Abbotsford Mission
Water & Sewer Services

ABBOTSFORD

DISTRICT OF Mission ON THE FRASER

Annual Water Quality Report

2020

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 several groundwater wells within the Abbotsford-Sumas Aquifer. 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 2020, the Norrish Creek Water Treatment Plant consistently delivered high quality water, within the limits recommended by the Guidelines for Canadian Drinking Water Quality (GCDWQ). Well water also met all health-related GCDWQ requirements.

Cannell Lake raw water quality was within the requirements. Cannell raw water was tested weekly for *E. coli. E. coli* was detected four times, but the counts were only 1 or 2 counts/100 ml, therefore the AMWSC remained in compliance with filtration exemption criteria.

The AMWSC, Abbotsford and Mission tested more than 2000 treated water samples for microbiological parameters in 2020 as shown in Appendix H. *Total Coliforms* were detected in five of the regular weekly distribution samples as listed in Table 3-3. Each site was re-sampled for several days until no detectable coliforms were found in the follow-up samples.

Total Coliforms were detected along the Cannell transmission system and five distribution sites in July and August during weekly monitoring. Corrective actions were implemented with samples taken regularly until they were non-detect and no *E.coli* were detected. Staff were in regular communication with Fraser Health and treatment systems were adjusted as required.

Table of Contents

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.

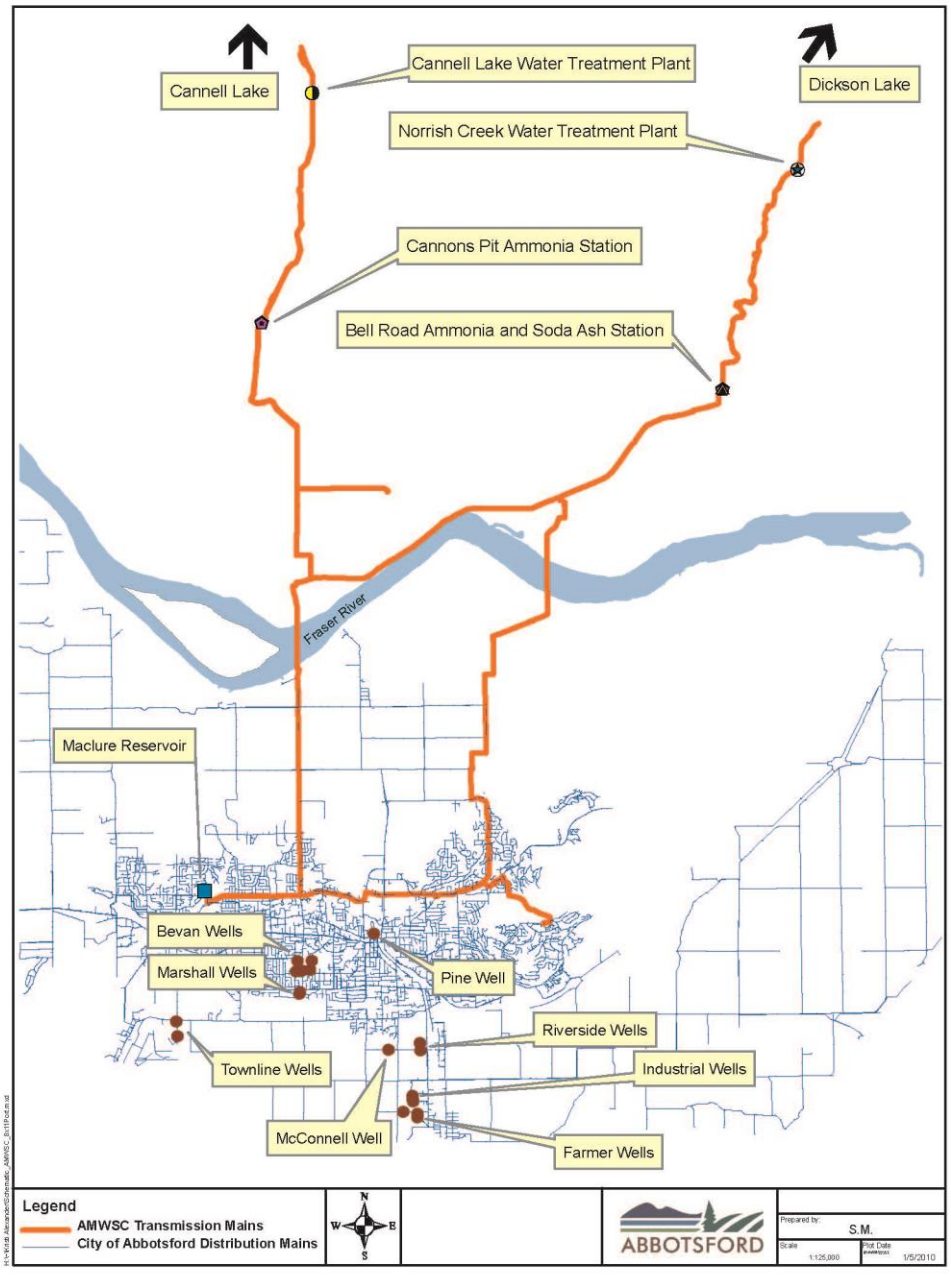

Figure 2-1: AMWSC Water Supply

2.1 Water Sources & Treatment

Norrish Creek

Norrish Creek, located northeast 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 (NCWTP). 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 2020.

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. Most well water is chloraminated prior to distribution.

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 2020 (and the two year's prior) are summarized in Table 2.1.

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

Source [1]	2018 Total	2019 Total	2020 Total
Norrish Creek	17,302	16,864	16,305
Cannell Lake	3,463	3,385	3,745
Farmer #1 Well	763	419	47
Farmer #3 Well	8	2*	0
Industrial Well "A"	0	0	121
Industrial Well "B"	46	180	140
Industrial Well "C"	335	20	494
Marshall #1 Well	264	581	350
Marshall #3 Well	0	0	223
McConnell Well	189	48	139
Pine Well	40	3	8
Riverside #1 Well	112	133	7
Townline #1 Well	473	662	478
Townline #2 Well	226	212	552
Bevan #1 Well	360	425	487
Bevan #2 Well	425	280	439
Bevan #3 Well	420	601	564
Bevan #4 Well	550	629	744
Overall Total	**24,976**	**24,444**	**24,843**
Total Surface Water	**20,765**	**20,249**	**20,050**
Total Groundwater	**4,211**	**4,195**	**4,793**

1 – The following wells have been removed from the table since they have been out of service for more than 5-years and there are no plans to put them back into production: Farmer 2, Marshall 2 & Riverside 2. If any water quality results exist for these inactive wells, such can be obtained by contacting:eng-info@abbotsford.ca

2.2 Distribution System

The Abbotsford distribution system includes 12 pump stations, 9 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.

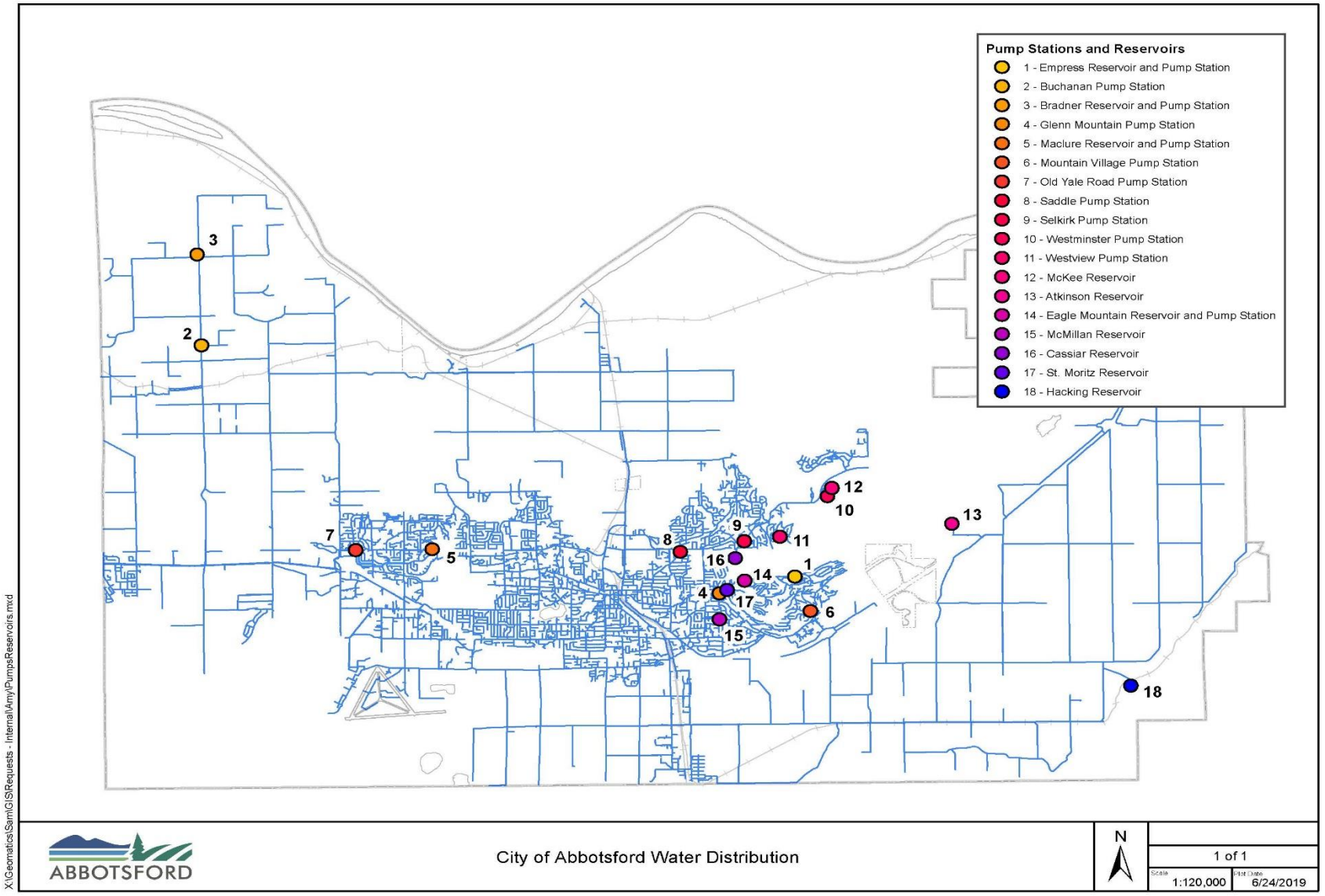

Figure 2-2: City of Abbotsford Water Distribution System

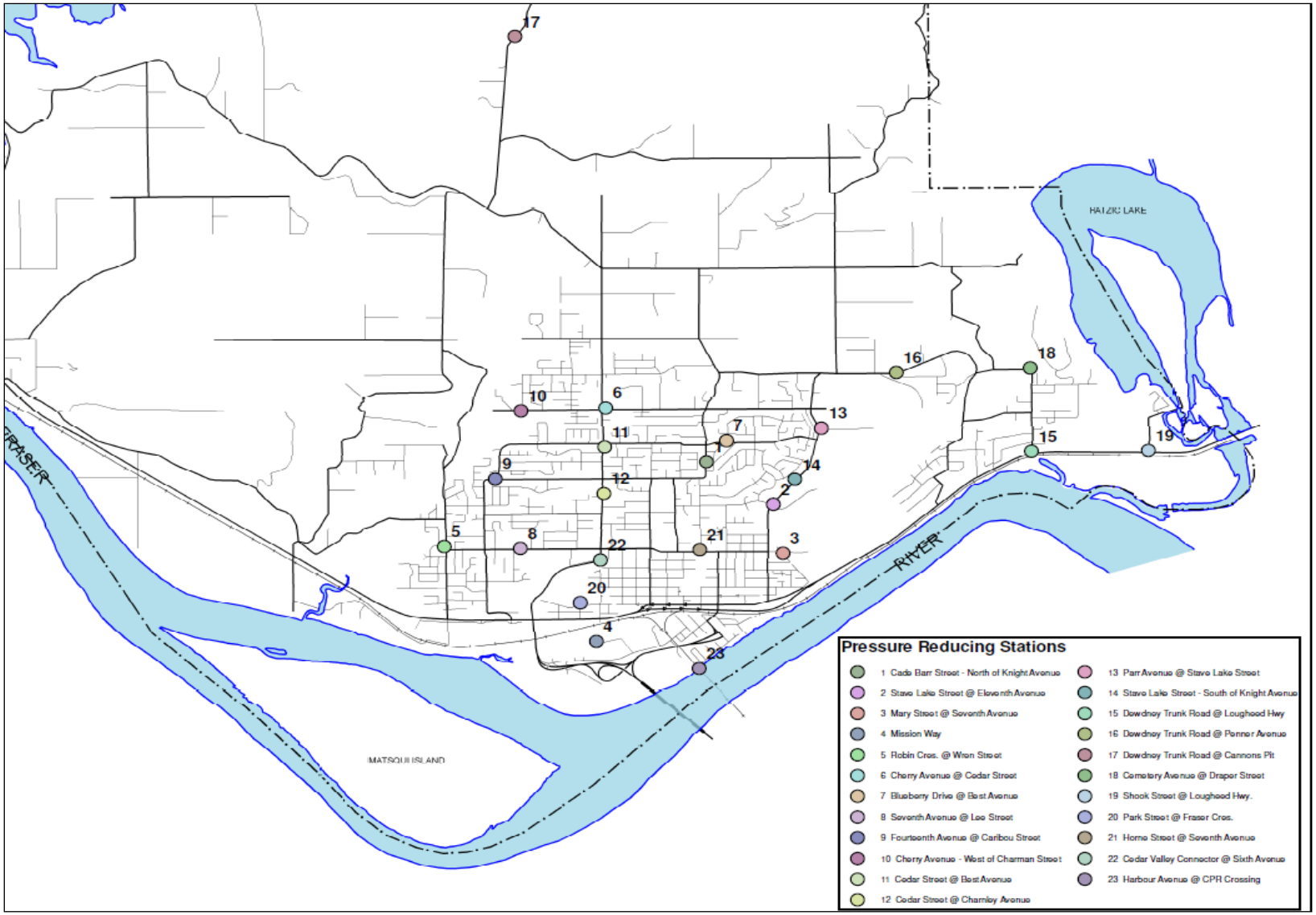

Figure 2-3: District of Mission Water Distribution System

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 to ensure water quality delivered to end users meets requirements. Table 3-1 summarizes the monitoring program and the following sections describe key water quality results from 2020 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 (3)	-	Monthly	-	To proactively screen for aquifer contamination and naturally occurring mineral trends.
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.
Limnology	Monthly (Cannell)			To provide early indication of lake water quality changes arising from disturbances in the watershed, particularly those associated with climate change.
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 totalchlorine, monochloramine, free ammonia, nitrite, pH, and temperature Conductivity is also monitored at Abbotsford locations. On a monthly basis, alkalinity is checked at all locations..

