5.52 Watson Lake - Airport Pumphouse Water Supply System

The Watson Lake Airport is located about 8 km northwest of the Town of Watson Lake, Yukon. The Watson Lake Airport pumphouse water supply system provides potable water to the Watson Lake Air Terminal Building, Maintenance Garage and Camping Area. The water 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 sources for human consumption.

5.52.1 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.

5.52.2 Hydrogeology

This Watson Lake Airport well was drilled to a depth of 33.2 m bgs and completed at a depth of 32.6 m bgs. From the well log, lithology encountered during drilling included a silt and sandy silt layer from 17.8 m bgs to 21.1 m bgs, and this 3.3 m thick fine-grained layer provides some degree of protection from surface contamination sources. The static water level in this well at the time of drilling was 5.3 m bgs. The groundwater flow direction inferred from topography is south towards Watson Lake.

5.52.3 Well Summary

The well log from the Watson Lake Airport Pumphouse well is included in the GIS map and database portion of this project. The following table summarizes available data for the water well.

5.52.4 Source Water Quality

The most recent water quality data available for this current study was from 2005 when Tetra Tech reviewed available groundwater chemistry data and collected an additional sample to test for identified potential parameters of concern. The observations made in 2005 are summarized below:

- The groundwater source is calcium-bicarbonate type with a pH of approximately 7.4 and is considered medium-hard with a measured hardness of 112 mg/L to 114 mg/L (as $CaCO_3$) on the dates sampled;
- Turbidity measured ranged from 23.4 NTU to 142 NTU. 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;
- The colour in the initial sample was measured at 60 CU which exceeds the GCDWQ AO of 15 CU, but the water colour in the subsequent sample was measured at <5 CU;
- Total iron concentration measured ranged from 1.28 mg/L to 3.14 mg/L, and exceeded the GCDWQ AO of 0.3 mg/L. The dissolved iron concentration was measured at 1.25 mg/L, which was similar to the total iron concentrations, indicating that the iron content can be attributed to both suspended solids an dissolved particles;
- Total manages concentration measured ranged from 1.84 mg/L and 2.69 mg/L, and exceeded the GCDWQ AO of 0.05 mg/L. The dissolved manganese concentration, measured at 2.65 mg/L, also exceeded the GCDWQ

AO, and indicates that the manganese occurs as dissolved ions and cannot be entirely attributed to elevated turbidity;

- The water met all other GCDWQ health-based and aesthetic objectives for the parameters tested;
- EPH and PAH were below the detection limits; and
- 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.

5.52.5 Water Treatment and Distribution

Table 5-133: Watson Lake Airport Pumphouse Water Treatment and Distribution Details

Item	Details	Source
Owner/Operator	Government of Yukon	Tetra Tech 2006 p.c. Nick Barnett 2017 p.c. Barry Drury 2017
Water source	Groundwater	
Wells serving the system	Watson Lake Airport Pumphouse Well	
Treatment type	None	
Water users	Wash water for airport workers, flight crews and passengers. Drinking water is supplied by water delivery	
Delivery method	Piped service connection to Airport building	
Age of system/last known update	Unknown	

5.52.6 Source Water Protection Planning

There is no SWPP/AWPP in place for the Watson Lake Airport Pumphouse Well 4851. Given the industrial nature of work on the adjacent Tanker Storage site and fuel storage at the airport, source water protection planning here would be warranted. An integrated SWPP that includes the Tanker Base supply well would provide a comprehensive approach to protecting the groundwater resource at the Watson Lake Airport.

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

- Sewer service lines at approximately 20 m from the well; and
- Reported hydrocarbon contaminants in soil and groundwater as close as 5 m to the well.

5.52.7 Water Supply Information Data Gaps

Tetra Tech understands there have not been significant upgrades to the water system since the SPDWS review in 2005. Data gaps identified in the course of this summary are:

- There is no source water protection planning for this groundwater resource; and
- As an outcome of the 2005 SPDWSA, Tetra Tech recommended installation of potassium permanganate green sand filtration system and an activated carbon filtration to reduce the high concentrations of iron, manganese and turbidity and to remove any potential hydrocarbon contamination. Tetra Tech understands this work has not been completed. Tetra Tech also recommended routine quarterly sampling for hydrocarbon contamination indicators. Tetra Tech understands this monitoring has not been implemented (p.c. B. Drury 2017).