

COLORADO GEOLOGICAL SURVEY

1801 19th Street
Golden, Colorado 80401



Karen Berry
State Geologist

August 17, 2018

Adam Springer
Senior Planner
Clear Creek County Planning
P.O. Box 2000
Georgetown, CO 80444

Location:
Section 27 and 28,
T3S, R74W of the 6th P.M.
39.7575, -105.6703

Subject: Douglas Mountain Ranch – Rezoning to Planned Development and Boundary Line Adjustment RZ2018-0001 and AX2018-0003; Clear Creek County, CO; CGS Unique No. CL-19-0001

Dear Adam:

Colorado Geological Survey has reviewed the Douglas Mountain Ranch rezoning and boundary line adjustment referral. The available referral documents include an Engineering Geology and Geologic Hazard Report (Greg Lewicki and Associates, February 28, 2018), and other documents.

I understand the applicant proposes to rezone to planned development approximately 160 acres located east and southeast of Empire, along the West Fork of Clear Creek, for the purpose of developing a sand and gravel mining operation and, ultimately, a reservoir and “usable flats.” The applicant also proposes boundary line adjustments to reconfigure and consolidate parcels within the project area. I visited the site on August 10, 2018.

CGS cannot recommend approval of rezoning to PD for the purpose of developing a sand and gravel extraction operation as proposed.

CGS partially agrees with Lewicki’s assessment (page 2 of the Engineering Geology and Geologic Hazard Report) that the project area contains potentially unstable slopes and debris fans, and that there is a risk of slope failure leading to a landslide/mudflow.

However, the unstable slope hazard is more significant than indicated in the geologic hazard report:

Mapped landslide and risk of landslide reactivation. The eastern and southeastern portion of the proposed sand and gravel extraction area is located in the lower half, or toe area, of a large mapped landslide (Colton, R.B., Holligan, J.A., and Anderson, L.W., 1975, Preliminary map of landslide deposits, Denver 1 degree x 2 degrees quadrangle, Colorado: U.S. Geological Survey, Miscellaneous Field Studies Map MF-705, scale 1:250,000.) See map on page 3 of this letter.

The landslide appears to be stable under current slope and vegetation conditions. It is not known whether or when the mapped landslide was last active, but removal of material within and below the toe area of a landslide or unstable slope significantly increases the risk of destabilization and landslide reactivation.

Lewicki states (page 2) “In the event of any slope failure, the failure material would be contained entirely within the proposed gravel operation. Mining operations will be conducted to a slope of 2H:(1?)V or

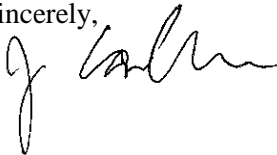
shallower, and will take place on the alluvial terrace, not up on the potentially unstable slopes of the mountainside.” The map attached to this letter shows that **proposed extraction encroaches into the mapped landslide area.**

It is not possible to determine the probability or predict the magnitude of future landslide activity, and stabilization of a landslide complex this large would be impractical. Avoidance is the preferred mitigation for landslides, and CGS strongly discourages grading and development within and below identified and potential landslide areas. Even if the proposed final (reclaimed) slopes were analyzed and determined to be locally stable, removal of toe material would significantly increase the risk that seismic activity or an exceptionally heavy or prolonged rainfall or snowmelt event could cause destabilization and slope movement of unknown extent and magnitude.

