

5.4 Beaver Creek - Canada Border Services Water Supply System

The Canada Border Services Agency (CBSA) Beaver Creek water system supplies water to three CBSA duplexes in Beaver Creek, Yukon. The system is supplied by one groundwater well, CBSA-Beaver Creek-YT-WDS-000025, completed in July 2011 and serves potable water to the Beaver Creek CBS duplexes. The system is governed under the Sections 12.1 (a) and (b) and 17 of the *Public Health and Safety Act* and Section 5 of the *Public Health Regulations* (C.O. 1958/079, O.I.C. 2009/194), which require safety measures and inspection for water and water sources for systems that provide for human consumption.

5.4.1 Data Compilation Methodology

Tetra Tech approached all the stakeholders including government departments, water system operators and owners to let them know the project was in progress and to request their assistance in compiling the most complete data set possible. Through the process of compiling the data, Tetra Tech the following parties regarding data for the Beaver Creek CBS supply system:

- Government of Canada – Canada Border Services Agency was consulted regarding the current status of this system. CBS owns and operates the water system and provided review comments as well as recent water quality testing results.
- YG Property Management Division – YG PMD has been consulted and provided permission to use available data for the first iteration of data compilation.

For the Beaver Creek CBS Water Supply system, data from the SPDWS review with updates from more recent work were used and the summary was reviewed by the current water system operator.

5.4.2 Hydrogeology

Based on previous hydrogeological investigations in the Beaver Creek area, the groundwater flow direction in the area was assumed to be towards the northeast or north-northeast (Tetra Tech 2011a).

The aquifer is a semi-confined sand and gravel aquifer, with a low permeability silt layer about 14 m thick located above the aquifer which offers some protection from potential infiltration from surface sources of contamination (Tetra Tech 2011). Due to the variability of sediments in the Beaver Creek area, some areas may have significantly higher vulnerability to surface source of contamination than others.

Pumping test results from the well indicate an aquifer transmissivity in the order of $1 \times 10^{-3} \text{ m}^2/\text{s}$ (86 m^2/day) (Tetra Tech 2011).

5.4.3 Well Summary

The log for the well serving the CBS housing in Beaver Creek is included in the GIS map and database portion of this project. The following table summarizes the completion characteristics of the well.

Table 5-11: Canada Border Services Beaver Creek Well Summary		
Well Construction Parameters	Details	Source
Date of construction	Well was completed by Impact Drilling Ltd. in July 2011	Tetra Tech 2011

Table 5-11: Canada Border Services Beaver Creek Well Summary

Well Construction Parameters	Details	Source
Total well depth	41.3 m bgs	
Casing	6" (152 mm) OD Steel Well Casing	
Casing depth	40.1 m bgs	
Well screen	1.2 m 50 slot (1.27 mm) stainless steel well screen from 40.1 m bgs to 41.3 m bgs	
Static water level	10.6 m bgs (July 24, 2011)	
Sanitary seal	Bentonite sanitary seal to 5.6 m bgs	
Wellhead completion	Unknown	
Wellhead stickup	Unknown	
Well rated capacity	3 L/s (40 IGPM)	
Well GUDI status	Non-GUDI	
Well Construction Comments:	Well was constructed to meet Canadian Groundwater Association Well Construction Guidelines.	

5.4.4 Source Water Quality

Tetra Tech reviewed available water quality information for the Beaver Creek CBS well including water quality testing completed at the time of well construction and water quality testing for 2016. In general, the water from the CBS Beaver Creek well meets Health Canada's Guidelines for Canadian Drinking Water Quality (GCDWQ) for the parameters analyzed with the exception of the aesthetic objective (AO) for manganese and iron (2016 results and Tetra Tech 2011). The key water quality observations include:

- The groundwater source was is very hard and can be characterized as a calcium-bicarbonate type water;
- The total iron concentration measured at one water use point in 2016 exceeded the GCDWQ AO of 0.3 mg/L with a concentration of 2.67 mg/L; and
- The total manganese concentration (0.0642 to 0.193 mg/L in the raw water) exceeded GCDWQ AO value of 0.05 mg/L with concentrations measured at the point of use as high as 0.334 mg/L.

5.4.5 Water Treatment and Distribution

Table 5-12: Canada Border Services Beaver Creek *Water Treatment and Distribution Details*

Item	Details	Source
Owner/Operator	Canadian Border Services Agency	Tetra Tech 2011

Item	Details	Source
Water source	Groundwater	Tetra Tech 2012
Well serving the system	CBS Beaver Creek well	
Delivery Method	3 duplex service connections	
Treatment type	Water softening and UV	
Age of system/last known update	Water Treatment system installed in 2012	

5.4.6 Source Water Protection Planning

No records were found indicating that any source water protection planning which includes the CBS Well in Beaver Creek. Although the aquifer is semi-confined and is protected from surface-based contamination by silts encountered during drilling, the aerial extent of this impermeable layer is unknown. The vulnerability of the overburden aquifer underlying the community of Beaver Creek is variable due to variation in the sedimentary sequence. Implementing a source water protection plan for the community of Beaver Creek would provide a comprehensive approach to protecting this groundwater resource.

5.4.7 Water Supply Information Data Gaps

Tetra Tech has compiled this summary from the most recent reports available and has obtained review comments from the system operator. For the purpose of this study, Tetra Tech identified the following data gaps:

- Wellhead completion details have not been provided; and
- No SWPP is in place for this system.