

Located on a small ridge overlooking a tributary of Skippack Creek in Montgomery County, archaeological site 36MG378 was the setting for short-term Native American camps from about 1800 B.C. to as late as 1760 A.D. Early occupations at the site were indicated by a very small number of stone tools and pottery fragments. Later occupations by groups ancestral to the Lenape people were part of a scheduled round of hunting and gathering camps away from their villages. The Pennsylvania Department of Transportation and the Federal Highway Administration sponsored the site's discovery and excavation prior to the construction of the State Route 309 Connector Project. Although the site was small and contained few artifacts, it yielded important insights into how Native Americans used areas away from major rivers.



pennsylvania

DEPARTMENT OF TRANSPORTATION

Pennsylvania Historical and Museum Commission

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Small is Beautiful:

Native American Occupations at Site 36MG378,
Montgomery County, Pennsylvania



Andrew Wyatt & Barbara J. Shaffer



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APPENDIX I - Getting Involved in Archaeology



Volunteers, both adults and children, can make valuable contributions during archaeological investigations.

Archaeologists' understanding of the Native American past is based on excavation and research conducted over the last 150 years. Scientifically-based archaeology, with its attention to hypothesis-testing and rigorous standards of evidence, has developed from the 1930's onward. Because archaeology is a relatively young discipline compared to history and the physical sciences, new discoveries on sites and in the lab can radically change what we know about the past. It is also one of the few fields of study in which non-academics can participate and make lasting contributions.

The best way to get involved with archaeology is to join a local chapter of the Society for Pennsylvania Archaeology (SPA). The SPA's website says that it was:

organized in 1929 to: Promote the study of the prehistoric and historic archaeological resources of Pennsylvania and neighboring states; Encourage scientific research and discourage exploration which is unscientific or irresponsible in intent or practice; Promote the conservation of archaeological sites, artifacts, and information; Encourage the establishment and maintenance of sources of archaeological information such as museums, societies, and educational programs; Promote the dissemination of archaeological knowledge by means of publications and forums; Foster the exchange of information between the professional and the avocational archaeologists (www.pennsylvaniaarchaeology.com).

Local chapters of the SPA often do research, conduct archaeological excavations, process and analyze artifacts, and write reports and other publications. They do most of this through the efforts of volunteers. The SPA local chapter in the Montgomery County area is Chapter #21, the John Shrader Chapter. It meets on the 1st Wednesday each month at 7:00 p.m., at the Joanna Furnace, Berks County, Pennsylvania (as of the publication of this booklet). The Chapter Representative is Catherine Spohn and she can be reached at (610) 678-1274 or cspohn@pa.gov.

Another way to volunteer for archaeological studies is through the United States Forest Service's Passports in Time Program. The US Forest Service uses volunteers to perform archaeological investigations and other historic preservation activities at interesting sites in the National Forests throughout the country. Further information is on their website at www.passportintime.com.



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Artifact photographs were taken by the authors on collections held at the
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Layout and design by Jennifer Regina

Cover Photograph: Archaeologists excavating Block 1 at Site 36MG378.

Inset: Triangular point from 36MG378.

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top of rocks that were heated in another fire and then covered with wood and brush in a conical shape. The wood and brush were then burned in a controlled fire.

Most pottery that was made by Native Americans has been broken over the years and it is very rare to find whole pots. On archaeological sites, we usually recover sherds, which are broken pieces of pots. Each Native American group manufactured ceramics that were slightly different than other groups, and the way in which they made them changed over time. Different groups used different tempers, different techniques for making the pots, different decorations, and different shapes for their pots. Luckily for archaeologists, that means that pots are often diagnostic of a particular Native American culture or time period and when we find them, we can often tell which group made them and during what time period they were made.



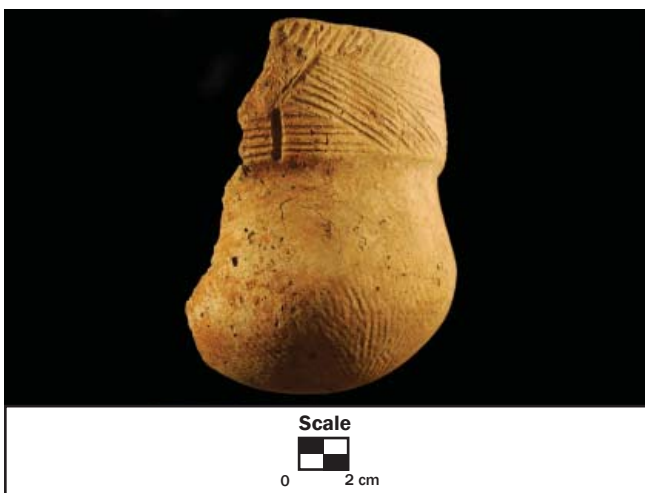
Coils are added to a hand-modeled base. The base is allowed to partially dry so that it can support the weight of additional coils.



The coils are first joined with finger pressure.



The coils are firmly joined and air pockets are removed by pressing the pot's exterior surface with a cord-wrapped paddle. The interior is supported with a small anvilstone (not shown). The resulting cordmarked surface makes the pot easier to grip and increases its thermal conductivity. The pot is thoroughly dried before firing.



Completed pot recovered from the 36CU194. The coils have been smoothed with a cord-wrapped paddle. The impressions from the cords can be seen on the bottom portion of the pot. The upper portion of the pot has been incised with a stick or bone splinter.

APPENDIX H - Making Native American Pottery

In Pennsylvania, Native Americans began making fired clay pottery by about 1200 B.C. The manufacture and use of pottery at this time was associated with a whole host of other changes in the ways Native Americans lived. These include a larger population, longer stays at base camps, and smaller territories in which Native Americans moved around. When we find pottery on a Native American archaeological site, we can potentially learn much more about the people who lived there than just the fact that they used pottery.

Native Americans in Pennsylvania made numerous pottery items. The most common use was for pots, but they also made smoking pipes and effigies. An effigy is a small model of a person or animal. A ceramic effigy could be attached to a pot or a pipe, but it could also be a stand-alone figurine.

How did Native Americans make pottery? The most common pottery in Pennsylvania was constructed from coils and fired in a pit. Local clay was used and Native Americans added temper to the clay to make it stronger and help it hold its shape better. A wide variety of material was used for temper, including crushed rock fragments, sand, or crushed shell. Once the temper was thoroughly mixed in with the clay, it was kneaded to eliminate air pockets.

To make pots, the potter made numerous coils out of the prepared clay, then stacked the coils into the desired shape. Sometimes a flat disc of clay was used for the base. Different shapes and sizes of pots were made for different purposes. The coils were firmly pressed into one another so that cracks would not develop when the pot was fired.

Wooden paddles were often pressed against the outside of the pot while it was being smoothed to ensure that no air pockets remained. The paddles were sometimes wrapped with a cord made from plant fibers which left impressions of the cord on the pot's surface. Archaeologists refer to pottery impressed in this way as cordmarked pottery.

Pottery was sometimes decorated with designs made by incising lines on the clay with sticks or bone splinters. The ends of sticks or reeds were sometimes pushed into the pot, which is called punctation. Nets were pressed against the exterior surface of the pot to leave an impression of the net. Lugs of clay were occasionally attached to the outside of the pot.

Once the pot was made into the right shape, it was allowed to air dry for several days and then fired in a shallow pit. The unfired pottery was placed upside down in the pit on



Small is Beautiful:

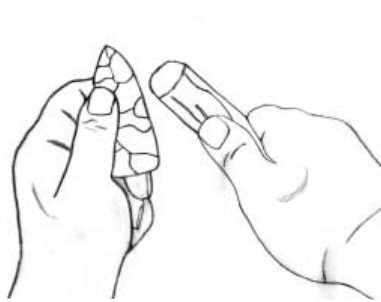
Native American Occupations at Site 36MG378,
Montgomery County, Pennsylvania

Andrew Wyatt & Barbara J. Shaffer
McCormick Taylor, Inc.

Commonwealth of Pennsylvania
Pennsylvania Historical and Museum Commission
for the Pennsylvania Department of Transportation

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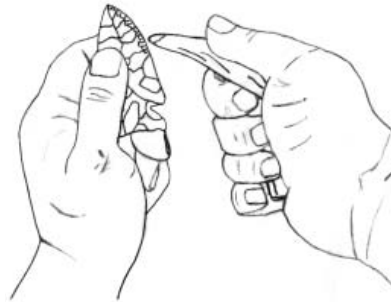
however coarser-grained stones like rhyolite and quartzite were also used. Chipped stone tools could be resharpened by repeated flaking, and they could be recycled to perform different tasks. The series of drawings below illustrate a typical sequence of chipped stone manufacture and re-use.



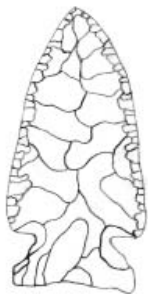
An antler billet removes flakes to thin and shape the biface and create straighter cutting edges.



The refined biface can now be fitted into a shaft or hand-held for more delicate cutting tasks.



A sharpened antler tine is used to notch the biface for hafting and to press off very small flakes to sharpen its edges.



A completed side-notched projectile point.



After the point's blade width is reduced through re-sharpening, it is recycled into a drill.



If the blade tip breaks, the break can be chipped to form an endscraper. Endscrapers were used to scrape the flesh and hair from an animal hide, the first step in making skin clothing.

Pestles are cylindrical in shape and have rounded ends. They could be used with a wooden mortar to pulverize nutmeats or seeds into meal. The cylindrical portion of the pestle could be used with a stone anvil or wood plank as a roller for the same purpose.



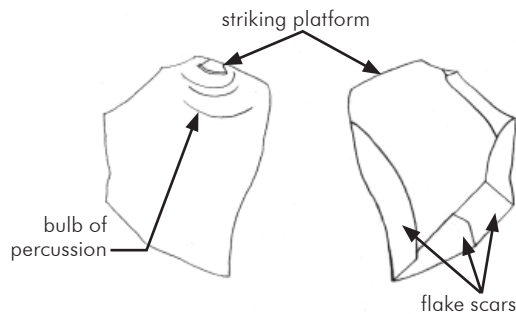
Pestle (approx. 14 inches in length).

Chipped Stone Tools

Chipped stone tools were the most versatile class of stone tool. They could be made quickly and were used for a variety of piercing, cutting, or scraping tasks. Chipped stone tool types include bifaces, projectile points, drills, and endscrapers. The process of making these artifacts is variously called chipping, flaking, or knapping, because stone chips/flakes were removed from the worked piece to attain the desired shape. Fine-grained stones like flint, chert, jasper, and quartz were used for making chipped stone tools due to their predictable fracture characteristics,



A hammerstone is used to detach a large flake from a larger piece of stone.



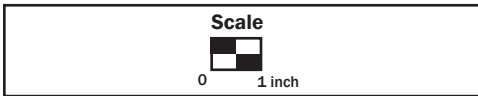
The resulting flake has a striking platform where the hammerstone made contact. The smooth interior surface of the flake (left) exhibits a bulb of percussion from the force of the blow, while the exterior surface of the flake (right) shows the scars of previous flake removals on the exterior of the core.



The flake is repeatedly turned over and chipped with a small hammerstone to create a biface, a stone tool that has been flaked on both faces. The biface is thick and its edges are wavy; it could be used to butcher a carcass or scrape wood. In addition, the flakes from making the biface could also be used to pierce, cut, or scrape a variety of materials.

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Netsinkers. Larger netsinkers may indicate the use of larger, heavier nets or seines.

