DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

MISCELLANEOUS FIELD STUDIES
MAP MF-768 A
MINERAL RESOURCES,
PRINCE GEORGES COUNTY, MD.

EXPLANATION

1 — Sand and gravel commonly associated with clay of unit 5

2 — Sand and gravel in upland deposits of southern county area

3 — Thin sand and gravel deposits in terraces along streams

4 — Red clay layer 10-30 ft (3-9 m) thick. In places suitable as ceramic material

5 — Red and variegated clay, a possibly suitable ceramic material north and east of Washington, D. C.

5+1 — Complex deposits containing lenses of clay like unit 5, but clay lenses have not been separately mapped

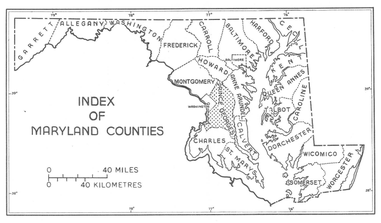
Contact, approximately located

Gravel or borrow pit (as of 1974)

C — Clay pit (as of 1974)

Clay sample locality. Those with numbers are explained in the text

Mine or quarry symbol. May include some active sand, gravel, and clay pits but also includes pits now abandoned or covered



Base from Maryland Geological Survey, 1:62,500, 1969

Scale 1/62500
1 1/2 0 1 2 3 4 Miles
1 1/2 0 1 2 3 4 5 Kilometres

Datum is mean sea level

MAP OF MINERAL RESOURCES, PRINCE GEORGES COUNTY, MARYLAND

By

John T. Hack

1976

SAND AND GRAVEL

Sand and gravel constitute the principal mineral resources of the county. They occur in extensive deposits west of Indian Creek in the northern part of the county where they are dug from many pits. Sand and gravel are also extensive in thinner deposits beneath the flat uplands in the southern half of the county, as well as in small scattered deposits in the lowlands. The map shows the distribution of three geologic formations in which usable resources of sand and gravel are likely to be found. Many deposits of valuable gravel, especially in units 1 and 2, have been lost because of urban or industrial development on them. Consideration should certainly be given to the use of these resources where possible before new construction.

Unit 1

This unit consists of ancient deposits of sand and gravel in the northern part of the county; the deposits are interbedded with layers of clay and sandy clay.

Deposits west of Indian Creek--Large amounts of gravel and sand have been and still are extracted from this area. Clay layers occur in restricted areas. Thick deposits of medium and coarse sand, as well as layers of sand and gravel in various mixtures, are common. The gravel beds are generally poorly sorted. On the average, sand makes up about 30 percent of samples but may run as high as 80 percent. Clay content is generally less than 1 percent. The gravel is predominantly quartz but contains other materials. An average sample in the fine-gravel range contains the following: quartz, 65 percent, quartzite, 20 percent, sandstone, 10 percent, ironstone, 2 percent, chert, 2 percent, and clay galls, 1 percent. In some samples chert content may be as much as 25 percent, but these are rare. More detailed information on these deposits west of Indian Creek can be obtained from Withington (1965) and Withington and Froelich (1974a, 1975b).

Deposits east of Indian Creek--In this region outcrops of clay are very extensive. Sand and gravel occur in small areas and pockets and are quite variable in character. As shown on the map, a large area of unit 1, which has long been used as a source of construction material, is exposed north and west of Bowie. Most of the area is sand, but gravelly lenses also occur.

Unit 2

A large sand and gravel resource occurs in a triangular area south of Washington, D. C. The sand and gravel occur mostly in a sheet from 20-40 ft (6-12 m) thick underlying a plateau-like plain. In much of this area, the gravel is not visible at the surface but is covered by 10-15 ft (3-4.5 m) of silt-loam soil that contains a hardpan layer. The area along Route 5 between Silver Hill and Brandywine that forms the divide between the Potomac and Patuxent Rivers has been much exploited as a source of gravel. To the east of this divide, the deposits become more sandy; they appear to be somewhat thinner to the west. In places near the Potomac River, the deposits contain coarse bouldery material. Most geologists believe that the upland gravels were deposited by the ancestral Potomac River before it eroded down to present sea level. The texture, like that of all river deposits, is very uneven; the gravel occurs in bars or channels intermixed with sand. In general, the material is finer upward and is fine sand or silt near the surface. The base of the gravel sheet is rather irregular but forms a sharp boundary with the very fine sand below it.

Unit 3

Large quantities of sand and gravel are found in terraces along the major streams, and some of these areas have been used commercially, especially those along the Patuxent River. In general, the deposits are thinner than in units 1 and 2 and more variable in texture. The largest deposits occur in the terraces of the Patuxent and Potomac Rivers (see Glaser, 1973). Some of the tributaries, especially those draining the upland areas of unit 2, contain usable gravel, as along the lower course of Western Branch.

Other Sources of Sand and Gravel

Sand and gravel occur in many alluvial areas in the flood plains of streams. Some of these have been used as sources of construction material, but they are subject to flooding and present a potential pollution hazard. Gravel is also dredged from shoals in the Potomac River. These are ancient terrace deposits like those of unit 3 which formed when sea level was lower than now, and they were drowned when the sea rose. Thin layers of gravel occur in some other areas but are too spotty or thin to be used commercially. Unit 2, the upland sand and gravel, is underlain by very fine sand that is clean or contains as much as 10 percent silt and clay. The fine sand is also found on sloping areas surrounding unit 2. It may have some commerical uses.

