

5.1 Summary and Evaluation of Cultural Resources

Phase Ib survey of US 301 Section 1 resulted in the identification of 19 cultural resources, including 18 archaeological sites and one historic landscape feature. Three archaeological sites had only prehistoric components, eight sites had both prehistoric and historic components, and seven sites had only historic components. The following review of sites focuses on attributes relevant to an evaluation of site eligibility.

The sites are evaluated below, with regard to their potential eligibility for listing in the National Register of Historic Places. Five of the 18 archaeological sites are recommended not eligible on the basis of the Phase Ib survey (Table 24). Phase II survey is recommended for 13 of the archaeological sites, to further evaluate their eligibility. Phase II survey is also recommended for the historic railroad line.

Spring Mill Branch Site (N14528, in Segments 3 and 4)

This site was identified as a prehistoric site characterized by a low to moderate density of artifacts. It was located at the headwaters of a small tributary of Spring Mill Branch. Survey of adjacent areas by HRI showed that the site extended south of the A&HC project area to the confluence with Spring Mill Branch and contained both prehistoric and historic components. The portion of the site within the A&HC LOD included one contracting stemmed point, but had limited potential to yield additional information about lithic technology and choice of lithic materials.

Next Steps: The site will be recorded on CRS forms by HRI. Based on the material from the portion within the A&HC project area, this site is recommended not eligible for the National Register, and no further survey is recommended. However, information from the A&HC survey should be combined with results from the HRI survey to provide a fuller interpretation of the site.

Reedy Island Cart Road Site 4 (N14533, in Segment 6)

This site, which included both historic and prehistoric components, was located on the west side of Drawyer Creek in the vicinity of an early historic cart road and ford. Additional survey of adjacent areas by HRI indicated that the site extended northwest along the creek. The portion of the site within the A&HC LOD lacked chronologically diagnostic artifacts and other tools associated with the prehistoric occupation. The historic occupation was generally light within the A&HC portion of the site, although it included one locus characterized as a late nineteenth or early twentieth century field dump.

Next Steps: The site will be recorded on CRS forms by HRI. Based on the materials from the A&HC portion of the site, this site has little potential to yield additional information about the prehistoric or historic occupation. However, this is one of a series of sites representing almost continuous prehistoric occupation along Drawyer Creek and its tributaries, where lithic source materials were accessible both in the streams and on the adjacent uplands. It is therefore recommended that Phase II testing be conducted on select sites in this group to better understand the range of activities and periods of occupation they represented. Additionally, information

Table 24
Cultural Resources and Recommendations

Cultural Resource	Survey Segment	CRS Number	Site Number	Site Occupation	Recommendations	Comments
Spring Mill Branch	3/4	N14528	7NC-F-148	P	Not Eligible	Site extended in HRI survey
Reedy Is Cart Road 4	6	N14533	7NC-F-153	H, P	Phase II Survey	Site extended in HRI survey
Churchtown 2	6	N14534	7NC-F-154	P	Phase II Survey	Site extended in HRI survey
Churchtown 4	7	N14535	7NC-F-155	H	Phase II Survey	Site extended in HRI survey
Churchtown 3	7/8	N14514	7NC-F-136	P	Phase II Survey	
Churchtown 1	8/9	N14515	7NC-F-137	P, H	Phase II Survey	
Bird-Houston Locus A&B	9	N14516	7NC-F-138	H, P	Phase II Survey	
Houston-LeCompt	11	N14517	7NC-F-139	H, P	Phase II Survey	
Hobson/ LeCompt 1	12	N14385	7NC-F-140	H	Not Eligible	
Emerson Locus A&B	13/14	N14518	7NC-F-141	P, H	Phase II Survey	
Mt. Pleasant to Port Penn Railroad	14	N14519	-- --	H	Phase II Survey	Landscape feature, not archaeological site
LeCompt 2	14	N14520	7NC-F-142	H	Not Eligible	
Reed-Elliot	18	N14521	7NC-F-143	H	Not Eligible	
Bowman 2 (Tenancy)	20	N14523	7NC-F-145	H	Phase II Survey	
Bowman 1 (Mrs. Bowman)	21	N14522	7NC-F-144	H	Phase II Survey	
Bowman 3 [& 4]	23/24	N14176	7NC-F-085	P, H	Phase II Survey	
Hyetts Corner Road Tenant	25	N14536	7NC-G-176	H	Not Eligible	Site extended in HRI survey
Elkins Locus A&B	28	N14524	7NC-G-174	H, P	Phase II Survey	
Van Allen	29/30	N14525	7NC-G-175	H, P	Phase II Survey	

