

AGEC

Applied GeoTech

May 23, 2016
Revised June 7, 2016

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Subject: Geologic Hazard Evaluation
Proposed Residence
6804 and 6762 North 2275 East
Liberty, Utah
Project No. 1160381

Gentlemen:

Applied Geotechnical Engineering Consultants, Inc. (AGEC) was requested to perform a geologic hazard evaluation for the proposed residence to be constructed at 6804 and 6762 North 2275 East in Liberty, Utah.

1.0 PURPOSE AND SCOPE OF INVESTIGATION

This study was performed to identify potential geologic hazards that may affect the proposed residence to be constructed on the two lots. The study includes a review of aerial photographs, geologic literature and Lidar data for the area and site reconnaissance. The study was performed in general accordance with our authorization for services dated May 16, 2016 with additional work requested for the 6762 North 2275 East lot.

2.0 SITE CONDITIONS

At the time of our field study, the property consisted of two undeveloped residential lots. There is a drainage that extends in a general southwest/northeast direction through the north side of the north lot. There was no water in the drainage at the time of the site visit. The ground surface slopes gently down toward the west and northwest south of the drainage and down to the south and southeast north of the drainage.

Vegetation at the site consists of grass, shrubs and trees.

There is a house north of the lot and south of the south lot. There are roads to northwest of the north lot and west of both lots. There is a house and vacant land west of the west road and vacant land north of the north road.

There is no evidence of landslide deposits at or near the properties. The soil appears to consist of clayey sand and gravel. No bedrock outcrops were observed on or near the property.

3.0 PROPOSED CONSTRUCTION

We understand that a single-family residential house is planned to be constructed on the south portion of the combined properties. We anticipate the residence will be a one to two-story, wood-frame structure with potential for a walk-out basement.

4.0 GEOLOGIC SETTING

Aerial photographs used in the geologic review were downloaded from the Utah Geological Survey website. Photograph Nos. WF2-030 and 031 with a date of 1970 and reported scale of 1 to 12,000 were used in our evaluation. The Lidar data was obtained from the Utah Geological Survey. Geologic maps reviewed for the study are Crittenden and Sorensen (1985), Coogan and King (2000), Elliott and Harty (2010) and the Utah Fault and Fold database available at the Utah Geological Survey website.

The geology map for the area by Crittenden and Sorensen (1985) is presented on Figure 1. The site is underlain by the Tertiary-age Norwood Tuff. The Coogan and King (2000) map shows similar geologic conditions as those of the Crittenden and Sorensen (1984). The Elliott and Harty (2010) landslide map shows the property to be located on the west side of an area mapped to have potential landslide deposits.

5.0 GEOLOGIC HAZARDS

Geologic hazards considered for this study are surface-fault-rupture, seismicity, landslide, liquefaction, debris flow, rockfall and snow avalanche.

5.1 SURFACE-FAULT-RUPTURE AND SEISMICITY

There are no active faults mapped to extend near or through the site. The closest fault considered active based on the Utah Fold and Fault database is the Wasatch fault located approximately 4 miles to the southwest. Surface-fault-rupture is not considered a hazard at the site.

The property is located in the Intermountain seismic zone, which consists of an area of relatively high historical seismic activity. The largest seismic ground shaking is expected to originate from the Wasatch fault zone. The Wasatch fault zone is considered capable of producing earthquakes on the order of 7 to 7.5 magnitude and can result in significant seismic ground shaking at this property. Mapping by the U.S.

Geological Survey indicates that a peak ground acceleration of 0.33g would have a 2 percent probability of being exceeded in a 50-year time period (IBC, 2012).

5.2 LANDSLIDE

Landslide deposits have been mapped for the area by Elliott and Harty (2010). However, based on a review of aerial photographs and Lidar data and a site reconnaissance, landslide is not considered a hazard at the site. No geomorphic features consistent with landslides were found for the site based on review of aerial photographs and Lidar data. The ground surface in this area is sufficiently flat such that in our professional opinion, landslide is not a hazard at the site.

5.3 LIQUEFACTION

The subsurface soil at the site is expected to consist of clayey sand and gravel overlying bedrock. It is our professional opinion that liquefaction is not a hazard at the site.

5.4 DEBRIS FLOW

There are no drainages of sufficient gradient that they would produce debris-flow deposits. Thus, debris flow is not considered a hazard at this site.

5.5 ROCKFALL

There are no sources of rock and no slopes of sufficient gradient to result in rockfall events on these properties.

5.6 SNOW AVALANCHE

The site is not located in a known avalanche hazard zone. There are no potential sources for snow avalanche near the site.

6.0 CONCLUSION

The site is suitable from a geologic-hazard perspective if the proposed residence is constructed in the south portion of the combined properties. Seismic ground shaking is the primary geologic hazard to consider in development of the site. This hazard is mitigated through structural design of the building to lower the risk to human life and damage to property to an acceptable level as set forth in the International Building Code. There is no evidence that landslide, surface-fault-rupture, liquefaction, debris flow, rockfall and avalanche will affect the proposed residence.

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7.0 LIMITATIONS

This report has been prepared in accordance with generally accepted geologic engineering practices in the area for the use of the client. The findings and conclusions included in this report are based on conditions observed at the time of our site visit, review of geologic literature, aerial photographs, Lidar data and our experience in the area. Variations in the geologic conditions may not become evident until additional exploration or excavation is conducted. If geologic conditions are found to be significantly different from those described above, we should be notified to reevaluate the recommendations given.

