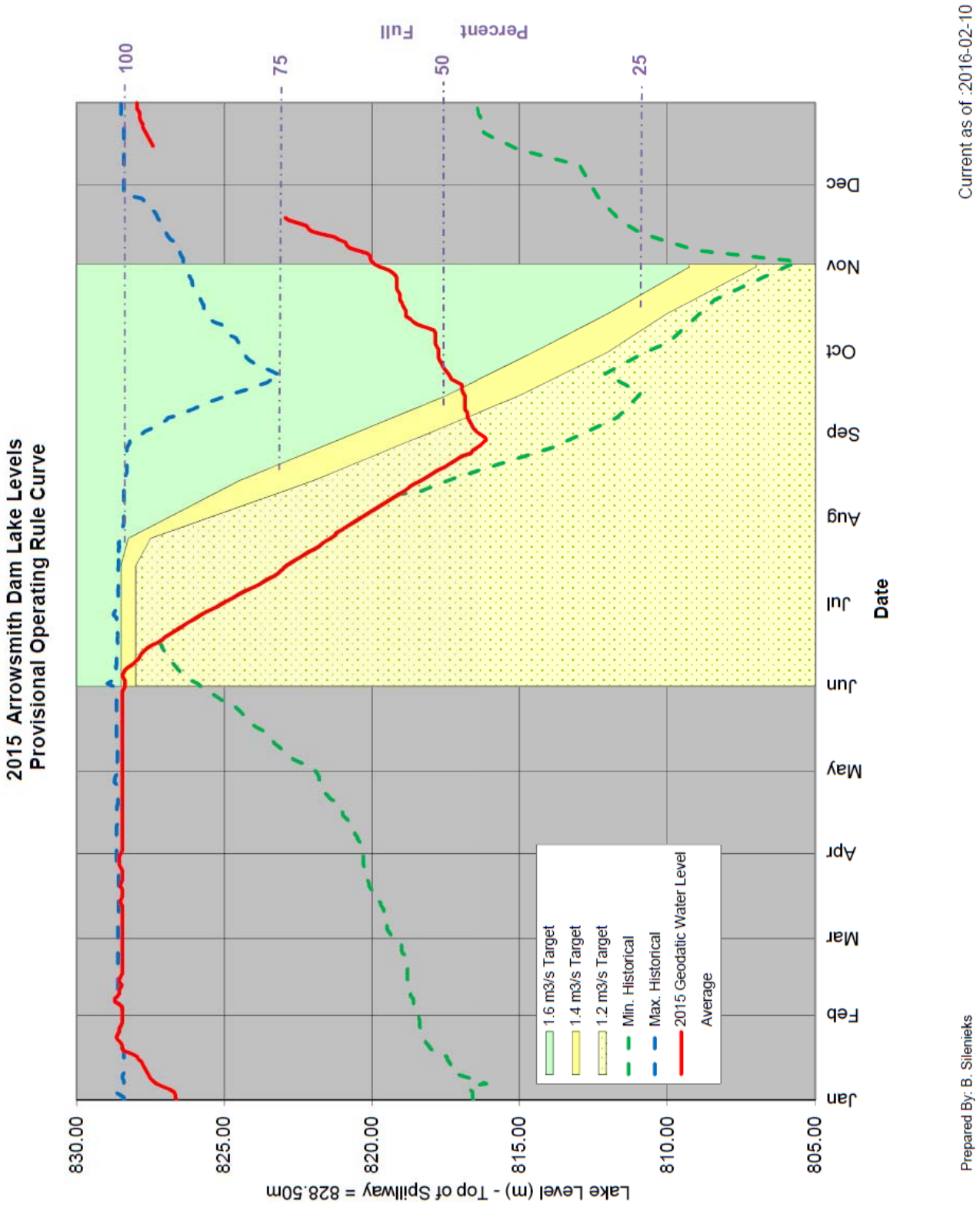
The City of Parksville has an Emergency Response Plan (ERP) pertaining to the water system available for public viewing at the Operations Department. This document outlines the strategies to deal with events such as contamination of water supply, pump failures and turbidity events. This plan was updated in 2015 and a separate ERP is being created for the Arrowsmith Dam.

