

City of  
**Parksville**  
Engineering & Operations Department

**ANNUAL WATER REPORT**



**December 2008**

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## **1.0 Introduction:**

All water suppliers 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.

This report has been submitted to the Vancouver Island Health Authority and is posted on the City of Parksville Website. [www.Parksville.ca](http://www.Parksville.ca).

## **2.0 Parksville Water System:**

The City of Parksville has approximately 4500 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 16 production wells ranging from 1.4 l/s (18 IGPM) to 9.2 l/s (121 IGPM).

Well Name	Well Depth (m)	Production (l/s, Igpm)
Springwood Well #1	31.9	3.9 , 51
Springwood Well #2	10.4	5.0 , 66
Springwood Well #3	25.3	5.2 , 69
Springwood Well #4	9.8	5.8 , 77
Springwood Well #5	31.0	7.3 , 97
Springwood Well #6	31.1	6.7 , 88
Springwood Well #7	40.2	7.3 , 97
Springwood Well #8	39.4	8.3 , 110
Railway Well#1	30.7	7.5 , 99
Railway Well#2	32.2	6.7 , 88
Railway Well#3	25.2	3.3 , 44
Railway Well#4	22.5	4.6 , 61
Railway Well#5	36.3	9.2 , 121
Railway Well#6	36.7	5.8 , 77
Railway Well#7	34.2	5.0 , 66
Trill Well#8	25.1	1.4 , 18

See **Appendix A** for Well locations.



Railway Well Kiosk No. 5

## 2.2 River Intake:

Between May and October the City pumps water from the Englishman River at a maximum rate of 136 l/s (1800 IGPM) to keep up with summer demands. The water in the Englishman river is partially supplied from the Arrowsmith Dam. The City has a permit with the Ministry of Environment to release a minimum flow of 1.6 m<sup>3</sup>/min between June 1<sup>st</sup> and October 31<sup>st</sup>.

## 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). The dam is located at Arrowsmith Lake approximately 19km south of Parksville. It was commissioned in September 2000. The dam has a capacity of 9,000,000 m<sup>3</sup> 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 2003 – 2009.

## 2.4 Reservoirs:

Water that has been pumped either from the ground or from the river is stored in 5 reservoirs. Reservoirs numbers 1, 2 and 4 are located in the Springwood Water Compound on Despard Rd. These 3 are concrete with 2 being partially below ground and one above. Storage capacities are:

- Reservoir #1 - 616 m<sup>3</sup> (135,500 Imp. gal).
- Reservoir #2 - 2023 m<sup>3</sup> (445,000 Imp. gal)
- Reservoir #4 - 4559 m<sup>3</sup> (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 - 671m<sup>3</sup> (148,000 Imp. gal.)
- Reservoir #5 - 4300 m<sup>3</sup> (950,000 Imp. gal).

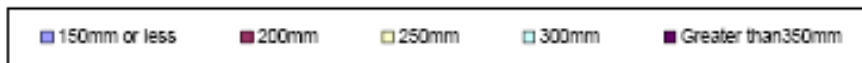
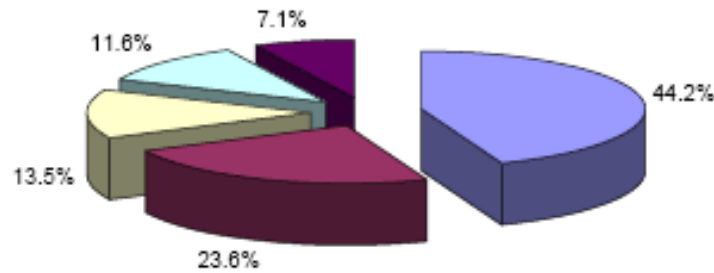
**3.0 Distribution System:**

The distribution system consists of 54 km of PVC (plastic) pipe, 8.3 km of Ductile Iron pipe and 32 km of AC (Asbestos Cement) pipe. Sizes range from 4" to 14".

There are 455 fire hydrants and one Pressure Reducing Valve (PRV).

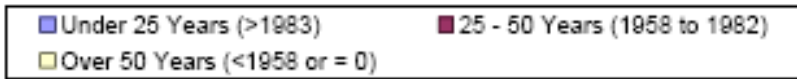
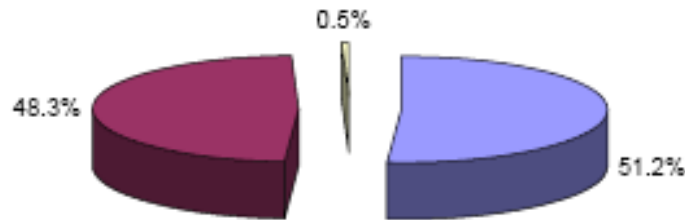
Like all municipalities, the infrastructure is aging and watermains are being replaced through capital improvements. The following shows the size, age and material of the mains in the Parksville Water System

2008 Watermains - Proportions of Diameter



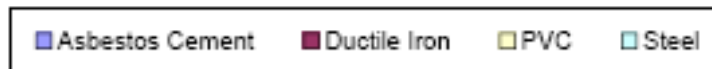
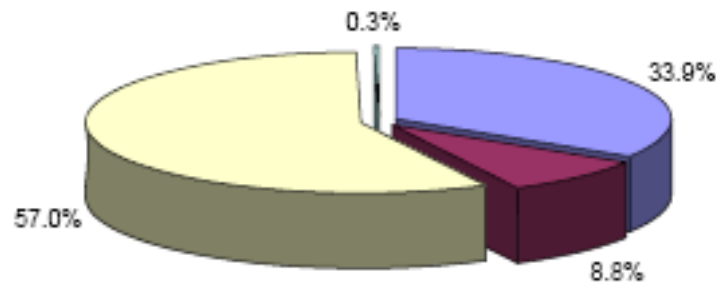
2008 Watermains Proportions of Diameter				
Diameter	No Pipes	Distance (km)	Percentage	Type
150mm or less	559	41.960	44.2%	Distribution Mains
200mm	336	22.467	23.6%	
250mm	166	12.830	13.5%	Supply Mains
300mm	142	11.000	11.6%	
Greater than 350mm	80	6.757	7.1%	
<b>Total:</b>	<b>1283</b>	<b>95.014</b>	<b>km</b>	

2008 Watermains - Proportions of Age



2008 Watermains Proportions of Age			
Age	No Pipes	Distance (km)	Percentage
Under 25 Years (>1983)	696	48.676	51.2%
25 - 50 Years (1958 to 1982)	559	45.862	48.3%
Over 50 Years (<1958 or = 0)	28	0.478	0.5%
<b>Total:</b>	<b>1283</b>	<b>95.014</b>	<b>km</b>

2008 Watermain Materials Proportions



2008 Watermains Proportions of Materials		
Material Types	Distance (km)	Percentage
Asbestos Cement	32.184	33.9%
Ductile Iron	8.318	8.8%
PVC	54.188	57.0%
Steel	0.327	0.3%
<b>Total:</b>	<b>95.014</b>	<b>km</b>

### 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 where you are.

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.

