

DISTRICT OF MAPLE RIDGE Whonnock Well WATER QUALITY REPORT 2009



*Deep Roots
Greater Heights*



WHONNOCK WELL WATER QUALITY REPORT 2009

Table of Contents

1	EXECUTIVE SUMMARY.....	1
2	INTRODUCTION	2
3	BACKGROUND.....	3
3.1	OUTLINE	3
3.2	FACILITY MAINTENANCE.....	3
3.3	WHONNOCK WELL WATER SYSTEM EMERGENCY RESPONSE PROTOCOL.....	4
3.4	CORRECTIVE MEASURES AND MAINTENANCE.....	5
3.5	WATER QUALITY SAMPLING AND MONITORING	5
4	EMERGENCY RESPONSE.....	9
4.1	NOTIFICATION REQUIREMENTS	9
4.2	ECOLI POSITIVE SAMPLES – RESPONSE PROCEDURE	9
5	DRINKING WATER QUALITY MONITORING RESULTS	10
6	CONCLUSION.....	10

APPENDIX A – HPC VS TEMPERATURE GRAPH

APPENDIX B – HPC VS TEMPERATURE & TURBIDITY GRAPH

APPENDIX C – WEEKLY SAMPLE GVRD LAB RESULTS

APPENDIX D – ANNUAL MATERIAL ANALYSIS

APPENDIX E – ANALYTICAL REPORTS (ARSENIC)

Prepared by:
Victor Negoita

Reviewed by:
Andrew Wood, PhD, PEng.

Reviewed by:
Russ Carmichael, ASCT, Eng.L

Approved by:
Frank Quinn, MBA, PEng

District of Maple Ridge
March 2010

1 EXECUTIVE SUMMARY

The District of Maple Ridge provides well water at the Whonnock well site, under permit by the Fraser Health Authority (FHA). It contains a storage tank, two filters, two backflow preventers and a UV disinfection unit along with a push button dispenser for the user. Whonnock well is a 36m deep well which provides water for citizens living in the 272 Street area. It was drilled in 1981 which means the well is near the end of its useful life. Even though the well is used only by the residents in Whonnock area, the maintenance of the well is paid for by all of the taxpayers. The District is assessing all the options available following the anticipated closing of the well.



2 INTRODUCTION

This document is the Municipality's report on the Whonnock Well, located on 10919-272 Street. Information was collaborated with the Operations Department in the making of this report. This report is prepared for public information.

Contents of the report include an outline of the regulatory framework, and water quality monitoring data and results for the year 2009.



3 BACKGROUND

3.1 OUTLINE

Whonnock Well is a low-volume water well located at 10919-272 Street. The existing connection size is 32mm diameter, male pipe thread. An ultraviolet disinfection unit preceded by two filters has been added in August of 2001 as part of water quality improvements work. The maximum discharge is 40 liters per minute (9 gallons/min).



3.2 FACILITY MAINTENANCE

Whonnock Well is maintained by the Public Works Division's Operations Department of the District of Maple Ridge. Their duties involve sampling and routine maintenance of the equipment within the Whonnock Well structure. The maintenance costs are not recovered from Whonnock residents.

3.3 WHONNOCK WELL WATER SYSTEM EMERGENCY RESPONSE PROTOCOL

These procedures were revised in February 2008 and approved by FHA.

- Routine water sampling

Water samples are taken every Tuesday morning by the Municipal Water Works Department. A courier delivers these samples the same day, to the Metro Vancouver laboratory. The laboratory reports the analysis results via e-mail by Monday of the following week. The e-mail is sent to the following municipal personnel and the Fraser Health Authority:

- Andrew Wood – Municipal Engineer – 604 467-7339
- Barbara Croucher – Engineering Projects Clerk – 604 467-7339
- Russ Carmichael – Director of Engineering Operations – 604 463-9581
- Ed Mitchell – Water Works Superintendent – 604 463-9581
- Sandy Blakeway – Water Foreman – 604 463 – 9581
- Bruce Gailling – Electro-Mechanical – 604-463-9581
- Rob Dyer – Facilities Maintenance – 604-466-4342
- Victor Negoita – Electro - Mechanical Manager – 604 463-9581
- Andrew McAusland – Facilities Maintenance Coordinator – 604 467-7476

In the event of a concern discovered upon analysis, the Metro Vancouver laboratory will e-mail those listed above. Public Works will contact first the personnel in Electro-Mechanical Department that is available to respond, or any of the above personnel.

