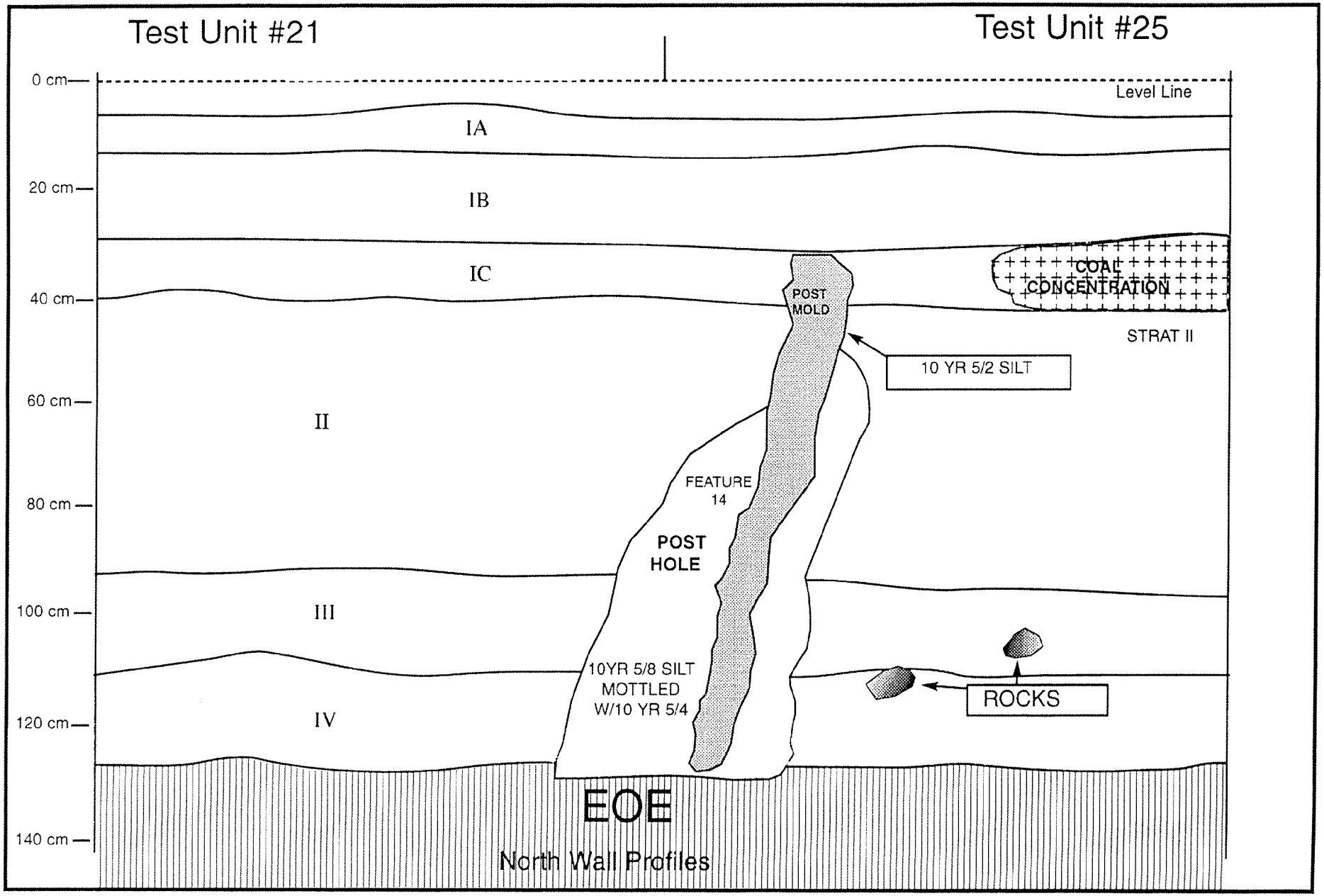
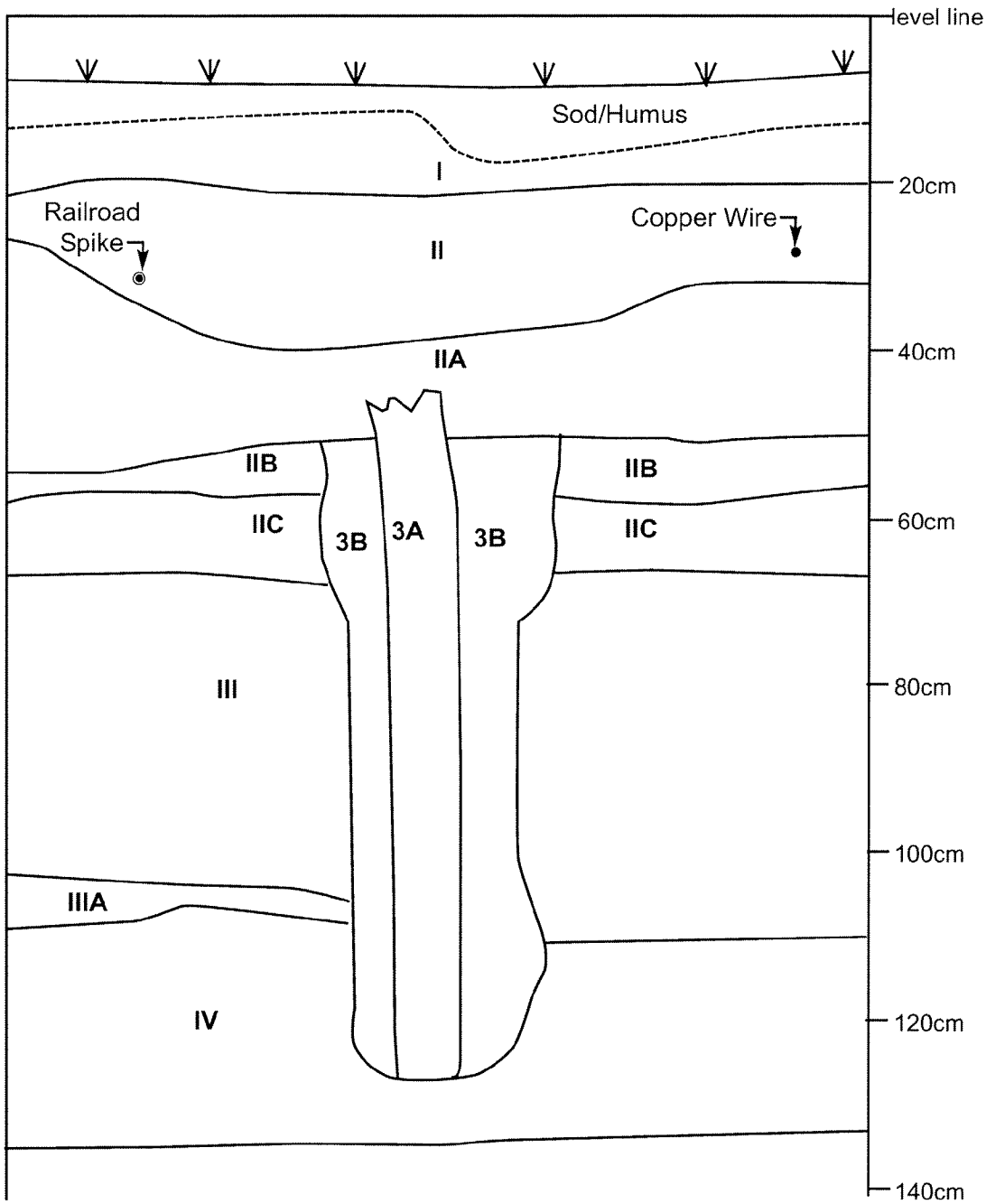


IA - 10YR 4/2 Silt Loam
IB - 10YR 5/3 Silt
IC - 10YR 5/2 Silt Loam (Trolley Fill)
II - 10YR 5/6 Silt Loam (Fill)
III - 10YR 6/4 Silt Loam (Ab Horizon)
IV - 10YR 5/8 Mottled with 10YR 5/4 (Subsoil)
EOE - End of Excavation

Figure 25
Test Units 21 and 25 North Profile
7NC-C-12B
Cauffiel Connector Project
New Castle County, Delaware

20 cm

Photograph 35: Test Units 25 and 26 West Profile, 7NC-C-12B.

