



City of
Parksville

2013 ANNUAL WATER REPORT



May 2014

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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 F.

This report has been submitted to Island Health and is posted 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 3 sources.

- Englishman River Intake
- Springwood Well Field
- Railway Well Field

The water is treated using either liquid or gaseous chlorine and stored in 4 reservoirs at either end of the City.



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 18 production wells ranging from 0.9 l/s (12 IGPM) to 10.3 l/s (136 IGPM).

See **Appendix A** for Well locations.

Well Name	Well Depth (m)	Production (l/s, Igpm)
Springwood Well #1	31.9	2.2, 29
Springwood Well #2	10.4	Off Line
Springwood Well #3	25.3	3.5, 46.2
Springwood Well #4	9.8	Off Line
Springwood Well #5	31.0	5.3, 70
Springwood Well #6	31.1	3.2, 42.2
Springwood Well #7	40.2	3.2, 42.2
Springwood Well #8	39.4	8.5, 112
Springwood Well #10	25.6	4.5, 59.4
Springwood Well #11	30.6	6.5, 85.8
Railway Well#1	30.7	4.9, 64.7
Railway Well#2	32.2	5.1, 67.3
Railway Well#3	25.2	2.1, 27.7
Railway Well#4	22.5	2.2, 29
Railway Well#5	36.3	7.5, 99
Railway Well#6	36.7	7.2, 95
Railway Well#7	34.2	3.2, 42.2
Railway Well #8	28.6	4.4, 58.1
Trill Well#8	25.1	Off Line

2.2 River Intake:

Between May and October the City pumps water from the Englishman River at a maximum rate of 159 l/s (2100 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. (See **Appendix B**)

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 m³ and is operated and maintained by City of Parksville staff. Water is released to the Englishman river through 2 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 2013.

2.4 Reservoirs:

Water that has been pumped either from the ground or from the river is stored in 4 reservoirs. Reservoirs numbers 1, 2 and 4 are located in the Springwood Water Compound on Despard Road. These 3 are concrete with 2 being partially below ground and one above. Storage capacities are:

- Reservoir #1 - 616 m³ (135,500 Imp. gal).
- Reservoir #2 - 2023 m³ (445,000 Imp. gal)
- Reservoir #4 - 4559 m³ (1,000,000 Imp. gal).

There are 2 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:

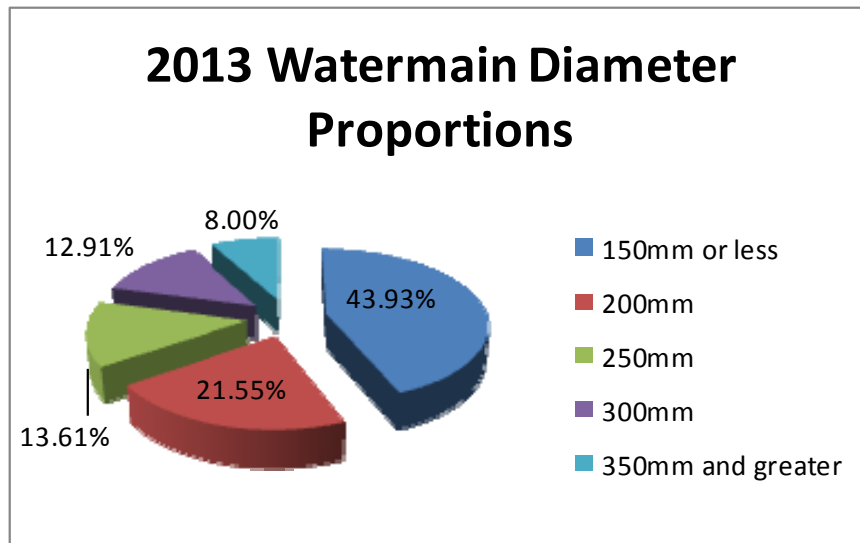
- Reservoir #3 - 671m³ (148,000 Imp. gal.)
- Reservoir #5 - 4300 m³ (950,000 Imp. gal).

3.0 Distribution System:

The distribution system consists of 48.79 km of PVC (plastic) pipe, 8.0 km of Ductile Iron pipe and 34.2 km of AC (Asbestos Cement) pipe. Sizes range from 100mm (4") to 400mm (16").

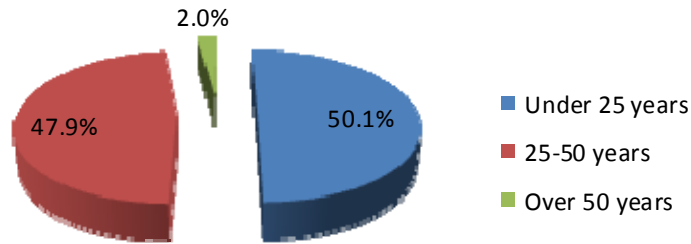
There are 469 fire hydrants and one Pressure Reducing Valve (PRV).

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 2013. Some of these pipes have been replaced since 2013 but newer data has not yet been updated by the Engineering department.



2013 Watermain Diameter Proportions				
Diameter	No Pipes	Distance (km)	Percentage	Type
150 mm or less	532	40.17	43.93%	Distribution Mains 65.48%
200 mm	297	19.71	21.55%	
250 mm	152	12.45	13.61%	Supply Mains 34.52%
300 mm	131	11.81	12.91%	
350 mm and greater	82	7.31	8.00%	
Total:	1194	=91.45 km		

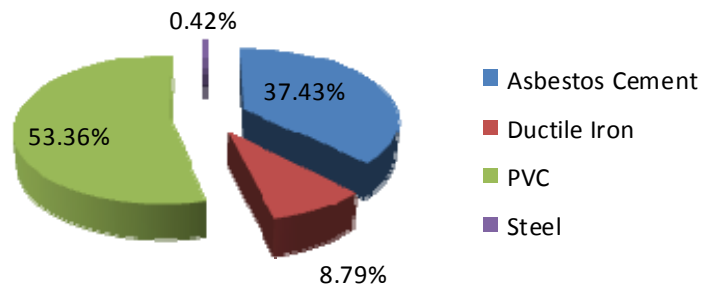
2013 Watermain Age Proportions



2013 Watermain Age Proportions

Age	No Pipes	Distance (km)	Percentage
Under 25 Years (≥ 1989)	719	45.807	50.1%
25 - 50 Years (1964 - 1988)	604	43.814	47.9%
Over 50 Years (≤ 1963)	69	1.83	2.0%
Total:	1392	91.45 km	

2013 Watermain Material Proportions



2013 Watermain Material Proportions

Material Types	Distance (km)	Percentage
Asbestos Cement	34.233	37.43%
Ductile Iron	8.041	8.79%
PVC	48.794	53.36%
Steel	0.382	0.42%
Total:	91.45 km	

3.1 Pressure Zones:

The City is divided into 2 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.

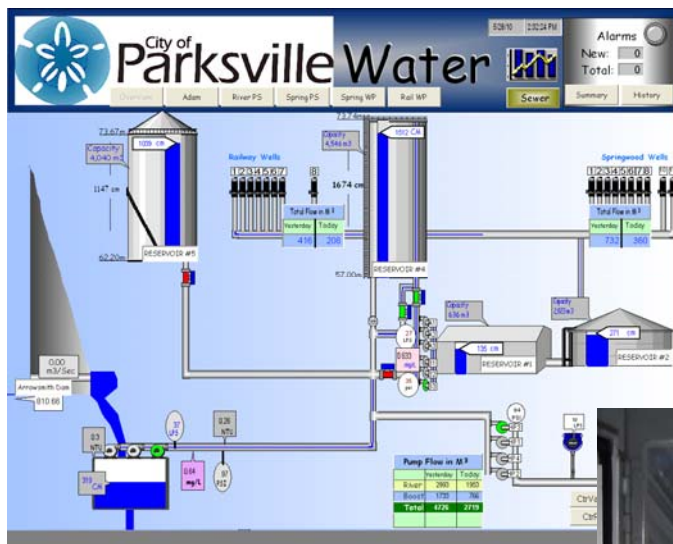
The high pressure water in this zone is supplied from 4 pumps, a 15hp, 2-40hp and a 100 hp. These pumps are controlled through the SCADA system that automatically watches flows and switches on however many pumps it needs to meet the flow requirements.

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



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 on/off 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 monitor the system 24 hours a day, 7 days a week.



5.0 Water Sampling and Testing

5.1 Bacteriological

As required by the Vancouver Island Health Authority (VIHA), 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 2013 test results (L1 means Less than 1 - 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 (CaCO_3). 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 2013 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.



6.0 Water Quality Complaints

The Engineering and Operations Department had very few water quality complaints throughout 2013. During periods of high flows or during water main flushing and fire hydrant maintenance there were a few calls related to “brown or dirty” water. A majority of these complaints were on dead end lines. City of Parksville crews would either reflush the mains through a hydrant or flushout at a spot closest to the dead end or advise the homeowner that running an outside tap for a few minutes would clear up the problem.

