Aquifer Name: Kiskatinaw Glaciodeltaic Overburden Aquifer

Aquifer Number: 0596

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A. AQUIFER DESCRIPTION FOR AQUIFER 0596

A.1 CONCEPTUAL UNDERSTANDING OF HYDROSTRATIGRAPHY

A.1.1 AQUIFER EXTENTS

The aquifer is located along the Kiskatinaw River. The boundaries in the north, west, and east were based on the combination of the Kiskatinaw paleovalley extent (Hickin and Best 2013) and the 15 m depth-to-bedrock contour (Monahan et al. 2018) (Lengyel et al. 2023, Figure 1). The southern boundary is uncertain as the aquifer is likely continuous towards the south. The aquifer boundaries are uncertain in the north as the boundaries of the buried channel here are uncertain. The western boundary of the aquifer is uncertain due to lack of information on the hydraulic connection between aquifers 0590, 0594 and 0596. The coarse-grained sediments may not be continuous throughout the entire aquifer extent due to glacial erosion.

A.1.2 GEOLOGIC FORMATION (OVERLYING MATERIALS)

The aquifer is overlain by glaciolacustrine sediments, till, and colluvium. Glaciolacustrine sediments consist of silt and clay; the till mainly consists of poorly sorted clasts in a clay to sand matrix. Thirteen out of the 14 wells associated with the aquifer reported low-permeability, fine-grained material (clay, silt) on the surface, and one reported high-permeability, coarse-grained material (sand). The thickness of the overlying material is more than 15 meters (Monahan et al. 2018).

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

The aquifer material, interpreted to be Late Wisconsinan ice-advance glaciodeltaic origin, consists of silt, fine- to medium-grained sand, and gravel. Based on the thickness and the type of overlying material, the aquifer is interpreted to be a confined aquifer.

A.1.4 VULNERABILITY

Depth to groundwater varies from shallow to moderately shallow. The permeability of the aquifer has not been tested, but it is expected to be moderate to high based on the type of the dominant aquifer material (silt, sand, and gravel). Surficial mapping by Reimchen (1980) and borehole logs indicate that the glaciodeltaic aquifer is covered by fine-grained materials of variable thickness. The overall vulnerability of the aquifer to surface contamination has been qualitatively assessed to be low.

A.2 CONCEPTUAL UNDERSTANDING OF FLOW DYNAMICS

A.2.1 GROUNDWATER LEVELS AND FLOW DIRECTION

Static groundwater levels recorded in the provincial groundwater wells database (GWELLS) range from shallow (2.1 m) to moderately deep (35.1 m). There are no active provincial observation wells within the aquifer extents but there is one inactive provincial observation well (OW-113, Well Tag Number [WTN] 22906). There are no wells with artesian conditions in the aquifer.

The groundwater surface is interpreted to be a subdued representation of the topography based on regional interpolation of groundwater surface elevations. Groundwater is interpreted to flow primarily toward the Kiskatinaw River with a northerly component corresponding to the regional slope of the river valley.

A.2.2 RECHARGE

Recharge to the aquifer could occur via distributed infiltration of precipitation and snowmelt. The aquifer may be recharged from surrounding weathered bedrock (Goetz 2021) (i.e., aquifers 0593, 0595, 0633, and 1275). The aquifer may also be recharged by the Kiskatinaw River; however, the spatial and temporal understanding of these recharge pathways are uncertain and further investigation is required to evaluate these hydraulic connections.

A.2.3 POTENTIAL FOR HYDRAULIC CONNECTION

Groundwater may be hydraulically connected with the Kiskatinaw River, as well as with wetlands located in the southern portion of the aquifer extent, however, further investigation is required to evaluate the magnitude and level of hydraulic connectivity. Groundwater may also be hydraulically connected with the underlying bedrock aquifers (0593, 0595, 0633, and 1275) where bedrock aquifers are fractured, and where the aquifers are not separated by layers of fine-grained sediment.

A.3 WATER MANAGEMENT

A.3.1 ADDITIONAL INFORMATION ON WATER USE AND MANAGEMENT

Baye et al. (2016) reported exceedances for arsenic, iron, manganese, and hardness in some of the overburden wells within the area of aquifer 0596. Stated yields in the well records range from 1.1 to 3.2 L/s, with a geometric mean of 1.7 L/s indicating moderate productivity with localized zones of high productivity. Groundwater is used for domestic, commercial, and monitoring purposes based on the GWELLS database.

A.3.2 ADDITIONAL ASSESSMENTS OR MANAGEMENT ACTIONS

No water availability or water budget studies have been completed in the area.

A.4 AQUIFER REFERENCES

Baye, A., Rathfelder, K., Wei, M., and Yin, J., 2016. Hydrostratigraphic, hydraulic and hydrogeochemical descriptions of Dawson Creek-Groundbirch areas, Northeast BC. Victoria, Prov of B.C. Water Science Series 2016-04.

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A.5 REVISION HISTORY

Date	Version	Revision Class	Comments	Author
2011	1	Major	Initial mapping of aquifer	Lowen Hydrogeology Consulting Ltd. 2011.
02/10/2023	2	Minor	Aquifer boundaries updated to reflect aquifer extent based on updated conceptual model	Tibor Lengyel, M.Sc., P.Geo., Judit Deri-Takacs, Ph.D., Andrew Hinnell, Ph.D., P.Geo.