



PO Box 2546, Bellingham, Washington 98227

December 22, 2023

Steven Dahl
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Re: Potential Groundwater Mounding
Proposed surface mine expansion
Skagit County Parcel P4486

It is my understanding that Skagit County is conducting a SEPA review of the proposed mine expansion and has requested additional information regarding the potential for the additional stormwater infiltration resulting in groundwater mounding? And, if so, would groundwater mounding have potential impacts on neighboring properties and water supplies?"

Based on our assessment of the proposed mine area (geology hazard assessment and hydrology assessment), it is our opinion that the expansion of the mine as proposed will not result in appreciable groundwater mounding beneath the mine area and groundwater levels will not impact the slope to the west of the mine area as water levels will remain very near their current levels.

Details of the groundwater conditions are provided in the Hydrologic Assessment (May 15, 2020). Per that assessment, the proposed mine is within an area of glacial recessional outwash with no units within the proposed mine or above the deposit that impede groundwater infiltration. There are no low permeability units overlying the mine.

Removal of the trees and the top soil layer in order to excavate the sand and gravel may result in an increase in the amount of water infiltrating to groundwater below the mine due to the loss of vegetation transpiration and top soil storage of water. These changes in infiltration will be offset as the mine reclamation plan will require that previously mined areas will be covered with stored top soil and revegetated.

The removal of sand and gravel and thus lowering of the elevation may also result in infiltrated surface water reaching the groundwater aquifer faster.

Groundwater beneath the subject property appears to consist two of aquifers: 1) A semi-confined aquifer is within an approximately a 10- to 15-foot thick silty outwash gravel unit capped by a thin (~2 ft) but apparently continuous silt layer and 2) A deeper confined aquifer beneath a 150-foot thick silt and clay cap. Measurements of outwash material from the shallow unconfined

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aquifer on the adjacent Sauk Landfill also provide estimates of hydraulic gradient (0.007 ft/ft), hydraulic conductivity (1.4 ft/day), porosity (25%) and groundwater flow velocity (0.04 ft/day) (Skagit County Public Works, 2018). These very high porosity levels and flow velocities will preclude any appreciable mounding above existing groundwater levels. Water levels in the aquifer fluctuate about 30 feet on a seasonal basis from infiltration of water over a large area. The large fluctuation of water levels indicates that the water flow from the aquifer to the river is very rapid.

As noted in our initial assessments of the slope stability of the area and the hydrology of the site the mine and the slope to the west are underlain by well drained sand and gravel and no impervious area or springs are present on the slope to the west. The small temporary increase of water infiltration at the mine will not have an appreciable impact on water levels in the underlying aquifers and the hydrogeology of the slope to the west of the mine.

Sincerely yours,
Stratum Group



Dan McShane, L.E.G., M.Sc.
Licensed Engineering Geologist