CERAMIC CLAY

Clay of various kinds occurs in many geologic formations throughout the county. Generally, it is mixed with sand in too high a proportion to be usable as a ceramic material, or it contains montmorillonite. Red, variegated, and white clays consisting mainly of kaolinite and illite, with small amounts of montmorillonite, are suitable for ceramic uses. These clays occur in the northern county area in unit 5 and in the southern county area in unit 4.

Unit 4

A clay layer occurs in a thin persistent bed or sheet about 10-30 ft (3-9 m) thick known as the Marlboro Clay Member of the Nanjemoy Formation. It underlies the whole southern part of the county, but it crops out or is near the surface only in the Upper Marlboro area and in the southwestern part of the county. In the south-central area it is buried by as much as 300 ft (90 m) of younger materials. In general, the clay is a light-red or tan color, containing laminae of silt, and having moderate plasticity. According to Glaser (1971, p. 53-55), it has potential use as a ceramic material suitable for face brick and structural tile.

X-ray analysis of clay samples seems to indicate that the clay contains more kaolinite and less montmorillonite in the southwestern part of the county than near Upper Marlboro. Samples north and south of Upper Marlboro collected by Hack have the following clay content.

Location	Percent illite	Percent kaolinite	Percent montmorillonite
7411-3	20	51	29
7411-5	25	55	20

A sample of clay obtained near the extreme southwestern corner of Prince Georges County in a test boring by Glaser (1971, p. 73) contained the following clays (analysis by U.S. Geological Survey).

Location	Percent illite	Percent kaolinite	Percent montmorillonite
Boring SM 12, depth 14-21 ft (4-6 m)	30	60	10

Unit 5

These clays occur as lens-like bodies interbedded with the sand and gravel deposits of unit 1, and sandy clays and clayey sands not shown on the map. These types of material are interlayered in a very complex manner. The clay areas shown as unit 5 were delineated using data from soil maps of the Soil Conservation Service (Kirby, Matthews, and Bailey, 1967). As the soils data do not correlate directly with geologic units and as they represent only surface material, the areas shown as unit 1 may be in error in many places; but the map does provide an indication of where the clays can be found near the surface. Clay is thick and massive in the area directly east of Indian Creek at Muirkirk where the clay has been extracted for many years to make brick and tile. Further to the east, toward the Patuxent River, clay is commonly mixed with layers and lenses of sand.

South of Washington in the vicinity of the Potomac River, the deposits are not well enough exposed to separate clays from sands and gravels. In this area the map combines units 5 and 1. Also in this area, the character of the clay changes and contains as much as 20 percent montmorillonite, making it less suitable as a ceramic material. Nevertheless, clays suitable for ceramic use might be present.

A series of samples in the northern part of the county were analyzed by Knechtel and others (1961) who suggest possible uses of these materials. Most samples collected by them showed the presence of usable clays. Details can be obtained from the report (Knechtel and others, 1961, table 5, plate 5).

Hack collected samples at 4 localities shown on the map east and south of Washington. They had the following mineralogic content as determined by X-ray analyses.

Location	Percent illite	Percent kaolinite	Percent montmorillonite
7411-1	0	81	19
7412-1	25	62	13
7412-2	34	38	28
7412-3	19	69	12

OTHER MINERAL RESOURCES

High-silica sand occurs in places in a narrow belt along the southeastern margin of unit 1, between Washington, D. C., and the Patuxent River (Edwards, 1969).

Beds containing diatomite occur in the southeastern part of the county between Upper Marlboro and Aquasco. They are a possible resource and have been extracted at a locality in Calvert County near Lyons Creek Wharf (see Edwards, 1969).

REFERENCES CITED

Edwards, Jonathan, Jr., 1969, Mineral Commodities of Maryland, *in* Ground water aquifers and mineral commodities of Maryland: Baltimore, Md., Maryland State Plan. Dept., Publication 152, p. 15-36.

Glaser, J. D., 1971, Geology and mineral resources of southern Maryland: Maryland Geol. Survey Rept. Inv., no. 15, 84 p., scale 1:200,000.

_____1973, Bowie quadrangle: Maryland Geol. Survey Geol. and Envir. Atlas.

Kirby, R. M., Matthews, E. D., and Bailey, M. A., 1967, Soil survey of Prince Georges County, Maryland: U.S. Soil Conservation Service, 170 p.

Knechtel, M. M., Hamlin, H. P., Hosterman, J. W., and Carroll, Dorothy, 1961, Physical properties of nonmarine Cretaceous clays in the Maryland Coastal Plain: Maryland Dept. Geology, Mines and Water Resources Bull. 23, 11 p.

Withington, C. F., 1965, Distribution of gravel in the Patuxent Formation in the Beltsville quadrangle, Prince Georges and Montgomery Counties, Maryland: U.S. Geol. Survey Prof. Paper 525-B, p. B39-B42.

Withington, C. F., and Froelich, A. J., 1974a, Selected geologic data for the Beltsville quadrangle, Prince Georges, Montgomery, and Howard Counties, Maryland: U.S. Geol. Survey open-file rept.

_____1974b, Preliminary geologic map of the Beltsville quadrangle, Prince Georges, Montgomery, and Howard Counties, Maryland: U.S. Geol. Survey Misc. Field Studies Map MF-582.

Interior—Geological Survey, Reston, Virginia—1976

For sale by Branch of Distribution, U.S. Geological Survey, 1200 South Eads Street, Arlington, VA 22202, price $.50