



Reply to: 2880 Geologic Services and Resources

Date: January 8, 1985

Subject: Land Stability of Twelve Mile Canyon Between
Newfield Reservoir and Spring Hill

To: William H. Boley, Forest Engineer

WIB

On September 10, 1984, I conducted a land stability field review of a portion of the proposed Ferron-Mayfield Road Relocation in Twelve Mile Canyon (Map 1) at the request of Holger Theobalt, Civil Engineer. The investigation was conducted in the area between Newfield Reservoir and Spring Hill. No concerns for stability were expressed for the remaining sections of the road relocation. Holger Theobalt accompanied me on the field examination.

The objectives of the examination were to assess the stability of the Twelve Mile Canyon area between Newfield Reservoir and Spring Hill, and to identify possible stability problems that may be associated with the relocation of the Ferron-Mayfield Road (50022) in that area.

The subject area is located in Section 21, T19S, R3E (Map 1). The present Ferron-Mayfield Road located near the bottom of Twelve Mile Canyon was extensively damaged by landslides and stream bank failures in the springs of 1983 and 1984. Relocation of the road in the subject area is now being evaluated to re-establish surface access.

Geology

The proposed Ferron-Mayfield relocation is situated at the base of Loveridge Flat. The area is composed of unconsolidated colluvial material underlain by the North Horn and Flagstaff Formations (Map 2). The bench below Loveridge Flat and the lower valley sides are underlain by shales, sandstones and minor limestones of the North Horn Formation. The steep upper faces being Flagstaff Limestone. The North Horn Formation has been involved in 66% of the acreage disturbed by land failures on the Manti Division in 1983 and 1984. The road crosses two faults, one near the base of Spring Hill and approximately 950 feet of vertical displacement and the other 1,000 feet west of Newfield Reservoir with approximately 150 feet of vertical displacement. No recent movement has been recorded on these faults.

Specific Observations

There are three small landslides along the road relocation route between Spring Hill and Newfield Reservoir (Map 2). These slides are earth slumps which move along a concave surface of rupture with the main body of unconsolidated material tilted back toward the slope and dropping vertically at the head. These slides formed in the spring of 1984. The Ferron-Mayfield Road relocation as proposed has avoided slumps one and two but cuts the toe of slump three. There is spring seepage originating from the toe of slump three. Slump two appears to have found a stable center of gravity and will most likely not continue to fail further up slope.



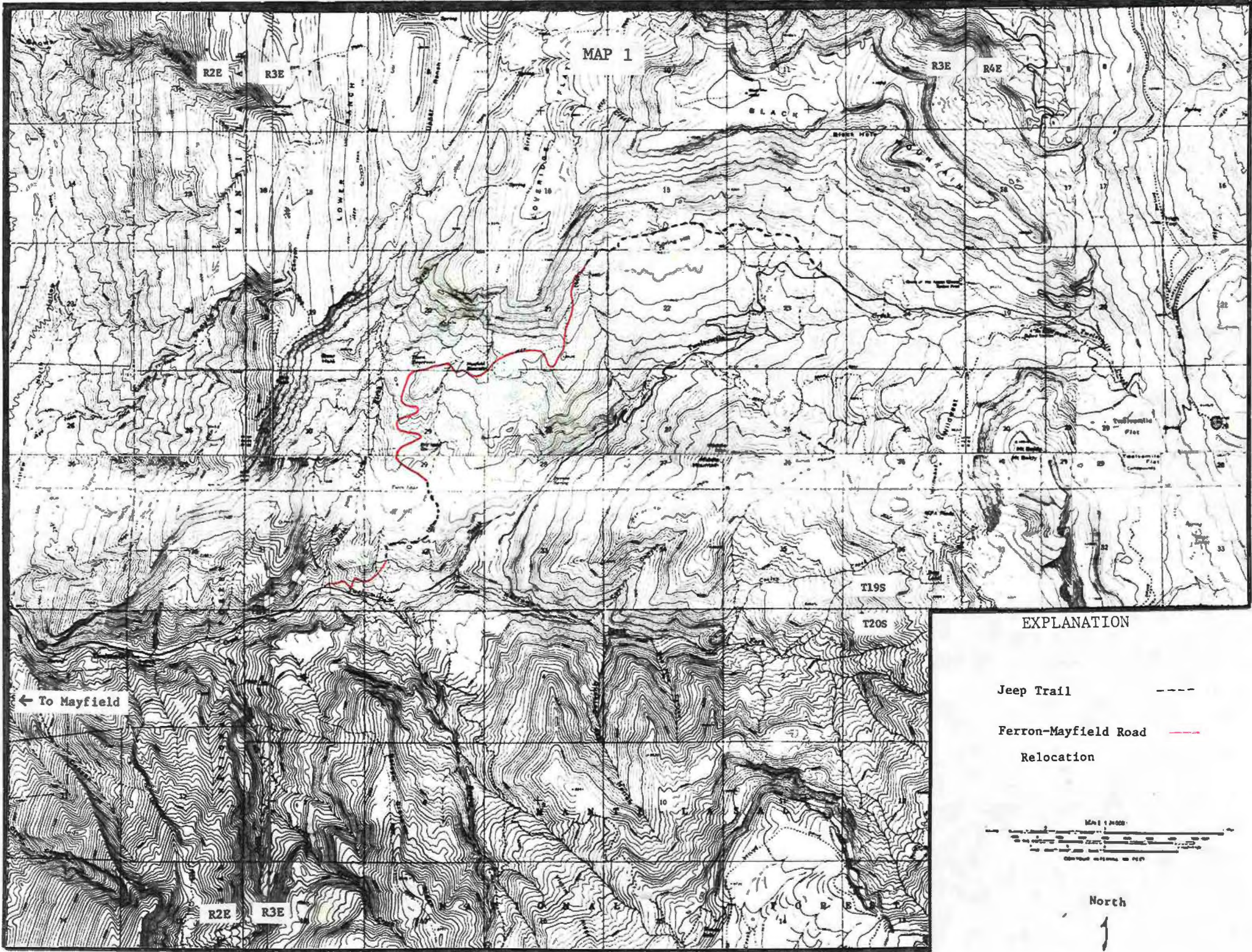
There are two areas (A and B) which have the highest potential for slope instability (Map 2). These areas are located on well vegetated, north or east-facing steep slopes. In both areas there is soil creep occurring at an estimated rate of 2 inches per 20 years as evidenced by tree deformation. The subject area receives an average annual precipitation of 30 inches. The total 1983 annual precipitation at the Manti City monitoring station was 172% of the average annual precipitation for that station. The Manti Station is the nearest monitoring station to the subject area. The soils in Areas A and B have remained wet throughout much of the summer due to surface runoff.

