S.R. 7015, Section 236
Chester County Bridge 236 over the West Branch of Red Clay Creek
Bridge Replacement Project
Kennett Township,
Chester County, Pennsylvania

PHASE I ARCHAEOLOGICAL SURVEY

ER# 07-6056-029

Chester County, Pennsylvania
In association with
the Pennsylvania Department of Transportation
S.R. 7015, Section 236
Chester County Bridge 236 over the West Branch of Red Clay Creek
Bridge Replacement Project
Kennett Township,
Chester County, Pennsylvania

PHASE I ARCHAEOLOGICAL SURVEY

ER# 07-6056-029

by

Paula R. Miller

Philip Ruth

with

Thomas R. Lewis

Cultural Heritage Research Services, Inc.
North Wales, Pennsylvania

Chester County, Pennsylvania
In association with
the Pennsylvania Department of Transportation

April 2007
ABSTRACT

This report documents the results of a Phase I Archaeological Survey performed for the S.R. 7015, Section 236, Chester County Bridge 236 over the West Branch of Red Clay Creek Bridge Replacement Project along Chandler’s Mill Road in Kennett Township, Chester County, Pennsylvania. The project entails the replacement of the single span, steel plate through-girder bridge structure with a new, wider bridge. The 1910 bridge is not eligible for listing in the National Register of Historic Places. The Area of Potential Effect (APE) lies in the Piedmont Upland Section of the Piedmont Physiographic Province and is centered around the existing bridge, which is to be replaced on the same alignment. The Phase I Archaeological Survey examined approximately 0.19 hectares (0.48 acres). Of that, approximately 0.16 hectares (0.4 acres), or 83% of the APE was assessed through a geomorphological investigation as having a low potential for precontact archaeological deposits due to the presence of a wet or modern floodplain. This is the second cultural resource report prepared for the project; a Pennsylvania Historic Resource Survey Form was previously prepared (Black 2007). The cultural resource work was performed for Chester County in association with the Pennsylvania Department of Transportation (PENNDOT).

The archaeological work for this project included background research, geomorphological investigation and the excavation of two 1-meter (3.28-foot) square test units. The northwest quadrant and the more well-drained, northernmost portion of the northeast quadrant contained moderate potential for precontact archaeological deposits. The northwest quadrant also contained high potential for historic archaeological deposits due to the proximity (within 30.48 meters [100 feet]) of a nineteenth-century mill.

A total of 34 artifacts were recovered from the two test units. Many of the recovered objects were modern. Historic artifacts were found in low numbers, and represent a combination of light field scatter and objects washed in with the alluvial soils. No archaeological sites were identified within the APE. No additional archaeological testing is recommended within the APE.
# CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABSTRACT</td>
<td>i</td>
</tr>
<tr>
<td>CONTENTS</td>
<td>ii</td>
</tr>
<tr>
<td>ILLUSTRATIONS</td>
<td>iii</td>
</tr>
<tr>
<td>INTRODUCTION</td>
<td>1</td>
</tr>
<tr>
<td>BACKGROUND RESEARCH</td>
<td>3</td>
</tr>
<tr>
<td>Introduction</td>
<td>3</td>
</tr>
<tr>
<td>Environment</td>
<td>4</td>
</tr>
<tr>
<td>Precontact Period</td>
<td>5</td>
</tr>
<tr>
<td>Study Area History</td>
<td>8</td>
</tr>
<tr>
<td>Previously Recorded Sites</td>
<td>20</td>
</tr>
<tr>
<td>METHODS</td>
<td>20</td>
</tr>
<tr>
<td>FIELD DATA</td>
<td>21</td>
</tr>
<tr>
<td>Archaeological Potential</td>
<td>21</td>
</tr>
<tr>
<td>Field Data</td>
<td>24</td>
</tr>
<tr>
<td>ANALYSIS</td>
<td>24</td>
</tr>
<tr>
<td>SUMMARY AND RECOMMENDATIONS</td>
<td>26</td>
</tr>
<tr>
<td>REFERENCES CITED</td>
<td>27</td>
</tr>
<tr>
<td>APPENDICES</td>
<td></td>
</tr>
<tr>
<td>Appendix A: Qualifications of Researchers</td>
<td>33</td>
</tr>
<tr>
<td>Appendix B: Artifact Inventory</td>
<td>34</td>
</tr>
<tr>
<td>Appendix C: BHP Report Summary Form</td>
<td>35</td>
</tr>
<tr>
<td>Appendix D: Project Photographs</td>
<td>38</td>
</tr>
<tr>
<td>Appendix E: Geomorphology and Pedology Report</td>
<td>41</td>
</tr>
</tbody>
</table>
# ILLUSTRATIONS

<table>
<thead>
<tr>
<th>Figure</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Project Location Map</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>Project Area Circa 1856</td>
<td>11</td>
</tr>
<tr>
<td>3</td>
<td>Project Area Circa 1860</td>
<td>12</td>
</tr>
<tr>
<td>4</td>
<td>Project Area Circa 1873</td>
<td>15</td>
</tr>
<tr>
<td>5</td>
<td>Project Area Circa 1883</td>
<td>16</td>
</tr>
<tr>
<td>6</td>
<td>Project Area Circa 1904</td>
<td>18</td>
</tr>
<tr>
<td>7</td>
<td>Project Area Circa 1937</td>
<td>19</td>
</tr>
<tr>
<td>8</td>
<td>Archaeological Test Locations</td>
<td>22</td>
</tr>
<tr>
<td>9</td>
<td>Test Unit Profiles</td>
<td>25</td>
</tr>
</tbody>
</table>
INTRODUCTION

This report documents the results of a Phase I Archaeological Survey performed for the S.R. 7015, Section 236, Chester County Bridge 236 over the West Branch of Red Clay Creek Bridge Replacement Project along Chandler’s Mill Road in Kennett Township, Chester County, Pennsylvania (Figure 1; USGS 1993). The project entails the replacement of the single span, steel plate through-girder bridge structure with a new, wider bridge. The 1910 bridge is not eligible for listing in the National Register of Historic Places. The Area of Potential Effect (APE) lies in the Piedmont Upland Section of the Piedmont Physiographic Province and is centered around the existing bridge, which is to be replaced on the same alignment. The Phase I Archaeological Survey examined approximately 0.19 hectares (0.48 acres). Of that, approximately 0.16 hectares (0.4 acres), or 83% of the APE was assessed through a geomorphological investigation as having a low potential for precontact archaeological deposits due to the presence of a wet or modern floodplain. This is the second cultural resource report prepared for the project; a Pennsylvania Historic Resource Survey Form was previously prepared (Black 2007). The cultural resource work was performed for Chester County in association with the Pennsylvania Department of Transportation (PENNDOT).

This Phase I Archaeological Survey was conducted in accordance with federal and state laws that protect significant cultural resources, including historic and archaeological sites. Federal and state mandates for cultural resource protection include: The Department of Transportation Act of 1966, as amended in 1968; the National Environmental Policy Act of 1969; the National Historic Preservation Act of 1966 (NHPA) (as amended); Executive Order 11593; the Archaeological and Historic Preservation Act of 1974; and the Commonwealth of Pennsylvania State Act No. 1978-273, amended as Act No. 1988-72. This legislation requires that the effect of any federally assisted undertaking on historically significant buildings, structures, objects or sites be taken into account during project planning. All work was performed in accordance with 36 CFR §800, with the Department’s procedures as outlined in BHD-430-92-29 “Archaeological Procedures for Highway Project Development,” Strike-off Letter 430-91-46 Archaeology Scope-of-work Format and Guidelines, and the Pennsylvania Historical and Museum Commission’s Cultural Resource Management in Pennsylvania: Guidelines for Archaeological Investigations (PHMC 1991, curation guidelines revised 2006).

The research and field analysis for this project were undertaken during the winter of 2007. The work was performed by Cultural Heritage Research Services, Inc. (CHRS) of North Wales, Pennsylvania. Thomas R. Lewis served as the Principal Investigator. Paula Miller was the Project Manager. Christina Civello served as Lab Director. Philip Ruth performed historical and background research for the project, and was the primary author of the study area history. Graphics for the report were prepared by Bradley Harrison and editorial work was executed by Kevin Quigg and Maria DiNicola of the CHRS, Inc. staff. Daniel P. Wagner, Ph.D., of Geo-Sci Consultants, Inc. performed geomorphological and pedological analysis for the project. (Appendix A). This report was prepared under contract to the firm of Johnson, Mirmiran and Thompson (JMT) of York, Pennsylvania.
BACKGROUND RESEARCH

Introduction

Background research was conducted in order to identify and provide a context for evaluating cultural resources in and immediately adjacent to the Area of Potential Effect (APE). Repositories and/or personnel consulted include those associated with the Pennsylvania Historical and Museum Commission (including the Pennsylvania Bureau for Historic Preservation), the Pennsylvania State Archives, the National Register of Historic Places, the Chester County Historical Society, the Chester County Courthouse, and the Chester County Archives. A variety of source materials were consulted, including regional and municipal histories, newspaper archives, land records, aerial photographs, census records, published and unpublished histories, historical and archaeological resource files, as well as environmental, geological, archaeological, and other pertinent studies. Maps published in the nineteenth and twentieth centuries were used to pinpoint historic buildings and structures, to identify property owners, and to distinguish development in the study area.

