COLORADO
Division of Reclamation, Mining and Safety
Department of Natural Resources

Date: January 14, 2020

To: Zach Trujillo

From: Tim Cazier, P.E.

RE: Pikeview Quarry, DRMS File No. M-1977-211;
Geotechnical Review in Support of Amendment AM-04

The Division is reviewing AM-04 for the Pikeview Quarry. A significant portion of this amendment deals with a revised reclamation slope steeper than that proposed in AM-03. The Division has received an objection letter which has questioned the use of strength parameters in the AM-04 slope stability analyses and that the previous conservative strength parameters should be used. The Objector's consultant has indicated he cannot find various reports that area and have been referenced in previous submittals. Those referenced in AM-04 are as follows (*reference p. 2 of 4 [pdf p. 164], Stantec Memo in Exhibit 6.5 of the AM-04 application received 8/26/2019*):

- Core logs (including strata descriptions and RQD) for drill holes EXC-1 to EXC-4.
- Laboratory test data from drill hole core samples.
- Laboratory test data from bulk soil samples taken from trenches.
- Previous engineering reports, including:
  - CTL Thompson Inc., 2009. Slope Stability Evaluation Pikeview Quarry. Report to Transit Mix Aggregates. May 19.
  - Exponent Failure Analysis Associates, 2011. Investigation of the Pikeview Quarry. Report to Counsel for Continental Materials Corp. September 22.
  - Seegmiller International, 2012. Stability Analysis Reclaimed Slope Design, Pikeview Quarry, El Paso County, Colorado. Prepared for Norwest Corporation. July 2012.

The Objector's consultant has also called into question the derivation (reduction) of the seismic coefficient used for the pseudo static analyses.

The goals of the review are as follows (in order of importance):

1. Determine if the Division has all the referenced previous study reports, data and test results needed to support the AM-04 stability analyses.
   a. If not, identify what is missing.
2. Make an assessment of and provide a recommendation as to the appropriateness of the strength parameters used in the AM-04 stability analyses.

3. Review the seismic coefficient used for the pseudo static analyses and make a recommendation as to its appropriateness for the site.

Please be aware the Permittee has submitted two adequacy responses: the first received December 11, 2019, and the second received January 8, 2020.

The objection letter was received 10/30/2019. The following table summarizes the relevant comments:

Comment	Commentor	Page #	Comment #	Category
What studies / information indicate granite as exists in the upper parts of the quarry, along w/ any faults, fractures, or jointing, will be stable?	Mount		3	**Geotech**
Section 3.1 explores Exponent Material Strength Properties and carefully concludes that " ... the values calculated by Seegmiller are conservative for use in evaluating the slope stability." Once again, given the cost involved in constructing this buttress, the history of instability of this highwall at this site and the need to ensure long term stability for final reclamation, Unit Weight, Cohesion and Friction Angles that are the most conservative must be used for stability calculations.	Mount		23	**Geotech**
no data to back up the stabilization claim and the highwalls shown on Amendment 4, though lower than Amendment 3, are still 300 to 400 feet tall.	Dean	2		**Stability**

Relevant revisions to this permit are the following: AM-04, AM-03, and TRs 12, 13, 14(?), 15, 16, 17(?), 18, and 19(?) [those revisions with "(?)" may have limited to no use in the evaluation].

Please complete the review and recommendation memorandum by the close of business January 16, 2020.