

December 13, 2006

Resource Management Consultants 8138 South State Street, Suite 2A Midvale, UT 84047

Attention:

Todd Leeds

FAX: 255-3266

Subject:

Geotechnical Consultation

Alice Mine Claim In Woodside Gulch

Near Intersection of King Road and Ridge Road

Park City, Utah

AGEC Project No. 1060955

### Gentlemen:

Applied Geotechnical Engineering Consultants, Inc. (AGEC) was requested to provide geotechnical consultation with regards to the Alice Mine Claim located in Woodside Gulch near the intersection of King Road and Ridge Road in Park City, Utah. There is a mine shaft and mine adit which are located near the proposed development.

AMEC previously provided a draft of a preliminary geotechnical report for the Alice Mine Claim and presented their findings and recommendations in a report addressed to DHM Design Corporation dated July 13, 2006 under Project No. 6-817-005165.

### **BACKGROUND**

Based on information provided in the above-referenced geotechnical report and conversation with the client, we understand that the mine shaft has a reported depth of approximately 500 feet. The open depth of the mine shaft was measured at approximately 230 feet. The mine shaft has a diameter of approximately 6 feet to 8 feet.

A horizontal adit is located at the ground surface near the mine shaft and extends into the hillside at an approximate bearing of north 20 degrees west. The length of the adit is unknown.

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## FIELD STUDY

A geologist from AGEC visited the site on November 22, 2006 to observe the mine shaft and adit. Three test pits were excavated near the mine shaft. The test pits were excavated using a trackhoe. The test pits were logged and samples of the subsurface material were obtained by a geologist from AGEC.

The material used to backfill the test pits was not compacted and should be removed and replaced with properly compacted fill if the test pits are in areas of proposed buildings, concrete flatwork and/or pavement.

#### SUBSURFACE CONDITIONS

The subsurface materials encountered in the test pits consist of approximately 9 to 14 inches of topsoil overlying bedrock. The maximum depth investigated was approximately 11½ feet.

The bedrock consists of quartzite which is highly weathered and fractured near the ground surface. Excavation in the bedrock became more difficult with depth. The bedrock is slightly moist and yellowish brown.

### SUBSURFACE WATER

No subsurface water was encountered in the test pits at the time of excavating to the maximum depth investigated, approximately 11½ feet.

#### PROPOSED CONSTRUCTION

We understand that residential development is planned for the area around and including the mine shaft and adit. A conceptual site plan indicates that a residence is planned to be constructed above the mine shaft.

## CONCLUSIONS AND RECOMMENDATIONS

Based on our observations at the site and information presented in the above-referenced geotechnical report, the following conclusions and recommendations are given:

- 1. Based on the subsurface conditions encountered in the test pits excavated near the mine shaft, we recommend a setback distance of at least 40 feet. The setback distance could be reduced to 10 feet if the mine shaft were filled up to the ground surface with soil and/or gravel.
- 2. If a building or other structure is planned to be constructed above the mine shaft, the following recommendations are given:

- a. The upper approximately 10 feet of the mine shaft should be excavated to have a slope of approximately ½ horizontal to 1 vertical.
- b. Concrete should be placed in the mine shaft from a depth of at least 110 feet up to within 5 feet of the footing bearing elevation for the proposed building. The concrete should have a slump less than 4 inches and a 28-day compressive strength of at least 3,000 psi. The concrete used should be a low shrinkage concrete mix.
- c. Reinforcement should be placed in the upper portion of the concrete to connect the concrete in the wider portion of the mine shaft to the concrete below.

The reinforcement should be designed by a structural engineer.

- d. If the shaft is open below a depth of 110 feet, the portion of the shaft below this depth should be filled using soil, broken-up bedrock or other imported fill. The fill should have a maximum particle size of approximately 4 inches.
- e. A representative of AGEC should observe remediation of the mine shaft.
- 3. Buildings should not be constructed above the mine adit unless the adit is remediated or the foundation support of buildings near the adit extends below the adit elevation.
- 4. The adit which extends into the hillside from near the mine shaft could be remediated by excavating down to the adit and filling the adit and the excavated area above with compacted structural fill. As an alternative, buildings which are located near the adit could be supported on a deep foundation extending down to or deeper than the adit elevation.

# **LIMITATIONS**

This letter has been prepared in accordance with generally accepted soil and foundation engineering practices in the area for the use of the client. The conclusions and recommendations included in the letter are based on conditions observed at the time of our site visit. Variations in the subsurface conditions may not become evident until additional exploration or excavation is conducted. If the subsurface conditions or proposed construction is significantly different from what is described in this letter, we should be notified to reevaluate our recommendations.

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If you have any questions or if we can be of further service, please call.

Sincerely,

APPLIED GEOTECHNICAL ENGINEERING CONSULTANTS, INC.

Scott D. Anderson, P.E.

Reviewed by DRH, P.E., P.G. SDA/dc