from the A&HC survey should be combined with results from the HRI survey to provide a fuller interpretation of the site.

Churchtown 2 Site (N14534, in Segment 6)

This prehistoric site was located on the east side of Drawyer Creek, across from Reedy Island Cart Road 4 (N14533). Additional survey of adjacent areas by HRI showed that the prehistoric occupation extended south along the side of the stream. The only diagnostic artifact from the A&HC portion of the site was a broadspear projectile point, but the site also contained tools representing a variety of activities.

Next Steps: This site will be recorded on CRS forms by HRI. It is one of the sites representing almost continuous prehistoric occupation along Drawyer Creek and its tributaries. Phase II testing should be conducted on some of these sites. Additionally, information from the A&HC survey should be combined with results from the HRI survey.

Churchtown 4 Site (N14535, in Segment 7)

This site was located on a slight rise in a field between Drawyer Creek and Taylor Branch. The site had an early historic occupation, characterized by a relatively low density of artifacts. Survey of adjacent areas by HRI showed that the site included both historic and prehistoric components, extending south to Drawyer Creek.

Next Steps: This site will be recorded on CRS forms by HRI. The historic occupation may be associated with the presence of an early cart road that crossed Drawyer Creek to the west. This is one of three early historic occupations identified on the Bird-Houston Farm, together Churchtown 1 (N14515) and the Bird-Houston Site (N14516). Phase II survey is recommended with to examine the nature of these sites and their relationship to the early owners of the property. The prehistoric occupation forms part of the group of occupations extending along Drawyer Creek and its tributaries, and the above recommendations regarding these sites pertain. Additionally, information from the A&HC survey should be combined with results from the HRI survey.

Churchtown 3 Site (N14514, in Segments 7 and 8)

This prehistoric site was located on the west side of Taylor Branch, across from Churchtown 1 (N14515). The only chronologically diagnostic artifact was a Lamoka style projectile point, but the site also contained tools representing a variety of activities and therefore has the potential to yield additional information about prehistoric occupation of the region.

Next Steps: The site was recorded on CRS forms. This site is one of a group of prehistoric sites extending along Drawyer Creek and its tributaries, and the above recommendations regarding these sites pertain.

Churchtown 1 Site (N14515, in Segments 8 and 9)

This site, which had both prehistoric and early historic occupations, was located on the east side of Taylor Branch, across from Churchtown 3 (N14514). The prehistoric component included a Jacks Reef Pentagonal projectile point, a scraper, and a variety of lithics. It likely has the potential to yield additional information about prehistoric occupation of the region. The site also had an early historic component, likely extending beyond the LOD to the south.

Next Steps: The site has been recorded on CRS forms. The historic occupation may be associated with the presence of an early cart road that crossed Drawyer Creek to the west. This is one of three early historic occupations identified on the Bird-Houston Farm, together with Churchtown 4 (N14535) and the Bird-Houston Site (N14516). Phase II survey is recommended to examine the nature of these sites and their relationship to the early owners of the property. The prehistoric occupation forms part of the Drawyer Creek series of sites, and should be so treated.

Bird-Houston Site, Locus A and B (N14516, in Segment 9)

This site had both historic and prehistoric components. The historic component was characterized by two distinct loci of occupation. Locus A, in the northern part of the site, represented a predominantly nineteenth century occupation, while Locus B, in the southern part, represented a late eighteenth to early nineteenth century occupation. The prehistoric occupation was associated with Locus B. It included a triangular projectile point, as well as two untyped points and other tools. The site has the potential to yield information relating to both the historic and prehistoric occupation of the region.