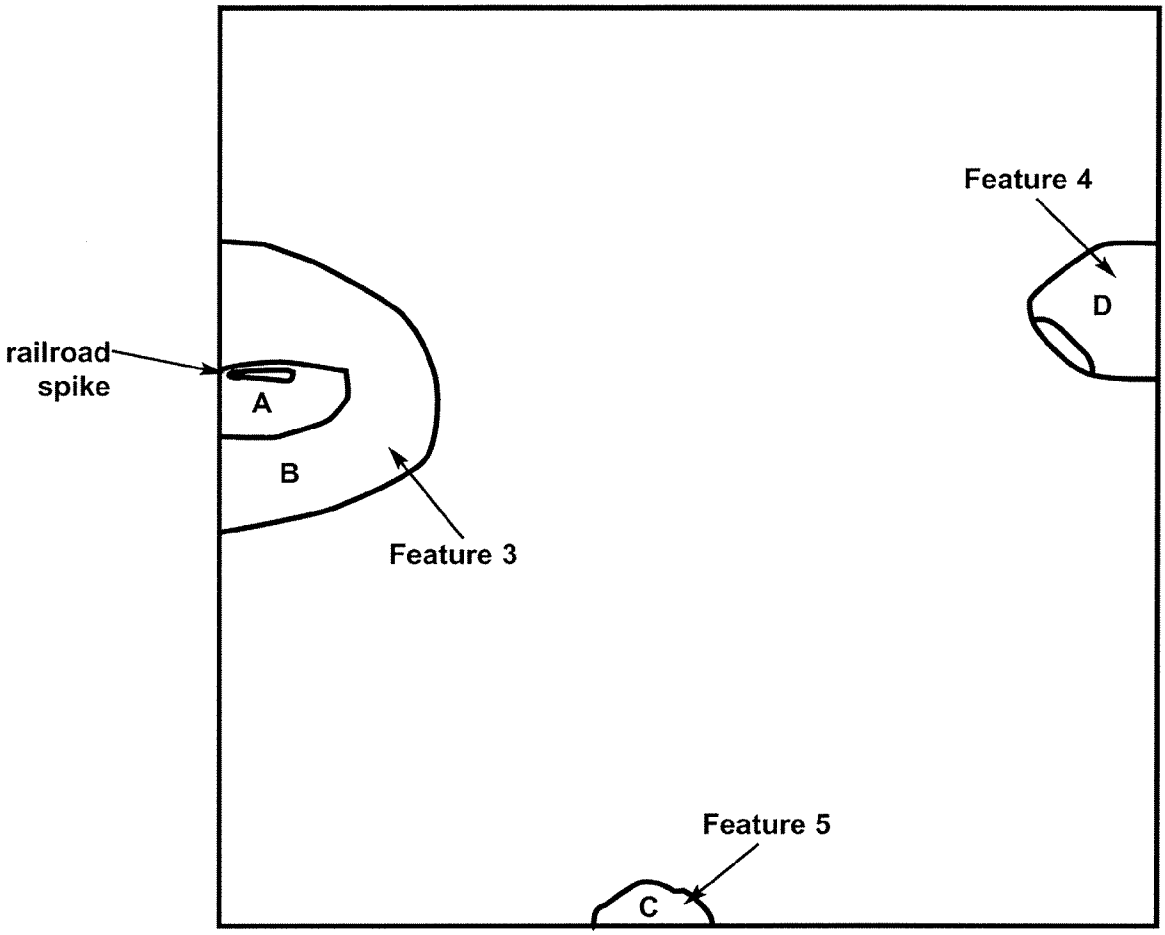


Scale

20 cm

STRAT I - 10YR4/3 Silt
STRAT II - 10YR5/3 Mottled with 10YR5/6 Silt
STRAT IIA - 10YR5/3 Silt
STRAT IIB - 10YR5/4 Mottled with 10YR6/4 Silt
STRAT IIC - 10YR5/4 Silt
STRAT III - 10YR4/6 Clayey Silt Loam
STRAT IIIA - 10YR4/4 Silt Loam (Ab Horizon)
STRAT IV - 10YR5/8 Mottled with 10YR5/4 Silt
3A - postmold - 10YR5/4 Silt
3B - posthole - 10YR5/8 Mottled with 10YR5/4 Silt

Figure 26
Test Unit 5 West Profile
7NC-C-12B
Phase I Identification Survey
Cauffiel Connector Project
New Castle County, Delaware



A. 10YR5/4 Silt (Postmold)
B. 10YR5/6 Silt (Posthole)
C. 10YR4/6 Silt Loam
D. 10YR4/6 Silt Loam

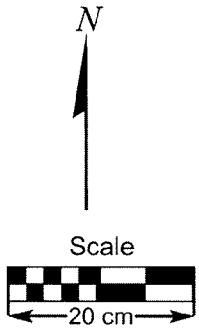


Figure 27
Test Unit 5 Composite Planview
7NC-C-12B
Phase I Identification Survey
Cauffiel Connector Project
New Castle County, Delaware

Feature 4 was a modern posthole roughly bisected by the east wall TU 5 ***(Figure 27)***, as a result its exact dimensions are unknown, although it was found to be intrusive through much of the fill and slopewash overlying the Apb, indicating that it is may be modern. Feature 4 was filled predominantly with coal and slag, which were interpreted as trolley ballast.

Feature 5 is also interpreted as a modern post in TU 5 and 17 ***(Figure 27)***. It was found to be only 5 cm in depth and was found within the trolley fill. No cultural materials were recovered from the feature matrix.

Feature 14 was a modern postmold and posthole intruding into the fill and slopewash, APB, and subsoil horizons in TU 21. The feature exhibited a depth of approximately 0.78 meter ***(Figure 25).*** Two japer flakes were recovered from the feature fill.

All four of the posts were exposed in TUs in proximity to the trolley grade (TUs 5 and 21), therefore it is likely that the posts were associated with the trolley system. All of the features originated in fill associated with the trolley grade, further supporting their association with the trolley system.

Because the Archaeological Identification and Evaluation Surveys investigations were limited to the portions of the Stoney Run site that are to be impacted by the proposed road improvements, functional interpretations of the prehistoric component of the site are somewhat problematic. Based on the recovery of Marcey Creek pottery and a chalcedony triangular projectile point, the site dates predominantly to the Woodland I Period. The site location, which is approximately 300 feet from Stoney Run and well removed from the Delaware River floodplain, along with the relatively low quantity of artifacts (especially tools) and lack of prehistoric features, indicates that it may represent a micro-band base camp used for seasonal or specialized resource procurement.

The historic artifacts recovered from 7NC-B-12B are interpreted as being associated with the Cauffiel Estate, and likely represent field refuse that has redeposited down slope through the effects of plowing and erosion. No features or evidence of any structures were encountered during the investigations at 7NC-B-12B that would indicate the presence of an historic occupation not associated with Cauffiel Estate. The artifact analysis in the following section reveals the temporal affiliation and types of historic artifacts associated with the Stoney Run site.

3. Artifact Analysis

A total of 349 prehistoric artifacts were recovered during the Archaeological Identification and Evaluation Surveys. Three hundred and twenty-eight prehistoric artifacts were recovered from 7NC-C-12B, 17 were recovered from 7NC-C-12A, and four were recovered from non-site, redesposited contexts. A total of historic artifacts were recovered during the investigations. Four hundred and thirty-two historic artifacts were recovered from 7NC-C-12B, 146 were recovered from 7NC-C-12A, and 38 were recovered from non-site, redesposited contexts. The artifact inventory is in ***Appendix E***.

A. Prehistoric Artifacts

a. Methods

The analysis of artifacts that follows is both typological and quantitative. Each specimen was assigned to a category that reflects chronological placement, formal properties, stage of reduction, or use based on the presence of one or more key attributes. Several of these attributes were then measured and recorded in order to facilitate a more detailed investigation of technological patterning. The categories used for this analysis were developed by Taylor *et al.* (1991); however, in some cases the attributes used to assign specimens to categories have been modified for greater specificity.

i. Debitage

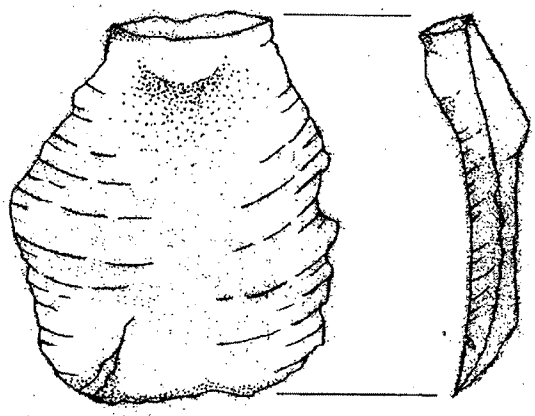
For this analysis, all by-products of lithic reduction are initially categorized either as **cores**, **flakes, flake fragments**, or **blocky shatter**. **Cores**, as defined here, are lithic specimens from which flakes have been detached, but which do not display other uses aside from a source of usable flakes. Cores are classified as freehand if removals are oriented multidirectionally or unidirectionally. Bipolar cores are the source of usable flakes detached by the application of force at opposed ends (hammer and anvil technique). Bipolar cores display crushing at both points of applied force and/or compression rings originating from opposite ends of the specimen (Andrefsky 1998:120). Maximum length, weight and cortex type are recorded for all complete cores. **Flakes** display an intact or partially intact striking platform and recognizable dorsal and ventral surfaces. Striking platform morphology is an important attribute for identifying the form of the objective piece and is recorded as cortical, flat, transverse, bifacial, partially removed/crushed, or irregular (***Figure 28***). Flake condition (complete/broken) is also recorded. **Flake fragments** possess identifiable ventral and dorsal surfaces, but lack platforms. **Blocky shatter** are detached pieces with no clearly identifiable platforms, ventral or dorsal surfaces. All debitage specimens are weighed individually and their raw material is recorded. Cortex type is recorded as tabular, nodule, cobble, or indeterminate. The amount of cortex present on the dorsal surface of flakes is quantified as (1) absent, (2) $\leq$50%, (3) > 50%, < 100%, and (4) 100%. All debitage is further sorted by size class in 5mm increments. Flakes are further classified into the following categories.

