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Appendix A

"Geoarchaeological Interpretations of Selected Locations along the Glassboro-Camden Line, New Jersey" (by Dr. Daniel Wagner)

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GEOARCHAEOLOGICAL INTERPRETATIONS OF SELECTED LOCATIONS ALONG THE GLASSBORO-CAMDEN LINE, NEW JERSEY

Submitted to
A.D. Marble Company, Inc.

By
Daniel P. Wagner, Ph.D.
Pedologist

October 21, 2013

Introduction

This report discusses geoarchaeological interpretations of soils and landscapes in the vicinities of six selected locations along the Glassboro-Camden Line in southwest New Jersey. Locations were chosen primarily on the basis of geomorphic attributes that may have been of special appeal to prehistoric populations. In this regard proximity to major streams was a particular consideration. In contrast to positive attributes, however, was also a factor employed to eliminate some locations from consideration. This was apparent degrees of modern disturbances or other landscape modifications which have, of course, affected many locations in this part of New Jersey.

Evaluation techniques included interpretations of historic and modern map data as well as field investigations of those locations where intact soils and landscapes seemed possible. Field efforts were undertaken on October 9, 2013 and entailed pedestrian traversal of landscapes in and near the examined areas, together with soil examinations by means of hand auger borings. Any soil profiles described in detail were done so in accordance with standard pedological techniques and nomenclature for the field description of soils.

Physiology and Geology

The study location is within the Coastal Plain Physiographic Province. This largest of New Jersey's provinces spans over half of the State and encompasses all of the region southeast of a line roughly running between Perth Amboy in the north and Trenton in the south. The Coastal Plain province is further divided into several sections, and the project corridor spans both the Inner Coastal Plain section near the western limit of the province as well as the western portion of the Outer Coastal Plain section. Most of the uplands in both sections are formed in sediments of considerable antiquity ranging from Cretaceous in the western section near the Delaware River to Tertiary across a broader southeastern region. However, in lower elevational, shoreline settings such as those along principal tributaries to the Delaware River, deposits are mostly of Quaternary origins more directly associated with existing waterways or their Late Pleistocene precursors. Such deposits can be highly variable in composition, but most are typically sandy to gravelly. Additionally, it is not uncommon for older Quaternary deposits to occur as relatively thin surface mantles atop landforms composed primarily of much more ancient Tertiary or Cretaceous sediments.

Although not of the extreme antiquity of higher more interior uplands, most Quaternary upland deposits are nevertheless principally of Pleistocene origins that usually predate the first human presence within the region. Accordingly, near-surface restrictions apply for the great majority of cultural resources, and the main natural mechanisms for deeper occurrences are those of bioturbation. More coarse-textured soils, which are prevalent throughout the region, tend to have thicker biomantle zones, and the introduction of artifacts into upper subsoil levels as much as two feet deep is not uncommon.

Lowland Quaternary deposits and landforms of the Coastal Plain tend to be related to Pleistocene glacial cycles in which fluctuations in sea level and climate forced correlative responses in erosional and sedimentation processes. Although all of the major stream systems along the project corridor are now tidally influenced, estuarine conditions brought on by marine transgression during the Holocene have not always characterized these Coastal Plain settings. For much of the time since the Pleistocene the region was simply within the alluvial watershed of a freshwater Delaware River, and streams were deeply incised to levels controlled by previously lower sea stands.

Perhaps as much as 250 feet lower than present at the time of the Last Glacial Maximum[1], it was not until almost the middle of the Holocene before the rising sea established brackish conditions in this portion of the Delaware Valley. With this change flow regimes shifted from free flowing, higher energy systems to sluggish ones in which estuarine sedimentation progressively filled the previous valleys. Other consequences would also have ensued during the course of this tidal transgression. Extensive land areas adjacent to rivers were inundated or destroyed, and shorelines migrated landward as rivers expanded in breadth. Also, as is common along virtually all waterway shorelines near major urban areas of the East Coast, some amount of channel dredging possibly accompanied by artificial filling of former marshes and even open water is a possibility. Conversely, silting in of waterways due to greatly accelerated rates of historic erosion of the uplands is also usually in play.

Soils and Geomorphology

Six locations were ultimately chosen for varying degrees of scrutiny. For the three northern locations where the rail line crosses major stream valleys, evaluations of map data were sufficient to develop geoarchaeological assessments. Others entailed both map interpretations as well as direct field examinations. The particulars of each location are separately addressed below and are arranged in a north to south progression.

Maintenance Facility Site 11

This area located at the crossing of Newton Creek has been heavily modified. Not only is there now a HAZMAT issue on the southeast side of the creek, but early topographic mapping in 1848 and 1891 indicate marshland along most shorelines. As suggested by street layouts shown in 1891 on the southwest side, this area may have been more stable, inhabitable terrain; however the elevation was below 10 ft, and even then the land could well have been the product of early filling. In any event this location is now well removed from the modern shoreline. Whereas the breadth of Newton Creek where it was crossed by the rail line in 1891 was some 1400 ft in length, today it is only about 400 ft. This indicates a history of extensive filling that not only produced broad swaths of made land in areas of former open water, but

[1] Fletcher, C.H. 1988. Holocene sea level history and neotectonics of the United States Mid-Atlantic region: Applications and corrections. *Journal of Geology* 96: 323-337.

also very likely entailed deep filling of marshes and other low-lying positions. It is presently difficult to estimate how the made land is distributed on either side of the creek, but presumably several hundred feet occur on both sides. The Soil Survey of Gloucester County supports this assessment. All land within hundreds of feet of the creek is identified as Urban Land consisting either of buildings and pavement or introduced unnatural materials.

Little Timber Creek

As with positions around Newton Creek, widespread land disturbance has also occurred around Little Timber Creek. Based on the 1891 topographic map two principal landscape types appear to have originally been present. These include a broad marsh to the north and an abruptly rising upland to the south. Extensive filling has greatly altered both the marsh and creek. From the combined 700-ft breadth of water and marsh at that time, less than 100 feet of water remains today, although marsh and a diked water impoundment are respectively present in the northwest and northeast quadrants. Less filling probably occurred south of the creek, but roughly 200 ft of made land appears to extend outward from the original upland position where the 1891 map indicates elevations were between 10 and 20 ft. This upland area are is, however, heavily built upon, and given the usual Pleistocene antiquity typically assigned to regional upland landscapes, severe disturbances to the upland surface translate to comparable disturbances to any cultural material that may once have been present.

The area in the vicinity of the crossing of Little Timber Creek has virtually no potential for containing intact prehistoric cultural deposits. To the north of the creek originally poorly drained marshy conditions and extensive filling remove any prospects for a cultural resource potential. The upland area some 200 ft south of the modern shoreline has been so extensively disturbed by house and road construction that little if any potential remains here as well.

Big Timber Creek

Big Timber Creek meanders through a valley originally some 2,000 ft wide. During the Late Pleistocene and through the Early Holocene the creek was no doubt deeply incised, and probably was flanked by inhabitable alluvial landforms. With marine transgression, however, the valley would have filled with estuarine sediments that built at a rate in step with sea level rise. Not surprisingly, historic mapping shows low-lying marshy terrain on both sides of the creek. This lowland has been variably filled, possibly beginning as early as colonial time. Even today unfilled positions within the valley are not inhabited, and after about the middle of the Holocene there would not have existed stable, well drained ground suitable for occupation until the arrival of Europeans and the initiation of intentional filling.

Mantua Boulevard Station Parking Area

This several-acre site occupies an upland interfluve position between Mantua Creek and Chestnut Branch. More closely situated to Mantua Creek and lying at an elevation of nearly 70 ft, the landscape looms above the nearly tidal creek. Presently cultivated, it also likely has a prolonged history of agriculture; but except for the effects of plowing it has probably otherwise changed very little since the Late Pleistocene. Hence, as would be typical for most of the regional uplands any cultural resources present should be restricted to near-surface levels.

Pedestrian survey revealed the landscape to be uniform throughout the area, with the surface characterized by a sandy texture and also containing a few gravels. A soil examination (Table 1) identified a well drained sandy soil consistent with the Freehold soil series that is mapped at the location in the Soil Survey of Gloucester County. This soil and other similar sandy soils are regionally common, and with such textures upper bioturbational zones potentially containing cultural materials are often relatively thick. At this location, however, the zone is not so thick and encompasses the plow zone (Ap) and underlying upper subsoil horizon (E) extending to the depth of 14 in. Beneath this is a dense fragipan (Btx) horizon that would be highly unlikely to contain any artifacts. Such a subsoil horizon is consistent with the presumed Pleistocene age of the landscape, as both its fragic (x) and argillic (t) properties both signal an advanced stage in soil development.

Table 1. Soil profile description for the Mantua Boulevard Station parking area.

Horizon	**Depth (in)**	**Properties**
Ap	0-7	Dark brown (10YR 3/3) loamy sand; very friable consistence
E	7-14	Dark yellowish brown (10YR 3/4) loamy sand; very friable consistence
Btx	14-24+	Strong brown (7.5YR 4/6) sandy loam; brittle; firm consistence

Other comments: Upland interfluve position; 3% slope; probably moderately well drained; minor gravel, mostly small pebbles throughout; auger refusal on gravel at 24 in; described 10/9/13

Mantua/Pitman Station Parking Area

This parking location also occupies an upland interfluve position, in this instance between the headwaters of two small tributaries to Chestnut Branch. Pedestrian survey identified two principal landscape settings consisting of mostly disturbed higher terrain over roughly the northern half of the property, and a poorly drained position to the south. Some disturbance has also occurred within the poorly drained area adjacent to the rail line where it appears that some fill material from the excavated rail grade may have been disposed of. The remainder of the lower area is distributed between wooded and open field settings, both of which display surface indications of severely impeded drainage. These include very dark coloration of the surface soil and the presence of hydrophytic vegetation such as rushes, sedges and ferns. Even in a wholly undisturbed state this position would have been too poorly drained for occupation and is thus highly unlikely to contain any prehistoric cultural resources.

The more favorably drained northern terrain is situated about 4 to 5 ft higher than the wetland, but it is nearly everywhere severely disturbed. Surface contours are suggestive of

extensive earth movement, some of which was even ongoing at the time of investigation. A boring at a location where surface disturbance was less overt encountered only earthen and gravelly fill materials to refusal on gravel at the depth of 4 ft. There may be some isolated remnants of intact soils of unpredictable distribution, but for the most part disturbances have been thorough enough that little if any prospects remain for intact cultural resources.

Maintenance Facility Site 2 (south of Glassboro along Buck Road)

This southernmost of the examined locations is also the only one where rather than to the north, surface drainage is directed southward toward Delaware Bay mainly via tributaries to the Maurice River. The headwater of one such tributary closely approaches the west side of the location. As with the previous location this much larger area spans both well drained upland terrain as well as a wetland. The wetland is by far the greater component of the area and comprises about the central two thirds. Even to the south of this the drainage appears to be at least somewhat limiting for occupation, and the only portion of the area likely to have no drainage restrictions for human occupation constitutes about the northern fifth. This corresponds to the yard areas of a residence as well as mixed grassy and wooded areas north and east of the residence. Some locations here have likely suffered limited disturbances, but most surfaces appear to be largely intact. Accordingly, the usual archaeological interpretation for the regional uplands applies, and there could be some potential for prehistoric cultural resources in near-surface levels. In fact, given the proximity to the large wetland with its spectrum of floral and faunal resources, the potential could be quite good.

Appendix B

Report Figures

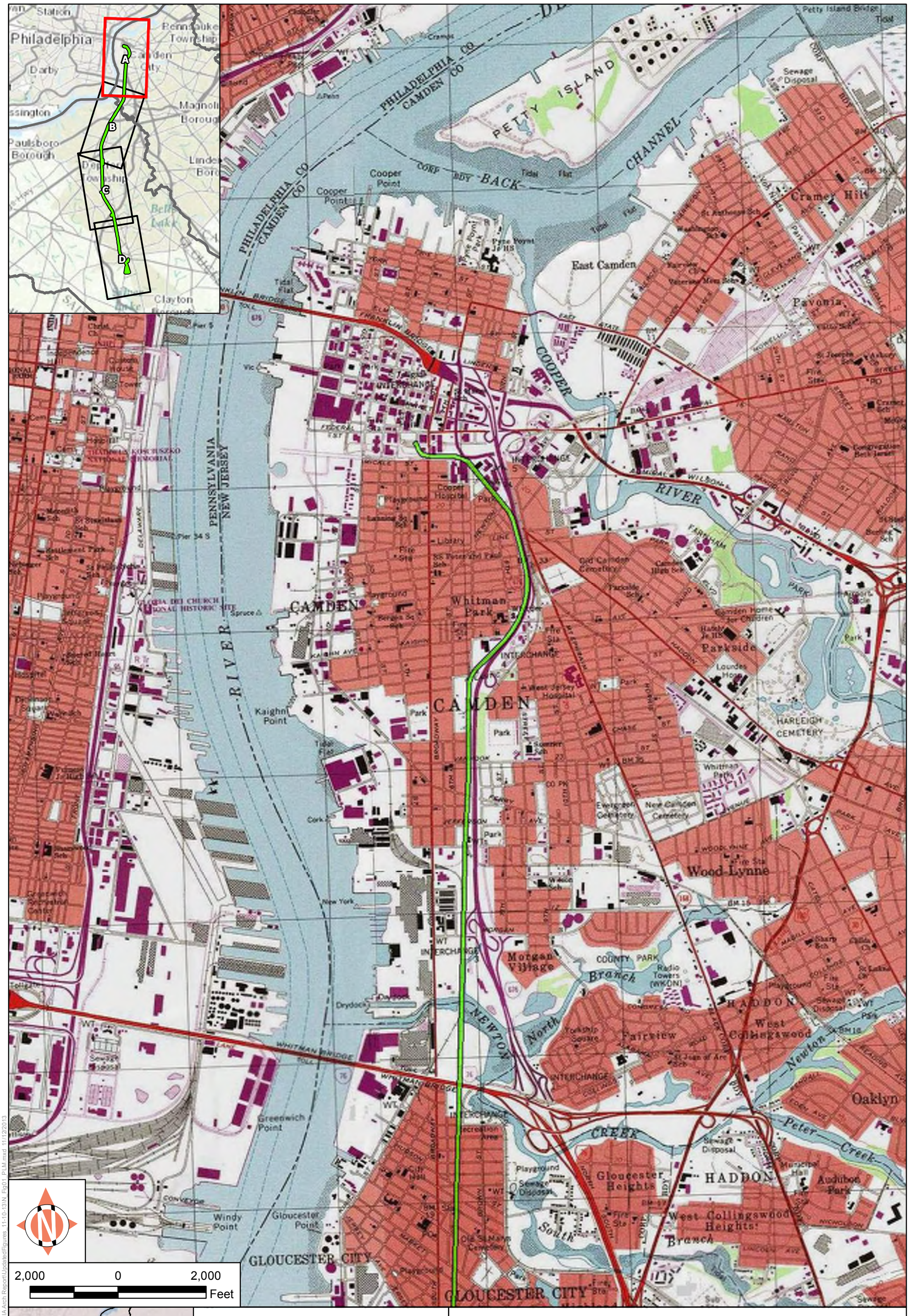

Figure 1A
Project Location Map
Glassboro-Camden Line
Camden and Gloucester Counties, New Jersey

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Source: © 2013 National Geographic Society, i-cubed; Camden, Pitman East, Pitman West, Runnemade, and Woodbury, New Jersey and Philadelphia, Pennsylvania Quadrangles

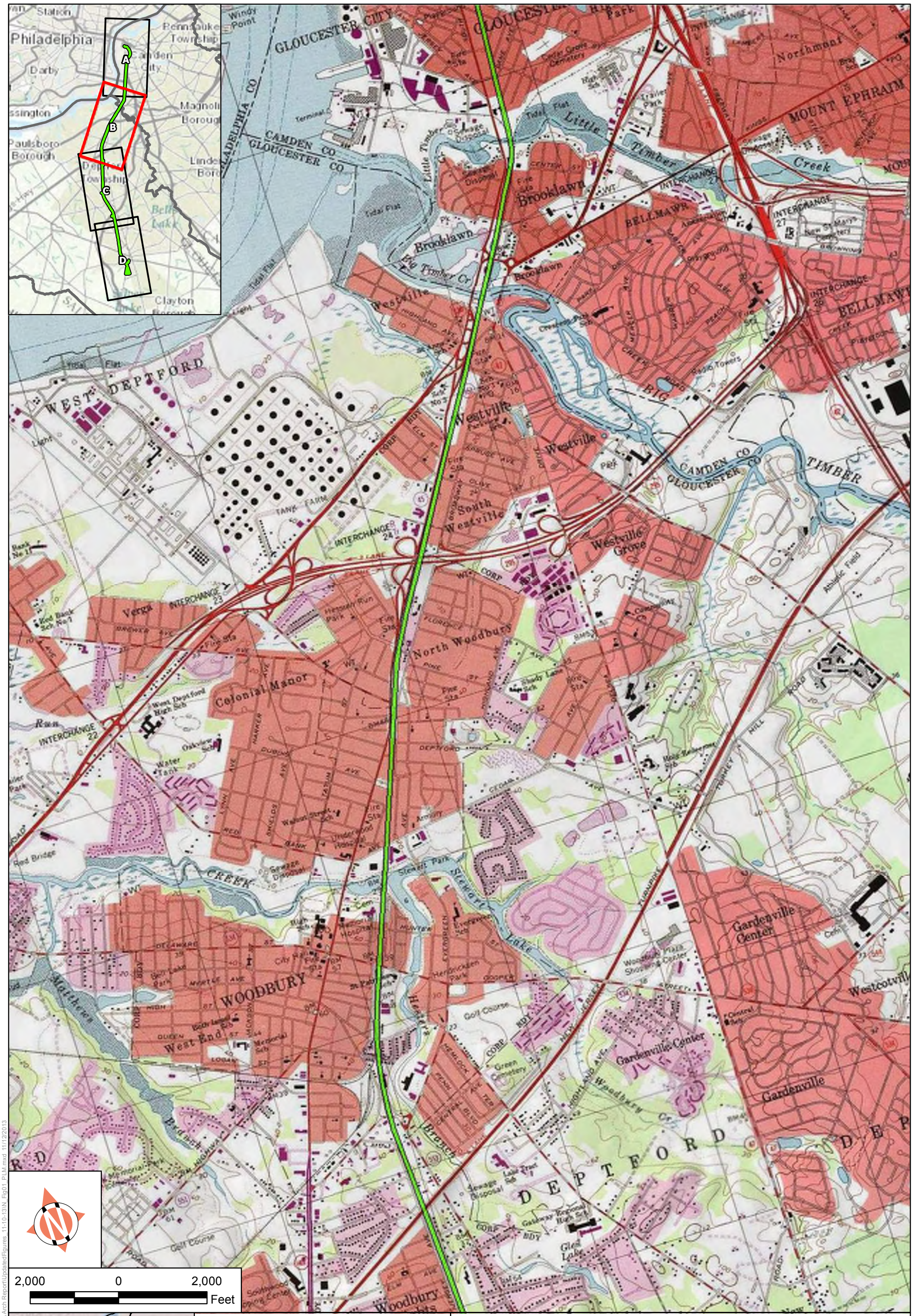

Figure 1B
Project Location Map
Glassboro-Camden Line
Camden and Gloucester Counties, New Jersey

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Source: © 2013 National Geographic Society, i-cubed; Camden, Pitman East, Pitman West, Runnemade, and Woodbury, New Jersey and Philadelphia, Pennsylvania Quadrangles

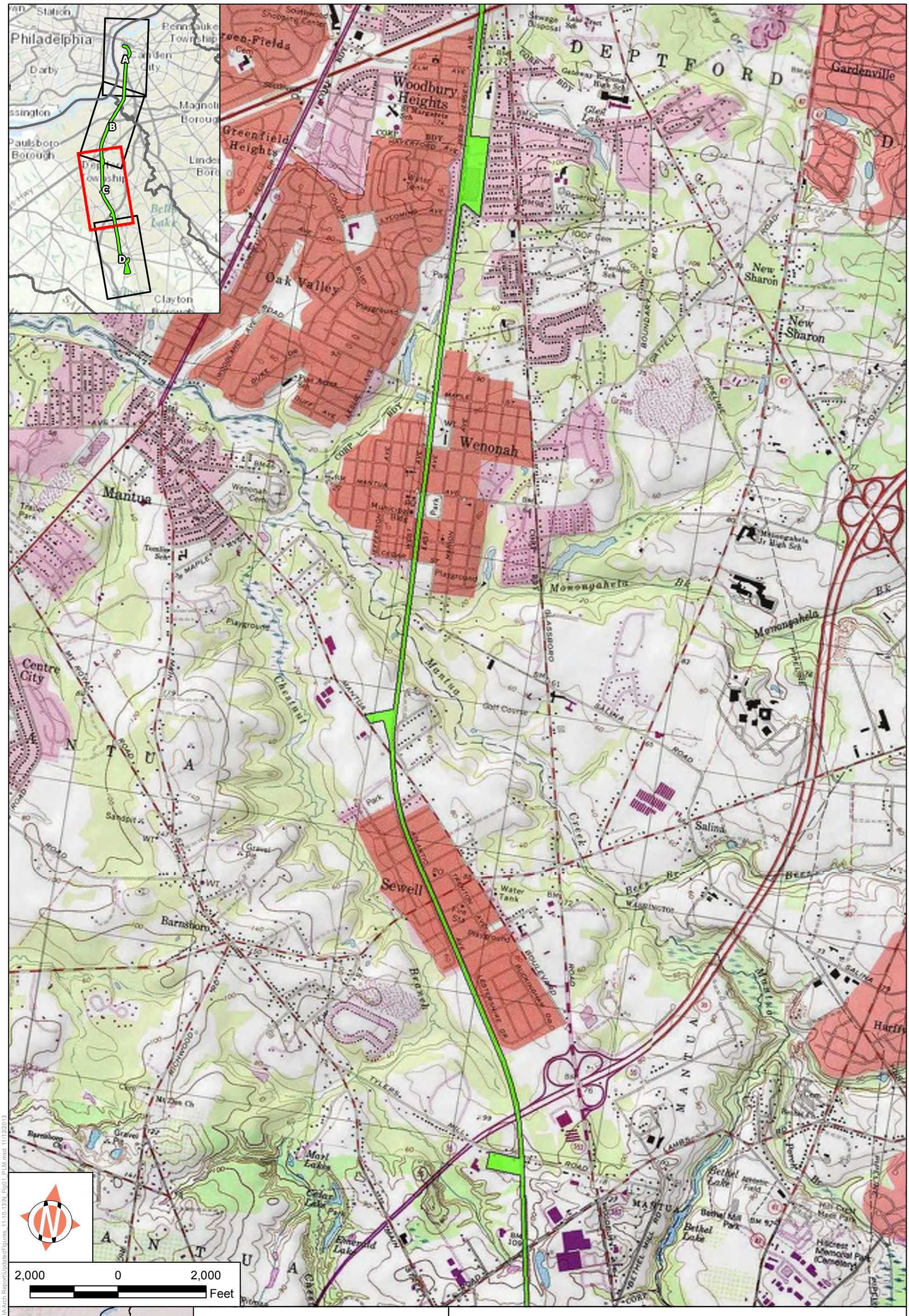

Figure 1C
Project Location Map
Glassboro-Camden Line
Camden and Gloucester Counties, New Jersey

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Source: © 2013 National Geographic Society, i-cubed; Camden, Pitman East, Pitman West, Runnemade, and Woodbury, New Jersey and Philadelphia, Pennsylvania Quadrangles

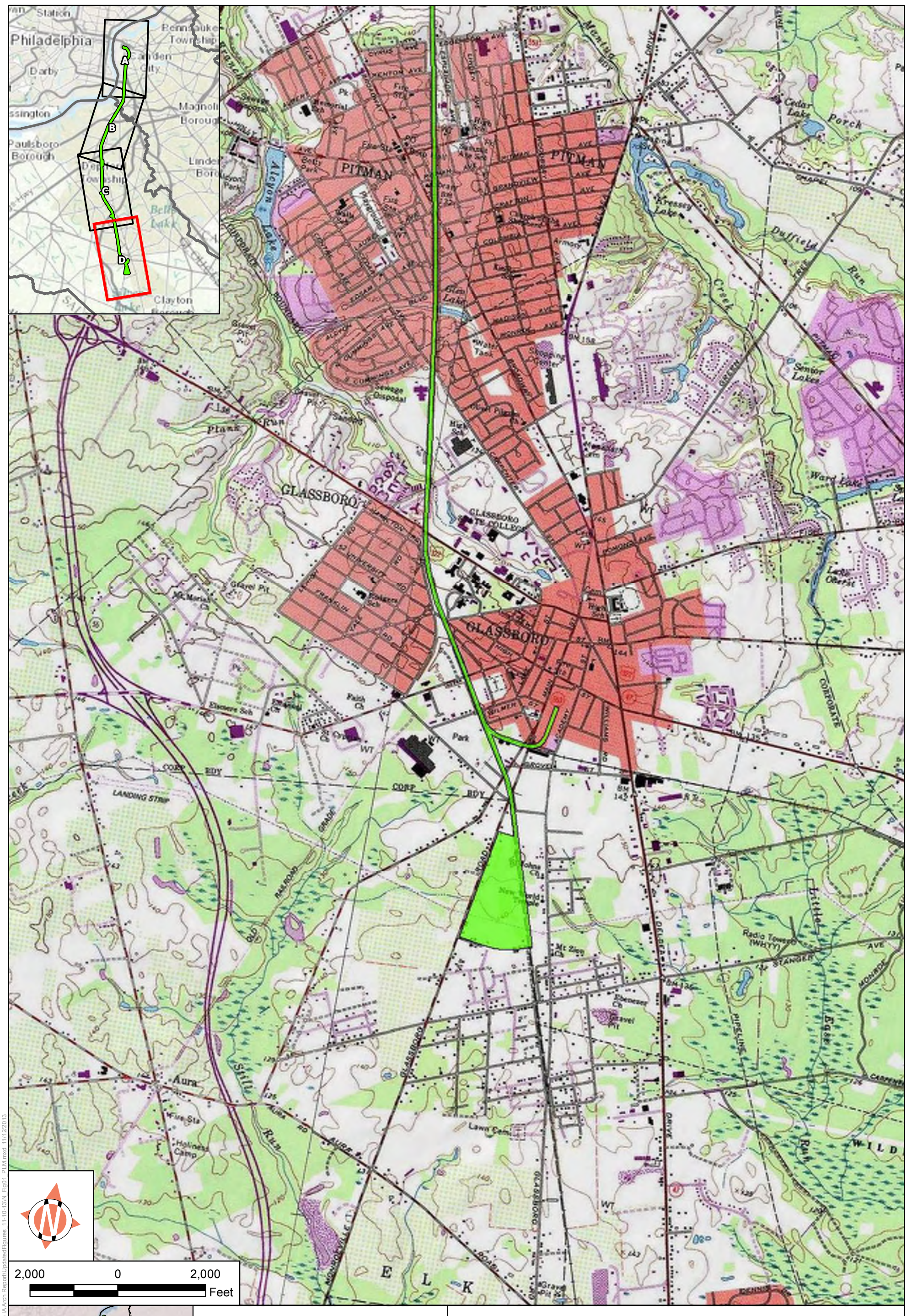

Figure 1D
Project Location Map
Glassboro-Camden Line
Camden and Gloucester Counties, New Jersey