<table>
<thead>
<tr>
<th>INSTITUTIONS AND REPOSITORY RECORDS CONSULTED</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Institution/Repository</strong></td>
</tr>
<tr>
<td>Pennsylvania Historical and Museum Commission</td>
</tr>
<tr>
<td>Pennsylvania State Archives</td>
</tr>
<tr>
<td>National Register of Historic Places</td>
</tr>
<tr>
<td>Chester County Historical Society</td>
</tr>
<tr>
<td>Chester County Courthouse</td>
</tr>
<tr>
<td>Chester County Archives</td>
</tr>
</tbody>
</table>

The collected data is important as it assists in the development of the survey testing strategy by which cultural resources are located. The data also provides the necessary context for the accurate interpretation of recovered archaeological materials. Physical environmental factors such as underlying lithology, topographical configuration, soil types and/or hydrology were also collected and correlated with cultural resource data for the purpose of assessing settlement pattern distributions. The environmental factors are responsible for the creation and maintenance of vegetal communities. The floral composition, in turn, affects the faunal distribution. Proximity of previously resource rich locales (where food, lithic, or other resources would have been abundant) in conjunction with well drained, level, or gently sloping soils serves as a discriminating factor in determining areas with a high potential for precontact occupation. Social and cultural traits of aboriginal groups also serve as factors affecting precontact site location. High probability areas for historic sites generally fall into two categories. Early historic sites can be expected to occur in areas of high precontact potential. Later historic site areas are expected to occur in the vicinity of extant historic buildings or in areas of activity identified through documentary research.
**Environment**

The study area lies within the Piedmont Uplands Section of the Piedmont Physiographic Province; this section is dominated by metamorphic rocks of Lower Paleozoic to Precambrian age. Within the Piedmont Uplands section, topography is characterized by broad, rounded to flat-topped hills and shallow valleys. The underlying geology of the APE consists of Oligoclase-Mica Schist member of the Wissahickon Formation, which includes some hornblende gneiss, some augen gneiss, and some quartz-rich and feldspar-rich members due to various degrees of granitization (Socolow 1980). These rocks tend to form moderately to steeply sloping uplands, and the principal settings of nearly level terrain are mostly confined to the floors of stream valleys where fluvial landscapes are distributed between variably drained floodplain and terrace positions.

The soils are comprised of the Glenelg-Manor-Chester association (Kunkle 1963). These soils are shallow to deep, silty and channery soils on grayish-brown schist and gneiss. Wedhadkee silt loam (We) is present in the western bridge quadrants and Chewacla silt loam (Ch) is present in the eastern bridge quadrants (Kunkle 1963). Wehadkee soils are deep, poorly drained soils on floodplains. Chewacla soils consist of deep, moderately well drained soils. Soils in both series formed in general alluvium washed by streams from upland soils underlain by schist, gneiss, quartzite, anorthosite, quartz, monzonite, and granite (Kunkle 1963:100).

The regional hydrology is part of Watershed I of the Lower Delaware River subbasin. The APE lies along the West Branch of Red Clay Creek, approximately 219.45 meters (720 feet) downstream (east) of its confluence with Bucktoe Creek. The West Branch of Red Clay Creek flows eastward through Pennsylvania, joining the East Branch of the Red Clay Creek to form Red Clay Creek just north of the Delaware state line. Red Clay Creek enters Delaware near the town of Yorklyn, flowing southward to Stanton, Delaware, where it merges into White Clay Creek. White Clay Creek then flows into the Christina River at Churchman’s March, Delaware. The mouth of the Christina River forms the harbor at Wilmington, on the Delaware River.

Pennsylvania has undergone radical changes in environment during the last 15,000 years. The Pleistocene climate was colder and dryer than present conditions. During this period, a forest tundra mosaic was likely to have existed, consisting of spruce stands intermingled with dwarf birch (Watts 1979). As the climate became warmer following the retreat of the Wisconsin glaciation, fir, pine, and alder entered the forest mosaic. Birches were present by 13,000 BP, and hemlock and chestnut appeared by ca. 8000 BP (Watts 1979). Although the forest species continued to shift until ca. 1500 BP, conditions similar to the modern forest were probably present by 5,000 BP (Carbone 1976; Stewart 1981).

The study area is located in the Temperate Deciduous Forest Biome of North America (Shelford 1964:18). This biome, under pristine climax forest conditions, is a multi-layered forest with different species dominating the various layers. Large trees (oak, chestnut, hickory, elm, beech and maple) form the canopy with young members and smaller species (dogwood, sassafras and horn-beam) just below. Immediately beneath this understory tree layer is a bi-level shrub layer, under which is a bi-level herb layer (Shelford 1964:26). This diverse multi-layer forest provides many resources for animal and human exploitation, including food (nuts, seeds, berries and fruit), fuel, wood, fiber and various plant products used for dyes and medicinal purposes.
At the time of European settlement, the forests in this region were not completely untouched; Amerind exploitation for thousands of years had modified considerable portions of them. The effects of the activities of these original inhabitants were minimal, however, when compared to the impact of the Europeans. The extensive clearing of the existing forests for fuel, lumber, and agricultural purposes, rapidly destroyed the integrity of the existing biotic community. Similarly, the faunal resources (elk, deer, bear, wolf, fox, rabbit, hare, beaver, turkey, partridge, pigeon and other fowl) had been exploited by the Amerind populations. Their habitats were largely destroyed by European settlement, causing severe depletion. However, this region contained an abundance of resources for the precontact and early historic populations.

Precontact Period

Evidence from precontact sites in the eastern United States indicates a number of successive regional cultural traditions. Although the exact number and nature of these traditions, which varied locally, remains the subject of debate, three major cultural periods can be defined: Paleo-Indian, Archaic, and Woodland. These traditions are best viewed as responses to changing social and environmental conditions.

The Paleo-Indian Tradition, 12,000 - 8,000 BC: The earliest, widely recognized tradition in the northeastern United States is the Paleo-Indian. This tradition is believed to have been characterized by small hunter-gatherer groups subsisting mainly on large mammals, many of which are now extinct or no longer present in the area (woolly mammoth, mastodon, and caribou). The artifact distinctive to this tradition is the fluted projectile point, lanceolate-shaped with a central flake removed from both faces along its longitudinal axis. This and related tools have been found in association with various floral and faunal resources in sites across the eastern United States (Funk 1969; Gardner 1974; Adovasio 1977; Dent and Kauffman 1978). This evidence suggests that the Paleo-Indian population exploited a wide variety of terrestrial subsistence resources. The Paleo-Indian Period is marked by specific cultural ecological adaptations to the Pleistocene and Early Holocene environments. Custer (1984, 1985) has outlined the expected site types for the Paleo-Indian Period and they include the following: quarry, quarry reduction, base camps, base camp maintenance stations, and hunting sites. Based upon the present data, Paleo-Indian and Early Archaic occupations in the Piedmont Province tend to be small procurement-related encampments associated with small upland bogs, sinkholes, and poorly drained areas in floodplains (Custer and Wallace 1982). The larger sites or base camps are quarry-related (i.e., lithic resource focus) and are located near major waterways (Gardner 1978; Custer 1984). The Coastal Plain section of southeastern Pennsylvania may have the potential to contain some of these sites in part because of a suspected high paleo-environmental and lithic resource potential. However, the virtual absence of high quality cryptocrystalline materials in the Piedmont Province suggests that few of this site type would be present within this region.

A number of tools diagnostic of the Paleo-Indian Tradition have been found in the Delaware and Schuylkill River Valleys (Mason 1959; Zatz et al. 1985); however, no recorded specimens have been found in the immediate vicinity of the Area of Potential Effect.
The Archaic Tradition, 8,000 - 1,000 BC: The Archaic Tradition emerged from the Paleo-Indian with a more generalized subsistence strategy in response to changing environmental and, perhaps, social conditions. Approximately 10,000 years ago, as glacial conditions slowly gave way to the warmer Holocene climate, hardwood forests gradually replaced the tundra-like vegetation (Sirkin 1977:214). The socio-cultural response to the climatic amelioration and resultant environmental diversification was one of resource-exploitative expansion in terms of biotic and lithic consumption. The Early Archaic settlement pattern for the Piedmont Province is similar in southeastern Pennsylvania to the Paleo-Indian Period which is characterized by the presence of small hunting sites in association with upland bogs, sink holes, and poorly drained areas in floodplains (Custer and Wallace 1982; Custer 1985).

The period of time that signals the cultural adaptation to the fully emergent Holocene milieu is the Middle Archaic division. Settlement patterns in the Piedmont Province are thought to be focused on upland slopes adjacent to ephemeral streams and springheads, and toes of slopes extending into swampy floodplains of the larger drainages (Custer and Wallace 1982:154). The dominant site type is inferred to be procurement or hunting. The focus for base camps in this province is projected to be the extensive swamplands (Custer and Wallace 1982:34). Changes in habitat are reflected in cultural artifacts by the presence of new tool types (Bryan 1977:363).

Evidence suggests that Archaic peoples lived in small nomadic groups (Cushman 1981:9). The resources exploited varied on the basis of local availability. This factor, coupled with the types and quantities of the lithic materials employed in toolmaking, results in different artifact assemblages at different sites. It is therefore difficult to characterize a typical regional Archaic tool assemblage. Archaic assemblages are, however, clearly distinguished from those of the preceding Paleo-Indian Tradition by the replacement of fluted points with smaller points of cruder materials and the emergence of grinding and ground stone tool (axes, chisels, and gouges) technologies. In general, tool assemblages from this tradition are marked by increasing diversification and specialization through time.

The increased number of sites dating to the Archaic is evidence that population density was greater during the Archaic than it was during the Paleo-Indian Tradition. This increase in population density was possible because, as climatic fluctuations stabilized and hardwood forests became established, the carrying capacity of the environment increased. In addition, the warming trend caused a rise in the sea level which allowed for the formation of extensive marshes and estuaries along the Delaware River. As resources became more abundant in and around major waterways and marshes, settlement was increasingly focused along them (Kraft 1977; Gardner 1980). Despite this trend, there is evidence of continued seasonal nomadism based on a resource-scheduling strategy (Cushman 1981:12).

