5.37 Pelly Crossing – Selkirk First Nation Water Supply System

The Selkirk First Nation (SFN) owns and operates a public drinking water system in Pelly Crossing, Yukon. The SFN public water supply system sources water from two groundwater wells: Well 1 (called PW05-1 in previous reports) and Well 2 (called BW06-1 in previous reports), both of which are located in an undeveloped area in the Willow Creek Subdivision on the North side of the Pelly River in Pelly Crossing. The system is classified as a Large Public Drinking Water Supply System under the Yukon Drinking Water Regulations – Guidelines for Part I – Large Public Drinking Water Systems (YG 2007) and is also regulated under the Yukon Drinking Water Regulations - Guidelines for Part II - Bulk Delivery of Drinking Water (YG 2007).

5.37.1 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. For the SFN system, the following proponents were contacted to request information:

- Selkirk First Nation – Confirmed that the most up to date information had been captured in the 2012 LPDWSA, and gave approval for use of Tetra Tech data for the project.
- YG Community Services (the client) – YG CS provided data for several systems that they have been involved with the construction of when the other proponents contacted were not able to find the documents.
- YG Environmental Health – YG EHS was contacted and assisted with the provision of data for systems where a full dataset was not available from other sources.

5.37.2 Hydrogeology

Well 1 and Well 2 are both completed in the same unconfined gravel aquifer (Tetra Tech 2007). Depth to groundwater is approximately 15 m bgs to 18 m bgs. The groundwater flow direction is reported to be southwesterly (Vista Tek 2008).

The vulnerability of the aquifer encountered by Well 1 and Well 2 was assessed using the semi quantitative Intrinsic Susceptibility Index (ISI) method suggested by the Ontario Ministry of Environment. The ISI method defines aquifers with an ISI score of less than 30 as having high intrinsic susceptibility to surface sources of contamination. The ISI method calculated for Well 1 and Well 2 resulted in a value of 22 to 23, which indicates that the aquifer underlying the site has a high vulnerability to potential surface sources of contamination (Tetra Tech 2012).

5.37.3 Summary of Wells

Well logs for the two SFN public wells serving the system are included in the GIS map and database portion of this project. The following tables summarize the completion characteristics of the SFN wells.

Table 5-96: SFN Public Drinking Water System, Well 1 (PW05-1) Summary		
Well Construction Parameters	**Details**	**Source**
Date of construction	Well was completed by Double D Drilling in July 2005	Well log
Total well depth	28.9 m bgs	
Casing	8" (203 mm) ID Steel Well Casing	
Casing depth	25.9 m bgs	
Well screen	3 m x 200 slot (5 mm) stainless steel well screen from 25.9 m to 28.9 m bgs	Tetra Tech 2012
Static water level	6.45 m bgs (May 26, 2009)	Well log
Sanitary seal	Bentonite surface seal to 6 m bgs	
Wellhead completion	Pitless adaptor and enclosed within a fence. Freeze protection consists of an insulated cover and heat trace extending into the well	Tetra Tech 2012
Wellhead stickup	0.85 m ags	
Well rated capacity	4.9 L/s (65 IGPM)	
Well GUDI status	Non-GUDI	
Well Construction Comments:	Well was constructed to meet Canadian Groundwater Association Well Construction Guidelines.	

Table 5-97: SFN Public Drinking Water System, Well 2 (BW06-1) Summary		
Well Construction Parameters	**Details**	**Source**
Date of construction	Well was completed by Double D Drilling in September/October 2006	Well Log
Total well depth	32.0 m bgs	
Casing	8" (203 mm) ID Steel Well Casing	
Casing depth	29.0 m bgs	
Well screen	3 m 150 slot (3.8 mm) stainless steel well screen from 29.0 m bgs to 32.0 m bgs	
Static water level	6.45 m bgs (May 26, 2009)	
Sanitary seal	Bentonite surface seal to 6 m bgs	
Wellhead completion	Pitless adaptor and enclosed within a fence. Freeze protection consists of an	Tetra Tech 2012

Table 5-97: SFN Public Drinking Water System, Well 2 (BW06-1) Summary		
Well Construction Parameters	**Details**	**Source**
	insulated cover and heat trace extending into the well	
Wellhead stickup	0.8 m ags	
Well rated capacity	4.1 L/s (54 IGPM)	
Well GUDI status	Non-GUDI	
Well Construction Comments:	Well was constructed to meet Canadian Groundwater Association Well Construction Guidelines.	

5.37.4 Source Water Quality

Records provided to Tetra Tech for review during the 2012 LPDWSA indicate that Well 1 was sampled for water chemistry twice in 2009 and Well 2 was sampled twice in 2009 and once in 2010. The key observations and comments noted during Tetra Tech's 2012 review on the water quality are summarized as follows:

- The water from the SFN wells meets GCDWQ with the exception of the aesthetic objectives for total iron and total manganese;
- There have been no exceedances of GCDWQ maximum acceptable concentrations for parameters listed in Y DWR Schedule B; and
- A "spike" in both iron and manganese concentrations was observed on November 2, 2009 in Well 2 but have since returned to acceptable concentrations This could have been a result of analytical error, elevated turbidity (from biol. sloughing), etc.

5.37.5 Water Treatment and Distribution

Table 5-98: SFN Public Drinking Water System Treatment and Distribution Details		
Item	**Details**	**Source**
Owner/Operator	Selkirk First Nation	Tetra Tech 2012
Water source	Groundwater	
Wells serving the system	Well 1 and Well 2	
Treatment type	Filtration (10 and 1 micron steps) and chlorination	YES 2012
Number of connections	Population of approximately 200 (100 service connections, 48 delivery sites)	
Delivery method	Piped distribution and bulk water delivery	
Age of system/last known update	Water Treatment system completed in 2009	Tetra Tech 2012

5.37.6 Source Water Protection Planning

A Well Head Protection Plan (WHPP) was completed by Vista Tek in March 2008 and presents the following:

- Well capture zone is approximately 154 m wide and extends from the wells in a northeast direction;
- Groundwater flow is estimated to be 271 m/year and there are no known surface waterbody within the 1 year travel time boundary, but the Klondike Highway may be within the 10 year travel boundary; and
- The permeable sand and gravel soils in this area will contribute to the rapid transmission of surface contamination and the management area should be protected against the possibility of spills of hazardous materials;
- There were no potential contaminants of concern identified within the well capture zones.

Based on the results of the WHPP, Vista Tek recommended the following:

- Community education to communicate well protection areas and the importance of protecting the community groundwater resource.
- Signage on the Klondike Highway notifying the area where it passes through the well capture zone;
- Regular inspection of residential septic fields and the immediate vicinity of the wellheads and monitoring of water levels in Well 1 and Well 2; and,
- Creation of a contingency plan for the water supply system and utilization of the WHPP in community planning to ensure the well protection areas are maintained.

Although the aquifer is considered vulnerable to surface sources of contamination as indicated above, the following reduce the risk of aquifer contamination significantly:

- There have been no residential, industrial or agricultural developments previously within the well capture zones;
- Source Water Protection Planning is in place for this system; and,
- There were no potential contaminants of concern identified within the well capture zones by Tetra Tech's 2012 LPDWSA.

5.37.7 Water Supply Information Data Gaps

Tetra Tech has not identified any major system upgrade or expansion since 2012. For the purpose of this project, the following data gaps were identified:

- As the WHPP was created in 2008, it should be updated to include any changes that have occurred in the well capture zones and surrounding area since 2008.