CHAPTER 3

GEOGRAPHICAL SETTING

A. Physiography and Topography

The planned alignment for the Puncheon Run Connector runs in a generally west-east direction, crossing the tidal St. Jones River, one of the principal drainages flowing into the west side of the Delaware Bay. Stream gradient is subdued in the Dover area, with the trunk artery emerging downstream into a palustrine and subsequently estuarine environment at the bay outlet.

The study corridor lies within the Mid-Drainage environmental zone of the Lower Coastal Plain physiographic province. This is a broad belt of land oriented north/south extending from Smyrna to Georgetown and positioned between the Delaware Shore and the Drainage Divide zones (Figure 3.1). It is characterized by a relatively flat, featureless landscape with long gradual slopes. Elevations range from 0 to 30 feet above sea level (Custer 1983:7-13).

The alignment for the Puncheon Run Connector passes immediately north of and runs parallel to Puncheon Run, a tributary of the St. Jones River. Commencing to the west of the main channel of the St. Jones River, the highway corridor crosses both the main valley of the St. Jones and a small island in the floodplain that has been created by a meander cut-off. The east bank of the St. Jones River is mapped as a Late Pleistocene terrace between seven and eight meters (23 to 25 feet) above the mean water level of the channel. The alignment then crosses an abandoned orchard, open fields, another abandoned orchard and a commercial woodlot before reaching its eastern termination at the recently completed State Route 1.

The 1987 National Wetlands Inventory map of the Dover area indicates that on the west side of the St. Jones river the alignment of the Puncheon Run Connector corridor crosses a palustrine ecological system of the emergent class, consisting of narrow-leaved persistent vegetation mixed with broad-leaved evergreen vegetation of the scrub/shrub class in a seasonal tidal water regime. On the east side, within the meander cut-off, the inventory map shows a riverine ecological system within a tidal subsystem of the flat class with a regular water regime. Core samples taken from a similar setting less than a mile downriver indicated a riverine wetland environment at 3,500 BP along the outside of the cutoff and a widespread palustrine emergent wetland after 1,500 BP up to the present (Kellogg and Custer 1994:75).

B. Geology

In the Dover area, sands and gravels of the Columbia formation underlie the surficial geology. These extensively reworked non-marine sediments deposits date to the Pleistocene Epoch of the Quaternary Period and directly overlie middle Miocene rocks. They represent the southern extremity of a fluvial system that transported meltwater and debris from glaciers to the north. At lower elevations along drainages like the St. Jones River organic-rich silts, clays and fine sands deposited in tidal marshes represent infilling of old stream valleys following the end of the last glacial period some 10,000 years ago.

C. Soils

The project area, lying chiefly in the Fredrica Aquifer, is dominated by the Sassafras soil series with small patches of Johnston silt loam, Fallsington loam and swampland (Figure 3.2; Table 3.1). The Sassafras series within the corridor consists of well-drained upland sandy soils ranging from 0 to 40% slope. The varying degree of slope and the sandy nature of the Sassafras series make these soils susceptible to aeolian erosion and deposition. Within the project corridor, most of these soils have been disturbed by plowing and/or erosion. A typical profile displays an A-horizon of eight inches of dark grayish-brown sandy loam (plowzone) above three inches of brown sandy loam. The subsoil (B-horizon) can typically be divided into three zones within a total thickness of 33 inches: an upper dark yellowish-brown sandy clay; a middle strong-brown sandy clay loam; and a lower strong-brown heavy sandy loam (Matthews and Ireland 1971:21).

Table 3.1. Soils within the Puncheon Run Project Corridor

Map Symbol	Soil Decription	Percent Slope
SaA	Sassafras Sandy Loam	0 to 2%
SaB	Sassafras Sandy Loam	2 to 5%
SaC2	Sassafras Sandy Loam	5 to 10%
SaD2	Sassafras Sandy Loam	10 to 15%
SfB	Sassafras Loam	2 to 5%
SvE	Sassafras and Evesboro Soils	15 to 40%
Fs	Fallsington Loam	-
Jo	Johnston Silt Loam	-
Sw	Swamp	-

Source: Matthews and Ireland 1971

D. Vegetation

Sassafras sandy loam is considered to be one of the most productive soils in the county (Matthews and Ireland 1971:22-23). The climax vegetation for the Sassafras soil series is normally mixed hardwoods, but intensive agriculture within the region has altered the mix of representative species. At the time of field survey in 1994-95, the vegetation cover was as follows:

Area A (Plates 3.1 and 3.2): This area comprised a grassy field adjoining a series of small commercial businesses fronting on to U.S. Route 13.

Area B (Plates 3.2-3.5): This area comprised grassy fields, patches of light to moderate woodland, and a small lightly wooded island in the main channel of the St. Jones River. Although no longer farmed, this area was formerly cultivated, supporting a variety of crops, including asparagus, corn, soybean and grapes. A comparison of aerial photographs taken in 1937 and 1994 shows that successional vegetation has migrated north along Puncheon Run into what were formerly farm fields. The partially filled wetland located at the confluence of the St. Jones River and Puncheon Run was occupied completely by *phragmites*. The small island located at the eastern end of Area B was lightly wooded with water-tolerant species. Of special note was bald cypress which was present near the northern end of the island.

Area C (Plates 3.5 and 3.6): Woodland covered this area between stations 399+50 and 407+00, and consisted of an abandoned and overgrown apple orchard with a dense understory dominated by poison ivy and grapevine. To the west of this, the woodland consisted of older growth with much larger trees, notably hickory, oak, dogwood, poplar, beech, sassafras, holly, pine and two bald cypress with a less dense understory. East of station 407 to U.S. Route 113, the project corridor was open grassland that in recent years had been periodically mowed by DelDOT, but which was also formerly part of an apple orchard which was aparently operational for much of the present century.

Area D (Plate 3.6): This area comprised an abandoned and overgrown apple orchard with a dense understory dominated by poison ivy. The apple orchard appeared to have been in operation for the majority of this century.

Area E (Plate 3.6): This area was mostly covered by a dense commercially grown grove of pine trees, but also crossed an unnamed tributary of the Morgan's Branch where a mature hardwood forest is present.

E. Current Land Use

Current land use within the project corridor at the time of the Phase I and II field surveys can be classified as largely passive with the exception of a series of small commercial businesses fronting on to U.S. Route 13. The majority of the project area consists of periodically manicured grassy fallow fields with sections of abandoned orchards and woodlots. These former agricultural properties are now owned by the State of Delaware. They are presently in the process of being cleared of vegetation by DelDOT and soil is being stockpiled for use in the planned highway construction.