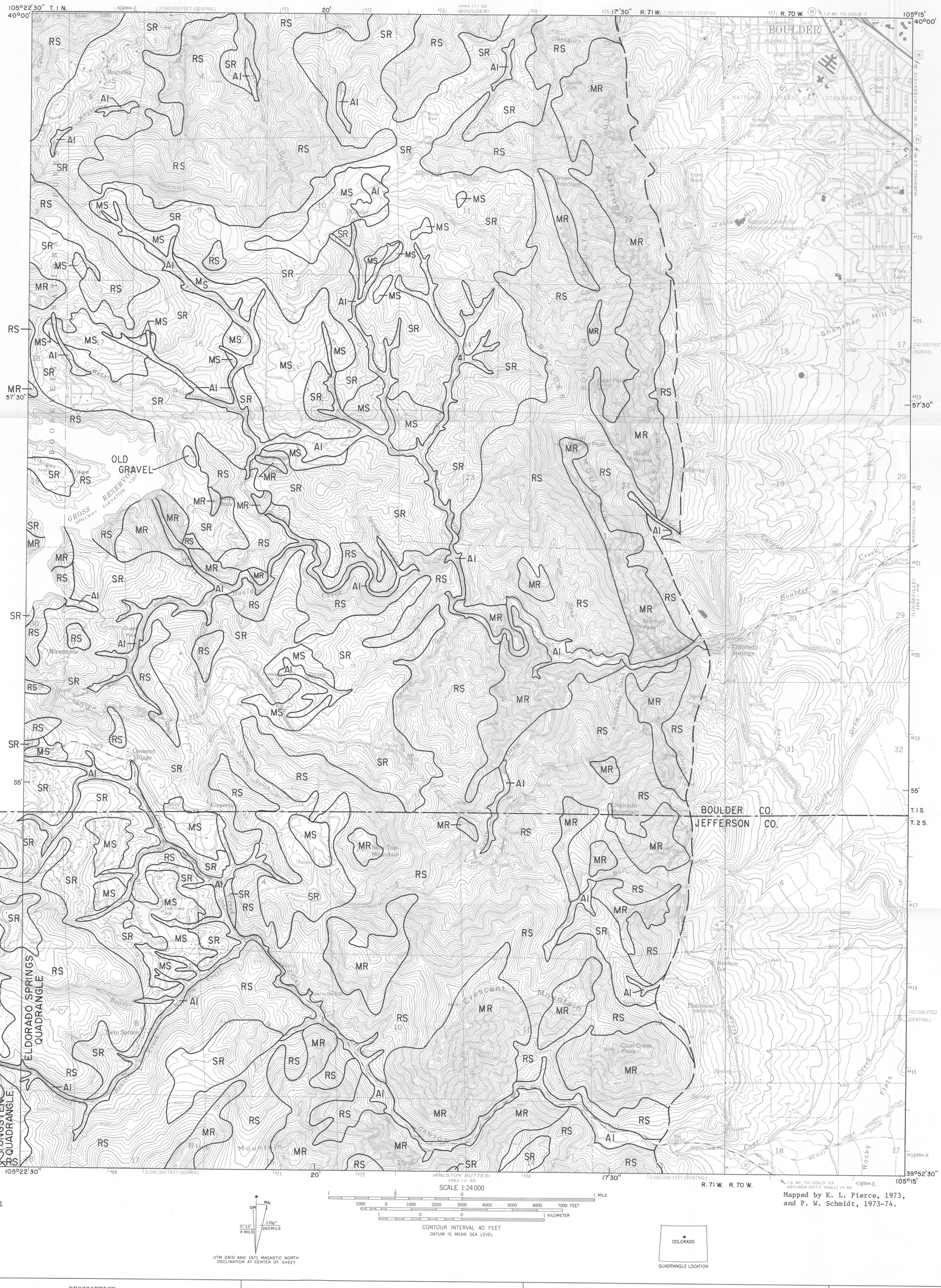
DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

MISCELLANEOUS FIELD STUDIES
MAP MF-695



Base from U.S. Geological Survey:
Tungsten, 1942, and Eldorado Springs, 1965, photorevised 1971

SCALE 1:24 000
1 MILE
7000 FEET
1 KILOMETER
CONTOUR INTERVAL 40 FEET
DATUM IS MEAN SEA LEVEL

UTM GRID AND 1971 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

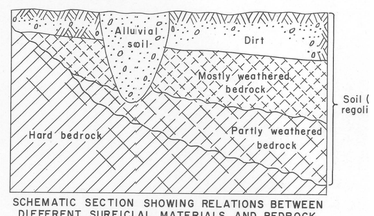
COLORADO
QUADRANGLE LOCATION

Mapped by K. L. Pierce, 1973, and P. W. Schmidt, 1973-74.