The well will be shut down immediately, Fraser Health Authority will be notified and a notice will be posted advising the users about alternate sources of water.

All after-hours, in weekends or statutory holidays calls will be made to the Public Works Stand-by personnel via Surrey Dispatch.

The expected triggers for this Emergency Response Protocol are listed below:

- Unsatisfactory bacterial results.
- A resident's report of bad smell, colour or taste.
- Environmental hazards or spills around the well.
- Motor Vehicle Accident causing damages to the building or installations.
- Vandalism to the building or installations.
- Pump failure.
- Breach of security.

3.4 CORRECTIVE MEASURES AND MAINTENANCE

The facility is inspected weekly and the filters are changed when they have been in use for three months or if the discharge flow drops to 30 liters a minute.

The ultraviolet lamp used in the disinfection unit is replaced annually.

When dealing with a possible problem with the water quality of the Whonnock Well, the following steps are followed by staff:

1. Turn off the system and post outside one of the notifications (well shut down due to a bad sample or due to maintenance)
2. Inspect the integrity of the system (ensuring that nothing was tampered with or changed).
3. Check the operation of the ultra-violet disinfection, filtration, hoses, or any other mechanical components.
4. Once the defective condition has been located and resolved or repaired, the Public Works Water Department will collect three separate samples on the following Monday, Tuesday and Wednesday to be sent to the Metro Vancouver Lab for analysis. If all three analyses return within acceptable limits, Fraser Health Authority will be notified and, with their agreement, the system can be reactivated and the warning signs removed.
5. If any of the lab results continue to read as unacceptable, and no remedial measures are effective, the Fraser Health Authority must be informed.
6. When an isolated report outside of routine water testing occurs (i.e. residents report bad smell, colour, taste or high turbidity), the above protocol will be immediately activated. Public Works Water Department will collect a sample to be sent to the Metro Vancouver Water Department lab for analysis.
7. No action required in case of power failure: there is no water dispensed when the power is out.

3.5 WATER QUALITY SAMPLING AND MONITORING

The Municipality and Metro Vancouver monitor water quality in a cooperative manner. Water quality is monitored on a weekly basis at the Whonnock well to determine the water quality in its system. Monitoring frequencies have been unchanged since 2002.

Samples are taken weekly by the Municipality's Operations Department staff and sent to the Metro Vancouver for analysis. The Metro Vancouver lab sends the results to the Municipality and the FHA by e-mail (these results are fully tabulated for 2009 in Appendix C).

In addition, an annual water chemical analysis is performed. For this annual analysis, the Municipality uses a laboratory that can provide the necessary accuracy in determining the arsenic level. This was necessary after the changes in 2006 in Health Canada’s arsenic guidelines and to demonstrate compliance. The test results are attached in Appendix D.

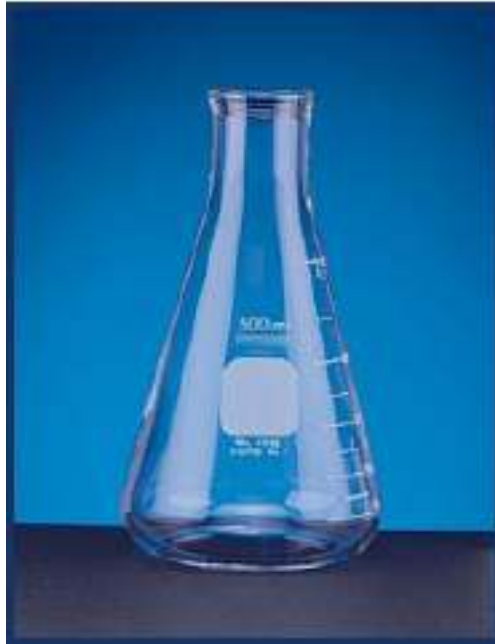
It is important to note that this water quality monitoring program provides a representative picture of drinking water quality in the well system to the tap. However, it does not provide a definite picture of drinking water quality once the user has obtained the water from the well.