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Source: © 2013 National Geographic Society, i-cubed; Camden, Pitman East, Pitman West, Runnemade, and Woodbury, New Jersey and Philadelphia, Pennsylvania Quadrangles

Area of Potential Effects (APE) - Approximate

Figure 2
1639 Suydt Rivier
Glassboro-Camden Line
Camden and Gloucester Counties, New Jersey

Source: http://mapmaker.rutgers.edu/SvydtRivier1639.html

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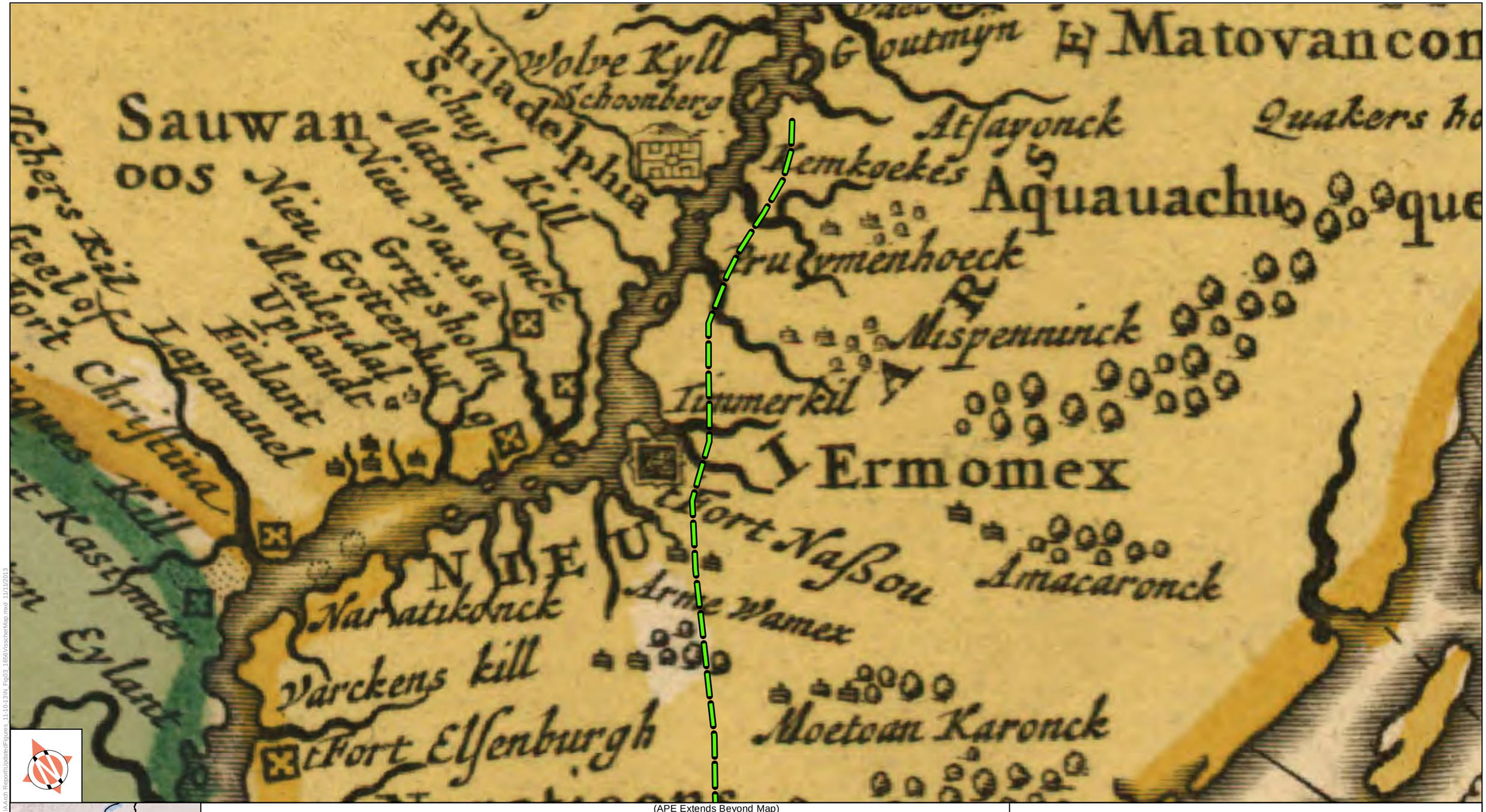

(APE Extends Beyond Map)

Area of Potential Effects (APE) - Approximate

Figure 3
1656 Visscher Map
Glassboro-Camden Line
Camden and Gloucester Counties, New Jersey

Source: Novi Belgii Novaeque Angliae (Library of Congress)

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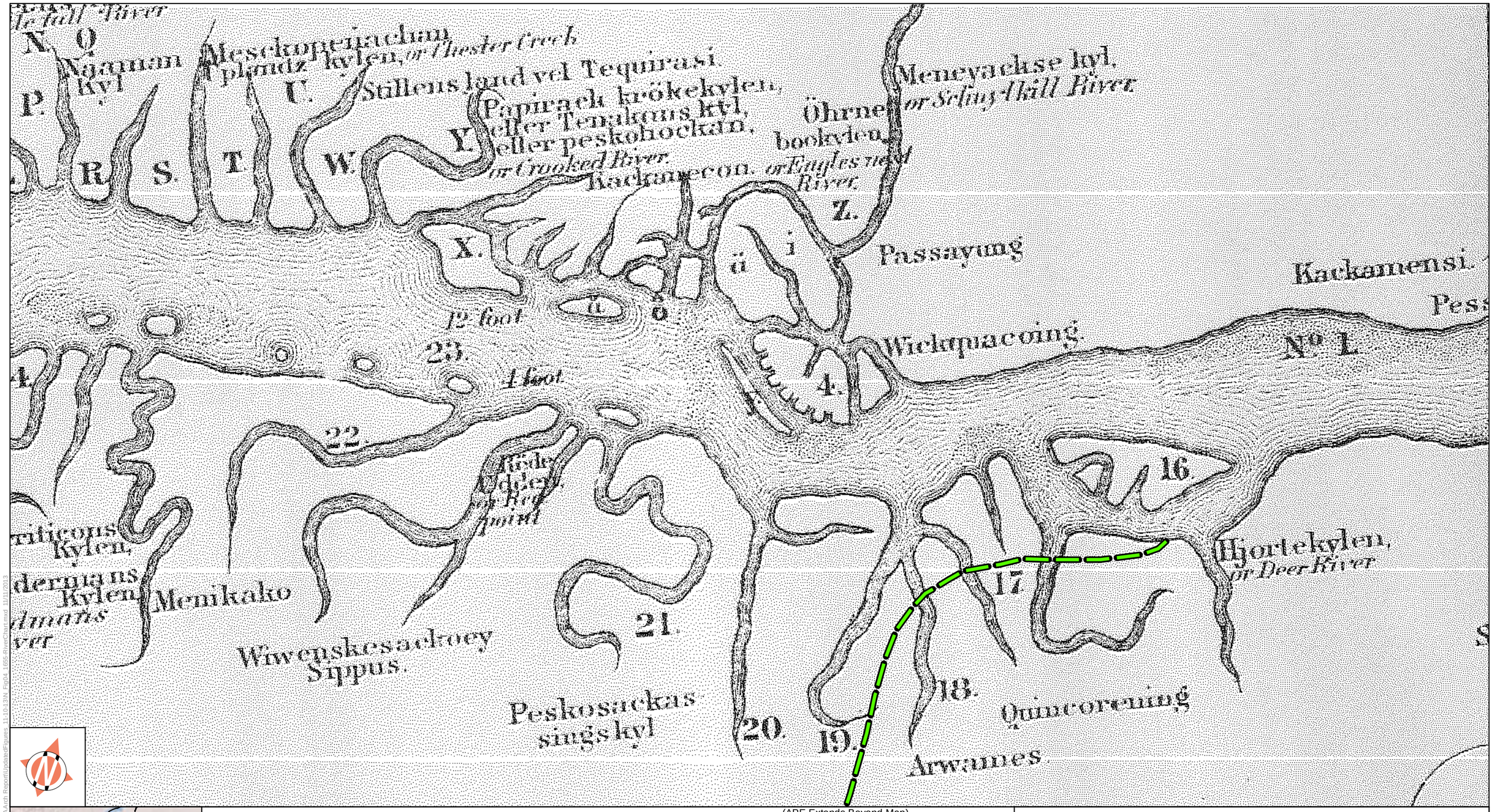

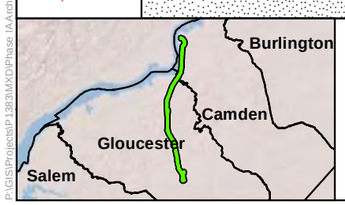

(APE Extends Beyond Map)

Area of Potential Effects (APE) - Approximate

Figure 4
1654-55 Lindström Map
Glassboro-Camden Line
Camden and Gloucester Counties, New Jersey

Source: Novi Suecia via upload.wikimedia.org/wikipedia/commons/1/1f/Delaware_river_chart_1655.jpeg

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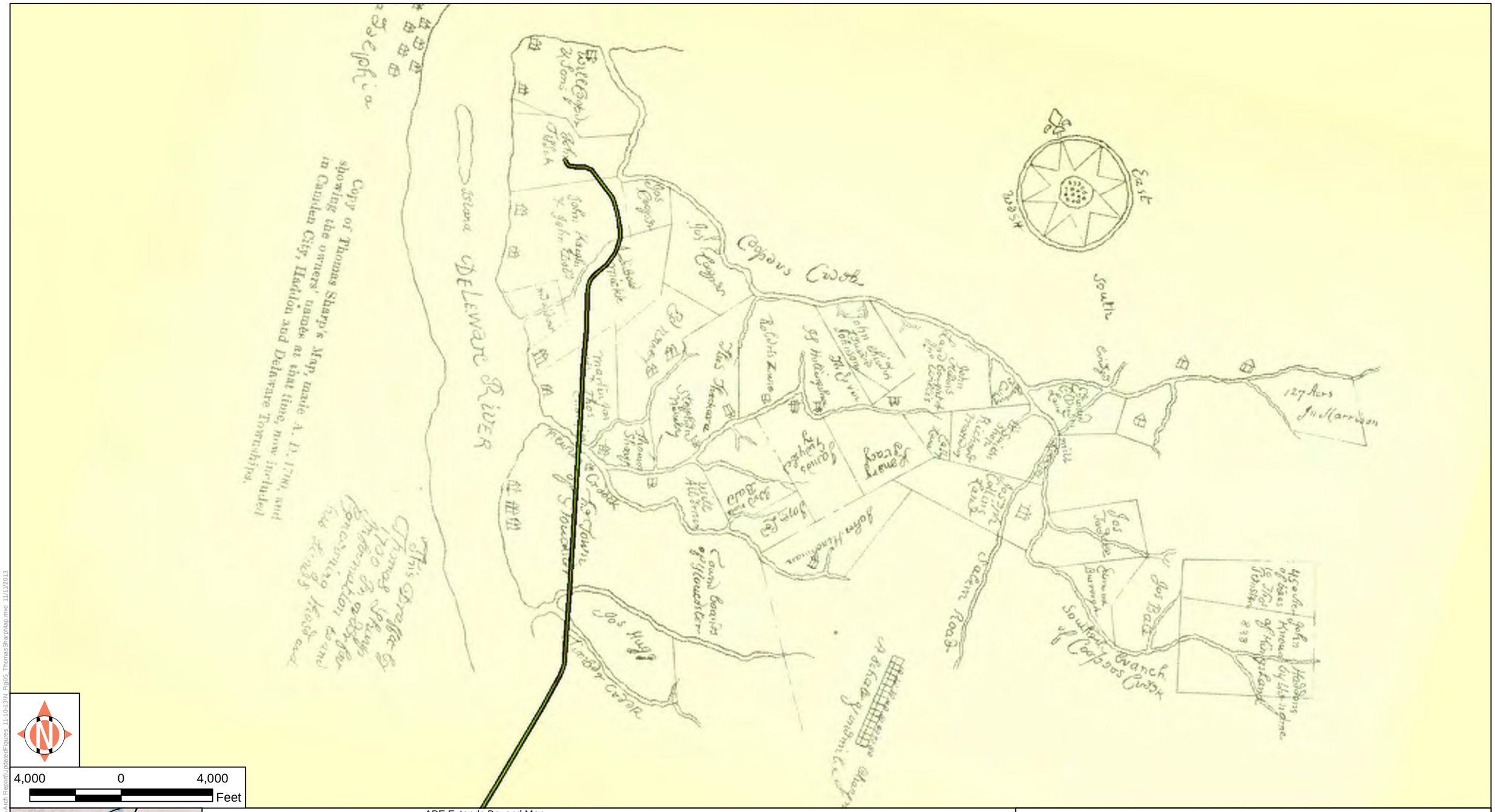

Figure 5
1700 Sharp Map of Camden Area
Glassboro-Camden Line
Camden and Gloucester Counties, New Jersey

Source: Library of Congress and Prowell 1886

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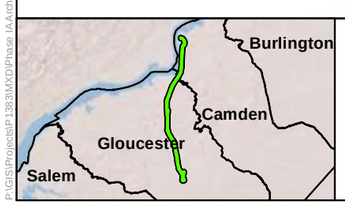
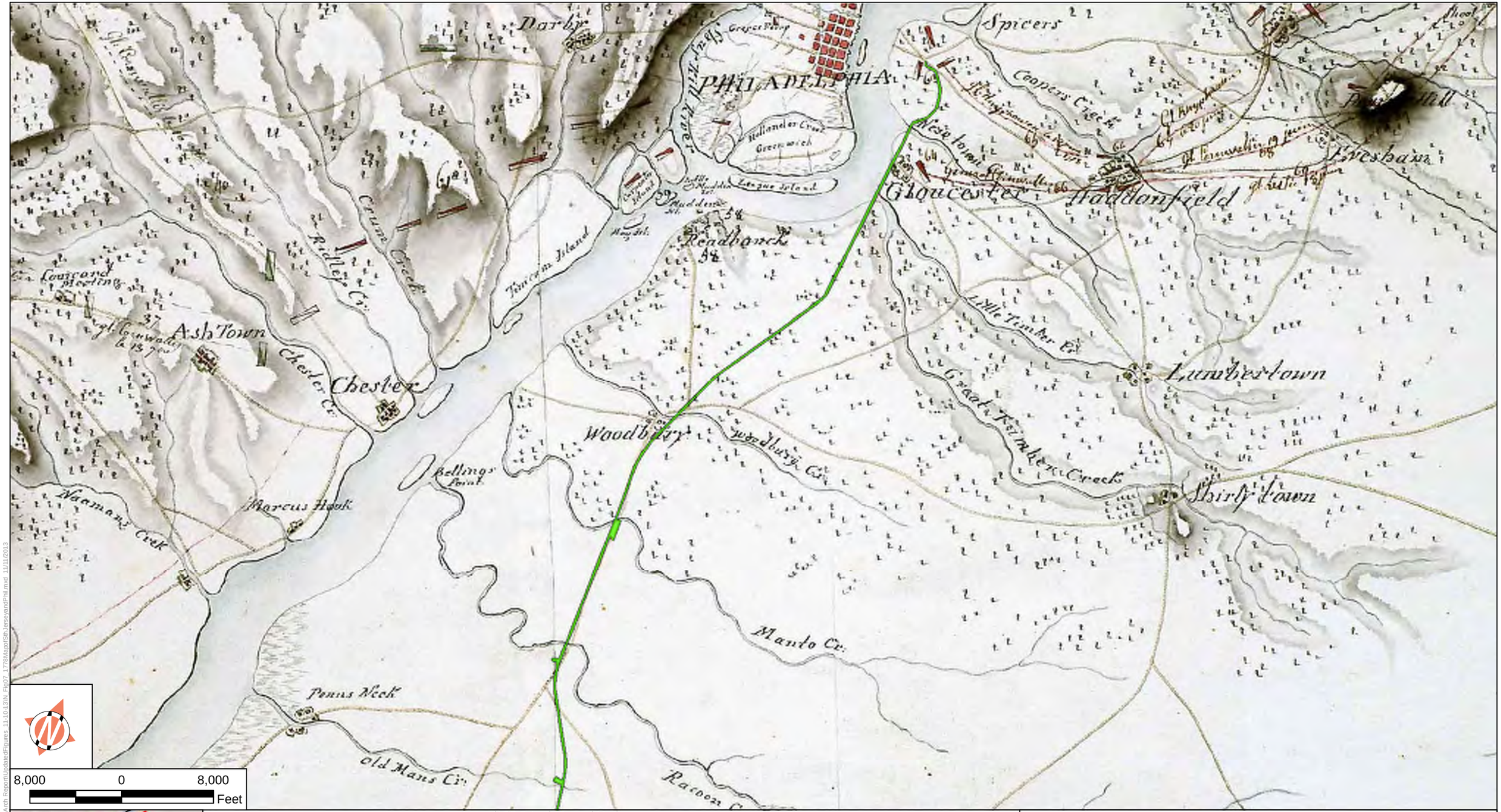


Figure 6
1778 British Military Map of Cooper's Point
Glassboro-Camden Line
Camden and Gloucester Counties, New Jersey

Source: Library of Congress



(APE Extends Beyond Map)

Area of Potential Effects (APE)

Figure 7
1778 Map of South Jersey and Philadelphia Area
Glassboro-Camden Line
Camden and Gloucester Counties, New Jersey

Source: Hessisches Staatsarchiv Marburg

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Figure 8
"Les Marches du Corps…de Novembre 1777"
Glassboro-Camden Line
Camden and Gloucester Counties, New Jersey

Source: Library of Congress

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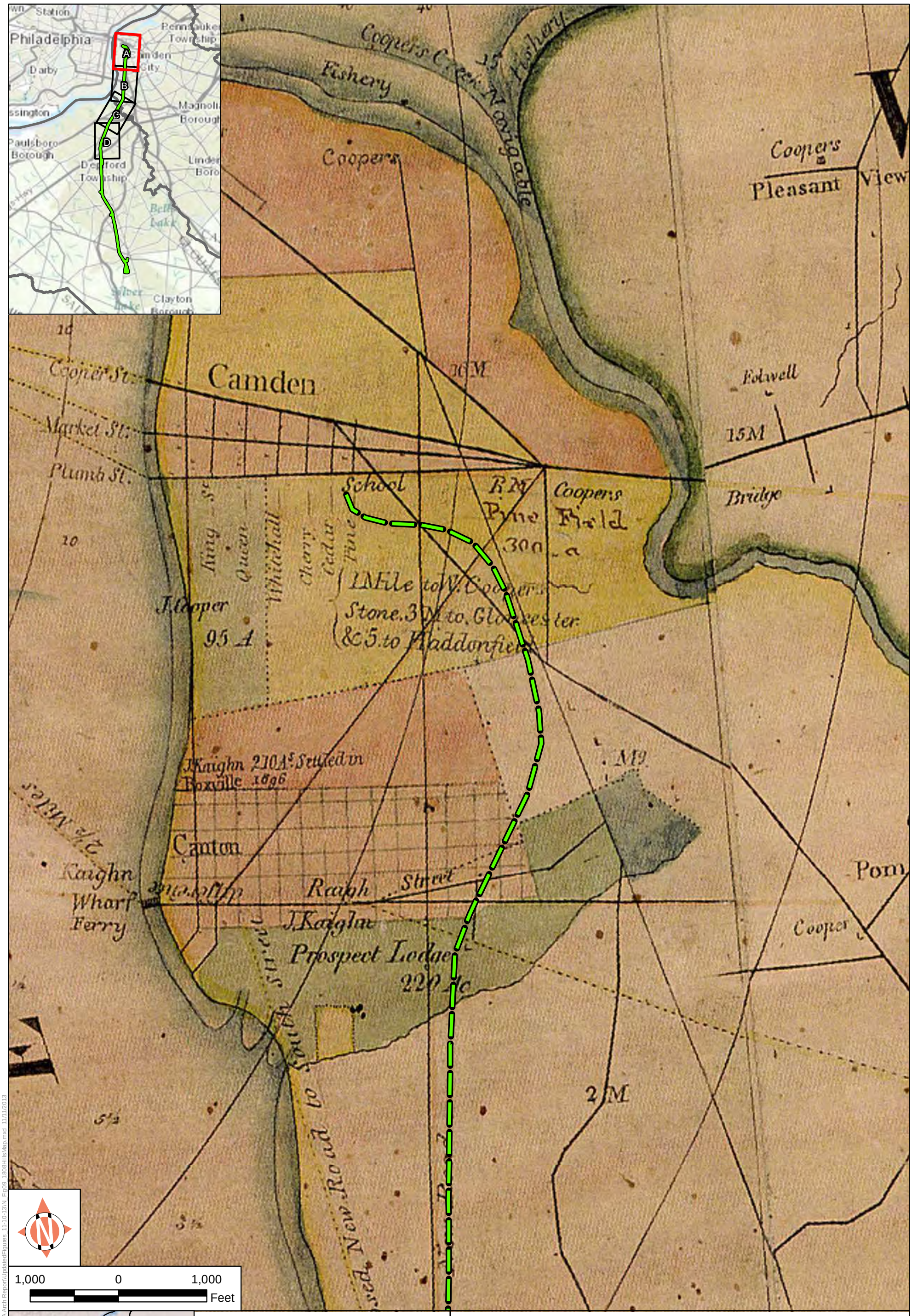

Figure 9A
1808 Hills Map
Glassboro-Camden Line
Camden and Gloucester Counties, New Jersey

Source: Camden County Historical Society

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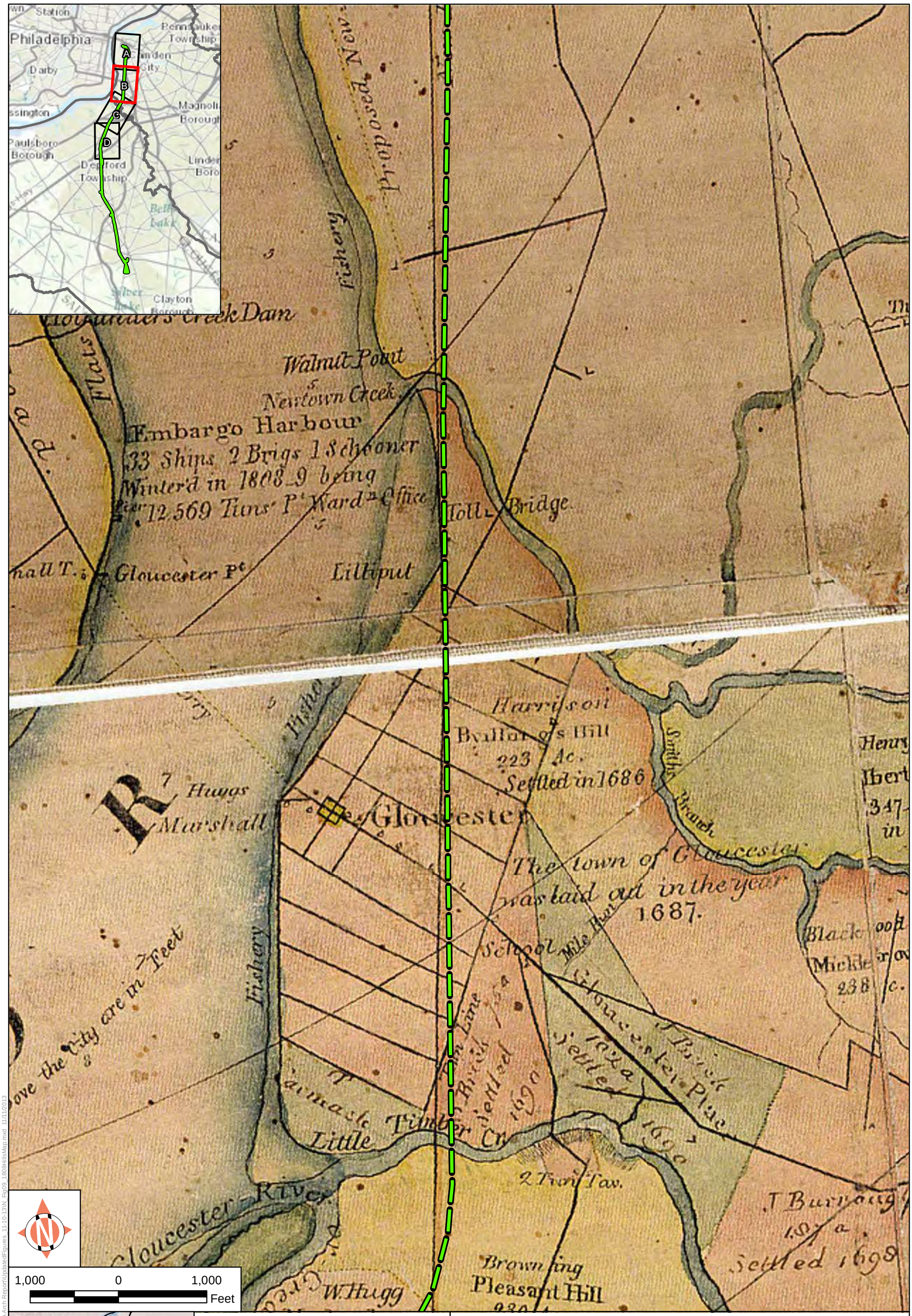

