

LEGEND

Thickness Zones

- a** 0-20 feet: Areas where slopes exceed 35 percent. Regolith tends to be thin and stoney with unweathered rock fragments.
- b** 0-20 feet: Areas of gentle slopes with grades less than 8 percent. These areas are typically underlain by Wilmington Complex rocks which tend to be more resistant to physical and chemical weathering than the other rocks of the Piedmont.
- c** 20-50 feet: This is the average regolith thickness in the Piedmont. Lithology commonly ranges from sandy silt to silty clay, with unweathered rock fragments less common than "b" above. Slopes are moderate to gentle-less than 15 percent and seldom exceeding 8 percent.
- d** 50-80 feet: Above average regolith thickness. Although slopes are normally 3 percent to 5 percent, they may be as high as 12 percent.
- e** > 80 feet: Flat-lying areas and gently sloping hillcrests with slopes less than 5 percent.

SCALE 1:24000

TOPOGRAPHIC CONTOUR INTERVAL 20 FEET

DISCUSSION

This map shows the total thickness (regolith) of both the loose, transported material and the weathered rock that overlies crystalline rocks of the Delaware Piedmont. Transported material is generally thin, and the weathered rock in place (saprolite) usually makes up the bulk of the regolith. Saprolite may vary gradually from a weathered rock that has retained much of the characteristics of the parent rock to a product mineralogically and texturally different from its source rock.

Regolith thickness was determined mainly by means of borings and through a review of the existing data in the files of the Delaware Geological Survey and local drilling contractors. In some cases the thickness was taken to be the same as the length of well casing used in Piedmont water wells; the bottom of the casing is usually set at the crystalline rock saprolite interface. When no other data were available regolith thickness was estimated from topographic characteristics of the area. Thin soils, residual boulders, and rock exposures are usually found on extreme slopes while thick regolith is characteristic of gently sloping areas.

The western Delaware Piedmont is, for the most part, underlain by gneiss, schists, and amphibolites of the Missa-hickon Formation (Woodruff and Thompson, 1972), a formation of large areal extent in the Appalachian Piedmont. The gneisses and amphibolites support ridges, while less resistant mica schists erode into steep-sided valleys. The mica schist and gneiss usually weathers to a clayey silt or sandy silt, whereas the amphibolite weathers to sandy silt or silty sand.

The Hockessin-Tortlyn and Pleasant Hill valleys in the western Piedmont are the only known areas of the Delaware Piedmont underlain by the Cockeysville Formation, a medium- to coarse-grained, white marble. The topography and regolith thickness are the direct result of solution weathering of the marble. The dominant lithology is a coarse-grained sand, which may exceed 80 feet in thickness. Fimucles of marble can occur close to the ground surface causing great irregularities in the bedrock surface. However, most of the Hockessin-Tortlyn and Pleasant Hill valleys are deeply weathered.

Pegmatites occur locally in the Missa-hickon schist and Cockeysville marble. The clayey saprolite (kaolinite) developed by the weathering of pegmatites has been mined in parts of New Castle County, most notably in the Hockessin-Tortlyn and Pleasant Hill valleys.

Much of the eastern Delaware Piedmont is underlain by the high grade metamorphic gneisses and associated igneous rocks of the Wilmington Complex. Typically, the Wilmington Complex weathers into boulders and blocks resting in a clayey saprolite containing varying amounts of sand and silt. The saprolite-unweathered rock contact is usually abrupt, unlike the gradual contact that occurs in the Missa-hickon Formation.

Highway construction and excavation work in the Wilmington Complex are often hindered by the presence of the residual boulders in the saprolite. Throughout the Piedmont, slope failures along preserved bedding planes and joints can be a hazard in excavations.

REFERENCES

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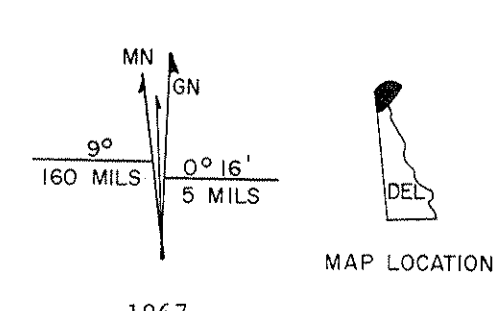
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The thickness zones shown on this map are not necessarily final but represent the best judgment of the authors based on available data. Detailed investigations of specific sites may require additional data.

THICKNESS OF REGOLITH IN THE DELAWARE PIEDMONT
by
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Base maps - USGS Topographic Division, Newark East, Newark West, Kennett Square, West Grove, Wilmington North, Wilmington South, Marcus Hook, Ferns Grove Quadrangles.



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