Abbotsford Mission
Water & Sewer Services

ABBOTSFORD

DISTRICT OF Mission ON THE FRASER

Annual Water Quality Report

2017

EXECUTIVE SUMMARY

The City of Abbotsford and District of Mission receive domestic water from the Abbotsford Mission Water & Sewer Commission (AMWSC). The primary source of water is Norrish Creek, supplemented by Cannell Lake and 19 groundwater wells. The Norrish Creek source is filtered (either by slow sand or ultrafiltration membranes) and chloraminated prior to distribution. Cannell Lake water is treated by ultraviolet (UV) disinfection and chloramination. Chloramination is also practiced at most wells.

During 2017, the Norrish Creek Water Treatment Plant consistently delivered high quality water, within the limits recommended by the Guidelines for Canadian Drinking Water Quality (GCDWQ). Water quality from Cannell Lake was also within the requirements. Well water met all health-related GCDWQ requirements with one exception: Industrial B had one reading slightly higher than the Maximum Allowable Concentration (MAC) guideline for arsenic. It produced only 36ML (i.e. < 0.15% of total water supply) in 2017 and when it did operate, its water was blended with that from Industrial C to dilute the arsenic before entering the distribution system. The distribution system is tested on a quarterly basis for arsenic and all results were below the MAC.

All distribution water met the British Columbia Drinking Water Protection Regulation's microbiological criteria. Specifically, there were no positive *E.coli* test results. Out of more than 2,100 samples, *Total Coliforms* were detected in five samples. In those cases, the locations were immediately re-sampled; there were no *Total Coliforms* detected in any resample.

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1 INTRODUCTION

The British Columbia Drinking Water Protection Act requires that all water suppliers produce an annual water quality report that is reviewed by the local Drinking Water Officer and published for public access. This report has been prepared for the Abbotsford-Mission Water and Sewer Commission (AMWSC) and Ministry of Health for this purpose.

2 WATER SYSTEM DESCRIPTION

Abbotsford & Mission receive domestic water from the Abbotsford Mission Water & Sewer Commission (AMWSC). The AMWSC draws water from three sources, provides treatment, and transmits the treated water to Abbotsford and Mission. The two municipalities distribute the water to consumers directly from transmission pipeline take-off points or through transmission end-point reservoirs. This water supply strategy is illustrated as Figure 2-1.

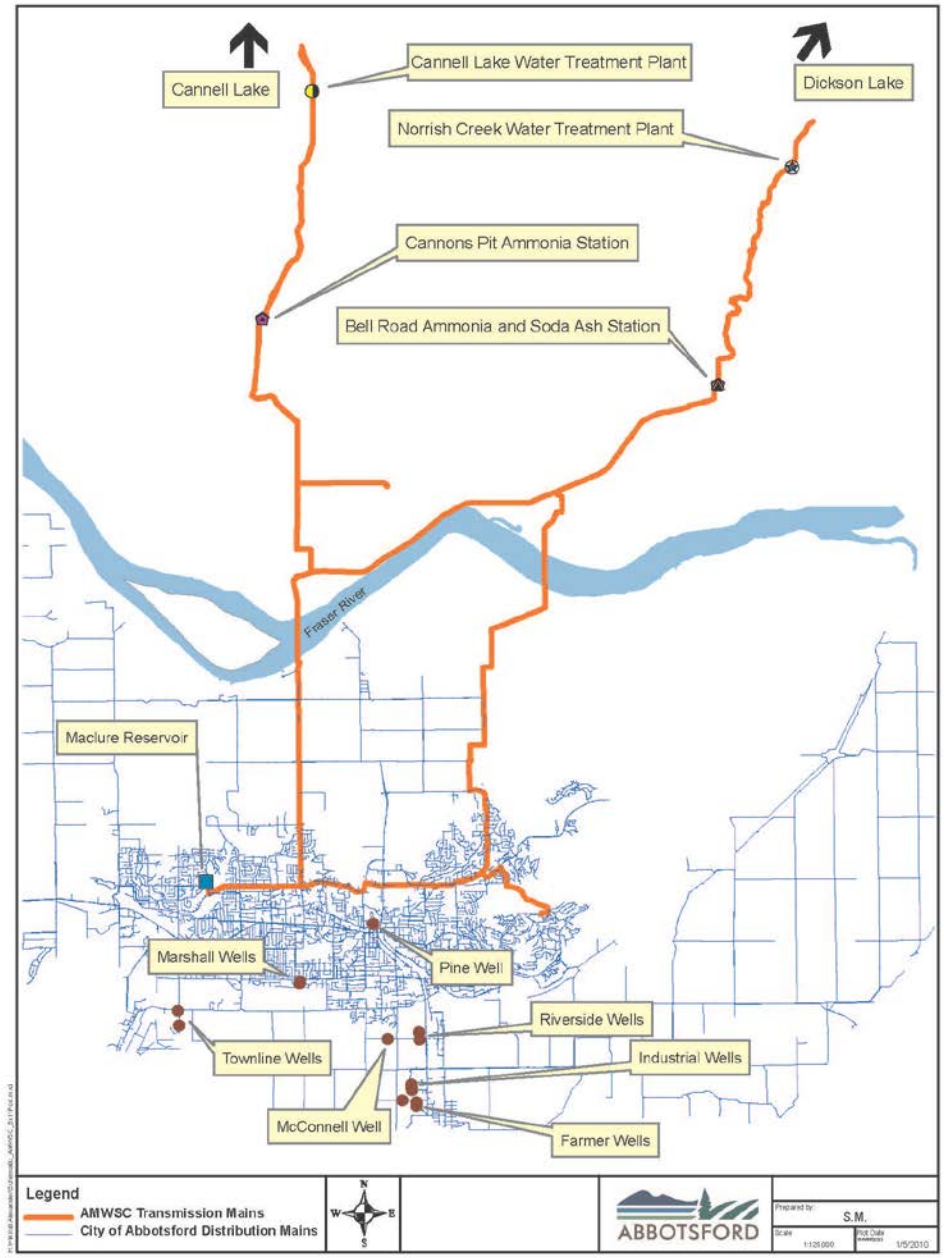

Figure 2-1: AMWSC Water Supply

2.1 Water Sources & Treatment

Norrish Creek

Norrish Creek, located north-east of Mission, sources from Dickson Lake and provides the bulk of Abbotsford and Mission's drinking water. Norrish water is filtered by slow sand or ultrafiltration membranes at the Norrish Creek Water Treatment Plant (WTP). The water is chlorinated at the plant outlet and then flows 7.5 km to the Bell Road Ammonia & Soda Ash Station, where aqueous ammonia is added to form chloramines for distribution system residual disinfection. Soda ash was not dosed in 2017.

Norrish Creek Water Treatment Plant

Cannell Lake

Cannell Lake, located north of Mission, supplies water to consumers located in the higher elevations of Mission. It also supplements supply to Abbotsford when demand is high or when the Norrish supply is off-line. Cannell Lake water is treated by ultraviolet (UV) disinfection and chlorinated 1 km downstream of the intake, then travels 7 km to the Cannons Pit Ammonia Station to form residual chloramines prior to entering the distribution networks.

Cannell Lake

Groundwater Wells

The AMWSC supplements times of high demand with groundwater from the Abbotsford-Sumas aquifer using nineteen wells. Water from the three Industrial Way wells is chlorinated before distribution. Similarly, water from another twelve wells is chloraminated.

Groundwater Well Head

Treated water travels through more than 95 km of pipeline from the water sources to Abbotsford and Mission. The water then either enters the municipalities' distribution systems via direct take-off points or after feeding through the Maclure and Mt. Mary Ann Reservoirs. The volumes of water produced by Norrish, Cannell and the wells in 2017 (and the two years prior) are summarized in Table 2.1.

Table 2-1: Annual Water Production in Megaliters (ML)

Source	2015 Total	2016 Total	2017 Total
Norrish Creek	16,264	18,190	17,896
Cannell Lake	3,880	3,437	3,801
Farmer #1 Well	75	48	552
Farmer #2 Well	0	0	0
Farmer #3 Well	137	109	30
Industrial Well "A"	5	27	2
Industrial Well "B"	88	8	36
Industrial Well "C"	748	293	228
Marshall #1 Well	1	1	1
Marshall #2 Well	0	0	0
Marshall #3 Well	774	291	0
McConnell Well	58	85	114
Pine Well	86	34	12
Riverside #1 Well	287	19	16
Riverside #2 Well	<1	<1	<1
Townline #1 Well	529	353	386
Townline #2 Well	296	175	170
Bevan #1 Well	119	109	270
Bevan #2 Well	89	201	285
Bevan #3 Well	825	482	272
Bevan #4 Well	465	377	395
Overall Total	**24,726**	**24,239**	**24,465**
Total Surface Water	**20,144**	**21,627**	**21,696**
Total Groundwater	**4,582**	**2,612**	**2,769**

2.2 Distribution System

The Abbotsford distribution system includes 12 pump stations, 10 reservoirs, more than 20 pressure reducing stations (PRVs) and over 850 km of pipelines as shown in Figure 2-2. The Mission distribution system includes 23 PRVs and over 170 km of pipelines as shown in Figure 2-3.

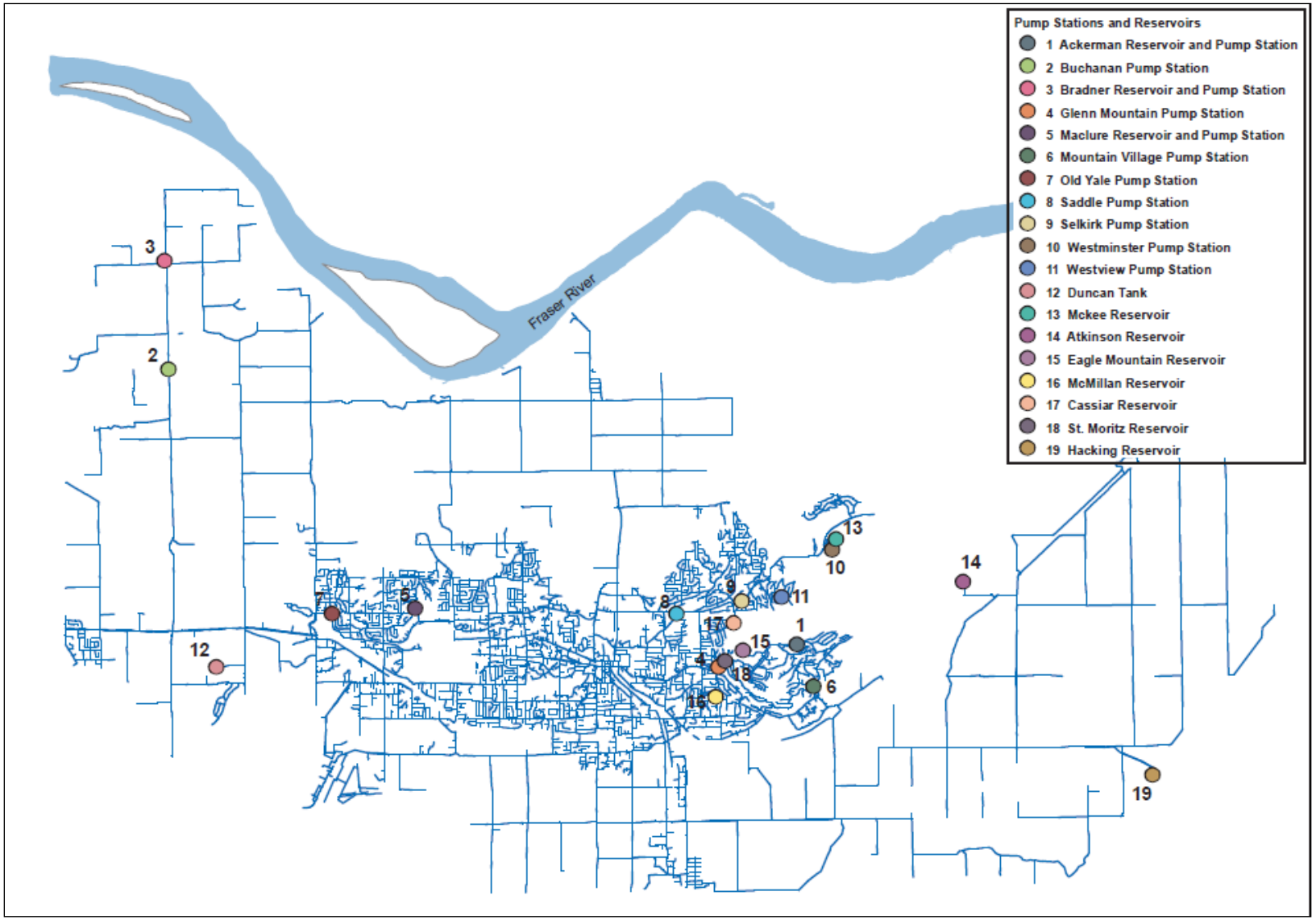

Figure 2-2: City of Abbotsford Water Distribution System

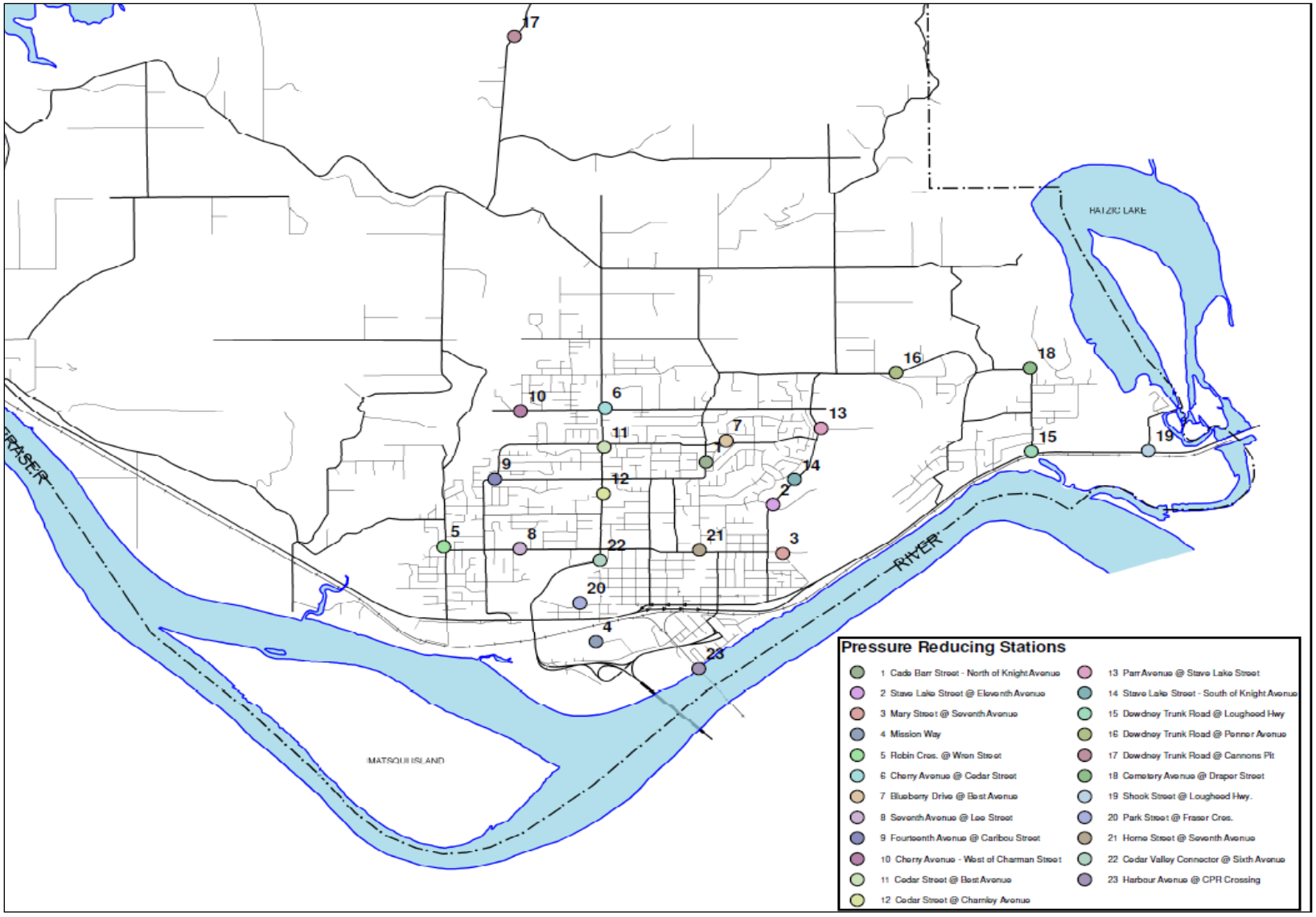

Figure 2-3: District of Mission Water Distribution System

3 WATER SAMPLING AND TESTING PROGRAM

Abbotsford and Mission work together to monitor drinking water quality according to the requirements of the BC Drinking Water Protection Act and Guidelines for Canadian Drinking Water Quality (GCDWQ). The AMWSC monitors source water quality and transmission system water quality to confirm effective water treatment. Mission and Abbotsford monitor their distribution network water quality to ensure that there has been no water quality deterioration during passage through their distribution pipelines. Table 3-1 summarizes the monitoring program and the following sections describe key water quality results from 2017 sampling programs.