Appendix A



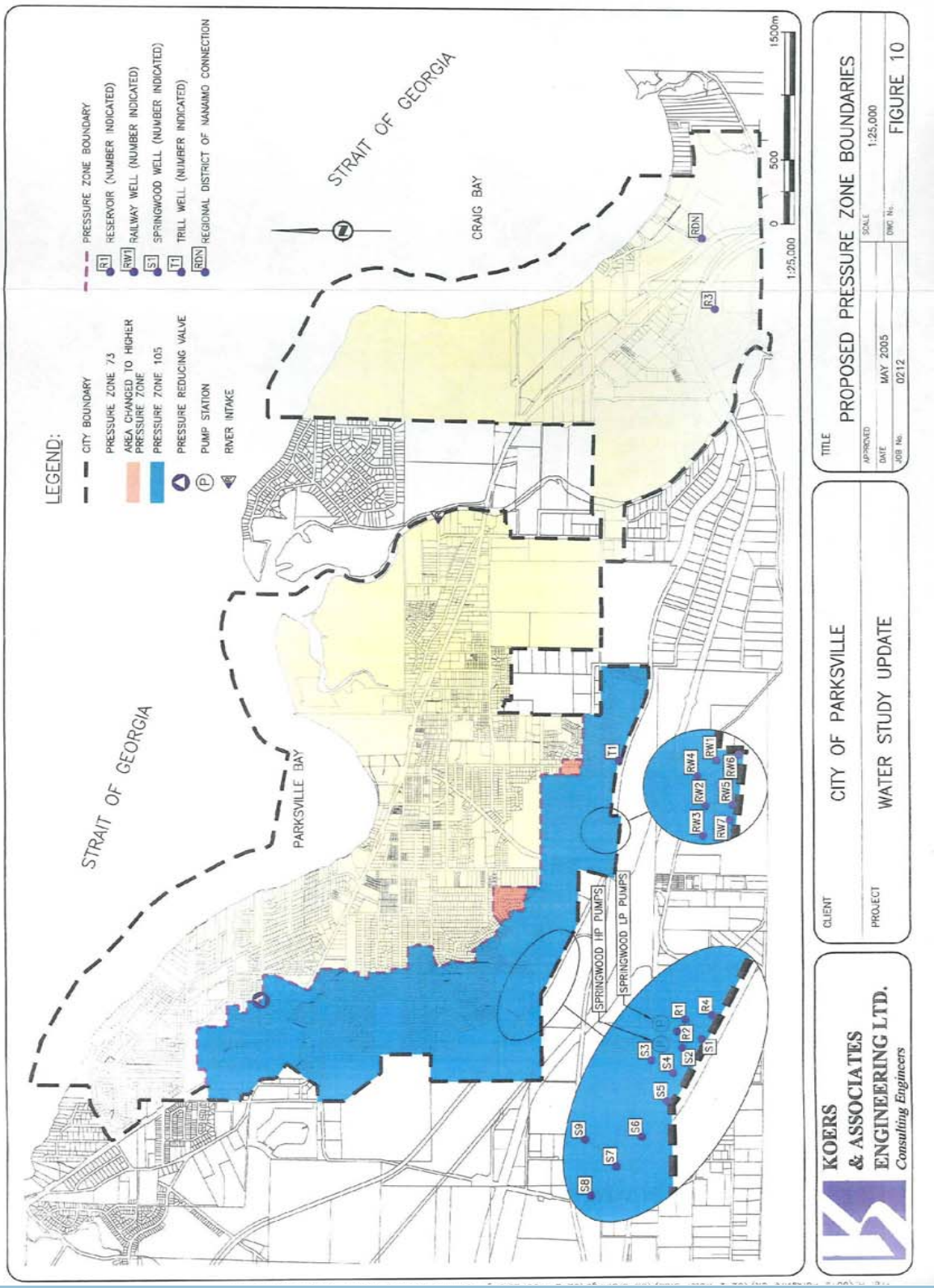
Water Source Locations Map

Appendix B



Arrowsmith Dam Lake Levels

Appendix C



Map of Pressure Zone Boundaries

Appendix D

PARKSVILLE, WWS

Facility Location:
1116 Herring Gull Way
Parksville

Facility Information:
Facility Type: DWT

Facility Sampling History:

Location	Date	Total Coliform	E. Coli
613 Chinook Avenue, Parksville , 613 Chinook Avenue, Parksville BC	2-Feb-2016	L1	L1
Despard & Moilliet, 401 S. Moiliet Street, Parksville BC	2-Feb-2016	L1	L1
Parksville MHP/Utility Building, Parksville, 1247 Arbutus Road, Parksville BC	2-Feb-2016	L1	L1
Top of Corfield, Parksville , Harbour Homes, Parksville BC	2-Feb-2016	L1	L1
136 Memorial, 136 Memorial	26-Jan-2016	L1	L1
330 Park View, Parksville, 330 Park View, Parksville BC	26-Jan-2016	L1	L1
Island Highway, by Temple, Island Highway, by Temple	26-Jan-2016	L1	L1
Wheeler, Top of Kingsley, 378 Kingsley Street	26-Jan-2016	L1	L1
271 Chestnut Street, Parksville, 271 Chestnut Street, Parksville BC	20-Jan-2016	L1	L1
770 Soriel , 770 Soriel	20-Jan-2016	L1	L1
851 TEMPLE (beside), 851 Temple	20-Jan-2016	L1	L1
Community Park, Parksville BC, 193 East Island Highway, Parksville BC	20-Jan-2016	L1	L1
across from 450 Wisteria, 450 Wisteria	12-Jan-2016	L1	L1
Daffodil at Camas, Parksville, Daffodil at Camas, Parksville BC	12-Jan-2016	L1	L1
River Pump Station, Englishman River Intake	12-Jan-2016	L1	L1
Works Yard, Parksville, 1390 Herring Gull Way, Parksville BC	12-Jan-2016	L1	L1
613 Chinook Avenue, Parksville , 613 Chinook Avenue, Parksville BC	5-Jan-2016	L1	L1
Despard & Moilliet, 401 S. Moiliet Street, Parksville BC	5-Jan-2016	L1	L1
Parksville MHP/Utility Building, Parksville, 1247 Arbutus Road, Parksville BC	5-Jan-2016	L1	L1
Top of Corfield, Parksville , Harbour Homes, Parksville BC	5-Jan-2016	L1	L1
136 Memorial, 136 Memorial	14-Dec-2015	L1	L1
613 Chinook Avenue, Parksville , 613 Chinook Avenue, Parksville BC	14-Dec-2015	L1	L1
Daffodil at Camas, Parksville, Daffodil at Camas, Parksville BC	14-Dec-2015	L1	L1
Island Highway, by Temple, Island Highway, by Temple	14-Dec-2015	L1	L1
River Pump Station, Englishman River Intake	14-Dec-2015	L1	L1
330 Park View, Parksville, 330 Park View, Parksville BC	8-Dec-2015	L1	L1
770 Soriel , 770 Soriel	8-Dec-2015	L1	L1
851 TEMPLE (beside), 851 Temple	8-Dec-2015	L1	L1
Despard & Moilliet, 401 S. Moiliet Street, Parksville BC	8-Dec-2015	L1	L1
Wheeler, Top of Kingsley, 378 Kingsley Street	8-Dec-2015	L1	L1
Works Yard, Parksville, 1390 Herring Gull Way, Parksville BC	8-Dec-2015	L1	L1

Appendix D

271 Chestnut Street, Parksville, 271 Chestnut Street, Parksville BC	2-Dec-2015	L1	L1
across from 450 Wisteria, 450 Wisteria	2-Dec-2015	L1	L1
Community Park, Parksville BC, 193 East Island Highway, Parksville BC	2-Dec-2015	L1	L1
Parksville MHP/Utility Building, Parksville, 1247 Arbutus Road, Parksville BC	2-Dec-2015	L1	L1
Top of Corfield, Parksville , Harbour Homes, Parksville BC	2-Dec-2015	L1	L1
136 Memorial, 136 Memorial	24-Nov-2015	L1	L1
Island Highway, by Temple, Island Highway, by Temple	24-Nov-2015	L1	L1
River Pump Station, Englishman River Intake	24-Nov-2015	L1	L1
Wheeler, Top of Kingsley, 378 Kingsley Street	24-Nov-2015	L1	L1
613 Chinook Avenue, Parksville , 613 Chinook Avenue, Parksville BC	17-Nov-2015	L1	L1
Community Park, Parksville BC, 193 East Island Highway, Parksville BC	17-Nov-2015	L1	L1
Daffodil at Camas, Parksville, Daffodil at Camas, Parksville BC	17-Nov-2015	L1	L1
Works Yard, Parksville, 1390 Herring Gull Way, Parksville BC	17-Nov-2015	L1	L1
330 Park View, Parksville, 330 Park View, Parksville BC	9-Nov-2015	L1	L1
851 TEMPLE (beside), 851 Temple	9-Nov-2015	L1	L1
Despard & Moilliet, 401 S. Moiliet Street, Parksville BC	9-Nov-2015	L1	L1
Top of Corfield, Parksville , Harbour Homes, Parksville BC	9-Nov-2015	L1	L1
271 Chestnut Street, Parksville, 271 Chestnut Street, Parksville BC	3-Nov-2015	L1	L1
770 Soriel , 770 Soriel	3-Nov-2015	L1	L1
across from 450 Wisteria, 450 Wisteria	3-Nov-2015	L1	L1
Parksville MHP/Utility Building, Parksville, 1247 Arbutus Road, Parksville BC	3-Nov-2015	L1	L1
Oceanside Health Center, Audit , OHC, Kitchen	2-Nov-2015	L1	L1
136 Memorial, 136 Memorial	28-Oct-2015	L1	L1
330 Park View, Parksville, 330 Park View, Parksville BC	28-Oct-2015	L1	L1
851 TEMPLE (beside), 851 Temple	28-Oct-2015	L1	L1
Despard & Moilliet, 401 S. Moiliet Street, Parksville BC	28-Oct-2015	L1	L1
Island Highway, by Temple, Island Highway, by Temple	28-Oct-2015	L1	L1
Wheeler, Top of Kingsley, 378 Kingsley Street	28-Oct-2015	L1	L1
770 Soriel , 770 Soriel	20-Oct-2015	L1	L1
River Pump Station, Englishman River Intake	20-Oct-2015	L1	L1
613 Chinook Avenue, Parksville , 613 Chinook Avenue, Parksville BC	14-Oct-2015	L1	L1
Community Park, Parksville BC, 193 East Island Highway, Parksville BC	14-Oct-2015	L1	L1
Daffodil at Camas, Parksville, Daffodil at Camas, Parksville BC	14-Oct-2015	L1	L1
Works Yard, Parksville, 1390 Herring Gull Way, Parksville BC	14-Oct-2015	L1	L1
271 Chestnut Street, Parksville, 271 Chestnut Street, Parksville BC	7-Oct-2015	L1	L1
across from 450 Wisteria, 450 Wisteria	7-Oct-2015	L1	L1
Parksville MHP/Utility Building, Parksville, 1247 Arbutus Road, Parksville BC	7-Oct-2015	L1	L1
Top of Corfield, Parksville , Harbour Homes, Parksville BC	7-Oct-2015	L1	L1