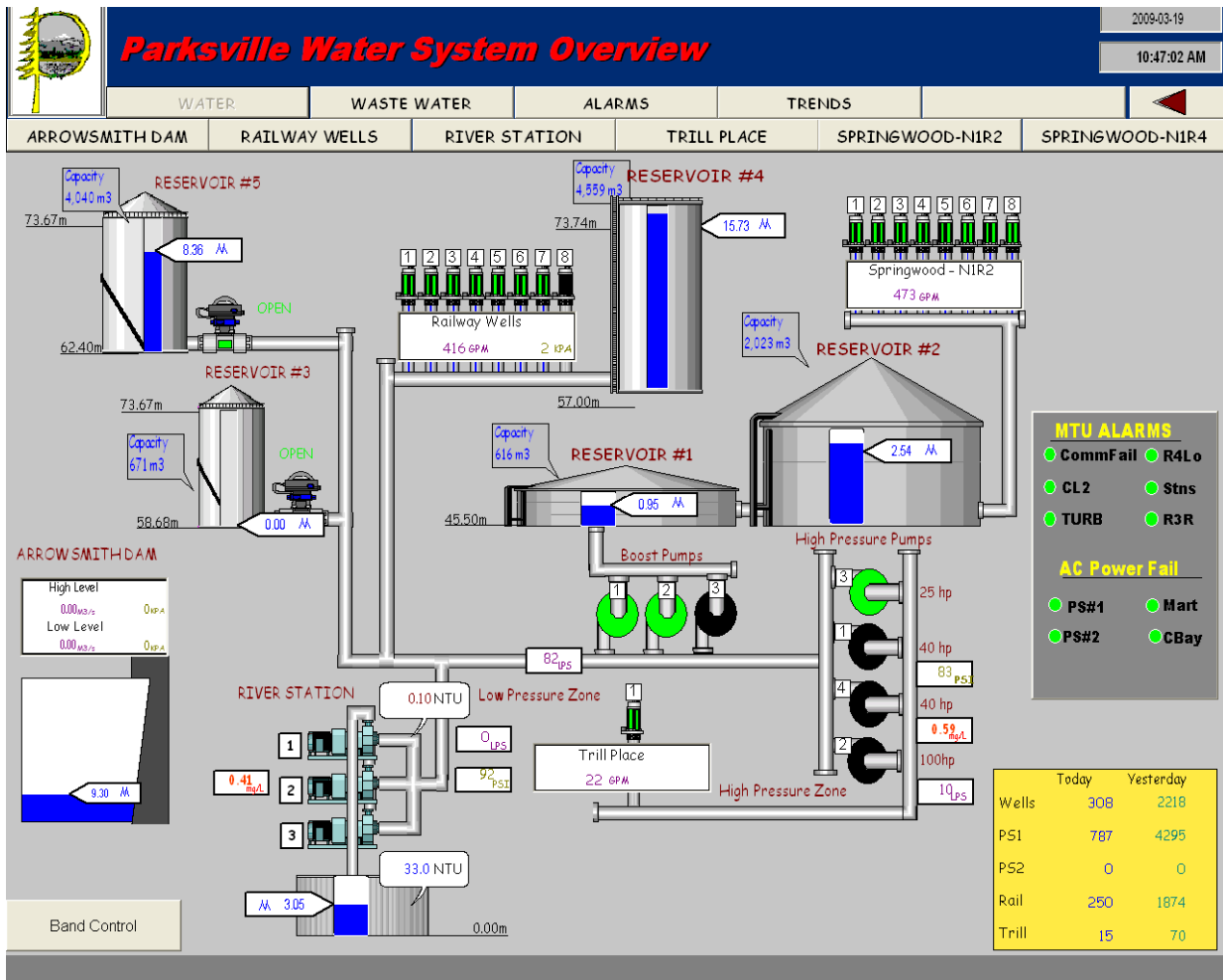
The high pressure water in this zone is supplied from a 25hp, 2-40hp and a 100 hp. These pumps are controlled through the SCADA system that automatically watches flows and switches on however many pumps it needs to meet the flow requirements.

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 2008 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 water once per year, in the Fall, for a full spectrum analysis. As seen below, 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<sub>3</sub>). The river water is considered "Soft" under the guidelines and the Well water is "Moderate".

All parameters meet the Canadian Drinking Water Guidelines.

See **Appendix E** for the 2008 Full Spectrum Analysis of the Parksville Water System Source Water.

## 6.0 Water Quality Complaints

The Public Works Department had very few water quality complaints throughout 2008. Most were related to a noticeable chlorine taste in the water. A majority of these complaints were from residences closest to the pump station where the chlorine is injected.

There were a few hardness related complaints mostly contributed to new homeowners from other municipalities with different water composition.

There were also a few "brown or dirty water" complaints that came from either water main breaks or flushing that causes an increase in turbidity from fast moving water.

One "brown or dirty water" complaints stemmed from a faulty turbidimeter at the River Pump Station allowing the pumps to run for a few hours during a higher than normal turbidity event in the river. Part of the downtown core was flushed and the faulty turbidimeter was replaced.



## **7.0 Routine Maintenance Program**

### **7.1 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

### **7.2 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

### **7.3 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
- Annual calibration of turbidity analyzers

### **7.4 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.

### **7.5 Pump Stations**

- Daily checks of pumps and chlorination system
- Security checks of compounds
- Annual calibration of chlorine analyzer

### **8.0 2008 Improvements:**

- Rebuilt Pump #2 at river pump station
- Purchased 2 chlorine regulators at River Station
- Purchased 1 chlorine valve at River Station
- Purchased turbidimeter for River Station
- Upgrading SCADA system to current technologies
- Had portable generator retrofitted to run either the River Station or Railway Well field
- Re keyed all water facilities and compound locks

### **9.0 2008 Capital Projects:**

- Major upgrades to Springwood Pump Station including dedicated supply lines from Railway Wells and Springwood Wells to Springwood compound.
- Reservoir #1 booster pump replacement and pump house.
- Many water main upgrades to upsize aging pipes and loop dead ends.
- Replaced 2 existing shallow wells with 2 deep wells (awaiting approvals)
- Drilled 1 new production well (awaiting approvals)

### **10.0 2009 Capital Projects and Improvements:**

- Continue upgrading SCADA system
- Continue with Well Rehabilitation on aging wells
- Starting a water meter change out program
- Continue developing the cross connection program
- Develop a comprehensive water conservation program
- Upgrade second pump at River Station
- Upgrade chlorination system for Springwood Pump station
- Second phase of Springwood Booster upgrade

### 11.0 Cross Connection Control Program

In May 2006 the City of Parksville developed a cross connection control program. An additional staff person was hired in September 2006 to review the program, and is currently working on the implementation of it. This staff member was also trained as a Certified Backflow Tester in 2008.