Table 3-1: AMWSC, Abbotsford & Mission Water Quality Monitoring Program

Parameters	Raw Surface Water	Raw Well Water	Treated Water	Monitoring Purpose
Potability Scan (1)	Annually (2)	Annually	Quarterly	To characterize source and treated water quality and to track fundamental shifts in quality.
Nitrates & Metals	-	Monthly (3)	-	To proactively screen for aquifer contamination.
Pesticides/Herbicides		Annually		To proactively screen for aquifer contamination.
Various (4)	On-Line	On-Line	On-Line	Data required for effective control of the water treatment processes.
Coliforms	-	-	Weekly (42 locations)	To proactively screen for biological contamination of the distributed water.
Disinfection Monitoring (4)	-	-	Weekly (5) (42 locations)	To ensure that a disinfection residual is maintained through the distribution system.
Disinfection By-Products	-	-	Quarterly (4-5 locations)	To ensure that disinfection by-product levels remain below recommended limits.
Various (6)	-	-	Annually (6)	Proactively screening for pipe deterioration.

(1) Potability scan typically includes: alkalinity, aluminum, antimony, arsenic, barium, boron, bicarbonate, calcium, carbonate, colour, conductivity, hardness, hydroxide, cadmium, chloride, chromium, copper, fluoride, iron, lead, magnesium, manganese, mercury, nitrate/nitrite, pH, potassium, silicon, selenium, sodium, sulphate, turbidity, total dissolved solids, uranium, and zinc. This list may vary slightly year over year.

(2) For Cannell Lake raw water, there are some additional parameters being monitored weekly (e.g. coliforms, colour, pH, UV-absorbance, iron and manganese) and monthly (e.g. organic carbon & protozoa) to manage the treatment process and to comply with filtration exemption.

(3) Monthly metal testing at the wells is not normally part of the water quality monitoring program. This data is being collected under a separate program related to an AMWSC environmental assessment certificate.

(4) There are various on-line water quality instruments throughout the system (e.g. for turbidity, chlorine, pH, and ultraviolet transmittance).

(5) Disinfection monitoring includes analyses of total and free chlorine, along with temperature, turbidity and pH. Alkalinity, ammonia, monochloramine and dichloramine are also monitored at 5 transmission system locations to ensure effective chloramination.

(6) In addition to weekly & quarterly treated water sampling, parameters such as asbestos and vinyl chloride are checked annually or bi-annually at select points in the distribution systems to monitor for pipe deterioration.

The GCDWQ sets standards for safe levels of contaminants commonly found in municipal drinking water. However, some people with significantly weakened immune systems may be more vulnerable to contaminants in drinking water than the general population. Immunocompromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants,

people with HIV/AIDS or other immune system disorders, some elderly, and some infants can be particularly at risk from infections. These people are urged to review the HealthLinkBC information sheet attached as Appendix A.

All customers should read Fraser Health's message about flushing taps that have not been used for six hours or longer. Please refer to Appendix B.

3.1 Raw Source Water Quality Monitoring

3.1.1 Surface Water

The quality of raw source water influences the level of treatment required to produce domestic water suitable for consumption. Outside of analytical measurements for managing the water treatment processes, both Norrish Creek and Cannell Lake raw water are tested annually for various physical and chemical characteristics in order to monitor if there are any fundamental changes in quality from year to year. Appendix C contains the results from these analyses for 2015 - 2017. In general, the raw source water quality has remained consistent for the past three years.

Cannell Lake raw water is also monitored weekly and monthly for certain additional parameters, which is further discussed in Section 3.2.

3.1.2 Groundwater

Well water quality results from 2017 are provided in Appendices D through G. Parameters of particular note are further discussed below.

Arsenic

Arsenic can be found in both surface water and groundwater sources, with levels generally higher in groundwater. Most provinces and territories across Canada report some areas where arsenic can be detected in drinking water supplies. Although levels are generally well below the guideline, elevated arsenic concentrations have been found in areas with natural sources.[1] The Maximum Allowable Concentration (MAC) is 10 μg/L. The only AMWSC well that has ever had arsenic results in excess of the MAC is Industrial B. In 2017, Industrial B's average arsenic concentration was 9.8 μg/L and the maximum concentration was 11.4 μg/L. The well only produced 36ML in 2017 (i.e. < 0.15% of total water supply) and when it was in production, its water was blended with that from Industrial C before entering the distribution system. Note that all distribution system results for arsenic were not detectable or below 1μg/L as shown in Appendix I.

[1] Health Canada, December, 1978. Guidelines for Canadian Drinking Water Quality: Guideline Technical Document – Arsenic Retrieved from: http://healthycanadians.gc.ca/publications/healthy-living-vie-saine/water-arsenic-eau/index-eng.php

Iron

The presence of iron in natural waters can be attributed to the weathering of rocks and minerals, acidic mine water drainage, landfill leachates, sewage effluents and iron-related industries[2]. Elevated iron can lead to aesthetic issues such as coloured water or objectionable taste. Townline 2, Bevan 3 and 4 iron results occasionally exceeded the GCDWQ aesthetic guideline of 300 μg/L in 2017. However, the water from these wells blends with other sources prior to reaching customers and thus their iron concentrations are diluted; there has never been any indication of iron-related aesthetic issues in the distribution system. All distribution results for iron in 2017 were well below the MAC or not detectable as shown in Appendix I.

Manganese

Manganese is a naturally occurring element in most water sources. High levels of manganese may cause fixture and laundry staining. The GCDWQ specifies an aesthetic guideline 0.05 mg/L for manganese. Three wells that operated in 2017 (Industrial C, Townline #1 and Pine) produce water with elevated manganese. For the most part, the blending of the high manganese well water with that from other sources dilutes the manganese to levels that do not cause staining problems. All distribution results for manganese were below the MAC or not detectable as shown in Appendix I.

Nitrate & Nitrite

Nitrate itself is a relatively non-toxic substance. However, bacteria can convert nitrate to nitrite in the environment, in foods and in the human body. Nitrite can then interfere with the ability of red blood cells to carry oxygen to the tissues of the body, producing a condition called methemoglobinemia. It is of greatest concern in infants.

Water naturally contains less than 1 milligram of nitrate-nitrogen[3]; higher levels may indicate contamination. The Abbotsford-Sumas aquifer is known to contain elevated levels of nitrate stemming from the application of agricultural fertilizer to the land above. The AMWSC thus monitors for nitrate and nitrites on a monthly basis in all wells. 2017 results are shown in Appendix E. No wells had nitrates in excess of the 10 mg/L MAC during 2017 and the last ten-years of data suggest a general downward trend in most wells.

Pesticides & Herbicides

Pesticides and herbicides are tested annually in select wells to generally monitor for aquifer contamination. In 2017, 15 wells were tested and all results were non-detect. (The parameters tested are listed in Appendix G).

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[2] Health Canada, December, 1978. Guidelines for Canadian Drinking Water Quality: Guideline Technical Document – Iron Retrieved from: http://healthycanadians.gc.ca/publications/healthy-living-vie-saine/water-iron-fer-eau/index-eng.php

[3] BC Water Stewardship Office, May 2007. Nitrate in Groundwater. Retrieved from: http://www.env.gov.bc.ca/wsd/plan_protect_sustain/groundwater/library/ground_fact_sheets/pdfs/no3(020715)_fin2.pdf

3.2 Cannell Filtration Exemption

In 2005, Fraser Health adopted the "Drinking Water Treatment Objectives (Microbiological) for Surface Water Supplies in British Columbia". These standards generally require filtration for drinking water supplied from surface water sources. However, authorities may exclude such sources from filtration assuming compliance with four criteria. Fraser Health granted such 'filtration exemption' for Cannell Lake in 2013, under the conditions that (i) UV-disinfection be added to the treatment process to comply with Criterion #1, (ii) raw water quality continues to satisfy Criteria #2 & #3, and (iii) a watershed control program is maintained as per Criterion #4. The following describes the four filtration exemption criteria and notes how the AMWSC complied with each during 2017.

1. *Overall inactivation is met using a minimum of two disinfection processes, providing 4-log reduction of viruses and 3-log reduction of Cryptosporidium and Giardia.*

   AMWSC Compliance: As of December 2016, Cannell Lake water is treated with 2 disinfection processes: UV-disinfection and chlorination. In 2017, Cannell Lake's raw water was sampled for Cryptosporidium and Giardia 12 times. There were no viable counts in any of the samples.

2. *The number of E. coli in raw water does not exceed 20 counts/100 mL (or if E. coli data are not available, less than 100 counts/100 mL of Total Coliform) in at least 90% of the weekly samples from the previous six months. The treatment target for all water systems is to contain no detectable E. coli or Fecal Coliform per 100 ml. Total Coliform objectives are also zero based on one sample in a 30-day period. For more than one sample in a 30-day period, at least 90% of the samples should have no detectable Total Coliform bacteria per 100 ml and no sample should have more than 10 total coliform bacteria per 100 ml.*

   AMWSC Compliance: In 2017, Cannell raw water was tested weekly for coliforms. No *E.coli* were detected and *Total Coliforms* were found in 9 of the samples, but all counts were well below the 100 cts/100 ml threshold. As described later in Section 3.3.1, there was no detectable *E.coli* in any treated water sample collected during 2017, more than 99.7% of the samples were free of *Total Coliforms* and no sample contained more than 10 total coliform counts per 100 ml.

3. *Average daily turbidity levels measured at equal intervals (at least every four hours) immediately before the disinfectant is applied are around 1 NTU, but do not exceed 5 NTU for more than two days in a 12-month period.*

   AMWSC Compliance: The average daily turbidity reading at Cannell Lake was 0.1 NTU and the highest recorded value was 0.8 NTU.

4. *A watershed control program is maintained that minimizes the potential for fecal contamination in the source water.*

   AMWSC Compliance: Since 2014, the AMWSC has maintained a watershed program plan that monitors and mitigates the risk of lake fecal contamination. This program includes the following key components:

   - Completing weekly visual checks at the lake for any signs of watershed contamination (e.g. human trespass, etc). During 2017, no signs of potential contamination were apparent during the weekly lake visits.

- Maintaining watershed access gates & fences to discourage vehicular entry into the watershed. In 2017, all gates and fences were checked weekly and no sign of forced entry was apparent.
- Completing an annual helicopter inspection of the watershed to identify any changes that may increase contamination risk. In 2017, the helicopter inspection occurred on June 12th. The only noteworthy change some logging along Cannell Lake access road, but this was outside the watershed boundary and thus poses no risk to the lake.
- Maintaining signs at watershed access points to alert the public that entry is restricted. There are two signs in place for this purpose as shown in the photographs below.
- Maintaining electronic surveillance devices to monitor human entry into the watershed. In December 2016, a camera was installed at the Cannell Lake WTP that monitors entry to the lake access road.

Cannell Lake Sign

Cannell Lake Gate Sign

3.3 Distribution Water Quality Monitoring

Abbotsford and Mission's distribution systems are tested weekly for *E.Coli*, *Total Coliforms*, chlorine residuals, turbidity, and pH at 37 locations. The AMWSC analyzes these parameters at a further five locations along the transmission lines. A list of sample location codes are provided in Table 3-2. Maps of Abbotsford and Mission sampling sites are provided as Figure 3-1 and 3-2, respectively.

Table 3-2 Weekly Water Distribution Test Sites

City of Abbotsford Distribution Network	
W1 - 35041 Harris Rd.	**E2** – Old Yale & Arnold Rd.
W2 - Sandy Hill School	**E3** - 39189 Marion Rd. @ Wellsline Rd.
W3 - 35944 McKee Rd.	**E4** - Campbell Rd. & Tolmie Rd.
W4 - Bateman Park	**E5 -** #3 Rd. @ South Parallel Rd.
W5 - 3315 Gladwin Rd.	**E6** - Cole Rd. Across from 1024
W6 - 32961 South Fraser Way	**E7 -** #1 Rd. @ Tolmie Rd.
W7 - 32111 Joyce Ave.	**E8** - 3434 McDermott Rd.
W8 - King Works Yard	**E9** - Lower Sumas Mtn. Rd.
W9 - 515 Gladwin Rd.	**E10** - 36101 Regal Parkway
W11 - 5030 Lefeuvre Rd.	**E11** - St. Moritz North of Glen Mtn. Dr.
W13 - 7942 Bradner Rd.	**E12** - Beck Rd. @ Larch Park
W14 - Dunach School	**E13** - 2092 McMillan Rd.
W15 - 3154 Clearbrook Rd.	**E14** - Victory Blvd. @ Moulstade Rd.
W16 – 27875 Swensson Rd.	**E15** - 2195 Orchard Dr.
District of Mission Distribution Network	
M1 – Israel Avenue	**M8** – Laminman Avenue
M2 – Balsam Avenue	**M9** – Shook Street
M3 – Penner Avenue	**M10** – Miller Crescent
M5 – Hillcrest Avenue	
M6 – Cannell Booster Station	
M7 – Mary St. @ 4th Avenue	
AMWSC Transmission Pipelines	
Bell Rd.	Cannon Pit 400 & Cannon Pit 600
Ainsworth St.	Maclure Reservoir

Schedule B of the BC Drinking Water Protection Regulation establishes the guideline for water sampling frequency of microbiological contaminants. For water utilities serving more than 90,000 consumers, 90 samples plus 1 sample for every additional 10,000 persons is required per month. Thus, with a serviced population of approximately 165,000, a minimum of 98 samples per month are required. In 2017, the AMSWC, Abbotsford and Mission tested more than 180 samples per month, thereby exceeding requirements.

