Phase IB
Archaeological Survey
Newark Regional Transportation Center
Newark, New Castle County, Delaware

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Abstract

On August 18 and 19, 2015, Parsons Brinckerhoff and EAC/Archaeology, Inc. conducted a Phase IB archaeological survey within the proposed Area of Potential Effects (APE) for the Newark Regional Transportation Center (NRTC) in Newark, New Castle County, Delaware. The project area was located along the Amtrak rail, east of its intersection with South College Avenue, and contained an area of 6,750 square meters (72,656 square feet).

During December 2012 and January 2013, Parsons Brinckerhoff (PB) completed a Phase IA survey to assess the potential effects to both historic standing structures and archaeological resources (Ward et al. 2013). Based on the results of that survey, it was concluded that the proposed NRTC would have no effect on historic standing structures or archaeological resources listed on or eligible for the National Register of Historic Resources.

Following the study, proposed design modifications resulted in an expanded Area of Potential Effects (APE). As a result, it was necessary to carry out additional survey work to identify and evaluate historic standing structures and archaeological resources within the modified APE, and to access potential effects on these resources.

A prehistoric isolated find was located at the eastern end of the APE, was assigned the Department of Historic and Cultural Affairs (DHCA) Accession Number 2015.0016. No further work is recommended.

Artifacts and field documentation for this project are currently located at the EAC/Archaeology, Inc. (EAC/A) laboratory in Baltimore City, Maryland.

Cover Image: Aerial Photograph- Newark, Delaware (November 9, 1995).

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1.0 Introduction

In 2013, Parsons Brinckerhoff (PB) completed a Phase IA survey to assess the potential effects to both historic standing structures and archaeological resources (Ward et al. 2013). Based on the results of that survey, it was concluded that the proposed NRTC would have no effect on historic standing structures or archaeological resources listed on or eligible for the National Register of Historic Resources. Following the report, there were proposed design modifications that resulted in an expanded Area of Potential Effects (APE). As a result, it was necessary to carry out additional survey work to identify and evaluate historic standing structures and archaeological resources within the modified APE, and to access potential effects on these resources. For Section 106 compliance for archaeological resources PB and its subconsultant, EAC/Archaeology, Inc. (EAC/A) completed a shovel testing survey of the new project impacts between August 18 and 19, 2015.

1.1 Project Location and Current Conditions

The APE is located on south side of the Amtrak rail, east of its intersection with South College Avenue within an urban area between a rail line and a cultivated field (**Figures 1 and 2**). The width of the APE is approximately 15 meters (49 feet), and its length 450 meters (1,476 feet), giving a total surface area of 6,750 square meters (72,656 square feet). Two manhole covers for antiquated utilities, and several large poles for overhead electric lines were present along the northern edge of the APE (**Photographic Plate 1**). One drainage ditch was approximately at the center of the APE. There is a chain link fence delineating the northern edge of the APE.

1.2 Project Staff and Report Organization

Key project staff consisted of Henry Ward, Project Manager; Stephanie Foell, Architectural Historian; Esther Doyle Read, Robert Wanner, and Jane Seiter as Principal Investigators (see Appendix 1 for investigator qualifications). Robert Wanner produced the report figures. The field crew included Rob Wanner (Field Director), Esther Doyle Read, Joseph Clemens, Augustus Kahl, and Patrick Kim. Lab crew consisted of Jane Seiter (Lab Director) and Molly Greenhouse.

The report is divided into five main sections with additional sections for cited references and appendices. Section 1.0 includes introductory and organizational material. Section 2.0 presents the results of additional archival research and includes a summary of the environmental setting and historic land use of the project area. Section 3.0 presents the research design and methodology that guided the Phase I work. Section 4.0 describes the field survey results and interpretation of the findings. Section 5.0 presents an assessment of the project impact and suggestions for future work. The final sections of the report include a list of the cited references (Section 6.0) and the appendices (Section 7.0). The appendices include photographic plates, a list of investigator qualifications, and artifact inventory, a log of soils encountered in the survey, and correspondence.

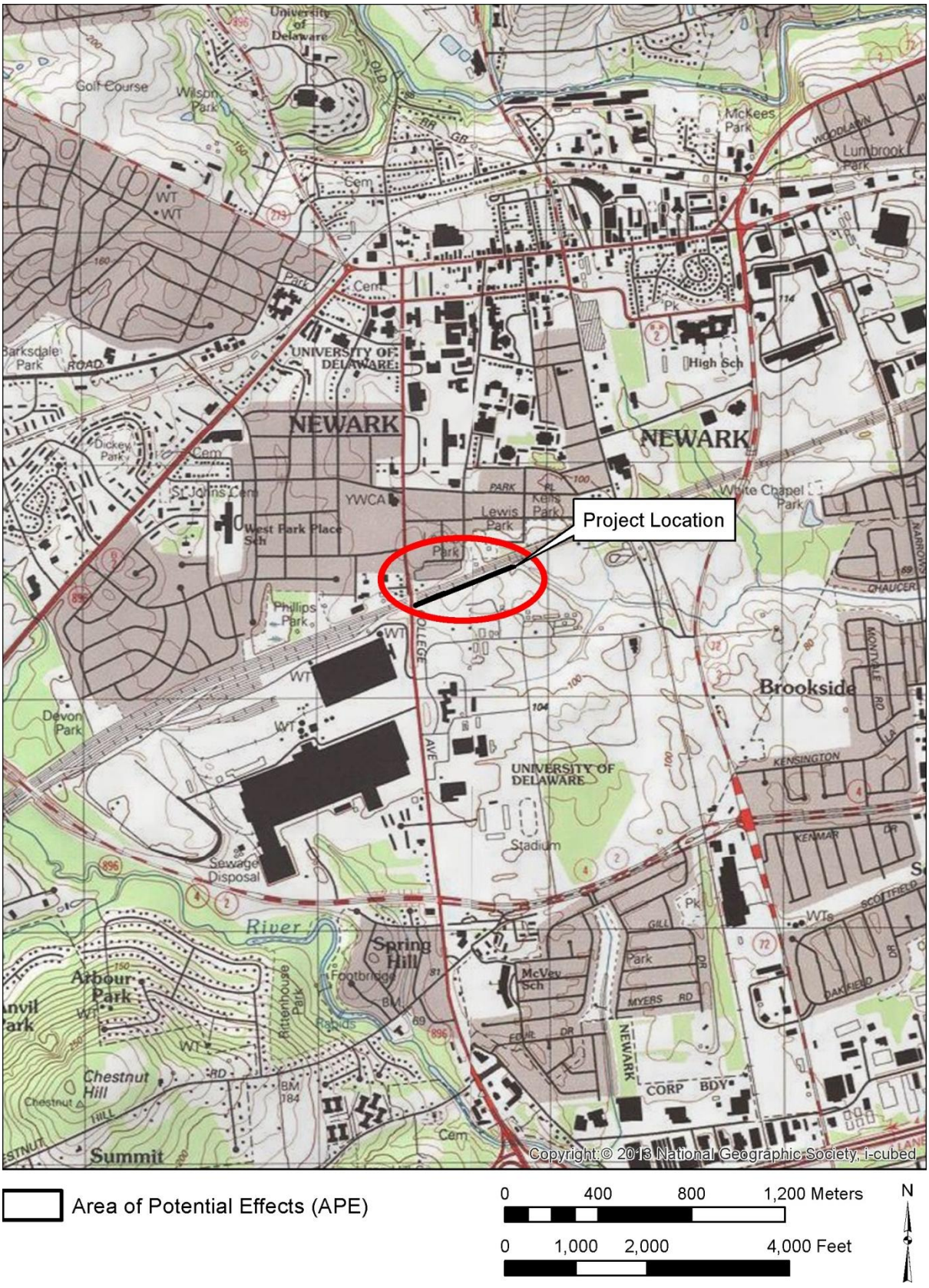

Figure 1: Project Location on USGS 1993 Topographic Map, *West and East Newark 7.5 Minute Quadrangle*

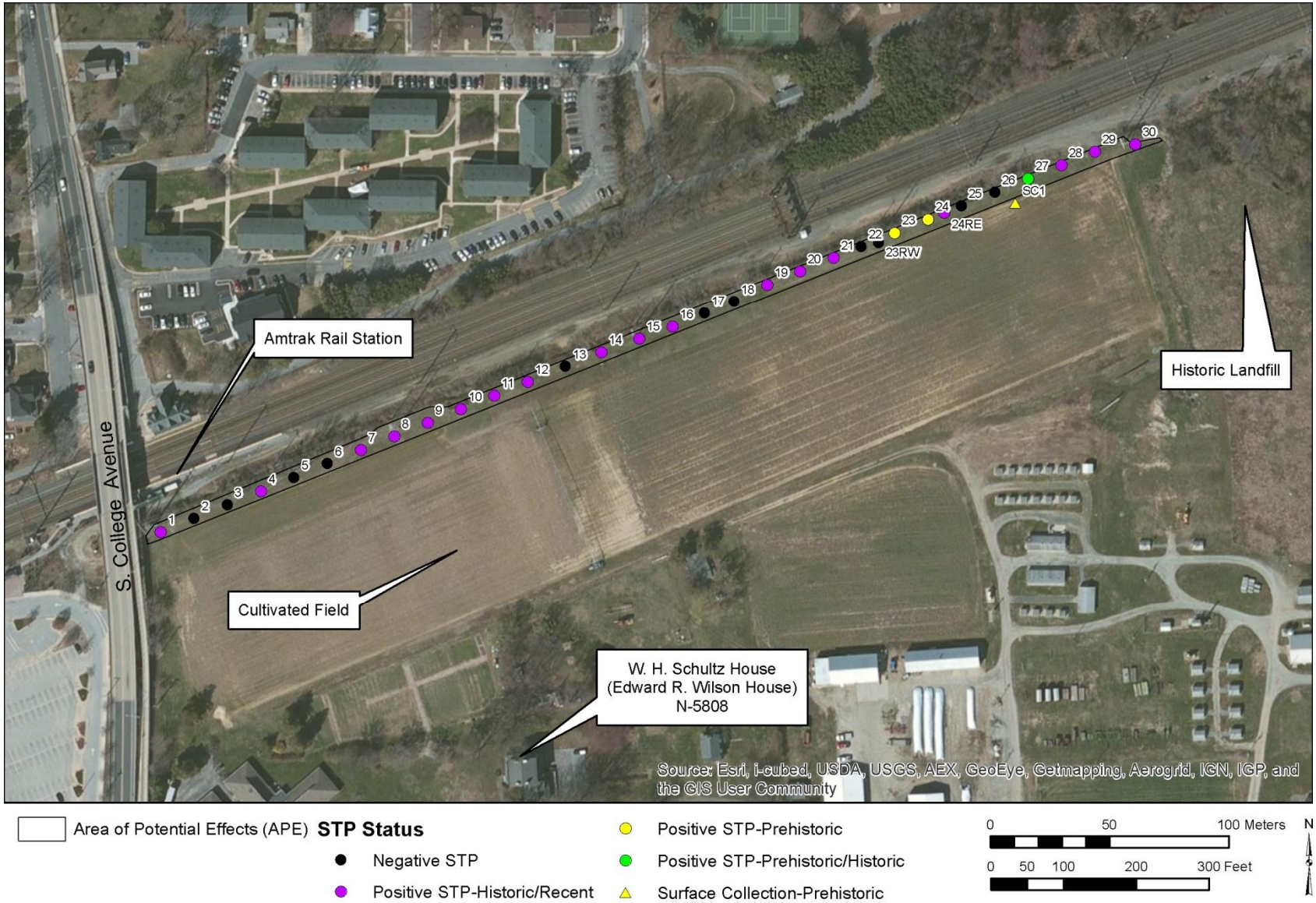

Figure 2: Project APE Layout and Testing Results

2.0 Background Research

Much of the background research has already been conducted for the general area of the APE (Bedell 1999; Ward et al. 2013). The reader is directed to the Phase IA report associated with the current Phase IB survey, *Archaeological and Architectural Survey Newark Regional Transportation Center, Newark, New Castle County, Delaware* (Ward et al. 2013) for a full description of the prehistoric and historic contexts for the project area.