Appendix D

770 Soriel , 770 Soriel	30-Sep-2015	L1	L1
Despard & Moilliet, 401 S. Moiliet Street, Parksville BC	30-Sep-2015	L1	L1
Island Highway, by Temple, Island Highway, by Temple	30-Sep-2015	L1	L1
across from 450 Wisteria, 450 Wisteria	22-Sep-2015	L1	L1
Daffodil at Camas, Parksville, Daffodil at Camas, Parksville BC	22-Sep-2015	L1	L1
River Pump Station, Englishman River Intake	22-Sep-2015	L1	L1
330 Park View, Parksville, 330 Park View, Parksville BC	15-Sep-2015	L1	L1
851 TEMPLE (beside), 851 Temple	15-Sep-2015	L1	L1
Top of Corfield, Parksville , Harbour Homes, Parksville BC	15-Sep-2015	L1	L1
136 Memorial, 136 Memorial	9-Sep-2015	L1	L1
271 Chestnut Street, Parksville, 271 Chestnut Street, Parksville BC	9-Sep-2015	L1	L1
613 Chinook Avenue, Parksville , 613 Chinook Avenue, Parksville BC	9-Sep-2015	L1	L1
Parksville MHP/Utility Building, Parksville, 1247 Arbutus Road, Parksville BC	9-Sep-2015	L1	L1
Community Park, Parksville BC, 193 East Island Highway, Parksville BC	1-Sep-2015	L1	L1
Wheeler, Top of Kingsley, 378 Kingsley Street	1-Sep-2015	L1	L1
Works Yard, Parksville, 1390 Herring Gull Way, Parksville BC	1-Sep-2015	L1	L1
770 Soriel , 770 Soriel	25-Aug-2015	L1	L1
Daffodil at Camas, Parksville, Daffodil at Camas, Parksville BC	25-Aug-2015	EST 670	L1
Island Highway, by Temple, Island Highway, by Temple	25-Aug-2015	L1	L1
River Pump Station, Englishman River Intake	25-Aug-2015	L1	L1
across from 450 Wisteria, 450 Wisteria	18-Aug-2015	L1	L1
Community Park, Parksville BC, 193 East Island Highway, Parksville BC	18-Aug-2015	L1	L1
Wheeler, Top of Kingsley, 378 Kingsley Street	18-Aug-2015	L1	L1
Works Yard, Parksville, 1390 Herring Gull Way, Parksville BC	18-Aug-2015	L1	L1
136 Memorial, 136 Memorial	11-Aug-2015	L1	L1
271 Chestnut Street, Parksville, 271 Chestnut Street, Parksville BC	11-Aug-2015	L1	L1
330 Park View, Parksville, 330 Park View, Parksville BC	11-Aug-2015	L1	L1
613 Chinook Avenue, Parksville , 613 Chinook Avenue, Parksville BC	11-Aug-2015	L1	L1
851 TEMPLE (beside), 851 Temple	4-Aug-2015	L1	L1
Despard & Moilliet, 401 S. Moiliet Street, Parksville BC	4-Aug-2015	L1	L1
Parksville MHP/Utility Building, Parksville, 1247 Arbutus Road, Parksville BC	4-Aug-2015	L1	L1
Top of Corfield, Parksville , Harbour Homes, Parksville BC	4-Aug-2015	L1	L1
136 Memorial, 136 Memorial	28-Jul-2015	L1	L1
271 Chestnut Street, Parksville, 271 Chestnut Street, Parksville BC	28-Jul-2015	L1	L1
Island Highway, by Temple, Island Highway, by Temple	28-Jul-2015	L1	L1
Wheeler, Top of Kingsley, 378 Kingsley Street	28-Jul-2015	L1	L1
Daffodil at Camas, Parksville, Daffodil at Camas, Parksville BC	27-Jul-2015	L1	L1
613 Chinook Avenue, Parksville , 613 Chinook Avenue, Parksville BC	21-Jul-2015	L1	L1
Community Park, Parksville BC, 193 East Island Highway, Parksville BC	21-Jul-2015	L1	L1
Daffodil at Camas, Parksville, Daffodil at Camas, Parksville BC	21-Jul-2015	1	L1
Works Yard, Parksville, 1390 Herring Gull Way, Parksville BC	21-Jul-2015	L1	L1
330 Park View, Parksville, 330 Park View, Parksville BC	14-Jul-2015	L1	L1
770 Soriel , 770 Soriel	14-Jul-2015	L1	L1
851 TEMPLE (beside), 851 Temple	14-Jul-2015	L1	L1
River Pump Station, Englishman River Intake	14-Jul-2015	L1	L1

