VILLAGE OF LIONS BAY
DRINKING WATER QUALITY ANNUAL REPORT

FY 2016

TABLE OF CONTENTS

Contents

Appendices

INTRODUCTION

INTRODUCTION

This report comprises the 2016 Drinking Water Quality Annual Report prepared by the Village of Lions Bay. It provides pertinent information about the Village's drinking water to support the Village's application for its annual Operating Permit, issued by the Medical Health Officer. The purpose of the report is to provide Village water consumers with drinking water sampling test results for 2016, as well as to present background information on Village-specific issues concerning water supply, treatment, and measures being taken to protect and enhance drinking water quality as per requirements under the *Drinking Water Protection Regulation* and the *Drinking Water Protection Act*.

Although the Village is a member of Metro Vancouver, its water supply is not sourced from the Greater Vancouver Water District (GVWD). The Village of Lions Bay owns and operates its own water supply, treatment, and distribution system, and has the water from its system analyzed for the presence of microbiological pathogens (and other indicator organisms), and metals by laboratories approved by the Medical Health Officer. Testing for chlorine residuals and turbidity levels are conducted by trained in-house staff.

GENERAL DESCRIPTION

The Village of Lions Bay supplies potable water to its customers via a waterworks system comprised of 2 intakes located on Harvey and Magnesia Creeks, 2 water treatment plants (which provide UV disinfection and chlorination) located downstream from the respective intakes, 5 storage tanks, 18 PRV stations, and 13 kilometers of water mains. A population of approximately 1,334 is served through 551 service connections.

LICENSES

The Village of Lions Bay held 6 water licenses in 2016, issued by the Ministry of Environment. Of these licenses, 5 are currently being utilized. Table 1 lists the licenses and quantity of water associated with each.

Table 1. Village Water Licenses

License No	Imperial Quantity	Metric Quantity	Stream Name
C059405	10,000,000.00 gal/year	45,460.90000 m3/year	Magnesia Creek
C065267	4,380,000.00 gal/year	19,911.87420 m3/year	Magnesia Creek
C065316	7,300,000.00 gal/year	33,186.45700 m3/year	Magnesia Creek
C042330	18,250,000.00 gal/year	82,966.14250 m3/year	Alberta Creek *
C119916	9,125,000.00 gal/year	41,483.07125 m3/year	Harvey Creek
C119917	54,750,000.00 gal/year	248,898.42750 m3/year	Harvey Creek

*Alberta Creek is not currently utilized by the Village

In 2016, a total volume of 351,317.76 m^3 of water was supplied to residents from the Magnesia and Harvey Creek surface water sources. This represents a year over year decrease of 19% when compared to 2015 and a 54.5% decrease from 2017.

Table 2. Total Treated Water Production from Magnesia and Harvey Creek

Year	2016	2015	2014
m3	351,318	437,433	772,301

CONSUMPTION RATES

Summer 2016 on the south coast saw a return to average temperatures and slightly higher-than-average rainfall. As a result, the Village's Outdoor Water Use Bylaw conservation levels did not drop below the level one stage.

The Public Works Department's leak detection program identified a total of 12 private side leaks and one municipal side leak.

Table 3 provides a month by month comparison with average Village daily consumption rates (USG) and the percentage change year over year.

GENERAL DESCRIPTION

Table 3. Average Daily Consumption Rates 2015 vs. 2016

Month	2015 (USG)	2016 (USG)	Percentage change
January	*381,273*	*200,312*	47%
February	*382,268*	*198,256*	48%
March	*391,763*	*196,146*	50%
April	*390,755*	*235,808*	40%
May	*357,663*	*295,110*	17%
June	*401,600*	*155,573*	61%
July	*349,890*	*353,757*	1%
August	*292,394*	*326,024*	12%
September	*254,540*	*269,984*	6%
October	*273,092*	*203,117*	26%
November	*197,812*	*174,518*	12%
December	*175,062*	*229,071*	31%

SOURCE WATER

The Village of Lions Bay's watershed areas include Magnesia Creek drainage (421 hectares), Harvey Creek drainage (635 hectares), Alberta Creek drainage (51 hectares), and Rundle Creek drainage (20 hectares). The Village's total water supply is drawn from the Magnesia Creek and Harvey Creek watersheds. The Public Works Department is responsible for water acquisition, supply, treatment, and distribution to the Village's residents.

The Village is systematically working toward a "4-barrier" approach to mitigate source water quality issues that include the potential for waterborne disease, seasonal raw water turbidity fluctuations, and bacterial regrowth in its distribution system. The barriers are as follows: primary (UV) and secondary (chlorine) treatment, water quality monitoring (daily, weekly, and biannually), water main cleaning/flushing (biannually), and watershed protection (in progress).

ISSUES

Adequate supply for both residential consumption and fire protection is the primary issue for the Village, as both creek flow levels vary throughout the year. Harvey Creek flow levels are the more volatile of the two, ranging from 1,279.2 gallons per minute (May 2) to 268.9 gallons per minute (October 14) entering the treatment plant in 2016. Conversely, Magnesia Creek flows appear more stable year round; however, Village crews manually limit the amount of water taken from Magnesia due to operational considerations downstream.

Between July 25 and September 02 of 2016, Public Works were able to measure the full flow of Magnesia Creek thanks to the installation of a new pressure reducing valve just upstream of the treatment plant. Over this period, high flows peaked at 998.1 gallons per minute (August 10) while low flows dropped to 211.9 gallons per minute (August 4).

CHALLENGES

The Village draws all of its water from surface sources that are subject to fluctuating turbidity levels, and are designated as unstable terrain upslope. This fluctuation in raw water turbidity presents many challenges for the treatment of the water to ensure that turbidity and chlorine residuals throughout the entire supply system are not adversely affected. The water treatment plants are monitored remotely via a SCADA system, and are checked daily (Monday through Friday) by crews; each intake is checked at least weekly, unless safe work procedures prohibit entry to the intake road.

The watershed areas for the intakes are contained by steep, rocky, unstable terrain upslope on one side, and steep flowing creeks subject to debris torrents on the other. Access to the intakes is via narrow gravel roads which are subject to rock fall and tree throw hazards from above. Strict safe working guidelines for unstable terrain upslope prohibit crews from entering the watershed areas and water intakes if rainfall parameters are exceeded. This prevents crews from being able to investigate

decreased water flow or increased raw water turbidity levels during periods of heavy rain – the exact times most likely to cause either event.

In 2016 the Village of Lions Bay experienced four separate water outages, three caused by minor debris torrents which blocked the raw water intakes and one caused by a lightning strike to our Water Treatment Plant which resulted in a meltdown of some treatment plant controls. For the duration of these outages residents were put on water restrictions and kept up to date via alerts posted on the Village's website and through an email notification system for those residents who elect to be notified in this manner.

Table 4. 2016 Water Outages

Start Date	Duration of outage (days)	Surface Water Supply System	Cause
January 12, 2016	28	Magnesia Creek	Minor debris torrent resulting in blocked intake.
May 27, 2016	31	Harvey Creek	Lightning strike disabled treatment plant controls.
October 15, 2016	11	Magnesia Creek	Minor debris torrent resulting in blocked intake.
November 3, 2016	15	Magnesia Creek	Minor debris torrent resulting in blocked intake.

TESTING & RESULTS

The Village tests raw source water for turbidity from both creeks daily (work days). More extensive testing is undertaken biannually for general water chemistry, hardness, metals, and other contaminants including organic compounds. Table 5 presents the Village's raw water turbidity test results for 2016.

Table 5. 2016 Raw Water Turbidity Results

	Harvey Creek	Magnesia Creek
Count	251	237
Maximum result (NTU)	3.42	8.69
Minimum result (NTU)	0.11	0.15
Average (NTU)	0.60	0.51
Number >5 NTU	0	2
Percentage > 5 NTU	0.40%	0.85%

Section 3.3 of the 2003 Guidelines for Canadian Drinking Water Quality Supporting Documentation titled "Turbidity, Criteria for Exclusion of Filtration in Waterworks Systems" contains a provision for exemption from its recommendation of filtration for all surface water supplies if the system's average daily source water turbidity levels measured immediately prior to where disinfection is applied are around 1.0 NTU but do not exceed 5.0 NTU for more than 2 days in a 12-month period. As indicated in Table 4, raw water turbidity did not exceeded 5 NTUs from Harvey Creek, and exceeded 5 NTUs twice from Magnesia Creek.

SOURCE WATER

Elevated turbidity levels caused by debris slides and stream scouring upslope of the Village's intakes have resulted in boil water advisories issued by Vancouver Coastal Health in previous years. No boil water advisories were issued for 2016.

Appendix B contains all source raw water test results for 2016 while Appendix E contains copies of all boil water advisories issued for 2016 (none).

The Village further tests twice a year for metals and general chemistry of its treated and raw water, including hardness, pH, total suspended solids, turbidity, alkalinity, organic carbon, biochemical oxygen demand (BOD), and trihalomethanes. Appendix D contains the 2016 raw water metals and general chemistry test results.

WATER TREATMENT

The Village of Lions Bay does not have a filtration system. Raw water from Harvey and Magnesia Creek intakes is treated via a 2-stage process within their respective treatment plants – the primary stage is disinfection utilizing ultraviolet radiation (UV), and the secondary stage is chlorine injection. This 2-stage process is required because although UV is very effective at inactivating Giardia and Cryptosporidium, it does not introduce any disinfectant residual to the water, rendering it incapable of protecting the distribution system against contamination. Therefore, chlorination is used as the secondary stage of disinfection in order to establish a residual throughout the system.

The Village tests samples which are taken daily (Monday to Friday) for turbidity and chlorine residuals from 6 sampling stations located in the middle and ends of the distribution system, in addition to those taken from the 2 tanks located at the treatment plants. Once a week, further samples are taken from each of the aforementioned sites and sent to a Vancouver Coastal Health approved testing laboratory and tested for E. coli and total coliforms along with raw water samples before and after the UV reactors.

The Drinking Water Protection Regulation's water quality standards for potable water indicate that there can be no detectable E. coli per 100ml; and that total coliform bacteria samples (for more than 1 sample taken per month) must have at least 90% of samples with no detectable total coliform bacteria per 100ml and no 1 sample can have more than 10 total coliform bacteria per 100ml. No test samples taken weekly from the Village's 2 tanks or the 6 sampling stations exceeded these parameters in 2016.

CHALLENGES & TURBIDITY EVENT RESPONSE

The challenges outlined in the Source Water Section of this report also impact the Village's water treatment plants. The performance of the primary UV treatment is affected by increased turbidity because water that has higher turbidity absorbs a significant amount of UV light, and will therefore have a correspondingly low UV transmittance (UVT) rate. The UV system automatically increases lamp intensity to counter the lower UVT. If turbidity exceeds 5 NTUs entering the plants, the UV system will send an alarm through SCADA to notify the Water Operator, and the UV reactor shuts down. During turbidity events in excess of 5 NTU, microbiological sampling and testing is increased at all sampling locations; chlorine residual sampling and testing is likewise increased; and the Village will contact Vancouver Coastal Heath, who may issue a Boil Water Advisory. Appendix F contains the Village's Emergency Response Plan.

In times of severe weather, the Water Operator increases the frequency of testing and adjusts chlorine injection rates to compensate for any fluctuating chlorine demand caused by varying turbidity levels. The generally agreed minimum acceptable residual chlorine level for treated drinking water at all points in the distribution system is 0.2ppm; and the maximum is 4ppm.

TESTING & RESULTS

Table 6 presents an overview of the Village's treated water turbidity results at Harvey and Magnesia storage tanks located directly downstream of their respective treatment plants. Table 7 presents an overview of the chlorine residuals at the same storage tanks. Appendix C contains graphs of turbidity and chlorine residual test results.

Table 6. 2016 Village Treated Water Turbidity at Tanks

	Harvey tank	Magnesia tank
Count	251	236
Maximum NTU	4.06	2.97
Minimum NTU	0.11	0.14
Average NTU	0.67	0.47
Number >5 NTU	0	0
Percentage >5 NTU	0%	0%

Table 7. 2016 Village Chlorine Residuals at Tanks

	Harvey tank	Magnesia tank
Count	251	251
Maximum ppm	1.13	2.41
Minimum ppm	0.49	0.11
Average ppm	0.89	0.50
Number <0.2 ppm	0	0
Percentage <0.2 ppm	0%	0%

DISTRIBUTION SYSTEM

The Village of Lions Bay's distribution system serves a population of approximately 1,348 residents accounting for essentially 100% of the Village's annual water consumption. As the Village is located on a mountainside, water pressure within the Village's 13km of water mains is controlled by 18 PRV stations; 10 of which are located on the Harvey Creek supplied system, and 8 on the Magnesia Creek supplied system. These mains are constructed primarily of ductile iron (DI), however a variety of materials, including asbestos cement (AC), cast iron (CI), and PVC also exist within the Village. The oldest pipes in the Village's distribution system were installed between 1970 and 1971. Village Public Works crews are able to seamlessly switch the supply source of the water in the distribution system in the event that one source is compromised or offline, although water pressure is significantly reduced for residents of upper Sunset Drive if the Village is being supplied solely by Harvey Creek.

There are 8 storage tanks located on the system, 5 of which were in use in the potable water system in 2016. These 5 were Harvey tank (480,380 USG), Magnesia tank (120,095 USG), Phase 4 tank (24,019 USG), Phase 5 tank (30,024 USG), and the Highway tank (25,220 USG). In 2015, both Brunswick tank (42,000 USG) and Oceanview tank (100,000 USG) were filled with water to act as emergency fire reserves. These tanks do not contain potable water, and are isolated from the Village's potable water system.

In 2016, 351,318 m^3 or 92,808,397 US gallons of water was supplied to the Village from Magnesia and Harvey creeks through 591 service connections. This equates to a rough average of 959.8 m^3 or 253,575 US gallons consumed by the Village per day.

TESTING & RESULTS

The Village tests samples which are taken daily (workdays) for turbidity and chlorine residuals from 6 sampling stations located in the middle and ends of the distribution system, in addition to those taken from the 2 tanks located at the treatment plants, to ensure all meet the generally accepted minimum residual of 0.2ppm for chlorine residual and are less than 5 NTU for turbidity. Once a week, further samples from each of the 6 sampling stations are sent to a Vancouver Coastal Health approved testing laboratory and tested for E. coli and total coliforms.

The Drinking Water Protection Regulation's water quality standards for potable water indicate that there can be no detectable E. coli per 100ml; and that total coliform bacteria samples (for more than 1 sample taken per month) must have at least 90% of samples with no detectable total coliform bacteria per 100ml and no 1 sample can have more than 10 total coliform bacteria per 100ml. No test sample results taken weekly from the Village's distribution and storage system exceeded these parameters in 2016.

DISTRIBUTION SYSTEM

Tables 8 and 9 presents an overview of the Village's treated water turbidity results on each of the two water systems: Harvey and Magnesia. Tables 10 and 11 present an overview of the Village's chlorine residual results on the Harvey and Magnesia distribution systems respectively. Appendix A lists all sample site locations, the tests performed, and the frequency of testing at each. Appendix B contains all Village treated water test results for 2016.

Table 8. 2016 Turbidity Results in Harvey Distribution System

	PRV-3	CAFÉ	LIONS BAY AVE	KELVIN GROVE
Count	251	251	251	251
Maximum NTU	2.41	2.55	2.84	3.88
Minimum NTU	0.11	0.13	0.11	0.13
Average NTU	0.50	0.37	0.32	0.31
Number >5 NTU	0	0	0	0
Percentage >5 NTU	0%	0%	0%	0%

Table 9. 2016 Turbidity Results in Magnesia Distribution System

	PRV-5	BRUNSWICK BEACH
Count	251	251
Maximum NTU	1.79	1.44
Minimum NTU	0.12	0.14
Average NTU	0.34	0.34
Number >5 NTU	0	0
Percentage >5 NTU	0%	0%

As indicated in Tables 8 and 9 above, the Village's treated water turbidity on both distribution systems was on average less than $^1/_2$ of 1 NTU and was not in excess of 5 NTU in any samples taken in 2016.

Table 10. 2016 Chlorine Residual Results in Harvey Distribution System

	PRV-3	CAFÉ	LIONS BAY AVE	KELVIN GROVE
Count	251	251	251	251
Maximum ppm	1.10	1.05	0.94	1.08
Minimum ppm	0.43	0.20	0.20	0.20
Average ppm	0.85	0.65	0.63	0.52
Number <0.2 ppm	0	0	0	0
Percentage <0.2 ppm	0%	0%	0%	0%

Table 11. 2016 Chlorine Residual Results in Magnesia Distribution System

	PRV-5	BRUNSWICK BEACH
Count	251	251
Maximum ppm	1.21	1.12
Minimum ppm	0.28	0.20
Average ppm	0.83	0.62
Number <0.2 ppm	0	0
Percentage <0.2 ppm	0%	0%

As indicated in Tables 10 and 11 above, the Village's treated water chlorine residuals on both distribution systems was on average less than 1ppm; and was not below 0.2ppm in any samples taken in 2016. As indicated in the Water Treatment Section of this report, the Water Operator adjusts chlorine injection rates to compensate for any fluctuating chlorine demand caused by varying turbidity levels, and must ensure that all points in the system show minimum residuals. The generally agreed minimum acceptable residual chlorine level for treated drinking water at all points in the distribution system is 0.2ppm; the maximum is 4ppm.

