COMBINED PHASE I/II ARCHAEOLOGICAL SURVEY
ASSUNPINK CREEK RESTORATION
CITY OF TRENTON, MERCER COUNTY, NEW JERSEY

TECHNICAL REPORT

U.S. ARMY CORPS OF ENGINEERS, PHILADELPHIA DISTRICT
CITY OF TRENTON

CONTRACT NO: GS-10F-0410R, ENVIRONMENTAL PLANNING (SIN 899-1)

Prepared by:

J. Patrick Harshbarger, M.A.
James S. Lee, III, M.A., RPA
Richard W. Hunter, Ph.D., RPA

Prepared for:

Wallace, Roberts & Todd, LLC
1700 Market Street, 28th Floor
Philadelphia, PA 19103

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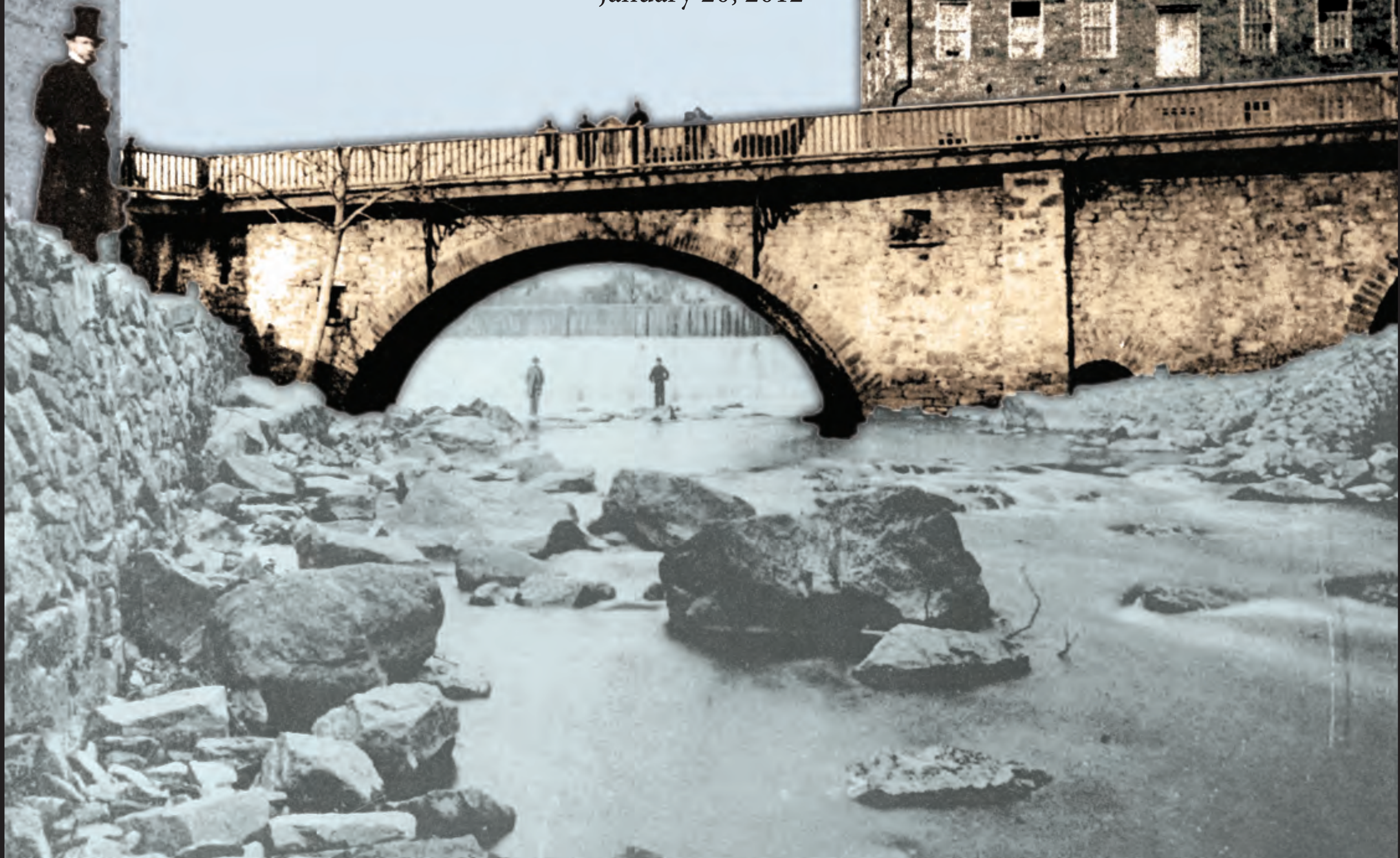

HUNTER RESEARCH

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JANUARY 2012

MANAGEMENT SUMMARY

This report presents the findings and recommendations of a combined Phase I and II archaeological survey conducted for the Assunpink Creek Restoration Project in the City of Trenton, Mercer County, New Jersey. The preferred alternative for this project will result in the removal of a reinforced-concrete box culvert that currently carries the creek underground between South Broad and South Warren Streets in downtown Trenton. The "day-lighting" project will realign the creek into a natural channel with stabilization of the creek embankments. The project is being sponsored by the U.S. Army Corps of Engineers, Philadelphia District (USACE) with participation by the City of Trenton. As part of the USACE's planning phase, Hunter Research, Inc., as a subconsultant to Wallace Roberts & Todd, LLC, conducted the archaeological survey for project compliance with Section 106 of the National Historic Preservation Act of 1966, as amended, and its implementing regulations (36 CFR 800).

The archaeological scope of work included development of a research methodology and health and safety plan, literature review, consideration of historic contexts, field investigations, artifact analysis, synthesis of data, and preparation of this technical report, which presents the collected data and makes recommendations concerning National Register eligibility and project effects. To the extent possible, this report makes use of, and builds upon, the findings of previous reports associated with the project vicinity, particularly the research and documentation compiled for the Old Mill Hill Society under a grant from the New Jersey Historical Commission (Hunter Research, Inc. 2002) and the planning for the rehabilitation of the South Broad Street Bridge sponsored by the New Jersey Department of Transportation (Hunter Research, Inc. 2003b; AECOM 2009, 2010).

This and prior studies have confirmed that the study area in the vicinity of the South Broad Street crossing of the Assunpink Creek has a long and distinguished history. The location served as an important fording point within the regional Native American trail network. Trenton's origins as a colonial settlement also derived from this crossing point, and Mahlon Stacy's gristmill, the first major industrial structure in the embryonic Quaker settlement that would become Trenton, was erected here in the late 1670s. Throughout the colonial period, the gristmill at this location was the primary element in the settlement pattern driving the growth of Trenton as a market town. The Assunpink crossing also was at the core of First and Second Battles of Trenton, fought respectively on December 26, 1776 and January 2, 1777. These engagements were integral to restoring the military reputation of George Washington and turning the military tide that ultimately saw the Continental Army triumph over British forces and secure American independence. Trenton's first true steps toward embracing industrialization took advantage of the Assunpink's waterpower to support the growth of an early textile industry in the first half of the 19th century. Land here has since been developed and redeveloped for industrial purposes, and the immediately surrounding area has experienced an equally complicated sequence of residential, commercial and public recreational usage.

The historical significance of the events that occurred along this stretch of the Assunpink are indisputable, but the ability of the setting to convey its significance has been greatly diminished by the removal of most of the physical fabric of the 18th and 19th centuries due to urban renewal, most of which took place in sweeping fashion south of the South Broad Street Bridge during the late 1950s and 1960s. The only above-ground resource over 50 years old surviving in the immediate study area is the South Broad Street Bridge, which has previously been determined eligible for inclusion in the New Jersey and National Registers of Historic Places under Criteria A and C, and which may also be considered a potential contributing resource to a proposed expansion of the Mill Hill Historic District (National Register and New Jersey Register, 1977) by moving the district's boundary line from the east to the west side of South Broad Street. Today, the historic stone-arched bridge is difficult to appreciate since so much of it is buried by the earth fill that has been placed against its side walls. The present visible portion of the South Broad Street Bridge is a 60-foot wide stone arch, but the entire structure is estimated to measure 160 feet long, including a second arch span, approximately 28-foot long, buried under the fill at the southern end of the bridge, and the probability that a third smaller arch likely exists deeply buried between the two longer arches. In some measure, the bridge, although properly categorized as a structure using the National Register of Historic Places categorizations, also has the characteristics of an archaeological site since so much of it is now a subsurface feature that spans the remains of buried mill raceways.

Archaeological fieldwork was undertaken in June and July of 2011. Four of six test trenches were targeted on the south bank to determine the degree to which remains survived of the mills that once lined this section of the creek. Results of test trenches on the south bank eliminated with a high level of certainty large areas of the archaeological study area from further consideration as potentially significant areas of archaeological sensitivity. Within the test trenches, no significant mill remains were identified above a depth of approximately 6 to 9 feet above sea level. Features identified below that level consisted of one or two courses of stone masonry that may represent the lower foundations of a mill wall or raceway, and a wooden floor that may form the base of a raceway, turbine pit or powerhouse. The diagnostic value of these features is limited. Subsurface testing of the north bank involved the excavation of two test trenches. The north bank was historically an area of marshy wetland up until the mid- to late 19th century when the riverbank was capped with filled and built over. Several late 19th-century foundations were encountered, all relating to outbuildings and structures located to the rear of residential and commercial properties fronting on to South Broad and East Lafayette Streets. These remains and the underlying riverbank deposits are not considered archaeologically significant.

Based on the archaeological fieldwork, the study area, with some qualifications, is judged to have a low potential to yield significant archaeological resources due to the demonstrated record of deep ground disturbance indicated by testing. This evaluation is offered with a caveat that there are some limited areas where a moderate to high potential may still remain, but these areas could not be tested or proved to have significant ground disturbance due to site constraints. The principal of these areas are located in the very southeast and southwest corners of the site and immediately adjacent to the west face of the South Broad Street Bridge. Archaeological studies undertaken by the New Jersey Department of Transportation found potentially significant remnants of the South Broad Street Bridge and raceway system immediately adjacent to the bridge at the northwest angle formed by South Broad Street and Factory Street. Mill and raceway remains could also exist in a narrow strip of land between the bridge's western face and the approximate location of the Veolia Energy Trenton utility lines that run parallel to South Broad Street. At the southwest corner of the study area, the Moore's Flour Mill site could not be thoroughly investigated due to environmental contamination, but a test boring did encounter what was interpreted as masonry that might be a foundation of the mill.

Section 106 criteria of adverse effects were applied to the undertaking based on the preferred alternative of day-lighting the creek through full removal of the culvert and re-contouring the stream bed between South Broad and South Warren Streets. A recommendation of this study is that adverse effects can be avoided or minimized by a project design and landscaping that is compatible with the historic South Broad Street Bridge and the Mill Hill Historic District. In fact, it is this consultant's belief that the project creates an important opportunity to enhance the bridge's historic character and increase appreciation of what is currently a hugely undervalued historic and cultural resource. Avoidance of adverse effects can be achieved through improved grading, land-scaping, and alternative mitigations, including an intentional plan of interpretation, quite possibly through the placement of outdoor signage within the park area that will be created by day-lighting the Assunpink.

Another recommendation is that careful consideration be given to the alternatives currently being discussed for relocating the Veolia Energy Trenton lines so that a proposed new utility bridge to carry the lines across the newly day-lit stream does not visually detract from the historic bridge or have an adverse impact on the bridge's setting. Currently, these utility lines are buried parallel to, and about 25 feet from, the western face of the South Broad Street Bridge. Consultation with the New Jersey Historic Preservation Office should include discussion of the utility bridge's alignment, length, height and aesthetics with a view to minimizing the project's visual impacts. With the restoration of the creek, the park below the bridge will become the ideal vantage point from which to view the bridge and increase the public's appreciation of the strategic role this location played in the development of Trenton and, particularly, in the Battles of Trenton.

It is also recommended that archaeological monitoring take place during construction within limited areas of potentially moderate to high archaeological sensitivity if they cannot be avoided by construction activities. The three areas of sensitivity are: 1) deeply buried remains below a depth of 10 feet above sea level on the south bank more than 10 feet from the southern edge of the existing culvert; 2) within approximately 25 feet of the west side of the South Broad Street Bridge; and 3) the southeast corner of the project area (northeast quadrant of the intersection of South Warren Street and Assunpink Way) where remains of the Moore's Flour Mill site may survive. A monitoring protocol should be developed that will allow for documentation of significant archaeo-logical remains should work occur in these areas.

