

PROJECT RESULTS

DelDOT 's proposed improvements to U.S. 301 will create a 28 kilometer (17.5 mi) four-lane toll highway from U.S. 1 in Delaware to the existing four-lane segment of U.S. 301 in Maryland. The Area of Potential Effects (APE) includes the construction of interchanges, relocation of existing roads and off ramps, installation of culverts, and the construction of approximately 14 stormwater management facilities. The Warwick Site was among the 10 archaeological sites identified during the survey, which included two historic, five prehistoric, and three multicomponent sites.

Phase I Survey Results

RGA completed Phase IB identification-level archaeological survey along a 7.2-kilometer (4.5-mi) section of U.S. 301 in Delaware and Maryland. Phase IB archaeological survey included visual inspection of plowed or disked surfaces, the excavation of STPs, and, in some cases, the excavation of test units to investigate the attributes of dense concentrations of artifacts within 24 study areas. The Warwick Site was discovered during shovel testing in Area 21, the proposed location of a stormwater management facility southeast of U.S. 301 in Cecil County, Maryland (Grossman-Bailey 2011).

Twenty-three STPs spaced at 15.2-meter (50-ft) intervals were excavated in Area 21. Recovery of artifacts from one STP resulted in the excavation of 21 radial STPs and one test unit surrounding the positive STP. The recovery of 39 artifacts within a 12-x-21 meter (39.4-x-68.9 ft) area atop a knoll overlooking the headwaters of an unnamed tributary of the Sassafras River area led to the identification of the Warwick Site. Both STPs and the test unit revealed dark topsoil that extended approximately 30 centimeters (11.7 in) below the ground surface above brownish yellow to yellowish brown subsoil. The test unit, designated TU 21-1 during the Phase I work and TU 1 during the Phase III excavation, was located with the northwest corner at Phase II/III grid N2000/E2000 (Figure 7 and Figure 8, p. 26–27).

Artifacts recovered from nine of the STPs and the test unit during the Phase I fieldwork included a jasper Lamoka point, a jasper contracting stem, Teardrop-shaped point, a chert core, a jasper biface, 25 pieces of jasper, chert, quartz, and quartzite debitage, 9 fire-cracked rocks, and a fragment of aqua bottle glass. Prehistoric artifacts unearthed during the excavation of the test unit, all within the upper 40 centimeters (15.6 in) of the profile, occurred in the plowzone and the first two levels in the subsoil. Grossman-Bailey (2010:43) considered site 18CE371 potentially eligible for listing in the NRHP due to the recovery of artifacts from the subsoil and the limited evidence of disturbance; as a consequence, RGA undertook Phase II evaluation of the Warwick Site.

Phase II Testing Results

RGA undertook Phase II evaluation-level excavation at the Warwick Site during the spring of 2011. Twenty-five 1-x-1 meter (3.3-x-3.3 ft) test units were excavated (Grossman-Bailey et al. 2011:4-1; Figure 9, p. 30). In addition, Dr. Raymond Mueller (2011) excavated test pits and examined soil profiles exposed by the Phase II test units to evaluate formation processes. Mueller (2011) identified historic plowing, determined that the soils originally formed as Aeolian silt loess deposited during the Younger Dryas, and identified tree falls and plowing as the major disturbance processes affecting the site. The generally level landform and low-order streams surrounding the site minimized the potential impact of colluvial and alluvial burial or reworking of sediments. Rather, plowing, tree falls, and other sources of bioturbation, as well as the high water table evident in portions of the site, allowed artifacts to migrate downward through the soil profile and mixed artifacts in the upper sediments. In addition, winds perhaps deflated the previously exposed plowzone (Muller 2011:7; Grossman-Bailey et al. 2011:4-16).

Muller (2011:5) described six distinct strata in the west wall of a test unit near the center of the site designated TU 12 during the Phase III excavation (N1998/E2001). An Oe horizon, the organic leaf litter, covered the ground surface. The second stratum, a deflated plowzone (1Ap1), consisted of very dark grayish brown (10YR 3/2) silt loam that extended 5 centimeters (2.0 in) below the ground surface. Many fine to medium roots occurred in the deflated plowzone. A clear, smooth boundary separated the 1Ap1 stratum from a second, roughly 100-year-old plowzone (1AP2), that consisted of dark grayish brown (10YR 4/2) silt loam. Fine to medium roots were common in the 1Ap2 stratum; at 17 centimeters (6.6 in) below the surface, an abrupt smooth boundary marked the transition to the B horizon. The 1B1 soils, described as yellowish brown (10YR 5/4) silt loam, extended to 32 centimeters (12.5 in) below the surface. At approximately that point, the 1B2 horizon appeared via a gradual, smooth boundary. Yellowish brown (10YR 5/6) silty clay loam that reached a depth of 60 centimeters (23.4 in) below the ground surface constituted Stratum 1B2. A clear, smooth boundary separated the 1B2 soil from the lowermost horizon, Stratum 2B. Stratum 2B comprised strong brown (7.5YR 4/6–5/8) soils with many faint medium-sized pinkish gray (7.5YR6/2) and a few distinct, medium-sized yellowish red (5YR 5/8) mottles (Figure 10, p. 31). Artifacts occurred in all but the 2B horizon, though 89 percent, or 42 of 47, occurred within 22 centimeters (8.9 in) of the ground surface (cited in Grossman-Bailey 2011:4-18).

