

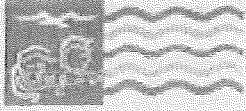
**The Municipality of the Village of Lions Bay**

**DRINKING WATER QUALITY**

**ANNUAL REPORT**

**2012**

**Works Department**

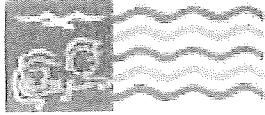


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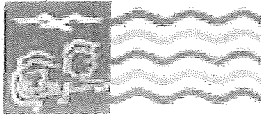


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**GENERAL DESCRIPTION**

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 UV disinfection and chlorination, and then distributed via five 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 2012.

**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 drawn from the intakes on Harvey Creek and Magnesia Creek.

**Challenges**

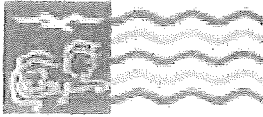
The Village draws its water from surface sources that are subject to fluctuating turbidity levels. This fluctuation in raw water turbidity, presents a challenge to ensure that distributed water turbidity and residual chlorine levels, are not adversely affected. Water intakes are typically checked once or twice a week, 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 twice a year for general water chemistry, hardness, metals and contaminants including organic compounds. The results for source water during 2012 are presented and discussed below.

**Turbidity Raw Water**

	RAW WATER 2012	
	Harvey Creek	Magnesia Creek
Count	259	259
Maximum Result (NTU)	2.76	3.00
Minimum Result (NTU)	0.11	0.15
Average (NTU)	0.53	0.53
Number of samples < 1 NTU	237	233
Number of samples > 1 NTU but < 5 NTU	22	26
Number of samples > 5 NTU	0	0
Percentage of samples < 1 NTU	91.51	89.96
Percentage of samples > 1 NTU but < 5 NTU	8.49	10.04
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 2012 was generally acceptable, with an average of 0.53 NTU for Harvey and 0.53 NTU for Magnesia.

Due to heavy rain and snow melting, the creeks Harvey and Magnesia had high Turbidity on Wednesday, April 25, 2012, and due to this situation the Village issued a Boil Water Advisory that was lifted on Wednesday, May 2, 2012, when clearer water started flowing on both creeks. No high Turbidity levels were recorded at the plants and distribution system. Vancouver Coastal Health was informed about this situation.

Due to heavy rain, , the creeks Harvey and Magnesia had high Turbidity on Wednesday, October 31, 2012, and due to this situation the Village issued a Boil Water Advisory (BWA) that was lifted on Thursday, November 8, 2012, when clearer water started flowing on both creeks. No high Turbidity levels were recorded at the plants and distribution system. Vancouver Coastal Health (VCH) was informed about this situation, and they asked the Village to send water samples to the Laboratory to be tested for Total and Fecal coliforms, and E. Coli, during three consecutive days. This was done and the results were negative. VCH was informed about the results and they authorized to lift the BWA.

#### **Metals and General Chemistry**

See results in appendix "C"

### **WATER TREATMENT**

#### **Treatment**

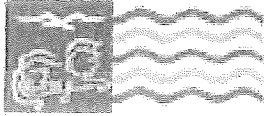
Currently, no filtration is applied to the water in Lions Bay. Disinfection using an Ultra Violet (UV) system and Chlorine are the only treatment applied. The Village maintain one Water Treatment Plant for Harvey creek and another Water Treatment Plant for Magnesia creek. Water turbidity and residual chlorine tests are performed at these locations and downstream of the water tanks.

#### **Challenges**

In times of severe weather, the Village water system operators increase the frequency of testing and adjustment of the injection 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 twice or more 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 Plant storage tanks for turbidity and residual chlorine daily from Monday to Friday (see Appendix "B"). These results are presented and discussed below.



### Turbidity Treated Water

	TREATED WATER 2012	
	HARVEY TANK	MAGNESIA TANK
Count	259	259
Maximum Result (NTU)	3.29	4.96
Minimum Result (NTU)	0.09	0.13
Average (NTU)	0.68	0.62
Number of samples < 1 NTU	204	221
Number of samples > 1 NTU but < 5 NTU	55	38
Number of samples > 5 NTU	0	0
Percentage of samples < 1 NTU	78.76	85.33
Percentage of samples > 1 NTU but < 5 NTU	21.24	14.67
Percentage of samples > 5 NTU	0.00	0.00

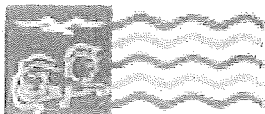
The Canadian Drinking Water Guidelines and the US Environmental Protection Agency state that the turbidity of an unfiltered treated water supply should generally be around 1 NTU, and should not exceed 5 NTU. As can be seen from the above summary table, treated water turbidity during 2012 was generally acceptable for unfiltered treated water, with an average of 0.68 NTU for Harvey and 0.62 NTU for Magnesia.

### Chlorine Residual

	TREATED WATER 2012	
	HARVEY TANK	MAGNESIA TANK
Count	259	259
Maximum Result (ppm)	1.30	1.68
Minimum Result (ppm)	0.40	0.44
Average (ppm)	0.85	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 Tanks 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 2012 (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 460,000 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 2012), 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 2012), and Brunswick Beach (35,000 IG, out of service during 2012).

### **Distribution**

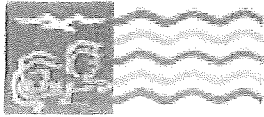
The Village of Lions Bay's location on the side of a mountain requires that water pressures be controlled by 13 PRV stations, for Harvey: one at the Plant and six in the Distribution System, and for Magnesia: one at the Plant and five in the Distribution System. Approximately 13 kilometres of water mains 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 six sampling sites in the middle and end of the distribution system and tested for turbidity and residual chlorine (see Appendix "B"). 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 twice a year at up to eleven locations in the distribution system. The results of these samples are presented in appendix "C".

### **Harvey Turbidity**

	<b>HARVEY 2012</b>			
	<b>PRV-3</b>	<b>CAFE</b>	<b>LB AVENUE</b>	<b>KELVIN G.</b>
Count	259	259	259	259
Maximum Result (NTU)	2.18	4.96	1.19	2.36
Minimum Result (NTU)	0.11	0.12	0.09	0.13
Average (NTU)	0.44	0.38	0.30	0.29
Number of samples < 1 NTU	246	254	254	257
Number of samples > 1 NTU but < 5 NTU	13	5	5	2
Number of samples > 5 NTU	0	0	0	0
Percentage of samples < 1 NTU	94.98	98.07	98.07	99.23
Percentage of samples > 1 NTU but < 5 NTU	5.02	1.93	1.93	0.77
Percentage of samples > 5 NTU	0.00	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 2012 was generally acceptable for unfiltered treated water, with an average of 0.44 NTU for PRV-3, 0.38 NTU for Café, 0.30 NTU for Lions Bay Avenue, and 0.29 NTU for Kelvin Grove.

### Magnesia Turbidity

	MAGNESIA 2012	
	PRV-5	B. B.
Count	259	259
Maximum Result (NTU)	4.72	4.80
Minimum Result (NTU)	0.12	0.12
Average (NTU)	0.51	0.38
Number of samples < 1 NTU	242	252
Number of samples > 1 NTU but < 5 NTU	17	7
Number of samples > 5 NTU	0	0
Percentage of samples < 1 NTU	93.44	97.30
Percentage of samples > 1 NTU but < 5 NTU	6.56	2.70
Percentage of samples > 5 NTU	0.00	0.00

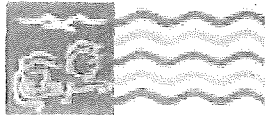
The Canadian Drinking Water Guidelines and the US Environmental Protection Agency, state that the turbidity of an unfiltered treated water supply should generally be around 1 NTU, and should not exceed 5 NTU. As can be seen from the above summary table, treated water turbidity from Magnesia during 2012 was generally acceptable for unfiltered treated water, with an average of 0.51 NTU for PRV-5 and 0.38 for Brunswick Beach.

### Harvey Chlorine Residual

	HARVEY 2012			
	PRV-3	CAFE	LB AVENUE	KELVIN G.
Count	259	259	259	259
Maximum Result (ppm)	1.27	1.33	1.10	0.95
Minimum Result (ppm)	0.44	0.25	0.20	0.20
Average (ppm)	0.83	0.69	0.64	0.57
No. of Samples Outside Limits	0	0	0	0
% Samples Outside Limits	0.00	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 2012 was generally acceptable, with an average of 0.83 ppm for PRV-3, 0.69 ppm for the Café, 0.64 for Lions Bay Avenue, and 0.57 ppm for Kelvin Grove.

### Magnesia Chlorine Residual

	MAGNESIA 2012	
	PRV-5	B. B.
Count	259	259
Maximum Result (ppm)	1.33	1.11
Minimum Result (ppm)	0.29	0.20
Average (ppm)	0.85	0.49
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 2012 was generally acceptable, with an average of 0.85 ppm for PRV-5, and 0.49 ppm for Brunswick Beach.

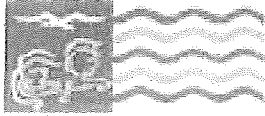
### Fecal and Total Coliforms

#### Harvey

	PRV-3	STORE/CAFE	LB AVENUE	KELVIN G.
Count	54	54	54	54
Max Result (mg/l)	N	N	N	N
Min Result (mg/l)	N	N	N	N
Average (mg/l)	N	N	N	N
No. Outside Limits	0	0	0	0
% Outside Limits	0%	0%	0%	0%

#### Magnesia

	PRV-5	BRUNSWICK B.
Count	54	54
Max Result (mg/l)	N	N
Min Result (mg/l)	N	N
Average (mg/l)	N	N
No. Outside Limits	0	0
% Outside Limits	0%	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-3 during 2012 (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 March 12, 2012 the Village received from The ALS Laboratories a positive result with Total Coliform = 2 MPN/100ml for the PRV-3 sample station, and according to the Canadian Drinking Water Quality Guidelines, this result was within the acceptable limits. On March 19, 2012 another sample from the PRV-3 station was sent to the ALS laboratory and the result was Negative.

#### **Metals and General Chemistry**

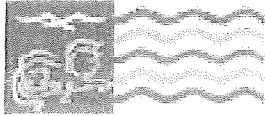
See results in Appendix “C”

#### **UPGRADING WORK IN 2012**

There were not upgrading works during 2012.

#### **UPGRADING WORK PLANNED FOR 2013**

There are not upgrading works planned for 2013



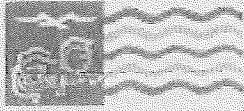
**OPERATOR TRAINING**

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
❖ Hydrant Maintenance Program	2012
❖ Water Quality Sampling for Water & Wastewater	2012
❖ 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



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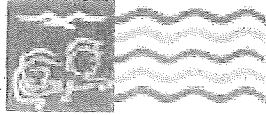
**2012**

**Appendix A**

**Water Quality Sampling**

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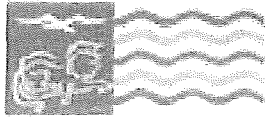
**LIST OF SAMPLING SITE LOCATIONS**

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
Lions Bay Avenue	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
Lions Bay Avenue	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

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
Lions Bay Avenue	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
Kiddley Winks Preschool	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 seven sites. Samples are delivered to the ALS Environmental Laboratory for analysis and reporting. The sampling locations are listed above and include source, middle, 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.

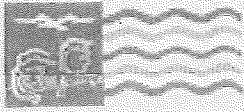
The Canadian Drinking Water Guidelines (and the US Environmental Protection Agency) state that the turbidity of an unfiltered raw water supply should generally be around 1 NTU, and should not exceed 5 NTU.

### **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 THM's testing. The GCDWQ recommend an aesthetic objective for pH ranging between 6.5 and 8.5
  
- ❖ Metals: The Regional Medical Health Officers developed a strategy for sampling metals at the tap. The new requirement is to sampling metals "at the tap" in a biyearly basis for lead, copper and zinc, with sample locations consisting of a mixture of private homes, sample stations, and public buildings, including schools.