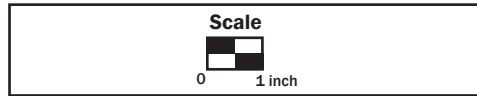
Netsinkers were typically made from flat cobbles to hold the bottom edge of a net in contact with the stream or river bottom. The notches on each side allowed net cords to be securely tied to the netsinker. The notches were chipped and then lightly ground with a hammerstone.

Ground Stone Tools

Ground stone tools are heavily modified and were often designed for specific tasks. They were made by pecking and grinding the piece being worked with a harder

stone. Rubbing with sand and water produced a polished surface. Ground stone tool manufacture required significant time and labor as well as the experience necessary to select stone that would not fracture when the final product was used. Ground stone tool types include axes, celts, adzes, and pestles.

Ground stone axes were made with grooves around their back ends for the attachment of a haft (handle). Like metal axes today, the axe head was oriented parallel to the haft for efficient wood chopping and splitting. Ground stone axe bits could be resharpened by pecking and grinding, but when the bit angle became too wide for effective chopping, the axe could be “re-purposed” as a maul for driving wooden wedges to split wood.



Full-grooved ground stone axe.

Celts are typically smaller and thinner than axes and could be oriented parallel to the haft for lighter-duty chopping. Often, however, one face of the bit displays a steeper angle. Called

adzes, these tools were oriented perpendicular to the haft and could be used to hollow out wooden bowls, masks, or dugout canoes.



Ground stone celt.

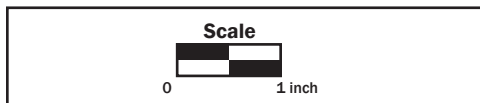


Hafted ground stone tool replicas.

APPENDIX G - Making Stone Tools

Before European contact Native Americans made most of their tools, clothing, and shelters from organic materials like wood, plant fibers, or animal products (skin, sinew, bone, antler, and shell). These materials decompose quickly and are rarely found on archaeological sites. In contrast, stone tools formed a small part of Native American technology, yet they preserve almost indefinitely. Stone tools and the debris from making them are often the only artifacts available to reconstruct how and when a site was used. Stone tools were durable and reusable; they were an integral part of human technology for much longer than metals. Archaeologists divide stone tools into three classes based on how they were made: chipped stone tools, ground stone tools, and rough stone tools.

Rough Stone Tools



This hammerstone is heavily pitted from repeated impacts on a hard material, probably stone.

Rough stone tools are unmodified or minimally modified stones used for a variety of tasks. They took very little effort or skill to make. Rough stone tools include hammerstones, anvils, and netsinkers.

Hammerstones, often river pebbles and cobbles, were used to pound, batter, and crush many materials. Hammerstones were used to make chipped and ground stone tools, to crack nuts and seeds, to break bones for marrow, or virtually any task that required concentrated force from a hard object. They were often used together with an anvil stone.

Anvil stones are flat slabs of stone or flat cobbles that were used in combination with a hammerstone to crush or grind other materials. The working surface of an anvil stone often exhibits deep pits made by pecking. The pits might have held nuts securely for cracking or pieces of stone to be broken.

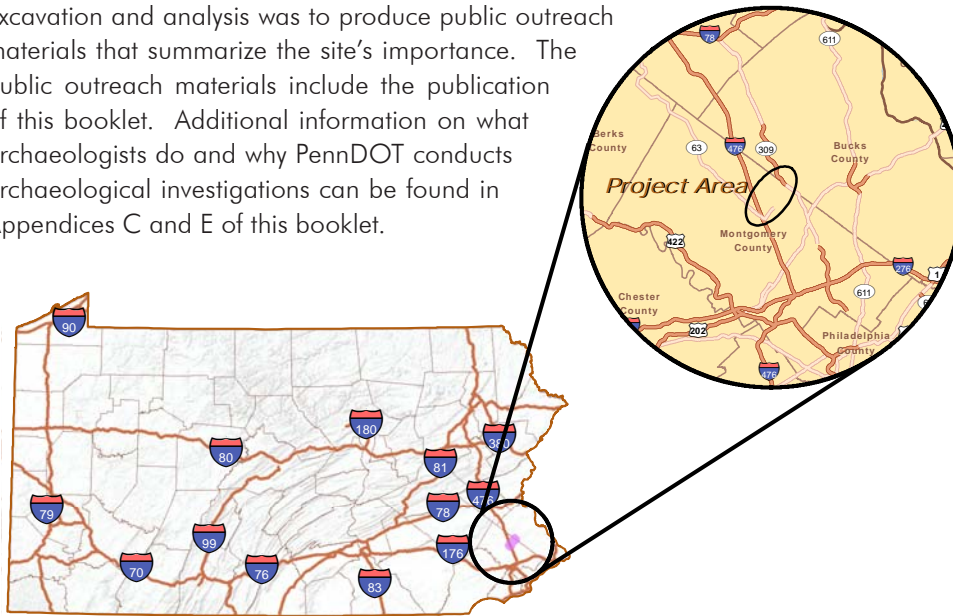


An anvil stone and hammerstone. Deep pitting on the anvil stone indicates repeated use.



Introduction

The Pennsylvania Department of Transportation (PennDOT) and the Federal Highway Administration (FHWA) sponsored archaeological excavations at 36MG378, a Native American archaeological site located in Towamencin Township, Montgomery County, Pennsylvania. Site 36MG378¹ was discovered in 2002 by archaeologists working for McCormick Taylor, Inc. during an archaeological survey for the State Route 309 Connector in Montgomery and Bucks Counties, Pennsylvania. PennDOT hired McCormick Taylor to conduct final archaeological excavations at the site before the project was constructed. The transportation project was designed to relieve traffic congestion between State Route 309 and State Route 63 in Montgomery and Bucks Counties, Pennsylvania by widening existing roads and by building new sections of two-lane road.

During the project development process, PennDOT realized that 36MG378 contained important information for understanding the Native American past in Pennsylvania and was eligible for listing in the *National Register of Historic Places*. They also determined that project-related construction would destroy 36MG378. Because it would be destroyed, PennDOT and FHWA funded intensive excavations at the site to recover the important data it contained. Another component of the site's excavation and analysis was to produce public outreach materials that summarize the site's importance. The public outreach materials include the publication of this booklet. Additional information on what archaeologists do and why PennDOT conducts archaeological investigations can be found in Appendices C and E of this booklet.



¹ Archaeological sites in Pennsylvania are assigned unique site numbers by the Pennsylvania Historical and Museum Commission using the Smithsonian Trinomial System. The first number "36" reflects Pennsylvania's alphabetical place with respect to other states before Alaska and Hawaii gained statehood, "MG" is the abbreviation for Montgomery County, and the number "378" indicates that the site is the 378th archaeological site recorded in that county.



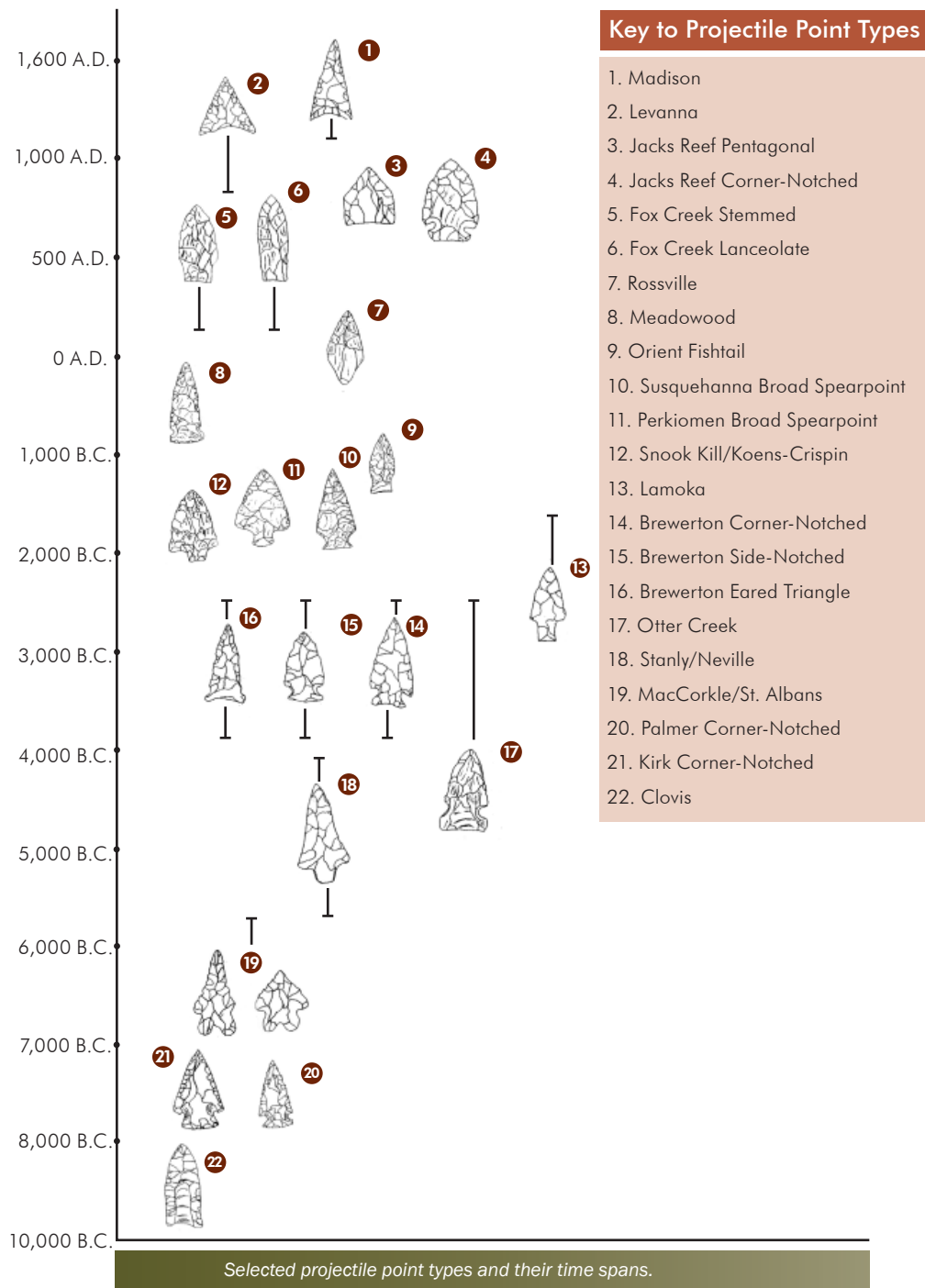
When people think about Native American life in Pennsylvania, images of large stockaded villages along the Susquehanna or Delaware Rivers with significant numbers of inhabitants often come to mind. The title of this brochure, “Small is Beautiful,” refers to the small size of site 36MG378 in comparison to other archaeological sites presented in PennDOT’s Byways to the Past series. Despite its small size, the site has an important story to tell about the ways Native Americans used areas away from major rivers.

As a final introductory note, when archaeologists communicate with each other about what they have found, how old it is, and what they think it means, they use specialized technical terms or “jargon”. Although we have tried to keep technical terms to a minimum, a few are unavoidable because they stand for ideas, objects, or processes that are unique to the study of the past. These technical terms are italicized in this booklet, and their definitions can be found in the Glossary (Appendix A).

