5.25 Destruction Bay - Firehall Water Supply System

The Destruction Bay Firehall has water supplied from an approximately 31.4 m deep well (Well 3172). The well is located in a pit approximately 5 m from the Firehall. The water system is split to serve both the domestic and firefighting water needs for the Firehall. The system used for firefighting is equipped with an elevated 22,500 L water storage tank. This system provides domestic water to the Firehall and is regulated under the *Public Health Act,* General Regulations Sections 18 and 19 (YG *Public Health Act,* 1958/079), which requires safety measures and inspection for water and water sources for systems that provide for human consumption.

5.25.1 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.

5.25.2 Hydrogeology

The log for Well 3172 indicates that the well is completed at a depth of 31.4 m within a sand aquifer. Overlying the aquifer is approximately 29.9 m of interbedded clay and till, and this is consistent with most well logs in the Destruction Bay area, which typically indicate 25 m to 50 m of fine-grained material overlying a confined sand and gravel aquifer. The presence of a fine-grained confining layer provides some aquifer protection from surficial sources of contamination. The static water level at the time of drilling was 7.6 m bgs and the expected direction of groundwater flow in the vicinity of the site from topography and proximity to surface water is inferred to be east to northeast towards Kluane Lake.

5.25.3 Well Summary

The log for Well 3172 is included in the GIS map and database portion of this project. The following table summarizes the completion characteristics of the well.

Table 5-60: Destruction Bay Firehall, Well 3172 Summary

Well Construction Parameters	Details	Source
Date of construction	The well was constructed by Midnight Sun Drilling Co. Ltd. in September/October 1987	
Total well depth	31.4 m bgs	
Casing	6” (152 mm) OD Steel Well Casing	
Casing depth	30.3 m bgs	
Well screen	1.1 m 30 slot (0.76 mm) well screen from 30.3 m bgs to 31.4 m bgs	
Static water level	Approximately 7.6 m bgs (September 1987)	
Sanitary seal	No record of sanitary seal installation	Well log and Tetra Tech 2006

Table 5-60: Destruction Bay Firehall, Well 3172 Summary		
Well Construction Parameters	**Details**	**Source**
Wellhead completion	The wellhead is located in a pit approximately 5 m from the Firehall building. The pipes are insulated and likely are equipped with heat trace for freeze protection	Tetra Tech 2006
Wellhead stickup	0.7 m bgs (measured on July 28, 2005)	Tetra Tech 2006
Well rated capacity	1.9 L/s (25 IGPM) (estimated by the driller)	Well log
Well GUDI status	Potentially GUDI	Based on well construction
Well Construction Comments:	Well was not constructed to meet Canadian Groundwater Association Well Construction Guidelines.	

5.25.4 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 (Tetra Tech 2006):

- The water quality results indicated that the water from Well 3172 was a magnesium-bicarbonate type water;
- The water was considered very hard, with a hardness ranging from 308 mg/L to 312 mg/L on the dates sampled; and
- The water quality results indicated that the water from Well 3172 meets the GCDWQ for all the parameters analyzed with the exception of colour. The colour of the sample when sampled on October 19, 2004 was greater than 60 CU, which exceeds the GCDWQ AO of 15 CU; however, the colour of the two subsequent samples was less than the laboratory detection limit of 5 CU and meets the GCDWQ AO.

5.25.5 Water Treatment and Distribution

Table 5-61: Destruction Bay Firehall Water Treatment and Distribution Details		
Item	**Details**	**Source**
Owner/Operator	Government of Yukon	Tetra Tech 2006 p.c. Nick Barnett 2017 p.c. Martin Eckervogt 2017
Water source	Groundwater	
Number of wells serving the system	Destruction Bay Firehall well (Well 3172)	
Treatment type	None	
Water users	Users of the Firehall	
Delivery method	Directly connected to the Firehall	

Table 5-61: Destruction Bay Firehall Water Treatment and Distribution Details		
Item	**Details**	**Source**
Age of system/last known update	Unknown	

5.25.6 Source Water Protection Planning

There is no source water protection planning in place for the Destruction Bay Firehall Well 3172, and there is no record of a GUDI assessment for the well. Source water protection planning here should be incorporated with source water protection planning throughout the community to create a comprehensive Destruction Bay SWPP.

During the 2005 SPDWSA, one underground and one above ground fuel storage tank and a number of scrap cars were found to be located within 30 m of the well; the fuel storage tanks and scrap cars are considered to be potential contamination sources (Tetra Tech 2006).

There had been multiple spill events of raw sewage due to failures of the community sewage system in Destruction Bay (Tetra Tech 2006). On two occasions in 1993, a mechanical failure caused approximately 37,800 L and 11,340 L of raw sewage to spill (Tetra Tech 2006). The sewage had in both cases reportedly flowed over the ground surface and ponded near Kluane Lake (Tetra Tech 2006). Additionally, four recorded spill events occurred in 1995 and 1996 caused by leaking or broken sewer mains, spilling raw sewage in the Destruction Bay area (Tetra Tech 2006). Two events recorded spills of approximately 200 L each, but the other two events spilled an unknown amount (Tetra Tech 2006).

Although the vulnerability of the aquifer in which this well is completed is considered to be low, a SWPP would provide a valuable tool for identifying, monitoring and managing risks to the wells and aquifer.

5.25.7 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, source water protection planning here could be incorporated into a greater Destruction Bay SWPP and provide comprehensive planning to protect the groundwater resource;
- Tetra Tech recommended in 2006 that the well supplying the Firehall be decommissioned and that the Firehall be connected to the Kluane Lake School Well. Tetra Tech understands this connection has not been completed.