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**Appendix B**

**Source / Distribution Water Test Results**

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# Treated Water Quality Record

## February 2012

DATE	TREATED WATER FEBRUARY 2012															
	HARVEY										MAGNESIA					
	400 HAR. TANK		PRV-3		STORE/CAFÉ		LIONS BAY AVE.		KELVIN GROVE		100 MAG. TANK		PRV-5		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)	Turbidity (NTU)	CL2 Res. (ppm)
1	0.96	0.94	0.34	0.92	0.25	0.64	1.09	0.58	0.26	0.65	0.33	0.66	0.53	0.69	0.59	0.72
2	0.31	0.58	0.24	0.78	0.34	0.46	0.29	0.63	0.35	0.71	0.22	0.84	0.29	0.84	0.19	0.58
3	0.49	0.86	0.16	0.84	0.16	0.61	0.31	0.51	0.27	0.72	0.41	0.87	0.28	0.85	0.31	0.57
4																
5																
6	0.19	0.95	0.12	0.94	0.23	0.71	0.25	0.69	0.19	0.76	0.29	1.24	0.19	1.25	0.18	0.51
7	0.73	0.94	0.25	0.91	0.18	0.77	1.00	0.74	0.17	0.85	0.16	1.19	0.16	1.15	0.17	0.61
8	0.43	0.94	0.28	0.92	0.24	0.77	0.67	0.68	0.28	0.84	0.25	1.11	0.31	1.13	0.26	1.11
9	0.35	0.86	0.28	0.84	0.23	0.71	0.86	0.68	0.50	0.74	0.21	1.14	0.39	1.10	0.32	0.88
10	1.68	0.69	0.89	0.66	0.58	0.57	1.16	0.61	0.60	0.59	1.59	0.87	0.35	0.92	0.22	0.79
11																
12																
13	1.53	0.90	0.84	0.89	0.24	0.72	0.34	0.47	0.19	0.58	0.27	0.76	0.48	0.74	0.31	0.45
14	0.44	1.03	0.83	1.01	0.25	0.72	0.42	0.58	0.32	0.68	0.31	0.69	0.32	0.68	0.39	0.22
15	3.29	1.10	0.24	1.07	0.46	1.33	0.20	0.71	0.28	0.66	0.25	0.78	0.19	0.81	0.33	0.26
16	0.20	1.05	0.14	1.03	0.25	0.83	0.19	0.77	0.18	0.78	0.25	0.98	0.15	0.92	0.24	0.34
17	3.14	0.84	0.45	0.82	0.22	0.70	0.22	0.84	0.79	0.80	0.52	1.05	0.24	0.99	0.21	0.29
18																
19																
20	0.29	0.81	0.34	0.79	0.59	0.51	0.22	0.40	0.15	0.51	0.30	0.94	0.39	0.95	0.19	0.70
21	1.30	0.88	0.14	0.86	0.20	0.68	0.14	0.48	0.20	0.47	0.30	1.30	0.21	1.01	0.22	0.53
22	1.40	0.85	0.15	0.83	0.18	0.67	0.17	0.61	0.23	0.49	0.22	0.95	0.23	0.88	0.20	0.68
23	0.77	0.82	0.70	0.80	1.01	0.60	0.47	0.60	0.24	0.54	1.23	0.82	0.27	0.82	0.24	0.74
24	2.21	0.89	1.08	0.87	0.41	0.57	0.17	0.49	0.16	0.44	0.27	0.86	0.51	0.81	0.83	0.66
25																
26																
27	0.25	0.98	0.52	0.96	0.12	0.72	0.14	0.63	0.60	0.74	0.30	0.87	0.17	0.92	0.23	0.51
28	1.60	1.06	0.17	1.04	0.13	0.77	0.13	0.67	0.13	0.87	0.15	0.81	0.42	0.79	0.35	0.57
29	2.79	1.07	0.44	1.04	0.41	0.83	0.23	0.77	0.18	0.73	0.20	0.82	0.29	0.31	0.34	0.67

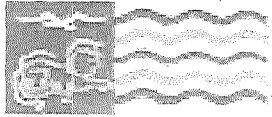




# Treated Water Quality Record

## April 2012

DATE	TREATED WATER APRIL 2012															
	HARVEY										MAGNESIA					
	400 HAR. TANK		PRV-3		STORE/CAFÉ		LIONS BAY AVE.		KELVIN GROVE		100 MAG. TANK		PRV-5		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)	Turbidity (NTU)	CL2 Res. (ppm)
1																
2	0.33	0.98	0.28	0.95	0.31	0.78	0.24	0.61	0.24	0.76	0.24	0.97	0.44	1.05	0.49	0.36
3	1.56	0.85	0.40	0.82	0.30	0.69	0.34	0.59	0.30	0.76	0.76	1.09	1.11	1.05	0.63	0.39
4	0.32	0.79	0.27	0.76	0.38	0.58	0.14	0.68	0.19	0.60	0.93	1.03	0.95	0.95	0.35	0.57
5	0.43	0.87	0.31	0.84	0.21	0.56	0.24	0.52	0.25	0.60	0.86	1.07	0.80	1.02	0.36	0.66
6	1.85	0.88	0.32	0.86	0.23	0.63	0.24	0.53	0.28	0.47	0.56	0.98	0.83	1.00	0.39	0.63
7																
8																
9	0.57	1.04	0.21	1.00	0.47	0.82	0.14	0.76	0.27	0.62	0.33	1.07	0.38	1.06	0.39	0.66
10	0.49	0.93	0.19	0.90	0.34	0.78	0.19	0.84	0.21	0.68	0.33	0.87	0.39	0.87	0.38	0.73
11	0.56	0.86	0.35	0.82	0.32	0.69	0.23	0.78	0.19	0.67	1.18	0.72	0.33	0.73	0.29	0.76
12	1.31	0.80	0.44	0.77	0.35	0.58	0.19	0.65	0.29	0.56	0.33	0.64	0.35	0.62	0.24	0.59
13	0.92	0.79	0.48	0.76	0.38	0.57	0.17	0.50	0.35	0.64	0.68	0.65	1.01	0.63	0.38	0.44
14																
15																
16	0.28	0.89	0.96	0.86	0.33	0.71	0.17	0.57	0.15	0.72	0.60	0.65	0.45	0.76	0.28	0.25
17	0.36	0.80	0.21	0.76	0.32	0.60	0.24	0.58	0.35	0.67	0.31	0.89	1.70	0.85	0.45	0.34
18	0.59	0.76	0.57	0.73	0.45	0.52	0.25	0.53	0.26	0.67	0.37	0.91	0.53	0.88	0.33	0.43
19	0.68	0.76	0.30	0.72	0.21	0.51	0.21	0.55	0.32	0.62	0.73	0.97	0.59	0.90	0.28	0.43
20	0.86	0.75	0.41	0.71	0.21	0.52	0.16	0.48	0.17	0.61	0.45	0.89	0.48	0.90	0.30	0.52
21																
22																
23	0.42	0.70	0.42	0.66	0.36	0.53	0.21	0.47	0.26	0.58	1.55	0.87	0.50	0.89	0.20	0.56
24	0.60	0.70	0.45	0.66	0.29	0.44	0.31	0.39	0.37	0.54	0.71	0.70	0.78	0.68	0.28	0.62
25	0.86	0.68	0.62	0.65	0.50	0.54	0.28	0.33	0.65	0.60	0.63	0.61	0.77	0.58	0.31	0.54
26	2.16	0.58	1.60	0.55	0.84	0.30	0.36	0.37	0.90	0.33	3.63	0.75	2.99	0.33	0.33	0.36
27	2.48	0.89	1.34	0.86	0.83	0.55	0.78	0.23	0.78	0.21	3.55	1.68	4.25	0.63	0.45	0.24
28																
29																
30	0.68	1.12	0.36	1.10	0.42	0.98	0.31	0.73	0.30	0.90	0.84	0.97	1.15	0.93	1.22	0.47



## Treated Water Quality Record May 2012

DATE	TREATED WATER MAY 2012															
	HARVEY										MAGNESIA					
	400 HAR. TANK		PRV-3		STORE/CAFÉ		LIONS BAY AVE.		KELVIN GROVE		100 MAG. TANK		PRV-5		BRUNSWICK B.	
	Turbidity	CL2 Res.	Turbidity	CL2 Res.	Turbidity	CL2 Res.	Turbidity	CL2 Res.	Turbidity	CL2 Res.	Turbidity	CL2 Res.	Turbidity	CL2 Res.	Turbidity	CL2 Res.
	(NTU)	(ppm)	(NTU)	(ppm)	(NTU)	(ppm)	(NTU)	(ppm)	(NTU)	(ppm)	(NTU)	(ppm)	(NTU)	(ppm)	(NTU)	(ppm)
1	0.68	1.00	0.59	0.97	0.35	0.80	0.33	0.81	0.39	0.80	1.17	1.01	0.65	0.97	1.61	0.40
2	1.62	0.89	0.47	0.86	0.27	0.66	0.23	0.67	0.23	0.71	0.43	1.02	0.71	0.98	0.52	0.45
3	1.39	0.87	0.71	0.83	0.21	0.65	0.25	0.57	0.24	0.68	0.75	1.11	0.57	1.04	0.44	0.42
4	1.42	0.86	0.28	0.83	0.20	0.62	0.23	0.55	0.21	0.57	0.47	0.98	0.40	0.95	0.32	0.44
5																
6																
7	0.27	0.86	0.19	0.82	0.27	0.68	0.18	0.64	0.19	0.61	0.36	1.00	0.38	0.99	0.26	0.54
8	2.81	0.85	0.44	0.83	0.25	0.62	0.15	0.62	0.24	0.66	1.97	0.87	0.48	0.87	0.23	0.56
9	0.49	0.85	0.32	0.82	0.40	0.55	0.30	0.57	0.37	0.67	0.53	0.72	0.47	0.73	0.30	0.60
10	0.72	0.84	0.46	0.66	0.67	0.57	0.25	0.65	1.14	0.60	1.29	0.74	0.67	0.55	0.30	0.44
11	0.81	0.87	0.47	0.86	0.26	0.66	0.40	0.65	0.31	0.74	0.53	0.60	0.27	0.72	1.11	0.30
12																
13																
14	1.03	0.87	0.41	0.85	0.48	0.83	0.45	0.76	0.29	0.69	0.34	0.86	0.36	0.88	0.21	0.51
15	0.50	0.72	0.49	0.70	0.51	0.61	0.29	0.63	0.32	0.49	1.69	0.93	0.60	0.89	0.27	0.62
16	0.40	0.67	0.44	0.75	0.39	0.63	0.50	0.51	0.30	0.23	0.83	0.63	0.62	0.79	0.39	0.52
17	0.62	0.74	0.24	0.82	0.27	0.75	0.22	0.58	0.28	0.46	0.36	1.08	0.42	1.10	0.34	0.79
18	0.33	0.77	0.31	0.86	0.37	0.85	0.20	0.72	0.18	0.37	0.29	1.13	0.32	1.11	0.30	0.74
19																
20																
21	0.24	0.90	0.52	0.87	0.27	0.75	0.16	0.76	0.32	0.52	0.65	1.10	0.39	1.11	0.41	0.61
22	1.52	0.69	0.81	0.66	0.83	0.58	0.33	0.56	0.57	0.37	1.19	0.68	1.16	0.64	0.42	0.67
23	1.04	0.81	0.79	0.78	0.81	0.78	0.57	0.33	0.47	0.56	1.00	0.80	1.32	0.80	0.28	0.69
24	0.43	0.91	0.80	0.90	0.49	0.82	0.47	0.50	0.34	0.58	1.19	0.85	0.69	0.90	0.62	0.26
25	0.50	0.97	0.71	0.95	0.38	0.88	0.36	0.74	0.33	0.69	1.26	1.02	0.44	0.96	0.53	0.25
26																
27																
28	0.35	0.85	0.36	0.83	0.23	0.79	0.24	0.70	0.25	0.64	0.51	0.72	0.69	0.69	0.23	0.47
29	0.51	0.88	0.46	0.85	0.28	0.74	0.22	0.59	0.29	0.54	1.69	0.83	0.97	0.82	0.36	0.39
30	0.48	0.90	0.42	0.87	0.46	0.76	0.23	0.58	0.25	0.40	0.75	1.07	0.98	1.08	0.37	0.30
31	1.35	0.83	0.32	0.80	0.24	0.74	0.24	0.92	0.21	0.37	0.93	0.94	0.44	1.10	0.35	0.37

