

Base of Saprolite Map, Annandale Quadrangle, Virginia

The map showing the base of the saprolite which overlies fresh crystalline rocks portrays, by means of continuous contours, a generalized configuration of the saprolite-hard rock interface. This interface is usually gradational and irregular; it is the contact zone or surface between almost impermeable bedrock below (except for fractures) and porous, relatively permeable, weathered material. Most outcrops and drill holes (mainly water wells) used as elevation control points are shown; however, the locations of many drill holes were not verified, and thus should be considered only as approximations. Use of a contour interval of 20 feet locally may exceed the limits of subsurface and surface control and implies an accuracy not inherent in the available data. Local variations greater than the contour interval are possible; thus the map should not be used for detailed site evaluation, which requires additional drill hole or geophysical surveys. Dashed contours indicate areas where the saprolite is missing, and where hard, fresh bedrock occurs at the surface, and thus no base of saprolite horizon is present. It is projected across valleys or in upland areas underlain by essentially unweathered bedrock.

As shown on the cross-section, the base of the saprolite generally parallels the topographic surface in the western half of the map area; in the eastern half the saprolite is thinner, mantled by much younger sedimentary rocks, and slopes to the southeast at about 20 m. per km. (125 ft. per mile).

Comparing this map with the Thickness of Overburden Map and the Bedrock Map, it is apparent that many of the bedrock "highs" are coincident with areas of thin saprolite on quartz bodies, mafic and ultramafic rocks, and the relatively low areas are formed on schist, gneiss, or granite overlain by thick saprolite.

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The trend of the contours is usually parallel to the regional planes of splitting, and it seems likely that routes and rates of fluid migration would be influenced by the orientation and inclination of ubiquitous micas and clays in the saprolite mantle. Parallel and intersecting joint systems would also strongly influence fluid migration.

Despite excellent studies by Nutter and Otton (1969), Otton (1972), and Stewart (1962, 1964), not enough is currently known to enable accurate predictions about the physicochemical nature, filtration, transmissivity and hydrologic properties of the saprolite and soil produced from different rock types in different physiographic settings, and additional work is needed to evaluate these factors.

Possible uses of the Map: The Base of Saprolite Map can be used to show the subsurface bedrock configuration for preliminary evaluation of proposed excavation or tunneling corridors. Use of this map in conjunction with the Bedrock Map may contribute to prediction of routes of subsurface fluid migration, not only of ground-water, but of effluent from septic tank fields, leachate from sanitary landfills, sewage disposal plants, or sludge pits. Used in conjunction with the topographic map, base of saprolite contours may suggest avenues where ground-water may emerge to mingle with surface streams or where storm water runoff may enter the saprolite. Relatively low areas on the bedrock surface which are overlain by a thick mantle of porous saprolite, have large storage capacities; they may be favorable sites for developing ground-water supplies from wells in bedrock fractures (Cederstrom, 1972).

EXPLANATION

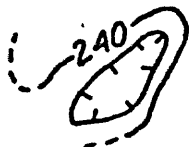
Data Control Point

240x Bedrock outcrop, unweathered, at saprolite interface; with approximate elevation in feet. Not all outcrops shown.

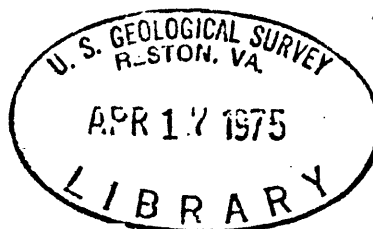
180 o Drill hole, approximately located; with approximate elevation of unweathered bedrock in feet, estimated from drillers' logs or inferred from depth of casing in water wells. Queried where depth inferred. Not all wells shown.

< 170 o Drill hole, approximately located; unweathered bedrock not penetrated but known to be less than indicated elevation in feet.

185 a Spring, with approximate elevation in feet.



Generalized contours on base of saprolite, contour interval 20 feet. Machures indicate possible basins. Contours projected and dashed where saprolite bedrock interface is absent.



Virginia (Annandale quad.). Surficial. 1:24,000. 1975A
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