2.1 Physical Geography and Environment

The APE is located in New Castle County, Delaware (**Figure 1**) within the Drainage Divide Physiographic Zone (**Figure 3**) and the Piedmont Geographic Zone (**Figure 4**). The Fall Line, along which the APE is situated, divides the Coastal Plain Province from the Piedmont Plateau Province. The Fall Zone is located on either side of the Fall Line, and is where the metamorphic rocks of the Piedmont Plateau Province of the Appalachians descend under the unconsolidated sediments of the Coastal Plain Province (Plank and Schneck 1998).

The United States Department of Agriculture (USDA) Web Soil Survey indicates two prominent soils within the APE (**Figure 5**). Approximately 35 percent of the APE contains Elsinboro silt loam (3 to 8 percent slopes), which is well-drained (Soil Survey Staff, Natural Resources Conservation Service, USDA 2015a). This soil group is located in the western half of the APE. Approximately 61 percent of the APE contains Elsinboro-Delanco-Urban land complex (0 to 8 percent slopes), which is moderately well-drained to somewhat poorly-drained. This soil complex is located at the eastern half of the APE. A small portion at the very eastern end contains Othello silt loam (0 to 2 percent slopes) to the south, and Fallsington-Urban land complex (0 to 5 percent slopes) to the north, both poorly-drained soils.

The typical profile for Elsinboro silt loam consists of two brown plow zone horizons (Ap1 and Ap2) with a combined thickness of 15 to 30 centimeters; followed by two distinct brown to strong brown B-horizons (Bt1 and Bt2), 41 to 91 centimeters in thickness; a brown, black, and strong brown BC-horizon 0 to 51 centimeters in thickness; a reddish yellow and strong brown CB-horizon 0 to 76 centimeters in thickness; and a strong brown, brown, and black C-horizon (Soil Survey Staff, Natural Resources Conservation Service, USDA, 2015b).

A small, unnamed tributary of White Clay Creek flows along the southeastern edge of the APE. The tributary turns east, then eventually northeast to meet White Clay Creek near the current Windy Mill Park. This tributary is visible on the 1900/1904 USGS maps (Figure 6) of the area but the drainage patterns are much more complex. A second unnamed tributary is also visible on this map flowing parallel and south of the APE, meeting the first tributary at a confluence southeast of the APE. This situation is the same in the 1917/1919 USGS maps (**Figure 7**). However, by 1953, the tributary is no longer depicted east of the APE (**Figure 8**).

