With this resubmittal, CGS received a request to provide Review Comments (Email dated April 8, 2024); Letter of Intent (N.E.S., Inc., April 2024); Sketch Plan (N.E.S., Inc., March 19, 2024); Soils and Geology Report (HDR, March 2024); and other documents. The applicant requests a Sketch Plan to permit a new railroad spur through the property to service Fort Carson and associated railroad-oriented heavy and light industry and commercial uses that encompassing 3100 acres of land. CGS addressed the majority of these concerns in our comments dated October 30, 2023. Since then, HDR revised their soils and geology report, however, our concerns were not addressed and are generally repeated with additional comments included herein.

Soils and geology study: HDR's soils and geology study, while informative, does not fully meet the requirements listed in the El Paso County Land Development Code (LDC) for a comprehensive Geology and Soils report (Section 8.4.9). No test borings/pits were performed during HDR's field investigation, however, HDR states (p. 8), "HDR recommends performing additional geotechnical borings to further evaluate the subsurface conditions." Per the LDC, a map consisting of geologic hazards and constraints should be provided in the geology and soils report. Expansive soil is a significant geologic constraint that should be thoroughly addressed (borings and laboratory testing).

Also, Figure 3 of HDR's report is not a geologic map. Refer to available geologic mapping (Geologic Map of the Fountain Quadrangle, El Paso County, Colorado, 2017, CGS, OF-17-05).

Permitted mines: The letter of intent and HDR report indicate that the permitted sand and gravel mines should not pose a danger to future development in the area as the operations are setback from the proposed development area. However, Lots 22, 29, and 30 contain permitted sand and gravel mines, and it is unclear where the development will occur in relation to these mines. A thorough investigation of the gravel pits that were noted by HDR and included in available geologic mapping should be performed if development will occur in these areas with mitigation measures presented.

Debris flows: HDR states (p. 4), "In accordance with the Colorado Geological Survey Map ON-006-12, the project site is located immediately east of mapped potentially dangerous debris flow regions." Areas with conditions favorable for the generation and deposition of debris flows exist in the northern portion of the development (Lots 32 and 33). Additionally, young alluvial fan deposits and alluvial mud-flow deposits are mapped within the development (CGS publication OF-17-05, 2017). Debris flows/mud flows are geologic hazards that should be addressed in the geology and soils report.

Floodplain and erosion setbacks: The Little Fountain Creek traverses the southern portion, and Rock Creek traverses the northern portion of the project area. Little Fountain Creek is designated a 100-year FEMA floodplain (FIRM Panel No. 08041C0965G and 08041C01155G, December 7, 2018) and described as "Zone A". Erosional setbacks from the creeks or any drainage/channel within the site should be established along with site grading that provides positive surface drainage and BMPs for stormwater. A slope stability analysis should be conducted in areas with steep slopes (>20 percent), or areas with slopes designated as unstable or potentially unstable. In addition, flooding and scour erosion mitigation for rail and road crossings should be implemented and maintained.

Groundwater conditions: The project is in a geologic setting and location known for shallow, fluctuating groundwater. Just as the natural drainages within the site will vary in flow rates annually and over differing years, shallow groundwater conditions are expected to fluctuate with differing precipitation events and seasons. During preliminary plan phases, site-specific data should be collected to evaluate the potential for shallow groundwater along with the fluctuations in groundwater elevations. Investigations for natural fluctuations in shallow groundwater should include monitoring programs that can be used

during preliminary and final plans using site-specific groundwater elevation data. This should be combined with the evaluation of publicly available yearly precipitation data for this region.

In summary, CGS recommends:

- The soils and geology report is expanded/updated to include all the geologic hazards and constraints to development (i.e., debris flows, mudflows, mines, expansive soils, etc.). Figure 3 should be updated to include available geologic mapping for the area.
- A geologic hazard and constraint map is included in the soils and geology report that identifies all the geologic hazards and constraints within the site and provides mitigation measures.
- Further investigation and consideration of the permitted mines shown in Figure 4 of HDR's study should be provided with appropriate mitigation measures.
- Erosional setbacks from Rock Creek, Little Foundation Creek, and other drainages/channels within the parcel are established.
- Geotechnical borings are performed to characterize soil and bedrock engineering properties such as expansion/consolidation potential, density, strength, water content, etc.
- Shallow groundwater is investigated using site-specific monitoring for season variations. Yearly precipitation data, in conjunction with the monitoring program, should be used to evaluate expected variation in groundwater elevations.

Submitted 4/29/2024 by Amy Crandall, Engineering Geologist, Colorado Geological Survey (303-384-2632 or acrandall@mines.edu)