Appendix C contains comparison graphs of turbidity and chlorine residual test results.

The Village further tests 10 locations twice a year for metals and general chemistry of its treated and raw water, including hardness, pH, total suspended solids, turbidity, alkalinity, organic carbon, biochemical oxygen demand (BOD), and trihalomethanes. First draw test results from samples taken in April for lead exceeded the limits set in the Guidelines for Canadian Drinking Water Quality of a maximum acceptable concentration of 0.010 mg/L measured at the tap in 1 location – at the Public Work Yard in Kelvin Grove. Given that lead test results have been consistently low in the distribution system, the most likely sources of lead found in these locations would be from lead in the private-side service lines, lead solder in plumbing, or brass fittings such as faucets. Both locations tested below the acceptable limit after flushing. In April and September, the Public Works Yard's first draw tests were above the acceptable limit but tested below the acceptable limit after flushing. Appendix D contains metals and general chemistry test results for 2016.

WORK PROGRAM - 2016

In addition to the standard work program which includes system-wide flushing and leak detection, the Village's Public Works Department performed minor upgrades to 12 of the Village's pressure reducing valve (PRV) stations.

Capital upgrades funded by the New Building Canada Fund (NBCF) program included the installation of a PRV upstream of the Magnesia water treatment plant to mitigate infrastructure and safety concerns for staff working on or near this main and in the treatment plant; and the installation of a bypass at the Magnesia water treatment plant to ensure that regular maintenance or emergency work to the water

plant can be undertaken without shutting down the entire supply system. Additional components of the NBCF grant program included road safety improvements to both access roads.

WORK PROGRAM - 2017

The Village's Public Works Department will perform Village-wide hard water main flushing in April and October of 2017. This will augment the biennial leak detection program for all residences and commercial facilities throughout the Village.

Part of the NBCF grant is to install a new infiltration intake design to be retrofitted to the existing Magnesia intake to mitigate the impact of sediment debris that enters the system and reduces the amount of time staff must spend at the intake itself to manually clean out debris. The infiltration gallery could not be installed in 2016 due to above average streamflow and so will be attempted this summer during the low flow window in late August.

Further to this, the balance of the NBCF intended for the installation of an infiltration gallery at the Harvey Creek intake will be repurposed to address deficiencies discovered in the main structure of the intake weir. Approvals have been granted for this repurposing as well as an extension to the construction timelines.

Finally, the Village's application to the federal and provincial Clean Water and Wastewater program for the replacement of the Village's water storage facilities was successful. As a result, the Village has initiated preparatory research in the form of water modeling in order to determine the most suitable arrangement, location, and sizing of new potable water storage facilities in the community. It is anticipated that redundant storage facilities will be eliminated and that larger, more efficient storage facilities will be constructed in 2017.

OPERATOR TRAINING

The BC Drinking Water Protection Regulation outlines water system operator qualification standards. Water systems are classified by the Environmental Operators Certification Program (EOCP), based on the population served and the complexity of the system. The chief "operator(s)" of the system must, in turn, be certified by the EOCP at the matching classification level of the system. The Village's water treatment and distribution system has been evaluated as a "Level 2" classification. The Village currently has one water distribution system operator (Alberto Urrutia) with Level 2 certification from the EOCP.

The Village recognizes the inherent value that operator education training and education provides and ensures that its operator participates annually in a variety of product orientation, workshops, and technical courses that become available annually. In 2016, the course undertaken to maintain the year's mandatory Continuing Education Units (CEUs) was Confined Space Entry and Water Distribution II. In addition to this, two more Village Public Works employees were certified as Water Distribution 1 Operators through the EOCP.

The Village's two water treatment facilities were assessed and classified as Class 1 water treatment plants. The Village's lead operator, Alberto Urrutia, will begin coursework and write the certification exam in 2017 to match the treatment plants Class 1 designation.

Appendices H and I, respectively, contain the Village's EOCP water system facility classifications and operator certifications.

APPENDIX A: WATER QUALITY SAMPLING SITE LOCATIONS AND TEST FREQUENCY

SAMPLE STATIONS AND TESTS

SAMPLE STATIONS AND TESTS

Tests	Location	Source	Frequency
Chlorine Residual & Turbidity	PRV-3	Harvey Creek	Daily (workdays)
(Treated Water)	Harvey Tank	Harvey Creek	Daily (workdays
	Lions Bay Café	Harvey Creek	Daily (workdays)
	Lions Bay Avenue	Harvey Creek	Daily (workdays
	Kelvin Grove	Harvey Creek	Daily (workdays)
	PRV-5	Magnesia Creek	Daily (workdays
	Magnesia Tank	Magnesia Creek	Daily (workdays)
	Brunswick Beach	Magnesia Creek	Daily (workdays)

Test	Location	Source	Frequency
Raw Water Turbidity	Harvey Intake	Harvey Creek	Daily (workdays)
	Magnesia Intake	Magnesia Creek	Daily (workdays

Tests	Location	Source	Frequency
Treated Water Bacteriological	PRV-3	Harvey Creek	weekly
(E. coli & total coliforms)	Harvey Tank	Harvey Creek	weekly
	Lions Bay Café	Harvey Creek	weekly
	Lions Bay Avenue	Harvey Creek	weekly
	Kelvin Grove	Harvey Creek	weekly
	Harvey Raw Water	Harvey Creek	monthly
	Harvey UV Reactor	Harvey Creek	monthly
	PRV-5	Magnesia Creek	weekly
	Magnesia Tank	Magnesia Creek	weekly
	Brunswick Beach	Magnesia Creek	weekly
	Magnesia Raw Water	Magnesia Creek	monthly
	Magnesia UV Reactor	Magnesia Creek	monthly

Test	Location	Source	Frequency
Raw Water Turbidity	Harvey Intake	Harvey Creek	Daily (workdays)
	Magnesia Intake	Magnesia Creek	Daily (workdays

SAMPLE STATIONS AND TESTS

Tests	Location	Source	Frequency
Treated Water Metals & Chemical	Harvey Tank	Harvey Creek	2x annually
Composition	Lions Bay Café	Harvey Creek	2x annually
	Lions Bay Avenue	Harvey Creek	2x annually
	Kelvin Grove	Harvey Creek	2x annually
	Community Centre	Harvey Creek	2x annually
	Magnesia Tank	Magnesia Creek	2x annually
	Brunswick Beach	Magnesia Creek	2x annually

Test	Location	Source	Frequency
Raw Water Metals & Chemical	Harvey Intake	Harvey Creek	2x annually
Composition	Magnesia Intake	Magnesia Creek	2x annually

APPENDIX B: SOURCE & DISTRIBUTION WATER TESTING RESULTS

Village of Lions Bay - Source Water NTU Results

	January		February		March	
	Harvey	Magnesia	Harvey	Magnesia	Harvey	Magnesia
1			0.46	0.44	0.88	0.29
2			0.29	0.46	1.23	0.75
3			0.25	0.50	0.51	0.77
4	0.11	0.23	0.37	0.60	0.4	0.39
5	0.15	0.23	0.45	0.74		
6	1.45	0.49				
7	0.64	0.30			0.39	0.34
8	0.68	0.58			1.04	0.21
9			0.95	0.64	0.48	1.73
10			0.44	0.55	1.14	4.39
11	0.46	0.30	0.62	0.30	0.59	2.00
12	0.37	N/A	0.66	0.75		
13	2.13	N/A				
14	0.38	N/A			0.65	0.76
15	0.41	N/A	0.67	0.39	0.5	0.4
16			0.66	0.53	1.04	0.54
17			0.34	0.46	0.34	0.28
18	0.58	N/A	0.88	0.45	0.55	0.24
19	0.47	N/A	0.37	0.52		
20	0.48	N/A				
21	0.97	N/A			0.77	0.37
22	3.42	N/A	0.51	0.23	0.61	1.01
23			0.31	0.28	0.61	1.14
24			0.33	0.36	0.61	0.27
25	0.94	N/A	0.73	0.32		
26	0.63	N/A	0.28	0.37		
27	0.84	N/A			0.14	0.35
28	2.59	N/A				
29	0.68	N/A	0.71	0.23	0.48	1.1
30					0.74	0.27
31					0.35	0.38

APPENDIX B: SOURCE & DISTRIBUTION WATER TESTING RESULTS

Village of Lions Bay - Source Water NTU Results

	April		May		June	
	Harvey	Magnesia	Harvey	Magnesia	Harvey	Magnesia
1	0.41	0.52			0.19	0.44
2			0.34	0.52	0.41	0.43
3			0.67	0.33	0.30	0.48
4	0.30	0.43	0.64	0.3		
5	0.21	0.24	0.35	0.25		
6	0.62	0.47	0.34	0.22	0.82	0.91
7	1.20	0.35			0.30	0.55
8	0.63	0.31			0.34	0.54
9			0.54	0.25	0.48	0.24
10			0.37	0.19	0.41	0.28
11	0.20	0.28	0.15	0.21		
12	0.27	0.28	0.31	0.24		
13	0.17	0.20	0.36	0.35	0.33	0.16
14	0.22	0.29			0.31	0.24
15	0.21	0.25			0.18	0.32
16			0.2	0.2	0.22	0.16
17			0.32	0.48	0.32	0.46
18	0.26	0.26	0.3	0.25		
19	0.46	0.31	0.29	0.41		
20	0.28	0.45	0.26	0.25	0.55	0.36
21	0.43	0.77			0.30	0.24
22	0.70	0.37			0.46	0.20
23					0.72	0.86
24			0.88	0.24	0.37	0.43
25	0.70	0.28	0.42	0.24		
26	0.31	0.24	0.56	0.26		
27	0.33	0.26	0.32	0.5	0.27	0.19
28	0.33	0.22			0.24	0.23
29	0.43	0.27			0.20	0.24
30			0.35	0.41	0.18	0.25
31			0.35	1.55		

APPENDIX B: SOURCE & DISTRIBUTION WATER TESTING RESULTS

Village of Lions Bay - Source Water NTU Results

	July		August		September	
	Harvey	Magnesia	Harvey	Magnesia	Harvey	Magnesia
1					0.78	0.19
2			0.40	0.21	0.64	0.31
3			0.45	0.32		
4	0.24	0.2	0.52	0.29		
5	0.36	0.16	0.53	0.29		
6	0.39	0.46			0.69	0.17
7	0.38	0.48			0.52	0.34
8	1.45	0.82	1.44	0.30	0.76	0.19
9			0.70	0.36	0.48	0.16
10			1.41	0.23		
11	0.63	0.25	0.35	0.25		
12	0.84	0.23	0.82	0.37	1.15	0.17
13	0.4	0.67			0.61	0.21
14	0.59	0.31			0.56	0.2
15	0.65	0.29	1.38	0.22	0.22	0.24
16			0.52	0.20	0.56	0.33
17			0.76	0.21		
18	0.86	1	0.25	0.19		
19	1.02	0.3	0.58	0.16	1.55	0.35
20	0.76	0.22			0.42	0.17
21	0.43	0.37			0.33	0.24
22	0.48	0.25	1.32	0.28	0.42	0.19
23			0.56	0.15	1.18	0.23
24			0.61	0.15		
25	1.26	0.23	0.47	0.18		
26	0.41	0.94	0.53	0.31	1.21	0.31
27	0.53	1.23			0.27	0.15
28	0.76	0.44			0.5	0.49
29	0.65	0.3	1.12	0.18	0.83	0.22
30			0.66	0.27	0.5	0.19
31			0.72	0.28		

APPENDIX B: SOURCE & DISTRIBUTION WATER TESTING RESULTS

Village of Lions Bay - Source Water NTU Results

	October		November		December	
	Harvey	Magnesia	Harvey	Magnesia	Harvey	Magnesia
1			0.39	0.33	0.30	0.28
2			1.65	0.35	0.49	0.51
3	0.31	0.18	0.62	0.53		
4	1.07	0.18	2.03	0.44		
5	0.58	0.7			0.32	0.41
6	0.74	0.35			0.48	0.52
7	3.23	8.68	0.6	1.86	0.35	0.23
8			0.47	0.63	0.26	0.26
9			0.87	1.22	0.33	0.23
10			0.35	0.42		
11	1.17	0.37				
12	0.54	0.27			0.27	0.47
13	0.63	0.69			0.33	0.34
14	0.66	1.31	0.94	1.76	0.24	0.32
15			0.37	0.49	0.23	0.28
16			0.29	0.58	0.30	0.21
17	1.22	8.69	0.35	0.52		
18	0.65	1.3	0.36	0.59		
19	0.56	0.77			0.32	0.22
20	0.99	0.76			0.50	0.39
21	0.34	0.47	0.68	0.73	0.51	0.44
22			0.71	0.38	0.27	0.22
23			0.79	1.03	0.29	0.31
24	0.77	0.69	0.53	1.47		
25	0.80	0.4	0.66	0.79		
26	0.65	0.85			0.33	0.22
27	0.76	0.54				
28	1.19	0.67	0.76	0.35	0.57	0.19
29			0.65	0.28	0.49	0.55
30			0.93	0.81	0.30	0.47
31	0.4	0.61				

Village of Lions Bay Distribution System NTU and CL^2 Ressults

	TREATED WATER JANUARY 2016															
	HARVEY										MAGNESIA					
	400 HAR. TANK		PRV-3		STORE/CAFÉ		LIONS BAY AVE.		KELVIN GROVE		100 MAG. TANK		PRV-5		BRUNSWICK B.	
Date	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																
4	0.18	0.94	0.18	0.78	0.20	0.72	0.20	0.79	0.27	0.65	0.24	1.06	0.20	1.04	0.21	1.12
5	0.11	0.92	0.18	0.93	0.23	0.72	0.29	0.79	0.25	0.74	0.23	1.07	0.17	1.02	0.32	0.82
6	1.11	0.82	0.72	0.79	0.62	0.72	0.57	0.74	0.15	0.90	0.51	0.91	0.28	0.92	0.51	0.91
7	2.14	0.94	0.41	0.93	0.34	0.66	0.45	0.81	0.22	0.68	0.35	0.91	0.31	0.84	0.37	0.86
8	3.33	0.81	1.90	0.77	0.52	0.55	0.63	0.71	1.38	0.64	0.26	0.88	0.30	0.85	0.53	0.80
9																
10																
11	0.51	0.92	0.57	0.89	0.25	0.77	0.19	0.63	0.20	0.42	0.34	0.88	0.21	0.82	0.22	0.65
12	1.02	0.93	1.47	0.90	0.78	0.74	1.02	0.72	0.34	0.72	N/A	N/A	1.79	0.84	0.72	0.56
13	2.92	0.75	0.67	0.72	1.73	0.60	0.63	0.71	0.14	0.56	N/A	N/A	0.76	0.80	0.29	0.63
14	0.65	0.95	0.74	0.93	0.60	0.63	0.40	0.69	0.77	0.57	N/A	N/A	0.43	0.78	0.41	0.57
15	0.48	0.95	0.57	0.92	0.38	0.71	0.28	0.57	0.75	0.41	N/A	N/A	0.63	0.93	0.24	0.56
16																
17																
18	0.35	1.06	0.59	1.03	0.36	0.79	0.25	0.84	0.42	0.69	N/A	N/A	0.35	0.98	0.25	0.55
19	2.23	1.10	1.42	1.07	0.55	0.78	0.86	0.79	0.25	0.65	N/A	N/A	0.33	1.00	0.30	0.70
20	1.23	1.06	1.88	1.03	1.05	0.77	0.99	0.77	0.24	0.74	N/A	N/A	0.79	0.94	0.43	0.62
21	0.92	1.08	0.31	1.05	0.92	0.75	0.61	0.76	0.46	0.64	N/A	N/A	0.21	0.95	0.32	0.63
22	0.93	0.93	0.90	0.90	0.72	0.72	0.74	0.74	0.66	0.66	N/A	N/A	0.80	0.91	0.25	0.64
23																
24																
25	0.53	0.95	1.15	0.91	0.41	0.72	0.40	0.56	0.58	0.35	N/A	N/A	0.49	0.80	0.29	0.41
26	0.62	0.98	0.56	0.95	0.38	0.77	0.73	0.86	0.52	0.55	N/A	N/A	0.92	0.88	0.83	0.35
27	3.40	0.94	1.79	0.90	1.23	0.69	1.48	0.71	0.42	0.63	N/A	N/A	0.92	0.81	0.54	0.38
28	1.74	0.83	2.18	0.80	1.47	0.63	1.17	0.83	0.35	0.61	N/A	N/A	1.72	0.78	0.49	0.41
29	1.46	0.85	1.28	0.82	0.74	0.56	0.50	0.66	0.70	0.53	N/A	N/A	0.81	0.70	0.46	0.43
30																
31																