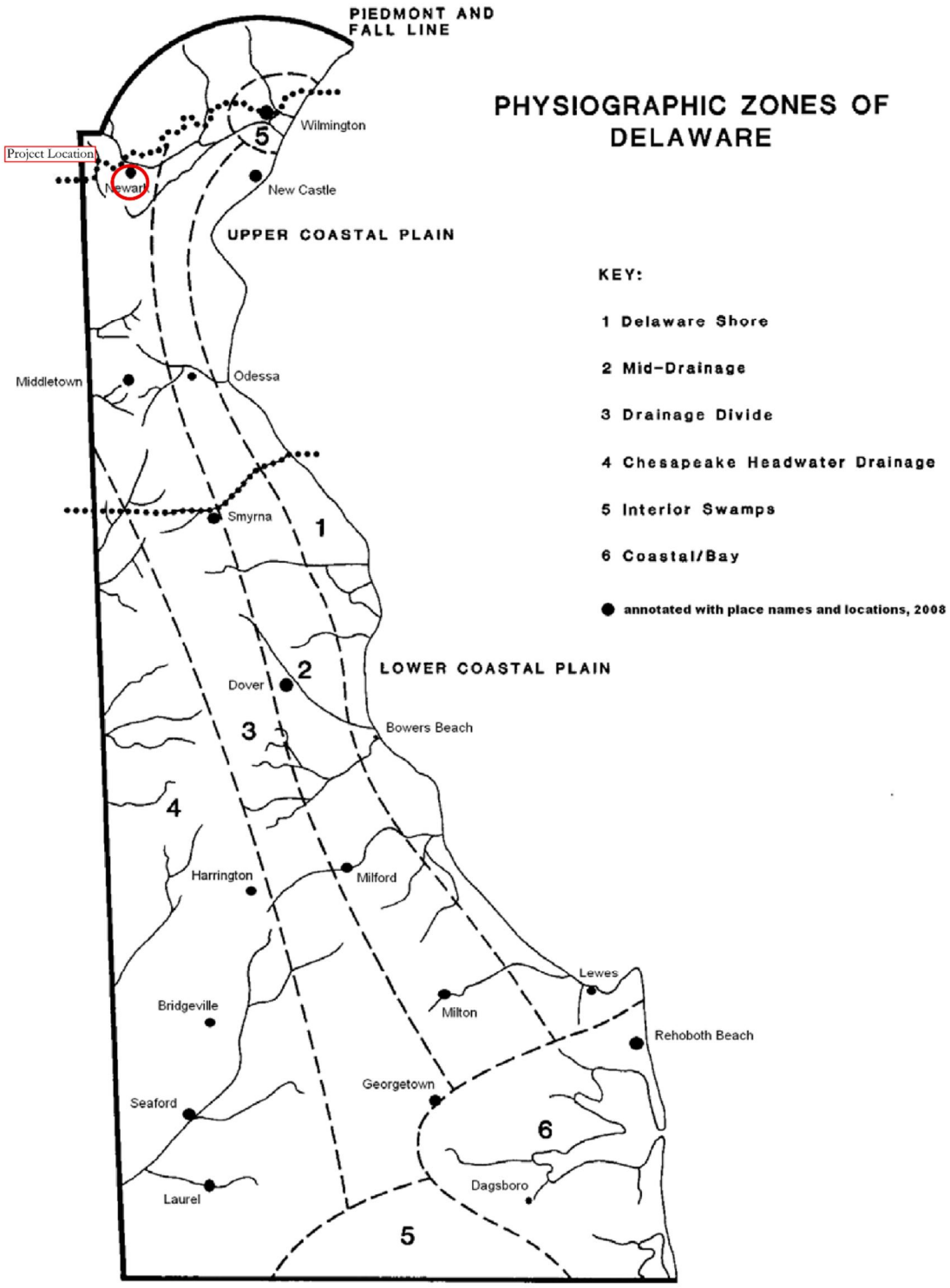

Figure 3: Project Location within Physiographic Provinces of Delaware

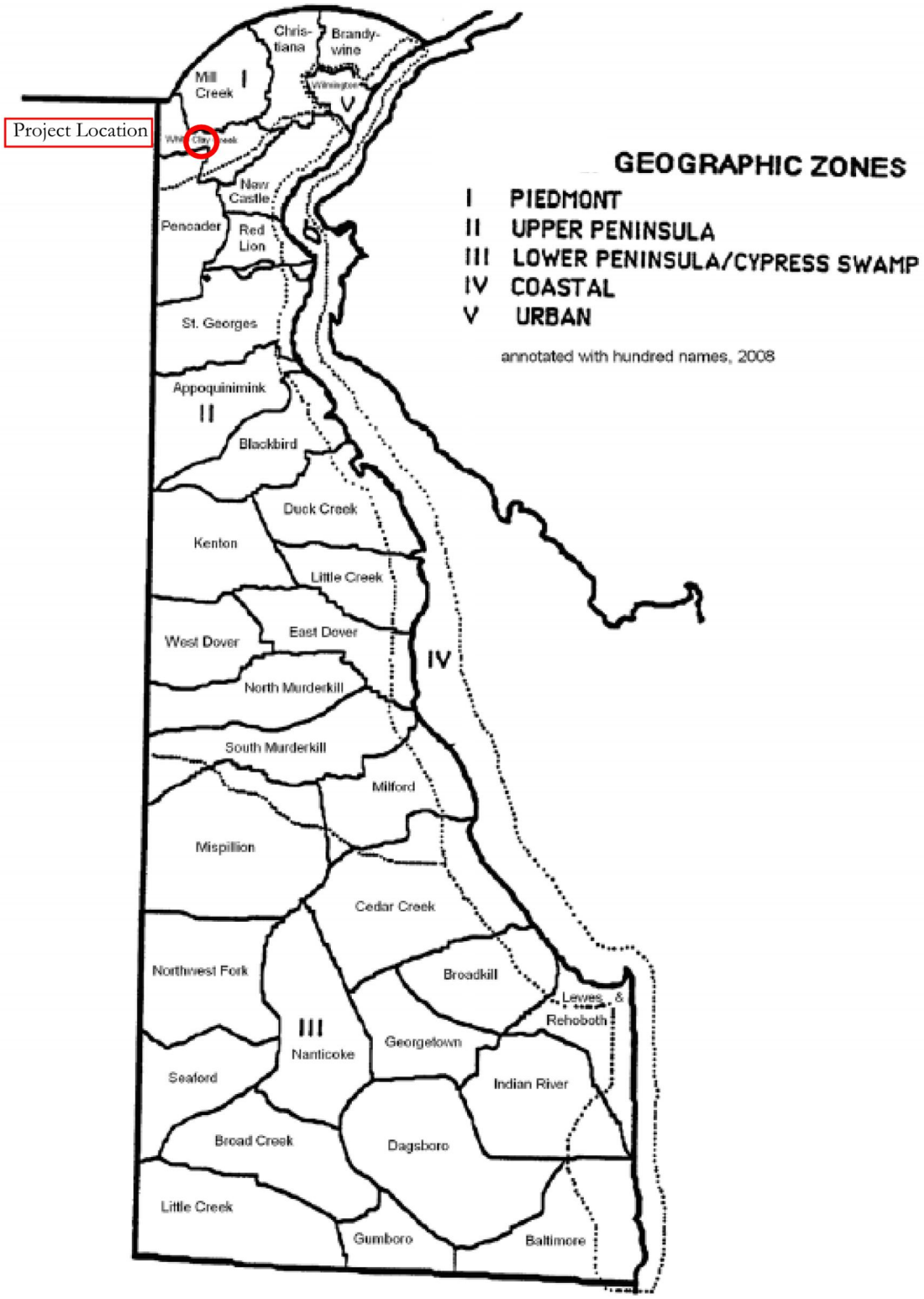

Figure 4: Project Location within Geographic Zones of Delaware

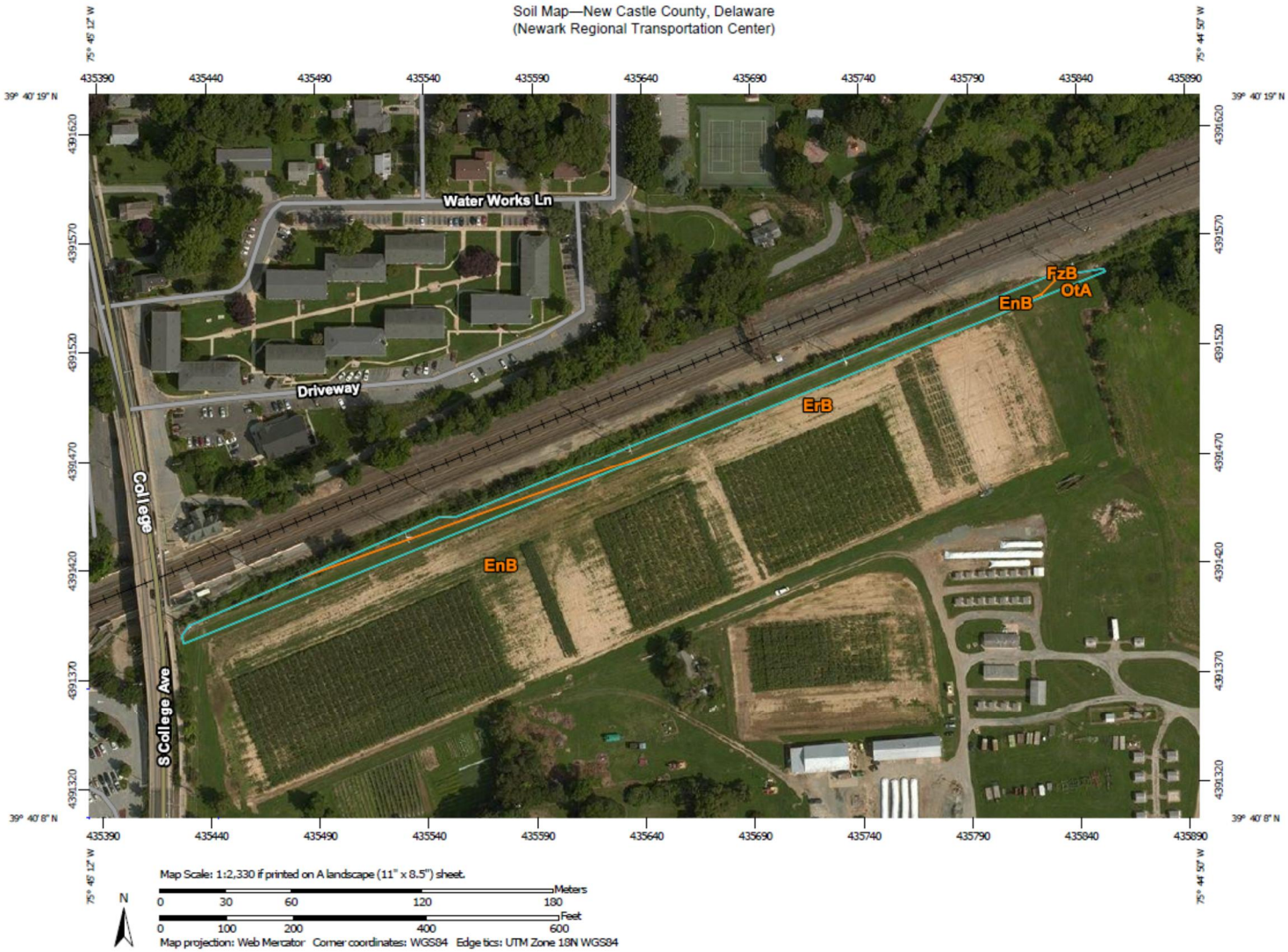

Figure 5: Soil Map based on Web Soil Survey, USAD, NRCS. Codes indicate the following: EnB = Elsinboro silt loam, 3 to 8 percent slopes; ErB = Elsinboro-Delanco-Urban Land Complex, 0 to 8 percent slopes; FzB = Fallsington-Urban Land complex, 0 to 5 percent slopes; OtA = Othello silt loam, 0 to 2 percent slopes

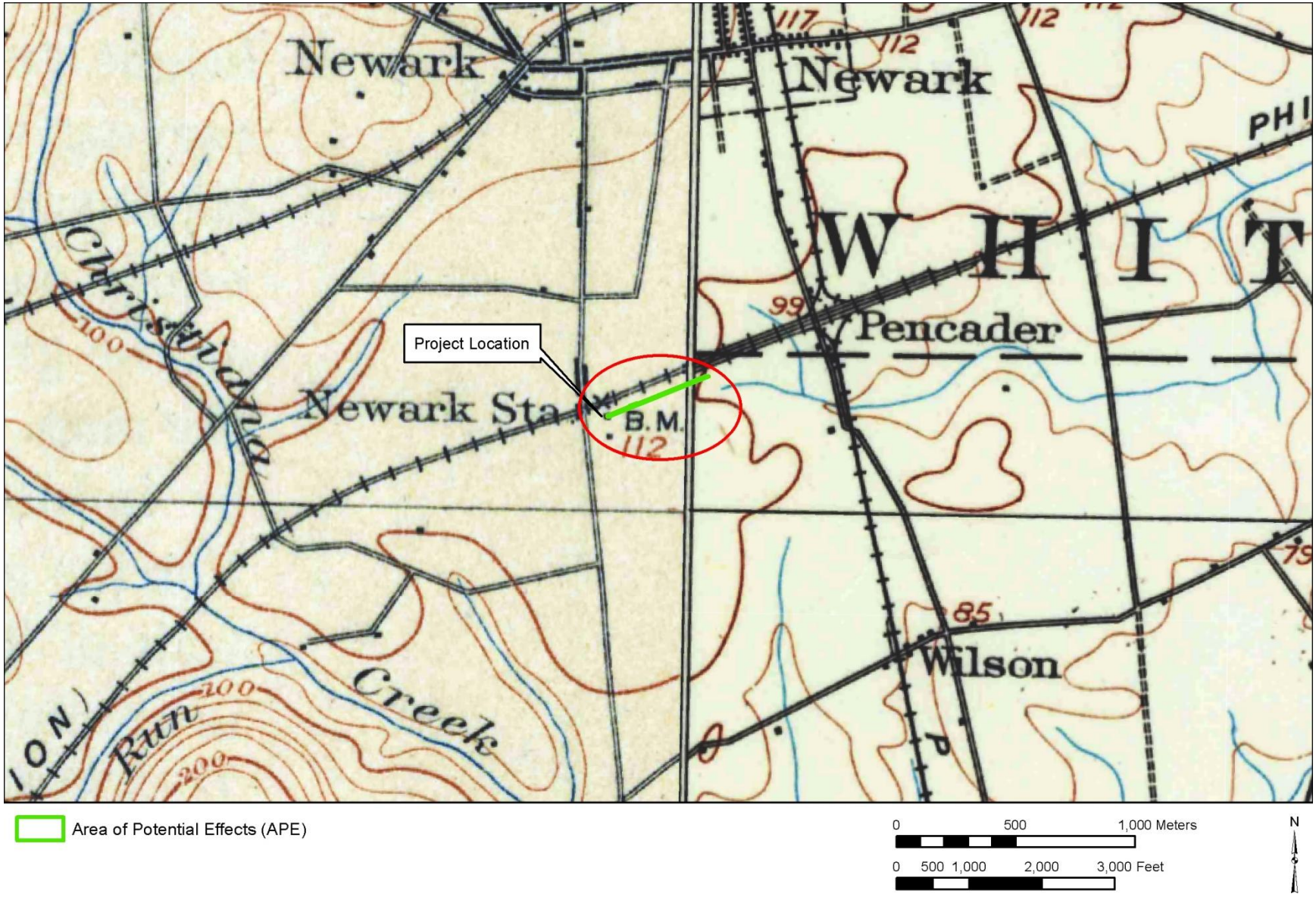

Figure 6: Project Location on USGS Topographic Maps of Elkton (1900) and Wilmington (1904)

