



August 21, 2015

Stillwater County Board of Commissioners
400 East 3rd Avenue North
Columbus, Montana 59019

Subject: Stillwater River Road Rockfall Hazard Summary

Dear Stillwater County Board of Commissioners:

GeoStabilization International (GSI[®]) is pleased to offer this letter regarding the existing rockfall hazards at the Stillwater River Road rockfall site. GSI conducted a site reconnaissance with Great West Engineering and Mark Shreiner of Stillwater County on June 26, 2015 and a follow up reconnaissance with the County Commissioners and County Attorney on August 11, 2015. We have also reviewed information contained in the SK Geotechnical Report completed on June 15, 2015 titled "Geotechnical Reconnaissance, Stillwater River Road Rock Slide, East of Absorokee, Montana."

The previous rockfall failure was caused by mobilization of a large rock wedge that increased the stresses on the adjacent mass to the right, and caused failure that deposited significant debris (approximately 150 tons) on the road and into the river. Remaining on the slope is a much larger rock mass (greater than 10 times the weight) in the shape of a wedge that remains on the near vertical slope in an unstable configuration. This image of the failed section and unstable wedge are shown in subsequent figures. Signs of distress on this mass are visible and leads to the conclusion that failure of this large wedge will occur; however, there is not a scientific method to determine the exact timeframe in which it will occur. Our best judgment would put it within the next 10-15 years, but could just as likely be within the next year. It is most prone for failure after a significant rain event or during the freeze-thaw process in the spring.

Given the recent failure that deposited significant debris into the river combined with the significant increase in size of current potential failure mass, the possibility of damming of the river below cannot be ignored. The possibility of damming the river can only be determined through the completion of hydraulic study that compares the volume of material that could be deposited in the channel and overall geometry of the channel and floodplain. At minimum, a migration of the river channel should be expected.

This large unstable mass poses a significant hazard to the road users, the adjacent river, and potentially nearby dwellings across the river. GSI recommends that the road remain closed until rockfall remediation is completed.