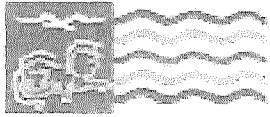




# Treated Water Quality Record

## July 2012

DATE	TREATED WATER JULY 2012															
	HARVEY										MAGNESIA					
	400 HAR. TANK		PRV-3		STORE/CAFÉ		LIONS BAY AVE.		KELVIN GROVE		100 MAG. TANK		PRV-5		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)	Turbidity (NTU)	CL2 Res. (ppm)
1																
2	1.58	0.72	0.25	0.70	0.27	0.62	0.34	0.39	0.23	0.50	0.97	0.77	0.33	0.81	0.25	0.38
3	1.11	1.06	0.85	1.03	0.50	1.01	0.30	0.45	0.20	0.52	0.49	0.68	0.39	0.66	0.38	0.21
4	1.32	1.17	0.56	1.15	0.36	1.12	0.34	0.70	0.27	0.95	1.42	0.74	0.59	0.74	0.27	0.25
5	1.00	1.30	0.36	1.27	0.33	1.15	0.30	0.87	0.23	0.55	1.68	0.76	0.27	0.74	0.24	0.26
6	1.06	0.94	0.53	0.91	0.32	0.83	0.22	0.93	0.34	0.75	0.55	0.76	0.62	0.76	0.28	0.29
7																
8																
9	0.62	1.18	0.30	1.15	0.44	1.10	0.37	1.10	0.26	0.85	0.32	0.71	0.30	0.69	0.27	0.29
10	0.26	1.04	0.24	1.01	0.34	0.93	0.41	0.93	0.24	0.86	0.33	0.80	0.31	0.81	0.36	0.40
11	0.36	0.85	0.40	0.82	0.21	0.76	0.46	0.78	0.21	0.67	0.57	0.87	0.89	0.85	0.28	0.39
12	1.25	0.82	0.58	0.78	0.33	0.74	0.68	0.70	0.24	0.63	1.10	0.88	0.24	0.85	0.36	0.44
13	1.37	0.88	0.50	0.85	0.34	0.79	0.32	0.67	0.20	0.44	0.63	0.92	0.59	0.83	0.24	0.51
14																
15																
16	0.33	0.84	0.31	0.81	0.29	0.74	0.26	0.69	0.23	0.74	0.50	0.90	0.57	0.83	0.34	0.45
17	1.48	0.89	0.56	0.86	0.34	0.77	0.24	0.68	0.18	0.57	0.99	0.78	0.49	0.77	0.25	0.40
18	0.90	0.88	0.68	0.79	0.46	0.85	0.32	0.75	0.20	0.55	0.36	0.73	0.49	0.69	0.27	0.45
19	0.93	0.89	0.46	0.85	0.35	0.79	0.36	0.75	0.27	0.62	1.14	0.74	0.51	0.69	0.26	0.36
20	1.01	0.90	0.41	0.87	0.46	0.80	0.24	0.69	0.23	0.55	0.81	0.73	0.37	0.73	0.24	0.32
21																
22																
23	0.81	0.75	1.15	0.72	0.39	0.65	0.19	0.58	0.24	0.33	0.35	0.67	0.53	0.63	0.26	0.21
24	0.99	0.66	0.56	0.64	0.37	0.56	0.30	0.40	0.32	0.33	0.62	0.72	0.65	0.75	0.24	0.43
25	0.89	0.81	0.63	0.78	0.36	0.74	0.32	0.53	0.26	0.36	1.40	0.83	0.65	0.73	0.23	0.20
26	1.00	0.97	1.01	0.94	0.39	0.84	0.34	0.72	0.52	0.49	1.20	0.91	0.48	0.86	0.40	0.45
27	0.96	0.95	0.36	0.92	0.22	0.82	0.23	0.73	0.26	0.57	0.54	0.87	0.61	0.87	0.24	0.40
28																
29																
30	0.53	0.89	0.30	0.86	0.31	0.64	0.24	0.75	0.27	0.55	1.08	0.94	0.24	0.89	0.26	0.51
31	0.83	0.88	0.25	0.85	0.31	0.68	0.29	0.72	0.18	0.69	0.40	0.71	0.41	0.81	0.23	0.52



# Treated Water Quality Record

## August 2012

DATE	TREATED WATER AUGUST 2012															
	HARVEY										MAGNESIA					
	400 HAR. TANK		PRV-3		STORE/CAFÉ		LIONS BAY AVE.		KELVIN GROVE		100 MAG. TANK		PRV-5		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)	Turbidity (NTU)	CL2 Res. (ppm)
1	0.23	0.92	0.21	0.89	0.29	0.72	0.25	0.77	0.19	0.46	0.46	0.76	0.24	0.71	0.22	0.49
2	0.60	0.93	0.25	0.89	0.32	0.69	0.39	0.79	0.18	0.49	0.86	0.73	0.68	0.71	0.16	0.45
3	0.38	0.89	0.45	0.86	0.37	0.70	0.50	0.80	0.29	0.66	0.35	0.77	0.40	0.72	0.32	0.44
4																
5																
6	1.23	0.89	0.25	0.86	0.25	0.69	0.33	0.76	0.26	0.58	0.29	0.78	0.22	0.75	0.32	0.55
7	0.36	0.87	0.23	0.84	0.24	0.62	0.25	0.73	0.19	0.60	0.61	0.82	0.29	0.82	0.32	0.41
8	0.66	0.82	0.54	0.78	0.36	0.60	0.28	0.65	0.20	0.47	0.90	0.83	0.50	0.84	0.28	0.35
9	0.28	0.84	0.32	0.80	0.36	0.63	0.24	0.45	0.25	0.85	0.31	0.79	0.42	0.79	0.28	0.47
10	0.57	0.90	0.32	0.87	0.28	0.69	0.35	0.79	0.17	0.58	0.61	0.86	0.51	0.82	0.26	0.42
11																
12																
13	0.19	0.86	0.20	0.83	0.33	0.71	0.23	0.83	0.18	0.68	0.32	0.86	0.26	0.80	0.19	0.60
14	0.37	0.95	0.22	0.93	0.18	0.81	0.22	0.82	0.14	0.69	0.27	0.76	0.21	0.72	0.22	0.55
15	0.23	0.90	0.19	0.87	0.18	0.79	0.25	0.82	0.16	0.71	0.28	0.78	0.26	0.75	0.27	0.50
16	0.34	0.87	0.24	0.84	0.30	0.68	0.26	0.82	0.17	0.70	0.66	0.70	0.73	0.65	0.78	0.37
17	0.20	0.84	0.13	0.85	0.19	0.72	0.21	0.72	0.16	0.58	0.35	0.84	0.57	0.79	0.48	0.49
18																
19																
20	0.19	0.65	0.17	0.80	0.19	0.71	0.13	0.71	0.18	0.53	0.21	0.91	0.35	0.87	0.36	0.56
21	0.31	0.90	0.34	0.86	0.32	0.69	0.25	0.75	0.16	0.64	0.34	0.82	0.25	0.81	0.21	0.55
22	0.28	0.90	0.20	0.86	0.53	0.74	0.18	0.72	0.17	0.42	0.42	0.87	0.47	0.88	0.22	0.49
23	0.40	0.84	0.23	0.81	0.15	0.65	0.21	0.70	0.20	0.51	0.56	0.88	0.21	0.97	0.26	0.55
24	0.38	0.84	0.24	0.81	0.25	0.68	0.26	0.71	0.18	0.52	0.42	0.98	0.28	0.95	0.22	0.52
25																
26																
27	0.20	0.84	0.35	0.80	0.33	0.68	0.30	0.70	0.97	0.73	0.30	0.91	0.34	0.93	0.28	0.62
28	0.30	0.89	0.40	0.86	0.29	0.71	0.21	0.73	0.23	0.49	0.46	0.90	0.52	0.86	0.24	0.59
29	0.26	0.87	0.23	0.84	0.19	0.75	0.28	0.68	0.17	0.56	0.82	1.00	0.31	0.97	0.30	0.62
30	0.61	0.90	0.32	0.87	0.27	0.71	0.18	0.73	0.21	0.48	0.40	0.86	0.34	0.85	0.18	0.51
31	0.19	0.89	0.18	0.87	0.24	0.75	0.12	0.76	0.15	0.51	0.13	0.85	0.16	0.84	0.35	0.63



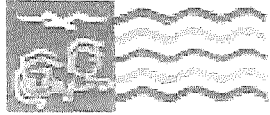




## Treated Water Quality Record October 2012

DATE	TREATED WATER OCTOBER 2012															
	HARVEY										MAGNESIA					
	400 HAR. TANK		PRV-3		STORE/CAFÉ		LIONS BAY AVE.		KELVIN GROVE		100 MAG. TANK		PRV-5		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)	Turbidity (NTU)	CL2 Res. (ppm)
1	0.20	0.90	0.27	0.87	0.28	0.76	0.19	0.76	0.16	0.47	0.18	0.80	0.21	0.74	0.24	0.42
2	0.15	0.83	0.18	0.89	0.21	0.76	0.21	0.83	0.14	0.60	0.18	0.79	0.23	0.81	0.18	0.46
3	0.14	0.90	0.16	0.87	0.22	0.76	0.14	0.77	0.15	0.68	0.14	0.79	0.18	0.75	0.21	0.45
4	0.30	0.90	0.22	0.87	0.21	0.75	0.29	0.79	0.19	0.67	0.16	0.83	0.34	0.78	0.24	0.47
5	0.21	0.91	0.25	0.88	0.32	0.81	0.27	0.82	0.15	0.65	0.15	0.81	0.18	0.78	0.28	0.51
6																
7																
8	0.21	1.01	0.62	0.98	0.28	0.87	0.18	0.88	0.24	0.80	0.16	0.80	0.19	0.79	0.20	0.59
9	0.18	0.89	0.24	0.85	0.18	0.80	0.16	0.84	0.26	0.71	0.14	0.86	0.23	0.87	0.22	0.52
10	0.21	0.84	0.39	0.81	0.27	0.68	0.18	0.75	0.24	0.69	0.30	0.92	0.18	0.84	0.26	0.62
11	0.24	0.84	0.37	0.83	0.24	0.72	0.20	0.74	0.20	0.59	0.46	0.86	0.32	0.86	0.27	0.60
12	0.36	0.84	0.39	0.80	0.28	0.68	0.24	0.69	0.22	0.49	0.35	0.94	0.43	0.92	0.25	0.54
13																
14																
15	0.53	0.58	0.52	0.55	0.56	0.31	0.61	0.22	0.42	0.24	2.04	0.76	0.73	0.65	0.29	0.41
16	0.51	0.77	0.62	0.75	0.85	0.51	0.42	0.31	0.34	0.27	0.97	0.67	0.62	0.70	0.39	0.30
17	0.37	0.94	0.53	0.92	0.40	0.68	0.36	0.51	0.31	0.61	0.35	0.87	0.33	0.82	0.46	0.30
18	0.62	0.99	0.48	0.96	0.33	0.79	0.28	0.63	0.29	0.65	0.53	1.10	0.29	1.07	0.38	0.53
19	1.33	0.70	0.52	0.67	0.35	0.63	0.23	0.74	0.32	0.65	0.95	0.73	0.81	0.67	0.23	0.43
20																
21																
22	0.33	0.83	0.42	0.81	0.47	0.66	0.28	0.60	0.21	0.48	0.52	0.97	0.30	0.96	0.24	0.21
23	1.11	0.89	0.36	0.86	0.49	0.72	0.18	0.58	0.13	0.58	0.57	1.09	0.39	1.03	0.25	0.34
24	0.37	0.85	0.75	0.82	0.28	0.70	0.26	0.61	0.24	0.52	0.27	1.00	0.35	0.98	0.24	0.46
25	1.05	0.78	0.76	0.74	0.37	0.63	0.28	0.59	2.36	0.49	0.72	0.90	0.31	0.86	0.31	0.56
26	0.89	0.72	0.38	0.70	0.30	0.58	0.17	0.52	0.17	0.48	0.14	0.88	0.24	0.87	0.30	0.63
27																
28																
29	0.25	0.60	0.25	0.56	0.32	0.36	0.28	0.24	0.24	0.24	0.31	0.74	0.31	0.71	0.21	0.40
30	0.80	0.55	1.12	0.53	0.77	0.39	0.47	0.27	0.30	0.26	0.86	0.44	1.40	0.42	0.42	0.36
31	0.74	0.63	0.86	0.60	0.64	0.46	0.33	0.21	0.34	0.25	1.47	0.61	0.74	0.56	0.23	0.22

