Chapter 3

FIELDWORK NARRATIVE AND ARTIFACT ANALYSIS

A. FIELDWORK NARRATIVE

1. Remote Sensing Surveys

a. Underwater Archaeological Investigations

Phase I underwater archaeological investigations were conducted by Dolan Research, Inc. and consisted of side-scan sonar and magnetometer surveys within a 500-foot-wide corridor centered on the ferry route (Appendix C). The goal was to locate and identify potentially significant remote sensing targets within the survey corridor that produced signatures suggestive of submerged cultural resources.

Sonar and magnetic survey operations were conducted individually from a 22-foot aluminum vessel. Survey lanes were set up on 50-foot centers, parallel with the path of the ferry and perpendicular to the flow of the river. A laptop PC-based software package used in conjunction with a Differential Global Positioning System (DGPS) on board the survey vessel provided positioning accuracy for the survey area of +/- 3 feet. While surveying, vessel positions were continuously updated on the computer monitor to assist the vessel operator, and the processed data were continuously logged on computer disk for post-processing and plotting.

Sonar data were gathered with a two-channel digital side-scan sonar unit with a 600kHz side-scan sensor. The sonar sensor was towed off the bow of the survey boat and was operated alternately at two different ranges (164 feet and 66 feet in either channel) in an effort to collect the most detailed acoustic data. Data acquisition software was used to merge the acoustic data with real-time positioning data.

Magnetic data were collected with a cesium marine magnetometer, capable of +/- 1/10 gamma resolution. The magnetometer sensor was mounted on the bow of the survey vessel to allow access into the shallow waters along the southern shoreline of the Nanticoke River. The magnetometer collected data on the ambient magnetic field strength by measuring the variation in cesium electron energy states. As the sensor passed over objects containing ferrous metal, a fluctuation in the earth's magnetic field was recorded. The fluctuation was measured in gammas and is proportional to the amount of ferrous metal contained in the sensed object.

Raw sonar records were inspected for potential man-made features and obstructions present on the bottom surface. Individual acoustic data files were initially examined using acoustic data review software to identify any unnatural or man-made features in the records. Raw sonar data files were then edited to remove the water column from the records and the processed sonar files were compiled into a geo-referenced sonar mosaic. The mosaic was then overlaid onto background plans of the ferry crossing.

Magnetic survey data were edited so that the resulting data represent only the localized changes in the magnetic background created by ferrous objects (i.e., anomalies) or geological features. When graphically represented by contouring, only the intensity of variation is represented.

Magnetic records were correlated with the acoustic targets to provide any further information on the identity of the material generating the remote sensing signatures. As expected, there was larger scale mag-

netic disturbance around both of the berthing docks – particularly the north dock where the ferryboat was berthed at the time the surveys were conducted.

Although preliminary inspection of the remote sensing records reveals no potentially significant remote sensing targets, a program of manual underwater testing by archaeologists equipped with SCUBA equipment may be advisable to detect and identify inundated/ submerged cultural features along the shorelines that were not detectable with remote sensing equipment.

b. Onshore Remote Sensing Investigation

Geo-Graf, Inc. conducted a non-intrusive subsurface investigation, using ground-penetrating radar, electromagnetic and magnetic instruments, at both the north and south ferry landings on August 2, 2007 (Appendix D). The goal was to locate and delineate subsurface anomalies that may be associated with ferry operations from the 18th century to the present.

The survey areas consisted of accessible portions of a 3,500 square foot area at the south landing and a 5,500-square foot area at the north landing. Initially both areas were investigated using electromagnetic and magnetic instruments to locate subsurface metallic anomalies. A reference grid was then laid out at five-foot intervals, and ground-penetrating radar data were collected from traverses run in both east-west and north-south directions at five-foot intervals. The results of the surveys were presented in the form of a report that included two "surface anomaly maps," one for each survey area.

Geo-Graf, Inc. estimates that at this location the maximum depth achieved by the radar signal would be approximately five feet below grade. Features below this depth would not be detected.