A more typical Phase II soil profile comprised thin very dark grayish to dark olive brown (10YR 3/2) humus and loam (O/Ap1 horizon) above an olive brown (2.5Y 5/3) silt loam plowzone (Ap2 horizon) with a clear, smooth boundary. At approximately 13 centimeters (5.1 in) below the ground surface, light olive brown (2.5Y5/6) silty clay loam subsoil (B1 horizon) appeared. Artifact density dropped with depth the B1 horizon, which occasionally included a mottled light olive brown (2.5Y5/6) clay loam and strong brown (7.5YR 5/8) sandy loam B2 horizon beneath the B1 sediments (Grossman-Bailey et al. 2011:4-16–4-18).

A single, small feature intruded into the B horizon in a test unit located at N1995/E2002, in the southeastern corner of the Phase II excavation; the unit was designated TU 7 during the Phase III fieldwork. Feature 1, an olive brown (2.5Y 4/3) silt loam oval feature that measured approximately 20 by 17 centimeters (7.8 by 6.6 in) in plan, was bisected along the east-west axis. The basin-shaped feature extended 6 centimeters (2.3 in) into the B horizon. No artifacts appeared in the south half of Feature 1, which was screened through 0.32 centimeter (1/8 in) wire mesh. Flotation of the north half, however, resulted in the recovery of four micro-debitage fragments of jasper, quartz, and quartzite, as well as charred wood (Grossman-Bailey et al. 2011:4-18).. No charred nuts or seeds were identified in the flotation sample. Grossman-Bailey et al. (2011:4-18) interpreted the feature as the truncated storage or refuse pit (Figure 11 and Figure 12, p. 31–32).

Excavation of the twenty-five test units and one ambiguous feature unearthed one fragment of charred wood and 395 artifacts, including 382 prehistoric artifacts. Prehistoric diagnostics consisted of six Lamoka points, five of jasper and one of quartz. Five small stemmed and one corner-notched point also were recovered. The points probably date to the Late Archaic and/or Early Woodland periods. Custer (1989:147) considers all poor temporal indicators that potentially range in age from the Late Archaic through as late as the Middle Woodland, his Woodland I Period (Grossman-Bailey 2011:4-26). Four bifaces, both early and late stage, a hammerstone fragment, 67 fire-cracked rocks, one flake tool, and 295 pieces of debitage, most jasper and chert, formed the remainder of the assemblage. Cortex on 21 percent of the assemblage suggested cobble-based tool manufacture. Reddened color, potlids, and glossy surfaces on 33 percent of the assemblage of jasper and chert provided evidence of heat treatment during tool production (Grossman-Bailey 2011:4-26–4-27).

The 382 prehistoric artifacts recovered during the Phase II excavation include four pieces of microdebitage collected from the Feature 1 flotation sample. Phase II records indicate the remaining artifacts occurred primarily in and above the plowzone, where 52 percent of artifacts were unearthed. An additional 47 percent of prehistoric artifacts were recovered from the B1 horizon, and more than half of the sub-plow-zone artifacts appeared in the upper 10 centimeters (3.9 in) of the stratum; the remaining nine artifacts appeared in the B2 sediments, two within the upper 40 centimeters (15.6 in) of the profile in TU 26 (N1997/E2005), where no B1 stratum existed. No artifacts were recovered from the 2B horizon.

The major concentration of artifacts, located in the northeastern portion of the primary excavation block, extended northeast from N1998/E2001 to N2002/E2003 (TU 12 to TU 21 in Figure 9, p. 30). Points and other bifaces occurred throughout the core of the site, but, like artifacts in general, were recovered primarily from the north-central portions of the site, in test units located between N1998 and N2003. FCR appeared at low density across a somewhat broader area than bifacial tools, though most fragments were recovered in the northeastern portion of the site. The artifact analysis and spatial analysis chapters examine the attributes and distributions of artifacts recovered from Phase I, II, and III test units in greater detail.

