

5.20 Dawson City Area – Klondike Valley Firehall Water Supply System

The Klondike Valley Firehall (Building 2592) is located at Rock Creek at about km 696 on the North Klondike Highway, 20 km south of Dawson City, Yukon. The serve-serve water system sources water from a shallow drilled well (Well 2592B). Improvements to the Klondike Valley Fire Hall water system in 2012 included water treatment upgrades to ensure adequate treatment for a groundwater under the direct influence of surface water source. The small 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 provide measures for inspection and oversight by an officer of medical health for systems that provide water for human consumption.

5.20.1 Data Compilation Methodology

Tetra Tech approached stakeholders including YG 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 obtained data regarding the Klondike Valley Firehall Water Supply system from the following proponents:

- YG Community Services (the client) – YG CS provided data for the Klondike Valley Firehall Water Supply as this system is owned and operated by YG CS. The YG CS operator provided review comments and edits for the final summary to ensure completeness and accuracy.

5.20.2 Hydrogeology

The well completion log for Well 2592-B indicates that the well is completed at a depth of 14.9 m within a shallow unconfined gravel aquifer, i.e., within the same aquifer as the original Well 2592-A. The static water level in Well 2592-B was 3.4 m below ground at the time of drilling and significant fine-grained sediments were encountered. The aquifer materials are primarily gravel with some sand and trace silt (Tetra Tech 2013).

Both Well 2592-B and Well 2592-A are located southeast of the Klondike River, and are most likely completed within alluvial floodplain sediments deposited by the river. Discontinuous lenses of permafrost are also known to exist in the area. Water levels in the aquifer are likely strongly connected to water levels in the Klondike River. The shallow depth of this aquifer, presence of various ephemeral surface water features in the area, combined with the absence of fine-grained material leaves this aquifer vulnerable to surficial sources of contamination (Tetra Tech 2006 and 2013).

The expected direction of groundwater flow is westerly to northwesterly along the Klondike River valley with a component of flow towards the Klondike River (Tetra Tech 2006).

5.20.3 Well Summary

The lithology and well completion log for the Klondike Valley Firehall Well (Well 2592-B) serving the system is included in the GIS map and database. The original Well 2592-A is located near the firehall building, and YG CS is considering decommissioning it in the near future (p.c. Steve Perrin 2017). The following table summarizes the completion characteristics Well 2592-B.

Table 5-50: Klondike Valley Firehall, Well 2592-B Summary

Well Construction Parameters	Details	Source
Date of construction	Well was completed by Cathway Water Resources Ltd. in October 2012	Well log
Total well depth	14.9 m bgs	
Casing	6" (152 mm) ID Steel Well Casing	
Casing depth	13.8 m bgs	
Well screen	1.1 m 100 slot (2.54 mm) stainless steel well screen from 13.8 m bgs to 14.9 m bgs	
Static water level	3.4 m bgs (October 19, 2012)	
Sanitary seal	Bentonite surface seal to 6 m bgs	Tetra Tech 2013
Wellhead completion	Pitless Unit	Government of Yukon Record Drawings 2013
Wellhead stickup	1.0 m	Government of Yukon Record Drawings 2013
Well rated capacity	Approximately 3.1 L/s (41 IGPM)	Tetra Tech 2013
Well GUDI status	GUDI	Tetra Tech 2013
Well Construction Comments:	Well was constructed to meet Canadian Groundwater Association Well Construction Guidelines with the exception of the well completion depth.	

5.20.4 Source Water Quality

In general, the water from the new Klondike Valley Firehall well (Well 2592-B) meets Health Canada's Guidelines for Canadian Drinking Water Quality (GCDWQ) for the parameters analyzed and the key observations and comments noted in 2006 are (Tetra Tech 2013):

- The water was hard, has a pH of approximately 7.5 and can be characterized as calcium-magnesium-bicarbonate-sulphate type water;
- Turbidity was measured at 2.3 NTU during well development. Health Canada recommends that groundwater sources provide water with turbidity less than 1.0 NTU and that water from GUDI sources have appropriate filtration and disinfection. Filtration is expected to achieve a turbidity level of 1.0 NTU for slow sand or diatomaceous earth filtration, 0.3 NTU for conventional direct filtration and 0.1 NTU for membrane filtration in 95% of samples between filter changes or per month with no measurements exceeding 3.0 NTU; and,
- A lab detectable concentration of extractable petroleum hydrocarbon (127 parts per billion) was detected during initial sampling. However, the results of the re-sampling showed that extractable petroleum hydrocarbon concentrations were non-detect and this result was likely from the drilling process.

Tetra Tech did not review recent water quality data but understands water chemistry analysis is completed at this system annually and bacteriological monitoring is completed on a regular basis with results sent to YG EHS for review.

5.20.5 Water Treatment and Distribution

Table 5-51: Klondike Valley Firehall Water Treatment and Distribution Details		
Item	Details	Source
Owner/Operator	Government of Yukon	Tetra Tech 2013
Water source	Groundwater	
Well serving the system	Klondike Valley Firehall Well 2592-B	
Treatment type	UV Disinfection and chlorine disinfection	Government of Yukon Record Drawings 2013
Number of connections	Approximately 20 to 30 people	Tetra Tech 2013
Delivery method	Directly connected to the Firehall and the water storage tanks with a self-serve fill station outside the Firehall for public use consisting of a 3" overhead fill and a blue jug fill point	
Age of system/last known update	Water treatment upgraded in 2012 to account for GUDI source	

5.20.6 Source Water Protection Planning

Well 2592-B was installed about 5 m north of the northwest corner of the Firehall building and about 17 m from, and cross-gradient to, the sewage holding tank serving the facility (Tetra Tech 2013). Industrial activity in the Dawson area has included riverboat transport, placer gold mining in the Klondike River Valley and industrial services to the community and ongoing placer operations including repair shops and heavy equipment operation in the surrounding watershed.

There is no source water protection planning in place for the Klondike Valley Firehall wells. As the aquifer is shallow and unconfined, it is vulnerable to surface-based contamination, source water protection planning is considered important to ensure safe drinking water. The well is located near the Klondike Highway and the Klondike River and is vulnerable to sources of contamination from these features.

5.20.7 Water Supply Information Data Gaps

Tetra Tech has identified the following data gaps:

- There is no source water protection planning in place to protect this shallow groundwater resource.
- Tetra Tech understands that the original water well has not been connected as a backup water supply, and that YG CS is considering decommissioning it in the near future.