During the Late Transitional Archaic, trade—particularly in non-local lithic material—expanded and new artifact forms, such as steatite (soapstone) vessels, were used. These attributes are born out by the large number of sites and by the more diverse cultural assemblages found in the region from this cultural period. A larger population with more diverse procurement activities is likely to increase the importance of upland areas in the region during this period. Custer (1985), feeling a continuity in resource exploitation, combines the traditional Late Archaic, Early Woodland, and Middle Woodland Periods together under the term Woodland I. This division is
marked by the following items: “focus on the highest productivity settings, an intensified use of certain resources, appearance of large semi-sedentary macro-band base camps, development of storage and processing facilities, extensive use of a wide range of environments, development and maintenance of trade and exchange networks, and the appearance of incipient ranked societies” (Custer 1985:36-37).

Settlement locations for the Woodland I Period in the Piedmont Uplands are thought to closely resemble the Middle Archaic pattern (Custer and Wallace 1982:158). These small procurement site-types are postulated to be found in the following settings: upland slopes adjacent to ephemeral streams and spring heads, and toes of slopes extending into swamplike floodplains of the larger drainages (Custer and Wallace 1982:154). Additionally, the presence of base camps is strongly suggested for the first time in this province (Custer 1985:39). The base camp locations are thought to be associated with well-drained ground adjacent to sink holes, swamplike floodplains, or interior swamps (Custer and Wallace 1982:158).

The Woodland Tradition, 1,000 BC - AD 1500: Traditionally, the beginning of the Woodland Tradition in this region is marked by the introduction of ceramics (Gardner 1980:3) and by two major trends: increasing sedentism and the development of extensive agriculture (Curry and Custer 1982:4; Cushman 1981:14). During the Woodland Tradition, permanent or semi-permanent settlements replaced the seasonal base camp. Settlement patterns derived from sites dating to this period are focused on major waterways (Curry and Custer 1982:1) where the exploitable biomass was the greatest. The harvesting of various plants, waterfowl, fish, and shellfish would have provided a more than adequate supply of food. These waterways supplied relatively easy transportation and also facilitated trade, increasing the range and quantity of resources that could be exploited. The Late Woodland (Custer’s “Woodland II”) Period is generally characterized by the introduction of maize and squash cultigens and the appearance of sedentary villages. These developments were neither unilateral nor temporally concomitant throughout the Mid-Atlantic region.

The Late Woodland Period reflects a continuation of similar land use patterns and settlement locations to the earlier Late Archaic/Early-through-Middle Woodland Periods. The major difference appears as an “increasing use of floodplain settings for relatively large semi-sedentary communities and the habitation-utilization of certain levees along major drainages” (Custer and Wallace 1982:159). The results from Stewart’s (1981) work on precontact settlement and subsistence patterns in the Great Valley of Maryland are congruous with Custer and Wallace’s study. Stewart found a wide variety of ecotonal settings have supported both the small hunting-procurement type site and the large base camp site within the Late Archaic to Late Woodland Periods. Stating the obvious, it appears that the primary determinant of precontact settlement pattern distributions, excluding mortuary or ceremonial sites, is the location of water resources (Stewart 1981; Custer and Wallace 1982; Hatch et al. 1985; Sneathkamp and Ebright 1982; Gardner 1987). Stewart and Kratzer (1989:28) in their study of the Allegheny Plateau found that the significant site predictive factors translate into a combination of landform type and proximity to surface water. Custer’s (1985) research into the lithic scatter sites of the Piedmont Uplands is consonant with Stewart’s contention. He found that the most common topographical setting was the upland slope, and 67 percent of the sites are located within 40 meters (131.23 feet) of surface water.
The Contact Period, AD 1500-1750: The Late Woodland Period ended with European contact, which appears in the archaeological record as an intrusion of European artifacts into Late Woodland assemblages. At the time of Native American/European contact, relations between the two groups took various forms, usually beginning as trade interactions and religious proselytization. Relations then often proceeded to armed conflict, ultimately leading to the displacement of Native populations.

At the time of European forays into southeastern Pennsylvania, the Lenapes (Delawares) occupied the region. Interaction with the Europeans in the early period consisted primarily of the Swedish and Dutch fur trade on the Delaware River. Becker (1985) suggests that the Lenape may have altered their settlement pattern to a more sedentary and concentrated form as a response to a commensurable relationship with Europeans. He suggests that in the 1660s the Lenape were concentrated in the flatlands of Passyunk, in what is now southern Philadelphia (Becker 1985:48). At the end of Dutch rule in the area, and with the dispersion of the Minquas by the Seneca, the Lenape may have returned to a dispersed settlement pattern based upon seasonal fishing. By the 1680s the Lenape may have operated with the settlement system of one extended family band per feeder river (Becker 1985:50); however, the evidence for such a conclusion is scanty. The Lenape groups were gradually displaced by the Europeans in southeastern Pennsylvania. Lenape groups began arriving in the Susquehanna River area in the 1680s. Some groups were forced further west by the Iroquois as early as the 1720s (Kraft 1986). In 1742, the coastal Delaware Indians groups which remained in eastern Pennsylvania were asked by Governor Thomas to move to the Susquehanna River. In the Treaty of Lancaster of 1744, all of the Native Americans still remaining in the Lower Delaware River Valley were ordered to leave (Kraft 1986:233).

Study Area History

The Area of Potential Effect (APE) encompasses Chester County Bridge 236, a 1910 single span, steel plate through-girder bridge structure carrying Chandler Mill Road across the West Branch of Red Clay Creek in Kennett Township, Chester County (Figure 1; USGS 1993; Pennsylvania Department of Transportation 1997:n.p.). Bucktoe Creek flows into the West Branch of Red Clay Creek approximately 152.4 meters (500 feet) west (upstream) of Bridge 236. The mill for which Chandler Mill Road was named stood for over a century several dozen meters north of Bridge 236, on the west side of Chandler Mill Road. It was razed or removed sometime prior to 1986 (USGS 1986). Two houses formerly associated with the mill are still standing on the north side of Chandler Mill Road, across from the former mill site: a circa-1835 brick dwelling at 539 Chandler Mill Road, and a circa-1855 frame dwelling at 541 Chandler Mill Road. Deed, tax, census, and cartographic records indicate that these houses and the mill were part of a 12.14-hectare (30-acre) farm that encompassed the APE from the early nineteenth century (when it was created by members of the Gregg family) until its subdivision in the second half of the twentieth century.

Deed records indicate that the Gregg family settled in the area sometime prior to 1771, in which year Eves conveyed 42.09 hectares (104 acres) of land to Solomon Gregg (Chester County Deed Book V2:267) (on a map “Showing some of the Former Landholders around Old Kennett Meeting,” Eves was identified as the owner of a 82.96-hectare [205-acre] tract embracing the APE [Cope 1910]). Solomon Gregg’s tract was later acquired by his father Joseph, who conveyed it before 1805 to Solomon’s brother Isaac (Gregg 1807). As of 1805, Isaac Gregg’s
48.56-hectare (120-acre) tract was functioning as a farm. Isaac’s farmhouse must have been located some distance from the APE. In the will he composed on November 2, 1807, Isaac devised to his son Samuel the land on which he then resided, while to his son Solomon he devised a smaller tract of land—designated “the Fulling Mill place,” and said to contain approximately 13.75 hectares (34 acres)—on which Solomon was then a resident (Gregg 1807). The latter tract encompassed the APE and what would be known later in the nineteenth century as the 12.14-hectare (30-acre) Gregg farm. Solomon Gregg may have occupied a recently constructed log house on “the Fulling Mill place,” as he paid tax on a log house valued at $20 for the first time in 1808.

Solomon must have done well financially in the ensuing decade, as he constructed a frame barn on his 13.76 hectares (34-acre tract) around 1817 (according to Township tax records; the barn is still standing on the north side of Chandler Mill Road, north of the APE). The taxable value of Gregg’s property increased substantially during this period. Between 1810 and 1817 the assessed value of Solomon’s log house increased incrementally from $20 to $100, and the addition of the barn in 1817 added another $150 of value. Although his tract was referred to in his father’s 1807 will as the “Fulling Mill place,” Solomon would not be identified as a miller or mill owner in Kennett Township until 1821. The earliest record of incipient or ongoing milling activity on Solomon’s property is a lease dated August 20, 1818 wherein Samuel Gregg granted to Solomon the right to use a “dam and race or watercourse built and made upon a certain stream of water (called Red Clay Creek) within the lands of said Samuel Gregg for the claiming and conveying of water onto the land of the said Solomon Gregg for the use of a grist mill” (Chester County Deed Book R3:140). Nine weeks later, Solomon acquired from William Mansel an additional sliver of land “on the east side of Red Clay Creek together with the bed of the creek” (Chester County Deed Book P3:223). These acquisitions set the stage for Solomon to construct or complete construction of a dam, race, and gristmill on the West Branch of Red Clay Creek—work that he wrapped up by 1821, the first year in which he paid tax on a gristmill (valued at $1,000).

Tax records also indicate that Solomon Gregg was assessed for his ownership of a dwelling valued at $100 every year from 1817 through 1834. Then, in 1835, his residence was assigned a taxable value of $300, and this increase was reflected in subsequent assessments. This data suggests that sometime in 1834 or 1835 Solomon replaced his circa-1808 log house with a larger and more substantial dwelling (i.e., the brick dwelling standing at what is today 539 Chandler Mill Road).