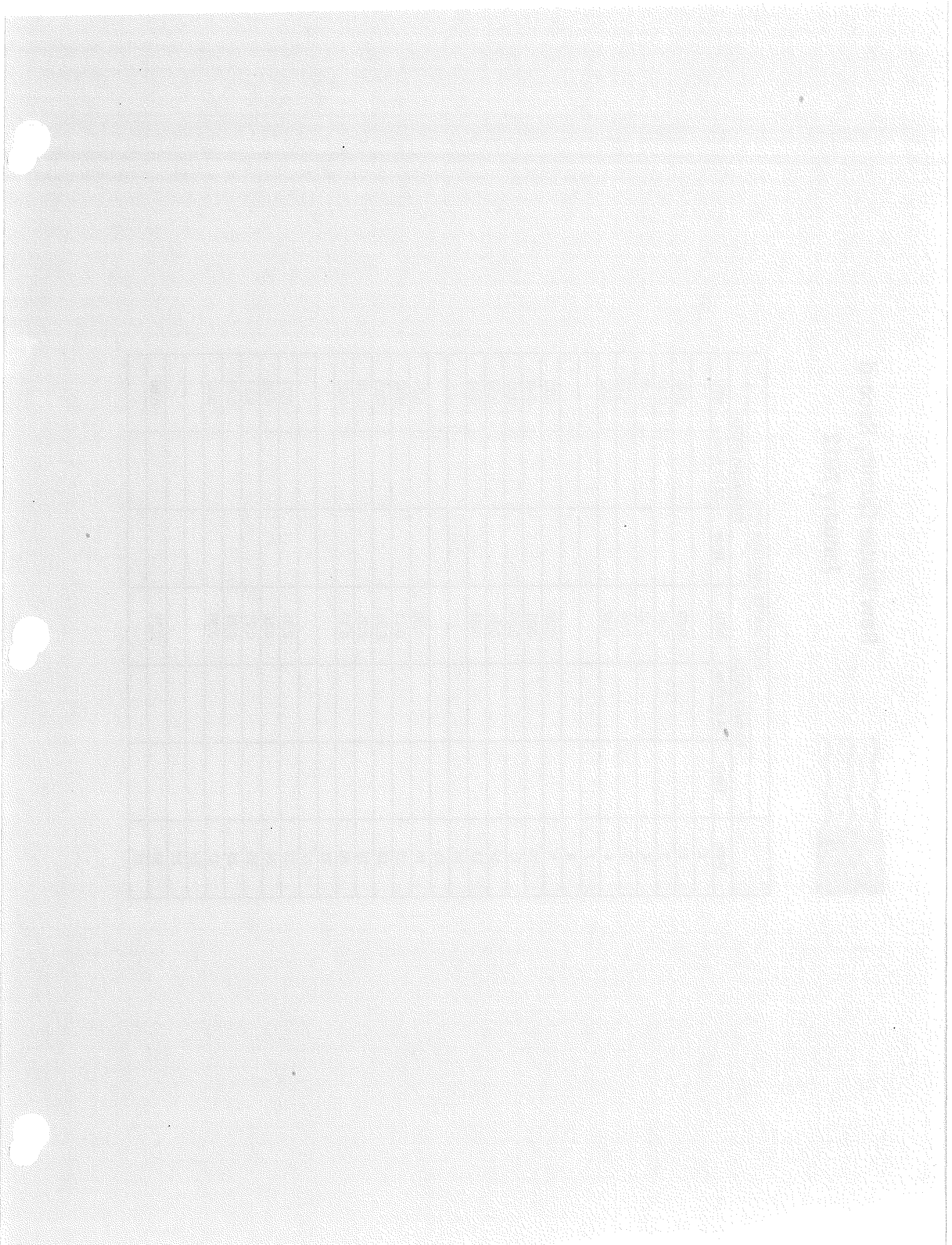


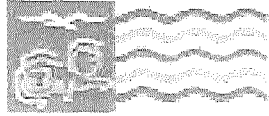


# Treated Water Quality Record

## December 2012

TREATED WATER DECEMBER 2012																
DATE	HARVEY										MAGNESIA					
	400 HAR. TANK		PRV-3		STORE/CAFÉ		LIONS BAY AVE.		KELVIN GROVE		100 MAG. TANK		PRV-5		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)	Turbidity (NTU)	CL2 Res. (ppm)
1																
2																
3	1.21	1.05	0.92	1.01	0.53	0.76	0.44	0.54	0.39	0.28	0.64	1.21	0.67	1.13	0.88	0.62
4	0.93	0.90	0.58	0.86	0.37	0.73	0.39	0.61	0.53	0.31	2.56	0.94	1.69	0.85	0.50	0.49
5	0.64	0.82	1.43	0.79	0.63	0.59	0.34	0.61	0.35	0.35	0.80	0.93	0.97	0.80	0.36	0.71
6	0.54	0.92	0.71	0.89	0.39	0.63	0.29	0.52	0.25	0.22	0.65	1.06	0.76	1.05	0.71	0.50
7	0.20	0.82	0.25	0.83	0.28	0.64	0.22	0.63	0.19	0.32	0.34	0.86	0.31	0.89	0.47	0.38
8																
9																
10	0.27	1.01	0.56	0.98	0.22	0.80	0.15	0.72	0.18	0.74	0.37	0.94	0.25	0.90	0.26	0.43
11	0.23	0.81	0.27	0.78	0.31	0.76	0.20	0.72	0.16	0.78	0.28	0.91	0.26	0.87	0.23	0.52
12	0.65	0.78	0.47	0.75	0.26	0.60	0.17	0.68	0.17	0.45	0.35	0.91	0.39	0.87	0.38	0.56
13	0.67	0.75	0.35	0.72	0.25	0.57	0.18	0.60	0.26	0.43	0.20	0.92	0.18	0.87	0.37	0.55
14	0.49	0.80	0.22	0.77	0.16	0.58	0.18	0.54	0.15	0.35	0.42	1.00	0.26	0.97	0.33	0.54
15																
16																
17	0.28	0.81	0.26	0.77	0.29	0.71	0.26	0.65	0.23	0.33	0.90	1.00	0.85	0.97	0.33	0.62
18	0.67	0.80	0.31	0.77	0.28	0.61	0.16	0.65	0.28	0.45	0.51	0.89	0.31	0.86	0.28	0.72
19	0.30	0.88	0.64	0.85	0.33	0.70	0.15	0.65	0.26	0.84	0.40	0.84	0.72	0.86	0.65	0.59
20	0.44	0.82	0.56	0.80	4.96	0.67	0.46	0.66	0.41	0.51	0.48	0.82	0.52	0.79	0.36	0.57
21	0.61	0.72	0.63	0.69	3.69	0.55	0.31	0.64	0.28	0.47	0.29	0.78	0.28	0.81	0.34	0.58
22																
23																
24	0.26	0.59	0.55	0.56	0.41	0.40	0.20	0.46	0.42	0.25	0.39	0.77	0.21	0.70	0.22	0.50
25																
26	0.39	0.92	0.27	0.89	0.66	0.79	0.25	0.49	0.20	0.47	0.39	1.25	0.42	1.19	0.39	0.38
27	0.27	0.94	0.24	0.91	0.26	0.74	0.24	0.65	0.29	0.45	0.36	1.07	0.17	1.06	0.27	0.71
28	0.32	0.96	0.62	0.93	0.26	0.75	0.26	0.69	0.27	0.57	0.53	1.06	0.35	1.01	0.35	0.88
29																
30																
31	0.31	1.04	0.29	1.02	0.48	0.87	0.16	0.76	0.13	0.74	0.26	1.02	0.18	1.02	0.34	0.68





# Raw Water Quality Record

## January 2012

Date	RAW WATER JANUARY 2012					
	HARVEY CREEK			MAGNESIA CREEK		
	Time	24 Hr Flow	NTU	Time	24 Hr Flow	NTU
1						
2			0.48			0.25
3			0.48			0.32
4			2.43			0.47
5			0.35			0.73
6			0.37			0.51
7						
8						
9			0.20			0.22
10			0.21			0.44
11			0.49			0.21
12			0.24			0.52
13			0.34			0.41
14						
15						
16			0.20			0.21
17			0.15			0.32
18			0.25			0.19
19			0.21			1.38
20			0.19			0.65
21						
22						
23			0.35			0.22
24			0.16			0.38
25			0.25			0.37
26			0.31			0.43
27			0.30			0.69
28						
29						
30			0.58			0.80
31						



# Raw Water Quality Record

## February 2012

Date	RAW WATER FEBRUARY 2012					
	HARVEY CREEK			MAGNESIA CREEK		
	Time	24 Hr Flow	NTU	Time	24 Hr Flow	NTU
1			0.64			0.43
2			0.21			0.38
3			0.21			0.43
4						
5						
6			0.22			0.19
7			0.44			0.21
8			0.35			0.28
9			0.25			0.22
10			0.44			1.55
11						
12						
13			0.50			0.23
14			0.41			0.33
15			0.82			0.26
16			0.17			0.20
17			0.87			0.33
18						
19						
20			0.19			0.23
21			0.94			0.29
22			0.45			0.29
23			0.22			0.29
24			0.50			0.21
25						
26						
27			0.18			0.60
28			0.25			0.24
29			1.03			0.52



# Raw Water Quality Record

## March 2012

Date	RAW WATER MARCH 2012					
	HARVEY CREEK			MAGNESIA CREEK		
	Time	24 Hr Flow	NTU	Time	24 Hr Flow	NTU
1			0.44			0.26
2			0.45			0.29
3						
4						
5			0.23			0.39
6			0.87			0.15
7			0.45			0.16
8			0.40			0.27
9			0.53			0.86
10						
11						
12			0.25			0.51
13			0.26			0.76
14			0.18			0.32
15			0.63			0.65
16			0.46			0.77
17						
18						
19			0.99			0.35
20			0.76			0.68
21			0.69			0.19
22			0.27			0.30
23			0.70			0.62
24						
25						
26			0.31			0.35
27			1.22			0.47
28			0.62			3.00
29			1.19			2.59
30			0.16			0.66
31						

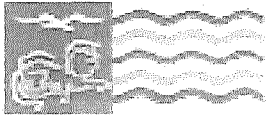




# Raw Water Quality Record

## April 2012

Date	RAW WATER APRIL 2012					
	HARVEY CREEK			MAGNESIA CREEK		
	Time	24 Hr Flow	NTU	Time	24 Hr Flow	NTU
1						
2			0.22			0.36
3			1.19			0.96
4			0.37			0.62
5			0.39			0.65
6			0.76			0.71
7						
8						
9			0.49			0.26
10			0.30			0.37
11			0.98			0.21
12			0.87			0.52
13			0.53			0.45
14						
15						
16			0.46			0.29
17			0.36			0.52
18			0.47			0.46
19			0.52			0.35
20			0.49			0.30
21						
22						
23			0.32			1.15
24			0.30			0.59
25			1.71			1.75
26			1.18			2.78
27			0.82			1.30
28						
29						
30			0.67			1.72



# Raw Water Quality Record

## May 2012

Date	RAW WATER MAY 2012					
	HARVEY CREEK			MAGNESIA CREEK		
Date	Time	24 Hr Flow	NTU	Time	24 Hr Flow	NTU
1			0.32			0.86
2			1.00			0.34
3			1.19			0.65
4			0.61			0.27
5						
6						
7			0.28			0.38
8			1.51			1.53
9			0.42			0.59
10			0.50			0.67
11			0.50			0.59
12						
13						
14			1.22			0.45
15			0.52			1.52
16			0.33			0.32
17			0.24			0.35
18			0.22			0.42
19						
20						
21			1.16			1.87
22			0.47			1.02
23			0.57			1.39
24			0.34			0.75
25			0.49			1.03
26						
27						
28			0.41			0.57
29			0.61			1.39
30			0.37			0.89
31			1.10			1.75



# Raw Water Quality Record

## June 2012

Date	RAW WATER JUNE 2012					
	HARVEY CREEK			MAGNESIA CREEK		
	Time	24 Hr Flow	NTU	Time	24 Hr Flow	NTU
1			0.45			0.81
2						
3						
4			0.58			0.28
5			0.68			0.33
6			0.42			0.54
7			1.44			0.50
8			1.49			0.52
9						
10						
11			0.23			0.17
12			0.31			0.25
13			0.52			0.39
14			0.33			0.27
15			0.54			0.22
16						
17						
18			0.36			0.32
19			0.30			0.59
20			0.19			0.22
21			0.20			0.19
22			0.57			1.02
23						
24						
25			0.33			0.38
26			0.55			0.61
27			0.45			0.41
28			0.37			0.81
29			0.74			0.29
30						