At the south landing, one electromagnetic and two magnetic subsurface anomalies were detected. Ground-penetrating radar data from these locations indicate that the electromagnetic anomaly is from reinforcing bars within a concrete curb, and the magnetic anomaly along the east side of the landing is a buried metallic target such as a construction feature, utility or isolated metallic debris. The ground-penetrating radar survey indicated anomalous subsoil layers about ten feet wide in the center of the existing road from the ramp to the landing gate. Geo-Graf, Inc. suspects this is associated with a former roadbed to the landing. The top of the anomalous layer is approximately one to two feet below the ground surface. Additionally two 20-foot-long areas of disturbed subsoil were identified on both sides of the road closer to the landing. Geo-Graf, Inc. suspects that these indicate areas of fill, possibly related to the earlier road. Finally, two lines detected about five to ten feet from the road are interpreted as earlier bulkheads or shoreline.

At the north landing an anomalous subsoil layer was detected that was ten feet wide and centered on the existing road to the landing. As at the south landing, this was interpreted as representing an earlier road. Estimated depth to the top of the anomalous layer is one to two feet below the ground surface. Disturbed subsoil delineated in a grassy area northeast of the landing was interpreted as buried debris lying between zero and two feet below grade. Electromagnetic and magnetic anomalies were detected, and ground-penetrating radar data at the location of one of these, near the area interpreted as the earlier road, was indicative of a shallow metallic target. Partial excavation by Hunter Research personnel revealed this to be a 55-gallon drum. A magnetic anomaly south of the drum was also excavated and found to contain a metal cable, possibly a remnant of the ferry guide system. On the basis of these findings, Geo-Graf, Inc. concluded that the other magnetic anomalies detected are likely associated with construction features or isolated buried metallic debris.

2. Archaeological Fieldwork

Archaeological testing was undertaken within a defined Area of Potential Effect (APE) on both sides of the river and included limited subsurface work using augers and shovels at extreme low tide in the inter-tidal zone (Figures 3.1 and 3.2; Plates 3.1 and 3.2). Testing included excavation with a four-inch-diameter auger to depths of approximately six feet (two meters) in anticipation of finding complex and deeply buried cultural strata. Two 25-square foot excavation units were also completed.

i) Left Bank

Phase I fieldwork was conducted on the southeast side of the Nanticoke River on August 1, 2007. A total of nine shovel tests (numbered 1 through 9) were excavated at ten-foot intervals on a staggered grid within the right-of-way at the end of the causeway adjacent to the ferry slip. The only item of note found in these tests was a timber lying horizontally at the base of Shovel Test 3; this was thought to be a framing timber from the cribbing for the causeway. Shovel Tests 1, 2 and 4 through 8 all contained a variety of fill materials consisting of soil, oyster shell, large rocks, asphalt, concrete, and gravel. Shovel Test 9 was excavated at low tide in one foot of water immediately beyond the end of the rock rip-rap in the Nanticoke River in an effort to characterize the natural stratigraphy (Plate 3.3). Soils from this test encountered 1.5 feet of sandy clay with gravel and bits of freshwater clam shells over a dense clay that extended down to a depth of at least four feet. This soil sequence, typical of a tidal marsh environment, helps to confirm that the deposits observed in Shovel Tests 1 through 8 consist entirely of transported materials. The various materials observed within the fill layers (concrete, asphalt and styrofoam) suggest the causeway was raised and possibly widened during the second half of the 20th century.

ii) Right Bank

Phase I and II level excavations on the northwest side of the Nanticoke River were conducted between August 2 and August 14, 2007. Tests were located on a ten-foot grid within the right-of-way adjacent to the ferry slip. A total of 29 shovel tests were excavated as part of the Phase I investigations (numbered 10 through 35 and three supplementary tests, numbered 12A, 13A and 27A). Phase II investigations involved the digging of two five-foot-square excavation units.