Site Discovery and Significance

From a large geographical perspective, PennDOT’s S.R. 309 Connector project is located in the Piedmont *physiographic province*, a 600 mile-long plateau extending from Alabama to New Jersey characterized by rolling hills and shallow river valleys. On a smaller scale, the project falls within the Gettysburg-Newark Lowland, an area of more isolated hills and rolling lowlands. The project area extends along the drainage divide between the Neshaminy Creek and Skippack Creek watershed. Although both streams are part of the Lower Delaware River Drainage, Neshaminy Creek flows east directly to the Delaware River while Skippack Creek flows to the west. Skippack Creek joins Perkiomen Creek approximately nine miles southwest of the project area, which in turn contributes to the Schuylkill River, a major Delaware River tributary in southeastern Pennsylvania. Technically, the site lies in the Lower Schuylkill River Watershed, which is part of the Lower Delaware River Drainage.

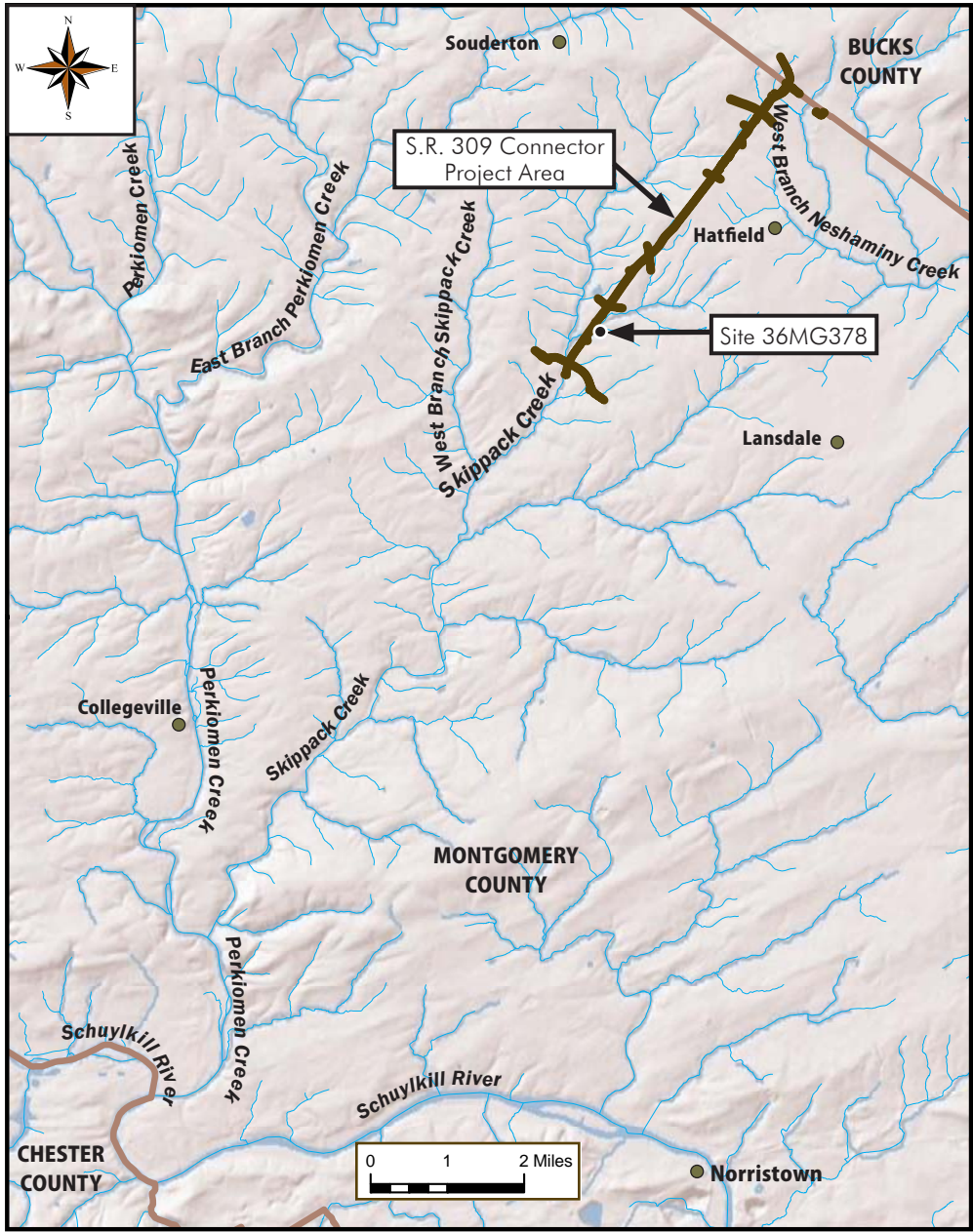
Using engineering plans for the proposed roadway improvements, archaeologists walked the entire project area and divided it into two general categories. Areas where the ground surface had been disturbed by grading for roads, housing, and commercial development held little chance of containing archaeological sites. Areas near natural water sources and historic houses, agricultural fields, and forested areas where archaeological sites might still be preserved were the focus of a Phase I archaeological identification survey, the goal of which is to identify archaeological sites. The locations of undisturbed or relatively undisturbed areas were then compared to topographic and aerial maps, historic maps from the eighteenth and nineteenth centuries A.D., and maps showing the location of known archaeological sites in order to pinpoint areas where archaeological testing would be performed.



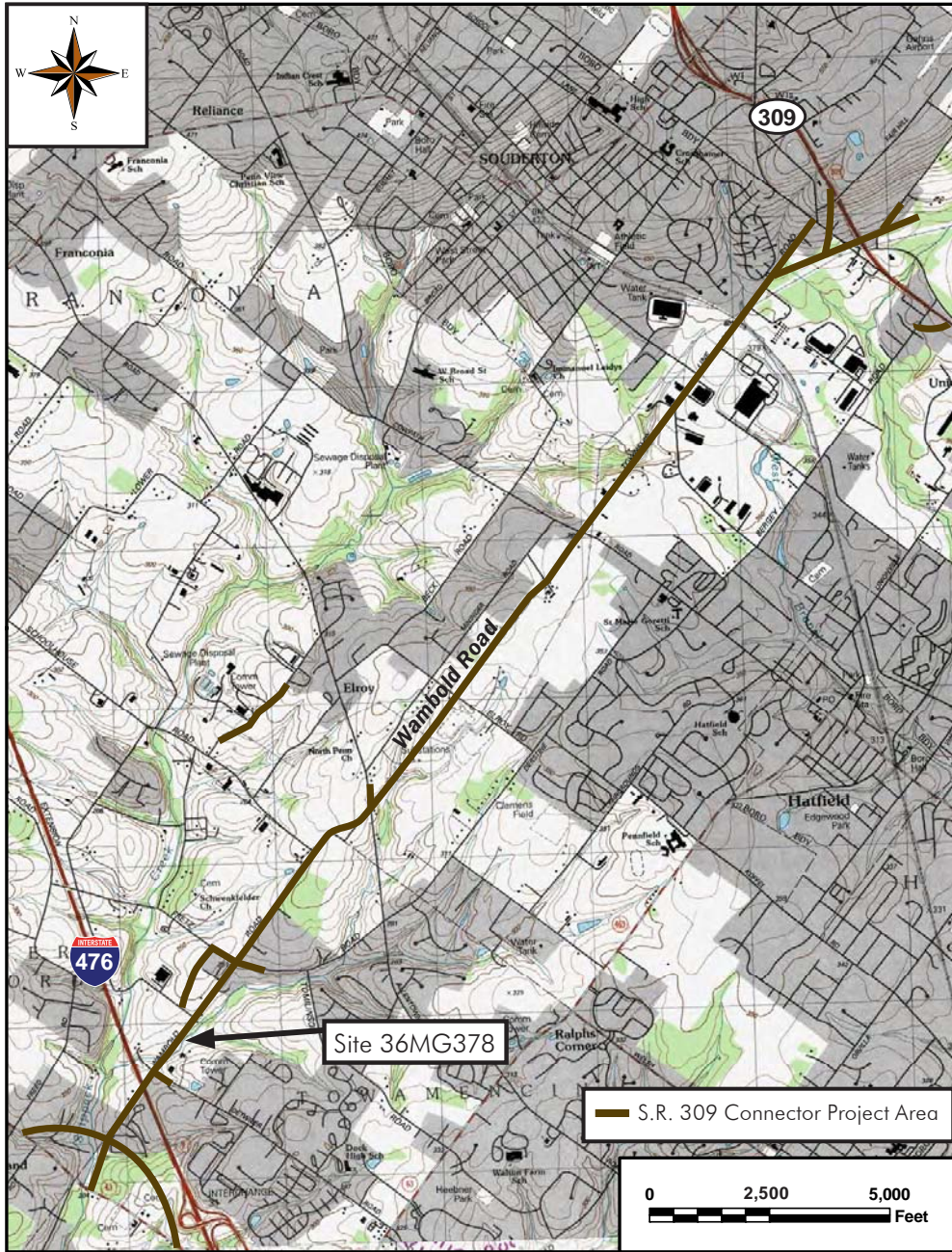
APPENDIX F - Native American Cultural Periods in PA

Archaeologists working in the Susquehanna and Delaware River Basins have divided the Native American past into four major periods: Paleoindian, Archaic, Woodland, and Contact. Lifeways and technology within a period were generally similar, while period boundaries reflect significant cultural changes. The Archaic and Woodland are divided into sub-periods, each of which is based on changes in tool types, settlement patterns, or technology. The table below presents the dates for each period and sub-period along with some of the defining characteristics of each. Although the time boundaries in this table appear sharp, they approximate when changes had taken place in the region. The earliest periods/sub-periods (Paleoindian through Middle Archaic) are represented by very few excavated sites. The Early and Middle Woodland sub-periods are so poorly understood in Pennsylvania that farming seems to appear out of nowhere by the beginning of the Late Woodland sub-period.

Period	Sub-Period	Dates	Defining Characteristics
Paleoindian	None	10,000-8,000 B.C.	Small, highly mobile groups adapted to late Ice Age environment. Strong focus on hunting (possibly caribou and extinct Ice Age animals).
Archaic	Early Archaic	8,000-7,000 B.C.	Small groups, less mobile than Paleoindian. Environment in transition to modern conditions, with greater abundance of and attention to gathered foods.
	Middle Archaic	7,000-3,000 B.C.	Group size still small, mobility reduced from Early Archaic. Forests composed of modern species. Ground stone tools rare in beginning, more common at end.
	Late Archaic	3,000-1,800 B.C.	Large re-occupied base camps appear in river valleys indicate population growth, increased sedentism. Range of artifacts indicate intensive resource collection.
	Terminal Archaic	1,800-1000 B.C.	Similar in most respects to Late Archaic, with new container technology (soapstone vessels early, pottery by 1,200 B.C.) Inter-regional trade reaches high levels.
Woodland	Early Woodland	1,000-400 B.C.	Sites smaller than Late, Terminal Archaic. Low-level pottery use continued. Longer stays at base camps suggested by increased number of storage pits.
	Middle Woodland	400 B.C.-900 A.D.	Similar to Early Woodland. Inter-regional trade more common. Maize and squash cultivated in Susquehanna Drainage after 700 A.D.
	Late Woodland	900-1600 A.D.	Small farming hamlets, burial mounds in Susquehanna Drainage early, large stockaded villages after 1,200 A.D. Some farming in Delaware drainage by 1,200 A.D.
Contact	None	1600-1780 A.D.	Extensive farming supports large Susquehannock villages, Delaware groups organized in small farming villages. European contact and settlement intensifies inter-tribal conflict. European diseases reduce Native American population by up to 90 percent.



Regional Setting of Site 36MG378



S.R. 309 Connector Project (Basemap: USGS 7.5' Series Telford, PA Quadrangle)

- When PennDOT projects have an adverse effect on a historic property, PennDOT must explore measures to minimize or mitigate the effect.