Next Steps: The site has been recorded on CRS forms. The late historic component (Locus A) represents a secondary residence on the "Home Farm" of Thomas Houston, and has the potential to provide material for comparison with the excavation of principal residences at nineteenth century farmsteads, which have been well studied in the past. The early historic component is one of three early historic occupations identified on the Bird-Houston Farm, together with Churchtown 4 (N14535) and Churchtown 1 (N14515). Phase II survey is recommended to examine the nature of these sites and their relationship to the early owners of the property. The prehistoric occupation forms part of the Drawyer Creek series of sites, and should be so treated.

Houston-LeCompt Site (N14517, in Segment 11)

This is a large site situated on a low rise on the south side of the historic road from Bohemia Manor to Reedy Island. It had historic occupations dating from the late eighteenth to the twentieth century. Shovel testing confirmed the presence of two features on the site, which was also characterized by a very high frequency of artifacts. Documentary information indicated that it was occupied by the owner, James Houston, in the first half of the nineteenth century and that the site was likely established by the Houston family, who were one of the principal land owner families in this region in the nineteenth century. The site also contained a small prehistoric component, which included two chronologically diagnostic projectile points.

Next Steps: The site has been recorded on CRS forms. The boundaries of the historic occupation at the Houston-LeCompt Site likely extended beyond the LOD to the east and south. To the south, the site extended to the edge of Survey Segment 10, which had been eliminated from the Phase Ib survey. It is therefore recommended that additional Phase Ib survey be conducted in the northern part of Segment 10 to define the southern limits of the site. It has been proposed that additional LOD be added to the project on the west side of the Houston-LeCompt Site, for construction of an emergency access ramp. This area should also be surveyed to define the limits of the site, and if necessary, be included in subsequent work.

This site has a rich artifact assemblage and the documented presence of cultural features, indicating that it has the potential to yield information about the historic occupation of the region. Phase II survey is recommended to evaluate the historic component. Phase II survey

would also provide the opportunity to evaluate the extent of the prehistoric component and the degree to which it has been impacted by the historic occupation.

Hobson/LeCompt 1 Site (N14385, in Segment 12)

This historic site was identified on the north side of the public road, across from the Houston-LeCompt Site (N14517). It was characterized by a light historic occupation. The low frequency and limited range of artifacts suggest that the site does not have the potential to yield significant information.

Next Steps: The site has been recorded on CRS forms. The site is recommended not eligible for listing in the National Register of Historic Places and no further archaeological survey is recommended.

Emerson Site, Locus A and B (N14518, in Segments 13 and 14)

This site had both historic and prehistoric components. It was located above the headwaters of Scott Run, in an area where cobbles available on the surface may have provided a source for prehistoric lithic raw material. The prehistoric occupation was characterized by two loci of activity. Locus A was an area of high prehistoric artifact density, centered on a small knoll to the north. Locus B was a wider area of lower artifact density extending to the south. The assemblage was also notable for the relatively high proportion of jasper among the lithics. This occupation included several chronologically diagnostic projectile points, as well as other tools and lithics, indicating that the site has the potential to yield information about the prehistoric occupation of the region.

Locus B was also associated with a historic occupation, which likely extended beyond the LOD to the west. This would have been associated with LeCompt Area 2, a secondary residence or tenant farm on the property in the second half of the nineteenth century.

Next Steps: The site has been recorded on CRS forms. Phase II survey is recommended for the prehistoric component, which has the potential to yield significant information. In addition, Phase II survey would also provide an opportunity to evaluate the historic component of the site.

Mt. Pleasant to Port Penn Railroad (N14519, in Segment 14)

This resource was identified as a historic landscape feature, the grade of a railroad line dating to the World War I period. The railroad extended far beyond the LOD to the east and west. The rails and ties were removed and portions of the railroad grade have been lost to plowing or development. The grade is better preserved in the wooded portion of the project area.