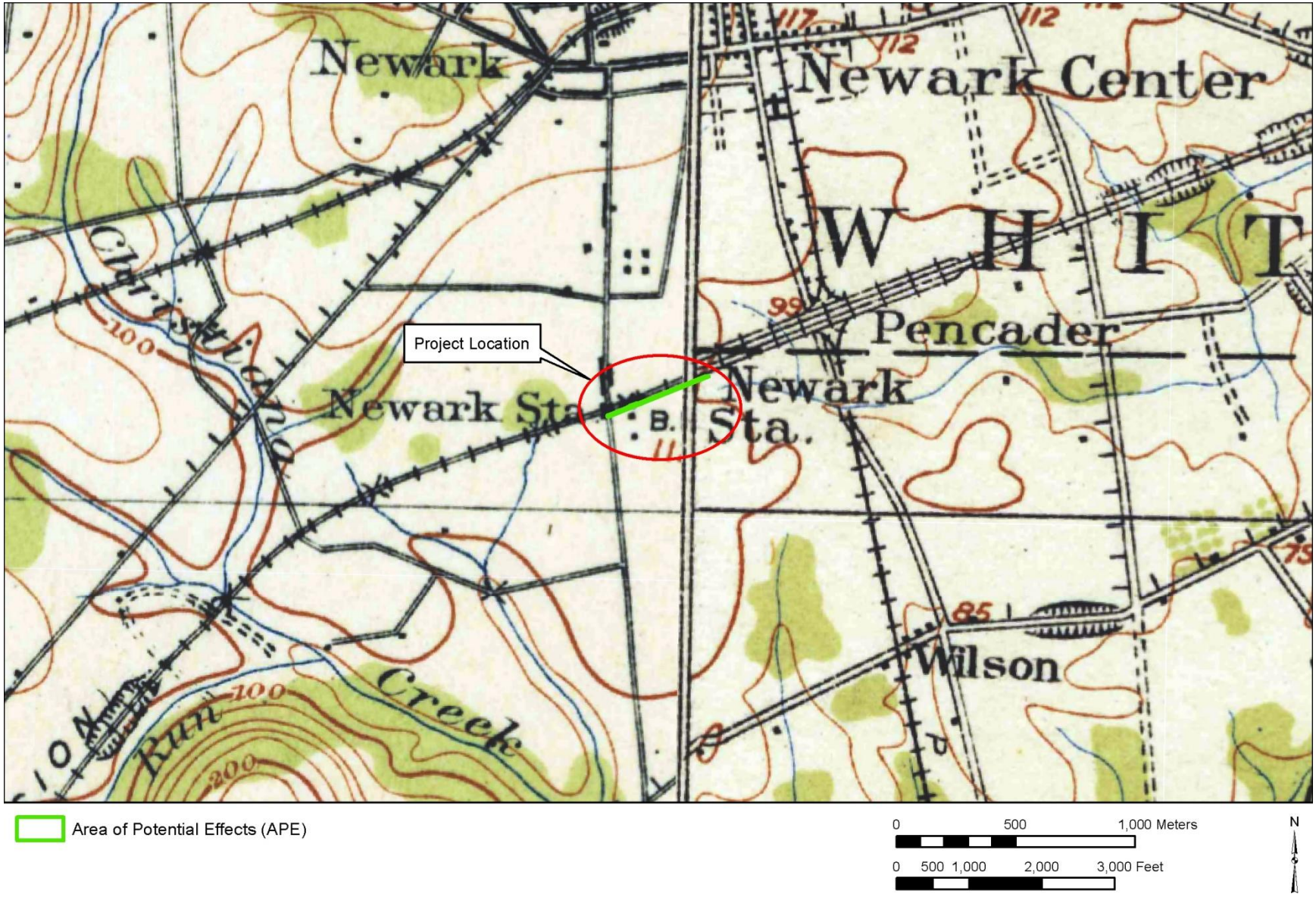

Figure 7: Project Location on USGS Topographic Maps of Elkton (1917) and Wilmington (1919)

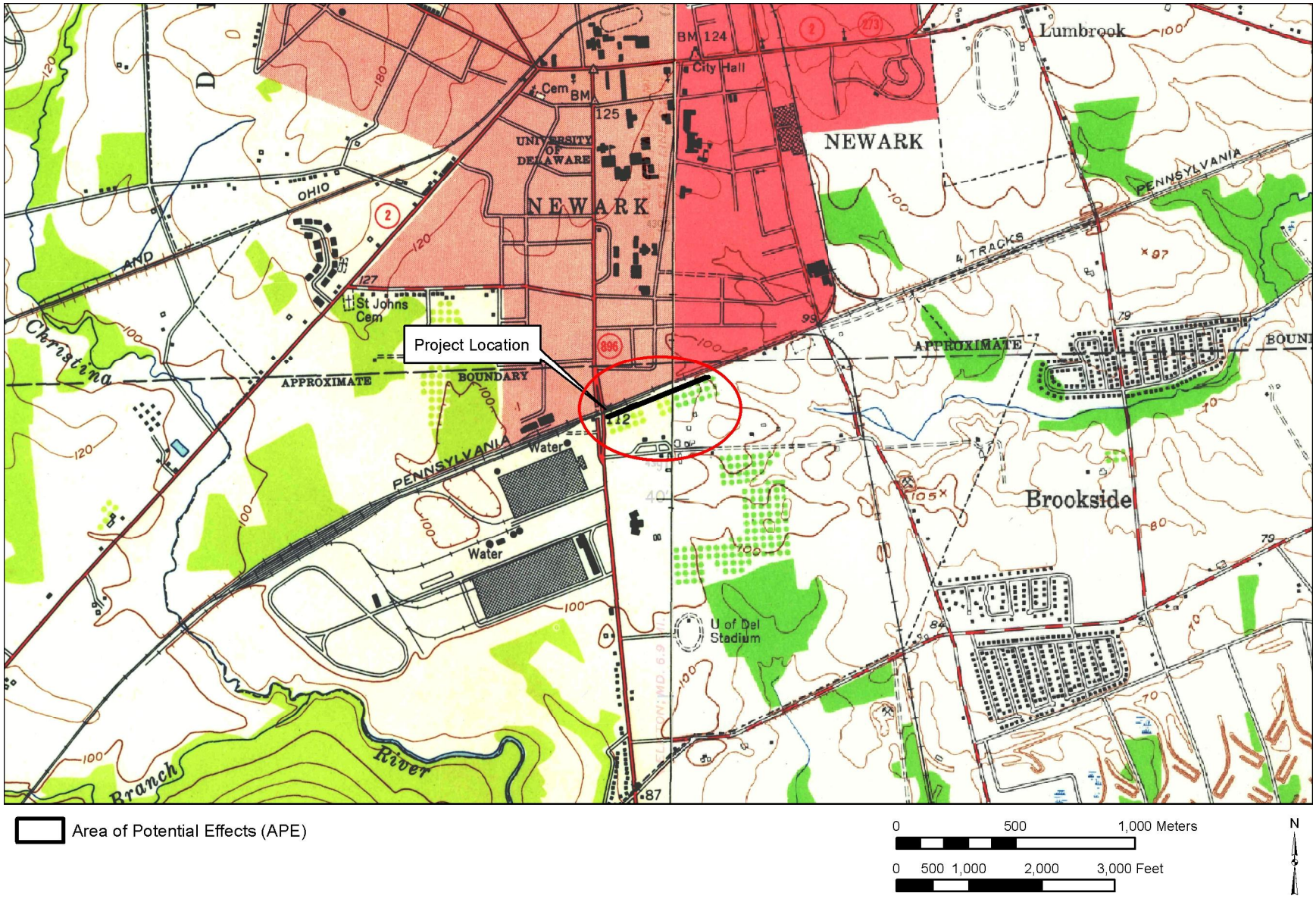

Figure 8: Project Location on USGS Topographic Maps of Newark East (1953) and Newark West (1953)

2.1.1 Historic Land Use

During the twentieth century, land use in the APE was primarily arboricultural and agricultural, but the area has also been influenced by the adjacent railroad. A 1951 aerial photograph and the 1953 USGS topographic map depict two orchards, one at the western and one at the eastern end of the APE (**Figures 8 and 9**). The photograph indicates that there was a cultivated field between the two orchards. At this time, the orchards and the fields extended all the way to the limits of the railroad right-of-way (ROW), encompassing the APE for this project.

A 1970 aerial photograph shows that by this time the orchards had changed into cultivated fields, although a remnant of the eastern orchard remained (**Figure 10**). At the eastern end of the APE, a landfill had been established. Two drainage ditches appear to run perpendicular to the APE at the eastern end. The fields in the photograph also appear to extend all the way to the railroad ROW, encompassing the APE. The tubular steel power line poles which are emplaced within the APE currently are not visible in the photograph, indicating that they were installed after this date.

2.1.2 Previously Recorded Sites

There are no recorded archaeological sites within the APE. One recorded standing structure is located south of the APE at 521 College Avenue; the nineteenth-century W. H. Schultz (Edward R. Wilson) House (CRS N5808) Before its sale to the University of Delaware in 1907, the property was owned by Edward Wilson, the son of Rathmell Wilson a President of the University of Delaware. Rathmell Wilson was a Quaker, born in 1810, probably in Philadelphia. In 1840, He and his family lived in New London Township, Chester County, Pennsylvania (1840 United States Federal Census). All of his children were born in Pennsylvania. By 1847, the family relocated to Delaware and lived on the Oaklands estate on the western border of Newark (they are listed as residents of the state on the 1850 United States Federal Census). The 1860 United States Federal Census places Edward Wilson in his own household with his wife Anna Maria Allen and their three daughters (Martha, Elizabeth, and Alice). Their home was in Pencader Hundred, not in White Clay Creek Hundred where the Edward R. Wilson house is located. The 1870 United States Federal Census places them in White Clay Creek Hundred.

The National Register form states that the house was built in 1868, hence given the census data it is likely the Wilsons moved into the house shortly after it was constructed. The family is listed as residents of White Clay Creek Hundred on the 1880 United States census. Edward Wilson died in about 1894 and left the property to his wife and daughters. At the time of his death, Edward Wilson was the administrator of his father's estate (Rathmell died intestate in 1894), which was centered at Oaklands. Edward Wilson's will attempted to entail his father's estate and placed restrictions on property transfers. However, his daughters, who never married, were able in 1907 to sell the College Ave. property that belonged to their father to the University of Delaware. The Wilson sisters were actively involved in the affairs of the University of Delaware throughout the first half of the twentieth century both as major donors to the institution and as members of the board of trustees. The house and land on College Ave. became the University Farm.

