CESARE, INC.
Geotechnical Engineers & Construction Materials Consultants

October 21, 2021

Mr. Eric Leigh
Monarch Mountain Mineral and Aggregate
2660 West 64th Avenue
Denver, CO 80221

Subject: Geologic Hazards and Highwall Stability Study
Lilly Mines
Garfield, Colorado
Project No. 21.6087

Dear Mr. Leigh:

A Cesare, Inc. (Cesare) engineering geologist visited the Colorado Marble LLC quarry in the Lilly Mines area of Taylor Gulch off Monarch Pass, Country Road 228 on June 15, 2021 to address the geologic hazards and highwall slope stability.

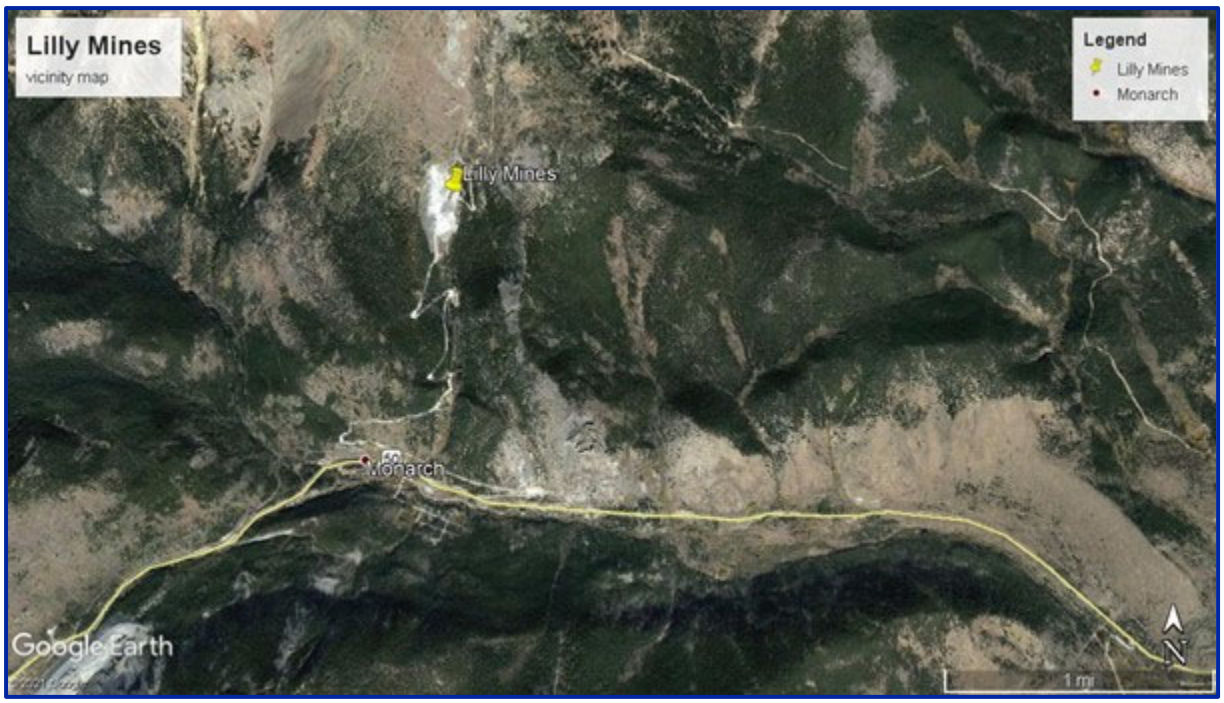

EXHIBIT 1. Vicinity map of the Lilly Mines project. The active mining area is 1.4 miles north of US Highway 50 in Garfield, Colorado.

Summary

- The highwall area of the Lilly Mines is a north-south striking cut face. The main fracture sets include northwest dipping, southwest dipping, and a vertical fracture set that aligns with the strike of the bedding. The intersection of the fracture sets and the highwall cut face are stable (no wedge failure indicated) within 20 degrees (+/-) of the current strike

of the highwall.

- There are areas of moderately massive rock with fewer continuous fracture sets and repeating areas of highly fractured rocks. The highly fractured areas create rock blocks of 1 foot or less along their long axis and pose more of a rockfall hazard. Monitoring the change in rock mass character will reduce the rockfall risk as operations move along the highwall.
- The operational platform showed some erosion and instability along the edge.
- Overall, the rockfall hazard along the highwall and in the operational areas is being well managed.

1. SCOPE

The purpose of the site visit was to address the highwall stability and associated rockfall, as stated in the Division of Minerals and Geology (DMG) letter dated June 1, 2006. The mine was nonoperational the morning of June 15, 2021. Cesare's engineering geologist observed the highwall cut face and surrounding area of mine operations.