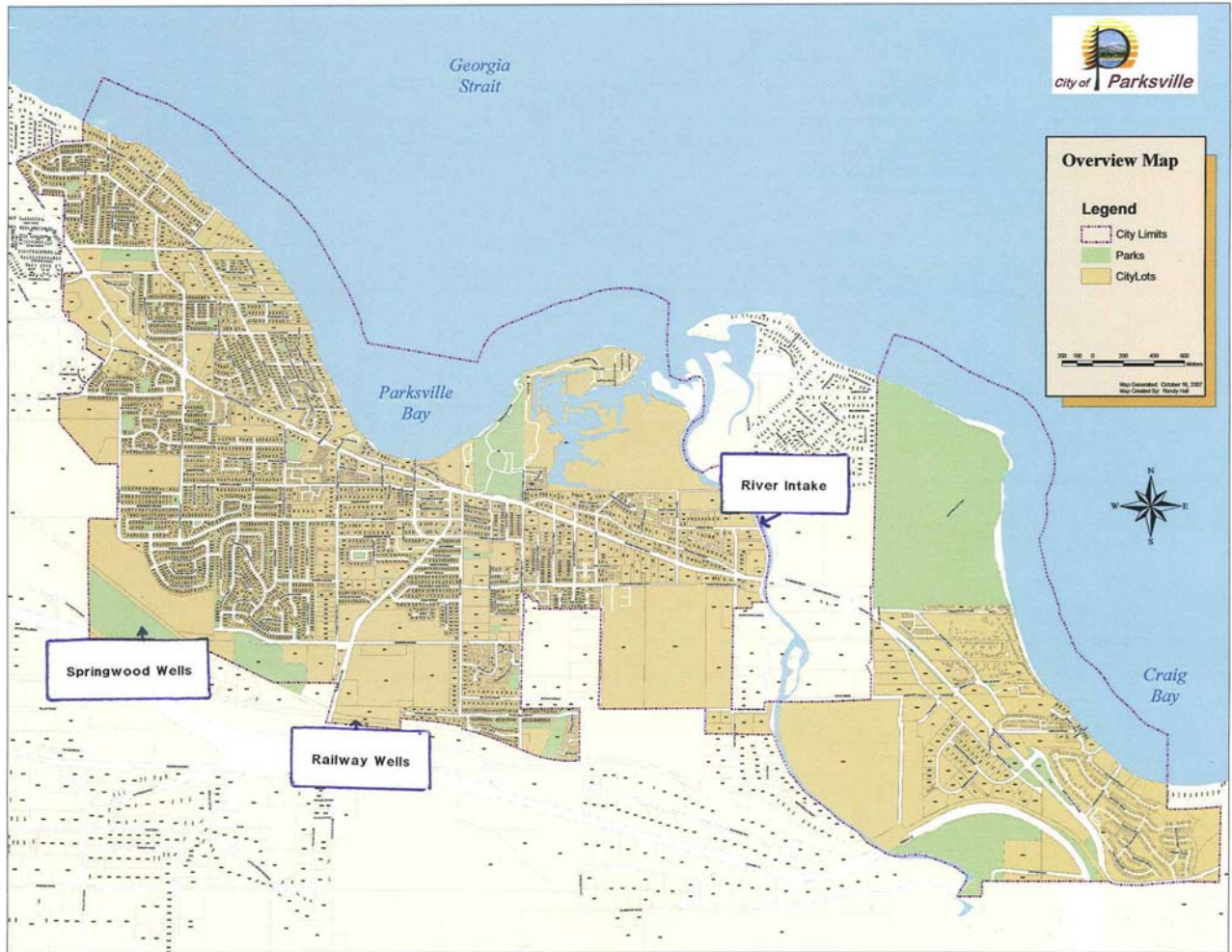
The cross connection program will be implemented in a manner that will address high and severe hazard water use processes first. These include Industrial, Commercial and Institutional (ICI) users. Each ICI user will be assessed as to the potential risk to the water system. An approved backflow device will have to be installed.

City Bylaw 1999 No. 1320 was amended outlining the program with a termination clause for non-compliance.