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 concerns about calcium 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 is mixed with the well supply. The river water is considered “Soft”.



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%

City of Parksville staff completed a year long water quality monitoring program of the Englishman River. This data was used to determine the best type of treatment process for a water treatment plant. Membrane technology has been chosen. A consultant will be chosen to complete the design of the plant and intake structure.

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 2 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

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 2013 Improvements:

- Rebuilt 40 HP pump/motor at Springwood pump station.
- Cross Connection tracking program.
- Well rehabilitation of Springwood #3 and Railway #2.
- Completed 3” and 4” meter replacement, started on 2” meter replacement.
- Arrowsmith Dam road maintenance.
- Replaced ultrasonic flow meters at Arrowsmith Dam.
- Replaced antenna at Cokely Mountain.
- New 150mm water service to Community Park Sports Field.
- Reservoir cleaning—All tanks.

10.0 2013 Capital Projects:

- Completed Bay Avenue Realignment (Hwy 19): water.
- Completed Dogwood: Bay to SRW: water, sewer, storm.
- Started Temple Street water/sewer/storm plans for upgrades.
- Watermain upgrades on the Island Highway—Moilliet to Temple.
- ASR well—full scale cycle test.

11.0 2014 Capital Projects and Improvements:

- Springwood Well#2 abandonment.
- Continuing the water meter replacement program.
- Continuing to replace aging water mains for better distribution (Temple Street scheduled).
- Continue developing the Cross Connection Control Program.
- Water Treatment Plant pre-design.
- Installation of a new sports field meter at Springwood Park.
- Rebuild 100 HP & 40 HP pumps at Springwood pump station.

12.0 Cross Connection Control Program

In May 2006 the City of Parksville developed a draft cross connection control program as is currently working on the implementation of it.

The cross connection program will be implemented in a manner that will address 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. An approved backflow device will have to be installed.

All City owner facilities were assessed and appropriate backflow installed. A tracking program called FAST was installed to track devices around the City and produce letters reminding businesses of when testing is due.

City staff remain watchful of potential cross connections in the fields and report problems back to Cross Connection Control Coordinator.

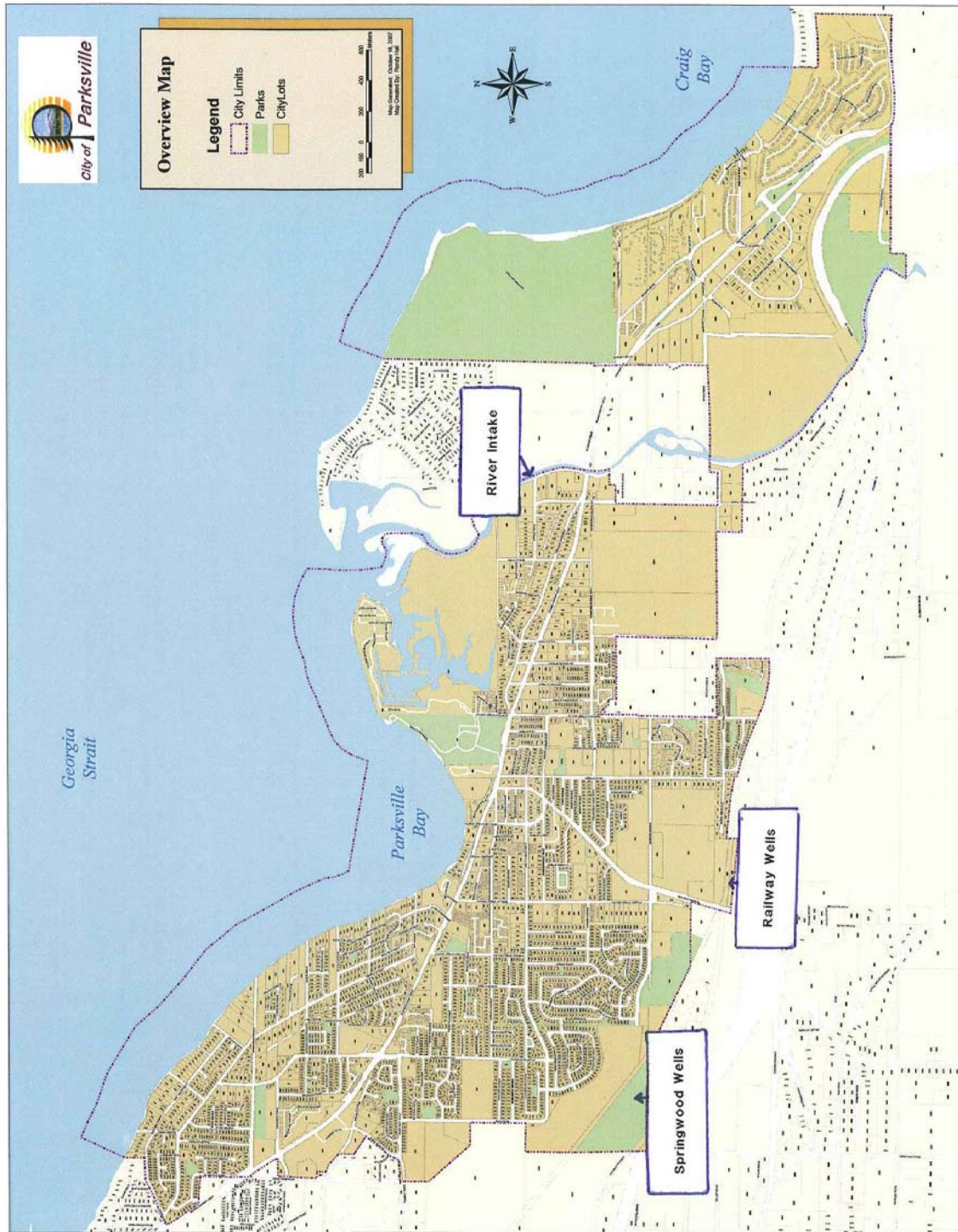


Double Check Valve Assembly

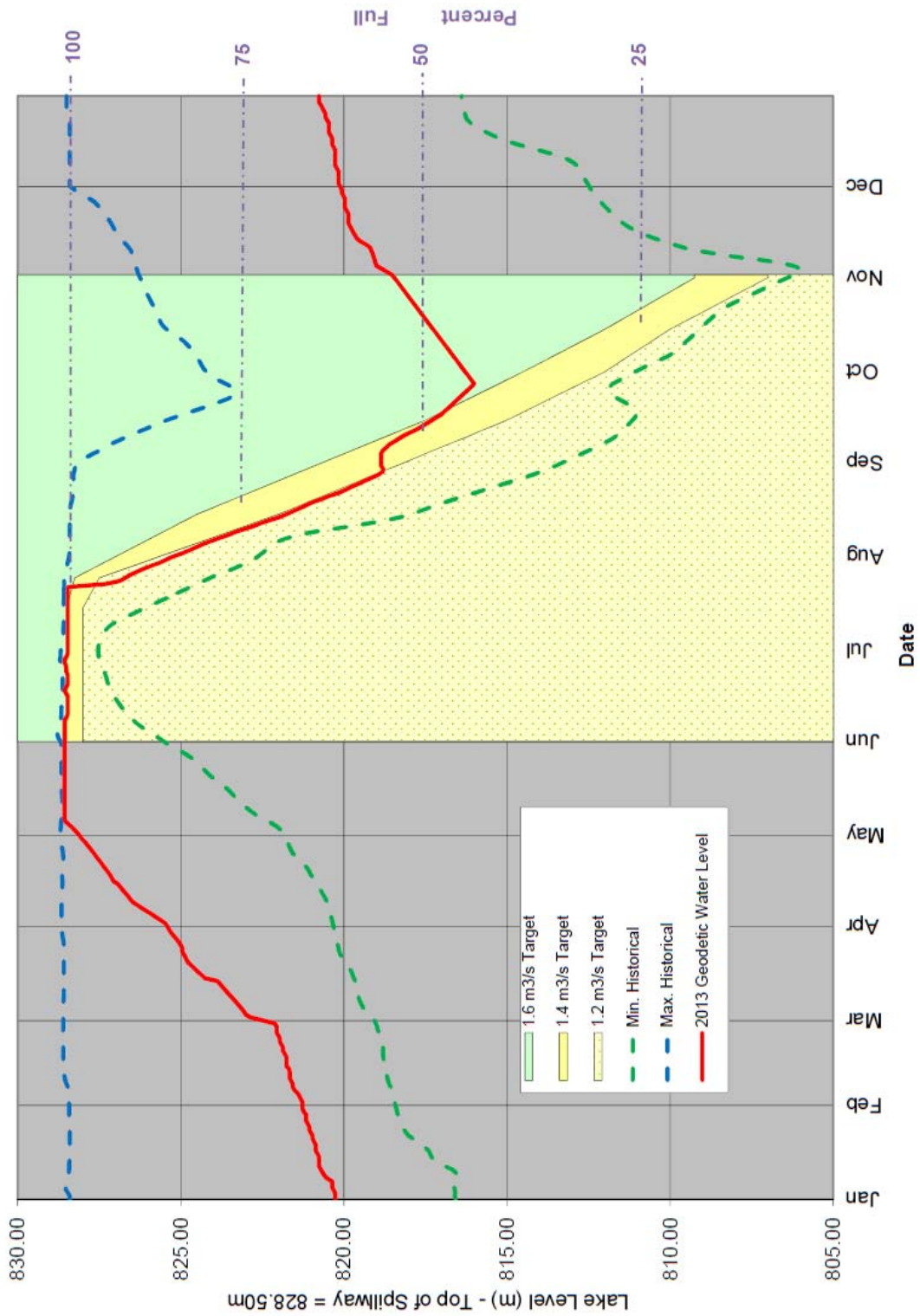
13.0 Emergency Response Plan

The City of Parksville has an Emergency Response Plan pertaining to the water system available for public viewing at the Engineering and Operations Department. This document outlines the strategies to deal with events such as contamination of water supply, pump failures and turbidity events. This plan continues to be updated.

