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District of Central Saanich
1903 Mount Newton X Road
Saanichton BC V8M 2A9
Via email: nirmal.bhattachary@csaanich.ca

Attention: Nirmal Bhattachary, P.Eng.
Re: Senanus Drive Watermain Study

Dear Sir:

In response to the questions that emerged from the December 11, 2006 Committee meeting, we have reviewed the existing water network and rerun the water model for Option 1, provision of domestic water supply only to the end of Senanus Drive, for various servicing scenarios. The following is a brief summary of our findings addressing the questions:

1. Our water modeling result showed that the existing water network is capable of providing approximately 65 L/s fire flow at Hydrant #190, east of Thomson Road, during maximum day demand (MDD). Minimum residual pressure of 140 kPa could be maintained within the system during this fire flow condition. In accordance with the guidelines outlined by Fire Underwriter Survey (FUS), this available flow would provide adequate protection for a wood construction detached building with approximately 185 m² (2,000 ft²) floor area.
2. The water system for Option 1 was modeled to determine maximum fire flow available at St. Stephen's Road. The model results showed that the potential extension of the 200 mm diameter watermain would be able to deliver an estimated 25 L/s of fire flow to St. Stephen's Road during MDD and maintaining 140 kPa residual pressures in the system. In accordance with FUS guidelines, minimum fire flow requirement for residential area should be 33 L/s, and given the large floor areas of the homes in this area, the available flow would not offer adequate fire protection.
3. The potential 200 mm diameter watermain extension on Mt. Newton Cross Road in Option 1 would be capable of delivering an additional 6.5 L/s flow to the area under peak hour demand (PHD). Based on the District of Central Saanich design criteria of 9.50 L/dw (single residential unit average day demand), an estimated 127 additional single-family units could be serviced by the potential watermain extension.

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It should be noted that areas serviceable by the potential watermain extension would be governed by the existing hydraulic grade line of the existing Saurashtra Pressure Reducing Station which is set at 109 m. The hydraulic grade would restrict potential development to area below 80 m elevation which would exclude much of the area north of Mt. Newton Cross Road.

4. Using the water model for Option 1 servicing scenario, maximum fire flow available at the end of Senanus Drive was reviewed. The water model results showed that approximately 25 L/s fire flow would be available at Senanus Drive. There are two main restrictions in providing the needed fire flow to the end of Senanus Drive. Firstly, being a dead end system and with over 5 km of pipes between the source and the Henderson Point, large friction loss could be expected in the water system thus minimizing the capability of flow delivery. Secondly, the hydraulic head in the system would not be able to deliver the large flow past the high point of the area, just west of St. Stephen's Road. This rise in elevation limits the flow to the end of the system. Consequently, increasing the pipe size to 200 mm diameter would have negligible impact of the flow availability.
5. Allowing for the possibility of increased development along Mt. Newton Cross Road, water modelling results indicated that approximately 22 L/s fire flow would be available at the end of Senanus Drive. Again, increasing the pipe size to 200 mm diameter would have negligible impact on the flow.
6. Incorporation of a booster or fire pump east of St. Stephen's Road might be able to increase the hydraulic head in the system and possibly meet the fire flow demand at the end of Senanus Drive. With the requirement of high flow and low head, a multi-stage centrifugal pump system would possibly be required. Work involved to implement a booster pump system would entail construction of pumpstation building, installation of pumps and necessary mechanical appurtenances, and electrical work. We are in discussions with a pump supplier to gather some information with regards to pump size and cost estimates. This information will be forwarded to you upon receipt.

If you have any questions or require further information, please call.

Sincerely,

bullock baur associates ltd

Elizabeth Lau

per E.C. Lau, P.Eng

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