

5.58 Whitehorse Area - Hootalinqua Firehall Water Supply System

The Hootalinqua Firehall is serviced by a water supply system that delivers water from a 156 m deep well (Well 1391) with static water level of approximately 30 m bgs. From the wellhead, the water system splits to service the two water storage tanks for firefighting use, and to service the domestic water supply for the Firehall (Tetra Tech 2005). This 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 water for human consumption.

5.58.1 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 the following water system owners, operators and proponents regarding the Hootalinqua Firehall Water Supply System:

- YG Property Management Division – YG PMD has been consulted and has provided review comments and data for the compilation.
- YG Community Services (the client) – YG CS provided data for systems where proponents contacted were not able to find the documents and/or YG CS had the data readily available.

5.58.2 Hydrogeology

The aquifer in which Well 1391 is completed, is deep and confined under several sequences of silt and till. The aquifer is therefore considered to be well protected from surface sources of contamination so long as the well itself does not provide a pathway (Tetra Tech 2006). Based on topography and proximity to surface water features, the groundwater flow direction is inferred to be in a northeasterly direction towards the Yukon River (Tetra Tech 2006). The well at Hootalinqua Firehall is well protected from potential sources of contamination (Tetra Tech 2006).

PHCL completed a 24-hour pump test of the well in September 2003 and reported an aquifer transmissivity of 4 to 8 m²/day (PHCL 2003).

5.58.3 Well Summary

A log for the well is included in the GIS map and database portion of this project. The following table summarizes the completion characteristics of the well.

Well Construction Parameters	Details	Source
Date of construction	The well was constructed by Cathway Water Resources in 2002	Well log
Total well depth	157 m bgs	
Casing	6" (152 mm) OD Steel Well Casing	
Casing depth	152.3 m bgs	

Table 5-155: Hootalinqua Firehall, Well 1391 Summary		
Well Construction Parameters	Details	Source
Well screen	3.7 m 240 slot (1.02 mm) well screen from approximately 152.3 m bgs to 156 m bgs	
Static water level	Approximately 31.8 m bgs	PHCL 2003
Sanitary seal	No records of sanitary seal installation. It was noted that a steel plate is welded over the annulus between the 8" (200 mm) surface casing and the 6" (152) steel casing, but there was no mention if a grout seal was installed between the two casings	Well log
Wellhead completion	The wellhead is located in a pit that is approximately 14 m away from the Firehall building	Tetra Tech 2005
Wellhead stickup	1.5 m bgs (May 19, 2005)	
Well rated capacity	1.44 L/s (19 IGPM)	PHCL 2003
Well GUDI status	Not assessed	
Well Construction Comments:	Based on the wellhead completion and the lack of a surface seal, the well was not constructed to meet the Canadian Groundwater Association Well Construction Guidelines.	

5.58.4 Source Water Quality

As part of the SPDWSA review conducted in 2005, Tetra Tech reviewed available groundwater chemistry data and collected an additional sample to test for identified parameters of concern. The key observations and comments noted during Tetra Tech’s 2005/2006 chemical water quality review and groundwater sampling on the well are summarized as follows (Tetra Tech 2006):

- The water quality results indicated that the water from the well was a sodium-sulphate type water with moderate hardness (ranging from 90.2 mg/L to 131 mg/L as CaCO₃) and a pH of approximately 8 to 8.23 on the date sampled;
- The turbidity of the water on the date sampled ranges from 1.5 NTU to 2.6 NTU;
- The water quality results indicated that the water from the well meets the GCDWQ for all the parameters analyzed with the exception of total iron. The reported total iron concentrations on the dates sampled ranges from 0.531 mg/L to 0.556 mg/L. The reported dissolved iron concentration was less than the laboratory detection limit of 0.030 mg/L which is less than the GCDWQ and also the reported total iron concentrations, suggesting that the elevated iron can likely be attributed to suspended iron particles in the water;
- Review of chloride, nitrate and nitrite showed all three to be low and within the normal background ranges, suggesting that the aquifer was not under the influence of anthropogenic surface sources of nutrients or anions such as septic wastes at the time of sampling; and

- Concentrations of EPH and PAH were below the laboratory detection limits on the date sampled.

5.58.5 Water Treatment and Distribution

Item	Details	Source
Owner/Operator	Government of Yukon	Tetra Tech 2006 p.c. Nick Barnett 2017
Water source	Groundwater	
Number of wells serving the system	Hootalinqua Firehall well (Well 1391)	
Treatment type	Chlorination (for the water storage tanks); Filtration (sand trap and 5 micron), but no chlorination for the domestic system Iron/manganese filtration added	
Water users	Users of the Firehall	
Delivery method	Piped (to the building)	
Age of system/last known update	Iron and manganese filtration added since 2005	

5.58.6 Source Water Protection Planning

There is no SWPP in place for the Hootalinqua Firehall water system. Given the limited nature of water distribution here (water is used only for firefighting and domestic water supply in the Firehall), source water protection planning may not be warranted for this water supply. Tetra Tech was not able to locate any record of a GUDI assessment for the well.

During the 2005 SPDWSA, Tetra Tech identified an AST located approximately 24 m from the well; other than the AST, there were no other potential contaminant sources identified within 30 m of the wellhead (Tetra Tech 2005). However, it was noted that the AST at the Hootalinqua Firehall has had the concrete supports oriented with respect to the supports on the tank that would make it susceptible to being knocked off the concrete supports in the event of contact with a vehicle, or an earthquake (Tetra Tech 2005). This could potentially result in a piping to break or leak and cause a significant hydrocarbon spill (Tetra Tech 2005).

There was no recorded spill events or contaminated sites reported on or near the property (Tetra Tech 2005). However, during the 2005 SPDWSA site review, it was noted, by two different sources, that there had previously been a hydrocarbon spill resulting from a leak at the union for the transfer pipe in 2005 during the winter months (Tetra Tech 2005). The UST was approximately 27 m from the well (Tetra Tech 2005). The volume of fuel spilled was unknown, and it was unclear if the spill had not been properly cleaned up (Tetra Tech 2005). A noticeable diesel odour in the vicinity of the AST was obvious at the time of the SPDWSA in 2005 (Tetra Tech 2006). Given the depth of the well, and the horizontal separation distance, it was considered unlikely that hydrocarbons from this spill would have impacted on deep groundwater quality and the concentrations of EPH and PAH in the groundwater sample collected from Well 1391 were non-detect (Tetra Tech 2006).

5.58.7 Water Supply Information Data Gaps

Tetra Tech has obtained review comments from YG PMD regarding the current status of this system and to our knowledge this summary is complete and accurate to March 2017. The following data gaps have been identified:

- There is no source water protection planning in place for this water supply system.