By a deed dated April 6, 1844, Solomon Gregg and his wife Mary conveyed to their son Isaac the “water, corn, grist and merchant mill” on a pair of parcels together totaling approximately 3.23 hectares (8 acres) (Chester County Deed Book A5:84). Isaac paid his parents $5,000 for the detached milling property, which encompassed the APE. This income was not enough to ensure long-term financial health for Solomon and Mary Gregg. For unrecorded reasons, the Chester County Sheriff seized what remained of their farm in 1849 and prepared to liquidate their real estate and personal effects at a public sale. An advertisement of sale placed by the Sheriff in a local newspaper on February 13, 1849 read as follows:

By virtue of a Writ of Fieri Facias to me directed, will be sold at Public Sale, on Tuesday, the 6th of March next, at one o’clock, P.M. on the premises a certain Brick mess[u]age, plantation and tract of land, situate on Red Clay Creek, 2 miles [3.21 kilometers] south of Kennett Square, in the Township of Kennett, in the County of

9
Chester, bounded by lands of Isaac W. Gregg, William Gregg and others, containing about 30 ACRES [12.14 hectares], more or less with the appurtenances. The arable land is of first-rate quality, well watered and fenced, and has a sufficiency of woodland, and an APPLE ORCHARD and a variety of fruit trees on the premises.

The improvements consist of a Brick Mansion HOUSE, two stories high with kitchen attached and finished in the modern style. Stone and Frame Barn and other out buildings.

Also to be sold at the same time and place of the above mentioned tract; the personal property of the said defendant, to wit: One Horse, one Cart and gears, one Dearborn and harness, one Plough, one Harrow, one Hoco [sic], one Fan, Corn Sheller, one Cutting Box, one Horse Rake, one Grind Stone, lot of manure and straw, 3 acres [1.21 hectares] of wheat in the ground, household and Kitchen furniture &c., &c. Seized and taken in execution as the property of SOLOMON GREGG (The Village Record 1849:n.p.).

At the March 6 sale, Benjamin Harvey of Mill Creek Hundred, New Castle County, Delaware submitted the winning bid of $1,675. Sheriff Brinton Darlington presented Harvey with a deed to the property on May 5, 1849 (Chester County Sheriff’s Deed Book 5:320; Chester County Deed Book K5:359). Within a year, Harvey conveyed the 12.14-hectare (30-acre) farm to Solomon and Mary Gregg’s son Isaac, who owned the adjoining mill property and might have been living in the Greggs’ “brick mansion house” throughout this period. Isaac paid $1,900 to reunite the farm and mill properties under single ownership (Chester County Deed Book N5:347).

Solomon and Mary Gregg were no longer residents of Kennett Township in August 1850 when a census enumeration was conducted (United States Bureau of the Census 1850a). The Gregg farm was occupied at that time by 47-year-old farmer Isaac, his 44-year-old wife Hannah, and three Gregg children: 20-year-old John (occupied as a miller), Louisa (age 17), and Amanda (15) (United States Bureau of the Census 1850a). Though identified as a farmer, Isaac derived most of his income from his mill, which was worth almost twice as much (according to the census enumerator) as his farm. Data recorded on agricultural schedules during the summer of 1850 revealed the Gregg farm to be approximately 34% smaller, 28% less valuable, and significantly less productive than the average Kennett Township farm of this era (United States Bureau of the Census 1850b).

The approximate locations of the head race, the tail race, and the dam powering “Greggs G[rist] M[ill]” were denoted on a map of Kennett Township published in 1856 (Figure 2; Kennedy 1856). While dwellings were not denoted on this map, their locations were pinpointed on a map of Kennett Township published in 1860 (Figure 3; Kennedy 1860). By that year—and possibly as early as the mid-1850s (as reflected in tax records)—Isaac Gregg had constructed a frame house southeast of his brick residence (north of the APE). Gregg’s “G. Mill” was thus depicted on the 1860 map in the company of two neighboring dwellings, jointly attributed to “I. Gregg” (Figure 3; Kennedy 1860).

It has not been determined if Isaac and Hannah moved into the new house (perhaps as part of their retirement) or if they stayed in the brick residence and allowed their son John to move into the new dwelling. John had recently married, or was about to marry, a woman named Elizabeth, so the Greggs apparently decided separate dwellings were in order. There were indeed two occupied
PROJECT AREA CIRCA 1860

FIGURE 3

PREPARED BY CHRS, INC.

SCALE

0m 304.8m
0ft 1000ft

SOURCE

KENNEDY 1860

Prepared by CHRS, Inc.

AREA OF POTENTIAL EFFECT
dwellings on the Gregg farm when a census enumerator visited the property in June 1860. One dwelling was occupied by 57-year-old miller Isaac with his 54-year-old wife Hannah, and the other residence was home to 29-year-old farmer John Gregg, his 26-year-old wife Elizabeth, and the family of 24-year-old farm laborer John P. McCloud and his wife Susan (United States Bureau of the Census 1860a).

Agricultural data recorded in June 1860 reveal that Isaac Gregg’s farm continued to be significantly smaller than his neighbors’ and other Kennett Township farms. The farm was also still producing significantly less than neighboring farms. The value of the farm was said to be $6,000—significantly more than the few other farms of similar size in Kennett Township—but this assessment probably included the value of the mill on the property (United States Bureau of the Census 1860b).

Four years later, Isaac was ready to sell his farm. He announced his plan to sell the property “at [a] Private Sale” in newspaper advertisements such as the following, published in The Village Record on December 10, 1864:

The subscriber will sell at private sale, the property on which he now resides, situate about 2 miles [3.22 kilometers] south of Kennett Square, on the west branch of Red Clay Creek, containing near 30 ACRES [12.14 hectares] of good and productive land on which is erected a good GRIST AND MERCHANT MILL, 2 GOOD DWELLINGS, barn and large stable, and other out buildings. For further information apply on the premises, or address at Kennett Square. If the above is not sold, the mill will be for rent.

ISAAC GREGG

P.S. – A young man wanted to assist in the mill (The Village Record 1864:n.p.).

Over a year passed before Isaac was able to find a suitable buyer for his farm and mill. By a deed dated March 31, 1866, he and his wife conveyed the property to Abram Chandler of Mill Creek Hundred, New Castle, Delaware, in consideration of $8,000 (Chester County Deed Book N7:228). The real estate was described at this time as comprising a “messuage, grist mill, plantation and formerly three tracts of land” totaling just over 11.33 hectares (28 acres). Though he remained the owner of record, Abram Chandler apparently purchased the property on behalf of his sons Newton and Edwin. When a census enumerator visited the former Gregg farm on July 29, 1870, he found one of the dwellings occupied by 34-year-old miller Newton Chandler, his 31-year-old wife Mary, 3-year-old daughter Anna, and 26-year-old brother Edwin (also occupied as a miller). Newton and Edwin each owned real estate valued at $3,500. In the house next-door lived a farm laborer and his family (United States Bureau of the Census 1870a). It is unclear which household occupied which dwelling on the Chandler property.

As had Isaac Gregg before them, Newton and Edwin Chandler derived more income from milling than farming. Agricultural data compiled on June 1, 1870 reveals that the Chandler farm’s size and production level, as well as the values of its farming implements, machinery, and livestock, were still significantly lower than other farms in the area (United States Bureau of the Census 1870b). An 1870 schedule of manufacturers reveals that the Chandlers had invested $7,000 in their water-powered mill, identified as “N. & E.J. Chandler’s Grist and Flour Mill” (United States Bureau of the Census 1870c). The mill was similarly identified on a map of Kennett Township
published in 1873 (Figure 4; Bridgens 1873). The two dwellings on the Chandler property were also depicted on this map, on the opposite (northeast) side of a new road that crossed the West Branch of Red Clay Creek immediately south of the mill. This road is known today as Chandler Mill Road. The nature of the bridge or bridges erected in the late 1860s or early 1870s to carry Chandler Mill Road across the West Branch of Red Clay Creek and the tail race of the Chandler mill is not known. The iron span currently serving this purpose would not be installed until 1910 (Pennsylvania Department of Transportation 1997:n.p.).

Edwin Chandler’s marriage to Emmarine Walton on May 7, 1873 led to the dissolution of the Chandler brothers’ milling partnership. In 1874, Newton Chandler moved with his family to Milltown, Delaware, leaving the mill and farm along Chandler Mill Road to his brother (Chandler Family Reunion Committee 1937:n.p.). When a Kennett Township census enumerator visited the property on June 17, 1880, he found one of the dwellings occupied by 37-year-old farmer Edwin Chandler (erroneously identified as Edward), his wife Emma, and their daughter Mary. Living in the neighboring house were a miller, his wife, and a farm laborer (United States Bureau of the Census 1880a). The Chandler farm continued to rank below the Township average in most measured categories of size, livestock population, and productivity. Only in the areas of poultry flock size and egg production did the farm exceed the Township average (United States Bureau of the Census 1880b).

On a map of Kennett Township published in 1883, the mill on the Chandler property was identified as a sawmill, and the 10.9-hectare (26.94-acre) mill and farm tract was attributed to Abram Chandler (Edwin’s father, who had not relinquished ownership during his sons’ occupation) (Figure 5; Kirk 1883). The location and composition of the property’s two dwellings on the northeast side of Chandler Mill Road were also indicated. A frame barn was denoted midway between the two residences.

As of 1895, Abram Chandler still owed the estate of Isaac Gregg $2,000 for the farm and mill. When Chandler defaulted on this debt, the property was seized by the Chester County Sheriff and sold on August 22, 1895 to Gregg’s administrator, Howard G. Wilson, for $1. In the deed reflecting this sale, the property was described as “two messuages, grist and saw mill, and tenement houses” on two tracts of land, one tract containing 9.91 hectares (24.5 acres) and the other 0.8 hectare (2 acres) (Chester County Sheriff’s Deed Book 13:25). The size of the larger of the two tracts was corrected to 10.7 hectares (26.44 acres) in a deed dated April 1, 1896 by which Howard Wilson conveyed the property to Kennett Square Borough resident Clayton M. Pyle in consideration of $1,800 (Chester County Deed Book Q1120). The smaller tract was described in this deed as a woodlot.