# Raw Water Quality Record

## July 2012

Date	RAW WATER JULY 2012					
	HARVEY CREEK			MAGNESIA CREEK		
	Time	24 Hr Flow	NTU	Time	24 Hr Flow	NTU
1						
2			1.22			0.47
3			0.42			0.47
4			0.80			0.26
5			0.88			1.31
6			0.91			0.37
7						
8						
9			0.58			0.24
10			0.33			0.32
11			0.44			0.42
12			0.80			0.60
13			0.63			0.31
14						
15						
16			0.41			0.37
17			0.43			1.03
18			0.67			0.29
19			0.70			0.73
20			1.19			0.75
21						
22						
23			0.71			0.46
24			0.60			0.42
25			0.79			0.74
26			0.89			0.51
27			0.67			0.41
28						
29						
30			0.64			1.10
31			0.45			0.41



# Raw Water Quality Record

## August 2012

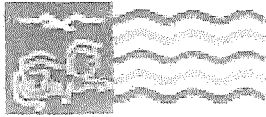
RAW WATER AUGUST 2012						
Date	HARVEY CREEK			MAGNESIA CREEK		
	Time	24 Hr Flow	NTU	Time	24 Hr Flow	NTU
1			0.73			0.69
2			0.42			0.49
3			0.34			0.33
4						
5						
6			0.64			0.23
7			0.31			0.37
8			0.60			0.64
9			0.24			0.20
10			0.34			0.50
11						
12						
13			0.40			0.16
14			0.35			0.26
15			0.36			0.18
16			0.30			0.33
17			0.33			0.50
18						
19						
20			0.32			0.22
21			0.37			0.32
22			0.29			0.31
23			0.32			0.43
24			0.56			0.35
25						
26						
27			0.34			0.47
28			0.27			0.55
29			0.26			0.58
30			0.32			0.25
31			0.20			0.25



# Raw Water Quality Record

## September 2012

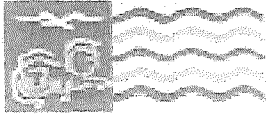
Date	RAW WATER SEPTEMBER 2012					
	HARVEY CREEK			MAGNESIA CREEK		
Date	Time	24 Hr Flow	NTU	Time	24 Hr Flow	NTU
1						
2						
3			0.11			0.19
4			0.24			0.26
5			0.17			0.37
6			0.24			0.23
7			0.19			0.25
8						
9						
10			0.38			0.37
11			0.26			0.19
12			0.20			0.48
13			0.22			0.27
14			0.33			0.24
15						
16						
17			0.31			0.26
18			0.19			0.25
19			0.26			0.31
20			0.85			0.23
21			1.25			0.26
22						
23						
24			0.40			0.22
25			0.36			0.41
26			0.74			0.47
27			0.19			0.36
28			0.26			0.47
29						
30						



# Raw Water Quality Record

## October 2012

RAW WATER OCTOBER 2012						
Date	HARVEY CREEK			MAGNESIA CREEK		
	Time	24 Hr Flow	NTU	Time	24 Hr Flow	NTU
1			0.80			0.23
2			0.22			0.27
3			0.22			0.21
4			0.27			0.25
5			0.21			0.20
6						
7						
8			0.56			0.21
9			0.32			0.54
10			0.27			0.32
11			0.33			0.44
12			0.43			0.34
13						
14						
15			1.18			0.89
16			0.31			0.49
17			0.33			0.40
18			0.50			0.57
19			0.64			0.87
20						
21						
22			0.50			0.30
23			0.48			0.56
24			0.93			0.26
25			0.77			0.46
26			0.37			0.22
27						
28						
29			0.59			0.43
30			1.02			1.47
31			0.54			0.97



# Raw Water Quality Record

## November 2012

Date	RAW WATER NOVEMBER 2012					
	HARVEY CREEK			MAGNESIA CREEK		
	Time	24 Hr Flow	NTU	Time	24 Hr Flow	NTU
1			0.84			1.47
2			0.90			1.34
3						
4						
5			0.95			0.75
6			0.92			0.48
7			0.76			0.48
8			0.37			1.06
9			0.46			0.30
10						
11						
12			0.30			0.27
13			0.27			0.47
14			0.71			0.22
15			0.32			0.29
16			0.29			0.37
17						
18						
19			0.81			0.65
20			0.54			0.42
21			0.25			0.36
22			0.56			0.40
23			0.99			0.51
24						
25						
26			0.48			0.25
27			0.47			0.34
28			0.45			0.28
29			0.94			0.90
30			2.08			0.83

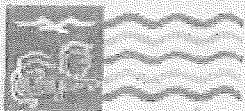




# Raw Water Quality Record

## December 2012

Date	RAW WATER DECEMBER 2012					
	HARVEY CREEK			MAGNESIA CREEK		
Date	Time	24 Hr Flow	NTU	Time	24 Hr Flow	NTU
1						
2						
3			0.80			0.46
4			2.76			1.87
5			0.76			0.41
6			0.38			0.70
7			0.41			0.30
8						
9						
10			0.37			0.27
11			0.26			0.21
12			0.36			0.19
13			0.36			0.37
14			0.35			0.37
15						
16						
17			0.24			0.32
18			0.34			0.48
19			0.41			0.78
20			0.36			0.41
21			0.64			0.32
22						
23						
24			0.19			0.39
25						
26			0.62			0.19
27			0.36			0.26
28			0.41			0.26
29						
30						
31			0.40			0.32



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**The Municipality of the Village of Lions Bay**

**DRINKING WATER QUALITY**

**ANNUAL REPORT**

**2012**

**Appendix C**

**Water Chemistry Test Results**

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

Date Received: 26-MAR-12  
Report Date: 05-APR-12 10:21 (MT)  
Version: FINAL

Client Phone: 604-921-9833

## Certificate of Analysis

Lab Work Order #: L1127850  
Project P.O. #: NOT SUBMITTED  
Job Reference:  
C of C Numbers: 10-169584  
Legal Site Desc:

Stefanie Teo  
Account Manager

[This report shall not be reproduced except in full without the written authority of the Laboratory.]

ADDRESS: 8081 Lougheed Hwy, Suite 100, Burnaby, BC V5A 1W9 Canada | Phone: +1 604 253 4188 | Fax: +1 604 253 6700  
ALS CANADA LTD Part of the ALS Group A Campbell Brothers Limited Company

# ALS ENVIRONMENTAL ANALYTICAL REPORT

PAGE 2 of 8  
05-APR-12 10:21 (MT)  
Version: FINAL

Sample ID	Description	L1127850-1	L1127850-2	L1127850-3	L1127850-4	L1127850-5
Sampled Date	Sampled Time	26-MAR-12 10:00	26-MAR-12 10:00	26-MAR-12 11:00	26-MAR-12 11:00	26-MAR-12 08:00
Client ID		HARVEY TANK (FIRST DRAW)	HARVEY TANK (AFTER FLUSH)	PRV-3 (FIRST DRAW)	PRV-3 (AFTER FLUSH)	CAFE (FIRST DRAW)
Grouping	Analyte					
<b>WATER</b>						
Physical Tests	Hardness (as CaCO3) (mg/L)	8.04	9.32	7.28	7.63	7.04
	pH (pH)	8.10		7.46		6.57
	Total Suspended Solids (mg/L)	<3.0		<3.0		<3.0
	Turbidity (NTU)	0.36		0.13		0.15
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	9.3		7.3		6.1
Organic / Inorganic Carbon	Total Organic Carbon (mg/L)	1.22		1.23		1.15
Total Metals	Aluminum (Al)-Total (mg/L)	0.061	0.044	0.040	0.044	0.037
	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)	2.71	3.22	2.40	2.51	2.35
	Chromium (Cr)-Total (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
	Copper (Cu)-Total (mg/L)	0.0654	0.0011	0.577	0.0036	0.0435
	Iron (Fe)-Total (mg/L)	0.036	0.035	<0.030	<0.030	0.049
	Lead (Pb)-Total (mg/L)	0.00134	<0.00050	0.00457	<0.00050	<0.00050
	Magnesium (Mg)-Total (mg/L)	0.31	0.31	0.31	0.33	0.28
	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)	0.13	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	<2.0	<2.0	2.1	<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	0.194	<0.050	<0.050
	Aggregate Organics	BOD (mg/L)	<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)	0.0211		0.0195		0.0197
	Total THMs (mg/L)	0.0211		0.0195		0.0197

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

# ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID Description Sampled Date Sampled Time Client ID	L1127850-6 TREAT. W. 26-MAR-12 08:00 CAFE (AFTER FLUSH)	L1127850-7 TREAT. W. 26-MAR-12 09:25 LIONS BAY AVE. (FIRST DRAW)	L1127850-8 TREAT. W. 26-MAR-12 09:25 LIONS BAY AVE. (AFTER FLUSH)	L1127850-9 TREAT. W. 26-MAR-12 08:25 KELVIN GROVE (FIRST DRAW)	L1127850-10 TREAT. W. 26-MAR-12 08:25 KELVIN GROVE (AFTER FLUSH)
Grouping	Analyte					
<b>WATER</b>						
Physical Tests	Hardness (as CaCO3) (mg/L)	7.40	7.57	7.53	8.82	8.72
	pH (pH)		6.75		6.88	
	Total Suspended Solids (mg/L)		<3.0		<3.0	
	Turbidity (NTU)		0.16		0.15	
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)		7.4		8.1	
Organic / Inorganic Carbon	Total Organic Carbon (mg/L)		1.07		1.07	
Total Metals	Aluminum (Al)-Total (mg/L)	0.039	0.014	0.038	0.052	0.054
	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)	2.47	2.53	2.50	3.07	3.05
	Chromium (Cr)-Total (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
	Copper (Cu)-Total (mg/L)	0.0136	0.732	0.0038	0.0821	0.0060
	Iron (Fe)-Total (mg/L)	0.049	<0.030	<0.030	0.102	0.093
	Lead (Pb)-Total (mg/L)	<0.00050	0.00449	<0.00050	0.00950	0.00084
	Magnesium (Mg)-Total (mg/L)	0.30	0.30	0.31	0.28	0.27
	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	0.12	0.12	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	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)		0.0212		0.0376	
	Total THMs (mg/L)		0.0212		0.0376	

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

# ALS ENVIRONMENTAL ANALYTICAL REPORT

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Version: FINAL

	Sample ID Description Sampled Date Sampled Time Client ID	L1127850-11 TREAT. W. 26-MAR-12 12:00 MAGNESIA TANK (FIRST DRAW)	L1127850-12 TREAT. W. 26-MAR-12 12:00 MAGNESIA TANK (AFTER FLUSH)	L1127850-13 TREAT. W. 26-MAR-12 11:20 PRV-5 (FIRST DRAW)	L1127850-14 TREAT. W. 26-MAR-12 11:20 PRV-5 (AFTER FLUSH)	L1127850-15 TREAT. W. 26-MAR-12 12:40 BRUNSWICK BEACH (FIRST DRAW)
Grouping	Analyte					
<b>WATER</b>						
Physical Tests	Hardness (as CaCO <sub>3</sub> ) (mg/L)	15.8	15.6	15.8	15.6	16.3
	pH (pH)	6.78		6.78		6.86
	Total Suspended Solids (mg/L)	<3.0		<3.0		<3.0
	Turbidity (NTU)	0.17		0.21		0.21
Anions and Nutrients	Alkalinity, Total (as CaCO <sub>3</sub> ) (mg/L)	7.2		7.1		7.4
Organic / Inorganic Carbon	Total Organic Carbon (mg/L)	0.74		0.75		0.75
Total Metals	Aluminum (Al)-Total (mg/L)	0.025	0.026	0.029	0.034	0.016
	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)	5.19	5.13	5.20	5.15	5.45
	Chromium (Cr)-Total (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
	Copper (Cu)-Total (mg/L)	0.0149	0.0089	0.0099	0.0052	0.350
	Iron (Fe)-Total (mg/L)	<0.030	<0.030	0.051	<0.030	<0.030
	Lead (Pb)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	0.00060
	Magnesium (Mg)-Total (mg/L)	0.69	0.68	0.68	0.68	0.66
	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)	2.9	2.9	2.9	2.8	2.9
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)	0.0093		0.0092		0.0198
	Total THMs (mg/L)	0.0093		0.0092		0.0198

