UTAH GEOLOGICAL SURVEY
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PLATE 10

SHALLOW-BEDROCK-SUSCEPTIBILITY MAP FOR THE ST. GEORGE–HURRICANE METROPOLITAN AREA

by

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14°
TRUE NORTH
MAGNETIC NORTH
Approximate mean declination, 2007

UTAH
Map Location

Basemap consists of National Agricultural Imagery Program natural color aerial photography.

Universal Transverse Mercator Projection, zone 12.
North American Datum 1983.

Scale 1:24,000

1 0.5 0 1 2 Miles

1 0.5 0 1 2 Kilometers

SYMBOLS

- Municipality boundary
- Interstate Highway
- State Highway
- Major local surface street
- Other road

EXPLANATION

BR_H Hard: Areas where generally hard and resistant bedrock crops out at the ground surface. These bedrock units typically require blasting to excavate.

BR_S Soft: Areas where less resistant bedrock crops out at the ground surface. Even when fresh, these bedrock units typically can be excavated without blasting, although some blasting may be required locally. Some rock units may contain expansive clay minerals and may be deeply weathered.

BR_B Buried: Areas where depth to bedrock is ≤10 feet beneath soil cover. In most areas the identity and degree of weathering of the underlying bedrock is unknown. However, many basalt flows in the study area, which consist of very hard and durable rock, are covered with a thin veneer of soil and fall into this category.

DISCUSSION

Bedrock crops out at the ground surface or is present in the shallow subsurface (≤10 ft) over much of the St. George – Hurricane metropolitan area. The principal problem associated with shallow bedrock is difficulty of excavation, particularly in highly resistant, unweathered units. Bedrock in the study area ranges from hard, resistant units that may require blasting to softer, less resistant units that typically can be excavated without or only minimal blasting. In general, unweathered bedrock formations provide incompressible foundations with high shear strengths, making mechanical compaction of these materials generally ineffective and unnecessary. Bedrock is not a suitable material for the installation of onsite wastewater disposal systems. Because shallow bedrock rarely if ever causes rapid, catastrophic property damage or is a threat to life safety, for purposes of this study, shallow bedrock is considered an adverse construction condition and not geologic hazard.