Village of Lions Bay Distribution System NTU and CL^2 Ressults

	TREATED WATER FEBRUARY 2016															
	HARVEY										MAGNESIA					
	400 HAR. TANK		PRV-3		STORE/CAFÉ		LIONS BAY AVE.		KELVIN GROVE		100 MAG. TANK		PRV-5		BRUNSWICK B.	
Date	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	0.32	0.91	0.47	0.87	0.34	0.68	0.41	0.52	0.37	0.36	0.67	1.08	0.52	0.86	0.42	0.25
2	0.88	1.02	0.51	0.99	0.48	0.74	0.46	0.71	0.35	0.61	1.09	1.07	0.30	0.88	0.29	0.41
3	0.59	1.08	0.82	1.05	0.60	0.83	0.52	0.73	0.45	0.65	1.08	1.26	0.67	0.97	0.36	0.50
4	0.71	1.08	0.63	1.05	0.49	0.94	0.37	0.80	0.27	0.87	0.71	1.26	0.26	1.00	0.22	0.49
5	1.94	1.06	1.05	1.03	0.71	0.83	1.17	0.86	0.24	0.79	1.48	1.29	1.07	0.96	0.35	0.52
6																
7																
8																
9	0.23	0.97	0.32	0.93	0.26	0.73	0.19	0.69	0.18	0.41	0.65	1.17	0.57	0.85	0.21	0.48
10	0.42	0.91	0.46	0.88	0.25	0.68	0.82	0.72	0.39	0.57	0.37	1.23	0.30	1.21	0.22	0.45
11	1.01	0.83	0.41	0.79	0.48	0.61	0.87	0.71	0.19	0.58	0.90	1.07	0.44	1.10	0.18	0.53
12	0.98	0.95	1.44	0.84	0.64	0.75	0.59	0.69	0.29	0.58	0.57	1.09	0.48	1.05	0.71	0.87
13																
14																
15	0.20	0.92	0.28	0.89	0.19	0.63	0.23	0.65	0.17	0.44	1.42	1.00	0.39	1.01	0.35	0.75
16	3.03	0.88	0.51	0.85	0.57	0.64	0.37	0.61	0.28	0.58	0.69	0.86	0.53	0.85	0.46	0.62
17	0.31	0.86	0.34	0.82	0.34	0.63	0.32	0.68	0.57	0.47	0.51	0.73	0.64	0.62	0.31	0.71
18	2.18	0.96	1.27	0.94	0.51	0.66	0.84	0.74	0.45	0.54	0.38	0.74	0.30	0.66	0.36	0.70
19	3.13	0.84	1.36	0.81	0.96	0.61	0.80	0.73	0.47	0.73	0.61	0.72	0.88	0.69	0.30	0.53
20																
21																
22	0.35	0.91	0.25	0.87	0.17	0.61	0.16	0.72	0.29	0.26	0.29	0.96	0.29	0.95	0.26	0.48
23	0.21	0.93	0.29	0.90	0.24	0.69	0.20	0.81	0.21	0.54	0.40	1.13	0.35	1.06	0.42	0.68
24	4.06	1.03	0.68	1.00	0.77	0.72	0.54	0.86	0.66	0.52	0.29	1.10	0.24	1.04	0.35	0.72
25	0.57	1.01	0.23	0.98	0.31	0.82	0.35	0.90	0.25	0.62	0.29	1.09	0.32	1.04	0.29	0.79
26	1.21	1.04	2.09	1.02	0.80	0.85	0.41	0.94	0.40	0.91	1.11	1.05	0.64	1.05	0.41	0.89
27																
28																
29	0.36	0.91	0.32	0.87	0.26	0.65	0.25	0.84	0.18	0.66	0.41	0.98	0.21	0.91	0.29	0.77

Village of Lions Bay Distribution System NTU and CL^2 Ressults

	TREATED WATER MARCH 2016															
	HARVEY										MAGNESIA					
	400 HAR. TANK		PRV-3		STORE/CAFÉ		LIONS BAY AVE.		KELVIN GROVE		100 MAG. TANK		PRV-5		BRUNSWICK B.	
Date	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	0.62	0.94	0.75	0.91	0.27	0.68	1.05	0.72	0.19	0.81	0.31	0.88	0.49	0.89	0.37	0.83
2	3.61	0.81	2.41	0.77	1.16	0.57	1.26	0.69	0.19	0.54	0.64	0.77	0.28	0.75	0.45	0.78
3	0.78	0.78	1.03	0.74	0.32	0.52	0.66	0.57	0.21	0.61	0.59	0.77	0.54	0.62	0.32	0.72
4	0.41	0.84	0.67	0.89	0.26	0.57	0.31	0.55	0.22	0.50	0.35	0.67	0.31	0.60	0.23	0.60
5																
6																
7	0.30	1.04	0.27	1.02	0.23	0.73	0.40	0.66	0.25	0.31	0.36	0.75	0.56	0.67	0.24	0.39
8	2.03	0.81	0.85	0.77	1.36	0.74	0.49	0.73	0.50	0.73	0.87	0.86	0.38	0.74	0.43	0.45
9	0.48	1.04	0.73	1.01	0.30	0.76	0.25	0.71	0.24	0.75	2.97	0.99	0.43	0.90	0.40	0.47
10	0.44	0.91	0.61	0.87	0.27	0.82	0.20	0.78	0.21	0.69	0.69	1.02	0.41	0.93	0.31	0.44
11	2.36	0.85	1.12	0.82	0.98	0.65	0.63	0.74	0.22	0.66	1.12	0.89	0.78	0.83	0.53	0.61
12																
13																
14	1.19	0.98	0.41	0.95	0.42	0.72	0.28	0.72	0.23	0.43	0.72	1.00	0.54	0.93	0.54	0.59
15	1.53	1.00	1.16	0.97	0.64	0.75	0.68	0.74	0.40	0.60	0.76	0.99	0.49	0.92	0.49	0.69
16	3.94	1.03	0.47	0.99	0.59	0.86	0.84	0.79	0.22	0.53	0.80	1.01	0.92	0.91	0.49	0.75
17	1.44	0.99	0.51	0.96	0.56	0.81	0.23	0.80	0.22	0.67	0.43	0.96	0.42	0.92	0.40	0.71
18	1.18	0.98	0.95	0.95	0.29	0.73	0.24	0.79	0.31	0.66	0.47	0.97	0.36	0.89	0.60	0.73
19																
20																
21	0.31	0.99	0.28	0.95	0.33	0.81	0.21	0.79	0.57	0.76	0.33	0.92	0.32	0.85	0.39	0.88
22	0.51	0.82	0.95	0.78	0.58	0.64	0.46	0.77	0.24	0.85	0.86	0.91	0.47	0.89	0.66	0.68
23	0.87	0.84	0.85	0.80	0.67	0.62	0.39	0.67	0.85	0.66	0.20	0.91	0.87	0.83	0.78	0.67
24	0.33	0.80	0.22	0.71	0.19	0.54	0.18	0.54	0.17	0.51	0.24	0.94	0.23	0.84	0.37	0.67
25																
26																
27	0.28	0.68	0.22	0.72	0.21	0.61	0.20	0.50	0.29	0.34	0.22	1.12	0.19	0.99	0.22	0.72
28																
29	0.18	0.80	0.30	0.76	0.17	0.68	0.16	0.59	0.14	0.46	0.63	1.13	0.26	1.07	0.24	0.83
30	0.48	0.85	0.30	0.82	0.34	0.68	0.31	0.57	0.26	0.56	0.43	1.02	0.46	0.95	0.30	0.86
31	0.22	0.93	0.31	0.89	0.26	0.78	0.18	0.68	0.64	0.75	0.40	0.96	0.29	0.89	0.55	0.88

Village of Lions Bay Distribution System NTU and CL^2 Ressults

	TREATED WATER APRIL 2016															
	HARVEY										MAGNESIA					
	400 HAR. TANK		PRV-3		STORE/CAFÉ		LIONS BAY AVE.		KELVIN GROVE		100 MAG. TANK		PRV-5		BRUNSWICK B.	
Date	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	1.27	0.90	1.20	0.69	2.55	0.75	0.69	0.81	0.28	0.69	0.60	0.91	0.69	0.87	0.49	0.83
2																
3																
4	0.34	0.95	0.25	0.91	0.20	0.83	0.23	0.80	0.22	0.63	0.42	0.71	0.39	0.67	0.25	0.52
5	0.30	0.99	0.24	0.96	0.39	0.76	0.19	0.77	0.25	0.64	0.29	0.83	0.25	0.69	0.31	0.50
6	1.09	1.03	0.54	0.99	0.32	0.79	0.30	0.69	0.21	0.70	0.45	0.93	0.51	0.83	0.35	0.49
7	1.79	0.92	0.51	0.88	0.27	0.76	0.21	0.73	0.21	0.81	0.30	0.98	0.31	0.89	0.35	0.63
8	1.66	0.93	1.00	0.90	0.36	0.79	0.31	0.77	0.18	0.89	0.34	1.08	0.48	0.97	0.46	0.66
9																
10																
11	0.20	0.95	0.21	0.92	0.19	0.77	0.32	0.69	0.19	0.73	0.30	1.12	0.26	1.04	0.35	0.92
12	0.18	0.96	0.31	0.88	0.25	0.77	0.15	0.68	0.24	0.63	0.32	1.21	0.24	1.11	0.23	0.86
13	0.23	0.97	0.22	0.90	0.79	0.78	0.14	0.65	0.27	0.55	0.28	1.09	0.23	1.00	0.22	0.82
14	0.21	0.96	0.20	1.00	0.19	0.80	0.19	0.57	0.17	0.62	0.20	1.10	0.18	1.05	0.22	0.88
15	0.18	1.01	0.17	0.95	0.20	0.80	0.13	0.61	0.17	0.63	0.18	1.09	0.17	1.00	0.21	0.80
16																
17																
18	0.17	1.02	0.35	0.98	0.22	0.82	0.19	0.85	0.23	0.69	0.25	0.89	0.16	0.84	0.22	0.83
19	0.24	0.84	0.53	0.80	0.24	0.71	0.38	0.76	0.48	0.88	0.30	0.94	0.29	0.89	0.31	0.73
20	0.25	0.92	0.22	0.82	0.15	0.63	0.11	0.73	1.91	0.66	0.24	0.94	0.21	0.89	0.34	0.77
21	0.27	0.84	0.36	0.81	0.33	0.60	0.20	0.64	0.77	0.61	0.42	0.90	0.27	0.81	0.24	0.73
22	0.64	0.74	0.58	0.71	0.25	0.52	0.21	0.53	0.63	0.47	0.39	0.84	0.27	0.74	0.31	0.75
23																
24																
25	0.23	0.86	0.57	0.83	0.20	0.60	0.16	0.41	0.25	0.30	0.32	0.93	0.24	0.77	0.25	0.55
26	0.22	1.03	0.28	1.00	0.30	0.74	0.20	0.61	0.24	0.88	0.35	0.91	0.24	0.84	0.31	0.59
27	0.24	1.09	0.41	1.05	0.31	0.86	0.23	0.92	0.20	0.69	0.35	0.94	0.26	0.84	0.29	0.60
28	0.21	1.11	0.31	1.07	0.20	0.85	0.16	0.84	0.24	0.74	0.31	0.97	0.21	0.92	0.29	0.59
29	0.25	1.00	0.35	0.97	0.33	0.51	0.16	0.89	0.43	0.83	0.32	1.01	0.21	0.93	0.22	0.81
30																

Village of Lions Bay Distribution System NTU and CL^2 Ressults

	TREATED WATER MAY 2016															
	HARVEY										MAGNESIA					
	400 HAR. TANK		PRV-3		STORE/CAFÉ		LIONS BAY AVE.		KELVIN GROVE		100 MAG. TANK		PRV-5		BRUNSWICK B.	
Date	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	0.21	0.87	0.26	0.84	0.32	0.52	0.22	0.78	0.28	0.62	0.18	0.89	0.18	0.87	0.24	0.76
3	1.35	0.84	0.37	0.80	0.22	0.57	0.24	0.68	0.52	0.64	0.31	0.96	0.21	0.89	0.24	0.79
4	0.34	0.64	0.24	0.60	0.27	0.45	0.21	0.59	0.19	0.47	0.32	0.95	0.28	0.87	0.28	0.75
5	0.22	0.78	0.42	0.74	0.20	0.56	0.21	0.52	0.21	0.38	0.32	0.97	0.20	0.85	0.21	0.75
6	0.27	0.93	0.27	0.89	0.65	0.62	0.20	0.53	0.15	0.38	0.24	0.95	0.18	0.85	0.26	0.74
7																
8																
9	0.15	1.05	0.18	1.02	0.24	0.60	0.25	0.89	0.19	0.53	0.22	1.00	0.19	0.97	0.23	0.75
10	0.20	1.04	0.24	1.01	0.20	0.77	0.27	0.91	0.20	0.54	0.23	0.96	0.17	0.89	0.20	0.74
11	0.11	1.03	0.11	1.01	0.15	0.66	0.14	0.82	0.14	0.81	0.16	0.88	0.13	0.81	0.16	0.75
12	0.15	0.95	0.30	0.92	0.29	0.77	0.16	0.76	0.25	0.56	0.24	0.79	0.17	0.67	0.29	0.64
13	0.21	0.96	0.26	0.93	0.44	0.65	0.16	0.75	0.19	0.64	0.49	0.87	0.44	0.82	0.72	0.62
14																
15																
16	0.19	0.90	0.30	0.86	0.45	0.58	0.23	0.71	0.15	0.49	0.23	1.01	0.26	0.91	0.34	0.63
17	0.25	0.93	0.20	0.84	0.20	0.71	0.17	0.73	0.23	0.46	0.50	1.08	0.23	0.91	0.37	1.04
18	0.34	0.88	0.21	0.84	0.27	0.69	0.24	0.79	0.18	0.43	0.26	1.04	0.36	0.95	0.34	0.82
19	0.41	0.91	0.17	0.87	0.13	0.70	0.17	0.70	0.29	0.46	0.26	0.96	0.28	0.95	0.21	0.85
20	0.19	0.90	0.16	0.85	0.28	0.63	0.19	0.65	0.17	0.51	0.21	0.96	0.20	0.87	0.26	0.75
21																
22																
23																
24	0.21	0.89	0.20	0.85	0.18	0.68	0.12	0.72	0.18	0.41	0.24	0.87	0.24	0.84	0.28	0.73
25	0.20	0.93	0.27	0.88	0.20	0.72	0.37	0.80	0.16	0.58	0.14	0.82	0.23	0.76	0.20	0.69
26	0.27	0.92	0.62	0.88	0.31	0.75	0.18	0.72	0.19	0.60	0.53	0.71	0.26	0.68	0.26	0.68
27	0.19	0.87	0.30	0.83	0.25	0.71	0.16	0.71	0.14	0.53	0.18	0.68	0.24	0.62	0.21	0.56
28																
29																
30	0.34	0.70	0.36	0.59	0.33	0.46	0.14	0.40	0.21	0.21	0.28	0.55	0.35	0.49	0.16	0.45
31	0.25	0.76	0.23	0.72	0.30	0.53	0.17	0.40	0.18	0.20	0.20	0.55	0.19	0.62	0.19	0.29

Village of Lions Bay Distribution System NTU and CL^2 Ressults

	TREATED WATER JUNE 2016															
	HARVEY										MAGNESIA					
	400 HAR. TANK		PRV-3		STORE/CAFÉ		LIONS BAY AVE.		KELVIN GROVE		100 MAG. TANK		PRV-5		BRUNSWICK B.	
Date	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	0.56	0.87	0.76	0.82	0.66	0.57	0.18	0.42	0.20	0.29	0.27	0.67	0.40	0.70	0.21	0.34
2	0.23	0.78	0.26	0.77	0.28	0.60	0.16	0.55	0.40	0.36	0.56	0.59	0.27	0.74	0.45	0.47
3	0.23	0.87	0.47	0.83	0.28	0.58	0.15	0.57	0.28	0.40	0.25	0.68	0.18	0.70	0.29	0.41
4																
5																
6	0.26	0.87	0.35	0.82	0.23	0.57	0.20	0.70	0.21	0.42	0.35	0.64	0.26	0.76	0.16	0.42
7	0.21	0.91	0.27	0.87	0.26	0.66	0.22	0.70	0.27	0.42	0.32	0.73	0.19	0.78	0.14	0.55
8	0.36	0.90	0.15	0.87	0.39	0.59	0.24	0.79	0.20	0.41	0.27	0.78	0.26	0.78	0.24	0.53
9	0.23	0.88	0.27	0.84	0.20	0.67	0.20	0.63	0.17	0.46	0.21	0.95	0.26	0.79	0.18	0.53
10	0.32	0.94	0.29	0.92	0.24	0.69	0.24	0.76	0.27	0.51	0.27	1.07	0.32	0.96	0.40	0.62
11																
12																
13	0.17	0.84	0.29	0.80	0.44	0.58	0.16	0.55	0.19	0.42	0.18	1.04	0.18	0.98	0.17	0.81
14	0.15	0.87	0.34	0.85	0.21	0.57	0.20	0.54	0.30	0.41	0.37	1.09	0.71	0.99	0.18	0.85
15	0.20	0.78	0.44	0.76	0.19	0.59	0.16	0.51	0.17	0.48	0.31	1.06	0.25	1.04	0.18	0.88
16	0.25	0.71	0.54	0.67	0.23	0.48	0.14	0.52	0.14	0.47	0.20	1.02	0.18	0.98	0.17	0.82
17	0.21	0.69	0.31	0.67	0.20	0.44	0.15	0.41	0.13	0.32	0.33	1.08	0.22	1.03	0.21	0.80
18																
19																
20	0.18	0.74	0.20	0.70	0.23	0.45	0.20	0.54	0.14	0.23	0.43	1.02	0.22	0.93	0.21	0.80
21	0.14	0.72	0.48	0.68	0.19	0.55	0.17	0.51	0.14	0.42	0.22	1.01	0.25	0.91	0.20	0.78
22	0.18	0.73	0.39	0.69	0.30	0.47	0.25	0.58	0.14	0.30	0.25	1.01	0.17	0.96	0.17	0.77
23	0.16	0.81	0.32	0.76	0.24	0.60	0.21	0.56	0.18	0.32	0.39	1.06	0.23	1.00	0.20	0.79
24	0.50	0.67	0.54	0.63	0.28	0.43	0.31	0.53	0.15	0.39	0.43	1.01	0.32	0.94	0.30	0.78
25																
26																
27	0.22	0.65	0.22	0.73	0.26	0.54	0.24	0.56	0.42	0.48	0.33	1.03	0.31	0.93	0.29	0.64
28	0.20	0.66	0.24	0.60	0.23	0.43	0.24	0.36	0.18	0.73	0.17	0.90	0.25	0.81	0.27	0.65
29	0.16	0.91	0.22	0.74	0.34	0.37	0.38	0.49	1.67	0.42	0.38	0.81	0.40	0.58	0.26	0.69
30	0.20	0.75	0.27	0.81	0.22	0.34	0.23	0.56	0.58	0.49	0.27	0.74	0.25	0.72	0.34	0.51