For this booklet, we only talk about how PennDOT considers the effects of its projects on archaeological sites, although they also consider buildings, bridges, historic districts and other above ground man-made structures.

There are three phases that PennDOT follows when considering whether the project will affect archaeological sites.

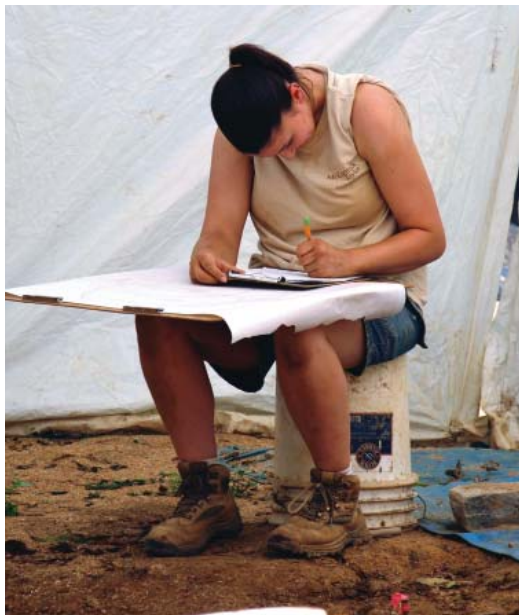
- **Phase I archaeological identification surveys** are intended to locate archaeological sites within the area of potential effects.
- **Phase II archaeological evaluation investigations** are conducted to determine if an archaeological site is eligible for listing in the National Register of Historic Places. The results of the investigations should also provide the time period in which the site was used, the boundaries of the site, and some idea of the artifacts types and distribution and soil characteristics found at the site. If the site is determined to be eligible, PennDOT must assess if the project will have an effect on the site, and if so, if the effect will be adverse. For PennDOT projects, an adverse effect usually means that the project will destroy a part or all of the site.
- **Phase III archaeological data recovery excavations** are conducted on sites that are eligible for listing in the National Register of Historic Places as mitigation if PennDOT activities will have an adverse effect on the site.

PennDOT and FHWA are required to involve the public throughout the process of identifying historic properties, determining if they are eligible for listing in the National Register of Historic Places, assessing if the project will have an effect on properties that are eligible, and mitigating those effects that are adverse.

To learn more about PennDOT's public involvement process for historic properties and find out about projects that are being developed in your area and how you can get involved in them, you can go to the Pennsylvania Transportation & Heritage website that PennDOT has set up for this purpose: www.paprojectpath.org.

To find out more about the Section 106 process, you can read *A Citizen's Guide to Section 106 Review*. Go to www.achp.gov and click on **Working with Section 106**.

As a result, agencies such as PennDOT and FHWA are required to consider the effects on historic properties within the area of potential effects of any projects they carry out, approve, or fund. **Historic properties** are defined by regulation as districts, sites, structures, buildings, objects, or traditional cultural properties that are listed in or eligible for listing in the National Register of Historic Places. Historic properties are also referred to as cultural resources. **The National Register of Historic Places** is the official list of the Nation's historic places worthy of preservation. The regulatory definition of the **area of potential effects** is the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties. For archaeological sites, the area of potential effects is any place in which ground disturbing activities could occur for a project.



Careful record-keeping is essential during archaeological investigations.

The **State Historic Preservation Office** administers the national historic preservation program at the state level, reviews National Register of Historic Places nominations, maintains data on historic properties that have been identified but not yet nominated, and consults with Federal agencies during the Section 106 process. In Pennsylvania, the State Historic Preservation Office is the Pennsylvania Historical and Museum Commission's Bureau for Historic Preservation. To successfully complete the Section 106 process, PennDOT and FHWA work with the State Historic Preservation Office, any Federally Recognized Tribes that are interested in the project, and other parties to complete the steps listed below.

- Identify properties within the area of potential effects that are listed in or eligible for listing in the National Register of Historic Places.
- Determine if the project will have an effect on the property, and if so, if the effect will be adverse. An **adverse effect** occurs when an undertaking may directly or indirectly alter characteristics of a historic property that qualify it for inclusion in the National Register of Historic Places.

The undisturbed areas that could contain archaeological sites which were identified through the walk-over and background research totaled approximately 37 acres, or about 74 percent of the 49-acre S.R. 309 Connector project area. These areas were then tested for the presence of sites by a method called systematic shovel-testing in which small holes (shovel test pits) are excavated at a set distance (usually 50 feet) from each other. The soil from each shovel test pit is screened through ¼-inch wire mesh, and the material left in the screen is visually scanned for **artifacts**. Using this method, five Native American sites were found within the project area. Each of the sites was identified based on the recovery of a small number of **stone tools** or **flakes** in shovel test pits (see Appendix G for a brief discussion of how stone tools were made).

In the next stage of fieldwork, a Phase II archaeological evaluation investigation, the sites were evaluated for their research potential. Could any of the sites contribute important information to our understanding of the Native American past on a national, regional, or local level? If so they would be eligible for listing in the National Register of Historic Places. To answer this question, additional



Soils from a shovel test pit are passed through a portable shaker screen. The material left in the screen is visually scanned for artifacts.

excavations were conducted at each of the five sites. Additional systematic shovel-testing at closer intervals (12.5 feet) was used to determine the size of each site within the proposed limits of ground disturbance. Square test units measuring 3.3 by 3.3 feet² were excavated to gather a larger sample of artifacts and to determine if archaeological **features** like **postmolds**, **hearths**, or **storage pits** were present. Four of the five sites yielded a small number of flakes, one or two stone tools, and no features.

The four sites were small and none of the artifacts could be assigned to a specific time period. Together these findings indicated very brief stays by Native Americans at unknown points in the past. In contrast, Phase II evaluation at 36MG378 produced substantially higher numbers of stone tools and flakes than the other four sites and was larger than those sites. In addition, one of the recovered stone tools, a **projectile point**, was similar

² The site was excavated using the metric system units of measurement. These have been converted to English measurement units for this brochure.



in form to the Fox Creek Lanceolate projectile point type which was made and used between about 100 and 800 A.D. Sites of this time period are rare in interior portions of the Delaware River Basin. (see Appendix F for a summary of Native American cultural periods in Pennsylvania and examples of the projectile points commonly associated with them).

Given these observations, PennDOT determined that 36MG378 was eligible for listing in the National Register of Historic Places, and that further excavation and analysis of the site should be conducted prior to road construction. No further work was recommended at the other four Native American sites. PennDOT and State Historic Preservation Office staff archaeologists agreed with this finding, and in September 2005 the final stage of excavation, Phase III archaeological data recovery excavations, began with a five-person crew.

Data Recovery Excavations at 36MG378

Final excavations at 36MG378 were guided by four general research questions:

1. Did Native Americans use 36MG378 only between 100 to 800 A.D.?

Most sites in the local area were occupied during more than one time period. A larger excavation at the site might reveal evidence for multiple visits over a longer time span. Archaeologists refer to the date of a site's occupation(s) as its chronology; building reliable chronologies for sites is fundamental to understanding the past.

2. Does the site contain areas where distinct tasks were performed, like food preparation or stone tool manufacture?

Finding activity areas would help answer the next question.

APPENDIX E - Why Does PennDOT Do Archaeology?

Many PennDOT as well as local road and bridge projects receive funding from the Federal Highway Administration (FHWA). There are federal and state laws that require agencies or individuals to take historic properties into consideration any time that they receive federal or state funding, licensing, or assistance. Two of the important laws are Section 106 of the National Historic Preservation Act (along with the regulations that enforce it, 36CFR§800) and the Pennsylvania History Code (37 Pa. Cons. Stat., Section 507 et. seq.). We often call the process that PennDOT goes through when it is considering historic properties the **Section 106 process**.

The underlying assumption of these laws is that historic properties, including archaeological sites, are important to all Americans. Our federal government believes this and has explained why in the National Historic Preservation Act:

The Congress finds and declares that -

(1) the spirit and direction of the Nation are founded upon and reflected in its historic heritage;

(2) the historical and cultural foundations of the Nation should be preserved as a living part of our community life and development in order to give a sense of orientation to the American people;



Our federal government believes that historic properties are significant to the Nation's heritage. Photograph of intensive excavations at site 36BK876, a historic farmstead in Berks County, Pennsylvania.

(3) historic properties significant to the Nation's heritage are being lost or substantially altered, often inadvertently, with increasing frequency;

(4) the preservation of this irreplaceable heritage is in the public interest so that its vital legacy of cultural, educational, aesthetic, inspirational, economic, and energy benefits will be maintained and enriched for future generations of Americans.

APPENDIX D - Archaeological Ethics

Archaeologists adhere to a set of ethics. This means that we recognize that there are appropriate and inappropriate activities and behaviors that we follow when conducting archaeological investigations. Conducting archaeological excavations is destructive – once someone has excavated a portion of a site, it is destroyed. If the important information from that portion of the site is lost, it can never be obtained again. Ways the information could be lost are if the excavations were carried out haphazardly, careful records weren't kept during the excavations, the artifacts weren't properly analyzed, the results weren't written up and made available to the public, or any number of other reasons. This is why it is so important that all archaeological work be conducted in a manner which follows accepted protocols and why trained archaeological professionals should supervise all archaeological excavations.

One of the core beliefs at the center of archaeological ethics is the idea that archaeological sites are an important part of our shared heritage and the results of the excavations should benefit the public. Anyone participating in archaeological research should strive to be a good steward of the site, the artifacts, and the information that was recovered.

If you are involved in an archaeological project, always remember that you are destroying or damaging the site. The reasons for conducting the excavations should outweigh the damage. Good reasons for conducting archaeological excavations are that the site is slated for destruction by some kind of construction project (such as the roadway project for which this booklet has been written) or that the site contains information that is so significant that it will contribute greatly to our knowledge of the way people lived during a specific time period in a certain place (such as the work often conducted by universities and the Society for Pennsylvania Archaeology).



The paperwork completed by archaeologists is an important part of the documentation of the archaeological investigations. These records will be permanently curated with the artifacts.

The Society for American Archaeology, an international organization dedicated to the research, interpretation, and protection of the archaeological heritage of the Americas, has 8 principles that archaeologists should follow. If you plan to become involved in archaeological research, you should take a look at them. They can be found on their website at www.saa.org, under the section entitled "About the Society."