Appendix D

across from 450 Wisteria, 450 Wisteria	7-Jul-2015	L1	L1
Despard & Moilliet, 401 S. Moiliet Street, Parksville BC	7-Jul-2015	L1	L1
Parksville MHP/Utility Building, Parksville, 1247 Arbutus Road, Parksville BC	7-Jul-2015	L1	L1
Top of Corfield, Parksville , Harbour Homes, Parksville BC	7-Jul-2015	L1	L1
136 Memorial, 136 Memorial	6-Jul-2015	L1	L1
271 Chestnut Street, Parksville, 271 Chestnut Street, Parksville BC	6-Jul-2015	L1	L1
Daffodil at Camas, Parksville, Daffodil at Camas, Parksville BC	6-Jul-2015	4	L1
Island Highway, by Temple, Island Highway, by Temple	6-Jul-2015	L1	L1
613 Chinook Avenue, Parksville , 613 Chinook Avenue, Parksville BC	24-Jun-2015	L1	L1
Community Park, Parksville BC, 193 East Island Highway, Parksville BC	24-Jun-2015	L1	L1
River Pump Station, Englishman River Intake	24-Jun-2015	L1	L1
330 Park View, Parksville, 330 Park View, Parksville BC	16-Jun-2015	L1	L1
770 Soriel , 770 Soriel	16-Jun-2015	L1	L1
Despard & Moilliet, 401 S. Moiliet Street, Parksville BC	16-Jun-2015	L1	L1
851 TEMPLE (beside), 851 Temple	9-Jun-2015	L1	L1
Wheeler, Top of Kingsley, 378 Kingsley Street	9-Jun-2015	L1	L1
Works Yard, Parksville, 1390 Herring Gull Way, Parksville BC	9-Jun-2015	L1	L1
across from 450 Wisteria, 450 Wisteria	3-Jun-2015	L1	L1
Parksville MHP/Utility Building, Parksville, 1247 Arbutus Road, Parksville BC	3-Jun-2015	L1	L1
Top of Corfield, Parksville , Harbour Homes, Parksville BC	3-Jun-2015	L1	L1
136 Memorial, 136 Memorial	26-May-2015	L1	L1
271 Chestnut Street, Parksville, 271 Chestnut Street, Parksville BC	26-May-2015	L1	L1
Daffodil at Camas, Parksville, Daffodil at Camas, Parksville BC	26-May-2015	L1	L1
Island Highway, by Temple, Island Highway, by Temple	26-May-2015	L1	L1
613 Chinook Avenue, Parksville , 613 Chinook Avenue, Parksville BC	19-May-2015	L1	L1
Community Park, Parksville BC, 193 East Island Highway, Parksville BC	19-May-2015	L1	L1
Wheeler, Top of Kingsley, 378 Kingsley Street	19-May-2015	L1	L1
Works Yard, Parksville, 1390 Herring Gull Way, Parksville BC	19-May-2015	L1	L1
330 Park View, Parksville, 330 Park View, Parksville BC	13-May-2015	L1	L1
770 Soriel , 770 Soriel	13-May-2015	L1	L1
851 TEMPLE (beside), 851 Temple	13-May-2015	L1	L1
River Pump Station, Englishman River Intake	13-May-2015	L1	L1
across from 450 Wisteria, 450 Wisteria	6-May-2015	L1	L1
Despard & Moilliet, 401 S. Moiliet Street, Parksville BC	6-May-2015	L1	L1
Parksville MHP/Utility Building, Parksville, 1247 Arbutus Road, Parksville BC	6-May-2015	L1	L1
Top of Corfield, Parksville , Harbour Homes, Parksville BC	6-May-2015	L1	L1
136 Memorial, 136 Memorial	28-Apr-2015	L1	L1
271 Chestnut Street, Parksville, 271 Chestnut Street, Parksville BC	28-Apr-2015	L1	L1
Daffodil at Camas, Parksville, Daffodil at Camas, Parksville BC	28-Apr-2015	L1	L1
Island Highway, by Temple, Island Highway, by Temple	28-Apr-2015	L1	L1

Appendix D

613 Chinook Avenue, Parksville , 613 Chinook Avenue, Parksville BC	21-Apr-2015	L1	L1
Community Park, Parksville BC, 193 East Island Highway, Parksville BC	21-Apr-2015	L1	
Wheeler, Top of Kingsley, 378 Kingsley Street	21-Apr-2015	L1	L1
Works Yard, Parksville, 1390 Herring Gull Way, Parksville BC	21-Apr-2015	L1	L1
330 Park View, Parksville, 330 Park View, Parksville BC	14-Apr-2015	L1	L1
770 Soriel , 770 Soriel	14-Apr-2015	L1	L1
851 TEMPLE (beside), 851 Temple	14-Apr-2015	L1	L1
River Pump Station, Englishman River Intake	14-Apr-2015	L1	L1
across from 450 Wisteria, 450 Wisteria	7-Apr-2015	L1	L1
Despard & Moilliet, 401 S. Moiliet Street, Parksville BC	7-Apr-2015	L1	L1
Parksville MHP/Utility Building, Parksville, 1247 Arbutus Road, Parksville BC	7-Apr-2015	L1	L1
Top of Corfield, Parksville , Harbour Homes, Parksville BC	7-Apr-2015	L1	L1
Island Highway, by Temple, Island Highway, by Temple	1-Apr-2015	L1	L1
136 Memorial, 136 Memorial	31-Mar-2015	L1	L1
271 Chestnut Street, Parksville, 271 Chestnut Street, Parksville BC	31-Mar-2015	L1	L1
Community Park, Parksville BC, 193 East Island Highway, Parksville BC	24-Mar-2015	T	
Daffodil at Camas, Parksville, Daffodil at Camas, Parksville BC	24-Mar-2015	T	
Despard & Moilliet, 401 S. Moiliet Street, Parksville BC	24-Mar-2015	T	
River Pump Station, Englishman River Intake	24-Mar-2015	T	
330 Park View, Parksville, 330 Park View, Parksville BC	17-Mar-2015	L1	L1
770 Soriel , 770 Soriel	17-Mar-2015	L1	L1
across from 450 Wisteria, 450 Wisteria	17-Mar-2015	L1	L1
613 Chinook Avenue, Parksville , 613 Chinook Avenue, Parksville BC	10-Mar-2015	L1	L1
Wheeler, Top of Kingsley, 378 Kingsley Street	10-Mar-2015	L1	L1
Works Yard, Parksville, 1390 Herring Gull Way, Parksville BC	10-Mar-2015	L1	L1
851 TEMPLE (beside), 851 Temple	2-Mar-2015	L1	L1
Parksville MHP/Utility Building, Parksville, 1247 Arbutus Road, Parksville BC	2-Mar-2015	L1	L1
Top of Corfield, Parksville , Harbour Homes, Parksville BC	2-Mar-2015	L1	L1
136 Memorial, 136 Memorial	24-Feb-2015	L1	L1
271 Chestnut Street, Parksville, 271 Chestnut Street, Parksville BC	24-Feb-2015	L1	L1
613 Chinook Avenue, Parksville , 613 Chinook Avenue, Parksville BC	24-Feb-2015	L1	L1
Daffodil at Camas, Parksville, Daffodil at Camas, Parksville BC	24-Feb-2015	L1	L1
330 Park View, Parksville, 330 Park View, Parksville BC	17-Feb-2015	L1	L1
770 Soriel , 770 Soriel	17-Feb-2015	L1	L1
Island Highway, by Temple, Island Highway, by Temple	17-Feb-2015	L1	L1
River Pump Station, Englishman River Intake	17-Feb-2015	L1	L1
across from 450 Wisteria, 450 Wisteria	10-Feb-2015	L1	L1
Community Park, Parksville BC, 193 East Island Highway, Parksville BC	10-Feb-2015	L1	L1
Wheeler, Top of Kingsley, 378 Kingsley Street	10-Feb-2015	L1	L1
Works Yard, Parksville, 1390 Herring Gull Way, Parksville BC	10-Feb-2015	L1	L1
851 TEMPLE (beside), 851 Temple	3-Feb-2015	L1	L1
Despard & Moilliet, 401 S. Moiliet Street, Parksville BC	3-Feb-2015	L1	L1
Parksville MHP/Utility Building, Parksville, 1247 Arbutus Road, Parksville BC	3-Feb-2015	L1	L1
Top of Corfield, Parksville , Harbour Homes, Parksville BC	3-Feb-2015	L1	L1
Community Park, Parksville BC, 193 East Island Highway, Parksville BC	27-Jan-2015	L1	L1
Daffodil at Camas, Parksville, Daffodil at Camas, Parksville BC	27-Jan-2015	L1	L1