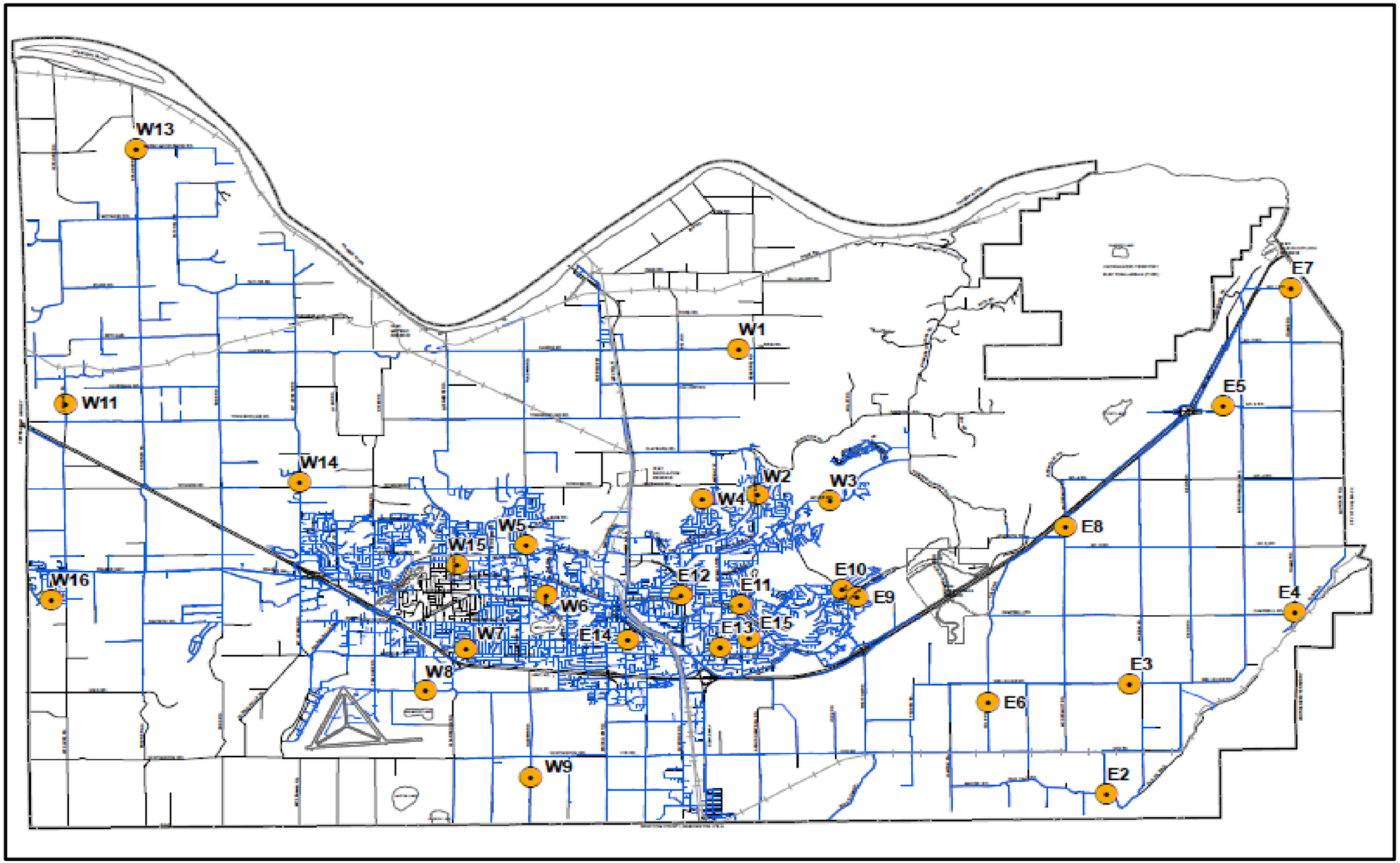

Figure 3-1: Abbotsford Water Distribution Network Sampling Locations

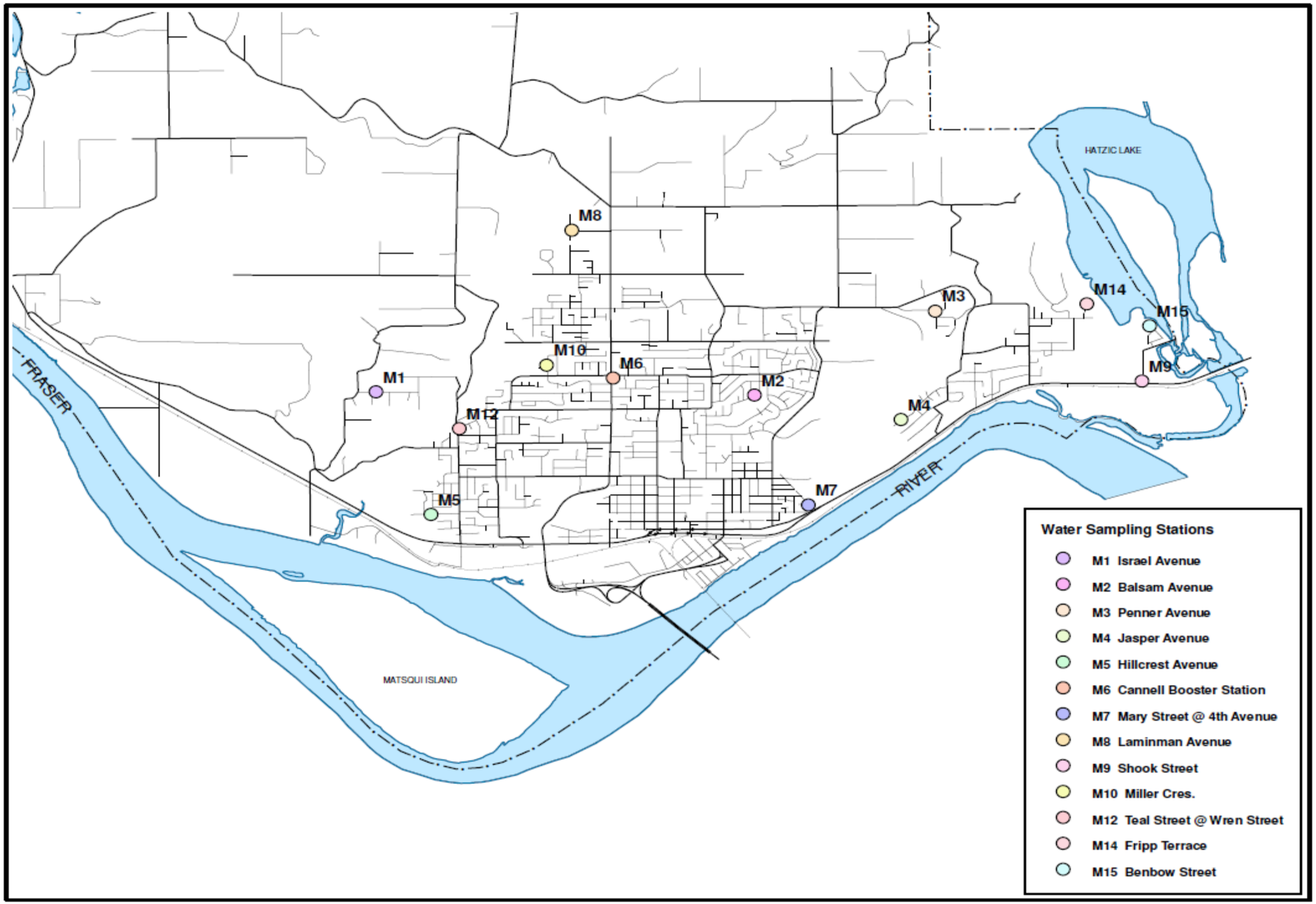

Figure 3-2: Mission Water Distribution Network Sampling Locations

3.3.1 E.Coli and Total Coliform

Schedule A of the BC Drinking Water Protection Regulation contains standards for the bacteriological quality of potable water in the province:

- No sample should be positive for *E.Coli*;
- No more than 10% of the samples in a 30-day period should be positive for *Total Coliform*; and
- No sample should contain more than 10 *Total Coliform* per 100 ml.

Total Coliforms are a group of bacteria that are generally free-living in the environment, but are also present in water contaminated with human and animal faeces. They generally do not cause human disease, but their presence in a water distribution system may indicate that the system is vulnerable to contamination or is experiencing bacterial re-growth.

E.Coli is a member of the *Total Coliform* group and is found exclusively in the faeces of humans and other animals. Its presence in water indicates faecal contamination of the water and possible presence of intestinal disease-causing bacteria, viruses, and protozoa. The detection of *E.Coli* triggers a protocol which involves immediate notification of health and municipal officials, re-sampling and a thorough investigation into the possible causes.

The AMWSC, Abbotsford and Mission tested more than 2100 treated water samples for microbiological parameters in 2017. *E.Coli* was not found in any sample. *Total Coliforms* were detected in five of the samples as listed in Table 3-3. In each case, the locations were re-sampled upon receiving the result and no detectable coliforms were found in any follow-up sample. All 2017 bacteriological results can be found on the AMWSC website at http://www.ourwatermatters.ca/water-quality.

Table 3-3 – Detectable Coliform Results in Distribution

Date	Location	Total Coliforms (ct/100 ml)
February 21	M1 - Israel	6
February 21	M5 - Hillcrest	1
February 21	E13 – McMillan Rd	1
June 20	W5 – 3315 Gladwin Rd	1
November 15	Bell Road	3

In addition to the AMWSC and municipal testing, Fraser Health found no E.Coli or Total Coliforms in 27 samples they independently collected in Abbotsford and Mission during 2017.

3.3.2 Disinfection Residuals

Disinfectants are added to potable water supplies to inactivate microorganisms, such as bacteria and viruses, which may be present in the water sources. Chlorine-based chemicals are the most widely used disinfecting agents. The AMWSC uses chloramines for residual disinfection. Chloramination has two distinct advantages over free chlorine: (i) the residual lasts longer, which ensures that disinfection is maintained to the extreme ends of Mission and Abbotsford's large distribution networks, (ii) research suggests that chloramines produce less disinfection by-products than chlorine.

Health Canada describes that the "optimal operational range for chlorine in drinking water is between a detectable level and 5 mg/L."[4]. As the water travels through the distribution system, the concentration of chloramines declines. The AMWSC typically doses chloramines so that the water initially contains a total chlorine residual between 1.0 and 1.5 mg/L. This initial concentration range generally ensures that there are trace amounts of disinfectant at the far reaches of the pipe network.

The AMWSC, Abbotsford and Mission tested more than 2000 samples for total and free chlorine in 2017. (Aside: The difference between the total and free values approximates the total chloramine concentrations). Of these samples, more than 97% of Abbotsford samples and 100% of Mission samples had total chlorine results above 0.2 mg/L. Unless total coliforms begin to appear in the system, periodic low disinfection residuals are not a concern. The maximum total chlorine concentrations detected in the Abbotsford and Mission distribution systems during 2017 were 1.56 mg/L and 1.63 mg/L, respectively. Appendix H provides 2017 total chlorine residual statistics for the system and individual sampling locations.

3.3.3 Turbidity

Turbidity is a principal physical characteristic of water. It is caused by suspended matter or impurities that interfere with the clarity of the water. Excessive turbidity in drinking water is aesthetically unappealing, and may also represent a health concern since it can provide food and shelter for pathogens. Although turbidity is not a direct indicator of health risk, studies show a strong relationship between removal of turbidity and removal of pathogens.

The Guidelines for Canadian Drinking Water Quality (GCDWQ) specify that water filtration systems should target a treated water turbidity of less than 0.1 NTU. However, for slow sand filters, this guideline is relaxed to 1.0 NTU[5]. Since the primary AMWSC source, Norrish Creek, is filtered by a combination of ultrafiltration and slow sand filters, it is expected this source will always provide a treated turbidity well less than 1.0 NTU. Similarly, as discussed earlier, Cannell Lake's natural turbidity is typically well below 1.0 NTU. All AMWSC wells also consistently produce water with very low turbidity. Considering all three sources, Abbotsford and Mission distribution systems should have

[4] Health Canada, December 2007. Chlorine in Drinking Water. Retrieved from: http://www.hc-sc.gc.ca/ewh-semt/alt_formats/hecs-sesc/pdf/consult/_2007/chlorine-chlore/chlorine-chlore-eng.pdf. pg. 3.

[5] Health Canada, May 2008. Guidelines for Canadian Drinking Water Quality Summary Table. Retrieved from: http://www.hc-sc.gc.ca/ewh-semt/alt_formats/hecs-sesc/pdf/pubs/water-eau/sum_guide-res_recom/summary-sommaire-eng.pdf

turbidity consistently below 1.0 NTU. Higher values typically indicate a disturbance in the distribution system (e.g. a main break, etc).

In 2017, no Abbotsford distribution site had a result above 1.0 NTU and the average turbidity was 0.16 NTU. For Mission, 0.15% of samples exceeded 1 NTU and the average turbidity was 0.28 NTU. Appendix H provides more detailed turbidity results.

3.3.4 pH

The AMWSC monitors pH on-line following water treatment of the Norrish Creek and Cannell Lake sources. The average pH at these locations in 2017 was 6.42 and 6.83, respectively. Additionally, field testing for pH occurs weekly at each distribution system sample location. In Abbotsford, the 2017 median pH was 7.01. In Mission, the median pH was 6.82 [6].

3.3.5 Trihalomethanes and Haloacetic Acids

Trihalomethanes (THMs) and Haloacetic Acids (HAAs) are by-products of disinfection, created when chlorine reacts with organic matter dissolved in water. THMs and HAAs are suspected carcinogens and thus a human health concern. The GCDWQ recommend limits of 100 µg/L for Trihalomethanes and 80 µg/L for Haloacetic Acids[7].

The AMWSC tests quarterly for THMs and HAAs at the locations shown Appendix H tables. All results were well below the recommended limits, with the highest results being 24 and 25 µg/L for total THMs and HAAs, respectively. These excellent results are partly attributed to the low organic content in the source waters. Chloramination also helps to suppress the level of disinfection by-products (i.e. chlorine preferentially bonds with the dosed ammonia rather than the organic matter).

3.3.6 Metals Testing

In 2017, the Abbotsford and Mission distribution systems were tested quarterly for metals to monitor for pipe corrosion and variations in treated water quality relative to that at the sources. Appendix I provides maximum and average values for total metals results collected under this program. In 2017, all distribution sampling locations met all the GCDWQ requirements.

3.3.7 Pipe Deterioration Monitoring

On an annual basis, several samples are collected from various points in the distribution system to proactively monitor for pipe deterioration. For example, asbestos fiber testing provides confidence that there is no deterioration of asbestos cement (AC) pipe. In 2017, all asbestos results were non-detect.

[6] Due to instrument malfunction, weekly pH testing in Mission only occurred until March 2017.

[7] Health Canada, May 2008. Guidelines for Canadian Drinking Water. Retrieved from: http://www.hc-sc.gc.ca/ewh-semt/alt_formats/hecs-sesc/pdf/pubs/water-eau/sum_guide-res_recom/summary-sommaire-eng.pdf

4 SYSTEM MAINTENANCE

The AMWSC, City of Abbotsford, and District of Mission have more than 40 staff assigned to engineering, operations management, maintenance, and light construction of the water utility system.

To maintain the quality of the water throughout the distribution system, Abbotsford and Mission utilize an annual flushing program. Regular flushing is an integral part of a comprehensive water management program to prevent bacterial re-growth and stagnation in low circulation areas of the distribution system. Mission also swabs about 20% of their water system annually.

Abbotsford has an annual program to replace aging pipe, based on its developing asset management system. Priority is given to pipes that are made of asbestos cement (AC), ductile iron in a known corrosive soil, and those that are approaching the end of their service life or have a history of problems. Abbotsford began using its new smart meters to identify leaks in its distribution system in 2010. Mission has developed a leak detection program which identifies system areas in need of upgrades or replacement.

4.1 Staff Certification & Training

The BC Environmental Operators Certification Program (EOCP) classifies water systems and certifies operators using ratings of I through IV. Higher numbers correspond to greater operational complexity and operators with more advanced training. The BC Drinking Water Protection Act requires that water system owners employ operators with a certification level numerically equivalent to the classification of the water system.

The AMWSC's Norrish Water Treatment Plant is classified as Level III and the transmission system is classified as Level IV. Abbotsford's water distribution system is classified as Level IV and Mission's is Level II. Abbotsford staff maintain and operate the sources, water treatment facilities, transmission system and Abbotsford's distribution system. The District of Mission operates the Mission distribution system.

The AMWSC Water Supply operations team includes 8 Operators. Of these, seven have water treatment certificates with the highest being a Level III Operator. All eight Operators have water distribution certificates; four have Level III and one has Level IV.

The Abbotsford Water Distribution department consists of 16 Operator positions, of which two were vacant in 2017. Of the 14 Operators, there are two Level IV Water Distribution (WD) Supervisors, three Level III WD Operators, eight Level II WD Operators, and one Level I WD operator.

The District of Mission's team includes 14 Operators with water distribution certificates; nine have their Level II.

4.2 Water System Events in 2017

In 2017, there were no notable system events that impacted water quality.

4.3 Operational Highlights for 2017

In 2017 the AMWSC, Abbotsford and Mission achieved the following significant works:

AMWSC

- Started updating the Water Supply Master Plan and began a Future Source Study;
- Submitted well license applications as required under the new BC Water Sustainability Act;
- Completed planning investigations related to groundwater system infrastructure renewal;
- Began a multi-year program to address recommendations from the 2016 Dickson and Cannell Lake Dam Safety Reviews; and
- Received an amendment to the Bevan Avenue Wells Environmental Assessment Certificate to operate the wells indefinitely.

Abbotsford

- Service line transfers completed on Babich Street;
- Empress relief valve system repaired;
- Empress and Eagle Mountain altitude valves repaired; and
- Condition assessments on asbestos cement pipe at various locations.

Mission

- Leak detection on 20% of the water distribution system;
- Continued the AC water main replacement program, replacing 1.4 km of existing AC water mains with ductile iron water main material;
- Completed construction of 3 critical water main loops to improve both fire flows and water quality;
- Completed 88 new water meter installs;
- Replaced 31 older and larger ICI water meters and all were converted to radio read; and
- Continued with the second year of a unidirectional flushing program, completing 20% of the system annually.

4.4 Works Planned for 2018

Key water system projects scheduled for 2018 include the following:

AMWSC

- Complete Water Supply Master Plan;
- Update Water Efficiency Plan;
- Begin investigative level studies for a future water source;
- Complete re-sanding of the Norrish Slow Sand Filters;
- Complete various infrastructure replacement projects at facilities such as the Maclure Level Control Facility and Marshall 1 Well;
- Complete detailed design of infrastructure replacement and improvements at the Farmer & Marshall Wellfields;
- Continue multi-year dam safety program, including installation of log booms at both Dickson and Cannell Lake dams; and
- Lining Maclure Cell No. 3 to eliminate leaks from concrete cracks.