There is a spring flowing from the fault zone in Area A. Groundwater originating from precipitation and snowmelt on Black Mountain and surface water from the sag ponds on Spring Hill may be migrating downslope along the fault plane into Area A. A small crack approximately 20 feet long and less than one-fourth inch wide was observed running parallel with the slope contours in Area A in the relocation route.

Irene Savanyo-Lemley

IRENE SAVANYO-LEMLEY
Staff Geologist

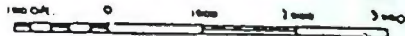
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B. Barney
H. Theobalt
I. Savanyo-Lemley



Explanation

- Jeep Trail
- Road Relocation Route
- Landslide Area ⬇
- Area of Possible Movement
- Spring
- Formation Contact
- North Horn Formation TKnh
- Flagstaff Formation Tf
- Relocation Route through Subject Area

Scale 1:24,000



Contour Interval 40 Feet

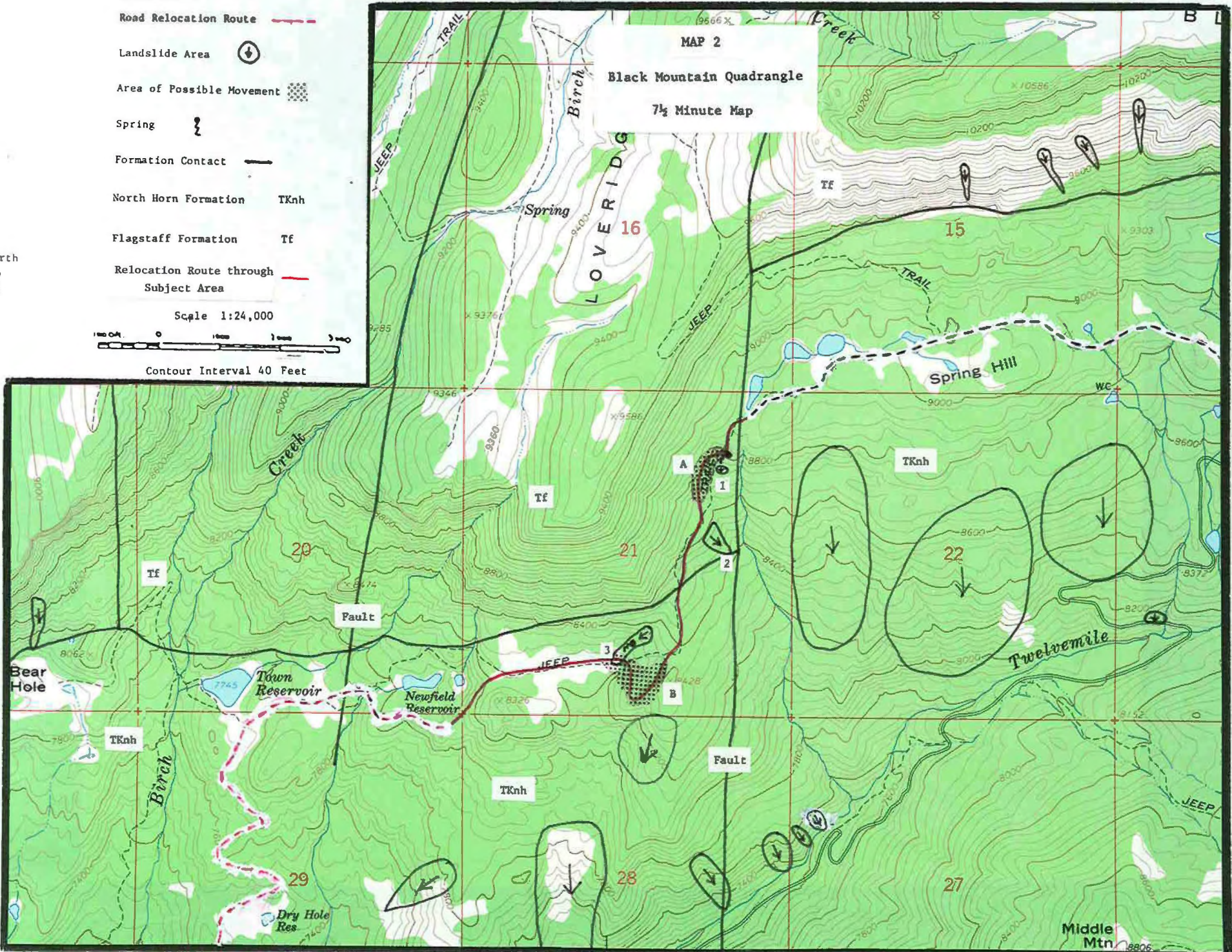
R 3 E

MAP 2

Black Mountain Quadrangle

7½ Minute Map

North
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T 19 S

T 19 S

R 3 E