

Colorado Geological Survey	Colorado Geological Survey review of the resubmittal for Homestead North Phase 1 Preliminary Plan SP208 (Amy Crandall, P.E., acrandall@mines.edu):	8/25/2021 1:10:05 PM
----------------------------	--	----------------------------

With the resubmittal documents, we received the revised Preliminary Plan (N.E.S. Inc., August 2, 2021) and the Grading and Erosion Control Plan (J.R. Engineering, June 30, 2021). An updated soil and geology report addressing our previous correspondence or the proposed infrastructure plans (Briargate Parkway and Sterling Ranch Road to include channel crossings) was not provided with the recent referral documents.

Entech Engineering's report (Entech Job No. 201421; July 22, 2020) identified uncontrolled artificial fill, frost heave, potentially unstable slopes adjacent to Sand Creek, expansive soils and claystone bedrock, flooding along Sand Creek, and potentially seasonal shallow groundwater areas as geologic hazards and constraints impacting the proposed development. As stated in our previous comments (April 7, 2021), Entech provides a good description of the site's subsurface conditions based on eight test borings and laboratory testing results and makes appropriate recommendations for mitigation of these hazards.

We offer the following comments and recommendations:

Seasonal Shallow Groundwater: Entech identifies potentially seasonal shallow groundwater areas in Figure 7 of their July 22, 2020 report. Groundwater levels ranged from 8.5 feet to 18.5 feet below ground surface in four borings mainly found along drainage swales and Sand Creek. Groundwater was encountered in Entech's previous study (Appendix D: Entech Job No. 82556) at depths of 8 and 11 feet below existing grades. Seasonal shallow groundwater is common in eastern El Paso County. Groundwater levels can rise following construction and irrigation. The feasibility of basements due to potentially seasonal shallow groundwater and perched groundwater on shallow bedrock is not discussed in Entech's report, and it is unknown if basements are planned. Proposed floor levels should be at least three feet (preferably five feet) above maximum anticipated groundwater levels and maintained year-round. A groundwater monitoring/observation program should be performed if basements are planned. CGS recommends no below-grade construction in areas with shallow groundwater levels within three feet of proposed floor levels.

JR Response: Basements are assumed to be proposed, proposed floor levels will be at least 3' above anticipated groundwater as the areas with shallow ground water(along Sand Creek) are proposed mostly fill areas with approximately 1-5' of fill.

Entech recommends (page 11) subsurface perimeter drains where high subsurface moisture conditions are anticipated, a practice we believe is prudent. Individual foundation perimeter drains are needed around any below-grade (basement) space. According to the geologic hazard disclosure statement on sheets 1 and 25 of the preliminary plan, "In Areas of High Groundwater: Due to high groundwater in the area, all foundations shall incorporate an underground drainage system. Under drains to be maintained by the District." CGS recommends the underground drainage system and maintenance requirements are shown in the plans, and the "District" understands the maintenance requirements throughout the life of the development. The underground drainage system must gravity discharge to a daylight outfall. Please note that individual foundation perimeter drains are intended to handle small amounts of intermittent, perched water and may NOT be used as sole mitigation of persistent shallow groundwater conditions.

JR Response: Noted, subsurface perimeter drains will be used.

Expansive Soil and Bedrock: Entech states that moderate to highly expansive soil underlies parts of the site. Entech recommends two different mitigation options that

include overexcavation of expansive soil or the use of drilled pier foundations. According to the geologic hazard disclosure statement on sheets 1 and 25 of the preliminary plan (N.E.S, Inc., Revised June 2, 2021), "In Areas of Expansive Soils: Incorporate special foundation design." Therefore, the applicant should evaluate and discuss what mitigation option will be performed for expansive soil before final plans are approved.

JR Response: Noted, over excavation or pier foundations will be used to mitigate expansive soils

In summary, the site does not appear to contain any hazards that will prevent development. However, the site does have geologic hazards and constraints that the developer will need to mitigate adequately. The county should consider the recommendations outlined above and in our previous correspondence. As noted on page 16 of Entech's July 22, 2020 report, "Specific recommendations should be made after additional investigation prior to construction." Therefore, the county should require site-specific investigations for each lot and the channel crossings.