(6) In addition to weekly & quarterly treated water sampling, parameters such as benzo(a)pyrene, 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 2017 - 2020. In general, the raw source water quality has remained consistent for the past three years. Glyphosate monitoring was added to the Norrish Creek parameters in 2019 as it is an actively logged watershed and this herbicide may have been used historically. The results were non-detect.

Cannell Lake raw water is also monitored weekly and monthly for certain additional parameters, which is further discussed in Section 0.

3.1.2 Groundwater

Well water quality results from 2020 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. Industrial B and C are the only two wells that have historically contained arsenic that has been at or above the MAC. In 2020, neither well exceeded the MAC. Industrial B's average arsenic concentration was 7.15 μg/L and the maximum concentration was 9.61 μg/L. Similarly, for Industrial C, the average and maximum concentrations were 7.67 & 8.48 μg/L, respectively.

[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. The GCDWQ specifies an aesthetic objective (AO) of 300 μg/L. Some AMWSC wells periodically produce samples above this threshold for short durations if they have been idle for prolonged periods. Despite these events, there have never been any known 'red water' or iron-related customer concerns. All distribution results for iron in 2020 were well below the AO 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 20 μg/L for manganese and a health based MAC of 120 μg/L. Five AMWSC wells (Farmer 1, Industrial B, Industrial C, Pine and Townline 1) regularly produce water with manganese above the aesthetic guideline, but significantly below the MAC. The water from these wells is blended with water from other sources. All distribution results for manganese were below the health based MAC and only five sites (i.e.W8, W9, W11, W14, and W16) occasionally yielded results above the aesthetic objective, as these sample locations are often served by the some of the wells listed above.

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 nitrates and nitrites on a monthly basis in all wells. 2020 results are shown in Appendix E. No wells had nitrates in excess of the 10 mg/L MAC during 2020 and the last ten-years of data suggest a general downward trend in most wells.

[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] Health Canada, June, 2013. Guidelines for Canadian Drinking Water Quality: Guideline Technical Document – Nitrate and Nitrite Retrieved from: https://www.canada.ca/en/health-canada/services/publications/healthy-living/guidelines-canadian-drinking-water-quality-guideline-technical-document-nitrate-nitrite/page-2-guidelines-canadian-drinking-water-quality-guideline-technical-document-nitrate-nitrite.html#a2

Pesticides & Herbicides

Pesticides and herbicides are tested annually in select wells to generally monitor for aquifer contamination. In 2020, 12 wells were tested and all results were non-detect. The parameters tested are listed in Appendix G.

3.2 Cannell Filtration Exemption Monitoring

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 2020.

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 2020, 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 2020, Cannell raw water was tested weekly for *E. coli. E. coli* was detected four times (May 26, September 15, October 14, November 3), but the counts were only 1 or 2/100mL for each sample, therefore the AMWSC remained in compliance with Criterion #2.

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 0.23 NTU and the highest recorded value was 0.68 NTU in 2020.

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 2020 a few signs of hikers, dog walkers and quad tracks were noted, but no signs of contamination were observed.
   - Conducting limnology monitoring to assess if any lake water quality changes may be arising from watershed disturbances, particularly those associated with climate change
   - Maintaining watershed access gates & fences to discourage vehicular entry into the watershed. In 2020, 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 2020, the helicopter inspection occurred on July 31. No changes in the watershed area were noted.
   - 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, temperature 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 is 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 of 5,000 to 90,000, 1 sample per 1000 of population is required. For systems serving more than 90,000 consumers, 90 samples plus 1 sample for every additional 10,000 persons is required per month. For Mission, which has a serviced population of approximately 34,000, 34 samples per month are required. Monthly, 39 samples were tested,thus exceeding the requirement. Abbotsford has a serviced population of approximately 130,000, a minimum of 94 samples per month are required. In 2020, Abbotsford tested more than 120 samples per month, again exceeding the requirement.

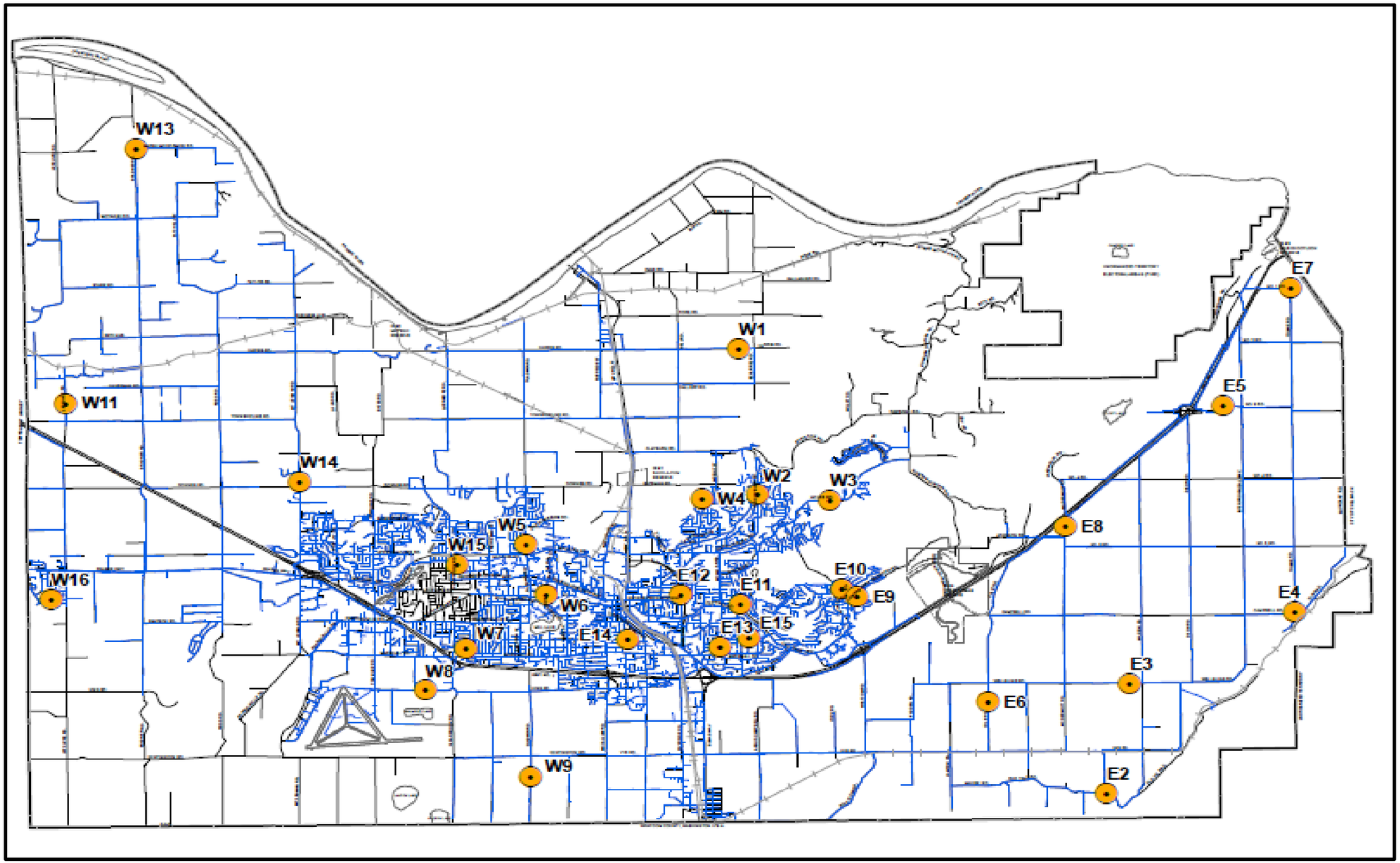

Figure 3-1: Abbotsford Water Distribution Network Sampling Locations

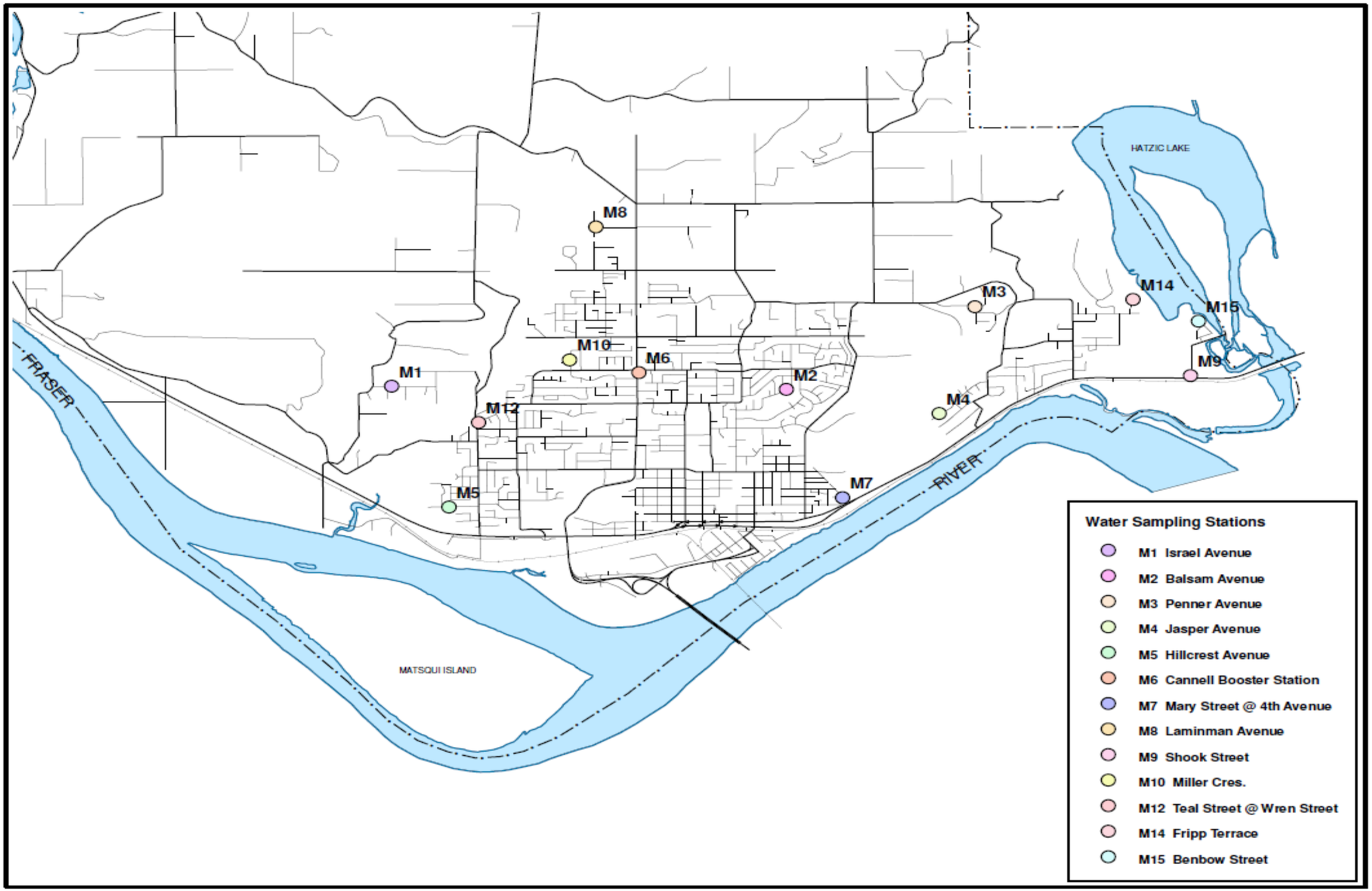

Figure 3-2: Mission Water Distribution Network Sampling Locations

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 2000 treated water samples for microbiological parameters in 2020 as shown in Appendix H.

