The Municipality of the Village of Lions Bay

DRINKING WATER QUALITY

ANNUAL REPORT

2011

Works Department

CONTENTS

GENERAL DESCRIPTION

The Village of Lions Bay supplies potable water to approximately 1500 residents with 500 service connections. Water is sourced from two local creeks, treated with chlorine and then distributed via eight storage tanks and thirteen kilometres of water mains to the residents. This report provides an overview of the water quality at the Village of Lions Bay during 2011.

SOURCE WATER

The community's watershed lands include Magnesia Creek drainage (421 hectares), Alberta Creek drainage (51 hectares), Harvey Creek drainage (635 hectares), and Rundle Creek drainage (20 hectares). Water is normally drawn from the intakes on Harvey Creek and Magnesia Creek. Two additional water intakes exist, one at lower Magnesia Creek, and one at Alberta Creek; however, these intakes are considered as 'reserve intakes' and were not used during 2011.

Challenges

The Village draws its water from surface sources that are subject to fluctuating turbidity levels. This fluctuation in raw water turbidity, presents a challenge to ensure that distributed water turbidity and residual chlorine levels, are not adversely affected. Water intakes are typically checked every second or third day, and several times a day when the weather dictates. Water Treatment Plants with Ultra Violet (UV) and Chlorine Disinfection are checked once daily from Monday to Friday.

Test Results

The Village tests untreated source water for turbidity once daily from Monday to Friday, and performs more extensive testing two times a year for general water chemistry, hardness, metals and contaminants including organic compounds. The results for source water during 2011 are presented and discussed below.

Turbidity Raw Water

	RAW WATER 2011	
	Harvey Creek	**Magnesia Creek**
Count	248	249
Maximum Result (NTU)	3.37	2.28
Minimum Result (NTU)	0.10	0.14
Average (NTU)	0.48	0.50
Number of samples < 1 NTU	232	230
Number of samples > 1 NTU but < 5 NTU	16	19
Number of samples > 5 NTU	0	0
Percentage of samples < 1 NTU	93.55	92.37
Percentage of samples > 1 NTU but < 5 NTU	6.45	7.63
Percentage of samples > 5 NTU	0.00	0.00

The Canadian Drinking Water Guidelines and the US Environmental Protection Agency, state that the turbidity of an unfiltered raw water supply should generally be around 1 NTU, and should not exceed 5 NTU. As can be seen from the above summary table, raw water turbidity during 2011 was generally acceptable, with an average of 0.48 NTU for Harvey and 0.50 NTU for Magnesia.

Metals and General Chemistry
See results in appendix "C"

WATER TREATMENT

Treatment
Currently, no filtration is applied to the water in Lions Bay. Disinfection using an Ultra Violet (UV) system and Chlorine are the only treatment applied. The Village maintain one Water Treatment Plant for Harvey creek and another Water Treatment Plant for Magnesia creek. Turbidity and residual chlorine tests are performed at these locations and downstream of the treated water tanks. There are also two standby water treatment stations, one liquid hypochlorite injector at Brunswick Beach and another one at Alberta Creek; however, these facilities were not operated during 2011.

Challenges
In times of severe weather, the Village water system operators increase the frequency of testing and adjustment of the injector rates in order to compensate for any fluctuating chlorine demand caused by varying turbidity levels. Residual chlorine levels in treated water exiting the storage tanks are tested sometimes two to four times per day to ensure that sufficient chlorine residuals levels are maintained during raw water turbidity variations.

Test Results
The Village tests treated water exiting the storage tanks for turbidity and residual chlorine daily from Monday to Friday. These results are presented and discussed below.

Turbidity Treated Water

	TREATED WATER 2011	
	HARVEY	MAGNESIA
Count	249	249
Maximum Result (NTU)	4.04	2.10
Minimum Result (NTU)	0.11	0.14
Average (NTU)	0.71	0.57
Number of samples < 1 NTU	201	218
Number of samples > 1 NTU but < 5 NTU	48	31
Number of samples > 5 NTU	0	0
Percentage of samples < 1 NTU	80.72	87.55
Percentage of samples > 1 NTU but < 5 NTU	19.28	12.45
Percentage of samples > 5 NTU	0.00	0.00

The Canadian Drinking Water Guidelines and the US Environmental Protection Agency state that the turbidity of an unfiltered treated water supply should generally be around 1 NTU, and should not exceed 5 NTU. As can be seen from the above summary table, treated water turbidity during 2011 was generally acceptable for unfiltered treated water, with an average of 0.71 NTU for Harvey and 0.57 NTU for Magnesia.

Chlorine Residual

	TREATED WATER 2011	
	HARVEY	MAGNESIA
Count	249	249
Maximum Result (ppm)	1.21	1.28
Minimum Result (ppm)	0.22	0.49
Average (ppm)	0.84	0.88
No. of Samples Outside Limits	0	0
% Samples Outside Limits	0.00	0.00

The generally agreed Minimum Acceptable Residual Chlorine level in treated drinking water is 0.2 ppm, as recommended by Vancouver Coastal Health. The generally agreed Maximum Acceptable Residual Chlorine level in treated drinking water is 4.0 ppm as recommended by the US Environmental Protection Agency.

As shown in the above analysis, no sample for Harvey and Magnesia had Chlorine residual less than 0.2 ppm. This indicates that 100.00% of samples in Harvey and 100.00% of samples in Magnesia had acceptable levels of residual chlorine during 2011 (greater than 0.2 ppm but less than 4 ppm).

When less than 0.2 ppm chlorine residual is noted in the Distribution System, some hydrants in the system are flushed until a minimum chlorine residual of 0.2 ppm or more is obtained.

WATER DISTRIBUTION SYSTEM

Storage

Approximately 486,000 imperial gallons (IG) of water are consumed per day for the whole system. There are currently 8 water storage tanks throughout the system. These include: Harvey (400,000 IG), Ocean view (100,000 IG, out of service during 2011), Magnesia (100,000 IG), Upper Bayview Phase 4 (20,000 IG), Upper Bayview Phase 5 (25,000 IG), Highway (21,000 IG), South Sunset (40,000 IG, out of service during 2011), and Brunswick Beach (35,000 IG, out of service during 2011).

Distribution

The Village of lions Bay's location on the side of a mountain requires that water pressures be controlled by thirteen (13) PRV stations, for Harvey: one (1) at the Plant and six (6) in the Distribution System, and for Magnesia: one (1) at the Plant and five (5) in the Distribution System.

Approximately 13 kilometres of water mains of a variety of ages and constructed from a variety of materials including asbestos cement, ductile iron, cast iron, and PVC make up the Village's distribution system.

Test Results

Samples are taken daily from Monday to Friday from five sampling sites in the middle and end of the distribution system and tested for turbidity and residual chlorine. On Mondays, samples from these sites are sent to the laboratory to be tested for Total and Fecal Coliforms, and E. Coli.

In addition, metals levels and general chemistry are tested two times a year at up to eleven locations in the distribution system. The results of these samples are presented in appendix "C".

Harvey Turbidity

	W.D.S. HARVEY 2011		
	PRV-3	**CAFE**	**KELVIN G.**
Count	249	249	249
Maximum Result (NTU)	2.05	1.56	3.72
Minimum Result (NTU)	0.12	0.11	0.11
Average (NTU)	0.49	0.30	0.29
Number of samples < 1 NTU	226	248	246
Number of samples > 1 NTU but < 5 NTU	23	1	3
Number of samples > 5 NTU	0	0	0
Percentage of samples < 1 NTU	99.76	99.60	98.80
Percentage of samples > 1 NTU but < 5 NTU	9.24	0.40	1.20
Percentage of samples > 5 NTU	0.00	0.00	0.00

The Canadian Drinking Water Guidelines and the US Environmental Protection Agency, state that the turbidity of an unfiltered treated water supply should generally be around 1 NTU, and should not exceed 5 NTU. As can be seen from the above summary table, treated water turbidity from Harvey during 2011 was generally acceptable for unfiltered treated water, with an average of 0.49 NTU for PRV-3, 0.30 NTU for Café, and 0.29 NTU for Kelvin Grove.