Appendix D

Location	Date	Total Coliform	E. Coli
Island Highway, by Temple, Island Highway, by Temple	27-Jan-2015	L1	L1
Works Yard, Parksville, 1390 Herring Gull Way, Parksville BC	27-Jan-2015	L1	L1
136 Memorial, 136 Memorial	21-Jan-2015	L1	L1
271 Chestnut Street, Parksville, 271 Chestnut Street, Parksville BC	21-Jan-2015	L1	L1
770 Soriel , 770 Soriel	21-Jan-2015	L1	L1
across from 450 Wisteria, 450 Wisteria	21-Jan-2015	L1	L1
330 Park View, Parksville, 330 Park View, Parksville BC	13-Jan-2015	L1	L1
613 Chinook Avenue, Parksville , 613 Chinook Avenue, Parksville BC	13-Jan-2015	L1	L1
River Pump Station, Englishman River Intake	13-Jan-2015	L1	L1
Wheeler, Top of Kingsley, 378 Kingsley Street	13-Jan-2015	L1	L1
851 TEMPLE (beside), 851 Temple	7-Jan-2015	L1	L1
Despard & Moilliet, 401 S. Moiliet Street, Parksville BC	7-Jan-2015	L1	L1
Parksville MHP/Utility Building, Parksville, 1247 Arbutus Road, Parksville BC	7-Jan-2015	L1	L1
Top of Corfield, Parksville , Harbour Homes, Parksville BC	7-Jan-2015	L1	L1

Information taken from: http://www.viha.ca/mho/water/water_sampling_results.htm

Appendix E

Maxxam
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Your C.O.C. #: 002786

Attention:Barbara Silenieks

City of Parksville
Engineering and Operations Dpt
PO Box 1390
Parksville, BC
Canada V9P 2H3

Report Date: 2016/02/09
Report #: R2127946
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B607691
Received: 2016/02/02, 10:45

Sample Matrix: DRINKING WATER
Samples Received: 4

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity - Water	4	2016/02/04	2016/02/04	BBY6SOP-00026	SM 22 2320 B m
Chloride by Automated Colourimetry	4	N/A	2016/02/02	BBY6SOP-00011	SM 22 4500-Cl- G m
Colour (True) by Kone Lab	4	N/A	2016/02/02	BBY6SOP-00057	SM 22 2120 C m
Total Coliforms & E.coli Potable W- MF	4	N/A	2016/02/02	BBY4SOP-00001	SM 22 9222 m
Conductance - water	4	N/A	2016/02/04	BBY6SOP-00026	SM 22 2510 B m
Fluoride	4	N/A	2016/02/02	BBY6SOP-00048	SM 22 4500-F C m
Hardness Total (calculated as CaCO3)	4	N/A	2016/02/03	BBY7SOP-00002	EPA 6020a R1 m
Mercury (Total) by CVAF	4	2016/02/05	2016/02/05	BBY7SOP-00015	BCMOE BCLM Oct2013 m
Na, K, Ca, Mg, S by CRC ICPMS (total)	4	N/A	2016/02/03	BBY7SOP-00002	EPA 6020A R1 m
Elements by CRC ICPMS (total)	4	N/A	2016/02/02	BBY7SOP-00002	EPA 6020A R1 m
Nitrate + Nitrite (N)	4	N/A	2016/02/02	BBY6SOP-00010	SM 22 4500-NO3- I m
Nitrite (N) by CFA	4	N/A	2016/02/02	BBY6SOP-00010	SM 22 4500-NO3- I m
Nitrogen - Nitrate (as N)	4	N/A	2016/02/03	BBY6SOP-00010	SM 22 4500-NO3 I m
pH Water (1)	4	N/A	2016/02/04	BBY6SOP-00026	SM 22 4500-H+ B m
Sulphate by Automated Colourimetry	4	N/A	2016/02/02	BBY6SOP-00017	SM 22 4500-SO42- E m
Total Dissolved Solids (Filt. Residue)	4	2016/02/03	2016/02/04	BBY6SOP-00033	SM 22 2540 C m
Turbidity	4	N/A	2016/02/02	BBY6SOP-00027	SM 22 2130 B m

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Maxxam Analytics International Corporation o/a Maxxam Analytics Burnaby: 4606 Canada Way V5G 1K5 Telephone(604) 734-7276 Fax(604) 731-2386

Appendix E

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Success Through Science®

Your C.O.C. #: 002786

Attention:Barbara Silenieks

City of Parksville
Engineering and Operations Dpt
PO Box 1390
Parksville, BC
Canada V9P 2H3

Report Date: 2016/02/09
Report #: R2127946
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B607691
Received: 2016/02/02, 10:45

Encryption Key

Maxxam
REPORT AUTOMATION ENGINE
09 Feb 2016 12:28:36 -08:00

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Shanaz Akbar, Project Manager
Email: SAkbar@maxxam.ca
Phone# (604)639-2618
==========
This report has been generated and distributed using a secure automated process.
Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Appendix E

Maxxam
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Maxxam Job #: B607691
Report Date: 2016/02/09

City of Parksville

DRINKING WATER PACKAGE (DRINKING WATER)

