Sukunka River Landslide (2019) Assessment Report

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Background

On March 23, 2019, Emergency Management BC (EMBC) requested assistance from the BC Ministry of Forests, Lands, Natural Resource Operations and Rural Development (FLNRORD) to conduct a landslide hazard and risk assessment of a rural property located along Highway 29, in the Peace River District. The address of the property is 8657 Highway 29S, Peace River District (Fig. 1). On March 24th, a FLNRORD staff with expertise in landslide science examined the landside. This examination included helicopter and field-based assessments. The duration of the inspections was approximately 2 hours.

Information Provided by the Occupant and Owner of the Property

On March 21 or 22, 2019 the tenant renting 8657 Highway 29S noticed fractures extending across their yard, near their porch. During the day of March 23, approximately 50m of the slope slid towards the Sukunka River. The tenants were awake and in the house during the landslide event but were unaware that the landslide had occurred. Given the close proximity of the house to the landslide's main scarp, the tenants chose to self-evacuate.

Findings

- The landslide occurred on March 23, 2019.
- The width of the landslide is some 60m and the length is some 50m (Fig. 2).
- The landslide's main scarp came to within 2.5m of the porch supports, or 4m from the house foundation (Figs. 3, 4).
- The main scarp was 10 to 12m high and is near vertical in places.
- Lacustrine (lake bed) clay soils were observed in the main scarp, at the top of the landslide, and near the bottom of the slope. The lacustrine soils appeared contorted in the left (north) lateral scarp, suggesting previous landslide activity (the right lateral scarp was not examined). Further, angular blocks of coarser soils were observed in scarp exposures at several locations which also suggest previous landslide activity.
- At the toe of the landslide, the rupture surface emerged below river ice level causing the ice to be up-thrust onto the landslide colluvium. Further, five large cracks in the ice extended across the Sukunka River and river ice was up-thrust onto the opposite river bank.
- The landslide colluvium represents only a minor constriction of the Sukunka River, and will be unlikely to cause upstream or downstream flooding.

- The landslide can be described as a translational earth slide in glacial lacustrine soil. This type of motion is common for landslides in the Peace River area with basal rupture surfaces in glacial lacustrine soil.
- No more tension cracks were seen behind the main scarp of the landslide.
- The Sukunka River remained mostly frozen and a considerable snow pack remains. Once the river starts to flow, the toe of the landslide is expected to quickly erode away. Further, with the progression of spring melt, coupled with the thaw of ground frost, the soil water content is expected to increase. These conditions may cause a further reduction in slope strength.
- Some further retrogression of the main scarp is considered probable. This retrogression could be due to possible continued activity of the main body of the landslide, or due to slope modification of the main scarp, bringing it to a gentler gradient.

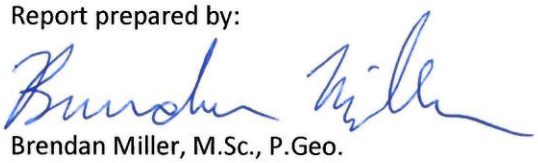
Recommendations

Given the proximity of the house to the main scarp (4m), the height and steepness of the main scarp (10 to 12m), and the impending onset of spring snow melt, ground frost thaw, and enhanced river flows, it is my opinion that this dwelling is currently unsafe for occupation. A subsurface investigation is required to quantify the landslide hazard. This subsurface investigation might involve drilling and laboratory soil property testing. It is recommended that a subsurface investigation be conducted to determine if the dwelling is safe for occupation.

Disclaimer

This assessment is a reconnaissance assessment. There is always a degree of uncertainty when conducting reconnaissance assessments due in part to the limited information on which opinions must be formed. This report should be considered a reconnaissance assessment of the current condition at the time of the assessment. This report was done for immediate public safety concerns, and should not be relied on for other geotechnical or hydrotechnical hazard or risk assessments, or for planning purposes.

Report prepared by:



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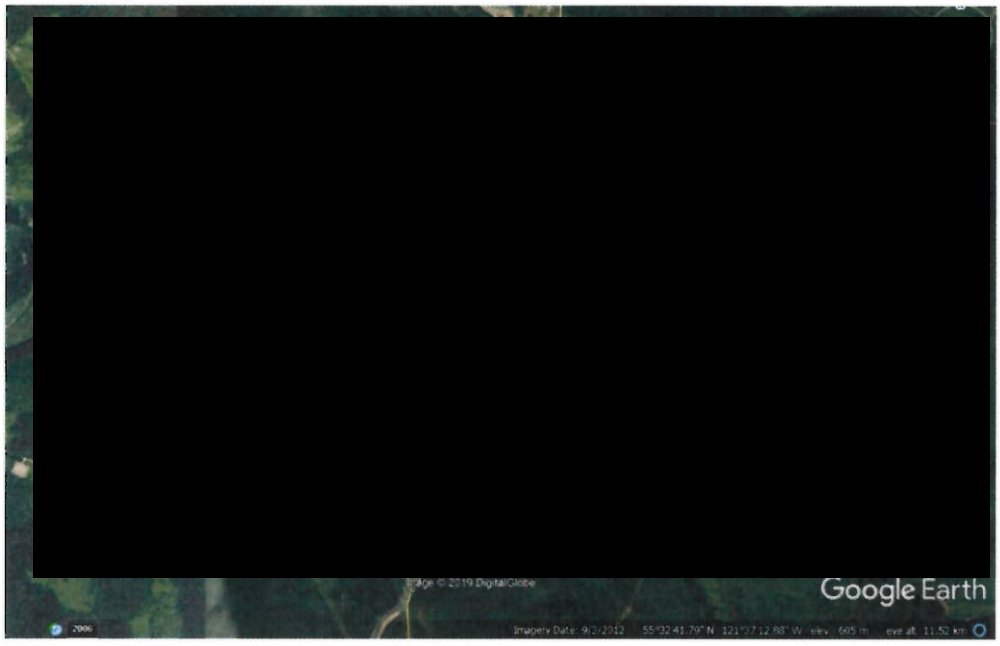

Figure 1. Location of the dwelling at 8657 Highway 29S, Peace River District, BC.

Figure 2. Extent of March 23, 2019 landslide along the Sukunka River and its proximity to the dwelling at 8657 Highway 29S.

Figure 3. Proximity of the mainscarp to the dwelling foundation.

Figure 4. Oblique photo showing the height and steepness of the mainscarp in relation to the dwelling, and proximity of the main scarp to the dwelling.