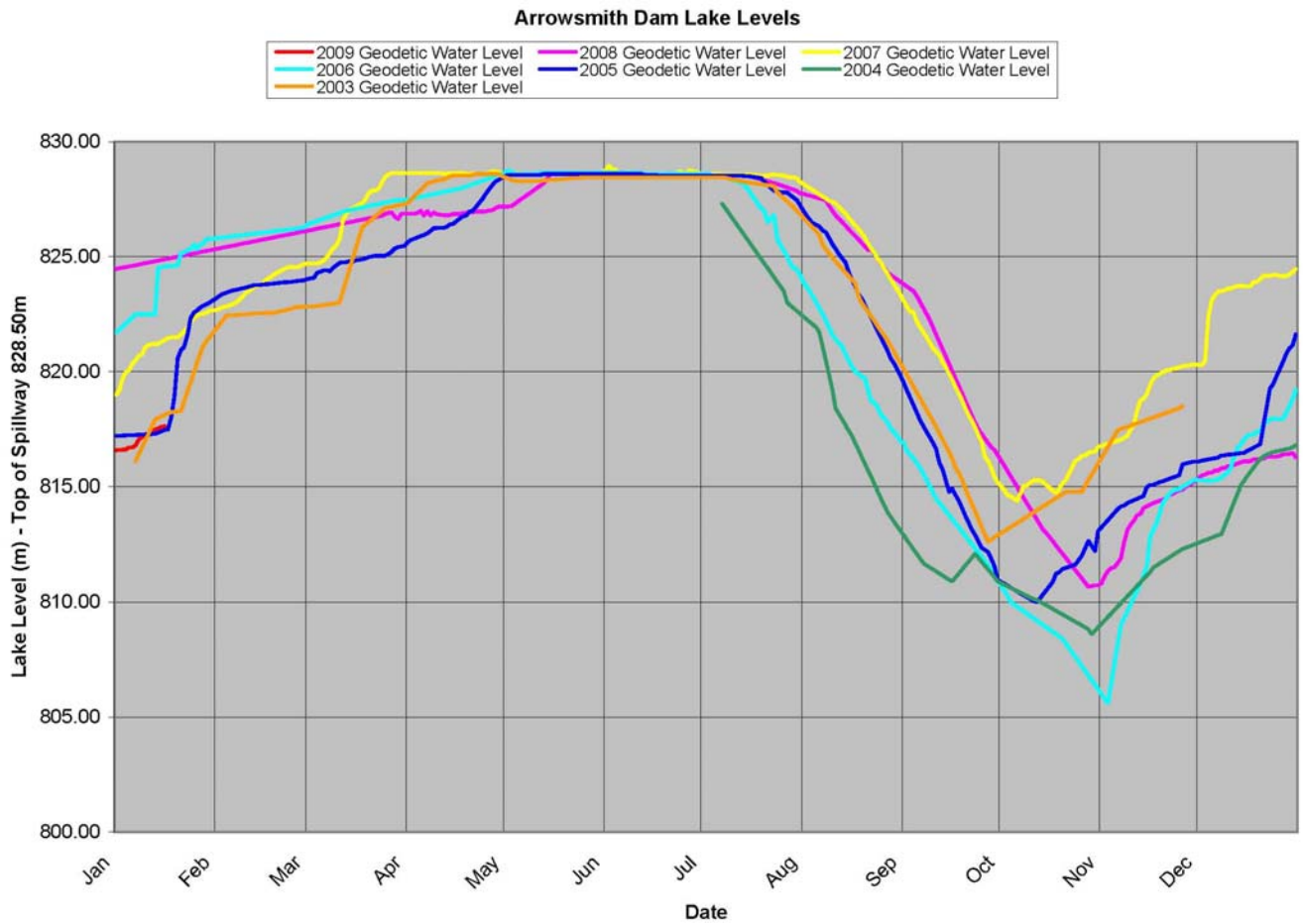
Double Detector Check Valve

# Well Locations Map





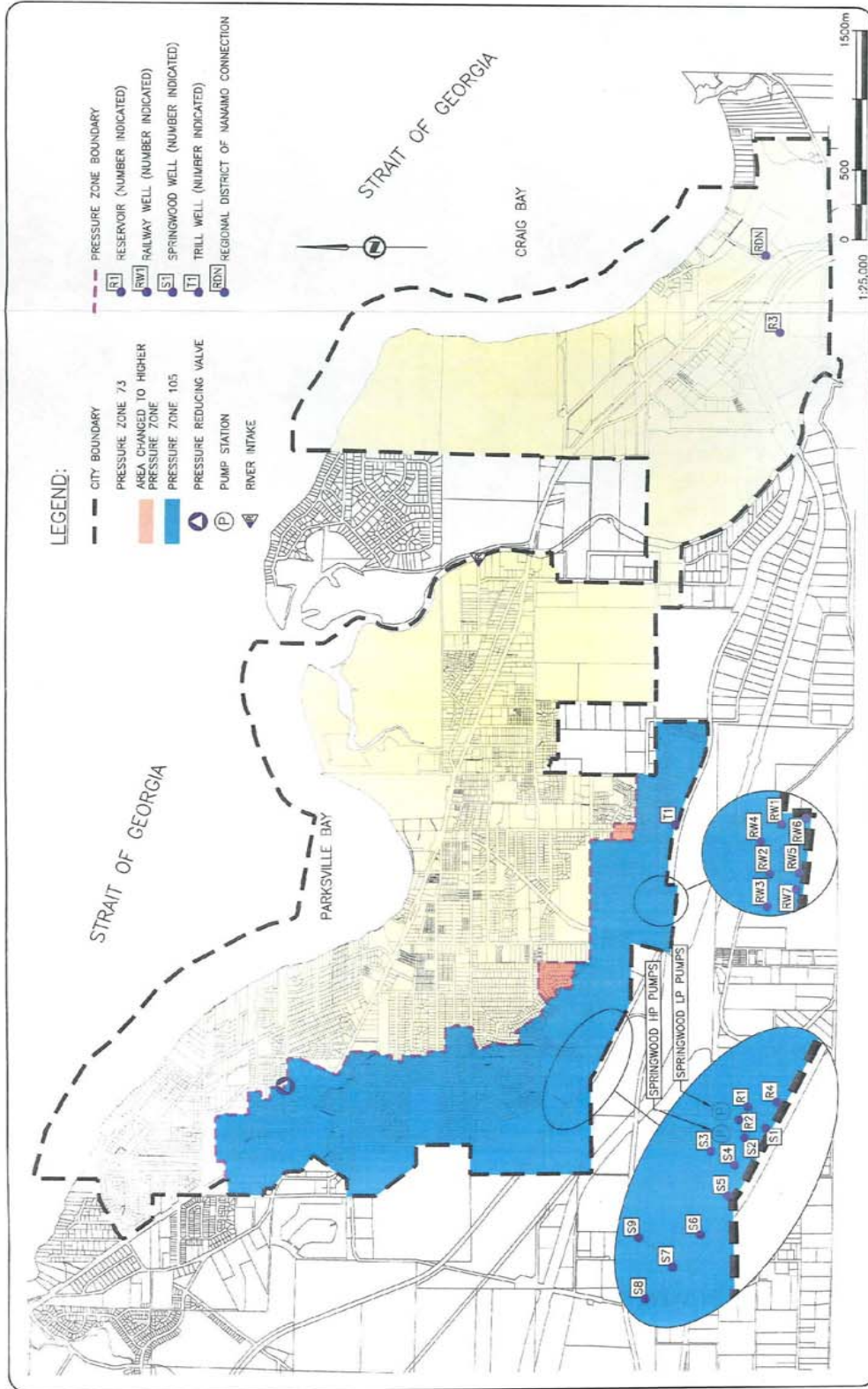
## Arrowsmith Dam Lake Levels 2003 - 2009