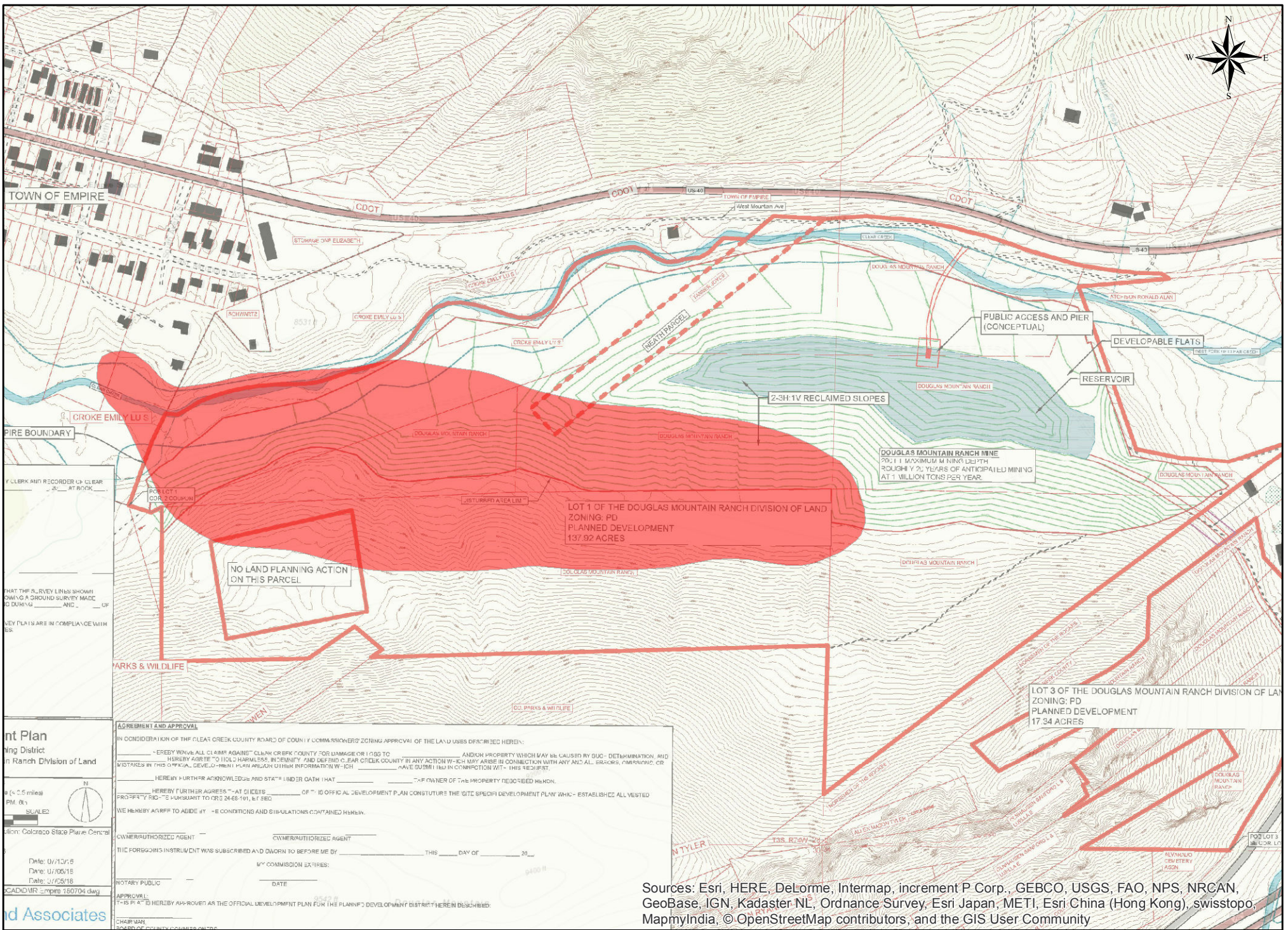
Feasibility of future development if extraction occurs as proposed. Sheet ODP 7 – Post Mine Land Use (Lewicki, July 5, 2018) shows future commercial/residential development within the reclaimed area south of the West Fork of Clear Creek, and within the 2-3H:1V reclaimed slope area. Improvements adjacent to the West Fork of Clear Creek would be at risk of undermining due to stream channel erosion, scour, and undercutting. People, homes and businesses in the area north of the proposed open space would be exposed to potential landslide, debris flow/mudslide, and snow avalanche hazards. Any change in vegetation conditions above the site (on the north-facing slopes of Douglas Mountain) such as through wildfire, disease, erosion, or other disturbance, would increase these hazards, and possibly introduce a rockfall hazard as well. It is unlikely that CGS would recommend approval of lots, post-mining, within the proposed commercial/residential area shown on sheet ODP7 – Post Mine Land Use.

Thank you for the opportunity to review and comment on this project. If you have questions or require additional review, please call me at (303) 384-2643, or e-mail carlson@mines.edu.

Sincerely,



Jill Carlson, C.E.G.
Engineering Geologist



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THAT THE SURVEY LINES SHOWN
 OWING A GROUND SURVEY MADE
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MARKS & WILDLIFE

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 n Ranch Division of Land

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 Feet
 1 inch = 500 feet

Date: 01/13/15
 Date: 01/06/15
 Date: 3/23/16

SCADONR Empire 150704.dwg

nd Associates

AGREEMENT AND APPROVAL

IN CONSIDERATION OF THE CLEAR CREEK COUNTY BOARD OF COUNTY COMMISSIONERS' ZONING APPROVAL OF THE LAND USES DESCRIBED HEREIN:

_____ HEREBY WAIVE ALL CLAIMS AGAINST CLEAR CREEK COUNTY FOR DAMAGE OR LOSS TO _____ AND/OR PROPERTY WHICH MAY BE CAUSED BY QUIC - DETERMINATION, AND
 HEREBY AGREE TO HOLD HARMLESS, IN DEFENSE, AND DEFEND CLEAR CREEK COUNTY IN ANY ACTION WHICH MAY ARISE IN CONNECTION WITH ANY AND ALL ERRORS, OMISSIONS, OR
 MISTAKES IN THIS OFFICIAL DEVELOPMENT PLAN AND ANY INFORMATION WHICH _____ HAVE SUBMITTED IN CONNECTION WITH THIS REQUEST.

_____ HEREBY FURTHER ACKNOWLEDGE AND STATE UNDER OATH THAT _____ THE OWNER OF THE PROPERTY DESCRIBED HEREIN.

_____ HEREBY FURTHER AGREE THAT ALL CONDITIONS OF THIS OFFICIAL DEVELOPMENT PLAN CONSTITUTE THE QDC SPECIFIC DEVELOPMENT PLAN WHICH ESTABLISHES ALL VESTED
 PROPERTIES TO BE SUBMITTED TO ORD 24-68-101, LT SEC.

WE HEREBY AGREE TO ABIDE BY THE CONDITIONS AND REGULATIONS CONTAINED HEREIN.

OWNER/AUTHORIZED AGENT _____ OWNER/AUTHORIZED AGENT _____
 THE FOREGOING INSTRUMENT WAS SUBSCRIBED AND GIVEN TO BEFORE ME BY _____ THIS _____ DAY OF _____ 20____
 MY COMMISSION EXPIRES: _____ DATE _____

NOTARY PUBLIC _____ DATE _____

APPROVAL:
 IT IS HEREBY APPROVED AS THE OFFICIAL DEVELOPMENT PLAN FOR THE PLANNED DEVELOPMENT DISTRICT HEREIN DESCRIBED:

CHAIRMAN _____
 BOARD OF COUNTY COMMISSIONERS

Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

* Colton, R.B. et al, 1975, Preliminary map of landslide deposits, Denver 1 degree x 2 degrees quadrangle, Colorado: U.S. Geological Survey, Miscellaneous Field Studies Map MF-705, scale 1:250,000

Georeferenced DMR Official Development Plan with Colton* mapped landslide