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ACKNOWLEDGMENTS

Various individuals contributed to the completion of this Phase I and II archaeological investigation. Funding for this work was provided by the U.S. Army Corps of Engineers (USACE). We gratefully acknowledge Brian Mulvenna, P.E. (Project Manager), Nikki Minnichbach (District Cultural Resource Specialist/Tribal Liaison), Earl M. Fisher, P.E. (Geotechnical Section) and Michael F. Mohn (Geo-Environmental Engineer), all with the Philadelphia District of the USACE, for their professional assistance and interest in these studies. Matthew Brener, P.E., Brownfield Redevelopment Solutions, Inc., acting on behalf of the City of Trenton, also provided invaluable assistance and information at critical points during this work. Eric Tamulonis and Loren Shaw have overseen this work for Wallace, Roberts & Todd, LLC, the prime consultant.

Considerable assistance was received from staff within the New Jersey Historic Preservation Office, in particular Vincent Maresca and Sara Andre, Senior Historic Preservation Specialists. The staffs of several research repositories and libraries have also helped us throughout our work. We acknowledge most especially the staffs of the New Jersey State Archives, the New Jersey State Library, the Burlington County Historical Society, the Mercer County Courthouse, the Mercer County Engineering Department, the Trenton Public Library and the Historical Society of Pennsylvania. Finally, we are indebted to Gary Nigh of the Old Mill Hill Society and Trenton Historical Society for his generous sharing of historical information on Mill Hill, without which the high level of detail achieved in this study would not have been attained.

Environmental Connection, Inc. provided essential environmental support to the archaeological work, assisting in the preparation of the site safety and health plan and providing environmental monitoring services for the duration of the fieldwork. The efforts of Steven Mania, President, James Frisbee, CIH, and Ken Newsome, On-site Monitor, of Environmental Connection have been greatly appreciated in facilitating our work. Steve Spaulding of S.L. Spaulding & Company provided expert backhoe excavation and dewatering services during the archaeological fieldwork.

Overall direction for this project was provided by Richard Hunter. Background research for this study was performed by Alison Haley under the supervision of Patrick Harshbarger, and drew extensively on earlier work carried out by Nadine Sergejeff and James Cox working under the supervision of Damon Tvaryanas. Archaeological field investigations were performed by Andrew Martin, Glen Keeton and Josh Butchko under the supervision of James Lee. The report graphics were drafted by Katie Rettinger. Final report coordination and assembly were undertaken by James Lee. This report was authored by Patrick Harshbarger, James Lee and Richard Hunter.

Richard Hunter, Ph.D, R.P.A.
  Principal Investigator

Chapter 1

INTRODUCTION

A. PROJECT BACKGROUND AND SCOPE OF WORK

The U.S. Army Corps of Engineers, Philadelphia District (USACE) is presently in the planning phase for the Assunpink Creek Restoration Project that will remove the existing reinforced-concrete box culvert between South Broad Street and South Warren Street in downtown Trenton, Mercer County, New Jersey (Figures 1.1-1.3; Plate 1.1). As part of the District's planning, Hunter Research, Inc., as a subconsultant to Wallace Roberts & Todd, LLC, conducted a combined Phase I and II archaeological investigation of the site for project compliance with Section 106 of the National Historic Preservation Act of 1966, as amended, and its implementing regulations (36 CFR 800).

Several alternatives have been considered for "day-lighting" the creek including complete removal of the culvert, partial removal of the culvert and no action. The preferred alternative is the complete removal of the culvert and realignment of the creek into a natural channel with stabilization of the creek embankments. Work will take place within Block 105, Lots 1 and 4, which are owned by the City of Trenton, and Block 105, Lot 2, which is owned by the State of New Jersey. The project area is currently a grassy, open space that was established in the 1960s and early 1970s when the property was cleared of pre-existing buildings and the creek enclosed in the currently existing culvert. A section of the culvert roof collapsed in September 2006 forcing the closure of the property to the public.

The purpose of the combined Phase I and II archaeological investigation was to analyze the potential for the project to impact significant cultural resources within the study area where project activities and ground disturbances are likely to occur as a result of the day-lighting project.

Methodology for the combined Phase I and II archaeological investigation included at the outset a review of prior cultural resources studies of the study area and adjacent areas to identify previously identified resources, documentary research, historic map and aerial photograph analysis, and geophysical survey (Appendix A). A Site Safety and Health Plan was prepared (Appendix B) and implemented by Hunter Research and Environmental Connection, Inc. prior to and during fieldwork in June 2011 (Appendix C). Field investigations consisted of six, mechanically excavated, test trenches followed by analysis of the recovered data.

These investigations were conducted in accordance with the instructions and intents of various applicable Federal and State legislation and guidelines governing the evaluation of project impacts on archaeological resources, notably: Section 106 of the National Historic Preservation Act of 1966, as amended; Section 101(b)(4) of the National Environmental Policy Act of 1969; Section 1(3) and 2(b) of Executive Order 11593; the regulations and guidelines for determining cultural resource significance and eligibility for the National Register of Historic Places (36 CFR 60 and 63); the Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation (36 CFR 61); the regulations and guidelines specifying the methods, standards and reporting requirements for the recovery of scientific, prehistoric, historic and archaeological data (36 CFR 66); the regulations and guidelines for the protection of historic properties as published in the Federal Register on May 18, 1999

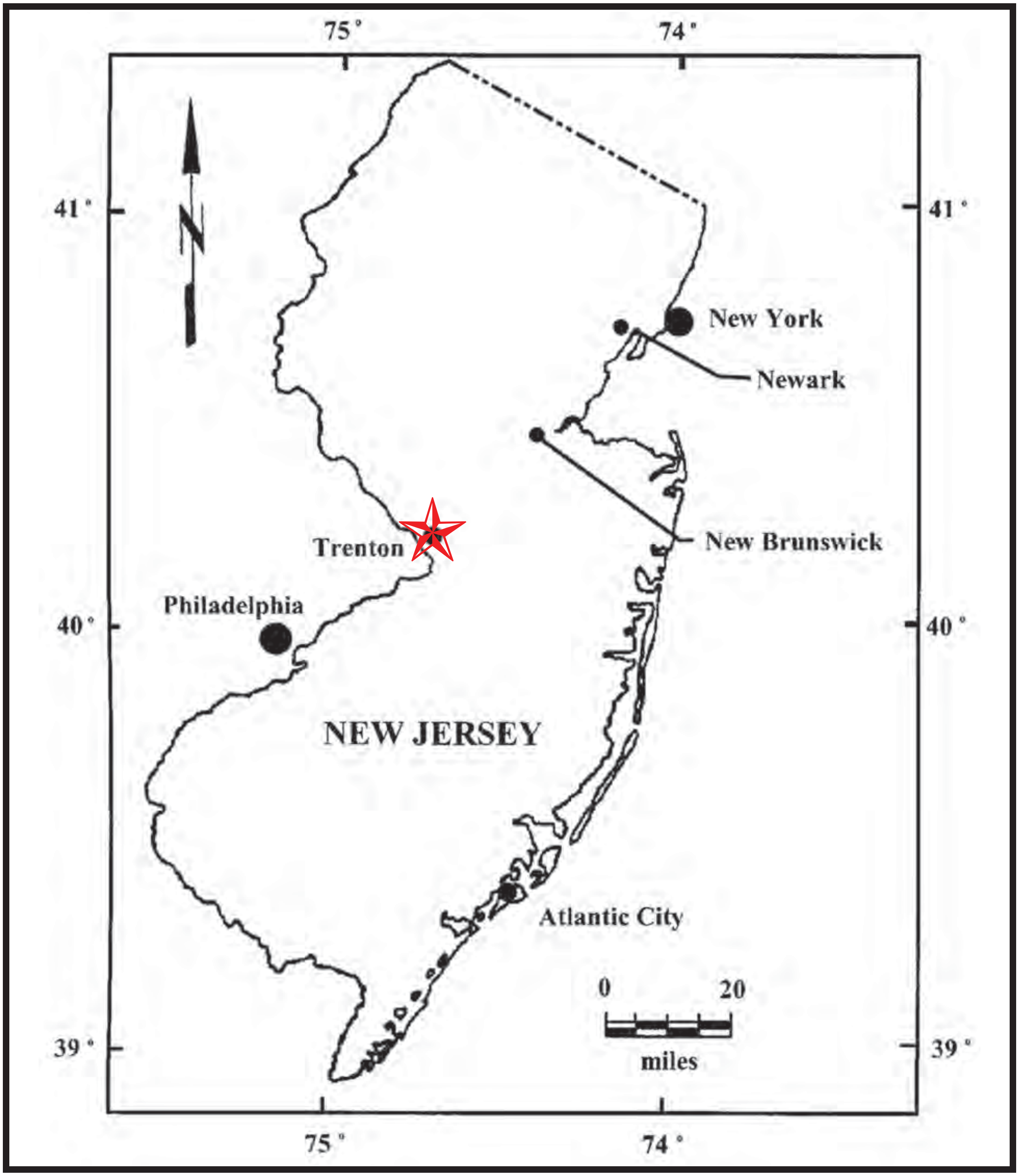


Figure 1.1. Location of Study Area (starred).

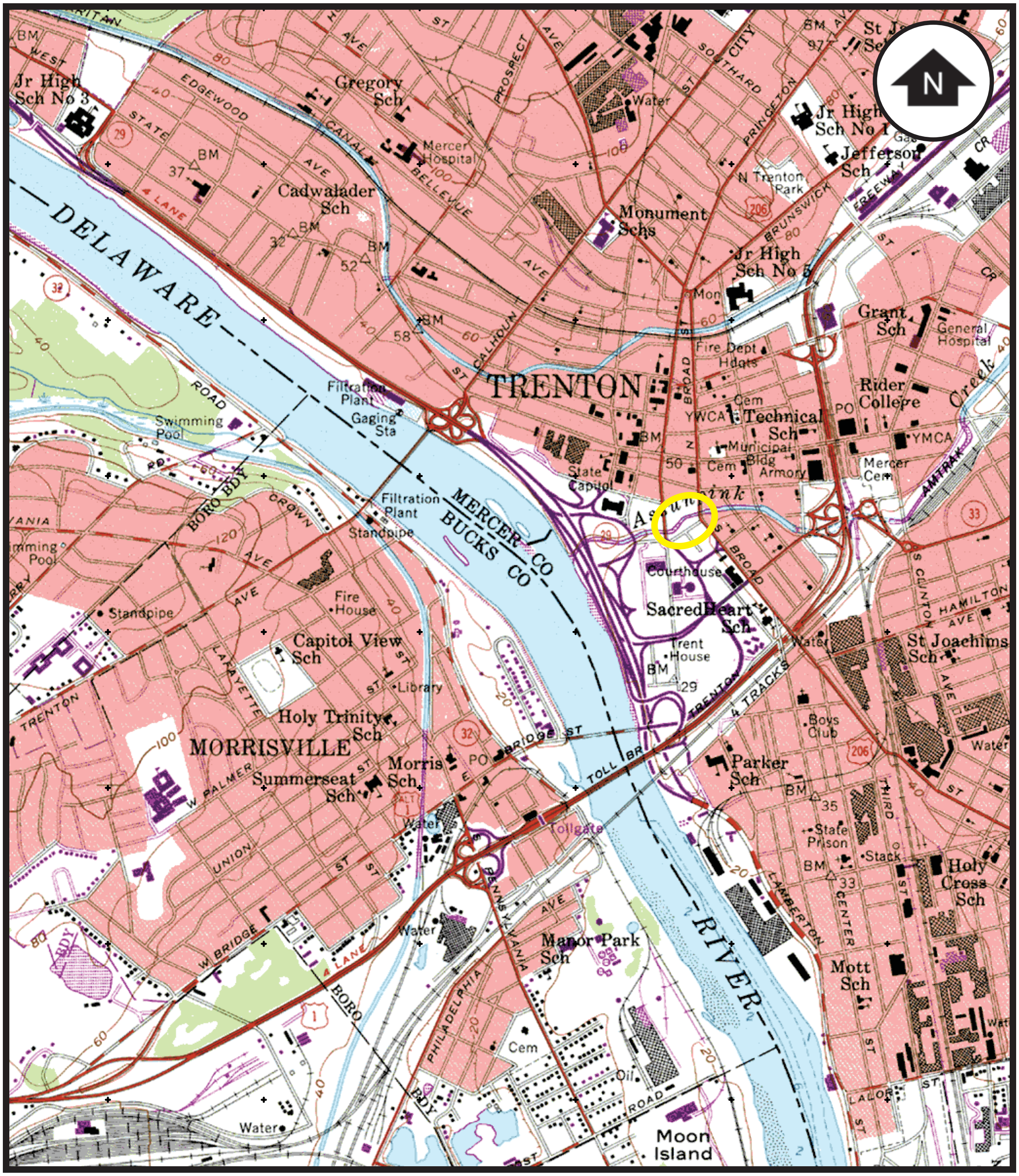


Figure 1.2. Detailed Location of Study Area. Source: USGS 7.5' Topographic Series, Trenton West N.J.-PA. (1955 [photorevised 1981]). Study area circled. Scale 1 inch: 1,000 feet.