Water Source Locations Map



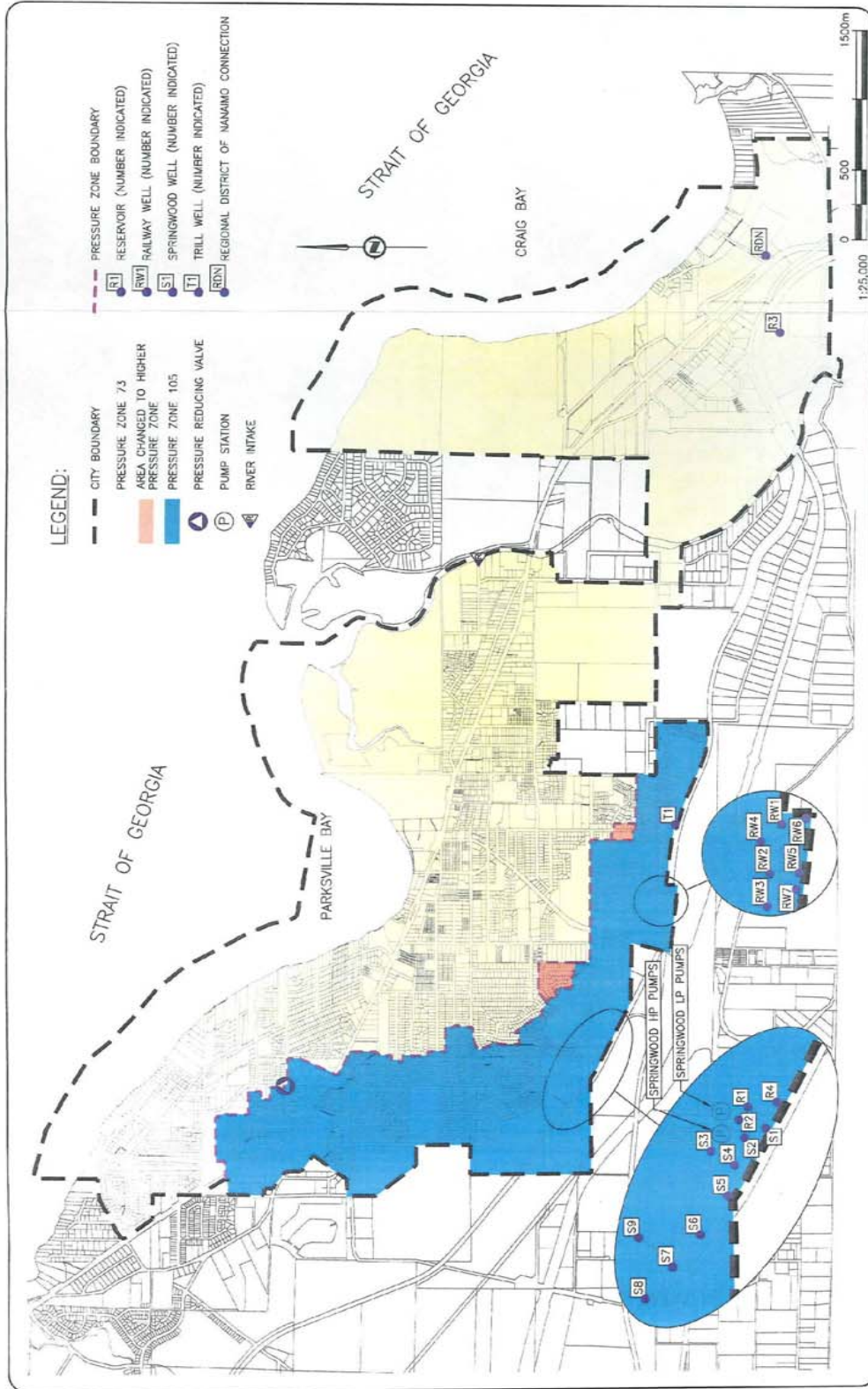
2013 Arrowsmith Dam Lake Levels
- Provisional Operating Rule Curve



Current as of : 1/6/2014

Prepared By: M. Squire

Map of Pressure Zone Boundaries



TITLE	PROPOSED PRESSURE ZONE BOUNDARIES
APPROVED	SCALE 1:25,000
DATE	MAY 2005
DWG No.	0212
JOB No.	FIGURE 10

CLIENT	CITY OF PARKSVILLE
PROJECT	WATER STUDY UPDATE

KOERS & ASSOCIATES ENGINEERING LTD.
Consulting Engineers

2013 Bacteriological Results

Water Sample Range Report for PARKSVILLE, WWS

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Water Sample Range Report

Island Health

Facility Name: PARKSVILLE, WWS
Facility Type: DWT
Date Range: Jan 1 2013 to Dec 31 2013
Date Created: Feb 21 2014

Sampling Site	Date Collected	Total Coliform	E. Coli	Fecal Coliform
<u>401 S. Moiliet Street,</u>				
<u>Parksville BC,</u>				
<u>Despard & Moilliet,</u>				
<u>Dist. site, Monthly</u>				
	1/29/2013	L1	L1	
	2/19/2013	L1	L1	
	3/27/2013	L1	L1	
	4/30/2013	L1	L1	
	5/14/2013	L1	L1	
	6/11/2013	L1	L1	
	7/31/2013	L1	L1	
	8/20/2013	L1	L1	
	9/3/2013	L1	L1	
	10/29/2013	L1	L1	
	11/19/2013	L1	L1	
	12/10/2013	L1	L1	
	Total Positive:	0	0	0
<u>1247 Arbutus Road,</u>				
<u>Parksville BC,</u>				
<u>Parksville</u>				
<u>MHP/Utility Building,</u>				
<u>Parksville, Dist. site,</u>				
<u>Monthly</u>				
	1/2/2013	L1	L1	
	2/5/2013	L1	L1	
	3/5/2013	L1	L1	
	4/2/2013	L1	L1	
	5/8/2013	L1	L1	
	6/5/2013	L1	L1	
	7/2/2013	L1	L1	
	8/6/2013	L1	L1	
	9/3/2013	L1	L1	
	10/1/2013	L1	L1	
	11/5/2013	L1	L1	
	12/4/2013	L1	L1	
	Total Positive:	0	0	0
<u>Harbour Homes,</u>				
<u>Parksville BC, Top</u>				
<u>of Corfield,</u>				
<u>Parksville, Dist. site,</u>				
<u>Monthly</u>				
	1/2/2013	L1	L1	
	2/5/2013	L1	L1	
	3/5/2013	L1	L1	

2013 Bacteriological Results

Water Sample Range Report for PARKSVILLE, WWS	L1	L1	Page 2 of 7
4/9/2013	L1	L1	
5/14/2013	L1	L1	
6/18/2013	L1	L1	
7/9/2013	L1	L1	
8/13/2013	L1	L1	
9/17/2013	L1	L1	
10/22/2013	L1	L1	
11/19/2013	L1	L1	
12/10/2013	L1	L1	
Total Positive:	0	0	0

1390 Herring Gull
Way, Parksville BC,
Works Yard,
Parksville, Dist. site,
Monthly

1/15/2013	L1	L1	
2/13/2013	L1	L1	
3/12/2013	L1	L1	
4/9/2013	L1	L1	
5/14/2013	L1	L1	
6/11/2013	L1	L1	
7/9/2013	L1	L1	
8/20/2013	L1	L1	
9/10/2013	L1	L1	
10/8/2013	L1	L1	
11/13/2013	L1	L1	
12/10/2013	L1	L1	
Total Positive:	0	0	0

613 Chinook
Avenue, Parksville
BC, 613 Chinook
Avenue, Parksville,
Dist. site, Monthly

1/2/2013	L1	L1	
2/5/2013	L1	L1	
3/12/2013	L1	L1	
4/9/2013	L1	L1	
5/8/2013	L1	L1	
6/5/2013	L1	L1	
7/31/2013	L1	L1	
8/13/2013	L1	L1	
9/17/2013	L1	L1	
10/1/2013	L1	L1	
11/13/2013	L1	L1	
12/17/2013	L1	L1	
Total Positive:	0	0	0

