

Aquifer Name: Bulkley Buried Channel Aquifer

Date of Mapping: September 2020

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## **A. AQUIFER DESCRIPTION FOR AQUIFER 0660**

### **A.1 CONCEPTUAL UNDERSTANDING OF HYDROSTRATIGRAPHY**

#### **A.1.1 AQUIFER EXTENTS**

The aquifer follows a low in the bedrock surface, which runs roughly parallel with the Upper Bulkley River, extending from the town of Topley down toward the town of Houston. The aquifer is bounded in the west by the Morice River, with the rest of the boundaries primarily defined based on borehole logs with some information from surface water features and topography.

#### **A.1.2 GEOLOGIC FORMATION (OVERLYING MATERIALS)**

The Bulkley Buried Channel Aquifer is typically immediately overlain by glaciolacustrine Fraser ice advance deposits but can be locally overlain by Fraser till (see Hinnell et al., 2020, Figures 7A to 7E). Glaciolacustrine Fraser ice retreat deposits overlay those deposits, with Holocene clean sand and gravel alluvial deposits associated with the Bulkley Surficial Aquifer (0659).

#### **A.1.3 GEOLOGIC FORMATION (AQUIFER) – 4B CONFINED GLACIOFLUVIAL**

As interpreted in cross-sections (Hinnell et al., 2020, Figures 7A to 7E) the Fraser-aged glaciofluvial sands of Aquifer 0660 are generally confined. The aquifer material is typically clean sand and gravel, with sand and fines in some locations.

#### **A.1.4 VULNERABILITY-LOW**

Available lithological information obtained from borehole logs indicate that the aquifer is covered by fine-grained, glaciolacustrine sediment or till across its extent. Accordingly, the aquifer is interpreted to have a low vulnerability to surface contamination.

### **A.2 CONCEPTUAL UNDERSTANDING OF FLOW DYNAMICS**

#### **A.2.1 GROUNDWATER LEVELS AND FLOW DIRECTION**

Static water levels in the aquifer range from relatively shallow (0.9 m) to deep (48.5 m). No provincial observation wells exist within the aquifer extents. Artesian wells were not reported for any of the wells in the aquifer.

Calculated groundwater surface elevations appear to correspond to topography, suggesting that the groundwater surface may be a subdued replica of the topography. Accordingly, groundwater is expected to flow towards the Upper Bulkley and Morice rivers.

### **A.2.2 RECHARGE**

The aquifer is expected to be primarily recharged from overlying and underlying aquifers (i.e. Topley Bedrock Aquifer [0654], Houston Bedrock Aquifer [0658], Upper Bulkley Alluvial Aquifer [0659], and the North Houston Bedrock Aquifer [0775]). The aquifer may be recharged by surface water features, like the Upper Bulkley River; however, further investigation is required.

### **A.2.3 POTENTIAL FOR HYDRAULIC CONNECTION**

Groundwater may be connected to the surface water features such as the Upper Bulkley River where the intervening fine-grained layers are thin, absent, and or fractured. Furthermore, where not separated by fine grained (low permeability) sediments, it may also be hydraulically connected with the underlying bedrock aquifers (Houston Bedrock Aquifer [0658], North Houston Bedrock Aquifer [0775], and Topley Bedrock Aquifer [0654]) and overlying unconsolidated sediment aquifer (Upper Bulkley Alluvial Aquifer [0659], see Hinnell et al. 2020, Figures 7A to 7E).

## **A.3 WATER MANAGEMENT**

### **A.3.1 ADDITIONAL INFORMATION ON WATER USE AND MANAGEMENT**

There were no water quality concerns recorded in the well records. Driller's well yield estimates range from between approximately 0.06 L/s to 12.6 L/s with a geometric mean of 0.86 L/s, suggesting a moderately productive aquifer with localized pockets of poorly and highly productive intervals. There were wells noted to be dry within the aquifer.

Where groundwater use records were available, the water wells were dominantly used for domestic water supply purposes.

### **A.3.2 ADDITIONAL ASSESSMENTS OR MANAGEMENT ACTIONS**

Brown and Erdman (1970) undertook an intrusive groundwater exploration for the proposed pulp mill. They identified an upper aquifer (equivalent to the Upper Bulkley Alluvial Aquifer [0659]) and a lower aquifer (equivalent to the Bulkley Buried Channel Aquifer [0660]). Both aquifers were found to be capable of meeting the required demand for the pulp mill.

## **A.4 AQUIFER REFERENCES**

BROWN, W. L., ERDMAN, R.B. 1970. Bulkley Valley Forest Industries Ltd. Groundwater Exploration for Proposed Pulp Mill at Houston, British Columbia. Sandwell and Company Ltd. December 1970.

Geographic datasets from the BC Data Catalogue, accessed August 2020 <https://data.gov.bc.ca/>

HINNELL, A. C., LENGYEL, T., FUNK, S. P., CLAGUE, J. J. & HAMMOND, Z. M. 2020. Vanderhoof and Houston Aquifer Mapping and Hydrostratigraphic Characterization. Water Science Series. Victoria, B.C.

TIPPER, H. W. 1971. Surficial Geology, McLeod Lake, 1:250000. Geological Survey of Canada.

## A.5 REVISION HISTORY

Date	Version	Revision Class	Comments	Author
20031124	1	Major	Initial Mapping of Aquifer	W.S. Hodge
20061114	2	N/A	N/A	A.P. Kohut
20200909	3	Major	Remapping Aquifer extents to match with surficial mapping	Andrew Hinnell, P.Geo., Tibor Lengyel and Sean Funk

Mapping by W.S. Hodge assumed to be initial mapping of aquifer. N/A – The extent of revisions implemented by A.P. Kohut not documented.