Village of Lions Bay Distribution System NTU and CL^2 Ressults

	TREATED WATER JULY 2016															
	HARVEY										MAGNESIA					
	400 HAR. TANK		PRV-3		STORE/CAFÉ		LIONS BAY AVE.		KELVIN GROVE		100 MAG. TANK		PRV-5		BRUNSWICK B.	
Date	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																
4	0.22	0.90	0.24	0.87	0.19	0.72	0.18	0.76	0.19	0.37	0.25	0.89	0.19	0.90	0.24	0.75
5	0.19	0.82	0.33	0.79	0.42	0.66	0.15	0.70	0.18	0.51	0.29	0.89	0.17	0.85	0.21	0.69
6	0.15	0.93	0.18	0.89	0.20	0.72	0.17	0.76	0.24	0.49	0.43	0.92	0.18	0.91	0.24	0.64
7	0.15	0.88	0.24	0.85	0.22	0.67	0.13	0.74	0.19	0.52	0.20	0.96	0.37	0.89	0.20	0.71
8	0.51	0.73	0.27	0.70	0.27	0.61	0.19	0.69	0.20	0.54	0.42	0.90	0.30	0.86	0.32	0.68
9																
10																
11	0.46	0.61	0.48	0.56	0.27	0.26	0.26	0.23	0.68	0.46	0.43	0.67	0.35	0.56	0.33	0.30
12	1.18	0.74	1.61	0.71	0.25	0.40	0.22	0.21	0.20	0.37	0.54	1.03	0.28	0.93	0.34	0.20
13	0.51	0.87	0.76	0.83	0.25	0.54	0.27	0.51	0.19	0.27	0.60	1.07	0.33	1.09	0.26	0.47
14	1.49	0.98	0.50	0.95	0.22	0.73	0.23	0.64	0.30	0.42	0.25	1.01	0.22	1.00	0.25	0.71
15	1.06	0.90	0.44	0.86	0.31	0.55	0.20	0.79	0.20	0.37	0.29	0.87	0.21	0.86	0.22	0.72
16																
17																
18	0.24	1.07	0.22	1.04	0.22	0.66	0.18	0.93	0.17	0.48	0.43	0.92	0.20	0.85	0.19	0.55
19	1.40	0.98	0.51	0.96	0.19	0.75	0.35	0.88	0.17	0.55	0.31	0.92	0.22	0.89	0.31	0.57
20	1.73	0.89	0.56	0.85	0.22	0.68	0.17	0.78	0.18	0.53	0.28	0.88	0.24	0.84	0.24	0.66
21	0.20	0.90	0.33	0.87	0.16	0.71	0.22	0.72	0.15	0.44	0.64	0.92	0.25	0.88	0.25	0.63
22	0.17	0.79	0.27	0.75	0.22	0.69	0.21	0.67	0.23	0.43	0.27	0.88	0.23	0.88	0.27	0.67
23																
24																
25	0.25	0.85	0.18	0.81	0.28	0.64	0.20	0.71	0.30	0.40	0.17	0.91	0.15	0.86	0.19	0.70
26	0.21	0.83	0.29	0.79	0.19	0.63	0.13	0.68	0.17	0.45	0.24	0.89	0.15	0.89	0.17	0.76
27	0.16	0.84	0.33	0.81	0.63	0.59	0.23	0.74	0.21	0.44	1.11	0.76	0.81	0.73	0.31	0.68
28	0.74	0.89	0.19	0.85	0.16	0.63	0.16	0.69	0.17	0.47	0.75	0.90	0.62	0.86	0.95	0.54
29	0.77	0.83	0.20	0.80	0.25	0.68	0.21	0.71	0.17	0.43	0.40	0.99	0.29	0.95	0.48	0.70
30																
31																

Village of Lions Bay Distribution System NTU and CL^2 Ressults

	TREATED WATER AUGUST 2016															
	HARVEY										MAGNESIA					
	400 HAR. TANK		PRV-3		STORE/CAFÉ		LIONS BAY AVE.		KELVIN GROVE		100 MAG. TANK		PRV-5		BRUNSWICK B.	
Date	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	0.31	0.82	0.21	0.79	0.15	0.65	0.13	0.67	0.13	0.36	0.21	1.08	0.23	1.09	0.22	0.81
3	0.18	0.76	0.21	0.72	0.18	0.66	0.16	0.68	0.16	0.45	0.31	1.00	0.21	1.04	0.27	0.81
4	0.20	0.84	0.26	0.80	0.20	0.60	0.18	0.62	0.25	0.46	0.24	0.95	0.23	0.92	0.29	0.77
5	0.57	0.84	0.17	0.81	0.18	0.60	0.14	0.62	0.15	0.46	0.25	0.88	0.19	0.81	0.41	0.71
6																
7																
8	0.30	0.88	0.34	0.85	0.29	0.62	0.14	0.75	0.15	0.46	0.34	0.79	0.21	0.80	0.68	0.68
9	0.17	0.90	0.28	0.86	0.22	0.66	0.17	0.71	0.16	0.52	0.26	0.75	0.17	0.77	0.59	0.57
10	0.75	0.88	0.33	0.85	0.20	0.68	0.22	0.78	0.26	0.56	0.38	0.79	0.21	0.77	0.26	0.60
11	0.30	0.85	0.28	0.79	0.25	0.77	0.16	0.70	0.34	0.64	0.30	0.90	0.29	0.80	0.33	0.53
12	0.51	0.90	0.54	0.86	0.29	0.72	0.22	0.71	0.21	0.60	0.26	0.88	0.26	0.85	0.25	0.63
13																
14																
15	0.25	0.89	0.16	0.85	0.16	0.68	0.16	0.74	0.15	0.58	0.22	0.90	0.19	0.86	0.27	0.72
16	0.18	0.80	0.14	0.77	0.16	0.60	0.13	0.69	0.30	0.54	0.17	1.02	0.30	0.90	0.30	0.75
17	0.17	0.84	0.21	0.81	0.14	0.66	0.20	0.74	0.16	0.53	0.20	1.01	0.22	1.01	0.28	0.75
18	0.17	0.95	0.17	0.93	0.19	0.66	0.16	0.70	0.15	0.53	0.26	0.83	0.18	0.85	0.22	0.82
19	0.16	1.09	0.27	1.06	0.18	0.87	0.13	0.85	0.14	0.73	0.28	0.85	0.22	0.80	0.27	0.75
20																
21																
22	0.15	0.97	0.24	0.93	0.20	0.76	0.29	0.83	0.15	0.64	0.19	0.71	0.16	0.70	0.22	0.63
23	0.12	0.94	0.18	0.90	0.15	0.72	0.13	0.78	0.15	0.67	0.20	0.70	0.23	0.63	0.22	0.55
24	0.11	0.90	0.33	0.87	0.22	0.76	0.13	0.77	0.13	0.62	0.22	0.78	0.15	0.76	0.25	0.53
25	0.12	0.96	0.18	0.93	0.13	0.75	0.20	0.78	0.13	0.66	0.16	0.81	0.20	0.77	0.19	0.61
26	0.17	0.88	0.13	0.85	0.19	0.71	0.12	0.80	0.13	0.62	0.24	0.82	0.21	0.76	0.30	0.57
27																
28																
29	0.23	0.78	0.18	0.74	0.17	0.60	0.12	0.71	0.13	0.50	0.19	0.79	0.21	0.75	0.29	0.51
30	0.16	0.81	0.53	0.77	0.44	0.69	0.13	0.63	0.15	0.54	0.23	0.85	0.27	0.77	0.28	0.55
31	0.17	0.87	0.17	0.84	0.34	0.68	0.18	0.73	0.15	0.51	0.17	0.86	0.17	0.91	0.26	0.55

Village of Lions Bay Distribution System NTU and CL^2 Ressults

	TREATED WATER SEPTEMBER 2016															
	HARVEY										MAGNESIA					
	400 HAR. TANK		PRV-3		STORE/CAFÉ		LIONS BAY AVE.		KELVIN GROVE		100 MAG. TANK		PRV-5		BRUNSWICK B.	
Date	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	0.30	0.87	0.44	0.83	0.23	0.63	0.15	0.69	0.16	0.52	0.30	0.90	0.19	0.80	0.27	0.59
2	0.18	0.75	0.28	0.72	0.19	0.59	0.15	0.64	0.17	0.47	0.30	0.92	0.17	0.83	0.30	0.55
3																
4																
5																
6	0.16	0.80	0.18	0.76	0.38	0.62	0.14	0.47	0.13	0.21	0.17	0.96	0.29	0.87	0.20	0.61
7	0.18	0.84	0.24	0.81	0.23	0.60	0.15	0.59	0.13	0.47	0.33	0.93	0.16	0.88	0.21	0.65
8	0.22	0.82	0.22	0.79	0.32	0.70	0.20	0.56	0.15	0.63	0.17	0.86	0.17	0.82	0.27	0.65
9	0.17	0.94	0.18	0.89	0.18	0.71	0.13	0.62	0.29	0.50	0.14	0.87	0.17	0.81	0.20	0.63
10																
11																
12	0.15	1.12	0.18	1.10	0.15	0.85	0.12	0.91	0.13	0.55	0.14	0.88	0.14	0.84	0.23	0.61
13	0.15	1.03	0.32	1.01	0.18	0.93	0.14	0.92	0.18	0.69	0.14	0.93	0.41	0.87	0.21	0.67
14	0.14	1.08	0.17	1.05	0.25	0.86	0.15	0.94	0.14	0.80	0.17	1.00	0.84	0.95	0.37	0.75
15	0.13	1.02	0.15	0.99	0.15	0.88	0.16	0.94	0.16	0.76	0.20	0.97	0.15	0.94	0.45	0.74
16	0.18	1.00	0.19	0.97	0.43	0.83	0.18	0.86	0.16	0.79	0.23	0.93	0.19	0.90	0.26	0.80
17																
18																
19	0.17	0.86	0.24	0.81	0.16	0.67	0.18	0.66	0.15	0.46	0.18	0.96	0.17	0.90	0.23	0.69
20	0.25	0.75	0.19	0.72	0.18	0.58	0.14	0.52	0.15	0.37	0.22	0.87	0.22	0.85	0.30	0.63
21	0.21	0.88	0.24	0.85	0.21	0.64	0.15	0.53	0.14	0.35	0.21	0.85	0.25	0.84	0.22	0.64
22	0.14	0.92	0.34	0.89	0.30	0.74	0.15	0.62	3.88	0.44	0.36	0.91	0.41	0.86	0.28	0.57
23	0.32	1.09	0.19	1.07	0.41	0.76	0.17	0.68	0.74	0.66	0.30	0.93	0.35	0.91	0.35	0.63
24																
25																
26	0.17	0.74	0.19	0.70	0.24	0.54	0.22	0.50	0.18	0.23	0.23	0.79	0.17	0.74	0.22	0.57
27	0.19	0.79	0.20	0.76	0.15	0.58	0.18	0.42	0.16	0.32	0.20	0.82	0.17	0.72	0.26	0.50
28	0.20	0.84	0.18	0.80	0.18	0.66	0.16	0.53	0.15	0.27	0.37	0.92	0.18	0.98	0.53	0.53
29	0.24	0.85	0.17	0.82	0.17	0.72	0.15	0.65	0.15	0.41	0.23	0.95	0.19	0.91	0.27	0.50
30	0.15	0.93	0.17	0.90	0.20	0.80	0.18	0.68	0.16	0.47	0.35	0.98	0.16	0.98	0.31	0.62

Village of Lions Bay Distribution System NTU and CL^2 Ressults

	TREATED WATER OCTOBER 2016															
	HARVEY										MAGNESIA					
	400 HAR. TANK		PRV-3		STORE/CAFÉ		LIONS BAY AVE.		KELVIN GROVE		100 MAG. TANK		PRV-5		BRUNSWICK B.	
Date	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	0.16	0.94	0.21	0.91	0.18	0.84	0.19	0.75	0.18	0.55	0.21	0.97	0.25	0.98	0.23	0.73
4	0.23	0.88	0.27	0.85	0.23	0.73	0.16	0.66	0.22	0.42	0.19	0.96	0.19	0.94	0.27	0.72
5	0.46	0.52	0.67	0.48	0.23	0.37	0.22	0.63	0.15	0.35	0.29	0.82	0.22	0.86	0.28	0.70
6	0.62	0.49	0.53	0.43	0.26	0.20	0.27	0.35	0.23	0.34	0.54	0.66	0.35	0.59	0.28	0.69
7	0.66	0.54	1.10	0.46	0.34	0.77	0.23	0.23	0.22	0.76	1.86	0.60	0.34	0.64	0.35	0.51
8																
9																
10																
11	3.01	0.72	0.69	0.68	0.61	0.45	0.54	0.37	0.36	0.42	0.76	0.84	0.60	0.78	0.67	0.40
12	0.47	0.79	0.41	0.75	0.37	0.52	0.33	0.30	0.24	0.27	0.51	0.92	0.47	0.85	0.61	0.56
13	0.46	0.91	0.38	0.88	0.30	0.70	0.30	0.37	0.28	0.42	0.42	1.09	0.50	1.00	0.42	0.44
14	0.96	0.8	0.39	0.76	0.32	0.57	0.24	0.44	0.39	0.31	0.56	0.99	0.35	0.95	0.42	0.46
15																
16																
17	1.66	0.65	1.15	0.61	0.87	0.46	2.84	0.22	0.69	0.39	1.57	1.54	0.83	0.54	0.57	0.35
18	2.09	0.78	1.31	0.75	1.03	0.47	0.91	0.21	3.64	0.71	2.13	0.76	0.77	0.58	1.44	0.28
19	1.52	0.84	1.19	0.80	0.63	0.59	0.81	0.20	0.51	0.64	2.26	0.62	0.78	0.59	0.98	0.28
20	1.35	0.94	0.93	0.90	0.55	0.69	0.58	0.23	0.38	0.40	2.06	0.56	0.54	0.78	1.17	0.43
21	1.18	0.86	0.88	0.83	0.46	0.59	0.67	0.37	0.33	0.49	1.46	0.87	0.47	0.70	0.50	0.61
22																
23																
24	0.42	0.78	0.38	0.74	0.34	0.49	0.39	0.37	0.46	0.58	0.76	0.95	0.27	0.53	0.26	0.50
25	1.51	0.78	0.71	0.74	0.30	0.47	0.28	0.91	0.22	0.44	0.75	1.02	0.61	0.29	0.24	0.23
26	1.30	0.75	0.36	0.70	0.53	0.46	0.47	0.30	0.23	0.26	1.22	1.01	0.70	0.93	0.35	0.24
27	1.46	0.70	0.66	0.66	0.36	0.48	1.68	0.26	0.27	0.42	1.31	0.92	0.29	0.28	0.44	0.64
28	1.50	0.82	0.81	0.58	0.56	0.43	0.72	0.29	0.35	0.42	1.47	0.93	0.37	0.37	0.84	0.53
29																
30																
31	0.44	0.94	0.41	0.91	0.34	0.68	0.34	0.44	0.36	0.78	0.67	0.98	0.23	0.54	0.51	0.45