Bacteriological Monitoring

Weekly samples are analyzed for ecoli, total coliform and heterotrophic plate count (HPC) as shown in Appendix C.

Table 1. BC Drinking Water Protection Regulation Microbiological Standards (Extracted from Appendix A)

Parameter	Occurrence	Standard
Ecoli	1 sample	Less than 1 fecal coliform per 100mL
Total Coliform	a) 1 sample in a 30 day period	0 total coliform per 100mL
	b) more than 1 sample in a 30 day period.	At least 90% of samples have 0 total coliform per 100mL and no sample has more than 10 total coliform per 100mL



Chemical And Physical Monitoring

A table of the Municipality’s chemical and physical monitoring schedule is noted in Table 2. The report from Bodycote Testing Group Lab can be viewed in Appendix D.

Table 2. Chemical/Physical Monitoring in Municipal Distribution Systems

Parameter	Frequency
Temperature	Weekly
Copper	Annually
Iron	Annually
Lead	Annually
Odour	On Complaint Basis
PH	Annually
Taste	On Complaint Basis
Trihalomethanes	Annually
Turbidity	Weekly, collected with bacteriological samples
Zinc	Annually
Ecoli	Weekly
Aluminum	Annually
Arsenic	Annually
Barium	Annually
Boron	Annually

Parameter	Frequency
Cadmium	Annually
Calcium	Annually
Chromium	Annually
Cobalt	Annually
Magnesium	Annually
Manganese	Annually
Sodium	Annually

4 EMERGENCY RESPONSE

4.1 NOTIFICATION REQUIREMENTS

The various agencies would be notified in the situations shown in Table 3

Table 3. Notification for Unusual Situations Affecting Water Potability

Situation	Notifying Agency	Agency Notified	Time Frame For Notification
Municipal Ecoli Positive Sample	Laboratory ³	Public Health ⁴ Municipality	Immediate ²
Chemical Contamination- Municipality	Municipality	Public Health	Immediate
Turbidity >5 NTU. Municipality (ies) 1	GVRD	GVRD MHO	Immediate
Disinfection Failure- Source Water (Primary Disinfection)	GVRD	GVRD MHO Municipality ⁵	Immediate

1. Affected Municipality(ies) to notify local public health contact.
2. See Section 4.2
3. Metro Vancouver for samples being processed by Metro Vancouver laboratory.
4. BCDWPR requires the laboratory to notify public health.
5. With no suspected contamination.
6. With suspected contamination.

4.2 ECOLI POSITIVE SAMPLES – RESPONSE PROCEDURE

If a sample analyzed by the Metro Vancouver Lab tests positive for ecoli, the Well would be shut down immediately and will remain out of service until the problem is rectified.

5 DRINKING WATER QUALITY MONITORING RESULTS

No samples tested positive for total coliform bacteria in 2009, the same as in previous years. This in sum total represents 0% of the samples. There were no samples testing positive for ecoli and no samples containing more than 10 total coliform per 100mL. Therefore the microbiological standards were met for 2009.

Heterotrophic plate counts are also recorded in weekly samples. Although there is no standard for maximum CFU per mls, the US standard is 500 CFU/mls. HPC is a procedure for estimating the number of live heterotrophic bacteria in water and measuring changes during water treatment and distribution. A passage about what HPC counts keep track of is shown below (Heterotrophic Plate Counts and Drinking-water Safety, WHO, 2003):

“Heterotrophs are broadly defined as microorganisms that require organic carbon for growth. They include bacteria, yeasts and moulds. A variety of simple culture-based tests that are intended to recover a wide range of microorganisms from water are collectively referred to as “heterotrophic plate count” or “HPC test” procedures. Accordingly, the terms “heterotroph” and “HPC” are not synonymous. There is no universal “HPC measurement.” Although standardized methods have been formalized, HPC test methods involve a wide variety of test conditions that lead to a wide range of quantitative and qualitative results.