Abbotsford

- Reservoir cleaning at St. Moritz, McMillan, and McKee;
- Pump maintenance at various stations; and
- Concrete repairs at Eagle Mountain Reservoir.

Mission

- Continue AC water main replacement program, anticipating 1.5 km of replacement;
- Continue leak detection, on 20 % of the water distribution system;
- Continue installing residential water meters as part of metering program for new developments;
- Ongoing consumption comparison with the water meter pilot program between newer and older homes;
- Meter readings on pilot program will be delivered to residents as conversion begins from set fixed rate to usage billing;
- Continue oldest and largest ICI water meter replacement and radio read updates for 10-20%; and
- Continue with the third year of our unidirectional flushing program, completing 20% of the system annually.

4.5 Emergency Response

The AMWSC completed an Emergency Response Procedures Manual in 2009. The Emergency Response Plan (ERP) has been developed to addresses potential hazards such as earthquakes, floods, severe storms, volcanic eruption, and pandemic/staff illnesses. The ERP outlines procedures regarding the effect of hazards, including loss of water supply, loss of power, contamination/turbidity in the water system, or damage to water infrastructure. The ERP may be implemented as:

1. Part of a joint emergency between the City of Abbotsford and the District of Mission, where all engineering resources would be coordinated by the City's Engineering Department Operations Centre; the Plan is premised on Abbotsford staff taking the lead role on all emergencies related to the joint water system.
2. A stand-alone plan to deal with a water emergency, managed by water utility staff; or
3. In a limited response to a City wide emergency, involving water utility staff as part of an emergency resource to address a specific situation.

Activation of the ERP occurs when information is received that an emergency exists, either through staff, public, media, or police/fire communications. Staff are directed to determine the location and nature of the event, eliminate the hazard, and ultimately restore normal water service. The ERP contains checklists to prioritize risks and responses, indicators of problems, and restoration plans.

In the event of a positive test for contaminated water, or a case of field evidence indicating that the quality of the water system may be compromised, the City first isolates the affected section of the system to reduce the impact and then contacts Fraser Health to advise them of the situation. The City and the Medical Health Officer (MHO) then evaluate the need for a "Boil Water" or "Stop Water Use" advisory. If such an advisory is to be issued, the City will inform the public. The MHO determines when the advisory can be lifted.

Hard copies of the ERP manual are available for public perusal at Abbotsford's Engineering Department Reception (City Hall, 4th floor) and Mission's City Hall Reception.

5 CONCLUSIONS

Results from 2017 water quality monitoring demonstrate that the City of Abbotsford and District of Mission's drinking water is potable under the definition of the Drinking Water Protection Act & Regulation. AMWSC and municipal water engineers and operators continue to seek water system improvements to consistently provide quality potable water to customers. Monitoring and maintenance programs are designed to meet the challenges of distributing water while preserving public health and the environment and meeting all regulatory requirements. Working closely with Fraser Health, the public, and the AMWSC, Abbotsford and Mission will continue to provide an aesthetically-pleasing, clean, and safe source of drinking water for all to enjoy.

APPENDICES

APPENDIX A – FRASER HEALTH HEALTHLINK

fraserhealth Better health. Best in health care.

March 16, 2010

Water Suppliers:

Re: HealthlinkBC File #56 - Persons with Compromised or Weakened Immune systems

In the Ombudsman's Special Report No. 32, June 2008, entitled "Fit to Drink: Challenges in Providing Safe Drinking Water in British Columbia", the Ombudsman recommended that adequate procedures need to be established by Fraser Health to notify people with compromised or weakened immune systems about the potential health risks associated with drinking water.

As part of our ongoing efforts to comply with the Ombudsman's recommendation, we are requesting all water suppliers to include the attached HealthlinkBC File # 56 with their annual report. Please make the report available to all your users. The information can also be found on the following web link:
www.healthlinkbc.ca/healthfiles/pdf/hfile56.pdf

If you have any questions about the above, please contact our office at 604-870-7900 (toll free: 1-866-749-7900) and one of our environmental health officers will gladly assist you.

Sincerely

Marc Zubel.

Marc Zubel, P.Eng.
Manager, Drinking Water Program
Health Protection

Enc.

MZ/cs

Public Health Protection
Fraser Health Authority

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BRITISH COLUMBIA
The Best Place on Earth

HealthLinkBC

Number 56
August 2009

Drinking Water and Those with Weakened Immune Systems

Some people with very weak immune systems may be at higher risk of water-borne infections. This file provides information about how to help prevent water-borne infections.

People who have significantly weakened immune systems and who are at higher risk of certain water-borne diseases include:

- People with HIV infection who have a CD4+ count of < 100 cells/mm^3.
- People with hematological malignancies (lymphoma or leukemia) who are being actively treated or have been in remission and off treatment for less than 1 year.
- Hematopoietic stem cell transplant recipients.
- People born with diseases that severely affect their immune systems.

Some people with weakened immune systems, such as those with certain types of cancers or taking certain medications, may not be at higher risk of severe water-borne diseases. These people do not need to take extra precautions with their drinking water.

Ask your doctor or specialist how weak your immune system is, and whether you need to take extra precautions.

Diseases from drinking water

Drinking water can contain different organisms, including bacteria, viruses and parasites, which can cause disease. These organisms can exist in the source water such as lake water and survive through treatment, or they can enter the water supply in the distribution system. Well water can be contaminated if the well is not built properly or if it draws on water from the surface of the ground, such as shallow wells or wells drilled in fractured rock. Surface water, such as rivers, lakes and streams, can also contain disease-causing organisms from animal feces.

If you have a weak immune system, you should not drink water from surface sources or wells potentially contaminated by surface water (for example, dug wells), unless the water has been treated to remove or inactivate at least 99.9% of parasites (protozoa), 99.99% of viruses and 100% of harmful bacteria.

Most community water systems in B.C. have effective treatment, such as disinfection or chlorination, against bacteria and viruses. However, in many cases, treatment may not provide a 99.9% reduction in infectious parasites. Furthermore, some water systems and many private supplies have no treatment at all. If the water you drink has not been disinfected, please refer to HealthLink BC File #49b How to Disinfect Drinking Water.

To further treat drinking water that has been disinfected, consider the methods listed below.

Options for water treatment

Boiling: If your water supply is disinfected you need only bring the water to a full boil to inactivate any *Cryptosporidium* parasites - a major concern for immunocompromised people, as there is no medical treatment for this parasite.

If the water is not yet disinfected, it's recommended you bring water to a full boil for at least one minute as the best way to kill or inactivate bacteria, viruses and parasites.

At elevations over 2,000 meters [6,500 feet], you should boil water for at least two minutes to disinfect it. In this situation, you should not drink or use tap water to brush your teeth, rinse your mouth, mix drinks or make ice cubes without boiling it first.

If you are preparing infant formula, please see HealthLink BC File #69b Formula Feeding Your Baby: Safely Preparing and Storing Formula. Please note that boiling water will get rid of viruses, bacteria and parasites but not chemicals which may be found in the water. For more information, please contact the environmental health officer or drinking water officer at your nearest public health unit.

Filters: If you plan to install a drinking water filter in your home, you will need a system labeled as "Absolute" 1 micron or smaller, and labeled as meeting ANSI/NSF International Standard #53 for removal of parasites. These are *not* suitable for removing bacteria and viruses and should *not* be used *unless* the water supply is at least disinfected first.

Jug-type filters, which sit in a jug and allow water to trickle through, and some tap-mounted and built-in devices are not an appropriate solution. The jug filter models are *not* effective in removing many disease-causing organisms.

Reverse Osmosis (RO): RO is effective against all disease-causing organisms and many chemical contaminants. Unless it has a high capacity, it will only produce small amounts of water and waste a large volume. Speak to a water treatment specialist to see if this is the best option for you.

Ultraviolet (UV) Treatment: UV light will kill many disease-causing organisms, and it is effective against almost all parasites. UV will not kill some bacterial spores and some viruses, so it should *not* be used *unless* the water supply is at least disinfected. UV treatment units should meet NSF Standard #55A.

Bottled water

If you do not want to drink water from the tap, you may also choose to buy bottled water that has been treated adequately. Most bottled water in B.C. has had RO treatment, but not all has been treated. You should check with the water bottler to find out what treatment it has had. You can still use tap water for cooking as long as you boil it. You can use bottled water treated by reverse osmosis for drinking, brushing teeth, making ice cubes and for recipes where water is used but not boiled such as cold soups or salad dressings.

For more information, including the level of treatment in your local water system, please contact your drinking water purveyor or supplier or the local environmental health officer or drinking water officer. Please also see the following HealthLink BC Files.

#49a Water-borne Diseases in BC

#49b How to Disinfect Drinking Water

BC Centre for Disease Control
AN AGENCY OF THE PROVINCIAL HEALTH SERVICES AUTHORITY

For more HealthLink BC File topics, visit www.HealthLinkBC.ca/healthfiles/index.stm or your local public health unit.

Click on www.HealthLinkBC.ca or call 8-1-1 for non-emergency health information and services in B.C.

For deaf and hearing-impaired assistance, call 7-1-1 in B.C.

Translation services are available in more than 130 languages on request.

APPENDIX B – METALS IN DRINKING WATER

fraserhealth Better health. Best in health care.

February 26, 2016

Water System Operators

Re: Metals in Drinking Water – "Flush" Message in Annual Reports

Fraser Health has recently revised its metals at the tap "Flush" message and we are asking all water systems to please include the following health message with your next annual reports to your users.

Anytime the water in a particular faucet has not been used for six hours or longer, "flush" your cold-water pipes by running the water until you notice a change in temperature. (This could take as little as five to thirty seconds if there has been recent heavy water use such as showering or toilet flushing. Otherwise, it could take two minutes or longer.) The more time water has been sitting in your home's pipes, the more lead it may contain.

Use only water from the cold-tap for drinking, cooking, and especially making baby formula. Hot water is likely to contain higher levels of lead.

The two actions recommended above are very important to the health of your family. They will probably be effective in reducing lead levels because most of the lead in household water usually comes from the plumbing in your house, not from the local water supply.

Conserving water is still important. Rather than just running the water down the drain you could use the water for things such as watering your plants.

If you have any questions, please contact our Drinking Water Program at 604-870-7903.

Sincerely,

Marc Zubel
Manager, Drinking Water Program
Health Protection

Public Health Protection
Fraser Health Authority
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APPENDIX C – ANNUAL RAW WATER SCAN (SURFACE WATER)

Parameter	Units	GCDWQ[1]	Norrish Creek			Cannell Lake		
			2015 08-Oct	2016 20-Oct	2017 27-Sept	2015 08-Oct	2016 20-Oct	2017 27-Sept
Alkalinity (as $CaCO_3$)	mg/L	-	8.0	3.0	8.3	5.0	3.0	6.0
Aluminum (total)	µg/L	200	ND	181	18	ND	12	25
Antimony (total)	µg/L	6	ND	ND	ND	ND	ND	ND
Arsenic (total)	µg/L	10	ND	ND	ND	ND	ND	ND
Barium (total)	µg/L	1000	ND	5.0	7.6	ND	ND	ND
Bicarbonate (as HCO_3)	mg/L	-	8.0	3.0	8.3	5.0	3.0	6.0
Boron (total)	µg/L	5000	ND	7.0	16	ND	7.0	8.1
Cadmium (total)	µg/L	5	ND	ND	ND	ND	ND	ND
Calcium (total)	mg/L	-	3.3	2.0	2.6	ND	1.7	1.5
Carbonate (as CO_3)	mg/L	-	ND	ND	ND	ND	ND	ND
Chloride	mg/L	≤ 250	0.6	0.5	0.6	0.6	0.5	0.6
Chromium (total)	µg/L	50	ND	ND	ND	ND	ND	ND
Colour (total)	TCU	≤ 15	ND	27	ND	ND	ND	ND
Conductivity	microS/cm	-	23	13	24	13	12	14
Copper (total)	µg/L	≤ 1000	ND	2.1	1.4	50	8.8	6.2
Fluoride	mg/L	1.5	ND	ND	ND	ND	ND	ND
Hardness (as $CaCO_3$)	mg/L	-	9.7	5.7	8.2	ND	5.0	4.3
Hydroxide	mg/L	-	ND	ND	ND	ND	ND	ND
Iron (dissolved)	µg/L	-	ND	60	-	ND	60	-
Iron (total)	µg/L	≤ 300	ND	60	ND	ND	40	59
Lead (total)	µg/L	10	ND	0.4	ND	9.0	0.7	0.6
Magnesium (dissolved)	mg/L	-	0.4	0.2	0.3	0.2	0.2	0.2
Magnesium (total)	mg/L	-	0.4	0.2	0.3	0.2	0.2	0.2
Manganese (dissolved)	µg/L	-	ND	ND	-	3.0	ND	-
Manganese (total)	µg/L	≤ 50	ND	1.8	ND	8.0	6.7	29.3
Mercury (total)	µg/L	1	ND	ND	ND	ND	ND	ND
Nitrate (as N)	mg/L	10	0.13	0.13	0.1	ND	0.01	ND
Nitrite (as N)	mg/L	-	ND	ND	ND	ND	ND	ND
pH	-	7 – 10.5	6.57	6.53	6.34	6.59	6.51	6.63
Potassium (total)	µg/L	-	200	90	ND	ND	60	ND
Selenium (total)	µg/L	50	ND	ND	ND	ND	ND	ND
Sodium (total)	µg/L	≤ 200000	1300	750	1240	800	830	720
Sulphate	mg/L	≤ 500	1.4	ND	1.3	ND	ND	ND
Total Dissolved Solids	mg/L	≤ 500	12	25	ND	ND	21	ND
Uranium (total)	µg/L	20	ND	0.04	ND	ND	ND	ND
Zinc (total)	µg/L	≤ 5000	ND	5.0	ND	ND	8.0	5.0

ND = not detectable

1 - These are treated water criteria and only shown for comparison to raw water results. (i.e. Water treatment will improve quality before water is sent into distribution system). Black text denotes health-based maximum acceptable concentrations (MAC); light grey text denotes aesthetic objectives (AO).