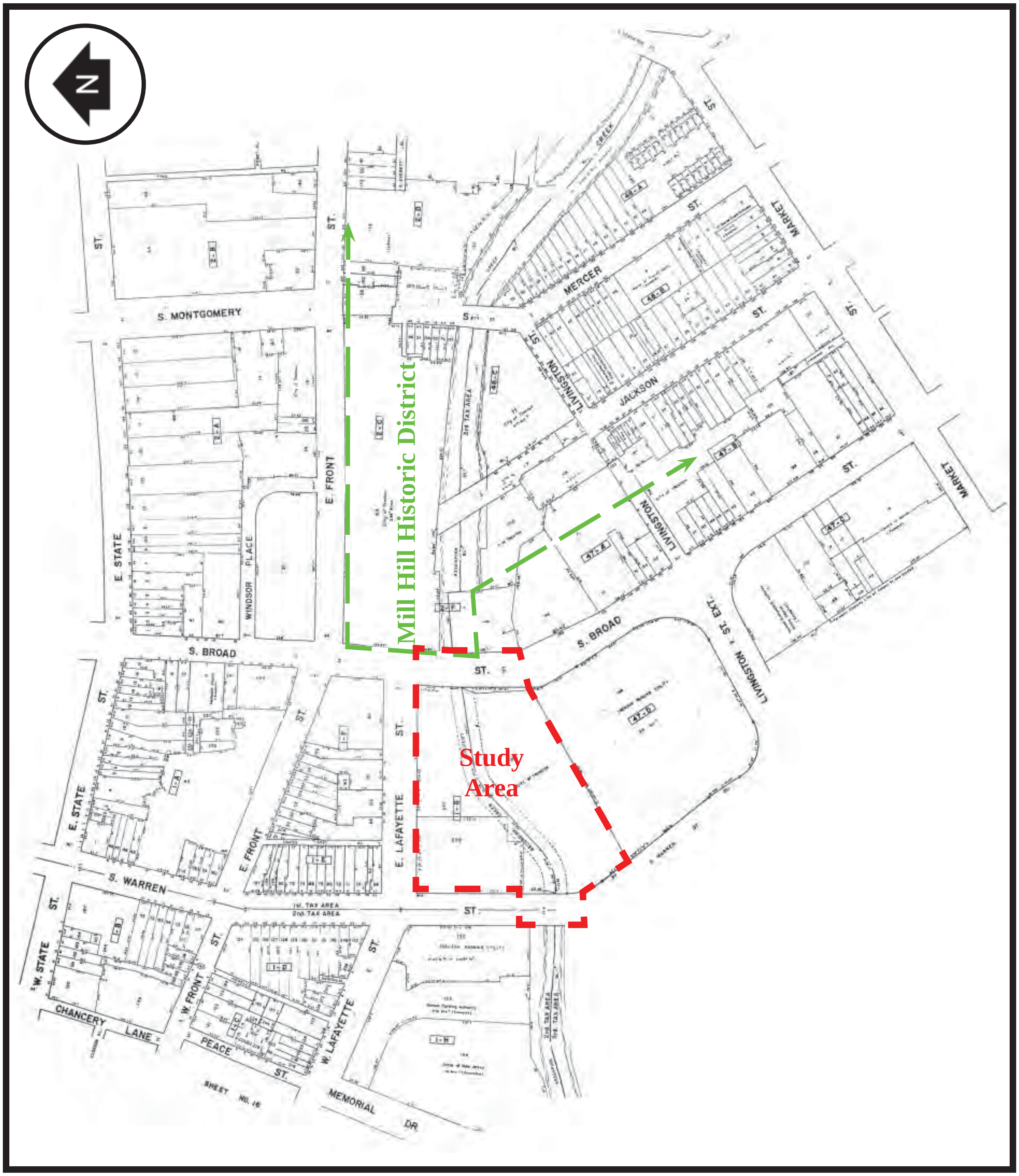


Figure 1.3. Location of Study Area Superimposed over Current Tax Parcel Map for the City of Trenton.

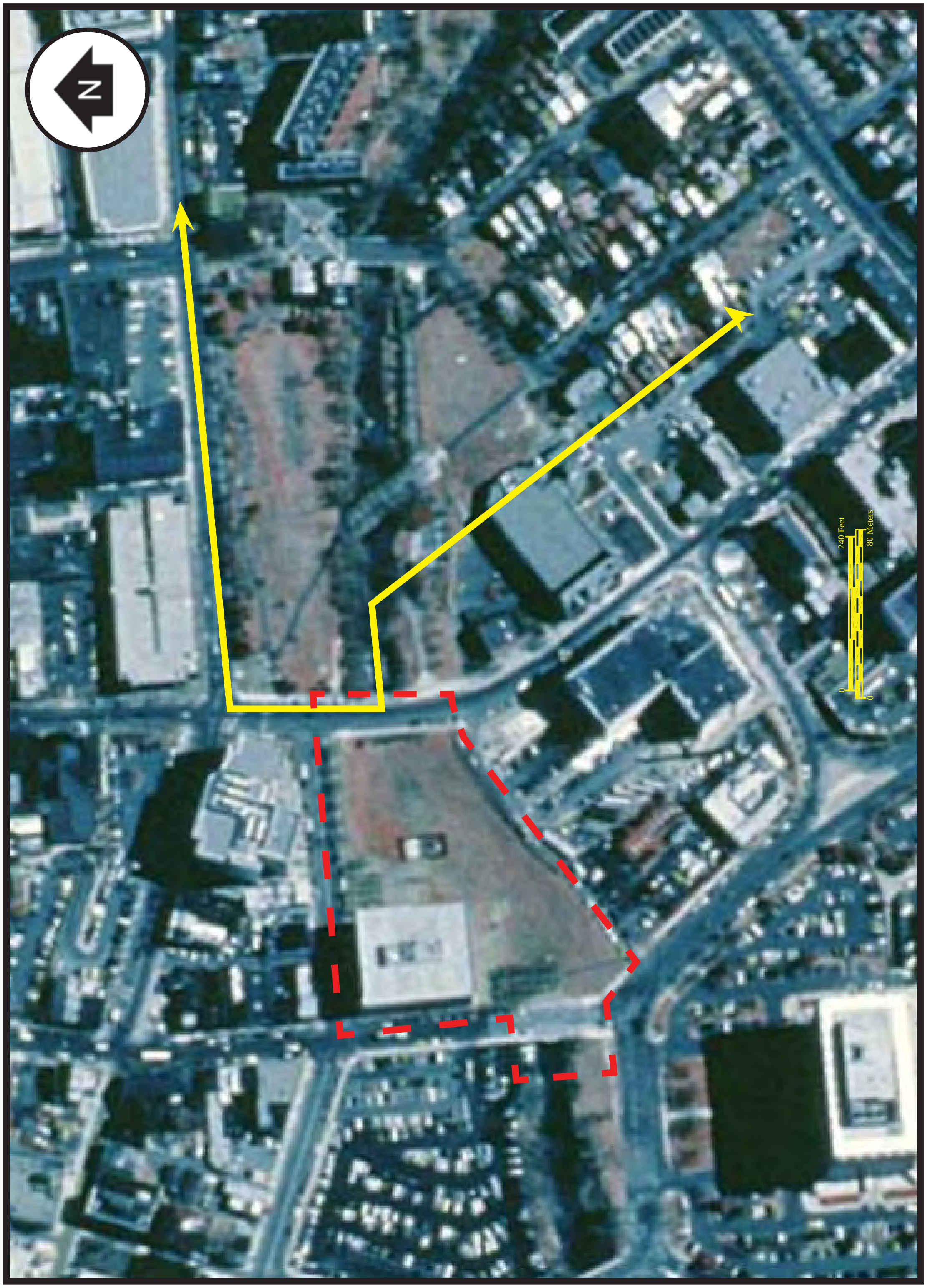


Plate 1.1. Aerial photograph showing the study area (red) and the limits of the Mill Hill Historic District (yellow) (Source: New Jersey Department of Environmental Protection 1995-1997).

by the Advisory Council on Historic Preservation (36 CFR 800); New Jersey Executive Order 215; the "Guidelines for Preparing Cultural Resources Management Archaeological Reports Submitted to the Historic Preservation Office," issued by the New Jersey Historic Preservation Office (NJHPO) in December, 1994; and the various draft and final Historic Context papers issued by the NJHPO as part of the "New Jersey Historic Preservation Plan."

Senior Hunter Research personnel who were responsible for undertaking these investigations meet the federal standards for qualified professional archaeologists as specified in 36 CFR 66.3(b)(2) and 36 CFR 61. All documentation and archaeological materials from this study will be stored at the Hunter Research offices in Trenton, New Jersey until the acceptance of the final report by the appropriate agencies. At this point, these materials and data will be dispatched to the New Jersey State Museum, Trenton, New Jersey or other approved repositories for permanent curation.

B. DEFINITION OF STUDY AREA

No formal archaeological area of potential effect (APE) was established for this Phase I and II archaeological investigation, largely because the project design was insufficiently advanced to permit precise definition of the limits of project-related ground disturbance. Instead an archaeological study area was defined that included the entire block within which the project undertaking will occur plus the locations of the South Broad Street Bridge and the South Warren Street Bridge (see above, Figure 1.3; Plate 1.1). The city block was defined by South Broad Street, Assunpink Way, South Warren Street and East Lafayette Street. Within these broadly defined limits, archaeological studies sought to narrow down specific areas of archaeological sensitivity for future consideration as the project design is developed.

C. DEFINITION OF TERMS

The following definitions are from the Department of the Interior, National Register of Historic Places 36 CFR 63 (Federal Register, Vol. 42, No. 183, Wed. Sept. 21, 1977, pp. 47666-67):

1. A "site" is the location of a significant event, or prehistoric or historic occupation or activity or a building or structure whether standing, ruined, or vanished where the location itself maintains historical or archaeological value regardless of the value of any existing structures.

2. A "building" is a structure created to shelter any form of human activity such as a house, barn, church, hotel or similar structure. "Buildings" may refer to a historically related complex, such as a courthouse and jail or a house and barn.

3. A "structure" is a work made up of interdependent and interrelated parts in a definite pattern or organization. Constructed by man, it is often an engineering project large in scale.

4. An "object" is a material thing of functional, aesthetic, cultural, historical, or scientific value that may be, by nature or design, movable yet related to a specific setting or environment.

D. EVALUATION CRITERIA

The information generated by these investigations was considered in terms of the criteria of evaluation, the guidelines established for making determinations concerning National Register eligibility as outlined by the U.S. Department of the Interior, National Register Program in 36 CFR 60.4:

The quality of significance in American history, architecture, archaeology, engineering, and culture is present in districts, sites, buildings, structures and objects that possess integrity of location, design, setting, materials, workmanship, feeling and association, and:

> A. that are associated with events that have made a significant contribution to the broad patterns of our history; or
>
> B. that are associated with the lives of persons significant in our past; or
>
> C. that embody the distinctive characteristics of a type, period or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
>
> D. that have yielded, or may be likely to yield information important in prehistory or history.
>
> Properties which qualify for the National Register, must have significance in one or more "Areas of Significance" that are listed in *National Register Bulletin 16A.*

Ordinarily, cemeteries, birthplaces or graves of historical figures, properties owned by religious institutions or used for religious purposes, structures that have been moved from their original locations, reconstructed historic buildings, properties primarily commemorative in nature, and properties that have achieved significance within the past 50 years shall not be considered eligible for the National Register. However, such properties will qualify if they are integral parts of districts that do meet the criteria or if they fall within the following categories:

> A. a religious property deriving primary significance from architectural or artistic distinction or historical importance; or
>
> B. a building or structure removed from its original location but which is significant primarily for architectural value, or which is the surviving structure most importantly associated with a historic person or event; or
>
> C. a birthplace or grave of a historical figure of outstanding importance if there is no other appropriate site or building directly associated with his productive life; or
>
> D. a cemetery which derives its primary significance from graves of persons of transcendent importance, from age, from distinctive design features, or from association with historic events; or
>
> E. a reconstructed building when accurately executed in a suitable environment and presented in a dignified manner as part of a restoration master plan, and when no other building or structure with the same association has survived; or
>
> F. a property primarily commemorative in intent of design, age, tradition, or symbolic value has invested it with its own historic significance; or
>
> G. a property achieving significance within the past 50 years if it is of exceptional importance.