Early Reduction Flakes display cortical, flat, or transverse platforms. They may possess cortex on less than 50% of their dorsal surface and/or exhibit less than four dorsal flake scars, but platform morphology is the key attribute for inclusion in this category.

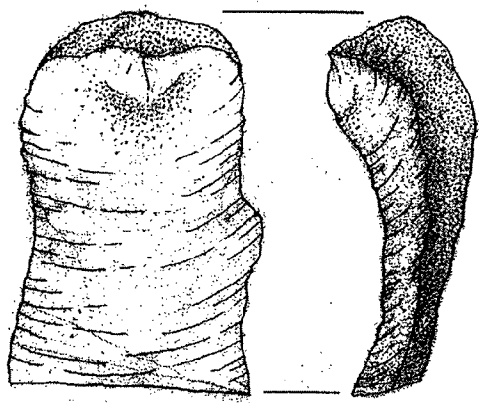
Biface Reduction Flakes display facetted platforms (more than one flake ridge) that represent the margin of a biface.

Bipolar Flakes display the same features as bipolar cores. For the purposes of this analysis, bipolar flakes and cores will be distinguished solely by size.

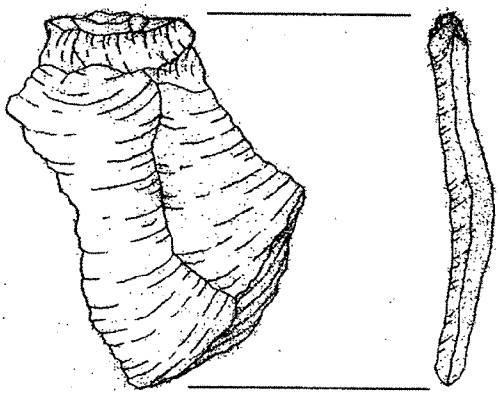
Indeterminate Flakes are flakes that possess crushed platforms and therefore cannot be assigned to any of the categories listed above.



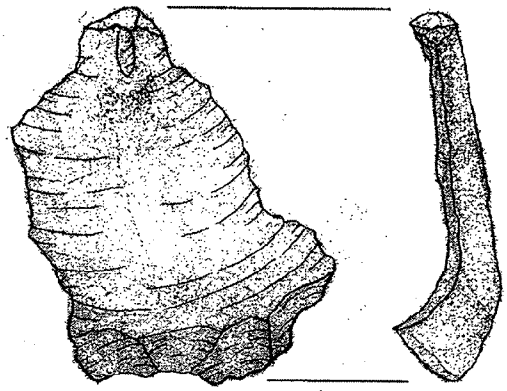
Platform Type: Flat
Termination Type: Feathered



Platform Type: Cortical
Termination Type: Flat Break



Platform Type: Facetted
Termination Type: Hinged



Platform Type: Transverse
Termination Type: Overshot

Figure 28
Debitage Attributes

Cauffiel Connector Project
New Castle County, Delaware

ii. Bifaces

Early Stage Bifaces are cobbles, blocks, or large flakes with bifacially trimmed edges, equivalent to Callahan's Stage 2 bifaces (1979).

Middle Stage Bifaces look more like bifaces; they have been initially thinned and shaped. A lenticular cross-section is developing, but edges are sinuous and patches of cortex may still remain on one or both faces. These bifaces are roughly equivalent to Callahan's (1979) Stage Three bifaces. Biface reduction is a continuum; therefore middle stage bifaces are often difficult to distinguish from early- and late-stage bifaces, depending on the point at which their reduction was halted.

Late-Stage Bifaces are basically finished bifaces. They are well thinned, symmetrical in outline, and their edges are centered. Areas of cortex may still be present. They are analogous to Callahan's Stage 4 bifaces (1979).

Indeterminate Biface Fragments are too small or damaged to assign to the types described above. In some cases, however, indeterminate biface fragments can be categorized less precisely as early- to middle-stage fragments and middle- to late-stage fragments. This was done to augment interpretations of biface stage data.

Projectile Points are bifaces that display hafting elements. Although "hafted bifaces" is a less functionally loaded term, "projectile points" is retained here for comparability with the work of most North American archaeologists, with the understanding that they could have been used as cutting tools as well as projectile tips. Projectile points were assigned to regionally defined types based on descriptions and photographs in Ritchie (1971) and Justice (1987).

iii. Flake Tools

Retouched Flakes are flake-based tools that have had one or more edges retouched, either to resharpen the working edge, to create a dulled edge for grasping (backing), or to form a specific angle or shape. Retouch can also be intentionally or unintentionally produced through contact with hard materials. These flakes are detached from all types of cores.

iv. Cobble-Based Tools

Hammerstones are cobbles that show evidence of battering/crushing along their margins, indicating that they were intentionally used as percussors.

B. 7NC-C-12A (Locus A)

1. General Assemblage Characteristics

A total of 17 prehistoric artifacts were recovered from Locus A. Jasper comprises the majority raw material type, followed by quartz and argillite. However, because plowzone stripping and redistribution by DelDot for the construction of Governor Printz Boulevard was likely extensive

across the site, it is unclear whether the recovered raw material frequencies are representative of the site before it was disturbed. Three examples of fire-cracked rock were also recovered. No chronologically diagnostic artifacts were encountered, therefore this locus can only be referred to a general prehistoric time frame. The distribution of artifacts by type and raw material are in ***Table 1***.

Table 1: Prehistoric Artifact Inventory, 7-NC-12A

Artifact Type	Jas	Qtz	Arg	Qtzt	SS	Totals
Early Reduction Flakes	2	2	1	0	0	**5 (29.4)**
Biface Reduction Flakes	1	1	0	0	0	**2 (11.8)**
Bipolar Flakes	1	0	0	0	0	**1 (5.9)**
Indeterminate Flakes	0	0	1	0	0	**1 (5.9)**
Flake Fragments	3	2	0	0	0	**5 (29.4)**
Fire-Cracked Rock	0	0	0	2	1	**3 (17.6)**
Totals	**7 (41.2)**	**5 (29.4)**	**2 (11.8)**	**2 (11.8)**	**1 (5.9)**	**17 (100.0)**

Abbreviations: Jasper-Jas; Quartz-Qtz; Argillite-Arg; Quartzite-Qtzt; Sandstone-SS Percentages in parentheses

C. 7NC-C-12B (Locus B)

1. General Assemblage Characteristics

A total of 328 prehistoric artifacts were recovered from Locus B. One hundred and ninety-eight artifacts were recovered from relatively intact Ap, Apb, and Bt horizon contexts, while 130 were recovered from slopewash deposits. The distribution of artifacts by type and raw material are depicted below in ***Tables 2*** and ***3.*** The frequencies of lithic raw materials from both redeposited and relatively intact contexts are generally similar. As was the case for Locus A, jasper is the dominant raw material, with relatively minor amounts of chert, quartz, chalcedony, and rhyolite. Argillite was represented by a single early reduction flake.