APPENDIX D – ANNUAL RAW WATER SCAN (WELLS)

(Page 1 of 3)

Parameter	Units	GCDWQ[1]	Farmer 1			Farmer 3			Industrial A			Industrial B			Industrial C			McConnell		
			2015 Oct 8	2016 Oct 20	**2017 Sept 27**	2015 Oct 8	2016 Oct 20	**2017 Sept 27**	2015 Oct 8	2016 Oct 20	**2017 Sept 27**	2015 Oct 8	2016 Oct 20	**2017 Sept 27**	2015 Oct 8	2016 Oct 20	**2017 Sept 27**	2015 Oct 8	2016 Oct 20	**2017 Sept 27**
Alkalinity (as $CaCO_3$)	mg/L	-	58	57	64.4	86	85		136	155		89	84	86.9	89	95	99.1	75	73	76
Aluminum (total)	µg/L	200	ND	ND	ND	ND	ND		ND	ND		ND	<ND	<ND	ND	ND	ND	ND	ND	7.0
Antimony (total)	µg/L	6	ND	ND	ND	ND	ND		ND	ND		ND	ND	ND	ND	ND	ND	ND	ND	0.22
Arsenic (total)	µg/L	10	ND	ND	ND	ND	5.6		ND	ND		8	6.9	8.3	8	8.2	6.14	ND	ND	2.97
Barium (total)	µg/L	1000	ND	ND	9.7	ND	ND		ND	ND		ND	ND	22.0	ND	ND	29.1	ND	ND	25.5
Bicarbonate (as HCO_3)	mg/L	-	58	57	64.4	86	85		136	155		89	84	86.9	89	95	99.1	75	73	76
Boron (total)	µg/L	5000	ND	ND	27.8	ND	ND		ND	ND		ND	ND	27.9	ND	ND	11.2	ND	ND	27.1
Cadmium (total)	µg/L	5	ND	ND	0.02	ND	ND		ND	ND		ND	ND	<ND	ND	ND	ND	ND	ND	ND
Calcium (total)	mg/L	-	26.8	30.4	27.5	41.6	41.6		53.3	55.9		29.8	29.6	24.2	36.6	37.2	36.8	31.1	33.3	32.4
Carbonate (as $CaCO_3$)	mg/L	-	ND	ND	ND	ND	ND		ND	ND		ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloride	mg/L	≤ 250	8.05	7.9	9.57	8.76	9.66		9.46	9.7.1		10.5	10.7	11.9	9.99	9.85	14.1	11.2	11.5	11.7
Chromium (total)	µg/L	50	ND	ND	ND	ND	ND		ND	ND		ND	ND	ND	ND	ND	ND	ND	ND	ND
Colour (Total)	TCU	≤ 15	ND	ND	ND	ND	ND		ND	ND		ND	ND	ND	ND	ND	ND	ND	ND	ND
Conductivity	microS/cm	-	259	249	263	317	316		433	447		277	247	246	303	303	297	314	322	316
Copper (total)	µg/L	≤ 1000	8	6.2	9.62	7	5.7		6	2.2		6	ND	1.12	5	2.8	0.83	7	3.6	4.56
Fluoride	mg/L	1.5	ND	ND	ND	ND	ND		ND	ND		ND	ND	0.11	ND	ND	ND	ND	ND	ND
Hardness (as $CaCO_3$)	mg/L	-	99.9	110	104	138	139		193	208		105	101	85.7	129	134	125	107	116	115
Hydroxide	mg/L	-	ND	ND	ND	ND	ND		ND	ND		ND	ND	ND	ND	ND	ND	ND	ND	ND
Iron (dissolved)	µg/L	-	ND	10.0	-	ND	ND		ND	ND		ND	ND	-	ND	ND	-	ND	ND	-
Iron (total)	µg/L	≤ 300	ND	ND	ND	ND	ND		ND	ND		ND	ND	24	ND	ND	21	ND	ND	ND
Lead (total)	µg/L	10	ND	ND	0.85	ND	ND		ND	ND		ND	ND	ND	ND	ND	ND	ND	ND	0.25
Magnesium (dissolved)	mg/L	-	8.0	-	-	-	-		-	-		-	-	-	-	-	-	-	-	-
Magnesium (total)	mg/L	-	8.0	8.31	8.56	8.2	8.60		14.6	16.6		7.3	6.59	6.09	9.2	9.99	8.13	7.1	7.91	8.17
Manganese (dissolved)	µg/L	-	14.0	25.3	-	2.0	1.2		35	19.7		39	39.8	-	54	51.5	-	19	13.2	-
Manganese (total)	µg/L	≤ 50	13.0	28.0	41.0	ND	ND		34	20.9		40	42.4	35.4	51	55.5	52.7 [2]	19	13.1	12.7
Mercury (total)	µg/L	1	ND	ND	ND	ND	ND		ND	ND		ND	ND	ND	ND	ND	ND	ND	ND	ND
pH	-	7 – 10.5	6.93	7.11	6.90	7.56	7.87		7.80	7.92		7.88	8.07	7.43	7.82	8.05	7.48	7.51	7.76	7.12
Potassium (total)	mg/L	-	1.5	1.42	1.34	2.1	1.90		2.3	2.42		3.4	3.15	2.72	3.5	3.47	2.31	2.8	2.50	2.30
Selenium (total)	µg/L	10	ND	ND	0.61	ND	ND		ND	ND		ND	ND	ND	ND	ND	ND	ND	ND	1.30
Silicon (dissolved)	µg/L	-	8000	-	-	8000	-		8000	-		6000	-	-	6000	-	-	7000	-	-
Sodium (total)	mg/L	≤ 200	5.3	6.17	6.15	4.9	5.41		5.8	7.34		12.3	11.8	13.0	6.8	8.12	6.90	16.0	14.4	12.7
Sulphate	mg/L	≤ 500	32.5	28.2	33.4	47.0	50.0		43.3	40.4		35.5	28.0	27.2	46.1	44.0	44.7	61.5	59.5	54.7
Total Dissolved Solids	mg/L	≤ 500	168	160	161	206	190		275	277		173	144	781 [3]	190	173	188	207	189	209
Turbidity	NTU	-	ND	0.1	ND	0.2	ND		0.1	ND		0.1	ND	0.16	0.1	ND	ND	0.1	ND	ND
Uranium (total)	µg/L	20	ND	ND	0.024	ND	ND		0.8	1.03		0.8	0.42	0.371	0.8	0.92	0.185	0.2	ND	0.154
Zinc (Total)	µg/L	≤ 5000	ND	ND	25.2	ND	ND		ND	ND		ND	ND	ND	ND	ND	ND	ND	ND	7.3

Not Tested

ND = not detectable
Not Tested = well pumps were out-of-service, thus sampling could not be completed. Farmer 2 results are not shown since the well has been out-of-service since 2010.
1 - These are treated water criteria and only shown for comparison to raw water results. (i.e. Water treatment will improve quality before water is sent into distribution system). Black text denotes health-based maximum acceptable concentrations (MAC); light grey text denotes aesthetic objectives (AO).
2 - Discussed in Section 3.1.2
3 - This result is considered an anomaly, likely due to lab error, since other parameters (.e.g conductivity) would show similar increases relative to previous years if there were an actual change in TDS.

(Page 2 of 3)

Parameter	Units	GCDWQ	Marshall 1			Marshall 3			Riverside 1			Riverside 2			Townline 1			Townline 2		
			2015 Oct 8	2016 Oct 20	**2017 Sept 27**	2015 Oct 8	2016 Oct 20	**2017 Sept 27**	2015 Oct 8	2016 Oct 20	**2017 Sept 27**	2015 Oct 8	2016 Oct 20	**2017 Sept 27**	2015 Oct 8	2016 Oct 20	**2017 Sept 27**	2015 Oct 8	2016 Oct 20	**2017 Sept 27**
Alkalinity (as $CaCO_3$)	mg/L	-	111	108	121	93	Not Tested	Not Tested	73	74	78.6	67	Not Tested	76.2	46	47	43.5	51	44	54.3
Aluminum (total)	µg/L	200	ND	ND	6.4	ND			ND	ND	ND	ND		ND	ND	ND	ND	ND	ND	ND
Antimony (total)	µg/L	6	ND	ND	ND	ND			ND	ND	ND	ND		ND	ND	ND	MD	ND	ND	ND
Arsenic (total)	µg/L	10	ND	ND	1.69	ND			ND	ND	0.55	ND		ND	ND	ND	ND	ND	ND	ND
Barium (total)	µg/L	1000	ND	ND	13.5	ND			ND	ND	12.8	ND		9.3	ND	ND	17.4	ND	ND	5.4
Bicarbonate (as HCO_3)	mg/L	-	111	108	121	93			73	74	78.6	67		76.2	46	47	43.5	51	44	54.3
Boron (total)	µg/L	5000	ND	ND	24.5	ND			ND	ND	17.0	ND		16.0	ND	ND	24.8	ND	42	32.2
Cadmium (total)	µg/L	5	ND	ND	0.019	ND			ND	ND	0.010	ND		0.035	ND	ND	0.029	ND	ND	0.024
Calcium (total)	mg/L	-	43.1	40.8	38.9	33.6			31.7	32.6	30.8	31.2		27.8	20.8	24.8	19.1	21.8	23.5	21.1
Carbonate (as CO_3)	mg/L	-	ND	ND	ND	ND			ND	ND	ND	ND		ND	ND	ND	ND	ND	ND	ND
Chloride	mg/L	≤ 250	30.2	30.8	31.8	22.3			17.2	19.4	21.3	23.9		23.1	10.4	10.1	10.6	9.36	6.78	12.9
Chromium (total)	µg/L	50	ND	ND	ND	ND			ND	ND	0.52	ND		ND	ND	ND	ND	ND	ND	ND
Colour (total)	TCU	≤ 15	ND	ND	ND	ND			ND	ND	ND	ND		ND	ND	ND	ND	ND	ND	ND
Conductivity	microS/cm	-	371	363	348	305			271	280	294	294		290	198	195	181	201	178	189
Copper (total)	µg/L	≤ 1000	9	3.2	2.59	7			39	15.3	5.47	20		13.5	13	16.0	7.05	12	11.0	8.37
Fluoride	mg/L	1.5	ND	ND	ND	ND			ND	ND	ND	ND		ND	ND	ND	ND	ND	ND	ND
Hardness (as $CaCO_3$)	mg/L	-	145	138	133	117			115	117	116	118		108	69.9	82.4	66.4	73.9	78.1	73.0
Hydroxide	mg/L	-	ND	ND	ND	ND			ND	ND	ND	ND		ND	ND	ND	ND	ND	ND	ND
Iron (dissolved)	µg/L	-	ND	20	-	ND			ND	ND	-	ND		-	ND	10	-	ND	17	-
Iron (total)	µg/L	≤ 300	ND	ND	138	ND			ND	ND	0.011	ND		47	ND	ND	ND	ND	140	35
Lead (total)	µg/L	10	ND	ND	0.58	ND			ND	ND	ND	ND		0.97	ND	ND	0.33	ND	ND	0.23
Magnesium (dissolved)	mg/L	-	-	-	-	-			-	-	-	-		-	-	-	-	-	-	-
Magnesium (total)	mg/L	-	9.0	8.79	8.69	8.1			8.7	8.77	9.50	9.8		9.47	4.4	5.00	4.52	4.7	4.73	4.92
Manganese (dissolved)	µg/L	-	4	5.9	-	ND			ND	ND	-	ND		-	87	78.2	-	ND	2.2	-
Manganese (total)	µg/L	≤ 50	6	6	10.3	ND			ND	ND	ND	ND		1.28	79	91.7	71.4 [4]	ND	2.3	0.85
Mercury (total)	µg/L	1	ND	ND	ND	ND			ND	ND	ND	ND		ND	ND	ND	ND	ND	ND	ND
pH	-	7 – 10.5	7.57	7.90	7.40	7.37			7.18	7.35	7.19	7.04		7.10	6.67	6.82	6.63	6.71	6.88	6.77
Potassium (total)	mg/L	-	3.3	2.74	2.44	2.0			1.8	1.58	1.49	1.8		1.43	2.9	2.90	2.72	1.1	1.01	0.99
Selenium (total)	µg/L	10	ND	ND	ND	ND			ND	ND	ND	ND		ND	ND	ND	ND	ND	ND	ND
Silicon (dissolved)	µg/L	-	7000	-	-	8000			11000	-	-	11000		-	9000	-	-	9000	-	-
Sodium (total)	mg/L	≤ 200	16.3	15.3	15.1	11.2			6.5	6.90	7.50	7.6		8.14	5.8	6.35	6.63	5.8	5.60	6.02
Sulphate	mg/L	≤ 500	29.0	27.8	27.8	27.7			23.9	24.2	28.3	22.3		23.8	14.9	13.7	14.0	15.8	13.7	14.1
Total Dissolved Solids	mg/L	≤ 500	218	213	195	188			168	153	176	207		179	135	142	108	138	128	117
Turbidity	NTU	20	0.3	0.85	0.37	0.5			0.2	0.12	ND	0.2		0.31	0.1	ND	0.10	1.0	1.11	0.19
Uranium (total)	µg/L	20	0.8	0.58	0.605	0.5			ND	ND	0.067	ND		0.041	ND	ND	0.024	ND	ND	0.057
Zinc (total)	µg/L	≤ 5000	ND	ND	ND	ND			ND	ND	7.7	ND		5.0	ND	ND	4.9	ND	ND	7.2

ND = not detectable
Not Tested = well pumps were out-of-service, thus sampling could not be completed.
4 - Discussed in Section 3.1.2

(Page 3 of 3)

Parameter	Units	GCDWQ	Bevan 1			Bevan 2			Bevan 3			Bevan 4			Pine		
			2015 Oct 8	2016 Oct 20	**2017 Sept 27**	2015 Oct 8	2016 Oct 20	**2017 Sept 27**	2015 Oct 8	2016 Oct 20	**2017 Sept 27**	2015 Oct 8	2016 Oct 20	**2017 Sept 27**	2015 Oct 8	2016 Oct 20	**2017 Sept 27**
Alkalinity (as $CaCO_3$)	mg/L	-	47	46	51.3	58	50	65.3	45	45	53.3	39	40	49.3	76	73	73.4
Aluminum (total)	µg/L	200	ND	ND	35.8	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Antimony (total)	µg/L	6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Arsenic (total)	µg/L	10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Barium (total)	µg/L	1000	ND	ND	ND	ND	ND	5.5	ND	ND	5.2	ND	ND	ND	ND	ND	13.4
Bicarbonate (as HCO_3)	mg/L	-	47	46	51.3	58	50	65.3	45	45	53.3	39	40	49.3	76	73	73.4
Boron (total)	µg/L	5000	ND	ND	21.0	ND	ND	11.9	ND	ND	12.4	ND	ND	12.4	ND	ND	37.0
Cadmium (total)	µg/L	5	ND	ND	0.024	ND	ND	0.018	ND	ND	0.025	ND	ND	0.026	ND	ND	0.066
Calcium (total)	mg/L	-	20.4	18.3	20.2	22.9	19.1	19.8	19.3	19.5	19.7	19.6	20.2	18.6	33.5	36.7	29.7
Carbonate (as CO_3)	mg/L	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloride	mg/L	≤ 250	15.6	13.8	19.3	17.4	14.8	14.9	15.8	14.6	19.9	18.5	17.2	17.1	50.5	55.4	49.7
Chromium (total)	µg/L	50	ND	ND	0.54	30	ND	0.54	ND	ND	ND	ND	ND	ND	ND	ND	ND
Colour (total)	TCU	≤ 15	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Conductivity	microS/cm	-	197	188	210	213	191	201	188	181	204	187	184	183	360	381	338
Copper (total)	µg/L	≤ 1000	8	5.6	3.58	4	4.2	3.70	6	5.7	9.17	10	9.7	38.6	26	38.4	40.1
Fluoride	mg/L	1.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hardness (as $CaCO_3$)	mg/L	-	75.0	66.8	74.9	84.7	72.1	74.6	69.4	69.3	73.1	69	70.2	67.9	127	141	119
Hydroxide	mg/L	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Iron (dissolved)	µg/L	-	ND	ND	-	ND	ND	-	ND	ND	-	ND	ND	-	ND	25	-
Iron (total)	µg/L	≤ 300	ND	ND	16	ND	ND	ND	ND	ND	ND	ND	ND	12	ND	ND	65
Lead (total)	µg/L	10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.27	ND	ND	0.61
Magnesium (dissolved)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium (total)	mg/L	-	5.9	5.09	5.94	6.7	5.43	6.11	5.2	4.97	5.82	4.9	4.81	5.17	10.5	11.9	10.8
Manganese (dissolved)	µg/L	-	ND	0.9	-	ND	ND	-	ND	0.9	-	ND	1.1	-	83	75.6	-
Manganese (total)	µg/L	≤ 50	ND	ND	0.62	ND	ND	0.24	ND	2.1	0.72	ND	ND	0.22	76	83.1	69.4 [5]
Mercury (total)	µg/L	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
pH	-	7 – 10.5	6.90	7.08	6.99	7.12	7.19	7.02	6.96	6.99	6.93	6.81	6.96	6.89	6.82	6.81	6.83
Potassium (total)	mg/L	-	1.2	0.90	0.96	1.4	0.93	0.99	1.2	0.93	0.97	1.1	0.93	0.95	2.0	1.82	1.72
Selenium (total)	µg/L	10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Silicon (dissolved)	µg/L	-	12000	-	-	11000	-	-	11000	-	-	11000	-	-	9000	-	-
Sodium (total)	mg/L	≤ 200	7.1	7.08	7.16	6.1	6.19	6.59	6.2	6.62	7.52	5.8	6.33	7.04	16.2	18.4	20.2
Sulphate	mg/L	≤ 500	10.4	10.2	15.0	10.9	8.9	12.0	10.5	9.5	13.3	10.5	10.3	11.2	18.5	17.0	18.0
Total Dissolved Solids	mg/L	≤ 500	133	121	132	148	119	138	132	119	140	135	120	125	228	221	214
Turbidity	NTU	20	1.0	0.13	0.26	1.4	0.31	ND	0.2	0.39	0.1	0.2	0.41	0.65	2.1	0.18	0.39
Uranium (total)	µg/L	20	ND	ND	ND	ND	ND	0.044	ND	ND	ND	ND	ND	ND	ND	ND	0.032
Zinc (total)	µg/L	≤ 5000	ND	ND	4.8	ND	ND	MD	ND	ND	ND	ND	ND	ND	ND	ND	9.6

ND = not detectable
5 - Discussed in Section 3.1.2

APPENDIX E – MONTHLY WELL MONITORING (NITRATES)

(all results expressed in mg/L as Nitrogen, NO_3 = nitrate)

