BACKGROUND RESEARCH RESULTS

Background research for the project area revealed that although no previous systematic archaeological investigations have been conducted within the Route 7 South Corridor currently

under investigation, a great deal of information is known about prehistoric and historic cultural resources in the area. A number of cultural resource management studies (Thomas 1980, 1981; Custer, Catts, and Bachman 1982; Bachman and Custer 1983; Catts, Shaffer, and Custer 1986; Custer, Coleman, Shaffer, and DeSantis 1985; Coleman et al. 1984, 1985, 1987; Basilik 1986; Catts, Cunningham, and Custer 1983; Bowers 1986; Shaffer, Custer, and Grettler n.d.; Custer and Bachman 1983, 1986a; Delmarva Clearinghouse for Archaeology 1975; O'Connor et al. 1983; Custer and Cunningham 1986) and other archaeological projects (Custer 1980, 1981, 1982; Custer and Watson 1985, 1987; Custer, Watson, and DeSantis 1987; Custer, DeSantis and Watson n.d.; Custer, Sprinkle, Flora, and Stiner 1981; Custer, Ward, and Watson 1986) have provided excavation and survey data on sites in the nearby region. The Delaware Cultural Resource Survey site files, which are maintained by the Delaware Bureau of Archaeology and Historic Preservation and which are the repository for records of all known prehistoric and historic sites in Delaware also contain information about numerous sites in the vicinity of the Route 7 South Corridor. Figure 10 shows the location of archaeological surveys in the nearby region and Figure 11 show the locations of some of the sites discussed below.

Cultural resource management surveys and site testing sponsored by DelDOT have provided much local data. A preliminary survey of proposed changes in segments of Routes 4, 7, and 273 near Christiana was conducted by Middle Atlantic Archaeological Research, Inc. under the direction of Ron Thomas (1980). Thomas

studied some areas which were part of, or adjacent to, the Route 7 South Corridor in the study of the Route 273 Corridor and identified a number of sites with varying levels of significance. Only one locus identified by Thomas in the Route 273 survey area lies within the current study area and this was locus C-2 which consisted of some foundations of unknown antiquity along the Christina River. None of the other ephemeral loci identified in the Route 273 Corridor warranted further investigations. Thomas' investigations in the Route 4 Corridor resulted in recommendations for further testing at several sites (7NC-D-70, 7NC-D-72, 7NC-D-75, 7NC-E-42, 7NC-E-43) in order to determine their National Register of Historic Places eligibility. Subsequent testing conducted by the University of Delaware Center for Archaeological Research (Bachman and Custer 1983; Custer, Catts, and Bachman 1982) indicated that these sites represented short term occupations where processing and tool kit replacement activities took place and were not eligible for the National Register. Of special interest was site 7NC-D-70 which bordered a small swamp associated with an ephemeral stream and produced a Paleo-Indian fluted point dated to ca. 11,000 years ago.

Thomas' (1980) survey included areas to the north of the present study. Only the Delaware Park site, 7NC-E-41 was recommended for further investigations. Subsequent data recovery excavations (Thomas 1981) indicated that the site represented a multi-seasonal base camp dating between 1800 B.C. and A.D. 700. An unusually high number of subsurface storage features (220) were identified and indicate that the inhabitants of the site were relatively sedentary and were intensively exploiting the

abundant, locally available plant food resources, some of which were stored for later consumption. The environmental setting of the site, which is on a low knoll adjacent to the floodplain of the White Clay Creek, is similar to many environmental settings in the Route 7 South Corridor.

Survey investigations conducted by DelDOT archaeologists in the New Churchman's Road area were designed to locate sites in the corridor. One historic site, the W. M. Hawthorn farmstead was identified as being eligible for the National Register (Coleman et al. 1983). Intensive test excavations and archival research at the Hawthorn historic site showed that the farmstead had been continuously occupied since the 18th century. The spatial arrangement of the farmstead and the floorplan of the house had been drastically altered during the early part of the 19th century in response to construction of a new road and changing agricultural practices. It is also interesting to note that even though archival research showed that the site's inhabitants were relatively prosperous, the artifact assemblage, specifically the ceramics, was similar to those from other sites occupied by people of lower socio-economic status, including tenant farmers and people living in urban settings (Custer, Catts, and Coleman 1986:152). Likewise spatial utilization patterns do not vary greatly among these sites. The Hawthorn site faunal assemblage was of interest because even though the residents of the site had high socio-economic status, their food consumption and processing habits were more typical of lower status groups (Custer, Catts, and Coleman 1986:152-153; Otto

1984). Similar historic farmsteads are expected to exist in the Route 7 South Corridor.