Next Steps: This historic resource has been recorded on CRS forms. Phase II survey is recommended, consisting primarily of additional background research, to document the construction, function, and span of operation of the railroad. The site is recommended not eligible, since it does not retain historic function or integrity.

LeCompt 2 Site (N14520, in Segment 14)

This historic site was identified from a small scatter of artifacts located in the back corner of a large property associated with the LeCompt home farm. It may have been the location of a field dump or isolated outbuilding, rather than a secondary residence. The site contained a low

frequency and limited range of artifacts, indicating that it had little potential to yield additional information.

Next Steps: The site has been recorded on CRS forms. It is recommended not eligible for the National Register and no further archaeological survey is recommended.

Reed-Elliott Site (N14521, in Segment 18)

This historic farmstead site was located above the headwaters of Ivy Run. It was occupied during the nineteenth and much of the twentieth century, until it was demolished in the 1970s. Although it was the principal residence on the property, documentary research indicated that the site was occupied by renters or tenant farmers throughout much of its history, not by the owners. As such, it is a common example of a nineteenth century farmstead, a type of site that has been well documented through past excavations.

Next Steps: The site has been recorded on CRS forms. Further excavation at this site is considered unlikely to yield significant new information relating to this type of site, especially since the tenant occupants have not been identified. The site is therefore recommended not eligible, and no further archaeological survey is recommended.

Bowman 2 or Bowman Tenant Site (N14523, in Segment 20)

This small historic site stood out from the sample of sites as distinctive in several ways. In the field, it was marked by a very high density of artifacts distributed over a compact area. Artifacts indicated that the occupation dated from the late eighteenth through the mid-nineteenth century. Documentary research showed that the property was occupied by the owner at that time, but that this site was a secondary residence, not the principal residence on the property. Research also documented the presence of both enslaved persons and free African Americans on the property in the early nineteenth century. Additional background research may provide further documentation, and assist in the identification of who was living in the secondary residence when the owner, and later a tenant farmer, was living in the principal residence.

Next Steps: The site has been recorded on CRS forms. Phase II survey is recommended, to evaluate the potential of this site to provide information about the occupation of a secondary residence on a historic farm property. This site also offers the opportunity to evaluate multiple site types on the same property as a group, through comparison with the Bowman 1 and Bowman 3 Sites (N14522 and N14176). Additional background research may help to clarify when the earlier principal residence and secondary residence on the property were each replaced by a later residence that served the same function within the hierarchy of sites on the property.

Bowman 1 or Mrs. Bowman Site (N14522, in Segment 21)

This site was identified as a historic farmstead, set back from Hyetts Corner Road on a driveway. The site dated from the mid-nineteenth century through the twentieth century and represented the principal residence on the property during that period. Features encountered in shovel testing and the high frequency and variety of artifacts suggest that the site has the potential to yield additional information. Documentary research showed that it was built to replace an earlier principal residence on the opposite side of the road, which had been set back on an allée and surrounded by secondary structures (located outside the LOD). The Bowman 1 Site, like the Reed-Elliott Site, was a common example of well-documented nineteenth century farmsteads.

Next Steps: The site has been recorded on CRS forms. Phase II survey is recommended to evaluate the site, both individually and in comparison with the other historic sites that made up the property, the Bowman 2 and Bowman 3 Sites (N14176 and N14523).

Bowman 3 Site (N14176, in Segments 23 and 24)

This site was determined to coincide with a previously recorded historic site. The latter had been identified from a light scatter of historic materials found in the Ap horizon on the floodplain. In the current survey, the site included both historic and prehistoric occupations. The historic occupation was focused on a slopes above Scott Run and dated to the eighteenth century, suggesting that it could be the earliest occupation on what became the Bowman Farm. The prehistoric component included occupations on both the slope and the adjacent stream terrace. On the terrace, prehistoric artifacts were recovered from both the Contact Period A_{pb} horizon and an overlying Ap horizon formed in slope wash, suggesting the re-deposition of materials from the occupation on the slope. In addition to two chronologically diagnostic artifacts, a projectile point and a ceramic sherd, the prehistoric component included a wide range of artifact types.

