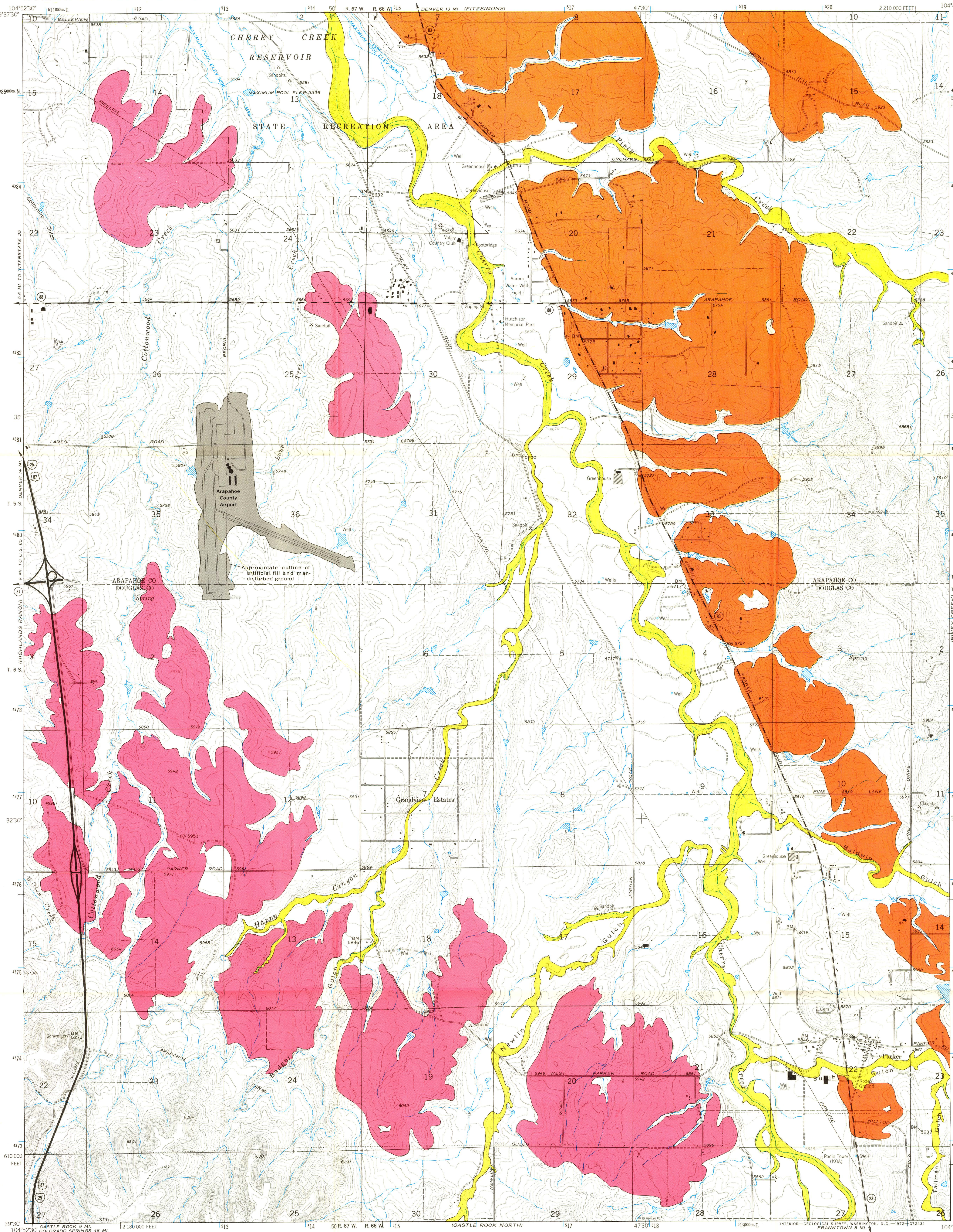


Base from U.S. Geological Survey, 1965
Photorevised in 1971
10,000-foot grid based on Colorado coordinate system, central zone
1000-meter Universal Transverse Mercator grid ticks, zone 13, shown in blue

Interpretive data derived during geologic mapping, 1970–71

EXPLANATION

LOESS – Silt and clay subject to differential compaction when loaded or wetted.

EOLIAN SAND – Mostly fine sand that may undergo subsidence by lateral spreading under load.

ALLUVIUM – Mostly sand and fine gravel that may undergo subsidence by lateral spreading under load.