Figure 9B
1808 Hills Map
Glassboro-Camden Line
Camden and Gloucester Counties, New Jersey

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Source: Camden County Historical Society

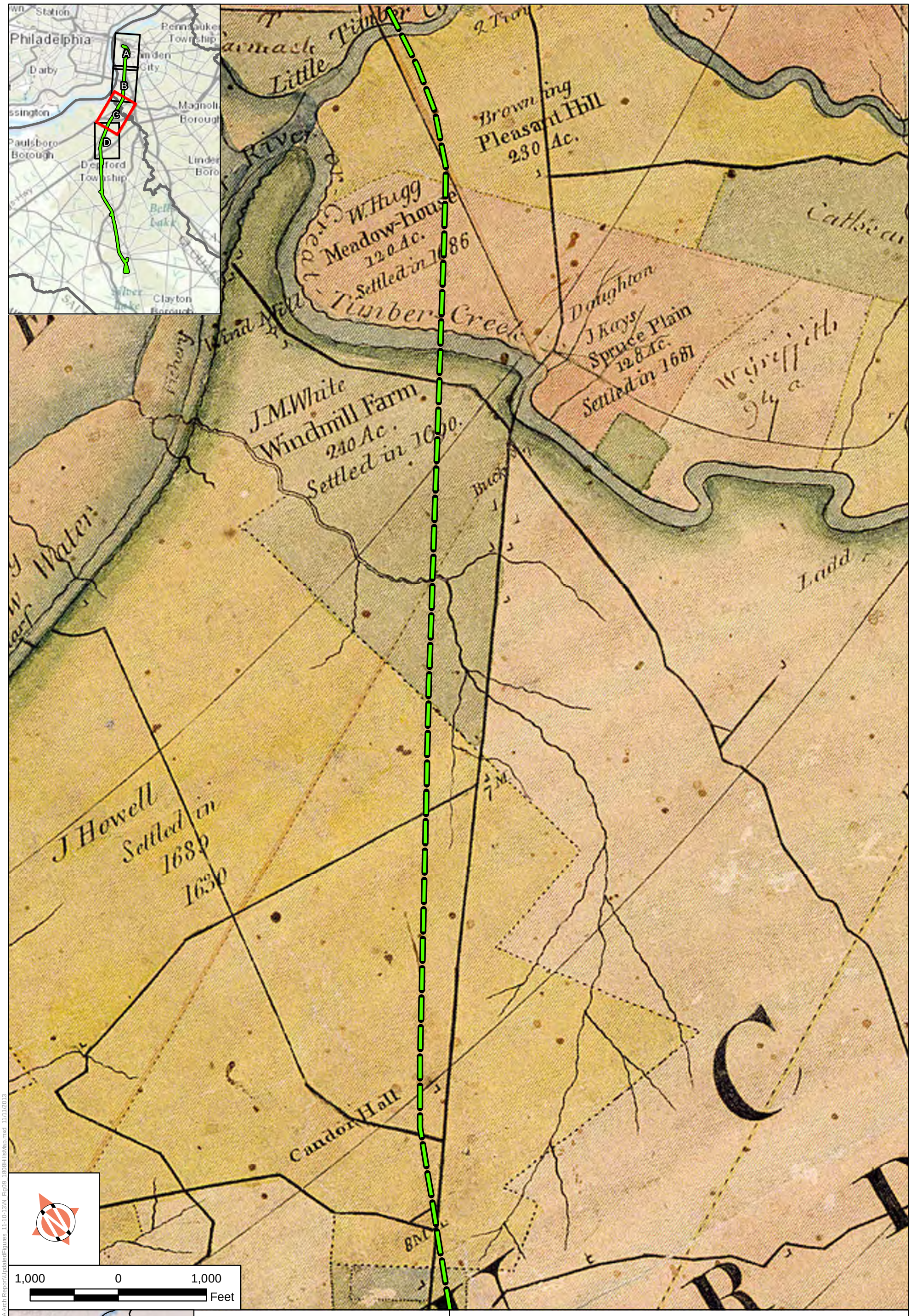

Figure 9C
1808 Hills Map
Glassboro-Camden Line
Camden and Gloucester Counties, New Jersey

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Source: Camden County Historical Society

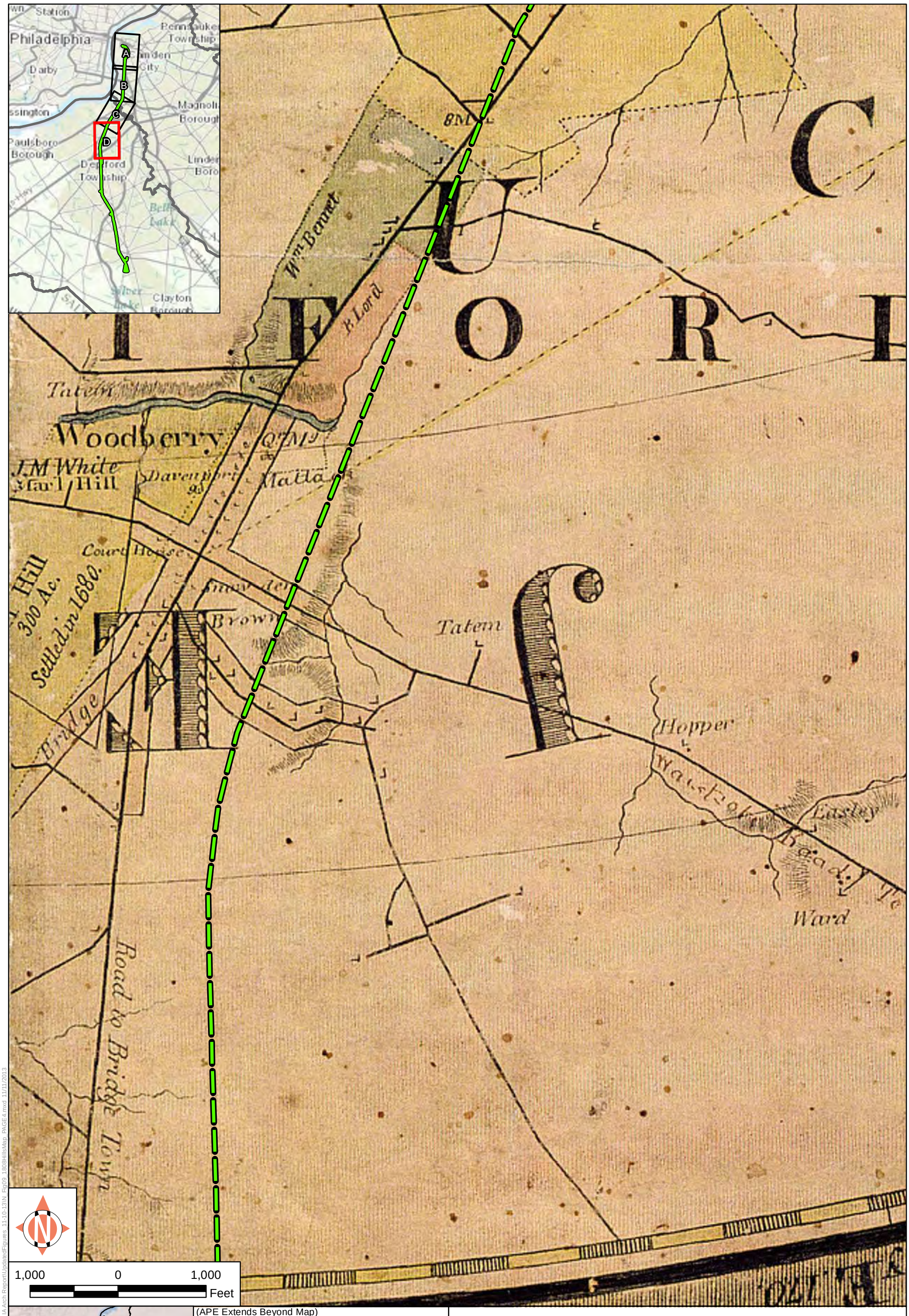

Figure 9D
1808 Hills Map
Glassboro-Camden Line
Camden and Gloucester Counties, New Jersey

Source: Camden County Historical Society

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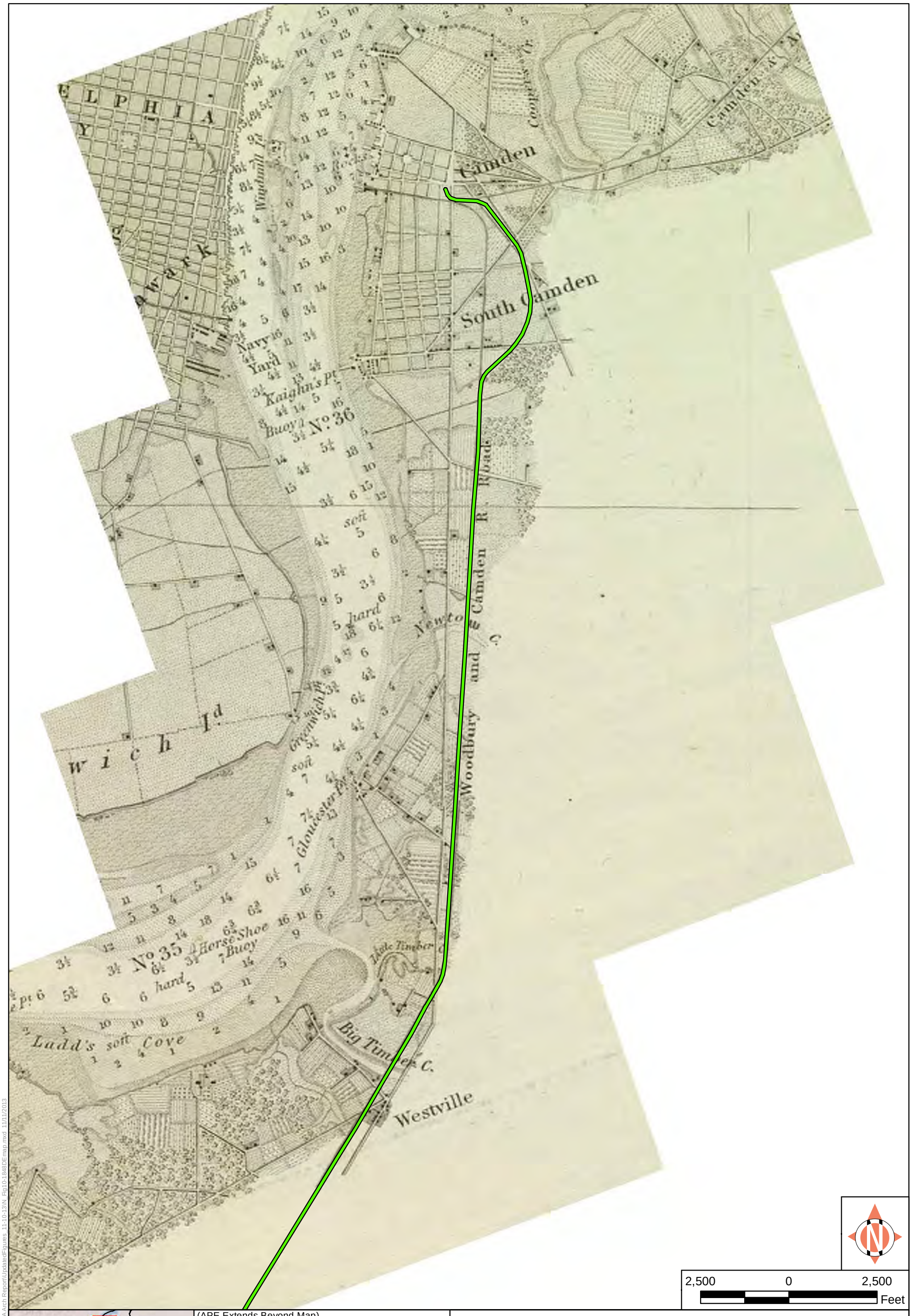

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Figure 10
1848 Map of Delaware Bay and River
Glassboro-Camden Line
Camden and Gloucester Counties, New Jersey

Source: USC&GS, www.davidrumsey.com

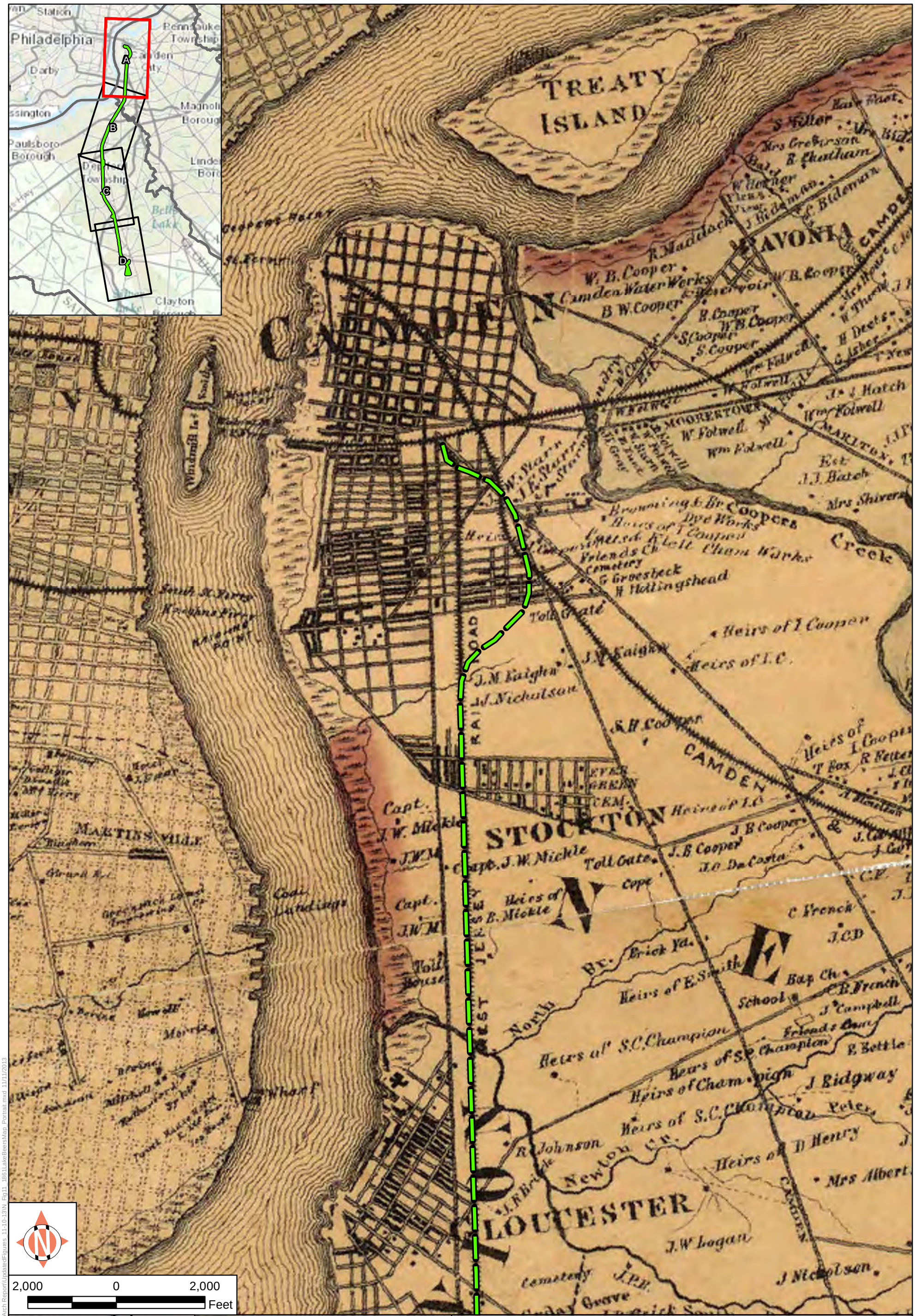

Figure 11A
1861 Lake and Beers Map of Philadelphia Vicinity
Glassboro-Camden Line
Camden and Gloucester Counties, New Jersey

Source: Pennsylvania State Archives

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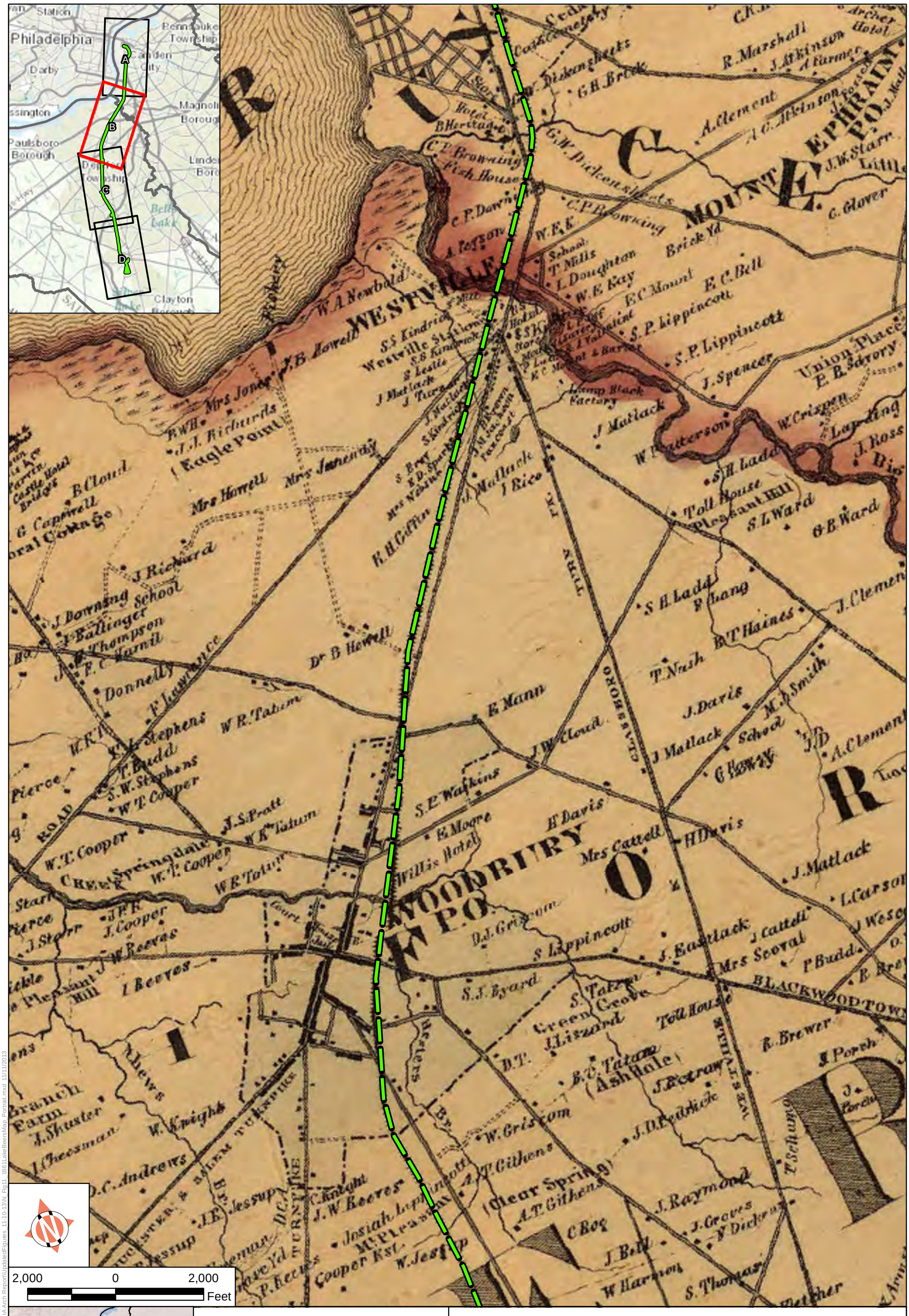

Figure 11B
1861 Lake and Beers Map of Philadelphia Vicinity
Glassboro-Camden Line
Camden and Gloucester Counties, New Jersey

Source: Pennsylvania State Archives

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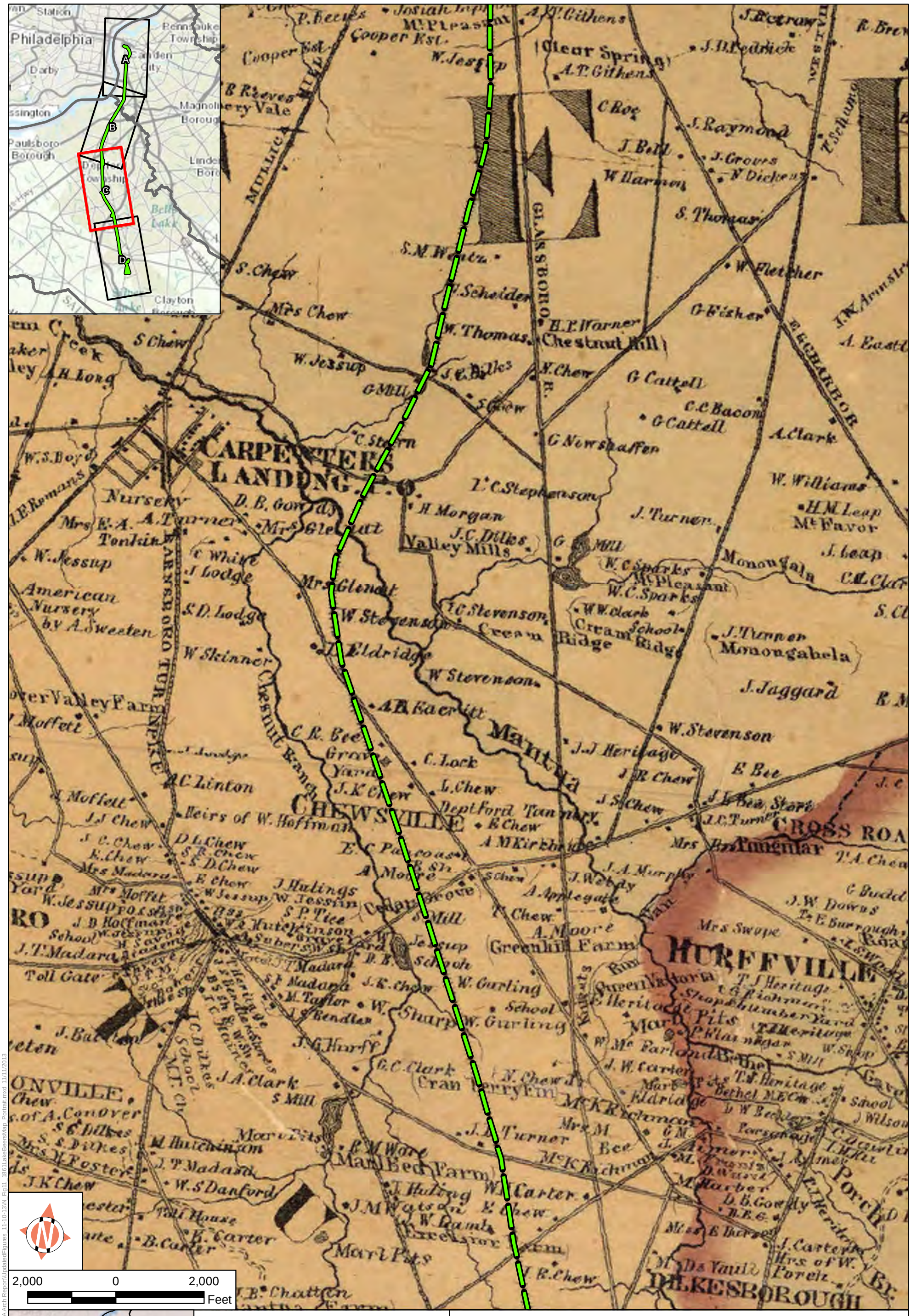

Figure 11C
1861 Lake and Beers Map of Philadelphia Vicinity
Glassboro-Camden Line
Camden and Gloucester Counties, New Jersey

Source: Pennsylvania State Archives

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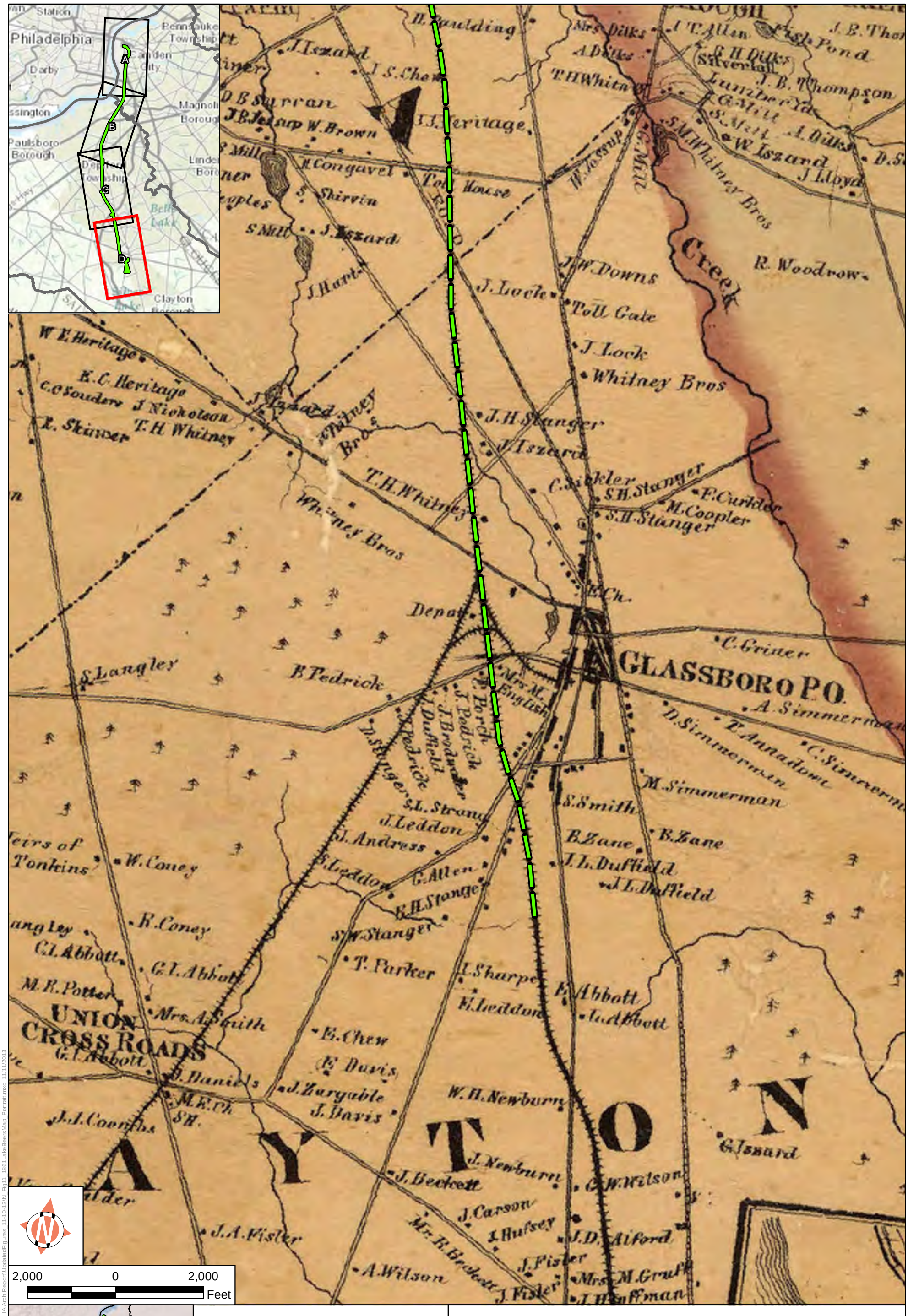