Prepared By: M. Squire



# Map of Pressure Zone Boundaries



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

CLIENT	CITY OF PARKSVILLE
PROJECT	WATER STUDY UPDATE

**KOERS & ASSOCIATES  
ENGINEERING LTD.**  
*Consulting Engineers*

## 2008 Bacteriological Results

### Sampling Site

Date Collected      Total Coliform      E. Coli      Fecal Coliform

401 S. Moilliet Street, Parksville BC, Despard & Moilliet, Dist. site, Monthly

15-Jan-2008	L1	L1	
19-Feb-2008	L1	L1	
04-Mar-2008	L1	L1	
22-Apr-2008	L1	L1	
27-May-2008	L1	L1	
17-Jun-2008	L1	L1	
15-Jul-2008	L1	L1	
19-Aug-2008	L1	L1	
09-Sep-2008	L1	L1	
07-Oct-2008	1	L1	*
15-Oct-2008	L1	L1	
25-Nov-2008	L1	L1	
09-Dec-2008	L1	L1	
Total Positive:	1	0	

Harbour Homes, Parksville BC, Top of Corfield, Parksville , Dist. site, Monthly

22-Jan-2008	L1	L1	
05-Feb-2008	L1	L1	
25-Mar-2008	L1	L1	
01-Apr-2008	L1	L1	
27-May-2008	L1	L1	
24-Jun-2008	1	L1	
09-Jul-2008	L1	L1	
12-Aug-2008	L1	L1	
16-Sep-2008	L1	L1	
07-Oct-2008	L1	L1	
18-Nov-2008	L1	L1	
09-Dec-2008	L1	L1	
Total Positive:	1	0	

1247 Arbutus Road, Parksville BC, Parksville MHP/Utility Building, Parksville,  
Dist. site, Monthly

15-Jan-2008	L1	L1	
05-Feb-2008	L1	L1	
04-Mar-2008	L1	L1	
01-Apr-2008	L1	L1	
13-May-2008	L1	L1	
03-Jun-2008	L1	L1	
15-Jul-2008	L1	L1	
26-Aug-2008	L1	L1	
09-Sep-2008	L1	L1	
21-Oct-2008	L1	L1	
12-Nov-2008	L1	L1	
09-Dec-2008	L1	L1	
Total Positive:	0	0	

## 2008 Bacteriological Results

Craig Bay Heritage Museum,  
Parksville BC, Craig Bay Heritage Museum, Parksville, Dist. site, Monthly

22-Jan-2008	L1	L1
12-Feb-2008	L1	L1
11-Mar-2008	L1	L1
22-Apr-2008	L1	L1
27-May-2008	L1	L1
10-Jun-2008	L1	L1
22-Jul-2008	L1	L1
19-Aug-2008	L1	L1
23-Sep-2008	L1	L1
28-Oct-2008	L1	L1
18-Nov-2008	L1	L1
16-Dec-2008	L1	L1
Total Positive:	0	0

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

15-Jan-2008	L1	L1
26-Feb-2008	L1	L1
18-Mar-2008	L1	L1
15-Apr-2008	L1	L1
27-May-2008	L1	L1
10-Jun-2008	L1	L1
29-Jul-2008	L1	L1
26-Aug-2008	L1	L1
23-Sep-2008	L1	L1
21-Oct-2008	L1	L1
04-Nov-2008	L1	L1
03-Dec-2008	L1	L1
Total Positive:	0	0

1116 Herring Gull Way, Parksville BC, Works Yard, Parksville, Dist. site, Monthly

08-Jan-2008	L1	L1
26-Feb-2008	L1	L1
25-Mar-2008	L1	L1
08-Apr-2008	L1	L1
06-May-2008	L1	L1
17-Jun-2008	L1	L1
02-Jul-2008	L1	L1
05-Aug-2008	L1	L1
02-Sep-2008	L1	L1
07-Oct-2008	L1	L1
04-Nov-2008	L1	L1
03-Dec-2008	L1	L1
Total Positive:	0	0

## 2008 Bacteriological Results

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

22-Jan-2008	L1	L1
05-Feb-2008	L1	L1
11-Mar-2008	L1	L1
08-Apr-2008	L1	L1
13-May-2008	C	
17-Jun-2008	L1	L1
15-Jul-2008	L1	L1
12-Aug-2008	L1	L1
02-Sep-2008	L1	L1
21-Oct-2008	L1	L1
04-Nov-2008	L1	L1
03-Dec-2008	L1	L1
Total Positive:	0	0

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

22-Jan-2008	L1	L1
05-Feb-2008	L1	L1
04-Mar-2008	L1	L1
08-Apr-2008	L1	L1
06-May-2008	L1	L1
03-Jun-2008	L1	L1
02-Jul-2008	L1	L1
05-Aug-2008	L1	L1
30-Sep-2008	L1	L1
28-Oct-2008	L1	L1
12-Nov-2008	L1	L1
16-Dec-2008	L1	L1
Total Positive:	0	0

Daffodil at Camas, Parksville BC, Daffodil at Camas, Parksville, Dist. site,  
Monthly

29-Jan-2008	L1	L1
12-Feb-2008	L1	L1
18-Mar-2008	L1	L1
01-Apr-2008	L1	L1
13-May-2008	L1	L1
03-Jun-2008	L1	L1
02-Jul-2008	L1	L1
05-Aug-2008	L1	L1
02-Sep-2008	L1	L1
14-Oct-2008	L1	L1
12-Nov-2008	L1	L1
03-Dec-2008	L1	L1
Total Positive:	0	0

## 2008 Bacteriological Results

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

15-Jan-2008	L1	L1
26-Feb-2008	L1	L1
25-Mar-2008	L1	L1
29-Apr-2008	L1	L1
06-May-2008	L1	L1
10-Jun-2008	L1	L1
29-Jul-2008	L1	L1
26-Aug-2008	L1	L1
23-Sep-2008	L1	L1
28-Oct-2008	L1	L1
25-Nov-2008	L1	L1
16-Dec-2008	L1	L1
Total Positive:	0	0

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

29-Jan-2008	L1	L1
12-Feb-2008	L1	L1
18-Mar-2008	L1	L1
08-Apr-2008	L1	L1
20-May-2008	L1	L1
17-Jun-2008	L1	L1
02-Jul-2008	L1	L1
05-Aug-2008	L1	L1
01-Sep-2008	L1	L1
09-Sep-2008	L1	L1
07-Oct-2008	EST 1	L1 *
14-Oct-2008	L1	L1
12-Nov-2008	L1	L1
16-Dec-2008	L1	L1
Total Positive:	1	0