Magnesia Turbidity

	W.D.S. MAGNESIA 2011	
	PRV-5	B. B.
Count	249	249
Maximum Result (NTU)	2.23	3.35
Minimum Result (NTU)	0.14	0.14
Average (NTU)	0.47	0.38
Number of samples < 1 NTU	234	241
Number of samples > 1 NTU but < 5 NTU	15	8
Number of samples > 5 NTU	0	0
Percentage of samples < 1 NTU	93.98	96.79
Percentage of samples > 1 NTU but < 5 NTU	6.02	3.21
Percentage of samples > 5 NTU	0.00	0.00

The Canadian Drinking Water Guidelines and the US Environmental Protection Agency, state that the turbidity of an unfiltered treated water supply should generally be around 1 NTU, and should not exceed 5 NTU. As can be seen from the above summary table, treated water turbidity from Magnesia during 2011 was generally acceptable for unfiltered treated water, with an average of 0.47 NTU for PRV-5 and 0.38 for Brunswick Beach.

Harvey Chlorine Residual

	TREATED WATER 2011		
	PRV-3	CAFE	KELVIN G.
Count	249	249	249
Maximum Result (ppm)	1.19	0.97	0.97
Minimum Result (ppm)	0.36	0.20	0.20
Average (ppm)	0.82	0.58	0.55
No. of Samples Outside Limits	0	0	0
% Samples Outside Limits	0.00	0.00	0.00

The generally agreed Minimum Acceptable Residual Chlorine level in treated drinking water is 0.2 ppm, as recommended by Vancouver Coastal Health. The generally agreed Maximum Acceptable Residual Chlorine level in treated drinking water is 4.0 ppm as recommended by the US Environmental Protection Agency.

As can be seen from the above summary table, treated water Chlorine residual from Harvey during 2011 was generally acceptable, with an average of 0.82 ppm for PRV-3, 0.58 ppm for the Café, and 0.55 ppm for Kelvin Grove.

Magnesia Chlorine Residual

	TREATED WATER 2010	
	PRV-5	B. B.
Count	249	249
Maximum Result (ppm)	1.33	0.91
Minimum Result (ppm)	0.34	0.20
Average (ppm)	0.86	0.50
No. of Samples Outside Limits	0	0
% Samples Outside Limits	0.00	0.00

The generally agreed Minimum Acceptable Residual Chlorine level in treated drinking water is 0.2 ppm, as recommended by Vancouver Coastal Health. The generally agreed Maximum Acceptable Residual Chlorine level in treated drinking water is 4.0 ppm as recommended by the US Environmental Protection Agency.

As can be seen from the above summary table, treated water Chlorine residual from Magnesia during 2011 was generally acceptable, with an average of 0.86 ppm for PRV-5, and 0.50 ppm for Brunswick Beach.

Fecal and Total Coliforms

	PRV-3	STORE/CAFE	KELVIN G.	PRV-5	BRUNSWICK B
Count	51	51	51	51	51
Max Result (mg/l)	N	N	N	N	N
Min Result (mg/l)	N	N	N	N	N
Average (mg/l)	N	N	N	N	N
No. Outside Limits	0	0	0	1	0
% Outside Limits	0%	0%	0%	1.96%	0%

In the Total and Fecal Coliform tests, the result is either Positive (P) or Negative (N), where a Positive result is not acceptable as it indicates the presence of coliforms. There was one Positive result in PRV-5 during 2011 (see information below).

The BC Water Protection Regulation establishes the following Water Quality Standards:

- Fecal Coliforms: <1cfu/100ml
- E. Coli: <1cfu/100ml
- Total Coliforms for 1 sample in 30 days: <1cfu/100ml
- Total Coliforms for more than 1 sample in 30 days: 90% of samples must be <1cfu/100ml and no sample >10cfu/100ml

"Immediate Reporting Standard": If the fecal Coliform or E. Coli parameter fails to meet the water quality standard results must be immediately reported to:

- The Manager of Public Works
- The Drinking Water Officer
- The Medical Health Officer

The Canadian Drinking Water Quality Guidelines establishes

- Maximum Acceptable Concentration (MAC) for Coliforms = 0 cfu/100ml
- A single sample may contain up to 10 cfu/100ml Total Coliforms, but no samples should contain Fecal Coliform

Note: 1cfu/100ml = 1 MPN/100ml

On September 26, 2011 the Village received from The ALS Laboratories a positive result with Total Coliform = 5 MPN/100ml for the PRV-5 sample station, and according to the Canadian Drinking Water Quality Guidelines, this result was within the acceptable limits. On September 28, 2011 another sample from the PRV-5 sample station was sent to the ALS laboratory and the result was Negative.

Metals and General Chemistry
See results in Appendix "C"

UPGRADING WORK IN 2011
Works performed in Lions Bay Avenue, Seaview Place, and Cloudview Place:

- Replace Water Main with Ductile Iron Pipe
- Install new Isolation Valves
- Install new Fire Hydrants
- Install new Service Connections.

Events during the Upgrading work
When a section of watermain was installed at the end of Lions Bay Avenue, it became apparent that the water supplied in this area had a strange smell and taste. Some residents started complaining about it.

After sampling, it was determined that the pipe under the Harvey bridge in Lions Bay Avenue was causing the problem. After relining the 6" watermain with a 4" HDPE pipe the water quality returned to normal.

UPGRADING WORK PLANNED FOR 2012

- Sections of Pipe and valves located above the UV Plant on Harvey creek road to be replaced due to earth displacement.

OPERATOR TRAINING

The Village's Water Treatment/Distribution System has been evaluated as Water System "Class II" by the Environmental Operators Certification Program (EOCP). The Operator for the Village's Water System is Alberto Urrutia, and he has completed the following courses:

Description	Year
Municipal Confined Space Entry	2011
Water Distribution II	2011
Truck Mounted Manlift	2010
Water Distribution I	2010
Trojan UV Swift Reactors	2010
Instrumentation 1	2008
Electrical Principles Level 1	2007
Hydrant Maintenance and Testing	2007
Water Sources	2007
Water Treatment 2	2006
Confined Space Workshop	2005
Water Treatment I	2005
Chlorine Handling	2005
Utility Management	2004
Water Treatment Plant Operation II	2004
Water Treatment Plant Operation I	2004
Water Distribution System Operation and Maintenance	2004
Small Water System Operation and Maintenance	2004
Small Water Systems	2003
Waterworks Technology.	2002

EOCP Certificates obtained by Alberto Urrutia:

Description	Year
Water Distribution Level 2	2006
Chlorine Handler	2005
Water Distribution Level 1	2005
Water Distribution Operator-In-Training.	2004

The Municipality of the Village of Lions Bay

DRINKING WATER QUALITY

ANNUAL REPORT

2011

Appendix A

Water Quality Sampling

LIST OF SAMPLING SITE LOCATIONS

Location	Source	Tests	Frequency
PRV-3	Harvey Creek	CL2 Residual and Turbidity	Daily Monday-Friday
400,000 Gal Harvey Tank	Harvey Creek	CL2 Residual and Turbidity	Daily Monday-Friday
General Store/Cafe	Harvey Creek	CL2 Residual and Turbidity	Daily Monday-Friday
Kelvin Grove	Harvey Creek	CL2 Residual and Turbidity	Daily Monday-Friday
PRV-5	Magnesia Creek	CL2 Residual and Turbidity	Daily Monday-Friday
100,000 Gal Magnesia Tank	Magnesia Creek	CL2 Residual and Turbidity	Daily Monday-Friday
Brunswick Beach	Magnesia Creek	CL2 Residual and Turbidity	Daily Monday-Friday
Harvey Intake	Harvey Creek	Raw Water Turbidity	Daily Monday-Friday
Magnesia Intake	Magnesia Creek	Raw Water Turbidity	Daily Monday-Friday
PRV-3	Harvey Creek	Total/Fecal Coliform, E Coli	Every Monday
400,000 Gal Harvey Tank	Harvey Creek	Total/Fecal Coliform, E Coli	Every Monday
Harvey UV Reactor	Harvey Creek	Total/Fecal Coliform, E Coli	Once a Month
General Store/Cafe	Harvey Creek	Total/Fecal Coliform, E Coli	Every Monday
Kelvin Grove	Harvey Creek	Total/Fecal Coliform, E Coli	Every Monday
PRV-5	Magnesia Creek	Total/Fecal Coliform, E Coli	Every Monday
100,000 Gal Magnesia Tank	Magnesia Creek	Total/Fecal Coliform, E Coli	Every Monday
Magnesia UV Reactor	Magnesia Creek	Total/Fecal Coliform, E Coli	Once a Month
Brunswick Beach	Magnesia Creek	Total/Fecal Coliform, E Coli	Every Monday
Harvey Intake	Harvey Creek	Total/Fecal Coliform, E Coli	Every Monday
Magnesia Intake	Magnesia Creek	Total/Fecal Coliform, E Coli	Every Monday
PRV-3	At Tap	Metals, THM's, Organics	Twice a year
400,000 Gal Harvey Tank	At Tap	Metals, THM's, Organics	Twice a year
General Store/Cafe	At Tap	Metals, THM's, Organics	Twice a year
Kelvin Grove	At Tap	Metals, THM's, Organics	Twice a year
Community Centre	At Tap	Metals, THM's, Organics	Twice a year
PRV-5	At Tap	Metals, THM's, Organics	Twice a year
100,000 Gal Magnesia Tank	At Tap	Metals, THM's, Organics	Twice a year
Brunswick Beach	At Tap	Metals, THM's, Organics	Twice a year
Elementary School	At Tap	Metals, THM's, Organics	Twice a year
Harvey Intake	Harvey Creek	Metals, Organics	Twice a year
Magnesia Intake	Magnesia Creek	Metals, Organics	Twice a year