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

# ALS ENVIRONMENTAL ANALYTICAL REPORT

PAGE 5 of 8  
05-APR-12 10:21 (MT)  
Version: FINAL

	Sample ID Description Sampled Date Sampled Time Client ID	L1127850-16 TREAT. W. 26-MAR-12 12:40 BRUNSWICK BEACH (AFTER FLUSH)	L1127850-17 TREAT. W. 26-MAR-12 07:35 ELEMENTARY SCHOOL (FIRST DRAW)	L1127850-18 TREAT. W. 26-MAR-12 07:35 ELEMENTARY SCHOOL (AFTER FLUSH)	L1127850-19 TREAT. W. 26-MAR-12 09:05 COMMUNITY CENTRE (FIRST DRAW)	L1127850-20 TREAT. W. 26-MAR-12 09:05 COMMUNITY CENTRE (AFTER FLUSH)
Grouping	Analyte					
<b>WATER</b>						
Physical Tests	Hardness (as CaCO <sub>3</sub> ) (mg/L)	16.5	15.1	16.1	7.08	6.96
	pH (pH)		6.80		6.47	
	Total Suspended Solids (mg/L)		<3.0		<3.0	
	Turbidity (NTU)		0.36		0.12	
Anions and Nutrients	Alkalinity, Total (as CaCO <sub>3</sub> ) (mg/L)		7.0		6.3	
Organic / Inorganic Carbon	Total Organic Carbon (mg/L)		0.72		1.08	
Total Metals	Aluminum (Al)-Total (mg/L)	0.026	0.013	0.027	0.014	0.033
	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)	5.52	4.99	5.34	2.38	2.34
	Chromium (Cr)-Total (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
	Copper (Cu)-Total (mg/L)	0.0059	0.856	0.0333	0.809	0.0457
	Iron (Fe)-Total (mg/L)	0.031	0.084	0.128	<0.030	0.033
	Lead (Pb)-Total (mg/L)	<0.00050	0.0489	0.00294	0.00966	0.00061
	Magnesium (Mg)-Total (mg/L)	0.67	0.63	0.66	0.28	0.27
	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	<0.10	<0.10
	Selenium (Se)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Sodium (Na)-Total (mg/L)	2.9	2.7	2.8	<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	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)		0.0211		0.0217	
	Total THMs (mg/L)		0.0211		0.0217	

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

# ALS ENVIRONMENTAL ANALYTICAL REPORT

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05-APR-12 10:21 (MT)  
Version: FINAL

	Sample ID Description Sampled Date Sampled Time Client ID	L1127850-21 RAW W. 26-MAR-12 10:05 HARVEY RAW WATER (AFTER FLUSH)	L1127850-22 RAW W. 26-MAR-12 12:05 MAGNESIA RAW WATER (AFTER FLUSH)			
Grouping	Analyte					
<b>WATER</b>						
Physical Tests	Hardness (as CaCO3) (mg/L)	6.87	15.0			
	pH (pH)	6.97	6.57			
	Total Suspended Solids (mg/L)	<3.0	<3.0			
	Turbidity (NTU)	0.16	0.29			
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	5.4	5.3			
Organic / Inorganic Carbon	Total Organic Carbon (mg/L)	1.30	0.78			
Total Metals	Aluminum (Al)-Total (mg/L)	0.051	0.028			
	Antimony (Sb)-Total (mg/L)	<0.00050	<0.00050			
	Arsenic (As)-Total (mg/L)	<0.00010	0.00011			
	Barium (Ba)-Total (mg/L)	<0.020	<0.020			
	Boron (B)-Total (mg/L)	<0.10	<0.10			
	Cadmium (Cd)-Total (mg/L)	<0.00020	<0.00020			
	Calcium (Ca)-Total (mg/L)	2.25	4.93			
	Chromium (Cr)-Total (mg/L)	<0.0020	<0.0020			
	Copper (Cu)-Total (mg/L)	0.0045	0.0055			
	Iron (Fe)-Total (mg/L)	<0.030	<0.030			
	Lead (Pb)-Total (mg/L)	<0.00050	<0.00050			
	Magnesium (Mg)-Total (mg/L)	0.31	0.65			
	Manganese (Mn)-Total (mg/L)	<0.0020	<0.0020			
	Mercury (Hg)-Total (mg/L)	<0.00020	<0.00020			
	Potassium (K)-Total (mg/L)	<0.10	<0.10			
	Selenium (Se)-Total (mg/L)	<0.0010	<0.0010			
	Sodium (Na)-Total (mg/L)	<2.0	<2.0			
	Uranium (U)-Total (mg/L)	<0.00010	<0.00010			
	Zinc (Zn)-Total (mg/L)	<0.050	<0.050			
Aggregate Organics	BOD (mg/L)	<5.0	<5.0			
Trihalomethanes	Bromodichloromethane (mg/L)					
	Bromoform (mg/L)					
	Dibromochloromethane (mg/L)					
	Chloroform (mg/L)					
	Total THMs (mg/L)					

\* 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)
Laboratory Control Sample	Bromoform	LCS-ND	L1127850-1, -11, -13, -15, -17, -19, -3, -5, -7, -9
Matrix Spike	Total Organic Carbon	MS-B	L1127850-1, -11, -13, -15, -17, -19, -21, -22, -3, -5, -7, -9
Matrix Spike	Total Organic Carbon	MS-B	L1127850-1, -11, -13, -15, -17, -19, -21, -22, -3, -5, -7, -9

### Qualifiers for Individual Parameters Listed:

Qualifier	Description
LCS-ND	Lab Control Sample recovery was slightly outside ALS DQO: Reported non-detect results for associated samples were unaffected.
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**
<b>ALK-COL-VA</b>	Water	Alkalinity by Colourimetric (Automated)	EPA 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.			
<b>BOD5-VA</b>	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.			
<b>BOD5-VA</b>	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.			
<b>CARBONS-TOC-VA</b>	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)".			
<b>HARDNESS-CALC-VA</b>	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.			
<b>HG-TOT-CVAFS-VA</b>	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).			
<b>MET-TOT-ICP-VA</b>	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).			
<b>MET-TOT-LOW-MS-VA</b>	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).			
<b>PH-MAN-VA</b>	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.			
<b>PH-MAN-VA</b>	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.			
<b>PH-PCT-VA</b>	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.			

## Reference Information

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.

**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
\	ALS ENVIRONMENTAL - VANCOUVER, BC, CANADA

**Chain of Custody Numbers:**

10-169584

**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.*

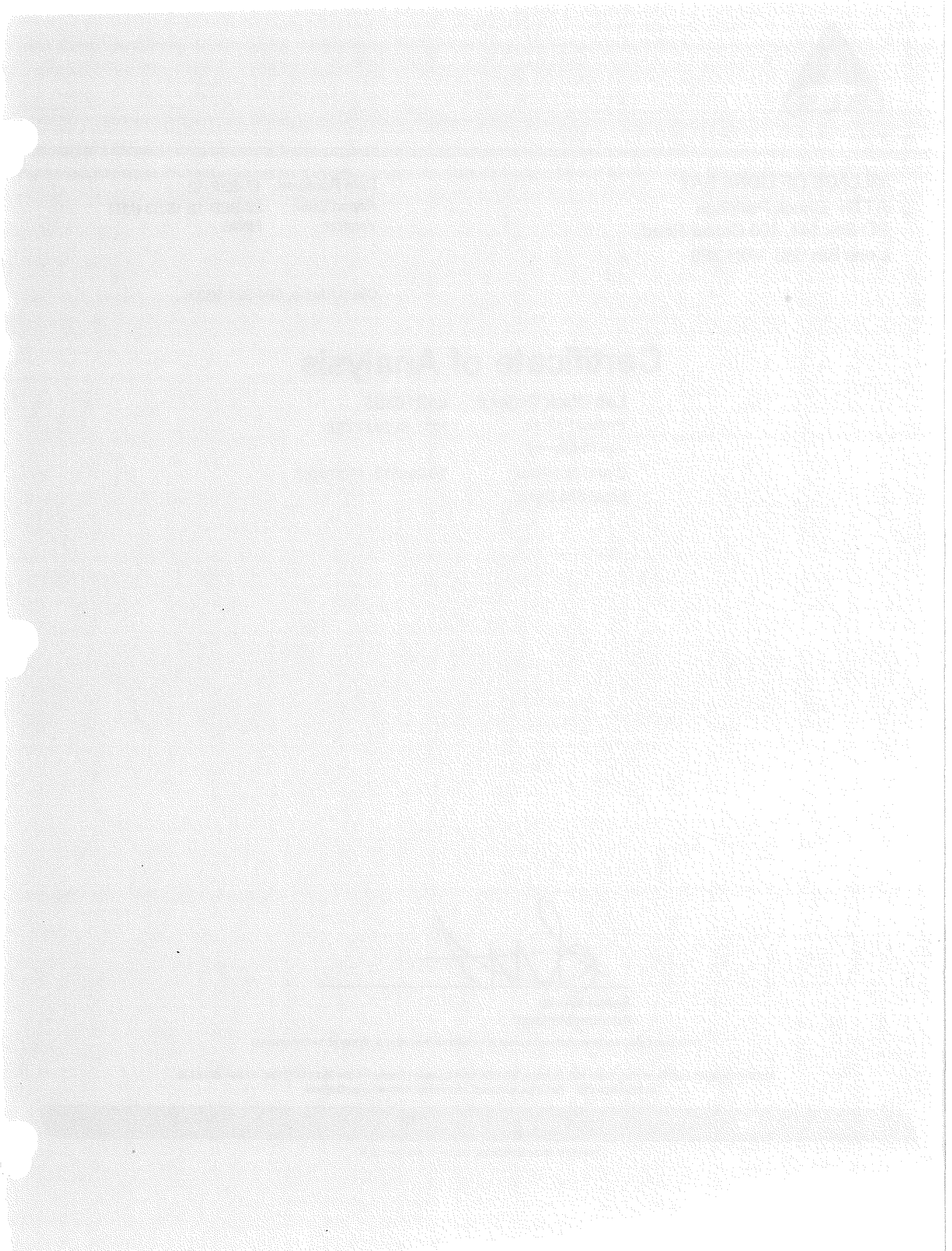
*D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).*

*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: 17-SEP-12  
Report Date: 28-SEP-12 16:53 (MT)  
Version: FINAL

Client Phone: 604-921-9833

## Certificate of Analysis

Lab Work Order #: L1210355  
Project P.O. #: NOT SUBMITTED  
Job Reference:  
C of C Numbers: 10-269511, 10-274467  
Legal Site Desc:

Selam Worku  
Account Manager

[This report shall not be reproduced except in full without the written authority of the Laboratory.]

ADDRESS: 8081 Lougheed Hwy, Suite 100, Burnaby, BC V5A 1W9 Canada | Phone: +1 604 253 4188 | Fax: +1 604 253 6700  
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# ALS ENVIRONMENTAL ANALYTICAL REPORT

L1210355-5  
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 28-SEP-12 16:53 (MT)  
 Version: FINAL

Sample ID	L1210355-1	L1210355-2	L1210355-3	L1210355-4	L1210355-5	
Description	TREATED WATER	TREATED WATER	TREATED WATER	TREATED WATER	TREATED WATER	
Sampled Date	17-SEP-12	17-SEP-12	17-SEP-12	17-SEP-12	17-SEP-12	
Sampled Time	13:40	13:40	10:45	10:45	08:30	
Client ID	HARVEY TANK (FIRST DRAW)	HARVEY TANK (AFTER FLUSH)	PRV-3 (FIRST DRAW)	PRV-3 (AFTER FLUSH)	STORE/CAFE (FIRST DRAW)	
Grouping	Analyte					
<b>WATER</b>						
Physical Tests	Hardness (as CaCO3) (mg/L)	9.07	9.26	7.51	8.63	8.21
	pH (pH)	7.18		7.40		7.43
	Total Suspended Solids (mg/L)	<3.0		<3.0		<3.0
	Turbidity (NTU)	0.24		<0.10		0.12
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	8.9		8.7		8.1
Organic / Inorganic Carbon	Total Organic Carbon (mg/L)	0.51		0.57		0.59
Total Metals	Aluminum (Al)-Total (mg/L)	0.022	0.022	0.020	0.021	0.021
	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)	3.06	3.14	2.48	2.84	2.74
	Chromium (Cr)-Total (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
	Copper (Cu)-Total (mg/L)	0.0046	0.0033	0.439	0.0049	0.0955
	Iron (Fe)-Total (mg/L)	<0.030	<0.030	<0.030	<0.030	<0.030
	Lead (Pb)-Total (mg/L)	<0.00050	<0.00050	0.00286	<0.00050	0.0101
	Magnesium (Mg)-Total (mg/L)	0.35	0.35	0.32	0.38	0.33
	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)	0.14	0.13	0.12	0.14	0.13
	Selenium (Se)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Sodium (Na)-Total (mg/L)	2.1	2.1	<2.0	2.2	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	0.204	<0.050	<0.050
	Aggregate Organics	BOD (mg/L)	<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)	0.0191		0.0133		0.0157
	Total THMs (mg/L)	0.0191		0.0133		0.0157