193 East Island
Highway, Parksville
BC, Community
Park, Parksville BC,
Dist. site, Monthly

1/29/2013	L1	L1	
2/5/2013	L1	L1	
3/5/2013	L1	L1	
4/2/2013	L1	L1	

2013 Bacteriological Results

Water Sample Range Report for PARKSVILLE, WWS	L1	L1	Page 3 of 7
6/18/2013	L1	L1	
7/2/2013	L1	L1	
8/13/2013	L1	L1	
9/17/2013	L1	L1	
10/8/2013	L1	L1	
11/5/2013	L1	L1	
12/4/2013	L1	L1	
Total Positive:	0	0	0

249 West Hirst
Avenue, Parksville
BC, Health Unit,
Audit TAP in kitchen,
parksville BC, Dist.
site, No Regular
Sampling

1/9/2013	L1	L1	
Total Positive:	0	0	0

271 Chestnut Street,
Parksville BC, 271
Chestnut Street,
Parksville, Dist. site,
Monthly

1/22/2013	L1	L1	
2/27/2013	L1	L1	
3/19/2013	L1	L1	
5/22/2013	L1	L1	
6/18/2013	L1	L1	
7/17/2013	L1	L1	
8/13/2013	L1	L1	
9/17/2013	L1	L1	
10/8/2013	L1	L1	
11/26/2013	L1	L1	
12/4/2013	L1	L1	
Total Positive:	0	0	0

Englishman River
Intake, River Pump
Station, Dist. site,
Monthly

1/8/2013	L1	L1	
2/19/2013	L1	L1	
3/19/2013	L1	L1	
5/22/2013	L1	L1	
6/25/2013	L1	L1	
7/17/2013	L1	L1	
8/27/2013	95.9	L1	
9/3/2013	L1	L1	
9/25/2013	L1	L1	
10/29/2013	L1	L1	
11/26/2013	L1	L1	
12/10/2013	L1	L1	
Total Positive:	1	0	0

Daffodil at Camas,

2013 Bacteriological Results

Waterbury BC Report for PARKSVILLE, WWS

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Daffodil at Camas,
Parksville, Dist. site,
Monthly

1/8/2013	L1	L1	
2/27/2013	L1	L1	
3/27/2013	L1	L1	
4/30/2013	L1	L1	
5/28/2013	L1	L1	
6/25/2013	L1	L1	
7/23/2013	L1	L1	
8/20/2013	L1	L1	
9/25/2013	L1	L1	
10/29/2013	L1	L1	
11/26/2013	L1	L1	
12/17/2013	<u>L1</u>	<u>L1</u>	
Total Positive:	0	0	0

330 Park View,
Parksville BC, 330
Park View,
Parksville, Dist. site,
Monthly

1/22/2013	L1	L1	
2/13/2013	L1	L1	
3/12/2013	L1	L1	
4/16/2013	L1	L1	
5/8/2013	L1	L1	
6/5/2013	L1	L1	
7/23/2013	L1	L1	
8/6/2013	L1	L1	
9/10/2013	L1	L1	
10/16/2013	L1	L1	
11/19/2013	L1	L1	
12/4/2013	<u>L1</u>	<u>L1</u>	
Total Positive:	0	0	0

851 Temple, 851
TEMPLE (beside),
Dist. site, Monthly

1/8/2013	L1	L1	
2/27/2013	L1	L1	
3/19/2013	L1	L1	
4/16/2013	L1	L1	
5/22/2013	L1	L1	
6/11/2013	L1	L1	
7/9/2013	L1	L1	
8/20/2013	L1	L1	
9/3/2013	1	L1	
9/9/2013	L1	L1	
10/16/2013	L1	L1	
11/5/2013	L1	L1	
12/4/2013	<u>L1</u>	<u>L1</u>	
Total Positive:	1	0	0

378 Kingsley Street,
Wheeler, Top of
Kingsley, Dist. site,

2013 Bacteriological Results

Water Sampling Range Report for PARKSVILLE, WWS

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	1/15/2013	L1	L1	
	2/19/2013	L1	L1	
	3/27/2013	L1	L1	
	5/8/2013	L1	L1	
	6/5/2013	L1	L1	
	7/2/2013	L1	L1	
	8/6/2013	L1	L1	
	9/10/2013	L1	L1	
	10/1/2013	L1	L1	
	11/13/2013	L1	L1	
	12/17/2013	<u>L1</u>	<u>L1</u>	
	Total Positive:	0	0	0
<u>Island Highway, by Temple, Island Highway, by Temple, Dist. site, Monthly</u>				
	1/22/2013	L1	L1	
	2/19/2013	L1	L1	
	3/27/2013	L1	L1	
	4/30/2013	L1	L1	
	5/28/2013	L1	L1	
	6/25/2013	L1	L1	
	7/31/2013	L1	L1	
	8/27/2013	L1	L1	
	9/25/2013	L1	L1	
	10/22/2013	L1	L1	
	11/26/2013	L1	L1	
	12/17/2013	<u>L1</u>	<u>L1</u>	
	Total Positive:	0	0	0
<u>136 Memorial, 136 Memorial, Dist. site, Monthly</u>				
	1/29/2013	L1	L1	
	2/27/2013	L1	L1	
	3/19/2013	L1	L1	
	4/30/2013	L1	L1	
	5/28/2013	L1	L1	
	6/18/2013	L1	L1	
	7/23/2013	L1	L1	
	8/27/2013	L1	L1	
	9/25/2013	L1	L1	
	10/1/2013	L1	L1	
	11/13/2013	L1	L1	
	12/17/2013	<u>L1</u>	<u>L1</u>	
	Total Positive:	0	0	0
<u>450 Wisteria, across from 450 Wisteria, Dist. site, Monthly</u>				
	1/15/2013	L1	L1	
	2/13/2013	L1	L1	
	3/5/2013	L1	L1	
	4/2/2013	L1	L1	
	5/14/2013	L1	L1	
	6/25/2013	148	L1	

2013 Bacteriological Results

Water Sample Range Report for <u>770 PARKSVILLE, WWS</u>	L1	L1	Page 6 of 7
8/6/2013	L1	L1	
9/10/2013	L1	L1	
10/8/2013	L1	L1	
11/19/2013	L1	L1	
12/10/2013	<u>L1</u>	<u>L1</u>	
Total Positive:	1	0	0
<u>770 Soriel, 770</u>			
<u>Soriel, Dist. site,</u>			
<u>Monthly</u>			
1/22/2013	L1	L1	
2/13/2013	L1	L1	
3/12/2013	L1	L1	
4/16/2013	L1	L1	
5/22/2013	L1	L1	
6/11/2013	L1	L1	
7/17/2013	L1	L1	
8/27/2013	L1	L1	
9/3/2013	L1	L1	
10/16/2013	L1	L1	
11/5/2013	L1	L1	
12/4/2013	<u>L1</u>	<u>L1</u>	
Total Positive:	0	0	0
<u>491 Island Highway,</u>			
<u>East, City of</u>			
<u>Parksville, 491</u>			
<u>Island Hwy, Audit,</u>			
<u>Dist. site, No</u>			
<u>Regular Sampling</u>			
1/8/2013	<u>L1</u>	<u>L1</u>	
Total Positive:	0	0	0

Result Values: E - estimated L - less than G - greater than

Interpreting Sample Reports

In VIHA, the results of drinking water sampling are reported using the following coding system:

- L1 Less than 1 (no detectable bacteria) - Meaning: No bacteria present
- OG Overgrown - Meaning: Too many background bacteria to give an accurate count
- EST Estimated Count
- and
- A Sample not tested; Too long in transit
- C Sample leaked/broken in transit
- D Sample not tested; No collection date given
- T Sample submitted unsatisfactory. Exceeded 30 hours holding time, please resample.
- NS No sample received with requisition

2013 Bacteriological Results

Water Sample Range Report for PARKSVILLE, WWS

Page 7 of 7

Samples that contain total coliform:	3	1.55% of total
Samples that contain e. coli:	0	0.00% of total
Samples that contain fecal coliform:	0	0.00% of total
Number of positive samples in last 30 days:	0/16	
Total number of samples:	193	

Comments:

Environmental Health Officer

May 13 2014

FOR FURTHER INFORMATION PLEASE CALL: Wrathall, Bill (250) 947-8222 Parksville

Operator

City of Parksville
1116 Herring Gull Way
Parksville, BC
V9P 2H3

(250) 248-5412

Full Spectrum Analysis – Well Water



Success Through Science™

Your P.O. #: S13-5065
Your C.O.C. #: G071735

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

Report Date: 2013/11/29

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B3A9396
Received: 2013/11/26, 08:45