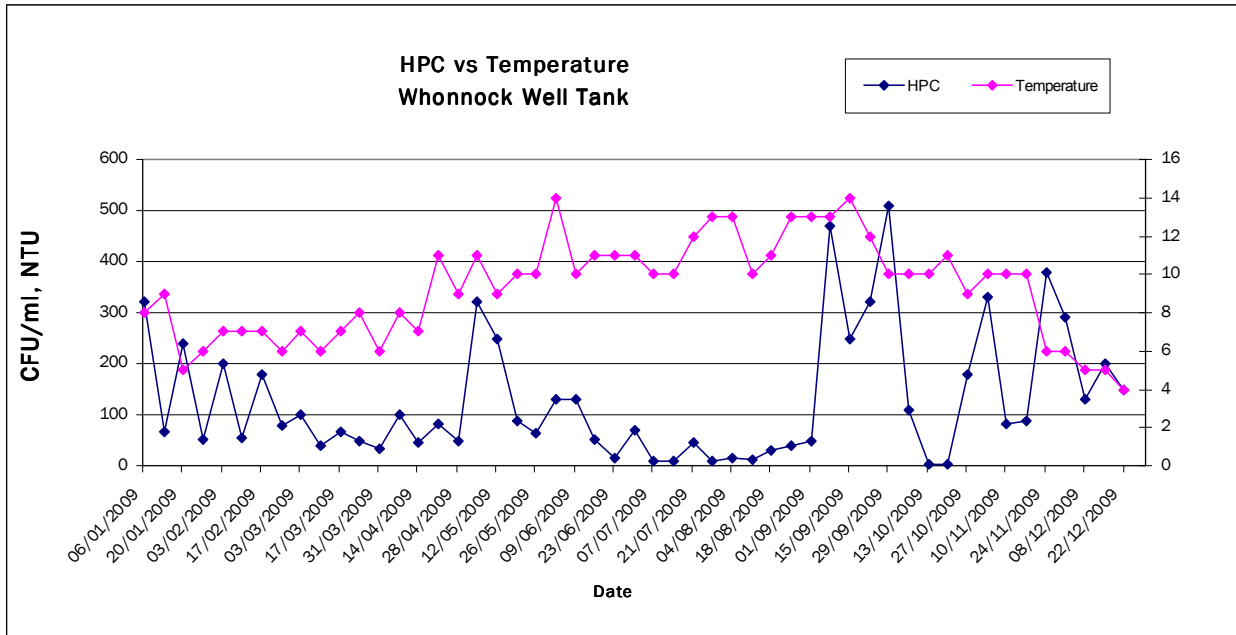
Temperatures employed range from around 20 °C to 40 °C, incubation times from a few hours to seven days or a few weeks, and nutrient conditions from low to high. The test itself does not specify the organisms that are detected. Only a small proportion of the metabolically active microorganisms present in a water sample may grow and be detected under any given set of HPC test conditions, and the population recovered will differ significantly according to the method used. The actual organisms recovered in HPC testing can also vary widely between locations, between seasons and between consecutive samples at a single location. Microorganisms recovered through HPC tests generally include those that are part of the natural (typically non-hazardous) microbiota of water; in some instances, they may also include organisms derived from diverse pollutant sources.”

In 2009, 1 test out of 52 tests had readings above 500 HPC [CFU/mls]. The average count was 16 HPC [CFU/mls] for that site. A sign has been posted that advises users to run the water for 15 seconds before filling up, in order to remove stagnant water within the pipe.

