Map showing contours on the base of saprolite, District of Columbia

by Albert J. Froelich, U. S. Geological Survey, Reston, Va. 22092

The map showing contours on the base of the saprolite depicts the surface between soft, weathered residual material (saprolite) and the underlying hard fresh crystalline bedrock. This contact is essentially the gradational interface between almost impermeable bedrock (except for fractures) and the overlying saprolite, composed of porous, relatively permeable material. The base of the thick saprolite mantle in the Piedmont of the western part of the city is undulatory and generally parallels the topographic surface. In the eastern part, however, the saprolite is thin and is mantled by much younger sedimentary rocks of the Coastal Plain, and the surface slopes regularly to the southeast at about 19 m. per km. (100 ft. per mile).

The 50 foot contour interval locally may exceed the limits of subsurface and surface control, implying an accuracy not inherent in the available data. Local relief greater than the contour interval at the interface between rock and saprolite is possible; thus the map should not be used for site evaluation, which requires additional drill hole or geophysical surveys. The list of references indicates the sources of most of the subsurface data used to prepare this map.

Comparison of this map with the thickness of overburden map (Froelich, 1975a) and the geologic map (Froelich, 1975b) shows that the bedrock "highs" commonly coincide with

areas of thin saprolite on quartz bodies, mafic and ultramafic rocks, and that closed depressions are found on schist or gneiss overlain by thick saprolite.

Contour trends are usually alined parallel to the regional foliation; this suggests that subsurface routes of fluid migration may also be influenced by the orientation and inclination of the foliation planes, which are reflected by the orientation of micas and clays in the saprolite mantle. Parallel and intersecting joint systems might also strongly influence fluid migration.

This map can be used for preliminary evaluation of proposed excavation or tunneling corridors. Use of this map in conjunction with the geologic map (Froelich, 1975b) may indicate possible routes of subsurface fluid migration, not only of groundwater, but of leachate from sanitary landfills, sewage disposal plants or sludge pits. This map, used with relevant soils data and a topographic map, may suggest sites where ground-water may emerge to mingle with surface streams, or where storm water runoff will enter the saprolite.

References

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EXPLANATION

Generalized contours on base of saprolite, contour interval 50 and 100 feet. Hachures indicate possible basins. Contours projected and dashed where saprolite-bedrock interface is absent.

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References

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