Bacteria

Sample collection for monitoring bacteria levels (Total Coliforms, Fecal Coliforms, and E. Coli) in the Lions Bay Water Distribution System is performed every Monday at nine sites. Samples are delivered to the Vancouver Coastal Health Authority for analysis and reporting. The sampling locations are listed above and include source, mid, and end systems sites.

In addition, random samples may be taken from areas where water quality complaints have originated or where waterworks construction or maintenance activities are underway.

Bacteriological standards in water distribution systems should meet the requirements of the B.C. Safe Drinking Water Regulations, which stipulates the following criteria for sample test results:

- Fecal Coliform: 0 fecal coliform / 100ml
- Total Coliform: 10 or less total coliform / 100 ml
- Total Coliform: 90% or more of the samples for a given month must have 0 total coliform / 100 ml.

Physical Parameters

Treated Water in the Distribution System is tested for Turbidity daily from Monday to Friday, at seven sites. Raw Water is tested for Turbidity at both intakes daily from Monday to Friday. Taste, Odour, and Turbidity are monitored on a complaint basis.

The Canadian Drinking Water Guidelines (and the US Environmental Protection Agency) state that the turbidity of an unfiltered raw water supply should generally be around 1 NTU, and should not exceed 5 NTU.

Chemical Parameters

- Free Chlorine Residual: Measured at all sampling sites when bacteriological samples are collected
- Haloacetic Acids (HAA's): HAA's are disinfection by-products. HAA's are not regulated in Canada but a maximum contaminant level of 60 ppb (based on a running annual average calculated with quarterly results for different locations within the system) has recently been adopted in the USA
- Trihalomethanes (THM's): THM's are disinfection by-products sampled with HAA's. The Guidelines for Canadian Drinking Water Quality (GCDWQ) list an interim maximum acceptable concentration for THM's at 100 ppb (based on a running annual average calculated with quarterly results for different locations within the system)
- pH: Measured on samples collected for HAA's / THM's testing. The GCDWQ recommend an aesthetic objective for pH ranging between 6.5 and 8.5
- Metals: During 2001, the regional Medical Health Officers developed a strategy for sampling metals at the tap. The new requirement is to sample 10% of the sampling metals "at the tap" in a quarterly basis for lead, copper and zinc, with sample locations consisting of a mixture of private homes and public buildings, including schools.

The Municipality of the Village of Lions Bay

DRINKING WATER QUALITY

ANNUAL REPORT

2011

Appendix B

Source / Distribution Water Test Results

DATE	TREATED WATER JANUARY 2011													
	HARVEY								MAGNESIA					
	PRV-3		400 HAR. TANK		STORE/CAFÉ		KELVIN GROVE		PRV-5		100 MAG. TANK		BRUNSWICK B.	
	Turbidity (NTU)	CL2 Res. (ppm)	Turbidity (NTU)	CL2 Res. (ppm)	Turbidity (NTU)	CL2 Res. (ppm)	Turbidity (NTU)	CL2 Res. (ppm)	Turbidity (NTU)	CL2 Res. (ppm)	Turbidity (NTU)	CL2 Res. (ppm)	Turbidity (NTU)	CL2 Res. (ppm)
1														
2														
3	0.15	0.97	0.17	0.68	0.13	0.64	0.12	0.28	0.32	0.88	0.27	0.91	0.32	0.77
4	0.15	0.91	0.28	0.94	0.15	0.72	0.17	0.60	0.62	0.88	0.44	0.89	0.32	0.60
5	0.51	0.81	0.31	0.84	0.35	0.68	1.09	0.36	1.52	0.93	0.41	1.00	0.36	0.59
6	0.33	0.81	0.67	0.84	0.28	0.66	0.27	0.39	0.76	0.99	0.90	1.01	0.25	0.61
7	0.77	0.62	0.74	0.65	0.30	0.52	0.33	0.41	0.73	0.89	0.51	0.88	0.44	0.66
8														
9														
10	0.66	0.77	0.36	0.80	0.28	0.49	0.38	0.68	0.45	0.97	0.32	0.96	0.26	0.60
11	0.47	0.92	0.44	0.92	0.61	0.60	0.23	0.61	0.34	0.92	0.22	0.93	0.39	0.64
12	0.89	0.94	0.43	0.82	0.37	0.75	0.29	0.70	0.42	0.93	0.34	0.91	0.31	0.69
13	0.82	0.93	1.15	0.94	0.55	0.71	0.44	0.87	0.53	0.88	0.43	0.87	0.24	0.64
14	2.05	0.80	0.60	0.82	0.56	0.65	0.92	0.64	0.92	0.78	0.80	0.78	0.46	0.64
15														
16														
17	0.52	0.74	0.32	0.76	0.26	0.46	0.32	0.50	0.69	0.82	0.95	0.85	0.46	0.53
18	0.76	0.92	0.44	0.94	0.26	0.56	0.28	0.44	0.61	0.98	0.46	0.99	0.91	0.52
19	0.45	0.93	0.34	0.96	0.30	0.66	0.25	0.77	0.77	1.06	0.32	1.08	0.63	0.46
20	0.37	0.89	1.04	0.92	0.34	0.67	0.41	0.57	0.54	1.02	0.61	1.02	0.33	0.52
21	0.85	0.84	0.41	0.87	0.47	0.62	0.41	0.69	0.68	1.05	0.50	1.12	0.38	0.63
22														
23														
24	0.31	0.78	0.78	0.81	0.25	0.58	0.20	0.67	0.50	0.91	0.48	0.91	0.29	0.67
25	0.67	0.60	0.78	0.62	0.41	0.43	0.29	0.53	0.59	0.71	0.45	0.74	0.30	0.61
26	0.44	0.79	0.61	0.81	0.27	0.48	0.28	0.56	0.39	0.77	1.04	0.79	0.27	0.65
27	0.90	0.88	0.84	0.91	0.23	0.53	0.38	0.54	0.47	0.82	0.38	0.82	0.38	0.45
28	0.46	0.86	0.24	0.89	0.30	0.66	0.36	0.78	0.33	0.85	0.34	0.86	0.29	0.49
29														
30														
31	0.28	0.91	0.41	0.93	0.23	0.61	0.15	0.74	0.22	0.86	0.46	0.84	0.28	0.55

	HARVEY CREEK			MAGNESIA CREEK		
Date	**Time**	**24 Hr Flow**	**NTU**	**Time**	**24 Hr Flow**	**NTU**
1						
2						
3			0.19			0.30
4			0.16			0.46
5			0.20			0.60
6			0.20			0.43
7			0.42			0.60
8						
9						
10			0.16			0.19
11			0.60			0.26
12			0.48			0.36
13			0.30			1.31
14			0.64			0.77
15						
16						
17			0.25			0.69
18			0.22			0.40
19			0.16			0.33
20			0.32			0.38
21			0.26			0.48
22						
23						
24			0.61			0.31
25			0.86			0.38
26			0.68			0.28
27			0.95			0.22
28			0.57			0.20
29						
30						
31			0.19			0.25

The Municipality of the Village of Lions Bay

DRINKING WATER QUALITY

ANNUAL REPORT

2011

Appendix C

Water Chemistry Test Results

VILLAGE OF LIONS BAY
ATTN: CHUCK PARTRIDGE
PO BOX 141, 400 CENTER ROAD
LIONS BAY BC V0N 2E0
Phone: 604-921-9833

Date Received: 14-MAR-11
Report Date: 23-MAR-11 13:46 (MT)
Version: FINAL

Certificate of Analysis

Lab Work Order #: L985922
Project P.O. #: NOT SUBMITTED
Job Reference:
Legal Site Desc:
C of C Numbers: 10-033204