PREPARATION AND USE OF THIS MAP

This map shows the relative amounts of soil and hard bedrock within the upper 6 feet (1.8 m) of the land surface. (See schematic section.) It provides information useful for broad-scale land-use decisions. The map is based on reconnaissance field studies and aerial-photograph interpretation. The depth of soil and partly weathered rock was measured directly in roadcuts and other excavations and was estimated from seismic profiles in areas of few or no excavations or outcrops. Secondary characteristics of map units, such as percentage of outcrop in a given area, steepness of slope, type and amount of vegetation cover, and general appearance of the landscape, were used in drawing the boundaries between map units on aerial photographs. The data were then transferred photogrammetrically to the base map.

This map is not intended to replace on-site inspection of individual sites for specific purposes.



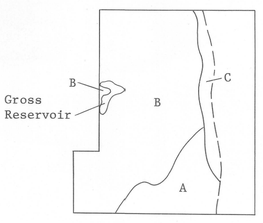
SCHEMATIC SECTION SHOWING RELATIONS BETWEEN DIFFERENT SURFICIAL MATERIALS AND BEDROCK

"Soil" includes all unconsolidated or partly weathered material over hard bedrock.

"Dirt" is the upper part of the "soil" and here refers to a mixture of sand, silt, clay, and rock fragments above weathered bedrock. The weathered bedrock still retains original structure and banding. The upper part of the dirt commonly contains organic matter.

Mostly weathered bedrock is "rotted," and fragments of it can be crushed or broken by hand. Chemical weathering has produced moderate yellowish- or reddish-brown colors.

Partly weathered bedrock is firm but can be dug with a pick. Fragments can be broken with considerable effor by hand. It makes a thud rather than a metallic ring when hit with a hammer. Chemical weathering has produced light-brown and yellow colors.



SKETCH MAP SHOWING MAJOR BEDROCK TYPES
Modified from Wells (1967)

Unit	Rock unit and weathering properties
A	Quartzite; extremely resistant to weathering. Nearly continuous hard bedrock outcrops, covered locally by blocky debris.
B	Granitic rock (mostly Boulder Creek Granodiorite). In gently to moderately sloping areas, generally is weathered to grus greater than 6 feet deep, with small areas of rock outcrops and scattered core stones. Where slopes are steep, weathering depths are irregular, with local areas of hard-rock canyons, cliffs, and ledges. Outside the central part of the map unit, the granitic rocks are generally less deeply weathered due to intrusions of younger granite and pegmatite in the northern quarter of the area and younger quartz monzonite in the southern quarter of the area.
C	Sandstone (Fountain Formation). Coarse-grained conglomeratic arkosic sandstone. Very resistant to weathering. Nearly continuous outcrop with local areas of blocky debris.

For map showing details of distribution of bedrock types and orientation of structural features, see Wells (1967, pl. 1).

REFERENCE

Wells, John D., 1967, Geology of the Eldorado Springs quadrangle, Boulder and Jefferson Counties, Colorado: U.S. Geological Survey Bulletin 1221-D, 85 p.

