

TECHNICAL MEMO

TO: Mr. Jayme Franklin, P.Eng.
Franklin Engineering Ltd.

DATE: 9-10-18

Shuswap Country Estates

FROM: Daniel Watterson, P.Geo.
Watterson Geoscience Inc.

WGI Project No. 18-073

SUBJECT: **Groundwater Supply Assessment, Proposed Additional Development at Shuswap Country Estates**

Watterson Geoscience Inc. (WGI) understands the Shuswap Country Estates (SCE) residential development wishes to increase the number of residences at the property from the existing 68 units to 132 units at maximum build-out.

Because of water supply concerns raised by nearby residents, WGI was retained to review available hydrogeological information and comment on the ability of the local well and aquifer to sustainably supply water to the proposed development expansion.

Based on information provided by Mr. Jayme Franklin, P.Eng. with Franklin Engineering Ltd. (Franklin), publicly available data available on the online BC Ministry of Environment (MOE) Water Resources Atlas (WRA), and by historic well testing reports provided by Interior Health, WGI understands the following:

- Current water demand for the 68 units is approximately 45 m³/day or about 10 US gpm.
- Projected water demand for the 132 units is conservatively estimated at approximately 109 m³/day or about 20 US gpm.
- This water is obtained from Well 88915, which is located in the southeast corner of the property. This 0.15 m (6 in) diameter well was drilled in 2004, is 127.41 m (418 ft) deep and is completed in overburden and fractured bedrock.
- Wells to the north and east of the community are completed in sand and gravel Aquifer 232 IIC, described as having low vulnerability with moderate productivity and demand. No quality or quantity concerns have been raised for this aquifer.
- In contrast, wells in the SCE vicinity are completed in an unnamed bedrock aquifer comprised of mid-Cretaceous-aged granodiorite and various older Cambrian to Silurian-aged fine clastic sedimentary rocks.
- Well records from the MOE WRA database indicate numerous other wells are completed in the bedrock aquifer, with reported flow rates ranging between 0.7 and 45 US gpm. This well production suggests the local bedrock aquifer is moderately productive.

TECHNICAL MEMO

- Other than a nearby well periodically used by CP Rail for dust control (Well 99585), all other known wells are located more than 300 m from Well 88915.

In 2008, Summit Environmental Consultants Ltd. (Summit) completed a comprehensive capacity testing program on Well 88915. Key findings from this program include:

- The well was flow tested for 50 hours at rates and durations ranging from 15 US gpm for 47 hours, 25 US gpm for two (2) hours, and 30 US gpm for one (1) hour.
- Approximately 25 ft of drawdown was observed during the 15 gpm part of the test, approximately 42 ft of drawdown was observed while pumping at 25 gpm, and significant drawdown as observed when pumping at 30 gpm.
- The maximum drawdown projected after 100 days of continuous pumping at 15 US gpm was about 26 ft, which was only 7% of available drawdown.
- Based on the ratio of water flow rate to amount of drawdown, Summit projected a long-term sustainable production rate of 71 US gpm.
- After the test ended, the water level in the well recovered to 99.7% of static level in less than one (1) hour, which strongly suggests the aquifer can readily replenish the pumped water and groundwater supply is sustainable.
- Limited drawdown (about 4 ft or 2% of available drawdown) was observed in Well 88915 from pumping the nearby CP Well. This observation suggests that simultaneous pumping of both wells does not significantly affect each well's ability to produce water.

The available information suggests Well 88915 can meet the projected water demand of 20 US gpm for the community at full build-out. Although production rates vary widely between wells, the production capability for the community well and CP Rail well, along with flow rates for numerous other wells in the vicinity, demonstrate the bedrock aquifer's sustainable water production capability. Summit recommended additional testing should be completed to further demonstrate the well's ability to sustainably produce water at 25 US gpm and WGI concurs with this recommendation.

This assessment has been completed in accordance with generally accepted engineering and environmental practice. In preparing this analysis I have relied in good faith on information provided by others, the accuracy of which I cannot attest. No hydrogeological investigation can wholly eliminate uncertainty regarding the potential for unrecognized conditions in connection with an aquifer or subsurface materials.

Do not hesitate to contact the undersigned if you have any questions or wish to discuss any aspect of this report.

WATTERSON GEOSCIENCE INC.

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