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

## ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	Description	L1210355-6	L1210355-7	L1210355-8	L1210355-9	L1210355-10
Sampled Date	Sampled Time	TREATED WATE 17-SEP-12 08:30 STORE/CAFE (AFTER FLUSH)	TREATED WATE 17-SEP-12 10:30 LIONS BAY AVE. (FIRST DRAW)	TREATED WATE 17-SEP-12 10:30 LIONS BAY AVE. (AFTER FLUSH)	TREATED WATE 17-SEP-12 12:10 KELVIN GROVE (FIRST DRAW)	TREATED WATE 17-SEP-12 12:10 KELVIN GROVE (AFTER FLUSH)
Client ID						
Grouping	Analyte					
<b>WATER</b>						
Physical Tests	Hardness (as CaCO <sub>3</sub> ) (mg/L)	8.34	7.73	8.21	10.4	9.69
	pH (pH)		7.41		7.64	
	Total Suspended Solids (mg/L)		<3.0		<3.0	
	Turbidity (NTU)		0.25		0.21	
Antons and Nutrients	Alkalinity, Total (as CaCO <sub>3</sub> ) (mg/L)		8.3		9.5	
Organic / Inorganic Carbon	Total Organic Carbon (mg/L)		0.52		0.59	
Total Metals	Aluminum (Al)-Total (mg/L)	0.025	<0.010	0.021	0.042	0.034
	Antimony (Sb)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Arsenic (As)-Total (mg/L)	0.00019	<0.00010	<0.00010	<0.00010	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)	2.78	2.57	2.71	3.51	3.42
	Chromium (Cr)-Total (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
	Copper (Cu)-Total (mg/L)	0.0110	0.676	0.0049	0.0523	0.0031
	Iron (Fe)-Total (mg/L)	<0.030	<0.030	<0.030	0.036	0.033
	Lead (Pb)-Total (mg/L)	<0.00050	0.00144	<0.00050	0.0144	0.00051
	Magnesium (Mg)-Total (mg/L)	0.34	0.32	0.35	0.39	0.28
	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)	0.12	0.13	0.13	0.13	0.13
	Selenium (Se)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Sodium (Na)-Total (mg/L)	2.1	<2.0	2.1	2.1	<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	
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)		0.0153		0.0322	
	Total THMs (mg/L)		0.0153		0.0322	

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

# ALS ENVIRONMENTAL ANALYTICAL REPORT

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 Version: FINAL

Sample ID	Description	L1210355-11	L1210355-12	L1210355-13	L1210355-14	L1210355-15
Sampled Date	Sampled Time	TREATED WATE 17-SEP-12 12:55 MAGNESIA TANK (FIRST DRAW)	TREATED WATE 17-SEP-12 12:55 MAGNESIA TANK (AFTER FLUSH)	TREATED WATE 17-SEP-12 11:05 PRV-5 (FIRST DRAW)	TREATED WATE 17-SEP-12 11:05 PRV-5 (AFTER FLUSH)	TREATED WATE 17-SEP-12 11:40 BRUNSWICK BEACH (FIRST DRAW)
Client ID	Client ID					
Grouping	Analyte					
<b>WATER</b>						
Physical Tests	Hardness (as CaCO3) (mg/L)	17.4	18.9	19.4	19.2	18.0
	pH (pH)	7.35		7.31		7.35
	Total Suspended Solids (mg/L)	<3.0		<3.0		<3.0
	Turbidity (NTU)	0.32		0.19		0.11
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	6.7		6.8		6.5
Organic / Inorganic Carbon	Total Organic Carbon (mg/L)	0.61		0.56		0.58
Total Metals	Aluminum (Al)-Total (mg/L)	<0.010	0.018	0.019	0.016	<0.010
	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)	0.00026	<0.00020	<0.00020	<0.00020	<0.00020
	Calcium (Ca)-Total (mg/L)	5.89	6.42	6.60	6.55	6.17
	Chromium (Cr)-Total (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
	Copper (Cu)-Total (mg/L)	0.543	0.0120	0.0116	0.0054	0.311
	Iron (Fe)-Total (mg/L)	0.673	<0.030	0.143	<0.030	<0.030
	Lead (Pb)-Total (mg/L)	0.00502	<0.00050	<0.00050	<0.00050	0.00111
	Magnesium (Mg)-Total (mg/L)	0.64	0.69	0.70	0.70	0.63
	Manganese (Mn)-Total (mg/L)	0.0050	<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	0.11	0.10
	Selenium (Se)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Sodium (Na)-Total (mg/L)	2.9	3.0	3.0	3.0	3.0
	Uranium (U)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Zinc (Zn)-Total (mg/L)	0.293	<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)	0.0095		0.0091		0.0179
	Total THMs (mg/L)	0.0095		0.0091		0.0179

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

## ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1210355-16 TREATED WATE 17-SEP-12 11:40 BRUNSWICK BEACH (AFTER FLUSH)	L1210355-17 TREATED WATE 17-SEP-12 08:15 ELEMENTARY SCHOOL (FIRST DRAW)	L1210355-18 TREATED WATE 17-SEP-12 08:15 ELEMENTARY SCHOOL (AFTER FLUSH)	L1210355-19 TREATED WATE 17-SEP-12 08:50 COMMUNITY CENTRE (FIRST DRAW)	L1210355-20 TREATED WATE 17-SEP-12 08:50 COMMUNITY CENTRE (AFTER FLUSH)
Grouping	Analyte					
<b>WATER</b>						
Physical Tests	Hardness (as CaCO <sub>3</sub> ) (mg/L)	19.6	18.6	19.2	8.94	8.45
	pH (pH)		7.27		7.44	
	Total Suspended Solids (mg/L)		<3.0		<3.0	
	Turbidity (NTU)		0.13		0.33	
Anions and Nutrients	Alkalinity, Total (as CaCO <sub>3</sub> ) (mg/L)		6.1		7.3	
Organic / Inorganic Carbon	Total Organic Carbon (mg/L)		0.53		0.64	
Total Metals	Aluminum (Al)-Total (mg/L)	0.019	0.011	0.016	0.013	0.027
	Antimony (Sb)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Arsenic (As)-Total (mg/L)	0.00012	<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)	6.72	6.27	6.57	3.01	2.85
	Chromium (Cr)-Total (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
	Copper (Cu)-Total (mg/L)	0.0076	0.611	0.0536	0.530	0.0436
	Iron (Fe)-Total (mg/L)	<0.030	<0.030	<0.030	<0.030	<0.030
	Lead (Pb)-Total (mg/L)	<0.00050	0.0390	0.00136	0.00693	0.00085
	Magnesium (Mg)-Total (mg/L)	0.68	0.71	0.69	0.34	0.33
	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)	0.13	0.10	<0.10	0.11	0.13
	Selenium (Se)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Sodium (Na)-Total (mg/L)	3.0	3.2	3.0	2.1	2.1
	Uranium (U)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Zinc (Zn)-Total (mg/L)	<0.050	0.477	<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)		0.0126		0.0363	
	Total THMs (mg/L)		0.0126		0.0363	

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



# ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID Description Sampled Date Sampled Time Client ID	L1210355-21 TREATED WATER 17-SEP-12 07:55 KIDDLEY WINKS PRESCHOOL (FIRST DRAW)	L1210355-22 TREATED WATER 17-SEP-12 07:55 KIDDLEY WINKS PRESCHOOL ( AFTER FLUSH)	L1210355-23 RAW WATER 17-SEP-12 13:45 HARVEY RAW WATER (AFTER FLUSH)	L1210355-24 RAW WATER 17-SEP-12 13:00 MAGNESIA RAW WATER (AFTER FLUSH)
Grouping	Analyte				
<b>WATER</b>					
Physical Tests	Hardness (as CaCO3) (mg/L)	7.67	8.25	8.36	19.5
	pH (pH)	7.42		7.43	7.28
	Total Suspended Solids (mg/L)	<3.0		<3.0	<3.0
	Turbidity (NTU)	0.46		0.30	0.20
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	7.9		6.2	4.8
Organic / Inorganic Carbon	Total Organic Carbon (mg/L)	0.73		0.71	0.77
Total Metals	Aluminum (Al)-Total (mg/L)	0.023	0.021	0.033	0.020
	Antimony (Sb)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050
	Arsenic (As)-Total (mg/L)	<0.00010	<0.00010	<0.00010	0.00011
	Barium (Ba)-Total (mg/L)	<0.020	<0.020	<0.020	<0.020
	Boron (B)-Total (mg/L)	<0.10	<0.10	<0.10	<0.10
	Cadmium (Cd)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020
	Calcium (Ca)-Total (mg/L)	2.54	2.72	2.74	6.66
	Chromium (Cr)-Total (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020
	Copper (Cu)-Total (mg/L)	0.226	0.0260	0.0069	0.0056
	Iron (Fe)-Total (mg/L)	<0.030	<0.030	<0.030	<0.030
	Lead (Pb)-Total (mg/L)	0.193	0.00051	<0.00050	<0.00050
	Magnesium (Mg)-Total (mg/L)	0.33	0.36	0.37	0.70
	Manganese (Mn)-Total (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020
	Mercury (Hg)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020
	Potassium (K)-Total (mg/L)	0.20	0.12	0.16	0.11
	Selenium (Se)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010
	Sodium (Na)-Total (mg/L)	2.0	2.2	<2.0	2.1
	Uranium (U)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010
	Zinc (Zn)-Total (mg/L)	0.244	<0.050	<0.050	<0.050
Aggregate Organics	BOD (mg/L)	<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)	0.0159			
	Total THMs (mg/L)	0.0159			

\* 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	Mercury (Hg)-Total	MS-B	L1210355-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Copper (Cu)-Total	MS-B	L1210355-17, -18, -19, -20, -21, -22, -23, -24

### 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**
<b>ALK-COL-VA</b>	Water	Alkalinity by Colourimetric (Automated)	EPA 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.			
<b>BOD5-VA</b>	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.			
<b>BOD5-VA</b>	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.			
<b>CARBONS-TOC-VA</b>	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)".			
<b>HARDNESS-CALC-VA</b>	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.			
<b>HG-TOT-CVAFS-VA</b>	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).			
<b>MET-TOT-ICP-VA</b>	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).			
<b>MET-TOT-LOW-MS-VA</b>	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).			
<b>PH-PCT-VA</b>	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.			
<b>PH-PCT-VA</b>	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.			
<b>THM-HSMS-VA</b>	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			

## Reference Information

States Environmental Protection Agency (EPA).

<b>THM-SUM-CALC-VA</b>	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.			
<b>TSS-VA</b>	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.			
<b>TURBIDITY-VA</b>	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.			
<b>TURBIDITY-VA</b>	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, BRITISH COLUMBIA, CANADA

### Chain of Custody Numbers:

10-269511                      10-274467

### 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 wwt** - milligrams per kilogram based on wet weight of sample.

**mg lwt** - milligrams per kilogram based on lipid-adjusted weight of sample.

**mg/L** - milligrams per litre.

**--** - Less than.

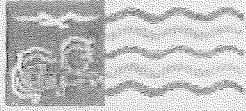
**D.L.** - The reported Detection Limit, also known as the Limit of Reporting (LOR).

**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**

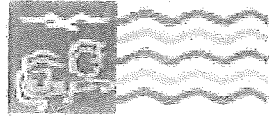
**DRINKING WATER QUALITY**

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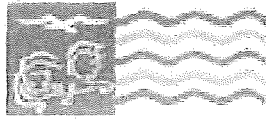
**Appendix D**

**Emergency Response Plan**



## CONTENTS

Boil Water Advisory	2D
Power Failures	2D
Earthquakes	2D
Fire in the Watershed	3D
Water Pump Failure	3D
Chemical Contamination	3D
Disinfection Interruption	3D
Loss of Pressure	4D
Turbidity Events	4D
Water Line Breaks	4D



### **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**

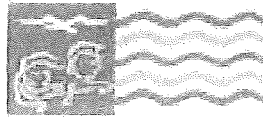
In the event of a Power Failure:

- ❖ 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**

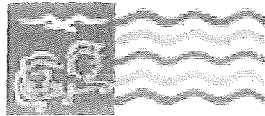
In the event of Chemical contamination such as oil, fuel, pesticides or any other type of substance that gets into or threatens to get into our water system including forest fire fighting activities:

- ❖ 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.