Figure 1: Frontal View Outline of Unstable Rock Wedge

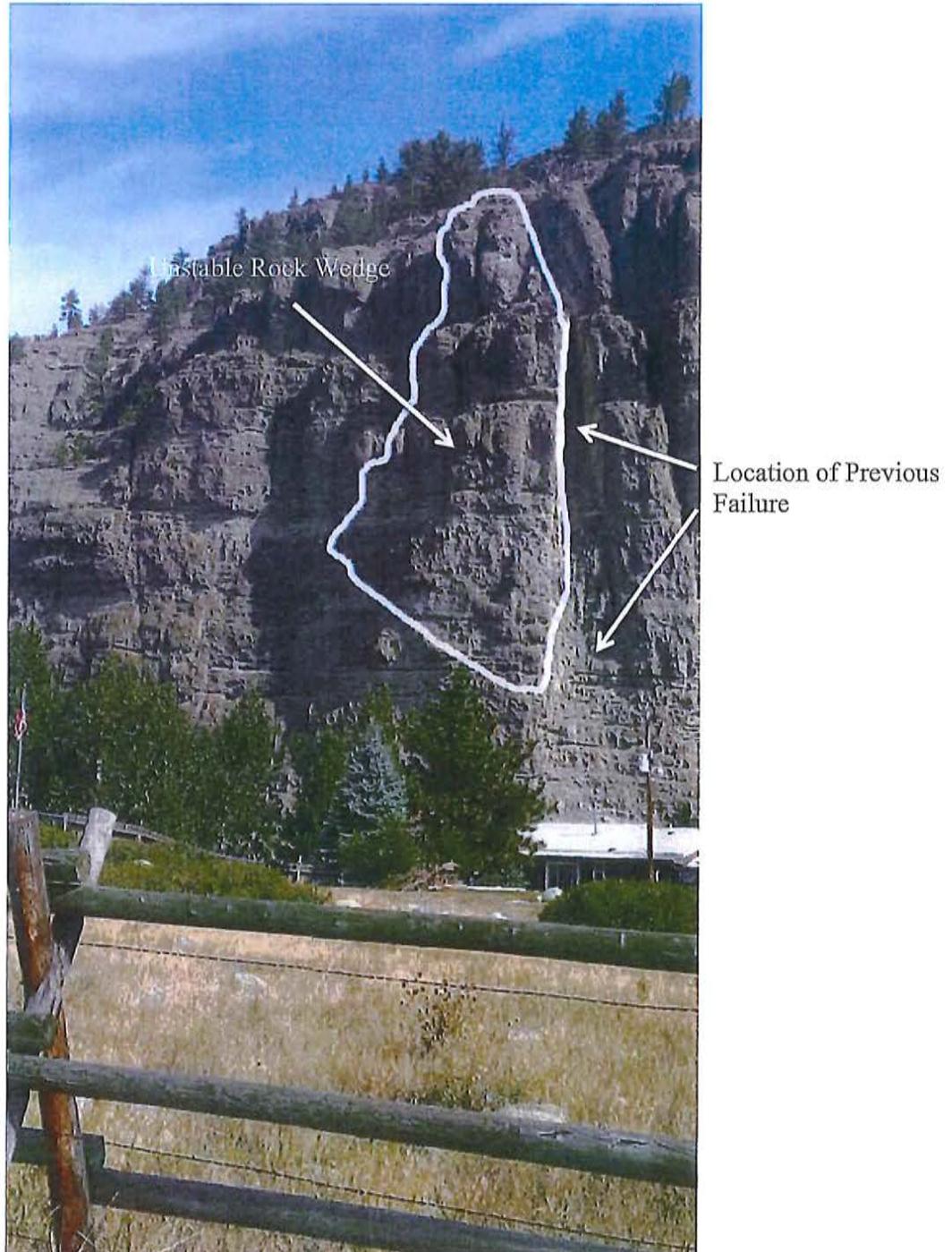


Figure 2: Up Close View of Unstable Rock Wedge Left of Previously Failed Block

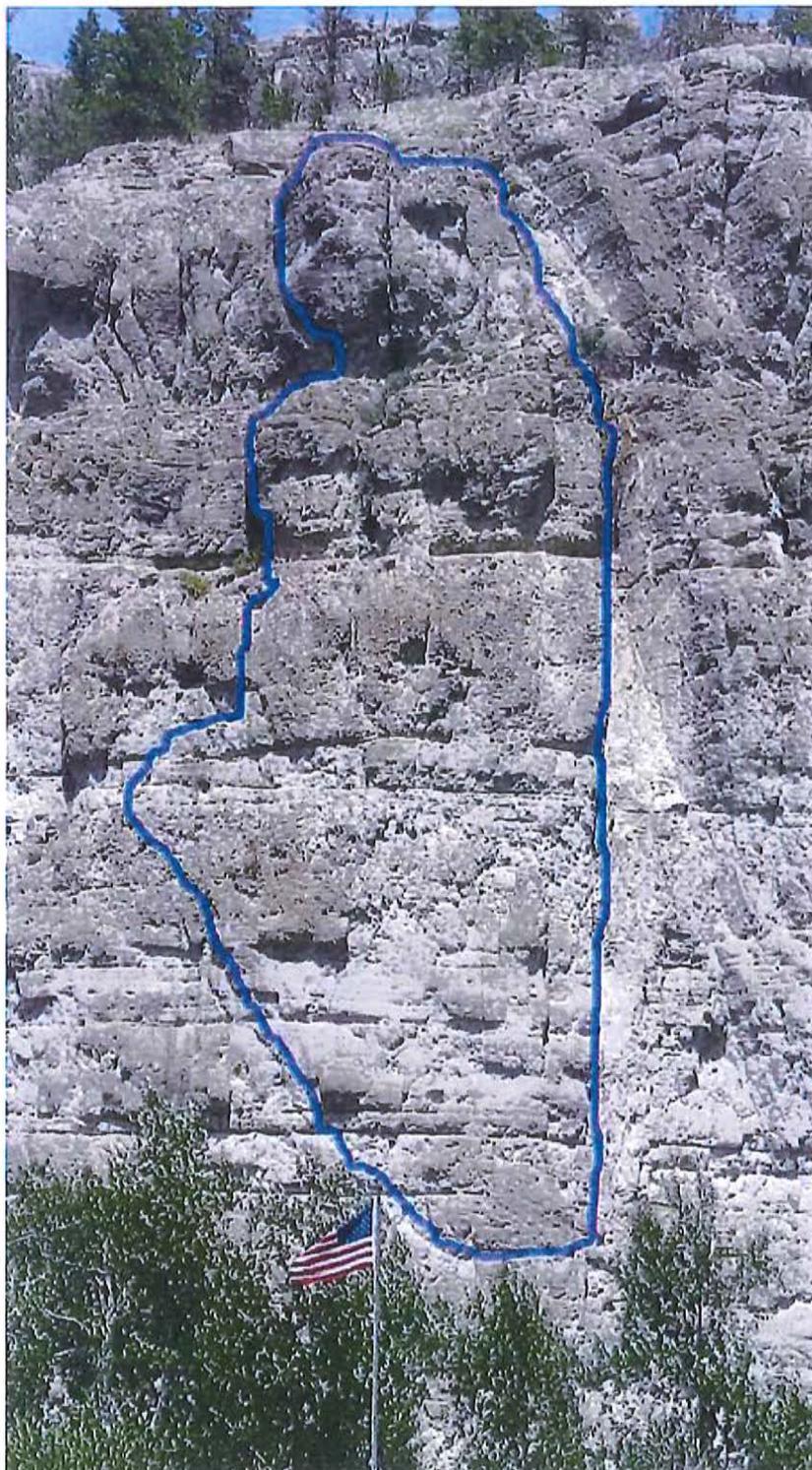
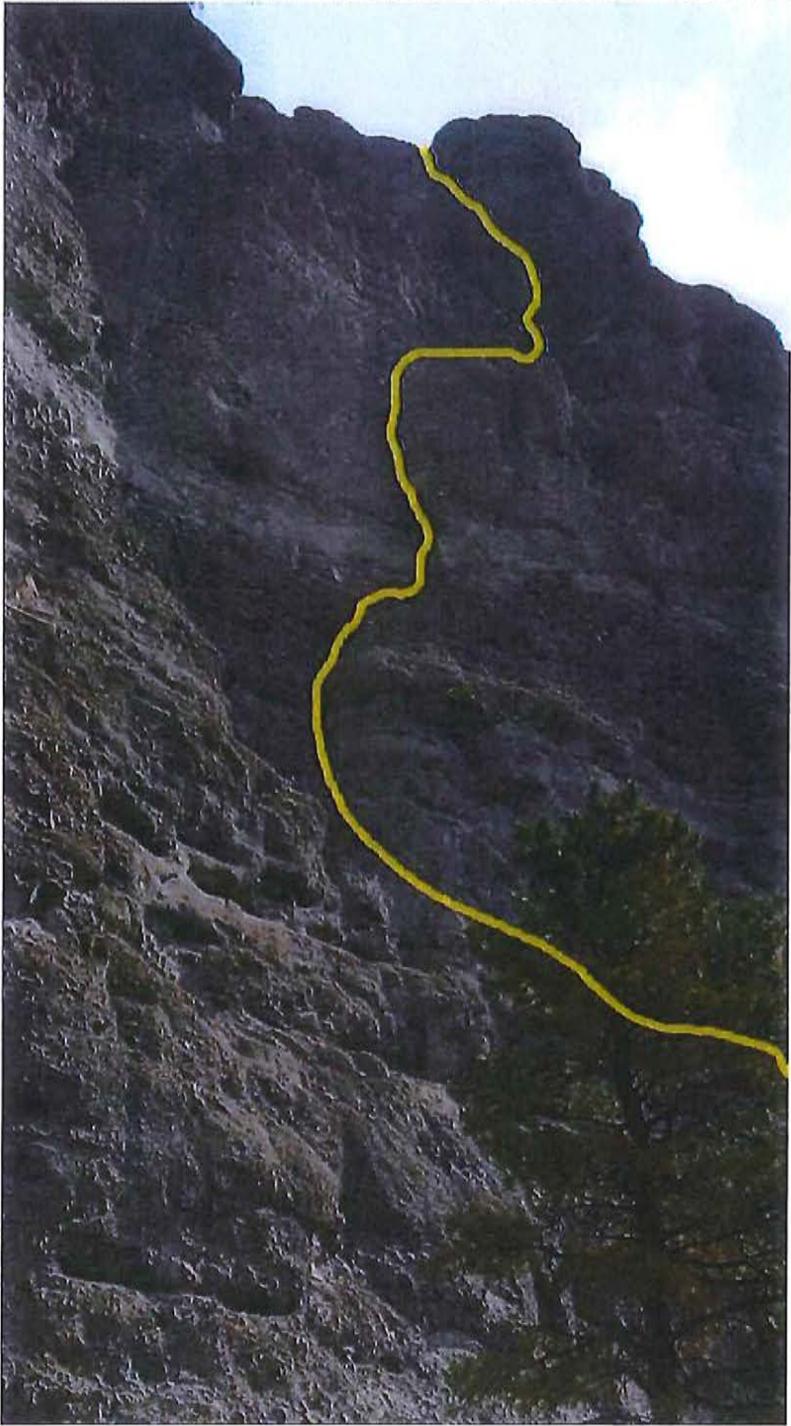
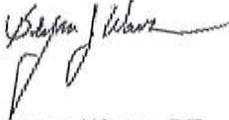


Figure 3: Failure Plane on Left Side of Unstable Rock Wedge



Sincerely,
GeoStabilization International



Bryan Wavra, PE
NW Project Development Engineer



Martin J. Woodard, PhD PG PE
Rockfall Division Engineer



Daniel Journeaux
Rockfall Division Director