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September 15, 2020

Mr. Eric Scott PG, RG
Colorado Division of Reclamation Mining and Safety
1313 Sherman Street, Room 215
Denver, CO 80203

RE: Aggregate Industries-WCR, Inc. Deer Creek Quarry (M1997-014) Interim Stability Evaluation

Dear Mr. Scott,

Aggregate Industries-WCR Inc. (AI) is currently obligated to submit an interim stability evaluation of the exposed highwalls within our Deer Creek Quarry (M-1977-014). This is a preliminary evaluation performed prior to the complete geotechnical stability and kinematic evaluation of the exposed highwalls scheduled for Q1 2021.

BACKGROUND

AI has operated the quarry since 1997. While the quarry has been kept in active status since that time, significant highwall development has not occurred since 2003, when market conditions and operational considerations led us to reducing capacity. Our operational plan is to continue to keep this quarry in active status for the foreseeable future, while not significantly increasing mine production.

During the timeframe when the quarry was in full production (1997-2003) and in limited production (2003 – present), the highwall, while not specifically evaluated for stability, has remained stable with respect to overall global stability, mass sliding, mass toppling, and mass wedge kinematic events.

INSPECTION

AI performed a visual inspection of the site on September 11, 2020. The purpose of the inspection was to evaluate current highwall conditions with respect to stability (global and kinematic). During the inspection, an AI engineer experienced in stability monitoring and evaluations of hard rock quarry highwalls traversed the site to observe the exposed highwalls from various strategic locations. The locations were selected to allow for full highwall, prominent joint set, and foliation observations. Pictures were taken from these locations to provide current documentation of the highwall conditions, as well as to allow time over time comparisons of these conditions with those observed during the Q1 2021 complete geotechnical evaluation.

EVALUATION

The rock type present within the Deer Creek Quarry is typical of that present within other quarries in the area, and is generally described as fine- to medium-grained granitic gneiss or biotite gneiss. Occasional intrusions of composed of pegmatitic material are present in the granitic gneiss. No shear zones were visible, although this does not indicate that no zones are present within the quarry.

The rock observed is typically slightly weathered to moderately weathered. Several highwall sections are more highly weathered. These sections are typically in areas proximal to the original (pre-mining) ground surface. Two prominent joint sets are visible throughout the within the Quarry along with a prominent foliation. Joint and foliation characteristics were not evaluated as part of this inspection. This will occur during the Q1 2021 geotechnical evaluation. It should be noted that the foliation trends appear to be SE-NW and near vertical, with prominent high angle N-S and E-W trending joint sets.

The global and kinematic risks present at the site are similar to other quarries in the area. The risk of large scale failures appears to be minimal. This is due to the highly fractured nature of the rock and the orientation of the prominent joint sets and foliation. These conditions tend to lead towards smaller scale localized failures and instabilities that are unlikely to propagate into larger scale risks to the larger highwall and quarry as a whole. The small scale/localized failures are likely to be captured on the existing benches. Kinematically, the conditions onsite allow for the development of minor wedge and sliding failures, however, unlike other quarries in the area, the vertical nature of the foliation allows for localized toppling failures to potentially develop.

Upon submission of this memorandum, AI will make operational staff that work at the site aware of the minor and localized failure risk present at the site. We will also discuss conditions for staff to be aware of during day to day activates at the quarry. AI's internal standard operating procedures should be sufficient to minimize risk to staff and visitors.

AI will work with our selected consultant to develop a scope for the Q1 2021 geotechnical evaluation that will allow for the nature and characteristics of any instabilities identified onsite to be developed and evaluated in detail. The evaluation will include global and kinematic analyses and will use the same approach that has been successfully implemented at the Morrison Quarry for the annual geotechnical addendums. This will allow AI to plan and develop mitigation measures, if necessary.

Jeremy Deuto, P.E., P.G.
Regional Land and Environment Manager
Aggregate Industries-WCR Inc.