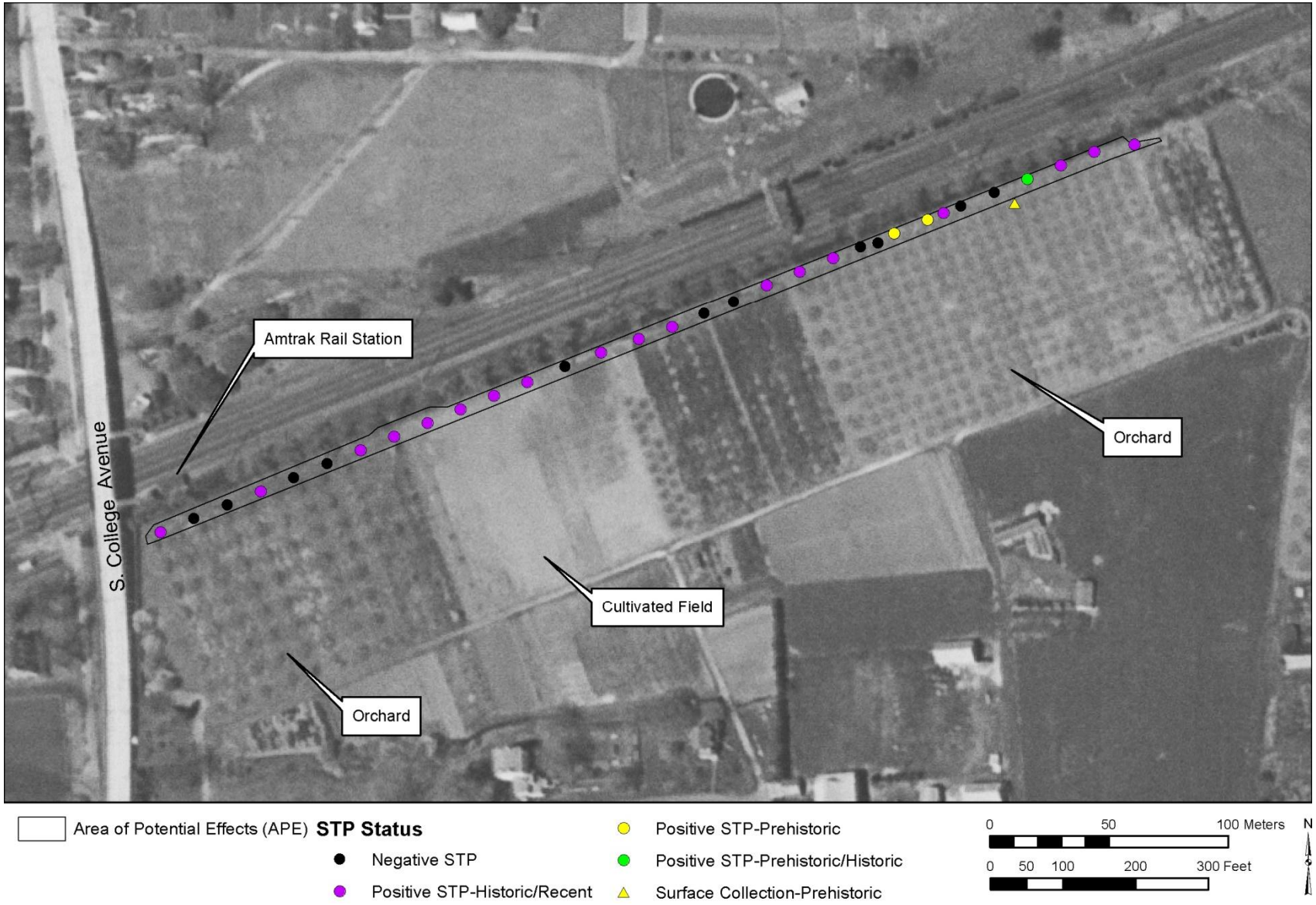

Figure 9: Testing Results and 1951 Aerial Photograph

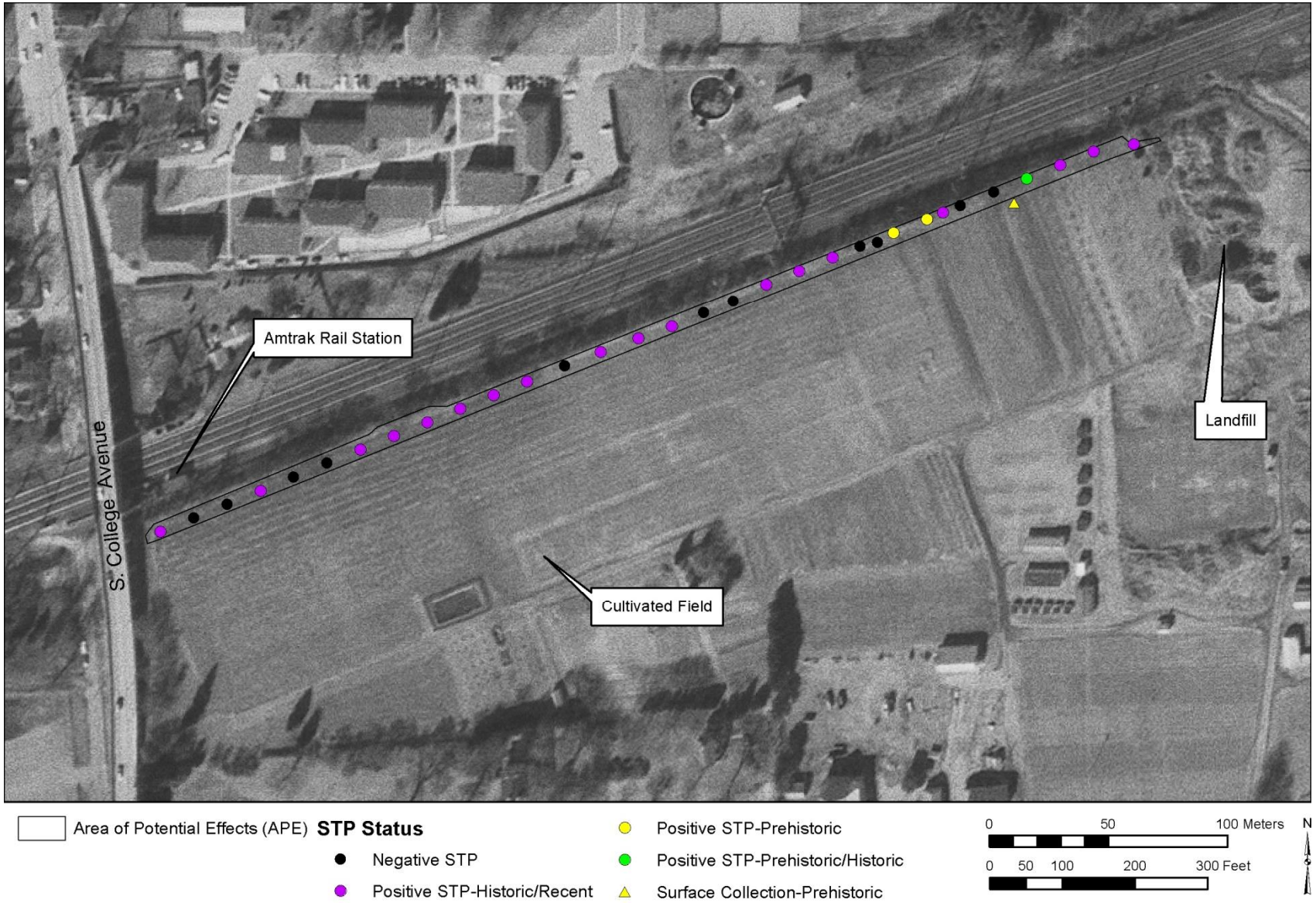

Figure 10: Testing Results and 1970 Aerial Photograph

White Clay Creek is a tributary creek of the Christina River. It originates in the Pennsylvania Pedimont Province and flows south out of Pennsylvania into Delaware near Newark. The creek is joined by Middle Run and Pike and Mill Creeks before it empties into the Christina River. Portions of the creek near the Christina River are tidal, but not the interior Piedmont portion in the Newark area. In 2000, 190 miles of the creek were added to the National Wild and Scenic River System in 2000 (University of Delaware).

2.1.3 Project Specific Historic Context

The project APE is sited on property that originally belonged to William Penn. In 1703, Penn sold 1,244 acres, which included the APE, to James James. In 1725, James James with Lewis and Rebecca David sold 250 acres of the property to John Evans of Iron Hill. Evans retained the property for 60 years until he and his daughter Mary sold the property to George Evans (who was John's bother). Barrett and Lopata (1983:31) note that there were several subsequent transfer of the property during the late eighteenth century and into the nineteenth century. Either Rathmell or Edward Wilson acquired the property in the mid-nineteenth century. Edward appears to have acted as an agent for this father, collecting rents and handling property transfers as an 1884 deed between the Sheriff of New Castle County and Edward Wilson notes that he is his father's assignee (Deeds Book A no. 13, pages 445-448).

The current house on the property is listed as the W. H. Schultz/Edward R. Wilson house. However, attempts to locate a W.H. Schultz in Newark during the first 70 years of the nineteenth century have been fruitless. It is possible that he/she was an owner of the property before Wilson. The closet matches in the United States Federal Census for the state of Delaware during the period 1850 through 1880 are:

- 1870 - William H. Schull, born about 1843 in Jew Jersey, an engine builder residing in Wilmington.
- 1880 - William Schultz, born about 1805 in Bremen, a retired Machinist living in Wilmington.

The house currently standing on the property was (according to its National Register Nomination Form) built in 1868. Edward Wilson married in the early 1860s, and by 1870 he and his wife Anna had three daughters: Martha, Elizabeth, and Alice. Wilson's father's home was in White Clay Hundred at his Oaklands Estate. Edward Wilson lived in Pencader Hundred in 1870. The house at 521 College Avenue was probably his home. Barrett and Lopata (1983:32) described the house as follows:

> *The Edward R. Wilson House is a monumental mid-nineteenth century frame mansion which is unique to contemporary dwellings located on farm properties in Delaware. This structure is notable for its unusually large size and uncommon number of rooms.*

The architectural elements described in the National Register Nomination and the Barrett and Lopata report (1983) describe a house that was quite elegant. Given the Wilson family's wealth and social position in Newark, the size of the dwelling and its elegant detailing point to Wilson as its main occupant.

After Edward Wilson died in 1894, his daughters inherited his estate, as well as parts of the Oaklands estate (their father had several sisters who also inherited parts of Oaklands). The property was sold to the University of Delaware in 1907 and became the State Farm, later University Farm. During the twentieth century the Edward R. Wilson House was used as a dormitory for students attending the agricultural college (Barrett and Lopata 1983).

3.0 Research Design

3.1 Research Objectives

All archaeological studies undertaken, including research, fieldwork, mapping, and report preparation, met DelDOT project-specific standards, and the guidelines of *Archaeological Survey in Delaware* (Delaware Division of Historical and Cultural Affairs, State Historic Preservation Office [DE SHPO] 2015). As such, the goal of the survey is "to find and identify archaeological sites and historic properties on a given parcel of land" (DE SHPO 2015: 3). The Phase IB archaeology survey fieldwork is predicated on the results of previously completed background research, and was performed with the intent to physically locate, delineate, and evaluate both precontact and historic period archaeological resources within the project APE (Ward et al. 2013).

3.2 Methodology

The Phase IB archaeological survey fieldwork consisted of hand-excavated shovel test pits (STPs) and judgmental surface collection in the adjacent field south of the APE. STPs measured 38 centimeters (1.25 feet) in diameter and were spaced at 15.0-meter (49.2-foot) intervals. When artifacts from intact deposits were recovered, the boundaries of the artifact distribution were delineated by lessening the STP intervals to 7.5 meters (25.6 feet). The STPs were excavated 10 centimeters (0.3 feet) into culturally sterile subsoil. All sediments removed from the STPs and/or test units were screened through 0.64 cm (0.25 in) mesh hardware cloth. The APE was investigated with 30 regularly-spaced STPs and two radial STPs.