E. ASSESSMENT OF EFFECTS AND ADVERSE EFFECTS

Assessments concerning determinations of effect and adverse effect of specific undertakings are based upon the following criteria contained in 36 CFR 800.5, issued December 12, 2000 and published in Volume

65, Number 239 of the Federal Register (pages 77697 through 77739). These regulations took effect January 11, 2001 and were amended effective August 5, 2004:

An adverse effect is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. Consideration shall be given to all qualifying characteristics of a historic property, including those that may have been identified subsequent to the original evaluation of the property's eligibility for the National Register. Adverse effects may include reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance or be cumulative.

Adverse effects on historic properties include, but are not limited to:

(i) Physical destruction of or damage to all or part of the property;

(ii) Alteration of a property, including restoration, rehabilitation, repair, maintenance, stabilization, hazardous material remediation, and provision of handicapped access, that is not consistent with the Secretary's standards for the treatment of historic properties (**36 CFR part** 68) and applicable guidelines;

(iii) Removal of the property from its historic location;

(iv) Change of the character of the property's use or of physical features within the property's setting that contribute to its historic significance;

(v) Introduction of visual, atmospheric or audible elements that diminish the integrity of the property's significant historic features;

(vi) Neglect of a property which causes its deterioration, except where such neglect and deterioration are recognized qualities of a property of religious and cultural significance to an Indian tribe or Native Hawaiian organization; and

(vii) Transfer, lease, or sale of property out of Federal ownership or control without adequate and legally enforceable restrictions or conditions to ensure long-term preservation of the property's historic significance.

F. RESEARCH CONTEXT

The South Broad Street crossing of the Assunpink Creek has been a pivotal point in the landscape throughout the prehistory and history of the Middle Delaware Valley. The first bridge was probably erected in the late 17th century and was repaired and replaced numerous times, most often in response to flood damage or to carry increasing volumes of vehicular traffic. The South Broad Street Bridge location served as an important fording point on the Assunpink within the regional Native American trail network. Trenton's origins as a colonial settlement and market town also derive from this critical river crossing point, and the first large industrial structure in the embryonic Quaker settlement at the Falls of the Delaware - Mahlon Stacy's gristmill – was erected here in the late 1670s. Throughout the colonial period, the gristmill at this location was the primary element in the settlement pattern driving the growth of Trenton as a market town.

The area of study also lies at the core of First and Second Battles of Trenton, fought respectively on December 26, 1776 and January 2, 1777. These engagements were integral to the turn-around in military fortunes that ultimately saw the Continental Army triumph over British forces and secure American independence.

The bridge, mill site and battle site are the best-known historic features at the project location, but this section of the city has an extremely complex and continuous land use history extending from *circa* 1680 to the present day. Trenton's first true steps toward embracing the Industrial Revolution were taken along this stretch of the Assunpink, where its water power supported the growth of an early textile industry in the first half of the 19th century. Land here has since been developed and redeveloped many times over for industrial purposes, and the immediately surrounding area has experienced an equally complicated sequence of residential, commercial and public recreational usage.

G. PREVIOUS CULTURAL RESOURCES WORK RELEVANT TO THE PROJECT

A number of previous cultural resources studies have a bearing on this project and provide valuable historical background and identification of National Register-eligible or listed resources in or near to the study area. Other cultural resources reports relevant to this project include:

- The Assunpink Creek in Mill Hill: A History and Consideration of Historic Interpretive Opportunities (Hunter Research, Inc. 2002a, for the Old Mill Hill Society and New Jersey Historical Commission);
- Phase IA Cultural Resources Investigation, Lower Assunpink Environmental Restoration Project (Hunter Research, Inc. 2003a for the U.S. Army Corps of Engineers, Philadelphia District, and the City of Trenton);
- South Broad Street Bridge Cultural Resources Assessment (Hunter Research, Inc. 2003b, for the New Jersey Department of Transportation [NJDOT]);
- The cultural resources components of A Master Plan for the New Jersey State Capital Park (Wallace Roberts & Todd, L.L.C. 2008, for the State of New Jersey, Department of the Treasury, Department of Property Management and Construction);
- Historic Architectural Survey – South Broad Street Bridge (U.S. Route 206) Bridge Rehabilitation Project (AECOM 2009 for NJDOT);
- Phase I/II Subsurface Archaeological Survey – South Broad Street (U.S. Route 206) Bridge Rehabilitation Project (AECOM 2010 for NJDOT).

These previous reports were reviewed and found to provide a significant level of baseline data for understanding the historical background of the study area. The Hunter Research report for the South Broad Street Bridge (2003b), in particular, offers a detailed history of the study area with a specific focus on the land-use history of the properties that existed to either side of the bridge and along the south bank of the Assunpink between South Broad and South Warren Streets. Chapter 4 of the current report draws extensively on this earlier report. The AECOM architectural survey (2009) includes updated intensive-level architectural survey forms for properties within the visual sight lines of the South Broad Street Bridge, which for all intents and purposes is the same as the sight lines for the Assunpink Creek Restoration Project for architectural properties over 50 years old.

The Section 106 compliance studies prepared by Hunter Research, Inc. (2003a, 2003b) and AECOM (2009) identified the following National Register-listed or eligible architectural resources within, or adjacent to, the current project study area:

- **South Broad Street Bridge over the Assunpink Creek.** The South Broad Street Bridge was determined eligible for the National Register of Historic Places on December 12, 1979, by the Office of New Jersey Heritage (the forerunner of the New Jersey Historic Preservation Office [NJHPO]). This determination stemmed from an earlier opinion of eligibility provided by the State Historic Preservation Office on May 31, 1980 which was based on a cultural resource study (Springsted 1979). The bridge's National Register eligibility was reaffirmed in the more recently completed statewide survey of historic bridges (A.G. Lichtenstein & Associates 2001).

  The South Broad Street Bridge is the most prominent historic feature in the study area and has long been regarded an important Trenton landmark. A bridge was first established at this crossing *circa* 1688, and that early bridge, undoubtedly a timber structure, was eventually replaced by a stone-arched structure *circa* 1766. On December 26, 1776 and on January 2, 1777, that structure played witness to the First and Second Battles of Trenton during which American forces under the command of General George Washington in the first instance blocked the retreat of Hessian units and in the second instance repelled a British advance by taking the high ground on the south side of the creek and preventing the British from crossing the bridge. In 1822, a flood on the Assunpink swept away much of the stone bridge, and it was reconstructed, an unfortunate event that was repeated in 1843. Some interior portions of the existing bridge are assumed to date to these rebuilding episodes and there is the possibility that some fabric of the original stone arch bridge of *circa* 1766 remains or was reused in the subsequent rebuilding episodes. In 1870, the stone-arch bridge took on its present form when the roadbed was raised and the bridge widened to both sides by stone arch extensions (Hunter Research 2003b:5-13 to 5-16).

  The South Broad Street Bridge today is difficult to appreciate since so much of it is buried by the earth fill that has been placed against its side walls. The present visible portion of the South Broad Street Bridge is a 60-foot wide stone arch that straddles the creek in a 50-foot span. The entire structure is estimated to measure 160 feet long although only about half that length is currently visible due to the earth fill. A second arch span, approximately 28-foot long, exists buried under the fill at the southern end of the bridge. This second span crosses a former mill race associated with the Eagle Factory site, a textile mill built in 1814-15 that was located at the bridge's southwest quadrant. Photographic evidence from *circa* 1870 suggests that a third smaller arch likely exists deeply buried between the two known arches (see below, Plate 4.7). In some measure, the bridge, although properly categorized as a structure using the National Register of Historic Places categorizations, also has the characteristics of an archaeological site since so much of it is now a subsurface feature that spans the remains of buried mill raceways.

- **The Mill Hill Historic District**. In 1977, the Mill Hill Historic District was added to the New Jersey and National Registers of Historic Places (Greiff and Ashton 1976). The western boundary line of the district extends along the eastern curb of South Broad Street and thus is located about 60 feet east of the Assunpink Creek Restoration Project. The district is not within the archaeological study area but it is within sight of the undertaking. The district includes Mill Hill Park, the Assunpink Creek, and the residential community lying to the east of South Broad Street on Clay, Mercer, Jackson, Market and Livingston Streets and Greenwood Avenue.

- **Proposed Mill Hill Historic District Extension**. It should be noted that in 1979, the NJHPO opined that "although the [South Broad Street] bridge is eligible on its own merits, it should more appropriately be included within the Mill Hill Historic District" (Wilson 1979). NJDOT's consultant concurred with the extension in their historic architectural survey of the South Broad Street Bridge rehabilitation project area in 2009. Adoption of this boundary extension would place the district's boundary line along the western edge of the South Broad Street Bridge's right-of-way and immediately adjacent to the Assunpink Creek Restoration Project undertaking (AECOM 2009:4-1).

- **Crossroads of the American Revolution National Heritage Area.** The entire City of Trenton lies within the Crossroads of the American Revolution National Heritage Area, designated by President Bush in October, 2006 (National Park Service, Northeast Region, Philadelphia Support Office 2002). Within this context, the area around the South Broad Street Bridge, with its rich Revolutionary War-era history, could ultimately benefit from envisaged programs and financial resources stemming from this designation. In addition, the National Park Service's American Battlefield Protection Program, which provides technical assistance and grants for the planning and preservation of battlefield sites, is potentially relevant to the current study.

- **Prior Archaeological Investigations.** No prior archaeological subsurface testing was found to have occurred within the study area with the exception of shallow test trenches excavated at the corners of the South Broad Street Bridge. In 2008, AECOM under contract with NJDOT conducted limited Phase I and II archaeological testing at each quadrant of the South Broad Street Bridge as part of the South Broad Street Bridge rehabilitation study. For the purposes of our project, the two tests of relevant interest were located on the western side of the bridge. Archaeological testing in the northwest quadrant consisted of a 10-foot by 8.5-foot trench below the bridge's sidewalk pavement to a depth of 4 feet. This testing encountered a rubble masonry wall that was interpreted as part of the *circa* 1822 or 1843-44 bridge reconstruction.

NJDOT's archaeological testing in the southwest quadrant consisted of an 18-foot by 6.5-foot trench to a depth of approximately 6 feet. This testing, which straddled the bridge's western facing wall, encountered the buried southern archway opening spanning the former mill race. Although this testing was not deep enough to reach the bottom of the raceway, some timber features were found within the arch opening and interpreted as being possible raceway features. NJDOT's consultant concluded that additional archaeological investigation in areas approximate to the bridge's western face did have the potential to yield significant information about the historic bridge and raceways (AECOM 2010:6-7, 8).

Chapter 2

GEOGRAPHICAL SETTING

The area of archaeological study comprises the city block defined by South Broad (formerly Queen and Greene) Street, Assunpink Way (formerly Factory Street), South Warren Street and East Lafayette Street, including also the South Broad Street and South Warren Street bridges over the Assunpink Creek (Figure 1.2; see below, Figure 5.1). This block contains one six-story state office building housing the Department of Human Services at the southeast corner of South Warren and East Lafayette Streets, but is otherwise presently vacant land.

Although the pre-urban drainage and topography in this section of downtown Trenton are difficult to discern within today's cityscape, two streams flow into the Delaware River in the immediate project vicinity. The larger of these two drainages is the Assunpink Creek, which bisects the archaeological study area. The Assunpink Creek rises in the Inner Coastal Plain and flows south and west through the City of Trenton, before finally disgorging into the Delaware River. The section of the Assunpink between South Broad and South Warren Streets flows within a buried culvert in a grassy swale. The sections of the creek immediately upstream from South Broad Street and downstream from South Warren Street flow through a relatively steep-sided channel bordered by urban fill.

A second, much smaller stream, known as Petty's or Pettit's Run, is another first-order tributary of the Delaware River that now flows mostly underground, passing just west of the War Memorial. Petty's Run originates in the northern part of Trenton and flows due south, joining the Delaware River immediately upstream of Assunpink Creek. Over the past two hundred years or so, the configuration of the Delaware River/Assunpink Creek/Petty's Run confluence has undergone considerable change, with the mouth of Assunpink Creek shifting progressively upriver. The location of the South Broad Street crossing of the Assunpink, however, has remained essentially fixed over time, in large part because of its geological underpinning.

