EXECUTIVE SUMMARY

As requested by Thompson Nicola Regional District (TNRD), Golder Associates Ltd. (Golder) has completed a wellhead protection plan (WHPP) for the Barriere Community Water System in Barriere, BC. The Community of Barriere is presently serviced for water supply by three wells that are operated by the Barriere Improvement District (BID). Two of the wells (PW#1 and PW#2) are in excess of 40 m deep and situated relatively close together while the third well (Well#2) is located approximately 500 m to the northeast of the deeper wells but is less than 7 m deep.

Well#2 is screened in an unconfined surficial sand and gravel aquifer that is likely directly hydraulically connected with the Barriere River. Well#2 has been tested at a rate of 11.08 L/s and is capable of producing flows at this rate. PW#1 and PW#2 are both screened in a lower confined sand and gravel aquifer that is overlain by approximately 24 m of silty clay that acts as a confining unit. PW#1 has been tested at a rate of 44.2 L/s and is capable of producing flows at this rate. PW#2 has been tested at a rate of 50.91 L/s and is capable of producing flows at this rate.

The 60-day, 1-year, 5-year and 10-year capture zones for the three production wells result in an elongated ellipse shape extending upgradient along the Barriere River. The 10-year capture zones for each production well extend as far as approximately 12.5 km in an upgradient direction for Well#2 and 6.5 km for both PW#1 and PW#2. The capture zones for Well#2 do not consider likely connection with the Barriere and would likely be considerably reduced in an upgradient direction. The proposed wellhead protection areas for each production well should extend slightly outside the respective 10-year capture zones.

The assessment of risks to the production wells from activities within and outside the capture zone is low. Activities included in this assessment were non-sewered residences and commercial activities.

This executive summary is not a stand-alone document: all conclusions and recommendations and terms and conditions in the main body of this document should be read, understood and followed.

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8.1 Aquifer Protection

Because of the resulting capture areas and the size of the aquifers in which the production wells are screened, it is probably impracticable to develop a complete aquifer/groundwater protection plan for the entire Community of Barriere. An aquifer or groundwater protection plan is a management and operational tool used for protection of the entire groundwater resource within an aquifer. Golder strongly urges the TNRD and the Community of Barriere to educate the general public on the issues of groundwater protection. This education would help to lessen the potential for adverse impacts on the entire aquifer resulting from discharge or spillage of contaminants to the ground or other high risk (to the aquifer) activities. The mindset of groundwater protection should be pursued to preserve this extremely valuable resource

9.0 CONCLUSIONS AND RECOMMENDATIONS

9.1 Conclusions

It is concluded that:

1. Well#2 is completed at a depth of 6.22 mbgs in an unconfined surficial aquifer. The aquifer has a moderate vulnerability to contamination from surface sources as it is unconfined. The unconfined aquifer is likely hydraulically connected with the Barriere River.

2. Well#2 was tested at 11.08 L/s and is capable of producing groundwater at the tested rate.

3. PW#1 and PW#2 are completed at depths 68.9 and 48.2 mbgs, respectively in a lower confined aquifer. The lower aquifer has a moderate to low vulnerability to contamination from surface sources as it is confined and protected by an approximately 24 m thick silty clay to silt aquitard.

4. PW#1 was tested at 44.2 L/s and is capable of producing groundwater at the tested rate. PW#2 was tested at 50.91 L/s and is capable of producing groundwater at the tested rate. Both PW#1 and PW#2 are likely capable of producing groundwater at increased rates at or near the screen ratings.

5. The configuration of the upper and lower aquifers and the proximity of the production wells to the recharge boundary of the Barriere River dictate the development of the capture zone. In the immediate vicinity of the production wells, the capture zones overlap with one moderate risk activity; the residential in

ground septic disposal. Because PW#1 and PW#2 are screened in a confined aquifer overlain by 24 m of silty clay, these production wells are likely at an extremely low risk of contamination from surface sources. Well#2 is screened in an unconfined surficial aquifer and therefore is not offered the same protection as PW#1 and PW#2 and therefore may be at greater risk of contamination from in ground septic disposal. The capture zone of Well#2 may also be reduced in size if a large quantity of the water is derived from the Barriere River.

6. Well#2 is located within 100 m of the Barriere River which would flag the well as GUDI. Because of the shallow depth of Well#2, its completion in an unconfined surficial aquifer that is likely in direct connection with the Barriere River and the appearance of total coliforms in water samples collected from the well, this well is assessed to be GUDI and the appropriate treatment requirements should be met.

9.2 Recommendations

Recommendations are provided to the TNRD as follows. Any recommendations provided in the text are repeated below:

With respect to wellhead and aquifer protection:

1. Each of the production wells should be inspected to ensure the presence of an adequate surface annular and casing seal. Seals should be repaired/installed where they are found to be damaged or absent.

2. The TNRD should alert any residences that are within the WHPA of their potential to contaminate groundwater and therefore affect the quality of their own water supply.

3. The TNRD should consider the pros and cons of placing signs around the WHPA (essentially making it clear to all exactly where damage might be done to the community supply) to make people aware of the groundwater resource and general groundwater protection measures.