Figure 11D
1861 Lake and Beers Map of Philadelphia Vicinity
Glassboro-Camden Line
Camden and Gloucester Counties, New Jersey

Source: Pennsylvania State Archives

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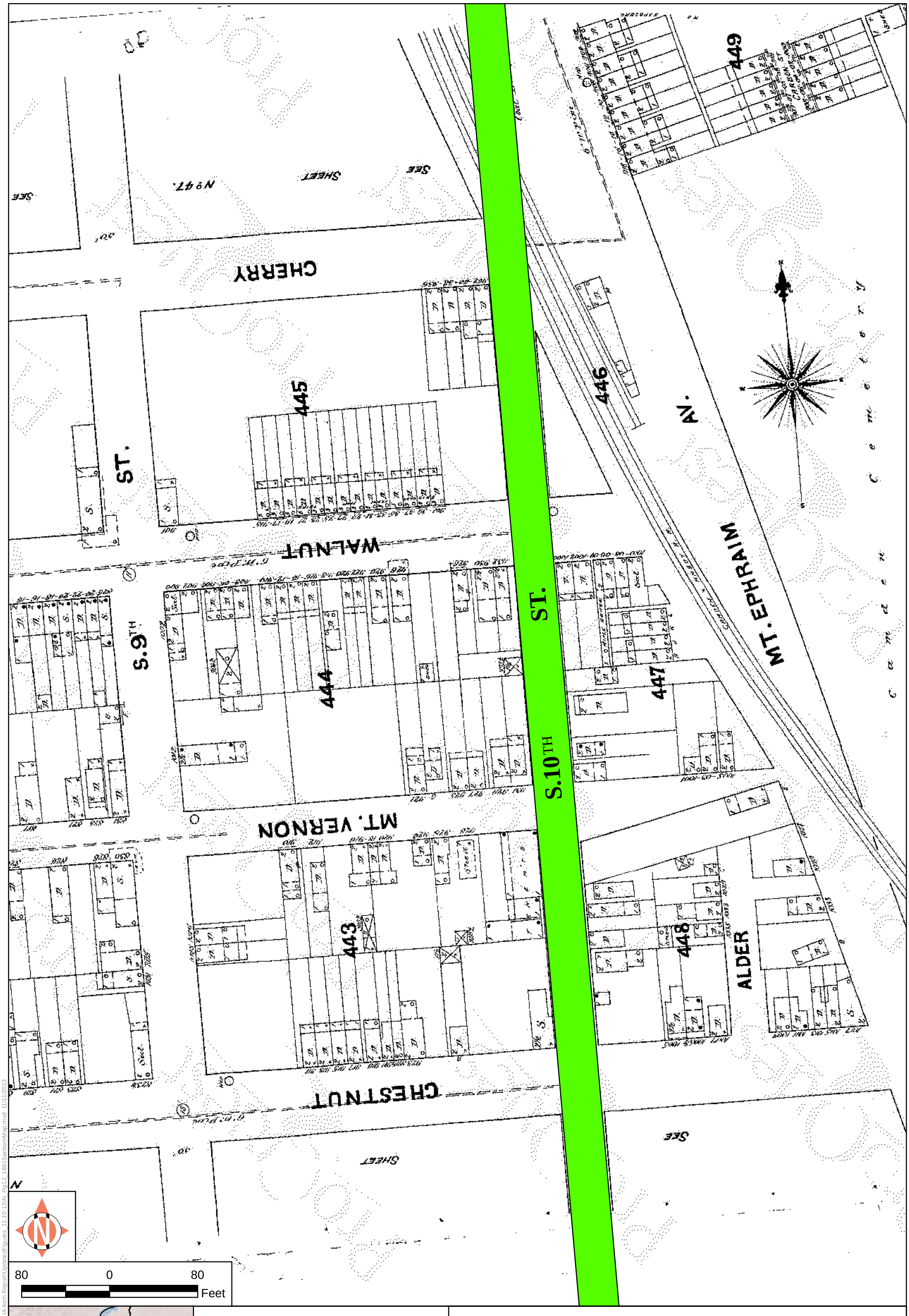

Figure 12
1891 Sanborn Map, Chestnut to Cherry Streets Camden
Glassboro-Camden Line
Camden and Gloucester Counties, New Jersey

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Source: Free Library of Philadelphia

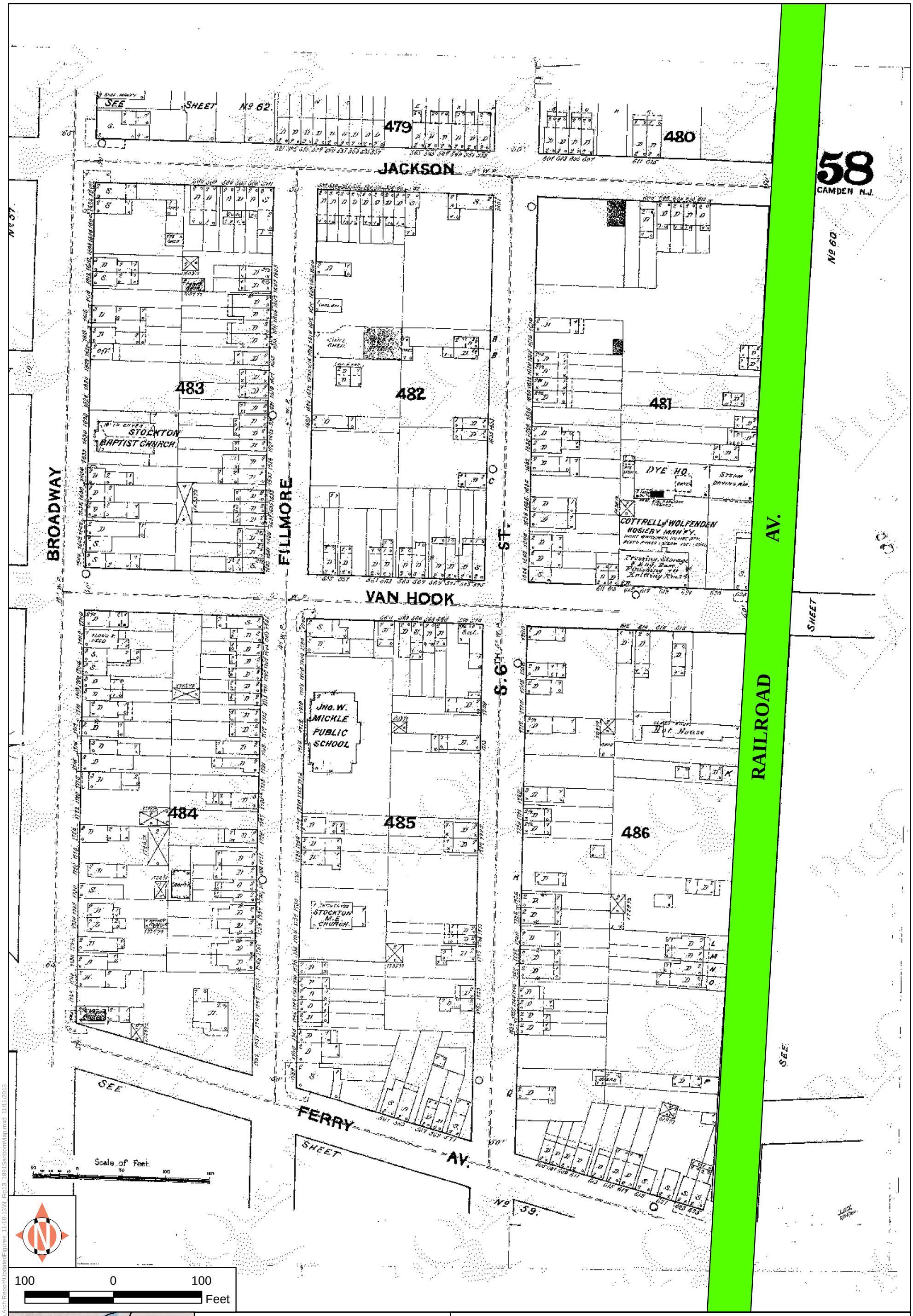

Figure 13
1891 Sanborn Map, Jackson Street to Ferry Avenue Camden
Glassboro-Camden Line
Camden and Gloucester Counties, New Jersey

Source: Free Library of Philadelphia

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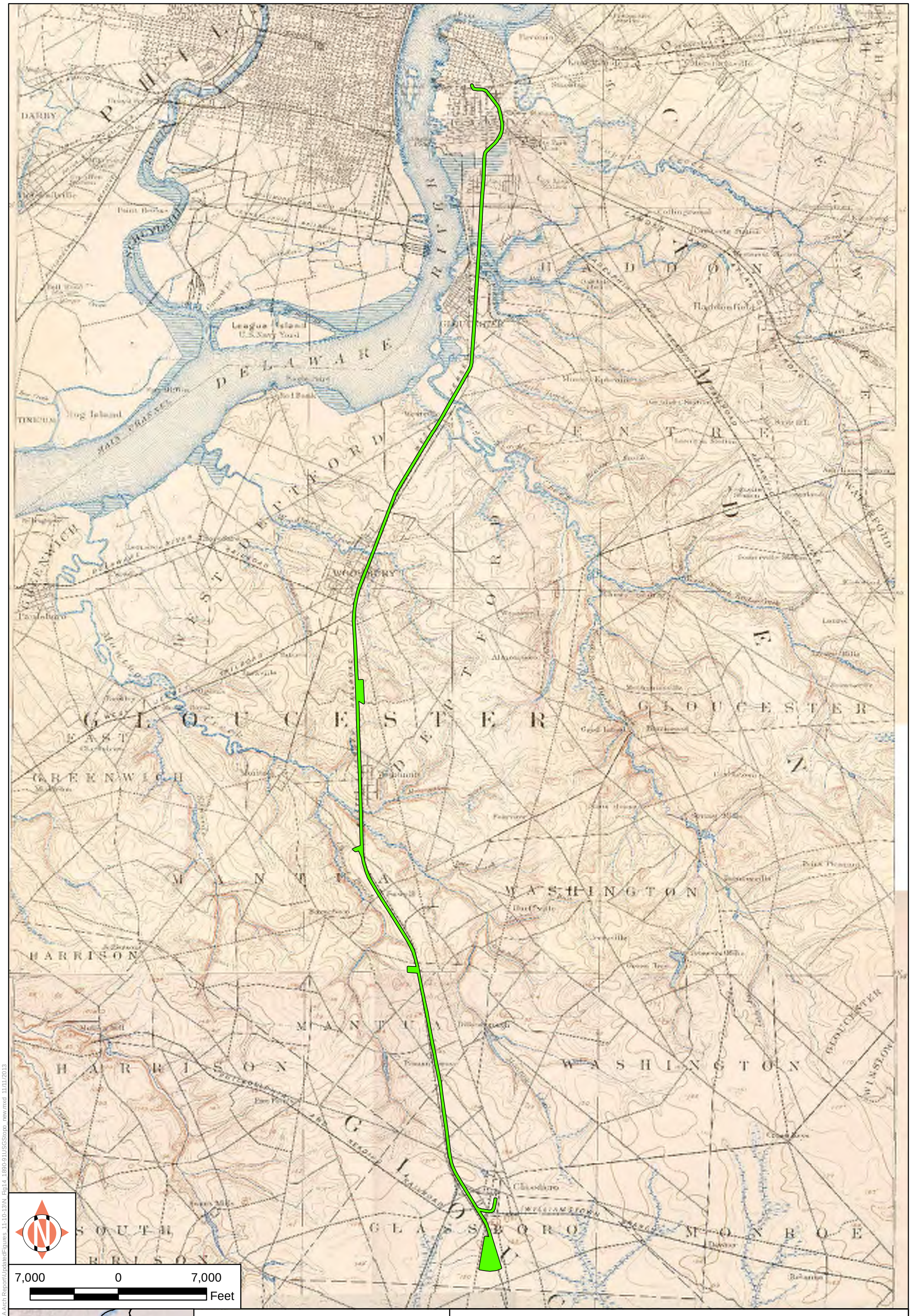

Figure 14
1890-91 USGS Philadelphia
and Glassboro Quadrangles
Glassboro-Camden Line
Camden and Gloucester Counties, New Jersey

Source: historical.mytopo.com

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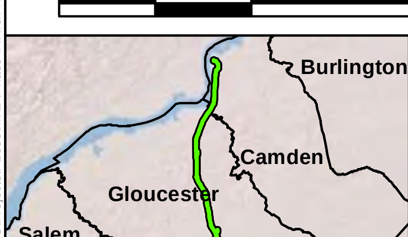

Area of Potential Effects (APE) - Approximate

Figure 15
1920 Pennsylvania Railroad Atlantic Division Map
Glassboro-Camden Line
Camden and Gloucester Counties, New Jersey

Source: http://www.prrths.com/newprr_files/newPRRResearch.htm

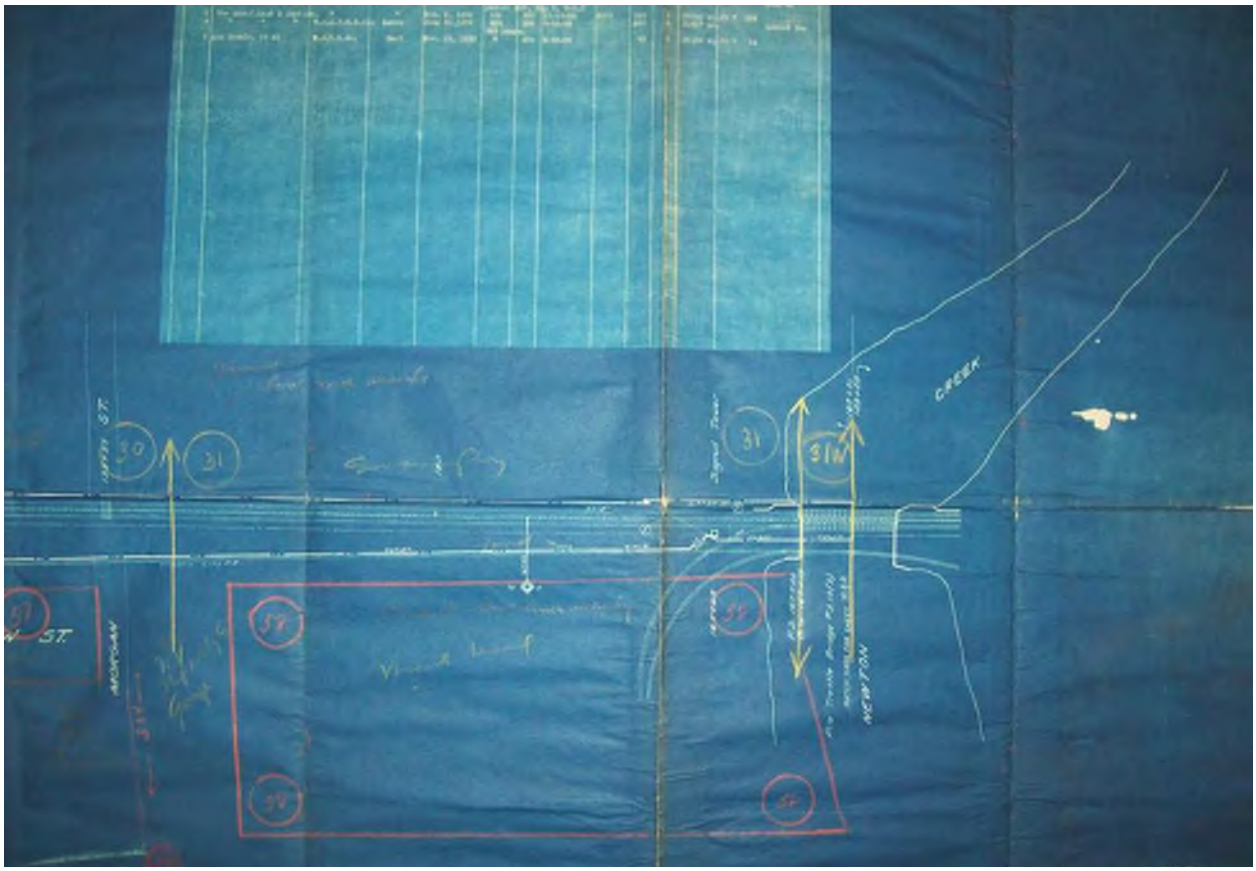

Figure 16A: Newton Creek (1916 West Jersey and Seashore Line ICC sheet V2.2/3, National Archives RG 134) and modern aerial view (Google Earth). North is at left margin for all Figure 16 sheets.

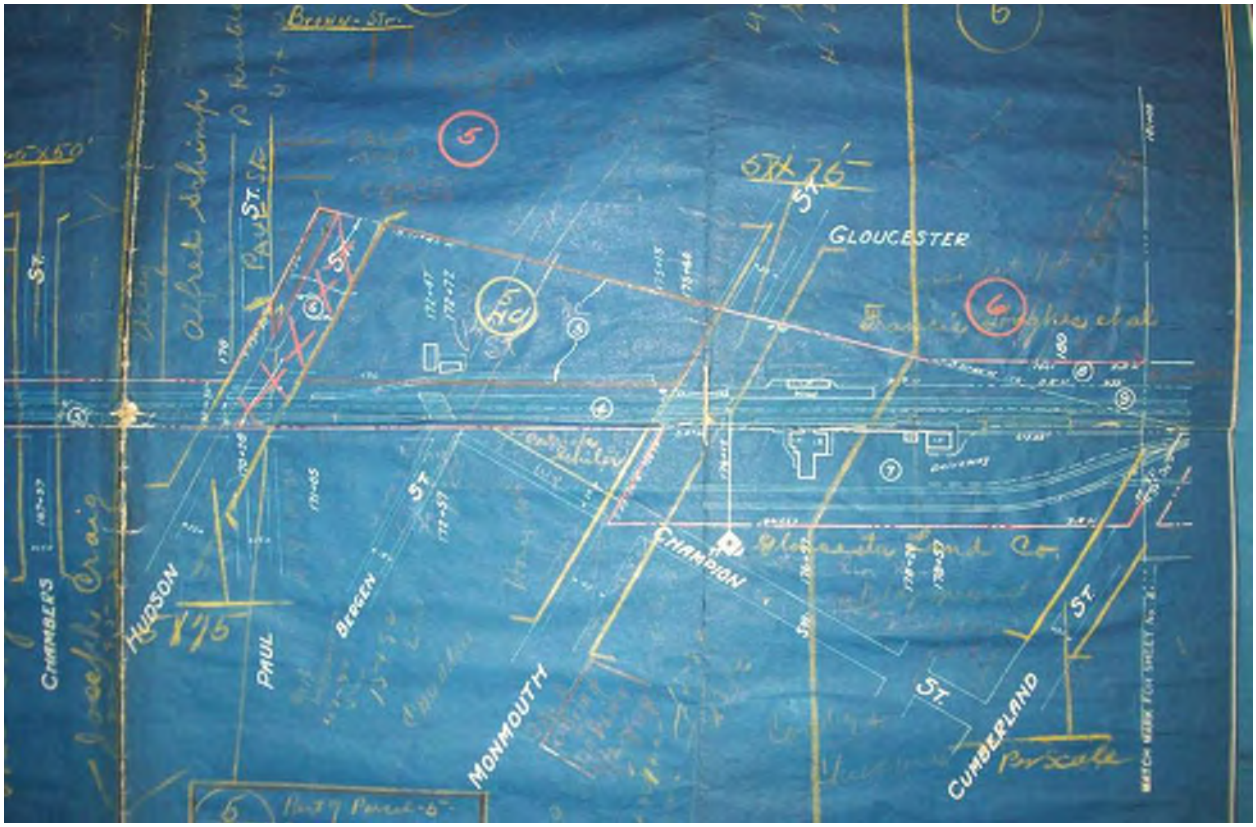

Figure 16B: Gloucester City (1916 West Jersey and Seashore Line ICC sheet V2.3/, National Archives RG 134) and modern aerial view (Google Earth).

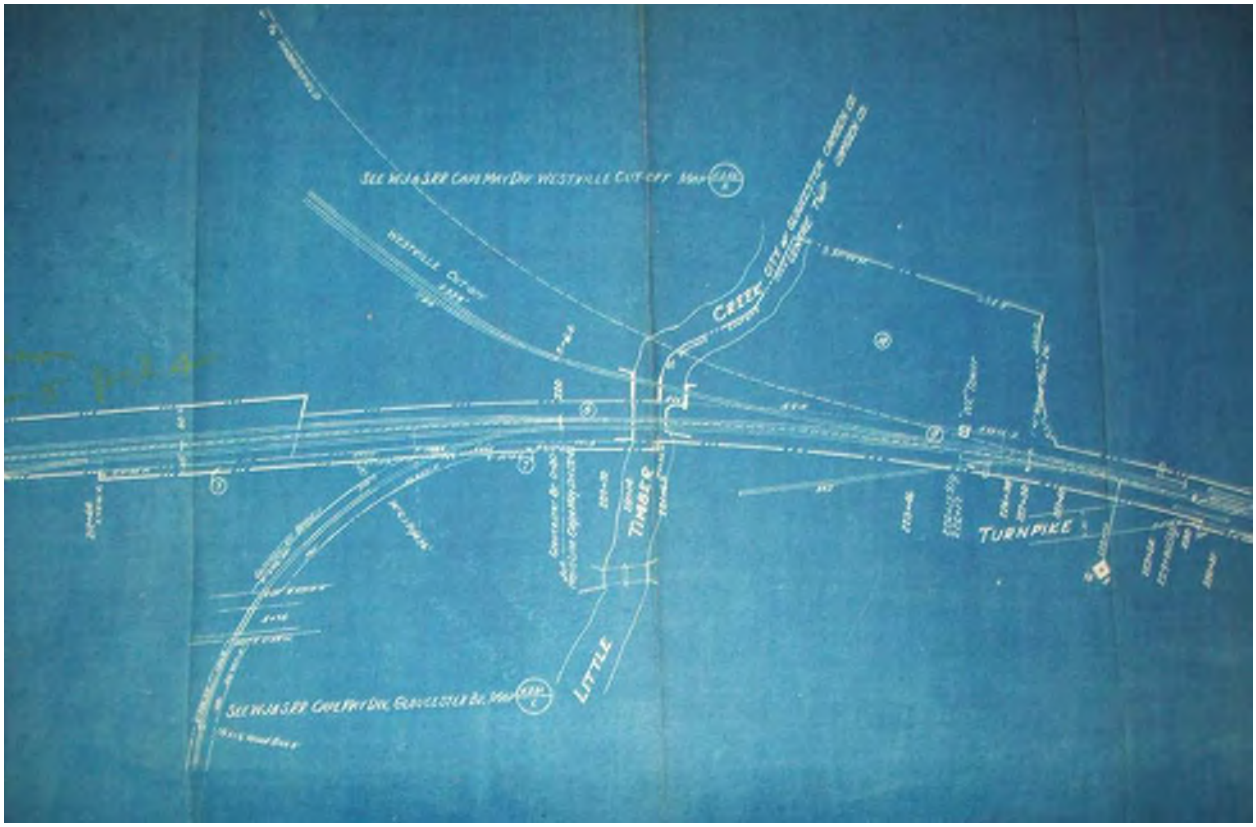

Figure 16C: Little Timber Creek (1916 West Jersey and Seashore Line ICC sheet V2.3/2, National Archives RG 134) and modern aerial view (Google Earth).