Trenton is located on the eastern margins of the Piedmont physiographic province close to the Inner Coastal Plain. The underlying geology consists of silts, sands and gravels, which overlie bedrock of Precambrian gneiss. The term "gneiss" is used in a generic sense here, for this indigenous metamorphic material is also variously referred to as mica schist, schistose with muscovite and Wissahickon schist. Historically, the gneiss has been an important building material, being widely used for foundations, property walls and stone buildings until well into the 19th century (Widmer 1963; Wolfe 1977; Chittick and Kalb 1980; Kalb *et al*. 1982).

Prior to the urban development of the past century or so, the confluence of the Assunpink Creek and Petty's Run with the Delaware River was composed of an area of gravel flats. These flats, which underlie much of the area downstream of South Warren Street, are now deeply buried beneath fill and were extensively built over in the late 19th and early 20th centuries. The former New Jersey State House complex parking lot (now in the process of being re-landscaped as parkland), the War Memorial and the Labor and Industry Building with their attendant parking areas cover most of this zone today. Immediately to the west, the river bottom in this section of the Delaware River (between Calhoun Street and U.S. Route 1 Freeway Bridges) is extremely rocky. This is the location of the "Falls of the Delaware," where the mica schist bedrock

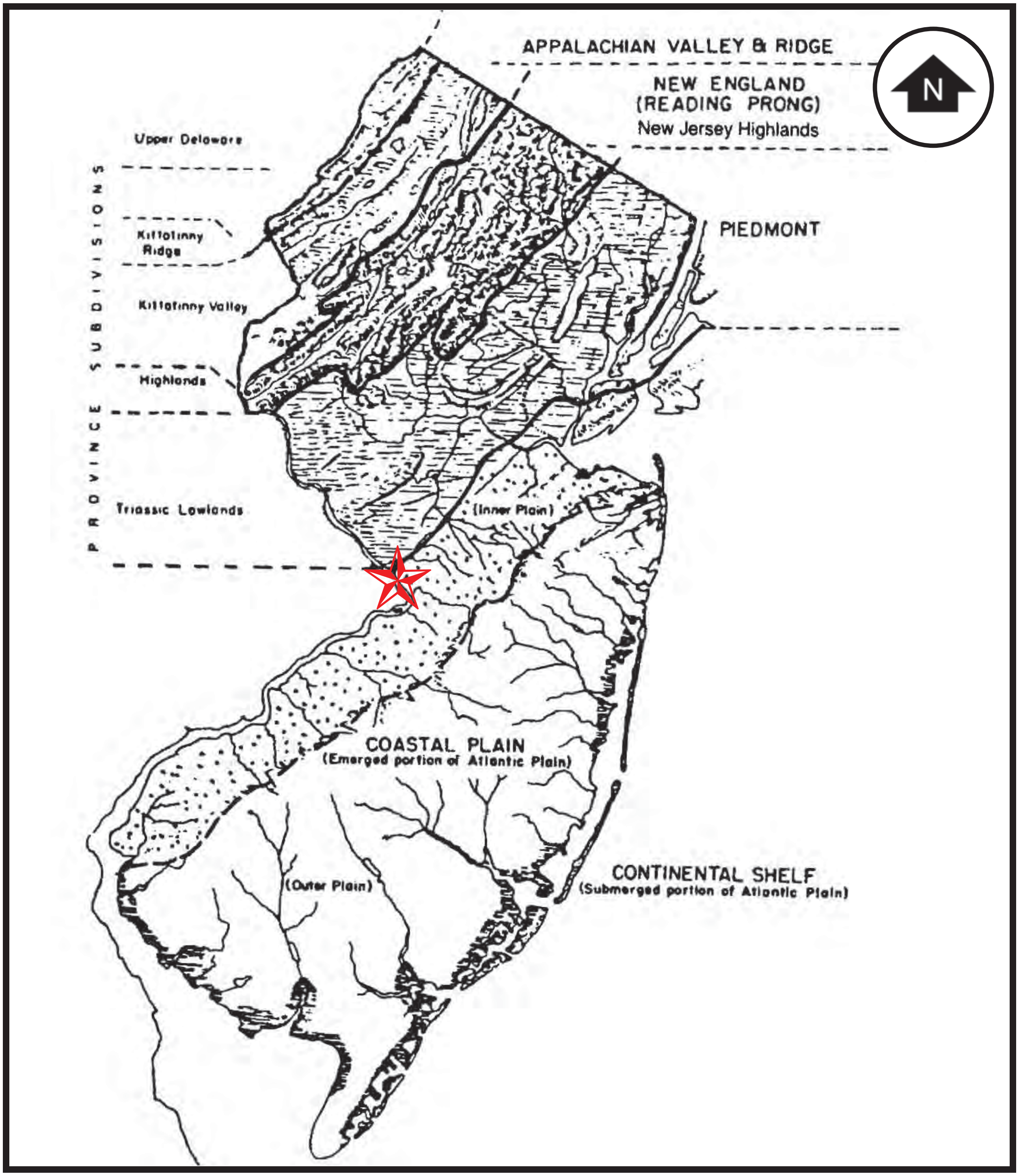


Figure 2.1. Physiographic Location of Study Area (starred).

outcrops in the valley floor and where the river was fordable in prehistoric and historic times. The South Broad Street crossing of the Assunpink Creek occupies a similar geological setting to the "Falls of the Delaware" in that the creek bed at this location is also composed of bedrock of mica schist.

Chapter 3

PREHISTORIC SETTLEMENT PATTERNS AT THE FALLS OF THE DELAWARE

Early human groups, termed Native Americans, apparently began to inhabit eastern North America approximately 12,000 to 13,000 years ago, and their occupation continued until the arrival of the Europeans during the late 16th and 17th centuries. The prehistory of New Jersey is conventionally divided into four major cultural periods: Paleo-Indian (*circa* 12,000 10,000 B.P.); Archaic (*circa* 10,000 - 3,000 B.P.); Woodland (*circa* 3,000 - A.D. 1600); and Contact (after *circa* A.D. 1600). Each of these prehistoric periods can be divided into early, middle and late sub periods (e.g. Early Archaic, Middle Archaic and Late Archaic) which are characterized by their own distinctive technologies, and by subsistence and settlement strategies developed in response to continually changing social environments.

In a localized sense, Native Americans enjoyed a very close relationship with the natural environment, which involved their adapting to seasonal fluctuations in the availability of plant and animal resources and acquiring a detailed knowledge of the location of varied lithic and organic raw materials. For recent detailed overviews of New Jersey prehistory, the reader is referred to *New Jersey's Archaeological Resources from the Paleo-Indian Period to the Present: A Review of Research Problems and Survey Priorities*, edited by Olga Chesler (1982), to two volumes by the late Herbert C. Kraft: *The Lenape: Archaeology, History, and Ethnography* (1986) and *The Lenape-Delaware Indian Heritage 10,000 BC to AD 2000* (2001), and to R. Alan Mounier's *Looking Beneath the Surface: The Story of Archaeology in New Jersey* (2002).

The Middle Delaware Valley has long been recognized as one of the most intensively occupied areas of prehistoric settlement in the entire Middle Atlantic region. The best-known and probable primary focus of prehistoric habitation and natural resource exploitation in this area is represented by the Abbott Farm National Historic Landmark, a cluster of sites in the wetlands, floodplain terraces and adjoining uplands bordering the confluence of the Delaware River and Crosswicks Creek, about one mile downstream from the study area (Figure 3.1).

Another major focus of prehistoric settlement in the Middle Delaware Valley was centered around the confluence of the Delaware River, the Assunpink Creek and Petty's Run, an area that today lies entirely within the present-day built-up area of the City of Trenton and which includes the current study area. The various islands within the Delaware River in the Trenton vicinity, as well as floodplain and blufftop settings on the Pennsylvania side of the river, have also produced prolific evidence of prehistoric activity. In many respects, it is misleading to distinguish between these prehistoric loci; they were all likely interrelated functionally, if not temporally, and their physical limits in the landscape are governed as much by underlying geographic and environmental factors (and current land use) as by cultural differences (Hunter Research, Inc. 1997, 2002b).

Trenton and its environs are situated at the "fall line" of the Delaware River drainage, the geological demarcation between the Coastal Plain and Piedmont physiographic provinces in New Jersey. This boundary, marked by a series of rapids in the Delaware River, also coincides with the approximate head of tide, although the waters just downstream from the fall line remain relatively fresh, except during periods of extreme drought. A secondary fall line may also be recognized along the Assunpink Creek at roughly the point where South Broad Street crosses this first-order tributary of the Delaware. At this point in the landscape, there is a mica schist outcrop much like that in the Delaware between the "Trenton Makes" and Calhoun Street bridges, where the Assunpink is fordable at its furthest downstream point. It is no coincidence, therefore, that the alignments of North and South Broad Streets on the north side of the creek, and of South Broad Street on the south side of the creek, roughly follow the course of an Indian trail that ran along the east side of the Middle Delaware Valley from the Trenton area down toward present-day Bordentown and Burlington.

The Trenton vicinity was an ideal location for prehistoric settlement largely because of the accessibility of a wide variety of exploitable habitats. From at least the Archaic period onward, the tidal wetlands at the mouth of Crosswicks Creek just south of Trenton offered a rich range of plant and animal resources, while anadromous fish, ascending the Delaware to spawn, provided a reliable, high-volume food source which could be easily harvested from local waters during the early spring. The adjoining uplands provided a dependable drinking water as well as supplemental food resources not found in the wetlands and floodplain terraces. Finally, the Pleistocene terrace gravels contain an abundance of cobbles, a suitable source material for the fabrication of lithic tools, while outcrops of other raw materials such as argillite, jasper and chert are found nearby along the banks of the Delaware River, the Assunpink Creek and other larger streams (Stewart 1990).

Many of the factors that made this area attractive to prehistoric populations also made it attractive to early European settlers. Throughout the length of the Atlantic seaboard, head-of-tide and fall line locations along major rivers were the focus of initial European settlement and urbanization, as seen in Mid-Atlantic cities such as New York, New Brunswick, Trenton, Philadelphia, Wilmington and Baltimore. As a result of intense urban development pressures, many fall line prehistoric sites have been destroyed, a circumstance exacerbated by the widespread perception that no important prehistoric sites are preserved within developed urban settings. However, intensive urban land use does not necessarily negate the possibility of archaeological preservation. Recent excavations conducted in downtown Trenton very near and directly adjacent to the current study area, within Mahlon Stacy Park, at the Old Barracks and Thomas Edison State College, and on the sites of the new State House Garage and the Water's Edge residential care facility and along the N.J. Route 29 corridor, all provide a striking reminder that significant prehistoric archaeological deposits can be preserved beneath urban fill (e.g., Hunter Research, Inc. 1996, 2002b).