The Chandler era at the Chandler Mill property was not yet over. On February 4, 1898, Clayton Pyle and his wife Florence conveyed the property to Kennett Township resident Sarah Chandler, in consideration of $2,500 (Chester County Deed Book Q11:216). When a census enumerator visited the property on June 6, 1900, 33-year-old Sarah Chandler was in residence with her 35-year-old husband George, who made his living as both a miller and a farmer (United States Bureau of the Census 1900). It cannot be determined from the enumeration which of the two dwellings on the property the Chandlers occupied, nor is it clear who, if anyone, occupied the other dwelling on the Chandler property.
Sarah and George Chandler owned the farm and mill property for a dozen years, during which time the two houses and the mill were denoted on opposing sides of Chandler Mill Road on a USGS topographical map (Figure 6; USGS 1904). On March 1, 1910 (the year in which Chester County Bridge 236 was installed), the Chandlers conveyed the property to Kennett Township miller John Becker, in consideration of $2,500 (Chester County Deed Book V13:176). Becker held the property for the next eight years. On May 1, 1918, he and his wife Augusta conveyed the farm and mill to Warren W. Springer, again in consideration of $2,500 (Chester County Deed Book E15:217). Springer and his wife Clara would own the property for the next four decades, adding to it a 7.64-hectare (18.88-acre) tract in 1924 (Chester County Deed Book L16:369). On an aerial photograph of the Chandler Mill vicinity taken on September 15, 1937, the mill and the frame house on the Springer property are partly obscured by foliage, but the brick house is entirely discernible, as are two outbuildings immediately south of this house and the barn (Figure 7; United States Department of Agriculture 1937). Portions of additional outbuildings are discernible north of the brick house.

According to the current owner of the frame dwelling at 541 Chandler Mill Road, the southern addition on the house was constructed in 1958 (Sandra Mills, pers. com., September 26, 2006). This act must have immediately preceded the Springers’ April 27, 1959 conveyance of the property to New Garden Township resident John W. Abernathy and his wife Heatherly, in consideration of $1 (Chester County Deed Book A31:574). Two covenants were included in the deed reflecting this conveyance. The first stipulated that “No mushroom houses shall be erected, maintained or operated on the within tract nor shall the land be used for composting or storage of mushroom manure, nor shall casing soil be taken from the premises.” The second covenant prohibited the presence of “junk or storage yards of like nature or house trailers” on the property.

In March 1960, the Abernathys set off the property’s frame house and mill site on a 1.02-hectare (2.54-acre) lot and conveyed the parcel to Richard H. Boyd and his wife Patricia, in consideration of $20,000 (Chester County Deed Book Y31:349). The following year the Abernathys completed a subdivision plan encompassing the remainder of the former Chandler property (Chester County Planning Commission 1961). On October 4, 1961, they conveyed the brick dwelling and barn on 0.87 hectares (2.17 acres) to Robert A. Hammond and his wife Mary, in consideration of $40,000 (Chester County Deed Book N33:388). The Hammonds added a two-story frame shed extension to the house during the 1970s (Sandra Mills, pers. com., September 26, 2006). After 37 years of ownership, the Hammonds conveyed the 0.87-hectare (2.17-acre) parcel with the brick house and barn at 539 Chandler Mill Road to the current owners, Timothy L. and Hillary W. Jones, by a deed dated August 17, 1998 (Chester County Deed Book 4407:472). In the fall of 2006, the Joneses were constructing a two-story frame addition to the rear of the dwelling.

The 1.02-hectare (2.54-acre) parcel containing the frame house and mill site, meanwhile, was conveyed by Richard and Patricia Boyd to the current owners, J. Thomas and Sandra F. Mills, by a deed dated February 28, 1962 (Chester County Deed Book X33:414). Over the course of the next 38 years, the Millses added two small pieces of land to the northeast side of their parcel, increasing the size of their holdings to 1.1 hectares (2.73 acres) (Chester County Deed Book D38:974; Chester County Deed Book 4823:291). In 1968 they constructed a second addition to the frame house (Sandra Mills, pers. com., September 26, 2006). On December 18, 2000, J. Thomas and Sandra Mills conveyed their property along Chandler Mill Road to themselves as Trustees under a
revocable Trust Agreement that they had worked out eighteen months earlier (Chester County Deed Book 4874:987).

The subdivision conceived by John and Heatherly Abernathy in 1961 was fully constructed by 1986, as reflected on a USGS map of the area (USGS 1986). No structures were denoted on this map in the location formerly occupied by the mill. Additional information concerning the fate of this structure has not been collected.

Previously Recorded Sites

The Pennsylvania Archaeological Site Survey (PASS) files list eight identified archaeology sites located between 1.61 kilometers (1 mile) to 2.41 kilometers (1.5 miles) of the APE. No sites have been recorded within 1.61 kilometers (1 mile) of the APE. Seven of the eight sites were identified during a Phase I Archaeological Survey for the PA-41 Corridor Improvement Project in Chester County, Pennsylvania (Miller 2005). These sites include the Lafferty Site (36Ch803), the Sunny Dell Schoolhouse Site (36Ch804), the McGarrett Site (36Ch806), the Marenco Site (36Ch807), the McGarrett 2 Site (36Ch808), the Limestone Road Site (36Ch809), and St. Anthony’s Site (36Ch810). Of these sites, three were precontact sites of unknown function, three were nineteenth-century domestic sites, and one (the Sunny Dell Schoolhouse Site [36Ch804]) contained both precontact and historic deposits. The precontact sites predominantly yielded quartz flakes, as well as quartzite and siltstone flakes. The Limestone Road Site (36Ch809) yielded a Perkiomen Broadspare, along with flakes of a variety of lithic materials, and the Marenco Site (36Ch807) yielded a core. No features were identified at any of the precontact sites. The eighth site, the Taylor Barn/Structure 38 (36Ch846) was a nineteenth-century farmstead.

The Pennsylvania Cultural Resources GIS shows a large, township-wide archaeological survey conducted in Kennett Township, entitled The Official Sewage Facilities Plan for Kennett Township, Chester County, PA (ER# 98-2662-029) (Tatman and Lee Associates 1998). However, upon review of the report, it was found that the report has no mention of cultural resources. It describes zoning, township demographics, existing sewer lines and treatment plants (Tatman and Lee Associates 1998).

METHODS

The purpose of the Phase I Archaeological Survey was to identify locations of potentially significant cultural resources within the Area of Potential Effect (APE) of the S.R. 7015, Section 236, Chester County Bridge 236 over the West Branch of Red Clay Creek Bridge Replacement Project, located in Kennett Township, Chester County, Pennsylvania, and to ensure these resources would not be disturbed. According to 36 CFR §800.16(d), the Area of Potential Effect (APE) for any proposed undertaking is defined as “the geographic area or areas within which an undertaking may cause changes in the character or use of historic [including archaeological] properties, if any such properties exist.”

The Area of Potential Effect (APE) consists of the area of the planned bridge replacement. The APE is centered on the existing bridge, extending approximately 15.24 meters (50 feet) east and
The Archaeological Survey was performed in accordance with *Cultural Resource Management in Pennsylvania: Guidelines for Archaeological Investigations* (PHMC 1991, curation guidelines revised 2006). Test units were excavated according to natural soil stratigraphy, and were terminated 10 centimeters (0.32 feet) into culturally sterile subsoil. All soil was screened through 0.63-centimeter (0.25-inch) hardware cloth. All recovered artifacts were bagged according to test unit and soil stratum. Information regarding Munsell color, texture, depth, and artifacts recovered was recorded on excavation record forms. All photographs were taken using color slide and black and white print film. All recovered artifacts were processed, inventoried, and catalogued. A complete artifact inventory is included as Appendix B.

**FIELD DATA**

**Archaeological Potential**

The APE is situated within a narrow stream valley in which alluvial landscapes of the valley floor are abruptly bounded by rising upland slopes. Uplands only occur outside of the anticipated APE. They have their closest approach to the bridge on the south side where steep slopes occur immediately adjacent to Chandler Mill Road. The road’s grade on this side of the Red Clay Creek valley is mainly the result of cut and fill actions along the upland toe. On the north side of the valley, uplands are somewhat more distant and are not quite as steeply sloping. As with the south side, the limit of the northern uplands again closely corresponds to Chandler Mill Road, in this case as the road bends westward away from the study area. Due to filling and grading associated both with the road as well as a former mill and mill race located along the base of the upland, the demarcation between upland and alluvial positions is now probably less pronounced than would have been apparent with original natural contours (Wagner 2007).

The project APE is entirely contained on alluvial terrain over which soil types and drainage conditions vary in relation to height above Red Clay Creek and local landscape position. The landscape on the south side of the creek is that of poorly drained, low-lying, unstable and variably disturbed floodplain (Appendix D, Plates 1 and 2). Surface seepage areas and hydrophytic vegetation testify to the poor drainage, and fill materials are common in close proximity to the bridge. This unstable and poorly drained landscape has no potential for intact cultural resources, and all direct soil examinations were made on the north side of the creek (Wagner 2007).
Alluvial landscapes on the north side Red Clay Creek are partitioned between the creek’s modern, active floodplain and a comparatively more stable but also relatively low-lying stream terrace. The floodplain is confined to the east side of the road where a well-defined levee adjacent to the bank rises nearly 1.5 meters (4.92 feet) above the creek. An examination of the levee soil (Boring 1) revealed only stratified recent alluvium almost certainly amassed well after construction of the existing bridge. As with the floodplain on the south side of the creek, the levee is too young and unstable to contain intact cultural resources (Wagner 2007).

