II. ENVIRONMENTAL SETTING

A. PHYSIOGRAPHY AND TOPOGRAPHY

The project area is within the Atlantic Coastal Plain Physiographic Province which is generally characterized by low-lying, nearly level topography. The Coastal Plain was formed by the deposition of material transported from beyond the Fall Line, and it is characterized by masses of unconsolidated sediments comprised of sands, gravels and clays of marine or fluvial origin. Surface elevations within the study area range a few feet above and below 50 feet above mean sea level.

Delaware may be divided into physiographic zones of similar geography and topography that are useful for discussion of prehistoric cultural manifestations (Custer 1986). The project area lies within the Mid-Peninsular Drainage Divide physiographic zone which has been described as the "backbone" of the Delmarva Peninsula (Thomas 1963 in Custer 1986). This zone is defined by the Atlantic-Chesapeake watershed line that separates the headwaters of streams that flow toward the east and empty into the Delaware Bay and those that flow to the west through Maryland and empty into the Chesapeake Bay (Ireland and Matthews 1974). The survey area is drained by headwaters and high-order tributaries of the Broadkill River, which empties into the Delaware Bay. In addition to flat topography and slow-moving headwaters of the streams that empty into the Delaware and Chesapeake Bays, the Mid-Peninsular Drainage Divide zone includes swamps surrounded by sand ridges and by bay/basin features (Custer 1986).

B. SOILS

The project area lies within the Pocomoke-Fallsington-Evesboro soil association, which contains a mixture of poorly drained soils with a moderately permeable subsoil of sandy loam or sandy clay loam and excessively drained soils that have a rapidly permeable sandy subsoil. The Pocomoke and Fallsington soils make up three-fourths of this association, and they are poorly drained, with moderately permeable subsoils. The Pocomoke and Fallsington soils occupy flat areas where the water table is at or near the surface for long periods. The Evesboro soils make up roughly 10 percent of the Pocomoke-Fallsington-Evesboro association, and they are excessively well drained with a rapidly permeable subsoil (Ireland and Matthews 1974).

The individual soils that have been mapped within the project area include Evesboro loamy sand, Pocomoke sandy loam, and Klej loamy sand. Evesboro and Pocomoke soils account for the majority of the acreage within the project, while Klej soils comprise a small fraction of the area. The non-hydric Evesboro soils are excessively well drained with a rapidly permeable subsoil, while the hydric Pocomoke soils are poorly drained, with moderately permeable subsoils. The Klej soils range from moderately well drained to poorly drained, with wide seasonal fluctuation in the water table (Ireland and Matthews 1974).

C. PALEOENVIRONMENT

Given the widespread evidence of human occupation of the Middle Atlantic Coastal Plain beginning as early as the Late Pleistocene, a reconstruction of the area's environmental history should consider at least the last 12,000-15,000 years. The primary factors to be considered in a local paleoenvironmental reconstruction are changing climatic conditions and sea levels which, in turn, influenced the local distribution of floral and faunal resources.

During the late Pleistocene, a series of massive continental glaciers advanced and retreated over much of North America. Because vast amounts of water were incorporated into these ice sheets, the sea levels were 300 to 500 feet lower than at present. The late Pleistocene was not only slightly cooler than the present, but was also characterized by higher levels of precipitation (Carbone 1976).

The generally accepted marker for the end of the Pleistocene is the beginning of the glacial retreat immediately following the Valders substage maximum, which has been dated radiometrically to about 10,500 years BP (Bryson et al. 1970). As the sea levels rose with the release of the glacial meltwater, the ancestral Susquehanna River and Delaware River Valleys were drowned, and the rising water eventually formed the estuarine environments of the Chesapeake and Delaware Bays.

While data indicate that the sea level has been rising continuously during the past 12,000 to 14,000 years, the rate of marine transgression over the Coastal Plain has varied considerably. In the millenia immediately following the glacial maxima, sea levels rose relatively rapidly, while in the most recent millenia, sea levels have been rising at a rate of somewhat less than one-foot per century (Edwards and Merrill 1977).