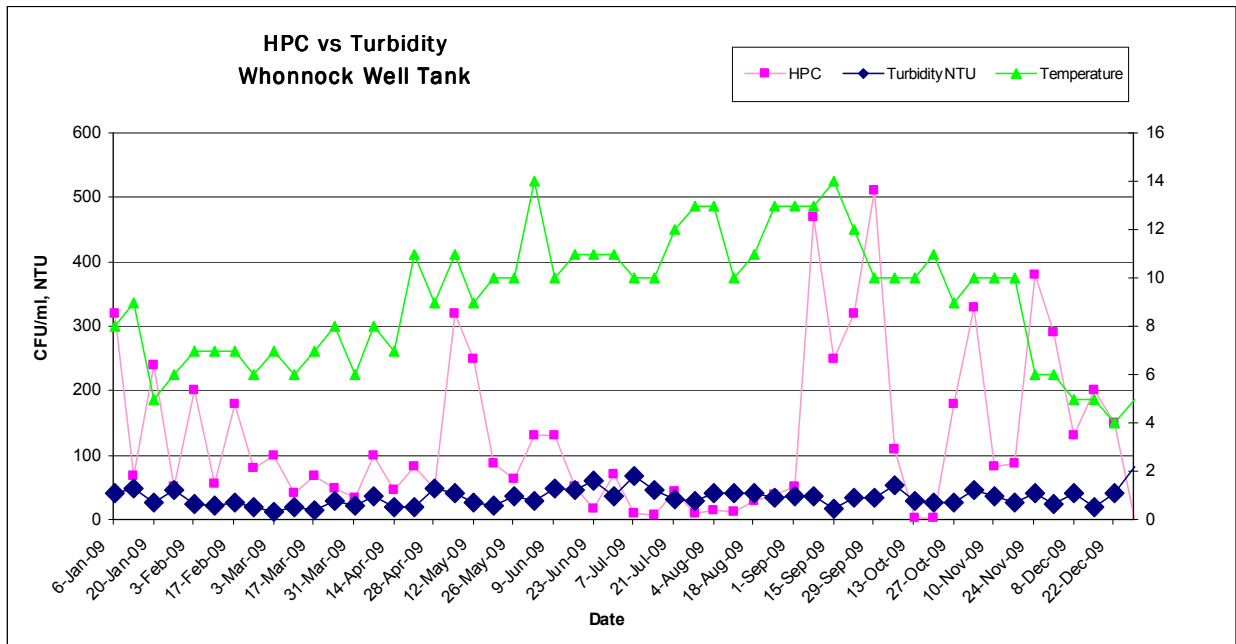
6 CONCLUSION

This report provides an outline of the water quality of the Whonnock well, as well as the initiatives and program being performed by the District of Maple Ridge.

APPENDIX A – HPC VS TEMPERATURE GRAPH



APPENDIX B – HPC VS TEMPERATURE & TURBIDITY GRAPH



APPENDIX C – WEEKLY SAMPLE METRO VANCOUVER LAB RESULTS

Whonnock Community Well on 272 Street	Date collected	Fcoli MF/100mLs	(Max 500) HPC CFU/mLs	TEMP °C	Tcoli MF/100mLs	Turbidity NTU
MPR-WP1	06-Jan-09	<1	320	8.0	<1	1.1
MPR-WP1	13-Jan-09	<1	68	9.0	<1	1.3
MPR-WP1	20-Jan-09	<1	240	5.0	<1	0.68
MPR-WP1	27-Jan-09	<1	52	6.0	<1	1.2
MPR-WP1	03-Feb-09	<1	200	7.0	<1	0.64
MPR-WP1	10-Feb-09	<1	56	7.0	<1	0.55
MPR-WP1	17-Feb-09	<1	180	7	<1	0.7
MPR-WP1	24-Feb-09	<1	80	6.0	<1	0.50
MPR-WP1	03-Mar-09	<1	100	7	<1	0.31
MPR-WP1	10-Mar-09	<1	40	6.0	<1	0.54
MPR-WP1	17-Mar-09	<1	68	7	<1	0.41
MPR-WP1	24-Mar-09	<1	48	8.0	<1	0.75
MPR-WP1	31-Mar-09	<1	34	6.0	<1	0.55
MPR-WP1	07-Apr-09	<1	100	8.0	<1	1.0
MPR-WP1	14-Apr-09	<1	46	7.0	<1	0.54
MPR-WP1	21-Apr-09	<1	82	11	<1	0.49
MPR-WP1	28-Apr-09	<1	48	9.0	<1	1.3
MPR-WP1	05-May-09	<1	320	11	<1	1.1
MPR-WP1	12-May-09	<1	250	9.0	<1	0.70
MPR-WP1	19-May-09	<1	88	10	<1	0.56
MPR-WP1	26-May-09	<1	64	10	<1	0.99
MPR-WP1	02-Jun-09	<1	130	14	<1	0.75
MPR-WP1	09-Jun-09	<1	130	10	<1	1.3
MPR-WP1	16-Jun-09	<1	52	11	<1	1.2
MPR-WP1	23-Jun-09	<1	16	11	<1	1.6
MPR-WP1	30-Jun-09	<1	70	11	<1	0.96
MPR-WP1	07-Jul-09	<1	10	10	<1	1.8
MPR-WP1	14-Jul-09	<1	8	10	<1	1.2
MPR-WP1	21-Jul-09	<1	44	12	<1	0.87
MPR-WP1	28-Jul-09	<1	10	13	<1	0.76
MPR-WP1	04-Aug-09	<1	14	13	<1	1.1
MPR-WP1	11-Aug-09	<1	12	10	<1	1.1
MPR-WP1	18-Aug-09	<1	30	11	<1	1.1
MPR-WP1	25-Aug-09	<1	38	13	<1	0.89
MPR-WP1	01-Sep-09	<1	50	13	<1	1
MPR-WP1	08-Sep-09	<1	470	13	<1	0.95
MPR-WP1	15-Sep-09	<1	250	14	<1	0.47
MPR-WP1	22-Sep-09	<1	320	12	<1	0.9
MPR-WP1	29-Sep-09	<1	510	10	<1	0.88
MPR-WP1	06-Oct-09	<1	110	10	<1	1.4
MPR-WP1	13-Oct-09	<1	<2	10	<1	0.79
MPR-WP1	20-Oct-09	<1	2	11	<1	0.69

