

TUCSON 1° x 2° QUADRANGLE

EASE OF EXCAVATION AND POTENTIAL ERODIBILITY

PHASES 4 AND 5

by

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scale 1:250,000

ARIZONA BUREAU OF GEOLOGY

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This report is preliminary and has not been edited or reviewed for conformity with Arizona Bureau of Geology and Mineral Technology standards.

MAPS OF 'EROSION SUSCEPTIBILITY/EASE OF EXCAVATION' WITHIN THE TUCSON 1 X 2 DEGREE QUADRANGLE, ARIZONA

Comments by Roger B. Morrison, December, 1982.

These comments pertain to two 'EROSION SUSCEPTIBILITY/EASE OF EXCAVATION' maps that I prepared between 1975 and 1977 and am submitting to the Arizona Bureau of Geology and Mineral Technology, Tucson, Arizona. I hope that these maps will be placed on open file at this Bureau, so that they will be available to the public. They are dual-purpose maps, that integrate information on surficial sediments, soil profiles, and bedrock within several meters of the landsurface. They are designed to be used by engineers, developers, resource managers, and planners.

One map, covering the entire Tucson 1 x 2 degree quadrangle at 1:250,000 scale, was prepared as part of a project to test the utility of Landsat-1 (ERTS-1) multispectral images to produce maps for practical geoscience applications. They were prepared by inspecting and interpreting many Landsat-1 images (bands 5, 6, and 7), from different orbital passes and times of year, of the same scenes. Map-unit boundaries were drawn on 1:250,000-scale enlargement prints of Landsat-1 images, on the basis of the clearest evidence of the boundaries from various images. This interpretation utilized information available from geologic and soil maps and my own limited field observations as purely secondary input; i.e., the Landsat-image enlargements were used only for plotting information that could be identified from Landsat images. Consequently, the accuracy of this map is constrained by the relatively poor ground resolution and stereovision capability of the Landsat-1 images; probably it is adequate for 1:500,000 scale.

The other map covers a 1,300 sq mi area around Tucson at 1:120,000 scale (the Tucson Metropolitan area and vicinity). Like the first map, it shows both (1) the susceptibility to erosion of the various types of earth materials within several meters of the landsurface (and hence on the potential magnitude of the modern problem of accelerated erosion), and (2) the ease of excavation of these near-surface materials for man's construction activities. This map is primarily photointerpretive, from high-quality high-altitude color airphotos taken from NASA's RB57 aircraft, but it has substantial ground control from my own field observations, hence it probably has accuracy suitable for publication at 1:150,000 scale.

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EXPLANATION for maps of EROSION SUSCEPTIBILITY/EASE OF EXCAVATION
of the Tucson 1 x 2 - degree quadrangle and the Tucson Metro area

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MAP UNIT	EASE OF EXCAVATION ¹	EROSION SUSCEPTIBILITY	DESCRIPTION
1. Easily excavated and readily erodible materials.			
1 a	Excavation easy	Highly erodible	Unconsolidated fine-textured alluvium on flood plains and lowermost stream terraces. Mainly silt, some sand, little or no gravel; very little or no soil development
1 b		Generally highly erodible.	Unconsolidated sandy, silty to locally clayey and somewhat gravelly alluvium of basin-interior lowlands and bajada toe slopes; soil development generally nil or weak, locally moderate.
2. Materials generally easy, ^{but} locally moderately difficult to excavate, and generally moderately erodible.			
2	Excavation generally easy, locally moderately difficult	Erodibility moderately high to moderate	Mostly silty to pebbly sandy alluvium with moderate soil development (clay and/or carbonate accumulation); local pebble to cobble gravel with no to moderate soil development.
3. Materials generally moderately difficult to excavate and only slightly erodible.			
3	Excavation moderately difficult	Erodibility mostly slight, locally moderate	Alluvium with very strong soil development including strong calcium carbonate (caliche) accumulation and/or moderate induration below the soil profile and/or coarse particle size (cobble and boulder gravel).
4. Materials moderately difficult or difficult to excavate and generally least erodible.			
4	Mostly rock excavation, moderately difficult to difficult	Erodibility mostly negligible, locally slight to moderate	Consolidated bedrock is widely exposed; thin deposits of gravelly colluvium or alluvium occur locally, which are class 2 or 3 excavability/erodibility.
<p>¹ Definitions of "ease of excavation" terms:</p> <p>Excavation easy: light power equipment or hand tools suitable for excavation.</p> <p>Excavation moderately difficult: light or heavy power equipment necessary for excavation.</p> <p>Excavation difficult: heavy power equipment needed for excavation; ripping may be necessary, and in places, blasting.</p>			