

EP-22-0031_1 Ohana Acres
NW¼ NW¼ Section 30 T13S, R63W, 6th P.M.
38.8943, -104.4967

Colorado Geological Survey comments uploaded to El Paso County Development Application Review on 9/12/2022:

With this referral, CGS received the Final Plat (Compass Surveying & Mapping, LLC, January 25, 2019), Letter of Intent (G & D Hammann Ohana Trust, September 30, 2021), and Geology and Soils Reports (Allison Engineering, October 28, 2021). We understand that the 19.31-acre site will be subdivided into four lots. Lot 1 includes an existing home, and lots 2 through 4 will consist of future structures and individual well and septic systems.

The site does not contain steep slopes and is not undermined. The Black Squirrel Creek traverses the northeastern portion of the project site and is mapped by FEMA as a 100-year floodplain (Zone A, FIRM Map Number 08041C0590G, December 7, 2018). The remainder of the site is mapped as minimal flooding risk (Zone X).

The site is underlain by eolian (wind-deposited) sand and silt. Eolian soils tend to be loose, fine-grained, low density, and hydrocompactive, meaning they can lose strength, settle, compress, or collapse under a structural load and/or when water infiltrates the soils. The soils are underlain by sandstone and claystone of the Dawson Formation. If claystone layers capable of producing high swell pressures are present within a few feet of foundation-bearing elevations, they can cause structural damage if not properly characterized and mitigated. Allison Engineering did not discuss potentially expansive soils/bedrock and hydrocompactive/compressible soils in the geology report, other than “The soil within the zone of influence is not of a character of which significant expansion is expected...”. We offer the following comments and recommendations.

1. The subsurface conditions described in Allison Engineering's report are based on the results of six excavations; however, no test pit logs or laboratory testing results were provided. Allison Engineering (page 3) describes the soil as “sand to loamy sand per the U.S. Department of Agriculture Soil Classification System.” Without the field investigation results, CGS cannot come to the same conclusions and identification of geologic hazards and constraints as Allison Engineering. CGS recommends that the county require the soil and geology study to be expanded to evaluate the geologic constraints based on a site-specific investigation and data. **A note should be included on the final plat listing the geologic hazards and constraints with appropriate mitigation measures.**
2. Also, Allison Engineering states (page 8) that “It is expected the program of subsurface exploration and testing necessary to satisfactorily determine (sic) site-specific subsurface conditions can be accomplished with a backhoe. The use of a (sic) exploratory drill will likely extend to a depth not useful for foundation or septic system design.” If basements are planned for future structures, test borings drilled to a sufficient depth (generally at least 20 feet) are necessary to determine groundwater and bedrock depths where both are likely to be shallow. If shallow groundwater is encountered or expected based on the subsurface conditions, the report should discuss the seasonal groundwater fluctuation expected at the site based on site-specific data. **The feasibility of basements or other anticipated habitable below-grade space should be discussed and noted on the plat.**
3. Allison Engineering states (page 8), “Cuts and test holes needed for additional geologic information would be needed to determine consistency with the findings of this study and to comply with the requirements of the El Paso County Health Department.” **CGS recommends that a note be added**

to the final plat requiring lot-specific geotechnical and septic investigations once building locations have been determined. The lot-specific geotechnical and septic investigations will be needed to:

- Determine the thickness and extent to which the soils beneath each proposed structures are subject to collapse under loading and/or wetting; characterize soil and bedrock engineering properties such as density, strength, water content, swell/consolidation potential, and bearing capacity; determine depths to groundwater, bedrock, and any impermeable layers that might lead to the development of a perched water condition.
- Determine percolation rates for each lot to determine if engineered septic systems are necessary.
- Provide earthwork, foundation, floor system, subsurface drainage, and pavement recommendations for design purposes.

Submitted 9/12/2022 by Amy Crandall, Engineering Geologist, Colorado Geological Survey (303-384-2632 or acrandall@mines.edu)