Total Coliforms were detected in the Cannell transmission system and five of the regular weekly distribution samples as listed in Table 3-3. Each site was re-sampled upon receiving the result. Several sites (E4, W5, and M6) were resampled for several days until no detectable coliforms were found in the follow-up samples. All 2020 monthly water quality reports with detailed results can be found here: https://www.ourwatermatters.ca/sites/1/files/2021-05/2020%20Annual%20Water%20Quality%20Results.pdf

Table 3-3 – Detectable Coliform Results in Weekly Distribution Monitoring

Date	Location	Total Coliforms (ct/100 ml)
Jul 21	E8	1
Aug 11	M6	11
Aug 11	W5	74
Aug 18	W13	2
Aug 25	E4	4

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's proposed guideline states that "it is not considered necessary to establish a guideline for chloramines in drinking water based on low toxicity of monochloramine at concentrations found in drinking water, but most Canadian drinking water supplies maintain a chloramine residual below 4mg/L in the distribution system."[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 2.5 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 chlorine in 2020. The maximum total chlorine concentrations detected in the Abbotsford distribution system was 2.29mg/L with an average of 1.00 mg/L and in Mission a maximum of 2.31 mg/L and an average of 1.35 mg/L was detected. Appendix H provides 2020 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 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 turbidity consistently below 1.0 NTU. Higher values typically indicate a disturbance in the distribution system (e.g. a main break, etc).

In 2020, two Mission distribution sites had a result above 1.0 NTU and the average turbidity was 0.24 NTU. In Abbotsford, only one site had one sample that exceeded 1.0 NTU and the average turbidity was 0.14 NTU. Appendix H includes more detailed turbidity results.

[4] Health Canada, June, 2009. Guidelines for Canadian Drinking Water Quality - Chloramines. Retrieved from: https://www.canada.ca/content/dam/hc-sc/documents/programs/consultation-chloramines-drinking-water/chloramines-drinking-water-2018-eng.pdf

[5] Health Canada, June 2019. Guidelines for Canadian Drinking Water Quality Summary Table. Retrieved from: https://www.canada.ca/en/health-canada/services/environmental-workplace-health/reports-publications/water-quality/guidelines-canadian-drinking-water-quality-summary-table.html

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 2020 was 6.6 and 6.9, respectively. Additionally, field testing for pH occurs weekly at each distribution system sample location. In Abbotsford, the 2020 median pH was 6.9. In Mission, the median pH was 7.2.

3.3.5 Metals Testing

In 2020, 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 2020, all distribution sampling locations met all the GCDWQ requirements.

3.3.6 Disinfection By-Products

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[6].

The AMWSC tests quarterly for THMs and HAAs at the locations shown in Appendix J tables. All results were well below the recommended limits, with the highest results being 41 and 36 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).

In 2020, the AMWSC started testing for N-Nitrosodimethlyamine (NDMA). NDMA is considered highly likely to be carcinogenic to humans. The GCDWQ recommend limits of 40 ng/L[7]. All results were well below the recommended limits, with the highest result being 5 ng/L.

3.3.7 Pipe Deterioration Monitoring

The AMWSC tests for various indicators of pipe degradation on annual or bi-annual intervals at applicable system locations. In 2020, all benzo(a)pyrene and vinyl chloride results were non-detect. The asbestos count was zero for all sites and the concentration was non- detect.

[6] Health Canada, July 2008. Guidelines for Canadian Drinking Water. Retrieved from: https://www.canada.ca/en/health-canada/services/publications/healthy-living/guidelines-canadian-drinking-water-quality-guideline-technical-document-haloacetic-acids.html

[7] Health Canada, May 2008. Guidelines for Canadian Drinking Water. Retrieved from: https://www.canada.ca/content/dam/canada/health-canada/migration/healthy-canadians/publications/healthy-living-vie-saine/water-nitrosodimethylamine-eau/alt/water-nitrosodimethylamine-eau-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 regular flushing programs. Flushing watermains 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. Abbotsford & Mission have annual programs to replace aging pipe. 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 IV[1] 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 nine Operators. Of these, all have water treatment certificates with three Level III Operators. All nine Operators have water distribution certificates; five have level II, two have Level III and one has Level IV.

The Abbotsford Water Distribution department consists of 17 full time positions. Of the 17 Operators, there are two Level IV Water Distribution (WD) Operators, three Level III WD Operators, six Level II WD Operators, six Level I WD Operators.

The District of Mission's team includes 13 Certified Operators with water distribution certificates; seven have their Level II.

[1] The WTP classification was increased from III to IV during 2020 based on new EOCP criteria.

4.2 Water System Events of Note in 2020

Two water quality events of note occurred in 2020:

- As described in Section 3.3.1, *Total Coliforms* were detected along the Cannell transmission system and one distribution site (M6). Samples were taken regularly until they were non-detect. Staff were in regular communication with Fraser Health.
- In the summer, some areas of Mission noticed a metallic, fishy taste and odour in their water supplied from Cannell Lake. While not a health concern, a specific golden algae was more abundant in the Lake in 2020 than previous years that led to taste and odour concerns from certain areas of the system.

4.3 Operational Highlights for 2020

In 2020, the AMWSC, Abbotsford and Mission achieved the following significant projects related to water quality:

AMWSC

- Continued with investigative level studies for a future water source;
- Completed a pH Control Study as first step towards possible future system treatment upgrades; and
- Completed infrastructure renewal at Farmer & Marshall pumps stations.

Abbotsford

- Reservoir cleaning (Cassiar, Bradner and Empress);
- Planned update of water quality sampling network;
- Purchased additional water quality analyzer unit to support monitoring for the broader flushing program;
- Developed a program to capture data directly from handheld water quality analyzer devices; and
- Continued annual dead-end water main flushing.

Mission

- Continued annual dead-end water main flushing;
- Continued annual backflow testing on all municipal owned backflow preventers;
- Continued annual UDF program to maintain water quality throughout the distribution system;
- Performed preventative system maintenance including: PRV maintenance, air valve maintenance, leak detection, etc; and
- The District replaced 1200 meters of old AC water main.

4.4 Works Planned for 2021

Key water system projects and programs related to water quality scheduled for 2021 include the following:

AMWSC

- Continue new source investigative studies;
- Complete some follow up studies as next step in pH Control planning process;
- Begin a Norrish Creek WTP design review for future facility capital improvements; and
- Drill a replacement Townline 1 Well and begin design for Townline Wells' pump station renewal.

Abbotsford

- Continue with the UDF program;
- Upgrade Saddle Booster/PRV;
- Replace Bradner Booster Station; and
- Reservoir cleaning (St. Moritz, McMillan, and McKee)

Mission

- Continue with the UDF program, completing 20% of the system annually; and
- Replace 1000 meters of old AC water main.

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 Emergency 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 2020 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.

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

#207 - 2776 Bourquin Crescent West
Abbotsford BC
V2S 6A4 Canada

Tel (604) 870-7900
Fax (604) 870-7901
www.fraserhealth.ca

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
#207 - 2779 Bourquin Crescent West
Abbotsford, BC
V2S 5A4 Canada
Tel (604) 870-7500
Fax (604) 870-7901
www.fraserhealth.ca

APPENDIX C – ANNUAL RAW WATER SCAN (SURFACE WATER)

Parameter *	Units	GCDWQ[1]	Norrish Creek			Cannell Lake		
			2018 26-Sep	2019 17-Oct	2020 14-Sep	2018 26-Sep	2019 17-Oct	2020 14-Sep
Alkalinity (as $CaCO_3$)	mg/L	-	6.5	6.0	8.4	5.3	4.2	4.0
Aluminum (total)	µg/L	200	280	112	20	11	7	16
Antimony (total)	µg/L	6	ND	ND	ND	ND	ND	0.1
Arsenic (total)	µg/L	10	0.38	0.21	0.41	0.13	0.14	0.17
Barium (total)	µg/L	1000	7.5	6.0	6.6	2.6	2.8	2.8
Bicarbonate (as HCO_3)	mg/L	-	6.5	-	-	5.3	-	-
Boron (total)	µg/L	5000	ND	ND	ND	ND	ND	ND
Cadmium (total)	µg/L	5	0.01	ND	ND	ND	ND	ND
Calcium (total)	mg/L	-	2.3	2.2	2.6	1.4	1.4	1.3
Carbonate (as CO_3)	mg/L	-	ND	-	-	ND	-	-
Chloride	mg/L	≤ 250	ND	0.8	0.5	4.0	0.6	0.6
Chromium (total)	µg/L	50	0.69	ND	ND	ND	ND	ND
Colour (total)	TCU	≤ 15	8.0	20	ND	ND	ND	ND
Conductivity	microS/cm	-	18	17	21	26	12	11
Copper (total)	µg/L	2000	16	ND	ND	4	4	1
Fluoride	mg/L	1.5	ND	ND	0.03	ND	ND	ND
Glyphosate	µg/L	-	-	ND**	ND**	-	-	-
Hardness (as $CaCO_3$)	mg/L	-	6.9	7.1	7.9	4.2	4.5	4.0
Iron (total)	µg/L	≤ 300	215	28	ND	21	26	27
Lead (total)	µg/L	5	2.2	ND	ND	ND	0.1	ND
Magnesium (total)	mg/L	-	0.3	0.3	0.3	0.2	0.2	0.2
Manganese (total)	µg/L	120	9.3	0.7	2.0	6.0	7.6	5.0
Mercury (total)	µg/L	1	ND	ND	ND	ND	ND	ND
Nitrate (as N)	mg/L	10	0.16	0.11	0.10	0.010	ND	ND
Nitrite (as N)	mg/L	-	ND	ND	ND	ND	ND	ND
pH	-	7 – 10.5	6.99	6.98	7.12	6.93	6.87	6.8
Potassium (total)	µg/L	-	97	90	91	50	ND	51
Selenium (total)	µg/L	50	ND	ND	ND	ND	0.05	0.06
Sodium (total)	mg/L	≤ 200	0.93	0.87	1.09	3.42	0.73	0.68
Sulphate	mg/L	≤ 500	0.70	0.80	1.25	0.80	1.3	0.90
Total Dissolved Solids	mg/L	≤ 500	26	20	21	30	14	15
Uranium (total)	µg/L	20	0.05	0.04	0.02	ND	ND	ND
Zinc (total)	µg/L	≤ 5000	19	ND	ND	ND	8.1	ND

ND = not detectable

- = Not Tested

* Parameters tested may vary slightly from year to year; this table provides results for those with GCDWQ specified limits and those that are more often of interest to certain customers (e.g. industries with processes sensitive to metal concentrations). Contact eng-info@abbotsford.ca to inquire about other results.

** Glyphosate tested only at Norrish because it is an actively logged watershed. Results are non-detect.

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		
			2018 26-Sep	2019 17-Oct	**2020 17-Sep**	2018 26-Sep	2019 17-Oct	**2020 17-Sep**	2018 26-Sep	2019 17-Oct	**2020 17-Sep**	2018 26-Sep	2019 17-Oct	**2020 17-Sep**	2018 26-Sep	2019 17-Oct	**2020 17-Sep**	2018 26-Sep	2019 17-Oct	**2020 17-Sep**
Alkalinity (as $CaCO_3$)	mg/L	-	62.4	67.1	60.2	Not Tested	Tested, but results not representative.[2]	Not Tested	Not Tested	Not Tested	169	87.5	98.6	83.3	92.6	Not Tested	80.6	74.5	78.6	76.2
Aluminum (total)	µg/L	200	ND	ND	ND						ND	ND	ND	ND	ND		ND	ND	ND	ND
Antimony (total)	µg/L	6	ND	ND	ND						0.31	0.11	0.31	0.12	0.21		0.34	0.19	0.28	0.22
Arsenic (total)	µg/L	10	0.16	0.14	0.17						1.6	8.9	6.1	8.0	6.9		7.3	4.0	5.5	4.6
Barium (total)	µg/L	1000	12	11	12						38	28	24	24	33		33	27	26	28
Bicarbonate (as HCO_3)	mg/L	-	62.4	-	-						-	87.5	-	-	92.6		-	74.5	-	-
Boron (total)	µg/L	5000	24	22	24						22	24	17	20	ND		10	23	24	23
Cadmium (total)	µg/L	5	0.01	0.02	0.01						0.02	ND	ND	0.01	ND		ND	0.01	0.01	0.01
Calcium (total)	mg/L	-	31.6	31.8	32.4						57.1	30.0	34.1	27.4	40.4		36.3	34.2	33.0	35.9
Carbonate (as $CaCO_3$)	mg/L	-	ND	-	-						-	ND	-	-	ND		-	ND	-	-
Chloride	mg/L	≤ 250	9.84	9.85	11.5						8.72	11.2	13.5	12.9	13.7		12.1	11.6	12.6	12.3
Chromium (total)	µg/L	50	0.37	0.27	0.18						0.76	ND	ND	ND	ND		ND	ND	ND	ND
Colour (Total)	TCU	≤ 15	ND	ND	ND						ND	ND	ND	ND	ND		ND	ND	ND	ND
Conductivity	microS/cm	-	280	270	303						456	258	282	264	310		306	322	305	339
Copper (total)	µg/L	≤ 2000	6.77	6.31	0.780						1.54	0.570	ND	0.570	0.550		0.550	4.10	2.94	2.43
Fluoride	mg/L	1.5	0.03	0.05	0.05						ND	0.05	0.05	0.05	0.03		0.04	0.04	0.06	0.04
Hardness (as $CaCO_3$)	mg/L	-	113	123	121						208	95	132	98	133		125	117	119	124
Iron (total)	µg/L	≤ 300	ND	ND	ND						ND	19	10	18	17		ND	12	29	ND
Lead (total)	µg/L	5	0.55	0.54	ND						ND	ND	ND	ND	ND		ND	0.17	0.25	0.12
Magnesium (total)	mg/L	-	9.10	9.19	9.65						15.8	6.53	8.30	7.25	8.52		8.36	7.95	7.57	8.46
Manganese (total)	µg/L	≤ 120	59.5	61.1	62.7						16.9	43.6	51.0	43.2	57.3		52.2	15.9	20.6	16.1
Mercury (total)	µg/L	1	ND	ND	ND						ND	ND	ND	ND	ND		ND	ND	ND	ND
pH	-	7 – 10.5	7.5	7.7	7.1						8.1	8.2	8.3	8.2	8.2		8.2	8.0	8.1	7.9
Potassium (total)	mg/L	-	1.5	1.6	1.6						2.4	3.2	3.3	3.0	2.6		2.8	2.7	3.0	3.0
Selenium (total)	µg/L	10	0.51	0.62	0.71						0.52	ND	ND	ND	ND		ND	0.48	0.25	0.50
Silicon (total)	µg/L	-	7860	8070	7720						9660	6750	6570	6680	7360		6510	7870	8030	7820
Sodium (total)	mg/L	≤ 200	6.56	6.13	6.05						6.46	12.7	8.89	10.4	6.92		6.39	16.3	16.2	14.6
Sulphate	mg/L	≤ 500	34.6	40.4	35.7						39.6	28.5	38.0	27.4	46.4		50.2	65.9	67.2	64.1
Total Dissolved Solids	mg/L	≤ 500	191	199	273						358	158	184	189	207		222	206	197	250
Turbidity	NTU	-	0.11	ND	ND						ND	0.10	ND	ND	0.11		ND	ND	0.14	0.14
Uranium (total)	µg/L	20	0.030	0.040	0.038						0.66	0.41	0.63	0.31	0.27		0.39	0.21	0.31	0.29
Zinc (Total)	µg/L	≤ 5000	17	35	5.1						ND	3.4	ND	3.4	ND		ND	7.1	4.5	3.8