Information regarding the soil texture and color of excavated sediments, depth of any cultural materials recovered, and any soil disturbance present was recorded on standard excavation forms. Daily field notes and excavation information were kept by the Field Director. Field data was recorded on standardized field forms and supplemented with notes made on project maps as warranted. The archaeological investigations were documented via digital photography.

In addition, when intact deposits yielding artifacts were located, the width of the APE did not allow for the reasonable placement of radial STPs on the north and south. The fence and utility poles on the north were cause for a great deal of disturbance, hence no radial STPs were undertaken on the north. However, the cultivated field on the south possessed 100 percent visibility. Thus, surface collection was undertaken south of STPs positive for archaeological deposits (**Photographic Plate 2**).

Recovered artifacts were processed and analyzed in order to allow questions of integrity and occupation span to be addressed. The recovered artifacts were transported to EAC/A's Baltimore laboratory facility where they were washed, sorted, labeled, and packed for curation in accordance with the standards contained in *Guidelines and Standards for the Curation of Archaeologi-*

cal Collections (Delaware Division of Historical and Cultural Affairs, State Historic Preservation Office 2001).

3.3 Expected Results

It was anticipated that no intact historic or prehistoric features would be encountered within the APE. Due to historic cultivation, a historic field scatter was expected to be encountered in a buried plow zone. This field scatter would be most closely associated with the nineteenth-century W. H. Schultz (Edward R. Wilson) House (CRS N5808), but such a scatter would not merit a site form in accordance with the Delaware Division of Historical and Cultural Affairs State Historic Preservation Office (DHCA SHPO [2015:6]). Artifacts and deposits were also expected to be mixed and redeposited due to track construction, buried utility installation, installation of steel tube support poles for overhead lines, and arboriculture.

4.0 Description of Work

The Phase IB fieldwork employed testing of 3,235 square meters ([sq m] 34,824 square feet [sq ft]) with 30 STPs (**Figure 2**) spaced 15 meters apart and two radial STPs space 7.5 meters apart. Judgmental surface collection was also employed south of STPs where intact archaeological deposits were located. These STPs defined the horizontal and vertical limits for the prehistoric scatter identified.

4.1 Field Testing Results

Subsurface testing indicated the general stratigraphy throughout the study area consisted of the following (**Photographic Plate 3**):

- An Ap-horizon consisting of a dark yellowish brown (10YR 4/6), brown (10YR 4/3), and yellowish brown (10YR 5/4 to 5/8) silt loam, 26 to 61 centimeters in thickness;
- An artifact-sterile Bt-horizon consisting of a reddish yellow (7.5YR 6/8), brownish yellow (10YR 6/8), or strong brown (7.5YR 5/8) clay loam.

In several STPs, a very subtle distinction was noted within the plow zone. The deeper plow zone appeared mottled with approximately five to ten percent subsoil. For STPs where this was observed, no distinction in the texture or artifact assemblages was noted for these sub-layers. It should also be noted that the Ap-horizon contained a mix of historic and recently-deposited artifacts such as plastic bags, bottle glass, brick, anthracite coal, lignite coal, angular gravel, and slag.

Instances of recent or historic disturbances were noted in several STPs. In STP 11 (**Figure 2**), a dark grayish brown (10YR 4/2) silty clay loam with 15 percent angular gravel (quartzite and limestone) was observed. The concentration of gravel increased with depth, and no further excavation was possible beyond 35 centimeters. Slag was recovered from this layer. This deposit is interpreted as either a possible gravel road or gravel fill, which post-dates the upgrades and expansion of the rail lines in the twentieth century. The gravel closely resembles ballast observed in the adjacent rail bed.

In STP 15 (**Figure 2**), a brown (10YR 5/3) silty clay was observed to a depth of 75 centimeters. Asphalt and shell were recovered from this layer. This STP was located just south of a tubular steel pole supporting overhead power lines (pole number 32C11), and the disturbed soil is linked to its installation.

In STP 17 (**Figure 2**), a layer of brown (10YR 5/3) silty clay loam was present to a depth of 85 centimeters. No artifacts were recovered. A drainage ditch running perpendicular to the APE was south of the STP; disturbance associated with ditch construction might best explain the presence of this thick, artifact-sterile layer.

Within STP 29 (**Figure 2**) there was a thin layer (seven centimeters) of dark grayish brown (10YR 4/2) silty clay loam, followed by a layer of brown (10YR 4/3) silty clay loam, 19 centimeters in thickness. These layers overlaid a concentration of medium-sized angular gravel, of the same type that was observed in STP 11 and also in the adjacent rail bed. The STP was located in the vicinity of a gravel road which extends along the south side of the rail line. The gravel layer is simply an earlier extension of the road that has been buried.

The easternmost test, STP 30 (**Figure 2**), contained fill consisting of dark yellowish brown (10YR 4/4) sandy silt loam mottled with strong brown (7.5YR 5/8) sandy silt loam (**Photographic Plate 4**). The fill contained brick, glass, coal, and slag. The STP was situated adjacent to a recent stream channel, which is on the east end of the APE. Broken concrete slabs were present north of the STP along the rail ROW, and east along the side of the creek. This was interpreted as modern fill, which is associated with in-filling of the creek.

Only a few historic diagnostic materials were recovered during the entire survey. These include PVC pipe (post-1950 [Walker 1990]) and a wire nail (post-1880s [Adams 2002]). A single, small sherd of whiteware was recovered as well, though the lack of diagnostic characteristics does not allow a more precise dating than general nineteenth to twentieth century. All historic artifacts were recovered from contexts deposited as a result of recent construction activity and hold little archaeological information.

In two cases, STPs 23 and 24 (**Figure 2**), prehistoric debitage was recovered from the interface between the Ap-horizon and the Bt-horizon (**A and B, Photographic Plate 5**). Radial STPs were excavated 7.5 meters east and west of these STPs, but no prehistoric artifacts were recovered in either radial (STP 24RE contained very small flecks of coal, which were not collected, and a single piece of lignite coal; while STP 23RW was negative). One additional piece of angular shatter was recovered from the Ap-horizon in STP 27, a layer which also contained slag and brick – no radials were excavated since this flake was recovered from a disturbed context (**D, Photographic Plate 5**). The field south of STPs 23 to 27 was carefully observed via a pedestrian inspection for the presence of additional evidence of prehistoric activity. A single flake was surface collected in the field, between STPs 26 and 27 (**Figure 2, marked as SC1; D, Photographic Plate 5**).

The extent of the isolated finds is delineated by the railroad track on the north, STP 23 on its west side, STP 28 on its north side, and the agricultural field on its south side. It is approximately 75 meters (246 feet) in length, and 12 meters (39.3 feet) wide, giving it a total surface area of 900 square meters (9,687.5 square feet). Although artifacts were encountered throughout this area, only the area around STPs 23 and 24 has the possibility of intact prehistoric deposits. The remainder of the area is characterized by disturbance in the form of historic and modern cultivation. The vertical boundary of the isolated finds is the top of the Bt-horizon, which is 26 to 46 centimeters below the surface.

The isolated finds were located just east of a subtle, yet noticeable rise in the terrain which is higher in elevation than both the eastern and western ends of the APE (visible in the background of **Photographic Plate 1**). The finds were located approximately 60 meters (197 feet) west of the unnamed tributary draining into White Clay Creek.

4.1.1 Artifact Description and Analysis

The prehistoric artifacts recovered from testing include one proximal chert flake, two pieces of angular shatter (one chert and one quartzite), and one quartzite biface tip recovered from the surface, which has been broken and worn (**C, Photographic Plate 5**). Naturally-occurring jasper and quartzite were both observed in small to medium-sized rocks in the adjacent agricultural field, but no chert.

The angular shatter comprises debitage without recognizable dorsal or ventral surfaces, and holds limited information about lithic processing at this location (**B and D, Photographic Plate 5**). The one proximal flake, recovered from STP 23 (**Figure 2**), has both a recognizable dorsal and ventral surface, as well as a striking platform (**A, Photographic Plate 5**). At its greatest width it is 0.9 centimeters.

Although the edges of the biface tip show evidence of previous flake removals on both sides of the blade, a more precise morphological identification was not possible due to heavy wear and the fact that the lower portion is missing. The wear and breakage may be associated with the long history of mechanized cultivation in this area. However, since it is nearly unrecognizable as a tool upon first observation, these very characteristics may have saved the artifact from collectors walking the field. It is uncertain whether the tool was hafted or unhafted, and its placement in reduction sequence was not clear. As such, it is nondiagnostic, and can contribute limited information about prehistoric activity here.

The limited amount of lithic material suggests that lithic processing may have taken place in the vicinity. The lack of tools may be a product of historic land use – other tools may have been collected or displaced in the cultivation of the field, during track construction, or during utility installations in the vicinity. However, a greater concentration of flakes might be anticipated if this area was occupied on a relatively permanent basis.

5.0 Interpretations and Conclusions

The survey recorded no archaeological sites. The limited scatter of prehistoric lithic material was designated as an isolated find (DHCA Accession Number - 2015.0016). The methodology employed was successful in identifying both historic and prehistoric land-use activity, despite the fact that the APE has been subjected to construction related to the railroad and utility installations, as well as continuous arboricultural and agricultural activity throughout the twentieth century.

5.1 Recommendations

Disturbances are severe that very little information may be gained from further archaeological investigation. No further work is recommended here.

6.0 Bibliography

6.1 Primary Sources

6.1.1 Census

United States Federal Census, National Archives, Washington, D.C.

1840 New London, Chester, Pennsylvania; Roll: 454; Page: 217; Image: 449.

1850 3rd Division, New Castle County, Delaware. Roll: M432_53; Page: 388B; Image: 240.

1860 White Clay Creek Hundred, New Castle County, Delaware. Roll: M653_97; Page: 549; Image:553.

1870 Pencader Hundred, Subdivision No. 7, New Castle County, Delaware. Roll: M593_120; Page: 672B; Image: 570.

1880 Wilmington Division 1, New Castle, Delaware; Roll: M593_121; Page: 366A; Image: 746.

1880 White Clay Creek Hundred, New Castle County, Delaware. Roll: 120; Family History Film: 1254120.

1880 Wilmington, New Castle, Delaware; Roll: 119; Page: 423C; Enumeration District: 016; Image: 0326.

6.1.2 Map

United States Geological Survey

1993a *Newark East Quadrangle, Delaware, New Castle County.* 7.5 Minute Series Topographic Map, 1:24,000. Washington D.C.