Shovel tests located on the north side of the approach to the ferry clearly demonstrated that the area had been subject to massive filling from the current bulkhead along the Nanticoke River north to Woodland Ferry Road. Shovel tests located closer to the bulkhead (14, 15, 20, 21, 25, 26 and 29) contained three feet or more of broken cinder blocks capped by topsoil. This material was reportedly deposited by a former owner of Cannon Hall who was a contractor and likely had access to such materials to informally expand his waterfront property.

Shovel tests located closer to the road (10-13, 16-19, 22-24, 27, 28, 12A and 27A) exhibited a variety of fill layers with artifacts dating to the second half of the 20th century. These layers are likely soils displaced from the former owner's filling operations in the area and were deposited on the site to build up the land. Under the fill layers a distinct dark gray organic-rich layer was encountered in Shovel Tests 12, 12A, 18, 23, 27 and 27A. These tests all fall within a single cross-transect possibly indicating the former shoreline. The organic layer exhibited artifacts dating from the mid- to late 19th century.

Below the organic layer, between 2.3 and 4.3 feet below the ground surface, red bricks positioned horizontally were encountered in Shovel Tests 12, 27 and 28. Due to the depth at which the bricks were encountered and the size of the shovel tests, a conclusive

Plate 3.1. View looking northwest showing shovel testing in progress on the southeast (left) bank of the Nanticoke River (Photographer: Joshua Butchko, August 2007) [HRI Neg. # 07033/D1:30].

Plate 3.2. View looking northwest showing shovel testing in progress on the northwest (right) bank of the Nanticoke River (Photographer: Joshua Butchko, August 2007) [HRI Neg. # 07033/D1:58].

Plate 3.3. View looking northeast showing Shovel (Auger) Test 9 under excavation in the Nanticoke River (Photographer: Joshua Butchko, August 2007) [HRI Neg. # 07033/D1:36].

interpretation was not possible. Upon completion of Shovel Test 28 David Clarke, DelDOT Archaeologist, arrived at the site and after consultation approved Phase II exploration of the buried horizons.

Before the Phase II excavations could be conducted the remainder of the testing grid was completed. Shovel Tests 30 through 35, located on the south side of the approach, were positioned to avoid a host of underground utilities (water, irrigation and electric). All of the shovel tests in this area were situated close to the edge of the paved approach to the ferry. Shovel Tests 30 and 32 encountered what appears to be a former surface of the approach to the ferry at 1.3 feet below the current ground surface. Shovel Tests 33, 34 and 35 encountered multiple fill layers with late 19th- and 20th-century artifacts. Each of these layers also exhibited a significant amount of oyster shells, suggesting the approach may have had a crushed-shell surface.

Phase II excavations consisted of two five-foot-square excavation units positioned within the shovel test grid to expose a deeply buried horizon and possible brick surface encountered in Shovel Tests 12, 27 and 28.

Excavation Unit 1 was positioned with Shovel Test 27 in its northwest corner and Shovel Test 27A in the northeast corner (Figure 3.3; Plate 3.4). The upper levels (Contexts 1-3 and 10) all seem to be the result of indiscriminate filling episodes by the former owner. Although these soils are the result of secondary deposition, Context 3 yielded a fair number of historic artifacts and a few prehistoric artifacts, including an exterior cord-marked ceramic sherd. Context 4, a sandy, silty loam, corresponding to the buried horizons encountered in the Phase I shovel tests, contained a mix of historic artifacts dating from the mid-19th century through the mid-20th century. As in Context 3, there were a few prehistoric artifacts (debitage and a single ceramic sherd). This deposit is likely the result of tidal action and the deposition of silts and sand over an extended period of time. At the base of Context 4 several scattered red bricks were observed lying flat. None of the bricks exhibited mortar suggesting they were not part of a former structure. They did exhibit wear, suggesting they had been exposed to tidal action or river erosion before being buried by later riverine and fill deposits. The water table was encountered at the base of Context 4. Below this, a sterile sandy subsoil with pockets of clay was observed (Context 5). This unit was excavated to the top of Context 5 at the close of the day's excavations. The following morning the unit contained nearly a foot of water derived from the exposed water table and an underground sprinkler system which had activated in the early hours of the morning. The saturated unit collapsed on two sides. The unit was bailed out and the remaining walls were cleaned, photographed and recorded before they too eventually collapsed.

