

COLORADO GEOLOGICAL SURVEY

1801 19th Street
Golden, Colorado 80401



Karen Berry
State Geologist

December 18, 2017

Kari Parsons
El Paso County
Planning and Community Development
2880 International Circle, Suite 110
Colorado Springs, CO 80910

Location:
Sections 21, 22, 27, and 28,
T12S, R65W, 6th P.M.
38.984, -104.6635

Subject: The Retreat @ TimberRidge PUD
File Number PUD173; El Paso County, CO; CGS Unique No. EP-17-0048 3

Dear Ms. Parsons:

Colorado Geological Survey has reviewed the Retreat @ TimberRidge PUD resubmittal. I understand the applicant now proposes 212 residential lots on approximately 300 acres located in the area of Vollmer Road and Arroya Lane. The available referral documents include a revised Letter of Intent (November 2017), a set of three PUD Development Plans (NES, revised December 4, 2017), a revised Soil, Geology, Geologic Hazard, and Wastewater Study, The Retreat at Timber Ridge (Entech Engineering, December 1, 2017), and other documents.

The currently proposed Retreat @ Timber Ridge PUD submittal represents a reduction in density from that previously reviewed by CGS. The site does not contain, nor is it exposed to, any identified geologic hazards that would preclude the proposed residential use and density. **CGS therefore has no objection to approval of the PUD as proposed.**

Entech's report contains a valid descriptions of the site's geology, surface and subsurface conditions and engineering properties, and potential development constraints. I agree that the site is suitable for the proposed development, provided Entech's recommendations are strictly adhered to regarding additional characterization and mitigation of: shallow groundwater and perched water; erosion, downslope creep and potentially unstable slope areas; artificial fill; loose, low density, potentially low strength and/or collapsible soils; and expansive soils and bedrock. Specifically:

Shallow groundwater and basement feasibility. Entech notes evidence of seasonally shallow groundwater at depths of 7 feet in November 2017 test pits 3 and 5, corresponding to the area of, at a minimum, proposed lots R-18 to R-23, and water was observed at 5 feet in test boring 2, located close to Sand Creek approximately behind currently proposed lots 147-148. Entech maps areas of seasonal shallow water (sw) and potential seasonal shallow water (psw) in many areas of the site, generally corresponding to Sand Creek and smaller drainages. It does not appear that there is a widespread shallow groundwater condition that would preclude full-depth basement construction on most proposed lots. Entech states (page 7), "Builders and planners should be cognizant of the potential for the occurrence of such subsurface water features during construction on-site and deal with each individual problem as necessary at the time of construction." This *may* be a valid strategy for mitigating instances of thin, discontinuous water-bearing sand and gravel lenses and intermittent perched water conditions, but **additional investigation and analysis are recommended to confirm the feasibility of below-grade construction on lots where**

basements are proposed adjacent to Sand Creek and in Entech's observed shallow groundwater areas.

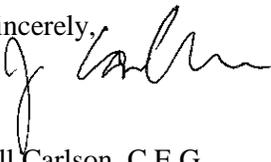
Lowermost floor levels *must* be located at least three feet above maximum anticipated groundwater levels, to reduce the risk of water infiltration into below-grade spaces, and damp, mold-conducive conditions. Full-depth basement construction should therefore not be allowed where shallowest seasonal water levels are less than about 11 feet below the ground surface (more if basement heights greater than 8 ft. are planned). Individual foundation perimeter drains are intended to handle small amounts of intermittent, perched water, and are *not* to be used to mitigate a persistent shallow groundwater condition.

Erosion setback. No lots appear to encroach on the mapped Sand Creek flood hazard zone. However, CGS recommends a conservative building setback from flood zone boundaries and Entech's mapped potentially unstable slopes (Entech's Figure 7) to reduce hazards associated not just with rising floodwaters but also erosion, scour, and local slope failures. The setback should be determined based on site-specific analysis of topography and soil erosion properties, and should be specifically identified on the plat as non-buildable.

Other geotechnical constraints. Entech provides appropriate mitigation strategies for use where artificial fill, loose, low density, potentially low strength and/or collapsible soils, and expansive soils and bedrock are present. Lot specific, design-level geotechnical investigations including drilling, sampling, lab testing and analysis will be needed, once building locations are identified, to determine groundwater levels, and to characterize soil and bedrock engineering properties such as density, strength, swell and consolidation potential, and bearing capacity at and below approximate foundation bearing depths. This information is needed to determine maximum bearing and minimum dead-load pressures, and to develop final design criteria for foundations, floor systems, pavements, and subsurface drainage.

Thank you for the continued 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