Landward of the eastern levee, the surface declines into a lower lying backswamp setting where a soil examination (Boring 2) identified a somewhat poorly drained, weakly developed soil buried by recent alluvium. This upper mantle of very young sediments is at least 44 centimeters (17.32 inches) thick and could be as much as 72 centimeters (28.34 inches) thick. Underlying cambic horizons (Bw) are mottled and eventually become gleyed with depth, but are sufficiently developed to suggest relatively stable landscape conditions may have existed for as much as a thousand years or so before introduction of the modern surface alluvium. These older horizons could have a very limited potential for containing precontact cultural deposits, but given the backswamp position and attending impeded drainage, the nearby and much more favorably drained upland is more likely to have been chosen for occupation (Wagner 2007).

The landscape on the west side of the road is slightly higher (approximately 1.75 meters [5.74 feet]) than that east of the road, but much of the height difference is due to a thicker surface mantle of modern alluvium. The soil (Boring 3) was found to consist of an upper 83-centimeter (32.67-inch) mantle of modern alluvium atop a buried terrace soil. This buried soil is marked by a conspicuous surface horizon (2Ab), and similar to the terrace soil east of the road, underlying subsoil horizons consist of mottled and gleyed cambic horizons that establish an archaeological potential comparable to that of the eastern terrace. Again, although the degree of subsoil development is suggestive of an origin well before European settlement of the region, impeded drainage greatly limits the prospects for former occupation. Absent the upper mantle of modern alluvium, the original terrace surface was less than 1 meter (3.28 feet) above the creek, and the somewhat swampy, low-lying setting would have had little appeal for occupation. Some utilization during the drier months of summer and early fall is a possibility, so that unlike the more poorly drained floodplain on the south side of the creek, prospects for precontact cultural resources cannot be fully ruled out (Wagner 2007).

As a result of the geomorphological assessment, the northwest quadrant and the more well-drained, northernmost portion of the northeast quadrant contained moderate potential for precontact archaeological deposits.

The northwest quadrant also contained high potential for historic archaeological deposits. A nineteenth-century mill stood within 30.48 meters (100 feet) of the APE. Two residences historically associated with the mill property lie further removed from the APE. Deposits associated with these buildings were not anticipated within the APE.
Field Data

Two 1-meter (3.28-foot) square test units were excavated in the northern quadrants of the APE. Test Unit 1 was placed in the northern portion of the northeast quadrant (Figure 8), in a fallow field (Appendix D, Plate 3). At ground surface was a very dark grayish brown (10YR 3/2) silt loam that was approximately 16 centimeters 6.29 inches thick. Below this was dark brown (10YR 3/3) silt loam that was approximately 40 centimeters (15.74 inches) thick. At the bottom of this stratum the soil was beginning to take on water. These upper two strata represent two stacked plowzone horizons (Ap1, Ap2). Below the plowzone horizons were several cambic horizons (Bw1, Bw2, Bwg, respectively); the first was 6 centimeters (2.36 inches) of dark yellowish brown (10YR 3/4) loam, which was underlaid by a fully saturated olive brown (2.5Y 4/3) loam that extended from 62 to 72 centimeters (24.4 to 28.34 inches) below ground surface. Culturally sterile subsoil was light olive brown (2.5Y 5/3) heavy silt loam with mottles of dark yellowish brown (10YR 4/6) heavy silt loam. This stratigraphic profile is depicted on Figure 9.

Test Unit 2 was placed in the northern portion of the northwest quadrant (Figure 8), in a manicured lawn (Appendix D, Plate 4). At ground surface was 21 centimeters (8.26 inches) of very dark grayish brown (10YR 3/2) silt loam, underlaid by 14 centimeters (5.51 inches) of dark brown (10YR 3/3) sandy loam. These two strata were plowzone horizons (Ap1 and Ap2, respectively). Beneath this was a C horizon, which was brown (10YR 4/3) silt loam that was 50 centimeters (19.68 inches) thick. These upper three strata are all modern alluvium. Below this, 85 centimeters (33.46 inches) below ground surface, was a buried surface horizon that was comprised of unconsolidated, sorted dark yellowish brown (10YR 4/4) coarse sand with gravel and stream cobbles; this appeared to be a former stream bed. These deposits were 24 centimeters (9.44 inches) thick. The water table was present at the base of this deposit, approximately 110 centimeters (43.3 inches) below ground surface. At this level, very dark gray (2.5Y 3/1) loamy sand was present; this horizon (3Cg) was culturally sterile. This stratigraphic profile is depicted on Figure 9.

ANALYSIS

A total of 34 artifacts were recovered from the two test units. Test Unit 1 yielded 13 artifacts from the two plowzone horizons (Ap1 and Ap2). The Ap1 horizon yielded modern objects including green bottle glass, cellophane and hard plastic. The Ap2 horizon yielded a small amount of historic artifacts, including redware, whiteware, brick, cut nail fragments and coal.

Test Unit 2 yielded 21 artifacts. The Ap1 horizon yielded a fragment of colorless bottle glass and one piece of milk glass. The Ap2 horizon yielded one piece each of amber bottle glass, window glass, hard plastic, coal, charcoal and two pieces of slag/cinders. A glass marble, fragments of charcoal or burned wood, and slag or cinders were recovered from the upper 20 centimeters (7.87 inches) of the C horizon. The lower 30 centimeters (11.81 inches) of the C horizon yielded a small piece of redware or brick and a small piece of sheet metal or can fragment. The buried surface (2Ab) horizon identified in the geomorphological Soil Boring 3 was not encountered in Test Unit 2. In Test Unit 2, the stratum underlying the C horizon was comprised of coarse sand, gravel and cobbles similar to a former stream bed, and yielded only two unidentifiable nails.
The archaeological testing did not identify any significant archaeological deposits within the APE of the S.R. 7015, Section 236, Chester County Bridge 236 over the West Branch of Red Clay Creek Bridge Replacement Project. Many of the recovered objects were modern. Historic artifacts were found in low numbers, and represent a combination of light field scatter and objects washed in with the alluvial soils. No archaeological sites were identified within the APE.

**SUMMARY AND RECOMMENDATIONS**

This report documents the results of a Phase I Archaeological Survey performed for the S.R. 7015, Section 236, Chester County Bridge 236 over the West Branch of Red Clay Creek Bridge Replacement Project along Chandler’s Mill Road in Kennett Township, Chester County, Pennsylvania (Figure 1; USGS 1993). The project entails the replacement of the single span, steel plate through-girder bridge structure with a new, wider bridge. The 1910 bridge is not eligible for listing in the National Register of Historic Places. The Area of Potential Effect (APE) lies in the Piedmont Upland Section of the Piedmont Physiographic Province and is centered around the existing bridge, which is to be replaced on the same alignment. The Phase I Archaeological Survey examined approximately 0.19 hectares (0.48 acres). Of that, approximately 0.16 hectares (0.4 acres), or 83% of the APE was assessed through a geomorphological investigation as having a low potential for precontact archaeological deposits due to the presence of a wet or modern floodplain. This is the second cultural resource report prepared for the project; a Pennsylvania Historic Resource Survey Form was previously prepared (Black 2007). The cultural resource work was performed for Chester County in association with the Pennsylvania Department of Transportation (PENNDOT).

The archaeological work for this project included background research, geomorphological investigation and the excavation of two 1-meter (3.28-foot) square test units. The northwest quadrant and the more well-drained, northernmost portion of the northeast quadrant contained moderate potential for precontact archaeological deposits. The northwest quadrant also contained high potential for historic archaeological deposits due to the proximity (within 30.48 meters [100 feet]) of a nineteenth-century mill.

A total of 34 artifacts were recovered from the two test units. Many of the recovered objects were modern. Historic artifacts were found in low numbers, and represent a combination of light field scatter and objects washed in with the alluvial soils. No archaeological sites were identified within the APE. No additional archaeological testing is recommended within the APE.
REFERENCES CITED

Adovasio, J.M.

Becker, M.J.

Black, Laura
2007  Pennsylvania Historic Resource Survey Form, Chester County Bridge 236 over the West Branch of Red Clay Creek, Bridge Replacement Project, Kennett Township, Chester County, Pennsylvania. Prepared by CHRS, Inc. North Wales, Pennsylvania. Prepared for Chester County in association with the Pennsylvania Department of Transportation (PENNDOT).

Bridgens, H.F. and A.R. Witmer

Bryan, A.L.

Carbone, Victor A.

Chandler Family Reunion Committee
1937  George and Jane Chandler and Their Descendants. No publication data. Book in the collection of the Chester County Historical Society, West Chester, PA.

Chester County Planning Commission

Cope, Gilbert
Curry, D. and Jay F. Custer
1982  Holocene Climate Change in the Middle Atlantic Area: Preliminary Observations from Archaeological Sites. Paper presented at the Middle Atlantic Archaeological Conference, Rehoboth Beach, Delaware.

Cushman, J.M.

Custer, Jay F.

Custer, Jay F. and Edith B. Wallace

Dent, R.J. and B. Kauffman

Funk, Robert

Gardner, W.M.
Gregg, Isaac
1807 Isaac Gregg will. On file at the Chester County Archives, West Chester, PA.

Hatch, James W., Christopher Hamilton, Linda Ries, and Christopher Stevenson

Kennedy, T.J.

Kirk, W. H. & Co.

Kraft, J.C.


Kunkle, W. Merrill

Mason, R.J.

Miller, Patricia
2005 *Phase I Archaeology, Common Alignment Areas, PA 41 Corridor Improvement Project, Chester County, Pennsylvania.* ER# 93-4038-029. Prepared by KCI Technologies, Inc. Submitted to FHWA.