Table 2: Prehistoric Artifact Inventory, 7-NC-12B (Ap, Apb, and Bw Horizons)

Artifact Type	Jas	Cht	Chal	Rhy	Arg	Qtz	Qtzt	SS	Totals
Projectile Points	0	0	1	0	0	0	0	0	**1 (0.5)**
Other Bifaces	1	0	0	0	0	0	0	0	**1 (0.5)**
Retouched Flakes	2	0	0	0	0	0	0	0	**2 (1.1)**
Cores	2	1	0	0	0	0	0	0	**3 (1.6)**
Early Reduction Flakes	23	6	3	1	1	0	3	0	**37 (20.0)**
Biface Reduction Flakes	12	2	1	1	0	1	0	0	**17 (9.2)**
Bipolar Flakes	0	1	0	0	0	1	0	0	**2 (1.1)**
Indeterminate Flakes	13	4	0	0	0	1	0	0	**18 (9.7)**
Flake Fragments	55	13	1	1	0	10	2	0	**82 (44.3)**
Shatter	4	0	1	0	0	3	0	0	**8 (4.3)**
Hammerstone	0	0	0	0	0	0	0	1	**1 (0.5)**
Fire-Cracked Rock	0	0	0	0	0	0	3	10	**13 (7.0)**
Lithic Totals	**112 (60.5)**	**27 (14.6)**	**7 (3.8)**	**3 (1.6)**	**1 (0.5)**	**16 (8.6)**	**8 (4.3)**	**11 (5.9)**	**185 (100.0)**
Pottery	NA	NA	NA	NA	NA	NA	NA	NA	**12**

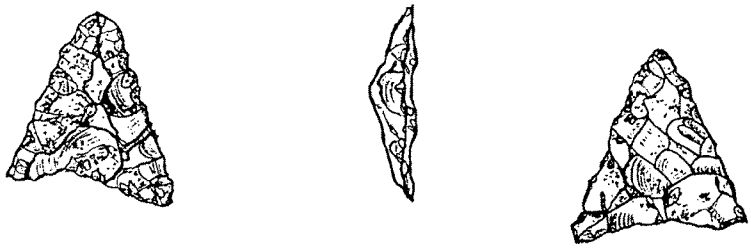
Abbreviations: Jasper-Jas; Chert-Cht; Chalcedony-Chal; Rhyolite-Rhy; Argillite-Arg; Quartz-Qtz; Quartzite-Qtzt; Sandstone-SS Percentages in parentheses

Table 3: Prehistoric Artifact Inventory, 7-NC-12B (Slopewash)

Artifact Type	Jas	Cht	Chal	Rhy	Arg	Qtz	Qtzt	SS	Totals
Projectile Points	0	0	0	0	0	0	0	0	**0 (0.0)**
Other Bifaces	0	0	0	0	0	1	0	0	**1 (0.9)**
Retouched Flakes	1	0	0	0	0	0	0	0	**1 (0.9)**
Cores	1	1	0	0	0	0	0	0	**2 (1.8)**
Early Reduction Flakes	18	1	1	0	0	0	1	0	**21 (18.3)**
Biface Reduction Flakes	11	1	0	0	0	0	0	0	**12 (10.4)**
Bipolar Flakes	3	0	0	0	0	0	0	0	**3 (2.6)**
Indeterminate Flakes	9	2	0	0	0	1	0	0	**12 (10.4)**
Flake Fragments	30	9	0	0	0	7	1	0	**47 (40.9)**
Shatter	2	3	0	0	0	3	0	0	**8 (6.9)**
Hammerstone	0	0	0	0	0	0	0	0	**0 (0.0)**
Fire-Cracked Rock	0	0	0	0	0	0	5	3	**8 (6.9)**
Lithic Totals	**75 (65.2)**	**17 (14.8)**	**1 (0.9)**	**0 (0.0)**	**0 (0.0)**	**12 (10.4)**	**7 (6.1)**	**3 (2.6)**	**115 (100.0)**
Pottery	NA	NA	NA	NA	NA	NA	NA	NA	**15**

Abbreviations: Jasper-Jas; Chert-Cht; Chalcedony-Chal; Rhyolite-Rhy; Argillite-Arg; Quartz-Qtz; Quartzite-Qtzt; Sandstone-SS Percentages in parentheses

Very few temporally diagnostic artifacts were recovered. A single chalcedony triangular point was found in the plowzone of TU 18 ***(Figure 29)***, and two small, refitting sherds from a quartz tempered, broad-incised vessel were recovered from slopewash deposits on TU 21. The latter artifact is most likely referable to the general Minguannan type, which dates to the Woodland II cultural period. The single triangular point may also date to the terminal Woodland I or Woodland II, however, triangular points have been recovered from sealed Archaic and early Woodland I stratigraphic contexts in the Middle and Lower Delaware Drainage in Pennsylvania and New Jersey (Siegel *et al.* 1999, Stewart and Cavallo 1991, Wall *et al.* 1996). An initial attempt to sort securely dated Woodland II (post 1000 A.D.), Archaic, and early Woodland I triangles on morphological and technological grounds indicates significant overlap, such that single triangular point finds from surface contexts in the Delaware Drainage can no longer be unquestionably assigned to a Woodland II time frame (Katz 2000). Two sets of two-sherd refits were recovered from the plowzone of TU 7 and slopewash deposits in TU 27, respectively. Both refit sets are ca. 1cm thick body sherds tempered with finely crushed steatite. Interior and exterior surfaces are intact. These sherds are referable to the Marcey Creek type which was manufactured during Woodland I, ca. 3200 BP to 2800 BP (Artusy 1976, Wise 1975). Nine thick (ca. 1cm) gneiss tempered body sherds were also recovered from various contexts in Locus B. These are probably examples of the Dames Quarter type, which was manufactured slightly later in the Woodland I period than Marcey Creek pottery (Artusy 1976, Wise 1975). In summary, the few temporally diagnostic artifacts found suggest occupations between 3200 BP and 2800/2500 BP (Woodland I) and after 950 BP (Woodland II).



Scale

0 1 2 3 4 5 cms.

Figure 29
Chalcedony Triangular Projectile Point

7NC-C-12-B
Test Unit 18
Stratum III, Level 3 NE
Cauffiel Connector Project
New Castle County, Delaware

2. Artifact Descriptions/Analysis

Chipped Stone Tools

Locus B (TU 18, Ap horizon) yielded a single translucent gray chalcedony triangular projectile point. The point is slightly isosceles in outline and exhibits a strongly concave base (22mm wide) with no apparent grinding. Blade cross section is plano-convex. The blade edges are straight, but slightly serrated due to the deep initiations of pressure flake scars. Length along the long axis is 24.5mm and thickness at midpoint is 5.5mm. Katz (2000:85) found that concave bases were more common among Woodland II triangles than among Archaic and early Woodland I examples from stratigraphic contexts, which together with the presence of Woodland II pottery at Locus B may indicate that the point is associated with the Woodland II component(s).

One quartz late-stage biface fragment was recovered from slopewash deposits in TU 27. It is a small midsection fragment ca. 23mm wide and 7mm thick with two transverse breaks. An indeterminate jasper biface fragment was recovered from the plowzone in TU 20. The fragment is small (26.5mm maximum length), lenticular, and completely covered with flake scars suggesting that it is either a middle or late stage biface fragment. Breakage during manufacture is indicated by a single bending fracture (Crabtree 1972, Whittaker 1994).

Locus B produced three retouched flakes. One specimen (TU 1, Apb horizon) is manufactured on a bipolar jasper flake measuring 23mm in maximum dimension. The flake retains cobble cortex and is reddened from thermal alteration. Retouch is steep and unifacial along one lateral margin for a length of 19mm. The plowzone of TU 18 produced a retouched jasper flake fragment measuring 31mm in maximum length with discontinuous steep unifacial retouch along 24mm of one lateral margin. The final specimen was recovered from slopewash deposits in TU 15 and is manufactured on a jasper biface reduction flake (21mm x 22mm). Two areas of steep unifacial retouch are present on the distal (11mm) and one lateral margin (7mm). Aside from raw material composition, the other attributes common to all retouched flakes are 1) unifacial retouch, and 2) retouch scars do not exceed 2mm in length. Light retouch of this type is most likely produced unintentionally by working (planing) against a hard material such as antler, bone, or wood. Alternatively, this type of retouch can be intentionally produced in the same fashion in order to strengthen a flake edge for the same types of tasks or as backing for easier prehension (Tixier 1963). The latter of these (backing) is unlikely because the flake edge opposite the retouched edges is either cortical, a flat fracture, or a platform, all of which would have naturally enhanced prehension.

Cores

Five cores/core fragments were recovered from Locus B. The first specimen to be described is categorized as a jasper freehand multidirectional core from the plowzone of TU 19. This core measures 58mm in maximum length and weighs 97.3g. It exhibits a substantial amount of cobble cortex and four large flake removals from multiple platforms. Each of these flake scars are completely reddened from thermal alteration. Two other jasper specimens are classified as bipolar core fragments. The first of these was recovered from slopewash deposits in TU 25, measures 44mm in maximum length, and weighs 33.4g. Its opposed platforms display heavy crushing and the interior

surface exhibits pronounced compression rings. A few small flake scras are present on the exterior surface. The other jasper bipolar core fragment, recovered from the Bt horizon of TU 1, measures 41mm in maximum length and weighs 9.7g. This small fragment is heavily battered, but exhibits at least one bipolar flake removal. One lustrous black chert bipolar core was recovered from slopewash deposits in TU 5. The fragment measures 37mm in maximum length and weighs 15.9g, and exhibits a small area of pebble cortex. This specimen exhibits one clear bipolar flake scar emanating from opposed crushed platforms. Several other flake scars are present on the piece but are not clearly diagnostic of bipolar technique. The final "core" is classified as a tested chert cobble from the Apb horizon of TU 1, measuring 56mm in maximum length and weighing 77.9g. The cobble was naturally split prior to testing; both the rounded cobble surface and the interior split display the same degree of patination. A few small flake removals were made on one end of the cobble which resulted in relatively fresh, unpatinated flake scars. The cobble may have been discarded because flaking revealed numerous interior fracture planes.