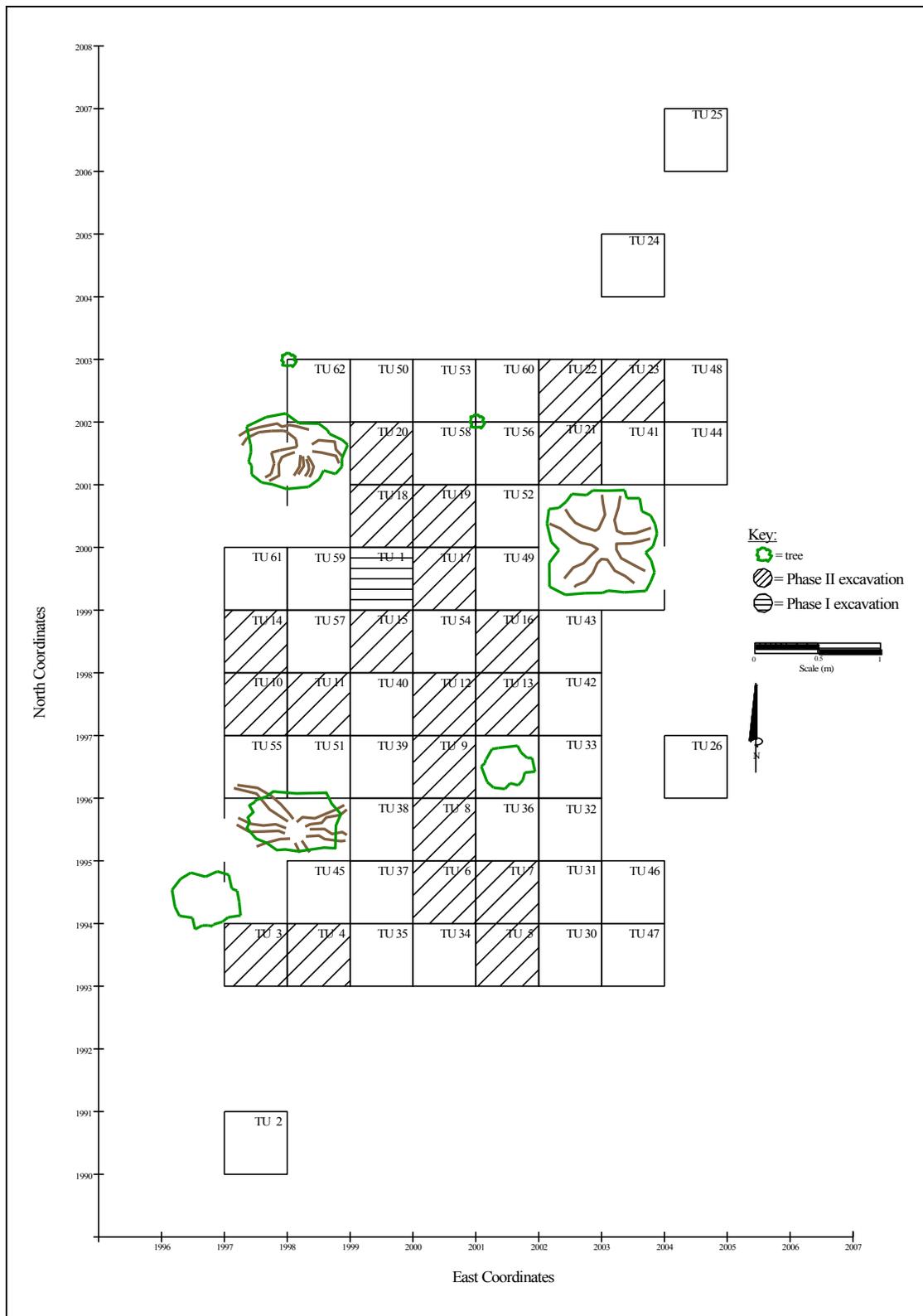


Figure 9: Plan Map of Phase I to III Test Units at the Warwick Site. Test Unit 1 was excavated during the Phase I work, Test Units 2–26 during the Phase II work, and Test Units 30–62 during the Phase III work.



Figure 10: Profile of the West Wall of TU 12 at N1998/E2001 (from Muller 2011:4, Figure 4).



Figure 11: Feature 1 in TU 5 (N1995/E2002) (from Grossman-Bailey et al. 2011:4-9, Plate 4-7).