ERIN BOLSTER
Account Manager

ALS LABORATORY GROUP ANALYTICAL REPORT

Grouping	Analyte	L985922-1	L985922-2	L985922-3	L985922-4	L985922-5
Sample ID		L985922-1	L985922-2	L985922-3	L985922-4	L985922-5
Description						
Sampled Date		14-MAR-11	14-MAR-11	14-MAR-11	14-MAR-11	14-MAR-11
Sampled Time		12:50	11:55	11:35	11:35	11:50
Client ID		MAGNESIA CREEK INTAKE	HARVEY CREEK INTAKE	PRV-3 (FIRST DRAW)	PRV-3 (AFTER FLUSH)	HARVEY TANK (FIRST DRAW)
WATER						
Physical Tests	Hardness (as CaCO3) (mg/L)	8.74	4.10	4.49	4.41	10.8
	pH (pH)	6.72	6.61	6.71		7.48
	Total Suspended Solids (mg/L)	<3.0	<3.0	<3.0		<3.0
	Turbidity (NTU)	0.55	0.89	1.24		0.72
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	3.5	3.4	3.3		8.3
Organic / Inorganic Carbon	Total Organic Carbon (mg/L)	1.04	1.45	1.63		1.68
Total Metals	Aluminum (Al)-Total (mg/L)	0.183	0.129	0.164	0.155	0.113
	Antimony (Sb)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Arsenic (As)-Total (mg/L)	0.00015	<0.00010	0.00011	0.00011	0.00011
	Barium (Ba)-Total (mg/L)	<0.020	<0.020	<0.020	<0.020	<0.020
	Boron (B)-Total (mg/L)	<0.10	<0.10	<0.10	<0.10	<0.10
	Cadmium (Cd)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
	Calcium (Ca)-Total (mg/L)	2.79	1.33	1.45	1.43	3.96
	Chromium (Cr)-Total (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
	Copper (Cu)-Total (mg/L)	0.0143	0.0043	0.0103	0.0059	0.0020
	Iron (Fe)-Total (mg/L)	0.135	0.038	0.055	0.051	0.119
	Lead (Pb)-Total (mg/L)	0.00069	<0.00050	<0.00050	<0.00050	<0.00050
	Magnesium (Mg)-Total (mg/L)	0.43	0.19	0.21	0.21	0.22
	Manganese (Mn)-Total (mg/L)	0.0054	0.0024	0.0033	0.0032	0.0025
	Mercury (Hg)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
	Potassium (K)-Total (mg/L)	0.11	<0.10	0.10	<0.10	<0.10
	Selenium (Se)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Sodium (Na)-Total (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0
	Uranium (U)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Zinc (Zn)-Total (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
Aggregate Organics	Biochemical Oxygen Demand (mg/L)	<2.0	<2.0	<2.0		<2.0
Trihalomethanes	Bromodichloromethane (mg/L)			<0.0010		<0.0010
	Bromoform (mg/L)			<0.0010		<0.0010
	Dibromochloromethane (mg/L)			<0.0010		<0.0010
	Chloroform (mg/L)			0.0087		0.0318
	Total THMs (mg/L)			0.0087		0.0318

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID	L985922-6	L985922-7	L985922-8	L985922-9	L985922-10
	Description					
	Sampled Date	14-MAR-11	14-MAR-11	14-MAR-11	14-MAR-11	14-MAR-11
	Sampled Time	11:50	13:10	13:10	12:45	12:45
	Client ID	HARVEY TANK (AFTER FLUSH)	PRV-5 (FIRST DRAW)	PRV-5 (AFTER FLUSH)	MAGNESIA TANK (FIRST DRAW)	MAGNESIA TANK (AFTER FLUSH)
Grouping	**Analyte**					
WATER						
Physical Tests	Hardness (as CaCO3) (mg/L)	8.81	10.5	10.4	13.8	10.3
	pH (pH)		6.90		6.80	
	Total Suspended Solids (mg/L)		<3.0		<3.0	
	Turbidity (NTU)		1.30		1.45	
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)		5.0		6.4	
Organic / Inorganic Carbon	Total Organic Carbon (mg/L)		1.19		1.16	
Total Metals	Aluminum (Al)-Total (mg/L)	0.120	0.145	0.131	0.015	0.130
	Antimony (Sb)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Arsenic (As)-Total (mg/L)	0.00011	0.00013	0.00012	<0.00010	0.00012
	Barium (Ba)-Total (mg/L)	<0.020	<0.020	<0.020	<0.020	<0.020
	Boron (B)-Total (mg/L)	<0.10	<0.10	<0.10	<0.10	<0.10
	Cadmium (Cd)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
	Calcium (Ca)-Total (mg/L)	3.15	3.41	3.36	4.54	3.35
	Chromium (Cr)-Total (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
	Copper (Cu)-Total (mg/L)	0.0018	0.0120	0.0050	1.08	0.0156
	Iron (Fe)-Total (mg/L)	0.128	0.164	0.070	0.129	0.067
	Lead (Pb)-Total (mg/L)	<0.00050	<0.00050	<0.00050	0.00227	<0.00050
	Magnesium (Mg)-Total (mg/L)	0.23	0.48	0.48	0.60	0.48
	Manganese (Mn)-Total (mg/L)	0.0023	0.0035	0.0027	<0.0020	0.0027
	Mercury (Hg)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
	Potassium (K)-Total (mg/L)	0.10	0.10	0.10	0.10	0.10
	Selenium (Se)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Sodium (Na)-Total (mg/L)	<2.0	2.6	2.6	2.9	2.6
	Uranium (U)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Zinc (Zn)-Total (mg/L)	<0.050	<0.050	<0.050	0.071	<0.050
Aggregate Organics	Biochemical Oxygen Demand (mg/L)		<2.0		<2.0	
Trihalomethanes	Bromodichloromethane (mg/L)		<0.0010		<0.0010	
	Bromoform (mg/L)		<0.0010		<0.0010	
	Dibromochloromethane (mg/L)		<0.0010		<0.0010	
	Chloroform (mg/L)		0.0106		0.0094	
	Total THMs (mg/L)		0.0106		0.0094	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS LABORATORY GROUP ANALYTICAL REPORT

Grouping	Analyte	Sample ID	L985922-11	L985922-12	L985922-13	L985922-14	L985922-15
		Description					
		Sampled Date	14-MAR-11	14-MAR-11	14-MAR-11	14-MAR-11	14-MAR-11
		Sampled Time	10:50	10:50	13:25	13:25	10:05
		Client ID	KELVIN GROVE (FIRST DRAW)	KELVIN GROVE (AFTER FLUSH)	BRUNSWICK BEACH (FIRST DRAW)	BRUNSWICK BEACH (AFTER FLUSH)	STORE / CAFE (FIRST DRAW)
WATER							
Physical Tests	Hardness (as CaCO3) (mg/L)		6.82	6.95	15.4	13.9	5.82
	pH (pH)		7.07		7.01		6.85
	Total Suspended Solids (mg/L)		<3.0		<3.0		<3.0
	Turbidity (NTU)		0.22		0.30		0.49
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)		5.3		6.9		4.2
Organic / Inorganic Carbon	Total Organic Carbon (mg/L)		1.42		0.85		1.56
Total Metals	Aluminum (Al)-Total (mg/L)		0.076	0.079	0.049	0.044	0.073
	Antimony (Sb)-Total (mg/L)		<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Arsenic (As)-Total (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Barium (Ba)-Total (mg/L)		<0.020	<0.020	<0.020	<0.020	<0.020
	Boron (B)-Total (mg/L)		<0.10	<0.10	<0.10	<0.10	<0.10
	Cadmium (Cd)-Total (mg/L)		<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
	Calcium (Ca)-Total (mg/L)		2.39	2.44	5.13	4.61	1.95
	Chromium (Cr)-Total (mg/L)		<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
	Copper (Cu)-Total (mg/L)		0.0088	0.0057	0.897	0.0077	0.279
	Iron (Fe)-Total (mg/L)		0.063	0.049	0.066	<0.030	0.058
	Lead (Pb)-Total (mg/L)		0.00196	0.00134	0.00124	<0.00050	0.00132
	Magnesium (Mg)-Total (mg/L)		0.21	0.21	0.62	0.58	0.23
	Manganese (Mn)-Total (mg/L)		<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
	Mercury (Hg)-Total (mg/L)		<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
	Potassium (K)-Total (mg/L)		<0.10	<0.10	0.11	0.11	0.10
	Selenium (Se)-Total (mg/L)		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Sodium (Na)-Total (mg/L)		<2.0	<2.0	2.5	2.9	<2.0
	Uranium (U)-Total (mg/L)		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Zinc (Zn)-Total (mg/L)		<0.050	<0.050	<0.050	<0.050	<0.050
Aggregate Organics	Biochemical Oxygen Demand (mg/L)		<2.0		<2.0		<2.0
Trihalomethanes	Bromodichloromethane (mg/L)		<0.0010		<0.0010		<0.0010
	Bromoform (mg/L)		<0.0010		<0.0010		<0.0010
	Dibromochloromethane (mg/L)		<0.0010		<0.0010		<0.0010
	Chloroform (mg/L)		0.0424		0.0239		0.0210
	Total THMs (mg/L)		0.0424		0.0239		0.0210