3. What range of tasks was carried out at the site?

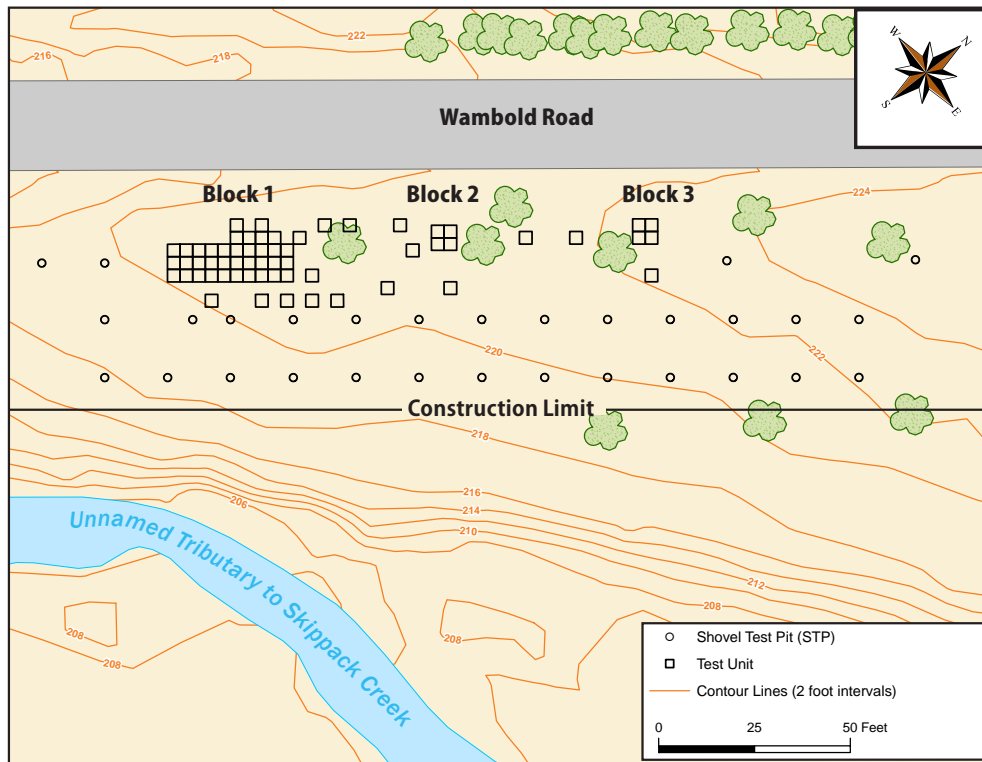
A wide range of activities might indicate a base camp where one or more families resided, while a more limited number of activities could be evidence for a short-term hunting or gathering camp. This research question addresses the site's place within a larger *settlement pattern*.

4. How does 36MG378 relate to other excavated sites in the local area and in the Lower Delaware River Drainage? Have other sites like 36MG378 been excavated, or are they relatively rare?

Site 36MG378 was located on a small ridge oriented northeast to southwest in the side yard of a house built in the 1840's³. The site is bordered on the west by a deep vertical cut for Wambold Road and on the east and south by a steep slope down to the floodplain formed near the confluence of two unnamed tributaries to the East Branch of Skippack Creek. Phase I and II testing indicated that the top of the ridge contained the highest concentration of artifacts. This area was the focus of data recovery excavations.

The *excavation grid* used for the previous Phase II testing was re-established over the site, and three *excavation blocks* were positioned to expand around the four Phase II test units

³ Artifacts from the 1840's through the present were thinly distributed in the side yard of the house, representing the random discard of broken household items over the last 150 years. Because they were not associated with specific features, they held little research potential and were not the focus of data recovery excavations.



Plan of Site 36MG378 Excavations

that had produced the highest artifact counts. Two lines of shovel test pits were excavated east of the blocks to determine whether the site extended farther to the east. Each test unit and shovel test pit was excavated by natural soil layers, and all excavated soil from each layer was screened separately through ¼-inch wire mesh to recover artifacts. All artifacts were found in the top two feet of soil, which was expected given how soil had formed on the ridge.

On river and stream floodplains archaeological sites can be buried, sometimes deeply, by flood-deposited soils. In contrast, on many landscape settings above floodplains like that at 36MG378, soils develop very slowly by the gradual grain-by-grain weathering of bedrock over many millennia. As a result, the ground surface we walk on in upland areas is at essentially the same elevation as it was when the earliest Native Americans arrived⁴. Like many *upland* archaeological sites, 36MG378 had been repeatedly plowed to a depth of about one foot since at least 1840 A.D. if not before. Plowing can move artifacts

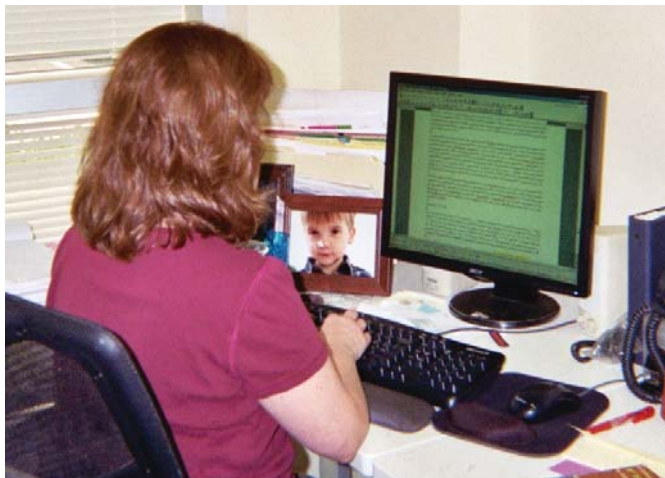
⁴ The earliest and most widespread evidence indicates that most Native American groups are descended from small groups of hunter-gatherers, called Paleoindians, who spread across North America some 13,000 years ago. The initial colonization of the New World by these small groups took place prior to that date, but exactly when they arrived is a hotly contested topic among archaeologists.

Laboratory analysis is the processing of the artifacts found during field work. It includes washing, labeling, inventorying, analyzing, and packing the artifacts in appropriate containers for curation. **Curation** is the storage and maintenance of archaeological artifacts in an appropriate facility. The artifacts should be stored in archivally safe bags and boxes and the facility should be climate controlled. A very important aspect of curation is that the artifacts are made available to other people in the future who might want to use them for additional research.



Artifacts are returned to the laboratory for processing and analysis.

Documentation is writing up the results of the archaeological investigations and making them available to other researchers and the general public. There are usually at least two different types of documentation. A detailed technical document, which may be very long and dry, is prepared for other archaeologists. It usually includes all of the data that was generated during the excavations and analysis, so that other archaeologists can use that data for their research. The second is a booklet (such as this one), brochure, poster, exhibit, website, or other avenue for the public to learn about the site and the important information that was learned from the site.



Preparing reports for other archaeologists and also for the public is an important component of archaeological investigations.

- **Field reconnaissance** involves walking over an entire area to assess the conditions. During the walk-over, the archaeologists look for previously disturbed areas, evidence of archaeological sites on the surface (such as artifacts or foundations), water sources, how steep the ground is, and any other factors that might help them determine if there might be any archaeological sites present.
- **Controlled surface collection** is the systematic collection of artifacts that are visible on the surface of the ground. It is usually done immediately after a field has been plowed and after it rains, as this often brings artifacts to the surface. When archaeologists are walking fields looking for artifacts during a controlled surface collection, they walk in rows that are a set distance apart, and they record the location of the artifacts they find.



Intensive excavations being conducted at site 7NC-B-11, a historic farm complex in Wilmington, Delaware

- **Subsurface sampling or testing** of an area is often done to determine if sites are present. Also, subsurface sampling or testing of a known site is done to assess whether the site is significant. It usually includes the excavation of shovel test pits or test units. Shovel test pits are round holes that are approximately 2 feet in diameter and test units are square holes that are approximately 3.3 by 3.3 feet. Sometimes backhoes can be used to cut trenches or to remove overburden that is covering up a site.
- **Intensive excavations** are usually full-scale investigations where a large portion of the site is excavated to recover the important information that can be learned from the site. It usually includes excavating blocks of test units and any features that are identified.



Perkiomen Broad point fragment from 36MG378 (left). Complete Perkiomen Broad point (right). Both points made of jasper.

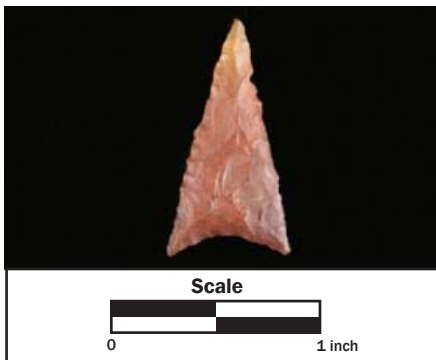
over a considerable distance from their original position, potentially mixing artifacts from different time periods. As a result, the degree of artifact movement from plowing had to be accounted for in our interpretation of the site.

Combined Phase I, II, and III excavations yielded a total of 2,013 Native

American artifacts from the site. The majority of these artifacts (1,872, 93 percent) were recovered from Block 1 and adjacent test units, indicating that this was the most heavily used area of the site. In comparison, only 120 artifacts were found to the north in Blocks 2, 3 and isolated test units around them. The shovel tests placed to the east of Block 1 produced very few artifacts, which suggests that this area of greater slope was not as intensively used. Finally, high artifact counts in test units on the west side of Block 1 showed that perhaps half of the site had been destroyed by the construction of Wambold Road. The total site area measured 8,859 square feet, however the area of most intensive use around Block 1 measured only 1,206 square feet. This is a very small area in comparison to many archaeological sites.



Argillite Rossville point from 36MG378



Jasper triangular point, from 36MG378



Rim sherd of Overpeck Incised pot from 36MG378. This vessel had an opening diameter of about five inches, indicating a small pot that might hold about two quarts.



Reconstructed section of an Overpeck Incised pot from the Overpeck site (36BU5), Bucks County, Pennsylvania. This pot was larger than the example from 36MG378, with an estimated capacity of about one gallon.

The data recovery excavations produced several surprising finds that were primarily related to the site's chronology. None of the artifacts could be definitely associated with the 100 to 800 A.D. occupation that was indicated by the single Fox Creek Lanceolate point found in Phase II testing. And although the majority of artifacts were stone tools and flakes resulting from the manufacture of stone tools, a small number of pottery *sherds* were also recovered that were not found in the Phase II investigations. **Diagnostic artifacts** (projectile points and pottery) that could be assigned to relatively broad time periods indicated that the site was occupied intermittently from around 1800 B.C. to as late as 1750 A.D. The oldest occupation at the site was indicated by a single Perkiomen Broad point. **Radiocarbon dates** associated with this point type at numerous sites in the eastern United States range between 1800 and 1200 B.C. Two refitting halves of a Rossville point represent at least one visit to the site between 500 B.C. and 300 A.D. Four of the pottery sherds found at the site can be placed in this same general time period, but may date as early as 1000 B.C. The Fox Creek Lanceolate point may indicate a separate occupation between 100 and 800 A.D., or it may have been discarded by the same group that discarded the Rossville point. Radiocarbon dates associated with both types overlap between about 100 and 300 A.D.

APPENDIX C - What Do Archaeologists Do?

The most common question archaeologists get is “Do you find dinosaur bones?” Archaeologists don’t actually look for dinosaur bones, although some archaeologists may find them by accident occasionally. Archaeology is the scientific study of the human past through the recovery of material remains and the analysis of those remains. Dinosaurs became extinct about 65 million years ago. Modern humans did not evolve until about 200,000 years ago at the very earliest, so dinosaurs were gone for at least 64 million years before people appeared. People have lived in North America for at least 13,000 years.

Here in Pennsylvania, archaeologists study the past lives of people who have lived here both before and after the European colonization of the New World. There are four basic components to an archaeological study: background research, fieldwork, laboratory analysis, and documentation. Each of these components is equally important, and fieldwork should never be undertaken unless the other three are also going to be completed.

Background research

should be conducted before beginning any field work. Background research tells us what is already known about an area, including where archaeological sites are already recorded and what work has been done at those sites. It also allows us to develop a context for the site. A **historic context** contains information about what is already known regarding a site’s specific time period, location, and type. The context is the framework within which the site’s importance can be evaluated. Background research will often continue throughout the field work, laboratory work, and report write-up, as new information from the excavations and analysis comes to light.



One component of background research is reviewing research that has been previously conducted.

Fieldwork is the on-site investigation of an area or archaeological site. Field work can consist of a variety of different activities. In Pennsylvania, these activities often include reconnaissance, controlled surface collection, subsurface sampling or testing, and intensive excavations.