Whonnock Well Water Quality Report 2009

Whonnock Community Well on 272 Street	Date collected	Fcoli MF/100mLs	(Max 500) HPC CFU/mLs	TEMP °C	Tcoli MF/100mLs	Turbidity NTU
MPR-WP1	27-Oct-09	<1	180	9.0	<1	0.73
MPR-WP1	03-Nov-09	<1	330	10	<1	1.2
MPR-WP1	10-Nov-09	<1	82	10	<1	1.0
MPR-WP1	17-Nov-09	<1	88	10	<1	0.73
MPR-WP1	24-Nov-09	<1	380	6.0	<1	1.1
MPR-WP1	01-Dec-09	<1	290	6.0	<1	0.63
MPR-WP1	08-Dec-09	<1	130	5	<1	1.1
MPR-WP1	15-Dec-09	<1	200	5.0	<1	0.53
MPR-WP1	22-Dec-09	<1	150	4.0	<1	1.1
MPR-WP1	29-Dec-09	<1	NA	5.0	<1	2.2

Note: Metro Vancouver laboratory did not provide HPC counts over the Christmas holidays

APPENDIX D – ANNUAL MATERIAL ANALYSIS



Analytical Report

Bill To: District of Maple Ridge	Project:	Lot ID: 669315
Report To: District of Maple Ridge	ID:	Control Number:
11995 Haney Place	Name: Whonnock Community Well	Date Received: Feb 19, 2009
Maple Ridge, BC, Canada	Location:	Date Reported: Feb 23, 2009
V2X 6A9	LSD:	Report Number: 1194034
Attn: Victor Negoita	P.O.:	
Sampled By:	Acct code:	
Company:		

