Utah Geological Survey

Project:			Requesting Agency:
Review of "Geotechnical and engineering geology study - lot 221 on Lake Pines Drive, Timberlakes subdivision, Wasatch County, Utah."			Wasatch County
By: F.X. Ashland	Date: 6-12-97	County: Wasatch	Job No: 97-10
USGS Quadrangle: Center Creek (1126)		Number of attachments: 1	

At the request of Margaret Stephens, Wasatch County Planning Office, I reviewed geologic-hazards aspects of a geotechnical and engineering-geology report by AGRA Earth & Environmental (AGRA) (1997) for lot 221 in Timber Lakes Estates, Wasatch County, Utah. I received the report on May 5, 1997. The lot is located on Lake Pines Drive in the NW1/4NW1/4 section 9, T. 4 S., R. 6 E., Salt Lake Base Line and Meridian. The purpose of the review was to evaluate whether geologic hazards were adequately addressed prior to issuing a building permit giving approval to construct a home on the lot. The scope of work included a review of geologic-hazards literature and aerial photographs (1987, 1:40,000 scale; 1962, 1:20,000 scale), but did not include a site visit. Recommendations pertaining to foundation design in the AGRA (1997) report should be reviewed by a qualified geotechnical engineer, but appear adequate for typical residential construction.

The AGRA (1997) report addresses shallow ground water, earthquake ground shaking, surface fault rupture, and liquefaction. I believe the report adequately addresses these potential geologic hazards and I concur with AGRA's related conclusions and recommendations.

The AGRA (1997) report also addresses landslides and slope stability and indicates "no obvious sign of slope instability" exists on the lot. A summary regarding my evaluation of the adequacy of AGRA's slope-stability assessment is shown in attachment 1. AGRA adequately addresses most lot-specific slope-stability issues, including the possible effects of a septic-system drain field and site grading. AGRA identified three known or possible landslides to the north, east, and southwest of the site, but did not recognize any landslides near the lot. As part of an investigation for lot 223, two lots south of lot 221, Klauber (1996) identified a landslide that underlies lot 223 and several adjacent properties including lot 221. A review of aerial photographs by me and other Utah Geological Survey (UGS) geologists confirms that a probable landslide underlies the site. The landslide is about 1,000 feet wide where it is crossed by Lake Pines Drive, and about 1,200 feet long. The subdued nature of the landslide features suggests it is likely of early Holocene age (latest movement older than 5,000 years) and would be classified as Mo/Ho on plate 1D of UGS Open-File Report 319 (Hylland and others, 1995). Because AGRA did not identify this possible landslide, it did not address the slide's stability or the potential for instability caused by local and cumulative effects of development in the area.

The AGRA (1997) report makes slope-angle recommendations for temporary and permanent cut slopes. AGRA recommends that temporary cut slopes greater than 4 feet but less than 8 feet high can be cut at a 1 horizontal: 1 vertical (1H:1V) slope, which is an acceptable slope angle for temporary cuts of short duration. Because supposed temporary cut slopes in Timber Lakes Estates,

in some instances, have remained in place for over a year, this recommended temporary cut-slope angle should not be used where cut slopes may remain in place for long periods of time, particularly over the winter and spring months. In addition, AGRA recommends a 2H:1V cut-slope angle for permanent cuts. Whereas this recommendation may be suitable for undisturbed glacial till, in my opinion, because of the potential for landslide deposits at the site, the recommended slope angle is too steep unless supported with geotechnical soil-strength data.

In conclusion, I believe that AGRA's statement that the site is "...not exposed to undue geologic hazards" is based on a lack of recognition of a possible landslide at the site, resulting in an incomplete assessment of slope stability of the area. I recommend that the existence and, if present, the potential for instability of the landslide identified by Klauber (1996) be addressed in a subsequent study before issuing a building permit for this lot or other lots on the landslide. If the landslide is present, this study should be at least a preliminary geotechnical-engineering slope-stability evaluation (Hylland, 1996) and consider the cumulative effects of development in the area, including the wetting of soils caused by effluent from septic-system drain fields. In addition, AGRA may need to reassess its permanent cut-slope-angle recommendations, considering the possible landslide origin of site soils, or support its recommended 2H:1V slope angle with geotechnical data.

