Aquifer Name: Trail Townsite Overburden Aquifer

Aquifer Number: 0483

Date of Mapping: December 30, 2022

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A. AQUIFER DESCRIPTION FOR AQUIFER 0483

A.1 CONCEPTUAL UNDERSTANDING OF HYDROSTRATIGRAPHY

A.1.1 AQUIFER EXTENTS

Aquifer 0483 is located along the Columbia River floodplain (see Figure 1; Lengyel et al. 2024). The aquifer boundaries were delineated based on surficial geological mapping of glaciofluvial sediments by Fulton et al. (1984). Aquifer 0483 is separated from aquifers 0484 and 0501 by inferred bedrock outcrops which interrupt the glaciofluvial sediments in the Columbia River valley.

A.1.2 GEOLOGIC FORMATION (OVERLYING MATERIALS)

Borehole records show boulders, silt, silty sand, and in some cases, clay overlie the aquifer (typically between 0 to 5 m of overlying material). Based on surficial geological mapping (Fulton et al. 1984), the aquifer material comprising glaciofluvial sand and gravel occurs at the surface, with no overlying material.

A.1.3 GEOLOGIC FORMATION (AQUIFER) – SUBTYPE: 4A – UNCONFINED GLACIOFLUVIAL AQUIFER

The aquifer is comprised of glaciofluvial sands and gravels (Fulton et al. 1984).

A.1.4 VULNERABILITY – HIGH

The depth to water is shallow, with an average depth to water of 8.1 m. While the permeability of the aquifer has not been tested, it is expected to be high based on the type of aquifer material (sand and gravel). Generally, the aquifer is exposed at the surface and is unconfined. Some boreholes show a thin (0 to 5 m) confining layer protecting the aquifer from contaminants from the surface. The overall vulnerability of the aquifer has been qualitatively assessed as high.

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) are shallow (0.6 m to 14.6 m)[1]. No provincial observation or artesian wells are within the aquifer extents.

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 towards the Columbia River with a southerly component influenced by the regional slope of the river valley**.**

A.2.2 RECHARGE

Recharge to the aquifer could occur via distributed infiltration of precipitation and snowmelt as the aquifer is exposed at surface. Much of the recharge is expected to occur in the spring associated with snowmelt. The aquifer may also be recharged by the Columbia River and its tributaries where the intervening overburden is thin, as well as deep groundwater flow associated with mountain block recharge in adjacent mountain ranges via the underlying bedrock aquifers (1281 and 1282). However, the spatial and temporal understanding of recharge mechanisms is uncertain and further investigation is required to confirm hydraulic connections.

A.2.3 POTENTIAL FOR HYDRAULIC CONNECTION

Groundwater is inferred to be hydraulically connected to the Columbia River. The aquifer may also be connected to the underlying bedrock aquifers (0500, 1281, and 1282). While inferred bedrock outcrops separate them, aquifers 0483, 0484, 0501, and 1117 are part of the same group of overburden aquifers along the Columbia and Kootenay Rivers.

A.3 WATER MANAGEMENT

A.3.1 ADDITIONAL INFORMATION ON WATER USE AND MANAGEMENT

Based on the water quality comments in the GWELLS database, one well reported elevated hardness and sulphur as a water quality concern. Reported well yields for 14 of 19 wells (excluding five wells that had no reported well yield) within the aquifer range between 0.001 L/s and 60.9 L/s, with a geometric mean of 3.0 L/s, indicating an aquifer with high productivity with localized zones of low and moderate productivity.

The intended use of groundwater, where recorded, was for domestic and commercial purposes based on land use and well records.

[1] The water wells with the deepest static water levels of 52.7 m (Well Tag Number 66202) and 109.7 m (Well Tag Number 110145) were not included as they were suspected to be erroneous measurements.

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

Berardinucci J. and K. Ronneseth, 2002. Guide to Using the BC Aquifer Classification Maps for the Protection and Management of Groundwater. BC Ministry of Water, Land and Air Protection, Water Air and Climate Change Branch, Water Protection Section.

Fulton, R.J., Shetsen, I., and Rutter, N.W., 1984. Surficial geology, Kootenay Lake, British Columbia-Alberta. Geological Survey of Canada, Open File 1084, 1:1,000,000 scale.

Geographic datasets from the BC Data Catalogue, accessed December 2022 https://data.gov.bc.ca/.

Lengyel, T., Verma, S., Deri-Takacs, J, and Hinnell., A. 2024. Aquifer Mapping in the Kootenay/Boundary Region of British Columbia: Creston, Rossland, Castlegar, and Salmo. Water Science Series, WSS2024-05. Prov. B.C., Victoria B.C.

A.5 REVISION HISTORY

Date	Version	Revision Class	Comments	Author
20020228	1	Major	Initial mapping of Aquifer	N/A
20221230	2	Major	Remapping of Aquifer	Tibor Lengyel, M.Sc., P.Geo., Simrat Verma, M.Sc., Judit Deri-Takacs, Ph.D., and Andrew Hinnell, Ph.D., P.Geo.

Note: Author of first mapping not available