Village of Lions Bay Distribution System NTU and CL^2 Ressults

	TREATED WATER NOVEMBER 2016															
	HARVEY										MAGNESIA					
	400 HAR. TANK		PRV-3		STORE/CAFÉ		LIONS BAY AVE.		KELVIN GROVE		100 MAG. TANK		PRV-5		BRUNSWICK B.	
Date	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	1.18	0.87	0.42	0.84	0.23	0.62	0.28	0.39	0.19	0.29	0.69	0.97	0.24	0.57	0.53	0.48
2	0.91	0.86	0.33	0.83	0.24	0.61	0.42	0.35	0.20	0.24	0.66	0.93	0.22	0.55	0.51	0.53
3	2.67	0.64	1.38	0.60	0.87	0.40	0.28	0.33	0.21	0.31	0.57	0.90	0.58	0.59	0.41	0.55
4	0.52	0.87	0.67	0.77	0.55	0.60	0.24	0.30	0.32	0.23	0.59	0.85	0.40	0.59	0.41	0.58
5																
6																
7	0.34	0.83	0.35	0.79	0.31	0.51	0.27	0.41	0.31	0.25	0.56	0.89	0.33	0.70	0.33	0.25
8	0.98	0.79	0.67	0.75	0.50	0.55	0.54	0.38	0.29	0.28	1.29	0.87	0.48	0.72	0.24	0.23
9	1.52	1.04	1.47	1.01	0.83	0.70	0.69	0.29	0.21	0.25	1.03	0.79	0.55	0.76	0.31	0.24
10	1.23	0.96	0.29	0.90	0.27	0.69	0.39	0.27	0.23	0.27	0.80	0.93	0.27	0.86	0.24	0.24
11																
12																
13																
14	0.47	0.94	0.36	0.90	0.36	0.68	0.19	0.49	0.17	0.35	0.52	1.07	0.21	0.87	0.23	0.50
15	0.72	0.82	0.41	0.78	0.80	0.53	0.22	0.54	0.23	0.47	0.69	1.04	0.30	0.74	0.18	0.51
16	0.54	0.95	0.40	0.90	0.31	0.52	0.21	0.46	0.23	0.20	0.54	1.10	0.38	0.73	0.21	0.41
17	0.40	0.98	0.42	0.94	0.26	0.51	0.24	0.40	0.26	0.46	0.46	1.49	0.30	0.78	0.27	0.34
18	0.44	1.00	0.40	0.70	0.24	0.60	0.33	0.26	0.18	0.28	0.97	0.93	0.26	0.74	0.26	0.30
19																
20																
21	0.39	0.84	0.43	0.80	0.32	1.05	0.19	0.38	0.17	0.29	0.81	0.62	0.20	0.70	0.36	0.51
22	1.07	0.75	1.39	0.71	0.36	0.45	0.20	0.43	0.20	0.21	0.66	0.57	0.28	0.57	0.44	0.44
23	2.20	0.76	0.49	0.71	0.33	0.42	0.33	0.39	0.27	0.25	0.57	0.71	0.26	0.54	0.49	0.29
24	0.57	0.78	0.42	0.73	0.35	0.41	0.47	0.34	0.28	0.20	0.54	0.94	0.27	0.53	0.37	0.26
25	1.49	0.84	0.60	0.78	0.30	0.34	0.25	0.28	0.26	0.45	0.70	0.89	0.30	0.49	0.38	0.30
26																
27																
28	0.67	0.93	0.42	0.89	0.23	0.54	0.25	0.21	0.22	0.83	0.48	1.03	0.20	0.58	0.34	0.32
29	2.04	1.02	0.54	0.97	0.30	0.58	0.27	0.20	0.26	0.43	0.46	1.09	0.23	0.69	0.43	0.57
30	1.38	1.03	1.45	0.99	0.25	0.59	0.28	0.38	0.51	0.36	0.43	1.10	0.21	0.72	0.45	0.70

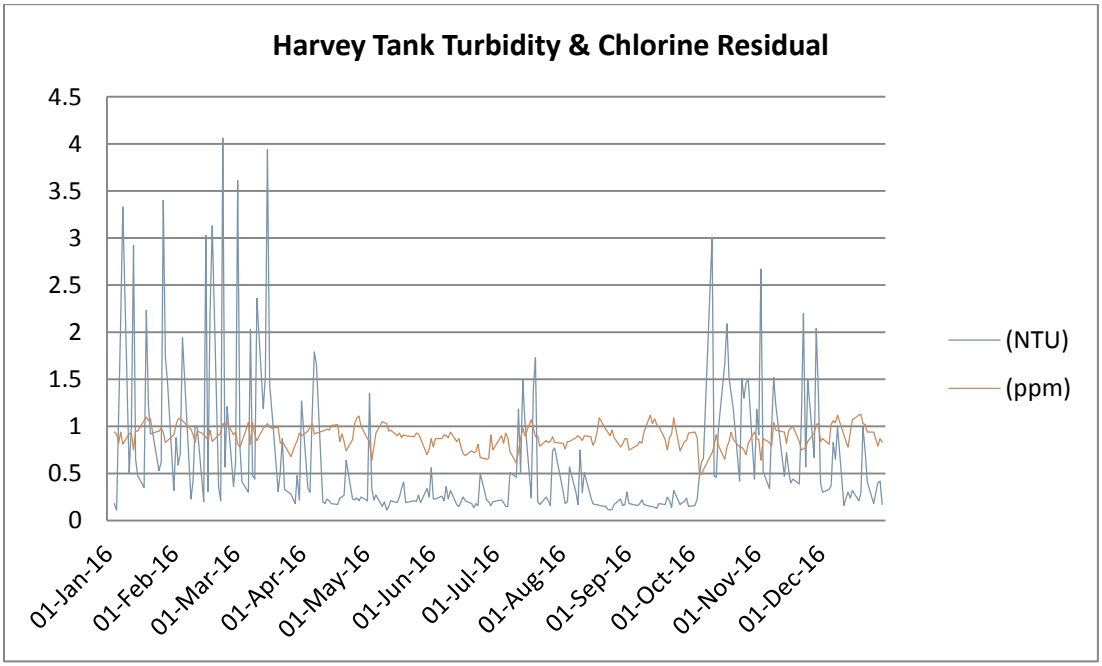
Village of Lions Bay Distribution System NTU and CL^2 Ressults

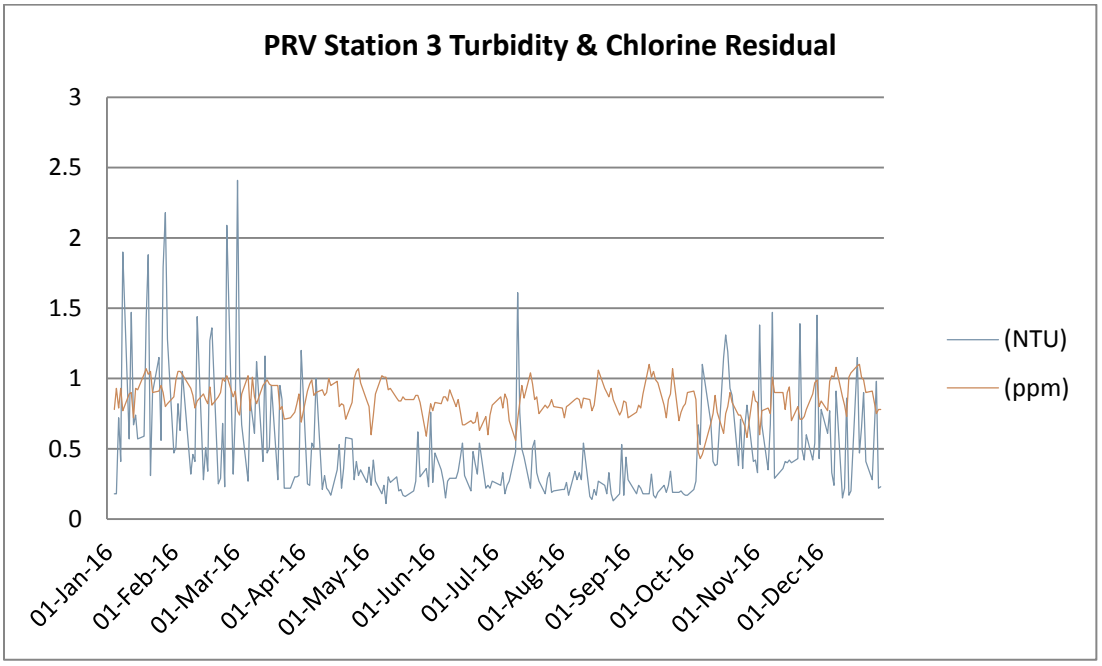
	TREATED WATER DECEMBER 2016															
	HARVEY										MAGNESIA					
	400 HAR. TANK		PRV-3		STORE/CAFÉ		LIONS BAY AVE.		KELVIN GROVE		100 MAG. TANK		PRV-5		BRUNSWICK B.	
Date	Turbidity (NTU)	CL2 Res. (ppm)	Turbidity (NTU)	CL2 Res. (ppm)	Turbidity (NTU)	CL2 Res. (ppm)	Turbidity (NTU)	CL2 Res. (ppm)	Turbidity (NTU)	CL2 Res. (ppm)	Turbidity (NTU)	CL2 Res. (ppm)	Turbidity (NTU)	CL2 Res. (ppm)	Turbidity (NTU)	CL2 Res. (ppm)
1	0.40	0.84	0.43	0.80	0.26	0.63	0.25	0.37	0.18	0.37	0.53	1.08	0.21	0.77	0.96	0.69
2	0.30	0.87	0.78	0.84	0.28	0.50	0.40	0.31	0.21	0.29	0.84	1.03	0.28	0.68	0.49	0.70
3																
4																
5	0.33	0.81	0.61	0.77	0.21	0.41	0.19	0.32	0.14	0.53	0.41	0.91	0.24	0.56	0.38	0.65
6	0.37	1.02	0.77	0.98	0.23	0.59	0.32	0.31	0.18	0.35	0.53	0.94	0.18	0.60	0.35	0.66
7	0.83	1.06	0.33	1.02	0.32	0.55	0.25	0.29	0.17	0.38	0.28	0.90	0.17	0.70	0.36	0.62
8	0.65	1.04	0.24	1.01	0.37	0.75	0.29	0.42	0.19	1.08	0.45	0.97	0.33	0.86	0.30	0.63
9	1.00	1.12	0.91	1.08	0.50	0.81	0.25	0.59	0.37	0.68	0.60	0.95	0.23	0.91	0.29	0.67
10																
11																
12	0.16	0.91	0.15	0.87	0.24	0.67	0.16	0.70	0.48	0.54	0.31	0.90	0.23	0.83	0.25	0.72
13	0.24	0.84	0.22	0.81	0.67	0.63	0.24	0.71	0.15	0.65	0.38	0.84	0.25	0.77	0.30	0.73
14	0.30	0.78	0.86	0.73	0.39	0.53	0.20	0.65	0.38	0.61	0.27	0.82	0.29	0.68	0.29	0.70
15	0.24	0.94	0.17	1.01	0.28	0.58	0.18	0.63	0.19	0.53	0.20	0.82	0.14	0.68	0.26	0.69
16	0.32	1.07	0.20	1.04	0.33	0.73	0.20	0.53	0.31	0.55	N/A	N/A	0.21	0.71	0.29	0.64
17																
18																
19	0.21	1.12	1.15	1.09	0.49	0.87	0.23	0.81	0.14	0.46	0.23	0.84	0.14	0.97	0.35	0.59
20	0.29	1.13	0.47	1.10	0.51	0.82	0.29	0.83	0.27	0.51	0.32	0.82	0.25	0.99	0.27	0.60
21	0.99	1.03	0.65	1.01	0.42	0.76	0.33	0.79	0.38	0.93	0.67	0.78	0.18	0.95	0.44	0.61
22	0.73	1.02	0.90	0.99	0.46	0.71	0.36	0.81	0.27	0.79	0.33	0.83	0.22	0.90	0.50	0.62
23	0.41	0.94	0.41	0.90	0.60	0.64	0.32	0.82	0.19	0.67	0.52	0.88	0.28	0.88	0.39	0.66
24																
25																
26	0.18	0.94	0.28	0.91	0.29	0.61	0.18	0.66	0.23	0.43	0.23	0.91	0.22	0.77	0.23	0.78
27																
28	0.40	0.79	0.98	0.75	0.31	0.64	0.33	0.65	0.19	0.30	0.30	0.92	0.21	0.80	0.64	0.79
29	0.42	0.87	0.22	0.78	0.37	0.57	0.31	0.64	0.41	0.62	0.21	0.93	0.12	0.84	0.36	0.88
30	0.17	0.83	0.23	0.78	0.24	0.82	0.27	0.71	0.36	0.67	0.18	0.91	0.22	0.74	0.29	0.90
31																

APPENDIX C: TURBIDITY V. CHLORINE RESIDUAL GRAPHS

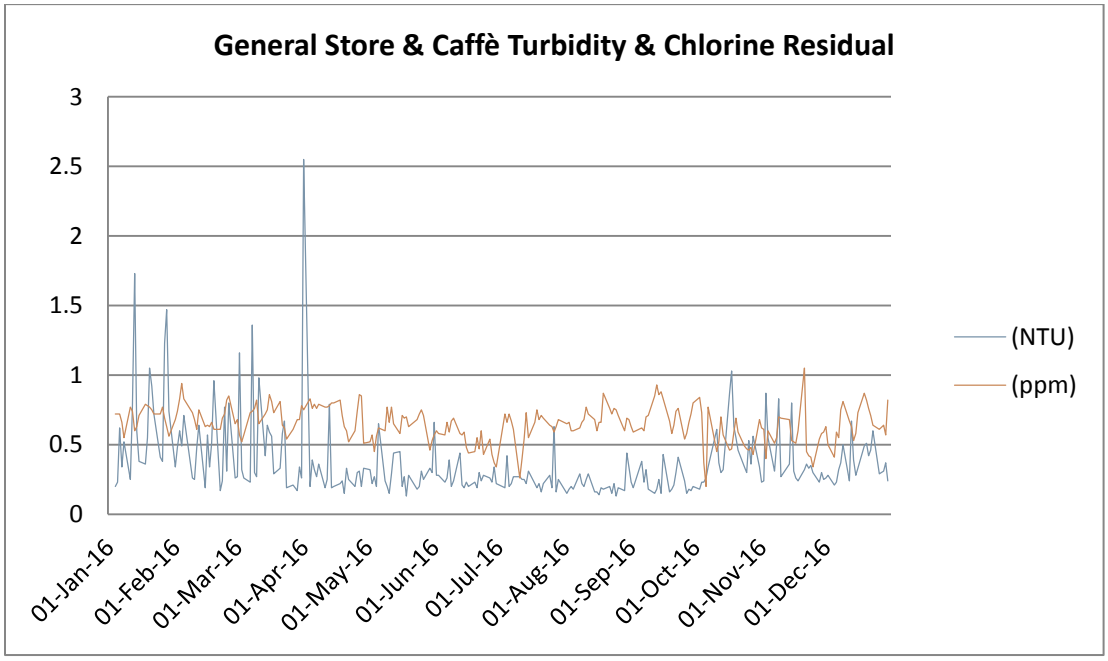
APPENDIX C: TURBIDITY V. CHLORINE RESIDUAL GRAPHS