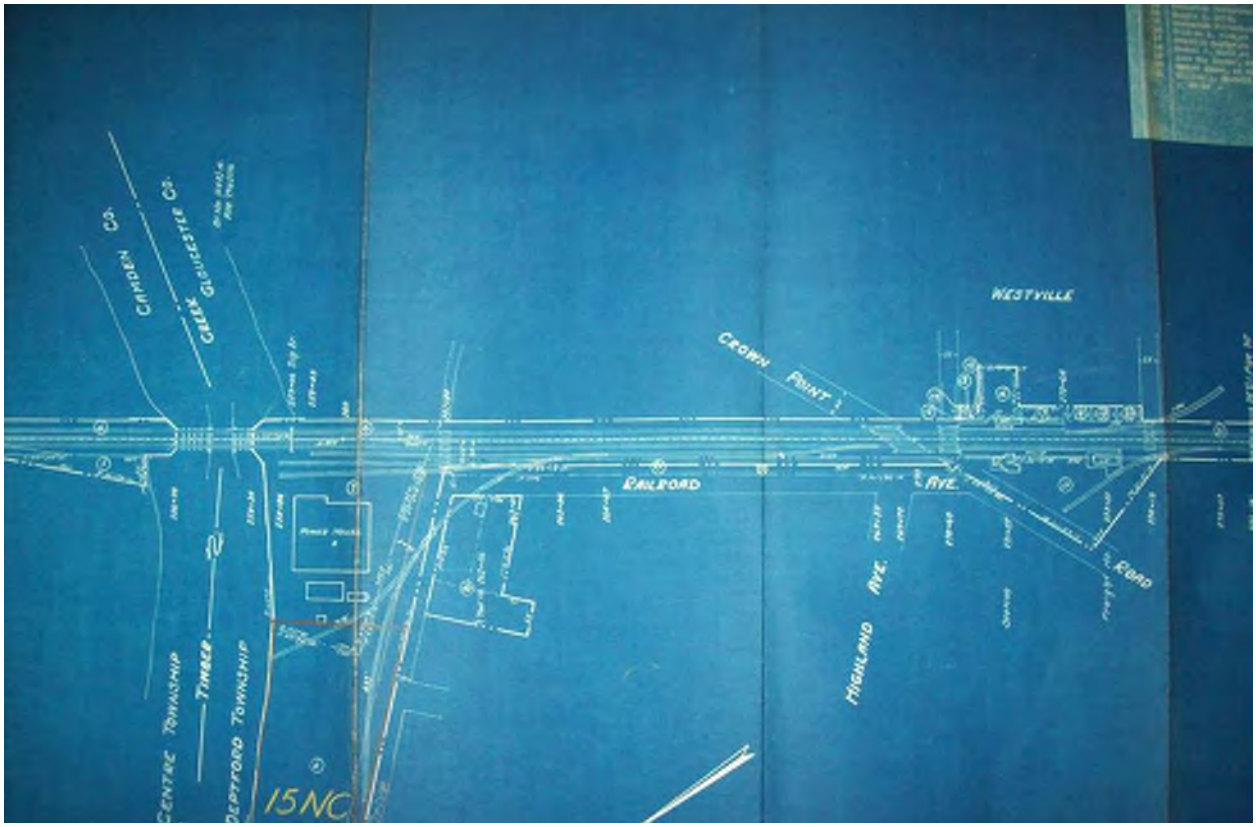

Figure 16D: Big Timber Creek (1916 West Jersey and Seashore Line ICC sheet V2.3/3, National Archives RG 134) and modern aerial view (Google Earth).

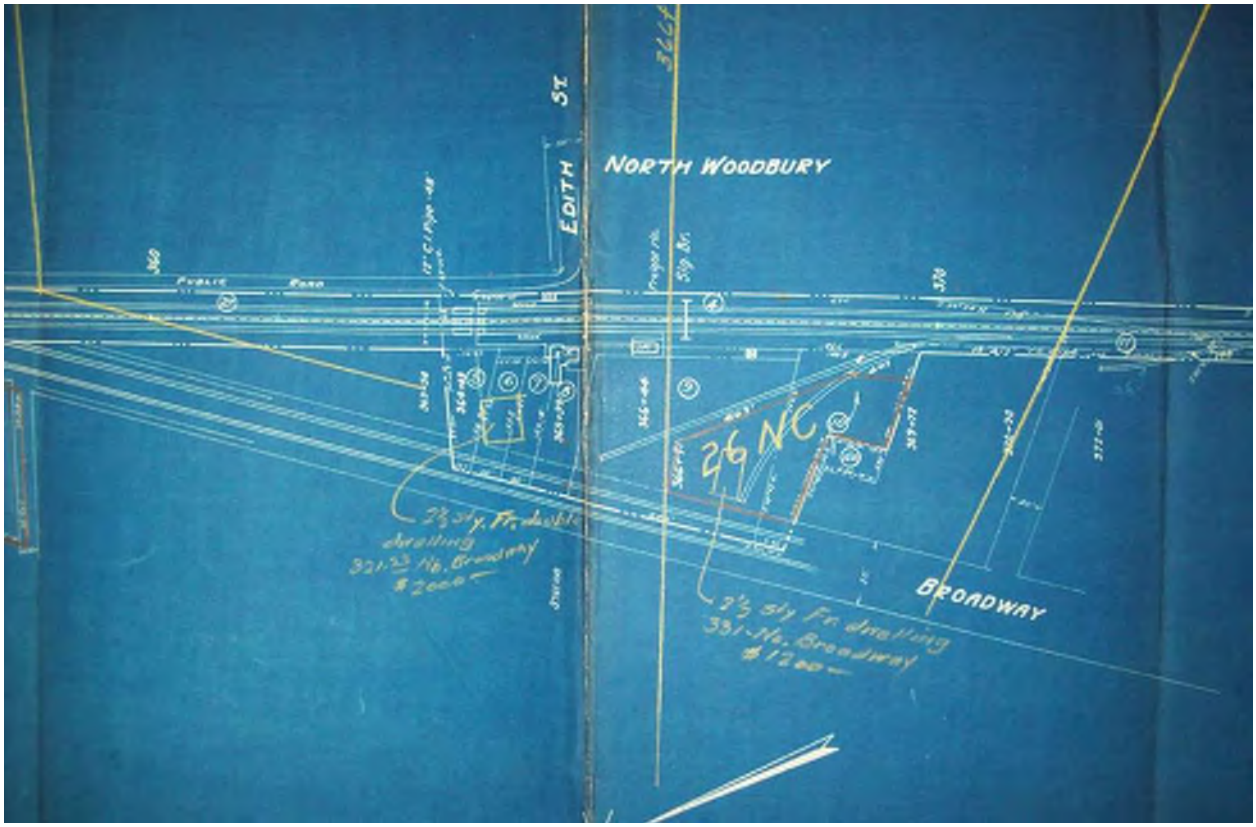

Figure 16E: North Woodbury (1916 West Jersey and Seashore Line ICC sheet V2.3/5, National Archives RG 134) and modern aerial view (Google Earth).

Figure 16F: Woodbury Station area south (1916 West Jersey and Seashore Line ICC sheet V2.3/5, National Archives RG 134) and modern aerial view (Google Earth).

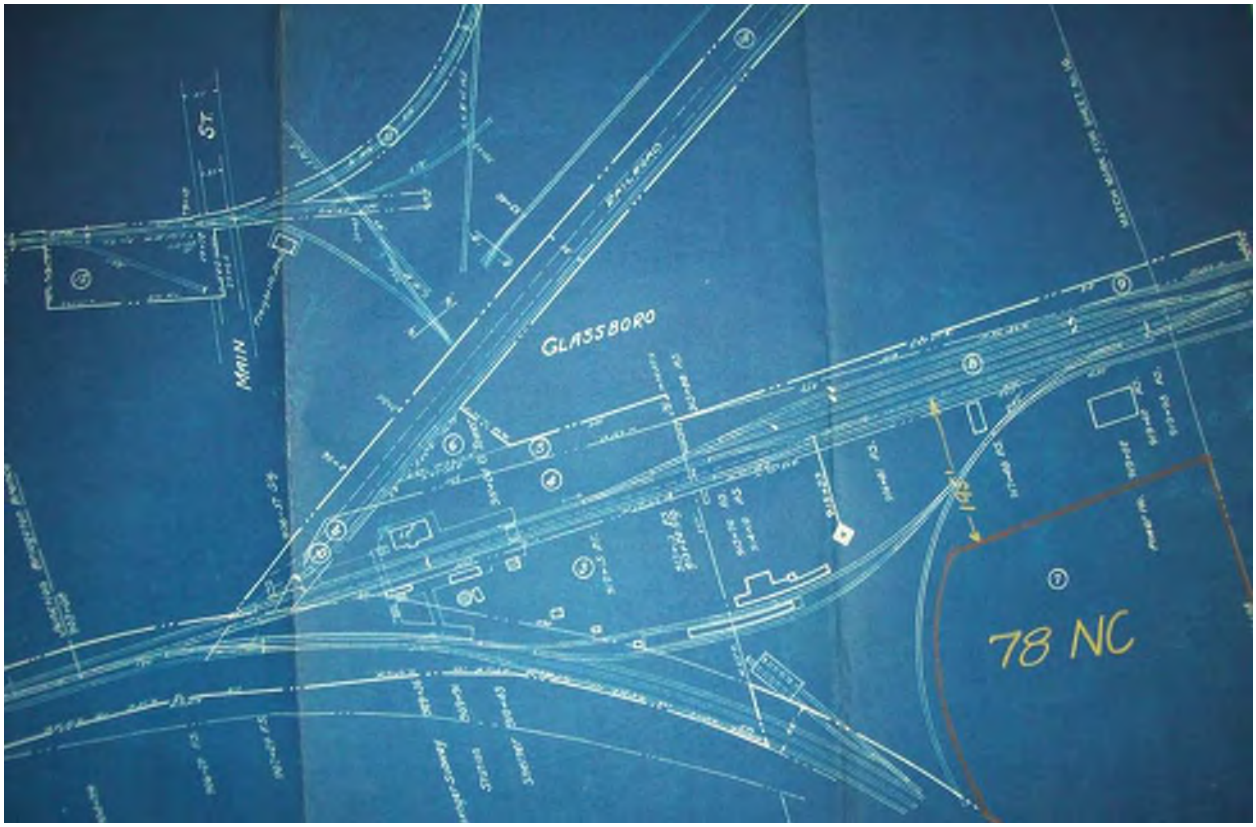

Figure 16G: Glassboro Railroad Avenue Station (1916 West Jersey and Seashore Line ICC sheet V2.3/15, National Archives RG 134) and modern aerial view (Google Earth).

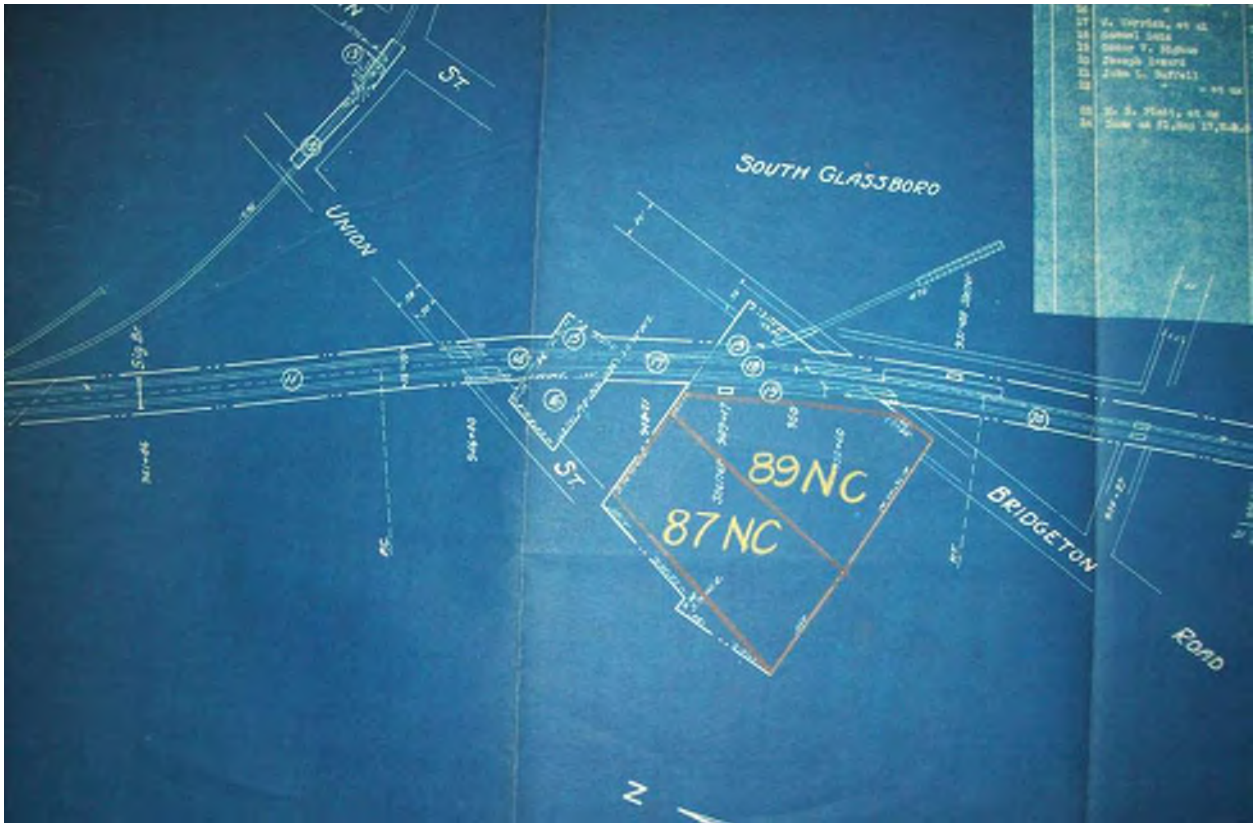

Figure 16H: South Glassboro branch across Union and Main streets (1916 West Jersey and Seashore Line ICC sheet V2.3/16, National Archives RG 134) and modern aerial view (Google Earth).

Figure 17
1922 Map of the City of Camden and Vicinity
Glassboro-Camden Line
Camden and Gloucester Counties, New Jersey

Source: http://www.prrths.com/newprr_files/newPRRResearch.htm

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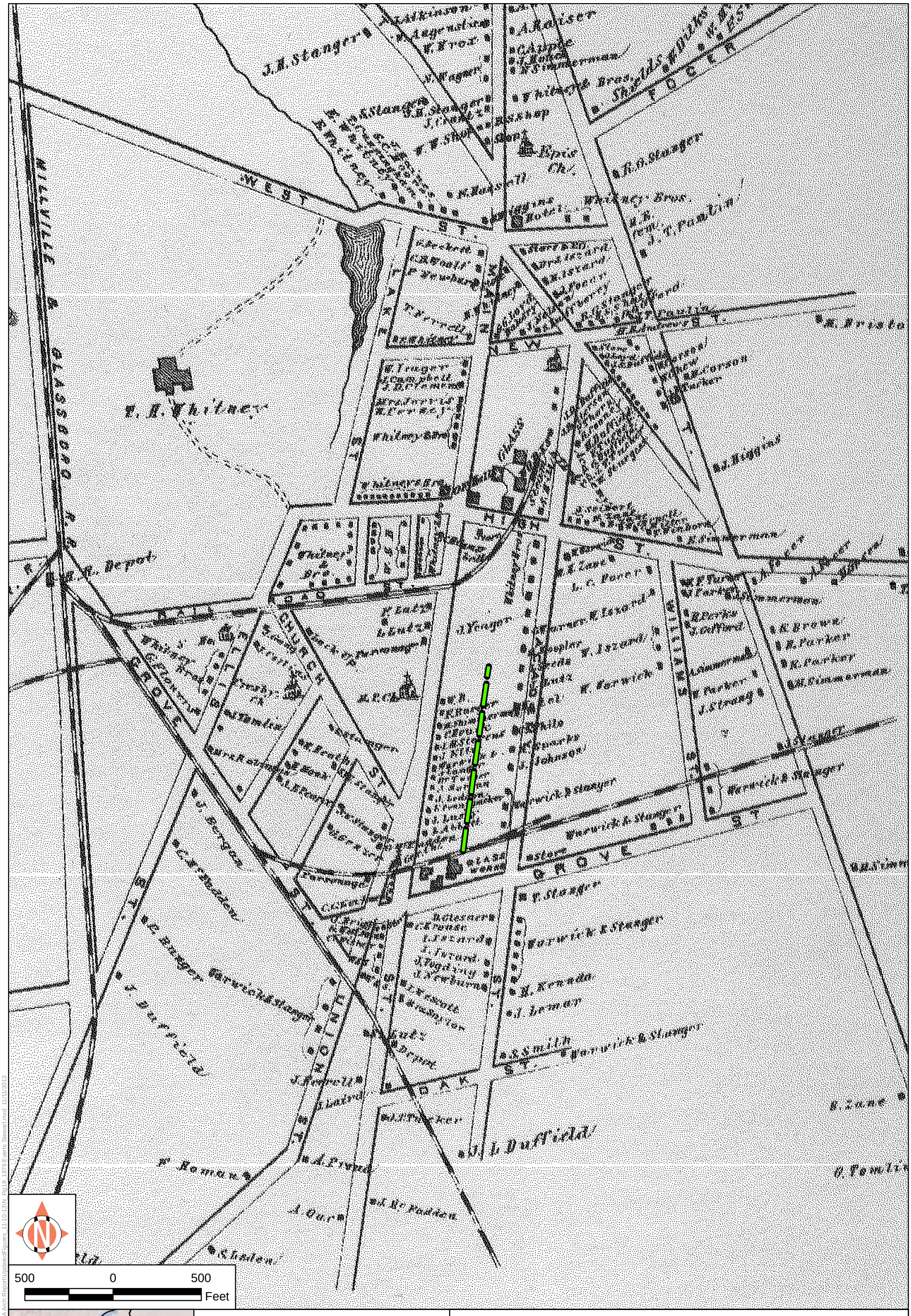

Figure 18
1876 Everts and Stewart Map of Glassboro
Glassboro-Camden Line
Camden and Gloucester Counties, New Jersey

Source: Combination Atlas of Salem & Glouchester Counties, New Jersey; Philadelphia

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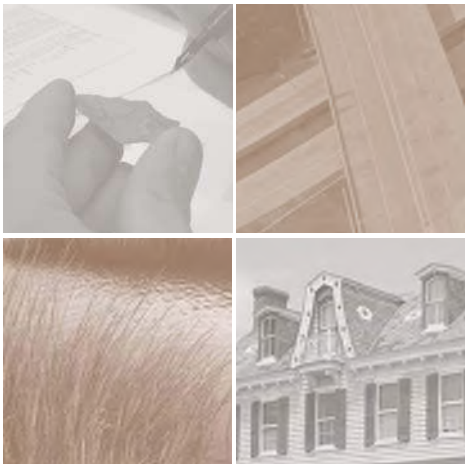

Phase IA Archaeological Addendum

Glassboro-Camden Line

Camden and Gloucester Counties, New Jersey

Submitted to:

New Jersey Department of Environmental Protection
Historic Preservation Office
Trenton, New Jersey

Prepared for:

STV, Inc.
1818 Market Street, Suite 1420
Philadelphia, Pennsylvania 19103

February 2014

Prepared by

A.D. MARBLE & COMPANY
Environmental, Cultural & Engineering Services

375 East Elm Street
Suite 101
Conshohocken, Pennsylvania
19428

DRAFT

PHASE IA ARCHAEOLOGICAL ADDENDUM

Glassboro-Camden Line

Camden and Gloucester Counties, New Jersey

Prepared for:

STV, Inc.
1818 Market Street, Suite 1410
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February 7, 2014

ABSTRACT

This report represents an addendum to the November 2013 Phase IA archaeological survey report conducted by A.D. Marble & Company for the proposed Glassboro-Camden Line (GCL) under consideration for construction in Gloucester and Camden counties, New Jersey. A.D. Marble & Company performed the survey in the summer of 2013 on behalf of the Federal Transit Administration (FTA; lead federal agency); and the Delaware River Port Authority (DRPA), the Port Authority Transit Corporation, and the New Jersey TRANSIT (local joint lead agencies). An Environmental Impact Statement (EIS) is being prepared in compliance with the National Environmental Policy Act of 1969 (NEPA). In addition, since the proposed project requires a United States Army Corps of Engineers (USACE) permit and may involve federal funding, the undertaking must comply with Section 106 of the National Historic Preservation Act of 1966 (as amended) and the implementing regulations (36 CFR 800) of the Advisory Council on Historic Preservation. GCL would provide an 18-mile expansion of transit service between Camden and Glassboro. The proposed GCL project corridor generally follows the existing Conrail right-of-way from Glassboro northward to Camden, passing through the communities of Glassboro, Pitman, Sewell, Mantua Township, Deptford Township, Wenonah, Woodbury Heights, Woodbury, Westville, Brooklawn, Gloucester City, and Camden.

This addendum has been prepared in response to agency comments received from the New Jersey State Historic Preservation Office (NJ HPO) in a December 2013 letter to the United States Department of Transportation (USDOT). The NJ HPO requested additional planning information and more detailed project mapping before evaluating recommendations offered in the Phase IA survey report. The addendum also provides an opportunity to present proposed design changes and project conditions as of February 2014.

Much of the project corridor will pass through areas with limited archaeological potential or would remain within the confines of the previously disturbed rail corridor. The rail corridor itself represents a resource of varying (but at times considerable) archaeological preservation, and has been evaluated both as an important industrial resource and an agent of disturbance. A spur line to a proposed vehicle maintenance facility (VMF) is currently planned in the southern portion of the former location of the Glassboro station at Railroad Avenue. This location contains numerous railroad features, and avoidance of this location during this and subsequent projects is strongly recommended. Phase IB archaeological survey is recommended for ten potential test areas (PTA) pending assessments of site integrity as well as radiological or other hazardous conditions at some of the areas. An alternative mitigation study is recommended in Camden from Wright Street south to Kaighns Avenue due to the proposed use of elevated track support structures with currently uncertain impact locations and narrow nature of the project corridor. An alternative mitigation may also be considered at the location of a proposed rail line extension into Glassboro parallel to Main Street.

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1.0 Introduction

1.0 INTRODUCTION

The following addendum report was prepared as a supplement to the Phase IA archaeological evaluation conducted by A.D. Marble & Company of Conshohocken, Pennsylvania, for a proposed light commuter rail project in southern New Jersey extending south from the City of Camden in Camden County to Glassboro in Gloucester County. The project is described as the Glassboro-Camden Line (GCL) Light Rail Project. The preparation of this Phase IA study was undertaken to fulfill requirements of Section 106 of the National Historic Preservation Act of 1966. This study was therefore both parallel to and separate from the National Environmental Policy Act of 1966 (NEPA) process but ultimately contributed to fulfillment of agency NEPA responsibilities.

The Phase IA archaeological survey report was submitted in November 2013. Agency comments were received in the form of a letter dated December 3, 2013, from Daniel Saunders, Deputy State Historic Preservation Officer of the New Jersey State Historic Preservation Office (NJ HPO), to Letitia Thompson of the United States Department of Transportation (USDOT; the Federal Transit Administration [FTA] is the lead federal agency for the project). The letter included the following comments:

> The Phase IA report includes valuable information to understand the previous historic and Native American land use within the project's area of potential effect (APE). The HPO agrees with the background research and the general sensitivity outlined in the report. However, due to the preliminary nature of project plans, it is not possible to fully assess the potential to encounter archaeological resources throughout the APE. *Therefore, the HPO cannot concur with the need or lack of need for additional archaeological survey within portions of the APE at this time based on the lack of detailed project plans. Once plans for the construction of the light rail are fully developed, the HPO will be better able to provide guidance on the need for any further survey* [emphasis in original].

A follow-up phone conference on December 19, 2013, involved representatives of A.D. Marble & Company, STV Corporation, and Vincent Maresca and Caroline Scott of the NJ HPO. The conference consisted of a discussion of project plans as of that date and enabled Mr. Maresca and Ms. Scott to define the nature of the desired additional data. At the request of the HPO, the project limit of disturbance (LOD) has been presented on aerial photography map sheets adapted from the historic resources report prepared by A.D. Marble & Company for the same project. The overall LOD has been refined and permanent and temporary construction-related impacts were further developed since the

discussions in December. The LODs for both permanent and temporary (construction-related) impacts have been combined to form the archaeological Area of Potential Effects (APE) presented on the enclosed figures. The map sheets are included herein as Figure 1, Map Sheets 1 to 13. Permanent and temporary LODs have been refined since the November and December meetings. As a consequence, various potential test areas (PTAs) are indicated on Figure 1. These various PTAs are also discussed in greater detail later in this section.

Additional figures are included to amplify the analysis of project impacts, particularly at the northern end of the APE in Camden. These figures primarily consist of Sanborn Insurance Company maps dated 1891 and 1906 that illustrate the project corridor south from Bridge Avenue (modern-day Dr. Martin Luther King, Jr., Boulevard) to Atlantic Avenue (Figures 2 to 9). A separate 1891 Sanborn Map (Figure 10) illustrates the proposed location of the South Camden Station; two proposed parking lots west of the tracks between Van Hook Street and Jackson Street are currently under consideration.

Two maps examine archaeological impacts in Glassboro at the opposite end of the corridor. A detail of the 1916 Interstate Commerce Commission (ICC) valuation map for the former Railroad Avenue Station is provided as an overlay on a modern aerial photograph (Figure 11). The composite figure also illustrates the proposed course of a new spur track that will connect with a Vehicle Maintenance Facility (VMF) along Sewell Street to the south. The proposed alignment of a track into the center of Glassboro parallel to Main Street is shown on the 1876 Everts and Stewart Map of Glassboro (Figure 12).

1.1 Project Description

The GCL Light Rail Project is a proposed 18-mile expansion of transit service in southern New Jersey that would traverse 11 communities between Camden (Camden County) and Glassboro (Gloucester County): Camden, Gloucester City, Brooklawn, Westville, Woodbury, Woodbury Heights, Wenonah, Deptford Township, Mantua Township, Pitman, and Glassboro. The proposed project would provide 14 new transit stations, including 12 walk-up stations and two park-and-ride facilities.

The proposed GCL would restore passenger rail service primarily along the existing Conrail freight corridor between Camden and Glassboro. The northern end of the corridor would share tracks with the existing New Jersey TRANSIT RiverLINE from the Camden waterfront through the Walter Rand Transportation Center (WRTC) in downtown Camden. The GCL would operate as its own service from

WRTC south to Glassboro. The proposed project would use diesel-powered light rail vehicles similar to the RiverLINE and would be designed to provide two tracks for light rail use: one for northbound and one for southbound service. In general, this service would operate at-grade, but some portions would be elevated to pass over existing roads and waterways. Gated crossings would be used for at-grade crossings along the Conrail freight corridor. The GCL would operate within an urban environment along and within existing streets and roads at the northern end of the proposed alignment.

The GCL service would leave the WRTC on the existing in-street RiverLINE alignment along a portion of Dr. Martin Luther King Boulevard. The line would be elevated from Haddon Avenue near Cooper Hospital south to Cherry Street. Initially, the line would be carried on an aerial structure consisting of tracks supported on piers. The elevated structure would curve southward and continue adjacent to Interstate 676 (I-676), running roughly along modern-day 9th Street. The line would be supported by a filled embankment retained within vertical walls from Pine Street south to Cherry Street. The embanked portion of the line would be carried over cross streets by newly constructed bridges. The line at Atlantic Avenue would encounter or lie closely parallel to the historic route of the Woodbury and Camden Railroad, which was later known as the West Jersey and Seashore Railroad.