Debitage

In the following description and analysis of Locus B debitage, debitage from both slopewash and relatively less disturbed contexts is combined for two reasons. First, raw material frequencies are sufficiently similar between these two contexts to suggest that artifacts in slopewash deposits are from the same site ***(Table 2 and 3)***. Second, low debitage numbers in both contexts would decrease the reliability of a technological analysis performed on those from either context singly.

Jasper artifacts comprise between 60 to 65 percent of the Locus B assemblage; it represents the dominant lithic raw material utilized at the site. This section presents data on select attributes of the jasper debitage in order to elucidate patterning in the type lithic reduction practiced with this raw material. The utilization of minority lithic materials is discussed below. Aside from flake fragments and blocky shatter, jasper early reduction flakes comprise the majority of the debitage sub-assemblage, outnumbering jasper biface reduction flakes by an approximate 2 to 1 ratio. ***Table 4*** depicts the distribution of all platform-bearing flakes by platform type, presence of cortex, grinding, and lipping. Cortex is present on 9.8 percent of early reduction flakes and is not present on biface reduction flakes. Where present, cortex is rounded, suggesting that at least some of the jasper objective pieces were procured from secondary cobble deposits. Ground and/or lipped platforms are most common on biface reduction flakes. Grinding probably reflects greater attention to platform preparation, which is more commonly applied to middle- to late-stage bifaces (Andrefsky 1998, Whittaker 1994), while lipping is most likely related to the transition from hard-hammer percussion in earlier stages of reduction to soft-hammer (antler or wood) percussion in later reduction stages (Ohnuma and Bergman 1982). Flat platforms are the most common platform type on early reduction flakes, followed by transverse and cortical platform types. Flakes with flat platforms can result from the reduction of many different types of objective pieces (i.e. core reduction, early through middle stages of biface reduction from flake blanks or blocks, uniface production and maintenance). Transverse platforms on flakes reflect the presence of a single flake ridge on the striking surface of the objective piece, and are common in the early and middle stages of biface reduction and throughout the process of core reduction (Tomka 1989).

Table 4: Jasper Flake Attributes , Locus B

Platform Type	Cortex	Grinding	Lipping	Ground and Lipped
Cortical: N= 1 (2.4)	N= 0	N= 0	N= 0	N= 0
Flat: N= 33 (80.5)	N= 4	N= 0	N= 2	N= 0
Transverse: N= 7 (17.1)	N= 0	N= 0	N= 1	N= 0
Subtotal: N= 41 (100.0)	N= 4 (9.8)	N= 0 (0.0)	N= 3 (7.3)	N= 0 (0.0)
Bifacial: N= 23 (100.0)	N= 0	N= 6 (26.1)	N= 5 (21.7)	N= 2 (8.7)

Note: Flakes with cortical, flat, and transverse platforms are classified as Early Reduction Flakes while those with bifacial platforms are classified as Bifacial Reduction Flakes. Percentages in Parentheses

Although biface manufacture was clearly performed at the site, the significant proportion of debitage classified as early reduction flakes does not allow for a clear-cut identification of the primary mode of lithic reduction undertaken. This is because flakes with flat, transverse, or cortical platforms can be produced in several different reduction sequences (i.e. core reduction, early stages of biface reduction from flake blanks or blocks, uniface production). In order to understand the end products of lithic reduction at Locus B, the size distribution of platform-bearing jasper flakes (early reduction flakes, biface reduction flakes, indeterminate flakes) was compared to experimental reduction data provided by Patterson (1990). Patterson (1990:550-553) presented flake size data from 11 bifacial reduction experiments, all of which involved the production of bifacial dart points from flake blanks of various sizes. He found that when the percentage of flakes in each size class was graphed, the resulting curves were consistently exponential and dominated by flakes between 10 and 15 mm in maximum dimension without respect to platform type or completeness. When plotted on a logarithmic scale, the flake-size distributions closely approximate a straight line. The reduction of cores, however, resulted in bi- or tri-modal distributions. In order to evaluate the jasper sub-assemblage with respect to Patterson's study, all complete flakes were assigned to size classes using square templates. Patterson's bifacial reduction experiments were then graphed ***(Figure 30)*** and compared to the size class percentages graphed for Locus B ***(Figure 31)***.

The trend of the resulting flake size curve for the Locus B debitage tracks the curves produced via Patterson's experimental biface reductions. Both data sets display frequencies of >60 percent in the smallest flake size class, with frequencies in higher size classes falling off exponentially. Similar curves were also produced in experimental biface reductions by Maudlin and Amick (1989), Ahler (1987), and Stahle and Dunn (1982). The concordance between the archaeological and experimental data suggests that bifacial technology may have been more frequent than bipolar reduction or freehand core reduction at Locus B. One drawback of the approach is that it may not adequately indicate the reduction of other core types, which were certainly present at Locus B. Some bipolar reduction of jasper cobbles was clearly conducted; two of the three jasper bipolar flakes retain cobble cortex. Multidirectional core reduction was also practiced on jasper cobbles. In Patterson's experiment, all flakes were retained from non-bifacial core reduction, and the largest flakes produced the bi- and trimodal graphed curves. In the prehistoric case, however, these larger flakes were the desired product of core reduction and would have been selectively removed, retouched, and transported to other locations. This activity would likely alter a multimodal graph distribution, possibly in the direction of a unimodal "bifacial" trajectory. Nevertheless, based on comparison to

Figure 30: Experimental Flake Size Distribution, Bifacial Reduction (from Patterson 1990)

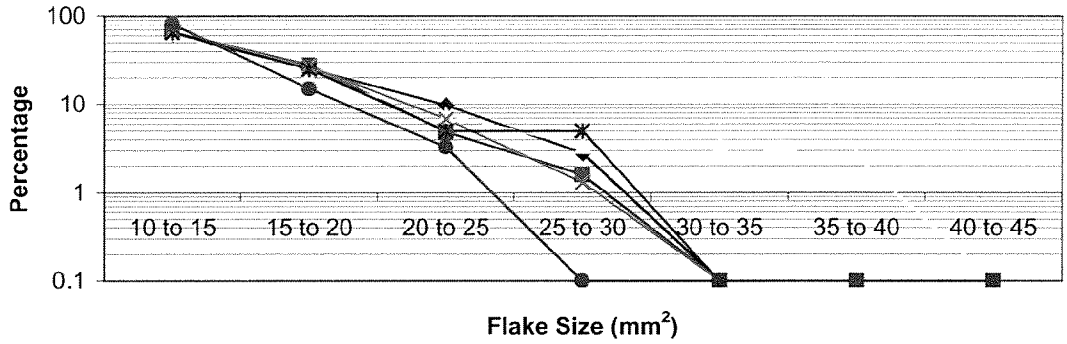
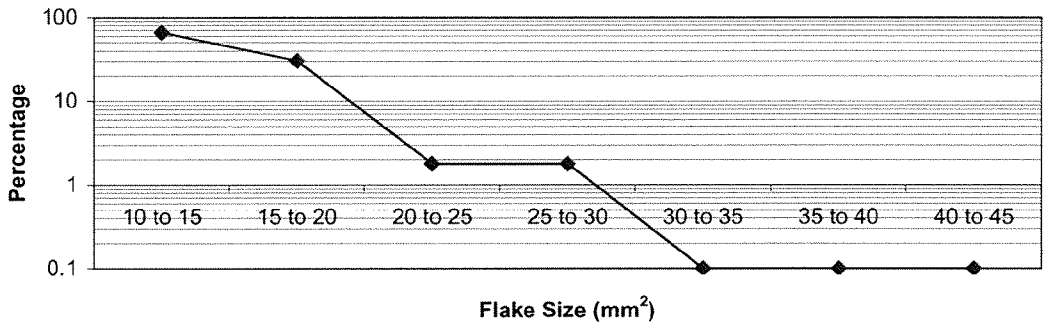


Figure 31: Locus B Flake Size Distribution



Note: In both figures, values of 0.1 are actually 0.0. The Excel® graphing package is unable to place 0.0 values in logarithmic graphs.

Patterson's experimental data, the jasper debitage sub-assemblage appears to indicate a strong bifacial tool production emphasis.