Excavation Unit 2 was positioned with Shovel Test 18 in the southwest corner and Shovel Test 12A in the southeast corner (Figure 3.4 and Plate 3.5). The upper levels (Contexts 1 through 3) were similar to the upper levels in Excavation Unit 1 and are considered the result of indiscriminate filling episodes by the former owner. Likewise these deposits are disturbed but contain a fair number of historic artifacts dating to the late 19th- and 20th centuries. Below Context 3, again as observed in Excavation Unit 1, there was a sandy, silty loam riverine deposit (Context 4) that contained a mix of historic artifacts dating from the mid-19th through the mid-20th centuries. At the base of Context 4 a large horizontal log (Context 6) was observed lying flat and oriented northeast/southwest, evidently reflecting the position of a former shoreline. The log was adjacent to the base of a tree stump and a cut timber four inches by three inches in cross section. The log, stump and timber may represent the remains of a failed attempt to stabilize the riverbank with an informal bulkhead put together with whatever was locally available, and making use of a tree (now a stump) along the river's edge. Approximately three-

Plate 3.4. Excavation Unit 1: View looking northeast showing northeast profile; scales in feet (Photographer: Joshua Butchko, August 2007)[HRI Neg. # 07033/D2:08].

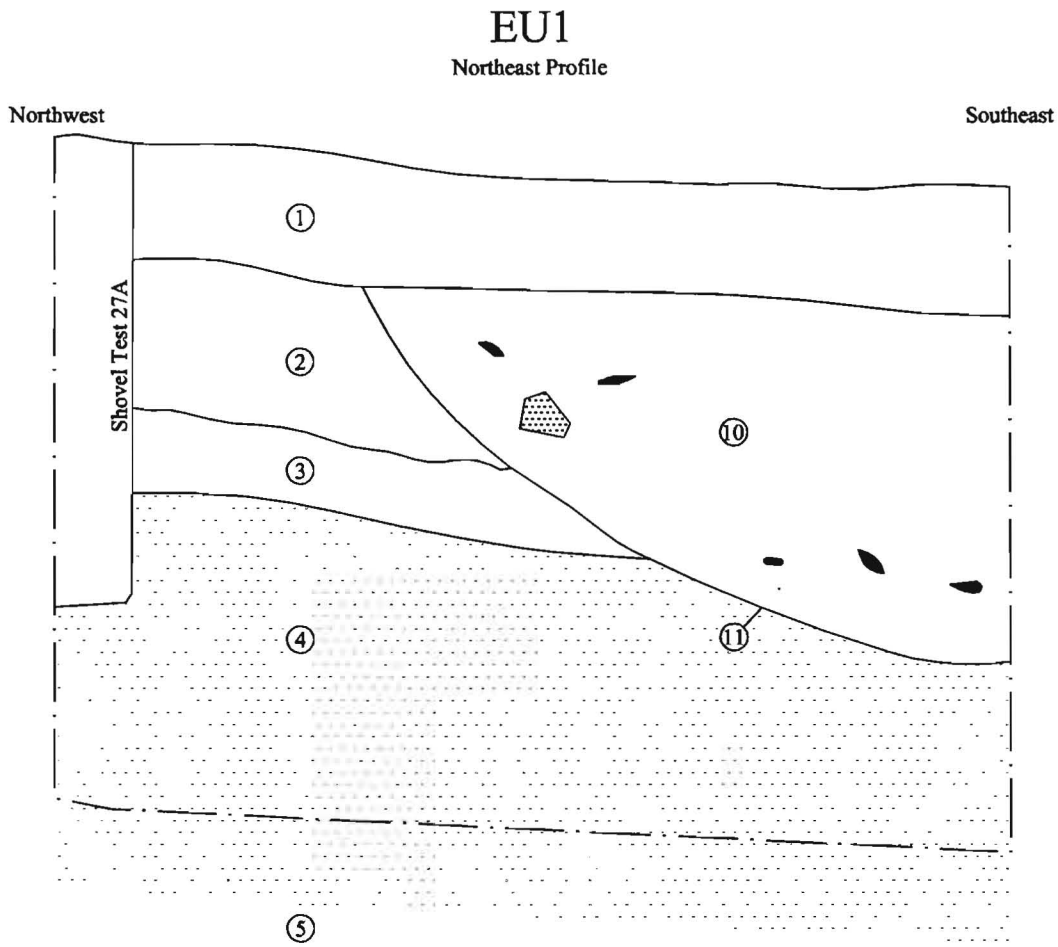
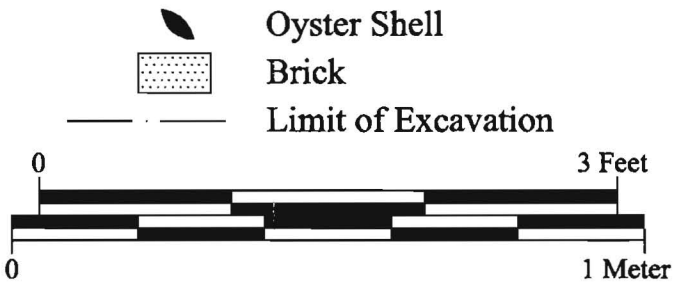
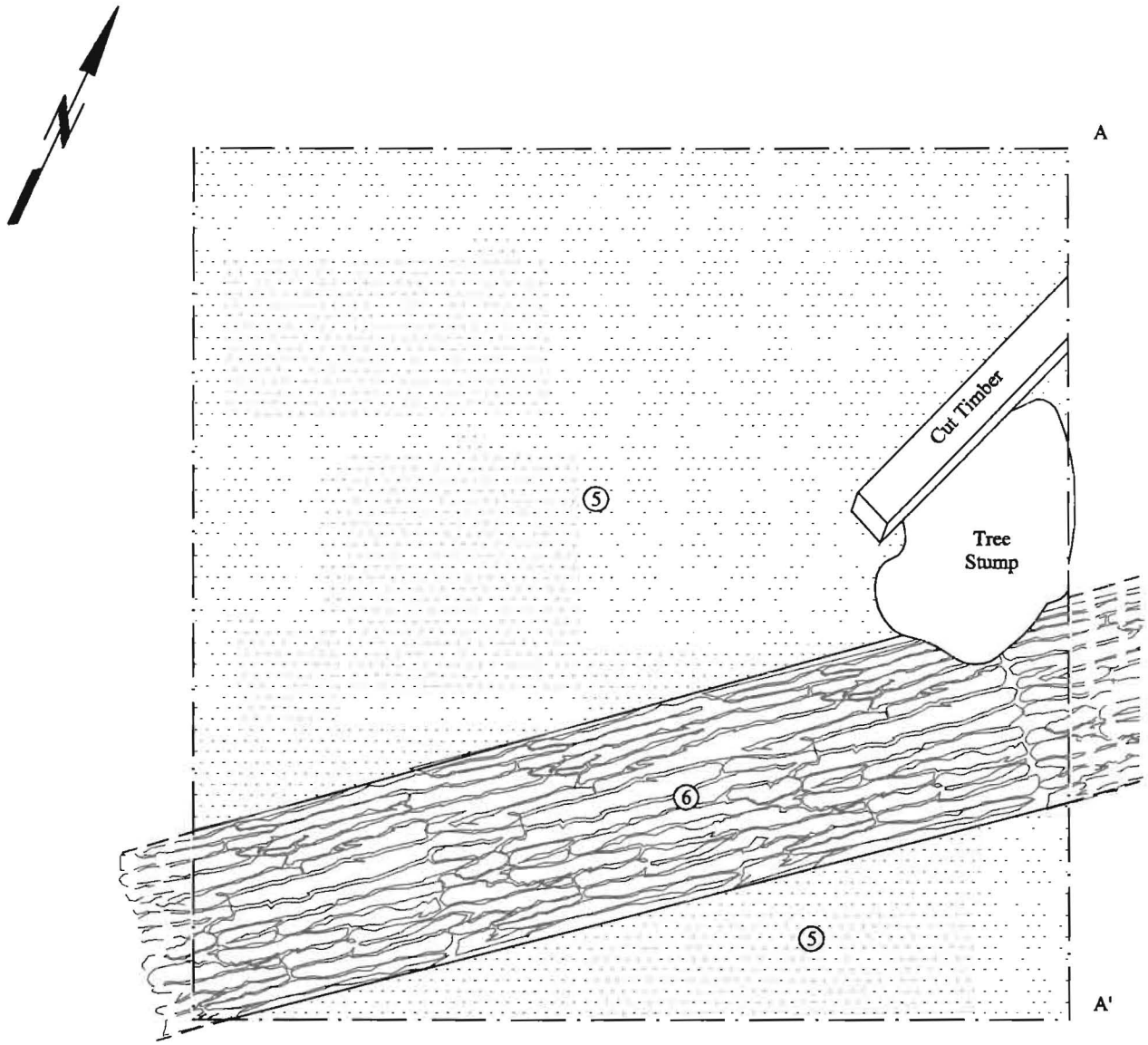