Excavations of the historic components of the Hawthorn Site also revealed the presence of a buried, intact, prehistoric site. Subsequent data recovery excavations (Custer and Bachman 1983) uncovered a procurement-staging camp site, dated to ca. 2200 B.C., which included the remains of an ephemeral structure, a butchering area, and a plant processing area. A tool kit of varied bifaces, cores, and flakes, which served various functions, was also recovered. The Hawthorn prehistoric site is located on the edge of a low knoll next to a small spring-fed stream and many similar locations can be found in the southern portion of the Route 7 South Corridor.

Other archaeological field investigations have been conducted in the vicinity of the Route 7 South Corridor. Investigations at the Green Valley site complex, (Custer, Sprinkle, Flora, and Stiner 1981) which is located along the White Clay Creek in the Fall Line Zone northwest of the Route 7 South Corridor consisted of surface and subsurface examinations of four sites. These sites were all seasonally occupied during the Woodland I Period (ca. 3000 B.C. to A.D. 1000) and exhibited stone tool production activities from different stages of manufacture and culling and rejection of exhausted tools from tool kits brought into the area. The Green Valley sites are associated with cobble deposits along the White Clay Creek and many similar site settings are present in the Route 7 South Corridor.

Archaeological studies at Churchman's Marsh (Custer 1982; Custer and Watson 1985; Custer, Watson, DeSantis 1987; Custer, DeSantis and Watson n.d.) consisted of excavation of several sites in a variety of local settings which are in proximity to the resource-rich marsh. Primary occupation of the area occurred during the Woodland I and II Periods (ca. 3000 B.C. to A.D. 1600) although limited utilization of the area as early as 6500 B.C. is suggested by sporadic finds of bifurcate points. Excavations at the Clyde Farm site (7NC-E-6), which is located at the confluence of the White Clay Creek and Churchman's Marsh revealed the presence of pit houses and storage pits dated to ca. 1000 B.C. As was the case for the Delaware Park site, which is located less than 3 km upstream from Clyde Farm, these features are seen as indicators of semi-sedentary lifeways during Woodland I times. The Clyde Farm site covers an area of at least one square kilometer and there are many outlying Woodland I sites within 3 km of Churchman's Marsh, including the Newport Site (7NC-E-1) which may have been even larger than Clyde Farm. The large size of the sites, and the large number of sites near Churchman's Marsh underscores the dense prehistoric settlement of the area during Woodland I times. Woodland II settlement in the Churchman's Marsh area seems to be neither as sedentary, nor as dense, as Woodland I settlement. However, numerous small Woodland II sites have been excavated along the lower order tributaries of the Christina and White Clay Creek drainages and on bluffs overlooking these major drainages. Examples would include the Woods site complex (Stocum n.d.) and a series of small sites on the Christina River downstream from Churchman's

Marsh (Custer and DeSantis 1986:56). The Route 7 South Corridor contains site settings similar to those of the sites noted above, except for the fact that the study area is not directly adjacent to Churchman's Marsh.

The site records of the Bureau of Archaeology and Historic Preservation (BAHP) indicate that three prehistoric and eight historic sites are located within or immediately adjacent to the current project area (Figure 12). Site 7NC-E-32 lies on the Saint Francis Hospital tract and produced 22 non-diagnostic quartz chunks whose status as artifacts is dubious. Prehistoric ceramics of the Wolf Neck cord-marked and Hell Island cord-marked types were collected by H. Geiger Omwake from 7NC-E-9 in the Lewden Greene Park area; however, the specific location of this site is unclear. Site 7NC-E-16, the Marta site, is reported to contain both prehistoric and historic components. Limited testing was conducted at this site by Newark High School students under the direction of Wayne Hill and produced less than satisfactory data. The records and artifacts from this site could not be located at the Island Field Museum although they are reported to be on repository there (personal communication, Wayne Hill). The following historic sites are noted in the BAHP files: W. Couper House (N-5076), J. Simmons Farm (N-4039), Silver Hill Farms (N-1592), African Union Church (N-1599), Lewden House (N-197), Christina Historic District, The Newery (N-1001), and Public School III-C (N-5258). Only the Public School III-C, the Lewden House, and Christiana Historic District have been placed on the National Register of Historic Places. New Castle County personnel have prepared a Multiple Resources nomination for White

Clay Creek Hundred concurrently with the Route 7 project. While this document is still in draft form, it recognizes the importance of the following sites which are adjacent to the Route 7 aligments: The Montgomery House (also called the Newery), and Old Fort Church (Figure 12).