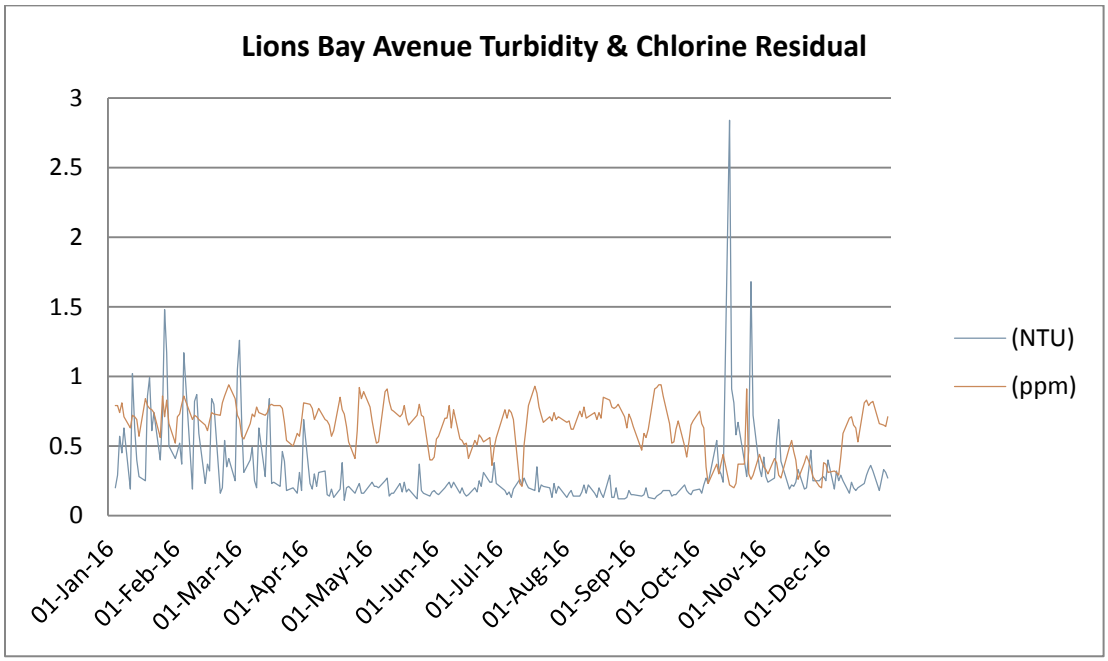
Harvey Creek Water System Graphs



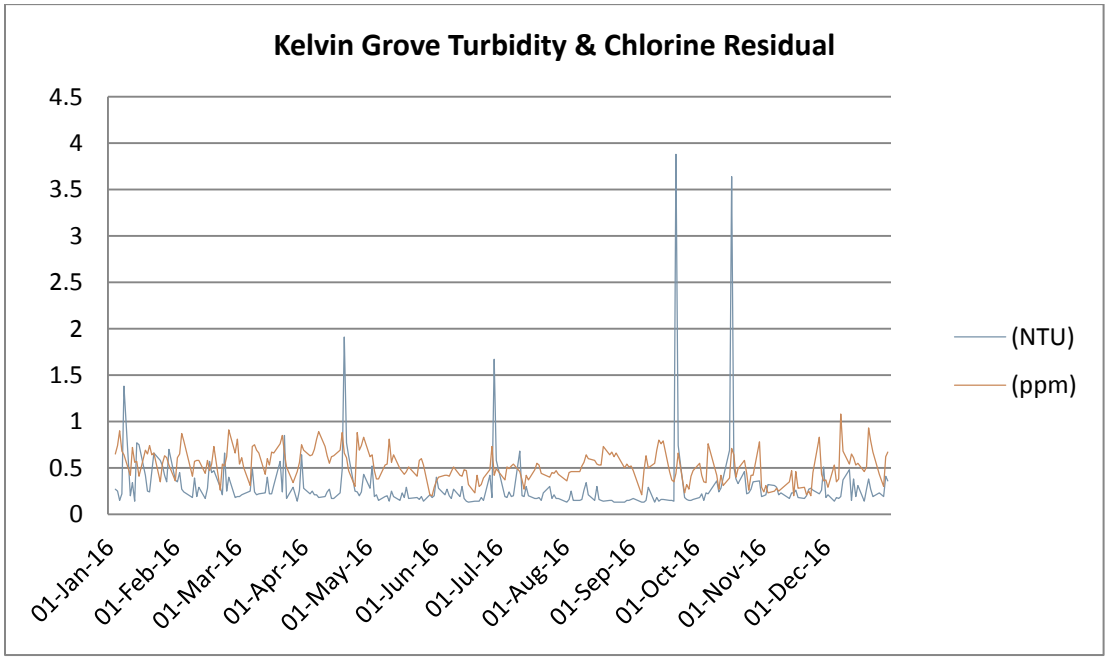


APPENDIX C: TURBIDITY V. CHLORINE RESIDUAL GRAPHS

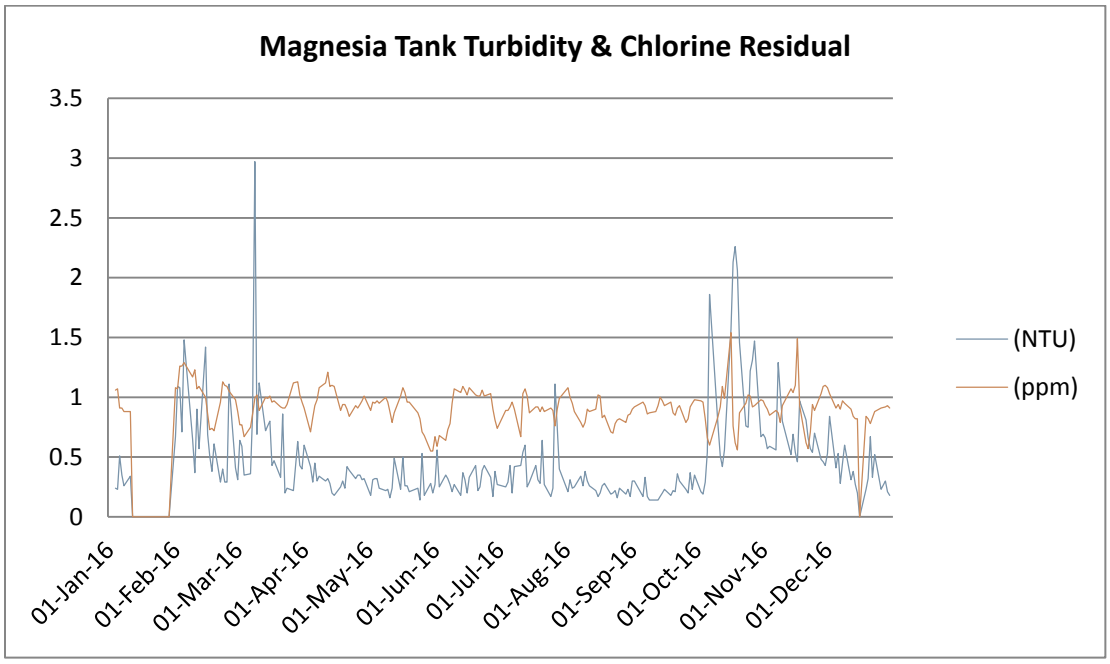




APPENDIX C: TURBIDITY V. CHLORINE RESIDUAL GRAPHS

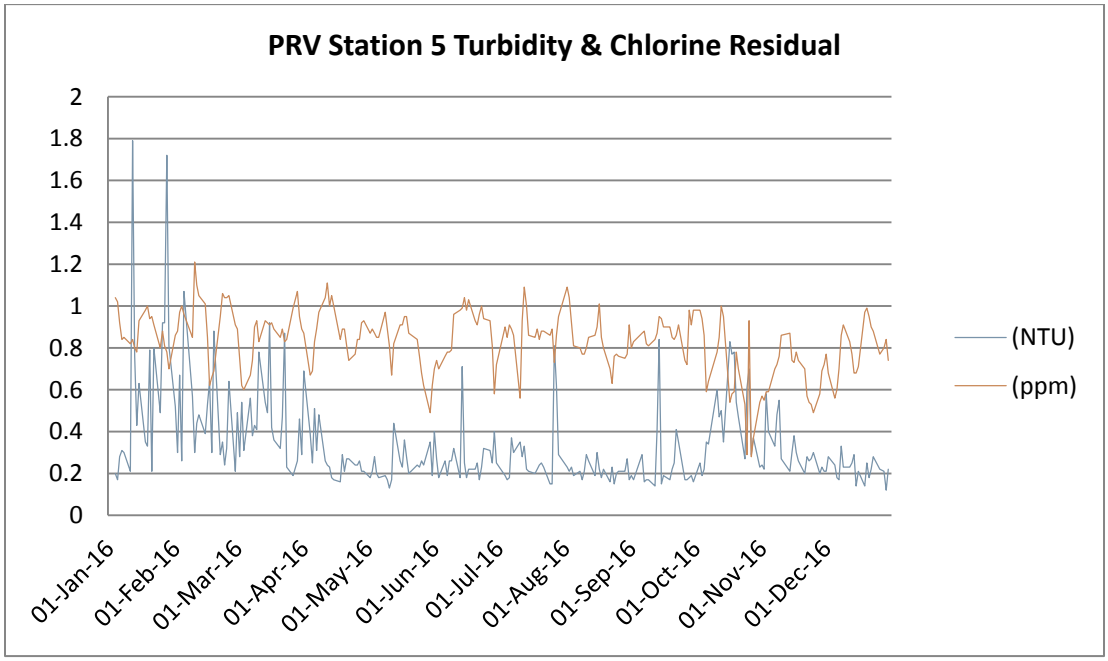


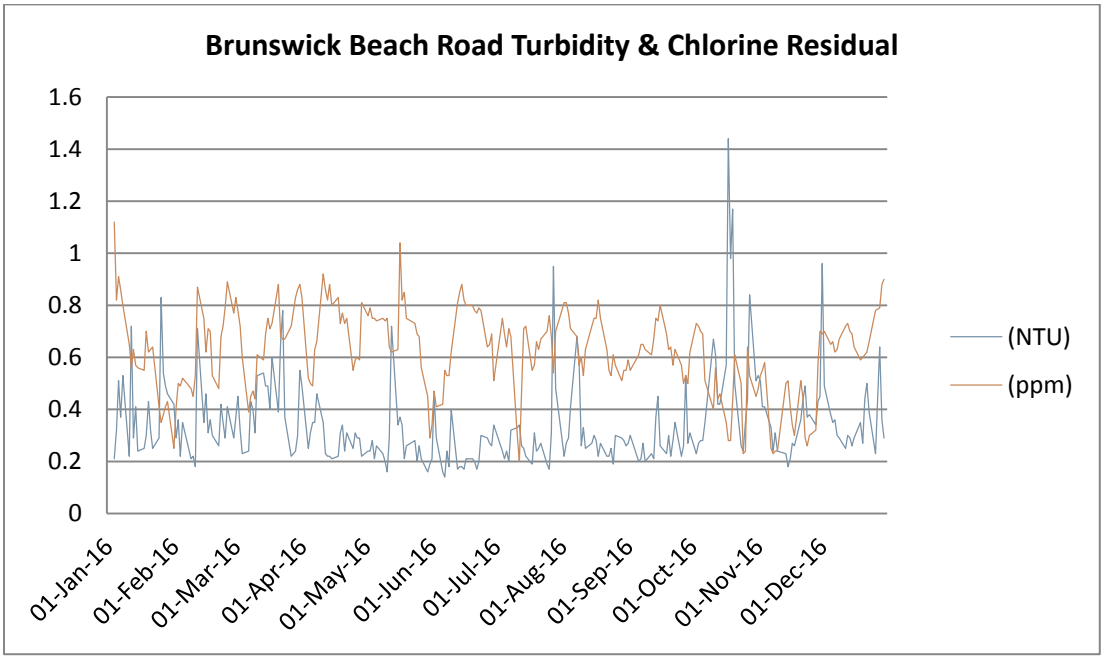
Magnesia Creek Water System Graphs



Note: Zero readings in the middle of January and late December of 2016 are indicative of plant shut-downs due to intake blockages.

APPENDIX C: TURBIDITY V. CHLORINE RESIDUAL GRAPHS





APPENDIX D: METALS & WATER CHEMISTRY TEST RESULTS

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

Date Received: 05-APR-16
Report Date: 18-APR-16 14:43 (MT)
Version: FINAL

Client Phone: 604-921-9833

Certificate of Analysis

Lab Work Order #: L1752219

Project P.O. #: NOT SUBMITTED
Job Reference:
C of C Numbers:
Legal Site Desc:

Courtney Duncan
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L1752219-1 Water 05-APR-16 10:30 HARVEY TANK (FIRST DRAW)	L1752219-2 Water 05-APR-16 10:30 HARVEY TANK (AFTER FLUSH)	L1752219-3 Water 05-APR-16 08:05 STORE/CAFE (FIRST DRAW)	L1752219-4 Water 05-APR-16 08:05 STORE/CAFE (AFTER FLUSH)	L1752219-5 Water 05-APR-16 12:50 LIONS BAY AVE. (FIRST DRAW)
WATER						
Physical Tests	Hardness (as CaCO3) (mg/L)	3.75	3.71	3.80	4.24	4.50
	pH (pH)	6.83		6.82		6.90
	Total Suspended Solids (mg/L)	<3.0		<3.0		<3.0
	Turbidity (NTU)	0.17		0.27		0.15
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	4.0		3.7		4.1
Organic / Inorganic Carbon	Total Organic Carbon (mg/L)	1.04		0.87		0.89
Total Metals	Aluminum (Al)-Total (mg/L)	0.085	0.055	0.050	0.033	0.015
	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)	1.26	1.25	1.30	1.43	1.55
	Chromium (Cr)-Total (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
	Copper (Cu)-Total (mg/L)	0.0123	0.0041	0.0178	0.185	0.728
	Iron (Fe)-Total (mg/L)	0.031	<0.030	0.084	0.062	<0.030
	Lead (Pb)-Total (mg/L)	<0.00050	<0.00050	<0.00050	0.00898	0.00075
	Magnesium (Mg)-Total (mg/L)	0.15	0.14	0.13	0.16	0.15
	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	<0.10
	Selenium (Se)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Sodium (Na)-Total (mg/L)	2.2	2.2	2.1	2.2	2.1
	Uranium (U)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Zinc (Zn)-Total (mg/L)	<0.050	<0.050	<0.050	0.139	<0.050
Aggregate Organics	BOD (mg/L)	<2.0		<2.0		<2.0
Trihalomethanes	Bromodichloromethane (mg/L)	<0.0010		<0.0010		<0.0010
	Bromoform (mg/L)	<0.0010		<0.0010		<0.0010
	Dibromochloromethane (mg/L)	<0.0010		<0.0010		<0.0010
	Chloroform (mg/L)	0.0418		0.0475		0.0506
	Total THMs (mg/L)	0.0418		0.0475		0.0506

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L1752219-6 Water 05-APR-16 12:50 LIONS BAY AVE. (AFTER FLUSH)	L1752219-7 Water 05-APR-16 08:30 KELVIN GROVE (FIRST DRAW)	L1752219-8 Water 05-APR-16 08:30 KELVIN GROVE (AFTER FLUSH)	L1752219-9 Water 05-APR-16 07:25 COMMUNITY CENTRE (FIRST DRAW)	L1752219-10 Water 05-APR-16 07:25 COMMUNITY CENTRE (AFTER FLUSH)
WATER						
Physical Tests	Hardness (as CaCO3) (mg/L)	4.35	7.06	5.81	5.33	4.05
	pH (pH)		7.23		6.85	
	Total Suspended Solids (mg/L)		<3.0		<3.0	
	Turbidity (NTU)		0.26		0.21	
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)		5.2		3.8	
Organic / Inorganic Carbon	Total Organic Carbon (mg/L)		1.03		0.90	
Total Metals	Aluminum (Al)-Total (mg/L)	0.050	0.015	0.058	0.044	0.051
	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)	1.49	2.40	2.11	1.43	1.40
	Chromium (Cr)-Total (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
	Copper (Cu)-Total (mg/L)	0.0064	0.201	0.0028	0.0941	0.0286
	Iron (Fe)-Total (mg/L)	<0.030	0.045	0.052	0.040	0.079
	Lead (Pb)-Total (mg/L)	<0.00050	0.0455	0.00074	0.00308	0.00070
	Magnesium (Mg)-Total (mg/L)	0.15	0.26	0.13	0.43	0.14
	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	<0.10
	Selenium (Se)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Sodium (Na)-Total (mg/L)	2.2	2.2	2.2	2.2	2.2
	Uranium (U)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Zinc (Zn)-Total (mg/L)	<0.050	0.111	<0.050	0.143	<0.050
Aggregate Organics	BOD (mg/L)		<2.0		<2.0	
Trihalomethanes	Bromodichloromethane (mg/L)		<0.0010		<0.0010	
	Bromoform (mg/L)		<0.0010		<0.0010	
	Dibromochloromethane (mg/L)		<0.0010		<0.0010	
	Chloroform (mg/L)		0.0604		0.0482	
	Total THMs (mg/L)		0.0604		0.0482	

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L1752219-11 Water 05-APR-16 09:35 MAGNESIA TANK (FIRST DRAW)	L1752219-12 Water 05-APR-16 09:35 MAGNESIA TANK (AFTER FLUSH)	L1752219-13 Water 05-APR-16 11:55 BRUNSWICK BEACH (FIRST DRAW)	L1752219-14 Water 05-APR-16 11:55 BRUNSWICK BEACH (AFTER FLUSH)	L1752219-15 Water 05-APR-16 07:45 ELEMENTARY SCHOOL (FIRST DRAW)
WATER						
Physical Tests	Hardness (as CaCO3) (mg/L)	9.10	7.93	10.1	9.33	9.86
	pH (pH)	6.94		7.11		7.21
	Total Suspended Solids (mg/L)	<3.0		<3.0		<3.0
	Turbidity (NTU)	0.18		0.22		0.35
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	5.1		5.6		5.7
Organic / Inorganic Carbon	Total Organic Carbon (mg/L)	0.77		0.67		0.56
Total Metals	Aluminum (Al)-Total (mg/L)	0.014	0.038	0.017	0.033	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	0.00013
	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)	3.07	2.63	3.39	3.14	3.36
	Chromium (Cr)-Total (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
	Copper (Cu)-Total (mg/L)	0.571	0.0115	0.274	0.0046	0.0142
	Iron (Fe)-Total (mg/L)	0.124	<0.030	0.042	0.038	0.163
	Lead (Pb)-Total (mg/L)	0.00295	<0.00050	0.00273	<0.00050	0.00164
	Magnesium (Mg)-Total (mg/L)	0.35	0.33	0.40	0.36	0.36
	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	<0.10
	Selenium (Se)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Sodium (Na)-Total (mg/L)	2.4	2.6	2.7	2.6	2.6
	Uranium (U)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Zinc (Zn)-Total (mg/L)	0.265	<0.050	<0.050	<0.050	<0.050
Aggregate Organics	BOD (mg/L)	<2.0		<2.0		<2.0
Trihalomethanes	Bromodichloromethane (mg/L)	<0.0010		<0.0010		<0.0010
	Bromoform (mg/L)	<0.0010		<0.0010		<0.0010
	Dibromochloromethane (mg/L)	<0.0010		<0.0010		<0.0010
	Chloroform (mg/L)	0.0329		0.0374		0.0431
	Total THMs (mg/L)	0.0329		0.0374		0.0431

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L1752219-16 Water 05-APR-16 07:45 ELEMENTARY SCHOOL (AFTER FLUSH)	L1752219-17 Surface Water 05-APR-16 10:35 HARVEY RAW WATER	L1752219-18 Surface Water 05-APR-16 09:40 MAGNESIA RAW WATER		
WATER						
Physical Tests	Hardness (as CaCO3) (mg/L)	10.0	3.36	7.44		
	pH (pH)		6.65	6.77		
	Total Suspended Solids (mg/L)		<3.0	<3.0		
	Turbidity (NTU)		0.15	0.17		
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)		2.8	3.2		
Organic / Inorganic Carbon	Total Organic Carbon (mg/L)		0.82	0.98		
Total Metals	Aluminum (Al)-Total (mg/L)	0.034	0.050	0.037		
	Antimony (Sb)-Total (mg/L)	<0.00050	<0.00050	<0.00050		
	Arsenic (As)-Total (mg/L)	0.00012	<0.00010	<0.00010		
	Barium (Ba)-Total (mg/L)	<0.020	<0.020	<0.020		
	Boron (B)-Total (mg/L)	<0.10	<0.10	<0.10		
	Cadmium (Cd)-Total (mg/L)	<0.00020	<0.00020	<0.00020		
	Calcium (Ca)-Total (mg/L)	3.41	1.11	2.45		
	Chromium (Cr)-Total (mg/L)	<0.0020	<0.0020	<0.0020		
	Copper (Cu)-Total (mg/L)	0.0132	0.0065	0.0033		
	Iron (Fe)-Total (mg/L)	0.166	<0.030	<0.030		
	Lead (Pb)-Total (mg/L)	0.00962	<0.00050	<0.00050		
	Magnesium (Mg)-Total (mg/L)	0.36	0.14	0.32		
	Manganese (Mn)-Total (mg/L)	<0.0020	<0.0020	<0.0020		
	Mercury (Hg)-Total (mg/L)	<0.00020	<0.00020	<0.00020		
	Potassium (K)-Total (mg/L)	<0.10	<0.10	<0.10		
	Selenium (Se)-Total (mg/L)	<0.0010	<0.0010	<0.0010		
	Sodium (Na)-Total (mg/L)	2.7	<2.0	<2.0		
	Uranium (U)-Total (mg/L)	<0.00010	<0.00010	<0.00010		
	Zinc (Zn)-Total (mg/L)	<0.050	<0.050	<0.050		
Aggregate Organics	BOD (mg/L)		<2.0	<2.0		
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)
Method Blank	Alkalinity, Total (as CaCO3)	B	L1752219-1, -11, -13, -15, -17, -18, -3, -5, -7, -9
Matrix Spike	Total Organic Carbon	MS-B	L1752219-17, -18
Matrix Spike	Total Organic Carbon	MS-B	L1752219-17, -18

Qualifiers for Individual Parameters Listed:

Qualifier	Description
B	Method Blank exceeds ALS DQO. All associated sample results are at least 5 times greater than blank levels and are considered reliable.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ALK-TITR-VA	Water	Alkalinity Species by Titration	APHA 2320 Alkalinity

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

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

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

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

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

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

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

HARDNESS-CALC-VA	Water	Hardness	APHA 2340B

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

HG-TOT-CVAFS-VA	Water	Total Hg in Water by CVAFS LOR=50ppt	EPA 1631E (mod)

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 or atomic absorption spectrophotometry (EPA Method 245.7).