APPENDIX B - For Further Reading

Jay F. Custer

- 1996 *Prehistoric Cultures of Eastern Pennsylvania*. Anthropological Series No. 7, Pennsylvania Historical and Museum Commission, Harrisburg.
- 2001 *Classification Guide for Arrowheads and Spearpoints of Eastern Pennsylvania and the Central Middle Atlantic*. Pennsylvania Historical and Museum Commission, Harrisburg.

Barry C. Kent

- 1993 *Susquehanna's Indians*. Anthropological Series No. 6. Pennsylvania Historical and Museum Commission, Harrisburg.

Robert G. Kingsley, James A. Robertson, and Daniel G. Roberts

- 1990 *The Archaeology of the Lower Schuylkill Valley in Southeastern Pennsylvania*. John Milner and Associates, Inc., West Chester, Pennsylvania. Report on file, Pennsylvania Historical and Museum Commission, Bureau for Historic Preservation, Harrisburg.

Fred W. Kinsey, III

- 1972 *Archaeology in the Upper Delaware Valley*. Pennsylvania Historical and Museum Commission, Anthropological Series No. 2. Harrisburg.

Herbert C. Kraft

- 1986 *The Lenape: Archaeology, History, and Ethnography*. New Jersey Historical Society, Newark, New Jersey.

Andrew Wyatt, Richard L. White, Brenda L. Carr-Weller, and Barbara J. Shaffer

- 2007 *Phase III Archaeological Data Recovery at 36MG378, S.R. 1058, Section HAT, Sumneytown Pike/309 Connector, Towamencin Township, Montgomery County, Pennsylvania*. Prepared by McCormick Taylor, Inc. for the Pennsylvania Department of Transportation, Engineering District 6-0, King of Prussia, Pennsylvania



Feature 1, a small hearth. Black dots mark the boundaries of this feature.



Feature 2, a small hearth with fire cracked shale

Evidence of the most recent period of Native American site use, however, was completely unanticipated. Eight small triangular points and 42 sherds from a single pot mark one or more visits to the site between approximately 800 and 1750 A.D. Based on their small size, light weight, and thin cross-section, archaeologists think that triangular points were true arrowheads, as opposed to spearheads or knife blades. Native Americans began to make triangular points around 800 A.D. and continued to use them until about 1750 A.D. By that time, they had largely stopped making stone arrow points, replacing most of their chipped stone tools with functional equivalents made from European metals⁵. The pottery, a type called Overpeck Incised, was made in the Middle and Lower Delaware River Drainage in Pennsylvania and New Jersey from about 1000 A.D. to the period of European settlement in the 1620's and

possibly later. The people who made these artifacts and lived on the site were probably ancestors of the Lenape, or Delaware Indians as they were called by English colonists.

In addition to the stone and pottery artifacts, three possible hearth features were found at the site, all in Block 1. Two of the hearths (Features 1 and 2) were located three feet apart, and only the bottom two inches of these features was intact below plow-disturbed

⁵ Although eastern Native Americans traded for both raw copper and hammered copper tools from the Great Lakes area, and may have mined small, local copper veins, copper artifacts are exceedingly rare on the archaeological sites they left behind. Initial contact and trade with Europeans on the Atlantic coast after 1520 A.D. brought the first smelted iron, brass and copper to Native Americans groups living on the Atlantic coast.

soils. Feature 1 was a small, shallow dark soil stain with fragments of wood charcoal and tiny flecks of burned bone. Feature 2 appeared as a small concentrated area of fire-cracked shale, burned bone, and very small charcoal flecks. Feature 6 consisted of 27 pieces of fire-cracked shale weighing 12 pounds, all contained within two adjacent test units. This likely represented a hearth like Feature 2 that had been completely disturbed by plowing. Despite their damaged condition, these features could tell us something about how people had used the site, and possibly provide a tighter date for one or more episodes of site use.

Native American Lifeways, 1800 B.C. to 1760 A.D.

The time-sensitive artifacts found during the data recovery indicated that the site was occupied by Native Americans as early as 1800 B.C. and perhaps as late as 1760 A.D., a much longer time span than we had originally thought. What was life like for Native Americans in the Delaware River Basin during this long stretch of time? The earliest occupation, registered by the single Perkiomen Broad point, dated between 1800 and 1200 B.C. Archaeologists refer to this time interval as the “Terminal Archaic”, a sub-period within the longer Archaic period which lasted from approximately 8000 B.C. to 1000 B.C. During the Archaic period, Native Americans throughout eastern North America were hunter-gatherers; they sustained themselves by hunting, fishing, and collecting wild plants⁶.

For the first 5000 years of the Archaic period, until about 3000 B.C., family groups lived in small camps and moved frequently to take advantage of seasonally available wild resources. A typical year might have involved a series of late fall-early spring camps away from river valleys. Deer, elk, bear, and a variety of other land animals were hunted, providing food and skins for clothing. In late spring through summer and early fall, they moved among series of camps closer to the Delaware River and its major tributaries. Shad and sturgeon migrated into the Delaware Drainage in late spring, and numerous other fish species were available through early fall. Edible roots, tubers, greens, fruits, and berries flourished through summer, and early fall yielded abundant harvests of acorns, hickory nuts, and walnuts. By late fall, the annual round started again with groups moving into interior areas for hunting.

By 3000 B.C., sites located on the Delaware River and its tributary streams grew larger, contained more and larger hearths, and were more numerous. Archaeologists

⁶ As more archaeological sites are excavated, evidence for the early cultivation of squash increases. Native Americans in the Susquehanna River Drainage were cultivating squash by 3500 B.C., perhaps for their nutritious, oily seeds. Archaic period squash remains may yet be found on sites in the Delaware River Basin, which would indicate that small-scale gardening supplemented the diet of local hunter-gatherers.

Settlement Pattern: The distribution of archaeological sites in a region during a specific time period. Archaeologists try to understand how people used an area and its resources by determining the function of sites in different ecological settings. Shifts in settlement patterns through time can signal past environmental changes or cultural transformations like the transition from hunting and gathering to farming.

Stone Tools: Generally, any stone used by humans to perform a task, however building stone is not included in the definition. Some stones, such as water-rounded cobbles, were used without modification as hammerstones to crack stone, bones, and nuts. Chipped stone tools made by flaking (see Appendix G) were used for piercing, cutting, and scraping tasks. Ground stone tools made by laborious pecking and grinding, like axes, adzes, and gouges were used for heavy-duty chopping and other woodworking tasks. Human ancestors may have used stone tools as early as 3.4 million years ago (www.sciencedaily.com/releases/2010/08/100811135039.htm).

Stone Boiling: An indirect cooking method in which heated rocks are placed into liquid-filled, waterproof containers (wooden bowls, baskets, and skin-lined pits). The heated rocks quickly bring liquid and foodstuffs to a boil, and boiling is continued by replacing cooled rocks with heated ones. Native American groups throughout North America used the stone boiling method to prepare soups, stews, and gruels.



Boy Scout group volunteering at an archaeological site.

Storage Pits: Pits of varying sizes excavated into the ground to store foodstuff or other material. Food storage pits were often lined with grass or bark to reduce moisture- and insect-damage to stored materials.

Upland: Landscapes surrounding, but not including river floodplains and terraces.

Use-Wear Analysis: Specific types of microscopic polishes or scratches develop on stone tools when they are used on various materials. By making stone tools and then using them to cut or scrape hide, meat, or bone and then comparing the resulting damage patterns to those on the actual artifacts, archaeologists can sometimes determine the material that was worked (hide, for example) and the action used (cutting versus scraping).

a fire. Most hearths are identified by concentrated areas of wood charcoal, however pits excavated for this purpose may also contain ash. Rocks were sometimes used to contain the fire but also radiated heat. If a fire is sustained over a long period, the surrounding soil may be reddened.

National Register of Historic Places: The official list of the Nation's historic places worthy of preservation. The National Register of Historic places is administered by the National Park Service, a division of the United States Department of the Interior.

Physiographic province: Geographers divide land masses into physiographic provinces based on similar landscape features (mountains, hills, coastal flats), rock types, and geological history. The boundaries separating these provinces are marked by abrupt changes in both the lay of the land and its underlying geology. A map of Pennsylvania's six physiographic provinces is available at www.dcnr.state.pa.us/topogeo/map13/map13.aspx.

Postmolds: Postmolds are soil stains left behind by decayed wooden posts. The stains are round in plan and tapered in cross-section. Their arrangement and size allow archaeologists to identify house patterns, fencelines, and other structures made by Native Americans.

Projectile point: A general term used for chipped stone tools used as the penetrating tip for spears and arrows. Commonly called arrowheads or spearpoints, some projectile points were also used as knives.

Protein Residue Analysis: A technique originally developed by forensic experts to determine the type of blood present on a murder weapon. It is based on the reaction of an antigen and antibody. For archeological purposes, an antigen is the unknown animal or plant protein adhering to an artifact after its use. An antibody is a protein made by the immune system with very reactive areas specific for a single area on the antigen. Antibodies made from a variety of animal species are introduced to the potential antigen on an artifact. Positive reactions indicate which family of animals the unknown proteins are from.

Radiocarbon Dates/Radiocarbon Dating: A chemical analysis used to determine the age of dead organic materials based on the amount of the radioactive isotope carbon-14 they contain. Developed in 1949 by the American chemist Willard Libby at the University of Chicago, this method revolutionized archaeology. Refinements to the method over the last 60 years have resulted in more precise dates on materials up to 40,000 years old. A clear description of radiocarbon dating can be found at <http://www.pbs.org/wgbh/nova/tech/radiocarbon-dating.html>.

Sherds: Broken fragments of pottery.



interpret these changes as evidence for population growth, larger group size, and longer stays at base camps during the late spring through early fall. The seasonal pattern of movement described above probably continued, but the geographic range in which these movements took place was probably smaller. Several changes took place during the Terminal Archaic sub-period (1800 to 1000 B.C.) which may have been responses to smaller group territories and higher population densities.

Native Americans began making soapstone bowls at the beginning of the Terminal Archaic and used them until the end of the sub-period. Although wooden bowls, waterproofed baskets, and skin-lined pits had probably been used to boil foods by the *stone boiling* method during the Archaic period, the heavy, shallow soapstone bowls could be placed directly on fires to heat their contents. By about 1200 B.C., fired clay pottery was first made in the Delaware River Basin. Like soapstone bowls, pottery can be used to boil foods over a fire, resulting in increased cooking efficiency. These changes in cooking technology are poorly understood, but may have resulted from the need to get higher levels of nutrition from resources within reduced territories. Exchanges of goods between regions increased dramatically in Terminal Archaic times. Soapstone bowls and projectile points made from stone types that are only available in southeastern Pennsylvania were traded into the Upper Delaware River Drainage and throughout the Susquehanna River Basin. More frequent gift exchanges may have promoted alliances between distant social groups that could be used to offset local shortfalls in food resources.

During the next cultural period, called the Woodland period (1000 B.C. to 1600 A.D.), the use of pottery increased, and there is evidence that Native Americans were spending more time at base camps. Food storage pits that are rarely found on Archaic sites became more common on base camps dating to the Early Woodland (1000 B.C. to 400 B.C) and Middle Woodland (400 B.C. to 900 A.D.) sub-periods⁷. Archaeologists believe this trend signals a subtle change in settlement patterns. Rather than spending the entire late fall through early spring in a series of interior hunting camps, groups may have returned to riverside base camps during the “leanest” season (late winter) to live off of stored foods. It is not at all clear what was being stored, however, Europeans in the early 1600’s documented Native Americans drying meat, fish, shellfish, berries, nuts, tubers and roots for storage.