In addition to the studies noted above, the state plan for the management of prehistoric cultural resources (Custer 1986) and a regional management plan for prehistoric archaeological sites (Custer and DeSantis 1986) provide some information on site location potential and site significance. In the state plan, the Route 7 South Corridor falls within the Interior Swamp Management Unit (Custer 1986:179-180). Data quality, potential for significant sites, and development pressure on sites are all assessed as high (Custer 1986:182, 190, 194, 204) and the area is accorded the greatest research sensitivity and highest management priority (Custer 1986:198, 206-207). Likewise, the regional management plan places the study area in the Churchman's Marsh and Lower Christina River management unit (Custer and DeSantis 1986:69-70) which has high data quality, high probability for significant sites, and high development pressure (Custer and DeSantis 1986:69-71, 79, 91). In fact, this management unit is subject to the highest degree of development pressure and site destruction of any place in the Delmarva Peninsula. Therefore, this unit is considered to have the highest research and management priority (Custer and DeSantis 1986:89, 92). In sum, the state and regional management plans indicate the high potential for encountering significant prehistoric sites in the Route 7 South Corridor.

Because of the large amount of previous archaeological work carried out in the vicinity of the Route 7 South Corridor, which was identified during the background research, it is possible to develop a set of predictions of expected site locations that is more detailed than those used in other DelDOT Phase I/II studies. Furthermore, the development of a set of predictive models, which can be tested using the Route 7 South Corridor survey data, allows the site survey to meet both research and cultural resource management goals. The use of research designs and model testing also enhances determination of site significance because "the best approach to assessing archaeological significance is in relation to explicit problem oriented research designs" (Raab and Klinger 1977:632).

With regard to the testing of predictive models, highway archaeology has certain limitations and advantages. Highway corridors tend to be linear transect samples and thus provide a less than comprehensive study of a settlement system. However, a transect sample provides the opportunity to study a random, long, and linear segment of the environment and have been shown to be effective sampling mechanisms (Custer 1979). The net effect of such highway transect studies is to force archaeologists to survey areas which were previously subjected to minimal, if any, archaeological survey because it was thought that such areas would be unlikely to yield significant archaeological data. Fortunately, the Route 7 South Corridor crosscuts a wide variety of varied environmental settings of both upland and lowland floodplain areas, and is an ideal transect of High Coastal Plain

environments (Figure 3) and, when the Route 7 South Corridor is combined with Thomas' (1980) survey of Route 7 between Christiana Mall and Stanton, with Custer's (1980) survey of the Lindell/Milltown Area, and with the DelDOT survey of Route 7 between Milltown Road and the Pennsylvania State Line (Catts, Shaffer, and Custer 1986), a nearly complete transect is obtained from the Hockessin Lowlands of the Piedmont Uplands, through the upland knolls of the same zone, across the Fall Line transition zone, and through a major portion of the High Coastal Plain. A discussion of site distribution through this transect will be presented at the end of this report.

In discussing the potential limitations of the Route 7 South Corridor data for testing predictive models of site locations, two additional points need to be discussed. First, it should be noted that many of the landscapes in the study area have undergone especially extensive erosion during the last 10,000 years of the Holocene. In the northern portion of the study area, north of the Christina River, Custer and Watson (1987) have documented extensive aeolian reworking of the landscapes along the marsh-edge and stream-side bluffs. Major depositional discontinuities indicate that landscapes dating between 6500 B.C. and 3000 B.C. have been removed from the sedimentary sequences. Erosion in interior areas, however, is not as extensive. South of the Christina River, through the majority of the Route 7 South Corridor, erosion is even more severe. In most locations, the United States Department of Agriculture Soil Survey classifies the soils as highly to severely eroded (Matthews and Lavoie 1970) and Pleistocene gravels are present on the present ground surface

in both cultivated and unplowed areas. Although archaeological sites are present in these areas (e.g. - Custer, Coleman, Shaffer, and DeSantis 1985), their context has been severely compromised and large components of their artifact assemblages may be missing. In such areas, it is difficult to know if the absence of sites is due to an absence of prehistoric habitation or if it is due to the erosion. Extensive modern development also acts to remove certain landscapes from consideration in testing predictive models and further biases the survey sample in unknown ways.