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID	L985922-16	L985922-17	L985922-18	L985922-19	L985922-20
	Description					
	Sampled Date	14-MAR-11	14-MAR-11	14-MAR-11	14-MAR-11	14-MAR-11
	Sampled Time	10:05	10:20	10:20	09:50	09:50
	Client ID	STORE / CAFE (AFTER FLUSH)	ELEMENTARY SCHOOL (FIRST DRAW)	ELEMENTARY SCHOOL (AFTER FLUSH)	COMMUNITY CENTRE (FIRST DRAW)	COMMUNITY CENTRE (AFTER FLUSH)
Grouping	**Analyte**					
WATER						
Physical Tests	Hardness (as CaCO3) (mg/L)	5.37	15.3	14.8	5.53	5.99
	pH (pH)		6.98		6.94	
	Total Suspended Solids (mg/L)		<3.0		<3.0	
	Turbidity (NTU)		0.91		0.37	
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)		6.0		5.5	
Organic / Inorganic Carbon	Total Organic Carbon (mg/L)		0.90		1.57	
Total Metals	Aluminum (Al)-Total (mg/L)	0.093	<0.010	0.062	0.081	0.086
	Antimony (Sb)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Arsenic (As)-Total (mg/L)	<0.00010	<0.00010	0.00011	<0.00010	<0.00010
	Barium (Ba)-Total (mg/L)	<0.020	<0.020	<0.020	<0.020	<0.020
	Boron (B)-Total (mg/L)	<0.10	<0.10	<0.10	<0.10	<0.10
	Cadmium (Cd)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
	Calcium (Ca)-Total (mg/L)	1.79	5.06	4.95	1.84	1.88
	Chromium (Cr)-Total (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
	Copper (Cu)-Total (mg/L)	0.0253	0.957	0.0570	0.194	0.0729
	Iron (Fe)-Total (mg/L)	0.043	<0.030	0.288	0.058	0.059
	Lead (Pb)-Total (mg/L)	<0.00050	0.149	0.00145	0.00940	0.00146
	Magnesium (Mg)-Total (mg/L)	0.22	0.65	0.59	0.22	0.31
	Manganese (Mn)-Total (mg/L)	<0.0020	<0.0020	0.0026	<0.0020	<0.0020
	Mercury (Hg)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
	Potassium (K)-Total (mg/L)	<0.10	0.10	0.11	<0.10	<0.10
	Selenium (Se)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Sodium (Na)-Total (mg/L)	<2.0	2.7	2.9	<2.0	<2.0
	Uranium (U)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Zinc (Zn)-Total (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
Aggregate Organics	Biochemical Oxygen Demand (mg/L)		<2.0		<2.0	
Trihalomethanes	Bromodichloromethane (mg/L)		<0.0010		<0.0010	
	Bromoform (mg/L)		<0.0010		<0.0010	
	Dibromochloromethane (mg/L)		<0.0010		<0.0010	
	Chloroform (mg/L)		0.0272		0.0237	
	Total THMs (mg/L)		0.0272		0.0237	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

Qualifiers for Individual Parameters Listed:

Qualifier	Description
MB-LOR	Method Blank exceeds ALS DQO. LORs adjusted for samples with positive hits below 5 times blank level. Please contact ALS if re-analysis is required.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ALK-COL-VA	Water	Alkalinity by Colourimetric (Automated)	APHA 310.2
This analysis is carried out using procedures adapted from EPA Method 310.2 "Alkalinity". Total Alkalinity is determined using the methyl orange colourimetric method.			
BOD-ED	Water	Biochemical Oxygen Demand (BOD)	APHA 5210 B-5 day Incub.-O2 electrode
C-TOT-ORG-LOW-CL	Water	Total Organic Carbon	APHA 5310 C-Instrumental
HARDNESS-CALC-VA	Water	Hardness	APHA 2340B
Hardness is calculated from Calcium and Magnesium concentrations, and is expressed as calcium carbonate equivalents.			
HG-TOT-DW-CVAFS-VA	Water	Total Mercury in Water by CVAFS	EPA 245.7
This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedure involves a cold-oxidation of the acidified sample using bromine monochloride prior to reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry (EPA Method 245.7).			
MET-TOT-ICP-VA	Water	Total Metals in Water by ICPOES	EPA SW-846 3005A/6010B
This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).			
MET-TOT-LOW-MS-VA	Water	Total Metals in Water by ICPMS(Low)	EPA SW-846 3005A/6020A
This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).			
PH-MAN-VA	Water	pH by Manual Meter	APHA 4500-H "pH Value"
This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode. It is recommended that this analysis be conducted in the field.			
PH-MAN-VA	Water	pH by Manual Meter	APHA 4500-H pH Value
This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode. It is recommended that this analysis be conducted in the field.			
THM-PT-MS-VA	Water	VOC (THM) by Purge and Trap with GCMS	EPA SW-846, METHOD 8260
This procedure is suitable for the analysis of trihalomethanes (chloroform, bromodichloromethane, dibromochloromethane, and bromoform) in chlorinated waters that have been treated to prevent the formation of trihalomethanes after sample collection. The analysis involves the purge and trap extraction of the sample prior to analysis by capillary column gas chromatography with mass spectrometric detection (GC/MS). The trihalomethanes analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Method 8260, published by the United States Environmental Protection Agency (EPA).			
THM-SUM-CALC-VA	Water	Total Trihalomethane-THM	CALCULATION
Total Trihalomethanes (where not conducted as part of a formation potential analysis) is equal to the sum of the individual parameter concentrations with non-detect results treated as zero.			
TSS-VA	Water	Total Suspended Solids by Gravimetric	APHA 2540 D - GRAVIMETRIC
This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, TSS is determined by drying the filter at 104 degrees celsius.			
TURBIDITY-VA	Water	Turbidity by Meter	APHA 2130 "Turbidity"
This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.			
TURBIDITY-VA	Water	Turbidity by Meter	APHA 2130 Turbidity
This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.			

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

Reference Information

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
ED	ALS LABORATORY GROUP - EDMONTON, ALBERTA, CANADA
CL	ALS LABORATORY GROUP - CALGARY, ALBERTA, CANADA
VA	ALS LABORATORY GROUP - VANCOUVER, BC, CANADA

Chain of Custody Numbers:

10-033204

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

VILLAGE OF LIONS BAY
ATTN: Chuck Partridge
PO Box 141, 400 Center Road
Lions Bay BC V0N 2E0

Date Received: 19-SEP-11
Report Date: 04-OCT-11 12:33 (MT)
Version: FINAL

Client Phone: 604-921-9833

Certificate of Analysis

Lab Work Order #: L1060412
Project P.O. #: NOT SUBMITTED
Job Reference:
C of C Numbers: 10-170311
Legal Site Desc:

Anna-Maria Karout
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1060412-1	L1060412-2	L1060412-3	L1060412-4	L1060412-5
	Description	RAW W.	RAW W.	TREAT W.	TREAT W.	TREAT W.
	Sampled Date	19-SEP-11	19-SEP-11	19-SEP-11	19-SEP-11	19-SEP-11
	Sampled Time	09:30	10:20	10:45	10:45	10:15
	Client ID	MAGNESIA CREEK INTAKE	HARVEY CREEK INTAKE	PRV-3 (FIRST DRAW)	PRV-3 (AFTER FLUSH)	HARVEY TANK (FIRST DRAW)
Grouping	Analyte					
WATER						
Physical Tests	Hardness (as CaCO3) (mg/L)	9.93	4.27	4.73	4.52	4.98
	pH (pH)	7.02	6.32	6.28		6.43
	Total Suspended Solids (mg/L)	<3.0	3.1	<3.0		<3.0
	Turbidity (NTU)	0.18	0.65	0.25		0.21
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	4.3	3.5	4.6		4.7
Organic / Inorganic Carbon	Total Organic Carbon (mg/L)	0.92	1.45	1.23		1.23
Total Metals	Aluminum (Al)-Total (mg/L)	0.025	0.031	0.045	0.039	0.041
	Antimony (Sb)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Arsenic (As)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Barium (Ba)-Total (mg/L)	<0.020	<0.020	<0.020	<0.020	<0.020
	Boron (B)-Total (mg/L)	<0.10	<0.10	<0.10	<0.10	<0.10
	Cadmium (Cd)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
	Calcium (Ca)-Total (mg/L)	3.36	1.43	1.59	1.53	1.71
	Chromium (Cr)-Total (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
	Copper (Cu)-Total (mg/L)	0.0034	0.0042	0.138	0.0041	0.0245
	Iron (Fe)-Total (mg/L)	<0.030	<0.030	<0.030	<0.030	<0.030
	Lead (Pb)-Total (mg/L)	<0.00050	<0.00050	0.00410	<0.00050	<0.00050
	Magnesium (Mg)-Total (mg/L)	0.37	0.17	0.18	0.17	0.17
	Manganese (Mn)-Total (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
	Mercury (Hg)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
	Potassium (K)-Total (mg/L)	<0.10	<0.10	0.10	0.10	0.11
	Selenium (Se)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Sodium (Na)-Total (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0
	Uranium (U)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Zinc (Zn)-Total (mg/L)	<0.050	<0.050	0.093	<0.050	<0.050
Aggregate Organics	BOD (mg/L)	<5.0	<5.0	<5.0		<5.0
Trihalomethanes	Bromodichloromethane (mg/L)					<0.0010
	Bromoform (mg/L)					<0.0010
	Dibromochloromethane (mg/L)					<0.0010
	Chloroform (mg/L)					0.0344
	Total THMs (mg/L)					0.0344

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L1060412-6 TREAT W. 19-SEP-11 10:15 HARVEY TANK (AFTER FLUSH)	L1060412-7 TREAT W. 19-SEP-11 11:10 PRV-5 (FIRST DRAW)	L1060412-8 TREAT W. 19-SEP-11 11:10 PRV-5 (AFTER FLUSH)	L1060412-9 TREAT W. 19-SEP-11 09:25 MAGNESIA TANK (FIRST DRAW)	L1060412-10 TREAT W. 19-SEP-11 09:25 MAGNESIA TANK (AFTER FLUSH)
WATER						
Physical Tests	Hardness (as CaCO3) (mg/L)	4.88	10.3	10.2	10.4	9.94
	pH (pH)		7.00		6.98	
	Total Suspended Solids (mg/L)		<3.0		<3.0	
	Turbidity (NTU)		0.35		0.27	
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)		6.1		5.9	
Organic / Inorganic Carbon	Total Organic Carbon (mg/L)		0.97		0.96	
Total Metals	Aluminum (Al)-Total (mg/L)	0.042	0.047	0.035	0.019	0.042
	Antimony (Sb)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Arsenic (As)-Total (mg/L)	<0.00010	0.00011	<0.00010	<0.00010	<0.00010
	Barium (Ba)-Total (mg/L)	<0.020	<0.020	<0.020	<0.020	<0.020
	Boron (B)-Total (mg/L)	<0.10	<0.10	<0.10	<0.10	<0.10
	Cadmium (Cd)-Total (mg/L)	<0.00020	<0.00020	<0.00020	0.00029	<0.00020
	Calcium (Ca)-Total (mg/L)	1.67	3.47	3.46	3.55	3.36
	Chromium (Cr)-Total (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
	Copper (Cu)-Total (mg/L)	0.0044	0.0092	0.0054	0.476	0.0118
	Iron (Fe)-Total (mg/L)	<0.030	0.038	<0.030	1.10	<0.030
	Lead (Pb)-Total (mg/L)	<0.00050	<0.00050	<0.00050	0.00773	<0.00050
	Magnesium (Mg)-Total (mg/L)	0.17	0.39	0.39	0.38	0.37
	Manganese (Mn)-Total (mg/L)	<0.0020	<0.0020	<0.0020	0.0039	<0.0020
	Mercury (Hg)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
	Potassium (K)-Total (mg/L)	0.11	<0.10	<0.10	<0.10	<0.10
	Selenium (Se)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Sodium (Na)-Total (mg/L)	<2.0	2.3	2.4	2.3	2.3
	Uranium (U)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Zinc (Zn)-Total (mg/L)	<0.050	<0.050	<0.050	0.441	<0.050
Aggregate Organics	BOD (mg/L)		<5.0		<5.0	
Trihalomethanes	Bromodichloromethane (mg/L)		<0.0010		<0.0010	
	Bromoform (mg/L)		<0.0010		<0.0010	
	Dibromochloromethane (mg/L)		<0.0010		<0.0010	
	Chloroform (mg/L)		0.0169		0.0140	
	Total THMs (mg/L)		0.0169		0.0140	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1060412-11	L1060412-12	L1060412-13	L1060412-14	L1060412-15
	Description	TREAT W.	TREAT W.	TREAT W.	TREAT W.	TREAT W.
	Sampled Date	19-SEP-11	19-SEP-11	19-SEP-11	19-SEP-11	19-SEP-11
	Sampled Time	08:35	08:35	11:40	11:40	08:10
	Client ID	KELVIN GROVE (FIRST DRAW)	KELVIN GROVE (AFTER FLUSH)	BRUNSWICK BEACH (FIRST DRAW)	BRUNSWICK BEACH (AFTER FLUSH)	STORE/CAFE (FIRST DRAW)
Grouping	**Analyte**					
WATER						
Physical Tests	Hardness (as CaCO3) (mg/L)	7.75	7.82	12.8	12.6	5.47
	pH (pH)	7.23		7.13		6.47
	Total Suspended Solids (mg/L)	<3.0		<3.0		<3.0
	Turbidity (NTU)	0.19		0.33		0.32
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	7.0		6.5		4.5
Organic / Inorganic Carbon	Total Organic Carbon (mg/L)	1.15		1.20		1.34
Total Metals	Aluminum (Al)-Total (mg/L)	0.046	0.057	0.011	0.034	0.027
	Antimony (Sb)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Arsenic (As)-Total (mg/L)	<0.00010	<0.00010	<0.00010	0.00011	<0.00010
	Barium (Ba)-Total (mg/L)	<0.020	<0.020	<0.020	<0.020	<0.020
	Boron (B)-Total (mg/L)	<0.10	<0.10	<0.10	<0.10	<0.10
	Cadmium (Cd)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
	Calcium (Ca)-Total (mg/L)	2.76	2.90	4.44	4.36	1.89
	Chromium (Cr)-Total (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
	Copper (Cu)-Total (mg/L)	0.0417	0.0026	0.353	0.0055	0.0973
	Iron (Fe)-Total (mg/L)	0.044	0.044	<0.030	0.050	<0.030
	Lead (Pb)-Total (mg/L)	0.0133	0.00174	0.00142	<0.00050	0.0122
	Magnesium (Mg)-Total (mg/L)	0.21	0.14	0.42	0.41	0.18
	Manganese (Mn)-Total (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
	Mercury (Hg)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
	Potassium (K)-Total (mg/L)	0.11	0.11	0.10	0.11	0.11
	Selenium (Se)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Sodium (Na)-Total (mg/L)	<2.0	<2.0	2.3	2.4	<2.0
	Uranium (U)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Zinc (Zn)-Total (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
Aggregate Organics	BOD (mg/L)	<5.0		<5.0		<5.0
Trihalomethanes	Bromodichloromethane (mg/L)	<0.0010		<0.0010		<0.0010
	Bromoform (mg/L)	<0.0010		<0.0010		<0.0010
	Dibromochloromethane (mg/L)	<0.0010		<0.0010		<0.0010
	Chloroform (mg/L)	0.0513		0.0191		0.0349
	Total THMs (mg/L)	0.0513		0.0191		0.0349

