

E X P L A N A T I O N

LOWLANDS AND VALLEY BOTTOMS

Nearly level floodplains and gently sloping lowland plains in major stream valleys. Includes filled areas along the Potomac River. Much of the area is underlain with alluvium. The dominant geologic process is active fluvial erosion and deposition during overbank flooding. Surface drainage commonly poor due to proximity of water table to land surface. Development is affected by potential flood hazard and poor drainage.

1a

Lowlands and valley bottoms with prevalent slopes less than 3 percent. Floodplains of major streams subject to periodic flooding.

1b

Gently sloping lowland plains with prevalent slopes less than 8 percent. May have as much as 20 feet (6 m) local relief. Locally subject to flooding.

SLOPING VALLEY SIDES

Transitional land between valley bottoms and uplands. The dominant geologic processes are characterized by gravitational mass-wasting, which includes downhill creep, landslides, slumping, and rockfalls. Drainage commonly occurs as surface water runoff, with runoff greatest on steeper slopes and increasing with removal of vegetation. Construction activities greatly increase rates of erosion and probability of creep and slumping.

2c

Moderately sloping valley sides with prevalent slopes between 8 and 15 percent. Local relief commonly less than 125 feet (38 m), but in places as much as 200 feet (61 m).

2d

Steeply sloping valley sides with prevalent slopes greater than 15 percent. Slopes generally range from 15 to 30 percent but reach 40 percent or greater in a few areas. Local relief commonly less than 125 feet (38 m), but in places as much as 200 feet (61 m).

UPLANDS

Nearly level to rolling upland areas. The dominant geologic process, especially in the flatter uplands, is chemical weathering. In the Triassic and Piedmont, the area is underlain with residual soils and residuum formed as a result of chemical weathering of the underlying bedrock. Erosional rates commonly are very slow with continuing formation of the residuum being the primary geomorphic process. Drainage rates vary depending on many factors including slope, thickness and type of residuum, and the depth to the water table. In the Coastal Plain most of the area is underlain by sands, silts and clays of fluvial origin. Sandy or silty soils tend to be most stable, with mass movement being the dominant geologic process in the undulating and rolling to hilly Coastal Plain uplands (3b and 3c) underlain by clayey soils.

3a

Nearly level uplands with prevalent slopes less than 3 percent. Typical in Coastal Plain and Triassic areas.

3b

Undulating uplands with prevalent slopes between 3 and 8 percent. Relief generally less than 50 feet (15 m). Dissected by streams that have cut valleys of varying widths up to depths of 100 feet (30 m) or more. Upland crests rise as much as 200 feet (61 m) above adjacent valleys. Typical in Piedmont area.

3c

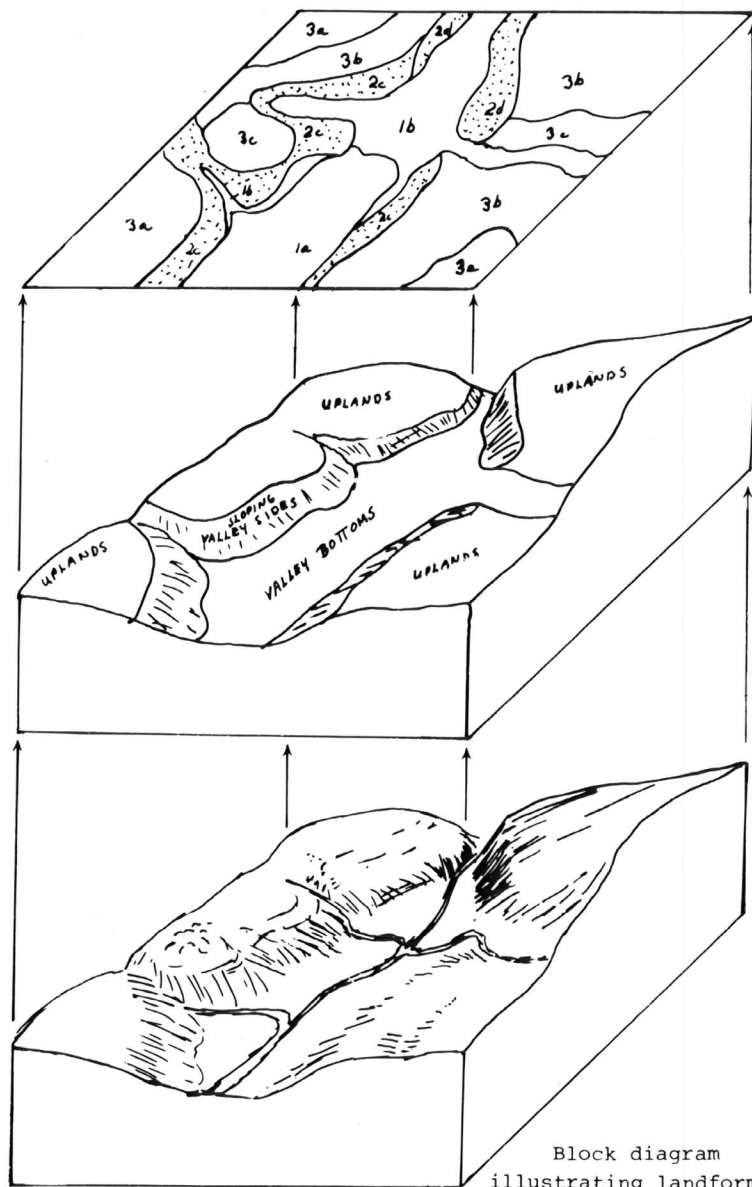
Rolling to hilly uplands with prevalent slopes generally between 8 and 15 percent, but locally greater than 15 percent. Local relief may be as much as 100 feet (30 m).

