MDM Groundwater Consulting Ltd. is reviewing Piteau's July 12, 2016 memorandum "Hydrogeological Assessment – 13610 Banks Crescent, Summerland, BC" on behalf of Freshwater Fisheries Society of BC (FFSBC) in response to the District of Summerland's request that FFSBC provide review comments/feedback by October 28, 2016. It is understood that Piteau's memorandum was prepared on behalf of the Lark Group to fulfill the District's requirement for a "*Hydrological Assessment Report confirming …… how the natural ground water source that feeds the fish hatchery will be protected from impact*".

The primary objectives of MDM Groundwater's on-going review are:

- Consider hazards identified in the memorandum that could potentially affect either the quantity or quality of groundwater available from the Summerland Trout Hatchery's sole source of water (Shaughnessy Springs)
- Consider the unmitigated risks associated with the hazards identified in the memorandum and the approaches recommended for effective mitigation of assessed risks
- Prepare a written review (i.e., Response Letter) with independent Qualified Professional opinion of the potential for the proposed Lark Group project (the Project) to impact either the quantity or quality of Shaughnessy Springs water

<u>Preliminary Review</u>

MDM Groundwater completed a preliminary review of Piteau's memorandum this week, prior to contacting you by phone and briefly discussing the following two items:

- Water Quantity: The memorandum assesses potential groundwater quantity impact as "low". However, the memorandum does not confirm if the Project will rely on groundwater from the sand/gravel unit that is the source of water for Shaughnessy Springs.
- Water Quality: The lone water quality hazard identified in the memorandum, that could potentially impact Shaughnessy Springs water, is elevated turbidity related to certain return-period storm events and construction-phase activities.

To complete our final review and prepare the Response Letter required by the District, MDM Groundwater is requesting some addition information and clarifications related to potential Project interactions with Shaughnessy Springs.

<u>Water Quantity</u>

Confirmation is required that the proposed Project will not either withdraw groundwater from or directly dispose of water into the water-bearing sand/gravel strata underlying Project lands. With such confirmation, combined with the information already provided in your memorandum, MDM Groundwater would be positioned to concur with Piteau's overall assessment of water quantity impact and, further, would assess the potential for Shaughnessy Springs water quantity effects as "no potential impact".

<u>Water Quality</u>

In discussing Project post-construction stormwater management, Piteau's memorandum refers to a "Concept Servicing" document prepared by CTQ Consultants Ltd. Piteau confirms the proposed Project will have no stormwater connection and, therefore, will initially retain/store stormwater on-site and release "*to the natural drainage course*", which, during certain return-period conditions, could "*result in elevated turbidity conditions at Shaughnessy*

Springs". This stormwater turbidity is to be specifically mitigated by dissipating the water flow energy and filtering at the point of discharge.

During construction-phase, the memorandum identifies ambient stormwater runoff, airborne dust and construction vehicle vibrations as hazards that could potentially introduce or induce elevated turbidity in Shaughnessy Springs water. Typical BMP's (silt fencing, sedimentation ponds and dust suppression) and a suggestion to consider moving the Project construction access point westward from Shaughnessy Springs are the recommended mitigation measures. A Shaughnessy Springs turbidity monitoring program is also suggested in the memorandum.

Changes in water quality at Shaughnessy Springs have potentially "very high consequence" for the hatchery, given their 100% reliance on spring water for fish management. Hatchery staff has confirmed that source water turbidity is a primary water quality operational parameter. Historically, only short-term incidents (i.e., pulses) of elevated turbidity in facility water have occurred in response to animal activity near the spring area. The facility is equipped to manage such occurrences. However, any recurring instances of intermittently high turbidity, or sustained high turbidity or even single pulses of very dirty source water can potentially induce egg/fish mortality, thus impacting the hatchery's primary operational objective and also affecting associated off-site operations reliant on hatchery production.

Hatchery staff have further confirmed that, due to the unique biological sensitivity of their facility, they must assume a "zero tolerance" position regarding introduction of water with typical urban runoff quality to their facility. Runoff from high-density urban development can inherently include low concentrations of chemicals known to affect egg/fish health, such as oils/greases from parking areas, and herbicides/pesticides etc. from landscaped/lawn areas, and other unknown chemicals that can be either accidentally or intentionally introduced to surfaces exposed to rainwater. Accordingly, post-construction runoff from the proposed Project or any other high-density development should not enter the Shaughnessy Springs area given the potential "very high consequence" for the FFSBC operations and associated off-site operations.

Both the construction-phase and post-construction mitigation measures and monitoring recommended by Piteau are known to be effective in controlling and reducing turbidity. However, given that the Project will necessarily convey stormwater off-site, presumably eastward and potentially toward the Shaughnessy Springs area, and given that construction-phase traffic may necessarily travel near the Shaughnessy Springs area, the potential residual impacts (mitigated) on the Shaughnessy Springs water quality should be consider "high" based on the hatchery's particular sensitivity to water quality effects. If Piteau or others (CTQ?) can confirm that stormwater collected from the proposed Project during both the construction phase and post-construction phase will not be conveyed into the Shaughnessy Springs area and, instead, will be hydraulically separated from the Shaughnessy Springs area, then that pathway for potential water quality interaction will be removed and the corresponding water quality effects assessed as "no potential impact". It is understood the CTQ servicing information is at conceptual level; however, we would like to have confirmation of those concept details, to determine if the required hydraulic separation is included.

Thanks for your consideration of this request. Please give me a call any time to discuss further.

Regards,

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