Sample Matrix: Water
Samples Received: 4

Analyses	Quantity	Date		Laboratory Method	Analytical Method
		Extracted	Analyzed		
Alkalinity - Water	4	2013/11/26	2013/11/26	BBY6SOP-00026	SM2320B
Chloride by Automated Colourimetry	3	N/A	2013/11/27	BBY6SOP-00011	SM-4500-Cl-
Chloride by Automated Colourimetry	1	N/A	2013/11/28	BBY6SOP-00011	SM-4500-Cl-
Coliform by membrane filtration	4	N/A	2013/11/26	BBY4SOP-00001	Based on SM-9222
E.coli by membrane filtration in Water	4	N/A	2013/11/26	BBY4SOP-00001	Based on SM-9222
Conductance - water	4	N/A	2013/11/26	BBY6SOP-00026	SM-2510B
Fluoride	4	N/A	2013/11/27	BBY6SOP-00012	SM - 4500 F C
Fecal Coliform by membrane filtration	4	N/A	2013/11/26	BRN SOP 00363 R2.0	Based on SM-9222
Hardness Total (calculated as CaCO ₃)	1	N/A	2013/11/28	BBY7SOP-00002	EPA 8020A
Hardness Total (calculated as CaCO ₃)	3	N/A	2013/11/29	BBY7SOP-00002	EPA 8020A
Hardness (calculated as CaCO ₃)	4	N/A	2013/11/27	BBY7SOP-00002	EPA 8020A
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	4	N/A	2013/11/27	BBY7SOP-00002	EPA 8020A
Elements by CRC ICPMS (dissolved)	4	N/A	2013/11/27	BBY7SOP-00002	EPA 8020A
Na, K, Ca, Mg, S by CRC ICPMS (total)	1	2013/11/26	2013/11/28	BBY7SOP-00002	EPA 8020A
Na, K, Ca, Mg, S by CRC ICPMS (total)	3	2013/11/26	2013/11/29	BBY7SOP-00002	EPA 8020A
Elements by CRC ICPMS (total)	1	2013/11/27	2013/11/27	BBY7SOP-00002	EPA 8020A
Elements by CRC ICPMS (total)	3	2013/11/28	2013/11/28	BBY7SOP-00002	EPA 8020A
Ammonia-N (Unpreserved)	4	N/A	2013/11/26	BBY6SOP-00009	SM-4500NH3G
Nitrate + Nitrite (N)	4	N/A	2013/11/26	BBY6SOP-00010	SM 4500NO3-I
Nitrite (N) by CFA	4	N/A	2013/11/26	BBY6SOP-00010	EPA 353.2
Nitrogen - Nitrate (as N)	4	N/A	2013/11/26	BBY6SOP-00010	SM 4500NO3-I
Filter and HNO ₃ Preserve for Metals	4	N/A	2013/11/26	BBY6WI-00001	EPA 200.2
pH Water (1)	4	N/A	2013/11/26	BBY6SOP-00026	SM-4500H+B
Silica (Reactive)	4	N/A	2013/11/26	BBY6SOP-00014	SM - 4500SiO2
Sulphate by Automated Colourimetry	4	N/A	2013/11/27	BBY6SOP-00017	SM4500-SO42- E
Total Dissolved Solids (Filt. Residue)	4	2013/11/26	2013/11/26	BBY6SOP-00033	SM 2540C
Tannin & Lignin (Total)	4	N/A	2013/11/27	BRN SOP-00221 R1.0	SM-5550 B
Total Suspended Solids	4	N/A	2013/11/27	BBY6SOP-00034	SM - 2540 D

* Results relate only to the items tested.

(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.

Full Spectrum Analysis—Well Water



Success Through Science®

Maxxam Job #: B3A9396
Report Date: 2013/11/29

City of Parksville

Your P.O. #: S13-5085

-2-

Encryption Key



Maxxam
29 Nov 2013 16:16:59 -08:00

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Samantha Fregien, Project Manager
Email: SFregien@maxxam.ca
Phone# (604) 734 7276

=====
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.

Total cover pages: 2

Maxxam Analytica International Corporation aka Maxxam Analytica | Burnaby, 4608 Canada Way V5G 1K5 Telephone (604) 734-7276 Fax (604) 731-2396



Maxxam Job #: B3A9396
Report Date: 2013/1/12/9

City of Parksville
Your P.O. #: S13-5085

Success Through Science

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID	IE3470	IE3471	IE3472	IE3473		
Sampling Date	2013/1/12/5 13:20	2013/1/12/5 13:30	2013/1/12/5 13:55	2013/1/12/5 14:10		
	UNITS	QC Batch	UNITS	QC Batch	UNITS	QC Batch
	SPRINGWOOD WELL #1	SPRINGWOOD WELL #3	RAILWAY WELL #1	RAILWAY WELL #3		
ANIONS						
Nitrite (N)	mg/L	<0.0050	7298026	0.0101	7298026	<0.0050
Nitrate (N)	mg/L	24.1	7298089	22.6	7298089	21.7
Calculated Parameters						
Filter and HNO3 Preservation	N/A	LAB	7297401	LAB	7297401	LAB
Nitrate (N)	mg/L	1.37	7297137	0.883	7297137	0.950
Misc. Inorganics						
Fluoride (F)	mg/L	0.062	7298003	0.058	7298003	0.058
Alkalinity (Total as CaCO3)	mg/L	101	7298148	107	7298148	108
Alkalinity (FP as CaCO3)	mg/L	<0.50	7298148	<0.50	7298148	<0.50
Bicarbonate (HCO3)	mg/L	123	7298148	131	7298148	132
Carbonate (CO3)	mg/L	<0.50	7298148	<0.50	7298148	<0.50
Hydroxide (OH)	mg/L	<0.50	7298148	<0.50	7298148	<0.50
Anions						
Dissolved Sulphate (SO4)	mg/L	5.28	7298980	6.02	7298980	6.21
Dissolved Chloride (Cl)	mg/L	15	7298978	20	7301558	23
MISCELLANEOUS						
Tannins and Lignins	mg/L	<0.10	7298123	<0.10	7298123	<0.10
Nutrients						
Ammonia (N)	mg/L	<0.0050	7297556	0.0135	7297556	0.0066
Nitrate plus Nitrite (N)	mg/L	1.37	7297472	0.893	7297472	0.950
Physical Properties						
Conductivity	uS/cm	256	7298150	279	7298150	296
pH	pH Units	7.66	7298149	7.78	7298149	7.87
Physical Properties						
Total Suspended Solids	mg/L	<4.0	7298959	<4.0	7298959	<4.0
Total Dissolved Solids	mg/L	170	7298970	148	7298970	170

N/A = Not Applicable
RDL = Reportable Detection Limit

Full Spectrum Analysis—Well Water



Maxxam Job #: B3A9398
 Report Date: 2013/11/29

MICROBIOLOGY (WATER)

City of Parksville
 Your P.O. #: S13-5085

Success Through Science

Maxxam ID	IE3470	IE3471	IE3472	IE3473				
Sampling Date	2013/11/25 13:20	2013/11/25 13:30	2013/11/25 13:55	2013/11/25 14:10				
	UNITS	UNITS	UNITS	UNITS	RDL	RDL	RDL	QC Batch
	SPRINGWOOD WELL #1	SPRINGWOOD WELL #3	RAILWAY WELL #1	RAILWAY WELL #3				
Microbiological Param.	CFU/100mL	CFU/100mL	CFU/100mL	CFU/100mL	2	2	1	7297491
E. coli	<2	<2	<1	<1				7297488
Fecal Coliforms	<2	<2	<1	<1				7297490
Total Coliforms	<2	<2	<1	<1	2	2	1	

RDL = Reportable Detection Limit



Maxxam Job #: B3A9398
Report Date: 2013/11/29

City of Parksville

Your P.O. #: S13-5085

Successive Through Sampling

CSR DISSOLVED METALS IN WATER (WATER)