The biogeographical patterns of the Middle Atlantic Coastal Plain for the late Pleistocene have not yet been definitively reconstructed. Detailed paleoenvironmental syntheses have been completed for the Shenandoah Valley (Carbone 1976) and the Upper Delaware Valley (Dent 1979). These studies are useful for understanding regional paleoenvironmental conditions, however, a reconstruction of local conditions should also consider applicable pollen cores. For Delaware, Custer (1984, 1986) relies heavily on Carbone's (1976) work and discusses paleoclimatic history in terms of an episodic model wherein abrupt, rather than gradual, changes in climate influenced the regional biogeography.

Custer's (1984, 1986) discussion of the Lower Coastal Plain paleoenvironmental sequence would be most suitable for the study area, as there is scant information to treat separately the Mid-Peninsular Drainage Divide physiographic zone. Pollen samples recovered from the Dill Farm Site, located in southern Kent County, would pertain directly to the Mid-Peninsular Drainage Divide zone; however, the Dill Farm sequence does not fully represent the Late Glacial and Holocene, so that it is of somewhat limited value. A summary of the paleoenvironmental history, based on Custer's (1984, 1986) statewide synthesis, is presented in Table 1.

D. MODERN ENVIRONMENT

Essentially modern environmental conditions were reached approximately 1,000 years before the present, that is during the Sub-Atlantic episode. Some minor fluctuations have occurred since that time, but it is generally recognized that modern distribution of flora and fauna closely approximates that of the past thousand years. Of course, one must recognize the profound environmental changes that have occurred as a result of cultural modification of the landscape during the historic period.

At the time of the initial European contact, the vegetative cover in the Middle Atlantic Coastal Plain was primarily a deciduous forest. This hardwood forest and its associated vegetation would have provided a fairly abundant supply of nuts, fruits, bulbs, and leaves. The terrestrial animals that inhabited the region included white-tailed deer, black bear, porcupine, squirrel, chipmunk, woodchuck, turtle, weasel, skunk, fox, wolf, cougar, raccoon, opossum, muskrat, otter, mink, beaver, turkey, shrew, rabbit and bobcat (Turner 1976, 1978).

Oak would have been the dominant deciduous element in the forests surrounding the study area, with an admixture of loblolly pine, Virginia pine and other deciduous species. Poorly drained upland areas would have included pin oak, willow oak, red maple, sweetgum, blackgum, holly,

sweetbay, dogwood, beech, birch, red cedar and cypress (Custer 1984, 1986; Ireland and Matthews 1974).

The current land use patterns in the study area vicinity are predominantly rural in character. Two residential complexes are present within the property, and the remainder of the acreage has been completely cleared and cultivated, except for a small (less than one acre) hog wallow near the center of the property.

TABLE 1

PALEOENVIRONMENTAL EPISODES,
DELAWARE LOWER COASTAL PLAIN

EPISODE	DATES	GENERAL CHARACTERISTICS
Late Glacial	10,000-8,000 B.C.	Mosaic of different vegetational communities; open grasslands within coniferous forests; deciduous elements present in wetland areas, etc.; bay/basin features open and active; animals include cold-adapted megafauna (musk ox, mammoth, mastodon), peccaries, white-tailed deer, caribou, elk, beaver, etc.
Pre-Boreal/ Boreal	8,000-6,500 B.C.	Reduction of open grasslands and spread of forests dominated by pine and northern hardwoods; extinction of Pleistocene megafauna and reduction of habitat for grazing and browsing species
Atlantic	6,500-3,100 B.C.	Full appearance of modern environment with warm, moist conditions; continental climate with marked seasonal differences; widespread dominance of mesic oak-hemlock forests; modern faunal communities
Sub-Boreal	3,100-800 B.C.	Warm, dry climate (mid-postglacial xerothermic) at the beginning of the episode, followed by gradually increasing moisture and cooling temperatures; spread of grasslands and reduction of oak-dominated forests
Sub-Atlantic	800 B.C.-recent	Cooling reduced the moisture stress of the Sub-Boreal, leading to essentially modern conditions; upland forests include a mix of coniferous and deciduous species; reduction of sea level rise permits florescence of estuarine environments in coastal areas

Source: Custer (1984, 1986)