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

08-Jan-2008	L1	L1
26-Feb-2008	L1	L1
11-Mar-2008	L1	L1
29-Apr-2008	L1	L1
13-May-2008	L1	L1
03-Jun-2008	L1	L1
22-Jul-2008	L1	L1
19-Aug-2008	L1	L1
02-Sep-2008	L1	L1
21-Oct-2008	L1	L1
04-Nov-2008	L1	L1
03-Dec-2008	L1	L1
Total Positive:	0	0

## 2008 Bacteriological Results

Englishman River Pump Station, Dist. site, Monthly		Intake, River
29-Jan-2008	14.6	1.0
19-Feb-2008	L1	L1
18-Mar-2008	L1	L1
15-Apr-2008	L1	L1
20-May-2008	L1	L1
24-Jun-2008	L1	L1
29-Jul-2008	L1	L1
12-Aug-2008	L1	L1
16-Sep-2008	L1	L1
14-Oct-2008	L1	L1
16-Dec-2008	L1	L1
Total Positive:	1	1

### 450 Wisteria, across from 450 Wisteria, Dist. site, Monthly

08-Jan-2008	L1	L1
19-Feb-2008	L1	L1
04-Mar-2008	L1	L1
15-Apr-2008	L1	L1
06-May-2008	L1	L1
10-Jun-2008	L1	L1
22-Jul-2008	L1	L1
26-Aug-2008	L1	L1
30-Sep-2008	L1	L1
28-Oct-2008	L1	L1
18-Nov-2008	L1	L1
09-Dec-2008	L1	L1
Total Positive:	0	0

### 136 Memorial, Dist. site, Monthly

08-Jan-2008	L1	L1
12-Feb-2008	L1	L1
11-Mar-2008	L1	L1
01-Apr-2008	L1	L1
20-May-2008	L1	L1
24-Jun-2008	L1	L1
09-Jul-2008	L1	L1
19-Aug-2008	L1	L1
16-Sep-2008	L1	L1
14-Oct-2008	L1	L1
18-Nov-2008	L1	L1
09-Dec-2008	L1	L1
Total Positive:	0	0

## 2008 Bacteriological Results

Island Highway,		by Temple,
Island Highway, by Temple, Dist. site, Monthly		
24-Jun-2008	L1	L1
09-Jul-2008	C	
26-Aug-2008	21	L1
30-Sep-2008	L1	L1
14-Oct-2008	L1	L1
25-Nov-2008	L1	L1
16-Dec-2008	L1	L1
Total Positive:	1	0

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

Samples that contain total coliform:	2.65%	of total
Samples that contain e. coli:	1	0.53% 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:	189	

Comments:

FOR FURTHER INFORMATION PLEASE CALL: Wrathall, Bill (250) 248-2044  
Parksville

Operator

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

(250) 248-5412

**\* resampled and sent to provincial lab**

## Full Spectrum Analysis

REPORTED TO: City of Parksville



REPORT DATE: October 29, 2008

GROUP NUMBER: 91021119

### Potability (Aesthetic Criteria) in Water

CLIENT SAMPLE IDENTIFICATION:	River Station	Springwood P/S	Well #5	Aesthetic Objective	UNITS
DATE SAMPLED:	Oct 20/08	Oct 20/08	Oct 20/08		
CANTEST ID:	810210599	810210627	810210636		
<b>Conventional Parameters</b>					
Dissolved Chloride Cl	7.98	23.3	30.6	250	mg/L
Dissolved Sulphate SO4	1.28	5.59	3.95	500	mg/L
<b>Conventional Parameters-Victoria Laboratory-</b>					
pH, Laboratory	6.9	7.7	7.5	6.5 - 8.5	pH units
True Color	8	< 5	10	15	CU
Turbidity	0.2	< 0.1	1.2	-	NTU
Total Dissolved Solids	48	158	205	500	mg/L
Alkalinity Total 4.5	22.1	113	127	-	mg/L
<b>Total Metals Analysis</b>					
Copper Cu	0.006	0.005	< 0.001	1.0	mg/L
Iron Fe	< 0.05	< 0.05	0.13	0.3	mg/L
Manganese Mn	0.001	0.007	0.068 X	0.05	mg/L
Sodium Na	3.17	7.09	8.75	200	mg/L
Zinc Zn	< 0.005	0.006	0.009	5	mg/L

mg/L = milligrams per liter

CU = color units

NTU = nephelometric turbidity units

< = Less than detection limit

X = Result is outside the Aesthetic Objective



## Full Spectrum Analysis

REPORTED TO: City of Parksville



REPORT DATE: October 29, 2008

GROUP NUMBER: 91021119

**Potability (Health Criteria at Point of Use) in Water**

CLIENT SAMPLE IDENTIFICATION:	River Station	Springwood P/S	Well #5	Reservoir #2		Max. Acceptable Concentration	UNITS
DATE SAMPLED:	Oct 20/08	Oct 20/08	Oct 20/08	Oct 20/08			
CANTEST ID:	810210599	810210627	810210636	810210653			
<b>Conventional Parameters</b>							
Hardness (Total)	CaCO3	24	127	144	-	-	mg/L
Dissolved Fluoride	F	< 0.05	0.05	< 0.05	-	1.5	mg/L
Dissolved Sulphate	SO4	1.28	5.59	3.95	-	-	mg/L
Ammonia Nitrogen	N	0.02	0.05	< 0.01	-	-	mg/L
<b>Conventional Parameters-Victoria Laboratory-</b>							
Conductivity		75.0	317	352	-	-	µS/cm
Nitrate and Nitrite	N	0.08	1.05	1.05	-	10	mg/L
Nitrate by UV	NO3	0.08	1.05	1.05	-	10.0	mg/L
Nitrite	N	< 0.002	< 0.002	< 0.002	-	1.0	mg/L
<b>Total Metals Analysis</b>							
Aluminum	Al	0.027	0.074	0.015	-	-	mg/L
Antimony	Sb	< 0.001	< 0.001	< 0.001	-	0.006	mg/L
Arsenic	As	< 0.001	< 0.001	< 0.001	-	0.010	mg/L
Barium	Ba	0.005	0.011	0.013	-	1.0	mg/L
Boron	B	< 0.05	< 0.05	< 0.05	-	5	mg/L
Cadmium	Cd	< 0.0002	< 0.0002	< 0.0002	-	0.005	mg/L
Calcium	Ca	8.21	29.5	34	-	-	mg/L
Calcium	Ca	7.51	28.8	32.9	-	-	mg/L
Chromium	Cr	< 0.001	< 0.001	< 0.001	-	0.05	mg/L
Lead	Pb	< 0.001	< 0.001	< 0.001	-	0.01	mg/L
Magnesium	Mg	0.94	12.8	14.4	-	-	mg/L
Mercury	Hg	< 0.02	0.02	< 0.02	-	1	µg/L
Potassium	K	0.1	0.7	0.9	-	-	mg/L
Selenium	Se	< 0.001	< 0.001	< 0.001	-	0.01	mg/L
Silver	Ag	< 0.00025	< 0.00025	< 0.00025	-	-	mg/L
Uranium	U	< 0.0005	< 0.0005	< 0.0005	-	0.02	mg/L
<b>Microbiological Analysis-Victoria Laboratory-</b>							
Non-Coliform Bacteria		< 1	< 1	26	-	-	Col./100 mL
Total Coliform		< 1	< 1	< 1	-	not detected	MPN/100mL
E. coli		< 1	< 1	< 1	-	not detected	MPN/100mL
<b>Trihalomethanes</b>							

