

SURFACE GEOLOGIC HAZARD STUDY

RED CLIFF SUBDIVISION

PROPERTY LOCATION

**PART OF THE NW CORNER OF SECTION 4 T 6 N, R 3 E,
SALT LAKE BASE & MERIDIAN, WEBER COUNTY, UTAH**

PREPARED FOR:

KEVIN GLASMANN

**5925 SOUTH 2450 EAST
OGDEN, UTAH 84403**

Kevin Glasmann
Property Owner
5925 South 2450 East
Ogden, Utah 84403

Re: Report
Surface Geologic Hazard Study
Property Location
South Bank of the South Fork of the Ogden River
Upstream of Camp Red Cliff
Huntsville, Utah

1. INTRODUCTION

1.1 GENERAL

Presented in this report are the results of a surface reconnaissance study which included the determination of potential geologic hazards present or adjacent to the property. Geologic hazards include landslides, active faults, debris flows, rock falls, and flooding. The location of the Red Cliff Subdivision with respect to major topographic features and general conditions, as of 1998, is shown on Figure 1, Vicinity Plan. A more detailed layout of the subdivision showing the location of three lots and the property boundaries is shown on Figure 2, Site Plan.

1.2 OBJECTIVES AND SCOPE

The objectives and scope of this study were planned during telephone discussions and emailed information between Kevin Glasmann and C. Charles Payton a Utah licensed professional geologist and a certified engineering geologist.

The objectives of this study were to:

1. Determine if there are any active landslides or other geologic hazards on the site.
2. Determine if active faults exist within the site area.
3. Determine the general soil conditions present on the site.

In accomplishing these objectives the scope of work included the following:

1. An initial review of geologic and topographic maps of the site area.
2. A field program consisting of a general reconnaissance of the site.
3. Preparation of this summary report.

2. SITE DESCRIPTION

This report presents the results of a surface geologic hazard study for the Red Cliff Subdivision, which is an area of approximately 40 acres located on the south bank of the South Fork of the Ogden River. This site is approximately nine miles east of Huntsville, Utah and approximately 1.7 miles downstream of the Causey Dam. The approximate elevation of the three lots planned within the subdivision is 5,400 feet above sea level. The property consists of the northern portion being nearly level along the south bank of the Ogden River. The southern portion of the property ranges in elevation from approximately 5,425 feet along the southern portion of the buildable area to an elevation of approximately 6,800 feet above sea level.

South of the buildable area is a steep slope of bedrock. Most of the lower portion of the slope is covered with vegetation of trees and shrubs. One very large outcrop of bedrock seems to be hanging over the slope. This outcrop has been called Red Cliff. The vegetation on the northern portion of the site south of the river varies from large trees and brush with open areas covered with smaller shrubs, weeds, and grass.

A spring area is also present near the toe of the steep slope and the location is shown on Figure 1 as two small black dots.

3. GEOLOGIC AND SEISMOTECTONIC SETTING

The property is located within the eastern portion of Weber County, Utah. It is east of the eastern foothills of the Wasatch Range and Ogden Valley. Causey Dam and Reservoir are located on the South Fork of the Ogden River which is just to the east (upstream) of the property site (Figure 1). The Wasatch Range is the eastern side of the Basin and Range Province which extends westward to the Sierra Mountains in California.

Based upon the United States Geologic Survey map of the Causey Quadrangle the Red Cliff Subdivision is on a north facing slope within an area which has been mapped as part of the main body of the Wasatch and Evanston Formations (Tkwe) as shown of Figure 3. These formations may be up to 3,000 feet thick and are mainly reddish-brown poorly sorted sandstone and conglomerate containing scattered beds of reddish-brown sandy siltstone. Where the sandstone and conglomerate beds are exposed at the surface the gentle dip of the sedimentary beds can be seen sloping to the west and some to the northwest. The dip slope of the sedimentary beds ranges from 4 to 7 degrees. Most off the conglomerate is composed of rounded tan, purple, and light green quartzite pebbles, cobbles, and boulders (Mullens, 1969).

The yellow marked areas on the geologic map (Figure 3) with the symbol (Qf) is a rock formation called Fanglomerate which is a quartzite cobble and boulder gravel eroded from the Wasatch Formation.

The property site is located approximately 18.0 miles east of the Weber segment of the Wasatch Fault Zone. The active Wasatch Fault is considered to be made up of several segments, each segment acting

relatively independently (Machette and Others, 1987). The Weber segment is one of the longest and most active segments within the Wasatch Fault Zone. The segment extends from north of Ogden to the north end of Salt Lake City, Utah. Nelson and others (2006) report four surface rupturing seismic events since the middle Holocene (about 5,000 years ago) with the most recent event being about 500 years ago with a surface rupture of 1.6 feet. The Weber Segment of the Wasatch Fault may be capable of producing earthquakes with a magnitude as large as 7.5 (Ms). Vertical displacements of 3 to 15 feet have been considered possible during a major earthquake on the Weber Segment of the Wasatch Fault (Hecker, 1993). No faults have been mapped on or adjacent to the Red Cliff Subdivision. And no evidence of surface displacement was noted on or adjacent to the property site.

