Map Unit Properties Table

Colored rows indicate units mapped within Appomattox Court House National Historical Park.

Age	Unit Name (Symbol)	Features and Description	Erosion Resistance	Suitability for Development	Hazards	Cultural Resources	Karst	Mineral Occurrence	Habitat	Geologic Significance
LOWER JURASSIC	Diabase (Jd)	Unit typically appears as irregular masses, but may also occur as discrete dikes and sills. In Appomattox area, unit is linear. Diabase is an intrusive igneous rock with fine- to coarsely-crystalline, subaphanitic or porphyritic with aphanitic margins. Crystalline textures include dark-gray mosaic of long thin plagioclase crystals and clinopyroxene. Some masses contain olivine or bronzite, whereas others are granophyric.	Very high if unweathered.	Suitable for most development unless high fractured, or weathered (friable), in which case there is a potential for shrink and swell clays. Unweathered rocks of this unit are nearly impossible to modify or move without blasting and heavy equipment.	Rockfall potential for this unit if exposed on slope.	Unit often underlies ridges that factored into troop movements throughout the Civil War.	None.	Plagioclase, clinopyroxene. Unit may be used for decorative stone.	Unit may support localized plant species changes.	Unit is time-correlative with Mesozoic extension events across the eastern United States.
MESOZOIC	Mylonite (My)	Deformed metamorphic rock. Textures include protomylonite, mylonite, ultramylonite, and cataclastic. Myriad lithologies present, depending on the nature of the parent rock, and degree and nature of deformation. Most outcrops contain belts of mylonite and cataclastic rock anastomosing around lenses of less-deformed or undeformed country rock. Typically, mylonitic and cataclastic rocks are gradational into less deformed or undeformed adjacent rocks, and contacts are approximate or arbitrary. Most belts of mylonite represent fault zones with multiple deformational events throughout the Paleozoic and Mesozoic locally.	Moderate to low depending on degree of deformation and weathering.	Units are heavily deformed and foliated, containing small lenses of many rock types. This variability may render the units unstable for heavy development. The high mica content of this unit gives it the potential for severe erosion and sedimentation control may be required.	Deformation bands between large blocks may cause them to be susceptible to rockfall and mass wasting on slopes.	None documented.	None.	None documented.	Deformed nature of unit creates localized permeability changes that may affect vegetation patterns.	Unit contains deformation fabrics from Paleozoic contractional events superimposed on Late Precambrian extensional and locally contractional fabrics. Mesozoic extensional reactivation overprints earlier fabrics along local faults.
ORDOVICIAN	Porphyroblastic garnet-biotite schist (Oas)	Mica schist contains 1- to 2-mm (0.04–0.08 in) garnet porphyroblasts in an anastomosing, greenish-black biotite-rich, schistose matrix. Many exposures show complex microstructures recording many phases of deformation. Locally, unit contains quartz-rich muscovite schist and thin interbeds of calcareous mica schist and marble.	Moderate.	Avoid highly schistose layers as well as areas of intense preferential compositional weathering (along foliation). High mica contents render the unit susceptible to severe erosion and causes increased sediment load in regional streams.	Lenses of resistant rocks in schistose layers may be susceptible to mass wasting. Severe erosion and sedimentation potential exists if unit is exposed due to high mica content. Potential for shrink and swell clay issues.	Garnets provide abrasive material and may have been objects of early trade.	Some dissolution is possible in local marbles.	Biotite, garnet, muscovite, quartz, plagioclase, magnetite, kyanite, and calcite. Some marble present.	Unit weathers to produce iron- and calcium-rich soils.	Unit has elongate positive magnetic and radiometric anomalies as an enigmatic geophysical signature.
ORDOVICIAN	Lineated biotite granite gneiss (Lgn)	Gneiss ranges from light-colored to ~equal amounts of light and dark minerals, with medium- to coarse-grained textures. Lineation fabrics are strong and some areas are locally porphyritic. Unit comprises more than one intrusive body and interlayers with Cambrian-age rocks associated with volcanic processes.	Moderate to high.	Units are suitable for most development unless local blocks and/or plagioclase groundmass are altered and weathered to saprolite, rendering the unit friable. Unit may be deeply weathered and unstable for deep excavated cuts.	Avoid units exposed and undercut on slopes due to potential spalling and mass wasting hazards.	None documented.	None.	Quartz, potassium feldspar, plagioclase, biotite, muscovite, garnet.	None documented.	Western portions of this unit coincide with a strong positive radiometric anomaly.
CAMBRIAN	Felsic metatuff, mica schist, and gneiss (Cfvs)	Myriad lithologies include light-gray to grayish-pink dacitic metatuff, very-light-gray quartz-rich muscovite and biotite-muscovite schist, and medium-gray biotite-muscovite gneiss. Metatuff is very-fine-grained to aphanitic, thin-bedded and may contain plagioclase phenocrysts bounded in part or totally by well-defined crystal faces. Distinctive pinstripe pattern characterizes local schists. Gneissic units are have characteristic salt-and-pepper appearance and are fine-grained. Some subordinate amounts of greenstone metabasalt and amphibole gneiss are interlayered locally.	Moderate.	Heterogeneity of units may render them unstable locally for foundation, road, and facilities development.	Avoid units exposed and undercut on slopes due to potential mass wasting hazards. Severe erosion and sedimentation potential exists if unit is exposed because of high mica content.	Unit is exposed in the park, and outcrops may have Civil War significance.	None.	Quartz, plagioclase, muscovite, biotite, epidote, magnetite.	Weathers to acidic, orange, saprolitic regolith with low permeability.	Unit records Cambrian volcanic activity and mélange accretion.
