Figure 6. Table of Selected Engineering Characteristics, Franconia Area, Virginia[1]

[Where shear strength is listed, the material is expected to perform as a cohesive soil; where no shear strength is listed, the material is expected to perform as a cohesionless soil. PCF, pounds per cubic foot; KSF, kips per square foot, a unit of weight equal to 1,000 pounds used to express a deadweight load; TSF, tons per square foot; KSI, kips per square inch; blows/foot, number of blows of 140-pound hammer falling 30 inches required to drive 2-inch outside diameter sampling spoon 1 foot.]

Preliminary Geologic Map Symbol	Surface Materials Map Symbol	Unit	Special conditions	Total unit weight (PCF)	Shear strength, cohesive (KSF)	Effective friction angle Ø[4]	Allowable bearing pressure (TSF)[6]	Standard penetration test (blows/foot)[7]
Af, As, Dg	1	Artificial fill	Local overburden mixed with rock	120-130	NA	28°-30°	None to 1.5 (needs special study)	10-20
Qal.	2	Alluvium and estuarine(?) deposits	Organic clay Silty sand	110-120 130	0.2-0.7 NA	23° 30°	None ordinarily 2	5-15 5-15
Qt, Q/Tc, Ug	3, 4	Gravel deposits (Upland and terraces)	Clay and silt Sand and gravel	130 130	0.7-3.5 NA	25°-28° 30°-38°	<1 to 3 1.5-4	8-30 10-60+
Kpc	5a	Unconsolidated[2] sands and clays	Plastic clay Sandy clay	130 130	1-5 4-6	20°-25°[5] 25°-30°	1-5 4-7	Up to 50+ Up to 100
Kps	5b		Silty to gravelly sand	135	NA	34°-38°	5-8	Up to 100+
Wds, Wms, Grs	6	Saprolite (decomposed rock)	Near surface micaceous, unstructured. Undisturbed, compact, retains rock structure	90[3] 140 140+	? NA NA	? 30° 36°	? 3-5 5	<25 25-50+ 50-100+
Wd, Wm, Gr	7	Bedrock	Highly jointed, weathered, schistose gneiss. Moderately jointed, sound gneiss	170 170	0.5-5ksi [compressive strength] 5-15ksi	45° NA	10+ 30-60	NA NA

[1]Modified from Table 8, Soil properties for design, Final Report, Subsurface Investigation, I-66 Route; report submitted to Washington Metropolitan Area Transit Authority, by Hueser and others, November, 1970.

[2]The swelling potential of the clays in the area should also be considered in engineering design.

3. Saprolite of very low unit weigh, low shear strength and high compressibility is found near the ground surface. Very limited test data are available.

4. The effective friction angle is the friction angle to be used for design purposes; this may or may not be equal to the angle of internal friction measured in a conventional soil mechanicsstrength test.

5. Residual ϕ' values are probably much lower than the peak values given above.

6. The allowable bearing pressure is the design pressure allowed at the base of a footing, caisson, etc.

7. The degree of consistency or compactness is indicated by the standard penetration resistance in blows/foot, in the table below:

Fine-Grained Soils, Silts & Clays	Coarse-Grained Soils, Sand and Gravel
<2 - very soft	<4 - very loose
2 to 4 - soft	4 to 10-loose
4 to 8-med. stiff	10 to 30-med. compact
15 to 30 - very stiff	30 to 50 - Compact
> 30 - hard	> 50 - very compact