Native American groups in the Delaware River Basin underwent changes through the Late Woodland sub-period (900 A.D. to 1600 A.D.) that eventually transformed their society and culture. Early in the sub-period, local groups appear to have been spending more of the year at base camps in the Delaware Valley. Sites with one or two house patterns and associated storage pits appear for the first time by 1000 A.D. Although the evidence is

⁷ The Rossville point and the possible Fox Creek Lanceolate point found at 36MG378 date to the Middle Woodland sub-period.



currently restricted to a few sites, maize, beans, and squash were being grown together by about 1200 A.D. When these crops and the techniques needed to grow them were first adopted, or how much they contributed to the total diet compared to hunting and gathering is currently unknown. Over the next 400 years, however, increased investments of labor in farming had important consequences.

By the early 1600's, European accounts of the Delaware River Valley describe relatively permanent villages of 100 to 200 people living in bark-covered houses. Some of the houses, called longhouses, measured 60 feet long by 20 feet wide and accommodated six to eight families. Single families lived in smaller oval houses commonly known as wigwams. The stored surplus of maize, beans, squash, and wild foods permitted year-round residence in villages, but smaller groups continued to leave the village for specific tasks. In late spring, men typically left their villages for temporary fishing camps on the Delaware and its larger tributaries where they caught and preserved shad, sturgeon, and other fish. At the same time, women prepared fields and sowed maize, beans, and squash. In late fall and early winter, after crops were harvested and stored, many families moved to small hunting camps in the interior, leaving the old, infirm, and some children at the village, returning in midwinter with fresh meat and skins.

In the 1600's, some European colonists were aware that the native people of the Delaware River Basin spoke slightly different versions of the same Eastern Algonquian language. Groups north of the Delaware Water Gap spoke the Munsee dialect, while those living south of the Water Gap down to Cape Henlopen, Delaware spoke the Unami dialect. It was the Unami-speaking groups that called themselves Lenape, translated as "real people" and were later referred to by the English as the Delaware Indians. Archaeologists believe that the ancestors of the Lenape and Munsee people had occupied the Delaware River Basin since the beginning of the Late Woodland sub-period and possibly before that time. Speakers of both dialects had organized themselves into local groups consisting of one or more villages. These groups sometimes came together for mutual defense, but were otherwise free to determine their own affairs.

Archaeologists estimate that there were roughly 11,000 Munsee and Lenape people living in 1600 A.D., yet by 1779 they were reduced to only 3,000 people, primarily by European diseases like smallpox and measles to which they had no natural immunity. The Unami-speaking groups sold the majority of their eastern Pennsylvania lands in the infamous Walking Purchase of 1737, relocating to villages on the Main Stem and North Branch of the Susquehanna River. Munsee-speaking groups held out longer, finally selling the lands above the Water Gap in 1758. They moved farther north on the Susquehanna River's North Branch to settlements established by Moravian missionaries. After a long, painful series of forced westward relocations in the late 1700's and early 1800's, descendants of these Delaware groups live together today on tribal lands in Oklahoma and Canada,

APPENDIX A - Glossary

Artifact: Any portable object made, altered, or used by humans.

Diagnostic artifacts: Artifacts, primarily projectile points and pottery, which were manufactured and used during a specific period of time. The discovery of these artifacts enables the dating of the site.

Excavation block: Any arrangement of multiple adjacent test units, usually placed to excavate and expose large areas of a site to examine the spatial patterning of artifacts and features.

Excavation grid: Prior to excavation, archaeologists establish a continuous grid of same-sized test units somewhat like a checkerboard over a site. This allows them to assign the artifacts excavated from any given test unit to a specific place on the site. By comparing the spatial relationships between artifacts and features, archaeologists are sometimes able to determine where different tasks took place within a site.

Features: Unlike artifacts, which can be removed from an archaeological site without destroying them, features are not portable and can be thought of as “site furniture” used



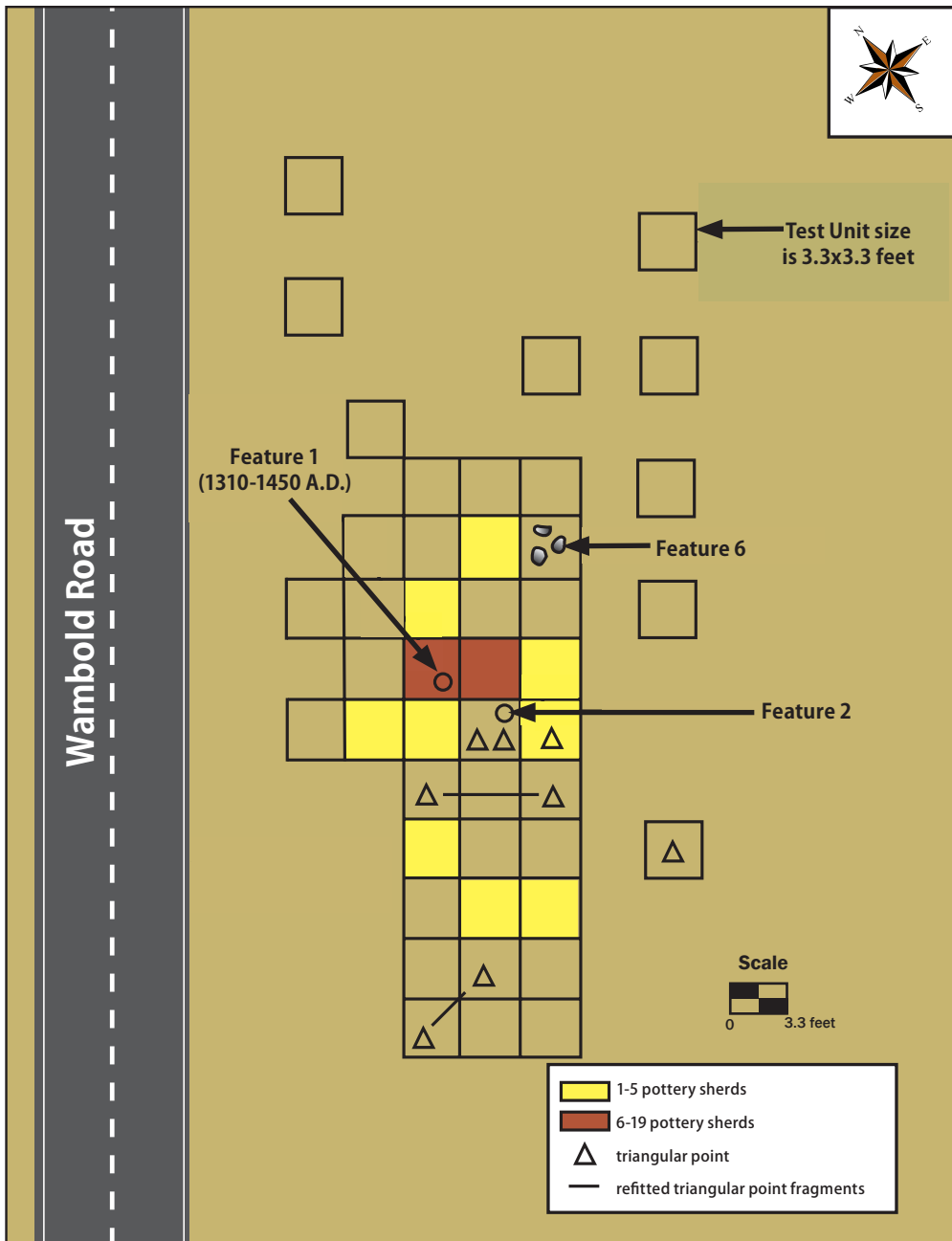
An archaeologist excavates a deep storage pit at site 36CU194, a Susquehannock site in Cumberland County, Pennsylvania.

to perform one or more functions. Pits dug into the ground for storage or processing, postmolds indicating house walls, racks, or fences, and campfires or prepared hearths are all examples of features found on Native American sites.

Flakes: Flakes are distinctively shaped pieces of stone removed in making a chipped stone tool. Although most flakes were simply discarded as manufacturing waste, some were used as cutting and scraping tools due to their naturally sharp edges. An overview of how chipped stone tools are made is presented in Appendix G.

Hearths: Hearths are discrete areas where fires were built. Hearths can be simple campfires on the ground surface or shallow pits dug to contain





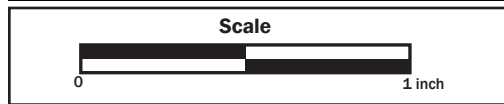
Distribution of Overpeck Incised pottery sherds and triangular points in Block 1

and many people with Delaware ancestry continue to live in Pennsylvania, New Jersey, and New York.

Reconstructing Life at 36MG378

After the excavation was finished, specialists performed several types of analysis on the recovered artifacts to help us reconstruct when and how the site was used⁸. We knew that the site was probably visited only a few times between 1800 B.C. and 800 A.D. based on the small number of artifacts dating to this period. The frequency of site use may

have increased between 800 and 1750 A.D. based on the greater number of triangular points found, but when were the hearths used?





Jasper Triangular point, 36MG378. Red dots mark the location of polishes from attachment to a wood or bone shaft.

Only one of the hearths contained enough wood charcoal for radiocarbon dating. Two **radiocarbon dates** on wood charcoal from Feature 1 ranged between 1310 and 1450 A.D., indicating that the feature was used for a short time within the total period when people made triangular points and Overpeck Incised pottery. The close proximity of Feature 2 suggests that it may have been used at about the same time. By plotting the location of all of the projectile points and the pottery, some interesting patterns emerged. Of the eight triangular points

recovered, four were recovered within six feet of Feature 1 and Feature 2 and two more were found within 15 feet of the two features. Several of the triangular points were refitted from fragments found in test units located no more than about three feet apart, indicating that plowing had not moved these artifacts over appreciable distances. In addition, 19 of the 42 sherds of the Overpeck Incised pot were found within the same test unit as Feature 1, and 14 other sherds from the same pot were recovered in test units adjacent to the one which contained Feature 1. The close spatial association of the dated hearth, the triangular points, and the Overpeck pottery strongly suggested a hearth-centered activity area used between about 1310 and 1450 A.D. What could the artifacts tell us about how the Lenape ancestors used the site?

⁸ Beta Analytic, Inc., Miami, Florida, provided the radiocarbon dates. Robert Parr, Ph.D., California State University Bakersfield, performed the protein residue analysis. Flora Church, Ph.D., Cultural Resource Associates, Inc., Hurricane, West Virginia, conducted the use-wear analysis.



Although it had been affected by plowing, the spatial patterning of artifacts and features from the site's Late Woodland occupation was not significantly disturbed. Analysis of the artifacts indicated that the site probably served as a short-term camp for hunting and gathering trips in the surrounding area throughout its 3800-year history of use. The most intensive period of use, however, dates to the Late Woodland sub-period, from approximately 900 to 1600 A.D. During this time interval, Native Americans in the Delaware River Basin and elsewhere in eastern North America gradually increased their reliance on maize, bean, and squash-based agriculture to supplement hunted and gathered foods. At the beginning of the period, settlements consisted of small house clusters supporting one or two families. However, by the early 1600's A.D., villages of 100 to 300 people dotted the terraces of the Delaware River. These people called themselves Lenape, and were known as the Delaware Indians by English colonists. The growth of their population was likely due to the storable resource base provided by farming. Nevertheless, hunting and gathering continued to contribute to their diet and provided important raw material for tools, clothing, and shelter. Despite its small size, 36MG378 has provided significant information regarding the structure and size of sites where wild resources were initially processed for transport to more permanent settlements.