Next Steps: The site has been recorded on CRS forms. Phase II survey is recommended to evaluate both the historic and prehistoric components. The historic component has the potential to provide information on the early occupation. In addition, it provides an opportunity for comparison among contemporaneous or subsequent occupations on the Bowman Farm, including the Bowman 1 and Bowman 2 Sites (N14522 and N14523). The prehistoric component does not appear to contain stratified deposits, but has the potential to yield information on multiple periods of occupation.

Hyetts Corner Road Tenant Site (N14536, in Segment 25)

This site was identified during survey of adjacent areas by HRI, and was defined to include a low-density area that had been surveyed by A&HC. It was a historic site located on the east side of Scott Run. The portion of the site within the A&HC LOD included a limited range of historic and prehistoric occupations, suggesting that the portion of the site has limited potential to yield additional information.

Next Steps: The site will be recorded on CRS forms by HRI. Based on materials from the portion of the site surveyed by A&HC, it is recommended not eligible for the National Register and no further archaeological survey is recommended. However, information from the A&HC survey should be combined with results from the HRI survey to provide a fuller interpretation of the site.

Elkins Site, Locus A and B (N14524, in Segment 28)

This site included an early historic occupation and a minor prehistoric occupation. It was located on a small drainage, a tributary of Scott Run. The historic component was characterized by two distinct loci. Locus A, located on a bench or slight rise northeast of the drainage, was marked by a high density of early historic artifacts. This was associated with traces of a foundation filled with building debris, suggesting deposits that had been sealed when the site was abandoned. Locus B, covering a rise between two arms of the small drainage, was characterized by a lower density of artifacts, possibly represents an outlying portion of the site, and a low density of prehistoric artifacts. This site represents an early occupation of the property. It predated the nineteenth century farmstead that existed to the east (Mondamon Tenant House, N05246), and

likely predated the site identified to the northeast on the same property, the Van Allen Site (N14525).

Next Steps: The site has been recorded on CRS forms. Phase II survey is recommended to evaluate this early historic occupation, both individually and in comparison with the other historic site on this property, the Van Allen Site (N14525). It could also provide comparison with the sequence of early and later occupations on other farmsteads in the region, such as the sites that make up the Bowman Farm.

Van Allen Site (N14525, in Segments 29 and 30)

This site had both a historic component and a small prehistoric component. It was located on a slope south of a small drainageway. The historic occupation was characterized by a low to moderate density of artifacts from the eighteenth to the twentieth century. The frequency of artifacts was low compared to mid- or late-nineteenth century residential sites, suggesting that this may have been a location of outbuildings, refuse disposal, or other non-residential activity. The prehistoric component was characterized by a diagnostic projectile point, a tool, and limited debitage found in a small area.

Next Steps: The site has been recorded on CRS forms. Phase II survey is recommended to further evaluate this site. Additional survey may help to characterize the nature of this site, which was not similar to other nineteenth century farmstead sites. It would also provide the opportunity for comparison with the Elkins Site (N14524) an earlier occupation on the same property.

5.2 Evaluation of the Phase Ib Survey

The Phase Ib field survey was conducted without any significant problems. Unusually severe winter weather and areas of poor drainage caused the delay of some of the fieldwork until the following spring, but there were no cases of denied access. The predictive model that was used to structure the field survey and the field methods that were instituted are evaluated below.