Maxxam ID	IE3470	IE3471	IE3472	IE3473		
Sampling Date	2013/11/25 13:20	2013/11/25 13:30	2013/11/25 13:55	2013/11/25 14:10		
	UNITS	SPRINGWOOD WELL #1	SPRINGWOOD WELL #3	RAILWAY WELL #1	RAILWAY WELL #3	RDL
Misc. Inorganics						
Dissolved Hardness (CaCO3)	mg/L	116	120	131	152	0.50
Dissolved Metals by ICPMS						
Dissolved Aluminum (Al)	ug/L	<3.0	<3.0	<3.0	<3.0	3.0
Dissolved Antimony (Sb)	ug/L	<0.50	<0.50	<0.50	<0.50	0.50
Dissolved Arsenic (As)	ug/L	0.10	0.92	0.28	0.25	0.10
Dissolved Barium (Ba)	ug/L	3.4	8.1	16.1	8.0	1.0
Dissolved Beryllium (Be)	ug/L	<0.10	<0.10	<0.10	<0.10	0.10
Dissolved Bismuth (Bi)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0
Dissolved Boron (B)	ug/L	<50	<50	<50	<50	50
Dissolved Cadmium (Cd)	ug/L	<0.010	0.026	<0.010	<0.010	0.010
Dissolved Chromium (Cr)	ug/L	<1.0	1.1	<1.0	<1.0	1.0
Dissolved Cobalt (Co)	ug/L	<0.50	<0.50	<0.50	<0.50	0.50
Dissolved Copper (Cu)	ug/L	1.38	0.98	<0.20	0.80	0.20
Dissolved Iron (Fe)	ug/L	<5.0	<5.0	<5.0	<5.0	5.0
Dissolved Lead (Pb)	ug/L	0.29	<0.20	<0.20	<0.20	0.20
Dissolved Lithium (Li)	ug/L	<5.0	<5.0	<5.0	<5.0	5.0
Dissolved Manganese (Mn)	ug/L	18.3	98.7	6.6	22.0	1.0
Dissolved Mercury (Hg)	ug/L	<0.050	<0.050	<0.050	<0.050	0.050
Dissolved Molybdenum (Mo)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0
Dissolved Nickel (Ni)	ug/L	<1.0	1.1	<1.0	<1.0	1.0
Dissolved Selenium (Se)	ug/L	<0.10	0.11	0.13	<0.10	0.10
Dissolved Silicon (Si)	ug/L	12800	11400	11100	11100	100
Dissolved Silver (Ag)	ug/L	<0.020	<0.020	<0.020	<0.020	0.020
Dissolved Strontium (Sr)	ug/L	77.1	83.5	92.3	105	1.0
Dissolved Thallium (Tl)	ug/L	<0.050	<0.050	<0.050	<0.050	0.050
Dissolved Tin (Sn)	ug/L	<5.0	<5.0	<5.0	<5.0	5.0
Dissolved Titanium (Ti)	ug/L	<5.0	<5.0	<5.0	<5.0	5.0
Dissolved Uranium (U)	ug/L	<0.10	0.23	0.25	0.16	0.10
Dissolved Vanadium (V)	ug/L	<5.0	5.4	<5.0	<5.0	5.0
Dissolved Zinc (Zn)	ug/L	<5.0	<5.0	<5.0	<5.0	5.0
Dissolved Zirconium (Zr)	mg/L	<0.50	<0.50	<0.50	<0.50	0.50
Dissolved Calcium (Ca)	mg/L	26.3	28.9	28.6	34.0	0.050
Dissolved Magnesium (Mg)	mg/L	12.3	12.7	14.4	16.2	0.050
Dissolved Potassium (K)	mg/L	0.512	0.756	0.755	0.706	0.050

RDL = Reportable Detection Limit

Full Spectrum Analysis—Well Water



Maxxam Job #: B3A8398
 Report Date: 2013/11/29

City of Parksville

Success Through Science!

Your P. O. #: S13-5085

CSR DISSOLVED METALS IN WATER (WATER)

Maxxam ID	Sampling Date	IE3470	IE3471	IE3472	IE3473	RDL	QC Batch
	2013/11/25 13:20	2013/11/25 13:30	2013/11/25 13:55	2013/11/25 14:10			
	UNITS	SPRINGWOOD WELL #1	SPRINGWOOD WELL #3	RAILWAY WELL #1	RAILWAY WELL #3		
Dissolved Sodium (Na)	mg/L	6.71	9.07	7.36	7.96	0.050	7297135
Dissolved Sulphur (S)	mg/L	<3.0	<3.0	<3.0	<3.0	3.0	7297135

RDL = Reportable Detection Limit



Maxxam Job #: B3A9396
Report Date: 2013/11/29

City of Parksville

Success Through Science

Your P.O. #: S13-5095

CSR TOTAL METALS IN WATER (WATER)

Maxxam ID	UNITS	SPRINGWOOD WELL #1	QC Batch	SPRINGWOOD WELL #3	QC Batch	RAILWAY WELL #1	RAILWAY WELL #3	RDL	QC Batch
Sampling Date		2013/11/25 13:20		2013/11/25 13:30		2013/11/25 13:55	2013/11/25 14:10		
Calculated Parameters									
Total Hardness (CaCO3)	mg/L	126	729879	137	729879	141	163	0.50	729879
Total Metals by ICPMS									
Total Aluminum (Al)	ug/L	<3.0	7301221	76.3	7298738	<3.0	<3.0	3.0	7301221
Total Antimony (Sb)	ug/L	<0.50	7301221	<0.50	7298738	<0.50	<0.50	0.50	7301221
Total Arsenic (As)	ug/L	0.11	7301221	1.04	7298738	0.28	0.25	0.10	7301221
Total Barium (Ba)	ug/L	3.4	7301221	8.8	7298738	16.0	8.3	1.0	7301221
Total Beryllium (Be)	ug/L	<0.10	7301221	<0.10	7298738	<0.10	<0.10	0.10	7301221
Total Bismuth (Bi)	ug/L	<1.0	7301221	<1.0	7298738	<1.0	<1.0	1.0	7301221
Total Boron (B)	ug/L	<5.0	7301221	<5.0	7298738	<5.0	<5.0	5.0	7301221
Total Cadmium (Cd)	ug/L	<0.010	7301221	0.034	7298738	<0.010	<0.010	0.010	7301221
Total Chromium (Cr)	ug/L	<1.0	7301221	2.2	7298738	1.1	<1.0	1.0	7301221
Total Cobalt (Co)	ug/L	<0.50	7301221	0.61	7298738	<0.50	<0.50	0.50	7301221
Total Copper (Cu)	ug/L	1.44	7301221	1.79	7298738	0.42	0.70	0.20	7301221
Total Iron (Fe)	ug/L	<5.0	7301221	33.1	7298738	21.9	<5.0	5.0	7301221
Total Lead (Pb)	ug/L	0.32	7301221	0.30	7298738	<0.20	<0.20	0.20	7301221
Total Lithium (Li)	ug/L	<5.0	7301221	<5.0	7298738	<5.0	<5.0	5.0	7301221
Total Manganese (Mn)	ug/L	18.9	7301221	11.9	7298738	6.9	23.9	1.0	7301221
Total Mercury (Hg)	ug/L	<0.050	7301221	<0.050	7298738	<0.050	<0.050	0.050	7301221
Total Molybdenum (Mo)	ug/L	<1.0	7301221	<1.0	7298738	<1.0	<1.0	1.0	7301221
Total Nickel (Ni)	ug/L	<1.0	7301221	1.4	7298738	<1.0	<1.0	1.0	7301221
Total Selenium (Se)	ug/L	0.11	7301221	0.16	7298738	0.18	<0.10	0.10	7301221
Total Silicon (Si)	ug/L	13300	7301221	12000	7298738	11000	11100	100	7301221
Total Silver (Ag)	ug/L	<0.020	7301221	0.028	7298738	<0.020	<0.020	0.020	7301221
Total Strontium (Sr)	ug/L	76.6	7301221	87.7	7298738	64.3	106	1.0	7301221
Total Thallium (Tl)	ug/L	<0.050	7301221	<0.050	7298738	<0.050	<0.050	0.050	7301221
Total Tin (Sn)	ug/L	<5.0	7301221	<5.0	7298738	<5.0	<5.0	5.0	7301221
Total Titanium (Ti)	ug/L	<5.0	7301221	6.7	7298738	<5.0	<5.0	5.0	7301221
Total Uranium (U)	ug/L	<0.10	7301221	0.25	7298738	0.23	0.14	0.10	7301221
Total Vanadium (V)	ug/L	<5.0	7301221	6.2	7298738	<5.0	<5.0	5.0	7301221
Total Zinc (Zn)	ug/L	<5.0	7301221	<5.0	7298738	<5.0	<5.0	5.0	7301221
Total Zirconium (Zr)	ug/L	<0.50	7301221	<0.50	7298738	<0.50	<0.50	0.50	7301221
Total Calcium (Ca)	mg/L	28.0	7297136	29.8	7297136	30.5	36.3	0.050	7297136
Total Magnesium (Mg)	mg/L	13.6	7297136	15.1	7297136	15.9	17.5	0.050	7297136
Total Potassium (K)	mg/L	0.548	7297136	0.854	7297136	0.820	0.780	0.050	7297136

RDL = Reportable Detection Limit

Full Spectrum Analysis—Well Water



Maxxam Job #: B3A0396
Report Date: 2013/11/29

City of Parksville
Your P.O. #: S13-5085

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CSR TOTAL METALS IN WATER (WATER)

Maxxam ID	Sampling Date	UNITS	WELL #	QC Batch	WELL #3	QC Batch	WELL #1	QC Batch	WELL #3	RDL	QC Batch
IE3470	2013/11/25 13:20	mg/L	7.24	7297136	<3.0	7297136	8.16	7297136	8.52	0.050	7297136
IE3471	2013/11/25 13:30	mg/L	10.2	7297136	<3.0	7297136	8.16	7297136	8.52	0.050	7297136
IE3472	2013/11/25 13:55	mg/L	8.16	7297136	<3.0	7297136	8.16	7297136	8.52	0.050	7297136
IE3473	2013/11/25 14:10	mg/L	8.52	7297136	<3.0	7297136	8.16	7297136	8.52	0.050	7297136
Total Sodium (Na)		mg/L	7.24	7297136	<3.0	7297136	8.16	7297136	8.52	0.050	7297136
Total Sulphur (S)		mg/L	<3.0	7297136	<3.0	7297136	8.16	7297136	8.52	0.050	7297136