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L1060412-16	L1060412-17	L1060412-18	L1060412-19	L1060412-20
Description	TREAT W.	TREAT W.	TREAT W.	TREAT W.	TREAT W.
Sampled Date	19-SEP-11	19-SEP-11	19-SEP-11	19-SEP-11	19-SEP-11
Sampled Time	08:10	07:55	07:55	07:30	07:30
Client ID	STORE/CAFE (AFTER FLUSH)	ELEMENTARY SCHOOL (FIRST DRAW)	ELEMENTARY SCHOOL (AFTER FLUSH)	COMMUNITY CENTRE (FIRST DRAW)	COMMUNITY CENTRE (AFTER FLUSH)
Grouping / **Analyte**					
WATER					
Physical Tests					
Hardness (as CaCO3) (mg/L)	5.11	11.2	11.3	5.68	5.46
pH (pH)		6.95		6.48	
Total Suspended Solids (mg/L)		<3.0		<3.0	
Turbidity (NTU)		0.33		0.21	
Anions and Nutrients					
Alkalinity, Total (as CaCO3) (mg/L)		4.3		5.3	
Organic / Inorganic Carbon					
Total Organic Carbon (mg/L)		0.94		1.23	
Total Metals					
Aluminum (Al)-Total (mg/L)	0.040	<0.010	0.027	0.012	0.041
Antimony (Sb)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Arsenic (As)-Total (mg/L)	<0.00010	0.00018	<0.00010	<0.00010	<0.00010
Barium (Ba)-Total (mg/L)	<0.020	<0.020	<0.020	<0.020	<0.020
Boron (B)-Total (mg/L)	<0.10	<0.10	<0.10	<0.10	<0.10
Cadmium (Cd)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Calcium (Ca)-Total (mg/L)	1.77	3.71	3.85	1.95	1.92
Chromium (Cr)-Total (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Copper (Cu)-Total (mg/L)	0.0155	0.974	0.173	0.730	0.0663
Iron (Fe)-Total (mg/L)	0.039	<0.030	<0.030	<0.030	0.034
Lead (Pb)-Total (mg/L)	<0.00050	0.267	0.00168	0.00764	0.00125
Magnesium (Mg)-Total (mg/L)	0.17	0.47	0.42	0.19	0.16
Manganese (Mn)-Total (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Mercury (Hg)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Potassium (K)-Total (mg/L)	0.11	<0.10	<0.10	0.11	0.10
Selenium (Se)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Sodium (Na)-Total (mg/L)	<2.0	2.3	2.4	<2.0	<2.0
Uranium (U)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Zinc (Zn)-Total (mg/L)	<0.050	0.066	<0.050	<0.050	<0.050
Aggregate Organics					
BOD (mg/L)		<5.0		<5.0	
Trihalomethanes					
Bromodichloromethane (mg/L)		<0.0010		<0.0010	
Bromoform (mg/L)		<0.0010		<0.0010	
Dibromochloromethane (mg/L)		<0.0010		<0.0010	
Chloroform (mg/L)		0.0271		0.0302	
Total THMs (mg/L)		0.0271		0.0302	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Total Organic Carbon	MS-B	L1060412-1, -11, -13, -15, -17, -19, -2, -3, -5, -7, -9

Qualifiers for Individual Parameters Listed:

Qualifier	Description
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ALK-COL-VA	Water	Alkalinity by Colourimetric (Automated)	APHA 310.2

This analysis is carried out using procedures adapted from EPA Method 310.2 "Alkalinity". Total Alkalinity is determined using the methyl orange colourimetric method.

BOD5-VA	Water	Biochemical Oxygen Demand- 5 day	APHA 5210 B- "BIOCHEMICAL OXYGEN DEMAND"

This analysis is carried out using procedures adapted from APHA Method 5210 B - "Biochemical Oxygen Demand (BOD)". All forms of biochemical oxygen demand (BOD) are determined by diluting and incubating a sample for a specified time period, and measuring the oxygen depletion using a dissolved oxygen meter. Dissolved BOD (SOLUBLE) is determined by filtering the sample through a glass fibre filter prior to dilution. Carbonaceous BOD (CBOD) is determined by adding a nitrification inhibitor to the diluted sample prior to incubation.

BOD5-VA	Water	Biochemical Oxygen Demand- 5 day	APHA 5210 B- BIOCHEMICAL OXYGEN DEMAND

This analysis is carried out using procedures adapted from APHA Method 5210 B - "Biochemical Oxygen Demand (BOD)". All forms of biochemical oxygen demand (BOD) are determined by diluting and incubating a sample for a specified time period, and measuring the oxygen depletion using a dissolved oxygen meter. Dissolved BOD (SOLUBLE) is determined by filtering the sample through a glass fibre filter prior to dilution. Carbonaceous BOD (CBOD) is determined by adding a nitrification inhibitor to the diluted sample prior to incubation.

CARBONS-TOC-VA	Water	Total organic carbon by combustion	APHA 5310 TOTAL ORGANIC CARBON (TOC)

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".

HARDNESS-CALC-VA	Water	Hardness	APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-TOT-CVAFS-VA	Water	Total Mercury in Water by CVAFS	EPA 245.7

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedure involves a cold-oxidation of the acidified sample using bromine monochloride prior to reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry (EPA Method 245.7).

MET-TOT-ICP-VA	Water	Total Metals in Water by ICPOES	EPA SW-846 3005A/6010B

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

MET-TOT-LOW-MS-VA	Water	Total Metals in Water by ICPMS(Low)	EPA SW-846 3005A/6020A

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).

PH-MAN-VA	Water	pH by Manual Meter	APHA 4500-H "pH Value"

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode.

It is recommended that this analysis be conducted in the field.

PH-MAN-VA	Water	pH by Manual Meter	APHA 4500-H pH Value

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode.

It is recommended that this analysis be conducted in the field.

PH-PCT-VA	Water	pH by Meter (Automated)	APHA 4500-H "pH Value"

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

It is recommended that this analysis be conducted in the field.

PH-PCT-VA	Water	pH by Meter (Automated)	APHA 4500-H pH Value

Reference Information

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

It is recommended that this analysis be conducted in the field.

THM-HSMS-VA	Water	VOC (THM) by Headspace GCMS	EPA SW-846, METHOD 8260

This procedure is suitable for the analysis of trihalomethanes (chloroform, bromodichloromethane, dibromochloromethane, and bromoform) in chlorinated waters that have been treated to prevent the formation of trihalomethanes after sample collection. The analysis involves the headspace extraction of the sample prior to analysis by capillary column gas chromatography with mass spectrometric detection (GC/MS). The trihalomethanes analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Method 8260, published by the United States Environmental Protection Agency (EPA).

THM-SUM-CALC-VA	Water	Total Trihalomethane-THM	CALCULATION

Total Trihalomethanes (where not conducted as part of a formation potential analysis) is equal to the sum of the individual parameter concentrations with non-detect results treated as zero.

TSS-VA	Water	Total Suspended Solids by Gravimetric	APHA 2540 D - GRAVIMETRIC

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, TSS is determined by drying the filter at 104 degrees celsius.

TURBIDITY-VA	Water	Turbidity by Meter	APHA 2130 "Turbidity"

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

TURBIDITY-VA	Water	Turbidity by Meter	APHA 2130 Turbidity

This analysis is carried out using procedures adapted from APHA Method 2130 "Turbidity". Turbidity is determined by the nephelometric method.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BC, CANADA

hain of Custody Numbers:

10-170311

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

The Municipality of the Village of Lions Bay

DRINKING WATER QUALITY

ANNUAL REPORT

2011

Appendix D

Emergency Response Plan

CONTENTS

BOIL WATER ADVISORY

If there is a need, or if Vancouver Coastal Health Authority (VCHA) orders the Village to issue a Boil Water Advisory (BWA):

- Notify the Manager of Public Works or his designated (person in charge),
- Identify the affected area,
- The person in charge will contact the Public Health Inspector (PHI),
- The person in charge will copy and have delivered by hand a printed BWA and post a notice at Lions bay School, Lions Bay Post Office, Lions Bay General Store / Café, and Child Care facilities,
- The person in charge will, when appropriate, notify the radio and television stations that are listed in the plan,
- When it has been determined that all hazards and problems have been alleviated, the PHI will lift the BWA,
- The person in charge will reverse the above actions notifying all those concerned, and
- The person in charge will record all of the pertinent information regarding the event and prepare a report for the Medical Health Officer.

POWER FAILURES

In the event of a Power Failure:

- Notify the Manager of Public Works or his designated,
- Determine the extent of the outage,
- Notify BC Hydro,
- During the power outage, the power generators at the Treatment Plants need to be checked constantly for level of Fuel.
- Monitor the tanks levels,
- Monitor and record the Chlorine Residual in the system,
- When the power comes back on, check the Plants for normal function.
- Reset all alarms, and
- Reset all the pumps including the STP.