From a regional perspective, 36MG378 represents the first short-term campsite with a significant, relatively intact Late Woodland component to be excavated and analyzed in the Lower Schuylkill River Watershed. The results of investigations at 36MG378 support the long-standing hypothesis that the Lower Schuylkill Watershed served primarily as a resource procurement territory for the Lenape and their ancestors who lived in more permanent settlements on the Delaware River and its major tributaries. From the perspective of other sites in the Lower Delaware River Drainage, small sites like 36MG378 pale in comparison to the information potential of larger village sites. However, upland sites like 36MG378, which represent the small and ephemeral end of the total Lenape settlement pattern are rapidly disappearing in southeastern Pennsylvania due to development pressures. Without a few excavated examples of these small sites, our understanding of Lenape lifeways would be greatly reduced.

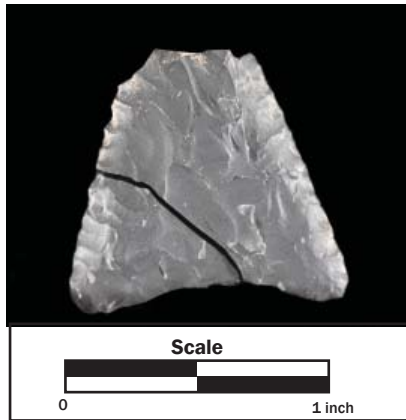
triangle recovered probably represents a more local pattern of tool stone collection and manufacture.

What Did We Learn & Why Was It Important?

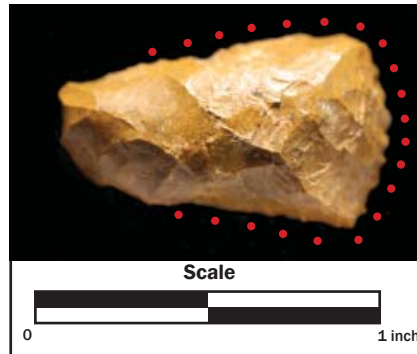
We used the results of the analyses described above to develop the following interpretation of how the site was used. Sometime between 1310 and 1450 A.D., Lenape ancestors used 36MG378 as a temporary camp for hunting large and small game in the surrounding countryside. Between hunting trips, animal carcasses were brought back to the camp where they were skinned and butchered. Some of the meat sustained the group during their stay, and some may have been preserved by drying to transport to more permanent settlements. During “downtime” at camp, they scraped the flesh from the hides, which was the first step in the production of skin clothing. Triangular arrowheads damaged while hunting were removed from their shafts, discarded near the small fire, and then replaced with freshly-made ones. These arrowheads were made from jasper and chert collected in recent trips to the north or west. Some were used for hunting in the local area, and some may have been taken back to the main village for use at other locations. These interrelated activities probably also describe use of the site by its earlier occupants as well.

Archaeologists typically categorize small sites like 36MG378 as “resource procurement sites” where natural resources were hunted and/or collected by small groups, and then minimally processed. These smaller groups then returned to larger, more permanent habitation sites with these critical natural resources, which were then used by the larger social group. We believe that the Late Woodland component of 36MG378 can be characterized as a briefly-occupied resource procurement site based on both the limited range of activities represented, as well as the lack of evidence for structures, storage pits, and other indications of a more permanent settlement.

It is possible that the site was used by small groups during one or more fall/winter hunting trips away from a village located on the Delaware River or one of its larger tributaries. Although this pattern of seasonal movement as part of a social group was documented by European explorers and settlers in the 1600’s, it had probably been a fundamental aspect of Native American life for at least 5,000 to 6,000 years. It is equally likely that the site represents one or more hunting trips during other times of the year when meat or skins were needed. Traditional fall/winter hunts involved men, sometimes with women and children, leaving a village for a month or more at a time. A temporary shelter would have almost certainly been necessary for a month’s stay in the fall or winter, yet no evidence for structures was found at the site. It is entirely possible that such evidence was destroyed when Wambold Road was constructed in the late 1700’s or early 1800’s.

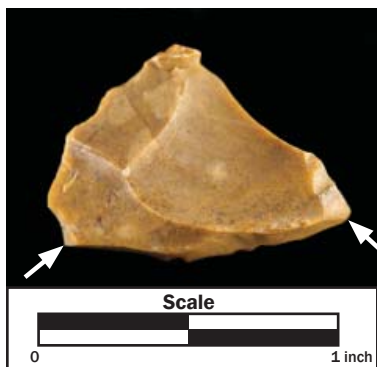


Chert Triangular point, 36MG378. The fracture on the corner and tip indicates that this point was broken in manufacture.



Jasper Endscraper, 36MG378. Heavy polish from hide-scraping is marked by red dots.

The few burned animal bone fragments found in Features 1 and 2 were too small to be identified to species, so a different method was used to determine what animals were hunted. Six of the eight triangular points and three of the Overpeck Incised sherds were submitted for **protein residue analysis**, but only two of the points and one of the sherds produced positive results. One of the triangles not associated with the dated hearth produced protein that could be from beaver, squirrel, or porcupine. Another triangle located approximately three feet from Feature 1 yielded rabbit protein. The single pottery sherd yielded traces of protein from an animal in the deer family, either white-tailed deer or elk, as well as beaver/porcupine/squirrel protein. These results indicate that both large and small animals were hunted, and that some were brought back to the site for consumption.



Retouched Jasper Flake, 36MG378. Arrows indicate area of detail. Detail: (shown to the right) Small chips on flake end display polish from scraping hide.

The types of damage to stone tools can often shed light on how they were made and used. **Use-wear analysis** on the triangular points indicated that four were used as projectile tips. They displayed characteristic wear patterns at their bases from contact with wood and bone shafts. Four of the

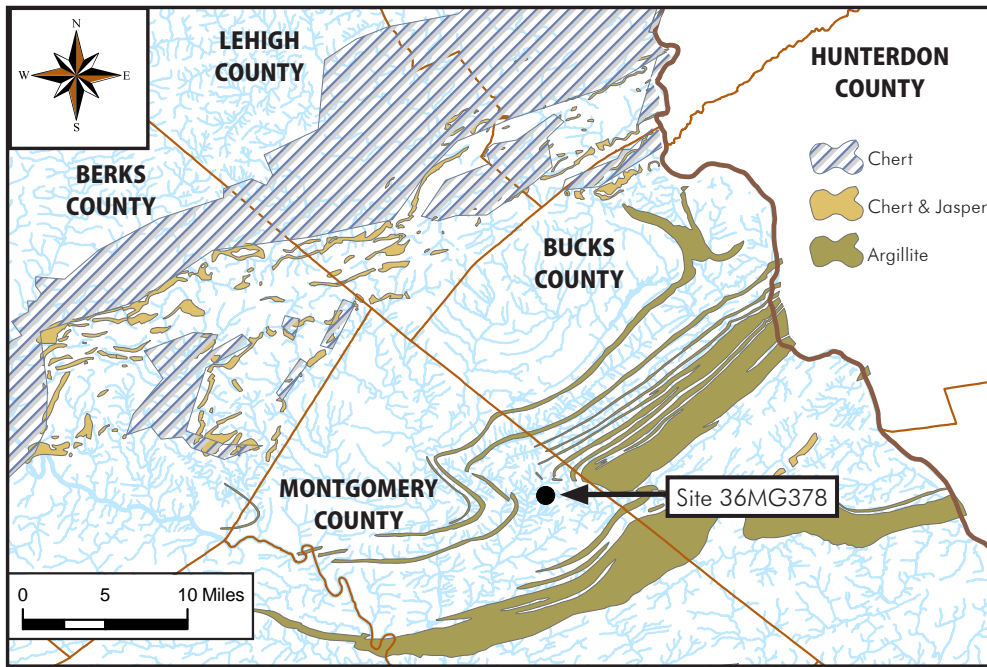


triangles showed no microscopic wear, but the general damage pattern was consistent with accidental breakage when the points were manufactured. Together, this shows that triangular points were not only used but also made on the site. Another stone tool called an endscraper displayed extensive microscopic polish along its edge which resulted from scraping hides. Although this artifact cannot be conclusively associated with the Lenape occupation of the site, serrated endscrapers were used in Pennsylvania and New Jersey during the Late Woodland sub-period. Both the projectile points and the endscrapers represent what archaeologists call formal tools. They were made in standardized shapes, often the result of extensive preparation, for frequently-performed, anticipated tasks. They were designed for durability, and could be re-sharpened for many episodes of re-use. Informal tools lie on the other end of the spectrum. Their shapes were not standardized, they were easily produced, and they could be used for a variety of light-duty cutting and scraping tasks.

Retouched flakes, a type of informal tool, were the most common chipped stone tool found at 36MG378. Flakes from making other chipped stone tools were mostly discarded as waste, however, some flakes were selected for use and modified by chipping the edges to make them more durable. Use wear analysis was conducted on 48 of the 68 retouched flakes to determine the types of tasks they were used for. Only 23 of the 48 retouched flakes displayed evidence of use, which might suggest that they were not used long enough to develop distinct microscopic polishes and scratches⁹. Wear traces on the remaining 25 retouched flakes resulted primarily from contact with meat and bone, while a slightly smaller number of wear traces indicated contact with animal hide. We interpret these traces as evidence for butchering animal carcasses and the initial preparation of animal hides for tanning (clothing) or for rawhide. Only a small number of traces from cutting and scraping wood were identified, which might indicate that arrowshafts or wooden handles for stone tools were being made on the site. Unfortunately, the retouched flakes were broadly distributed in Block 1, and none could be clearly linked to the area around the dated hearth. Nevertheless, they document a fairly restricted set of activities for the site during its long period of use.

Finally, by inventorying the types of stone used at the site, we were able to say something about where the Lenape ancestors had been before they camped at 36MG378. It is fairly certain that the broken Overpeck Incised pot was not made at the site but was carried there. During the Late Woodland sub-period, pots were typically made at villages located near the Delaware River and its major tributaries where large deposits of suitable clays could be found. Sherds of the Overpeck Incised pot found at the site contained small fragments of argillite, a black metamorphic rock used as temper to prevent the pot from cracking during the drying and firing process. Argillite has a natural distribution that is

⁹ The use-wear analyst noted that polishes/scratches only began to develop on her set of experimentally produced stone tools after about 20 minutes of use.

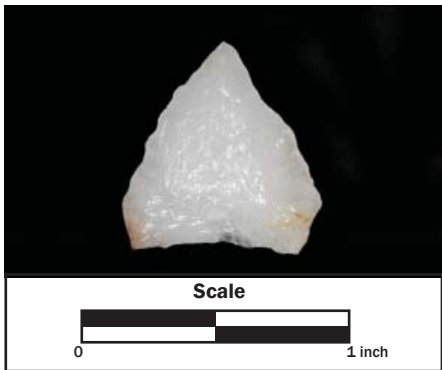


Location of 36MG378 and Regional Sources of Stone

restricted to the Gettysburg Lowland Section of the Piedmont, thus we can say that the pot was made by people residing somewhere in this large geographic area and brought to the site to prepare meals.

The overwhelming majority (85 percent) of stone tools and stone flakes from their manufacture, however, were made from non-local jasper and chert. The closest sources for these two stone types are located approximately 20 miles to the north and west of the site in southern Lehigh County and eastern Berks County.

Of the eight triangular points found at the site, three were made from jasper, four from chert, and one from quartz. This indicates that the site's Late Woodland residents probably travelled to 36MG378 from the north or west. Although it is possible that trips into the southern Lehigh/eastern Berks area were made solely to obtain these important raw materials, it is more likely that they were collected during the course of hunting and gathering forays. Quartz, by contrast, was widely available throughout the Piedmont, and the single quartz



Quartz Triangular Point, 36MG378