4. FIELD INVESTIGATION

The field investigation was conducted on July 2, 2019 and consisted of a reconnaissance of the building planned area and surrounding area. The property has a north facing slope with an average slope angle of approximately 40 degrees. This slope is covered by a thick growth of trees and brush with some areas of exposed bedrock. The cliff area above Lot 3 is a large area of bedrock with vertical to overhanging portions of rock. The bedrock appears to be massive conglomerate with some thin beds of sandstone. No fractures or joints were noted within the bedrock.

The surface soils within the areas of the three lots (Figure 2) within the Red Cliff Subdivision have been formed by the weathering and erosion of the bedrock formations. The soil is composed of reddish-brown silt, clay, and sand with scattered rounded hard gravel, cobbles, and boulders exposed on the ground surface. Some of the boulders are huge with the largest one seen, on Lot 3, being 25 feet long, 12 feet wide, and 10 feet high. These boulders are the result of gradual weathering of the bedrock outcrops on the north facing slope south of the three building lots. The soils on Lots 2 and 3 are composed of many rounded gravels and cobbles also due to the weathering and erosion of the conglomerate bedrock exposed on the slopes above the building lots.

Near the river bank the soils are composed mostly of silt, clay, and sand with few rounded gravels. These soils have been mapped as Alluvium (Qa) and can be partially related to flooding along the river and also to erosion of the steep slopes to the south. The soils are unconsolidated.

The springs near the toe of the steep slopes, located between Lot 1 and Lot 2, have been developed to provide water and the developed area was secured by a metal fence and a locked gate. Access to the spring development area was not possible. It is understood that the springs may have been developed by the owners of the Red Cliff Camp located downstream of the subdivision. Water was flowing from two pipes, from the spring development area, into a ditch along the access road and then into a culvert under the road. The estimated flow was between 5 and 7 gallons per minute.

The south bank of the South Fork of the Ogden River was examined for evidence of flooding. The water level was approximately 5 feet below the nearly level ground area where the three lots are located. Not evidence of any flooding was seen. With the Causey Dam located upstream of the site it is very likely that water release from the dam is controlled such that no flooding has occurred downstream of the dam since its construction.

5. CONCLUSIONS AND RECOMMENDATIONS

Based on field observations and reviews of available geologic literature there is no evidence of any active landslide movement on the property. Geologic hazards considered during this study also included slope stability, stream flooding, debris flow, rockfall, and fault rupture during earthquakes along the Wasatch Fault Zone. A slope stability analysis was not performed during this geologic hazard assessment. The geologic hazards which were considered likely to effect the property were stream flooding and rockfall.

Based upon the field investigation stream flooding is considered to be low under current conditions. However, should the Causey Dam ever fail stream flooding would be at a high risk.

Rockfall hazards are considered to be high. This is based upon the number of boulders seen on Lots 2 and 3. The rate of boulders rolling down the slopes based on the boulders observed during the field investigation is considered to be low. However, no buildings should be constructed any closer than approximately 150 feet from the toe of the steep slopes based upon the location of the boulders noted during the field investigation. The construction of a berm or wall at least 7 feet high south of any homes being build could defend against potential rockfall, debris-flow, and avalanche hazards.

The risk associated with surface-fault rupture, liquefaction, landslide, and shallow groundwater geologic hazards are considered to be low for the property. However, during a major earthquake on the Wasatch Fault located west of the property it is possible that ground shaking could be felt and minor damage to items within the homes could occur.

6. LIMITATIONS

The analysis and report findings are based upon published geologic maps and reports, and the reconnaissance of the property. The conclusions are based on currently accepted geologic interpretations of this information. The surface reconnaissance does not necessarily reflect geologic conditions at a greater depth. During construction of the foundations for cabins or homes planned for the property the geologic conditions at depth could be observed. It is therefore recommended that a geologic review be made of the excavations to be certain that geologic features observed are not detrimental to construction of structures.

No attempt has been made to predict earthquake ground motions or to determine the magnitude of earthquakes associated with the Wasatch Fault Zone located west of the project area.

I appreciate the opportunity to be of service in relation to potential geologic hazards that may effect the further development of the property. Should you have any questions regarding this report or wish to discuss additional services, please do not hesitate to contact me at your convenience. My cell phone number is (801) 631-1613. Also you may reach me by email at c2payton.egs@gmail.com.