The ratio of chert early reduction flakes to chert biface reduction flakes is similar to the same ratio for jasper, approximately two to one. A single chert bipolar flake is also present. Platform treatment for chert early reduction flakes is predominantly flat. As was true for the jasper debitage sub-assemblage, cortex is restricted to early reduction flakes and is represented by cobble cortex. Grinding and/or lipping is restricted to biface reduction flakes at an appreciably lower frequency than was the case for jasper debitage ***(Table 5)***. Graphing the size distribution of chert flakes was not undertaken because of their low number, however, out of a total of 16 early reduction, biface reduction, and indeterminate flakes, 12 are smaller than 20mm in maximum dimension and none are larger than 30mm. The same maximum size limit holds true for chert flake fragments. The lack of debitage exceeding 30mm strongly suggests that primary reduction of chert was not a common practice within Locus B, and that later stages of reduction are more prominently represented.

Table 5: Chert Flake Attributes , Locus B

1

Platform Type	Cortex	Grinding	Lipping	Ground and Lipped
Cortical: N= 0 (0.0)	N= 0	N= 0	N= 0	N= 0
Flat: N= 6 (85.7)	N= 3	N= 0	N= 0	N= 0
Transverse: N= 1 (14.3)	N= 0	N= 0	N= 0	N= 0
Subtotal: N= 7 (100.0)	N= 0 (42.9)	N= 0 (0.0)	N= 0 (0.0)	N= 0 (0.0)
Bifacial: N= 3 (100.0)	N= 0 (0.0)	N= 0 (0.0)	N= 1 (33.3)	N= 0 (0.0)

Note: Flakes with cortical, flat, and transverse platforms are classified as Early Reduction Flakes while those with bifacial platforms are classified as Bifacial Reduction Flakes. Percentages in parentheses.

The minor amounts of chalcedony, rhyolite, argillite, quartz, and quartzite debitage suggest that objective pieces of these materials were quite rare during any occupation of Locus B. Nevertheless the presence of argillite debitage indicates that at least a portion of the toolkit may have been acquired through exchange with groups in the Pennsylvania Piedmont or through visits to that area during some portion of the annual settlement round. Rhyolite, which occurs naturally only in the Blue Ridge sections of Maryland and Pennsylvania, is more likely related to exchange with groups closer to the source.

Hammerstones

A single possible hammerstone was recovered from the plowzone of TU 3. This specimen is a sandstone cobble (76mm in max. length, 202.2g) displaying shallow pitting on one margin. Cobble-sized materials are present in restricted areas of Locus B, and the artifact may indeed be a hammerstone. Alternatively, cobble- and pebble-sized material emplaced by glaciofluvial activity during the Late Pleistocene would have certainly been mechanically abraded/pitted.

Fire-Cracked Rock

Twenty-one pieces of fire-cracked rock were recovered from Locus B weighing 793g (average is 37.8g). These indicate the presence of thermal features in Locus B, however, none were found.

Botanical Specimens

One carbonized nutshell fragment was recovered from the Bt horizon of TU 1.

Pottery

Twenty-seven prehistoric pottery sherds were recovered from Locus B; 15 from slopewash horizons and 12 from relatively intact contexts (Ap, Apb, and Bt horizons). Provenience data for this pottery are present below in ***Table 6***. In general, all sherds were relatively small (<30mm^2 surface area) and exhibited significant erosion on interior and exterior surfaces. As a result, vessel lot-based analysis could not be conducted. Nevertheless, recognition of distinctive surface treatments and temper types allowed temporal placement of some of the sherds.

Table 6: Prehistoric Pottery Data

TU/STP	Context	Qty	Sherd Type	Condition	Thickness (mm)	Temper Type & Size (mm)	Surface Treatment	Decoration
TU 7	Apb	2	B	Intact	9	Steatite, 1-2	Smooth	None
TU 27	SW	2	B	Intact	8	Steatite, 1-2	Smooth	None
TU 1	Bt	4	B	Eroded	8	Gneiss, 1-2	ND	ND
TU 27	SW	3	ND	Eroded	ND	Gneiss, 1-2	ND	ND
TU 5	SW	1	B	Eroded	9	Gneiss, 1-4	ND	ND
STP E18	Ap	1	B	Eroded	10	Gneiss, 1-4	ND	ND
TU 21	SW	2	N/R	Intact	6	Quartz, 1-4	Smooth	Single incised line
STP W16	Bt	2	ND	Eroded	5	Quartz, 1-2	ND	Incised/Corded
TU 6	Ap	1	B	Intact	5	Quartz, 1-3	Smooth	None
STP E18	Bt	1	B	Eroded	8	Quartz, 1-5	ND	ND
TU 26	SW	1	B	Eroded	7	Quartz, 2-4	ND	ND
TU 26	SW	1	B	Eroded	4	Quartz, 1	ND	ND
TU 5	SW	2	B	Eroded	ND	Quartz, 1-3	ND	ND
TU 20	Ap	1	B	Eroded	ND	Quartz, 1-3	ND	ND
TU 21	SW	1	B	Eroded	ND	Quartz, 1-3	ND	ND
TU 4	SW	2	ND	Eroded	ND	Indeterminate	ND	ND

Abbreviations: Slopewash-SW; Quantity-Qty; Body sherd-B; Neck/Rim-N/R; No Data-ND

Two sets of two-sherd refits were recovered from the plowzone of TU 7 and slopewash deposits in TU 27, respectively. Both refit sets are ca. 1cm thick body sherds tempered with finely crushed steatite. Interior and exterior surfaces are intact and smooth. These sherds are referable to the Marcey Creek type which was manufactured during Woodland I, ca. 3200 BP to 2800 BP (Artusy 1976, Wise 1975). Nine thick (ca. 8-10mm) gneiss tempered body sherds were also recovered from various contexts in Locus B. These are probably examples of the Dames Quarter type, which was manufactured slightly later in the Woodland I period than Marcey Creek pottery (Artusy 1976, Wise 1975). Two small, thin (6mm), refitting sherds from a quartz tempered, broad-incised vessel were

recovered from slopewash deposits in TU 21. These may be referable to the general Minguannan type, which dates to the Woodland II cultural period. Another small, thin (5mm) quartz tempered sherd (STP W16) is probably assignable to a late Woodland I/Woodland II time frame based on its thinness and small temper size. However, surface erosion was so extensive that a positive determination of surface treatment could not be made. Nine of the remaining sherds were quartz tempered and two were untempered (possibly fired clay); their surfaces were eroded to the extent that no identification of surface treatment or decoration was possible.