1993b *Newark West Quadrangle, Delaware-Maryland-Pennsylvania.* 7.5 Minute Series Topographic Map, 1:24,000. Washington D.C.

1970 Aerial Photograph AR1VCLI00020130. Acquired February 22, 1970. Available at http://earthexplorer.usgs.gov/. Accessed August 25, 2015.

1953a *Newark East Quadrangle, Delaware, New Castle County.* 7.5 Minute Series Topographic Map, 1:24,000. Washington D.C.

1953b *Newark West Quadrangle, Delaware-Maryland-Pennsylvania.* 7.5 Minute Series Topographic Map, 1:24,000. Washington D.C.

1951 Aerial Photograph AR1OS0000010045. Acquired April 23, 1951. 1:24,000. Available at http://earthexplorer.usgs.gov/. Accessed August 25, 2015.

1919 *Delaware-New Jersey, Wilmington Quadrangle.* 15 Minute Series (Topographic) Map. 1:62,500. Washington D.C.

1917 *Maryland-Delaware-Pennsylvania, Elkton Quadrangle.* 15 Minute Series (Topographic) Map. 1:62,500. Washington D.C.

1904 *Delaware-New Jersey, Wilmington Quadrangle.* 15 Minute Series (Topographic) Map. 1:62,500. Washington D.C.

1900 *Maryland-Delaware-Pennsylvania, Elkton Quadrangle.* 15 Minute Series (Topographic) Map. 1:62,500. Washington D.C.

6.2 Secondary Sources

Adams, William Hampton

2002 Machine Cut Nails and Wire Nails: American Production and Use for Dating 19th-Century and Early-20th-Century Sites. *Historical Archaeology* 36(4): 66-88.

Barrett, Joan C. and Ray H. Lopata

1983 Historic Buildings of Newark, Delaware. Newark Planning Department, Newark Delaware. Manuscript on file, Delaware State Historic Preservation Office, Division of Historical and Cultural Affairs, Dover.Plank, Margaret O. and William S. Schneck

1998 *Delaware Piedmont Geology: Including a guide to the rocks of the Red Clay Valley.* Delaware Geological Survey Special Publications No. 20, University of Delaware, Newark.

Delaware State Historic Preservation Office (DE SHPO)

2001 *Guidelines and Standards for the Curation of Archaeological Collections.* Delaware State Historic Preservation Office, Dover.

Delaware State Historic Preservation Office (DE SHPO)

2015 *Archaeological Survey in Delaware.* Delaware State Historic Preservation Office, Dover.

Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture (USDA)

2015a *Web Soil Survey.* Available online at http://websoilsurvey.nrcs.usda.gov/. Accessed August 20, 2015.

2015b *Official Soil Series Descriptions.* Available online at http://soils.usda.gov/technical/classification/osd/index.html. Accessed August 20, 2015.

University of Delware

n.d. Delaware Watersheds. Electronic document. http://delawarewatersheds.org/piedmont/white-clay-creek/ Accessed 13 October 2015.

Walker, Robert

1990 The Early History of the PVC Pipe. *Uni-Bell PVC Pipe News*. Summer edition. Available online at http://www.sewerhistory.org/articles/compon/pdfs/pvc_history.pdf. Accessed August 20, 2015.

Ward, Henry, Esther Doyle Read and Stephanie Foell

2013 Archaeological and Architectural Survey Newark Regional Transportation Center, Newark, New Castle County, Delaware. Report prepared for the Delaware Department of Transportation, by Parsons Brinckerhoff, Inc., Baltimore, Maryland.

7.0 Appendices

Appendix A: Photographic Plates

Photographic Plate 1: Project Area, view to the northeast

Photographic Plate 2: Surface collection of field south of the APE

Photographic Plate 3: STP 22, completed, facing north

Photographic Plate 4: STP 30, completed, facing north

Photographic Plate 5: Prehistoric artifacts collected from survey including chert flake from STP 23 (A), chert shatter from STP 24 (B), surface-collected quartzite biface tip (C), and quartzite shatter from STP 27 (D)

Appendix B: Investigator Qualifications

H. Henry Ward – Project Manager. University of Delaware, Newark, Master of Anthropology. Mr. Ward has more than 35 years of experience as a professional Archaeologist and cultural resources manager. He not only possesses specific technical knowledge with the Archaeological resources of the Chesapeake Region, but also has over a decade's general experience in overseeing comprehensive cultural resources programs that integrate the full range of archaeology and historic architectural disciplines.

Esther Doyle Read – Principal Investigator. University of Maryland College Park, Master of Applied Anthropology, Phi Kappa Phi. Ms. Read has 37 years of experience that includes both prehistoric and historic era archaeological research. Her prehistoric experience includes Archaic, Woodland, and contact Period sites in the Middle Atlantic Coastal Plain, Piedmont, and Ridge and Valley Provinces. Historic era experience includes 17th-century settlements in Maryland, 18th-century farmsteads, plantations, towns and cemeteries in Maryland, Virginia and Washington D.C., 19th-century plantations and farmsteads in the Mid-Atlantic, South, Mid-West, and East Texas and urban contexts spanning the 18th through the 20th century in Baltimore and Annapolis, Maryland. She has been the Principal Investigator on numerous projects in the Mid-Atlantic Region. Ms. Read also has extensive project review experience, having served in the past as the Assistant Anne Arundel County, Maryland Archaeologist and currently as the Charles County, Maryland Archaeologist.

Robert Wanner – Field Director. University of Leicester, PhD in Archaeology. Mr. Wanner has 15 years of archaeological experience that includes work at both prehistoric and historic sites in North America and in Europe. His prehistoric experience in North American includes work at Archaic and Woodland Period sites. He has also worked at 17th-century, 19th-century, and 20th-century rural settlements in Maryland, Pennsylvania, and Virginia, as well as 19th- and 20th-century urban contexts in Baltimore, Maryland. Mr. Wanner has also served as the GIS technician for numerous cultural resource investigations.

Jane Seiter – Lab Director. University of Bristol, PhD in Archaeology. Ms. Seiter has 18 years of archaeological experience that includes work at both prehistoric and historic sites in North American, the Caribbean, the Middle East, and in Europe. Her prehistoric experience in North American includes work at Archaic and Woodland Period sites. She has also worked at 17th-century, 19th-century, and 20th-century rural settlements in Maryland, Pennsylvania, and Virginia, as well as 19th- and 20th-century urban contexts in Baltimore, Maryland. She also co-owns and co-manages the Oxford Tree-Ring Laboratory in Baltimore, Maryland, which specializes in dendrochronological and wood specimen analysis for historic structures and artifacts across America, Europe, and the Caribbean.

Appendix C: Artifact Inventory

FIELD BAG #	ARTI-FACT #	STP #	LEVEL	COUNT	MATERI-AL 1	MATERI-AL 2	GROUP	CATEGORY	TYPE	DESCRIPTION	PORTION	COLOR	DECO-RA-TION	DIS-CARD
1	1	4	I	1	COAL	X	UNDEFINED USE	FUEL	ANTHRACITE	COAL	PARTIAL	BK	X	.53 G
1	2	4	I	1	SLAG	X	UNDEFINED USE	WASTE	X	SLAG	PARTIAL	BK	X	.62 G
2	1	8	I	1	SLAG	X	UNDEFINED USE	WASTE	X	SLAG	PARTIAL	BK	X	.62 G
3	1	9	II	1	BRICK	X	STRUCTURAL	MATERIALS	X	BRICK	PARTIAL	X	X	.46 G
3	2	9	II	1	GLASS	X	STRUCTURAL	MATERIALS	X	WINDOW	PARTIAL	CL	X	
3	3	9	II	1	PLASTIC	X	UNDEFINED USE	WASTE	X	X	PARTIAL	BK	X	.05 G
3	4	9	II	1	PLASTIC	X	UNDEFINED USE	WASTE	X	X	PARTIAL	CL	X	.05 G
4	1	10	I	1	GLASS	X	STRUCTURAL	MATERIALS	X	WINDOW	PARTIAL	CL	X	
5	1	11	I	3	SLAG	X	UNDEFINED USE	WASTE	X	SLAG	PARTIAL	BK	X	16.66 G
6	1	12	I	2	COAL	X	UNDEFINED USE	FUEL	ANTHRACITE	COAL	PARTIAL	BK	X	15.55 G
7	1	14	I	1	PLASTIC	X	UNDEFINED USE	WASTE	X	X	PARTIAL	WH	X	.67 G
8	1	15	I	74	ASPHALT	X	UNDEFINED USE	WASTE	X	ASPHALT	PARTIAL	BK	X	119.48 G
8	2	15	I	1	SHELL	X	FAUNAL	SHELL	X	OYSTER SHELL	PARTIAL	WH	X	.29 G
9	1	16	I	2	SLAG	X	UNDEFINED USE	WASTE	X	SLAG	PARTIAL	BK	X	52.55 G
9	2	16	I	1	GLASS	X	DOMESTIC	FOOD/FOOD STORAGE	CONTAINER	BOTTLE	BODY	CL	X	
9	3	16	I	1	PLASTIC	X	UNDEFINED USE	WASTE	X	X	PARTIAL	CL	X	.32 G
10	1	19	II	1	GLASS	X	STRUCTURAL	MATERIALS	X	WINDOW	PARTIAL	CL	X	
10	2	19	II	2	BRICK	X	STRUCTURAL	MATERIALS	X	BRICK	PARTIAL	X	X	2.18 G