DISCUSSION

Three different types of geologic materials are shown on this map: eolian silt (loess), eolian sand, and alluvium. Loess is very fine material deposited by wind; eolian sand is fine to very fine sand that also was deposited by wind; and alluvium is mostly sand and fine gravel that was deposited by streams. These units are more susceptible to compaction and subsidence or differential settling than other sediments or sedimentary rocks in the quadrangle.

Loess occurs in two broad northwest-trending belts west of Cherry Creek, and comprises material brought into the area from the Platte River valley by northwesterly winds. It is as much as 18 feet thick. Loess has a relatively open but cohesive internal structure, owing to the loose packing of grains during deposition. Loess grains commonly have clay hulls or films around them. Water added to the sediment lubricates the clay, and reduces friction between the grains, allowing them to slip past each other easily. When wetted, therefore, loess may compact under its own weight or under the weight of a man-imposed load; the amount of compaction tends to increase as the amount of load increases.

Loess is subject to subsurface erosion, or piping; water may flow under the surface around a pipe, foundation, boulder, or other textural inhomogeneity, and if the force of the flow is sufficient to move the fine grains, the material may be eroded without disturbing the surface. Cavities of varied sizes are thereby created underground, and these may cause settlement or differential subsidence. Subsidence problems of loess can be substantially reduced by compacting the material before it is loaded. An engineering specialist should be consulted for evaluation of specific sites in loess-covered areas.

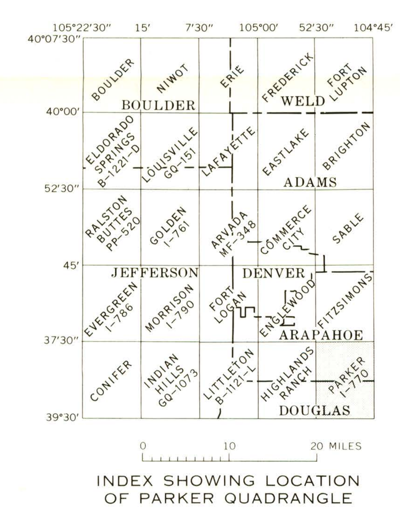
Eolian sand covers the land in a belt along the uplands east of Cherry Creek. It was deposited by northwesterly and westerly winds blowing material out of the Cherry Creek valley and is as much as 40 feet thick. The material has very little load-bearing strength when dry, but has increased strength when moist but not saturated. Subsidence and slumping may result from erosion of sand from underneath or from the sides of foundations. Loads placed on dry sand may be so heavy as to overcome the dry strength of the material, and lateral spreading may result. Loads placed on moist sand may subside when and if the sand is allowed to dry. Plans for land use in areas covered by eolian sand should include studies of physical properties of the material by an engineering specialist.

Much of the Parker quadrangle is covered by alluvium of various ages and compositions; the alluvium considered here, however, is the post-Piney Creek alluvium, the youngest in the map area (Maberry and Lindvall, 1972). Being the youngest and most recently deposited, it is the least naturally compacted of the alluvial sediments in the quadrangle. This alluvium occupies the streambeds of Cherry Creek and its major tributaries. It is made up of loose fine to coarse sand and fine gravel with minor amounts of clay. The alluvium was deposited by streams and is somewhat more compact in its natural state than eolian sand. Like eolian sand, its bearing strength is highest when somewhat moist and least when dry. Post-Piney Creek alluvium is subject to the same hazards of erosion and subsequent subsidence under load as eolian sand.

The scale of the map prohibits the illustration of sufficient detail to allow use of the map for individual site studies. Evaluation of the potential for subsidence of geologic materials at individual sites should be performed by an engineering specialist. Basic data from which the interpretive map was derived were gathered during the course of detailed geologic mapping of the quadrangle.

REFERENCE

Maberry, J. O., and Lindvall, R. M., 1972, Geologic map of the Parker quadrangle, Arapahoe and Douglas Counties, Colorado: U.S. Geol. Survey Misc. Geol. Inv. Map I-770-A.



INDEX SHOWING LOCATION OF PARKER QUADRANGLE

MAP OF DEPOSITS ESPECIALLY SUSCEPTIBLE TO COMPACTION OR SUBSIDENCE, PARKER QUADRANGLE, ARAPAHOE AND DOUGLAS COUNTIES, COLORADO

By

John O. Maberry

1972