



COLORADO

**Division of Reclamation,
Mining and Safety**

Department of Natural Resources

1313 Sherman Street, Room 215
Denver, CO 80203

MEMORANDUM

To: Peter Hays

From: Tim Cazier, P.E. 

Date: May 17, 2019

**Re: Douglas Mountain Ranch Mine – Permit No. M-2018-016;
Flood Analysis Submittal – Preliminary Adequacy Review**

The Division of Reclamation, Mining and Safety engineering staff (DRMS) has reviewed the Flood Analysis dated March 6, 2019 for Permit Application M-2018-016, prepared by Greg Lewicki And Associates, PLLC.

The review consisted of comparing the application content with specific requirements of C.R.S 34-32.5-116(4)(h) and Rule 3.1.6 of the Minerals Rules and Regulations of the Colorado Mined Land Reclamation Board for the Extraction of Construction Materials. Any inadequacies are identified below along with suggested actions to correct them.

1. Section 1.1.2 Flood Event Velocity – The unlabeled table on page 2 gives floodplain elevations, cross sectional flow areas, wetted perimeters, and hydraulic radii. Section 1.1 on page 1 states no base flood elevations are provided in the FEMA flood map. Furthermore, Section 1.1.2 provides no basis for how any of the parameters in the unlabeled table were obtained. In addition, there is some discussion about the average hydraulic radius, which is meaningless given the high variability of the cross-sectional area (4274.2 at 8+68 to 10208.8 at 6+34). Given the variability in cross-sectional area, the flow velocity would be expected to vary considerably. It is unclear as to whether the stated 60 feet per second velocity is an average or a worst case. Regardless, this extremely high velocity would be expected to cause severe scouring which would be expected to potentially undermine the existing banks of the creek, leading to potential stream capture without additional creek bank armoring and/or berm protection. The narrative also indicates Lewicki And Associates believe the 100-year floodplain is 100 feet off (reference the third paragraph on page 1). If this is truly the case, a considerable amount of additional effort and perhaps some map comparison is necessary to justify this statement.



The DRMS expects a full floodplain analysis using hydraulic modeling software such as the US Army Corps of Engineers' HEC-RAS (or equivalent) to show pre- and post-mine flood comparisons. The model should account for any variability in cross-sectional area, Mannings roughness, contraction/expansion losses, ineffective flow areas, etc.

2. Section 2 Mining and Reclamation Plans Impact on Flood Waters – The narrative under Figure 2 on page 3 states the mined out area will act as a hydrologic sink. If this is truly the case, the Division of Water Resources (DWR) may require evaporative losses be accounted for by obtaining a substitute water supply plan in the interim and an augmentation plan for the long term. Please provide documentation indicating this has been addressed with DWR.
3. Section 2, Riverside berm spillways – The narrative in the first paragraph on page 3 provides dimensions for the proposed spillway using Urban Drainage design criteria (South Platte River flows). Please provide a design analysis justifying the proposed spillway configurations.

If either you or the applicants have any questions regarding the comments above, please call me at (303) 866-3567, extension 8169.