8.0 PREPARER QUALIFICATIONS

The geologist/engineer who prepared this report is a licensed geologist and engineer in the Utah and meets the minimum requirements of the Weber County geologic-hazards ordinance for performing this study.

If you have questions or if we can be of further service, please call.

Sincerely,

APPLIED GEOTECHNICAL ENGINEERING CONSULTANTS, INC.



Douglas R. Hawkes, P.E., P.G.

Reviewed by JEN, P.E.
DRH/rs
Enclosures

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References:

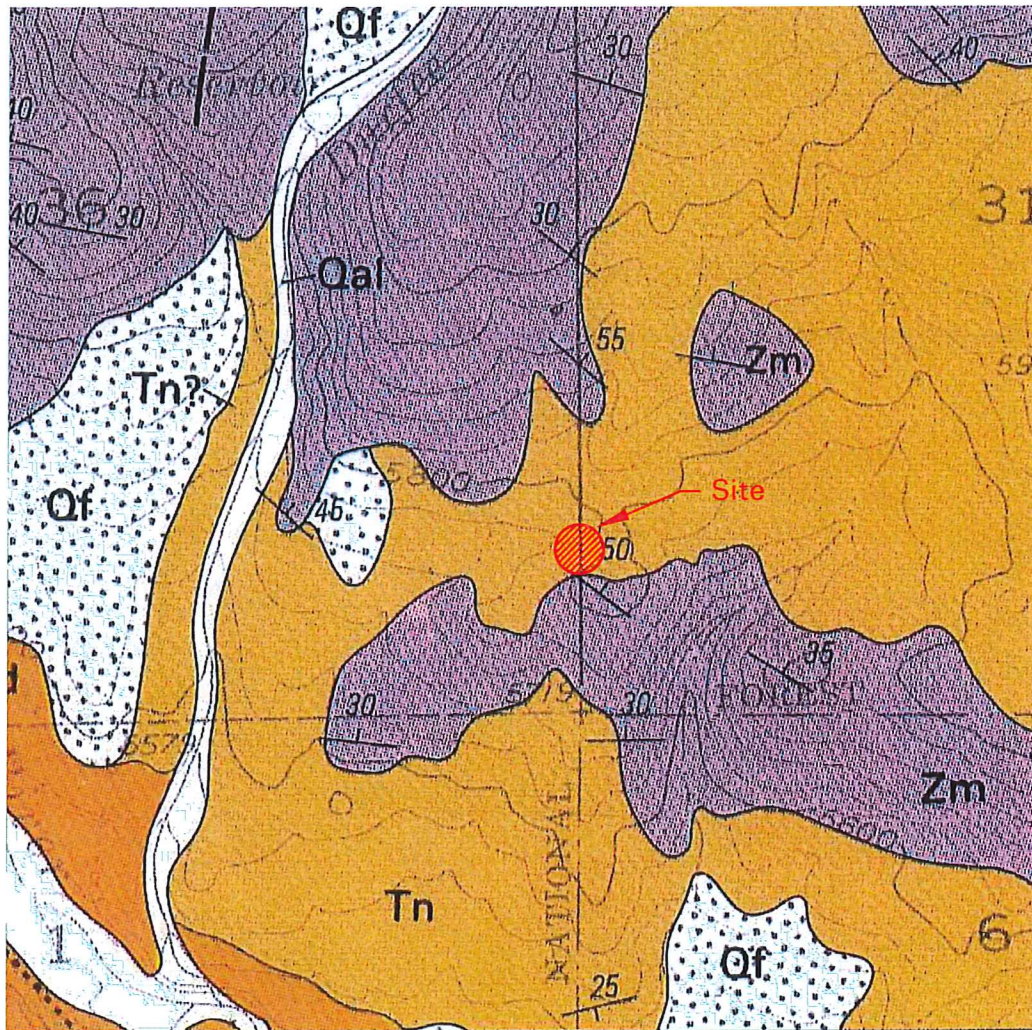
Coogan, J.C. and King, J.K., 2000; Progress report geologic map of the Ogden 30' X 60' quadrangle, Utah and Wyoming, Utah Geological Survey Open-file Map 380.

Crittenden, M.D., Jr. and Sorensen, M.L., 1985; Geologic map of the Mantua quadrangle and part of the Willard quadrangle, Box Elder, Weber and Cache Counties, Utah, US Geological Survey Map I-1605.

Elliott, A.H. and Harty, K.M., 2010; Landslide maps of Utah, Ogden 30' X 60' quadrangle, Utah Geological Survey Map 246DM, Plate 6.

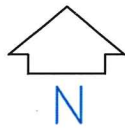
International Building Code, 2012; International Code Council, Inc. Falls Church, Virginia.

Utah Geological Survey, 2016; Utah fault and fold database accessed on March 18, 2016 at geology.utah.gov/resources/data-databases/qfaults/.



Approximate Scale 1" = 1,000'

From Crittenden and Sorensen (1985)



EXPLANATION OF SYMBOLS AND GEOLOGIC UNITS IN AREA OF PROPOSED DEVELOPMENT

- Qal - Alluvial deposits (Holocene) sand, silt and gravel.
- Qf - Alluvial-fan deposits (Holocene) sand, silt and gravel.
- Tn - Norwood Tuff (Tertiary) tuff, tuffaceous silt and sandy tuff.
- Zm - Mutual Formation (Upper Proterozoic) quartzite.
- Geologic contact between units, dashed where approximate.

PROPOSED RESIDENCE
6804 NORTH 2275 EAST
LIBERTY, UTAH