Analyte	Units	Result	Nominal Detection Limit	Guideline Limit	Guideline Comments
Reference Number 669315-1					
Sample Date February 19, 2009					
Sample Time NA					
Sample Location					
Sample Description Whonnock Community Well / Outside Pipe					
Sample Matrix Drinking Water					
Metals Extractable					
Aluminum	Extractable mg/L	<0.02	0.02	0.1	Acceptable
Antimony	Extractable mg/L	<0.0002	0.0002	0.006	Pass
Arsenic	Extractable mg/L	0.0004	0.0002	0.01	Pass
Barium	Extractable mg/L	0.003	0.001	1	Pass
Boron	Extractable mg/L	0.010	0.005	5	Pass
Cadmium	Extractable mg/L	<0.00007	0.00007	0.005	Pass
Chromium	Extractable mg/L	<0.0005	0.0005	0.05	Pass
Cobalt	Extractable mg/L	<0.00002	0.00002		n/a
Copper	Extractable mg/L	<0.001	0.001	1	Acceptable
Iron	Extractable mg/L	0.10	0.01	0.3	Acceptable
Lead	Extractable mg/L	<0.0001	0.0001	0.01	Pass
Manganese	Extractable mg/L	0.0626	0.0001	0.05	Above Aesthetic
Selenium	Extractable mg/L	<0.0006	0.0006	0.01	Pass
Silver	Extractable mg/L	<0.0001	0.0001		n/a
Uranium	Extractable mg/L	<0.0005	0.0005	0.02	Pass
Vanadium	Extractable mg/L	0.00019	0.00003		n/a
Zinc	Extractable mg/L	0.039	0.001	5	Acceptable
Physical and Aggregate Properties					
Colour	Apparent, Potable Colour units	5	5	15	Acceptable
Turbidity	NTU	0.3	0.1	5	Acceptable
Routine Water					
pH	@ 25 °C	7.45		6.5 - 8.5	Acceptable
Calcium	Extractable mg/L	13.8	0.05		n/a
Magnesium	Extractable mg/L	2.74	0.05		n/a
Phosphorus	Extractable mg/L	0.14	0.01		n/a
Potassium	Extractable mg/L	1.1	0.1		n/a
Silicon	Extractable mg/L	8.73	0.05		n/a
Sodium	Extractable mg/L	6.1	0.1	200	Acceptable
T-Alkalinity	as CaCO3 mg/L	57	5		n/a
Chloride	Dissolved mg/L	1.30	0.02	250	Acceptable
Fluoride	Dissolved mg/L	0.08	0.01	1.5	Pass
Nitrate - N	Dissolved mg/L	0.08	0.01	10	Pass
Nitrite - N	Dissolved mg/L	<0.01	0.01	1	Pass
Sulfate (SO4)	Dissolved mg/L	<0.05	0.05	500	Acceptable
Hardness	as CaCO3 mg/L	46	1		Soft
Total Dissolved Solids	Extractable mg/L	83	1	500	Acceptable



Analytical Report

Bill To: District of Maple Ridge	Project:	Lot ID: 669315
Report To: District of Maple Ridge	ID:	Control Number:
11995 Haney Place	Name: Whonnock Community Well	Date Received: Feb 19, 2009
Maple Ridge, BC, Canada	Location:	Date Reported: Feb 23, 2009
V2X 6A9	LSD:	Report Number: 1194034
Attn: Victor Negoita	P.O.:	
Sampled By:	Acct code:	
Company:		

Approved by:

Andrew Garrard, BSc
Operations Manager



Methodology and Notes

Bill To: District of Maple Ridge	Project:	Lot ID: 669315
Report To: District of Maple Ridge	ID:	Control Number:
11995 Haney Place	Name: Whonnock Community Well	Date Received: Feb 19, 2009
Maple Ridge, BC, Canada	Location:	Date Reported: Feb 23, 2009
V2X 6A9	LSD:	Report Number: 1194034
Attn: Victor Negoita	P.O.:	
Sampled By:	Acct code:	
Company:		

Method of Analysis

Method Name	Reference	Method	Date Analysis Started	Location
Alk, pH, EC, Turb in water	APHA	* Electrometric Method, 4500-H+ B	19-Feb-09	BTG Surrey
Alk, pH, EC, Turb in water	APHA	* Nephelometric Method, 2130 B	19-Feb-09	BTG Surrey
Alk, pH, EC, Turb in water	APHA	* Titration Method, 2320 B	19-Feb-09	BTG Surrey
Anions by IEC in water (Surrey)	APHA	* Ion Chromatography with Chemical Suppression of Eluent Cond., 4110 B	19-Feb-09	BTG Surrey
Colour (Apparent) in water	APHA	* Visual Comparison Method, 2120 B	20-Feb-09	BTG Surrey
Metals SemiTrace (Extractable) in water	US EPA	* Metals & Trace Elements by ICP-AES, 6010B	19-Feb-09	BTG Surrey
Trace Metals (extractable) in Water	US EPA	* Determination of Trace Elements in Waters and Wastes by ICP-MS, 200.8	19-Feb-09	BTG Surrey

* Bodycote method(s) based on reference method

References

Guideline	Guidelines for Canadian Drinking Water Quality, 6th Edition, May 16, 2006
APHA	Standard Methods for the Examination of Water and Wastewater
US EPA	US Environmental Protection Agency Test Methods

Comments:

Please direct any inquiries regarding this report to our Client Services group.

Results relate only to samples as submitted.

The test report shall not be reproduced except in full, without the written approval of the laboratory.