In developing predictive models for the Route 7 South Corridor, it is assumed that archaeological site distributions can be modeled primarily on the basis of environmental factors during the prehistoric period although social factors can play a role. For the historic period, environmental factors and socioeconomic and political factors can be used. Several studies have illustrated the use of environmental factors in predictive models for prehistoric sites in both the High and Low Coastal Plain (e.g. - Custer, Eveleigh, Klemas, and Wells 1986; Eveleigh 1984; Galasso 1983; Custer and Galasso 1983; Custer, Jehle, Klatka, and Eveleigh 1984; Gardner 1982, 1987; Custer n.d.a) and these models have been shown to be both accurate and precise (Custer and Bachman 1986a; Custer, Bachman and Grettler 1986; Custer n.d.a, n.d.b). For the most part, these models focus on the availability of surface water and productive swamp, marsh, and bog settings. In fact, a predictive model based solely on surface water availability was successfully applied to the Route

896 Corridor, which is located in the High Coastal Plain west of the Route 7 South Corridor (Lothrop, Custer, and DeSantis 1987). Social factors in prehistoric site locations have also been considered (Custer, Jehle, Klatka, and Eveleigh 1984), but their applicability is limited to Woodland I specialized base camps and their accuracy and precision has not been evaluated. For historic sites, explicit predictive models have not been regularly applied due to the effectiveness of archival research as a predictive tool. However, recent analyses of historic site locations (Custer, Bachman, and Grettler 1986; Custer and Grettler n.d.) have indicated that the factors of soil productivity and access to transportation facilities and markets had important influences on historic site locations. The accuracy of these factors as predictors of site locations has not yet been evaluated. For the Route 7 South Corridor, all of these models will be applied, where appropriate, to generate testable predictive models.

Because human adaptations and settlement patterns changed through time in northern Delaware, site location predictions are most accurate when they are made for individual time periods noted in the earlier discussion of the regional prehistory. The prehistoric site location predictions noted below are based on the northern Delaware management plan (Custer and DeSantis 1986) as well as the more general studies noted previously.

During the Paleo-Indian Period (ca. 12,000 - 6500 B.C.), settlement patterns were focused upon the limestone lowlands near Hockessin in northern Delaware, the primary cryptocrystalline outcrops at Iron Hill and Chestnut Hill south of Newark, the

emerging freshwater swamps of the Churchman's Marsh area, and the terraces of the Delaware River (Custer and DeSantis 1986:35-36). Although the study area is within 3 km of Churchman's Marsh, it is unlikely that the extensive wetlands which made Churchman's Marsh an attractive settlement location extended upstream along the Christina River to the study area. Therefore, no Paleo-Indian base camps are expected for the study area. Pleistocene gravels and cobbles are found throughout the study area and these kinds of lithic resources were exploited by Paleo-Indian groups. However, cobble lithic sources were generally exploited in a serial fashion by Paleo-Indian groups (Custer, Cavallo, and Stewart 1983), and specific Paleo-Indian quarry-related sites related to these cobble beds are not common and are not expected in the study area. Paleo-Indian procurement and hunting sites are associated with game-attractive swamps or bogs at ephemeral streams, major drainages, and interior areas. There are many of these kinds of swamps, or relicts of swamps, in the Route 7 South Corridor and they may be the locations of Paleo-Indian procurement sites. Figure 13 shows the locations of these predicted site locations in the study area. It should also be noted that the juxtaposition of cobble beds and swamps enhances the potential for Paleo-Indian procurement sites.

Archaic Period (ca. 6500 - 3000 B.C.) settlement patterns in northern Delaware are similar to those of the Paleo-Indian Period except for the fact that there is no Archaic Period focus on the cryptocrystalline outcrops of northwestern Delaware (Custer and DeSantis 1986:42-45). Therefore, the potential Paleo-Indian site

locations shown in Figure 13 are also potential Archaic Period procurement site locations. It should also be noted that the isolated bay/basin features in the southern portion of the project area between Route 13 and Route 40 have a high potential for being Archaic Period site locations because previous studies (Custer and Bachman 1986b) have shown that these features first begin to be utilized during this time period.

Site location potentials and settlement patterns became more diversified during the Woodland I Period (ca. 3000 B.C. - A.D. 1000). The area around Churchman's Marsh, including the northern end of the Route 7 South Corridor at the Christina River crossing, is the focus of major base camp sites (Custer and DeSantis 1986:50-53). Related small base camps, procurement-staging sites, and procurement sites are also expected in this zone. Figure 14 shows the projected site location model for major drainage wetlands and the potential locations for these sites are noted in Figure 15. Procurement and procurement-staging sites are also an important component of Woodland I forays into the interior. These kinds of sites are expected throughout the study area with procurement sites found adjacent to interior swamps, bay/basins, and ephemeral streams and procurement-staging sites found in areas where there are clusters of procurement sites. Figure 15 shows the places in the study area where these sites may be found and Figure 16 shows a more localized site location model.