Pennsylvania Department of Transportation
Pennsylvania Historical and Museum Commission

Shelford, Victor E.

Sirkin, L.

Snethkamp, Pandora E. and Carol A. Ebright

Socolow, Arthur A.

Stewart, Michael and Judson Kratzer

Stewart, R.M.
1981 *Prehistoric Settlement and Subsistence Patterns and the Testing of Predictive Site Location Models in the Great Valley of Maryland*. Published dissertation, The Catholic University, Washington, D.C.

Tatman and Lee Associates

United States Bureau of the Census
1850a *Seventh Census of the Population of the United States*. Manuscripts on microfilm.
1850b Agricultural schedules. Manuscript on microfilm.
1860a *Eighth Census of the Population of the United States*. Manuscripts on microfilm.
1860b Agricultural schedules. Manuscript on microfilm.
1870a  *Ninth Census of the Population of the United States.* Manuscripts on microfilm.

1870b  Agricultural schedules. Manuscript on microfilm.

1870c  *Census of Manufactures.* Manuscript on microfilm.

1880a  *Tenth Census of the Population of the United States.* Manuscript on microfilm.

1880b  Agricultural schedules. Manuscript on microfilm.

1900  *Twelfth Census of the Population of the United States.* Manuscript on microfilm.

United States Department of Agriculture


United States Geological Survey


*Village Record, The*

1849  “Sheriff’s Sales.” In *The Village Record*, edition of February 13, 1849. Clipping in the “Kennett Township—Lands” vertical file of the Chester County Historical Society Library, West Chester, PA.


Wagner, Daniel P., Ph.D.

Watts, W.A.  
1979  “Late Quaternary Vegetation of Central Appalachia and the New Jersey Coastal Plain.”  

APPENDIX A

QUALIFICATIONS OF RESEARCHERS
QUALIFICATIONS OF RESEARCHERS

Principal Investigator: Thomas R. Lewis  
Professional Experience: 23 years  
Education: M.A. Anthropology, Temple University  
B.A. Anthropology, Temple University  
Project Responsibility: Administration and review

Project Archaeologist: Paula Miller  
Professional Experience: 11 years  
Education: M.A. Applied Anthropology, University of Maryland  
B.A. Anthropology, Millersville University  
Project Responsibility: Field supervision and report writing

Archaeology Lab Manager: Christina Civello  
Professional Experience: 18 years  
Education: B.A. Anthropology/Art History, University of Delaware  
Project Responsibility: Artifact processing, supervision, artifact inventories and curation

Senior Historian: Philip Ruth  
Professional Experience: 20 years  
Education: M.A. English, University Of New Hampshire  
B.A. English, Goshen College  
Project Responsibility: Historical research, review, analysis, and report writing

Graphics Illustrator: Bradley Harrison  
Professional Experience: 6 years  
Education: M.Sc. Archaeological Computing, University of Southampton, UK  
M.A. Eastern Mediterranean Archaeology, Catholic University of Leuven, Belgium  
M.A. Jewish Studies, Gratz College  
B.A. Jewish Studies, Gratz College  
Project Responsibility: Graphics preparation

Editor: Kevin Quigg  
Professional Experience: 11 years  
Education: M.A. English, Beaver College  
B.A. Communications, Temple University  
Project Responsibility: Report editing

Editor: Maria DiNicola  
Professional Experience: 1 year  
Education: B.A. English with Communications, Gwynedd-Mercy College  
Project Responsibility: Report editing
### ARTIFACT INVENTORY

**Unit 1, Stratum A**  (Ap1 horizon)
1. green bottle glass  
2. cellophane  
2. hard plastic  

**Unit 1, Stratum B**  (Ap2 horizon)
1. redware; lead glaze  
1. redware; eroded  
1. whiteware  
2. brick (4.4 grams)  
2. cut nail fragments  
1. coal (1.2 grams)  

**Unit 2, Stratum A**  (Ap1 horizon)
1. colorless bottle glass  
1. milk glass  

**Unit 2, Stratum B**  (Ap2 horizon)
1. amber bottle glass  
1. window glass  
1. hard plastic  
1. coal (0.9 grams)  
1. charcoal (0.1 grams)  
2. slag/cinder (13.2 grams)  

**Unit 2, Stratum C, Level 1**  (C horizon)
1. glass marble  
4. charcoal/burned wood (2.7 grams)  
3. slag/cinder (19.7 grams)  

**Unit 2, Stratum C, Level 2**  (C horizon)
1. redware/brick (0.3 grams)  
1. sheet metal / can fragment  

**Unit 2, Stratum D**  (2Ab horizon)
2. unidentifiable nails
APPENDIX C

BHP REPORT SUMMARY FORM
BUREAU FOR HISTORIC PRESERVATION
REPORT SUMMARY FORM

PROJECT CHECKLIST: Please fill out a copy of this checklist and include it with your final report.

1) Report Title  
   S.R. 7015, Section 236, Chester County Bridge 236 over the West Branch of Red Clay Creek, Bridge Replacement Project, Kennett Township, Chester County, Pennsylvania, Phase I Archaeology Survey

2) ER # (BHP File #)  
   07-6056-029

3) Author / Firm (Principal Investigator)  
   Miller, Ruth and Lewis/CHRS, Inc. (T. Lewis)

4) Report Date (month/year)  
   April/2007

5) Number of Pages  
   44

6) Agency (State or Federal)  
   Chester County in assoc. with PENNDOT (local and state)

7) Project Area County(s)  
   Chester County

8) Project Area Municipality(s)  
   Kennett Township

9) Project Area Drainage(s) (use PA DER State Water Plan and PASS codesheet for codes), list up to four.

   Subbasin  50  
   Watershed  76  
   Major Stream  77  
   Minor Stream  78

   Subbasin  
   Watershed  
   Major Stream  
   Minor Stream  

   Subbasin  
   Watershed  
   Major Stream  
   Minor Stream  

   Subbasin  
   Watershed  
   Major Stream  
   Minor Stream  

   Subbasin  
   Watershed  
   Major Stream  
   Minor Stream  

35
10) Project Area Physiographic Zone(s), list up to three.
   Piedmont Upland Section of the Piedmont Physiographic Province

11) Survey Type (Some reports are combinations, check as many as apply to this report.)
   Pre-Phase I / Sensitivity Study
   Phase I  X
   Phase II
   Phase III
   Determination of Effects
   Workplan

12) Total Project Area (in acres)  0.48 acres

13) Low Probability / Disturbed Areas (% and acreage)  0.4 acres; 83%

14) Total Number of Sites Encountered/Phase I  0
    Total Sites Tested/Phase II
    Total Sites Excavated/Phase III

15) For each site discussed in this report record the following variables:

   - how the site is located (shovel tests, controlled test units/deep tests, surface survey, informant interview, other)

   - chronology (paleo; e, m, or l archaic; transitional; e, m, or l woodland; unknown prehistoric; historic with structure or structural remains; other historic. List up to ten)

   - site size (surface area in acres)

   - PASS #

   - NR Eligibility (eligible, ineligible, undetermined)

   - reasons for determination (Y/N for each variable)
     - eligible sites (criterion D)
       - Settlement patterning
       - Intrasite artifact patterning
       - Features
       - Radiocarbon dating
       - Organic preservation
       - Stratified
       - Burials / human remains
- Historic: technological
- Historic: economics
- Historic: ethnicity
- Historic: dietary
- eligible: criterion A
- eligible: criterion B
- eligible: criterion C

- reasons for determination; ineligible
  - Disturbed
  - ephemeral occupation
  - redundant information
  - Undatable
  - other (specify)

- radiocarbon dates (Y/N, list up to 15)

  __________________________
  __________________________
  __________________________
  __________________________
  __________________________

- Phase II methods
  - controlled surface collection
  - controlled excavation with screening of plowzone, > 5 units
  - Mechanical stripping of plowzone (%)
  - deep excavation units
  - remote sensing
  - % / acreage of site tested: Phase II

- Phase III methods
  - controlled surface collection
  - controlled excavation with screening of plowzone, > 5 units
  - Mechanical stripping of plowzone (%)
  - deep excavation units
  - remote sensing
  - Environmental reconstruction (soils, floral, pollen)
  - dietary reconstruction (floral, faunal)
  - intensive lithic analysis (functional)
  - intensive lithic analysis (technological)
  - raw material sourcing
  - ceramic analysis (seriation)
APPENDIX D

PHOTOGRAPHS
Plate 1: Overview of southwest quadrant of APE.

Plate 2: Overview of southeast quadrant of APE.
Plate 3: Overview of northeast quadrant of APE. Excavation of Test Unit 1 in progress in the background.

Plate 4: Overview of northwest quadrant of APE. Test Unit 2 was excavated in this quadrant.
PEDOLOGY AND GEOMORPHOLOGY

IN THE AREA OF BRIDGE 236 (CHANDLER MILL ROAD)

OVER RED CLAY CREEK

IN CHESTER COUNTY, PENNSYLVANIA

Submitted to
CHRS, Inc.

By
Daniel P. Wagner, Ph.D.
Pedologist

January 19, 2007
Introduction

This report discusses pedological and geomorphological interpretations of soils and landscapes examined in the impact area for the planned replacement of the Chandler Mill Road crossing (Bridge 236) of Red Clay Creek in Chester County, Pennsylvania. The area was examined primarily for the purpose of assessing potential occurrences of cultural resources in the site soils. Such assessments are based on considerations of apparent deposit age and stability as well as environmental conditions relating to human utilization of a landscape.

The investigation of the study area was made on December 6, 2006 and entailed pedestrian traversal of the area landscapes together with examinations of soils by means of hand auger borings. Examined soils were described in accordance with standard pedological techniques and nomenclature for the field description of soils. Soil descriptions and other notes are attached at the end of the report.