Maxxam ID		OB0602	OB0603	OB0604		OB0605		
Sampling Date		2016/02/01 08:35	2016/02/01 09:15	2016/02/01 09:05		2016/02/01 08:50		
COC Number		002786	002786	002786		002786		
	UNITS	RW6	SP3	SP7	QC Batch	RW2	RDL	QC Batch
ANIONS								
Nitrite (N)	mg/L	<0.0050	<0.0050	<0.0050	8181572	<0.0050	0.0050	8181572
Calculated Parameters								
Total Hardness (CaCO3)	mg/L	128	128	136	8180731	163	0.50	8180731
Nitrate (N)	mg/L	0.656	1.12	0.716	8180733	1.46	0.020	8180733
Misc. Inorganics								
Fluoride (F)	mg/L	0.039	0.033	0.034	8182171	0.031	0.010	8182171
Alkalinity (Total as CaCO3)	mg/L	105	114	111	8183156	122	0.50	8183156
Alkalinity (PP as CaCO3)	mg/L	<0.50	<0.50	<0.50	8183156	<0.50	0.50	8183156
Bicarbonate (HCO3)	mg/L	128	139	135	8183156	149	0.50	8183156
Carbonate (CO3)	mg/L	<0.50	<0.50	<0.50	8183156	<0.50	0.50	8183156
Hydroxide (OH)	mg/L	<0.50	<0.50	<0.50	8183156	<0.50	0.50	8183156
Anions								
Dissolved Sulphate (SO4)	mg/L	4.77	5.38	5.78	8181934	5.26	0.50	8181934
Dissolved Chloride (Cl)	mg/L	25	20	16	8181921	39	0.50	8181921
MISCELLANEOUS								
True Colour	Col. Unit	<5.0	<5.0	5.7	8182305	9.2	5.0	8182305
Nutrients								
Nitrate plus Nitrite (N)	mg/L	0.656	1.12	0.716	8181569	1.46	0.020	8181569
Physical Properties								
Conductivity	uS/cm	299	300	280	8183174	385	1.0	8183174
pH	pH	8.14	8.16	8.20	8183173	8.23		8183173
Physical Properties								
Total Dissolved Solids	mg/L	172	176	140	8181590	218	10	8181592
Turbidity	NTU	0.26	0.19	0.86	8181411	1.51	0.10	8181411
Elements								
Total Mercury (Hg)	ug/L	<0.010	<0.010	<0.010	8184396	<0.010	0.010	8184396
Total Metals by ICPMS								
Total Aluminum (Al)	ug/L	<3.0	<3.0	<3.0	8181377	<3.0	3.0	8181377
Total Antimony (Sb)	ug/L	<0.50	<0.50	<0.50	8181377	<0.50	0.50	8181377
Total Arsenic (As)	ug/L	0.52	0.45	0.29	8181377	0.24	0.10	8181377
Total Barium (Ba)	ug/L	15.6	6.5	4.6	8181377	17.0	1.0	8181377
Total Boron (B)	ug/L	<50	<50	<50	8181377	<50	50	8181377
Total Cadmium (Cd)	ug/L	0.079	<0.010	<0.010	8181377	<0.010	0.010	8181377
Total Chromium (Cr)	ug/L	<1.0	<1.0	<1.0	8181377	<1.0	1.0	8181377
Total Cobalt (Co)	ug/L	<0.50	<0.50	<0.50	8181377	<0.50	0.50	8181377
Total Copper (Cu)	ug/L	127	5.76	3.22	8181377	1.49	0.20	8181377
Total Iron (Fe)	ug/L	38.9	13.6	12.9	8181377	42.4	5.0	8181377
RDL = Reportable Detection Limit								

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Appendix E

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Maxxam Job #: B607691
Report Date: 2016/02/09

City of Parksville

DRINKING WATER PACKAGE (DRINKING WATER)

Maxxam ID		OB0602	OB0603	OB0604		OB0605		
Sampling Date		2016/02/01 08:35	2016/02/01 09:15	2016/02/01 09:05		2016/02/01 08:50		
COC Number		002786	002786	002786		002786		
	UNITS	RW6	SP3	SP7	QC Batch	RW2	RDL	QC Batch
Total Lead (Pb)	ug/L	15.3	1.76	0.55	8181377	0.23	0.20	8181377
Total Manganese (Mn)	ug/L	6.2	35.5	8.6	8181377	8.7	1.0	8181377
Total Molybdenum (Mo)	ug/L	<1.0	<1.0	<1.0	8181377	<1.0	1.0	8181377
Total Nickel (Ni)	ug/L	2.8	<1.0	<1.0	8181377	<1.0	1.0	8181377
Total Selenium (Se)	ug/L	<0.10	<0.10	<0.10	8181377	<0.10	0.10	8181377
Total Silver (Ag)	ug/L	<0.020	<0.020	<0.020	8181377	<0.020	0.020	8181377
Total Uranium (U)	ug/L	0.39	0.15	0.13	8181377	0.27	0.10	8181377
Total Vanadium (V)	ug/L	<5.0	<5.0	<5.0	8181377	<5.0	5.0	8181377
Total Zinc (Zn)	ug/L	255	25.6	<5.0	8181377	<5.0	5.0	8181377
Total Calcium (Ca)	mg/L	28.5	29.1	32.1	8181196	36.9	0.050	8181196
Total Magnesium (Mg)	mg/L	13.9	13.4	13.5	8181196	17.2	0.050	8181196
Total Potassium (K)	mg/L	0.788	0.750	0.695	8181196	0.857	0.050	8181196
Total Sodium (Na)	mg/L	8.26	8.84	6.50	8181196	10.5	0.050	8181196
Total Sulphur (S)	mg/L	<3.0	<3.0	<3.0	8181196	<3.0	3.0	8181196
Microbiological Param.								
Total Coliforms	CFU/100mL	<1	<1	<1	8181380	<1	1	8181380
E. coli	CFU/100mL	<1	<1	<1	8181380	<1	1	8181380
RDL = Reportable Detection Limit								

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Appendix E

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Maxxam Job #: B607691
Report Date: 2016/02/09

City of Parksville

GENERAL COMMENTS

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

Package 1	2.7°C

Results relate only to the items tested.

