

APPENDIX B

**RESULTS OF GEOMORPHOLOGICAL
RECONNAISSANCE**

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RESULTS OF GEOMORPHOLOGICAL RECONNAISSANCE
NEW CASTLE COUNTY, DELAWARE
ROUTE 40 IMPROVEMENTS, S.R. 896 TO S.R. 1

The project Area of Potential Effect (APE) is within the Coastal Plains physiographic province, where the majority of soils have formed in old coastal alluvium which has been deeply weathered and leached of many minerals and nutrients. The soil profiles contain varying amounts of sand, silt, and clay particles according to the conditions of sediment deposition and the location on the landscape. Soil profiles include a well developed argillic subsoil horizon, which indicates that they have been stable and exposed to *in situ* weathering throughout at least the Holocene period.

Under original, natural conditions, the most common soil found within the APE according to the *Soil Survey of New Castle County, Delaware* (Matthews and Lavoie 1970) was the Matapeake silt loam, a deep well drained soil. Other soils originally found within the APE were the Fallsington loam, Keyport silt loam, Sassafras sandy loam, and Woodstown loam. Each of these soils formed in Coastal Plain alluvium, and vary in degrees of internal drainage. The Fallsington loam is poorly drained and is often saturated to the surface, and the other soil types are either well drained or moderately well drained. A mapping type called "Mixed alluvial land" was also noted to occur within the APE. This mapping type is of scoured and redeposited alluvium without developed soil horizons which would define a soil type. It is found on floodplains and is normally poorly drained, and is frequently saturated. This soil type is too modern and changeable to define as a distinct soil type.

Since the mapping of the soils by the soil survey, however, much commercial development has occurred within the APE. The original soils have been extensively disturbed or completely excavated during the construction activities of the present roadway, commercial structures, and the associated driveways, parking lots, and subsurface utilities and stormwater drainage networks.

A geomorphology reconnaissance was performed in August 2002 to determine which areas within the APE were relatively undisturbed and suitable for testing for archaeological resources. Many soil auger borings were taken, and three representative profiles were described in detail according to the methods and nomenclature prescribed by the United States Department of Agriculture-Natural Resources Conservation Service. The descriptions are included at the end of this appendix.

The majority of borings were of a truncated profile of Coastal Plain sediment. The original surface and upper subsoil had been excavated by construction activities. Auger Boring 1 is typical of this type of disturbed profile. The C horizon, which is undeveloped parent material previously found deep within the profile, was encountered on the surface. These C horizon loamy sediments had been compacted by heavy equipment. All borings taken within disturbed areas were similar, if not identical to Auger Boring 1, with minor differences in sediment texture and color. No testing was recommended within these extensively disturbed areas.

A few areas with intact soils were found, predominantly within wooded areas or agricultural fields. Auger Boring 2 was found to be typical of these areas. A silt loam plowed surface (Ap) was found overlying a well developed argillic (Bt) horizon. The argillic horizon is normally found to be deeper within the profile, which suggests that this soil might have been eroded, forcing the plow to deeper levels within the subsoil through time. Testing was recommended within these less disturbed areas.

Wet soils high in clay content were found in the few depressions encountered within the APE. The profile of Auger Boring 3, taken within one of these depressions, was of gleyed Coastal Plain sediment. Gleyed conditions (gray, often mottled soil) occur when a soil profile is saturated for the majority of the growing season. No testing was recommended within these few depressional areas.

No auger borings were taken within the one stream crossing of the APE, where Belltown Run flows south to north under the present roadway. Obvious, extensive channelization and reconstruction of the stream banks have occurred within this area, and no intact areas remain.

SOIL PROFILE

Auger Boring 1

Date: August 7, 2002

County: New Castle, Delaware

Soil Description By: M.G. Sams, CPSS

Project Location: Route 40 Improvements, S.R. 896 to S.R. 1

Horizon/Depth	SOIL COLOR		Texture	Structure	Consistence	Boundary	Comments
	Matrix	Mottling					
C / 0-20.0 cm (0-7.9 in)	10YR 5/4 Yellowish brown		clay loam	massive	firm, compacted		

Additional Notes: Broad uplands position; truncated profile of coastal plain sediments. Surface and upper subsoil excavated.

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SOIL PROFILE

Auger Boring 2

Date: August 7, 2002

County: New Castle, Delaware

Soil Description By: M.G. Sams, CPSS

Project Location: Route 40 Improvements, S.R. 896 to S.R. 1

Horizon/Depth	SOIL COLOR		Texture	Structure	Consistence	Boundary	Comments
	Matrix	Mottling					
Ap / 0-25.0 cm (0-9.8 in)	10YR 4/3 Brown		silt loam	weak medium granular	friable	clear	
Bt / 25.0-35.0 cm+ (9.8-13.8 in+)	10YR 5/4 Yellowish brown		clay loam	moderate medium subangular blocky	friable		

Additional Notes: Broad uplands position; well developed, well drained profile of coastal plain sediments.

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SOIL PROFILE

Auger Boring 3

Date: August 7, 2002

County: New Castle, Delaware

Soil Description By: M.G. Sams, CPSS

Project Location: Route 40 Improvements, S.R. 896 to S.R. 1

Horizon/Depth	SOIL COLOR		Texture	Structure	Consistence	Boundary	Comments
	Matrix	Mottling					
A / 0-5.0 cm (0-2.0 in)	10YR 4/1 Dark gray		clay loam	weak medium granular	friable	clear	
Cg1 / 5.0-25.0 cm (2.0-9.8 in)	10YR 6/1 Gray	7.5YR 4/3 Brown	clay loam	massive	plastic	gradual	
Cg2 / 25.0-35.0 cm (9.8-13.8 in)	10YR 6/1 Gray		clay loam	massive	plastic		
C2 / 35.0 cm+ (13.8 in+)			channel lag gravels				

Additional Notes: Depression area; gleyed, poorly developed coastal plain sediments.

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