The proposed alignment would become elevated on piers again in South Camden from south of Jackson Street to north of Morgan Boulevard near an interchange with I-676. The proposed alignment would then return to grade and shift to the Conrail right-of-way along the east side of the existing freight track between Morgan Boulevard and Newton Creek. The alignment would then continue east of, and parallel to, the existing freight track on two new light rail tracks at-grade to Woodbury City.

En route to Woodbury City, the proposed GCL alignment would cross over Newton Creek and pass beneath Interstate 76 (I-76)/Walt Whitman Bridge. The proposed alignment would traverse Gloucester City, cross Little Timber Creek, extend through Brooklawn Borough, cross Big Timber Creek, and enter into Westville Borough. The proposed GCL alignment would then cross beneath Interstate 295 (I-295) and cross over Red Bank Avenue and Woodbury Creek as it continues to Woodbury City. South of Woodbury City, the proposed GCL alignment would continue at-grade to Glassboro Borough on two tracks made up of the existing freight track and a new track, which would be generally centered in the existing freight railroad right-of-way. En route to Glassboro Borough from Woodbury City, the proposed GCL alignment would cross beneath the New Jersey Turnpike through Woodbury Heights Borough,

continue through Wenonah Borough and Mantua Township, then cross over New Jersey Route 55 (NJ Route 55) and enter Pitman Borough. South of Pitman Borough, the proposed GCL alignment would enter Glassboro Borough and continue adjacent to Rowan University as it crosses S.R. 0322. The southern segment of the proposed alignment in Glassboro Borough would follow a new right-of-way, diverge from the existing freight track at Zane Street, cross Union and Main streets, continue northward within a former rail spur between and parallel to Main and Academy streets, and terminate south of High Street in Downtown Glassboro.

Fourteen potential new stations have been identified, namely:

- Two stations in Camden City (Cooper Hospital Station and South Camden Station);
- One station in Gloucester City (Gloucester City Station);
- One station in Westville Borough (Crown Point Road Station);
- Two stations in Woodbury City (Red Bank Avenue Station and Woodbury Station);
- One station in Woodbury Heights Borough (Woodbury Heights Station);
- One station in Wenonah Borough (Wenonah Station);
- Three stations in Mantua Township (Mantua Boulevard Station, Sewell Station, and Mantua Pitman Station);
- One station in Pitman Borough (Pitman Station); and,
- Two stations in Glassboro Borough (Rowan University Station and Glassboro Station).

As noted, 12 of the 14 stations would be walk-up stations, with the South Camden, Crown Point Road, Mantua Boulevard and the Mantua/Pitman stations proposed to include park-and-ride facilities. With the exception of the Cooper Hospital Station, South Camden Station, and Red Bank Avenue Station, stations would be located at existing ground level. Stations would be configured with center platforms, primarily from Woodbury City north, and side platforms, primarily south of Woodbury City. Platforms would be approximately 280 feet long to accommodate a two-car train. All stations would include facilities for bicyclists and pedestrians, including bike racks, sidewalks, and crosswalks. The proposed project would also include connections to the regional bus system. Ancillary facilities such as signal houses and crossing cases, as well as a maintenance and storage facility, would also be constructed. The maintenance and storage facility would be a full-service maintenance facility capable of providing the GCL project's needs for regular preventative and unscheduled corrective vehicle maintenance and

maintenance-of-way equipment. Two potential locations for the VMF, both in Gloucester County, are currently under evaluation: one in Woodbury Heights and one along Sewell Street in Glassboro. It should be noted that the Sewell Street location was proposed after the Phase IA archaeological survey report was submitted and replaces a location further to the south that is no longer under consideration. Two proposed parking facility locations are also included in this project. Both locations are in Camden City and are currently under evaluation for development of a 200-car surface parking lot near the proposed South Camden Station. The relocation of a belowground gas pipeline for south of Chelton Avenue in Camden City to south of Somerset Street in Gloucester City has been added to the project.

Proposed roadway improvements associated with the project include: construction along S. Railroad Avenue in Gloucester City; roadway and sidewalk construction at the intersection of Washington and Park avenues in Woodbury City; roadway widening along Tylers Mill Road in Mantua Township; and roadway and intersection improvements at Mullica Hill Road/S.R. 0322 in Glassboro Borough. Proposed off-corridor roadway improvements are proposed at the intersection of Cooper and Evergreen avenues in Woodbury City, and widening for traffic mitigation is proposed at the intersection of Main Street and Tylers Mill Road in Mantua Township.

Since the proposed project requires a United States Army Corps of Engineers (USACE) permit, the project must comply with Section 106 of the National Historic Preservation Act 1966 (as amended), and the implementing regulations (36 CFR 800) of the Advisory Council on Historic Preservation. This Phase I survey was performed in compliance with the Secretary of the Interior's Standards and Guidelines; Section 106 of The National Historic Preservation Act of 1966, as amended; the Procedures for the Protection of Historic and Cultural Properties set forth in 36 CFR 800, as amended; 23 CFR 771, as amended; guidance published by the Advisory Council on Historic Preservation (ACHP); Sections 1(3) and 2(b) of Executive Order 11593; and NEPA

Brooke Blades and Richard White prepared the Phase IA addendum with considerable graphic assistance from Abby Finkenbinder and Frank Dunsmore. A. D. Marble and Company wishes to extend its appreciation to the various archives and websites from which historical maps were obtained, and especially to Andrew and the other staff members in the Cartography Department of the National Archives in College Park, Maryland, for their assistance with the 1916 ICC valuation maps.

2.0 Phase IA Evaluation and Recommendations

2.0 PHASE IA EVALUATION AND RECOMMENDATIONS

This section has been adapted from the earlier Phase IA archaeological survey report in response to more detailed project data and some changes in project plans. The various geographic segments of the proposed GCL project are assessed from the standpoint of potential project impact, archaeological potential, and any recommendations for additional study. Several PTAs are proposed, and each is evaluated in the relevant geographic section.

2.1 Camden to South Camden

Camden north of WRTC (Figure 1, Map Sheet 1; Figures 2 to 9): North of the WRTC, the project will utilize existing tracks installed for the RiverLINE project and will have no impact on cultural deposits. The proposed rail line corridor extends east and south from the WRTC along Dr. Martin Luther King, Jr., Boulevard (former Bridge Avenue) along a former rail corridor opened by the Camden and Amboy Railroad in the early nineteenth century. The APE has been slightly expanded at the WRTC to facilitate the addition of a third track and an additional platform. The corridor will cross Haddon Avenue and diverge from the former track location at 7th Street (Figure 2). A northward loop will carry the corridor through a triangular block south of the former Carman Street; the corridor then turns southward across the former Bridge Avenue into areas marked as "Vacant beyond" on an 1891 Sanborn Map (Figure 3). The GCL tracks will be carried on an aerial structure supported by piers opposite Cooper Hospital and southward adjacent to I-676. An addition to the APE includes a bumpout south of Newton Avenue near the proposed station location (Figure 4), where a proposed parking structure will require the acquisition of Triangle Park in Camden. Several residences stood at this location during the early twentieth century (Figure 5). However, the buildings were likely demolished during the construction of I-676.

Camden block between Carman Street and former Bridge Avenue (Figure 1, Map Sheet 1): **PTA 1** consists of portions of the block bounded by 7th Street (west), former Carman Street (north), and former Bridge Avenue (south). The block lies south of Federal and Market streets, which were laid out in the original town grid in the early nineteenth century. The 1891 Sanborn Map (Figure 3) indicated a series of rowhouses two stories in height facing northward onto Carman Street. Some of the houses had rear ells two stories or one story in height, while others had only narrow one-story additions. The map shows a water main 4 inches in diameter beneath Carman Street, suggesting the houses may have benefited from piped water. The narrow one-story additions may have been rear porches. The destruction date for

these houses is unclear. Phase IB field survey is recommended at this location, provided the demolition of the houses did not severely impact the subterranean deposits on the block. If Phase IB investigations reveal subsurface features of potential interest, mechanical soil removal by backhoe may be employed to facilitate field survey investigations.

Camden Wright Street South to Kaighns Avenue (Figure 1, Map Sheet 1): South of Bridge Avenue, the corridor is carried on the pier-supported aerial structure along the west side of I-676. As indicated on a Sanborn Map of 1906 (Figure 4), the corridor will cross Wright Avenue and extend across former rowhouse locations along Carteret Street to Newton Avenue. The corridor passes through former residential blocks between Haddon and Trenton avenues down to Line Street (Figure 5). At this point, the corridor lies slightly east of 9th Street and crosses Pine, Division, and Spruce streets (Figure 6). The GCL rail corridor south of Pine Street to Cherry Street (Figure 7) will be supported on a filled embankment.

Presently, a narrow strip of ground survives between 9th Street to the west and the embankment for I-676 to the west from Line Street south to Mt. Vernon Street (Figure 1, Map Sheet 1; and Figures 6 and 7). Dwellings clearly stood along these streets in the early twentieth century, and these structures may have been demolished during the construction of I-676. The narrow strip of land at the base of the highway embankment will be very difficult to examine; therefore, it is recommended that alternative mitigation be undertaken for the residential blocks from Wright Street down to Kaighns Avenue, perhaps focusing on the social and economic histories of the development of the blocks in question.

The corridor follows the westward bend of I-676 from Mt. Vernon Street to Kaighns Avenue at 8th Street. Housing development was somewhat less dense here in the late nineteenth and early twentieth centuries, although the blocks south of Mt. Vernon and Chestnut streets were occupied (Figures 7 and 8). The corridor extends southwestward through an area that is currently largely open south of Kaighns Avenue to the modern-day junction of 7th Street and Atlantic Avenue. The former location of 7th Street lay to the east of the current location. The 1891 Sanborn Map (Figure 9) indicates that the GCL corridor passes through residential areas and the former site of Farr and Bailey, a firm that manufactured floor oil cloths. An abandoned industrial building stands south of Kaighns Avenue (Figure 1, Map Sheet 1). The construction of this building and the demolition occasioned by the creation of I-676 impacted the

location to a considerable extent, and it is recommended that no additional investigations be undertaken at this location.

2.2 South Camden to Newton Creek

Camden Ferry Avenue south to Newton Creek (Figure 1, Map Sheet 2): The corridor, south of Atlantic Avenue, extends southward on or close to the original route of the Woodbury and Camden Railroad, which operated under different names in the twentieth century. The GCL line becomes an aerial structure supported on piers south of Jackson Street to north of Morgan Boulevard. The South Camden Station is proposed north of Ferry Avenue with an adjacent parking area in the block to the west. An 1891 Sanborn Map (Figure 10) of this location indicates a partially occupied block with houses facing westward to 6th Street, eastward to the rail tracks along Railroad Avenue, and southward onto Ferry Avenue. The location is currently largely open, although some houses are standing (Figure 1, Map Sheet 2). The APE has been expanded to include minor road improvements at Chelten Avenue for the construction of an access road, the relocation of an underground gas utility line, and two proposed parking lot locations.

West of the GCl alignment, project activities include the relocation of a belowground gas pipeline from south of Chelton Avenue in Camden City to south of Somerset Street in Gloucester City. The pipeline will be primarily constructed within public rights-of-way (S. 6th Street and West Railroad Avenue). The APE was expanded to reflect the proposed pipeline alignment and potential impact areas (Figure 1, Map Sheets 2 and 3).

The APE was revised to reflect two locations currently under evaluation for the development of a 200-car surface parking lot near the proposed South Camden Station (Figure 1, Map Sheet 2). One proposed location for the parking lot is north of Van Hook Street/Carl Miller Boulevard and south of Jackson Street, immediately west of the GCL alignment. The second is north of Ferry Avenue and south of Van Hook Street/Carl Miller Boulevard, immediately west of the proposed alignment.

South Camden Station parking lot 6th Street and Van Hook Street (Figure 1, Map Sheet 2): **PTA 2N** will focus on the proposed location of the parking lot north of Van Hook Street/Carl Miller Boulevard and east of 6th Street if plans for the lot continue to be considered. The Sanborn Map suggests the parking lot would be placed over former residences fronting Railroad Avenue and portions of backyards of

residences fronting south 6th Street. The southern extent of the proposed location would be located over the former Cottrell & Wolfenden Hosiery Manufacturers (Figure 10). Buildings located on this lot in 1891 included a processing, storage, finishing and knitting house; and a dye house with a dryer and steam room. The dye house appears to have been covered by asbestos. Testing at the location may be problematic due to hazardous waste issues related to the manufacturing of hosiery, particularly at the location of the dye house.

South Camden Station parking lot 6th Street and Ferry Avenue (Figure 1, Map Sheet 2): **PTA 2S** will focus on the proposed location of the parking lot north of Ferry Avenue and east of 6th Street if plans for the lot continue to be considered. The Sanborn Map suggests that the parking lot would be placed above the rear yards of houses along Ferry Avenue and 6th Street and on the sites of dwellings that once faced the rail tracks. Water pipes extended beneath 6th Street and Ferry Avenue, so these houses may have had piped water.

As was the case with PTA 1, it is recommended that geophysical investigations emphasizing GPR be employed to isolate features of potential interest within the outline of the proposed parking lot. Mechanical trenches may be used to examine any features of interest and to examine the nature of soil stratigraphy in the former dwelling yards. One factor that may affect testing would be any potential radiological hazard at this location (see PTA 3 for further explanation).

South Camden adjacent to Morgan Street interchange (Figure 1, Map Sheet 3): **PTA 3** is located adjacent to I-676 and north of an exit ramp down to Morgan Boulevard. Previous excavations at the diagonally opposite quarter of the interchange to the southeast (Mounier 1976), which were conducted prior to construction of the highway, revealed intact stratigraphy containing evidence of a precontact site (28-Ca-22) near Newton Creek. For planning purposes, a potential test area 70 feet wide (width of LOD) and 300 feet long in the northwest quarter is proposed. Two factors would eliminate the need for testing at this location. If it is determined that construction of the interchange resulted in ground disturbance of sufficient magnitude to eliminate intact stratigraphy, the investigations would be either halted in the field or not undertaken. The second factor relates to the radiological hazards in this portion of Camden due to a gas mantle manufactory (Malcolm Pirnie 1998). Indeed, one of the locations proposed in early GCL planning as a possible VMF (i.e., the southeast side of Newton Creek) was identified as an area with a radiological hazard. If such environmental hazards exist or potentially exist near the Morgan Street

interchange, the proposed testing in PTA 3 will not be undertaken. Such a consideration will also apply to the potential test area PTA 2 at the South Camden Station.

2.3 Newton Creek and Gloucester to Little Timber Creek

Newton Creek into Gloucester (Figure 1, Map Sheet 2): The crossing of Newton Creek occurs in an area that was tidal marsh into the late nineteenth century. The rail corridor was obviously elevated and carried across the creek on a low bridge. The land north and south of the creek is currently covered with fill. The APE has been expanded at this location to cover bridge construction and staging. No archaeological deposits are indicated at this location, and no additional survey activities are recommended.

Gloucester Station area (Figure 1, Map Sheet 3): Extensive modern development is indicated at the location of the historic station; the station building has been adapted as a restaurant. The proposed development of the station would occur slightly north of Monmouth Street, while the historic location lay south of Monmouth Street. Since the proposed station would consist of a platform between the two light rail tracks (currently to be placed east of the existing freight line), no impact to surviving archaeological deposits is anticipated, as the rail corridor has remained in service since its creation in the second quarter of the nineteenth century. The continual use of the rail line has most likely eradicated evidence of railroad track features such as switches and signal towers that were documented on the 1916 ICC maps, just as those early-twentieth-century features had eliminated earlier ones. Proposed roadway improvements along S. Railroad Avenue between approximately Monmouth Street and Somerset Street will provide an alleyway between Paul Street and Chambers Street, as well as maintain the flow of traffic through Gloucester City. The APE was expanded in this area (Figure 1, Map Sheet 3). The work will occur within the public works right-of-way. Additional roadway and intersection improvements are proposed at the S.R. 0130 Intersection.

Gloucester to Little Timber Creek (Figure 1, Map Sheet 4): As was the case with Newton Creek, the land on both sides of Little Timber Creek was low-lying tidal marsh that is currently covered by fill. Expansion of the APE to include an area for the removal of an old pier, bridge construction, and staging is proposed at the Little Timber Creek crossing. The archaeological potential in such areas is considered to be low to non-existent, and no further survey is recommended.

2.4 Brooklawn to Big Timber Creek and Westville

Brooklawn to Big Timber Creek (Figure 1, Map Sheet 4): Much of the land on the north side of Big Timber Creek, particularly to the west between the railroad and the Delaware River, is low-lying tidal marsh. The rail line crossed the creek onto higher ground on the south side at Westville. The southeast corner was indicated as low-lying on the 1848 United States for the Coast and Geodetic Survey (USC&GS) map; it is currently covered with fill and occupied by an apparent salvage/storage yard and restaurant. The southwest corner was higher ground but was occupied in the early twentieth century by a railroad power house. The APE has been expanded at this location for bridge construction and staging. No archaeological potential is considered to exist in the current or former low-lying marshes. Despite the expansion of the APE, no impact to the site of the power house is anticipated at this section of the corridor.

Westville Station area (new Crown Point Road Station; Figure 1, Map Sheet 4): The historic station at Westville was located south of the junction of Crown Point Road with the rail line. The new station would be constructed further south of Crown Point Road in a highly urbanized area. The proposed location is south of the historic site of the Westville Flint Glass Works, but the development impact in such an urbanized zone is likely to be minimal.

PTA 4 lies on the east side of the proposed corridor at the Crown Point Road Station. The area measures roughly 460 by 310 feet and extends from the corridor east to Broadway Street. Project plans propose a parking area development associated with the station. Much of the eastern and southern portions of the area are covered with asphalt, and an automobile service station stands on the property. Additional evaluation will be undertaken and Phase IB investigations are recommended if the location possesses sufficient integrity to contain archaeological resources of interest.

2.5 Woodbury and Woodbury Heights

Former North Woodbury Station (abandoned; Figure 1, Map Sheet 6): The former North Woodbury Station was located between Broadway Street on the west side and Edith Street (modern Station Drive) on the east-side of the tracks. The area is currently covered with modern development and no additional impacts from the project are anticipated, as this location would not be utilized for a modern station; therefore, no further survey or study is required (Figure 1, Map Sheet 6; note that Map Sheet 5 is not used in this analysis).

Red Bank Avenue Station in Woodbury (Figure 1, Map Sheet 6): A new station is proposed south of Red Bank Avenue and north of the former position of Woodbury Creek, currently impounded in lakes. The station would be located between an existing strip mall (east) and commercial pharmacy building and electrical transformer (west). Although the location is currently extensively developed, the landform indicated on the 1891 United States Geological Survey (USGS) map would have been an elevated south-facing point of land above wetlands on the north side of Woodbury Creek. Such a location would be considered highly favorable for precontact occupation. The proposed station developments along the tracks are minimal, consisting primarily of a platform between the tracks and some landscaping with a slight widening of the LOD to the east. No further investigations are recommended. Roadway widening and a sidewalk are proposed along Red Bank Avenue; however, this does not change the recommendation of additional work, as the impacts will fall within heavily developed portions of the APE (Figure 1, Map Sheet 6).

Woodbury Station area (Figure 1, Map Sheet 6): The historic rail station in Woodbury was located south of Cooper Street; the station building remains standing and is currently utilized as a restaurant. The proposed station would be located immediately to the south of the station building but within the confines of the historic station area. The proposed station, consisting of a platform between the light rail tracks adjacent to the freight line and sidewalks, would straddle Center Street. The location in 1916 was occupied by six tracks: three through tracks and three sidings on the west side (ICC Valuation 1916). No substantial impact to the station area is anticipated from the proposed development, and no additional survey or study is recommended.

Woodbury Heights Station (Figure 1, Map Sheet 7): A new station is proposed along West Jersey Avenue at Linden and Beech avenues in the Borough of Woodbury Heights. The location is comparatively undeveloped, but plans propose limited development, specifically a platform between the light rail tracks with some landscaping and limited parking along the west side. No additional study or survey is recommended at this location.

Woodbury Heights VMF (proposed; Figure 1, Map Sheet 7): A railroad VMF is under consideration along the tracks within the township. The area would include 18.2 acres, measuring between 1,400 and 1,750 feet in length north-south and roughly 525 feet in width. Much of the proposed area was impacted by the construction of a rectangular warehouse structure ca. 1960 that was recently demolished. The rail

corridor within the township crosses a flat upland above and west of a north-flowing tributary of Woodbury Creek. Although no archaeological sites have been previously recorded in the vicinity, the wooded northern portion (roughly one-quarter) of the proposed maintenance area would require Phase IB archaeological testing (**PTA 5**).

2.6 Wenonah and Mantua Boulevard

Monongahela Brook crossing north of Wenonah (Figure 1, Map Sheet 8): The rail line crosses an existing bridge or viaduct over Monongahela Brook. The location is relatively open at present. The specific impact of the project (i.e., whether the bridge would be replaced or expanded) is unknown. Since the brook appears to be impounded and enlarged, it is unlikely that any archaeological deposits would be accessible, and therefore no additional survey or study is recommended.

Wenonah Station area (Figure 1, Map Sheet 8): The historic station of Wenonah was located between Poplar and Mantua avenues; the station building remains standing and currently serves as the community center. The proposed redeveloped station would extend northward from the station building past East Poplar Street. Platforms would be constructed on the outside of the light rail tracks. The new station area would be landscaped and would utilize existing parking areas. The LOD will extend from the GCL alignment to the edge of East and West avenues on their respective sides of the tracks. This construction would have limited impact on archaeological resources, and no further investigations are recommended.

Mantua Creek crossings south of Wenonah (Figure 1, Map Sheet 9): The rail line crosses a branch of Mantua Creek and the main channel of the creek between Wenonah and Sewell. The 1891 USGS map indicates that both crossings occur within deeply incised valleys. A recorded precontact site, 28-Gl-150, is located on an upland flat between the two creeks east of the rail corridor. The rail line formerly crossed the main creek over a brick arch bridge that was probably constructed in the mid-nineteenth century when the railroad was extended south from Woodbury to Glassboro. However, this brick arch bridge was apparently replaced within the recent past. Current options for this project include the placement of a new bridge to either side of the current crossing. No decisions have been made regarding which side would be used. The current APE provides for either decision and includes space for construction, access, and staging. No additional study or survey is recommended at this location.

Mantua Boulevard Station area (Figure 1, Map Sheet 9): A new station is proposed along the west-side of the rail line immediately north of the junction with Mantua Boulevard. The proposed area is located in an agricultural field currently planted in soybeans behind a modern commercial building. The proposed station includes a parking lot for approximately 250 cars between the commercial building and the rail line. The triangular parking lot measures roughly 510 by 550 by 750 feet.

A recorded precontact site, 28-Gl-150, was located on a similar landform on the opposite side of Mantua Creek, and an isolated precontact artifact was recorded in the early twentieth century to the north. Geomorphological investigations conducted by Dan Wagner revealed an Ap-horizon plowzone over a sandy E-horizon and underlying sandy Bt-horizon subsoil. The 1962 soils manual for Gloucester County mapped the portion of the field near the road and railroad as a former sand and gravel pit (United States Department of Agriculture [USDA] 1962). The archaeological potential would appear to be confined to the Ap-horizon. Phase IB survey testing is recommended at the proposed parking lot (**PTA 6**).

2.7 Sewell to Pitman

Sewell Station area (Figure 1, Map Sheet 9): The historic location of Sewell Station extends from Sussex Avenue past Essex Avenue to Center Street. The station building still stands near the tracks at the northwest corner of Center Street. The proposed new station platforms would extend along the light rail tracks from Sussex to Essex avenues, with landscaping from Center Street to north of Sussex Avenue. The proposed development would apparently result in limited disturbance to most potential railroad features.

However, **PTA 7** is located on the east-side of the tracks at the site of a “Freight Ho.” on the 1916 ICC Valuation map of Sewell Station. Numerous stations remain standing along the GCL corridor, but no surviving freight houses have yet been identified. A limited Phase IB survey investigation is recommended to determine if the outline of the freight house may still survive and be recorded. Geophysical investigations may be useful in defining the foundation, but such a structure may have left a limited architectural outline in the ground.

Mantua/Pitman Station along Tylers Mill Road (Figure 1, Map Sheet 10): A new station is proposed along the west-side of the tracks south of the crossing of Tylers Mill Road. The station would include platforms adjacent to the tracks and a parking lot for approximately 450 cars measuring roughly 490 by 600 feet

extending west along the road. An early-twentieth-century house was demolished by the owner in the late summer or early fall of 2013, and a new metal barn was constructed on the location. The demolition and subsequent construction activities have impacted any potential archaeological resources on the site. The 1916 ICC map of the location indicated that the railroad was placed within a cut ravine that is still visible today. Some of the earth displaced by this cut may have been placed along Tylers Mill Road since a geomorphological boring exposed evidence of extensive fill deposition. By contrast, the land along the tracks to the south was comparatively wet and low lying. The APE has been expanded at this location for roadway widening on Tylers Mill Road, east and west of the GCL alignment. The location does not appear to be one that possesses any archaeological potential, if indeed it ever had any, and no additional investigations are proposed.

Pitman Station area (Figure 1, Map Sheet 11): The historic station of Pitman or Pitman Grove was located on the west-side of the tracks in the triangular area framed by Pitman Avenue to the north and Glassboro Pike, or modern South Broadway, to the west. The proposed new station would be built north of the historic location and north of Pitman Avenue between Commerce Avenue to the east and Simpson Avenue to the west. The platforms and landscaping proposed for the station would not impact archaeological resources, and no additional investigations are recommended.

2.8 Glassboro

Chestnut Branch tributary crossing at Heston Road in Glassboro (Figure 1, Map Sheet 12): The railroad crossed a tributary stream that flowed northwestward as shown on the 1890 USGS Glassboro map. The recorded precontact site, 28-Gl-406, is located on the north side of the tributary west of the tracks. The impact of the project at this location is unclear, but it is unlikely that archaeological potential exists due to the existing railroad and the improvements to Heston Road. It is possible that archaeological sites may be buried by railroad embankment construction, but such sites would be inaccessible at present. No additional investigations are proposed at this location.