2. SITE CONDITIONS

The geology on the western side of the valley is dominated by north-south striking steeply dipping sedimentary and metasedimentary units of Paleozoic age, and the eastern side of the valley is dominated by the Silver Plume granite. There are intrusions of Mt. Princeton quartz monzonite in the area. The valley also includes mapped glacial moraine units to the northeast and south. The Paleozoic sequence that outcrops here includes the Manitou Dolomite, the Harding Quartzite, the Chaffee Formation (dolomite, limestone, quartzite), the Leadville Limestone, and the Belden and Minturn Formations (shale, limestone, quartzite). "*Geologic Map and Sections of the Garfield Quadrangle, Gunnison and Chaffee Countries, Colorado*". The Colorado Marble Quarry follows the north trending outcrops of the Leadville limestone, locally metamorphosed into marble.

The marble formation has several major joint sets and fracture patterns. The main joint set dips 43 degrees N10W and the secondary joint set dips 48 degrees S15W. This intersecting joint pattern indicates some degree of potential wedge failure of blocks (Exhibit 2). A third joint set follows strike of the bedding and has a nearly vertical dip (Exhibit 3) This fracture creates 1.5 to 6 foot blocks. The marble unit becomes highly fractured in areas along the highwall. The highly fractured zones occur about every 100 feet along the strike of the outcrop (Exhibit 2). These fracture zones have four fracture sets that break the rock into blocks 1 foot or less on their long axis. The probability of rockfall in these zones is increased, although the hazard is from smaller blocks. Local areas of this highly fractured and jointed marble limit the long-term stability of the overall rock mass. The strike of the unit and the strike of the joint sets provide short-term control of the highwall face.

EXHIBIT 2. The main fracture sets of the working highwall at Lilly Mines. The red lines are the main intersecting fracture sets in this area. These fracture sets tend to be larger and more persistent in the rock mass. Smaller fractures, like the one represented by the yellow line, are not persistent throughout the rock mass. The blue lines indicate a more highly fractured zone where rock blocks are smaller.

EXHIBIT 3. The joint set that aligns along the strike of the highwall and dips nearly vertically. This joint set creates layers that range from 1.5 to 6 feet thick.

3. HAZARDS ANALYSIS

During the site visit on June 15, 2021, Cesare's engineering geologist observed the area, measured the fracture sets, measured the rock mass rating (RMR) for the rock mass, and created a scan line survey of the fracture patterns to be used in a kinematic analysis.

3.1 FIELD RMR VALUE CALCULATION

Weathering grade:	I- II, fresh rock is exposed on the cut face
Strength:	Medium strong to strong rock, estimated field value of 50 to 60 megapascals (MPa)
Groundwater:	dry
Fracture sets:	VII, three main joint sets with random fractures
Fracture spacing:	Wide spacing, some zones of close spacing. Medium to high persistence
Aperture:	"Closed", 3 to 20 millimeters (mm)
Fracture infill:	None
Roughness:	3 to 4
Rock quality designation (RQD):	Field estimated value of 80%
RMR value 66 Class II:	**Good Rock**, should indicate a stand up time of 1 year for a 10 meter span.

3.2 SCANLINE SURVEY

A scanline survey of a portion of the highwall was conducted in an area that was safe to access (Exhibit 4). A 25 foot section was laid out and all intersecting fractures were measured for dip and dip direction. A total of 23 data points plus the cut face itself were recorded.

EXHIBIT 4. Scanline survey conducted on a portion of the highwall. Scanline is 25 feet. All intersection fractures were measured for dip and dip direction.

A kinematic stereonet analysis of the scan line data was completed (Exhibit 5). The interpretation of the slope stability for this data set is that the cut face will be stable within plus or minus 20 degrees of the present slope direction. If the highwall continues to follow the present strike, or within 20 degrees of the present cut face than there should be no changes in the slope stability.