Figure 3.3. Excavation Unit 1, Northeast Profile.

Southeast

Context	Description [Interpretation]	Munsell
1	Sandy loam [fill]	10YR 3/1
2	Sand [20th-century fill]	2.5Y 5/3
3	Medium sand [mid-19th/20th-century fill]	10YR 4/1
4	Sandy silty riverine loam [alluvium]	2.5Y 4/1
5	Wet sand with clay and gravel [subsoil]	2.5Y 5/4
10	Mottled silty sandy loam [fill]	2.5Y 4/1; 2.5Y 5/4
11	Cut for Context 10	--



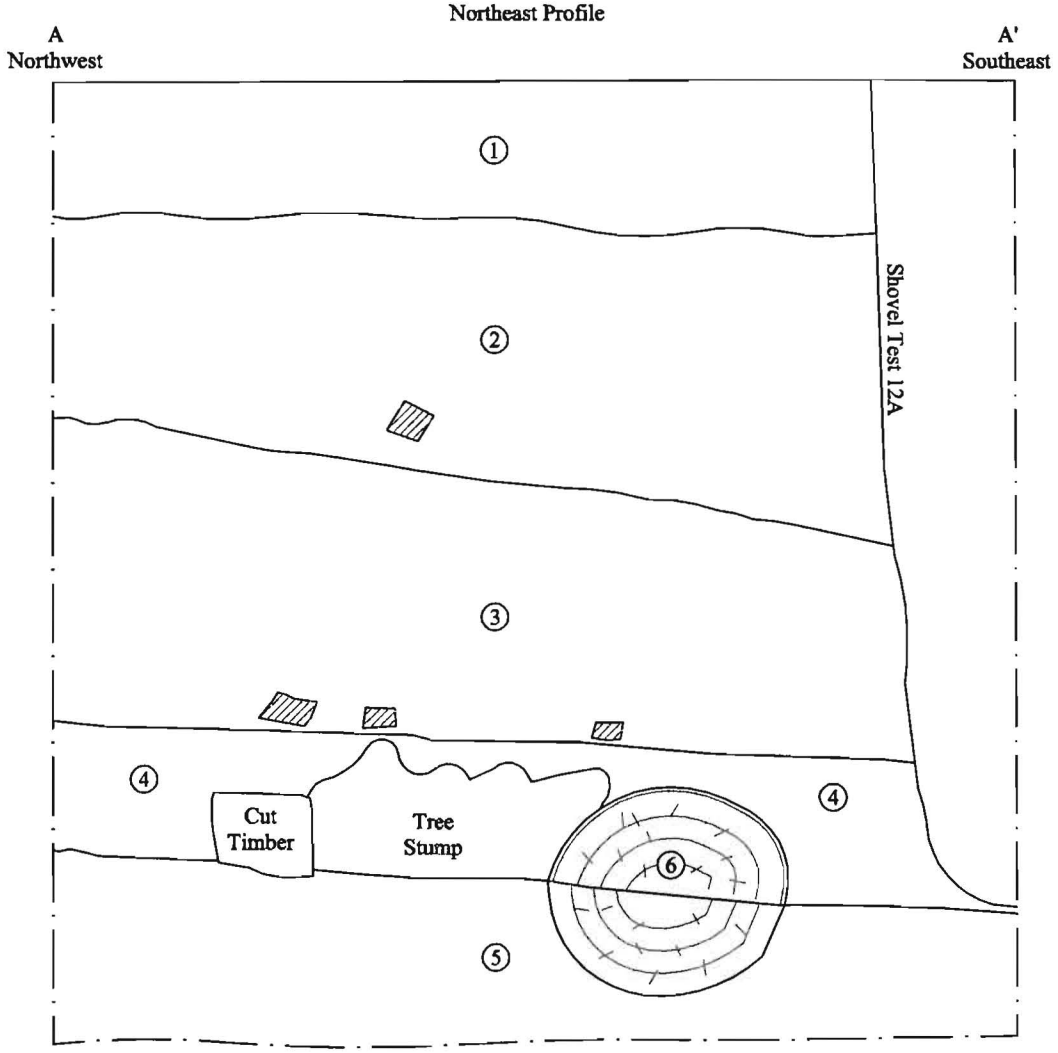


Context	Description [Interpretation]	Munsell
1	Sandy loam [fill]	10YR 3/2
2	Mottled medium sand [20th-century fill]	2.5Y 5/3; 10YR 4/2
3	Medium sand [mid-19th/20th-century fill]	10YR 4/1
4	Sandy silty riverine loam [alluvium]	10YR 2/2
5	Wet clayey sand with gravel [subsoil]	5Y 6/1
6	Log [possible bulkhead cribbing]	--

Figure 3.4. Excavation Unit 2, Plan and Northeast Profile.

EU2

Northeast Profile



Brick

Limit of Excavation

Plate 3.5. Excavation Unit 2: View looking down and northeast showing northeast profile; note log and tree stump in base of unit; scales in feet (Photographer: Joshua Butchko, August 2007) [HRI Neg. # 07033/D3:02].

tenths of a foot above the base of Context 4 the water table was encountered. Below Context 4 the same sterile sandy subsoil with pockets of clay (Context 5) encountered in Excavation Unit 1 was observed and excavated down one foot before the rising water table prohibited any further excavation.

B. ARTIFACT ANALYSIS

