5.6 Beaver Creek - Airport Terminal Building Water Supply System

The Beaver Creek Airport Terminal Building (ATB) has water supplied from a groundwater supply well (Well 3125-B), which was drilled in 2006 to replace the old well (Well 3125-A). Well 3125-A, which was located in a pit, had several deficiencies, including several contaminant sources within 30 m of the wellhead and poor water quality (Tetra Tech 2006 and 2014).

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.

5.6.1 Data Compilation Methodology

Tetra Tech approached stakeholders including 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 has had communication with YG PMD regarding all water systems they operate and/or maintain. YG PMD has provided review comments review comments and data for the compilation.

5.6.2 Hydrogeology

Beaver Creek is located on a broad glaciofluvial plain with the nearest bedrock outcrops occurring approximately 4 km northeast and northwest of the community (Gordey and Markpeace 2003). The subsurface soils in Beaver Creek consist of sand and gravel units with veneers of organic soils (Gordey and Markpeace 2013).

The Beaver Creek aquifer is used for both community and domestic water supply. Most of the wells in the Beaver Creek area indicate coarse sand and gravel with cobbles and small boulders to depths of at least 30 m (Tetra Tech 2006). The well logs also indicate that discontinuous lenses of finer-grained sediments persist throughout the area, the sediments are generally dominated by coarse alluvium. Some discontinuous permafrost is also interpreted to persist throughout the Beaver Creek area. 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. Regional groundwater flow in the Beaver Creek area is driven by infiltration in the upland areas to the west and southwest of Beaver Creek coupled with discharge to the Beaver Creek drainage (Tetra Tech 2013). The direction of groundwater flow is determined to be north to northeasterly (Tetra Tech 2006).

The aquifer where Well 3125-B was completed is a semi-confined sand and gravel aquifer which is overlain by about 14 m of low permeability silt. The thick low permeability silt layer offers some protection from potential infiltration of contaminants originating from ground surface, however, the sediments in the Beaver Creek area are variable and the aerial extent of the silt layer is unknown (Tetra Tech 2007). Grain size analysis of the aquifer bearing unit indicates a hydraulic conductivity of approximately 6 x 10^{-3} m/s (Tetra Tech 2007).



5.6.3 Well Summary

The well log for the new well (Well 3125-B) serving the ATB 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 5-15: Beaver Creek ATB Well 3125-B Summary			
Well Construction Parameters	Details	Source	
Date of construction	Well was completed by Double D Drilling Ltd. in October 2006		
Total well depth	28.9 m bgs	Well log	
Casing	6" (152 mm) OD Steel Well Casing		
Casing depth	27.7 m bgs		
Well screen	1.2 m 40 slot (1.02 mm) stainless steel well screen from 27.7 m to 28.9 m bgs		
Static water level	9.8 m bgs (October 20, 2006)		
Sanitary seal	Bentonite sanitary seal to 6 m bgs	Tetra Tech 2007	
Wellhead completion	Pitless unit and heat trace cable for the well for freeze protection	Tetra Tech 2014	
Wellhead stickup	Approx. 0.65 m ags		
Well rated capacity	5.5 L/s (72.6 IGPM)	Tetra Tech 2007	
Well GUDI status	Non-GUDI		
Well Construction Comments:	Well was constructed to meet Canadian Groundwater Association Well Construction Guidelines.		

5.6.4 Source Water Quality

Key observations (Tetra Tech 2006) regarding the groundwater analysis conducted on Well 3125-B when sampled in 2006 are:

- All parameters tested met current Health Canada's Guidelines for Canadian Drinking Water Quality (GCDWQ) for health-based and aesthetic parameters on the date sampled; and
- Water from Well 3125-B was calcium-bicarbonate type with a pH of approximately 8, and was considered very hard with a measured hardness of 194 mg/L.

5.6.5 Water Treatment and Distribution

Table 5-16: Beaver Creek ATB Water Treatment and Distribution Details			
Item	Details	Source	
Owner/Operator	Government of Yukon	Tetra Tech 2014 p.c. Nick Barnett 2017	
Water source	Groundwater		
Well serving the system	Beaver Creek ATB well (Well 3125-B)		
Treatment type	None		
Water users	ATB workers		
Delivery method	Directly connected to the Air Terminal Building		
Age of system/last known update	Well 3125-B was connected to the system in 2014. No known major upgrades/expansions on the system since 2014		

5.6.6 Source Water Protection Planning

There is no source water protection planning in place for ATB Well 3125-B in Beaver Creek. Although the aquifer is semi-confined and is protected from surface-based contamination by the 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.

5.6.7 Water Supply Information Data Gaps

YG PMD has reviewed this summary and provided comments. To our knowledge, this system summary includes all available data and is accurate and up to date as of March 2017. Tetra Tech identified the following data gaps:

- There is no source water protection planning for this groundwater resource. SWPP could be tied in with the
 planning completed for the WRFN source water supply and integrated with planning in other areas of Beaver
 Creek to create a comprehensive source water protection plan for the Beaver Creek Aquifer.
- Several upgrades on the water system including installation of a disinfection system, were recommended by Tetra Tech in 2006; however, it is our understanding that no updates have been completed to the system since 2006 other than the connection of the new water well in 2014.