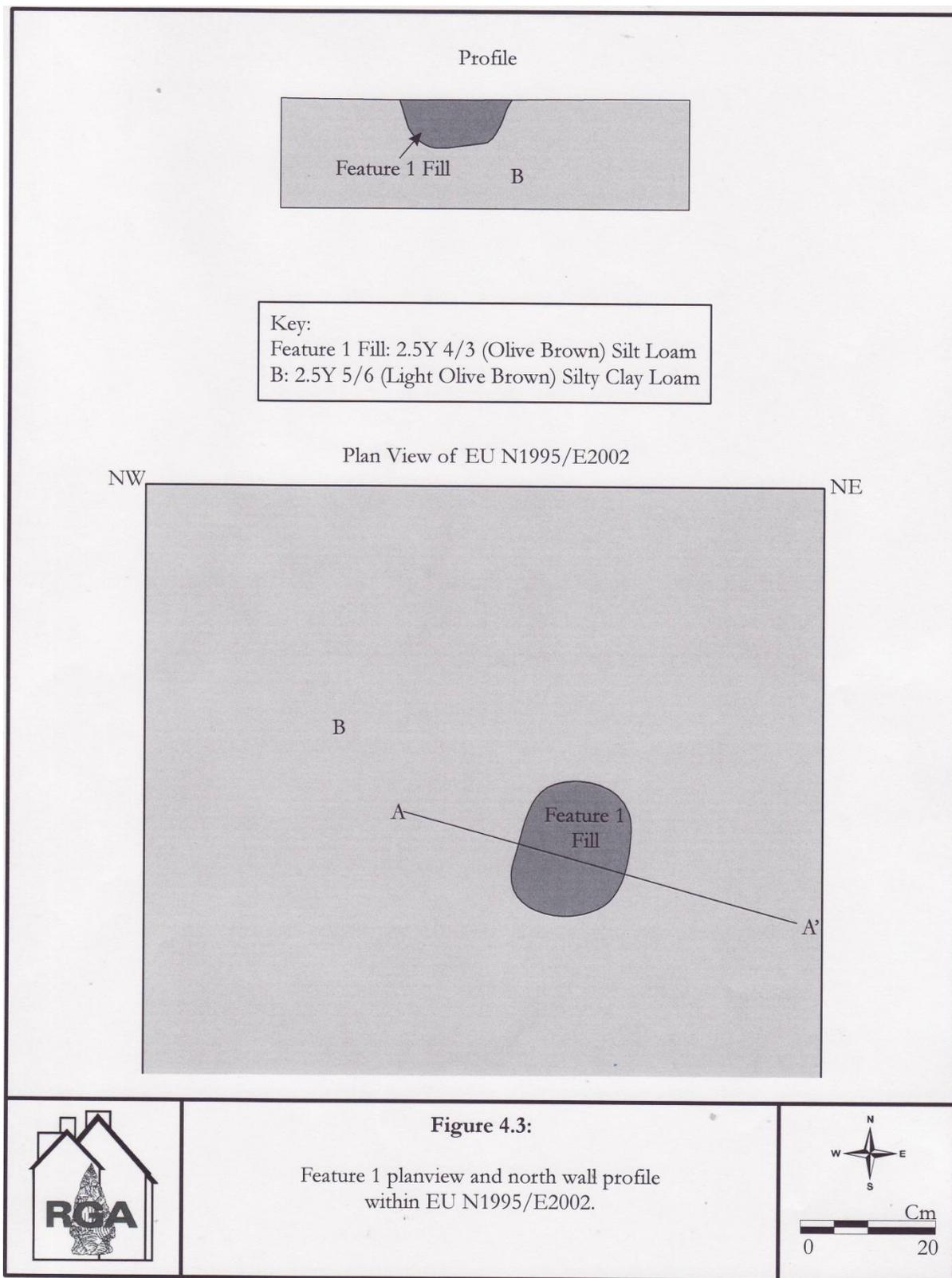


Figure 12: Plan and Profile Drawings of Feature 1 (from Grossman-Bailey et al. 2011:4-209, Figure 4.3).

Phase III Excavation

Dovetail began Phase III archaeological fieldwork at the Warwick Site on April 17, 2013. Fieldworkers began by clearing leaves off the site to identify the location of RGA excavations, and re-establishing the RGA excavation grid. The grid divided the area into blocks of 1 square meter (3.3 ft²). Excavation began by expanding the central area examined during the earlier work, where the possible cultural feature and the highest artifact densities were identified. The completed excavation exposed a 10 by 8 meter (32.8 by 26.2 ft) block, though unexcavated areas around trees interrupted the continuity of the block (Figure 9, p. 30, Figure 13 and Figure 14, pp. 34–35).

Stratum I, the root mat and associated organic material and soil, and the underlying historic plowzone were removed to expose the B1 horizon in hopes of identifying cultural features. Excavation of the underlying soils revealed profiles similar to those described during the Phase II fieldwork, with only minor variations in soil color and texture.