Evaluation of the Predictive Model

Prehistoric Probability Zones: The predictive model utilized during Phase Ib archaeological survey to delineate probability zones for prehistoric sites was based on the model developed by ADM for a large study area that encompassed a variety of design alternatives for the US Route 301 Project Development (Baublitz et al. 2006). Based on previous research and expectations regarding the settlement preferences of prehistoric peoples, ADM selected six variables as likely predictors of site occurrence probability, including distance to streams, distance to springs, distance to confluences, distance to swamps/wetlands, percent slope, and soil permeability. Using Geographic Information Systems technology, they then analyzed the distribution of previously recorded sites within the study area to identify clustering in the data vis-à-vis the variables of interest. Initially, they used statistical goodness of fit measures to identify natural breaks in the data, to be used as the variable values distinguishing high, moderate, and low probability zones. After fine tuning the goodness of fit analysis, they then applied Kvamme's Gain statistic to evaluate the efficiency of the model. The model derived used cost distance to water sources as the key variable in predicting prehistoric archaeological sensitivity, with different types of water sources weighted somewhat differently in terms of the strength of their contribution to the prediction. Final refinements were made by adding microdrainage divides as

additional high/moderate probability locations, and previously disturbed areas as having no probability for intact prehistoric sites. Based on the model, ADM produced a map delineating the distributions of high, moderate, low, and nil probability zones throughout their overall project area.

During its previous Phase Ia archaeological survey (Hay et al. 2009), A&HC made several minor alterations to the prehistoric probability zonation developed and mapped for Section 1 by ADM. Areas where surface inspection revealed concentrations of cobbles (APE Segments 6 and 14) were designated as prehistoric high probability zones because they could conceivably have served as sources of lithic raw material for prehistoric peoples. In addition, A&HC identified one microdrainage divide within the APE that had characteristics favorable for prehistoric settlement (APE Segment 28). A&HC designated this area having a high prehistoric probability also. Finally, ADM’s prehistoric high probability zones associated with several small 1st order drainages pinched out just downstream from the APE boundary (APE Segments 3, 8, and 28). A&HC extended these areas upstream along the drainageways where they crossed the APE.

To evaluate the success of the resulting predictive model, the distribution of prehistoric site components discovered during Phase Ib survey was examined (Table 25). The results indicated that eight of the 12 (67%) prehistoric components found were situated in zones attributed a high probability for prehistoric resources, or extended from high probability zones into adjacent moderate probability zones. In contrast, only one (8%) component was found in a moderate probability zone, one (8%) extended from a moderate probability zone into the adjacent low probability zone, and two (17%) were in low probability zones. Conversely, all six survey segments (100%) classified as having a high probability for prehistoric sites produced prehistoric components, including those added by A&HC. In contrast, only four of 12 segments (33%) attributed a moderate probability for prehistoric sites produced prehistoric components, and three of 15 (20%) low probability segments produced prehistoric components.

Table 25. Prehistoric Components by Probability Zone

Zone	Number of Components
High	4
High/Moderate	4
Moderate	1
Moderate/Low	1
Low	2

In general, these results indicated that the prehistoric predictive model was accurate. However, the fact that four of the eight components found in high probability zones extended into the adjacent moderate probability zones suggested that the high probability zones might have been too narrowly delineated. Baubitz et al. (2006) do not provide numerical “cut off” values for the cost distance to water variable they used to determine the width of high, moderate, and low probability zones, nor the mathematical formula used to calculate this variable. Therefore it is not possible here to recommend a specific numerical adjustment to their model to expand the width of prehistoric high probability zones. Along the US 301 Section 1 alignment, however,

prehistoric high probability zones adjacent to small 1st order tributaries were approximately 30 m wide, or 15 m on either side of the stream, while at Scott Run the high probability zone was approximately 60 m wide, or 30 m on either side of the stream. In both settings precontact sites extended beyond the narrow high probability zone into the adjacent moderate probability zone. For future studies, perhaps a cost distance to water value might be used that would increase the width of high probably zones to approximately 100 m on both sides of streams.

The presence of four prehistoric components in low and medium probability zones might be at least in part attributable to changes in the distribution of surface water during historic times caused by artificial drainage.

Historic Predictive Model: In ADM's predictive model, probability designations for historic archaeological resources were based on locations of extant historic buildings, historic maps, and background research. High probability areas were delineated at the locations of extant historic buildings and at the locations of non-extant buildings shown on historic maps, while moderate probability areas were drawn to encompass zones that extended 500 feet from early historic roads as shown on Faden's 1778 map of Delaware. All other areas were assigned a low probability for historic archaeological sites.