EARTHQUAKES

In the event of an earthquake:

- Notify the Manager of Public Works or his designated,
- Begin a system wide check for leaks or any other failures,
- Shut down any areas that appear to have problems,
- Notify VCHA if sections have been shut down and if necessary issue a BWA,
- Repair and flush lines with treated water, and
- Retest all zones and monitor.

FIRE IN THE WATERSHED

In the event of a forest fire in the watershed:

- Notify the Manager of Public Works or his designated,
- Notify BC Department of Forest,
- Call 911 and let them dispatch the affected Fire Department,
- Shut down the system at the affected intake,
- Notify Vancouver Coastal Health Authority,
- Notify Council,
- Monitor Raw Water for any contaminants, and
- Let BC Forest service know that we have an intake below and that we need to know if they are going to water bomb with any chemicals.

WATER PUMP FAILURE

In the event of a pump failure:

- Notify the Manager of Public Works or his designated,
- Shut down the affected pump,
- Notify all affected residents, and
- Change or repair pump and flush the affected area with treated water.

CHEMICAL CONTAMINATION

In the event of Chemical contamination such as oil, fuel, pesticides or any other type of substance that gets into or threatens to get into our water system including forest fire fighting activities:

- Notify the Manager of Public Works or his designated,
- Shut down the affected intake or line,
- Begin determining the extent of contamination,
- Notify Vancouver Coastal Health Authority who will issue a “No Use Order”,
- Call the listed radio and television stations and have them broadcast a “No Use Order” to the affected area,
- Hand deliver “Do Not Use Water” notices to the affected areas,
- Remedy the problem to the satisfaction of the Vancouver Coastal Health Authority, and
- Notify all those affected that the water is now safe to use again.

DISINFECTION INTERRUPTION

In the event of an interruption of the Treatment Plant:

- Notify the Manager of Public Works or his designated,
- Check and record the Chlorine Residual in the affected water tank,
- Shut down the Treatment Plant,

- Shut down the intake valve for the water tank,
- Determine the amount of down time that is available before we need to refill the water tank,
- Begin repairs on the Treatment Plant,
- If the downtime is going to be too long and we have to fill the tank, notify Vancouver Coastal Health Authority and issue a BWA, and
- Add chlorine to reservoir manually and check residual on ongoing basis.

LOSS OF PRESSURE

In the event of a system pressure loss due to high demand from high fire flow or a severe leak:

- Notify the Manager of Public Works or his designated,
- Determine if there was a negative pressure or if there was always positive pressure,
- If a negative pressure is suspected, notify Vancouver Coastal Health Authority who will determine if we need to issue a BWA, and
- Flush the affected area and record the results and give them to the Health Inspector.

TURBIDITY EVENTS

If the Turbidity is in the range of 1-3 NTU, increase monitoring. If the Turbidity reaches 4 NTU prepare to Take Off the system. If the Turbidity reaches 5 NTU or more:

- Notify the Manager of Public Works or his designated,
- Contact Vancouver Coastal Health Authority and possibly issue a BWA,
- Check and record the Chlorine Residual that is present at the same site as the turbidity sample was taken, and
- Check with other purveyors like the District of West Vancouver to see at what point high turbidity events correlate with positive water samples.

WATER LINE BREAKS

In the event of a water line break, where water pressure has maintained until the leak has been exposed so that there is no danger of any material flowing back into the break, there will be no need for any special condition to be applied. Flush the repair area with treated water before placing that area back in service.

In the event that the broken line is suspected of having a negative pressure:

- Notify the Manager of Public Works or his designated,
- Notify the Vancouver Coastal Health Authority for a possible BWA,
- Repair the break and flush the area with treated water, and
- Rescind the BWA if necessary.

The Municipality of the Village of Lions Bay

DRINKING WATER QUALITY

ANNUAL REPORT

2011

Appendix E

Sample Boil Water Advisory

THE MUNICIPALITY OF THE VILLAGE OF LIONS BAY

NOTICE TO RESIDENTS

of Lions Bay and Brunswick Beach

BOIL WATER ADVISORY

until further notice.

Due to high turbidity and low chlorine residual – we are issuing an immediate boil water advisory – We will keep you posted as to when this will be lifted –

Residents can disinfect their water by either:

1. Boiling the water for 2 minutes, or
2. Adding 4 drops of household bleach per gallon of water (.8 drops if water is cloudy), stirring and waiting for 20 minutes before consumption.

This includes water used for brushing teeth, cooking, washing dishes, and washing ready-to-eat fruit and vegetables.

Village of Lions Bay
October 26, 2010

The Municipality of the Village of Lions Bay

DRINKING WATER QUALITY

ANNUAL REPORT

2011

Appendix F

VCH Permits to Operate

Vancouver CoastalHealth
Promoting wellness. Ensuring care.

Vancouver Coastal Health

PERMIT
TO OPERATE

Drinking Water System 301-10,000 Connections

Facility Number: 3317552348

Name of Facility: Lions Bay Harvey Creek Water System

Address: Upper Oceanview Road
Lions Bay, BC

Owner: Municipality of The Village of Lions Bay

Conditions:

1. Submit weekly water samples for bacteriological testing at sites approved by VCH.
2. Chlorine residuals must be recorded daily at locations approved by VCH.
3. Biannual flushing on the entire distribution system.
4. Daily turbidity testing.
5. Annual chemical testing of source
6. Submit annual updated ERP to VCH.

September 29, 2010
Effective Date

Rod Schluter
Environmental Health Officer

This permit must be displayed in a conspicuous place and is nontransferable.

Place Decal Here

Vancouver CoastalHealth
Promoting wellness. Ensuring care.

Vancouver Coastal Health

PERMIT
TO OPERATE

Drinking Water System 301-10,000 Connections

Facility Number: 3317552347

Name of Facility: Lions Bay Magnesia Creek Water System

Address: Upper Sunset Road
Lions Bay, BC

Owner: Municipality of The Village of Lions Bay

Conditions:

1. Submit weekly water samples for bacteriological testing at sites approved by VCH.
2. Chlorine residuals must be recorded daily at locations approved by VCH.
3. Biannual flushing on the entire distribution system.
4. Daily turbidity testing.
5. Annual chemical testing of source
6. Submit annual updated ERP to VCH.

September 29, 2010
Effective Date

Rod Schluter
Environmental Health Officer

This permit must be displayed in a conspicuous place and is nontransferable.

Place Decal Here

The Municipality of the Village of Lions Bay

DRINKING WATER QUALITY

ANNUAL REPORT

2011

Appendix G

EOCP Facility Classification

ENVIRONMENTAL OPERATORS CERTIFICATION PROGRAM

Facility Classification

THIS IS TO CERTIFY THAT

Village of Lions Bay
Water System

has been classified by the Environmental Operators Certification Program in accordance with the guidelines established in co-operation with the Association of Boards of Certification (A.B.C.) as

Class II

Dated at Burnaby, B.C.on July 28, 2003

Secretary - Certification Board

Chairman - Certification Board

CERTIFICATE NO.675

eocp

MEMBER OF ASSOCIATION OF BOARDS OF CERTIFICATION
AFFILIATE OF B.C. WATER AND WASTE ASSOCIATION
A Society Incorporated under the Society Act, S.B.C. S-28724

The Municipality of the Village of Lions Bay

DRINKING WATER QUALITY

ANNUAL REPORT

2011

Appendix H

EOCP Operator Certificates

ENVIRONMENTAL OPERATORS CERTIFICATION PROGRAM

Certificate of Qualification

This is to certify that:

Alberto Urrutia

By Examination Has Qualified As A

Water Distribution System Operator

and certifies that he/she has met the established qualifications and has the ability to efficiently operate and maintain a specified maximum size and type of water distribution system designated as follows:

Level II

Secretary - Certification Board

Chairman - Certification Board

July 12, 2006

Certificate No: 4766

eocp

Member of Association of Boards of Certification
Affiliate of B.C. Water and Waste Association

This certificate shall be in full force and effect when accompanied by an annual renewal seal

A Society Incorporated under the Society Act, S.B.C. S-28724

ENVIRONMENTAL OPERATORS CERTIFICATION PROGRAM

Course Completion Certificate

This is to certify that

Alberto Urrutia

By Examination Has Qualified As A

Chlorine Handler

Secretary - Certification Board

Chairman - Certification Board

May 6, 2005

Certificate No. CH-4766