In general, very dark silty loam and organic matter capped the brown silty loam plowzone. Artifacts occurred primarily in the thin historic plowzone and the uppermost 10 centimeters (4.0 in) of the underlying yellowish brown silty clay B1 horizon. In test units with extensive root disturbance, a few artifacts were recovered throughout much of the B1 horizon. The B2-horizon soils consisted of yellowish brown silty clay with various amounts of strong brown mottling and patches (Figure 15 to Figure 24, pp. 35–40).

In Test Unit 34, for example, the 1 to 2 centimeter (0.39 to 0.78 in) thick Stratum I, an O or organic Ap horizon, comprised organic matter and very dark grayish brown (10YR 3/2) loam. Brown (10YR 4/3) fine silty clay constituted the plowzone. The deflated plowzone (Ap horizon) extended 3 to 4 centimeters (1.2 to 1.6 in) below the O horizon. Stratum III, the B1 horizon, extended roughly 40 centimeter (15.6 in) below the plowzone; stratum thickness, however, reached 60 centimeter (23.4 in) where roots were particularly deep and dense. Yellowish brown (10YR 5/6) silty clay formed the matrix of Stratum III; clay content increased with depth. Stratum IV, a B2 horizon, was yellowish brown (10YR 5/4) silty clay mottled with strong brown (7.5YR 5/8) clay. Appendix B provides descriptions of the 33 Phase III profiles.

The Phase III assemblage includes one mammal bone and one charred nut shell, five fragments of petrified wood, a piece of barbed wire, a nail, six pieces of glass, and prehistoric artifacts. The prehistoric assemblage includes 104 pieces of microdebitage, 377 larger pieces of debitage, 105 fragments of FCR, and 16 tools. Artifacts occur primarily in soils formed in a mantle of loess deposited above the older Pliocene to Pleistocene fluvio-marine sediments roughly 11,000 B.P. (Mueller 2011; cf also Wah 2003). Artifacts, as well as most biotic activity, occurred primarily in the Ap and B1 horizons. Six of the Phase III artifacts occurred in the B2 horizon, all small fragments of debitage from test units adjacent to trees with extensive root systems that reached deep into the B-horizon soils of the test units. Artifacts often move downward through the root zone, while plowing mixes deposits. In the absence of post-depositional aeolian or colluvial activity, therefore, the depositional environment generally limits potential archaeological

resources to near-surface contexts. By removing thick sediments in layers of comparable thickness, 10 centimeter (3.9 in) sections in this case, modes in artifact frequency within seemingly homogeneous B1 sediments could be isolated. The spindle diagram of the frequency of lithic artifacts recovered during the Phase I, II, and III test units by Stratum and 10 centimeter (3.9 in) arbitrary level did not reveal multiple peaks in artifact frequency (Figure 25, p. 40). Rather, artifact density peaked in one or two levels within the Ap and B1 horizons. Where artifacts appeared below the uppermost level of the B1 horizon, artifact frequency fell and artifacts occurred in low frequencies throughout the zone impacted by roots. Roots and, probably, burrowing animals, churned the soil, channeling artifacts downwards. Thus, as Balek (2002:49) points out:

Burial of most, if not all, artifacts in stable upland soils developed in pre-Holocene sediments in nonfeature contexts, is due to vertical movement of the artifact in response to normal biological activity, namely burrowing and mounding by earthworms, ants, and other fauna, and by tree-uprooting.

The absence of a multiple modes in artifact frequency and the similarity among artifacts recovered throughout the profiles indicate that the assemblage accumulated during the Holocene, probably after 5500 B.P. In addition, the stratigraphic distribution of artifacts supports Muller's (2011) inference that artifacts migrated through the profile after deposition.



Figure 13: Plan View Following Excavation of Strata I and II.



Figure 14: View North from the South End of the Excavation Block.