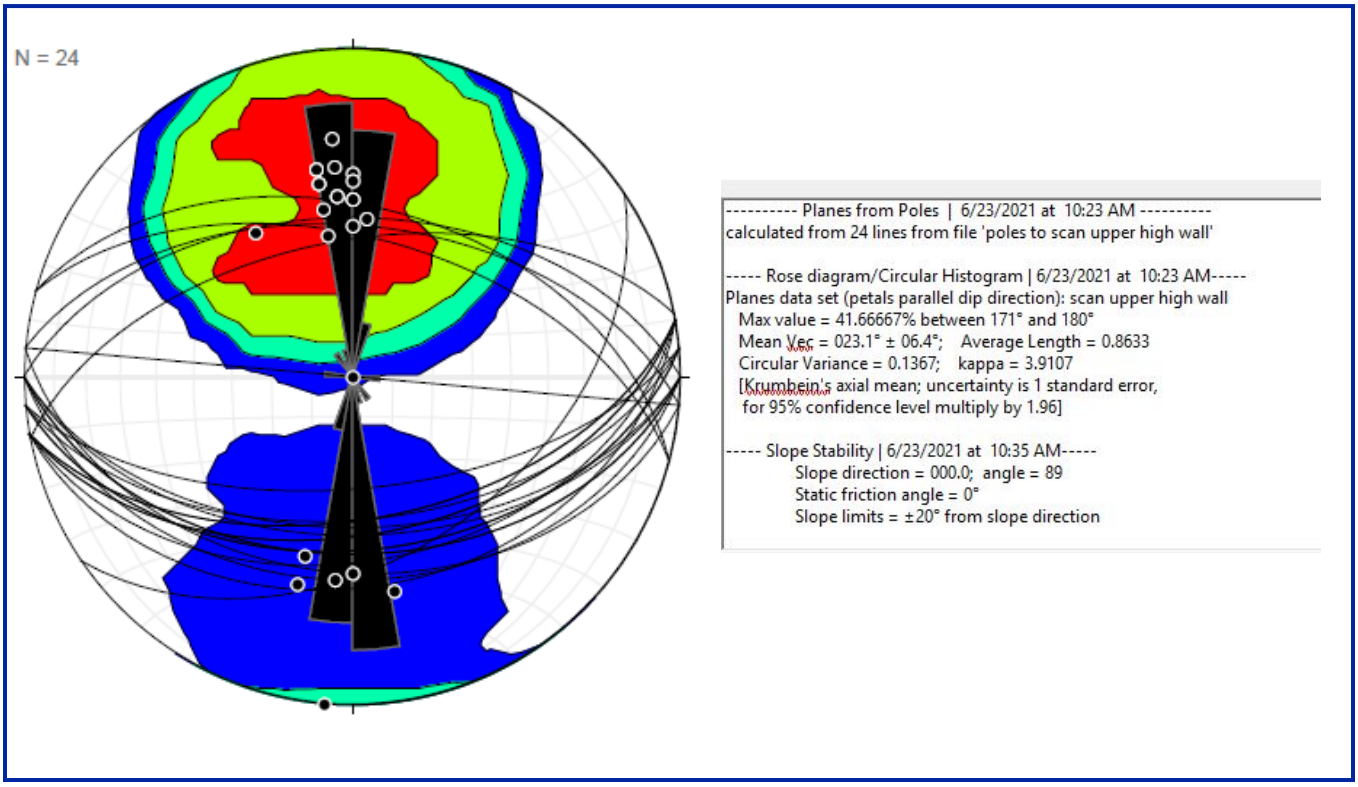

EXHIBIT 5. Stereonet analysis of the scanline data for the portion of the highwall that was accessible. Rockfall hazards come from the intersection of the fracture planes and the cut face. In this case, they are not intersecting in such a way as to create a large wedge that could slide or topple from the cut face.

3.3 OTHER OBERVATIONS

The black altered quartzite and other overburden material that outcrops west of the white marble bed is exposed along the contact at the top of the highwall (Exhibit 2). This unit is highly fractured and is a potential source for rockfall into the mine working area. It was observed that this overburden had been cut back away from the highwall working area and does not pose a significant hazard.

The lower benches as projected in the highwall system will be backfilled with waste rock as mining proceeds to the northern end of the unit. Where backfill of the lower operation area has begun, the angle of repose of the gray dolomite material is 53° and the fine grained gray material has an angle of repose of 45°. The plan, as stated by the mining engineer in 2019 for the closure of the lower (southern end) of the mine, will include backfilling the excavation area and grading the resulting slopes to a more natural slope angle using suitable waste rock. The angle of repose of the overburden and rock mixture was measured as 28°. The backfill plan, as observed 2 years later, seems to be advancing and filling as proposed.

The spoils of the quarry that are being used to create the working platform area are crushed stone. On June 15, 2021, Cesare observed the spoils have erosion and rilling along the edge of the platform (Exhibit 6). This poses a geologic hazard for the platform, slope, and areas below. This may have occurred during high spring runoff or snowmelt conditions.

EXHIBIT 6. Erosion and rilling of material was observed in the platform edge. The erosion of this material poses a hazard for the site and areas below.

4. CONCLUSIONS AND RECOMMENDATIONS

Cesare's engineering geologist concluded that highwall at the Lilly Mines operation remains stable due to the strike of the highwall not creating a planar or wedge failure from the persistent fracture sets. The RMR of the rock in the highwall indicates a high stand up time. Smaller hazards, like the overburden and the rilling, can easily be remedied through grading.

As operations continue along the marble outcrop and new highwall areas are quarried, the recommendation is to update the highwall control plan as new areas are uncovered that may have different joint sets or more highly fractured rock faces.

5. LIMITATIONS

This letter has been prepared for the exclusive use of Cesare's client for specific application to the project discussed and has been prepared in accordance with generally accepted geologic and geotechnical engineering practices. No warranties, either expressed or implied, are intended or made. In the event that changes in the nature, design, or location of the project as outlined in this letter are planned, the conclusions and recommendations contained in this report shall not be considered valid unless Cesare reviews the changes and either verifies or modifies the conclusions of this letter in writing.

Please contact Cesare with any comments or questions regarding this information

Sincerely,
CESARE, INC.

Holly A. Brunkal, PhD
Staff Engineering Geologist

Darin R. Duran, P.E.
Principal, Manager – Salida and Crested Butte

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