ND = not detectable
Not Tested = well pumps were out-of-service, thus sampling could not be completed. Farmer 2, Riverside 2 and Marshall 2 results are not shown since the well has been out-of-service since 2010.
- = Not Tested
* Parameters tested may vary slightly from year to year; this table provides results for those with GCDWQ specified limits and those that are more often of interest to certain customers (e.g. industries with processes sensitive to metal concentrations). Contact eng-info@abbotsford.ca to inquire about other results.
1 -These are treated water criteria and only shown for comparison to raw water results. (i.e. Water treatment may 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 - Farmer 3 has been out of service since Jul 2017. It is a well that requires extensive flushing after prolonged outages before water quality normalizes and water is sent to distribution. Its 2019 sampling occurred before quality had normalized.

(Page 2 of 3)

Parameter	Units	GCDWQ	Marshall 1			Marshall 3			Riverside 1			Townline 1			Townline 2		
			2018 26-Sep	2019 17-Oct	**2020 17-Sep**	2018 26-Sep	2019 17-Oct	**2020 17-Sep**	2018 26-Sep	2019 17-Oct	**2020 17-Sep**	2018 26-Sep	2019 17-Oct	**2020 17-Sep**	2018 26-Sep	2019 17-Oct	**2020 17-Sep**
Alkalinity (as $CaCO_3$)	mg/L	-	108	113	105	Not Tested	Not Tested	105	77.3	Not Tested	69.5	42.0	46.8		47.1	38.4	44.1
Aluminum (total)	µg/L	200	3.1	ND	ND			ND	ND		ND	ND	ND		ND	ND	ND
Antimony (total)	µg/L	6	0.13	0.18	ND			ND	ND		ND	ND	ND		ND	ND	ND
Arsenic (total)	µg/L	10	1.8	2.0	1.0			1.1	0.55		0.59	0.53	0.51		0.41	0.28	0.62
Barium (total)	µg/L	1000	15	13	11			11	13		15	19	20		6.0	6.2	4.9
Bicarbonate (as HCO_3)	mg/L	-	108	-	-			-	79.0		-	42.0	-		47.1	-	-
Boron (total)	µg/L	5000	19	18	16			17	17		15	18	18		29	26	21
Cadmium (total)	µg/L	5	0.02	0.03	0.02			0.03	0.01		0.05	0.03	0.03		0.02	0.03	0.03
Calcium (total)	mg/L	-	39.1	39.3	32.9			37.3	30.8		33.2	20.3	21.1		21.6	20.1	18.3
Carbonate (as CO_3)	mg/L	-	ND	-	-			-	ND		-	ND	-		ND	-	-
Chloride	mg/L	≤ 250	29.5	28.7	27.3			29.6	21.3		26.3	9.84	13.5		6.03	7.23	10.2
Chromium (total)	µg/L	50	ND	ND	ND			ND	0.52		0.45	0.18	0.18		0.22	0.24	0.18
Colour (total)	TCU	≤ 15	ND	ND	ND			ND	ND		ND	ND	ND		ND	ND	ND
Conductivity	microS/cm	-	350	326	349			357	294		317	185	194		178	165	182
Copper (total)	µg/L	≤ 2000	1.28	7.37	7.65			0.89	5.47		9.84	10.6	10.9		11.0	24.8	3.85
Fluoride	mg/L	1.5	0.03	0.03	0.04			0.05	ND		0.02	ND	0.02		ND	ND	0.02
Hardness (as $CaCO_3$)	mg/L	-	135	147	117			132	116		124	68.3	78.3		70.1	71.8	63.2
Iron (total)	µg/L	≤ 300	42.0	170	27.0			ND	0.01		ND	17	14		145	1630[3]	ND
Lead (total)	µg/L	5	0.14	0.30	0.22			ND	ND		0.29	0.47	0.34		0.40	0.69	0.08
Magnesium (total)	mg/L	-	8.59	8.82	8.40			9.50	9.50		9.99	4.52	4.59		4.45	4.24	4.22
Manganese (total)	µg/L	≤ 120	7.02	6.53	9.71			8.61	ND		1.46	77.4	85.2		2.06	11.2	4.74
Mercury (total)	µg/L	1	ND	ND	ND			ND	ND		ND	ND	ND		ND	ND	ND
pH	-	7 – 10.5	8.13	8.12	8.14			7.68	7.19		7.39	7.30	7.45		7.32	7.31	6.98
Potassium (total)	mg/L	-	2.5	2.7	1.8			2.1	1.5		1.7	2.9	2.8		1.0	0.95	1.1
Selenium (total)	µg/L	10	ND	ND	0.10			ND	ND		0.28	0.15	0.13		0.14	0.16	0.23
Silicon (total)	µg/L	-	6970	8010	7680			7360	-		10300	9400	9550		10100	10600	8690
Sodium (total)	mg/L	≤ 200	14.9	14.1	1.8			14.2	7.50		7.62	5.97	6.89		5.74	5.36	7.26
Sulphate	mg/L	≤ 500	28.6	30.4	26.2			29.7	28.3		28.9	13.7	16.5		13.4	13.8	14.6
Total Dissolved Solids	mg/L	≤ 500	218	216	230			243	176		269	136	145		124	130	154
Turbidity	NTU	20	0.23	0.12	0.20			ND	ND		ND	0.13	ND		0.93	1.69	ND
Uranium (total)	µg/L	20	0.60	0.60	0.50			0.80	0.07		0.06	0.02	0.02		0.03	0.02	0.08
Zinc (total)	µg/L	≤ 5000	5.7	18	4.8			ND	7.7		11	14	18		8.8	10	ND

ND = not detectable
- = Not Tested
Not Tested = well pumps were out-of-service, thus sampling could not be completed.
3 – In 2019, this water was blended with other sources. All distribution samples were below the AO.

(Page 3 of 3)

Parameter	Units	GCDWQ	Bevan 1			Bevan 2			Bevan 3			Bevan 4			Pine		
			2018 26-Sep	2019 17-Oct	**2020 17-Sep**	2018 26-Sep	2019 17-Oct	**2020 17-Sep**	2018 26-Sep	2019 17-Oct	**2020 17-Sep**	2018 26-Sep	2019 17-Oct	**2020 17-Sep**	2018 Sept 26	2019 17-Oct	**2020 17-Sep**
Alkalinity (as $CaCO_3$)	mg/L	-	46.3	43.6	52.4	47.8	49.8	54.6	45.6	43.1	Not Tested	42.2	39.3	38.4	72.1	Not Tested	47.5
Aluminum (total)	µg/L	200	7.3	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
Arsenic (total)	µg/L	10	0.27	0.23	0.26	0.33	0.23	0.25	0.27	0.32		0.24	0.22	0.21	ND		0.15
Barium (total)	µg/L	1000	5.5	5.8	6.1	5.9	5.8	6.5	5.4	5.9		5.1	5.1	6.0	13		16
Bicarbonate (as HCO_3)	mg/L	-	46.3	-	-	47.8	-	-	45.6	-		42.2	-	-	73.4		-
Boron (total)	µg/L	5000	13	17	13	11	13	14	11	13		11	12	12	37		32
Cadmium (total)	µg/L	5	0.02	ND	0.03	0.02	0.03	0.03	0.02	0.02		0.02	0.02	0.03	0.07		0.08
Calcium (total)	mg/L	-	21.1	34.1	25.7	19.5	21.0	29.1	21.2	20.5		20.9	20.2	25.4	29.7		33.6
Carbonate (as CO_3)	mg/L	-	ND	-	-	ND	-	-	ND	-		ND	-	-	ND		-
Chloride	mg/L	≤ 250	20.6	24.5	21.9	16.4	20.2	22.8	19.6	23.5		18.9	24.4	26.6	49.7		75.6
Chromium (total)	µg/L	50	0.21	ND	0.16	0.26	0.20	0.17	0.26	0.33		0.24	0.20	0.24	ND		0.11
Colour (total)	TCU	≤ 15	ND	ND	ND	ND	ND	ND	ND	ND		ND	ND	ND	ND		ND
Conductivity	microS/cm	-	209	202	228	190	194	248	200	197		195	194	217	338		417
Copper (total)	µg/L	≤ 2000	4.97	ND	4.27	6.69	8.15	4.90	5.25	13.1		7.74	6.47	12.4	40.1		32.1
Fluoride	mg/L	1.5	0.02	0.02	0.02	0.03	0.03	0.02	0.02	0.02		0.02	0.02	ND	ND		0.03
Hardness (as $CaCO_3$)	mg/L	-	74.5	80.3	92.9	71.7	81.3	105	72.9	79.5		70.8	78.7	90	119		126
Iron (total)	µg/L	≤ 300	31	10	ND	ND	52	ND	493[4]	49		13	32	ND	65		237
Lead (total)	µg/L	5	0.18	ND	0.07	ND	0.12	0.06	0.25	0.13		0.05	0.06	0.06	0.61		0.73
Magnesium (total)	mg/L	-	6.03	8.30	6.98	5.59	6.03	7.88	5.45	5.91		5.20	5.45	6.46	10.8		10.2
Manganese (total)	µg/L	≤ 120	0.78	7.6	1.7	0.53	2.4	1.0	1.2	1.2		1.4	1.0	0.15	69		112
Mercury (total)	µg/L	1	ND	ND	ND	ND	ND	ND	ND	ND		ND	ND	ND	ND		ND
pH	-	7 – 10.5	7.66	7.56	7.31	7.70	7.66	7.18	7.62	7.57		7.5	7.47	7.02	6.83		6.78
Potassium (total)	mg/L	-	1.1	1.1	1.2	1.0	1.1	1.2	1.0	1.1		1	1.1	1.1	1.7		1.9
Selenium (total)	µg/L	10	0.14	0.14	0.19	0.19	0.15	0.21	0.14	0.14		0.13	0.17	0.18	ND		0.10
Silicon (total)	µg/L	-	11700	12700	10700	11800	12400	11500	11200	11600		11100	12100	11300	-		9810
Sodium (total)	mg/L	≤ 200	8.16	7.98	7.1	6.79	6.49	8.38	7.59	6.85		7.55	7.23	8.36	20.2		21.1
Sulphate	mg/L	≤ 500	11	11	13	9.4	10	23	10	10		11	11	12	18		25
Total Dissolved Solids	mg/L	≤ 500	148	159	202	136	148	193	142	151		139	153	205	214		367
Turbidity	NTU	20	0.45	0.62	0.10	ND	0.71	ND	3.8	0.45		0.17	0.45	ND	0.39		2.8
Uranium (total)	µg/L	20	0.01	0.03	0.02	0.02	0.01	0.02	0.01	0.03		0.01	0.01	0.01	0.03		0.01
Zinc (total)	µg/L	≤ 5000	9.3	18	8.0	ND	18	6.8	17	5.1		7.8	6.0	8.8	9.6		7.4

ND = not detectable
- = Not Tested
4 – In 2018, this water was blended with other sources. All distribution samples were below the AO.