Loci of prehistoric activity on the bluffs to the south of Trenton and around the Crosswicks Creek confluence first began to be identified in the late 1860s and 1870s by Dr. Charles Conrad Abbott, a local antiquarian (Horan 1992; Kraft 1993; Hunter Research, Inc. 2009). Abbott initially characterized his finds as evidence of "Paleolithic" occupation of the North American continent, comparable in age to Paleolithic sites that were being identified around the same time in northern Europe (Abbott 1872; 1876). A major scholarly debate over the antiquity of man in North America then ensued, lasting more than half a century, in which Abbott's writings and continuing archaeological explorations in the "Trenton gravels" played a critical role. A number of sites in the Trenton area were subsequently studied in great depth by various archaeologists – notably by Abbott's protégé, Ernest Volk, who worked extensively in the Lalor Fields area under the sponsorship of Harvard University's Peabody Museum in the period *circa* 1890-1910 (Volk 1911), and by Dorothy Cross, who performed a series of wide-ranging excavations on the bluffs and terraces overlooking Watson's Creek for the New Jersey State Museum's Indian Site Survey between 1936 and 1941 (Cross 1956). By 1910, however, Abbott's contention

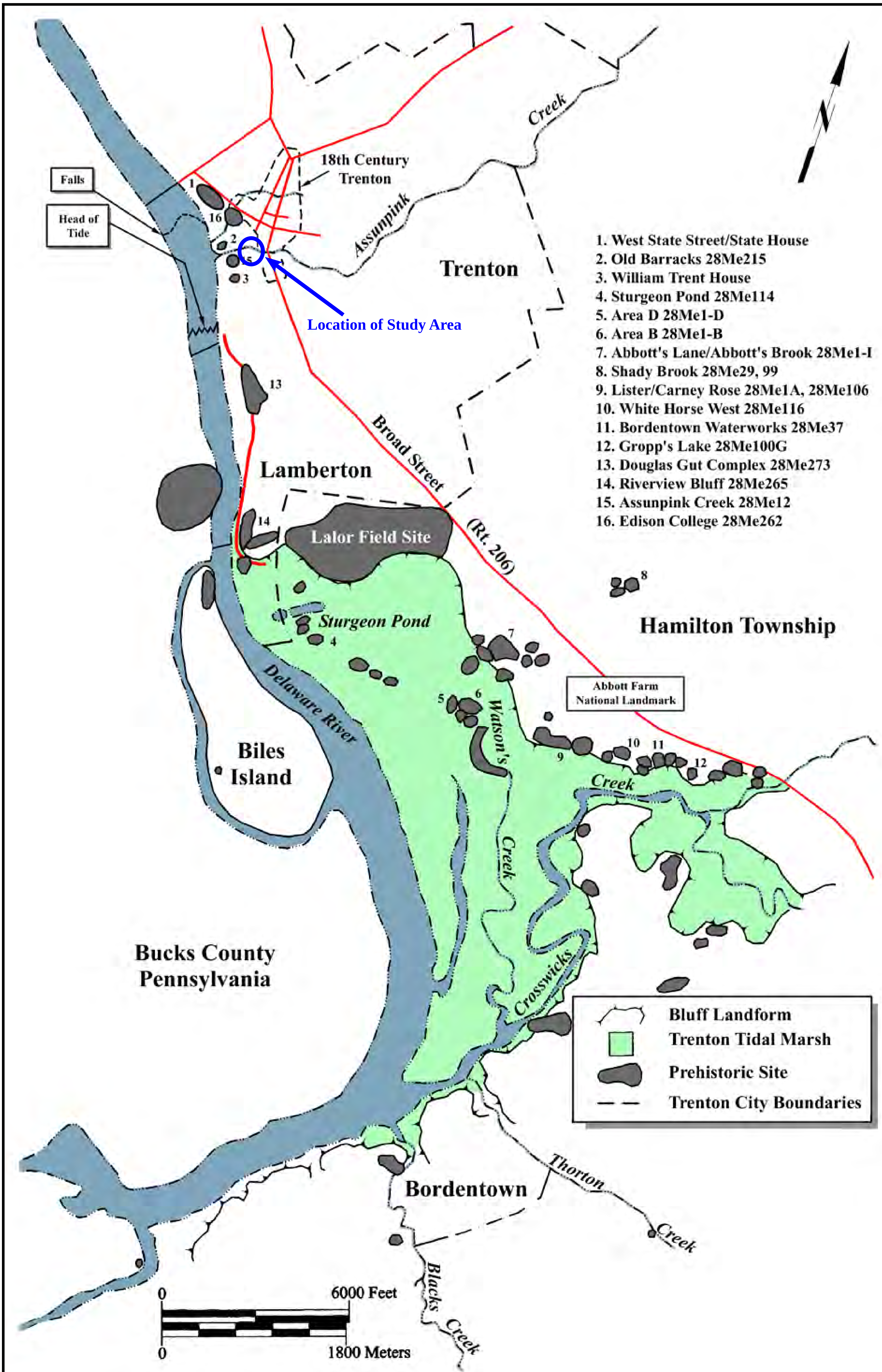


Figure 3.1. Previously Documented Prehistoric Sites within Study Area Vicinity.

that a human presence in the Delaware Valley extended back many tens, perhaps hundreds, of thousands of years into the glacial era had been largely discredited and a general consensus was instead gradually building around a post-glacial human chronology for the eastern United States of some 10,000 to 15,000 years.

In recent decades, largely as a result of Cross's work, the group of prehistoric sites clustered around the mouth of Crosswicks Creek and ranged along the bluff edge from Riverview Cemetery to Bordentown has become known as the Abbott Farm site or complex, an archaeological entity formally recognized since 1976 as the Abbott Farm National Historic Landmark. This proliferation of prehistoric occupation ranges in date from the Paleo-Indian through the Contact period and clearly reflects a concentrated exploitation of the rich confluence and tidal headwaters environment in this section of the Delaware Valley. Overall, archaeological data show an intensification of activity in this area through the Archaic period and into the Middle Woodland, possibly tailing off slightly in the Late Woodland and Contact periods in response to changes in subsistence habits and shifts in the settlement pattern.

The zone of prehistoric occupation around the mouth of the Assunpink Creek, roughly two-and-a-quarter miles northwest of the core of the Abbott Farm complex, is less well understood, chiefly because of the obscuring effects of the urban landscape. Not surprisingly, the urban cover has greatly limited the areas available for archaeological examination and far less work has consequently been undertaken. It has only been over the past two decades or so that any rigorous or systematic study of prehistoric (and early historic) archaeological resources has taken place within Trenton's downtown core, even though primary and secondary sources make reference to Late Woodland/Contact period occupation of the floodplain around the confluence of the Assunpink Creek and the Delaware River. Earlier this century, a local collector, Charles Rau, is reported to have recovered prehistoric artifacts on the south bank of the Assunpink Creek and, largely on the basis of this information, the New Jersey State Museum has registered a Native American site in this general vicinity [28Me12] (Skinner and Schrabisch 1913:65; Johnson 1925:165-166, 309-310; Cross 1956:186; New Jersey State Museum site maps and files).

Various recent archaeological explorations conducted in the downtown Trenton area in connection with redevelopment and restoration projects have enabled some semblance of a picture to be pieced together of what appears to have been an intensive and quite widespread Native American presence around the mouth of the Assunpink extending through the Archaic and Woodland periods up to the arrival of the first Europeans. Similar to the cluster of prehistoric sites at the Crosswicks Creek confluence, the downtown Trenton prehistoric occupation is evident both in the floodplain and on the adjacent upland terraces.

On the tongue of land between the Assunpink Creek and Petty's Run, which displays a two-step terrace dropping down to the southwest from present-day West State Street, important prehistoric finds have been made both at the lower elevation on the property of the Old Barracks [28Me125] and at the upper level on the Thomas Edison State College site [28Me262]. The Old Barracks property has been the scene of detailed archaeological investigations over a period of several years and has yielded artifacts dating from the Late Archaic through Contact periods, with particular concentrations of Late Woodland material. Of special note is a single pit feature, radiocarbon-dated to the early Late Woodland period, which contained large amounts of lithic debitage, thermally-altered rock, bone, hickory nut hull fragments and 44 ceramic sherds representing at least three individual vessels (Kardas and Larrabee 1983, 1987, 1988; Hunter Research Associates 1989; Historic Sites Research, Inc. 1990; Hunter Research, Inc. 1991; Martin 1991).

A program of archaeological data recovery conducted (and, as yet, unreported) by Hunter Research in 1996 at the Thomas Edison State College site, less than 200 feet upslope to the northeast of the Old Barracks, has confirmed and elaborated on earlier suggestions of prehistoric occupation in this area. Patches of significant prehistoric cultural stratigraphy, from the Archaic and Woodland period, are among the finds from this site perched within 100 feet of the bluff rim (Mounier 1996).

Moving northwest along the bluff rim from Edison College (along the southwest side of today's West State Street through the New Jersey State House complex), there remain pockets of intact archaeology between the various State of New Jersey office buildings and related facilities. One such pocket [28Me245] was delineated and investigated prior to the recent construction of the underground parking garage between the State House Annex and the New Jersey State Library. Evidence of predominantly Archaic period occupation was recorded in this location, a fragment of what one may reasonably assume was a zone of occupation extending along the bluff north of the Assunpink Creek confluence (Hunter Research, Inc. 1993).

The evidence on the south side of the Assunpink Creek is similarly piecemeal, but no less convincing, of a pervasive Native American presence. Recent test excavations conducted in connection with the restoration of the William Trent House indicate that this early 18th-century house site sits atop a low knoll-like landform within the floodplain close to both the Delaware and the Assunpink. Mixed in with historic cultural materials, and also present in undisturbed strata beneath the historic period deposits, were numerous prehistoric artifacts reflecting Late Archaic period usage of this site (Hunter Research, Inc. 1995). In connection with a second phase of restoration at the William Trent House, archaeological testing and monitoring have produced further evidence of Native American occupation (Hunter Research, Inc. 2003). A quarter mile to the southeast, on the site of the Water's Edge residential care facility, immediately adjoining the N.J. Route 29 corridor, a limited program of data recovery was undertaken for Archaic and Woodland period deposits [28Me268] identified within the building construction zone (Hunter Research, Inc. 1989, 1992). Archaeological investigations undertaken in advance of the recent reconstruction of N.J. Route 29 have resulted in the identification of additional prehistoric resources of basically the same period and type [28Me265; 28Me273] (Hunter Research, Inc. 1996, 2002b). The existence of these resources provides clear evidence that the Delaware River frontage in the vicinity of Trenton was a prime area for prehistoric occupation.

Finally, although this brief outline of the prehistory of the Trenton vicinity has focused primarily on the dominant clusters of sites on the New Jersey side of the Delaware River around the mouths of Crosswicks Creek and the Assunpink Creek (because of their proximity to the study area), the full scope of prehistoric activity around the falls of the Delaware stretches beyond and between these two areas, on to the islands in the river itself, and over to the Morrisville area on the opposite bank where the local group of Lenape Indians known as the "Sankhickan" were concentrated at the time of European contact (Johnson 1925: opp.156, 380). In addition, as a major regional focus of Native American activity, the sites around the falls of the Delaware serve a hinterland that extends throughout much of the Delaware watershed and parts of many adjoining drainages in the Piedmont and Inner Coastal Plain of New Jersey and Pennsylvania. Spread throughout this zone of influence is a dense web of villages, camps, stations, trails, navigable streams and resource exploitation having physical expression in the landscape and archaeological deposits.

Chapter 4

LAND USE HISTORY

The stretch of the Assunpink Creek between the South Broad Street and South Warren Street crossings has an extraordinarily complex and multi-faceted history that dates back to the period of earliest permanent European settlement around the Falls of the Delaware. Europeans, like Native Americans before them, gravitated to this place in the landscape where both the Assunpink Creek and the Delaware River could be forded at their furthest points downstream. The spot where present-day South Broad Street crosses the Assunpink was also a choice location for the development of water power, an easily accessible place where mills could be built, raw materials brought in and processed goods transported out. This convergence of overland transportation routes and industrial opportunity explains the origins, growth and continuing existence of Trenton as an urban place. Similar geographical explanations may be seen in the important role that Trenton played during the early years of the Revolutionary War when this militarily strategic location sat precariously balanced between American Philadelphia and British New York.

This chapter, which draws extensively and builds upon research and documentation compiled for the Old Mill Hill Society under a grant from the New Jersey Historical Commission (Hunter Research, Inc. 2002) and on studies conducted for the New Jersey Department of Transportation in connection with the planned rehabilitation of the South Broad Street Bridge (Hunter Research, Inc. 2003b; AECOM 2009, 2010), presents a narrative, for the most part chronologically arranged, that weaves the detailed history of the river crossings (the bridges) and the local industry (the mills) into a broader pattern of Trenton's past. The emphasis of this narrative is focused mostly on the study area (i.e., the city block defined by South Broad Street, Assunpink Way, South Warren Street and East Lafayette Street), but an effort is also made to place this specific piece of ground within the broader context of the surrounding property.

A. THE FIRST SETTLEMENT, THE FIRST MILL AND THE FIRST BRIDGE

In the late 17th century, the area of study lay at the northern limit of the English settled areas in the province of West New Jersey. The lower section of the Assunpink Creek drainage effectively formed the northern and upstream limit of the Yorkshire (or Upper or First) Tenth, a subdivision of West Jersey that extended from the Falls of the Delaware south to the Rancocas Creek. Acquired from the West Jersey Proprietors in 1676 by a group of English Quakers, most of whom hailed from Nottinghamshire, Derbyshire and South Yorkshire in the Midlands, the Yorkshire Tenth contained approximately 64,000 acres.

In 1678, the first wave of settlers headed for the Yorkshire Tenth arrived at Burlington aboard the *Shield*, spurred in part by the economic prospects of the New World and in part by a desire for a measure of religious toleration that was less than forthcoming at home. In the spring of 1679, these initial settlers traveled the short distance upstream from Burlington to the Falls of the Delaware where they proceeded to set up the first farmsteads on the bluffs and terraces overlooking the Delaware River and the mouth of the Assunpink. From 1681, this area fell under the jurisdiction of the court established at Burlington, the emerging port that in 1694 became the seat of the county then formally constituted with the same name.