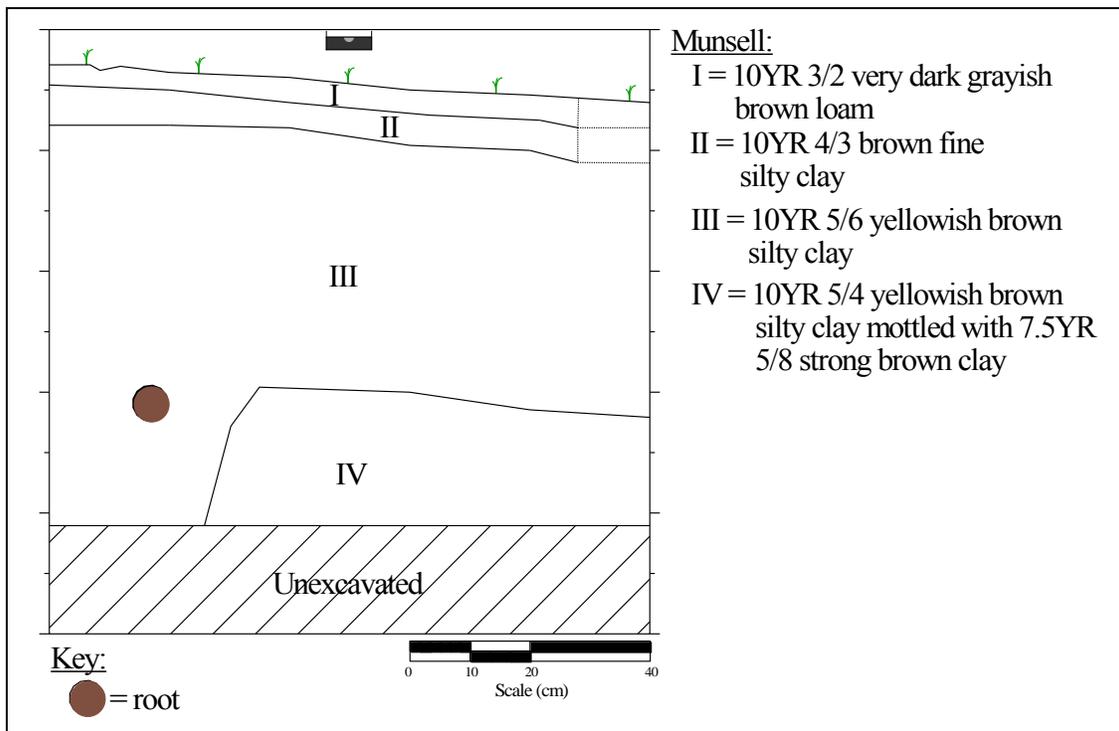


Figure 15: Drawing of the South Profile of Test Unit 34.



Figure 16: Photograph of the South Profile of Test Unit 34.

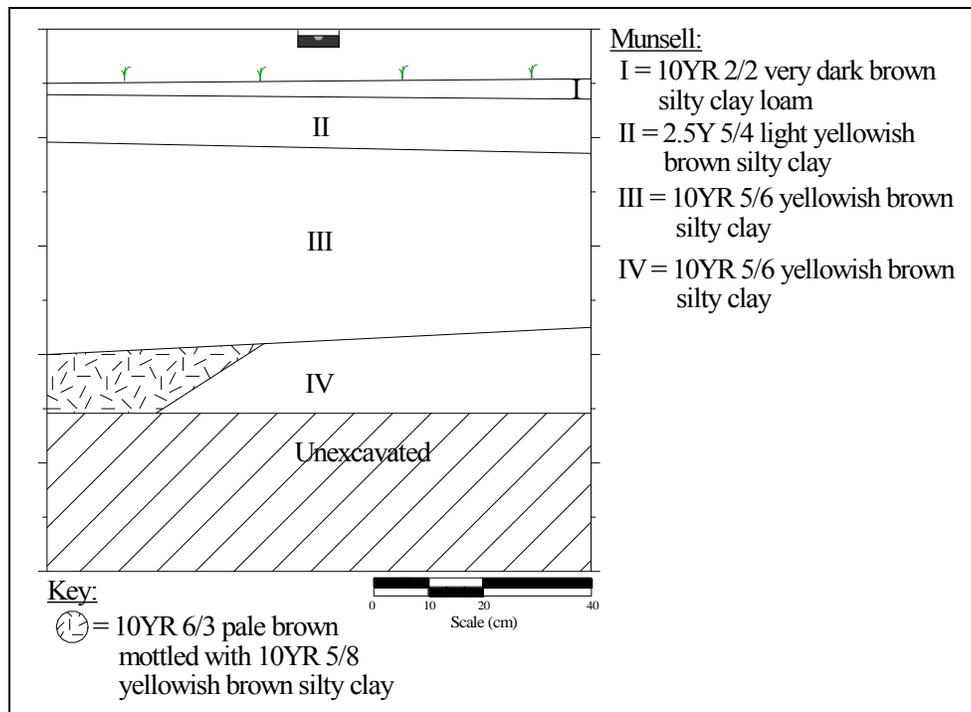


Figure 17: Drawing of the West Profile of Test Unit 39.



Figure 18: Photograph of the West Profile of Test Unit 39.