Rowan University West Station between Heston and Mullica Hill roads (Figure 1, Map Sheet 12): A new station is proposed along the tracks immediately north of Mullica Hill Road (S.R. 0322). This location would utilize an existing parking lot to the east that is associated with Rowan University. The station would be built along an elevated portion of the tracks. The recorded precontact site, 28-Gl-317, is located north of the parking lot. Proposed roadway improvements have expanded the APE along Mullica

Hill Road/S.R. 0322 east and west of the GCL corridor near the proposed Rowan University West Station in Glassboro Borough (Figure 1, Map Sheet 12). Most of the planned improvements will occur in areas of obvious disturbance. However, a small area just north of the parking lot does not appear to be as heavily disturbed and will require a Phase IB survey (PTA 8).No additional survey or study is recommended at the remainder of this location.

Glassboro Station at former Railroad Avenue (abandoned; Figure 1, Map Sheet 13): The former and historic station is located south of the crossing of University Boulevard-Oakwood Avenue (former Railroad Avenue) and the railroad. The station was a dividing point for the branch line to Bridgeton and the spur line into the center of Glassboro along Railroad Avenue. The main branch of the West Jersey Railroad continued southward. The frame station survives on the east side, and tracks associated with the Bridgeton Branch and traces of other tracks are still visible on the surface. Figure 11 presents an overlay of the 1916 ICC map of the Railroad Avenue Station on a modern aerial photograph.

Much of the location remains open wooded ground. The location is bounded by Ellis Street to the south and Girard Road to the west. This location is an important one for understanding and interpreting aspects of railroad development from the late nineteenth and early twentieth centuries in southern New Jersey. Since the location is currently open, it may be considered as an equipment staging area or storage yard during the GCL or other projects. Such usage should be avoided, and it was argued in the Phase IA survey report that the site should be preserved.

Subsequent to the preparation and submittal of the Phase IA report, a VMF was proposed along Sewell Street southwest of the former station. A spur track extends from the GCL line through the southern end of the former railroad station area as shown on Figure 1, Map Sheet 13, and in greater detail on Figure 11. The spur track appears to pass through the site of the power house as shown on the 1916 ICC map. Again, it is recommended that this location be avoided. The spur track should be realigned to the south to avoid the site of the power house.

PTA 9 would occupy a triangular lot between Ellis Street and Girard Road. The APE was expanded in the vicinity of the proposed VMF Site 4A and connecting track (see Figure 1, Map Sheet 13; Figure 11). The nature of Phase IB testing will be determined but would most likely include a mixture of shovel tests and larger units to identify possible rail grades not indicated on the 1916 ICC map. Since the location was a

former rail yard, the potential of hazardous materials contamination is present. Data from an assessment of the presence of such hazardous materials must be provided prior to any final decision as to whether such Phase IB investigations will be undertaken.

Proposed Sewell Street VMF (Figure 1, Map Sheet 13): An area southwest of Sewell Street is under consideration as a VMF. The location measures roughly 1,850 by 920 feet and is mostly covered by a historic glass manufactory building dating from around 1918. No Phase IB testing is proposed at the location due to the presence of the historic industrial building.

Proposed rail line into center of Glassboro (Figure 1, Map Sheet 13): An extension of GCL service into the center of Glassboro is under consideration. This extension would lie within a former rail corridor that was in existence by the early 1890s and is shown on the 1916 ICC Valuation maps. An earlier map of Glassboro (Everts and Stewart 1876) reveals that the northern portion of the spur line was not in existence in 1876, but it does indicate the presence of numerous houses along Main Street to the west and Academy Street to the east (Figure 12). The proposed line would follow the spur line rail corridor from the main GCL tracks to the west and would extend northward to a point roughly adjacent to the junction of Wilmer and Main streets. In addition, a new station to serve downtown Glassboro is proposed at the end of this extension line between Main and Academy streets.

PTA 10 is located at the northern end of the proposed rail line into Glassboro at the point where the corridor forms a T-shaped connection with Main Street to the west and Academy Street to the east. The connection is irregular in shape but measures roughly 60 to 80 feet wide (north-south) and 620 feet in length (east-west). Since this T-shaped connection has the potential to impact archaeological deposits in the yards of the nineteenth-century houses in addition to railroad-related features, Phase IB archaeological survey or an alternative mitigation study may be required.

Proposed off-alignment construction activities include intersection widening for traffic mitigation at Cooper Street and Evergreen Avenue in Woodbury (Figure 1, Map Sheet 6) and a reconfigured intersection for traffic mitigation at Tylers Mill Road and Main Street in Mantua (Figure 1, Map Sheet 10). Considering the modern development surrounding both locations, no Phase IB archeological studies are recommended.

2.9 Summary

The various portions of the project area discussed above may be placed in the following categories for ease of reference:

1. No further work required

- Camden north of WRTC;
- Camden Ferry Avenue south to Newton Creek (except for possible PTA 3);
- Newton Creek into Gloucester;
- Gloucester Station area;
- Gloucester to Little Timber Creek;
- Former North Woodbury Station (abandoned);
- Brooklawn to Big Timber Creek and Westville;
- Red Bank Avenue Station in Woodbury;
- Woodbury Station area;
- Woodbury Heights Station;
- Monongahela Brook crossing north of Wenonah;
- Wenonah Station area;
- Mantua Creek crossings south of Wenonah;
- Mantua/Pitman Station along Tylers Mill Road;
- Pitman Station area;
- Chestnut Branch tributary crossing at Heston Road in Glassboro;
- Rowan University West Station between Heston and Mullica Hill roads;
- Sewell Street VMF;
- Off-Alignment at Cooper Street and Evergreen Avenue; and
- Off-Alignment at Tylers Mill Road and Main Street.

2. Phase IB survey possibly required

- PTA 1N: Camden block between Carman Street and former Bridge Avenue;
- PTA 2N: South Camden adjacent to Van Hook Street and 6th Street interchange (pending assessment of site disturbance and radiological hazard);

- PTA 2S: South Camden Station parking lot 6th Street and Ferry Avenue (if retained in planning and pending assessment of radiological hazard);
- PTA 3: South Camden adjacent to Morgan Street interchange (pending assessment of site disturbance and radiological hazard);
- PTA 4: Crown Point Road Station parking lot between rail corridor and Broadway Street(if retained in planning and pending assessment of extent of disturbance);
- PTA 5: Woodbury Heights VMF at wooded northern end;
- PTA 6: Mantua Boulevard Station area parking lot;
- PTA 7: Sewell Station area at site of former freight house;
- PTA 8: Intersection of Bowe Boulevard and S.R. 0322;
- PTA 9: Former Railroad Avenue Station, spur track to VMF site (recommended that track be eliminated or moved south of former power station site); and
- PTA 10: Northern end of proposed rail extension into Glassboro (or alternative mitigation, see below).

3. Alternative mitigation study under Memorandum of Agreement

- Camden, Wright Street south to Kaighns Avenue; and
- PTA 9: Proposed rail line into center of Glassboro.

4. Avoid area and prevent development or use during project

- Former Railroad Avenue Station in Glassboro (abandoned) and Sewell Street VMF.

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1891 Philadelphia, Pennsylvania, United States Geological Survey 15-minute quadrangle. http://historical.mytopo.com, accessed December 2013.

Appendix A

Report Figures

Area of Potential Effects (APE)
Potential Test Areas
Limit of Disturbance
Temporary Limit of Disturbance
GCL Facilities
Potential VMF Site Locations

Map Source: i-cubed Nationwide Prime Imagery; National Hydrography Dataset (2002)

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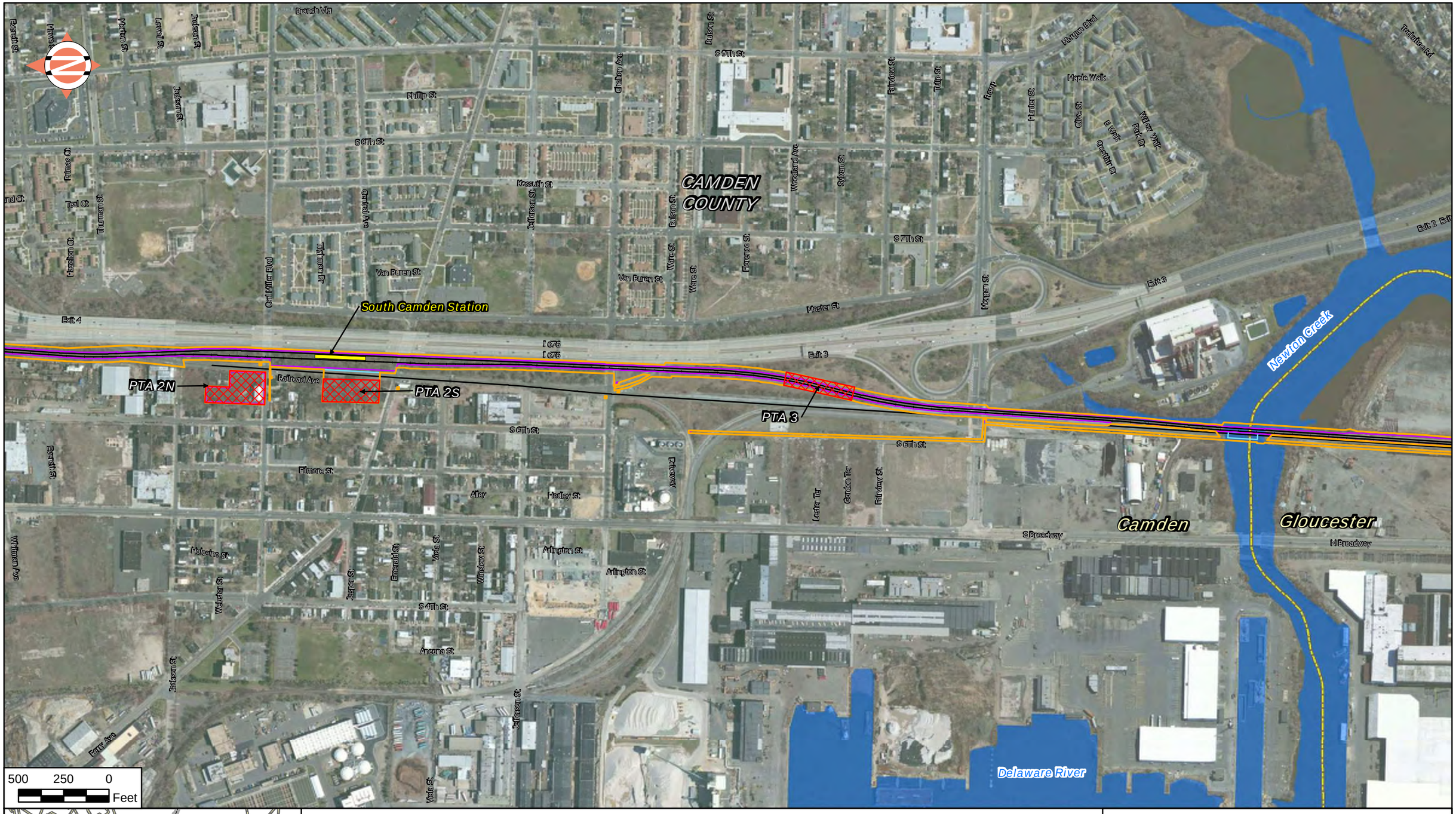
Figure 1
Area of Potential Effects (APE)
Glassboro-Camden Line Light Rail Project
Camden and Gloucester Counties, New Jersey
Sheet 1 of 13



Area of Potential Effects (APE)
Potential Test Areas
Limit of Disturbance
Temporary Limit of Disturbance
GCL Facilities
Potential VMF Site Locations

Map Source: i-cubed Nationwide Prime Imagery; National Hydrography Dataset (2002)

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Figure 1
Area of Potential Effects (APE)
Glassboro-Camden Line Light Rail Project
Camden and Gloucester Counties, New Jersey
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Figure 1
Area of Potential Effects (APE)
Glassboro-Camden Line Light Rail Project
Camden and Gloucester Counties, New Jersey
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Area of Potential Effects (APE)
Potential Test Areas
Limit of Disturbance
Temporary Limit of Disturbance
GCL Facilities
Potential VMF Site Locations

Map Source: i-cubed Nationwide Prime Imagery; National Hydrography Dataset (2002)

Figure 1
Area of Potential Effects (APE)
Glassboro-Camden Line Light Rail Project
Camden and Gloucester Counties, New Jersey
Sheet 4 of 13

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Area of Potential Effects (APE)
Potential Test Areas
Limit of Disturbance
Temporary Limit of Disturbance
GCL Facilities
Potential VMF Site Locations

Map Source: i-cubed Nationwide Prime Imagery; National Hydrography Dataset (2002)

Figure 1
Area of Potential Effects (APE)
Glassboro-Camden Line Light Rail Project
Camden and Gloucester Counties, New Jersey
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Figure 1
Area of Potential Effects (APE)
Glassboro-Camden Line Light Rail Project
Camden and Gloucester Counties, New Jersey
Sheet 6 of 13

Area of Potential Effects (APE)
Potential Test Areas
Limit of Disturbance
Temporary Limit of Disturbance
GCL Facilities
Potential VMF Site Locations

Map Source: i-cubed Nationwide Prime Imagery; National Hydrography Dataset (2002)

Figure 1
Area of Potential Effects (APE)
Glassboro-Camden Line Light Rail Project
Camden and Gloucester Counties, New Jersey
Sheet 7 of 13

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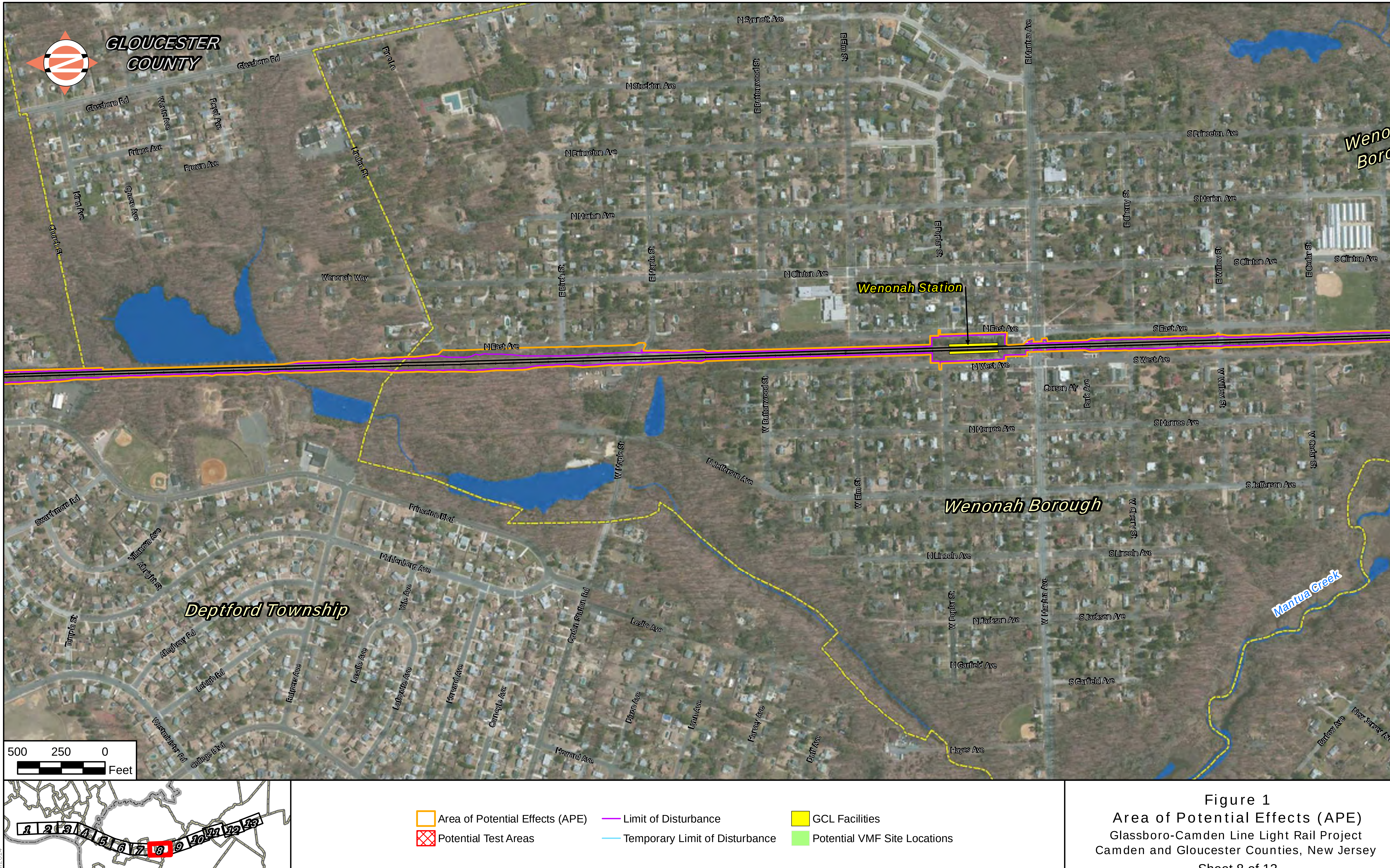
GLOUCESTER COUNTY
Wenonah Station
Wenonah Borough
Deptford Township
Mantua Creek
N East Ave
N West Ave
S East Ave
S West Ave
N Clinton Ave
S Clinton Ave
N Marion Ave
S Marion Ave
N Princeton Ave
S Princeton Ave
N Stockton Ave
N Synnott Ave
N Monroe Ave
S Monroe Ave
N Jefferson Ave
S Jefferson Ave
N Lincoln Ave
S Lincoln Ave
N Jackson Ave
S Jackson Ave
N Garfield Ave
S Garfield Ave
E Mantua Ave
W Mantua Ave
Glassboro Rd
Princeton Blvd
Muhlenberg Ave
Hayes Ave
Howard Ave
Leslie Ave
Ogden Station Rd
Wenonah Way
500 250 0 Feet
1 2 3 4 5 6 7 8 9 10 11 12 13

Area of Potential Effects (APE)
Potential Test Areas
Limit of Disturbance
Temporary Limit of Disturbance
GCL Facilities
Potential VMF Site Locations

Map Source: i-cubed Nationwide Prime Imagery; National Hydrography Dataset (2002)

Figure 1
Area of Potential Effects (APE)
Glassboro-Camden Line Light Rail Project
Camden and Gloucester Counties, New Jersey
Sheet 8 of 13

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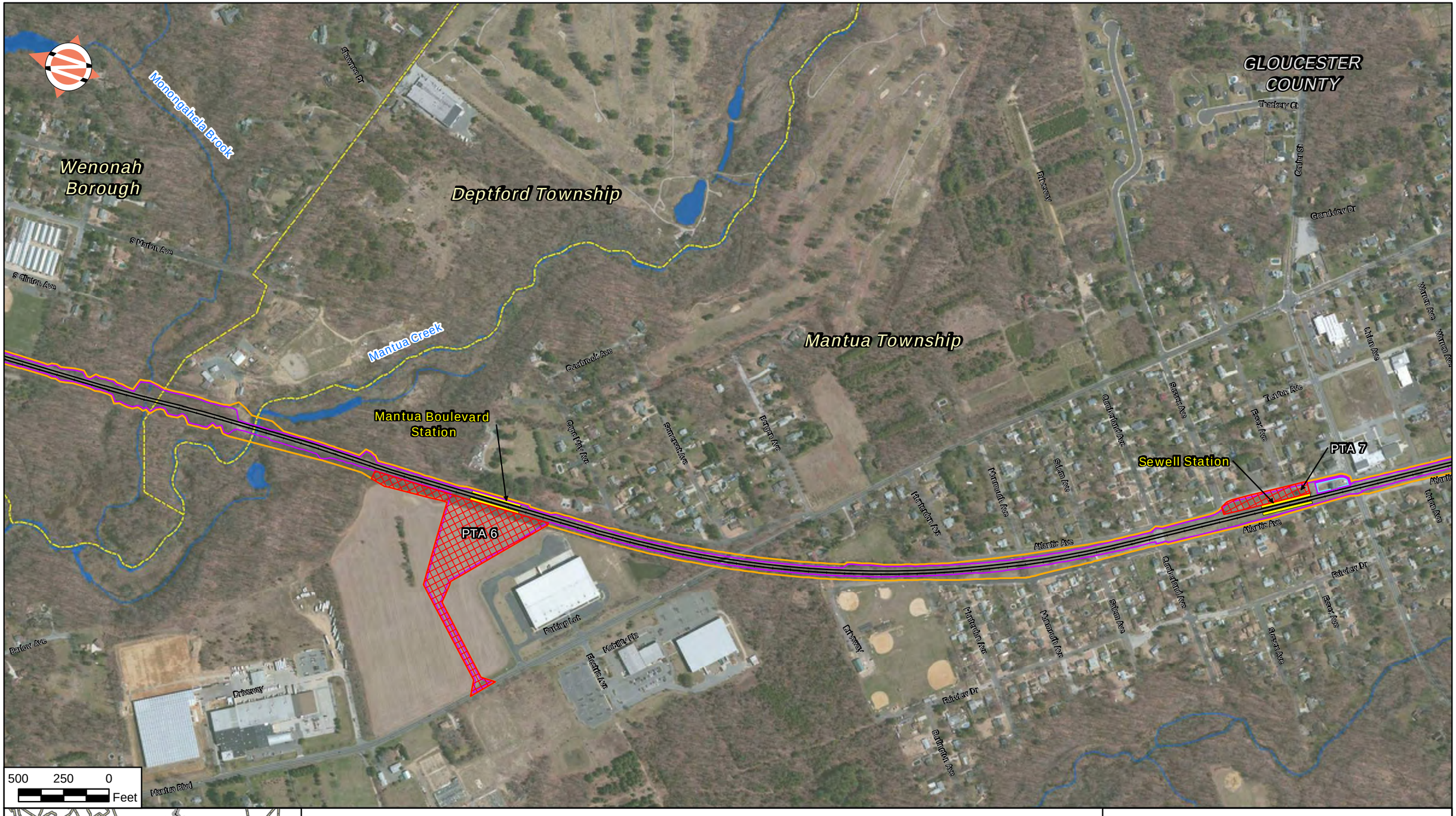

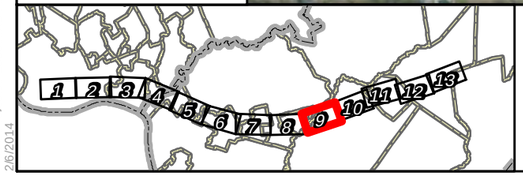

Area of Potential Effects (APE)
Potential Test Areas
Limit of Disturbance
Temporary Limit of Disturbance
GCL Facilities
Potential VMF Site Locations

Map Source: i-cubed Nationwide Prime Imagery; National Hydrography Dataset (2002)

Figure 1
Area of Potential Effects (APE)
Glassboro-Camden Line Light Rail Project
Camden and Gloucester Counties, New Jersey
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Figure 1
Area of Potential Effects (APE)
Glassboro-Camden Line Light Rail Project
Camden and Gloucester Counties, New Jersey
Sheet 10 of 13

Area of Potential Effects (APE)
Potential Test Areas
Limit of Disturbance
Temporary Limit of Disturbance
GCL Facilities
Potential VMF Site Locations

Map Source: i-cubed Nationwide Prime Imagery; National Hydrography Dataset (2002)

Figure 1
Area of Potential Effects (APE)
Glassboro-Camden Line Light Rail Project
Camden and Gloucester Counties, New Jersey
Sheet 11 of 13

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Pitman Borough

Glassboro Borough

PTA 8

Rowan University
West Station

500 250 0
Feet

Area of Potential Effects (APE)
Potential Test Areas
Limit of Disturbance
Temporary Limit of Disturbance
GCL Facilities
Potential VMF Site Locations

Map Source: i-cubed Nationwide Prime Imagery; National Hydrography Dataset (2002)

Figure 1
Area of Potential Effects (APE)
Glassboro-Camden Line Light Rail Project
Camden and Gloucester Counties, New Jersey
Sheet 12 of 13

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Area of Potential Effects (APE)
Potential Test Areas
Limit of Disturbance
Temporary Limit of Disturbance
GCL Facilities
Potential VMF Site Locations

Map Source: i-cubed Nationwide Prime Imagery; National Hydrography Dataset (2002)

Figure 1
Area of Potential Effects (APE)
Glassboro-Camden Line Light Rail Project
Camden and Gloucester Counties, New Jersey
Sheet 13 of 13