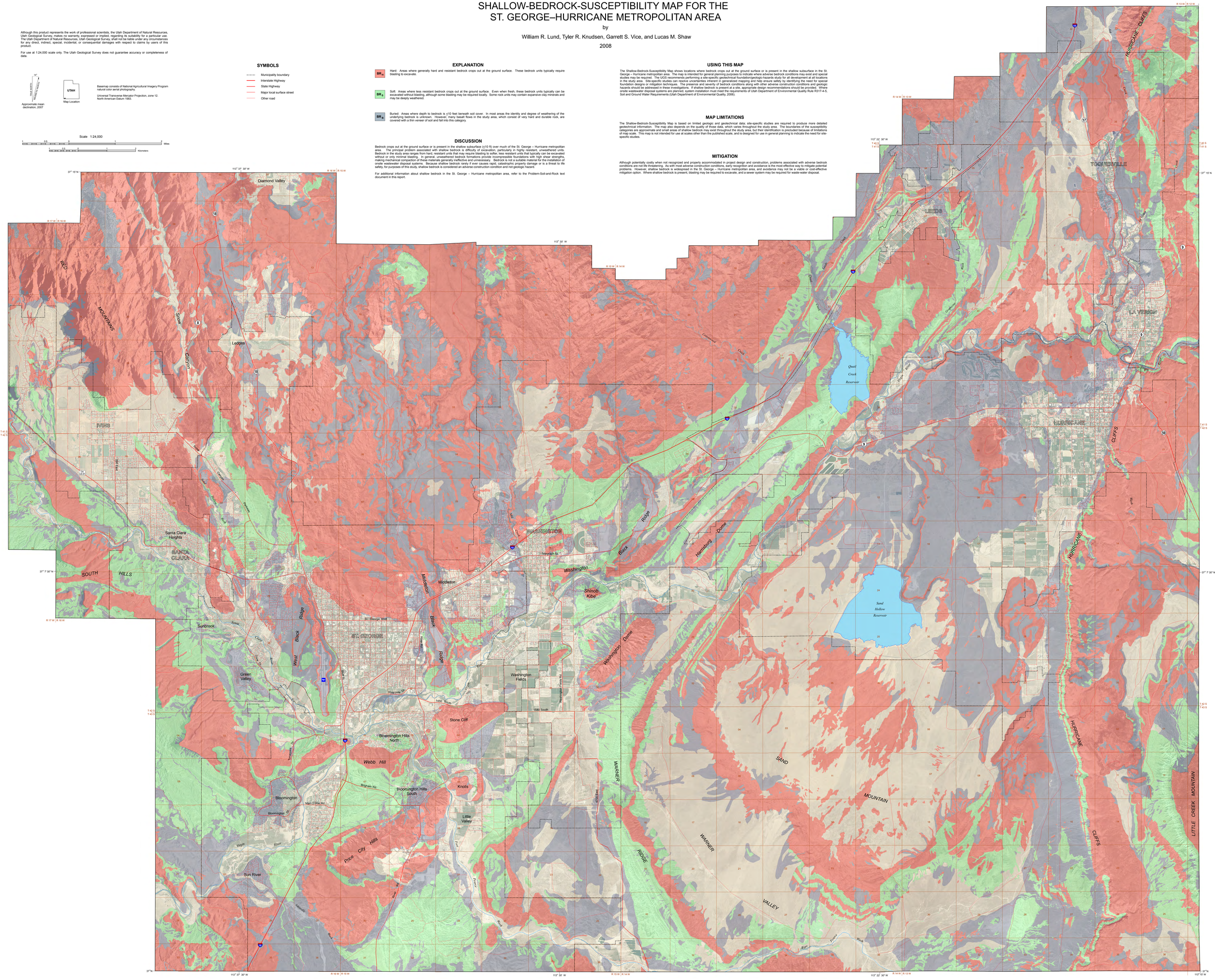
For additional information about shallow bedrock in the St. George – Hurricane metropolitan area, refer to the Problem-Soil-and-Rock text document in this report.

USING THIS MAP

The Shallow-Bedrock-Susceptibility Map shows locations where bedrock crops out at the ground surface or is present in the shallow subsurface in the St. George – Hurricane metropolitan area. The map is intended for general planning purposes to indicate where adverse bedrock conditions may exist and special studies may be required. The UGS recommends performing a site-specific geotechnical foundation/geologic-hazards study for all development at all locations in the study area. Site-specific studies can resolve uncertainties inherent in generalized mapping and help ensure safety by identifying the need for special foundation designs or mitigation techniques. The presence and severity of bedrock conditions along with other adverse construction conditions and geologic hazards should be addressed in these investigations. If shallow bedrock is present at a site, appropriate design recommendations should be provided. Where onsite wastewater disposal systems are planned, system installation must meet the requirements of Utah Department of Environmental Quality Rule R317-4-5, Soil and Ground Water Requirements (Utah Department of Environmental Quality, 2006).

MAP LIMITATIONS

The Shallow-Bedrock-Susceptibility Map is based on limited geologic and geotechnical data; site-specific studies are required to produce more detailed geotechnical information. The map also depends on the quality of those data, which varies throughout the study area. The boundaries of the susceptibility categories are approximate and small areas of shallow bedrock may exist throughout the study area, but their identification is precluded because of limitations of map scale. This map is not intended for use at scales other than the published scale, and is designed for use in general planning to indicate the need for site-specific studies.

MITIGATION

Although potentially costly when not recognized and properly accommodated in project design and construction, problems associated with adverse bedrock conditions are not life threatening. As with most adverse construction conditions, early recognition and avoidance is the most effective way to mitigate potential problems. However, shallow bedrock is widespread in the St. George – Hurricane metropolitan area, and avoidance may not be a viable or cost-effective mitigation option. Where shallow bedrock is present, blasting may be required to excavate, and a sewer system may be required for waste-water disposal.