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December 27, 1995

Dear Phil:

This letter summarizes my evaluation, conducted at your request, of the geologic suitability of four lots west of the Wasatch View Acres development for conventional septic-tank soil-absorption (STSA) systems. My conclusions are based on a literature review, including an AGRA Earth & Environmental report entitled "Site observations and logging of test pits - proposed septic tank/leach field systems associated with proposed four 10-acre lot development - west of western limits of Wasatch View Acres development - Heber, Utah," dated December 18, 1995, and observations made by UGS geologist Michael D. Hylland and myself, during a site visit with you on December 18, 1995.

The lots are in sections 28 and 29, T. 3 S., R. 5 E., Salt Lake Baseline and Meridian on the east-facing slope of a low-lying hill. We observed six test pits on the property. The test pits ranged from about 8 to 9 feet deep. Geologic materials exposed in five of the six test pits (AGRA E&E test pits TP-2 through TP-5) were similar. In these test pits, the materials include a surficial soil consisting of brown to dark brown silty sand with roots and minor clay, underlain by a pedogenic carbonate horizon, in turn underlain by variably decomposed light gray to light brown tuffaceous breccia. The tuffaceous breccia ranges from poorly indurated and severely decomposed to moderately well indurated and slightly decomposed. Cobble- to boulder-size clasts range from completely decomposed to fresh, respectively. The degree of induration of the decomposed tuffaceous breccia generally increases with depth in each test pit. In addition, the degree of induration appeared to increase in an up-slope direction toward the crest line of the hill. The sixth test pit (TP-1) is located in a broad swale on the eastern edge of the proposed development. In this test pit, materials include a surficial soil and pedogenic carbonate horizon as described above, underlain by a brown, silty fine sand. The sand may represent alluvium deposited over decomposed tuffaceous breccia in the swale. The surficial soil in all the test pits reached a maximum thickness of 36 inches and the underlying pedogenic carbonate horizon reached a maximum thickness of 40 inches. In at least two areas, we observed backfilled excavations that represent test pits abandoned due to encountering shallow refusal. These represent areas where the tuffaceous breccia is well indurated and is not rippable by a backhoe. We observed no ground-water seepage in the test pits.

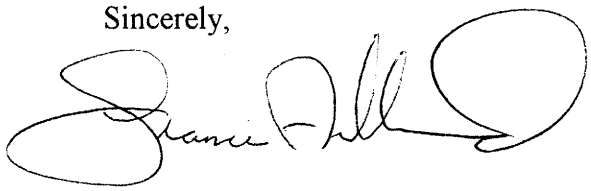
Based on our observations, I generally agree with the material classifications presented in the AGRA E&E report. Their descriptions make no mention of the pedogenic carbonate horizon I observed in most of the test pits. However, due to the pedogenic carbonate horizon's generally poor degree of induration, this difference has little effect on the material properties described in their report. I concur that decomposed bedrock is exposed in at least five of the six test pits. The presence of decomposed tuffaceous breccia in five of the test pits supports previous geologic mapping that indicates the lots are underlain by volcanic breccias of the Tertiary Keetley Volcanics (Bromfield and others, 1970, U.S. Geological Survey Geologic Quadrangle Map GQ-864). Also, the presence of decomposed rock at depths of less than 5 feet is as predicted by suitability mapping for wastewater disposal in conventional STSA systems (Hylland, 1995, Utah Geological Survey Open-File Report 319, plate 3A). Although conditions are generally unsuitable for conventional STSA systems where shallow bedrock is encountered, materials exposed in the test pits, although significantly variable, suggest that suitable locations for such systems may be identifiable at the property.

It is difficult to evaluate the accuracy of the field percolation tests summarized in the AGRA E&E report. AGRA E&E states that they are reporting test results performed and monitored by others. My opinion is that the range of reported percolation rates is generally consistent with the materials that we observed. However, percolation rates should be expected to vary across the site as a function of the physical characteristics of the materials and particularly the degree of decomposition of the shallow rock. The abandoned test pits indicate that well- indurated areas may be encountered at shallow depths where percolation rates could exceed 60 minutes per inch. I recommend that additional excavations be made to identify areas of suitable material that are consistent over a sufficient areal extent to meet the requirements of the drain field designs for the proposed lots. These excavations could be in the form of either long shallow trenches or a grid-like pattern of shallow test pits.

The potential for contamination of the nearby public water-supply well also needs to be considered in siting of the STSA systems. Because the systems would be located up-slope of the existing wellhead, they collectively could be a "potential contamination source" that is probably within "protection zone two" for the well as defined by the State of Utah Division of Drinking Water Rules R309-113-6 and R309-113-9, respectively. I recommend that the well log be reviewed in order to evaluate whether the aquifer intercepted by the well meets the classification of a "protected aquifer" (R309-113-6).

The UGS appreciates the opportunity to be of continued service to Wasatch County. Please do not hesitate to call if you have any questions regarding this letter or require additional information.

Sincerely,



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c.c.: Scott Wright, Heber City