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Maxxam Job #: B607691
Report Date: 2016/02/09

QUALITY ASSURANCE REPORT

City of Parksville

			Matrix Spike		Spiked Blank		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
8181377	Total Aluminum (Al)	2016/02/02	103	80 - 120	100	80 - 120	<3.0	ug/L	NC	20
8181377	Total Antimony (Sb)	2016/02/02	100	80 - 120	99	80 - 120	<0.50	ug/L	NC	20
8181377	Total Arsenic (As)	2016/02/02	104	80 - 120	101	80 - 120	<0.10	ug/L	2.7	20
8181377	Total Barium (Ba)	2016/02/02	NC	80 - 120	97	80 - 120	<1.0	ug/L	0.59	20
8181377	Total Boron (B)	2016/02/02	110	80 - 120	109	80 - 120	<50	ug/L	NC	20
8181377	Total Cadmium (Cd)	2016/02/02	96	80 - 120	97	80 - 120	<0.010	ug/L	3.9	20
8181377	Total Chromium (Cr)	2016/02/02	92	80 - 120	96	80 - 120	<1.0	ug/L	NC	20
8181377	Total Cobalt (Co)	2016/02/02	91	80 - 120	95	80 - 120	<0.50	ug/L	NC	20
8181377	Total Copper (Cu)	2016/02/02	NC	80 - 120	92	80 - 120	<0.20	ug/L	5.6	20
8181377	Total Iron (Fe)	2016/02/02	90	80 - 120	102	80 - 120	<5.0	ug/L	2.7	20
8181377	Total Lead (Pb)	2016/02/02	NC	80 - 120	96	80 - 120	<0.20	ug/L	2.0	20
8181377	Total Manganese (Mn)	2016/02/02	NC	80 - 120	99	80 - 120	<1.0	ug/L	3.9	20
8181377	Total Molybdenum (Mo)	2016/02/02	98	80 - 120	97	80 - 120	<1.0	ug/L	NC	20
8181377	Total Nickel (Ni)	2016/02/02	88	80 - 120	96	80 - 120	<1.0	ug/L	NC	20
8181377	Total Selenium (Se)	2016/02/02	100	80 - 120	97	80 - 120	<0.10	ug/L	NC	20
8181377	Total Silver (Ag)	2016/02/02	93	80 - 120	94	80 - 120	<0.020	ug/L	NC	20
8181377	Total Uranium (U)	2016/02/02	104	80 - 120	98	80 - 120	<0.10	ug/L	NC	20
8181377	Total Vanadium (V)	2016/02/02	92	80 - 120	96	80 - 120	<5.0	ug/L	NC	20
8181377	Total Zinc (Zn)	2016/02/02	NC	80 - 120	96	80 - 120	<5.0	ug/L	0.78	20
8181411	Turbidity	2016/02/02			101	80 - 120	<0.10	NTU	0.58	20
8181569	Nitrate plus Nitrite (N)	2016/02/02			103	80 - 120	<0.020	mg/L		
8181572	Nitrite (N)	2016/02/02			99	80 - 120	<0.0050	mg/L		
8181590	Total Dissolved Solids	2016/02/04	101	80 - 120	102	80 - 120	<10	mg/L	5.5	20
8181592	Total Dissolved Solids	2016/02/04	NC	80 - 120	94	80 - 120	<10	mg/L	3.1	20
8181921	Dissolved Chloride (Cl)	2016/02/02	102	80 - 120	93	80 - 120	<0.50	mg/L	0.93	20
8181934	Dissolved Sulphate (SO4)	2016/02/02	NC	80 - 120	91	80 - 120	<0.50	mg/L	2.1	20
8182171	Fluoride (F)	2016/02/02	106	80 - 120	100	80 - 120	<0.010	mg/L	NC	20
8182305	True Colour	2016/02/02			105	80 - 120	<5.0	Col. Unit	NC	20
8183156	Alkalinity (PP as CaCO3)	2016/02/04					<0.50	mg/L	NC	20
8183156	Alkalinity (Total as CaCO3)	2016/02/04	NC	80 - 120	92	80 - 120	<0.50	mg/L	0.44	20
8183156	Bicarbonate (HCO3)	2016/02/04					<0.50	mg/L	0.44	20
8183156	Carbonate (CO3)	2016/02/04					<0.50	mg/L	NC	20

Maxxam Analytics International Corporation o/a Maxxam Analytics Burnaby: 4606 Canada Way V5G 1K5 Telephone(604) 734-7276 Fax(604) 731-2386

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Maxxam Job #: B607691
Report Date: 2016/02/09

QUALITY ASSURANCE REPORT(CONT'D)

City of Parksville

			Matrix Spike		Spiked Blank		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
8183156	Hydroxide (OH)	2016/02/04					<0.50	mg/L	NC	20
8183173	pH	2016/02/04			102	97 - 103			0.13	N/A
8183174	Conductivity	2016/02/04			99	80 - 120	<1.0	uS/cm	0.14	20
8184396	Total Mercury (Hg)	2016/02/05	98	80 - 120	97	80 - 120	<0.010	ug/L	NC	20

N/A = Not Applicable

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

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

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

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

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than 2x that of the native sample concentration).

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

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Appendix E

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Maxxam Job #: B607691
Report Date: 2016/02/09

City of Parksville

VALIDATION SIGNATURE PAGE

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

Andy Lu, Data Validation Coordinator

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

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Appendix E

Maxxam

Burnaby: 4606 Canada Way, Burnaby, BC V5G 1K5 Ph: (604) 734-7276 Fax: (604) 731-2386, Toll Free: (800) 665-8566

DRINKING WATER SUBMISSION CHAIN OF CUSTODY RECORD

Maxxam Job #: COC #: 002786 Page: of

Invoice To: Require Report? Yes ☐ No ☐

Company Name: City of Parksville
Contact Name: Barbara Silenieks
Address: 116 Herring Gull Way
PC:
Phone / Fax#: Ph: 250-951-2414 Fax:
E-mail: bsilenieks@parksville.ca

Report To:

Company Name:
Contact Name: SAME
Address:
PC:
Phone / Fax#: Ph: Fax:
E-mail:

PO #:
Quotation #:
Project #:
Proj. Name:
Location:
Sampled by:

SERVICE REQUESTED:

☒ Regular Turn Around Time (TAT) (5 days for most tests)
☐ RUSH (Please contact the lab)
☐ 1 Day ☐ 2 Day ☐ 3 Day

Date Required:

SPECIAL INSTRUCTIONS:
Return Cooler ☐ Ship Sample Bottles (please specify) ☐

The BC Drinking Water Protection Act requires Maxxam to immediately give notice to the water supplier, drinking water officer, and medical health officer in the event your sample is positive in E. Coli and if you answered "yes" to any of the questions below. For that reason, Maxxam cannot analyse your sample unless you have completed all information on this form.