REFERENCES

AGRA Earth & Environmental, 1997, Geotechnical and engineering geology study - lot 221 on Lake Pines Drive, Timberlakes subdivision, Wasatch County, Utah: Salt Lake City, unpublished consultant's report, 13 p.

Hylland, M.D., Lowe, Mike, and Bishop, C.E., 1995, Engineering geologic map folio, western Wasatch County, Utah: Utah Geological Survey Open-File Report 319, 12 plates, scale 1:24,000.

Hylland, M.D., editor, 1996, Guidelines for evaluating landslide hazards in Utah: Utah Geological Survey Circular 92, 16 p.

Klauber, William, 1996, Landslide reconnaissance of lot 223, Timber Lakes Estates, Wasatch County, Utah: West Jordan, Utah, unpublished consultant's report, 10 p.

Attachment 1 Job No. 97-10

CHECKLIST FOR THE REVIEW OF LANDSLIDE-HAZARD REPORTS

Report Author AGRA Earth & Environmental Date Of Report April 30, 1997

Title Of Report Geotechnical and engineering study - lot 221 on Lake Pines Drive, Timberlakes subdivision, Wasatch County, Utah

UGS File No. Technical Report 97-10 Requesting Agency Wasatch County Planning County Wasatch

USGS 7.5' Quad(s) (BLM No.) Center Creek (1126) Sec., T., R. NW1/4NW1/4 section 9, T. 4 S., R. 6 E., SLB&M

Adequacy Codes: A = adequate; **N** = not necessary; **D** = additional data, analysis, or justification needed

SUBJECT[1]	Adequacy of report	COMMENTS (attach additional sheets if necessary)
1. List of reference materials used	N	
2. Vicinity map	A	
3. Site-planning map at suitable scale, showing:	A	plan showing proposed septic-system locations and homesite included
3a. proposed development	A	
3b. topography	A	topography included
3c. geology	N	
3d. subsurface exploration and cross section locations	A	sample locations shown
3e. surface water	N	
3f. landslide features	D	none identified by AGRA on lot, landslide features identified by Klauber (1996) not shown
3g. hazard-reduction features	N	
4. Description of site conditions:	D	
4a. slopes	A	described briefly in text
4b. slope materials	D	possible landslide origin not addressed
4c. subsurface planar features	N	
4d. surface/ground water	D	basis for projected depth to ground water not explained
4e. vegetation	A	described in text
4f. suspected landslide features	D	possible landslide origin of soils not addressed; does not identify possible landslide at site
4g. surficial processes	A	
4h. other	N	

table continued

[1] *Refer to UGS Circular 92, "Guidelines for Evaluating Landslide Hazards in Utah" (1996, M.D. Hylland [editor]) for supplemental information.*

Attachment 1 (cont.)

Adequacy Codes: A = adequate; N = not necessary; D = additional data, analysis, or justification needed

SUBJECT	Adequacy of report	COMMENTS (attach additional sheets if necessary)
5. Description of existing landslides, including items in (4) above, and:	D	landslide of Klauber (1996) not identified or addressed
5a. failed unit(s)	--	
5b. failure type(s)	--	
5c. scarp characteristics	--	
5d. age(s) of failure	--	
5e. cause(s) of failure	--	
6. Implications of nearby landslides	D	susceptibility of soils to landsliding not addressed
7. Geotechnical-engineering evaluation:	D	quantitative analysis necessary to assess stability of landslide, if present
7a. subsurface materials/ground-water characterization	--	
7b. laboratory testing	--	
7c. profiles/cross sections	--	
7d. static slope-stability analysis	--	
7e. seismic slope-stability analysis	--	
• input ground motions	--	
• effects on shear strength and pore pressures	--	
• liquefaction potential	--	
7f. post-earthquake stability analysis	--	
8. Conclusions regarding hazard	D	conclusions related to slope stability exclude assessment of existence and possible reactivation of landslide
9. Recommendations	D	slope-angle recommendations do not consider possible landslide origin of site soils

Additional comments:

Reviewed By Francis X. Ashland Date Reviewed June 3, 1997