In 1688, land within the Yorkshire Tenth extending between the Assunpink and Crosswicks Creek became the basis for the municipality named Nottingham Township. In 1700, land extending northward from the Assunpink became a part of Hopewell Township, newly created within Burlington County in this year (Snyder 1969).

Incipient settlement at the Falls of the Delaware, on both sides of the Delaware River, is evident on an early map copied in 1679 by Jasper Danckaerts, a member of a Labadist sect who was sent to the New World in order to scout locations for a planned Labadist settlement (Figure 4.1). The Danckaerts map marks the course of the Assunpink Creek as “Mill River” and shows a wagon route leading south from the creek to the point of the bluff at present-day Riverview Cemetery. The point of intersection of the wagon route and Mill River likely corresponds with the present-day location of the South Broad Street bridge over the Assunpink and almost certainly was the site of Mahlon Stacy’s gristmill, erected in the same year that Danckaerts produced his map. Danckaerts himself, accompanied by Peter Sluyter, also traveled to the Falls of the Delaware at this time. The pair visited the mill and apparently stayed overnight at Stacy’s house, uncomfortably by all accounts (Trenton Historical Society 1929:32; James and Jameson 1959:96-97).

Mahlon Stacy, a native of Handsworth, near Sheffield in Yorkshire, was the original Quaker settler on the Assunpink Creek at the Falls of the Delaware. The holder of two full proprietary shares within the province of West Jersey and a tanner by trade, Stacy laid claim to a large and desirable property that straddled both sides of the Assunpink. He established the main house on his plantation (named “Ballifield” after his ancestral home in England) in the vicinity of the present-day William Trent House and erected his gristmill, probably a small one or one-and-a-half story frame structure, a short distance upstream on the south bank of the Assunpink. The creek was variously known during this period as the Assunpink (often spelled Assanpink), the Sun Pink or St. Pink, the Derwent (a common river name in northern England), the Darwin and the Darion.

Danckaerts was unimpressed by Stacy’s gristmill, noting that it “could not stand long, especially if the flow of water was very heavy, because the work was not well arranged” (James and Jameson 1959:96-97). Notwithstanding these observations, the gristmill developed into a successful agricultural processing operation serving incoming settlers, and Stacy soon broadened the scope of the enterprise by shipping grain and meal to communities downstream. During this early settlement period, in the final quarter of the 17th century, Stacy’s mill on the Assunpink and Thomas Olive’s mill on the Rancocas Creek were the only two large gristmills operating in the Middle Delaware Valley in West Jersey. Stacy, because of his substantial landholdings at the Falls of the Delaware and position as a mill owner, soon became commercially and politically prominent within the province. Besides being a leading West Jersey trader, he also served as a justice, a member of the Burlington City Council and as a representative in the provincial General Assembly.

While Stacy’s gristmill was becoming an increasingly important economic hub in the landscape, no less critical was the need to maintain a crossing of the Assunpink at the mill site. This location was the furthest downstream point on the creek where overland travelers, passing up the east or West Jersey side of the Delaware Valley, could conveniently cross the stream and continue north into Hopewell and the Amwells. Quite possibly, the establishment of a mill seat at this location, with its attendant mill dam, pond and raceways, interfered with the creek crossing, especially when floods washed out the dam.

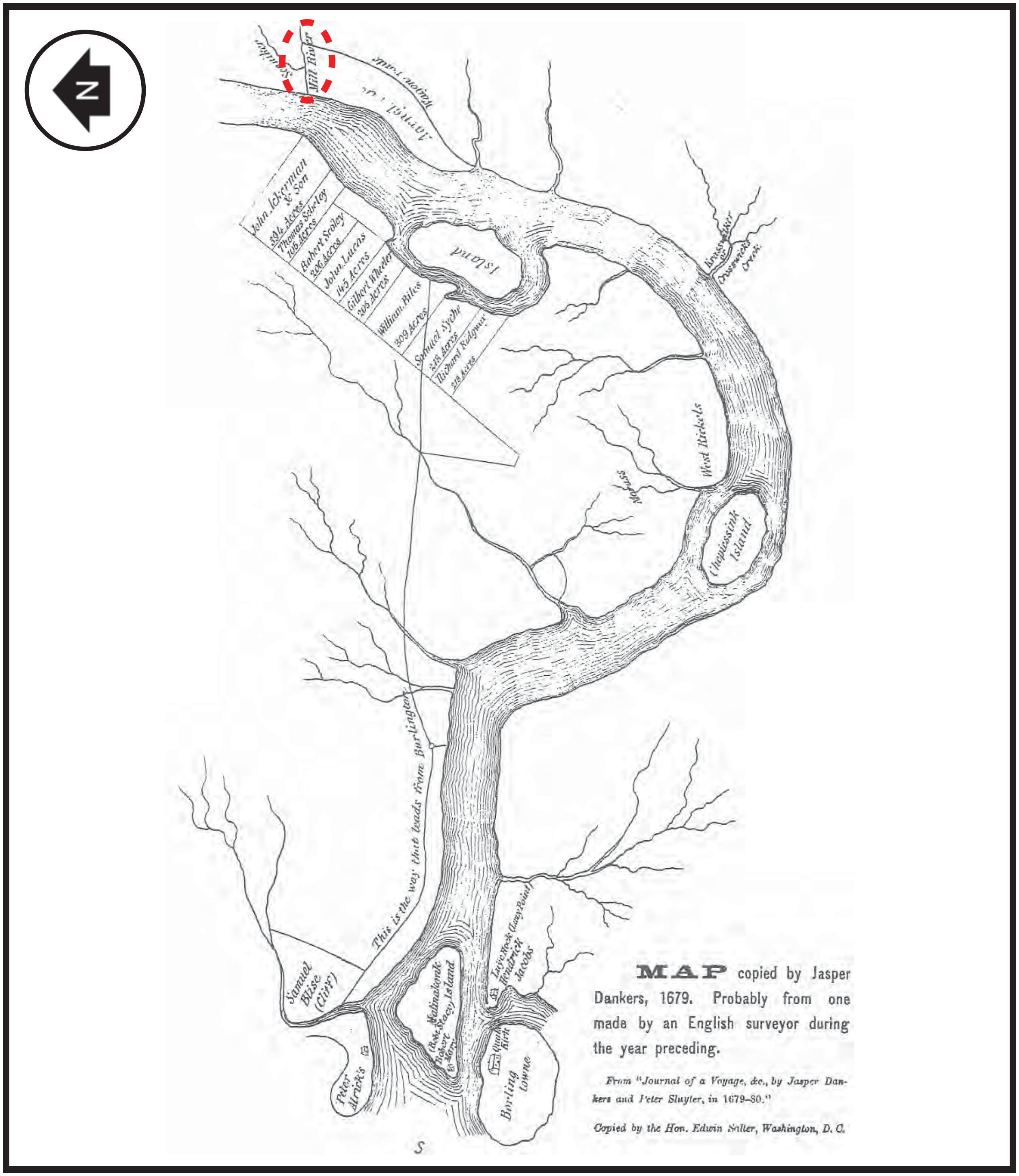


Figure 4.1. Danckaerts, Jasper. *Map of the Delaware from Burlington to Trenton*. *Circa* 1679. (Reproduced in Bisbee 1976). Scale: 1 inch: 1.5 miles (approximately). Study area circled.

In 1688, the Grand Jury of Burlington County noted that Nottingham Township had failed to make “a sufficient bridge” over the “River Darwin” (Reed and Miller 1944:91). The court determined that it would levy a £20 fine if the structure was not erected shortly thereafter. A bridge over the Assunpink was apparently then constructed later in the same year. Most likely, this bridge would have been a wooden structure, and one may assume that it underwent periodic repairs in subsequent years. In 1707, for example, Samuel Oldale complained that he had not received payment for building - or rebuilding - the wooden bridge. Not long after, in 1712, Hopewell Township resolved to raise £20 in taxes to put towards the repair of the bridge. At the same time, William Green presented a bond to continue repairs for 15 years (Podmore, 31 August 1957; Toothman 1977:159).

B. WILLIAM TRENT AND TRENT’S MILL

In 1714, lands lying to the north of the Assunpink Creek - in both Hopewell Township and communities further to the north - were set off as part of the newly formed Hunterdon County. By 1719, the Hopewell Township portion of the study area lying north of the Assunpink Creek was regarded as being a part of Trenton Township in Hunterdon County. The primary basis for these governmental reassignments lies in the appearance on the local scene of William Trent (see below). Lands to the south of the Assunpink Creek continued to remain a part of Nottingham Township in Burlington County during this period (Snyder 1969).

In the same year that Hunterdon County was created, Mahlon Stacy died, leaving his considerable estate of Ballifield to his son, Mahlon Stacy, Jr. The younger Stacy promptly sold 800 acres of his father’s property to William Trent, a prominent merchant from Philadelphia. A resurvey of the Stacy landholdings was also completed in 1714, presumably to facilitate the transfer of land to Trent (Figure 4.2). The survey map depicts the Stacy mill on the southern bank of the Assunpink Creek as well as several other smaller structures that were likely related to the milling operation (perhaps mill workers’ dwellings or other secondary agricultural processing facilities).

The Stacy survey map also identifies the Maidenhead Road heading northward away from the Assunpink Creek, a route that soon became better known as the King’s Highway or the Brunswick Road and which corresponds to present-day North Broad Street, Brunswick Avenue and U.S. Route 206. In existence by at least 1699 (and probably earlier because of the presence of the bridge over the Assunpink), the North Broad Street segment of the Maidenhead Road that extended from the creek to its junction with the Hopewell-Pennington Road (today’s Pennington Avenue) was also later known as Queen Street and then, still later, as Greene Street (Toothman 1977:119). The road network on the south bank of the creek bears little relation to the present-day street pattern, with the route from the mill leading southwest to join a cluster of three buildings (probably the nucleus of the “Ballifield” plantation) and then continuing on to the Delaware River end of the “Ferry Road.”

William Trent, the “father” of modern Trenton, was an Episcopalian, rather than a Quaker like most of his neighbors at the Falls. In the early years of the 18th century he was a leading member of the merchant elite, active in Pennsylvania politics and trade. He served in Pennsylvania as a Supreme Court judge, was a member of the Assembly and was elected Speaker within that body in 1717 and 1719. He enjoyed similar prominence in New Jersey during this same period, continuing into the 1720s. Among his more notable achievements was his service as a Burlington County representative in the New Jersey Assembly, as a county judge and as the first Chief Justice of New Jersey.