Respectfully submitted,

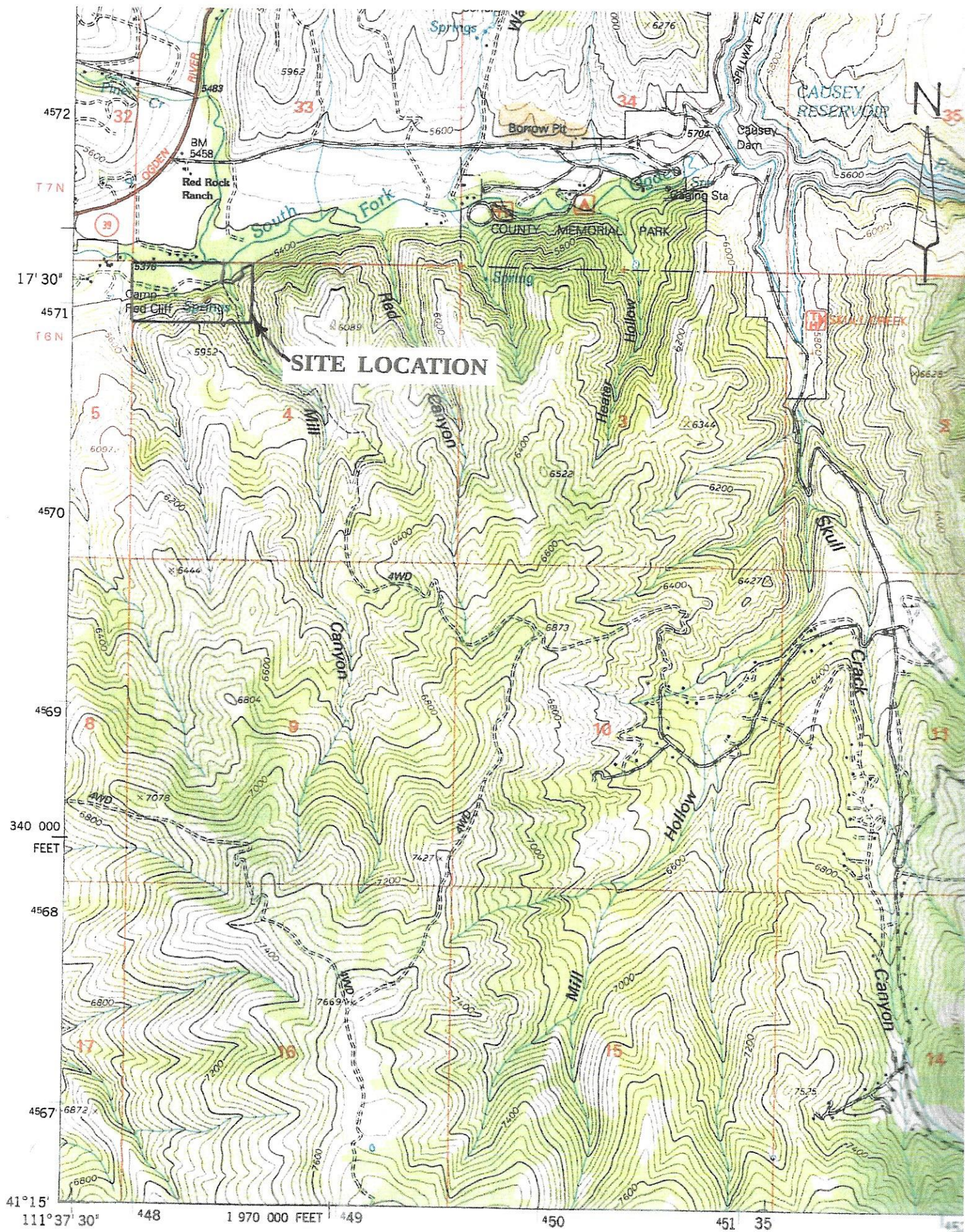
C. Charles Payton, P.G., C.E.G.
Professional Engineering Geologist
1474 North 1930 West
Provo, Utah 84604-2247



Enclosures: Figure 1. Vicinity Plan
Figure 2. Site Plan
Figure 3. Geologic Map

REFERENCES CITED

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- Machette, M. N., Personius, S.F., and Nelson, A.R., 1987: Quaternary geology along the Wasatch Fault Zone; segmentation, recent investigations and preliminary conclusions; U.S. Geological Survey Open File Report, 87-585, P, B-1 to B-124.
- Mullens, F.E., 1969: Geologic Map of the Causey Dam Quadrangle, Weber County, Utah: United States Geological Survey, Map GQ-790.
- Nelson, A.R., Lowe, M., Personius, S.F., Bradley, L., Forman, S.L., Izlask, R., and Garr, J., 2006: Holocene earthquake history of the northern Weber segment of the Wasatch Fault Zone, Utah: Paleoseismology of Utah, volume 13: Utah Geological Survey Miscellaneous Publication 05-8, 39 p.



VICINITY PLAN

FIGURE 1