MAP UNIT	DESCRIPTION	LANDSCAPE CHARACTERISTICS	RELATIVE CONSTRAINTS REGARDING SEPTIC SYSTEMS WITH LEACH FIELDS	RELATIVE EASE OF EXCAVATION IN UPPER 6 FT (1.8 M) [Roads, utility corridors, foundations, etc.]
AI Alluvial soil	Alluvial soil 5 ft (1.5 m) to more than 10 ft (3 m) thick with variation in average grain size depending on topographic position. In small upland basins consists primarily of sand, silt, and clay and, locally, colluvium containing angular rock fragments. Beneath valley floors along major drainages, the upper 1-4 ft (0.3-1.2 m) generally is silty sand which overlies coarse sand and gravel	In upland areas, gently sloping valley bottoms are cut locally by small steep-walled gullies; lush grassy vegetation. On valley floors adjacent to larger drainages, narrow sinuous flats support coniferous and deciduous trees, shrubs, and grasses	WATER-TABLE CONSTRAINTS--Although the unconsolidated materials in this area are easily excavated for septic systems with leach fields, the seasonal rise of the water table and local inundation of the surface make this area one of high potential constraint. Slopes are gentle. Only after careful site evaluation, especially during infiltration of the spring snowmelt, can this area be considered safe for septic systems with leach fields	EASY--Hard bedrock absent at or near the surface, making most shallow excavations easy. Machinery could get mired in areas of seasonally soft ground when water table is high
MS Mostly soil	More than 70 percent of area is covered by dirt and weathered bedrock to a depth of at least 6 ft (1.8 m). The dirt at the surface averages 2-4 ft (0.6-1.2 m) in thickness. It generally overlies at least 3 ft (0.9 m) of mostly weathered bedrock, which, in turn, overlies at least 2 ft (0.6 m) of partly weathered bedrock, which grades down into hard bedrock. This map unit includes scattered outcrops of hard bedrock (pegmatite dikes, granitic corestones, quartzose metamorphic rocks, etc.)	Gently rolling to flat slopes covered mostly by grass and, locally, widely spaced coniferous trees. Scattered sparse bedrock outcrops, mostly pegmatite dikes, locally protrude through the vegetation	FEWEST CONSTRAINTS--Fewest geologic constraints for septic systems with leach fields, except for possible water-table situations where sites near local drainages may be seasonally saturated, especially following spring snowmelt. Detailed site study should be made to determine if seasonal saturation will be a problem. Constraints are fewest because hard bedrock is only locally present within 6 ft (1.8 m) of ground surface and because slopes are gentle. With proper planning, this area can accommodate greatest density of septic systems with leach fields	EASY--Hard bedrock generally absent at or near the surface, making most shallow excavations easy
SR Soil with subordinate rock	From 40-70 percent of area is covered by dirt and weathered bedrock to a depth of at least 6 ft (1.8 m). The dirt at the surface averages 1-3 ft (0.3-0.9 m) in thickness. It generally overlies at least 4 ft (1.2 m) of mostly to partly weathered bedrock. At a depth of 6 ft (1.8 m), partly weathered bedrock is more common than mostly weathered bedrock. Hard bedrock is at or just beneath the ground surface in about 10-30 percent of the area	Gentle to moderate slopes covered by grass or open coniferous forests. Slopes locally are steep; north-facing slopes have dense coniferous forests and south-facing slopes have scattered coniferous trees and shrubs. Bedrock outcrops are commonly small and scattered	FEW CONSTRAINTS--Few geologic constraints because hard bedrock is at or near the surface in less than 40 percent of the area and because slopes are mostly gentle to moderate. With proper planning, can accommodate a moderate density of septic systems with leach fields	MODERATELY EASY--Hard bedrock at or near the surface only locally, making most shallow excavations moderately easy if such hard bedrock areas are avoided
RS Rock with subordinate soil	From 10-50 percent of area is covered by dirt and mostly to partly weathered bedrock to depths of 6 ft (1.8 m). Where soil is 6 ft (1.8 m) deep, the dirt at the surface is commonly about 1 ft (0.3 m) thick but may be as much as 4 ft (1.2 m). Much of this dirt has moved downslope and concentrated in pockets. This dirt generally overlies a few feet of partly weathered bedrock. The areas with soil as thick as 6 ft (1.8 m) commonly occur in pockets between rock outcrops. Hard bedrock is at or very near the ground surface in more than 30 percent of the area	Moderate to steep slopes covered with a dense to scattered coniferous forest. Rubbly surfaces covered by shrubs and sparse grass are common on south-facing slopes and along the mountain front, whereas very dense coniferous forests that often mask the soil and bedrock surface are common on north-facing slopes. Bedrock outcrops are generally extensive, locally with large knobs or pinnacles	MANY CONSTRAINTS--Many geologic constraints because of the large amount of hard bedrock at or near the ground surface and because slopes are mostly moderate to steep. With proper site evaluation, this area can accommodate only a limited density of septic systems with leach fields	DIFFICULT--Hard bedrock common at or near the surface, making most shallow excavations difficult. Many hard bedrock area may be avoided if local conditions are carefully studied and development is limited
MR Mostly rock	Less than 10 percent of area is covered by dirt and partly weathered bedrock to a depth of 6 ft (1.8 m). Soil, where present, fills small pockets where dirt and rock rubble have been concentrated by downslope movement. More than 50 percent of the area is hard bedrock outcrop; much of the remainder consists of rock fragments underlain by hard bedrock at shallow depths. Generally occurs on ridge crests and very steep slopes	Mostly rock outcrops on ridge crests and cliffs, covered with scattered trees and shrubs growing in cracks between rocks and on pockets of soil. Rock fragments mantle the slopes between outcrops	MOST CONSTRAINTS--Most geologic constraints because hard bedrock or coarse rock rubble is common at or near the ground surface and because slopes are mostly steep. Septic systems with leach fields should be restricted to those few areas where acceptable amounts of unconsolidated material can be located on suitable slopes or where pervious fill can be added	VERY DIFFICULT--Hard bedrock and rock fragments are nearly continuous at or near the surface, making most shallow excavations very difficult

RECONNAISSANCE MAP SHOWING RELATIVE AMOUNTS OF SOIL AND BEDROCK IN THE MOUNTAINOUS PART OF THE ELDORADO SPRINGS QUADRANGLE, BOULDER AND JEFFERSON COUNTIES, COLORADO

By

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1975

INTERIOR—GEOLOGICAL SURVEY, RESTON, VIRGINIA— REPRINTED

For sale by Branch of Distribution, U.S. Geological Survey, Box 25286, Federal Center, Denver, CO 80225