	Sample Identification	Lab Identification (Lab Use Only)	Water Type	Date/Time Sampled	Drinking Water Package (includes total metals, total coliform & E. coli)	Total Coliform and E. coli	Number of Containers
1	RW 6		Well	16/02/01 8:35	✓		
2	SP 3		Well	16/02/01 9:35	✓		
3	SP 7		Well	16/02/01 9:03	✓		
4	RW 2		Well	16/02/01 8:50	✓		
5							
6							

Are the samples from a drinking water source? YES ☑ NO ☐
Does the water source supply multiple households? YES ☑ NO ☐
Are individuals drinking this water? YES ☑ NO ☐

Please check the region where the samples were collected from:
MHO = Medical Health Officer; DWO = Drinking Water Officer

☐ FRASER HEALTH AUTHORITY
MHO: 604-527-4806; DWO: 604-870-7903 or 1-866-749-7900

☑ VANCOUVER ISLAND HEALTH AUTHORITY
MHO: 1-800-204-6166; DWO: 250-755-6215

☐ INTERIOR HEALTH AUTHORITY
MHO: 1-866-748-1691; DWO: 250-851-7338

☐ NORTHERN HEALTH AUTHORITY
MHO: 250-565-7424 or 250-565-2000; DWO: 250-565-2150

☐ VANCOUVER COASTAL HEALTH AUTHORITY - check any areas below if applicable
MHO: 604-527-4893; DWO: 604-983-6751

Coast Garibaldi MHO: 604-885-8708 and select one of the DWO below
☐ Powell River: 604-485-3335 ☐ Sechelt Area: 604-885-6711
☐ Sea to Sky (Howe Sound): 604-815-6841 or 604-892-2293 ext. 273

North Sh
☐ Bow
☐ Mour
☐ Grou

02-Feb-16 10:45
Shanaz Akbar
B607691
B607691_COC
AN0 SO131

Relinquished By:	Date (yy/mm/dd):	Time (24hr):	Received by:	Date (yy/mm/dd)	Time (24hr)	Time Sensitive	Temperature on Receipt (°C)	Custody Seal	Yes	No	N/A
Barb Silenieks	16/02/01	10:50	[illegible signature]	2016/02/02	10:45	☐	A) 2 B) 3 C) 3	Present?	☐	☐	☑
							Just sampled & rec'd on ice ☐	Intact?	☐	☐	☑

BBY FCD-00077/6

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Full Spectrum Analysis—Well Water

Maxxam
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Maxxam Job #: B607694
Report Date: 2016/02/05

City of Parksville

TRIHALOMETHANES (THM) IN WATER

Maxxam ID		OB0612		OB0613		OB0614	OB0615		
Sampling Date		2016/02/01 09:30		2016/02/01 09:35		2016/02/01 09:45	2016/02/01 09:55		
COC Number		483862-04-01		483862-04-01		483862-04-01	483862-04-01		
	UNITS	851 TEMPLE	RDL	450 WILLOW	RDL	CORFIELD	1116 HERRING GULL	RDL	QC Batch
Volatiles									
Chloroform	ug/L	1.0	1.0	<1.0	1.0	1.6	1.8	1.0	8183079
Chlorodibromomethane	ug/L	3.1	1.0	2.6	1.0	4.5	4.4	1.0	8183079
Bromodichloromethane	ug/L	<1.6 (1)	1.6	<1.4 (1)	1.4	2.8	3.1	1.0	8183079
Bromoform	ug/L	1.8	1.0	1.7	1.0	2.4	1.9	1.0	8183079
Surrogate Recovery (%)									
1,4-Difluorobenzene (sur.)	%	103		104		104	105		8183079
4-Bromofluorobenzene (sur.)	%	97		96		94	95		8183079
D4-1,2-Dichloroethane (sur.)	%	100		99		98	99		8183079

RDL = Reportable Detection Limit
(1) Detection limits raised due to matrix interference.

Appendix G

VANCOUVER ISLAND health authority

APPENDIX A

WATER SYSTEM OPERATING CONDITIONS FOR

PARKSVILLE, WWS

1116 Herring Gull Way

Parksville, BC, V9P 2H3

1. Compliance with Operating Permit Terms and Conditions do not relieve the operator of other legislated responsibilities and obligations.

2. Water system operators must be familiar with the relevant legislation 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.

3. The operator must ensure that the water system is in compliance with any and all lawful direction of the Drinking Water Officer. This includes any correspondence to further explain or alter the above operating terms and conditions. Proposed changes to the operating permit initiated by the Drinking Water Officer will allow an opportunity for input by the water supplier as per section 8 of the Act.

The specific terms and conditions are listed below as:

Condition 1.

The water system owner shall provide a residual level of disinfectant within the water distribution system. It is recommended that the level of residual disinfectant measured at any point within the distribution system be at least 0.20 mg/L, measured as *free* chlorine.

The maximum residual disinfectant concentration, measure as *free* chlorine shall not exceed 4.0 mg/L, or as combined chlorine shall not exceed 3.0 mg/L, anywhere in the distribution system. This does not apply in situations where watermains are being superchlorinated during their installation, repair or routine maintenance.

Condition 2.

Conduct a chemical analysis of raw water from each well in accordance with the list of parameters specified in the VIHA Guidelines for Approval of a Waterworks System at a frequency of no less than once every **5 years.**

Health Protection and Environmental Services

Parksville (250) 248-2044 Fax: (250) 248-8624
Nanaimo (250) 755-6215 Fax: (250) 755-3372
Port Alberni (250) 724-1281 Fax: (250) 724-4376
Courtenay (250) 334-5450 Fax: (250) 334-5466

Our Vision: Healthy People, Healthy Island Communities, Seamless Service

Water System Operating Conditions

Appendix G

Condition 3.

Develop and implement a wellhead protection plan to ensure that the drinking water source is protected in to the future. The wellhead protection plan should establish management strategies to avoid contamination of, or activities, which may degrade the quality of the drinking water source. The details of the wellhead protection plan and timing of the implementation of the program shall be established in consultation with the local Environmental Health Officer.

The wellhead protection plan should be based on the publication "Well Protection Tool Kit", Ministry of Environment, Lands and Parks, Ministry of Health and Ministry of Municipal Affairs; Issued by: Water Stewardship Division. ISBN 0-7726-5566-9.
http://www.env.gov.bc.ca/wsd/plan_protect_sustain/groundwater/wells/well_protection/wellprotect.html

Condition 4.

Develop and implement a Cross-Connection Control Program. The details of the cross-connection program and timing of implementation of the program shall be established in consultation with the local Environmental Health Officer.

Condition 5.

Provide continuous on-line turbidity monitoring of raw water for the Englishman River during drawing periods (May through October as applicable) and 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"*.

Condition 6.

In accordance with VIHA 4321 treatment policy for the Englishman River water source, provide finished water quality using technology that will achieve the following performance standard; a 4-log removal/inactivation of viruses, a 3-log removal/inactivation of Giardia cysts and Cryptospordium oocysts, provide two treatment processes and produce finished water with less that 1 NTU turbidity.

In consultation with, and in reference to the City of Parksville letter dated February 4, 2009 (Your file 5600-10-AWS), the City of Parksville is required to meet the following implementation plan:

May, 2009: Obtain the services of a professional engineering firm to develop a conceptual plan and preliminary design for a water intake and treatment facility.
November, 2010: Conceptual plan and preliminary design is completed.
December, 2013: Detailed design of the new intake and treatment facility is completed.
January, 2015: Construction for the water intake and treatment facility commences with completion scheduled for December 31, 2016.

Date: April 24, 2009

B. Wrenall