2.0 Environmental Setting

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The APE is located within the Mid-Drainage Zone of the Lower Coastal Plain Physiographic Province (Figure 3). This area is characterized as a Pleistocene-Age landform supporting a trellised drainage system of brackish and freshwater resources flowing generally in an east to west and northwest to southeast orientation (Groot and Jordan 1999; Jordan 1964; Pickett and Benson 1983). The center of this zone marks the tidal limit for drainages, with fresh water found to the west and brackish water to the east. Well-drained soils are found on the upper terraces of the drainages and on the headlands between major drainages. Tidal marshes and poorly drained areas are found on the floodplains bordering the drainages (Custer 1989:31).

The project area is underlain by mainly coarse-grain sand deposits of the Lynch Heights Formation. Coastal plain surficial deposits of Delaware, essentially a series of coarse-grained sandy deposits, were previously defined as part of the Columbia Formation (Jordan 1964). Recent research by Groot and Jordan (1999) further defined the soil facies of the Columbia Formation of Kent County into the Delaware Bay Group, including the older Lynch Heights Formation and the younger Scotts Corner Formation, which were laid down after the deposition of the Columbia Formation. The Delaware Bay Group of soils is found within 10 kilometers of the Delaware Bay, while the Columbia Formation deposit is located primarily west of Dover. The two formations vary in age, with the Columbia Formation dating to the middle Pleistocene (>300,000 years B.P.) and the Delaware Bay Group dating to the late Pleistocene (<100,000 years B.P.) (Groot and Jordan 1999).

Petraglia et al. (2002:4-3) suggests that in certain transitional zones between formations, associating a site with one formation source may be impractical. Formations are typically defined by the presence of indicator fossils in the soil matrix rather than lithological characteristics, and the absence or paucity of these fossil materials may hinder assigning the correct formation. For example, the Hickory Bluff site (7K-C-411), located on a high bluff overlooking the St. Jones River near the juxtaposition between the three formations, may comprise Delaware Bay Group sediments on the surface and Columbia Formation sediments deeper in the soil column. Excavations may encounter both formation sediments in the soil profile. Similarly, the SR 1

North Frederica Grade Separated Intersection project APE may contain Lynch Heights Formation in the surficial deposits capping the underlying Columbia Formation sediments, especially where drainages have cut down into the older underlying soils, based on the project location residing near the interface of the two formations.

The project APE predominantly consists of agricultural lands overlooking the estuary setting of the Murderkill River (Photograph 1). Gently rolling plowed fields are found on the east side of SR 1, as well as in the small area of land situated between SR 1 and SR 12. A small grove of ornamental trees and plants clustered along the east side of SR 1 at the intersection of SR 1 and SR 12 represents the location of the non-extant Soulie Gray House (Cultural Resource Survey [CRS] K-835) (Photograph 2). On the west side of SR 1 and SR 12, a large tract of agricultural land extends west to Spring Creek, a tributary of the Murderkill River. Marshlands border the southern limits of the APE, with a small drainage extending along the western edge of SR 12 to the intersection of SR 12 and SR 1 (Photograph 3). This drainage is fed by a farm pond found on the east side of SR 1, and empties into Spring Creek approximately 304.8 meters southwest of the SR 1 and SR 12 intersection (Photograph 4). The confluence of Spring Creek and the Murderkill River is found approximately 68.6 meters south of the project APE. A mix of deciduous and coniferous trees interspersed with scrub-shrub and briars are found along the transition zone between agricultural field and marshland. Grassy banks line the edge of the roadway.

In general, the terrain slopes from approximately 7.9 meters above mean sea level (amsl) at the northern limits of the project APE to approximately 0.0 meters amsl at the southern limits of the APE adjacent to the marshlands. A pedestrian survey of the project area identified significant variances in the depth of bank cuts along the Murderkill River valley. Inspection of the landform situated between SR 1 and SR 12 uncovered no appreciable dropoff where the plowed field transitioned into the marshland. To the east of SR 1, and on the north side of the Murderkill River valley, a 1.2- to 2.4-meter deep bank separated the agricultural field/wooded border from the marshland. To the west of SR 12, and on the north side of the Spring Creek drainage, the edge of the wooded field border progressed from a 0.6- to 0.9-meter deep bank near SR 12 to a 1.8- to 2.0-meter deep bank approximately 152.4 meters west of the roadway.