Date	Farmer 1	Farmer 3	Industrial A	Industrial B	Industrial C
11-Jan	4.72	2.36	8.02	<0.01	<0.01
23-Feb	4.58	3.45	7.82	<0.01	0.31
8-Mar	4.03	2.28	6.67	<0.01	0.09
5-Apr	4.77	2.12	-	<0.01	0.14
10-May	4.88	2.02	-	<0.01	0.16
7-Jun	3.67	1.32	-	0.30	0.48
12-Jul	5.48	-	-	0.01	0.07
10-Aug	4.06	-	-	<0.01	0.41
27-Sep	6.27	-	-	<0.02	<0.02
25-Oct	5.08	-	-	<0.01	<0.01
9-Nov	3.92	-	-	<0.01	<0.01
6-Dec	4.78	-	-	<0.01	0.08

Date	McConnell	Riverside 1	Riverside 2	Marshall 1	Townline 1	Townline 2
11-Jan	0.32	3.25	4.06	0.04	3.76	3.33
23-Feb	0.93	3.75	4.20	0.03	4.32	3.64
8-Mar	1.01	-	-	0.02	3.88	3.45
5-Apr	3.08	3.65	4.51	0.04	4.13	3.50
10-May	4.66	3.83	4.49	0.02	3.82	4.22
7-Jun	4.20	2.61	2.64	0.05	3.23	2.47
12-Jul	5.24	3.39	3.94	0.15	4.16	2.84
10-Aug	4.61	2.71	-	0.11	3.98	2.31
27-Sep	3.44	3.09	4.09	0.08	4.68	3.34
25-Oct	1.82	2.54	4.10	0.02	4.63	2.72
9-Nov	0.33	1.96	3.19	0.01	3.74	1.92
6-Dec	0.94	2.70	4.34	<0.01	4.90	3.07

Date	Bevan 1	Bevan 2	Bevan 3	Bevan 4	Pine
11-Jan	2.77	2.63	2.53	2.63	0.81
23-Feb	2.64	2.68	2.66	2.65	0.89
8-Mar	2.98	2.36	2.53	2.33	0.88
5-Apr	2.72	2.33	2.50	2.27	0.99
10-May	2.99	2.53	2.70	2.62	1.12
7-Jun	1.88	1.54	1.64	1.55	0.66
12-Jul	2.73	2.18	2.50	2.52	1.08
10-Aug	1.68	1.53	1.62	1.87	0.31
27-Sep	2.50	2.54	2.71	2.71	1.24
25-Oct	3.19	2.60	2.78	2.70	1.12
9-Nov	2.41	2.02	2.46	2.10	0.86
6-Dec	3.35	2.63	2.8	2.72	1.08

APPENDIX F – MONTHLY WELL MONITORING (TOTAL METALS)

Parameter	Units	GCDWQ [1]	Farmer 1		Farmer 3		Industrial B		Industrial C		McConnell		Marshall 1		Townline 1		Townline 2		Pine	
			Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg
Aluminum (total)	µg/L	200	ND	ND	6	5.5	ND	ND	ND	ND	ND	ND	10	8.08	ND	ND	7	7	ND	ND
Antimony (total)	µg/L	6	ND	ND	0.2	ND	ND	ND	0.5	0.43	0.46	0.33	0.2	ND	ND	ND	0.1	0.1	ND	ND
Arsenic (total)	µg/L	10	ND	ND	5.4	5.09	11.4	9.76	8.4	7.52	5.9	5.21	2.04	1.99	0.6	0.6	0.5	0.5	ND	ND
Barium (total)	µg/L	1000	11	10.34	38.1	37.02	25.4	21.88	38	35.8	29.4	27.48	14	13.78	22	20	6	5	15	14
Boron (total)	µg/L	5000	35	28	21	15.8	38	30.6	15	12.8	36	30	22	20	56	33	35	32	40	38
Cadmium (total)	µg/L	5	0.026	0.021	0.01	0.01	0.01	0.01	0.011	0.011	0.01	0.01	0.031	0.022	0.05	0.04	0.03	0.03	0.09	0.07
Chromium	µg/L	50	1.09	1.09	1.08	0.82	0.93	0.77	1.02	0.76	0.82	0.66	0.58	0.54	7	2.1	0.9	0.7	0.7	0.7
Copper (total)	µg/L	≤1000	12.1	9.09	7.64	5.05	2	1.01	17.6	4.38	9.9	4.66	4.7	3.11	31	15.5	21.4	12.3	76.4	45
Fluoride	mg/L	1.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hardness (as $CaCO_3$)	mg/L	-	112	104.82	149	143.8	85.4	82.76	134	126.4	128	121.4	133	128.6	77	74	75	73	147	134
Iron (total)	µg/L	≤300	41	41	44	23.5	70	29.8	50	22.5	60	26.2	250	133.6	20	19	690 [2]	264	140	78
Lead (total)	µg/L	10	0.69	0.42	ND	ND	ND	ND	1.7	1.7	0.5	0.30	1.4	0.85	1	0.6	0.7	0.4	1.2	0.7
Magnesium (total)	mg/L	-	8.84	8.34	8.97	8.55	5.88	5.74	9.11	8.51	8.31	7.91	8.22	7.84	4.8	4.6	4.8	4.7	11.6	10.9
Manganese (total)	µg/L	≤50	30.8	29.44	4.03	1.77	40.2	36.48	96.8 [2]	59.9 [2]	21.8	18.22	13.1	9.38	87.8 [2]	78.3 [2]	3.1	1.8	100 [2]	89.6 [2]
Mercury (total)	µg/L	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Selenium (total)	µg/L	10	1.3	1.15	0.6	0.6	ND	ND	ND	ND	1	0.81	ND	ND	ND	ND	ND	ND	ND	ND
Uranium (total)	µg/L	20	0.02	0.02	0.18	0.17	0.43	0.33	0.76	0.61	0.497	0.41	0.616	0.58	0.03	0.03	0.1	0.07	0.04	0.03
Zinc (total)	µg/L	≤ 5000	68.2	43.24	ND	ND	8	6.9	6	6	10	6.12	11	11	25	14	21	15	33	19

Parameter	Units	GCDWQ [1]	Bevan 1		Bevan 2		Bevan 3		Bevan 4	
			Max	Avg	Max	Avg	Max	Avg	Max	Avg
Aluminum (total)	µg/L	200	6	6	ND	ND	8	8	ND	ND
Antimony (total)	µg/L	6	ND	ND	ND	ND	ND	ND	ND	ND
Arsenic (total)	µg/L	10	ND	ND	ND	ND	ND	ND	ND	ND
Barium (total)	µg/L	1000	6	6	6	6	5	5	5	5
Boron (total)	µg/L	5000	17	14	14	12	13	12	13	11
Cadmium (total)	µg/L	5	0.03	0.03	0.03	0.03	0.03	0.02	0.03	0.02
Chromium	µg/L	50	0.9	0.8	0.9	0.7	0.9	0.8	0.9	0.8
Copper (total)	µg/L	≤1000	8.8	6.3	9.9	6.3	11.0	7.2	21.6	15.4
Fluoride	mg/L	1.5	ND	ND	ND	ND	ND	ND	ND	ND
Hardness (as $CaCO_3$)	mg/L	-	75	70	74	71	71	68	71	70
Iron (total)	µg/L	≤300	180	62	20	17	440 [2]	128	660 [2]	213
Lead (total)	µg/L	10	0.3	0.2	0.2	0.2	0.5	0.3	1.3	0.5
Magnesium (total)	mg/L	-	6.3	5.5	5.8	5.5	5.9	5.1	5.0	4.7
Manganese (total)	µg/L	≤50	8.8	3.4	1.0	0.6	4.4	2.5	5.1	3.3
Mercury (total)	µg/L	1	ND	ND	ND	ND	ND	ND	ND	ND
Selenium (total)	µg/L	10	ND	ND	ND	ND	ND	ND	ND	ND
Uranium (total)	µg/L	20	ND	ND	ND	ND	ND	ND	ND	ND
Zinc (total)	µg/L	≤ 5000	48	27	22	11	16	11	24	18

ND = not detectable
1 - These are treated water criteria and only shown for comparison to raw water results. (i.e. Water treatment will improve quality before water is sent into distribution system). Black text denotes health-based maximum acceptable concentrations (MAC); light grey text denotes aesthetic objectives (AO).
2 - Discussed in Section 3.1.2

APPENDIX G – WELL PESTICIDES & HERBICIDES SCAN

Parameters Tested (all results non-detect)	
2,3,4,6 + 2,3,5,6-Tetrachlorophenol	Diazinon
2,3,4,6-Tetrachlorophenol	Dicamba
2,3,4-Trichlorophenol	Dichlorvos
2,3,5-Trichlorophenol	Diclofop-methyl
2,3,6-Trichlorophenol	Dieldrin
2,3-Dichlorophenol	Dimethoate
2,4 + 2,5-Dichlorophenol	Dinoseb
2,4,5-Trichlorophenol	Disulfoton
2,4,5-Trichlorophenoxyacetic acid / 2,4,5-T	Diuron
2,4,6-Trichlorophenol	Endosulfan (total)
2,4-Dichlorophenoxyacetic acid / 2,4-D	Endosulfan sulfate
2,6-Dichlorophenol	Endrin
2-Chlorophenol	Endrin aldehyde
3 and 4-Chlorophenol	Endrin ketone
3,4,5-Trichlorophenol	Fenchlorphos
3,4-Dichlorophenol	Heptachlor
3,5-Dichlorophenol	Heptachlor epoxide
4-Chloro-3-methylphenol	Lindane
Alachlor	Linuron
Aldicarb	Malathion
Aldrin	MCPA
alpha-BHC	Methoxychlor
Atrazine + N-dealkylated metabolites	Methyl parathion
Azinphos-methyl	Metolachlor
Bendiocarb	Metribuzin
beta-BHC	Parathion
Bromacil	Pentachloronitrobenzene / PCNB
Bromoxynil	Pentachlorophenol
Butachlor	Permethrin
Captan	Phorate
Carbaryl	Prometon
Carbofuran	Prometryn
Chlordane	Simazine
Chlorothalonil	Sulfotep
Chlorpyrifos	Tebuthiuron
Cyanazine	Temephos
DDT + metabolites	Terbufos
delta-BHC	Triallate
Deltamethrin	Trifluralin

APPENDIX H – WEEKLY DISTRIBUTION SYSTEM MONITORING

System Wide Statistics

	Overall						
	# Micro Samples	# with Tot. Col.	Total Cl (mg/L)		pH	Turbiddity (NTU)	
			Max	Avg	Median	Max	Avg
2015	2127	2	2.20	0.93	7.08	1.53	0.19
2016	2127	1	1.89	1.00	7.02	1.25	0.19
2017	**2188**	**5**	**2.02**	**1.04**	**6.98**	**1.21**	**0.20**

	Transmission						
	# Micro Samples	# with Tot. Col.	Total Cl (mg/L)		pH	Turbiddity (NTU)	
			Max	Avg	Median	Max	Avg
2015	255	0	2.20	1.11	6.60	0.61	0.28
2016	255	0	1.66	1.12	6.70	0.91	0.26
2017	**260**	**1**	**2.02**	**1.24**	**6.80**	**0.94**	**0.28**

	Abbotsford						
	# Micro Samples	# with Tot. Col.	Total Cl (mg/L)		pH	Turbiddity (NTU)	
			Max	Avg	Median	Max	Avg
2015	1404	2	1.56	0.72	7.27	1.14	0.16
2016	1404	1	1.49	0.78	7.20	0.63	0.14
2017	**1458**	**2**	**1.56**	**0.83**	**7.01**	**0.79**	**0.16**

	Mission						
	# Micro Samples	# with Tot. Col.	Total Cl (mg/L)		pH	Turbiddity (NTU)	
			Max	Avg	Median	Max	Avg
2015	468	0	1.86	0.97	6.80	1.53	0.27
2016	468	0	1.89	1.07	6.70	1.25	0.27
2017	**470**	**2**	**1.63**	**1.08**	**6.82**	**1.21**	**0.28**

Transmission System Sample Locations

	Ainsworth						
	# Micro Samples	# with Tot. Col.	Total Cl (mg/L)		pH	Turbiddity (NTU)	
			Max	Avg	Median	Max	Avg
2015	52	0	2.20	1.24	6.40	0.60	0.33
2016	52	0	1.66	1.28	6.40	0.53	0.32
2017	**51**	**0**	**1.60**	**1.36**	**6.60**	**0.70**	**0.35**

	Cannon 600						
	# Micro Samples	# with Tot. Col.	Total Cl (mg/L)		pH	Turbiddity (NTU)	
			Max	Avg	Median	Max	Avg
2015	52	0	1.30	1.04	6.50	0.61	0.31
2016	52	0	1.42	1.08	6.70	0.49	0.31
2017	**52**	**0**	**2.02**	**1.19**	**6.80**	**0.64**	**0.33**

	Cannon 400						
	# Micro Samples	# with Tot. Col.	Total Cl (mg/L)		pH	Turbiddity (NTU)	
			Max	Avg	Median	Max	Avg
2015	52	0	1.62	1.03	6.60	0.60	0.32
2016	52	0	1.19	0.91	6.70	0.52	0.31
2017	**54**	**0**	**1.39**	**1.22**	**6.80**	**0.72**	**0.33**

	Bell Road						
	# Micro Samples	# with Tot. Col.	Total Cl (mg/L)		pH	Turbiddity (NTU)	
			Max	Avg	Median	Max	Avg
2015	52	0	1.50	1.05	6.70	0.50	0.29
2016	52	0	1.50	1.15	6.60	0.91	0.22
2017	**52**	**1**	**1.54**	**1.28**	**6.71**	**0.94**	**0.18**

	Maclure						
	# Micro Samples	# with Tot. Col.	Total Cl (mg/L)		pH	Turbiddity (NTU)	
			Max	Avg	Median	Max	Avg
2015	52	0	1.50	1.05	6.80	0.48	0.15
2016	52	0	1.50	1.15	6.70	0.55	0.15
2017	**50**	**0**	**1.47**	**1.17**	**6.80**	**0.70**	**0.19**

Mission Distribution Sample Locations

M1

	# Micro Samples	# with Tot. Col.	Total Cl (mg/L) Max	Total Cl (mg/L) Avg	pH Median	Turbiddity (NTU) Max	Turbiddity (NTU) Avg
2015	52	0	1.38	0.93	7.10	0.64	0.23
2016	52	0	1.31	1.05	7.00	1.11	0.18
2017	**54**	**1**	**1.35**	**1.09**	**7.00**	**0.72**	**0.21**

M2

	# Micro Samples	# with Tot. Col.	Total Cl (mg/L) Max	Total Cl (mg/L) Avg	pH Median	Turbiddity (NTU) Max	Turbiddity (NTU) Avg
2015	52	0	1.17	0.91	6.70	0.60	0.33
2016	52	0	1.31	1.00	6.77	0.76	0.40
2017	**52**	**0**	**1.29**	**1.03**	**6.81**	**0.67**	**0.34**

M3

	# Micro Samples	# with Tot. Col.	Total Cl (mg.L) Max	Total Cl (mg.L) Avg	pH Median	Turbiddity (NTU) Max	Turbiddity (NTU) Avg
2015	52	0	1.33	0.87	6.75	1.53	0.39
2016	52	0	1.35	0.97	6.70	0.84	0.39
2017	**52**	**0**	**1.38**	**1.04**	**6.80**	**1.21**	**0.37**

M5

	# Micro Samples	# with Tot. Col.	Total Cl (mg/L) Max	Total Cl (mg/L) Avg	pH Median	Turbiddity (NTU) Max	Turbiddity (NTU) Avg
2015	52	0	1.86	0.94	7.20	0.47	0.20
2016	52	0	1.47	1.07	7.00	0.52	0.16
2017	**54**	**1**	**1.55**	**1.12**	**6.80**	**0.56**	**0.23**

M6

	# Micro Samples	# with Tot. Col.	Total Cl (mg/L) Max	Total Cl (mg/L) Avg	pH Median	Turbiddity (NTU) Max	Turbiddity (NTU) Avg
2015	52	0	1.35	1.00	6.60	0.92	0.36
2016	52	0	1.89	1.05	6.60	0.96	0.42
2017	**51**	**0**	**1.63**	**1.15**	**6.87**	**0.66**	**0.34**

M7

	# Micro Samples	# with Tot. Col.	Total Cl (mg/L) Max	Total Cl (mg/L) Avg	pH Median	Turbiddity (NTU) Max	Turbiddity (NTU) Avg
2015	52	0	1.56	1.16	6.70	0.43	0.16
2016	52	0	1.52	1.20	6.70	0.79	0.18
2017	**52**	**0**	**1.58**	**1.19**	**6.80**	**0.55**	**0.20**