CAMBRIAN	Greenstone or amphibole gneiss (Cmvs)	Greenstone is dark- to dusky-green, with schistose textures including actinolite-chlorite mineralogies with segregations of the minerals epidote and quartz. Greenstone interlayers with hornblende-plagioclase gneiss and subordinate amounts of dacitic metatuff, quartz-muscovite schist, and fine-grained salt-and-pepper biotite-muscovite gneiss.	Moderate.	Intersections of bedding and flow cleavages in greenstones as well as heavily altered zones may be points of weakness in units. Due to high shrink and swell clay potential, avoid development of buildings and septic fields on this unit.	Lenses of resistant rocks in schistose layers may be susceptible to block and rockfall. Abundant shrink and swell clay potential exists for this unit.	Unit is exposed in the park, and outcrops may have Civil War significance.	None.	Actinolite, chlorite, epidote, quartz, hornblende, plagioclase, muscovite, biotite.	Units weather to produce calcium- and magnesium-rich orangish clayey soils, well-suited for growing tobacco.	Unit records subaqueous basaltic extrusion during the Cambrian.

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CAMBRIAN	Melrose granite (Cm)	Granite is light greenish gray with pink bands present in irregular masses. Textures range from medium to coarse grained. Compositions vary between quartz monzonite and quartz diorite. Near the Brookneal shear zone, deformation textures in the granite grade from protomylonite to mylonite to ultramylonite.	High to moderate where deformed.	Suitable for most development unless highly weathered and/or fractured. Avoid weathered areas for basements and foundations due to potential radon problem.	May be susceptible to mass wasting if exposed on slope.	Coarse-grained specimens may have attracted early trade interest.	None.	Quartz, plagioclase, potassium feldspar, biotite, muscovite, chlorite, epidote, titanite, garnet, magnetite-ilmenite, calcite, zircon.	Deformed nature of unit creates localized permeability changes that may affect vegetation patterns.	Unit has a positive-radiometric / negative-magnetic geophysical signature and a radiometric (Uranium-Lead) age date of 515 million years.
CAMBRIAN	Foliated felsite (Cfv)	Light-colored igneous rock. Foliated unit ranges in composition from rhyolite to dacite. In outcrop, unit appears light gray to white with medium-grained textures.	Moderately high.	Avoid weathered areas of rhyolite composition for basements and foundations due to potential radon problem. Unit may weather to saprolite and would be severely susceptible to erosion due to high mica content.	May be susceptible to mass wasting if exposed on slopes. Severe erosion and sedimentation potential exists if unit is exposed, due to high mica content.	Cryptocrystalline metarhyolite was a prized tool material for American Indians.	None.	Quartz, perthitic microcline, muscovite, biotite. Large beta-form quartz phenocrysts.	Unit weathers to produce potassium-rich soils.	Unit records Cambrian-age volcanism.
CAMBRIAN	Amphibolite, hornblende-biotite gneiss and schist (Cmv)	In outcrop, unit appears black to moderate olive brown. Lineations and foliations record pervasive deformation with textures ranging from medium to coarse grained. Stringers of quartz and epidote are relatively common.	Moderately high.	Suitable for most development unless highly weathered and/or fractured. Development of buildings and other infrastructure may be compromised due to the presence of abundant shrink and swell clays associated with weathered portions of this unit.	Preferential weathering of less resistant layers may increase likelihood of spalling when unit is exposed on a slope. Abundant shrink and swell clays associated with this unit can cause widespread instability.	Coarse-grained specimens may have attracted early trade interest.	None.	Hornblende, tremolite-actinolite, oligoclase, biotite, epidote, garnet.	Unit weathers to produce “sweet” calcium-rich soils.	Unit includes widely recognized Blackwater Creek Gneiss and Catawba Creek amphibolite member of Hyco Formation, hornblende gneiss, and dominantly mafic-composition units.
LATE PROTEROZOIC – CAMBRIAN	Banded marble (CZac)	Unit appears light and dark gray with medium-grained textures and fine laminations. Other interlayered rock types include calcareous gneiss and schist. Locally thick to thin beds of marble alternate with graphitic phyllite and mica schist, with compositions ranging from impure marble to calcareous metagraywacke.	Moderate.	Unit is suitable for most development unless highly heterogeneous layers are present, or beds are heavily fractured. Avoid areas with high carbonate contents for wastewater treatment or septic systems.	Unit is susceptible to mass wasting when exposed on slopes and undercut by local rivers. Pyrite and other sulfide minerals could produce acid drainage if disturbed.	None documented.	Karst dissolution is possible in calcareous units.	Calcite, quartz, biotite, muscovite, plagioclase, pyrite, magnetite-ilmenite.	Unit weathers to produce calcium-rich soils.	Unit records terrane accretion along continental margins and includes the Arch Marble and Archer Creek Formation.
