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Re: Saddlehorn Ranch Subdivision – Preliminary Plan

Dear Ms. Ruiz:

This firm represents the Upper Black Squirrel Creek Ground Water Management District ("the District"). Applicant, ROI Property Group, LLC, provided materials in support of its application for a Preliminary Plan for its proposed Saddlehorn Ranch subdivision development. Saddlehorn Ranch is located within the District and, as explained in the Applicant's application, will consist of 218 residential lots on 817 acres, with lots sizes of 2.5 acres or greater. The District previously submitted a letter concerning this application on January 11, 2021 and indicated that the District was consulting with its District Hydrogeologist, Mr. Mike Wireman of Granite Ridge Groundwater, regarding several of the issues raised in that letter.

The following additional comments are provided from the District Hydrogeologist's review:

Water Supply

According to the Application, Applicant's water supply will be provided by the Saddlehorn Ranch Metro District, which will utilize existing wells to obtain its supply. To meet Saddlehorn Ranch's annual demand of 146.06 acre-feet per year, these two wells would need to yield 90 gallons per minute. However, because the Arapahoe and Laramie-Fox Hills aquifers are highly confined, sustained pumping may result in a rapid decline in the potentiometric surface which may result in a decline in well yield overtime. Given this, there is a substantial likelihood that more wells will be required in the future.

Under the determinations 457-BD and 458-BD, the depth of each well under the determination must be geophysically logged prior to installing the casing. This requirement is important to confirm the total thickness of the saturated permeable material in each aquifer. Applicant should verify that the wells were properly logged and make the logs available to the District.

Wastewater Treatment

According to the Application, discharged wastewater will be treated through individual on-site wastewater treatment systems ("OWTSs"). *See* Water Resources & Wastewater Report, Executive Summary (Rev'd Sep. 2020). Assuming that 90% of Saddlehorn Ranch's total demand of 146.06 acre-feet per year is discharged from the OWTSs, approximately 131 acre-feet per year will be recharged to the alluvial aquifer dispersed over 816 acres. Concerns and issues related to discharge from the densely spaced OWTSs include:

1. The annual discharge from the septic tank is not measured and is assumed to be 90% of in-house water use. The basis for this assumption is unknown. There has apparently been no effort to verify this assumption with empirical monitoring data. In addition, estimates of annual in-house use are also subject to uncertainty if totalizing flow meters are not required on all wells.

2. Treatment effectiveness can vary significantly among Individual Sewage Disposal Systems ("ISDSs") depending on the quality of wastewater delivered to the system. Long-term maintenance of individual septic systems is often inadequate which also effects treatment effectiveness.

3. Some proposed housing developments plan to use ISDS for hundreds of new densely spaced homes. This will result in high density of ISDS (one ISDS per 2.5 acres). Current CDPHE and CGWC policies do not adequately consider the cumulative impact of septic system discharges in a specific region of the aquifer. Densely spaced ISDS can discharge hundreds of acre feet per year to a local part of the alluvial aquifer. The assumption that ISDS discharge results in negligible impact to aquifer water quality has not been proven under these conditions.

4. Little consideration is given to the location of septic systems within the alluvial groundwater flow system. Groundwater flow direction and velocity are influenced significantly by the degree of saturation which is spatially variable in the unsaturated zone. How will this effect subsurface flow of the discharged effluent?

5. There is significant uncertainty regarding the transport and fate of dissolved and suspended constituents in the ISDS discharge. Biological and geochemical conditions in the unsaturated and saturated zones will vary spatially and temporally. The potential for attenuation of selected contaminants in the subsurface that will become a source of residual contamination is unknown. Analysis of alluvial water quality by the USGS indicates that there is significant residual nitrogen stored in the aquifer. This results in significant uncertainties regarding the contamination of the alluvial aquifer and or receiving stream.

6. It is strongly recommended that the CDPHE require monitoring downgradient of subdivisions that include densely spaced ISDS and that the applicant provide an assessment of that part of the UBS alluvial aquifer that will receive the effluent discharge. Groundwater monitoring wells should also be required at WWTFs. These wells should be located at appropriate locations downgradient of the infiltration basins or galleries. Data from the wells can be used to determine if water quality in the aquifer is being impacted by the WWTF discharge.

Water Quality

The Application submitted by Applicant provides only limited water quality data for wells 66937-F and 66938-F. Apparently these wells were only sampled once, and Applicant should do so again to confirm the water quality data used to evaluate its required treatment.

The District reserves the right to provide additional comments at a later date founded upon information not readily ascertainable from the above-referenced application.

Sincerely,

Mirko L. Kruse
for
TROUT RALEY

cc: UBSCGWMD Board of Directors