M8

	# Micro Samples	# with Tot. Col.	Total Cl (mg/L) Max	Total Cl (mg/L) Avg	pH Median	Turbiddity (NTU) Max	Turbiddity (NTU) Avg
2015	52	0	1.38	0.96	6.80	0.46	0.29
2016	52	0	1.34	1.06	6.60	0.64	0.30
2017	**51**	**0**	**1.40**	**1.13**	**6.90**	**0.86**	**0.35**

M9

	# Micro Samples	# with Tot. Col.	Total Cl (mg/L) Max	Total Cl (mg/L) Avg	pH Median	Turbiddity (NTU) Max	Turbiddity (NTU) Avg
2015	52	0	1.54	1.19	6.70	0.40	0.16
2016	52	0	1.50	1.26	6.60	0.41	0.17
2017	**52**	**0**	**1.60**	**1.26**	**6.80**	**0.67**	**0.20**

M10

	# Micro Samples	# with Tot. Col.	Total Cl (mg/L) Max	Total Cl (mg/L) Avg	pH Median	Turbiddity (NTU) Max	Turbiddity (NTU) Avg
2015	52	0	1.02	0.76	6.90	0.46	0.28
2016	52	0	1.26	0.94	6.80	1.25	0.25
2017	**52**	**0**	**1.49**	**0.87**	**6.90**	**0.63**	**0.28**

Abbotsford West Distribution Sample Locations

W1

	# Micro Samples	# with Tot. Col.	Total Cl (mg/L) Max	Total Cl (mg/L) Avg	pH Median	Turbiddity (NTU) Max	Turbiddity (NTU) Avg
2015	52	0	1.37	0.87	7.25	0.43	0.15
2016	52	0	1.23	0.96	6.99	0.36	0.14
2017	**54**	**0**	**1.36**	**1.06**	**7.04**	**0.40**	**0.15**

W2

	# Micro Samples	# with Tot. Col.	Total Cl (mg/L) Max	Total Cl (mg/L) Avg	pH Median	Turbiddity (NTU) Max	Turbiddity (NTU) Avg
2015	52	0	1.41	1.06	7.11	0.57	0.14
2016	52	0	1.33	1.05	7.10	0.23	0.12
2017	**54**	**0**	**1.38**	**1.13**	**7.09**	**0.49**	**0.16**

W3

	# Micro Samples	# with Tot. Col.	Total Cl (mg/L) Max	Total Cl (mg/L) Avg	pH Median	Turbiddity (NTU) Max	Turbiddity (NTU) Avg
2015	52	0	1.43	1.08	7.19	0.43	0.14
2016	52	0	1.49	1.12	7.19	0.27	0.12
2017	**54**	**0**	**1.56**	**1.17**	**7.00**	**0.55**	**0.16**

W4

	# Micro Samples	# with Tot. Col.	Total Cl (mg/L) Max	Total Cl (mg/L) Avg	pH Median	Turbiddity (NTU) Max	Turbiddity (NTU) Avg
2015	52	0	1.44	0.90	6.95	0.81	0.15
2016	52	0	1.31	0.86	6.99	0.28	0.13
2017	**54**	**0**	**1.35**	**0.89**	**6.90**	**0.48**	**0.17**

W5

	# Micro Samples	# with Tot. Col.	Total Cl (mg/L) Max	Total Cl (mg/L) Avg	pH Median	Turbiddity (NTU) Max	Turbiddity (NTU) Avg
2015	52	0	1.44	1.14	7.22	0.43	0.14
2016	52	0	1.43	1.11	7.09	0.49	0.13
2017	**56**	**1**	**1.49**	**1.16**	**6.97**	**0.55**	**0.16**

W6

	# Micro Samples	# with Tot. Col.	Total Cl (mg/L) Max	Total Cl (mg/L) Avg	pH Median	Turbiddity (NTU) Max	Turbiddity (NTU) Avg
2015	52	0	1.44	1.07	7.12	0.42	0.14
2016	52	0	1.37	1.07	7.03	0.30	0.13
2017	**54**	**0**	**1.47**	**1.09**	**6.90**	**0.49**	**0.16**

W7

	# Micro Samples	# with Tot. Col.	Total Cl (mg/L) Max	Total Cl (mg/L) Avg	pH Median	Turbiddity (NTU) Max	Turbiddity (NTU) Avg
2015	52	1	1.27	0.64	6.98	0.35	0.14
2016	52	0	1.15	0.68	6.93	0.54	0.14
2017	**54**	**0**	**1.31**	**0.72**	**6.81**	**0.42**	**0.15**

W8

	# Micro Samples	# with Tot. Col.	Total Cl (mg/L) Max	Total Cl (mg/L) Avg	pH Median	Turbiddity (NTU) Max	Turbiddity (NTU) Avg
2015	52	1	1.05	0.43	6.82	1.14	0.28
2016	52	0	1.43	0.51	6.97	0.63	0.27
2017	**54**	**0**	**1.23**	**0.47**	**6.85**	**0.64**	**0.18**

W9

	# Micro Samples	# with Tot. Col.	Total Cl (mg/L) Max	Total Cl (mg/L) Avg	pH Median	Turbiddity (NTU) Max	Turbiddity (NTU) Avg
2015	52	0	1.09	0.48	6.94	0.36	0.14
2016	52	0	1.13	0.43	6.97	0.32	0.13
2017	**54**	**0**	**0.97**	**0.50**	**6.78**	**0.31**	**0.14**

W11

	# Micro Samples	# with Tot. Col.	Total Cl (mg/L) Max	Total Cl (mg/L) Avg	pH Median	Turbiddity (NTU) Max	Turbiddity (NTU) Avg
2015	52	0	1.14	0.70	7.19	0.40	0.18
2016	52	1	1.22	0.84	7.22	0.37	0.14
2017	**54**	**0**	**1.34**	**0.96**	**7.15**	**0.70**	**0.18**

W13

	# Micro Samples	# with Tot. Col.	Total Cl (mg/L) Max	Total Cl (mg/L) Avg	pH Median	Turbiddity (NTU) Max	Turbiddity (NTU) Avg
2015	52	0	0.99	0.44	7.29	0.37	0.16
2016	52	0	1.05	0.54	7.24	0.55	0.15
2017	**54**	**0**	**1.16**	**0.67**	**7.15**	**0.53**	**0.17**

W14

	# Micro Samples	# with Tot. Col.	Total Cl (mg/L) Max	Total Cl (mg/L) Avg	pH Median	Turbiddity (NTU) Max	Turbiddity (NTU) Avg
2015	52	0	1.08	0.46	7.13	0.39	0.16
2016	52	0	0.86	0.42	7.13	0.35	0.14
2017	**54**	**0**	**1.09**	**0.64**	**7.10**	**0.45**	**0.17**

W15

	# Micro Samples	# with Tot. Col.	Total Cl (mg/L) Max	Total Cl (mg/L) Avg	pH Median	Turbiddity (NTU) Max	Turbiddity (NTU) Avg
2015	52	0	1.40	1.08	7.35	0.34	0.14
2016	52	0	1.43	1.10	7.25	0.59	0.13
2017	**54**	**0**	**1.44**	**1.16**	**7.04**	**0.67**	**0.16**

W16

	# Micro Samples	# with Tot. Col.	Total Cl (mg/L) Max	Total Cl (mg/L) Avg	pH Median	Turbiddity (NTU) Max	Turbiddity (NTU) Avg
2015	52	0	1.27	0.77	7.43	0.48	0.20
2016	52	0	1.21	0.85	7.39	0.29	0.15
2017	**54**	**0**	**1.33**	**0.96**	**7.20**	**0.79**	**0.18**

Abbotsford East Distribution Sample Locations

E2

	# Micro Samples	# with Tot. Col.	Total Cl (mg/L)		pH	Turbiddity (NTU)	
			Max	Avg	Median	Max	Avg
2015	52	0	1.27	0.77	7.59	0.39	0.13
2016	52	0	1.21	0.85	7.47	0.28	0.13
2017	**53**	**0**	**1.25**	**0.83**	**7.12**	**0.46**	**0.15**

E3

	# Micro Samples	# with Tot. Col.	Total Cl (mg/L)		pH	Turbiddity (NTU)	
			Max	Avg	Median	Max	Avg
2015	52	1	1.30	0.53	7.55	0.29	0.13
2016	52	1	1.31	0.79	7.31	0.30	0.14
2017	**53**	**0**	**1.30**	**0.77**	**7.07**	**0.46**	**0.17**

E4

	# Micro Samples	# with Tot. Col.	Total Cl (mg/L)		pH	Turbiddity (NTU)	
			Max	Avg	Median	Max	Avg
2015	52	0	1.33	0.51	7.60	0.26	0.12
2016	52	0	1.31	0.76	7.39	0.45	0.14
2017	**54**	**0**	**1.05**	**0.50**	**7.00**	**0.45**	**0.17**

E5

	# Micro Samples	# with Tot. Col.	Total Cl (mg/L)		pH	Turbiddity (NTU)	
			Max	Avg	Median	Max	Avg
2015	52	0	1.14	0.41	7.54	0.27	0.13
2016	52	0	0.85	0.44	7.24	0.29	0.13
2017	**54**	**0**	**0.91**	**0.34**	**6.82**	**0.39**	**0.16**

E6

	# Micro Samples	# with Tot. Col.	Total Cl (mg/L)		pH	Turbiddity (NTU)	
			Max	Avg	Median	Max	Avg
2015	52	0	0.89	0.30	7.38	0.30	0.14
2016	52	0	0.86	0.37	7.60	0.23	0.13
2017	**53**	**0**	**1.28**	**0.85**	**7.20**	**0.46**	**0.17**

E7

	# Micro Samples	# with Tot. Col.	Total Cl (mg/L)		pH	Turbiddity (NTU)	
			Max	Avg	Median	Max	Avg
2015	52	0	1.32	0.55	7.55	0.29	0.14
2016	52	0	1.24	0.74	7.30	0.24	0.13
2017	**54**	**0**	**0.95**	**0.28**	**6.95**	**0.43**	**0.16**

E8

	# Micro Samples	# with Tot. Col.	Total Cl (mg/L)		pH	Turbiddity (NTU)	
			Max	Avg	Median	Max	Avg
2015	52	0	0.67	0.28	7.53	0.27	0.13
2016	52	0	0.78	0.30	7.10	0.24	0.14
2017	**54**	**0**	**0.91**	**0.46**	**6.82**	**0.52**	**0.16**

E9

	# Micro Samples	# with Tot. Col.	Total Cl (mg/L)		pH	Turbiddity (NTU)	
			Max	Avg	Median	Max	Avg
2015	52	0	1.23	0.43	7.58	0.32	0.13
2016	52	0	1.06	0.52	7.35	0.21	0.12
2017	**54**	**0**	**1.41**	**1.02**	**7.12**	**0.45**	**0.16**

E10

	# Micro Samples	# with Tot. Col.	Total Cl (mg/L)		pH	Turbiddity (NTU)	
			Max	Avg	Median	Max	Avg
2015	52	0	1.37	0.82	7.58	0.38	0.13
2016	52	0	1.40	0.91	7.38	0.28	0.13
2017	**54**	**0**	**1.37**	**1.08**	**7.14**	**0.44**	**0.15**

E11

	# Micro Samples	# with Tot. Col.	Total Cl (mg/L)		pH	Turbiddity (NTU)	
			Max	Avg	Median	Max	Avg
2015	52	0	1.38	0.89	7.48	0.42	0.14
2016	52	0	1.38	0.98	7.36	0.49	0.13
2017	**54**	**0**	**1.38**	**1.12**	**7.08**	**0.43**	**0.15**

E12

	# Micro Samples	# with Tot. Col.	Total Cl (mg/L)		pH	Turbiddity (NTU)	
			Max	Avg	Median	Max	Avg
2015	52	0	1.20	0.82	7.34	0.30	0.11
2016	52	0	1.29	1.03	7.48	0.27	0.13
2017	**54**	**0**	**1.41**	**1.18**	**7.12**	**0.51**	**0.17**

E13

	# Micro Samples	# with Tot. Col.	Total Cl (mg/L)		pH	Turbiddity (NTU)	
			Max	Avg	Median	Max	Avg
2015	52	0	1.56	1.04	7.39	0.24	0.12
2016	52	0	1.38	1.13	7.33	0.20	0.12
2017	**56**	**1**	**1.37**	**1.13**	**7.21**	**0.49**	**0.16**

E14

	# Micro Samples	# with Tot. Col.	Total Cl (mg/L)		pH	Turbiddity (NTU)	
			Max	Avg	Median	Max	Avg
2015	52	0	1.52	0.90	7.08	0.34	0.13
2016	52	0	1.35	0.97	7.28	0.28	0.13
2017	**54**	**0**	**1.46**	**0.97**	**6.96**	**0.54**	**0.17**

E15

	# Micro Samples	# with Tot. Col.	Total Cl (mg/L)		pH	Turbiddity (NTU)	
			Max	Avg	Median	Max	Avg
2015	52	0	1.39	0.91	7.53	0.30	0.13
2016	52	0	1.33	0.87	7.39	0.28	0.13
2017	**53**	**0**	**1.45**	**1.03**	**7.28**	**0.47**	**0.16**

APPENDIX I – QUARTERLY DISTRIBUTION SYSTEM MONITORING (TOTAL METALS)

Abbotsford (page 1 of 2)

Parameter	Units	GCDWQ	W1		W2		W3		W4		W5		W6		W7		W8		W9		W11		W13		W14		W15		W16	
			Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg
Aluminum (total)	µg/L	100	54	41	53	35	57	36	55	31	56	37	56	36	52	26	43	24	36	18	59	39	39	27	56	37	55	36	54	35
Antimony (total)	µg/L	6	ND	ND	ND	ND	ND	ND	ND	ND	0.4	0.2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Arsenic (total)	µg/L	10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Barium (total)	µg/L	1000	6.5	ND	7.2	3.6	7.0	ND	8.7	ND	6.7	ND	6.1	ND	9.7	ND	9.0	ND	12.0	6.0	6.7	ND	6.7	6.4	6.3	ND	7.1	ND	6.5	3.3
Beryllium (total)	µg/L	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bismuth (total)	µg/L	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Boron (total)	µg/L	5000	36.7	25.9	30.1	20.6	25.9	17.0	22.6	14.3	19.6	11.8	17.6	8.8	18.1	9.1	20.5	10.3	50.0	38.6	15.7	7.9	14.8	7.4	14.0	7.0	13.5	6.8	12.7	6.4
Cadmium (total)	µg/L	50	ND	ND	0.01	ND	0.02	0.01	0.02	0.02	0.02	0.01	ND	ND	0.01	ND	0.01	0.01	0.01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Calcium (total)	µg/L	-	3400	2600	2950	2275	2940	2370	13200	7450	2750	2125	2860	2230	21900	11900	14600	8700	27600	16500	3050	2425	2970	2785	2960	2330	2810	2205	2870	2285
Chromium (total)	µg/L	50	ND	ND	ND	ND	ND	ND	ND	ND	1.18	0.59	ND	ND	ND	ND	ND	ND	0.68	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cobalt (total)	µg/L	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.07	ND	ND	ND
Copper (total)	µg/L	≤1000	3.57	3.44	1.27	1.24	1.68	1.54	2.00	1.50	3.38	2.09	0.89	0.75	3.25	2.18	282	243	1.30	1.22	2.09	1.70	1.10	0.93	1.65	1.33	3.23	2.97	8.50	8.07
Hardness (as $CaCO_3$)	mg/L	-	9.8	7.6	8.8	6.9	8.7	7.0	47.2	26.2	8.3	6.4	8.7	6.7	80.3	43.0	49.5	28.9	102	59.6	9.2	7.3	9.0	8.6	9.2	7.1	8.5	6.6	8.5	6.9
Iron (total)	µg/L	≤300	10	5	10	ND	10	5	20	15	35	18	12	11	20	10	22	21	30	22	10	5	30	21	12	11	10	5	10	5
Lead (total)	µg/L	10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.26	0.13	1.32	1.21	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Lithium (total)	µg/L	-	0.14	ND	0.11	ND	0.12	0.06	0.61	0.31	ND	ND	0.12	0.06	1.02	0.51	0.71	0.42	0.63	0.42	0.13	ND	ND	ND	0.12	ND	ND	ND	ND	ND
Magnesium (total)	mg/L	-	0.325	0.258	0.350	0.270	0.337	0.269	3.46	1.83	0.343	0.267	0.382	0.291	6.20	3.21	3.18	1.76	8.00	4.46	0.37	0.296	0.384	0.377	0.433	0.322	0.358	0.274	0.332	0.271
Manganese (total)	µg/L	≤50	0.50	0.48	0.40	0.20	0.30	0.15	2.45	1.43	1.64	0.82	0.40	0.36	2.09	1.30	17.3	10.1	35.8	22.9	0.61	0.56	3.8	3.21	3.73	2.42	0.20	ND	0.50	0.40
Mercury (total)	µg/L	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.03	0.02
Molybdenum (total)	µg/L	-	0.50	0.25	0.49	0.25	0.46	0.23	0.30	0.15	0.48	0.24	0.45	0.23	0.18	ND	0.30	0.15	0.25	0.13	0.54	0.27	0.46	0.23	0.66	0.33	0.49	0.25	0.50	0.25
Nickel (total)	µg/L	-	ND	ND	0.54	0.27	ND	ND	0.54	0.27	4.98	2.49	ND	ND	1.37	0.69	0.78	0.39	0.90	0.45	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Phosphorus (total)	µg/L	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Potassium (total)	µg/L	-	110	100	110	100	90	45	620	355	90	45	110	100	1080	615	1030	625	1450	1005	120	110	150	135	140	115	100	95	100	100
Selenium (total)	µg/L	10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Silicon (total)	µg/L	-	3000	2450	3000	2450	2900	2450	7600	4750	2900	2400	2900	2400	12100	7100	7100	4650	9800	6500	3100	2550	2900	2600	3100	2450	3000	2500	2800	2350
Silver (total)	µg/L	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sodium (total)	µg/L	≤200000	1360	1030	1410	1080	1360	1090	5140	2940	1350	1020	1400	1050	8590	4715	5410	3300	8080	5070	1450	1165	1400	1325	1370	1100	1430	1065	1330	1130
Strontium (total)	µg/L	-	8.7	6.9	8.7	6.9	8.4	6.7	62.2	33.6	8.3	6.7	8.9	7.0	111	59	73.9	43.0	134	81	9.5	7.8	9	8.9	10	7.5	8.5	6.8	8.7	7.4
Sulfur (total)	µg/L	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	3400	1700	ND	ND	6500	3750	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tellurium (total)	µg/L	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Thallium (total)	µg/L	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Thorium (total)	µg/L	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tin (total)	µg/L	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Titanium (total)	µg/L	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Uranium (total)	µg/L	20	0.03	ND	0.03	ND	0.03	ND	0.03	0.030	0.03	ND	0.03	ND	0.04	0.03	0.03	0.03	0.03	0.03	0.03	ND	0.02	ND	0.03	ND	0.03	ND	0.03	0.02
Vanadium (total)	µg/L	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zinc (total)	µg/L	≤5000	ND	ND	ND	ND	ND	ND	ND	ND	5.1	ND	ND	ND	6.1	ND	13.7	10.4	4.1	ND	ND	ND	ND	ND	ND	ND	17.0	8.5	ND	ND
Zirconium (total)	µg/L	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

