Bedrock of the Bridgeport and Marcus Hook quadrangles includes sedimentary rocks of the Coastal Plain, basement rocks, and metamorphic rocks of the Appalachian orogen. The Coastal Plain rocks are Quaternary in age and are dominantly sand and silt. The bedrock formations are separated by a post-Pleistocene unconformity that was developed in the Coastal Plain bedrock units. The bedrock of the Bridgeport and Marcus Hook quadrangles is composed of the Coastal Plain formations, basement rocks, and metamorphic rocks of the Appalachian orogen.

The Coastal Plain formations are composed of sand, clay, and glauconite clay laid down in coastal, nearshore marine, and continental shelf settings. The Coastal Plain bedrock formations are divided into 16 map units (Km1 to Km16) and 15 basement rock units (Kp1 to Kp15) based on the characteristics of the sediments, their structure, and composition. The descriptions of the Coastal Plain formations include sand, clay, and glauconite clay laid down in coastal, nearshore marine, and continental shelf settings.

The basement rocks include the Gibbstown Formation, which is composed of sand, clay, and silt. The sand is white, yellow, and light gray where weathered, gray to pale brown where unweathered. As much as 50 feet thick. Sand contains some lignite and mica and minor amounts of glauconite; mica, lignite, and pyrite are common in the clays. Late Cretaceous (early Campanian) in age, based on pollen and spores, measurable thickness, and containing interbedded pyrite and glauconite clasts. The Gibbstown Formation is of Late Cretaceous (early Cenomanian) age. Unit 2 (Kp2) may be present in the Gibbstown Formation. Unit 2 (Kp2) is composed of sand, dark gray and black where unweathered, yellowish-brown to brown where weathered. As much as 70 feet thick. Clay is micaceous with some pyrite and mica, and pyrite are minor constituents. Iron cementation is common. Late Cretaceous (early Campanian) in age, based on pollen and spores, measurable thickness, and containing interbedded pyrite and glauconite clasts.

The Coastplain formations are composed of sand, clay, and glauconite clay laid down in coastal, nearshore marine, and continental shelf settings. The Coastplain bedrock formations are divided into 16 map units (Km1 to Km16) and 15 basement rock units (Kp1 to Kp15) based on the characteristics of the sediments, their structure, and composition. The descriptions of the Coastplain formations include sand, clay, and glauconite clay laid down in coastal, nearshore marine, and continental shelf settings.

The basement rocks include the Gibbstown Formation, which is composed of sand, clay, and silt. The sand is white, yellow, and light gray where weathered, gray to pale brown where unweathered. As much as 50 feet thick. Sand contains some lignite and mica and minor amounts of glauconite; mica, lignite, and pyrite are common in the clays. Late Cretaceous (early Campanian) in age, based on pollen and spores, measurable thickness, and containing interbedded pyrite and glauconite clasts. The Gibbstown Formation is of Late Cretaceous (early Cenomanian) age. Unit 2 (Kp2) may be present in the Gibbstown Formation. Unit 2 (Kp2) is composed of sand, dark gray and black where unweathered, yellowish-brown to brown where weathered. As much as 70 feet thick. Clay is micaceous with some pyrite and mica, and pyrite are minor constituents. Iron cementation is common. Late Cretaceous (early Campanian) in age, based on pollen and spores, measurable thickness, and containing interbedded pyrite and glauconite clasts.