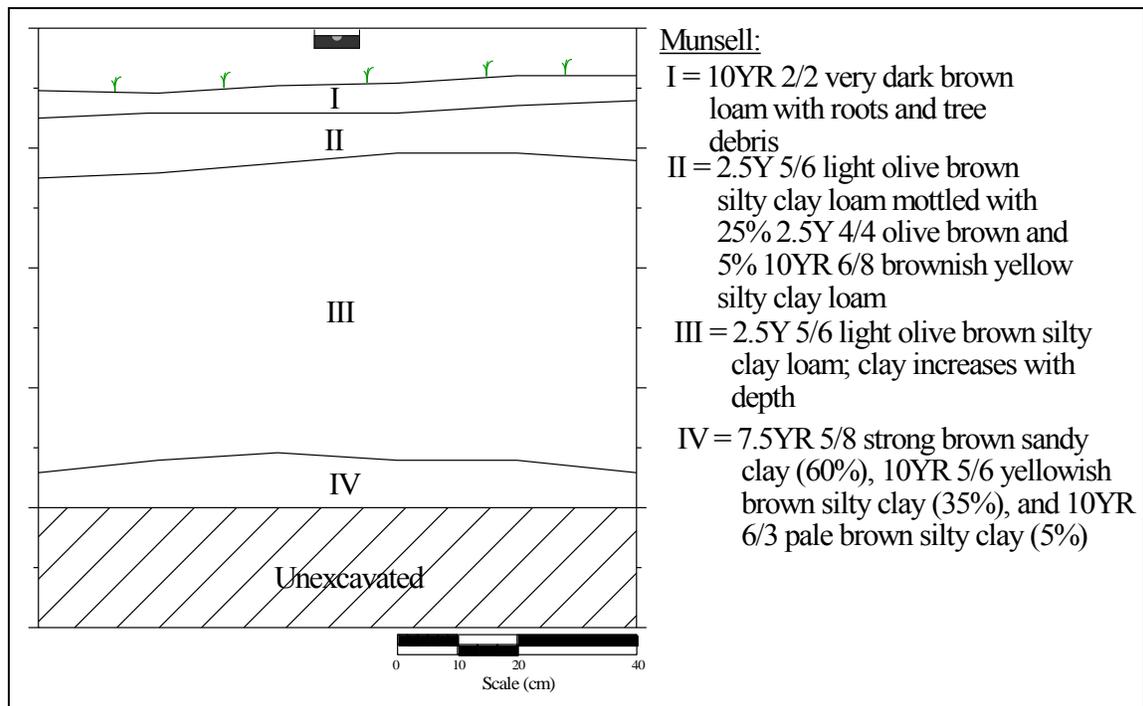


Figure 19: Drawing of the North Profile of Test Unit 43.



Figure 20: Photograph of the North Profile of Test Unit 43.