The artifacts recovered from the Phase II excavation at the Woodland Ferry site were analyzed in detail. They represent a mix of time periods dating as early as the prehistoric Woodland I period through to the 1960s. The original provenance of the contexts from which the artifacts were recovered is uncertain and may have no relation to the Woodland Ferry site. Some artifacts recovered from the upper fill levels are however worth noting.

The earliest diagnostic artifacts are two prehistoric ceramic sherds (one from Context 3 and one from Context 4) identified locally in southern Delaware as Mockley Ware and as Clagget Ware along the western shores of the Chesapeake Bay (Custer 1989:174). This ceramic type dates to A.D. 110-450 (Custer 1984:88) placing them within the later Woodland I period (3,000 B.C. to A.D. 1000). Although there are only two sherds, the method of manufacture is clearly coil construction, suggesting a conical form. Both sherds exhibit oyster shell tempering: one sherd has been smoothed on both the interior and exterior surfaces, the other sherd exhibits an interior smoothed fabric or cord impressed while the exterior exhibits impressed cord-wrapped paddle surface treatment. Interior surfaces of prehistoric vessels were initially paddled with a textured surface to blend the coils during construction and were then smoothed to facilitate cleaning during use. Like the interior, the exterior surface was blended using a cord-wrapped paddle. Unlike the interior surface, the exterior surface was often not smoothed to provide a textured surface to grip the vessel. Archaeologists refer to this as surface treatment. The surface treatment may have also served as a form of decoration.

