5.22 Dawson City Area - Tombstone Interpretive Centre Water Supply System

The Tombstone Interpretive Centre located at the Tombstone Territorial Park at km 71 on the Dempster Highway, Yukon water system has water supplied from one groundwater well (Well 2607). The system serves the visitors at the Interpretive Centre and 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 water for human consumption.

5.22.1 Data Compilation Methodology

Tetra Tech approached stakeholders including water system owners and operators to let them know the project was in progress and to request their assistance in compiling the most complete data set possible. Many of the stakeholder groups contacted were able to provide data and received the project positively. For the Tombstone Interpretive Centre water supply system, Tetra Tech contacted the following proponents:

- YG Property Management Division – YG PMD has been consulted and has reviewed the data set for the Tombstone Interpretive Centre.
- Yukon Department of Environment – YG Parks Branch has been consulted and has reviewed the data set for the Tombstone Interpretive Centre.

5.22.2 Hydrogeology

Tombstone Interpretive Centre is located in an area with significant topographic relief in the immediate surrounds. Groundwater recharge likely occurs at higher elevations in the mountains surrounding the Centre with discharge to streams and creeks in the valley bottom. Well 2607 is completed in an overburden aquifer. The saturated sand and gravel sequence encountered from 8 to 29.2 m bgs is interpreted as one unconfined aquifer consisting of sand and angular to sub-angular tabular gravel clasts (Tetra Tech 2009). The grain size results indicate that the aquifer material is primarily gravel with some sand (Tetra Tech 2009).

Hydraulic testing results from the pumping test conducted at the time of well construction show that the well is completed within a highly productive aquifer. An aquifer transmissivity was calculated from pumping test results and is on the order of 3 x 10^{-2} m^2/s with hydraulic conductivity on the order of 2 x 10^{-3} m/s (Tetra Tech 2009).

5.22.3 Well Summary

A lithology and well construction log for Well 2607, serving Tombstone Visitor Reception Centre, is included in the GIS mapping and database. The well is located upgradient of fuel handling and vehicle traffic on the site. The following table summarizes the completion characteristics of the well.

Table 5-54: Tombstone Interpretive Centre Well 2607 Summary

Well Construction Parameters	Details	Source
Date of construction	Well was completed by Double D Drilling Ltd. In September 2008	Tetra Tech 2009 M. Eckervogt 2017
Total well depth	29.1 m bgs	
Casing	6" (152 mm) ID Steel Well Casing	
Casing depth	27.8 m bgs	

Table 5-54: Tombstone Interpretive Centre Well 2607 Summary		
Well Construction Parameters	**Details**	**Source**
Well screen	1.3 m 150 slot (3.8 mm) well screen from approximately 27.8 m to 29.1 m bgs.	
Static water level	8.2 m bgs (October 2008)	
Sanitary seal	Bentonite surface seal to 6 m bgs	
Wellhead completion	Well is equipped with an above grade pitless adapter and protected by a fenced enclosure around the wellhead.	
Wellhead stickup	1.2 m ags (after well completion)	
Well rated capacity	10 L/s (132 IGPM)	
Well GUDI status	Potentially GUDI	
Well Construction Comments:	Well was constructed to meet Canadian Groundwater Association Well Construction Guidelines.	

5.22.4 Source Water Quality

Key observations and comments noted in 2009 (Tetra Tech 2009) and from communication with YG PMD are:

- The water from the well is hard and can be characterized as a calcium-magnesium-sulphate-bicarbonate type water;
- The raw water from the well met the GCDWQ for health-based parameters and aesthetic objectives at time of sampling, with the exception of the presence of total coliform bacteria. Tetra Tech understands subsequent tests have been negative for total coliform bacteria (p.c. M. Fraser 2017).
- Tetra Tech understands bacteriological testing is completed at start up and quarterly during seasonal system operation and bacteriological testing has shown satisfactory water quality results, but no further chemistry testing has been completed since well construction.

5.22.5 Water Treatment and Distribution

Table 5-55: Tombstone Interpretive Centre Water Treatment and Distribution Details		
Item	**Details**	**Source**
Owner/Operator	Government of Yukon	Tetra Tech 2009 M. Eckervogt 2017
Water source	Groundwater	
Well serving the system	Well 2607	
Treatment type	5 micron filtration, UV disinfection**	
Water users	Visitors and YG employees	

Table 5-55: Tombstone Interpretive Centre Water Treatment and Distribution Details		
Item	**Details**	**Source**
Delivery method	Directly connected to buildings	
Age of system/last known update	Plans are in place to upgrade filtration and UV systems in 2017	

**Tetra Tech understands that YG plans to upgrade filtration and UV systems for this water system in summer 2017.

5.22.6 Source Water Protection Planning

No records were found indicating that a source water protection plan has been completed for the Tombstone Interpretive Centre well. The aquifer is unconfined and the aquifer materials are relatively permeable (gravel with some sand); therefore, a SWPP would provide a valuable tool for identifying, monitoring and managing risks to the wells and aquifer.

5.22.7 Water Supply Information Data Gaps

Tetra Tech has reviewed available information for this system and has obtained review comments from both YG PMD and from YG Department of Environment. For the purpose of this project, the following data gaps were identified:

- No GUDI assessment has been conducted for Well 2607;
- No Source Water Protection Plan is in place; and,
- Details of the water system upgrades planned for summer 2017 should be included in this summary once complete.