APPENDIX E – MONTHLY WELL MONITORING (NITRATES)

(All results expressed in mg/L as Nitrogen)

Date **	Farmer 1	Farmer 3	Industrial A	Industrial B	Industrial C
9-Jan	-	-	6.72	ND	ND
13-Feb	-	-	6.67	0.44	0.03
12-Mar	-	-	6.84	1.11	0.28
9-Apr	-	-	7.79	1.82	0.51
14-May	-	-	8.48	1.84	0.57
11-Jun	-	-	8.11	0.06	1.21
9-Jul	-	-	7.83	ND	1.82
Aug	-	-	-	-	-
17-Sep	7.53	-	7.39	ND	0.010
8-Oct	ND	-	7.25	-	ND
12-Nov	ND	-	6.50	ND	ND
10-Dec	ND	-	5.69	ND	ND

Date	McConnell	Riverside 1	Marshall 1	Townline 1	Townline 2
9-Jan	1.31	-	0.130	3.87	4.18
13-Feb	3.47	-	0.140	4.13	3.29
12-Mar	2.16	-	0.120	4.15	3.06
09-Apr	4.3	-	0.170	4.69	3.09
14-May	2.43	-	0.210	4.9	3.04
11-Jun	1.76	-	0.160	5.09	2.92
9-Jul	1.79	-	0.250	5.02	2.83
6-Aug	4.9	-	0.310	-	2.94
17-Sep	0.92	3.63	0.620	-	2.92
08-Oct	1.06	2.38	0.020	-	2.90
12-Nov	0.97	3.48	0.520	-	3.24
10-Dec	0.19	3.43	0.020	-	2.96

Date	Bevan 1	Bevan 2	Bevan 3	Bevan 4	Pine
10-Jan	3.02	3.32	3.03	3.06	1.33
7-Feb	2.42	2.74	2.77	3.02	1.22
7-Mar	2.49	2.59	2.75	2.98	1.43
11-Apr	3.17	3.09	2.75	3.10	1.66
9-May	2.54	2.81	3.06	2.89	1.48
6-Jun	2.29	2.57	2.68	2.93	1.52
11-Jul	2.15	2.70	2.70	2.90	1.55
8-Aug	2.07	2.52	2.59	2.84	-
12-Sep	1.58	2.51	2.05	2.81	1.6
24-Oct	3.58	2.99	-	2.91	1.51
7-Nov	3.79	3.02	-	3.03	1.62
12-Dec	3.15	2.98	-	3.03	-

ND = not detectable
- = not tested

APPENDIX F – MONTHLY WELL MONITORING (TOTAL METALS)

Parameter	Units	GCDWQ [1]	Farmer 1		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
Aluminum (total)	µg/L	200	ND	ND	5.30	4.60	4.20	4.20	3.60	3.60	4.20	3.58	3.10	3.10	4.00	4.00	5.40	5.40
Antimony (total)	µg/L	6	ND	ND	0.44	0.30	0.67	0.37	0.34	0.24	0.20	0.15	ND	ND	1.0	1.0	ND	ND
Arsenic (total)	µg/L	10	0.16	0.15	9.6	7.2	8.5	7.7	5.3	4.3	3.5	2.2	0.60	0.55	1.7	0.72	0.23	0.17
Barium (total)	µg/L	1000	12.1	11.9	40.8	30.7	43.8	35.3	29.2	27.4	18.2	13.4	22.4	20.5	7.1	5.7	16.4	15.3
Boron (total)	µg/L	5000	25	24	25	20	15	13	26	23	20	18	26	22	25	22	36	32
Cadmium (total)	µg/L	5	0.01	0.01	ND	ND	0.03	0.02	0.02	0.01	0.03	0.03	0.04	0.03	0.09	0.03	0.10	0.09
Chromium	µg/L	50	0.36	0.26	ND	ND	0.31	0.31	0.22	0.16	ND	ND	0.16	0.15	0.45	0.21	0.22	0.14
Copper (total)	µg/L	≤2000	0.99	0.84	1.2	0.76	6.5	1.6	8.7	5.5	32.6	4.7	18	12.6	29.2	10.2	65.6	44.6
Fluoride	mg/L	1.5	0.05	0.05	0.06	0.04	0.04	0.04	0.05	0.04	0.05	0.04	0.02	0.02	0.02	0.02	0.03	0.03
Hardness (as $CaCO_3$)	mg/L	-	134	126	155	124	145	133	146	130	159	141	80.4	74.8	89	71.4	138	125
Iron (total)	µg/L	≤300	49	27	50	19	118	40	96	28	456[2]	83	50	22	222	116	862[2]	322[2]
Lead (total)	µg/L	5	0.09	0.09	ND	ND	0.10	0.10	0.41	0.24	0.48	0.25	0.56	0.40	1.7	0.41	2.1	1.01
Magnesium (total)	mg/L	-	10.2	9.59	10.8	8.86	10.4	9.01	9.70	8.70	10.2	9.13	5.08	4.71	5.08	4.57	10.9	10.0
Manganese (total)	µg/L	≤120	62	56	67	52	63	55	19	16	41	10	95	87	12	4.0	133[3]	105
Mercury (total)	µg/L	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.03	0.03	ND	ND
Selenium (total)	µg/L	10	1.0	0.83	0.11	0.09	0.13	0.09	1.2	0.62	0.06	0.05	0.15	0.13	1.4	0.31	0.09	0.07
Uranium (total)	µg/L	20	0.04	0.03	0.91	0.55	1.1	0.54	0.53	0.32	0.87	0.69	0.03	0.02	1.8	0.22	0.03	0.02
Zinc (total)	µg/L	≤ 5000	6.0	5.1	5.3	4.6	49	12	28	14	20	9.2	33	16	59	17	56	21

Parameter	Units	GCDWQ [1]	Bevan 1		Bevan 2		Bevan 3		Bevan 4		Riverside 1	
			Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg
Aluminum (total)	µg/L	200	ND	ND	3.60	3.60	ND	ND	4.20	4.20	ND	ND
Antimony (total)	µg/L	6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Arsenic (total)	µg/L	10	0.34	0.26	0.36	0.30	0.30	0.25	0.23	0.20	0.59	0.58
Barium (total)	µg/L	1000	6.89	5.88	6.88	6.21	6.26	5.77	5.92	5.38	14.9	14.6
Boron (total)	µg/L	5000	14	13	14	12	13	12	12	11	16	15
Cadmium (total)	µg/L	5	0.03	0.02	0.03	0.02	0.03	0.02	0.03	0.02	0.04	0.02
Chromium	µg/L	50	0.25	0.18	0.27	0.23	0.29	0.23	0.24	0.20	0.49	0.45
Copper (total)	µg/L	≤2000	134	18.9	54.9	12.0	12.1	7.04	102	18.8	10.3	7.39
Fluoride	mg/L	1.5	0.03	0.02	0.03	0.02	0.03	0.02	0.02	0.02	0.02	0.02
Hardness (as $CaCO_3$)	mg/L	-	103	87.9	97.3	84.9	89.5	83.5	82.3	77.4	132	128
Iron (total)	µg/L	≤300	528[2]	121	142	58	34	22	34	17	16	14
Lead (total)	µg/L	5	0.37	0.14	0.96	0.25	0.13	0.09	0.64	0.15	0.31	0.27
Magnesium (total)	mg/L	-	7.61	6.70	7.26	6.51	6.83	6.31	5.85	5.44	10.6	10.0
Manganese (total)	µg/L	≤120	13	1.9	4.6	1.1	1.8	0.92	1.7	0.91	1.8	1.6
Mercury (total)	µg/L	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Selenium (total)	µg/L	10	0.26	0.19	0.26	0.19	0.36	0.20	0.21	0.16	0.27	0.26
Uranium (total)	µg/L	20	0.05	0.02	0.06	0.03	0.03	0.02	0.01	0.01	0.07	0.06
Zinc (total)	µg/L	≤ 5000	28	14	15	9.2	13	8.2	26	13	17	12

ND = not detectable
1 - These are treated water criteria and only shown for comparison to raw water results. (i.e. Water treatment may 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 - Discussed in Section 3.1.2

APPENDIX G – WELL PESTICIDES & HERBICIDES SCAN

Parameters Tested (all results non-detect)		
1,2,3-Trichlorobenzene	Benzo(ghi)perylene	Malathion
1,2,4-Trichlorobenzene	Benzo(k)fluoranthene	Mecoprop
1,2-Dichlorobenzene	Benzoic acid	Metalaxyl
1,2-Methylnaphthalene	beta-BHC	Methoxychlor
1,3-Dichlorobenzene	Biphenyl	Methyl Parathion
1,4-Dichlorobenzene	Bis(2-chloroethoxy)methane	Metolachlor
1-Chloronapththalene	Bis(2-chloroethyl) ether	Metribuzin
1-Methylnaphthalene	Bis(2-chloroisopropyl) ether	Metsulfuron-methyl
2,3,4,5-Tetrachlorophenol	Bis(2-ethylhexyl)phthalate	Mirex
2,3,4,6-Tetrachlorophenol	Boscalid	Myclobutanil
2,3,4-Trichlorophenol	Bromacil	Naphthalene
2,3,5,6-Tetrachlorophenol	Bromoxynil	Nitrobenzene
2,3,5-Trichlorophenol	Butyl benzyl phthalate	N-Nitrosodi-n-propylamine
2,4,5-TP	Camphene	o,p-DDD
2,4,5-Trichlorophenol	Captan	o,p-DDE
2,4,5-Trichlorophenoxyacetic acid	Carbaryl	Oxychlordane
2,4,6-Trichlorophenol	Carbofuran	Parathion
2,4'-DDT	Carboxin	Pentachloronitrobenzene
2,4-Dichlorophenol	Chlorantraniliprole	Pentachlorophenol
2,4 Dichlorophenoxyacetic acid	Chlorpyrifos	Perylene
2,4-Dimethylphenol	Chrysene	Phenanthrene
2,4-Dinitrophenol	Clothianidin	Phenol
2,4-Dinitrotoluene	Cresol (total)	Phorate
2,6-Dichlorophenol	Cyanazine	Picloram
2,6-Dinitrotoluene	DCPMU	Prometon
2-Chloronaphthalene	delta-BHC	Prometryn
2-Chlorophenol	Diazinon	Propachlor
2-methyl-4-chlorophenoxyacetic acid	Dibenzo(a,h)anthracene	Propanil
2-Methylnaphthalene	Dibenzofuran	Propazine
2-Methylphenol	Dicamba	Propiconazole
2-Nitrophenol	Dichlorprop (2,4-D Propionic acid)	Propoxur
3,3-Dichlorobenzidine	Diclofop-methyl	Pyraclostrobin
3,4-Methylphenol	Dieldrin	Pyrene
4,4'-DDD	Diethyl phthalate	Quinoline
4,4'-DDE	Dimethoate	Quizalofop
4,4'-DDT	Dimethyl phthalate	Sethoxydim
4,6-Dinitro-2-methylphenol	Di-n-butyl phthalate	Simazine
4-Bromophenyl phenyl ether	Di-n-octyl phthalate	Tebuthiuron
4-Chloro-3-methylphenol	Dinoseb	Temephos
4-Chloroaniline	Diphenyl ether	Terbufos
4-Chlorophenyl phenyl ether	Diphenylamine	Terbutryn
4-Nitrophenol	Diuron	Thifensulfuron-methyl

5-Nitroacenaphthene	Endosulfan 1	Tralkoxydim
Acenaphthene	Endosulfan 2	trans-Nonachlor
Acenaphthylene	Endosulfan Sulfate	Triallate
a-Chlordane	Endrin	Trifloxystrobin
Acridine	Endrin Aldehyde	Trifluralin
Alachlor	Eptam	Triticonazole
Aldicarb	Ethalfluralin	
Aldrin	Fenoxaprop	
alpha-BHC	Fludioxonil	
Ametryn	Fluoranthene	
Anthracene	Fluorene	
Atrazine	Gamma-hexachlorocyclohexane	
Atrazine Desethyl	g-Chlordane	
Atrazine+N-Dealkylated Metabolites	Heptachlor	
Atrazine+Metabolites	Heptachlor Epoxide	
Atrazine-2-hydroxy	Hexachlorobenzene	
Atrazine-desethyl	Hexachlorobutadiene	
Atrazine-desethyl-desisopropyl	Hexachlorocyclopentadiene	
Atrazine-desisopropyl		
Azinphos-methyl	Hexachloroethane	
Azoxystrobin	Hexazinone	
Bendiocarb	Imidacloprid	
Benzo(a)anthracene	Indeno(1,2,3-c,d)pyrene	
Benzo(a)pyrene	Indole	
Benzo(b)fluoranthene	Iprodione	
Benzo(b,j)fluoranthene	Isophorone	
Benzo(b,j,k)fluoranthene	Linuron	

APPENDIX H – WEEKLY DISTRIBUTION SYSTEM MONITORING

System Wide Statistics

	Overall							Transmission							Abbotsford							Mission						
	# Micro Samples	# with Tot. Col.	Total Cl (mg/L)		pH	Turbidity (NTU)		# Micro Samples	# with Tot. Col.	Total Cl (mg/L)		pH	Turbidity (NTU)		# Micro Samples	# with Tot. Col.	Total Cl (mg/L)		pH	Turbidity (NTU)		# Micro Samples	# with Tot. Col.	Total Cl (mg/L)		pH	Turbidity (NTU)	
			Max	Avg	Median	Max	Avg			Max	Avg	Median	Max	Avg			Max	Avg	Median	Max	Avg			Max	Avg	Median	Max	Avg
2018	2054	6	1.97	1.14	7.48	1.54	0.22	249	4	1.97	1.32	7.18	0.81	0.24	1347	1	1.97	0.95	7.49	1.54	0.20	458	1	1.82	1.16	7.35	0.83	0.25
2019	2208	7	2.07	1.12	6.97	1.06	0.17	257	4	2.07	1.38	7.00	0.57	0.25	1484	1	1.82	0.98	6.93	1.06	0.14	467	2	1.79	1.12	7.17	0.97	0.24
2020	**2172**	**8**	**2.55**	**1.30**	**6.97**	**3.17 ***	**0.21**	**248**	**3**	**2.55**	**1.56**	**7.16**	**3.17***	**0.30**	**1456**	**4**	**2.29**	**1.00**	**6.91**	**0.76**	**0.16**	**468**	**1**	**2.31**	**1.35**	**7.14**	**2.63****	**0.29**