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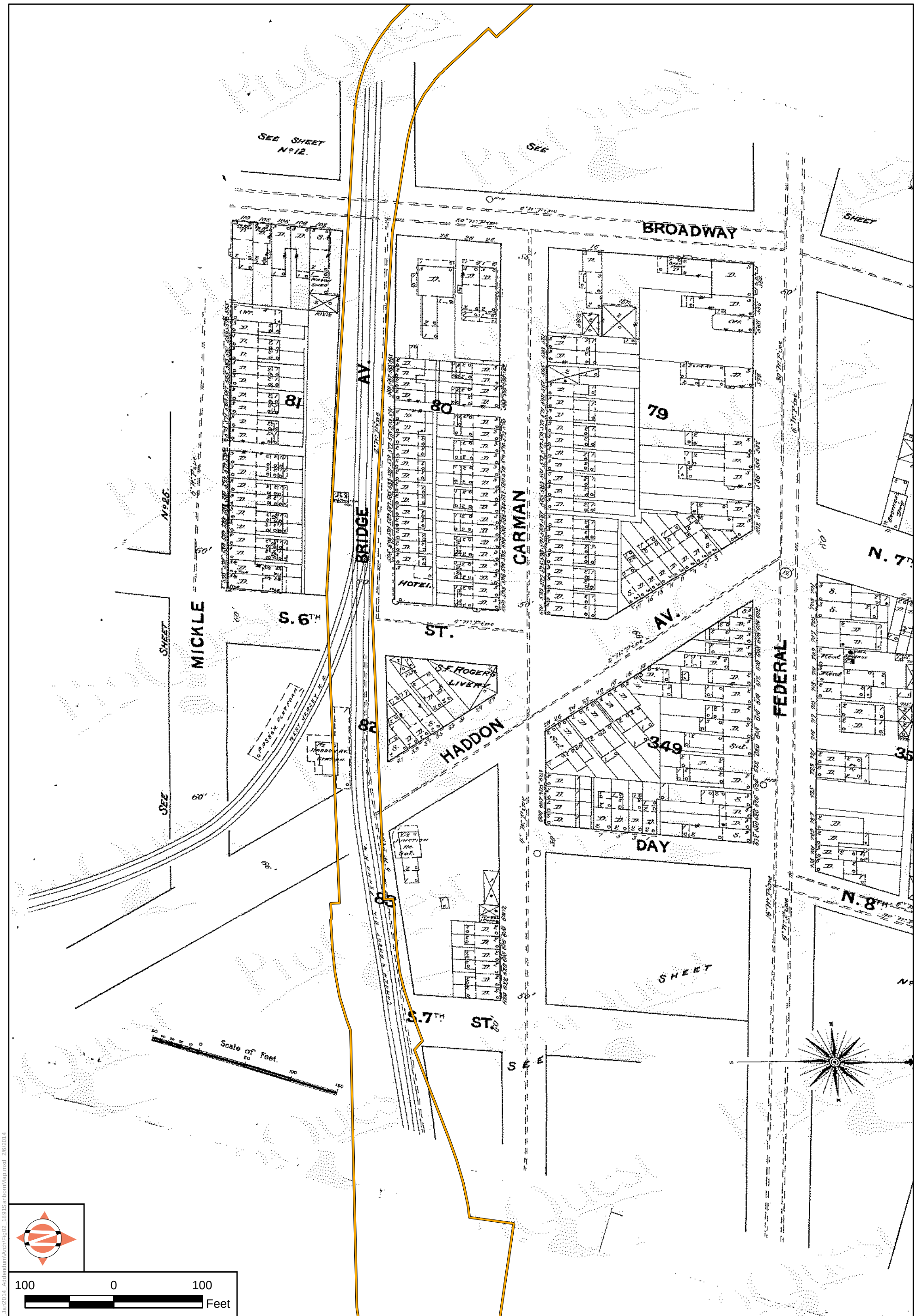

Figure 2
1891 Sanborn Map,
Broadway to South 7th Street, Camden
Glassboro-Camden Line
Camden and Gloucester Counties, New Jersey

Source: Free Library of Philadelphia

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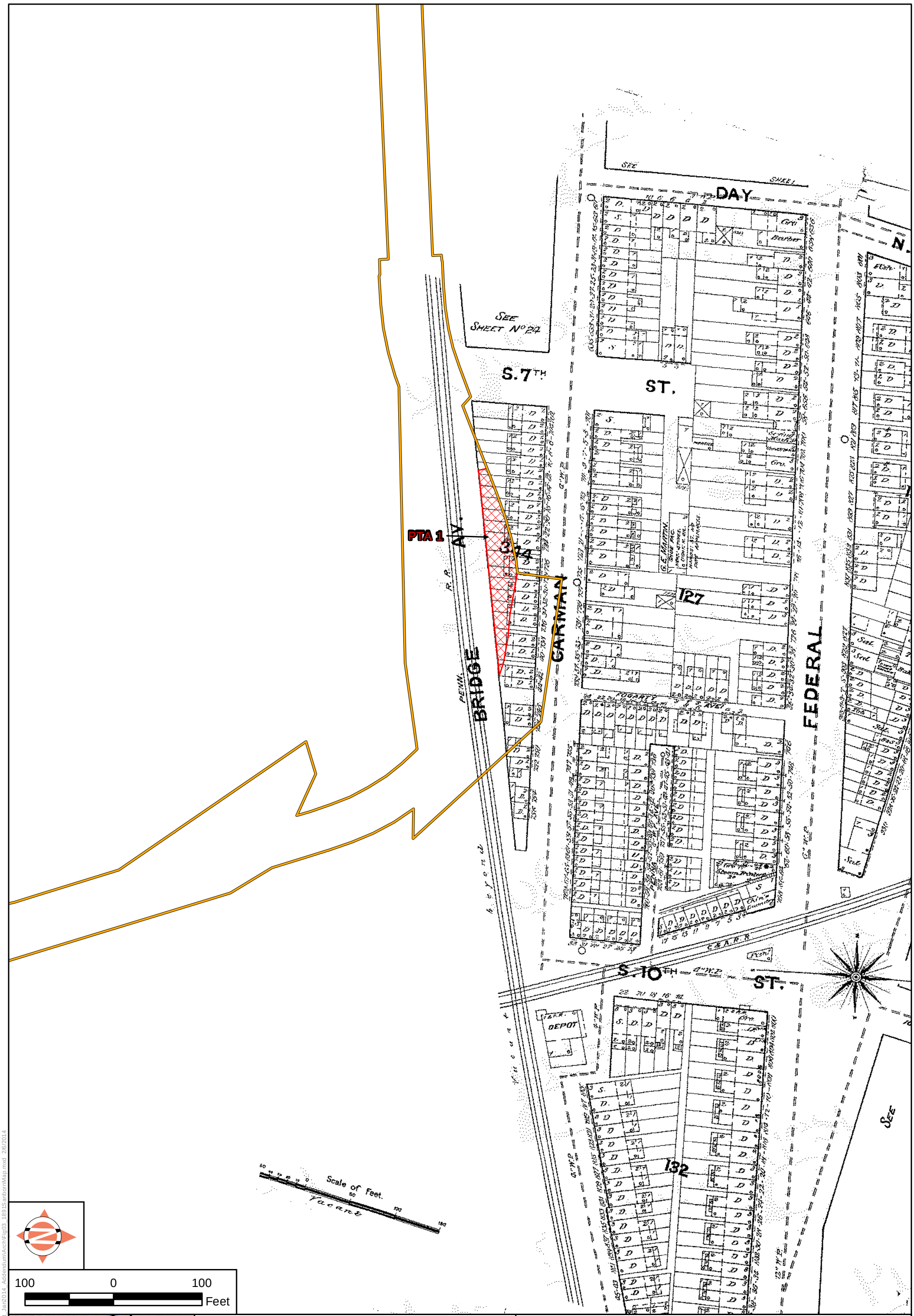

Figure 3
1891 Sanborn Map,
Carman Street to Bridge Avenue, Camden
Glassboro-Camden Line
Camden and Gloucester Counties, New Jersey

Source: Free Library of Philadelphia

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WRIGHT
WARREN ST.
WINDSOR
CAMDEN & SUBURBAN RAILWAY CO.
CAR HOUSE
CAR BARNS & SHOPS
CARTERET
SCHOOL LANE
WASHINGTON
HADDON AV.
BLAINE ST.
SEWARD ST.
TRENTON AV.
NEWTON AV.
NEW ST.
MANUAL TRAINING AND HIGH SCHOOL
6" W. PIPE
8" W. PIPE
Scale of Feet
100 0 100 Feet

Burlington
Camden
Gloucester
Salem

Area of Potential Effects

Figure 4
1906 Sanborn Map,
Wright Street to Newton Avenue, Camden
Glassboro-Camden Line
Camden and Gloucester Counties, New Jersey

Source: Free Library of Philadelphia

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NEWTON

BERKLEY ST.

CLINTON ST.

SILVER ST.

CARTERET ST.

S. 6TH ST.

BORDER

HADDON AV.

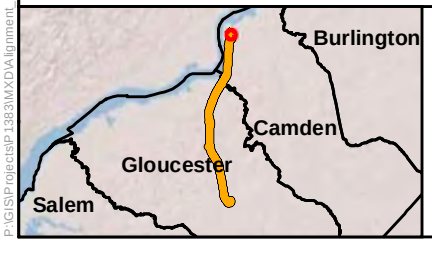
TRENTON AV.

STARR AV.

LINE

Scale of Feet.

100 0 100 Feet



Area of Potential Effects

Figure 5
1906 Sanborn Map,
Newton Avenue to Line Street, Camden
Glassboro-Camden Line
Camden and Gloucester Counties, New Jersey

Source: Free Library of Philadelphia

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Figure 6
1906 Sanborn Map,
Line to Spruce Streets, Camden

Glassboro-Camden Line
Camden and Gloucester Counties, New Jersey

Source: Free Library of Philadelphia

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CAMDEN VOL. 2

26

SPRUCE

CHERRY

WALNUT

MT. VERNON

CHESTNUT

MT. EPHRAIM AV.

S. 8TH ST.

S. 9TH ST.

S. 10TH ST.

ALDER ST.

EIGHTH ST. M.E. CHURCH

15

16

25

32

33

Scale of Feet. 50 100 150

100 0 100 Feet

Burlington
Camden
Gloucester
Salem

Area of Potential Effects

Figure 7
1906 Sanborn Map,
Spruce to Chestnut Streets, Camden

Glassboro-Camden Line
Camden and Gloucester Counties, New Jersey

Source: Free Library of Philadelphia

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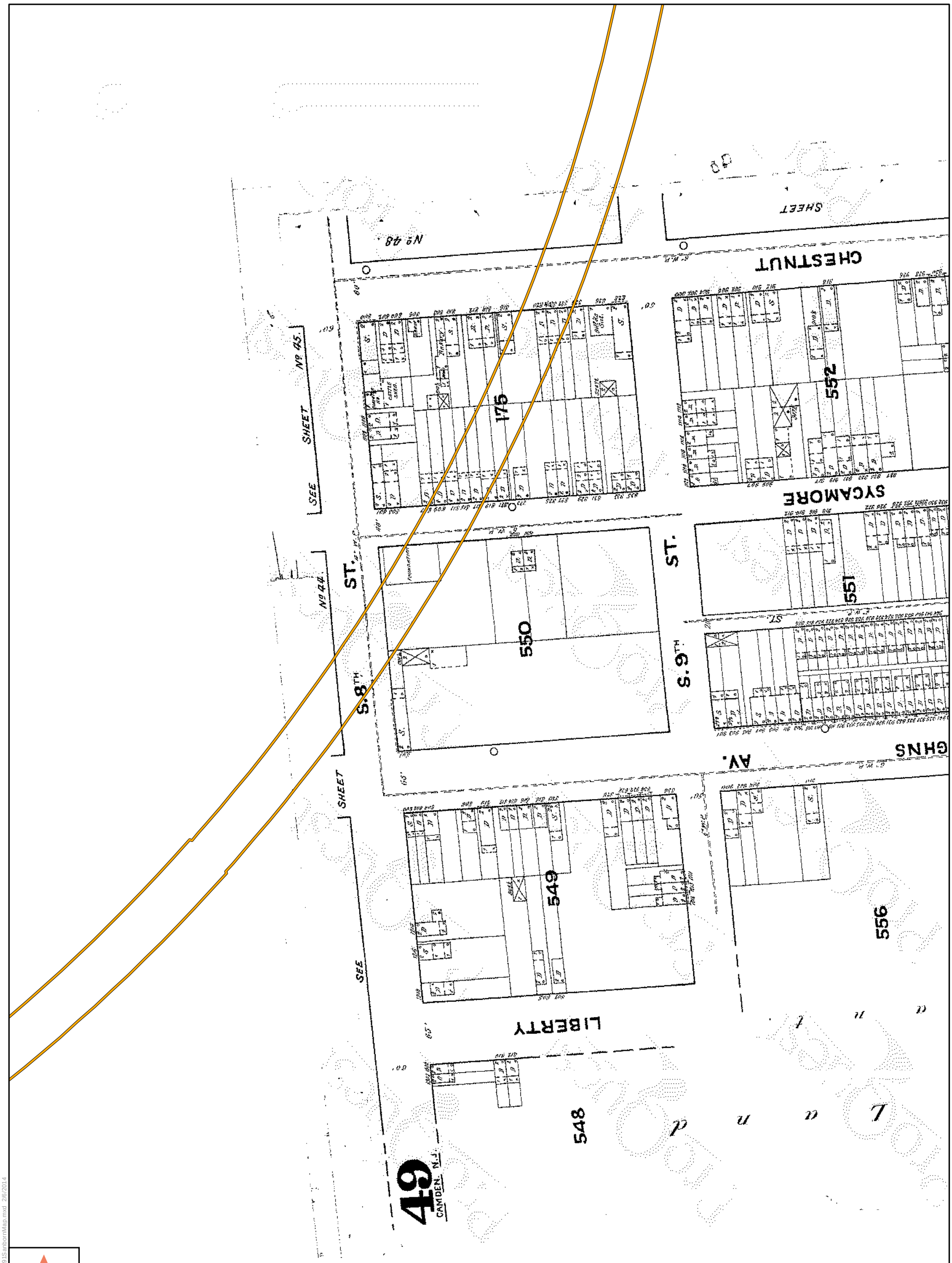

Figure 8
1891 Sanborn Map,
Chestnut Street to Kaighns Avenue, Camden
Glassboro-Camden Line
Camden and Gloucester Counties, New Jersey

Source: Free Library of Philadelphia

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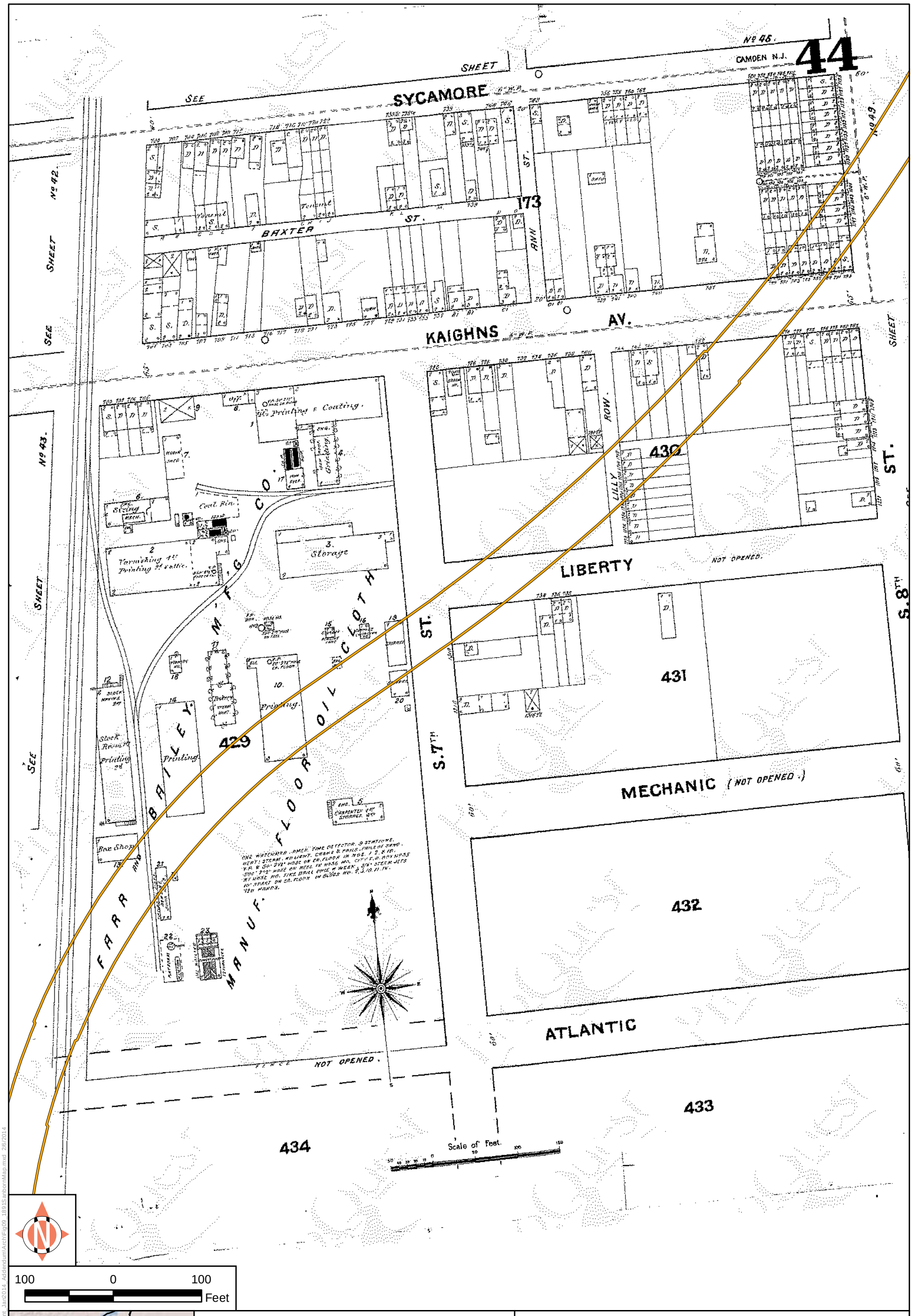

Figure 9
1891 Sanborn Map,
Kaighns Avenue to Atlantic Street, Camden
Glassboro-Camden Line
Camden and Gloucester Counties, New Jersey

Source: Free Library of Philadelphia

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PTA 2N

PTA 2S

JACKSON

VAN HOOK

FERRY AV.

FILLMORE ST.

S. 6TH ST.

BROADWAY

RAILROAD AV.

479

480

481

482

483

484

485

486

58

CAMDEN N.J.

JNO. W. SMICKLE PUBLIC SCHOOL

STOCKTON BAPTIST CHURCH.

STOCKTON M.E. CHURCH.

DYE HO.

COTTRELL & WOLFENDEN HOSIERY MANF'Y.

Hat House

SEE SHEET No 62.

SEE SHEET No 57.

SEE SHEET No 59.

Scale of Feet.

100 0 100 Feet

Burlington

Camden

Gloucester

Salem

Area of Potential Effects

Potential Test Areas

Figure 10
1891 Sanborn Map, Jackson Street to Ferry Avenue, Camden
Glassboro-Camden Line
Camden and Gloucester Counties, New Jersey

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Source: Free Library of Philadelphia

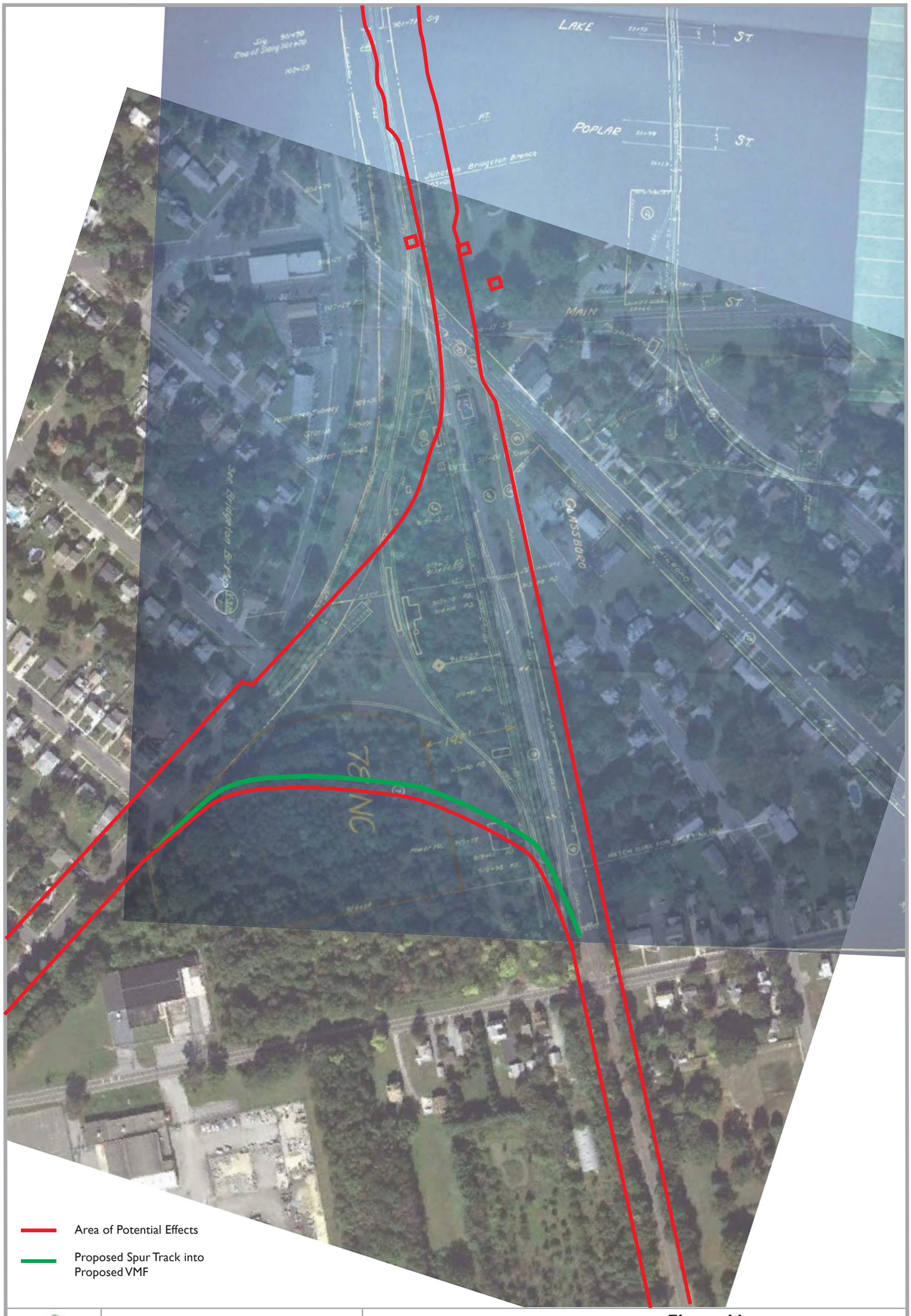

Figure 11
Overlay of 1916 ICC Map and Modern Aerial of Former Railroad Avenue Station
Glassboro-Camden Line
Camden and Gloucester Counties, New Jersey

Source: Aerial Courtesy Google Earth, 2011 (accessed Dec2013); ICC Valuation Maps V2.3-15, 1916

Map Document X: Graphics\Projects\P-1383\Mapping\overlay.pdf.ai

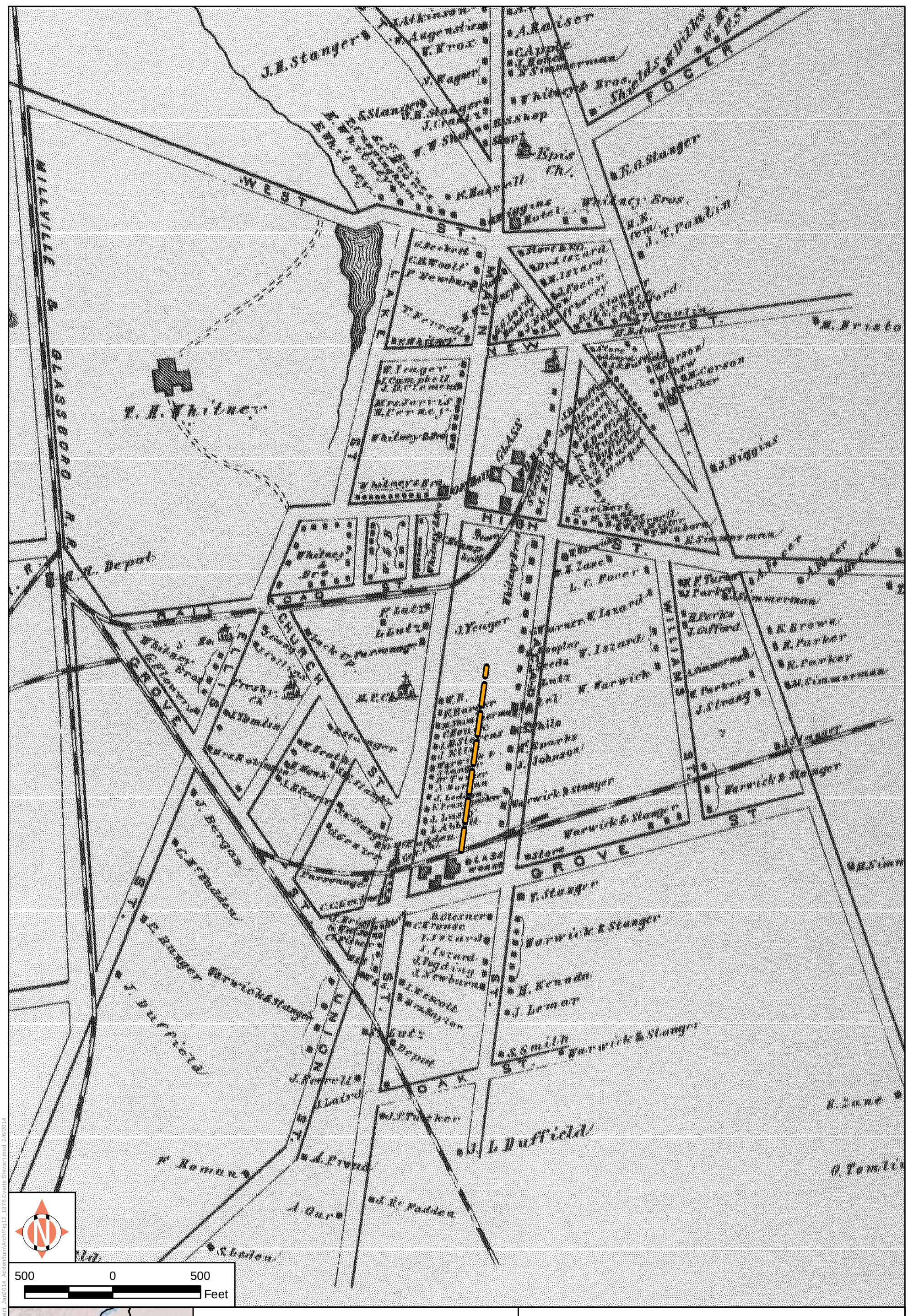

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Figure 12
1876 Everts and Stewart Map of Glassboro
Glassboro-Camden Line
Camden and Gloucester Counties, New Jersey

Source: Combination Atlas of Salem & Glouchester Counties, New Jersey

Appendix B

Letter from Daniel Saunders, New Jersey State Historic Preservation Office, to Letitia Thompson, United States Department of Transportation, December 3, 2013