In addition to the hypothetical site model described above, another model can be noted for the Woodland I Period. The lower reaches of the White Clay Creek and the Christina River and

Churchman's Marsh were clearly the focus of very intensive and dense Woodland I settlements. Indeed, these sites are some of the largest known for all of Delaware. The base camp sites in these areas were also foci of limited non-local exchange systems (Custer 1984b) and there are indications that these sites were foci for varied social groups (Custer 1984c). As such, these sites may have functioned as special "central places" which attracted settlement for reasons other than the high biological productivity of the surrounding areas. In this scenario, the "social attractiveness" of the Churchman's Marsh and lower Christina vicinity would have drawn groups away from potential settlement locales in the study area and the ecologically attractive base camp areas noted in Figure 15 would not be inhabited during Woodland I times.

Although prehistoric settlement remained focused on the Churchman's Marsh and major drainage areas during Woodland II times (ca. A.D. 1000 - 1600), the settlement seems to have been less dense, less sedentary, and less intensive (Custer 1982; Custer and DeSantis 1986:56-58; Stewart, Hummer, and Custer 1986). Numerous smaller base camp sites are found scattered along the major drainage floodplains and bluffs and along the minor drainages. Consequently, the Christina River crossing of the Route 7 South Corridor and the Eagle Run crossing are likely base camp site locations (Figure 17). Procurement site locations would be similar to those noted for the Woodland I Period. Table 2 summarizes the prehistoric predictive model for specific tracts of land within the study area.

TABLE 2

EXPECTED LOCATIONS OF SPECIFIC PREHISTORIC SITE TYPES
IN THE ROUTE 7 CORRIDOR

Cultural Period	Site Type	Potential Location (Alignment)	Settlement Patterning Principle
Paleo-Indian	Hunting	McMullen, Larsen, Lester Farm Creek, (8); in vicinity of Christina River (8 & 9); Getty Property (Red Lion Creek), Union Methodist Church Tracts (8); Brown's Lane vicinity (9)	Game attractive or poorly drained areas Best hunting locales
Middle Archaic	Macroband Base Camp	Proximity to Christina River (8 & 9); Moore Farm and Union Methodist Church tracts (8)	Areas of maximum habitat overlap, poorly drained areas and deciduous woodlands
	Microband Base Camp	Proximity to Christina River (8 & 9); Moore Farm Union Methodist Church and Getty Oil Tracts (8); Clough Tract (9); Brown's Lane vicinity (9)	Sheltered locales and flats along low order streams
	Procurement	In proximity to the Christina River (which is becoming tidal by this time); interior swamps	Limited resource and game procurement zones
Late Archaic/ Woodland I	Macroband Base Camp	In proximity to Christina River (8 & 9); Getty Oil (8); Clough (9); Upland Victorian (9) tracts	At stream confluences; interior drainages; floodplains and terraces of the Delaware River

TABLE 2 (cont.)

Cultural Period	Site Type	Potential Location (Alignment)	Settlement Patterning Principle
Late Archaic/ Woodland I (cont.)	Microband Base Camp	Lester and Getty Oil Tracts; difficult to recognize - unrecognized in Piedmont (8)	Terraces of the Delaware River
	Procurement	McMullen Farm south to Moore's Farm (8); vicinity of Getty and Lester Tracts (8); vicinity of Christina River (8 & 9); Getty Oil Tract (8)	High coastal plain drainage divides in proximity to deciduous nut trees; edge area grassland/parkland; poorly drained Red Lion Creek area; interior low order drainage floodplains
Woodland II	Base Camps	In meander of Christina River (9); Getty Oil and Lester Tracts (8); Upland Victorian Tract (9)	Stream confluences of interior drainages; floodplains and terraces of Delaware and other rivers
	Procurement	Union Methodist Church Tract (8 & 9); McMullen Tract (8); Getty Oil Tract (8); and in vicinity of Christina River (8 & 9)	Low knolls in proximity to poorly drained floodplains and bay/basin features; mid-peninsular drainage divide settings; during late prehistoric periods - near coastal seed plant stands and small, well drained flats near tidal marshes

For historic sites, the site locations noted from archival and background research (Figure 12) provide the best predictive model. From general historic site location studies (Custer and Grettler n.d.), it can be noted that areas near the Christina River, with its potential for water-borne transportation, would be preferred for 17th and 18th century settlement. The transportation center of Christiana would have also attracted settlement during the 19th century. Finally, it should be noted that possibly unrecorded 19th century tenant sites may be located on the fringes of property lines near major roads. Table 3 summarizes potential historic site locations developed during the DelDOT survey.