FIELD BAG #	ARTI-FACT #	STP #	LEVEL	COUNT	MATERI-AL 1	MATERI-AL 2	GROUP	CATEGORY	TYPE	DESCRIPTION	PORTION	COLOR	DECO-RA-TION	DIS-CARD
10	3	19	II	14	COAL	BITUMI-NOUS	UNDEFINED USE	FUEL	X	COAL	PARTIAL	BK	X	6.86 G
10	4	19	II	2	COAL	LIGNITE	UNDEFINED USE	FUEL	X	COAL	PARTIAL	BK	X	4.09 G
11	1	20	I	1	PLASTIC	X	UNDEFINED USE	WASTE	X	X	PARTIAL	WH/GN	X	.55 G
11	2	20	I	9	COAL	BITUMI-NOUS	UNDEFINED USE	FUEL	X	COAL	PARTIAL	BK	X	10.96 G
11	3	20	I	3	COAL	LIGNITE	UNDEFINED USE	FUEL	X	COAL	PARTIAL	BK	X	10.42 G
12	1	21	I	1	PLASTIC	PVC	STRUCTURAL	HARD-WARE	PLUMBING	PIPE	PARTIAL	WH	X	23.04 G
12	2	21	I	1	CERAMIC	WW	DOMESTIC	FOOD PREP/ COMSUMP TION	INDEFINITE USE	HOLLOW-WARE	BODY	WH	X	
12	3	21	I	1	COAL	ANTHRA-CITE	UNDEFINED USE	FUEL	X	COAL	PARTIAL	BK	X	.25 G
12	4	21	I	1	GLASS	X	DOMESTIC	FOOD/FOOD STORAGE	CONTAINER	BOTTLE	BODY	CL	X	
12	5	21	I	1	COAL	BITUMI-NOUS	UNDEFINED USE	FUEL	X	COAL	PARTIAL	BK	X	2.73 G
13	1	23	II/III	1	LITHIC	CHERT	PREHISTORIC	STONE DEBITAGE	FLAKE	PROXIMAL FLAKE		BR	X	
14	1	24	I	1	LITHIC	CHERT	PREHISTORIC	STONE DEBITAGE	SHATTER	ANGULAR SHATTER		GR	X	
15	1	SC BTWN 26-27	X	1	LITHIC	QUARTZ-ITE	PREHISTORIC	STONE TOOL	TOOL	BIFACE	TIP	WH	X	
16	1	27	II	1	LITHIC	QUARTZ-ITE	PREHISTORIC	STONE DEBITAGE	SHATTER	ANGULAR SHATTER		WH	X	
16	2	27	II	3	SLAG	X	UNDEFINED USE	WASTE	X	SLAG	PARTIAL	BK	X	5.07 G

FIELD BAG #	ARTI-FACT #	STP #	LEVEL	COUNT	MATERI-AL 1	MATERI-AL 2	GROUP	CATEGORY	TYPE	DESCRIPTION	PORTION	COLOR	DECO-RA-TION	DIS-CARD
17	1	30	I	1	GLASS	X	DOMESTIC	FOOD/FOOD STORAGE	CONTAINER	BOTTLE	BODY	BN	X	
17	2	30	I	1	METAL	FE	STRUCTURAL	HARD-WARE	FASTENER	WIRE NAIL	WHOLE	X	X	
17	3	30	I	1	METAL	FE	STRUCTURAL	HARD-WARE	FASTENER	NAIL	PARTIAL	X	X	
17	4	30	I	14	CERAMIC	EW	STRUCTURAL	MATERIALS	X	TILE	PARTIAL	RD/GY	MOLD-ED	
17	5	30	I	2	COAL	ANTHRA-CITE	UNDEFINED USE	FUEL	X	COAL	PARTIAL	BK	X	1.76 G
17	6	30	I	17	SLAG	X	UNDEFINED USE	WASTE	X	SLAG	PARTIAL	BK	X	247.36 G
18	1	1	II	1	COAL	ANTHRA-CITE	UNDEFINED USE	FUEL	X	COAL	PARTIAL	BK	X	.56 G
19	1	24 RE	I	1	COAL	LIGNITE	UNDEFINED USE	FUEL	X	COAL	PARTIAL	BK	X	9.63 G
20	1	28	I	1	COAL	LIGNITE	UNDEFINED USE	FUEL	X	COAL	PARTIAL	BK	X	13.84 G

Appendix D: Soil Log

STP	LEVEL	OPEN (cm)	CLOSE (cm)	DESCRIPTION	NOTES
1	I	0	20	10YR 4/6 dark yellowish brown silt loam	very compact
	II	20	36	95% 10YR 5/4 yellowish brown silt loam, 5% 10YR 6/8 brownish yellow clay loam	
	III	36	46	10YR 6/8 brownish yellow clay loam	
2	I	0	35	10YR 4/6 dark yellowish brown silt loam	26-35 cm less compact
	II	35	55	7.5YR 6/8 reddish yellow silty clay loam	
3	I	0	29	10YR 4/6 dark yellowish brown silt loam	
	II	29	47	10YR 6/8 brownish yellow clay loam	
4	I	0	30	10YR 4/6 dark yellowish brown silt loam	
	II	30	50	7.5YR 6/8 reddish yellow silty clay loam	
5	I	0	21	10YR 4/6 dark yellowish brown silt loam	
	II	21	-	90% 10YR 5/4 yellowish brown silty clay loam, 5% 10YR 6/8 brownish yellow clay loam, 5% gravel	gravel and soil became very compact at 32 cm; discontinued
6	I	0	40	10YR 4/6 dark yellowish brown silt loam	soil is gray at Lv. I/II interface
	II	40	60	7.5YR 6/8 reddish yellow silty clay loam	
7	I	0	51	10YR 4/6 dark yellowish brown silt loam	
	II	51	60	10YR 6/8 brownish yellow clay loam	
8	I	0	39	10YR 4/6 dark yellowish brown silt loam	
	II	30	50	7.5YR 6/8 reddish yellow silty clay loam	
9	I	0	25	10YR 5/4 yellowish brown silt loam	
	II	25	41	7.5YR 5/8 strong brown silty clay	
10	I	0	44	10YR 4/4 dark yellowish brown silt loam	
	II	44	64	7.5YR 6/8 reddish yellow silty clay loam	
11	I	0	34	10YR 4/2 dark grayish brown silt loam	
	II	34	-	85% 10yr 4/2 dark grayish brown silty clay loam, 15% quartzite/ limestone gravel	3-5 cm in size; rock layer impasse
12	I	0	50	10YR 4/4 dark yellowish brown silt loam	
	II	50	70	7.5YR 6/8 reddish yellow silty clay loam	
13	I	0	42	75% 10yr 4/2 dark grayish brown silty clay loam; 25% 5YR 3/3 dark reddish brown silt loam	
	II	42	55	95% 10YR 4/2 dark grayish brown clay loam, 5% 10YR 6/8 brownish yellow clay loam	
14	I	0	60	10YR 4/4 dark yellowish brown silt loam	
	II	60	75	7.5YR 6/8 reddish yellow silty clay loam	
15	I	0	75	10YR 5/3 brown silty clay	adjacent to power line pole "32C11"; fill/overburden
16	I	0	50	10YR 4/4 dark yellowish brown silt loam	
	II	50	70	7.5YR 6/8 reddish yellow silty clay loam	

17	I	0	85	10YR 5/3 brown silty clay loam	
18	I	0	53	10YR 4/4 dark yellowish brown silt loam	
	II	53	73	7.5 5/8 strong brown silty clay loam	
19	I	0	61	10YR 5/4 yellowish brown silty clay loam	jasper noted in gravel
	II	61	75	10YR 5/8 yellowish brown silty clay	
20	I	0	50	10YR 4/4 dark yellowish brown silt loam	
	II	50	70	7.5YR 5/8 strong brown silty clay loam	
21	I	0	37	10YR 5/4 yellowish brown silty clay loam	small brick flecks
	II	37	50	10YR 5/8 yellowish brown silty clay	
22	I	0	30	10YR 4/4 dark yellowish brown silt loam	
	II	30	50	7.5YR 5/8 strong brown silty clay loam	
23RW	I	0	31	10YR 4/4 dark yellowish brown silt loam	
	II	31	51	7.5YR 5/8 strong brown silty clay loam	
23	I	0	26	10YR 5/4 yellowish brown silty clay loam	
	II	26	52	10YR 5/8 yellowish brown silty clay	flake at I/II interface
24	I	0	32	10YR 4/4 dark yellowish brown silt loam	
	II	32	56	7.5YR 5/8 strong brown silty clay loam	flake at I/II interface
24RE	I	0	37	10YR 4/4 dark yellowish brown silt loam	small flecks of coal
	II	37	57	7.5YR 5/8 strong brown silty clay loam	
25	I	0	27	10YR 4/3 brown silt loam	
	II	27	40	10YR 5/8 yellowish brown silty clay	
26	I	0	38	10YR 4/4 dark yellowish brown silt loam	
	II	38	58	7.5YR 5/8 strong brown sandy silt loam	
27	I	0	46	10YR 4/3 brown silt loam	
	II	46	62	10YR 5/8 yellowish brown silty clay	
28	I	0	46	10YR 4/4 dark yellowish brown silt loam	
	II	46	66	7.5YR 5/8 strong brown sandy silt loam	
29	I	0	7	10YR 4/2 dark grayish brown silt loam	
	II	7	26	10YR 4/3 brown silty clay loam	
	III	26	-	gravel	old gravel road, too compacted to continue
30	I	0	75	95% 10YR 4/4 dark yellowish brown sandy silt loam, 5% 7.5YR 5/8 strong brown sandy silt loam	fill from old landfill

Appendix E: Correspondence

STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
800 BAY ROAD
P.O. BOX 778
DOVER, DELAWARE 19903

JENNIFER COHAN
SECRETARY

July 14, 2015

H. Alan Brangman, Vice President
University of Delaware
Facilities, Real Estate & Auxiliary Services
222 S. Chapel Street
Newark, DE 19716

Dear Mr. Brangman:

The purpose of this letter is to inform you and to request your consent to have the Delaware Department of Transportation (DelDOT), traverse, inspect, or conduct field investigations along the properties in the Newark Regional Transportation Center (NRTC) Project Area. The project is currently in the archeology and environmental approval phase. As part of the design process, we are investigating environmental and cultural resources, existing conditions, utility designation, and subsurface soil conditions. This will necessitate entry onto your property.

We make this request in the spirit of cooperation as the laws of Delaware Code (Section 132 (c) (13), Chapter 1, Title 17. As referenced "the Department may enter upon the lands or waters of any person for the purpose of surveys, repairs, reconstruction and operation of publically financed improvements but subject at all times to responsibility for all and any damages which shall be done to the property of any such person or persons." This citation is referenced at http://delcode.delaware.gov/title17/c001/sc03/index.shtml.

Every precaution will be taken to ensure that your property is not damaged during the gathering of this information. Should any damage occur, then DelDOT or our agent will make proper restitution or correct the problem to your satisfaction. It would help if you would point out to our staff any sensitive conditions (i.e. freshly planted crops, locations of domestic wells and septic tanks, buried utilities or other unique features) on your property that might not be readily apparent to our field personnel.

As discussed, DelDOT or our agent will contact Mr. Vic Costa from your office for the scheduling of site visits. If you have any questions or concerns, please contact me at 302-760-2275. Thank you for your assistance.

Sincerely,

Mark Tudor, P.E.
Assistant Director, Project Development

MT/jcm

cc: Mary Page Bailey, Deputy Attorney General
Albert Loyola, DTC
David Clarke, DelDOT
Vic Costa, UD
Jeff Riegner, WRA
Tom Pavlick, PB

DelDOT