ND = not detectable

Abbotsford (page 2 of 2)

Parameter	Units	GCDWQ	E2		E3		E4		E5		E6		E7		E8		E9		E10		E11		E12		E13		E14		E15	
			Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg
Aluminum (total)	µg/L	100	52	32	48	32	39	26	39	25	50	33	40	25	43	28	57	37	53	345	58	38	55	36	56	37	52	31	50	33
Antimony (total)	µg/L	6	0.32	0.16	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Arsenic (total)	µg/L	10	ND	ND	ND	ND	0.70	0.62	0.80	0.66	ND	ND	0.53	0.27	0.70	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Barium (total)	µg/L	1000	7.3	ND	7.5	ND	8.6	7.3	8.3	8.2	7.5	3.8	9.2	7.6	8.2	7.6	6.9	ND	6.8	ND	6.6	ND	6.8	ND	8.7	ND	7.7	ND	6.4	ND
Beryllium (total)	µg/L	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bismuth (total)	µg/L	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Boron (total)	µg/L	5000	37.6	18.8	31.6	15.8	29.2	14.6	26.4	13.2	22.8	17.4	22	15.5	19.5	13.8	17.2	11.6	15.7	10.4	14.3	9.15	13.9	7.0	14.4	7.2	13.1	6.6	12.5	6.3
Cadmium (total)	µg/L	50	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Calcium (total)	µg/L	-	5420	3660	5310	3505	6770	5535	6470	6285	6130	3965	7420	4910	6490	5645	3420	2510	3560	2530	3400	2500	3350	2475	3400	2450	10500	6050	3210	2555
Chromium (total)	µg/L	50	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cobalt (total)	µg/L	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.14	0.07	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Copper (total)	µg/L	≤1000	2.98	2.44	4.52	3.11	2.58	1.94	2.15	1.68	3.96	2.63	3.44	3.12	3.71	2.96	2.33	2.02	2.15	1.83	2.15	1.68	4.23	2.52	2.22	1.86	1.69	1.30	1.81	1.61
Hardness (as CaCO3)	mg/L	-	17.9	11.8	17.5	11.3	21.7	17.8	21.2	20.5	20.0	12.7	24.7	16.1	21.6	18.8	10	7.4	10.3	7.5	9.9	7.31	9.8	7.3	10.2	7.4	37.2	21.0	9.4	7.4
Iron (total)	µg/L	≤300	10	5	ND	ND	10	5	20	15	10	5	20	20	13	11.5	10	5	20	10	ND	ND	ND	ND	ND	ND	10	5	10	5
Lead (total)	µg/L	10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Lithium (total)	µg/L	-	0.20	0.18	0.20	0.20	0.30	0.30	0.30	0.27	0.24	0.22	0.30	0.26	0.30	0.25	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.44	0.22	ND	ND
Magnesium (total)	mg/L	-	1.05	0.635	1.02	0.615	1.16	0.960	1.23	1.18	1.13	0.680	1.51	0.945	1.32	1.14	0.358	0.274	0.349	0.265	0.345	0.268	0.361	0.278	0.410	0.30	2.64	1.42	0.333	0.247
Manganese (total)	µg/L	≤50	8.40	6.70	21.8	13.6	10.2	7.90	8.22	7.61	7.06	5.98	9.45	9.38	13.7	11.0	0.40	0.35	0.30	0.15	0.30	ND	ND	ND	0.30	ND	0.99	0.70	0.30	0.27
Mercury (total)	µg/L	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Molybdenum (total)	µg/L	-	0.43	0.22	0.44	0.22	0.52	0.26	0.61	0.31	0.47	0.24	0.52	0.26	0.44	0.22	0.52	0.26	0.49	0.25	0.47	0.24	0.49	0.25	0.58	0.29	0.35	0.18	0.47	0.24
Nickel (total)	µg/L	-	ND	ND	0.46	0.23	ND	ND	ND	ND	0.45	0.23	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Phosphorus (total)	µg/L	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Potassium (total)	µg/L	-	220	165	240	170	320	315	440	375	280	195	390	280	350	325	140	115	150	115	150	75	140	115	180	135	490	290	110	95
Selenium (total)	µg/L	10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Silicon (total)	µg/L	-	3500	2700	3700	2750	4200	3250	4200	3300	3900	2900	4300	3150	4100	3250	3300	2550	3300	2500	3200	1600	3300	2550	3800	2800	6300	4100	3100	2450
Silver (total)	µg/L	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1800	900	ND	ND	ND	ND	ND	ND	ND	ND
Sodium (total)	µg/L	≤200000	1970	1370	1980	1350	2360	1885	2350	2080	2140	1455	2600	1780	2280	1930	1470	1080	1450	1110	1390	695	1450	1095	1660	1205	4110	2450	1370	1045
Strontium (total)	µg/L	-	20.7	13.4	20	13	24.5	19.8	23.7	21.9	21.7	13.9	27.1	17.56	24.8	20.9	8.8	6.9	8.7	6.9	770	386	8.5	6.8	9.8	7.4	45.4	25.2	9.2	7.6
Sulfur (total)	µg/L	-	ND	ND	ND	ND	1000	ND	2000	1000	ND	ND	ND	ND	1000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tellurium (total)	µg/L	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Thallium (total)	µg/L	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Thorium (total)	µg/L	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tin (total)	µg/L	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Titanium (total)	µg/L	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Uranium (total)	µg/L	20	0.03	ND	0.03	ND	0.05	0.03	0.07	0.04	0.03	ND	0.05	0.04	0.07	0.04	0.03	ND	0.03	ND	0.03	ND	0.03	ND	0.03	ND	0.03	0.03	0.03	ND
Vanadium (total)	µg/L	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zinc (total)	µg/L	≤5000	ND	ND	ND	ND	4	ND	ND	ND	10.2	5.1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	8.5	4.3	ND	ND	ND	ND	ND	ND
Zirconium (total)	µg/L	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.11	ND	ND	ND	ND	ND	ND	ND	ND	ND

ND = not detectable

Mission (page 1 of 1)

Parameter	Units	GCDWQ	M1		M2		M3		M5		M7		M8		M9		M10		Ainsworth	
			Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg
Aluminum (total)	µg/L	100	59	46	15	14	26	18	61	45	57	43	37	27	60.1	45	46	34	15	13
Antimony (total)	µg/L	6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.13	ND	ND	ND	ND	ND	ND	ND
Arsenic (total)	µg/L	10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Barium (total)	µg/L	1000	7.1	ND	7.6	7.0	6.0	ND	6.4	ND	6.9	ND	ND	ND	6.7	2.2	7.3	5.3	ND	ND
Beryllium (total)	µg/L	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bismuth (total)	µg/L	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Boron (total)	µg/L	5000	12.3	5.9	6.1	ND	9.8	4.5	12.9	6.2	16.5	7.9	5	ND	21.5	9.7	ND	ND	ND	ND
Cadmium (total)	µg/L	50	ND	ND	ND	ND	0.01	ND	ND	ND	0.02	ND	ND	ND	ND	ND	0.01	ND	ND	ND
Calcium (total)	µg/L	-	2950	2518	1670	1520	2120	1850	2960	2565	2720	2095	2290	2040	2570	1923	2350	2190	1580	1428
Chromium (total)	µg/L	50	ND	0.50	0.70	ND	0.89	ND	0.72	ND	0.57	ND	0.73	ND	0.58	ND	0.84	ND	0.89	ND
Cobalt (total)	µg/L	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Copper (total)	µg/L	≤1000	0.95	0.81	1.3	0.97	0.90	0.61	1.05	0.89	1.54	1.4	1.5	0.71	14.3	10	1.4	0.81	7.51	6.34
Hardness (as CaCO3)	mg/L	-	8.46	7.13	4.85	4.55	5.82	5.40	8.03	7.17	8.12	6.18	6.15	5.54	7.74	5.78	6.48	6.12	4.74	4.30
Iron (total)	µg/L	≤300	20	12	25	21	49	30	19	11	28	20	20	16	10	3	31	22	22	10
Lead (total)	µg/L	10	ND	ND	ND	ND	ND	ND	ND	ND	0.1	ND	ND	ND	ND	ND	ND	ND	ND	ND
Lithium (total)	µg/L	-	ND	ND	ND	ND	0.13	ND	ND	ND	ND	ND	ND	ND	0.11	ND	ND	ND	ND	ND
Magnesium (total)	mg/L	-	0.267	0.196	0.187	0.174	0.166	0.151	0.264	0.188	0.321	0.228	0.115	0.106	0.322	0.230	0.170	0.154	0.209	0.178
Manganese (total)	µg/L	≤50	0.65	0.44	3.32	2.61	2.26	1.61	0.65	0.41	0.68	0.41	1.54	1.11	0.33	0.16	2.39	1.37	3.92	2.43
Mercury (total)	µg/L	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.02	ND	0.02	ND	ND	ND
Molybdenum (total)	µg/L	-	0.45	0.19	ND	ND	ND	ND	0.45	0.20	0.45	0.20	0.12	ND	0.46	0.20	0.16	ND	0.11	ND
Nickel (total)	µg/L	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.5	ND	ND	ND
Phosphorus (total)	µg/L	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Potassium (total)	µg/L	-	90	53	70	40	60	37	90	57	90	53	70	43	80	53	80	47	60	37
Selenium (total)	µg/L	10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Silicon (total)	µg/L	-	2600	2225	1500	1400	1400	1325	2600	2225	2700	1675	1700	1475	2700	2150	1800	1600	1600	1375
Silver (total)	µg/L	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sodium (total)	µg/L	≤200000	1270	920	2900	2642.5	2930	2620	1250	920	1240	852.5	2990	2625	1250	840	2970	2202.5	3280	2695
Strontium (total)	µg/L	-	8.6	6.9	5.0	4.9	6.0	5.7	7.8	6.3	7.8	6.0	7.3	6.6	7.6	5.4	6.8	6.2	5.6	5.0
Sulfur (total)	µg/L	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tellurium (total)	µg/L	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Thallium (total)	µg/L	-	ND	ND	ND	ND	ND	ND	ND	ND	0.08	0.03	ND	ND	0.02	ND	ND	ND	ND	ND
Thorium (total)	µg/L	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tin (total)	µg/L	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Titanium (total)	µg/L	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Uranium (total)	µg/L	20	0.034	0.022	ND	ND	ND	ND	0.03	ND	0.03	ND	ND	ND	0.04	ND	0.02	ND	ND	ND
Vanadium (total)	µg/L	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zinc (total)	µg/L	≤5000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zirconium (total)	µg/L	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

ND = not detectable

APPENDIX J – QUARTERLY DISTRIBUTION SYSTEM MONITORING (DBPS)

Trihalomethanes (µg/L)

Date	Location	A Chloroform	B Bromoform	C Bromodichloro-methane	D Dibromochloro-methane	Total (A + B + C + D)
22-Mar-17	Maclure Reservoir	20	ND	ND	ND	**20**
	E4	20	ND	ND	ND	**20**
	W9	20	ND	ND	ND	**20**
	W11	21	ND	ND	ND	**21**
	M7	19	ND	ND	ND	**19**
28-Jun-17	Maclure Reservoir	22.5	ND	ND	ND	**22.5**
	E4	22	ND	ND	ND	**22.0**
	W9	ND	ND	ND	ND	**ND**
	W11	18.3	ND	ND	ND	**18.3**
	M7	24.1	ND	ND	ND	**24.1**
14-Sept-17	Maclure Reservoir	11.8	ND	ND	ND	**11.8**
	E4	11.5	ND	ND	ND	**11.5**
	W9	1.1	ND	ND	ND	**1.1**
	W11	13.2	ND	ND	ND	**13.2**
	M7	12.7	ND	ND	ND	**12.7**
13-Dec-17	Maclure Reservoir	11.9	ND	ND	ND	**11.9**
	E4	5.8	ND	ND	ND	**5.8**
	W9	ND	ND	ND	ND	**ND**
	W11	12.3	ND	ND	ND	**12.3**
	M7	7.8	ND	ND	ND	**7.8**

Haloacetic Acids (µg/L)

Date	Location	A Monobromo-acetic acid	B Dibromo-acetic acid	C Monochloro-acetic acid	D Dichloro-acetic acid	E Trichloro acetic acid	Total (A + B + C + D + E)
22-Mar-17	Cannons Pit 400	ND	ND	ND	6.0	7.1	**13.1**
	Cannons Pit 600	ND	ND	ND	6.5	9.6	**16.1**
	Shook	ND	ND	ND	9.9	8.2	**18.1**
	Maclure Reservoir	ND	ND	ND	11.5	8.8	**20.3**
28-Jun-17	Cannons Pit 400	ND	ND	ND	4.2	7.2	**11.4**
	Cannons Pit 600	ND	ND	ND	5.5	9.5	**14.7**
	Shook	ND	ND	ND	9.0	11.0	**20.0**
	Maclure Reservoir	ND	ND	ND	12.6	12.7	**25.3**
14-Sept-17	Cannons Pit 400	2.1	ND	ND	6.9	7.3	**16.3**
	Cannons Pit 600	3.5	ND	ND	8.2	9.1	**20.8**
	Shook	3.3	ND	ND	5.1	5.0	**13.4**
	Maclure Reservoir	2.1	ND	ND	5.6	5.0	**12.7**
13-Dec-17	Cannons Pit 400	ND	ND	ND	5.9	7.4	**13.3**
	Cannons Pit 600	ND	ND	ND	4.2	4.0	**8.2**
	Shook	2.0	ND	ND	4.6	4.4	**11.0**
	Maclure Reservoir	ND	ND	ND	14.4	10.7	**25.1**

ND = not detectable