Transmission System Sample Locations

	Ainsworth							Cannon 600							Cannon 400							Bell Road						
	# Micro Samples	# with Tot. Col.	Total Cl (mg/L)		pH	Turbidity (NTU)		# Micro Samples	# with Tot. Col.	Total Cl (mg/L)		pH	Turbidity (NTU)		# Micro Samples	# with Tot. Col.	Total Cl (mg/L)		pH	Turbidity (NTU)		# Micro Samples	# with Tot. Col.	Total Cl (mg/L)		pH	Turbidity (NTU)	
			Max	Avg	Median	Max	Avg			Max	Avg	Median	Max	Avg			Max	Avg	Median	Max	Avg			Max	Avg	Median	Max	Avg
2018	50	1	1.93	1.49	7.25	0.81	0.33	51	1	1.94	1.26	7.65	0.72	0.31	51	2	1.97	1.38	7.23	0.59	0.31	51	0	1.60	1.30	6.42	0.29	0.08
2019	51	1	2.07	1.58	7.10	0.57	0.30	51	0	1.89	1.32	7.39	0.55	0.29	51	3	1.98	1.48	7.35	0.55	0.28	52	0	1.82	1.38	6.66	0.35	0.11
2020	**52**	**0**	**2.55**	**2.10**	**7.16**	**3.17***	**0.43**	**52**	**1**	**2.29**	**1.47**	**7.32**	**0.59**	**0.35**	**52**	**2**	**2.26**	**1.86**	**7.32**	**0.75**	**0.34**	**52**	**0**	**1.74**	**1.39**	**6.72**	**0.57**	**0.13**

	Maclure						
	# Micro Samples	# with Tot. Col.	Total Cl (mg/L)		pH	Turbidity (NTU)	
			Max	Avg	Median	Max	Avg
2018	50	0	1.40	1.17	7.12	0.52	0.18
2019	52	0	1.62	1.13	7.02	0.64	0.17
2020	**52**	**0**	**1.44**	**1.14**	**7.14**	**0.44**	**0.19**

*Due to a sudden increase in demand, sediment was stirred up in the pipes leading to a high turbidity reading of 3.17.
**On May 12, 2020 the system was switched to Cannell from Norrish, which led to a high turbidity reading at M6.

Mission Distribution Sample Locations

M1

	# Micro Samples	# with Tot. Col.	Total Cl (mg/L) Max	Total Cl (mg/L) Avg	pH Median	Turbidity (NTU) Max	Turbidity (NTU) Avg
2018	51	0	1.49	1.13	7.19	0.48	0.17
2019	52	0	1.59	1.1	7.16	0.41	0.16
2020	**52**	**0**	**2.14**	**1.21**	**7.16**	**0.59**	**0.23**

M2

	# Micro Samples	# with Tot. Col.	Total Cl (mg/L) Max	Total Cl (mg/L) Avg	pH Median	Turbidity (NTU) Max	Turbidity (NTU) Avg
2018	51	0	1.45	1.08	7.35	0.61	0.29
2019	52	0	1.32	0.97	7.12	0.81	0.31
2020	**52**	**0**	**1.83**	**1.27**	**7.09**	**0.67**	**0.33**

M3

	# Micro Samples	# with Tot. Col.	Total Cl (mg.L) Max	Total Cl (mg.L) Avg	pH Median	Turbidity (NTU) Max	Turbidity (NTU) Avg
2018	51	1	1.57	1.22	7.14	0.70	0.30
2019	52	0	1.56	1.17	7.16	0.86	0.32
2020	**52**	**0**	**1.96**	**1.54**	**6.96**	**0.49**	**0.31**

M5

	# Micro Samples	# with Tot. Col.	Total Cl (mg/L) Max	Total Cl (mg/L) Avg	pH Median	Turbidity (NTU) Max	Turbidity (NTU) Avg
2018	51	0	1.36	1.06	7.31	0.47	0.21
2019	52	0	1.58	1.11	7.26	0.48	0.18
2020	**52**	**0**	**2.04**	**1.24**	**7.13**	**1.45***	**0.28**

M6

	# Micro Samples	# with Tot. Col.	Total Cl (mg/L) Max	Total Cl (mg/L) Avg	pH Median	Turbidity (NTU) Max	Turbidity (NTU) Avg
2018	50	0	1.76	1.24	7.27	0.60	0.29
2019	51	2	1.78	1.11	7.11	0.97	0.30
2020	**52**	**1**	**2.31**	**1.46**	**7.13**	**2.63***	**0.40**

M7

	# Micro Samples	# with Tot. Col.	Total Cl (mg/L) Max	Total Cl (mg/L) Avg	pH Median	Turbidity (NTU) Max	Turbidity (NTU) Avg
2018	51	0	1.53	1.26	7.23	0.59	0.19
2019	52	0	1.65	1.26	6.95	0.84	0.18
2020	**52**	**0**	**2.27**	**1.32**	**6.94**	**0.49**	**0.21**

M8

	# Micro Samples	# with Tot. Col.	Total Cl (mg/L) Max	Total Cl (mg/L) Avg	pH Median	Turbidity (NTU) Max	Turbidity (NTU) Avg
2018	51	0	1.82	1.28	7.63	0.62	0.30
2019	52	0	1.50	1.22	7.46	0.82	0.26
2020	**52**	**0**	**2.10**	**1.62**	**7.25**	**0.64**	**0.34**

M9

	# Micro Samples	# with Tot. Col.	Total Cl (mg/L) Max	Total Cl (mg/L) Avg	pH Median	Turbidity (NTU) Max	Turbidity (NTU) Avg
2018	51	0	1.56	1.32	6.69	0.83	0.19
2019	51	0	1.79	1.32	6.80	0.51	0.17
2020	**52**	**0**	**2.21**	**1.41**	**6.77**	**0.50**	**0.17**

M10

	# Micro Samples	# with Tot. Col.	Total Cl (mg/L) Max	Total Cl (mg/L) Avg	pH Median	Turbidity (NTU) Max	Turbidity (NTU) Avg
2018	51	0	1.19	0.87	7.81	0.54	0.28
2019	51	0	1.31	0.84	7.55	0.53	0.25
2020	**52**	**0**	**1.87**	**1.03**	**7.36**	**0.53**	**0.31**

*Due to a sudden increase in demand isediment was stirred up in the pipes leading to a high turbidity reading of 3.17.
**On May 12, 2020 the system was switched to Cannell from Norrish, which led to high turbidity reading at M6.

Abbotsford West Distribution Sample Locations

	W1							W2							W3							W4						
	# Micro Samples	# with Tot. Col.	Total Cl (mg/L)		pH	Turbidity (NTU)		# Micro Samples	# with Tot. Col.	Total Cl (mg/L)		pH	Turbidity (NTU)		# Micro Samples	# with Tot. Col.	Total Cl (mg/L)		pH	Turbidity (NTU)		# Micro Samples	# with Tot. Col.	Total Cl (mg/L)		pH	Turbidity (NTU)	
			Max	Avg	Median	Max	Avg			Max	Avg	Median	Max	Avg			Max	Avg	Median	Max	Avg			Max	Avg	Median	Max	Avg
2018	50	0	1.44	1.13	7.56	0.46	0.18	50	0	1.58	1.22	7.55	0.74	0.20	50	0	1.74	1.28	7.48	0.48	0.18	50	0	1.47	0.97	7.26	0.55	0.19
2019	53	0	1.57	1.06	6.95	0.38	0.15	53	0	1.74	1.24	7.10	0.36	0.13	53	0	1.76	1.27	7.02	0.39	0.13	53	0	1.72	1.04	6.86	0.39	0.14
2020	**52**	**0**	**1.57**	**1.10**	**6.98**	**0.35**	**0.15**	**52**	**0**	**1.53**	**1.18**	**7.06**	**0.48**	**0.15**	**52**	**0**	**1.48**	**1.14**	**6.98**	**0.26**	**0.15**	**52**	**0**	**1.54**	**1.00**	**6.67**	**0.38**	**0.14**

	W5							W6							W7							W8						
	# Micro Samples	# with Tot. Col.	Total Cl (mg/L)		pH	Turbidity (NTU)		# Micro Samples	# with Tot. Col.	Total Cl (mg/L)		pH	Turbidity (NTU)		# Micro Samples	# with Tot. Col.	Total Cl (mg/L)		pH	Turbidity (NTU)		# Micro Samples	# with Tot. Col.	Total Cl (mg/L)		pH	Turbidity (NTU)	
			Max	Avg	Median	Max	Avg			Max	Avg	Median	Max	Avg			Max	Avg	Median	Max	Avg			Max	Avg	Median	Max	Avg
2018	50	0	1.81	1.33	7.45	0.72	0.21	50	0	1.97	1.18	7.36	0.77	0.20	50	0	1.54	0.82	7.14	0.84	0.19	50	0	1.17	0.56	7.15	0.80	0.22
2019	53	1	1.81	1.35	6.90	0.39	0.13	53	0	1.76	1.24	6.86	0.33	0.13	53	0	1.63	0.86	6.68	0.29	0.11	53	0	1.10	0.51	6.53	1.06	0.23
2020	**52**	**1**	**2.29**	**1.38**	**6.89**	**0.50**	**0.15**	**52**	**0**	**1.63**	**1.25**	**6.77**	**0.29**	**0.14**	**52**	**0**	**1.21**	**0.81**	**6.45**	**0.26**	**0.11**	**52**	**0**	**0.92**	**0.62**	**6.56**	**0.40**	**0.14**

	W9							W11							W13							W14						
	# Micro Samples	# with Tot. Col.	Total Cl (mg/L)		pH	Turbidity (NTU)		# Micro Samples	# with Tot. Col.	Total Cl (mg/L)		pH	Turbidity (NTU)		# Micro Samples	# with Tot. Col.	Total Cl (mg/L)		pH	Turbidity (NTU)		# Micro Samples	# with Tot. Col.	Total Cl (mg/L)		pH	Turbidity (NTU)	
			Max	Avg	Median	Max	Avg			Max	Avg	Median	Max	Avg			Max	Avg	Median	Max	Avg			Max	Avg	Median	Max	Avg
2018	50	0	1.60	0.65	7.20	0.72	0.18	49	0	1.33	1.06	7.58	1.12	0.23	50	0	1.21	0.75	7.59	0.35	0.20	50	0	1.00	0.62	7.52	0.62	0.25
2019	53	0	1.26	0.64	6.66	0.40	0.14	53	0	1.47	1.03	7.00	0.25	0.14	53	0	1.43	0.69	6.95	0.27	0.13	53	0	1.56	0.82	6.88	0.57	0.15
2020	**52**	**0**	**0.96**	**0.66**	**6.95**	**0.64**	**0.18**	**52**	**0**	**1.30**	**0.99**	**7.01**	**0.27**	**0.15**	**52**	**1**	**1.15**	**0.59**	**6.90**	**0.29**	**0.16**	**52**	**0**	**1.40**	**0.95**	**6.66**	**0.34**	**0.15**

	W15							W16						
	# Micro Samples	# with Tot. Col.	Total Cl (mg/L)		pH	Turbidity (NTU)		# Micro Samples	# with Tot. Col.	Total Cl (mg/L)		pH	Turbidity (NTU)	
			Max	Avg	Median	Max	Avg			Max	Avg	Median	Max	Avg
2018	50	0	1.77	1.27	7.40	1.54	0.20	50	0	1.29	0.98	7.68	0.39	0.21
2019	53	0	1.77	1.28	6.90	0.41	0.13	53	0	1.45	0.91	7.00	0.29	0.14
2020	**52**	**0**	**2.26**	**1.28**	**6.83**	**0.52**	**0.15**	**52**	**0**	**1.18**	**0.87**	**7.26**	**0.45**	**0.17**

Abbotsford East Distribution Sample Locations

E2

	# Micro Samples	# with Tot. Col.	Total Cl (mg/L) Max	Total Cl (mg/L) Avg	pH Median	Turbidity (NTU) Max	Turbidity (NTU) Avg
2018	50	0	1.38	0.85	7.52	0.41	0.20
2019	53	0	1.68	0.97	6.95	0.34	0.14
2020	**52**	**0**	**1.52**	**1.15**	**7.02**	**0.50**	**0.18**

E3

	# Micro Samples	# with Tot. Col.	Total Cl (mg/L) Max	Total Cl (mg/L) Avg	pH Median	Turbidity (NTU) Max	Turbidity (NTU) Avg
2018	50	0	1.37	0.83	7.49	0.35	0.19
2019	53	0	1.54	0.89	7.01	0.36	0.14
2020	**52**	**0**	**1.22**	**0.93**	**6.95**	**0.57**	**0.17**