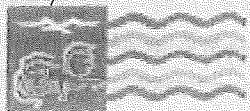
#### **WATER LINE BREAKS**

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.





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**The Municipality of the Village of Lions Bay**

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**Appendix E**

**Sample Boil Water Advisory**

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THE MUNICIPALITY OF THE VILLAGE OF LIONS BAY

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# NOTICE TO RESIDENTS

of Lions Bay and Brunswick Beach

## BOIL WATER ADVISORY

until further notice.

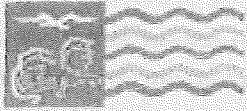
Due to high turbidity and low chlorine residual – we are issuing an immediate boil water advisory – We will keep you posted as to when this will be lifted –

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



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**The Municipality of the Village of Lions Bay**

**DRINKING WATER QUALITY**

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**Appendix F**

**VCH Permits to Operate**

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*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:**

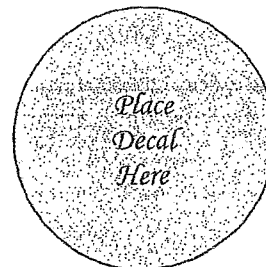
1. Submit weekly water samples for bacteriological testing at sites approved by VCH.
2. Chlorine residuals must be recorded daily at locations approved by VCH.
3. Biannual flushing on the entire distribution system.
4. Daily turbidity testing.
5. Annual chemical testing of source
6. Submit annual updated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



# 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.

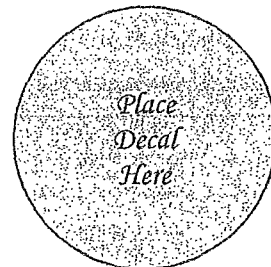
September 29, 2010

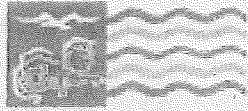
**Effective Date**



**Rod Schluter**  
**Environmental Health Officer**

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





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**The Municipality of the Village of Lions Bay**

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**Appendix G**

**EOCP Facility Classification**

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ENVIRONMENTAL OPERATORS CERTIFICATION PROGRAM

Facility Classification

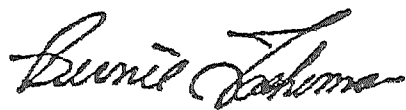
THIS IS TO CERTIFY THAT

*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

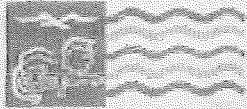


Chairman - Certification Board

CERTIFICATE NO.675



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



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**The Municipality of the Village of Lions Bay**

**DRINKING WATER QUALITY**

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**Appendix H**

**EOCP Operator Certificates**

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# ENVIRONMENTAL OPERATORS CERTIFICATION PROGRAM

## Certificate of Qualification

This is to certify that:

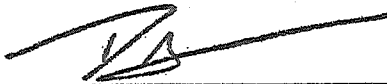
# Alberto Urrutia

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

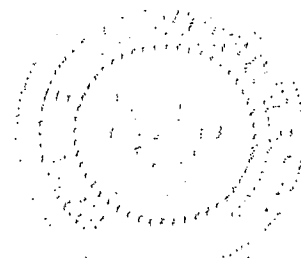
Certificate No: 4766



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

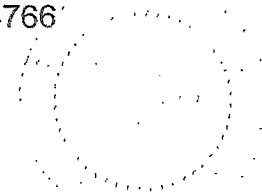
**Chlorine Handler**

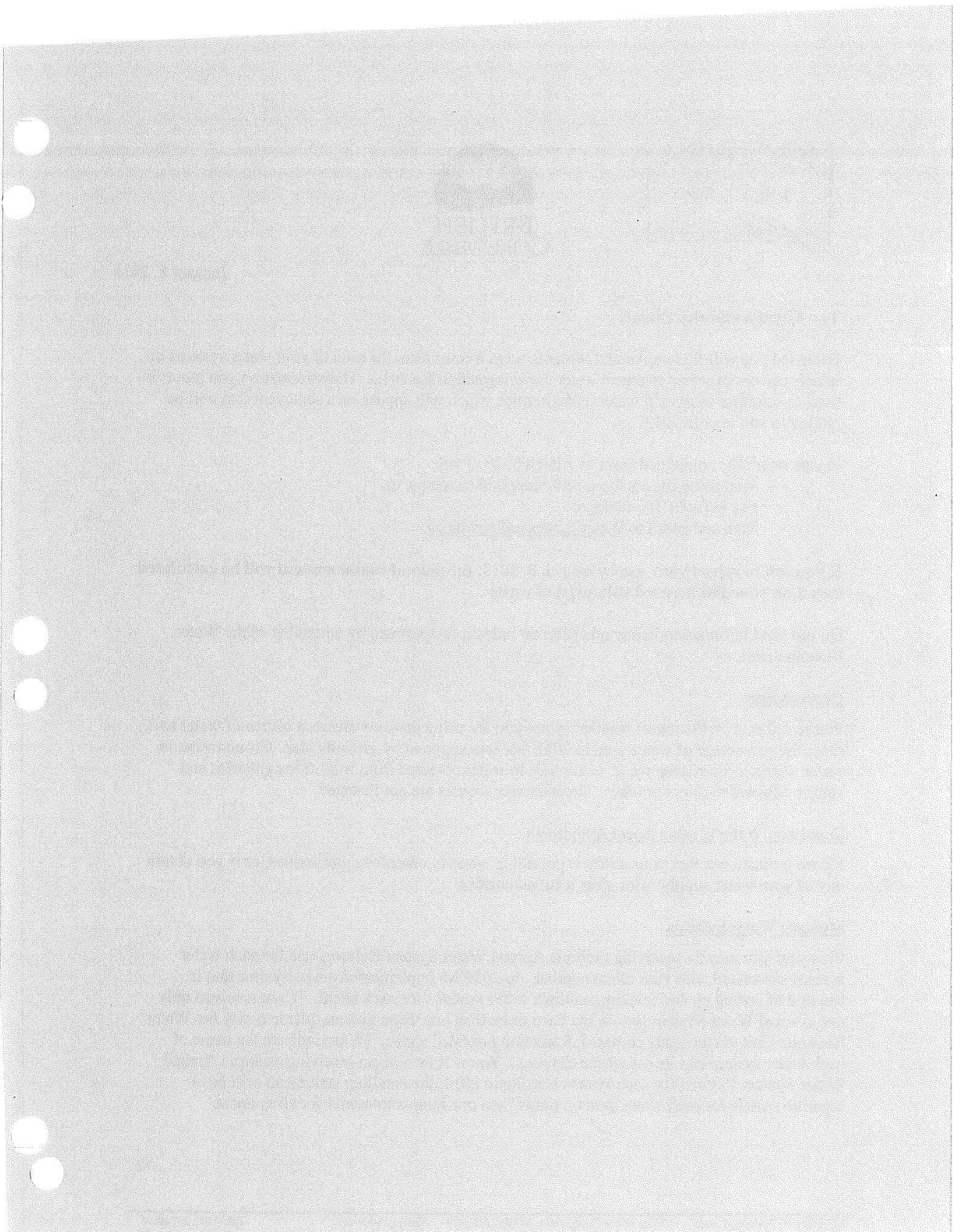
  
Secretary - Certification Board

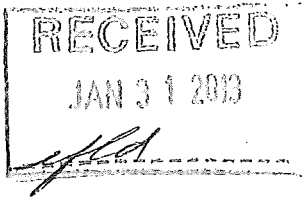
  
Chairman - Certification Board

May 6, 2005

Certificate No. CH-4766







January 8, 2013

**To: Local Authority Clients**

Enclosed you will find an Annual Water System Return form for each of your water systems on which you are expected to report water use information for 2012. The information you report is used to calculate an annual water rental invoice which will appear on a statement that will be mailed to you later in 2013.

Please return the completed form by March 8, 2013 via:

- Mail using the enclosed self-addressed envelope, or
- Fax to (250) 356-0605, or
- Scan and email to [Water.Revenue@gov.bc.ca](mailto:Water.Revenue@gov.bc.ca)

**If you fail to report your use by March 8, 2013, the annual rental amount will be calculated based on your full licensed volume(s) of water.**

Do not send information in any other format unless pre-approved by a member of the Water Revenue Unit.

Groundwater

Please indicate on the report whether or not you are using groundwater as a source of water and, if so, the percentage of water used in 2012 that was supplied by groundwater. Groundwater is water obtained from deep wells, in contrast to water obtained from infiltration galleries and sumps adjacent to rivers or lakes. Groundwater sources are not licensed.

Supplying Water to other Local Authorities

Please indicate whether your utility is providing water to other local authorities, or if you obtain any of your water supply from other local authorities.

Multiple Water Systems

This year you may be receiving multiple Annual Water System Returns, one for each water system associated with your client number. In 2010 we implemented a new system that is capable of setting up and tracking multiple water systems for each client. If you received only one Annual Water System Return but have more than one water system, please notify the Water Revenue Unit via the same contact information provided above. Please indicate the name of each water system and its associated licences. You will then begin receiving multiple Annual Water System Returns for each system starting in 2014; the resulting statements will have separate rentals for each water system, rather than one lump-sum rental for all systems.

.../2



Ministry of Forests, Lands and Natural Resource Operations  
Water Management Branch

Annual Water System Return

January 14, 2013

Village of Lions Bay  
PO BOX 141  
400 CENTRE RD  
LIONS BAY BC V0N 2E0

Return Report by:  
Client No:  
Water System No:  
Water System Name:

March 08, 2013  
21766  
0228  
LIONS BAY VILLAGE OF

Owner:

Village of Lions Bay

The information in this report will be considered in the calculation of your next annual rental. Failure to verify this information, and complete and return the form by the due date, may result in being charged at the maximum level as determined by the Comptroller of Water Rights.

For Calendar Year: 2012				
Purpose:	Total Volume (cubic metres)	Metered Location	Is any of your water supply from a Groundwater Source?	If Yes, what percentage of the Total Supply?
Water Works	766,273.5 M <sup>3</sup>	At the Source <u>  X  </u> At the Customer _____ or Not Metered _____	No <u>  X  </u> Yes _____	_____ %
Irrigation	<u>  X  </u>	At the Source _____ At the Customer _____ or Not Metered _____	No _____ Yes _____	_____ %
Minimum Daily Demand: <u>  1,400.2  </u> cubic metres		Date: <u>  DEC. 19, 2012  </u>	Maximum Daily Demand: <u>  3,363.8  </u> cubic metres	
Date: _____		Date: <u>  AUG. 17, 2012  </u>		
<b>Source(s) of Water Used</b> Please indicate the source name(s) and the percentage of supply obtained from each. <ol style="list-style-type: none"> <li><u>  HARVEY CREEK  </u> <u>  71.03  </u> %</li> <li><u>  MAGNESIA CREEK  </u> <u>  28.97  </u> %</li> <li>_____ %</li> </ol> Attach a list to report additional sources.			<b>Please provide the following information about Your Customers:</b> Number of Residential Connections: _____ Number of Other Connections: _____ Total Population: _____ Basis of Estimate: _____ Cultivated Area: _____ hectares	
A listing of existing licences held in your name is enclosed. If any of these licences are not used and do not form part of your development plan, you should consider their abandonment.				
<b>I certify that the above information is correct.</b>				
Signature of Official: _____			Position/Title: _____	
Print Name: _____		Phone No. (____) _____		Date: _____



Client No: 21766

Water System Name: LIONS BAY VILLAGE OF

Licence Number	File Number	Purpose/Use	Imperial Quantity/Unit	Metric Quantity/Unit	Stream Name(s)
C059405	0367241	Waterworks Local Auth	10,000,000.000 gal/year	45,460.90000 m3/year	Magnesia Creek
C065267	2000725	Waterworks Local Auth	4,380,000.000 gal/year	19,911.87420 m3/year	Magnesia Creek
C065316	0227502	Waterworks Local Auth	7,300,000.000 gal/year	33,186.45700 m3/year	Magnesia Creek
C042330	0290371	Waterworks Local Auth	18,250,000.000 gal/year	82,966.14250 m3/year	Alberta Creek
C119916	0225412	Waterworks Local Auth	9,125,000.000 gal/year	41,483.07125 m3/year	Harvey Creek
C119917	0215830	Waterworks Local Auth	54,750,000.000 gal/year	248,898.42750 m3/year	Harvey Creek