(Continued on next page)

REPORTED TO: City of Parksville



REPORT DATE: October 29, 2008

GROUP NUMBER: 91021119

Potability (Health Criteria at Point of Use) in Water

CLIENT SAMPLE IDENTIFICATION:	River Station	Springwood P/S	Well #5	Reservoir #2		
DATE SAMPLED:	Oct 20/08	Oct 20/08	Oct 20/08	Oct 20/08		
CANTEST ID:	810210599	810210627	810210636	810210653	Max. Acceptable Concentration	UNITS
Bromodichloromethane	-	-	-	< 0.1	16	µg/L
Total Trihalomethanes	-	-	-	< 0.1	100	µg/L

mg/L = milligrams per liter  
 µg/L = micrograms per liter  
 MPN/100mL = Most Probable Number / 100 mL  
 < = Less than detection limit

µS/cm = microsiemens per centimeter  
 Col./100 mL = Colonies per 100 mL

REPORTED TO: City of Parksville



REPORT DATE: October 29, 2008

GROUP NUMBER: 91021119

Trihalomethanes in Water

CLIENT SAMPLE IDENTIFICATION:	SAMPLE DATE	CANTEST ID	Bromoform	Chloroform	Dibromochloromethane
Reservoir #2	Oct 20/08	810210653	<	<	<
DETECTION LIMIT UNITS			0.2 µg/L	0.3 µg/L	0.1 µg/L

µg/L = micrograms per liter  
 < = Less than detection limit

## Full Spectrum Analysis

REPORTED TO: City of Parksville



REPORT DATE: October 29, 2008

GROUP NUMBER: 91021119

### Metals Analysis in Water

CLIENT SAMPLE IDENTIFICATION:	River Station	Springwood P/S	Well #5		
SAMPLE PREPARATION:	TOTAL	TOTAL	TOTAL		
DATE SAMPLED:	Oct 20/08	Oct 20/08	Oct 20/08		
CANTEST ID:	810210599	810210627	810210636	DETECTION LIMIT	
Beryllium	Be	<	<	<	0.001
Bismuth	Bi	<	<	<	0.001
Cobalt	Co	<	<	<	0.001
Lithium	Li	0.002	<	0.001	0.001
Molybdenum	Mo	<	<	<	0.0005
Nickel	Ni	<	<	<	0.001
Phosphorus	P	<	<	<	0.15
Silicon	Si	2.2	12.3	12.9	0.25
Strontium	Sr	0.035	0.084	0.12	0.001
Tellurium	Te	<	<	<	0.001
Thallium	Tl	<	<	<	0.0001
Thorium	Th	<	<	<	0.0005
Tin	Sn	<	<	<	0.001
Titanium	Ti	<	<	<	0.001
Vanadium	V	<	0.004	0.002	0.001
Zirconium	Zr	<	<	<	0.01

Results expressed as milligrams per liter (mg/L)  
 < = Less than detection limit

REPORTED TO: City of Parksville



REPORT DATE: October 29, 2008

GROUP NUMBER: 91021119

### Trihalomethanes in Water

CLIENT SAMPLE IDENTIFICATION:	SAMPLE DATE	CANTEST ID	Bromoform	Chloroform	Dibromochloromethane
Reservoir #2	Oct 20/08	810210653	<	<	<
DETECTION LIMIT UNITS			0.2 µg/L	0.3 µg/L	0.1 µg/L

µg/L = micrograms per liter  
 < = Less than detection limit

## Full Spectrum Analysis

REPORTED TO: City of Parksville



REPORT DATE: October 29, 2008

GROUP NUMBER: 91021119

### Trihalomethanes in Water

CLIENT SAMPLE IDENTIFICATION:	CANTEST ID	1,2-Dichloroethane -d4	Toluene-d8	Bromofluorobenzene
DETECTION LIMIT UNITS		0.001 % Recovery	0.0005 % Recovery	0.001 % Recovery

REPORTED TO: City of Parksville



REPORT DATE: October 29, 2008

GROUP NUMBER: 91021119

### Conventional Parameters-Victoria Laboratory- in Water

CLIENT SAMPLE IDENTIFICATION:	SAMPLE DATE	CANTEST ID	Tannin and Lignin
River Station	Oct 20/08	810210599	0.14
Springwood P/S	Oct 20/08	810210627	<
Well #5	Oct 20/08	810210636	<
DETECTION LIMIT UNITS			0.1 mg/L

mg/L = milligrams per liter  
 < = Less than detection limit

## Full Spectrum Analysis

REPORTED TO: City of Parksville



REPORT DATE: October 29, 2008

GROUP NUMBER: 91021119

### Microbiological Analysis-Victoria Laboratory- in Water

CLIENT SAMPLE IDENTIFICATION:	SAMPLE DATE	CANTEST ID	Heterotrophic Plate Count
River Station	Oct 20/08	810210599	2
Springwood P/S	Oct 20/08	810210627	1
Well #5	Oct 20/08	810210636	40
DETECTION LIMIT UNITS			1 Col./1 mL

Col./1 mL = Colonies per 1 mL

REPORTED TO: City of Parksville



REPORT DATE: October 29, 2008

GROUP NUMBER: 91021119

### Langelier Saturation Index in Water

CLIENT SAMPLE IDENTIFICATION:	SAMPLE DATE	CANTEST ID	Saturation Index at 4.4C	Saturation Index at 60C
River Station	Oct 20/08	810210599	-2.75	-1.71
Springwood P/S	Oct 20/08	810210627	-0.71	0.34
Well #5	Oct 20/08	810210636	-0.81	0.23
DETECTION LIMIT UNITS			- SI 4.4C	- SI 60C

SI 4.4C = Saturation Index at 4.4C

SI 60C = Saturation Index at 60C

# Full Spectrum Analysis

## Analysis Report



CANTEST LTD.