LATE PROTEROZOIC – CAMBRIAN	Feldspathic metagraywacke (CZmy)	Myriad rock types include: medium to light gray laminated quartz- and feldspar-rich to calcareous gneiss with thin mica schist partings; white and gray fine- to coarse-grained generally laminated marble; gray to greenish gray fine-grained graphitic mica schist and quartzite; light gray medium- to fine-grained mica schist; massive quartzite and micaceous blue quartz granule metasandstone; and dark greenish black actinolite schist.	Moderate.	Avoid areas of intense preferential compositional weathering (along foliation). Suitable for most development unless highly weathered and/or fractured, especially along talc-rich layers and boundaries. Actinolite schists may weather to produce shrink and swell clays.	May be susceptible to mass wasting if exposed on slope; talc and weathered areas may increase likelihood of sliding. Graphitic schists may contain high sulfide assemblages that could produce acid drainage if disturbed.	None documented.	Some dissolution of laminated marble is possible.	Quartz, potassium feldspar, plagioclase, biotite, muscovite, calcite, epidote, titanite, magnetite-ilmenite, graphite, chlorite, albite, garnet, kyanite, tremolite, talc, actinolite, dolomite.	None documented.	Units record multiple deformation events, including uplift along the Bowens Creek fault; they were previously mapped as the Evington Group and are continuous with the Lynchburg Group.
LATE PROTEROZOIC – CAMBRIAN	Fork Mountain Formation (CZfm)	Unit contains aluminosilicate-mica schist interlayered with other metamorphic rocks such as garnet-rich biotite gneiss, calcsilicate granofels, amphibolite, rare white marble, and calc-quartzite lenses. Schist is light to medium gray, with textures ranging from fine to medium grained. Units underwent multiple episodes of deformation and were metamorphosed with locally present porphyroblasts. Metamorphic and deformation textures include schistosity, multiple crenulation cleavages, and partly retrograded porphyroblasts of garnet and aluminosilicate. Some brittle deformation is recorded in polymictic breccias.	Mostly moderate depending on degree of alteration and deformation.	Unit has highly heterogeneous lithology and is heavily deformed, rendering it rather weak for heavy development. Amphibolite layers may weather to produce shrink and swell clays that may pose problems for building foundations and other infrastructure.	High degree of deformation renders unit unstable on slopes; may be prone to mass wasting. Shrink and swell clays associated with weathering of amphibolites in this unit can cause widespread instability.	Garnets provide abrasive material and may have been objects of early trade. Unit is exposed in the park, and outcrops may have Civil War significance.	Rare white marbles may be prone to dissolution.	Quartz, muscovite, biotite, garnet, staurolite, magnetite, ilmenite, rutile, paragonite, plagioclase, sillimanite, potassium feldspar, tourmaline, hornblende, epidote, kyanite, chlorite, chloritoid, andalusite, corundum, spinel.	Deformed nature of unit creates localized permeability changes that may affect vegetation patterns.	Unit has characteristic “curly maple” magnetic contour map patterns due to isolated concentrations of highly magnetic minerals. Many mineral assemblages record prograde and retrograde metamorphic events in the area.

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LATE PROTEROZOIC – CAMBRIAN	Metagraywacke, quartzose schist, and mélange (CZpm)	Metagraywackes include quartz-rich chlorite or biotite schists, and contain very fine to coarse granules of blue quartz. Shearing transposes primary graded laminations into elongate lozenge shapes that give the rock a distinctive pinstriped appearance in weathered surfaces that are perpendicular to schistosity. Locally, a mylonitic fabric and late-stage chevron-shaped folds overprint the earlier schistosity, and rocks in this unit are progressively more deformed from east to west across the outcrop belt. The most deformed rocks contain mylonitic mica schist with quartz-rich sausage-shaped segments. Rock fragments contain dacite tuff, gabbro, and monocrystalline quartz with zircon and biotite inclusions. These blocks range from 5 cm to 3 m (2 in to 10 ft) across in outcrop.	Moderate depending on degree of deformation.	Schistose, mylonitic, and highly foliated units should be avoided for heavy development due to inherent weakness. Heavily deformed and/or weathered areas are also unsuitable and unstable in deep excavated cuts.	May be susceptible to mass wasting if exposed on slope. Weathered material (saprolite) is susceptible to severe erosion and sedimentation problems if exposed.	Blue quartz may have been used for early trade.	None.	Quartz, albite, epidote, chlorite, muscovite, magnetite, chloritoid, calcite, biotite, staurolite, plagioclase, perthite, tourmaline, titanite.	Unit weathers to produce relatively impermeable acidic, orange, saprolitic regolith; quartz-rich schists weather to a light yellowish-gray, sandy, mica-rich saprolite.	Locally, polydeformed quartz-rich mica schists are lithologically indistinguishable from schists mapped as Fork Mountain Formation (**CZfm**) in structural blocks that occur to the west, and may be temporally correlative.