Physiology and Geology

The study area is situated in the Piedmont Upland Section of the Piedmont Physiographic Province. Geology within this section is dominated by metamorphic rocks of Lower Paleozoic to Precambrian age. In the vicinity of the study area mica-schists of the Wissahickon Formation comprise the local bedrock. These rocks tend to form moderately to steeply sloping uplands, and the principal settings of nearly level terrain are mostly confined to the floors of stream valleys where fluvial landscapes are distributed between variably drained floodplain and terrace positions.

Throughout cleared portions of the Piedmont, processes of soil erosion and redeposition have been greatly accelerated by tillage for crop production, and most sloping fields have usually suffered moderate to severe losses of soil. As with the much more slowly acting natural processes, tillage-induced erosion of sloping upland landscapes results in the depletion of upper soil horizons at higher positions with subsequent deposition of the eroded slope wash along lower toeslope positions. Much of the eroded soil also, of course, eventually finds its way to stream systems where as transported sediment it may ultimately be deposited in the alluvial settings of valley bottoms. This process has been so widespread that the floodplains and low-lying terraces of Piedmont stream systems are nearly everywhere mantled by deposits of agriculturally derived alluvium.

Soils and Geomorphology

The investigated area is situated within a narrow stream valley in which alluvial landscapes of the valley floor are abruptly bounded by rising upland slopes. Uplands only occur outside of the anticipated APE. They have their closest approach to the bridge on the south side where steep slopes occur immediately adjacent to Chandler Mill Road. Indeed, the road’s grade on this side of Red Clay Creek valley is mainly the result of cut and fill actions along the upland toe. On the north side of the valley uplands are somewhat more distant and are not quite as steeply sloping. As with the south side the limit of the northern uplands again closely corresponds to Chandler Mill Road, in this case as the road bends westward away from the study area. Due to filling and grading associated both with the road as well as a former mill and mill race located along the base of the upland, the demarcation between upland and alluvial positions is now probably less pronounced than would have been apparent with original natural contours.
The project APE is entirely contained on alluvial terrain over which soil types and drainage conditions vary in relation to height above Red Clay Creek and local landscape position. The landscape on the south side of the creek is that of poorly drained, low-lying, unstable, and variably disturbed floodplain. Surface seepage areas and hydrophytic vegetation testify to the poor drainage, and fill materials are common in close proximity to the bridge. This unstable and poorly drained landscape has no potential for intact cultural resources, and all direct soil examinations were made on the north side of the creek.

Alluvial landscapes on the north side Red Clay Creek are partitioned between the creek’s modern, active floodplain and a comparatively more stable but also relatively low-lying stream terrace. The floodplain is confined to the east side of the road where a well defined levee adjacent to the bank rises nearly 1.5 m above the creek. An examination of the levee soil (Boring 1) revealed only stratified recent alluvium almost certainly amassed well after construction of the existing bridge. As with the floodplain on the south side of the creek, the levee is too young and unstable to contain intact cultural resources.

Landward of the eastern levee the surface declines into a lower lying backswamp setting where a soil examination (Boring 2) identified a somewhat poorly drained, weakly developed soil buried by recent alluvium. This upper mantle of very young sediments is at least 44 cm thick and could be as much as 72 cm. Underlying cambic horizons (Bw) are mottled and eventually become gleyed with depth, but are sufficiently developed to suggest relatively stable landscape conditions may have existed for as much as a thousand years or so before introduction of the modern surface alluvium. These older horizons could have a very limited potential for containing precontact cultural deposits, but given the backswamp position and attending impeded drainage, the nearby and much more favorably drained upland is more likely to have been chosen for occupation.

The landscape on the west side of the road is slightly higher (~1.75 m) than that east of the road, but much of the height difference is due to a thicker surface mantle of modern alluvium. The soil (Boring 3) was found to consist of an upper 83-cm mantle of modern alluvium atop a buried terrace soil. This buried soil is marked by a conspicuous surface horizon (2Ab), and similar to the terrace soil east of the road, underlying subsoil horizons consist of mottled and gleyed cambic horizons that establish an archaeological potential comparable to that of the eastern terrace. Again, although the degree of subsoil development is suggestive of an origin considerably before European settlement of the region, impeded drainage greatly limits the prospects for former occupation. Absent the upper mantle of modern alluvium the original terrace surface was less than 1 m above the creek, and the somewhat swampy, low-lying setting would have had little appeal for occupation. Some utilization during the drier months of summer and early fall is a possibility, so that unlike the more poorly drained floodplain on the south side of the creek, prospects for precontact cultural resources can not be fully ruled out.

Summary

The narrow valley floor setting of the study area is sharply outlined by rising upland slopes that lie beyond the APE. All landscapes to be impacted by the project consist of alluvial forms distributed between the active, generally poorly drained floodplain of Red Clay Creek, and a low-lying stream terrace that is only slightly more favorably drained. A variably thick mantle of modern
alluvium covers the entire valley floor, and although terrace soils beneath these young sediments are perhaps as much as 1,000 years or so in age, impeded drainage greatly limits prospects for former human occupation. The possibility of seasonal usage during drier months of the year offers the only potential for precontact cultural resources.

**Soil Profile Descriptions and Notes**

Boring 1

Notes: Floodplain levee position; ~1.25 m above creek; stratified recent alluvium of sand, sandy loam, and fine sandy loam to refusal on gravel at 124 cm; described 12/6/06

<table>
<thead>
<tr>
<th>Horizon</th>
<th>Depth (cm)</th>
<th>Properties</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ap1</td>
<td>0-24</td>
<td>Dark brown (7.5YR 3/2) silt loam; very friable consistence</td>
</tr>
<tr>
<td>Ap2</td>
<td>24-44</td>
<td>Dark brown (7.5YR 3/3) silt loam; friable consistence</td>
</tr>
<tr>
<td>Bw1 (Ap3?)</td>
<td>44-72</td>
<td>Dark brown (7.5YR 3/4) loam; friable consistence</td>
</tr>
<tr>
<td>Bw2</td>
<td>72-91</td>
<td>Brown (10YR 4/3) loam; many, medium distinct mottles of gray (2.5Y 5/1); friable consistence</td>
</tr>
<tr>
<td>Bwg</td>
<td>91-115</td>
<td>Light brownish gray (2.5Y 6/2) loam; many, medium distinct mottles of dark yellowish brown (10YR 4/6); friable consistence</td>
</tr>
<tr>
<td>2Cg</td>
<td>115-140+</td>
<td>Dark gray (2.5Y 4/1) coarse sand; loose consistence</td>
</tr>
</tbody>
</table>

Boring 2

Notes: Terrace backswamp position; ~1.1 m above creek; somewhat poorly drained; water table 104 cm; crushed stone layer at surface; upper 44 cm and possibly upper 72 cm are modern alluvium; auger refusal on gravel at 140 cm; described 12/6/06

<table>
<thead>
<tr>
<th>Horizon</th>
<th>Depth (cm)</th>
<th>Properties</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ap1</td>
<td>0-20</td>
<td>Very dark grayish brown (10YR 3/2) silt loam; friable consistence</td>
</tr>
<tr>
<td>Ap2</td>
<td>20-48</td>
<td>Dark brown (10YR 3/3) silt loam; friable consistence</td>
</tr>
<tr>
<td>C</td>
<td>48-83</td>
<td>Brown (10YR 4/3) silt loam; friable consistence</td>
</tr>
<tr>
<td>2Ab</td>
<td>83-97</td>
<td>Very dark grayish brown (10YR 3/2) silt loam to loam; friable consistence</td>
</tr>
<tr>
<td>2Bw</td>
<td>97-113</td>
<td>Dark yellowish brown (10YR 4/4) loam; many, medium distinct mottles of light brownish gray (2.5Y 6/2); friable consistence</td>
</tr>
<tr>
<td>2Bwg</td>
<td>113-146</td>
<td>Light brownish gray (2.5Y 6/2) loam; many, medium distinct mottles of dark yellowish brown (10YR 4/6); friable consistence</td>
</tr>
<tr>
<td>3Cg</td>
<td>146-159+</td>
<td>Very dark gray (2.5Y 3/1) loamy sand; very friable consistence</td>
</tr>
</tbody>
</table>

Boring 3

Notes: Terrace position; ~1.75 m above creek; somewhat poorly drained; upper 83 cm are modern alluvium; described 12/6/06

<table>
<thead>
<tr>
<th>Horizon</th>
<th>Depth (cm)</th>
<th>Properties</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ap1</td>
<td>0-20</td>
<td>Very dark grayish brown (10YR 3/2) silt loam; friable consistence</td>
</tr>
<tr>
<td>Ap2</td>
<td>20-48</td>
<td>Dark brown (10YR 3/3) silt loam; friable consistence</td>
</tr>
<tr>
<td>C</td>
<td>48-83</td>
<td>Brown (10YR 4/3) silt loam; friable consistence</td>
</tr>
<tr>
<td>2Ab</td>
<td>83-97</td>
<td>Very dark grayish brown (10YR 3/2) silt loam to loam; friable consistence</td>
</tr>
<tr>
<td>2Bw</td>
<td>97-113</td>
<td>Dark yellowish brown (10YR 4/4) loam; many, medium distinct mottles of light brownish gray (2.5Y 6/2); friable consistence</td>
</tr>
<tr>
<td>2Bwg</td>
<td>113-146</td>
<td>Light brownish gray (2.5Y 6/2) loam; many, medium distinct mottles of dark yellowish brown (10YR 4/6); friable consistence</td>
</tr>
<tr>
<td>3Cg</td>
<td>146-159+</td>
<td>Very dark gray (2.5Y 3/1) loamy sand; very friable consistence</td>
</tr>
</tbody>
</table>