E4

	# Micro Samples	# with Tot. Col.	Total Cl (mg/L) Max	Total Cl (mg/L) Avg	pH Median	Turbidity (NTU) Max	Turbidity (NTU) Avg
2018	50	0	1.23	0.65	7.47	0.88	0.20
2019	53*	0	1.30	0.80	7.00	0.31	0.13
2020	**52**	**1**	**1.36**	**0.94**	**6.95**	**0.40**	**0.18**

E5

	# Micro Samples	# with Tot. Col.	Total Cl (mg/L) Max	Total Cl (mg/L) Avg	pH Median	Turbidity (NTU) Max	Turbidity (NTU) Avg
2018	49	0	1.09	0.39	7.44	0.37	0.18
2019	53	0	1.13	0.51	6.97	0.27	0.13
2020	**52**	**0**	**0.95**	**0.55**	**6.87**	**0.32**	**0.15**

E6

	# Micro Samples	# with Tot. Col.	Total Cl (mg/L) Max	Total Cl (mg/L) Avg	pH Median	Turbidity (NTU) Max	Turbidity (NTU) Avg
2018	50	0	1.42	0.86	7.48	0.59	0.22
2019	53	0	1.44	0.98	7.00	0.47	0.15
2020	**52**	**0**	**1.48**	**1.15**	**7.06**	**0.39**	**0.20**

E7

	# Micro Samples	# with Tot. Col.	Total Cl (mg/L) Max	Total Cl (mg/L) Avg	pH Median	Turbidity (NTU) Max	Turbidity (NTU) Avg
2018	50	0	1.10	0.35	7.42	0.52	0.19
2019	53	0	1.06	0.44	6.95	0.25	0.12
2020	**52**	**0**	**0.90**	**0.45**	**6.93**	**0.38**	**0.17**

E8

	# Micro Samples	# with Tot. Col.	Total Cl (mg/L) Max	Total Cl (mg/L) Avg	pH Median	Turbidity (NTU) Max	Turbidity (NTU) Avg
2018	50	0	1.26	0.64	7.44	1.02	0.21
2019	53*	0	1.40	0.69	7.10	0.43	0.16
2020	**52**	**1**	**1.20**	**0.84**	**7.13**	**0.58**	**0.26**

E9

	# Micro Samples	# with Tot. Col.	Total Cl (mg/L) Max	Total Cl (mg/L) Avg	pH Median	Turbidity (NTU) Max	Turbidity (NTU) Avg
2018	50	0	1.46	1.14	7.64	0.37	0.19
2019	53	0	1.61	1.16	7.13	0.31	0.13
2020	**52**	**0**	**1.62**	**1.14**	**7.08**	**0.63**	**0.17**

E10

	# Micro Samples	# with Tot. Col.	Total Cl (mg/L) Max	Total Cl (mg/L) Avg	pH Median	Turbidity (NTU) Max	Turbidity (NTU) Avg
2018	50	0	1.48	1.22	7.67	0.43	0.19
2019	53	0	1.57	1.18	7.06	0.26	0.13
2020	**52**	**0**	**1.76**	**1.19**	**7.03**	**0.76**	**0.18**

E11

	# Micro Samples	# with Tot. Col.	Total Cl (mg/L) Max	Total Cl (mg/L) Avg	pH Median	Turbidity (NTU) Max	Turbidity (NTU) Avg
2018	49	0	1.50	1.20	7.73	0.43	0.20
2019	53	0	1.78	1.24	6.99	0.23	0.12
2020	**52**	**0**	**1.49**	**1.19**	**6.98**	**0.55**	**0.18**

E12

	# Micro Samples	# with Tot. Col.	Total Cl (mg/L) Max	Total Cl (mg/L) Avg	pH Median	Turbidity (NTU) Max	Turbidity (NTU) Avg
2018	50	0	1.69	1.31	7.66	0.39	0.19
2019	53	0	1.81	1.31	6.93	0.44	0.13
2020	**52**	**0**	**2.14**	**1.29**	**6.91**	**0.71**	**0.16**

E13

	# Micro Samples	# with Tot. Col.	Total Cl (mg/L) Max	Total Cl (mg/L) Avg	pH Median	Turbidity (NTU) Max	Turbidity (NTU) Avg
2018	50	0	1.53	1.18	7.58	0.31	0.17
2019	53	0	1.82	1.20	6.94	0.26	0.12
2020	**52**	**0**	**1.59**	**1.17**	**6.91**	**0.34**	**0.16**

E14

	# Micro Samples	# with Tot. Col.	Total Cl (mg/L) Max	Total Cl (mg/L) Avg	pH Median	Turbidity (NTU) Max	Turbidity (NTU) Avg
2018	50	0	1.48	0.92	7.42	0.55	0.19
2019	53	0	1.75	1.10	6.69	0.25	0.12
2020	**52**	**0**	**1.48**	**0.92**	**6.61**	**0.27**	**0.12**

E15

	# Micro Samples	# with Tot. Col.	Total Cl (mg/L) Max	Total Cl (mg/L) Avg	pH Median	Turbidity (NTU) Max	Turbidity (NTU) Avg
2018	50	0	1.51	1.17	7.65	0.36	0.20
2019	53	0	1.56	1.13	6.97	0.28	0.12
2020	**52**	**0**	**1.61**	**1.18**	**6.92**	**0.28**	**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	58.7	34.8	62.6	34.7	64.5	38.4	41.8	21.9	61.7	34.5	62.7	30.2	42.4	42.4	14.9	14.9	8.90	5.53	46.8	28.4	41.0	29.6	40.1	18.5	66.3	33.8	47.6	23.6
Antimony (total)	µg/L	6	ND	ND	ND	ND	ND	ND	0.10	0.10	ND	ND	ND	ND	ND	ND	0.11	0.11	0.55	0.38	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Arsenic (total)	µg/L	10	0.31	0.20	0.33	0.20	0.32	0.19	1.37	0.81	0.26	0.18	0.35	0.24	0.57	0.43	1.0	0.91	7.1	5.2	0.42	0.30	0.28	0.21	0.55	0.39	0.40	0.25	0.40	0.33
Barium (total)	µg/L	1000	7.0	5.0	7.2	5.0	6.8	4.9	14.1	10	5.6	4.5	6.7	4.8	9.8	7.7	19	13	40	30	11	7.0	14	8.4	11.8	8.6	7.9	5. 5	11.8	8.5
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	ND	ND	ND	ND	ND	ND	12	11	ND	ND	11	11	13	12	23	15	17	16	12	12	ND	ND	16	13	ND	ND	14	12
Cadmium (total)	µg/L	50	ND	ND	ND	ND	ND	ND	0.01	0.01	ND	ND	0.02	0.02	0.03	0.02	0.03	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.01	0.01	0.02	0.02
Calcium (total)	µg/L	-	2940	2290	3400	2207	2680	2015	25600	16093	2190	1775	20300	7488	27300	20283	30300	26450	44900	39125	16300	8070	11300	6540	21000	13653	17700	5890	18000	11223
Chromium (total)	µg/L	50	ND	ND	ND	ND	ND	ND	0.20	0.16	ND	ND	0.18	0.18	0.28	0.23	0.26	0.22	0.24	0.20	0.15	0.15	ND	ND	0.16	0.14	0.14	0.14	0.15	0.15
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	ND	ND	ND	ND
Copper (total)	µg/L	≤2000	4.42	2.76	1.55	1.25	1.48	1.29	1.46	1.26	1.90	1.18	1.46	0.95	4.62	3.10	149	93.9	1.61	1.24	1.09	0.990	0.790	0.760	3.55	2.34	5.60	3.75	6.48	5.59
Hardness (as $CaCO_3$)	mg/L	-	8.77	6.75	10.5	6.68	7.99	5.95	91.2	55.4	6.58	5.32	72.4	26.0	95.6	70.7	104	90.4	161	136	55.4	26.9	37.5	21.5	71.5	46.2	62.9	20.1	60.1	37.4
Iron (total)	µg/L	≤300	20	16	16	13	16	13	16	14	15	14	17	13	14	14	24	16	14	14	16	13	40	34	27	16	14	14	17	15
Lead (total)	µg/L	5	ND	ND	0.06	0.06	0.07	0.06	ND	ND	ND	ND	ND	ND	ND	ND	0.72	0.51	ND	ND	ND	ND	ND	ND	0.15	0.09	0.09	0.07	0.07	0.06
Lithium (total)	µg/L	-	ND	ND	ND	ND	ND	ND	1.1	1.1	ND	ND	ND	ND	1.1	1.0	1.2	1.2	3.4	3.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Magnesium (total)	mg/L	-	0.33	0.25	0.50	0.29	0.32	0.22	6.6	3.7	0.27	0.22	5.3	1.8	6.7	4.9	7.0	5.9	12	9.3	3.6	1.6	2.3	1.3	4.6	2.9	4.6	1.3	3.7	2.3
Manganese (total)	µg/L	≤120	2.97	1.32	3.11	1.45	3.21	1.31	6.64	3.80	4.30	1.56	3.49	1.32	2.64	1.71	66.3	21.8	34.5	27.8	21.7	7.83	20	9.81	27.3	14.5	2.42	1.22	30.1	13.8
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	.007	.007	ND	ND	0.08	0.08
Molybdenum (total)	µg/L	-	0.41	0.21	0.41	0.22	0.43	0.21	0.64	0.38	0.31	0.18	0.20	0.15	0.32	0.23	1.0	0.55	2.2	1.7	0.39	0.24	0.30	0.21	0.30	0.23	0.29	0.21	0.28	0.23
Nickel (total)	µg/L	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.42	1.42	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	-	115	83.5	147	92.7	106	78.8	1340	873	84.0	78.0	959	352	1400	1047	2820	1768	3280	2760	1260	532	840	401	1610	935	914	286	1490	824
Selenium (total)	µg/L	10	ND	ND	ND	ND	ND	ND	0.18	0.12	ND	ND	0.13	0.09	0.24	0.18	0.19	0.17	0.19	0.13	0.13	0.10	0.08	0.07	0.16	0.12	0.11	0.11	0.12	0.11
Silicon (total)	µg/L	-	3000	2175	3150	2146.7	2900	2135	10200	6038	2670	2045	9680	4248	11000	8783	11100	8890	6690	6237.5	6870	4245	4820	3630	8260	6100	7450	3450	7250	5245
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	2300	1255	1960	1336	2120	1246	8810	5497	2570	1438	7560	3210	10300	7563	9480	9357.5	12400	10205	6480	3375	4520	2690	8000	5495	7170	2657	6910	4660
Strontium (total)	µg/L	-	8.54	6.64	11.6	7.23	8.46	6.29	123	71.57	6.91	5.79	104	36.0	130	99.4	163	130	155	140	95.8	42.4	59.0	31.0	123	74.9	87.4	26.5	109	62.6
Sulfur (total)	µg/L	-	ND	ND	ND	ND	ND	ND	6340	5290	ND	ND	4310	2780	6310	5287	6470	6155	16400	13413	3370	1897	2290	1433	4960	3683	3990	3990	3810	2823
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	0.03	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Titanium (total)	µg/L	-	0.03	0.3	0.3	0.3	0.4	0.4	ND	ND	0.3	0.3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Uranium (total)	µg/L	20	0.04	0.03	0.03	0.02	0.03	0.02	0.2	0.1	0.03	0.03	0.04	0.03	0.1	0.08	0.40	0.2	1.0	0.8	0.05	0.04	0.03	0.03	0.08	0.05	0.08	0.04	0.05	0.04
Vanadium (total)	µg/L	-	ND	ND	ND	ND	ND	ND	0.54	0.54	ND	ND	0.52	0.52	0.74	0.71	0.72	0.67	0.66	0.58	ND	ND	ND	ND	0.51	0.51	0.53	0.53	ND	ND
Zinc (total)	µg/L	≤5000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	8.9	5.7	3.8	3.8	ND	ND	5.7	5.7	3.1	3.1	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	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	54.5	31.6	52.0	35.6	44.5	29.9	40.2	30.9	55.2	40.0	47.0	33.2	55.9	38.4	61.4	36.8	61.3	40.0	64.5	38.2	58.9	36.2	67.00	38.50	41.70	18.63	64	35.30
Antimony (total)	µg/L	6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.20	0.20	ND	ND
Arsenic (total)	µg/L	10	0.68	0.52	0.75	0.50	0.61	0.52	0.58	0.48	0.72	0.52	0.57	0.47	0.62	0.49	0.30	0.19	0.34	0.21	0.34	0.21	0.34	0.20	0.32	0.20	3.30	1.67	0.34	0.20
Barium (total)	µg/L	1000	8.70	6.61	8.67	6.35	7.42	5.77	7.77	6.33	9.86	6.84	7.19	6.71	8.44	6.50	6.34	4.62	6.20	4.60	6.21	4.68	6.56	4.78	6.42	4.70	20	12.4	6.19	4.43
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	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	15	14	ND	ND
Cadmium (total)	µg/L	50	ND	ND	ND	ND	0.02	0.02	ND	ND	ND	ND	.007	.007	.009	.009	ND	ND	ND	ND	ND	ND	0.01	0.01	ND	ND	0.01	0.01	ND	ND
Calcium (total)	µg/L	-	6170	5108	6770	4778	7620	5435	5450	4883	6920	5168	5580	5155	5890	5240	2510	1870	2620	1978	2460	1910	2530	1903	2490	1885	30200	18645	2540	1903
Chromium (total)	µg/L	50	ND	ND	0.11	0.11	0.11	0.11	ND	ND	ND	ND	ND	ND	0.13	0.13	ND	ND	ND	ND	0.14	0.14	ND	ND	ND	ND	0.20	0.16	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	ND	ND	ND	ND
Copper (total)	µg/L	≤2000	2.04	1.73	2.24	1.80	1.96	1.58	1.84	1.64	3.22	2.31	1.73	1.61	1.93	1.63	2.19	1.81	2.53	1.96	1.36	1.09	3.05	2.20	2.32	1.92	1.73	1.29	2.08	1.62
Hardness (as CaCO3)	mg/L	-	20.7	17.0	22.7	15.7	24.7	17.4	18.3	16.2	23.3	17.2	18.4	17.0	19.6	17.3	7.60	5.61	7.79	5.87	7.40	5.72	7.65	5.70	7.49	5.64	105	65.1	7.63	6.18
Iron (total)	µg/L	≤300	13	13	14	12	16	13	21	16	13	13	26	22	13	13	15	12	14	14	13	12	19	16	13	13	10	10	14	11
Lead (total)	µg/L	5	0.06	0.06	ND	ND	ND	ND	0.05	0.05	0.08	0.06	ND	ND	ND	ND	0.08	0.08	0.09	0.07	ND	ND	0.08	0.07	0.06	0.06	ND	ND	0.07	0.06
Lithium (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	1.8	1.7	ND	ND
Magnesium (total)	mg/L	-	1290	1035	1400	902	1380	924	1140	962	1460	1038	1090	995	1190	1015	319	227	303	226	303	229	325	234	311	227	7250	4513	310	225
Manganese (total)	µg/L	≤120	5.64	4.63	6.33	4.08	4.09	3.07	5.30	4.47	5.28	4.66	7.95	5.55	6.18	5.23	2.97	1.22	3.02	1.11	2.58	1.04	2.80	1.03	3.26	1.32	13	6.64	3.13	1.20
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	-	0.48	0.30	0.49	0.29	0.44	0.29	0.46	0.32	0.47	0.29	0.45	0.30	0.45	0.28	0.42	0.20	0.43	0.22	0.45	0.23	0.41	0.22	0.44	0.21	1.13	0.59	0.46	0.22
Nickel (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
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	-	380	299	405	268	375	286	296	275	372	293	324	277	303	276	107	78	90	75	100	80	100	79	94	77	2150	1178	94	75
Selenium (total)	µg/L	10	0.08	0.07	0.07	0.06	0.08	0.07	0.06	0.06	0.06	0.05	ND	ND	0.08	0.08	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.3	0.2	ND	ND
Silicon (total)	µg/L	-	3470	2700	3500	2664	3330	2678	3430	2860	3740	2743	3330	2695	3400	2628	2820	2088	2870	2150	2950	2160	2960	2195	2970	2113	8080	6358	2960	2148
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	3040	2103	2730	1871	2700	2148	2300	2063	3080	2108	2510	2065	2470	1856	2260	1243	2020	1180	1900	1183	2060	1190	2130	1245	6990	5805	2250	1195
Strontium (total)	µg/L	-	24.5	19.2	23.4	17.1	25.4	19.4	21.6	18.3	26.9	19.2	20.5	18.8	20.8	18.6	8.75	6.24	8.31	6.27	8.03	6.18	8.60	6.22	8.41	6.09	127	81.4	8.73	6.29
Sulfur (total)	µg/L	-	1510	1238	1750	1425	1720	1305	1340	1260	1550	1365	1600	1235	1580	1228	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	11000	7267	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	0.38	0.38	ND	ND	ND	ND	0.40	0.40	0.34	0.34	ND	ND	0.31	031
Uranium (total)	µg/L	20	0.1	0.06	0.1	0.06	0.10	0.06	0.06	0.05	0.10	0.06	0.09	0.06	0.09	0.07	0.03	0.03	0.04	0.03	0.03	0.02	0.03	0.02	0.04	0.02	0.4	0.2	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	0.60	0.55	ND	ND
Zinc (total)	µg/L	≤5000	3.2	3.2	3.1	3.1	ND	ND	ND	ND	ND	ND	12.4	12.4	ND	ND	ND	ND	ND	ND	5.5	5.5	ND	ND	ND	ND	4.2	4.2	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