A&HC again made several modifications to ADM's historic predictive model. First, there were no extant historic structures within the APE for Phase Ib survey in US 301 Section 1. Second, because correlations between historic and current maps can be inaccurate, A&HC felt it prudent to expand the size of the historic high probability areas based on non-extant structure locations from ADM's 140' radius to a 500' radius, the center of which was the location of the structure in question. Third, ADM's historic high probability areas for non-extant structure locations appear to have been generated at least in part by separate correlations of historic maps, resulting in multiple nearby high probability locals for what was probably the same non-extant structure, or sequential structures in the same or nearly the same location. A&HC corrected for this by correlating historic maps collectively, assuming that a structure shown on one map was probably part of the same residential locus as one at "more or less" the same location on others. This location was used as the center of the 500' radius of the high probability area. In this way, A&HC delineated six historic high probability zones that encompassed what appeared to be the locations of six former structures, located within or near the US 301 Section 1 LOD.

None of ADM's moderate probability zones for historic resources were within the US 301 Section 1 LOD, except along SR 1/US 13 at the northeastern terminus of the project. There, the moderate probability zone fell entirely within the area of previous highway disturbance. This outcome was due to the fact that no roads on Faden's 1778 map cross or abut the US 301 Section 1 LOD except for the predecessor of SR1/US13. However, three historic roads that are not shown on Faden's 1778 map do cross the LOD, and predecessors of at least two of them, Boyds Corner Road and Hyetts Corner Road, were built by 1820, and could be substantially older than that. A&HC concluded that like the roads shown on Faden's 1778 map, Hyetts Corner Road and Boyds Corner Road had the potential to be old enough to be predictors of early historic sites and thus to justify delineating moderate probability zones for early historic archaeological resources based on their locations. As per ADM's model, A&HC delineated these moderate probability zones as extending 500' to either side of each road.

Archival research led to the delineation of one other area of moderate probability for historic resources within the project's APE. Deeds indicated that the Bird/Houston Farm once contained

a dwelling, but no structure representing that dwelling was extant or could be found on historic maps. As a consequence, the entirety of the APE within the limits of what had once been this farm was assigned a moderate probability for historic resources.

Table 26 exhibits the distribution of historic site components discovered during Phase Ib survey by historic probability zone. Of the 15 historic components found during Phase Ib survey, six (40%) were found in historic high probability zones and one (7%) extended from a high probability zone into an adjacent low probability zone. Three historic components (20%) were in moderate probability zones, while five (33 %) were in low probability zones.

Table 26. Historic Components by Probability Zone

Zone	Number of Components
High	6
High/Moderate	0
High/Low	3
Moderate	0
Moderate/Low	5
Low	1

These results suggested that the historic high probability model was a relatively poor predictor of historic site location, since more components were found in moderate and low probability zones than in high probability zones, and more components were found in low probability zones than in moderate probability zones. This patterning indicated that historic maps and the locations of historic roads can be relatively poor predictors of historic site locations, at least in regions such as Delaware where initial European settlement significantly predates the earliest maps that depict individual structure locations. However, it is notable that of the six historic components found in historic high probability zones, five were associated with the locations of non-extant structures shown on historic maps, and four of these were large, high artifact density sites. In contrast, the ten historic components that were not associated with historic map locations were generally smaller and all exhibited substantially lower artifact densities than the four large high density sites associated with mapped structures. Additionally, many had earlier artifact assemblages. This suggested that the historic components not associated with mapped structures represent a combination of early settlements that were abandoned prior to the mid 19th century and buildings/structures that were not primary residences, such as servants' or slaves' quarters.

It is also notable that of the ten historic components that were not at the locations of structures on historic maps, seven (70%) were in high, high/moderate, and moderate probability zones for *prehistoric* sites, while only 3 (30%) were in moderate/low and low probability zones for *prehistoric* sites. This could indicate that distance to water may be a better predictor of the locations of these types of historic sites than historic maps or distance to historic roads, although the data suggest that any such correlation, if it exists, is relatively weak.

