

5.24 Destruction Bay - Health Centre Water Supply System

Destruction Bay is located about 270 km north of Whitehorse, Yukon on the Alaska Highway. The Destruction Bay Health Centre water system has water supplied from a 69 m deep artesian well, Well 3957. The well also provides water for two adjacent nursing residences. This system 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.

5.24.1 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.

5.24.2 Hydrogeology

The log for Well 3957 indicates that the well was originally drilled to a depth of 25.2 m bgs and completed in a gravel aquifer. The well was subsequently deepened to 68.9 m bgs and completed in a confined flowing artesian aquifer. The well log indicates that the subsurface lithology is comprised of variable gravel, silt, clay and till with fine-grained sediments from 46.9 m bgs to 60.3 m bgs comprising a significant confining layer. The depth of the well, presence of the confining layer and the artesian pressure indicate that there is protection from surface sources of contamination.

The groundwater flow direction in the vicinity of the well is inferred from topography to be east towards Kluane Lake.

5.24.3 Well Summary

The log for the Destruction Bay Health Centre well is included in the associated GIS map and database portion of this project. The following table summarizes available data for the water well.

Well Construction Parameters	Details	Source
Date of construction	The well was originally drilled by Midnight Sun Drilling Co. Ltd. in October 1989. The well was subsequently deepened by the same contractor in September/October 1993	Well Log
Total well depth	68.9 m bgs	
Casing	6" (152 mm) ID Steel Casing	
Casing depth	Unknown	
Well screen	Unknown	
Static water level	Artesian Flowing	Well log
Sanitary seal	No surface seal	

Table 5-58: Destruction Bay Health Centre, Well 3957 Summary

Well Construction Parameters	Details	Source
Wellhead completion	Split gasket cap modified for artesian pressure	Tetra Tech 2006
Wellhead stickup	0.35 m bgs	
Well rated capacity	Unknown	
Well GUDI status	Potentially GUDI	Based on well construction
Well Construction Comments:	Well was not constructed to meet the Canadian Groundwater Association Well Construction Guidelines.	

5.24.4 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 observations made in 2005 are summarized below:

- The total arsenic concentration, which ranged from 0.114 mg/L to 0.0148 mg/L on the dates sampled, exceeds the current GCDWQ MAC of 0.01 mg/L.
- The pH in the water samples collected from the first two sampling events, ranged from 8.68 to 8.79, and was in exceedance of the GCDWQ AO upper threshold value of 8.5 for pH;
- The water quality met all other health-based and aesthetic objectives for the parameters analyzed; and
- A review of indicators of potential contamination including chloride, nitrate and nitrite found that nitrate and nitrite concentrations were low and within the natural background ranges but chloride was slightly elevated above the natural background concentration. The slightly elevated chloride was likely due to the water softening system, and the analytical results of the indicator parameter suggest that the deep groundwater aquifer has not been affected by surface sources of contamination.

5.24.5 Water Treatment and Distribution

Table 5-59: Destruction Bay Health Centre 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 p.c. Lester Balsillie 2017
Water source	Groundwater	
Wells serving the system	Destruction Bay Health Centre Well 3957	
Treatment type	Treatment for the Health Centre connection consists of water softener, pH neutralizer, and colour removal.	

Table 5-59: Destruction Bay Health Centre Water Treatment and Distribution Details

Item	Details	Source
	For the nursing residences, in addition to the above treatment, there is an reverse osmosis unit at the point of use in Residence #1 kitchen	
Water users	YG employees and patients	
Delivery method	Piped to Health Centre and nursing residences	
Age of system/last known update	Unknown	

**Note: The care of this system is split between YG PMD and Yukon Housing. Tetra Tech understands the Health Centre water treatment system and the well are maintained by YG PMD and the nursing residences are maintained by Yukon Housing.

5.24.6 Source Water Protection Planning

There is no source water protection planning in place for the Destruction Bay Health Centre Well 3957. Source water protection planning here should be incorporated with source water protection planning throughout the community to create a comprehensive Destruction Bay SWPP.

Potential sources of contamination in the vicinity of the wellhead that were identified as part of the 2005 SPDWSA site review, included:

- An indoor fuel storage tank located 20 m from the well;
- An AST located 26 m from the well;
- A septic field located 65 m from the well;
- An abandoned well on the property; and,
- There had been a number of spill events of diesel fuel and raw sewage in the nearby area.

5.24.7 Water Supply Information Data Gaps

YG PMD and Yukon Housing have each 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; and,
- The construction details of the well are missing (well screen, screen size, casing depth, etc.).