Mission & Transmission (page 1 of 1)

Parameter	Units	GCDWQ	M1		M2		M3		M5		M6		M7		M8		M9		M10		Ainsworth		Bell Road		Cannon Pit 400		Cannon Pit 600		MacLure Reservoir	
			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	80.1	43.9	19.0	14.9	39.6	22.6	65.2	40.6	20.2	14.1	57.2	37. 5	37.1	27.8	78.5	48.2	38.3	30.0	22.9	16.2	95.6	52.3	17.5	14.5	15.9	13.3	56.7	37.4
Antimony (total)	µg/L	6	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
Arsenic (total)	µg/L	10	0.28	0.19	0.16	0.13	0.18	0.15	0.28	0.19	0.19	0.15	0.31	0.19	0.18	0.15	0.32	0.19	0.18	0.15	0.16	0.14	0.30	0.20	0.17	0.14	0.12	0.11	0.3	0.21
Barium (total)	µg/L	1000	6.83	5.85	14.1	9.92	3.78	3.54	6.54	5.14	14.6	9.80	6.47	5.22	2.00	1.83	6.56	4.95	11.6	9.10	2.79	2.54	6.36	4.87	2.74	2.46	10.8	8.83	6.26	5.09
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	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	11	11	ND	ND	ND	ND	ND	ND
Cadmium (total)	µg/L	50	0.01	0.01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.01	0.01	ND	ND	ND	ND	0.01	0.01	ND	ND	ND	ND	ND	ND	0.4	0.4
Calcium (total)	µg/L	-	2930	2713	1580	1420	2710	2078	3270	2658	1470	1320	2740	2243	2130	1876	2700	2015	2460	2124	1410	1306	2710	2005	1470	1368	1360	1320	3640	2748
Chromium (total)	µg/L	50	0.20	0.16	ND	ND	ND	ND	0.44	0.28	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.17	0.17	ND	ND	ND	ND	0.21	0.21	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	ND	ND	ND	ND
Copper (total)	µg/L	≤2000	2.52	1.38	1.09	0.82	0.57	0.57	1.02	0.86	1.96	1.48	1.72	1.53	0.58	0.56	17.0	13.0	1.80	1.10	4.50	3.50	1.20	1.00	0.69	0.63	1.46	1.25	2.32	1.04
Hardness (as CaCO3)	mg/L	-	8.34	7.63	4.67	4.22	7.33	5.72	9.24	7.49	4.42	3.97	8.10	6.57	5.72	5.11	8.10	6.03	6.66	5.87	4.26	3.93	8.10	6.00	4.37	4.05	4.11	4.00	11.7	8.59
Iron (total)	µg/L	≤300	29	18	33	23	45	29	24	17	52	36	28	20	29	19	15	14	52	36	28	19	19	17	27	19	32	19	ND	ND
Lead (total)	µg/L	5	0.13	0.09	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.09	0.08	ND	ND	0.08	0.08	0.05	0.05	ND	ND	0.05	0.05	ND	ND
Lithium (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
Magnesium (total)	mg/L	-	249	207	178	163	134	129	260	209	180	162	307	236	112	104	322	242	159	138	178	163	320	240	170	155	183	171	636	420
Manganese (total)	µg/L	≤120	0.84	0.62	4.54	3.22	4.06	2.66	0.84	0.60	6.50	3.73	0.90	0.51	4.39	2.60	0.25	0.24	3.45	2.40	20.7	6.54	0.33	0.24	6.61	3.61	3.99	2.92	0.44	0.31
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	-	0.37	0.22	0.10	0.07	0.09	0.07	0.39	0.24	0.07	0.07	0.43	0.24	0.07	0.07	0.42	0.23	0.10	0.09	0.08	0.07	0.43	0.23	0.08	0.07	0.08	0.07	0.43	0.24
Nickel (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
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	-	108	90	55	53	58	55	112	85.75	51	50.50	109	83.75	58	55	114	83	64	61.33	53	51.5	110	83.75	54	53	52	52	150	122
Selenium (total)	µg/L	10	ND	ND	0.05	0.05	ND	ND	ND	ND	0.06	0.06	ND	ND	0.06	0.06	ND	ND	0.06	0.06	ND	ND	ND	ND	0.06	0.06	ND	ND	ND	ND
Silicon (total)	µg/L	-	2580	2308	1480	1358	1490	1435	2590	2335	1410	1344	2720	2358	1580	1482	2750	2247.5	1750	1570	1500	1364	2640	2220	1440	1346	1430	1377.5	2760	2590
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	1340	1013	3260	2836	3260	2857.5	1310	953.3	3210	2822	1100	887	3130	2844	1140	846.25	2860	2532	3330	2960	1130	839	3210	2796	3060	2750	1320	1134
Strontium (total)	µg/L	-	8.78	7.49	5.45	4.97	7.94	6.66	9.21	7.06	5.25	4.68	8.36	6.53	6.72	6.20	8.40	6.10	7.35	6.62	4.96	4.71	8.46	6.09	5.37	4.97	4.95	4.72	14.5	9.79
Sulfur (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
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	-	0.36	0.36	ND	ND	ND	ND	0.31	0.31	ND	ND	ND	ND	ND	ND	0.40	0.36	ND	ND	ND	ND	0.50	0.50	ND	ND	ND	ND	ND	ND
Uranium (total)	µg/L	20	0.03	0.02	ND	ND	ND	ND	0.03	0.02	ND	ND	0.03	0.02	ND	ND	0.03	0.02	ND	ND	ND	ND	0.03	0.02	ND	ND	ND	ND	0.04	0.02
Vanadium (total)	µg/L	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.56	0.56	ND	ND	0.56	0.56	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	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	ND	ND	ND	ND	ND	ND	ND	ND	ND

ND = not detectable

APPENDIX J – QUARTERLY DISTRIBUTION SYSTEM MONITORING (DBP)

Trihalomethanes (μg/L)

Date	Location	A Chloroform	B Bromoform	C Bromodichloro-methane	D Dibromochloro-methane	Total (A + B + C + D)
26-Mar-20	Maclure Reservoir	NT	NT	NT	NT	**NT**
	E4	14	ND	ND	ND	**14**
	W9	ND	ND	ND	ND	**ND**
	W11	8	ND	ND	ND	**8**
	M7	15	ND	ND	ND	**15**
11-Jun-20	Maclure Reservoir	20	ND	ND	ND	**20**
	E4	21	ND	ND	ND	**21**
	W9	ND	ND	ND	ND	**ND**
	W11	18	ND	ND	ND	**18**
	M7	29	ND	ND	ND	**29**
24-Sept-20	Maclure Reservoir	16	ND	ND	ND	**16**
	E4	14	ND	ND	ND	**14**
	W9	1	ND	ND	ND	**1**
	W11	14	ND	ND	ND	**14**
	M7	41	ND	ND	ND	**41**
17-Dec-20	Maclure Reservoir	21	ND	ND	ND	**21**
	E4	20	ND	ND	ND	**20**
	W9	19	ND	ND	ND	**19**
	W11	21	ND	ND	ND	**21**
	M7	24	ND	ND	ND	**24**

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)
26-Mar-20	Cannons Pit 400	4.2	ND	ND	7.4	8.6	**20**
	Cannons Pit 600	1.8	ND	ND	8.5	12.2	**23**
	Shook	2.7	ND	ND	9.4	9	**21**
	Maclure Reservoir	1.9	ND	ND	9	7.1	**18**
11-Jun-20	Cannons Pit 400	ND	ND	ND	4.8	8.1	**13**
	Cannons Pit 600	ND	ND	ND	5.3	11.9	**17**
	Shook	ND	ND	ND	13.5	14.4	**28**
	Maclure Reservoir	ND	ND	ND	11.3	10.4	**22**
24-Sept-20	Cannons Pit 400	ND	ND	ND	5.9	9.3	**15**
	Cannons Pit 600	ND	ND	ND	6.8	15.6	**22**
	Shook	ND	ND	ND	17.7	18.2	**36**
	Maclure Reservoir	ND	ND	ND	6.2	5.1	**11**
17-Dec-20	Cannons Pit 400	ND	ND	ND	7.2	7.5	**15**
	Cannons Pit 600	ND	ND	ND	6.7	10.1	**17**
	Shook	ND	ND	ND	13.7	10	**24**
	Maclure Reservoir	ND	ND	ND	10.7	7.8	**19**

ND = not detectable NT = not tested

n-Nitrodimethlamine (ng/L)

Date	Location	NDMA (ng/l)
26-Mar-20	Maclure Reservoir	**1.31**
26-Mar-20	E4	**1.35**
26-Mar-20	W9	**1.29**
26-Mar-20	W11	**1.14**
26-Mar-20	M7	**1.61**
11-Jun-20	Maclure Reservoir	**1.42**
9-Jun--20	E4	**2.14**
9-Jun-20	W9	**3.41**
9-Jun-20	W11	**1.71**
11-Jun-20	M7	**0.73**
24-Sep-20	Maclure Reservoir	**2.66**
1-Sep-20	E4	**0.75**
1-Sep-20	W9	**0.54**
1-Sep-20	W11	**0.70**
24-Sep-20	M7	**4.84**
17-Dec-20	Maclure Reservoir	**ND**
15-Dec-20	E4	**ND**
15-Dec-20	W9	**ND**
15-Dec-20	W11	**ND**
17-Dec-20	M7	**ND**