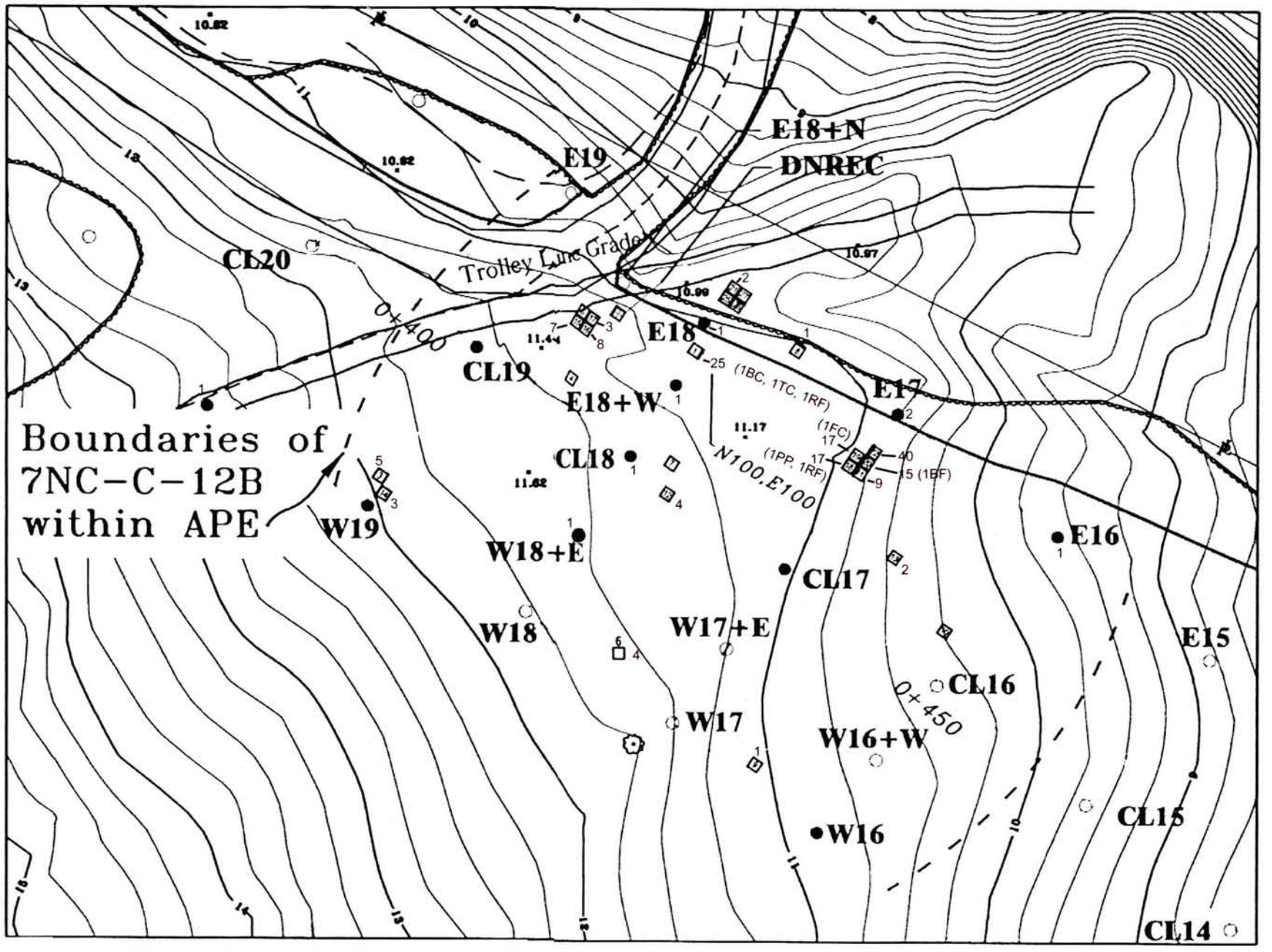
3. Spatial Patterning

The highest counts of debitage and tools within relatively undisturbed contexts of Locus B (Ap, Apb, and Bt horizons) are clustered in the eastern portion of the APE; no chipped stone tools were recovered from excavated contexts west of the project centerline ***(Figure 32)***. The greatest diversity of artifact types was recovered from Test Units 1 and the excavation block comprised of Test Units 11, 18, 19, 20, and 22. Prehistoric pottery exhibits a similar distribution ***(Figure 33)***. Early pottery types (Marcey Creek, Dames Quarter) are restricted to Test Units 1, 7, and STP E18. Two refitting sherds of thin, quartz tempered incised pottery (possible Minguannan types) were recovered from slopewash deposits in Test Unit 21. Isolated examples of untyped quartz tempered pottery were recovered from the western portion of the APE as well.

4. Discussion

Based on the temporally diagnostic artifacts recovered during Phase I and Phase II investigations of Locus B, the small upland flat was occupied during the Woodland I cultural period (ca. 3200-2800/2500 BP based on Marcey Creek and possible Dames Quarter sherds), and during the Woodland II period (possible Minguannan sherds). The chalcedony triangular point may also be associated with the Woodland II component(s), but this is not certain. A limited variety of chipped stone tool types were recovered from the site, and these are restricted to two biface fragments and three retouched flakes. The retouched flakes are not formal tools and indicate an expedient approach to tool manufacture. A small number of jasper and chert cores was also recovered, the majority of which have been classified as bipolar cores/fragments. The high proportion of bipolar cores may also be an indication of an expedient approach to the production of tool blanks from locally available cobbles and pebbles. Analysis of jasper and chert debitage from Locus B, however, suggests that bifacial reduction was the most common strategy employed for these raw materials. It is entirely possible that bipolar reduction of cryptocrystalline cobbles/pebbles supplied the flake blanks for subsequent bifacial reduction. Exotic lithic raw materials are limited to a very few examples of rhyolite and argillite.

By itself, this small collection of chipped stone tools and debitage might suggest that Locus B was little more than a resource procurement location of Archaic, early Woodland I, or Woodland II times. However, the presence of Marcey Creek and possible Dames Quarter pottery indicates that Locus B may have functioned as a base camp at one or more times during the Woodland I period ca. 3200-2500 BP. The presence of possible Minguannan pottery may indicate similar site utilization after 950 BP.



Key:

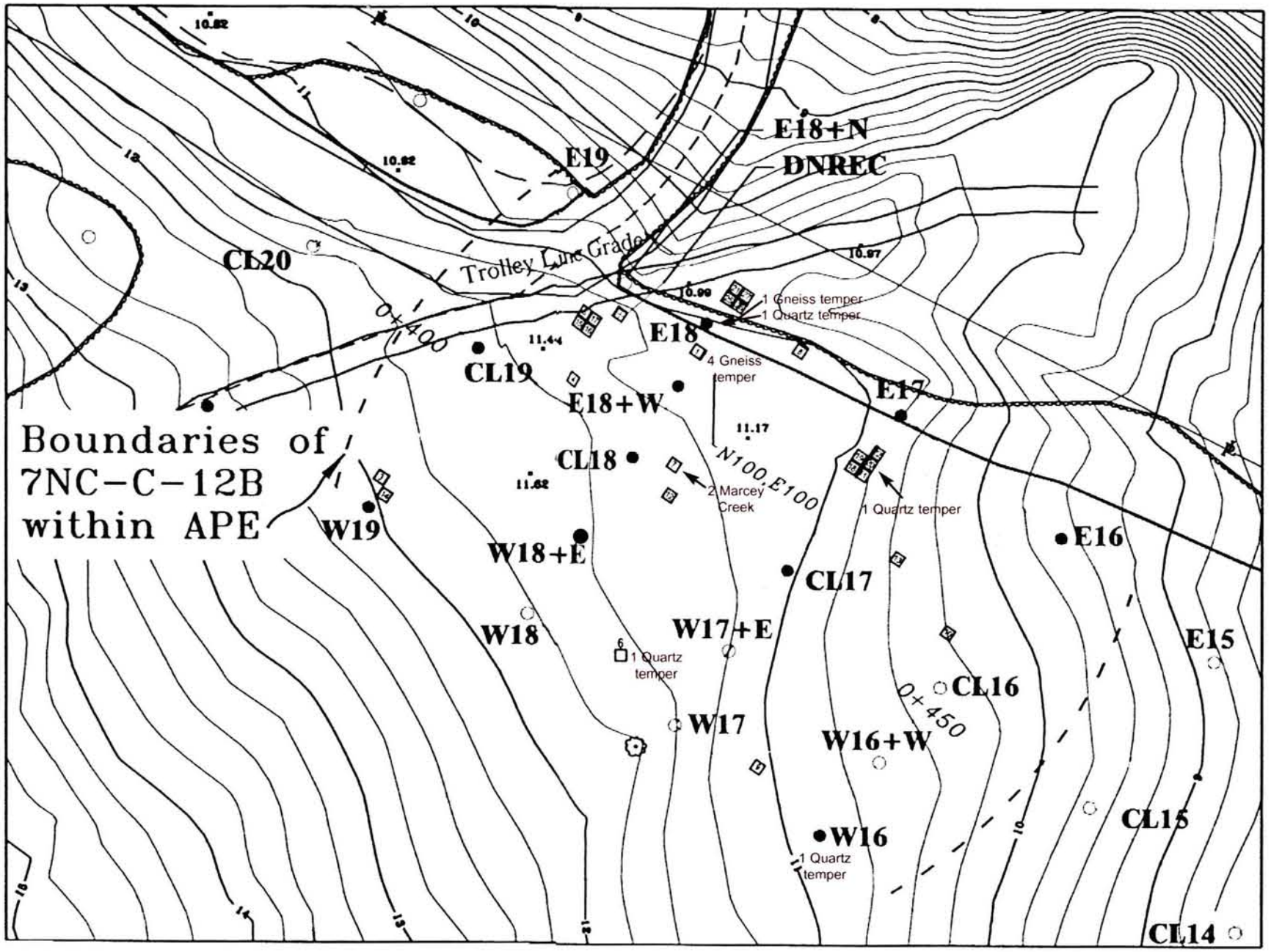
BC - Bipolar Core
FC - Freehand Core
TC - Tested Cobble
PP - Projectile Point
RF - Retouched Flake

LEGEND

- ○ MTA Negative Shovel Test
- ● MTA Positive Shovel Test
- —— Limit of APE
- - - Limit of Prehistoric Site 7NC-C-12B Within APE
- ⊡ Test Unit Number
- SCALE

Figure 32
Lithic Artifact Distribution
(Ap, Apb, and Bt Horizons)

Cauffiel Connector Project
New Castle County, Delaware



LEGEND

- ○ MTA Negative Shovel Test
- ● MTA Positive Shovel Test
- —— Limit of APE
- --- Limit of Prehistoric Site 7NC-C-12B Within APE
- ⊡ Test Unit Number
- SCALE

Figure 33
Prehistoric Pottery Distributions
(Ap, Apb, and Bt Horizons)

Cauffiel Connector Project
New Castle County, Delaware

B. Historic Artifacts

1. 7NC-C-12A

Excavations at Locus A yielded a total of 146 historic artifacts from six shovel test pits and eighteen test units ***(Appendix E)***. The historic portion of the assemblage consisted of architectural, domestic, heating by-product and indeterminate class artifacts dating to the nineteenth and twentieth centuries. Terminus Post Quem (TPQ) dates suggested nineteenth century deposition at the earliest, with twentieth century deposition being probable for Locus A.