Soils identified within the study area are within the Sasafrass-Fallsington association, and are described as dominantly level to gently sloping, possessing both well and poorly drained soils of moderate permeability on uplands (Matthews et al. 1971). Six soil types are mapped with the project study area. These soils include Sassafras sandy loam, (SaA) 0 to 2 percent slope, (SaB) 2 to 5 percent slope, and (SaC2) located on areas of 5 to 10 percent slope; Fallsington sandy loam (Fa); Woodstown loam (Ws); and Mixed alluvial land (Mv) (Matthews et al. 1971) (Figure 4).

Three soil types from the Sassafras series are represented within the project study area. Sassafras sandy loam, (SaA) 0 to 2 percent slope, is found at the northern and eastern portions of the APE on both sides of SR 1, as well as the triangular parcel of land situated between SR 12 and SR 1. The soil has few, if any, limitations for farm or non-farm use. Sassafras sandy loam, 2 to 5 percent slope (SaB), is found in the central portion of the project study area contiguous to a mid-nineteenth-century structure and drainage. Sassafras sandy loam, 5 to 10 percent slope, moderately eroded (SaC2) soils, is also found in the central portion of the project study area flanking the drainage and is normally turned up during plowing. Sassafras soils are formed in old, predominately sandy sediments. They typically exhibit a profile consisting of a 20.3-centimeter thick dark grayish brown sandy loam and a roughly 7.6-centimeter thick brown sandy loam subsurface layer, followed by a 56.0 centimeter thick layer of yellowish brown and strong-brown, friable subsoil. This soil is found mapped alongside of Mv soils that commonly follow drainages (Matthews et al. 1971:17).

Fallsington sandy loam (Fa) consists of poorly drained soils on uplands, formed in old, predominantly sandy sediments. A pocket of Fallsington sandy loam is noted in the course of the drainage where it crosses an open field north of the Soulie Gray Farm. Woodstown loams (Ws) consist of deep, well-drained soils that occur on uplands of the Coastal Plain in the southern part of the county. These soils often have impeded drainage, thus seasonal wetness often occurs, but can be farmed if the water table is lowered by artificial drainage (Matthews et al. 1971:12, 24). A band of this soil type is found at the upper reaches of the drainage course near the Barratt's Chapel Cemetery, with a second pocket of soil noted near the eastern edge of SR 1 south of the historic farm.

Mixed alluvial land (Mv) land is found in the central portion of the project study area, where a drainage channel carries surface runoff into a farm pond on the east side of SR 1, then empties under SR 1 into an unnamed tributary of the Murderkill River. Generally, the soil material lacks distinct characteristics and cannot be identified; they are described as consisting of mixed and unclassified soils that often flood at least once a year. Drainage is generally poor, but there are spots that are better drained (Matthews et al. 1971:17).

The current climate of the project area is continental modified by the Atlantic Ocean, Delaware Bay, and Chesapeake Bay. Temperatures range between an average daily maximum of 19.1 degrees to an average daily minimum of 7.9 Celsius across the project area, with an average of annual precipitation of 117.2 centimeters (Matthews et al. 1971:3).

The section of the Murderkill River drainage comprising the project area falls within the coastal section of the Oak-Chestnut forest region, which extends from Virginia northeastward, almost to the Delaware River (Braun 1950:195). The forest is multi-layered, with mixed species biome containing large trees of *Quercus* sp. (oak), *Carya* sp. (hickory), *Ulmus americana* (elm), and *Fagus grandifoloia* (beech) dominating the upper canopy, and a secondary level of immature trees and smaller species, including *Sassafras albidum* (sassafras), *Cornus sp.* (dogwood), and *Carpinus caroliniana* (hornbeam). A level below supports a bi-level of shrubs and herbs. Each layer of the forest canopy supports a unique array of animal life, including, insects, birds, and mammals (Shelford 1963:24-26).