Evaluation of Survey Methods

Pedestrian Surface Survey and Shovel Test Excavation: It is well recognized that pedestrian surface survey (PSS) is a far less labor intensive survey procedure than systematic shovel testing, regardless of shovel test size and interval. It is also the case that PSS is a far more effective site discovery strategy, due to the much larger volume of earth that is examined. Although the surface that is examined during PSS appears to the observer as a two dimensional plane, it was actually created by compaction through rain washing of a thin three dimensional volume perhaps 10 cm thick with the length and width dimensions of the field being surveyed. The volume of this compacted zone is orders of magnitude larger than that examined during even the most intensive shovel testing procedure, and as a result much larger numbers of artifacts are found and more sites, especially small low density ones, are discovered.

During field survey of the US 301 Section 1, PSS was the predominate technique used, and produced a large number of sites and artifacts. In contrast, shovel testing wooded portions of the APE resulted in discovery of no sites that were not discovered in adjacent areas of PSS. And as would be expected, sites that were covered partially by PSS and partially by shovel testing produced far more artifacts from the former areas than the latter ones.

Field personnel felt that field walking at arms length provided complete or nearly complete coverage of the ground surface, and was therefore the appropriate transect interval for PSS. The benefits of two passes of survey vs. one were less clear. Field personnel reported that second pass survey generally resulted in the recovery of few additional artifacts except at large high density sites like Houston-LeCompt. Furthermore, all of the sites recognized as such during field survey were found during the first pass, and none during second pass. Of the very low density sites defined as such after field survey during data analysis, two were in areas of two pass survey and three were in areas of one pass survey. Collectively, these results would suggest that one pass survey was nearly or perhaps even equally effective as two pass survey for finding sites and recovering artifact samples.

Shovel tests excavated at discovered sites provided valuable information on site context, generally confirming the presence of simple Ap/B soil profiles at the tested areas and in some cases, such as at Houston-LeCompt and Emerson Locus A, discovered features and/or more complex stratigraphy.

Geomorphology and Test Unit Excavation: Systematic geomorphological survey performed in advance of Phase Ib survey provided important guidance on the distribution of alluvial soils with the potential to contain buried archaeological resources. In such locations, A&HC excavated 1 m x 1 m test units at 30 m intervals as the principal Phase I survey strategy. In the event, this strategy was used only in Segment 24 on the terrace along the west bank of Scott Run and in Segment 28 in the vicinity of a 1st order tributary of Scott Run. In Segment 28, the test units did not identify a site. However, in Segment 24, the test units identified the prehistoric component of Bowman 3 in an Ap soil horizon below historic alluvium. Although labor intensive, geomorphological survey coupled with systematic test unit excavation thus proved effective in identifying an archaeological resource which would not have been found using shovel testing or PSS.

Point Proveniencing: Using GPS to record the provenience of each artifact found during PSS was labor intensive, especially at large high artifact density sites such as Houston-LeCompt.

However, the data so generated facilitated data analysis in several ways. First, the mapped artifact distributions could be used to define low density sites that were not recognized as such in the field, and to revise the boundaries of those that were. Within Section 1, four low density sites were defined using the mapped artifact distributions that would have otherwise remained undetected, and the boundaries of all sites were evaluated during the review process and revised as deemed appropriate. Second, the mapped data provided insights concerning variability in artifact distributions within identified sites. At large high artifact density sites, site core areas were clearly distinguishable from low density site peripheries, and the distribution of early historic artifacts could be compared with that of later artifacts. At sites having both prehistoric and historic components, the locations of the two components could be distinguished from one another. The resulting information on internal site structure informed the design of Phase II survey at potentially significant sites.

These various advantages would not have been realized with more traditional PSS techniques. If, for example, artifacts had been collected and provenienced within each site by grid square, the intrasite distributional analyses would have been less precise, site boundaries could not have been expanded beyond the limits of the grids, and the low density sites that were not recognized as such in the field would not have been identified in the subsequent analysis.