The majority of historic artifacts (51%) were domestic in nature. Domestic artifacts included whiteware, ironstone, semi-porcelain and redware vessel fragments, as well as clam shell, lamp chimney glass, bottle glass, serving dish and indeterminate vessel glass. Fragments of a nearly complete twentieth century Coca-Cola bottle accounted for most of the domestic artifact total (48% of domestic artifacts, 25% of Locus A assemblage).

The remainder of the assemblage was composed of architectural class artifacts (36%), heating by-product (3%) and indeterminate class artifacts (10%). Architectural artifacts included brick, concrete, earthenware sewage tile, window glass and nails. All nails were unidentifiable to manufacturing method and date. Heating by-products were coal fragments. Indeterminate class artifacts were artifacts unidentifiable to a particular function, such as glass fragments unidentifiable to form, iron lumps and a piece of slate that may or may not have been roofing slate.

Terminus Post Quem (TPQ) dates were calculable for thirteen proveniences, almost all of which were Stratum I contexts from test units and yielded nineteenth or twentieth century TPQ dates ***(Table 7)***. The only exception was Feature 3 from TU 62, which possessed a TPQ date of 1627, because the only datable artifact it contained was redware, which was manufactured from the seventeenth century into the late nineteenth century.

Table 7: Locus A Historic TPQ Dates

Provenience	TPQ Date	TPQ Artifact
TU 2 Stratum I	1810	Glass bottle/insulator-mold-blown
TU 34 Stratum I	1805	Whiteware-plain
TU 35 Stratum I	1842	Ironstone-plain
TU 37 Stratum I	1850	Whiteware-enamel overglaze
TU 38 Stratum I	1859	Lamp chimney glass
TU 39 Stratum I	1899	Concrete
TU 40 Stratum I	1899	Concrete
TU 41 Stratum I	1805	Whiteware-plain
TU 42 Stratum I	1939	Polyepoxide plastic
TU 46 Stratum I	1930	Coca-Cola bottle with enameled label
TU 54 Stratum I	1899	Concrete
TU 60 Stratum I	1810	Mold-formed glass
TU 62 Feature 3	1627	Redware-lead glazed

TU 2 Stratum I possessed the only nineteenth century TPQ represented by an artifact manufactured solely in the nineteenth century (a mold-blown bottle or electrical insulator). Other nineteenth century TPQs were represented by artifacts manufactured into the twentieth century, such as whiteware, ironstone, lamp chimney glass and concrete. Due to this continuation in manufacturing periods for artifacts with nineteenth century TPQs, and to the presence of twentieth century artifacts such as the Coca-Cola bottle and a piece of plastic, it is probable that this assemblage represents field scatter from the nineteenth century into the twentieth century.

2. 7NC-C-12B

Excavations at Locus B yielded a total of 432 historic artifacts from fifteen shovel test pits and twenty-four test units ***(Appendix E).*** The historic portion of the assemblage consisted of architectural, domestic, arms/ammunition, heating by-product and indeterminate class artifacts. While artifacts manufactured from the nineteenth century into the twentieth century were present, artifacts manufactured solely in the eighteenth and nineteenth centuries were also recovered. Terminus Post Quem dates were eighteenth century and nineteenth century. No mixed contexts were observed; none of the proveniences possessed artifacts that could not have been deposited at or around the same time.

The majority of the historic assemblage (50%) consisted of domestic artifacts. Most of the domestic artifacts were fragments of redware (35% of domestics), whiteware (17% of domestics), pearlware (14% of domestics) and glass vessels (26% of domestics). Glass vessels included bottle glass, lamp chimney glass, tumbler glass and indeterminate vessel glass. Other domestic artifacts included fragments of white salt-glazed stoneware, creamware, yellowware, stoneware, porcelain, ironstone, white clay tobacco pipe, a glass bead and bivalve shell.

The remainder of the assemblage was composed of architectural artifacts (16%), heating by-products (14%), arms/ammunition (.2%) and indeterminate class artifacts (19%). Architectural artifacts included brick, mortar or lime, window glass, nails and a porcelain electrical insulator fragment. Most of the nails were unidentifiable to manufacturing method and date, but two were identifiable as wire nails dating from 1850 to present. Heating by-products included coal, coal cinder and slag. The single arms/ammunition artifact was a lead bullet. Indeterminate class artifacts were bone not identifiable as a consumed animal, a fragment of a seed or nutshell, indeterminate redware or brick, roofing or non-cultural slate, glass and semi-porcelain unidentifiable to forms, lumps of iron and a piece of tin.

Terminus Post Quem (TPQ) dates were calculable for forty proveniences ***(Table 8)***. Nine TPQ dates were seventeenth century, eight were eighteenth century and twenty-three were nineteenth century. seventeenth century TPQ dates were calculated for nine proveniences, because the only datable artifacts for those proveniences were redware vessel fragments. All eight of the eighteenth century TPQ dates were represented by artifacts manufactured into the nineteenth century. Of the twenty-three nineteenth century TPQ dates, seven were represented by artifacts manufactured only in the nineteenth century, and fifteen were represented by artifacts manufactured into the twentieth century. STP E16 Stratum II, TU 6 Stratum III and Stratum IV, TU 12 Stratum I, TU 14 Stratum II, TU 16

Stratum III, and TU 18 Stratum II possessed nineteenth century TPQ dates represented by artifacts manufactured only in the nineteenth century. TPQ dates for Locus B suggested that the assemblage represents a scatter deposited from the eighteenth, nineteenth, and possibly the twentieth centuries.

Table 8: Locus B Historic TPQ Dates

Provenience	TPQ Date	TPQ Artifact
STP CL 18 Stratum III	1627	Redware
STP CL 19 Stratum III	1783	Pearlware-transfer printed blue
STP E16 Stratum II	1820	Pearlware-embossed blue
STP E18+W Stratum IV	1627	Redware
STP W18 Stratum II	1805	Whiteware-plain
STP W20 Stratum III	1772	Pearlware-plain
STP W20 Stratum IV	1780	Pearlware-shell edge, scalloped
TU 1 Stratum III	1772	Pearlware-plain
TU 1 Stratum IV	1762	Creamware-plain
TU 3 Stratum I	1805	Whiteware-plain
TU 4 Stratum II	1860	Glass bottle-mold formed, embossed
TU 5 Stratum II	1850	Wire nail
TU 5 Stratum III	1805	Whiteware-plain
TU 6 Stratum II	1772	Pearlware-plain
TU 6 Stratum III	1805	Whiteware-shell edge, scalloped
TU 6 Stratum IV	1830	Yellowware-wheel-thrown
TU 8 Stratum I	1805	Whiteware-plain
TU 8 Stratum II	1627	Redware
TU 9 Stratum II	1627	Redware
TU 9 Stratum III	1627	Redware
TU 10 Stratum II	1805	Whiteware-plain
TU 11 Stratum II	1627	Redware
TU 11 Stratum III	1772	Pearlware-plain
TU 11 Stratum IV	1805	Whiteware-plain
TU 12 Stratum I	1820	Pearlware-embossed blue
TU 13 Stratum II	1795	Pearlware-painted underglaze orange band
TU 14 Stratum II	1800	Pearlware-sponge or spatter decorated
TU 15 Stratum III	1805	Whiteware-transfer printed blue
TU 16 Stratum III	1860	Glass bottle-mold-blown, embossed
TU 17 Stratum III	1810	Glass bottle-mold formed
TU 18 Stratum II	1810	Pearlware-painted underglaze brown band
TU 18 Stratum III	1627	Redware
TU 19 Stratum III	1627	Redware
TU 20 Stratum II	1850	Wire nail
TU 21 Stratum II	1859	Lamp chimney glass
TU 22 Stratum II	1880	Redware flowerpot
TU 22 Stratum III	1805	Whiteware-plain
TU 25 Stratum II	1650	Redware-slip trailed
TU 26 Stratum II	1805	Whiteware-plain
TU 27 Stratum II	1860	Glass bottle-mold-blown, embossed

c. Field View

After the Archaeological Evaluation Survey was completed, a field view was held on June 25, 1999 to discuss whether the portions of **7NC-C-12A** or 7NC-C-12B within the APE are contributing elements to the National Register eligible Cauffiel Estate ***(Appendix C)***. It was agreed during the field view that the portion of **7NC-C-12A** within the APE does not have the potential to contribute significant information in prehistory or history. It was also agreed by all parties that 7NC-C-12B does not appear to have that potential. An evaluation of the eligibility of 7NC-C-12B was submitted to DelDOT in *Archaeological Investigations, Cauffiel Connector, Brandywine Hundred, New Castle County, Delaware, Management Summary, National Register Evaluation of Archaeological Site 7NC-C-12-B (Stoney Run Site Locus B)* (Shaffer and Taylor 2000).