RDL = Reportable Detection Limit

Full Spectrum Analysis—Raw River Water



Maxxam Job #: B3A9396
Report Date: 2013/1/29

City of Parksville

Succeed Through Science

Your P. O. #: S13-5085

Package 1 2.0°C

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

General Comments



Maxxam Job #: B3A9396
Report Date: 2013/11/29

City of Parksville

Your P. O. #: S13-6065

Successive Through Sciences

QUALITY ASSURANCE REPORT

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank Value	Blank Units	RPD Value (%)	QC Limits
			% Recovery	QC Limits	% Recovery	QC Limits				
7296569	Silica	2013/11/26	84	80-120	96	80-120	<0.50	mg/L	NC	20
7296559	Total Suspended Solids	2013/11/27	100	80-120	102	80-120	<4.0	mg/L	NC	20
7296870	Total Dissolved Solids	2013/11/26	NC	80-120	104	80-120	<10	mg/L	NC	20
7297472	Nitrate plus Nitrite (N)	2013/11/26	103	80-120	105	80-120	<0.020	mg/L	1.1	25
7297556	Ammonia (N)	2013/11/26	96	80-120	102	80-120	<0.0050	mg/L	NC	20
7298096	Nitrite (N)	2013/11/26	96	80-120	102	80-120	<0.0050	mg/L	NC	20
7298123	Tannins and Lignins	2013/11/27					<0.10	mg/L	NC	20
7298148	Alkalinity (Total as CaCO3)	2013/11/26	NC	80-120	99	80-120	<0.50	mg/L	6.6	20
7298148	Alkalinity (Pp as CaCO3)	2013/11/26					<0.50	mg/L	NC	20
7298148	Bicarbonate (HCO3)	2013/11/26					<0.50	mg/L	NC	20
7298148	Carbonate (CO3)	2013/11/26					<0.50	mg/L	NC	20
7298148	Hydroxide (OH)	2013/11/26					<0.50	mg/L	NC	20
7298150	Conductivity	2013/11/26			100	80-120	<1.0	uS/cm	2.5	20
7298738	Total Aluminum (Al)	2013/11/27	120	80-120	113	80-120	<3.0	ug/L		
7298738	Total Antimony (Sb)	2013/11/27	106	80-120	105	80-120	<0.50	ug/L		
7298738	Total Arsenic (As)	2013/11/27	111	80-120	105	80-120	<0.10	ug/L		
7298738	Total Barium (Ba)	2013/11/27	112	80-120	109	80-120	<1.0	ug/L		
7298738	Total Beryllium (Be)	2013/11/27	109	80-120	103	80-120	<0.10	ug/L		
7298738	Total Bismuth (Bi)	2013/11/27	109	80-120	102	80-120	<1.0	ug/L		
7298738	Total Cadmium (Cd)	2013/11/27	109	80-120	110	80-120	<0.010	ug/L		
7298738	Total Chromium (Cr)	2013/11/27	110	80-120	104	80-120	<1.0	ug/L		
7298738	Total Cobalt (Co)	2013/11/27	109	80-120	102	80-120	<0.50	ug/L		
7298738	Total Copper (Cu)	2013/11/27	NC	80-120	102	80-120	<0.20	ug/L		2.6
7298738	Total Iron (Fe)	2013/11/27	120	80-120	108	80-120	<5.0	ug/L		2.0
7298738	Total Lead (Pb)	2013/11/27	105	80-120	99	80-120	<0.20	ug/L		
7298738	Total Lithium (Li)	2013/11/27	108	80-120	106	80-120	<5.0	ug/L		
7298738	Total Manganese (Mn)	2013/11/27	NC	80-120	121(1.2)	80-120	<1.0	ug/L	3.3	2.0
7298738	Total Mercury (Hg)	2013/11/27	111	80-120	104	80-120	<0.050	ug/L		
7298738	Total Molybdenum (Mo)	2013/11/27	106	80-120	98	80-120	<1.0	ug/L		
7298738	Total Nickel (Ni)	2013/11/27	110	80-120	107	80-120	<1.0	ug/L		
7298738	Total Selenium (Se)	2013/11/27	106	80-120	102	80-120	<0.10	ug/L		
7298738	Total Silver (Ag)	2013/11/27	104	80-120	88	80-120	<0.020	ug/L		
7298738	Total Strontium (Sr)	2013/11/27	NC	80-120	107	80-120	<1.0	ug/L		
7298738	Total Thallium (Tl)	2013/11/27	110	80-120	103	80-120	<0.050	ug/L		
7298738	Total Tin (Sn)	2013/11/27	108	80-120	99	80-120	<5.0	ug/L		
7298738	Total Titanium (Ti)	2013/11/27	90	80-120	115	80-120	<5.0	ug/L		
7298738	Total Uranium (U)	2013/11/27	106	80-120	101	80-120	<0.10	ug/L		
7298738	Total Vanadium (V)	2013/11/27	113	80-120	106	80-120	<5.0	ug/L		
7298738	Total Zinc (Zn)	2013/11/27	110	80-120	104	80-120	<5.0	ug/L		



Maxxam Job #: B3A0396
Report Date: 2013/11/29

City of Parksville

Success Through Science

Your P. O. #: S13-5085

QUALITY ASSURANCE REPORT

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RSD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
7299738	Total Boron (B)	2013/11/27					<5.0	ug/L		
7299738	Total Silicon (Si)	2013/11/27					<100	ug/L		
7299738	Total Zirconium (Zr)	2013/11/27					<0.50	ug/L		
7299192	Dissolved Aluminum (Al)	2013/11/27	104	80 - 120	104	80 - 120	<0.50	ug/L	NC	20
7299192	Dissolved Antimony (Sb)	2013/11/27	106	80 - 120	104	80 - 120	<0.50	ug/L	NC	20
7299192	Dissolved Arsenic (As)	2013/11/27	103	80 - 120	103	80 - 120	<0.10	ug/L	NC	20
7299192	Dissolved Barium (Ba)	2013/11/27	100	80 - 120	101	80 - 120	<1.0	ug/L	NC	20
7299192	Dissolved Beryllium (Be)	2013/11/27	97	80 - 120	97	80 - 120	<0.10	ug/L	NC	20
7299192	Dissolved Bismuth (Bi)	2013/11/27	101	80 - 120	100	80 - 120	<1.0	ug/L	NC	20
7299192	Dissolved Cadmium (Cd)	2013/11/27	103	80 - 120	101	80 - 120	<0.10	ug/L	NC	20
7299192	Dissolved Chromium (Cr)	2013/11/27	102	80 - 120	101	80 - 120	<1.0	ug/L	NC	20
7299192	Dissolved Cobalt (Co)	2013/11/27	102	80 - 120	101	80 - 120	<0.50	ug/L	NC	20
7299192	Dissolved Copper (Cu)	2013/11/27	103	80 - 120	99	80 - 120	<0.20	ug/L	NC	20
7299192	Dissolved Iron (Fe)	2013/11/27	106	80 - 120	105	80 - 120	<5.0	ug/L	NC	20
7299192	Dissolved Lead (Pb)	2013/11/27	97	80 - 120	97	80 - 120	<0.20	ug/L	NC	20
7299192	Dissolved Lithium (Li)	2013/11/27	89	80 - 120	95	80 - 120	<5.0	ug/L	NC	20
7299192	Dissolved Manganese (Mn)	2013/11/27	104	80 - 120	103	80 - 120	<1.0	ug/L	NC	20
7299192	Dissolved Mercury (Hg)	2013/11/27	92	80 - 120	94	80 - 120	<0.050	ug/L		
7299192	Dissolved Molybdenum (Mo)	2013/11/27	97	80 - 120	98	80 - 120	<1.0	ug/L	NC	20
7299192	Dissolved Nickel (Ni)	2013/11/27	108	80 - 120	104	80 - 120	<1.0	ug/L	NC	20
7299192	Dissolved Selenium (Se)	2013/11/27	105	80 - 120	102	80 - 120	<0.10	ug/L	NC	20
7299192	Dissolved Silver (Ag)	2013/11/27	103	80 - 120	96	80 - 120	<0.020	ug/L	NC	20
7299192	Dissolved Strontium (Sr)	2013/11/27	98	80 - 120	99	80 - 120	<1.0	ug/L	NC	20
7299192	Dissolved Thallium (Tl)	2013/11/27	97	80 - 120	102	80 - 120	<0.050	ug/L	NC	20
7299192	Dissolved Tin (Sn)	2013/11/27	102	80 - 120	99	80 - 120	<5.0	ug/L	NC	20
7299192	Dissolved Titanium (Ti)	2013/11/27	99	80 - 120	100	80 - 120	<5.0	ug/L	NC	20
7299192	Dissolved Uranium (U)	2013/11/27	95	80 - 120	96	80 - 120	<0.10	ug/L	NC	20
7299192	Dissolved Vanadium (V)	2013/11/27	105	80 - 120	99	80 - 120	<5.0	ug/L	NC	20
7299192	Dissolved Zinc (Zn)	2013/11/27	111	80 - 120	107	80 - 120	<5.0	ug/L	NC	20
7299192	Dissolved Boron (B)	2013/11/27					<50	ug/L	NC	20
7299192	Dissolved Silicon (Si)	2013/11/27					<100	ug/L	NC	20
7299603	Fluoride (F)	2013/11/27	98	80 - 120	96	80 - 120	<0.010	mg/L	NC	20
7299978	Dissolved Chloride (Cl)	2013/11/27	92	80 - 120	104	80 - 120	<0.50	mg/L	0.2	20
7299980	Dissolved Sulfate (SO4)	2013/11/27	NC	80 - 120	100	80 - 120	<0.50	mg/L	1.0	20
7301221	Total Aluminum (Al)	2013/11/28	111	80 - 120	111	80 - 120	<3.0	ug/L	NC	20
7301221	Total Antimony (Sb)	2013/11/28	111	80 - 120	106	80 - 120	<0.50	ug/L	NC	20
7301221	Total Arsenic (As)	2013/11/28	108	80 - 120	104	80 - 120	<0.10	ug/L	NC	20
7301221	Total Barium (Ba)	2013/11/28	106	80 - 120	104	80 - 120	<1.0	ug/L	NC	20