Professional Analytical Services

4606 Canada Way  
Burnaby, B.C.  
V5G 1K5

FAX: 604 731 2386

TEL: 604 734 7276

1 800 665 8566

REPORT ON: Analysis of Water Samples  
 REPORTED TO: City of Parksville  
 Engineering and Operations Dpt  
 PO Box 1390  
 Parksville, BC  
 V9P 2H3  
 Att'n: Scott Churko

CHAIN OF CUSTODY: VI8040  
 P.O. NUMBER: 005442

NUMBER OF SAMPLES: 4 REPORT DATE: October 29, 2008  
 DATE SUBMITTED: October 21, 2008 GROUP NUMBER: 91021119  
 SAMPLE TYPE: Drinking Water

NOTE: Results contained in this report refer only to the testing of samples as submitted. Other information is available on request.

**Aesthetic Objective Summary:**

Aesthetic Objectives as set by "Guidelines for Canadian Drinking Water Quality Summary Table" -March 2007. Aesthetic objectives apply to certain substances or characteristics of drinking water that can affect its acceptance by consumers or interfere with practices for supplying good quality water. For certain parameters, both aesthetic objectives and health-related guidelines have been derived. Where only aesthetic objectives are specified, these values are below those considered to constitute a health hazard

CLIENT SAMPLE ID	STATUS
River Station	Acceptable
Springwood P/S	Acceptable
Well #5	Unacceptable

**Max. Acceptable Concentration Summary:**

Maximum Acceptable Concentrations (MAC) for both chemical and microbiological parameters are put forth in the "Guidelines for Canadian Drinking Water Quality Summary Table" - March 2007. For the parameters tested, results are generally categorized by health concerns. Some parameters have no limit value denoted because: a) currently available data indicates no health risk, b) the compound is not permitted in Canada, or c) it refers to a family of compounds.

CLIENT SAMPLE ID	HEALTH	HARDNESS
River Station	Acceptable	Soft

(Continued)

CANTEST LTD.



## Full Spectrum Analysis

REPORTED TO: City of Parksville



REPORT DATE: October 29, 2008

GROUP NUMBER: 91021119

### Max. Acceptable Concentration SUMMARY: (Continued)

CLIENT SAMPLE ID	HEALTH	HARDNESS
Springwood P/S	Acceptable	Moderate
Well #5	Acceptable	Moderate
Reservoir #2	Acceptable	Not tested

### TEST METHODS:

**Anions in Water by Ion Chromatography** - was determined based on Method 4110 in Standard Methods (21st Edition) and EPA Method 300.0 (Revision 2.1).

**Ammonia in Water** - was performed using Flow Injection Analysis where the aqueous sample is injected into a carrier stream, which merges a sodium hydroxide stream. Gaseous ammonia is formed, which diffuses through a gas permeable membrane into an indicator stream. This indicator stream is comprised of a mixture of acid-base indicators, which will react with the ammonia gas; resulting in a colour shift which is measured photometrically @ 590 nm.

**Total Kjeldahl Nitrogen in Water** - was determined based on Method 4500-N in Standard Methods (21st Edition) and Method X325 in the BC Laboratory Manual (2005).

**Total Organic Carbon in Water** - was determined based on Method 5310 A and B in Standard Methods (21st Edition) and Method X314 in the BC Laboratory Manual (2005).

**Conventional Parameters** - analyses were performed using procedures based on those described in the most current editions of "British Columbia Environmental Laboratory Manual for the Analysis of Water, Wastewater, Sediment and Biological Materials", (2005 edition) Province of British Columbia and "Standard Methods for the Examination of Water and Wastewater" (21st Edition), published by the American Public Health Association.

**Conventional Parameters - Victoria Laboratory (1104 - 4464 Markham Street, Victoria, BC V8Z 7X8):** - Analyses performed at Cantest's Victoria facility follow procedures based on those described in the most current editions of "British Columbia Environmental Laboratory Manual" (2005) and/or "Standard Methods for the Examination of Water and Wastewater" (21st Edition).

**Langelier Saturation Index** - analysis was performed based on Standard Methods for the Examination of Water and Wastewater (21st Edition).

**Mercury in Water** - analysis was performed using procedures based on U. S. EPA Method 245.7, oxidative digestion using bromination, and analysis using Cold Vapour Atomic Fluorescence Spectroscopy.

(Continued)

## Full Spectrum Analysis

REPORTED TO: City of Parksville

REPORT DATE: October 29, 2008

GROUP NUMBER: 91021119



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**Metals in Water** - analysis was performed using Inductively Coupled Plasma Optical Emission Spectroscopy (ICP), Inductively Coupled Plasma-Mass Spectroscopy (ICP/MS).

**Microbiological Parameters** - analyses were performed using procedures based on those described in "B. C. Environmental Laboratory Manual For the Analysis of Water, Wastewater, Sediment and Biological Materials" (2005 Edition), "Standard Methods for the Examination of Water and Wastewater", 21st Edition (2005) and Colilert Quanti-tray Standard Operating Procedure. Results are reported as Most Probable Number (MPN) per unit volume. <1 MF is equivalent to "Absent". Analysis was performed at CANTEST Ltd - Victoria Laboratory (1104 - 4464 Markham Street, Victoria, BC V8Z-7X8).

**Microbiological Parameters** - analyses were performed using procedures based on those described in "B. C. Environmental Laboratory Manual For the Analysis of Water, Wastewater, Sediment and Biological Materials" (2005 Edition) and "Standard Methods for the Examination of Water and Wastewater", 21st Edition. Analysis was performed at CANTEST Ltd. Victoria Laboratory (1104 - 4464 Markham Street, Victoria, BC, V8Z 7X8).

**Volatile Organic Compounds in Water and Soil** - analysis was performed using procedures based on U.S. EPA Methods 624/8240/8260, involving sparging with a Purge and Trap apparatus and analysis using GC/MS.

### COMMENTS:

Determination of THM was performed on a sample submitted with headspace. Possible vaporization of the analyte into the headspace may mean that the sample as analyzed does not reflect the sample at the time of collection. Determination of Heterotrophic Plate Count was initiated slightly past the recommended holding time. Possible resulting changes may mean that the sample as analyzed does not reflect the sample at the time of collection.  
kdd - Oct. 23, 08

### TEST RESULTS:

(See following pages)