

MEMORANDUM

State of Alaska

DEPARTMENT OF NATURAL RESOURCES DIVISION OF GEOLOGICAL AND GEOPHYSICAL SURVEYS

TO: Jill Taylor
Division of Coastal and Ocean Management

DATE: February 11, 2011

FROM: De Anne Stevens
Division of Geological & Geophysical Surveys

TELEPHONE NO: 451-5014

SUBJECT: Chilkat River (Schnabel Fill & Culvert Installation) hazard area designation

Pursuant to 11 AAC 110, 11 AAC 112, and the memorandum by Steve Winker, Division of Mining Land & Water, issued on February 9, 2011, and in conjunction with the current Alaska Coastal Management Program (ACMP) consistency reviews of the Chilkat River (Schnabel Fill & Culvert Installation) project (DCOM I.D. No. AK 1101-02J / ADL 108049), I am providing the following scientific justification for designating a natural hazard area. Specifically, I recommend that DNR designate as a landslide hazard area the state lands along the west-southwest flank of the Takshanuk Mountains from the western boundary of the Haines Coastal Management Area northwest to National Geodetic Survey benchmark "Picnic," from the ridge crest down to the 20 meter (65 foot) elevation level.

Please consider the following justification:

1. The proposed designated area is subject to natural hazards listed at 11 AAC 112.990(15)(A), including flooding, earthquakes, landslides, storm surges, erosion and beach processes, although only landslide processes are the subject of this area designation.
2. The proposed materials site is approximately 1 mile outside the boundary of the Haines Coastal Management Area and slope conditions are equivalent to or more extreme than those comprising designated slope hazard areas within the management area (fig. 1). The Haines Coastal Management Plan (2007) notes that small landslide and snow avalanche debris accumulations occur along the steep mountain front north and northwest of Haines and along the fjord walls of the Chilkoot and Lutak inlets. The Plan (2007) goes on to point out that numerous landslides of considerable extent occur frequently in the Haines borough, and that a landslide in the late 1890's virtually destroyed a Native village at 19-mile Haines Highway.
3. The site is located at the base of a debris fan formed by snow and rock avalanches, debris flows, and rock falls (fig. 2a,b). The limited and/or lack of vegetation at the site demonstrate that these processes are still active. Landslides and mixed mud and snow debris avalanches can occur in this type of setting during or after periods of extreme precipitation. Large rain events may cause massive amounts of water and debris to

rapidly flush down the tributary gullies from sources high up the mountain, and snow avalanches may catastrophically deposit snow and rock debris at and beyond the toe of the slope. Steep rock walls above the site may be sources of rock falls that could shed boulders onto the extraction operation. Ground shaking due to earthquakes may exacerbate the potential slope hazards.

4. Based on measurements made on USGS topographic maps, the current slope angle is approximately 36 degrees and represents the natural angle of repose of the constituent materials. Extraction of a sufficiently large amount of material to significantly increase the slope angle and/or undercut the toe of the deposit has the potential to trigger slope failure.

The available evidence indicates that slope processes along the slopes of the Takshanuk Mountains are very dynamic. It is important that any proposed operations to extract materials fully explore and mitigate potential impacts from these processes. Worker safety and siting of any staging/operations structures and equipment should be carefully evaluated in light of the potential hazards that may be inherent at this location. Ancillary effects of triggered landslides may include impacts on the stream at the foot of the deposit, or to the Haines Highway.

Consequently, I recommend that the areas described above on the west-southwest slopes of the Takshanuk Mountains be designated for the period of this consistency review.

If you have any questions, please do not hesitate to contact me.



Figure1. Location of proposed materials site in relation to designated slope hazard areas of the Haines Coastal Management Plan. Red line is Management Area boundary, yellow shading is designated slope hazard area. Source: Haines Coastal Management Plan (2007).

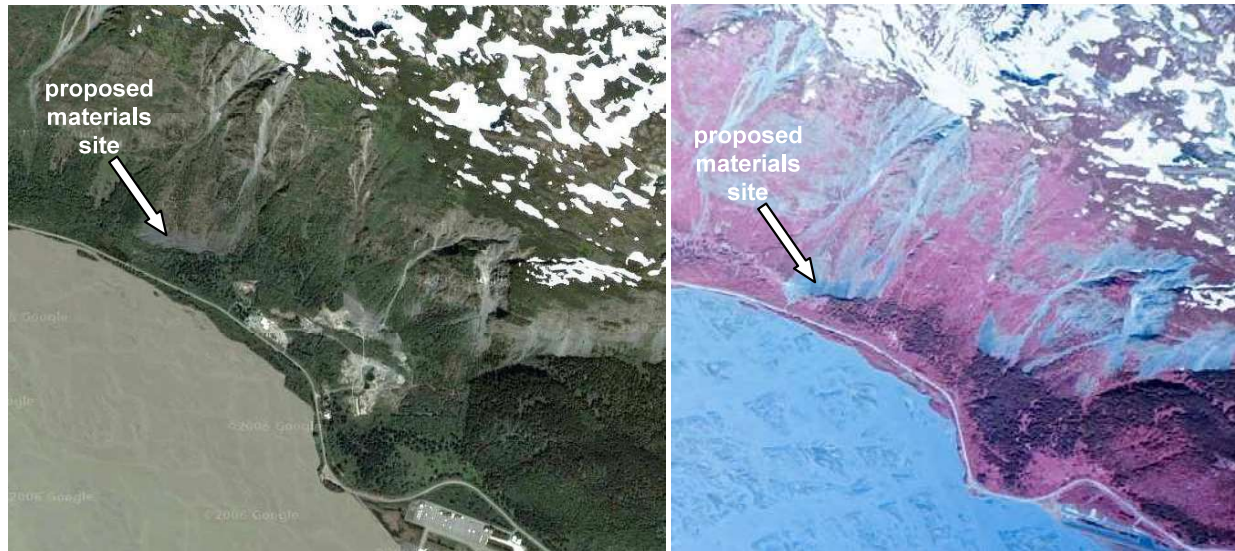


Figure 2. Recent true-color satellite image (a) and 1971 color-infrared aerial photograph (b) of the proposed materials site. The debris fan is sourced in the steep slopes and rocky alpine gullies above the site. Vegetation appears pink and dark red in the color-infrared photograph (b); note lack of vegetation on the fan surface, indicating ongoing, active slope processes. Source: Google Maps (a) and USGS (b).