Maxxam Job #: B3A9396
Report Date: 2013/11/29

City of Parksville

Your P. O. #: S13-5085

Success Through Science

QUALITY ASSURANCE REPORT

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
7301221	Total Beryllium (Be)	2013/11/28	103	80 - 120	100	80 - 120	<0.10	ug/L	NC	20
7301221	Total Bismuth (Bi)	2013/11/28	108	80 - 120	97	80 - 120	<1.0	ug/L	NC	20
7301221	Total Cadmium (Cd)	2013/11/28	109	80 - 120	104	80 - 120	<0.010	ug/L	NC	20
7301221	Total Chromium (Cr)	2013/11/28	110	80 - 120	106	80 - 120	<1.0	ug/L	NC	20
7301221	Total Cobalt (Co)	2013/11/28	107	80 - 120	108	80 - 120	<0.50	ug/L	NC	20
7301221	Total Copper (Cu)	2013/11/28	105	80 - 120	106	80 - 120	<0.20	ug/L	NC	20
7301221	Total Iron (Fe)	2013/11/28	120	80 - 120	118	80 - 120	<5.0	ug/L	NC	20
7301221	Total Lead (Pb)	2013/11/28	99	80 - 120	100	80 - 120	<0.20	ug/L	NC	20
7301221	Total Lithium (Li)	2013/11/28	106	80 - 120	104	80 - 120	<5.0	ug/L	NC	20
7301221	Total Manganese (Mn)	2013/11/28	109	80 - 120	107	80 - 120	<1.0	ug/L	NC	20
7301221	Total Mercury (Hg)	2013/11/28	99	80 - 120	103	80 - 120	<0.050	ug/L	NC	20
7301221	Total Molybdenum (Mo)	2013/11/28	105	80 - 120	102	80 - 120	<1.0	ug/L	NC	20
7301221	Total Nickel (Ni)	2013/11/28	108	80 - 120	107	80 - 120	<1.0	ug/L	NC	20
7301221	Total Selenium (Se)	2013/11/28	119	80 - 120	114	80 - 120	<0.10	ug/L	NC	20
7301221	Total Silver (Ag)	2013/11/28	107	80 - 120	98	80 - 120	<0.020	ug/L	NC	20
7301221	Total Strontium (Sr)	2013/11/28	102	80 - 120	102	80 - 120	<1.0	ug/L	NC	20
7301221	Total Thallium (Tl)	2013/11/28	83	80 - 120	98	80 - 120	<0.050	ug/L	NC	20
7301221	Total Tin (Sn)	2013/11/28	103	80 - 120	103	80 - 120	<5.0	ug/L	NC	20
7301221	Total Titanium (Ti)	2013/11/28	110	80 - 120	112	80 - 120	<5.0	ug/L	NC	20
7301221	Total Uranium (U)	2013/11/28	96	80 - 120	97	80 - 120	<0.10	ug/L	NC	20
7301221	Total Vanadium (V)	2013/11/28	107	80 - 120	105	80 - 120	<5.0	ug/L	NC	20
7301221	Total Zinc (Zn)	2013/11/28	124 ⁽¹⁾	80 - 120	120	80 - 120	<5.0	ug/L	NC	20
7301221	Total Boron (B)	2013/11/28					<50	ug/L	NC	20
7301221	Total Silicon (Si)	2013/11/28					<100	ug/L	NC	20
7301221	Total Zirconium (Zr)	2013/11/28					<0.50	ug/L	NC	20
7301558	Dissolved Chloride (Cl)	2013/11/28	97	80 - 120	101	80 - 120	<0.50	mg/L	NC	20

N/A - Not Applicable
 RPD - Relative Percent Difference
 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 not sufficiently significant to permit a reliable recovery calculation.
 NC (RPD): The RPD was not calculated. The level of analyte detected in the parent sample and its duplicate was not sufficiently significant to permit a reliable calculation.
 (1) - Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.
 (2) - Blank Spike outside acceptance criteria (10% of analyte failure allowed).

Full Spectrum Analysis—Raw River Water



Success Through Science

Validation Signature Page

Maxxam Job #: B3A9396

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



Rob Reinert, Data Validation Coordinator

=====
Maxxam has procedures in place to guard against improper use of the electronic signatures 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.

Full Spectrum Analysis—Raw River Water

Maxxam

4806 Corvallis Way, Bend, OR 97701-1044 Fax: 503 686 8686 Fax: 504 731 2396

Maxxam Job#: B3A9396

CHAIN OF CUSTODY RECORD
Page 1 of 1
G 071735

Report To:

Invoice To: Invoice Report: No Yes
 Company Name: City of Parksville
 Contact Name: Scott Churko
 Address: PO Box 1390
Parksville, OR 97131
250 Elk St. Parksville, OR 97131
 E-mail: schurko.parkville, ca

Company Name: _____
 Contact Name: _____
 Address: _____
 Phone / Fax: _____
 E-mail: _____

PO #: _____
 Operator #: _____
 Project #: _____
 Pool Name: _____
 Location: _____
 Sample By: _____

REGULATORY REQUIREMENTS SERVICE REQUESTED:

CSF
 CCME (5 days for most tests)
 9C Water Quality
 Other: _____
 DRINKING WATER
 Regular Turn Around Time (TAT)
 FLUSH (Press contact the lab)
 1 Day 2 Day 3 Day
 Date Required: _____
 Special Instructions: Ship Sample Bottles (please specify)
 Return Cooler:

Sample Identification	Lab	Sample Type	Date/Time Sampled	BTEX/VPH	MTE	VOC/VPH	TEH	PH	LEPHEPH	CGME-PHC (Pesticides 1-4 Plus BTEX)	CGME-PHC (Pesticides 5-8)	CGME BTEX (Pesticides 1 Plus BTEX)	PCB	Phenols by MAP	Phenols by GCMS	TDC	MOG	EWCG	Disolved Metals	Free Nitrate	Free Asbestos	Total Metals Plus Asbestos	Nitrate	Nitrite	Ammonia	Chloride	Fluoride	Sulfate	Total Suspended Solids TSS	TSS	pH	Conductivity	Hardness	BOD	COD	Coliform, Total & Escherichia	Ferrous	Asbestos	HOLD	
1 <u>Springwood Well #1</u>	<u>1E3470</u>	<u>Raw</u>	<u>2011/15 13:30</u>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
2 <u>Springwood Well #3</u>	<u>1E3471</u>	<u>Raw</u>	<u>2011/15 13:30</u>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
3 <u>Railway Well #1</u>	<u>1E3472</u>	<u>Raw</u>	<u>2011/15 12:55</u>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
4 <u>Railway Well #3</u>	<u>1E3473</u>	<u>Raw</u>	<u>2011/15 14:10</u>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Samples are from a Drinking Water Source? YES NO
 Does source supply multiple households? YES NO

Retrieved by: S. Churko Date (Y/M/D): 2011/15 Time: 14:30
 Received by: M. W. ... Date (Y/M/D): 2011/12 Time: 08:45
 Temperature on Receipt (°C): 9.2
 Custody Seal Intact on Cooler? Yes No

IT IS THE RESPONSIBILITY OF THE SUBMITTER TO OBTAIN THE CONSENT OF THE OWNER OF ANY PROPERTY WHERE AN ANALYSIS IS CONDUCTED FOR TESTING PURPOSES.

Water System Operating Conditions



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 water mains 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	Part Alberni	(250) 724-1281	Fax: (250) 724-4376
Nanaimo	(250) 755-6215	Fax: (250) 755-3372	Courtenay	(250) 334-5450	Fax: (250) 334-5466

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

Water System Operating Conditions

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 Cryptosporidium oocysts, provide two treatment processes and produce finished water with less than 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. W. Weirall