Some fragments of lithic tools were also recovered from the fill materials. None of these materials are considered diagnostic to any particular prehistoric time period. The lithic materials (pebble jasper and quartz) are locally available and likely derived from somewhere nearby in southern Delaware or eastern Maryland.

Historic artifacts recovered from the same upper fill contexts are representative of typical household trash indistinguishable from any other domestic historic site in the lower Delaware Valley, consisting of window and vessel glass, ceramics and rusted hardware fasteners. Most of the materials were fragmentary with no cross-mends between broken artifacts re-enforcing the interpretation that the upper levels represent secondary deposits introduced from somewhere off site.

Context 4 represents a layer of domestic debris, silt and sand built up over an extended period of time, *circa* 1830 to 1960. Artifacts from this deposit likely represent household trash discarded by the local inhabitants of Woodland into the Nanticoke River to be washed away with the tides. This form of trash disposal was typical for communities located along tidal waterways (Hunter Research, Inc. 2005). In this case, the swift tidal actions would flush lighter objects away with each in-coming and out-going tide, leaving behind heavier objects. Biodegradable items would be quickly consumed by scavengers.

Artifacts recovered from Context 4 were more numerous than artifacts recovered from upper fill deposits, numbering 373 between Excavation Units 1 and 2 (Table 3.1). A total of 86 historic ceramic sherds were recovered from Context 4. The majority of these wares are the undecorated ironstone granite china and whitewares that were common through-

Table 3.1. Artifacts from Context 4: Local Accumulation.

	Excavation Unit 1 Context 4	Excavation Unit 2 Context 4	Totals	Percent
Historic				
Ceramics	59	27	86	23.06
Agriculture/ Equestrian	1	0	1	0.27
Recreation/Activities	7	0	7	1.88
Tools/Hardware	38	1	39	10.46
Furnishings	5	0	5	1.34
Kitchen	2	0	2	0.54
Clothing-Related	6	15	21	5.63
Glass Vessel Fragments	85	59	144	38.61
Energy	1	0	1	0.27
Building Materials	34	11	45	12.06
Unidentified	1	0	1	0.27
Total	**239**	**113**	**352**	**94.37**
Prehistoric				
Ceramics	2	0	2	0.54
Cobble Based Lithics	1	0	1	0.27
Total	**3**	**0**	**3**	**0.80**
Indeterminate				
Fauna	11	0	11	2.95
Unidentified	0	7	7	1.88
Total	**11**	**7**	**18**	**4.83**
Total	**253**	**120**	**373**	**100.00**

out the 19th and early 20th centuries. Glass vessels from this context include fragments from fruit jars (Mason's 1858 Patent), medicine bottles (Turlington's "Balsam of Life"), perfume bottles (Larkin) and beverage bottles (Pepsi). The only legible maker's mark observed on ceramic vessel sherds, was a partial mark for the Johnson Brothers Company in England who started manufacturing ceramics for export to America in 1840 and continue to produce place settings until 2004 when the operations were moved abroad. A white ball clay pipe stem is impressed "MacDougal" and "Glasgow" (Scotland). Duncan MacDougal & Company exported millions of these pipes, during the second half of the 19th century. The absence of "Scotland" from the maker's mark may reflect manufacture prior to the McKinley Tariff Act of 1891 which would require products imported to the United States to be marked with the country of origin (John Milner Associates, Inc. 2000: 173).

As observed in the Phase I shovel tests and the Phase II excavation units a diffuse layer of red bricks were observed lying flat at the base of Context 4. None of the bricks exhibited mortar suggesting they were not part of a mortared masonry structure. They did exhibit wear, suggesting they had been exposed to tidal action or river erosion before being buried by later riverine and fill deposits. These bricks may reflect an early attempt to stabilize erosion of the river bank.