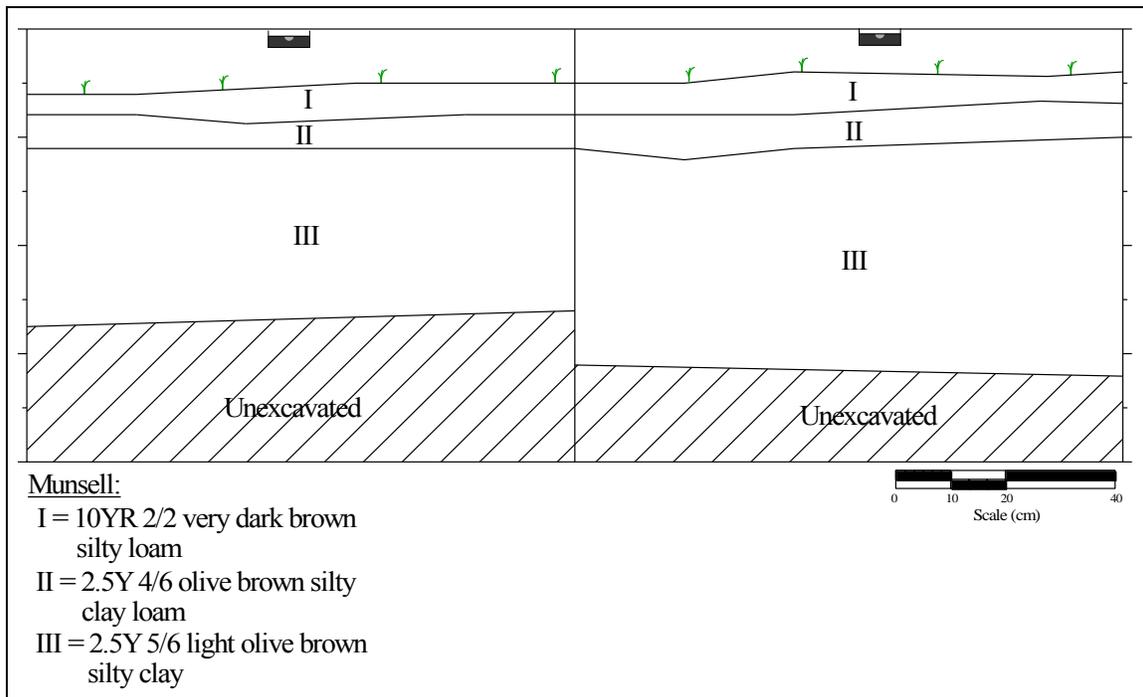


Figure 21: Drawing of the East Profile of Test Unit 48 (left) and 44 (right).



Figure 22: Photograph of the East Profile of Test Unit 48 (left) and 44 (right).

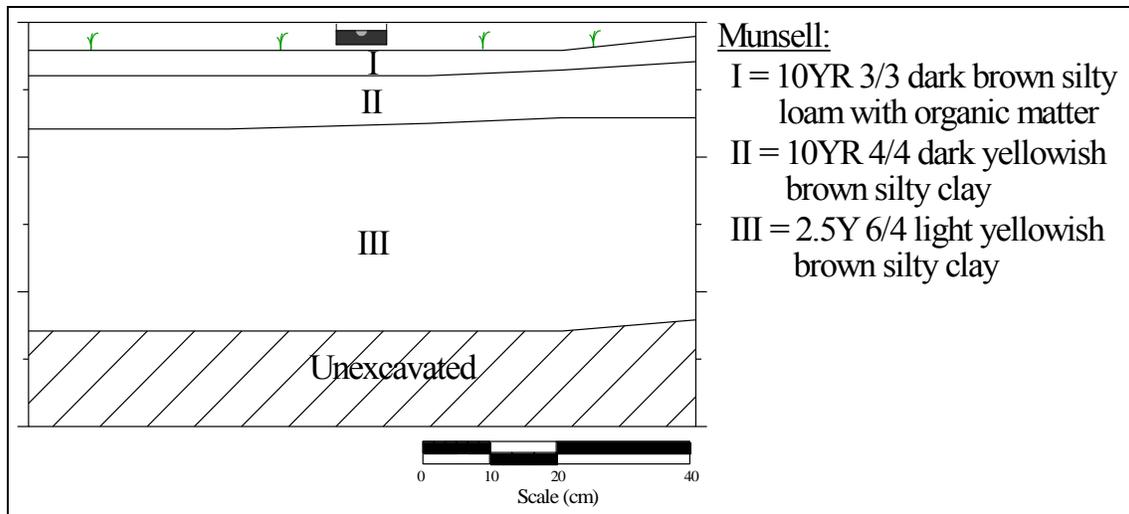


Figure 23: Drawing of the West Profile of Test Unit 61.



Figure 24: Photograph of the West Profile of Test Unit 61.

Stratum		Count
I (Ao)		17
II (Ap)		429
III-1 (B1)		272
III-2 (B1)		102
III-3 (B1)		40
III-4 (B1/2)		4
IV-1 (B2)		13
IV-2 (B2)		2
2B		0

Figure 25: Spindle Diagram of Lithic Count by Stratum and Level (Phase I-III Test Units, Microdebitage Excluded).

Public Outreach

Limited parking in an area northeast of the Warwick Site in Delaware combined with safety concerns due to the site's location immediately adjacent to the major highway linking the Chesapeake Bay Bridge and northern Delaware to limit public visitation during the Phase III fieldwork. The public outreach component of the Phase III work included notification of potentially interested persons and groups, preparation of handouts and a poster for visitors, fieldwork opportunities for Archaeological Society of Maryland (ASM) and ASD members, support of ongoing ASD excavation at the Avery's Rest Site, and the preparation of a weekly blog and video about the ongoing archaeological excavation and analysis. Notification of the beginning of fieldwork, and an invitation to visit the site during the excavation, was forwarded to affiliated Native American tribes and organizations, academics, regional archaeological organizations, and others based on consultation with staff at DelDOT, the SHA, and the MHT. The poster and handouts explained the results of the Phase I and II fieldwork, the goals of the Phase III fieldwork, and provided information on the larger U.S. 301 archaeological project. ASD member member Angie Humes, a photographer, volunteered at the site and contributed photographs. The blog and video discussed aspects of the ongoing the work, including the approach to excavation, preliminary and ongoing interpretations, and post-fieldwork analysis and artifact curation. In addition, an article describing the work at the Warwick Site will appear in the *Bulletin of the Archaeological Society of Delaware*.

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