MET-T-CCMS-VA	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

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

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

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

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

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

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

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

Reference Information

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. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.

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

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

TURBIDITY-VA Water Turbidity by Meter APHA 2130 Turbidity

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

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

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

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

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.

L1752219-COFC

Chain of Custody / Analytical Request Form

Canada Toll Free: 1 800 668 9878

www.alsglobal.com

COC # _____

Page 1 of 1

Report To		**Report Format / Distribution**	**Service Requested** (Rush for routine analysis subject to availability)
Company:	Village of Lions Bay	☐ Standard ☐ Other	◉ Regular (Standard Turnaround Times - Business Days)
Contact:	Nikii Hoglund	☑ PDF ☐ Excel ☐ Digital ☐ Fax	○ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
Address:	400 Centre Rd	Email 1: aurrutia@lionsbay.ca	○ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
	Lions Bay, BC V0N 2E0	Email 2: works@lionsbay.ca	○ Same Day or Weekend Emergency - Contact ALS to Confirm TAT
Phone:	604 921 9833 Fax:	Email 3:	
Invoice To	Same as Report ? ☑ Yes ☐ No	**Client / Project Information**	**Analysis Request**
Hardcopy of Invoice with Report?	☐ Yes ☐ No	Job #:	Please indicate below Filtered, Preserved or both (F, P, F/P)
Company:		PO / AFE:	
Contact:		LSD:	
Address:			
Phone:	Fax:	Quote #:	
Lab Work Order # (lab use only)		ALS Contact: Courtney Duncan	Sampler: Alberto Urrutia

Sample #	Sample Identification (This description will ... rt)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Hardness	pH	TSS	BOD	Turbidity	Alkalinity Total	Total Metals (First Draw)	Total Metals (After Flush)	Mercury	Total Organic Carbon	Trihalomethanes		Number of Containers
	Harvey Tank	05-Apr-16	10:30	Water	X	X	X	X	X	X	X	X	X	X	X		8
	Store / Café	05-Apr-16	8:05	Water	X	X	X	X	X	X	X	X	X	X	X		8
	Lions Bay Ave.	05-Apr-16	12:50	Water	X	X	X	X	X	X	X	X	X	X	X		8
	Kelvin Grove	05-Apr-16	8:30	Water	X	X	X	X	X	X	X	X	X	X	X		8
	Community Centre	05-Apr-16	7:25	Water	X	X	X	X	X	X	X	X	X	X	X		8
	Magnesia Tank	05-Apr-16	9:35	Water	X	X	X	X	X	X	X	X	X	X	X		8
	Brunswick Beach	05-Apr-16	11:55	Water	X	X	X	X	X	X	X	X	X	X	X		8
	Elementary School	05-Apr-16	7:45	Water	X	X	X	X	X	X	X	X	X	X	X		8
	Harvey Raw Water	05-Apr-16	10:35	Surface Water	X	X	X	X	X	X		X	X	X			4
	Magnesia Raw Water	05-Apr-16	9:40	Surface Water	X	X	X	X	X	X		X	X	X			4

Short Holding Time

Rush Processing

Special Instructions / Regulations with water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as provided on a separate Excel tab.

Also provided on another Excel tab are the ALS location addresses, phone numbers and sample container / preservation / holding time table for common analyses.

SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
Released by:	Date (dd-mmm-yy)	Time (hh-mm)	Received by: Shayan	Date: Apr.5	Time: 1515	Temperature: 1.6°C, 2.3°C	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF

GENF 18.01 Front

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

Date Received: 27-SEP-16
Report Date: 12-OCT-16 12:57 (MT)
Version: FINAL

Client Phone: 604-921-9833

Certificate of Analysis

Lab Work Order #: L1835131

Project P.O. #: NOT SUBMITTED
Job Reference:
C of C Numbers:
Legal Site Desc:

Courtney Duncan
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L1835131-1 WATER 27-SEP-16 10:40 HARVEY TANK (FIRST DRAW)	L1835131-2 WATER 27-SEP-16 10:40 HARVEY TANK (AFTER FLUSH)	L1835131-3 WATER 27-SEP-16 07:45 STORE / CAFE (FIRST DRAW)	L1835131-4 WATER 27-SEP-16 07:45 STORE / CAFE (AFTER FLUSH)	L1835131-5 WATER 27-SEP-16 11:25 LIONS BAY AVE. (FIRST DRAW)
WATER						
Physical Tests	Hardness (as CaCO3) (mg/L)	5.63 HTC	5.65 HTC	6.05 HTC	5.73 HTC	6.42 HTC
	pH (pH)	6.54		6.93		6.96
	Total Suspended Solids (mg/L)	<3.0		<3.0		<3.0
	Turbidity (NTU)	0.11		0.11		0.10
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	7.2		5.4		5.5
Organic / Inorganic Carbon	Total Organic Carbon (mg/L)	1.22		1.05		1.09
Total Metals	Aluminum (Al)-Total (mg/L)	0.032	0.030	0.030	0.030	0.022
	Antimony (Sb)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Arsenic (As)-Total (mg/L)	0.00011	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)	1.92	1.92	2.05	1.97	2.23
	Chromium (Cr)-Total (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
	Copper (Cu)-Total (mg/L)	0.0086	0.0040	0.0751	0.0073	0.241
	Iron (Fe)-Total (mg/L)	<0.030	<0.030	0.051	0.042	<0.030
	Lead (Pb)-Total (mg/L)	<0.00050	<0.00050	0.00650	<0.00050	0.00181
	Magnesium (Mg)-Total (mg/L)	0.20	0.21	0.23	0.20	0.21
	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	0.12	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)	2.3	2.3	2.3	2.3	2.3
	Uranium (U)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Zinc (Zn)-Total (mg/L)	<0.050	<0.050	0.055	<0.050	<0.050
Aggregate Organics	BOD (mg/L)	<2.0		<2.0		<2.0
Trihalomethanes	Bromodichloromethane (mg/L)	<0.0010		<0.0010		<0.0010
	Bromoform (mg/L)	<0.0010		<0.0010		<0.0010
	Dibromochloromethane (mg/L)	<0.0010		<0.0010		<0.0010
	Chloroform (mg/L)	0.0409		0.0499		0.0567
	Total THMs (mg/L)	0.0409		0.0499		0.0567

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1835131-6	L1835131-7	L1835131-8	L1835131-9	L1835131-10
	Description	WATER	WATER	WATER	WATER	WATER
	Sampled Date	27-SEP-16	27-SEP-16	27-SEP-16	27-SEP-16	27-SEP-16
	Sampled Time	11:25	08:20	08:20	07:20	07:20
	Client ID	LIONS BAY AVE. (AFTER FLUSH)	KELVIN GROVE (FIRST DRAW)	KELVIN GROVE (AFTER FLUSH)	COMMUNITY CENTRE (FIRST DRAW)	COMMUNITY CENTRE (AFTER FLUSH)
Grouping	**Analyte**					
WATER						
Physical Tests	Hardness (as CaCO3) (mg/L)	6.00 HTC	7.61 HTC	7.55 HTC	6.70 HTC	6.09 HTC
	pH (pH)		7.11		6.97	
	Total Suspended Solids (mg/L)		<3.0		<3.0	
	Turbidity (NTU)		0.11		0.11	
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)		7.0		5.6	
Organic / Inorganic Carbon	Total Organic Carbon (mg/L)		1.13		0.95	
Total Metals	Aluminum (Al)-Total (mg/L)	0.033	0.026	0.048	0.024	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	0.00012	<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)	2.06	2.69	2.73	2.16	2.11
	Chromium (Cr)-Total (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
	Copper (Cu)-Total (mg/L)	0.0030	0.175	0.0021	0.0924	0.0316
	Iron (Fe)-Total (mg/L)	<0.030	0.085	0.053	<0.030	0.040
	Lead (Pb)-Total (mg/L)	<0.00050	0.0437	0.00060	0.00268	0.00067
	Magnesium (Mg)-Total (mg/L)	0.21	0.22	0.18	0.32	0.20
	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	0.13	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)	2.3	2.4	2.4	2.4	2.4
	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	0.101	<0.050
Aggregate Organics	BOD (mg/L)		<2.0		<2.0	
Trihalomethanes	Bromodichloromethane (mg/L)		<0.0010		<0.0010	
	Bromoform (mg/L)		<0.0010		<0.0010	
	Dibromochloromethane (mg/L)		<0.0010		<0.0010	
	Chloroform (mg/L)		0.0799		0.0506	
	Total THMs (mg/L)		0.0799		0.0506	

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L1835131-11 WATER 27-SEP-16 09:15 MAGNESIA TANK (FIRST DRAW)	L1835131-12 WATER 27-SEP-16 09:15 MAGNESIA TANK (AFTER FLUSH)	L1835131-13 WATER 27-SEP-16 09:50 BRUNSWICK BEACH (FIRST DRAW)	L1835131-14 WATER 27-SEP-16 09:50 BRUNSWICK BEACH (AFTER FLUSH)	L1835131-15 SURFACE WATE 27-SEP-16 10:45 HARVEY RAW WATER (AFTER FLUSH)
WATER						
Physical Tests	Hardness (as CaCO3) (mg/L)	13.0 HTC	13.3 HTC	14.9 HTC	13.8 HTC	5.72 HTC
	pH (pH)	6.89		6.99		6.94
	Total Suspended Solids (mg/L)	<3.0		<3.0		<3.0
	Turbidity (NTU)	0.11		0.21		0.25
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	4.9		5.8		5.4
Organic / Inorganic Carbon	Total Organic Carbon (mg/L)	0.95		0.72		1.06
Total Metals	Aluminum (Al)-Total (mg/L)	0.022	0.024	0.012	0.024	0.029
	Antimony (Sb)-Total (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Arsenic (As)-Total (mg/L)	0.00011	0.00011	<0.00010	0.00012	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)	4.45	4.53	5.23	4.78	1.93
	Chromium (Cr)-Total (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
	Copper (Cu)-Total (mg/L)	0.0224	0.0109	0.214	0.0045	0.0076
	Iron (Fe)-Total (mg/L)	<0.030	<0.030	0.037	0.039	<0.030
	Lead (Pb)-Total (mg/L)	<0.00050	<0.00050	0.00296	<0.00050	<0.00050
	Magnesium (Mg)-Total (mg/L)	0.47	0.47	0.46	0.45	0.22
	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	0.12
	Selenium (Se)-Total (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Sodium (Na)-Total (mg/L)	3.1	3.2	3.1	3.0	<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)	<2.0		<2.0		<2.0
Trihalomethanes	Bromodichloromethane (mg/L)	<0.0010		<0.0010		
	Bromoform (mg/L)	<0.0010		<0.0010		
	Dibromochloromethane (mg/L)	<0.0010		<0.0010		
	Chloroform (mg/L)	0.0312		0.0446		
	Total THMs (mg/L)	0.0312		0.0446		

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1835131-16				
	Description	SURFACE WATE				
	Sampled Date	27-SEP-16				
	Sampled Time	09:20				
	Client ID	MAGNESIA RAW WATER (AFTER FLUSH)				
Grouping	**Analyte**					
WATER						
Physical Tests	Hardness (as CaCO3) (mg/L)	14.1 HTC				
	pH (pH)	6.90				
	Total Suspended Solids (mg/L)	<3.0				
	Turbidity (NTU)	0.11				
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	4.5				
Organic / Inorganic Carbon	Total Organic Carbon (mg/L)	0.70				
Total Metals	Aluminum (Al)-Total (mg/L)	0.019				
	Antimony (Sb)-Total (mg/L)	<0.00050				
	Arsenic (As)-Total (mg/L)	0.00010				
	Barium (Ba)-Total (mg/L)	<0.020				
	Boron (B)-Total (mg/L)	<0.10				
	Cadmium (Cd)-Total (mg/L)	<0.00020				
	Calcium (Ca)-Total (mg/L)	4.85				
	Chromium (Cr)-Total (mg/L)	<0.0020				
	Copper (Cu)-Total (mg/L)	0.0061				
	Iron (Fe)-Total (mg/L)	<0.030				
	Lead (Pb)-Total (mg/L)	<0.00050				
	Magnesium (Mg)-Total (mg/L)	0.49				
	Manganese (Mn)-Total (mg/L)	<0.0020				
	Mercury (Hg)-Total (mg/L)	<0.00020				
	Potassium (K)-Total (mg/L)	<0.10				
	Selenium (Se)-Total (mg/L)	<0.0010				
	Sodium (Na)-Total (mg/L)	<2.0				
	Uranium (U)-Total (mg/L)	<0.00010				
	Zinc (Zn)-Total (mg/L)	<0.050				
Aggregate Organics	BOD (mg/L)	<2.0				
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

Qualifiers for Individual Samples Listed:

Sample Numbe	Client Sample ID	Qualifier	Description
L1835131-10	COMMUNITY CENTRE (AFT	WSMT	Water sample(s) for total mercury analysis was not submitted in glass or PTFE container with HCl preservative. Results may be biased low.
L1835131-12	MAGNESIA TANK (AFTER F	WSMT	Water sample(s) for total mercury analysis was not submitted in glass or PTFE container with HCl preservative. Results may be biased low.
L1835131-14	BRUNSWICK BEACH (AFTE	WSMT	Water sample(s) for total mercury analysis was not submitted in glass or PTFE container with HCl preservative. Results may be biased low.
L1835131-2	HARVEY TANK (AFTER FLU	WSMT	Water sample(s) for total mercury analysis was not submitted in glass or PTFE container with HCl preservative. Results may be biased low.
L1835131-4	STORE / CAFE (AFTER FLU	WSMT	Water sample(s) for total mercury analysis was not submitted in glass or PTFE container with HCl preservative. Results may be biased low.
L1835131-6	LIONS BAY AVE. (AFTER FL	WSMT	Water sample(s) for total mercury analysis was not submitted in glass or PTFE container with HCl preservative. Results may be biased low.
L1835131-8	KELVIN GROVE (AFTER FLI	WSMT	Water sample(s) for total mercury analysis was not submitted in glass or PTFE container with HCl preservative. Results may be biased low.

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Arsenic (As)-Total	MS-B	L1835131-1, -10, -11, -12, -13, -14, -15, -16, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Barium (Ba)-Total	MS-B	L1835131-1, -10, -11, -12, -13, -14, -15, -16, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Calcium (Ca)-Total	MS-B	L1835131-1, -10, -11, -12, -13, -14, -15, -16, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Iron (Fe)-Total	MS-B	L1835131-1, -10, -11, -12, -13, -14, -15, -16, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Magnesium (Mg)-Total	MS-B	L1835131-1, -10, -11, -12, -13, -14, -15, -16, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Manganese (Mn)-Total	MS-B	L1835131-1, -10, -11, -12, -13, -14, -15, -16, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Sodium (Na)-Total	MS-B	L1835131-1, -10, -11, -12, -13, -14, -15, -16, -2, -3, -4, -5, -6, -7, -8, -9

Qualifiers for Individual Parameters Listed:

Qualifier	Description
HTC	Hardness was calculated from Total Ca and/or Mg concentrations and may be biased high (dissolved Ca/Mg results unavailable).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ALK-TITR-VA	Water	Alkalinity Species by Titration	APHA 2320 Alkalinity

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

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

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

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

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

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

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

HARDNESS-CALC-VA	Water	Hardness	APHA 2340B

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

HG-TOT-CVAFS-VA	Water	Total Hg in Water by CVAFS LOR=50ppt	EPA 1631E (mod)

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

Reference Information

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 or atomic absorption spectrophotometry (EPA Method 245.7).