Boundary between physiographic areas



LANDFORMS MAP OF FAIRFAX COUNTY, VIRGINIA

This map shows landforms by three major subdivisions: lowlands (units 1a and 1b), uplands (units 3a, 3b, and 3c), and sloping valley sides (units 2c and 2d) that generally separate uplands from lowlands. The landform categories are closely related to general slope; thus, slopes designated by an "a" are generally less than 3%, "b" are generally from 3% to 8%, "c" are generally from 8% to 15%, and "d" are generally 15% or more.



Fairfax County extends across three distinct physiographic and geologic areas. The central and largest area has developed on the deeply weathered crystalline rocks of the Piedmont; the eastern part of the county has developed on the young sediments of the Coastal Plain; and the western part of the county has developed on the sedimentary and igneous rocks of the Triassic Lowlands. Each major area presents a somewhat different landscape and different landform characteristics.

The highest land of the county is in the Piedmont, characterized by undulating to hilly uplands that rise to 350 to 450 feet (106 to 137 m) above sea level, locally exceeding 500 feet (152 m) in the Pender and Tysons Corner areas. The dendritic stream pattern has created both broad, flat-bottomed valleys and narrow, deeply incised gorges. Difficult Run, for example, for the most part flows through an alluvial valley 500 to 2,000 feet (152 to 610 m) wide, but in places is constricted to a narrow rocky gorge.

The Coastal Plain in the eastern part of the county is characterized by relatively flat uplands, generally at elevations below 250 feet (76 m). Here the land generally slopes gently to the southeast, where the uplands descend step-like to elevations of only 50 to 100 feet (15 to 30 m). Many

of the streams also flow southeastward, and the dendritic stream pattern is characterized by broad, flat-bottomed valleys, with a few narrow valleys.

The Triassic Lowland area in the western part of the county is characterized by nearly level to gently undulating uplands generally below 350 feet (106 m) drained by broad, shallow valleys. In some areas the sloping valley walls are absent, and the uplands merge insensibly with lowlands; elsewhere, steep narrow bedrock cliffs separate uplands from lowlands. The faulted transition zone along its eastern edge, where it abuts the higher Piedmont, rises in places to 400 feet (122 m) or more and has marked complexities of slope and drainage patterns.

The dominant geomorphic processes that affect the landforms are closely related to the major landform categories. Fluvial processes of erosion and deposition dominate in the lowlands, and mass wasting is dominant on the sloplands. In the uplands chemical weathering is significant, but mass movement is also important at the margins and in the more rolling areas. Man has altered the landscape notably in the densely built-up areas and in the areas such as Dulles International Airport, where hills have been leveled and stream valleys filled, with runoff now flowing in man-made channels.

Possible Uses of the Map: This map permits a rapid evaluation of terrain characteristics for specific uses. It enables the user to determine at a glance the steeply sloping valley walls that commonly pose hazards to development. Although not a true slope map, it has an added capacity;

to indicate the direction of steeply sloping valley walls, which naturally are inclined from uplands to lowlands. Valley bottoms, steep slopes, or undulating uplands all differ markedly in their land-use potential -- for example, the uplands are likely to pose fewer constraints on development and habitation than the floodplains. The maps main use, however, is for use in conjunction with maps of other aspects of the environment. For example, when it is used in conjunction with a surface materials map, correlations may reveal potential problems in the combinations of steep slopes with naturally unstable materials, such as clays. Steep slopes that are underlain by a deep mantle of saprolite or by unconsolidated sediments are very susceptible to erosion if they are denuded of vegetation.

References

- Rogers, H. G., 1975, Landforms map of the Annandale quadrangle, Virginia: U.S. Geol. Survey open-file map no. 75-157.
- 1975, Landforms map of the Herndon quadrangle, Virginia: U.S. Geol. Survey open-file map no. 75-597.
- 1975, Landforms map of the Vienna quadrangle, Virginia: U.S. Geol. Survey open-file map no. 75-598.

MAP SHOWING LANDFORMS OF FAIRFAX COUNTY, VIRGINIA

By
H. G. Rogers
1977