Review Comments by the Colorado Geological Survey – 1/25/2024

CGS Unique No.: EP-24-0047_1 Retreat at Prairie Ridge Preliminary Plan Phase 1 (AKA Jaynes)
Location: Portions of SW ¼ Section 28 and NW ¼ Section 33, T12S, R65W, 6th P.M.
Lat/Long: 38.9736, -104.6738
EP File Number: SP239, 217 SF lots and 6 rural residential lots on 108.89 acres for future residential development

The available referral documents include a Soil and Geology Study and Wastewater Study, Jaynes Property – Preliminary Plan (Entech Engineering, Job No. 212381, November 21, 2023), Preliminary Plan (Classic Consulting, December 19, 2023), Letter of Intent (N.E.S., Inc., December 2023), and other documents. Entech's report provides a valid description of surface and subsurface conditions and soil and bedrock engineering properties. CGS offers the following comments and recommendations.

1. The preliminary plan's Geologic Constraints Exhibit (Sheet 28) includes an incorrect legend and references an Entech report that was not provided. CGS recommends this sheet be updated with the correct information.

2. Entech states (page 13), "Cuts of up to 30 feet are anticipated in the north central portion of the site." Groundwater depths in TB-2 and TB-3 are 6 and 14 feet, respectively and bedrock was encountered in the test borings at depths of 1 to 9 feet. Additionally, the test hole termination depths ranged from 12.5 to 20 feet. These conditions will significantly affect the excavation/grading operations at this site.

3. In the test borings Entech previously drilled, groundwater was encountered at 6 to 28 feet below grade during drilling, and Entech observed areas of ponded water in some locations. Test pits excavated by Entech for their wastewater study showed signs of seasonally occurring groundwater at depths of 4 to 6 feet (page 8). CGS commends Entech for installing monitoring wells within the site. Measurements from August and October 2023 indicated groundwater depths between 6.5 to 28 feet. **CGS recommends that groundwater elevations within these wells continue to be measured during Spring/Summer/Fall 2024 and following early grading operations to determine the extent of shallow groundwater impacts on the overall development (as required by code)**.

4. We agree with Entech (page 11 of their report) that "A minimum separation of 3 feet between foundation components and groundwater levels are recommended." The shallow groundwater conditions likely preclude the construction of below-grade levels for this development. **CGS recommends that the preliminary plans include a statement indicating "no basements" or mitigation measures, such as raising the site grades**.

5. Page 9 of Entech's report states, "In areas where high subsurface moisture conditions are anticipated periodically, subsurface perimeter drains will be necessary to help prevent the intrusion of water into areas located below grade." Note 14 of the preliminary plan states, "In areas of shallow groundwater: Due to shallow groundwater in the area, all foundations shall incorporate an underground drainage system." An underdrain system should be allowed ONLY if it can gravity discharge to a daylight outfall. Individual foundation perimeter drains are intended to handle small amounts of intermittent, perched water and CANNOT be used to mitigate persistent shallow groundwater conditions. Similar to the Sterling Ranch development to the southeast, if shallow groundwater conditions exist (as determined from the continued groundwater monitoring/observation program) and mitigation measures are not possible (such as raising site grades well above maximum groundwater elevations based on a minimum yearlong monitoring program), then **NO basements** should be permitted within Prairie Ridge Filing No. 1.

6. Two drainages exist within the project area that are designated as existing non-jurisdictional wetlands per the National Wetlands Inventory (U.S. Fish and Wildlife Service, National Standards and Support Team, wetlands_team@fws.gov) and the drainage report. **CGS recommends that the existing channel alignments be further evaluated** to determine the effect of these systems (i.e., groundwater conditions, differential settlement, etc.) on future development. Since water will tend to convert back to its natural pathway, drain systems may be necessary within these areas, i.e., piped, burrito drain, etc. Additionally, per the letter of intent (page 10), "Absorption fields must also be located a minimum of 50 feet from any drainages, floodplains or ponded areas and 25 feet from dry gulches."

Reviewed on 1/25/2024 by Amy Crandall, Engineering Geologist (acrandall@mines.edu)