MET-T-CCMS-VA Water Total Metals in Water by CRC ICPMS EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

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

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

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

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

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. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.

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

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

TURBIDITY-VA Water Turbidity by Meter APHA 2130 Turbidity

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

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

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

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

Reference Information

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.

ALS En

Short Holding Time

Rush Processing

Chain of Custody / Analytical Request Form

Canada Toll Free: 1 800 668 9878

www.alsglobal.com

COC # _____

Page 1 of 1

Report To		**Report Format / Distribution**	**Service Requested** (Rush for routine analysis subject to availability)
Company:	Village of Lions Bay	☐ Standard ☐ Other	◉ Regular (Standard Turnaround Times - Business Days)
Contact:	Nai Jaffer	☑ PDF ☐ Excel ☐ Digital ☐ Fax	○ Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT
Address:	400 Centre Rd	Email 1: aurrutia@lionsbay.ca	○ Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT
	Lions Bay, BC V0N 2E0	Email 2: works@lionsbay.ca	○ Same Day or Weekend Emergency - Contact ALS to Confirm TAT
Phone:	604 921 9833 Fax:	Email 3:	
Invoice To	Same as Report ? ☑ Yes ☐ No	**Client / Project Information**	**Analysis Request**
Hardcopy of Invoice with Report?	☐ Yes ☐ No	Job #:	Please indicate below Filtered, Preserved or both (F, P, F/P)
Company:		PO / AFE:	
Contact:		LSD:	
Address:			
Phone:	Fax:	Quote #:	
Lab Work Order # (lab use only)		**ALS Contact:** Courtney Duncan	**Sampler:** Alberto Urrutia

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Hardness	pH	TSS	BOD	Turbidity	Alkalinity Total	Total Metals (First Draw)	Total Metals (After Flush)	Mercury	Total Organic Carbon	Trihalomethanes		Number of Containers
	Harvey Tank	27-09-16	10:40	Water	X	X	X	X	X	X	X	X	X	X	X		8
	Store / Café	27-09-16	7:45	Water	X	X	X	X	X	X	X	X	X	X	X		8
	Lions Bay Ave.	27-09-16	11:25	Water	X	X	X	X	X	X	X	X	X	X	X		8
	Kelvin Grove	27-09-16	8:20	Water	X	X	X	X	X	X	X	X	X	X	X		8
	Community Centre	27-09-16	7:20	Water	X	X	X	X	X	X	X	X	X	X	X		8
	Magnesia Tank	27-09-16	9:15	Water	X	X	X	X	X	X	X	X	X	X	X		8
	Brunswick Beach	27-09-16	9:50	Water	X	X	X	X	X	X	X	X	X	X	X		8
	Harvey Raw Water	27-09-16	10:45	Surface Water	X	X	X	X	X	X		X	X	X			4
	Magnesia Raw Water	27-09-16	9:20	Surface Water	X	X	X	X	X	X		X	X	X			4

L1835131-COFC

Special Instructions / Regulation ... water or land use (CCME-Freshwater Aquatic Life/BC CSR - Commercial/AB Tier 1 - Natural, etc) / Hazardous Details

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as provided on a separate Excel tab.

Also provided on another Excel tab are the ALS location addresses, phone numbers and sample container / preservation / holding time table for common analyses.

SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
Released by:	Date (dd-mmm-yy)	Time (hh-mm)	Received by: JC	Date: 27/9/16	Time: 14:10	Temperature: 7,7 °C	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF

GENF 18.01 Front

APPENDIX E: BOIL WATER ADVISORIES ISSUED

(NONE ISSUED)

APPENDIX F: EMERGENCY RESPONSE PLAN

APPENDIX F: EMERGENCY RESPONSE PLAN

EMERGENCY RESPONSE PLAN

Table 1 below outlines the notification process for unusual situations that could potentially affect the Village's potable water system.

Table 1. Notification of Unusual Situations Potentially Affecting Water Quality

Situation	Notifying Agency	Agency Notified	Notification Time Frame
E. coli – positive sample	VCH/Lab	VoLB and VCH	Immediate
Total coliform >10/100ml & low chlorine residual	VoLB	VCH	Immediate
Chemical contamination	VoLB	VCH	Immediate
Turbidity events >5 NTU	VoLB	VCH	Immediate
Disinfection failures/continued loss of residual	VoLB	VCH	Immediate for continued loss of residual
Loss of pressure due to high demand	VoLB	VCH	Immediate
Water main breaks	VoLB	VCH	Immediate
Lack of water due to drought or other causes	VoLB	EMBC & VCH	Information only; as drought situation progresses

E. COLI POSITIVE SAMPLES

1. Any interim samples (samples that have been taken in the period between the time the E. coli sample was first drawn and when the laboratory determined it to be positive) that have been taken from the same sampling station will be immediately examined by the laboratory.
2. The chlorine residual noted on the Water Operator's field sheet will be reviewed by the laboratory and compared to previous test results to determine if there is any localized loss of disinfectant residual.
3. The Public Works Manager (or designate) and VCH will be notified immediately by the laboratory.
4. Arrangements will be made for the immediate collection of a repeat sample, and, where possible, both upstream and downstream of the E. coli positive sample location.
5. VCH and the Public Works Manager (or designate) will liaise and determine the need for a Boil Water Advisory (BWA) to be issued. If it is determined to be warranted, VCH will issue the BWA.
6. The laboratory will continue to test the subsequent samples. Once consecutive negative sample results are returned, the Public Works Manager (or designate) will liaise again with VCH and determine whether the BWA can be lifted.

APPENDIX F: EMERGENCY RESPONSE PLAN

CHEMICAL CONTAMINATION

In the event of chemical contamination of the Village's water supply or distribution system, VCH will immediately be notified, and steps will commence to isolate the contaminated area. The level of contamination will be determined through water sampling and testing; identified; and any public health risk factors associated with the chemical presence and level will be determined. A public advisory will be issued and carried out by the Public Works Manager (or designate) under the guidance of VCH. Once the contamination is remedied and consecutive negative sample results are returned from the laboratory, the Public Works Manager (or designate) will again liaise with VCH and determine whether the public advisory can be lifted.

TURBIDITY EVENTS

Turbidity in the Village's treated water system is monitored on a regular basis through the water sampling and testing program. Water sample turbidity results that register >1 - 3 NTU are scrutinized, along with corresponding chlorine residual levels, and actively monitored. Any sections of the water system generating high turbidity results are field-checked and flushed if required.

Turbidity events in the raw source water impact the Village's water treatment plants. The performance of the primary UV treatment is affected by increased turbidity because water that has higher turbidity absorbs a significant amount of UV light, and will therefore have a correspondingly low UV transmittance (UVT) rate. The UV system automatically increases lamp intensity to counter the lower UVT. If turbidity exceeds 5 NTUs entering the plants, the UV system will send an alarm through SCADA to notify the Water Operator, and the UV reactors will shut down. The Water Operator will immediately inform the Public Works Manager (or designate) and investigate the alarm at the plant.

During turbidity events in excess of 5 NTU, microbiological sampling and testing is increased at all sampling locations; chlorine residual sampling and testing is likewise increased; and the Village will contact VCH, who may issue a Boil Water Advisory.

DISINFECTION FAILURES

Chlorine residuals in the Village's treated water system are monitored on a regular basis through the water sampling and testing program. If a daily sample registers below the generally accepted minimum chlorine residual of 0.2ppm, the Water Operator will first flush water through the system to attempt to bring the chlorine residual up to the minimum required. Should the results continue to not meet the minimum, the Village will immediately commence increased monitoring of all chlorine residuals in the system, including the tank, and determine the root cause of the problem. Chlorine will be added manually to the tank if required; and residuals checked frequently at all locations. The Public Works Manager (or designate) will contact VCH, who may issue a Boil Water Advisory if continued loss of residual is observed.

LOSS OF PRESSURE DUE TO HIGH DEMAND

In the event of adverse pressure loss due to high demand, Village crews will make adjustments to the system to isolate the affected section, and then take measures to supplement pressure in the affected area. The Public Works Manager (or designate) will immediately consult with VCH regarding further actions; and all water quality complaints from the public will be immediately and thoroughly investigated for potential contamination.

WATER MAIN BREAKS

In the event of a water main break where chemical or microbiological contamination of the system is suspected, Village crews will make adjustments to the system to isolate the contaminated section from the rest of the distribution system. The Public Works Manager (or designate) will immediately consult with VCH regarding further actions; and all water quality complaints from the public will be immediately and thoroughly investigated for potential contamination. Water samples will be taken from the vicinity and downstream of the break if possible, and tested for the suspected contamination. The same procedures as noted under E. coli positive samples above will be implemented if required.

LACK OF WATER DUE TO DROUGHT OR OTHER CAUSES

In the event of a lack of water due to low streamflow or other causes affecting supply (such as debris torrents, lack of safe access to intakes, or Village-wide water use in excess of supply), an escalating conservation system is implemented to address the lack of water in the system.

Conservation efforts now commence annually from June 1 through to September 30 of each year, in accordance with Level One of the Village's Outdoor Water Use Bylaw. Further stages of conservation are then utilized as required to reduce the outdoor use of water in the Village, combined with extensive public notification (via electronic notifications, printed media delivered to every home, and town hall meetings). The highest level of restrictions are intended for emergent situations which directly affect the supply of water in the system. Table 2 outlines the Village's 2016 outdoor water use conservation levels. Conservation Level 2 was in effect from July to September in 2016.

Village Public Works crews can switch valves within the water system itself, based on water availability from either creek, to ensure continuous Village supply. This "balancing" of supply vs. demand occurred often during the drought conditions of 2016.

The GPM of the water flowing from the creek intakes to the respective water treatment plants is monitored daily, during the water sampling and testing program. If the water flow entering either plant is compromised, Village crews ascertain the root cause of the problem (i.e. whether the decrease is due to a blockage or drought) and work to either repair (if blocked) and/or mitigate the impact on the system as a whole by implementing conservation measures noted in Table 2.

Table 2 Outdoor Water Use Conservation Levels

	ACTIVITY	CONSERVATION LEVEL 1	CONSERVATION LEVEL 2	CONSERVATION LEVEL 3
RESIDENTIAL & COMMERICAL USES	Watering lawns, 4am – 9am only Newly planted lawns may be watered outside allowed times with a municipal permit displayed	Even-numbered addresses: Monday, Wednesday and Saturday. Odd-numbered addresses: Tuesday, Thursday and Sunday.	Even-numbered addresses: Monday only Odd-numbered addresses: Thursday only	Prohibited
	Watering flowers, vegetables, planters, shrubs, trees	No restrictions	Only by hand using spring-loaded nozzle, containers, or drip irrigation. Sprinklers and soaker hoses prohibited	Prohibited
	Use of pools, spas, fountains/ponds	No restrictions. Must have a recirculation pump. "One-time-through" uses are prohibited at all times		Filling prohibited
	Washing outdoor impermeable surfaces such as driveways, buildings, sidewalks and roads, including pressure washing	No restrictions	Only for health and safety purposes, or to prepare a surface for painting or similar treatment	Prohibited
	Washing vehicles and boats	Only with a hose using spring-loaded shut off	Only by bucket	Prohibited, except for windows, lights, and license plates
	Flushing boat engines	No restrictions		4 minutes maximum
	Filling outdoor water storage	No restrictions		Prohibited
PUBLIC USES	Watering of school property, including Lions Bay Field	No restrictions	Minimum to maintain in useable condition	Prohibited
	Watering of parks, municipal lawns, and grassed boulevards 1am to 6am only	Even-numbered addresses: Monday and Wednesday. Odd-numbered addresses: Tuesday and Thursday. Parks Friday only	Even-numbered addresses: Monday only Odd-numbered addresses: Thursday only	Prohibited
	Flushing of water mains and hydrants	Only for safety or public health reasons		

APPENDIX F: EMERGENCY RESPONSE PLAN

During the drought of 2016, Village crews also repurposed 2 water storage tanks located at Brunswick (42,000 USG) and at the top of Oceanview Road (100,000 USG) to be used as stand-alone emergency non-potable water supply in the event of a fire. Both of these tanks are kept filled during the summer months, and are entirely separate from the potable water system.

Village crews also capture water from the daily water sampling program, store it in truck-mounted totes, and then use it to water municipal planted areas. Crews also fill rain barrels and totes located at the community garden and the native plant garden, so that recycled water is used for irrigation of these areas, as opposed to drinking water. Lions Bay Fire Rescue also discontinue any training activities that draw water from the potable water system.

When a lack of water continues despite conservation efforts, Village staff will liaise with EMBC, VCH, and FLNRO for both information and a consolidated response to events as they unfold. Village staff then arrange water tankers to truck in potable water and use this method to fill one or both tanks to keep potable water in the water system. Neighboring municipalities are also informed in the event they can lend assistance. As an example, in late 2014 after debris torrents had compromised one intake and the remaining intake's flow was similarly compromised, the District of West Vancouver allowed potable water to be drawn from their system via tanker trucks to the Village to fill the Village tanks and also allowed Lions Bay residents to utilize shower facilities at no charge at Gleneagles Community Centre during this isolated event.

Increased testing and monitoring of the water system is undertaken, in conjunction with VCH, until the system as a whole is once again restored.

APPENDIX G: VANCOUVER COASTAL HEALTH PERMIT TO OPERATE

APPENDIX G: VANCOUVER COASTAL HEALTH PERMIT TO OPERATE

Vancouver Coastal Health
Promoting wellness. Ensuring care.

Vancouver Coastal Health

PERMIT
TO OPERATE

Drinking Water System 301-10,000 Connections

Facility Number:	3317552347
Name of Facility:	Lions Bay Magnesia Creek Water System
Address:	Upper Sunset Road Lions Bay, BC
Owner:	Municipality of The Village of Lions Bay
Conditions:	

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

September 29, 2010
Effective Date

Rod Schluter
Environmental Health Officer

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

Vancouver Coastal Health
Expires March 2017
09021

ENV20 - 08/03

APPENDIX G: VANCOUVER COASTAL HEALTH PERMIT TO OPERATE

Vancouver Coastal Health

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.

Vancouver CoastalHealth
Expires March 2017
09022

ENV20 - 08/03

APPENDIX H: EOCP FACILITY CLASSIFICATION

ENVIRONMENTAL OPERATORS CERTIFICATION PROGRAM

Facility Classification

This is to certify that

Village of Lions Bay - Magnesia Water Treatment Plant

has been classified by the Environmental Operators Certification Program in accordance with the guidelines established with the Association of Boards of Certification as a

Class I Facility

Dated at Burnaby, BC on April 12, 2016

Secretary - Certification Board

President - Certification Board

Facility No. 2330

eocp

This certificate must hold the EOCP embossed seal.
Member of the Association of Boards of Certification
A society incorporated under the Society Act, S.B.C. S-28724

ENVIRONMENTAL OPERATORS CERTIFICATION PROGRAM

Facility Classification

This is to certify that

Village of Lions Bay - Harvey Water Treatment Plant

has been classified by the Environmental Operators Certification Program in accordance with the guidelines established with the Association of Boards of Certification as a

Class I Facility

Dated at Burnaby, BC on April 12, 2016

Secretary - Certification Board

President - Certification Board

Facility No. 2329

eocp

This certificate must hold the EOCP embossed seal.
Member of the Association of Boards of Certification
A society incorporated under the Society Act, S.B.C. S-28724

EOCP

CERTIFICATE of CLASSIFICATION

Environmental Operators Certification Program

This is to certify that:

Village of Lions Bay Water Distribution System

Facility No. 675

has been classified as a

Class II System

CHAIR, BOARD OF DIRECTORS

CHIEF EXECUTIVE OFFICER

Dated: July 28, 2003
At: Burnaby, BC

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

APPENDIX I: EOCP OPERATOR CERTIFICATES

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

APPENDIX I: EOCP OPERATOR CERTIFICATES

ENVIRONMENTAL OPERATORS CERTIFICATION PROGRAM

Course Completion Certificate

This is to certify that

Garth J. Begley

By Examination Has Qualified As A

Chlorine Handler

Secretary - Certification Board

Chairman - Certification Board

May 6, 2005

Certificate No. CH-713

This is to certify that:

Garth J. Begley

By examination has qualified as a

Water Distribution System Operator Level I

Certification No. 9324
Valid until December 31, 2017

CHAIR, BOARD OF DIRECTORS

CHIEF EXECUTIVE OFFICER

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

CERTIFICATE of QUALIFICATION

EOCP

Environmental Operators Certification Program

This is to certify that:

William K. Emo

By examination has qualified as a

Water Distribution System Operator

Level I

CHAIR, BOARD OF DIRECTORS

CHIEF EXECUTIVE OFFICER

Certification No. 8469
August 10, 2016
At Burnaby, BC

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