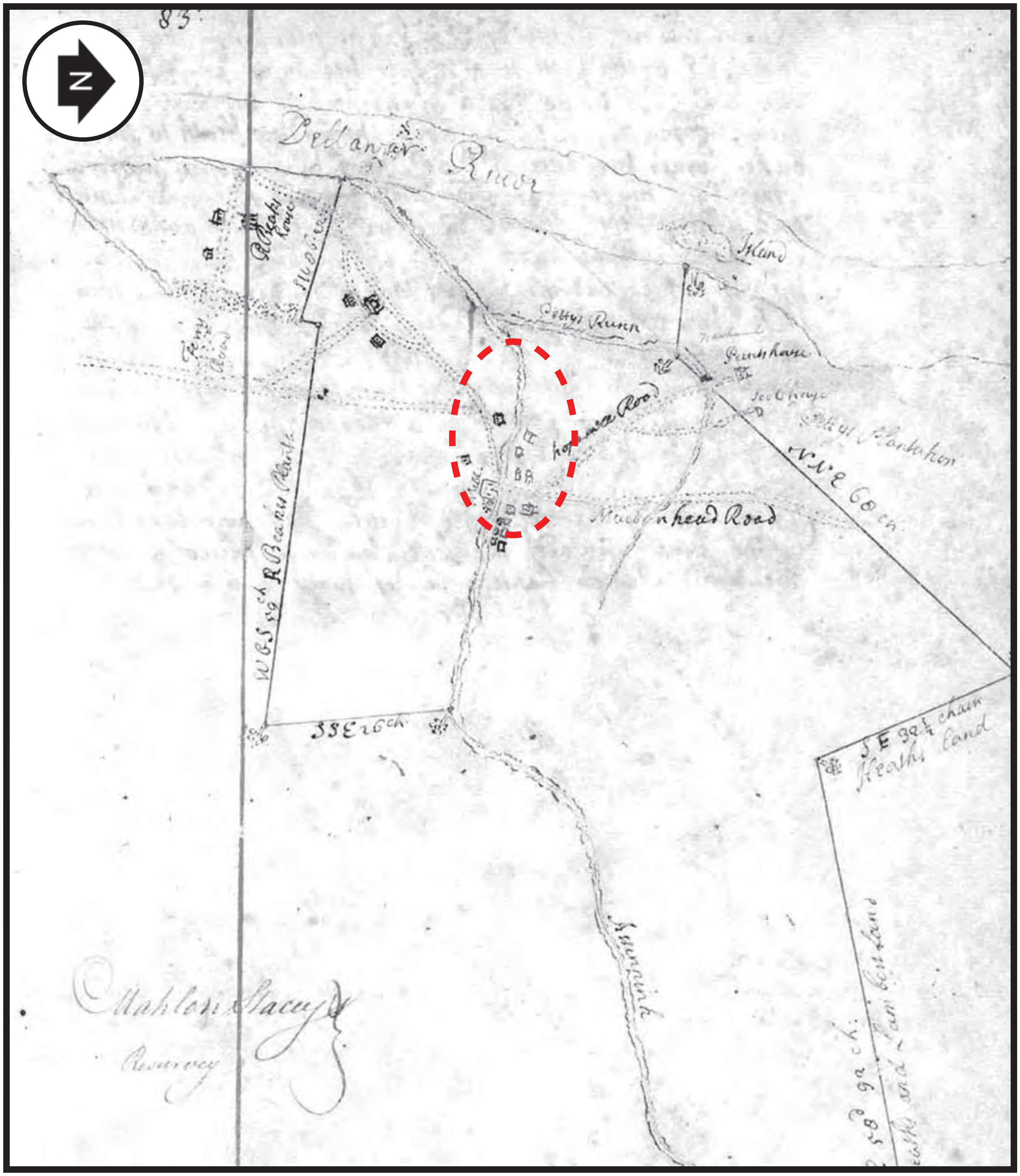


Figure 4.2. *Mahlon Stacey's Resurvey*. 1714. Scale: 1 inch: 1,300 feet (approximately). Study area circled.

Trent was clearly a man of means and he saw in his purchase of the Stacy lands at the mouth of the Assunpink in 1714 an opportunity to capitalize on the burgeoning population and budding agricultural economy of central New Jersey. This area, formerly divided between the provinces of East and West New Jersey, was unified under the royal colony in 1702 and by the second decade of the 18th century was being rapidly settled through in-migration from both the Raritan and Delaware Valleys. Trent played a pivotal role in setting up Hunterdon County on the north side of the Assunpink, where he laid the ground work for the newly implanted settlement of “Trent’s Town,” while he himself established a fine country estate on the south bank focused on the brick mansion today known as the William Trent House. This well-appointed residence was completed in 1719-20 and William Trent took up permanent residence there late in the fall of 1721. From archival, historic map and accumulating archaeological evidence, it appears that Trent established the nucleus of his plantation in roughly the same spot where Stacy had earlier created “Ballifield.”

In his relatively brief decade-long period of involvement with development at the Falls of the Delaware from 1714 until his death in 1724, William Trent substantially raised the status of the mouth of the Assunpink as a regional hub in the economy of the Middle Delaware Valley. Besides laying out the streets for a new town on the north bank of the creek, an action that has underpinned Trenton’s urban development down to the present day, Trent was also extensively involved in the expansion of water-powered industrial activity on the Assunpink. Midway through the second decade of the 18th century, it appears that he rebuilt and greatly enlarged the original Stacy gristmill, turning it into a three-story stone structure equipped with three “run” (or sets) of millstones. From this point on, the gristmill can almost certainly be viewed as a “merchant” rather than a “custom” mill, and its operation was placed in the hands of one or more tenant millers, one of whom during this period was a local Trenton resident named Joseph Peace (Trenton Historical Society 1929; Stone 1990; Susan Maxman Architects 1997).

Trent’s gristmill figures prominently in an inventory of New Jersey mills taken in 1717 in conjunction with an act of Parliament passed in support of “the Government of his Majesties Province of New Jersey in America for three years.” This inventory, evidently a fairly accurate and comprehensive listing of gristmills and sawmills in the colony at the time, references a total of approximately 85 mill sites. It excludes water-powered ironworking sites and minor mill types, such as fulling mills, which in any event were most often attached to gristmills. Trent’s gristmill was among a relatively small number of higher-assessed, presumably larger, mills that were in the hands of proprietors or wealthy landowners. It was one of roughly 60 to 65 gristmills colony-wide, a third of which were in West Jersey, and it was far and away the mill with the highest tax assessment. At four pounds (equivalent to 80 shillings), Trent’s gristmill was assessed four times higher than any other gristmill in West Jersey, while the closest in assessment value in East Jersey were the facilities owned by Thomas Kearny in Monmouth County and Dr. States in Essex County, each rated at 50 shillings. These tax assessment data strongly underscore the importance of Trent’s gristmill – it was absolutely the #1 gristmill in the colony and must have been a very substantial operation, drawing grain from an extensive hinterland that extended deep into Hunterdon and Burlington Counties in West Jersey, and probably also Monmouth and perhaps Middlesex Counties in East Jersey (Bush 1986:389-393; Hunter 1999:517-521).

Trent did not solely restrict his water-powered industrial development activities to agricultural processing. Shortly after upgrading the gristmill, he constructed a sawmill and fulling mill, probably as additional components at the gristmill site. In July of 1723 he partnered with John Porterfield, Esq. and neighboring plantation owner, Thomas Lambert, in buying two tracts along the Assunpink, amounting to 30 acres in total, upon which an ironworks was to be built. The precise location and date when this ironworks came on line are uncertain, but a forge and related buildings were certainly in existence by 1729. In addition to his milling ventures on the Assunpink, his laying out of Trent's Town and the establishment of his own plantation, William Trent continued to maintain a strong commercial presence in Burlington and Philadelphia, engaging in river and maritime trade with boats he owned (Nelson 1911:228-243; Stone 1990; Susan Maxman Architects 1997).

C. The Later Colonial Period

When William Trent died intestate on Christmas Day of 1724, his Trent's Town properties passed to his son, James Trent. Considerably less is known of the younger Trent's activities at the Falls of the Delaware and along the Assunpink Creek. Although it has been suggested that he may have inherited an estate that was in a precarious financial situation (Old Mill Hill Society 1991:5), James Trent certainly continued the milling operations and it was he who received the formal patent for running a ferry across the Delaware from the foot of Ferry Street in 1726 (Susan Maxman Architects 1997).

James Trent maintained ownership of the gristmill on the Assunpink for five years, before selling the facility along with the main plantation tract of 300 acres in 1729 to William Morris, a merchant of Barbados and the half-brother of William Trent's second wife, Mary Coddington (West Jersey Deed D-382). At this time, James Trent appears to have subdivided and sold off portions of the lands to the north of the Assunpink. According to surviving deeds, it appears that the property on the north side of the Assunpink near the bridge was conveyed as two parcels, one on either side of Queen Street, one passing to Enoch Anderson, the other to Thomas Biles (West Jersey Deed DD-391 and DD-396). Later in the 18th century, during the period of Robert Lettis Hooper II's ownership of the Trent plantation and the Trenton Mills (see below), these two lots were re-absorbed into a larger tract that spanned both banks of the creek and included the plantation tract sold to Morris.

William Morris, like the Trents before him, was a member of the merchant elite. He was a leader within the Society of Friends in the Trenton area in the early 1730s and was appointed a judge of the Hunterdon County Court in 1739. Morris declined to take up this latter appointment, but soon afterwards served as one of Trenton's 12 burgesses during the town's brief period as a royal borough from 1745 until 1750 (Susan Maxman Architects 1997).

The 300-acre tract acquired by William Morris from James Trent in 1729 lay entirely on the south side of the Assunpink Creek and included within its limits "ye water grist Mill or Mills being three grist Mills under one roof commonly called & known by the name of Trent's Mills and ye Mill stones and other gear". The site also included a fulling mill, a sawmill and "all boulting Mills sett up & erected in ye mill house of said grist mill and boulting cloths & appurtenances…" (West Jersey Deed D-382). In March of 1733, a serious flood destroyed the mills. The torrent broke the dam and walls, ruining the mill machinery, and also devastating the dying house and several other structures along the Assunpink. It is unclear, however, whether the gristmill building itself withstood the flood. The damaging effects of this flood were possibly a factor in William Morris' sale of the former Trent estate and the mills to George Thomas of Antigua in October of the same year (West Jersey Deed DD-333 and DD-336).

Flooding, of course, was damaging not only to the mills along the lower section of the Assunpink, but also likely affected the bridge that spanned the creek at this location. The precise fate of the bridge in the flood of March 1733, however, remains unclear. To the best of our knowledge, the bridge seems always to have been situated just downstream of the mill dam, placing it perhaps at even greater risk of flood damage whenever the dam burst apart. Due to the frequent repairs that the earlier wooden bridge near the mill required, a bill calling for the construction of a stone bridge was presented to the New Jersey House of Representatives in 1744. However, Nottingham Township objected, claiming that the project would be too costly and that anyway a new structure was not truly necessary. Residents on the northern side of the Assunpink evidently viewed the situation differently and appear to have regarded the mill as an exacerbating factor in times of flood. They responded that "the large abutment on the Nottingham side is the means of throwing large quantities of water on the north side after each great rain to the detriment of the inhabitants of Hunterdon County" and called for the bridge to be extended on the Trenton side of the Assunpink. Lack of any legislative action around this time suggests that any substantial alteration of the bridge did not occur (Podmore, 31 August 1957).

During the later colonial period, the bridge over the Assunpink was also commonly known as the Trenton Bridge or the Bridge at Trent's Mills. The structure underwent extensive repairs in the mid-18th century. In 1750, the Hunterdon County Court of Quarter Sessions and Common Pleas ordered the Sheriff to fine Trenton Township unless the Trenton Bridge was "putt in good and Sufficient Repairs by the first day of August next" (New Jersey Court of Oyer and Terminer and General Gaol Delivery, Records of the Sessions of the Court [1749-1762]). Around this time, Elijah Bond carried out extensive repairs to the structure.

In 1756, the Trenton Bridge was re-laid with 40 feet of new plank (Trenton Township Minutes 1756-1818). A year later, the bridge was still considered dangerous and the Nottingham Town Meeting appointed two men to carry out necessary repairs. Robert Lettis Hooper, by this time owner of the former Trent estate and the Trenton Mills (see below), supplied the funds for constructing a stone pillar (pier) at the center of the bridge that could support the timber structure's long sleepers. The pillar was not to exceed 20 feet in length and four feet in thickness. Unfortunately, these repairs were carried out inadequately (mainly due to a faultily cast pillar) and the bridge continued to be the subject of further evaluation. After an additional tax was raised in 1758, Richard Howell repaired the structure with new planks, although Nottingham Township had by now proposed an act for erecting a stone bridge (Hunterdon County Freeholders Minutes 1758). In 1760, it was decided that Nottingham Township would pay one third of the bridge expenses and Trenton Township the remaining two-thirds (Toothman 1977:159). Nevertheless, disputes over the costs of repair and maintenance continued.

By now, both Burlington and Hunterdon County were acknowledging that the bridge was "an old wooden bridge very much used by heavy carriages and horses daily passing and repassing to the mills standing at the foot of said bridge on the Burlington side, the continual repair whereof, falls very heavy on the two towns" (Cleary, January 23, 1921). In 1762, Nottingham Township raised monies towards the construction of a new bridge, with the Township Minutes noting that this was the "heavyest taxe this township has hitherto paid" (New Jersey Historical Society 1940:124-138). In 1762, Joseph Yard and George Bright, a baker who resided near the bridge, carried out necessary bridge repairs (Hunterdon County Freeholders Minutes). Another residence worthy of mention, which was in close proximity to the bridge around this time, was the two-story stone home of loyalist John Barnes, a distiller who served as Sheriff of Hunterdon County in the years leading up to the outbreak of the Revolutionary War. This property was situated on the west side of Queen (South Broad) Street between West Front Street and the north bank of the Assunpink Creek (Springsted 1979:16). Barnes purchased the property in 1764 from David Wright and his wife Rebeckah, who had inherited the lot from her brother Mahlon Stacy, Jr. Barnes reportedly tore down an earlier house, which was in "ruinous" condition at the time of purchase, in order to build his fine house, described as having four rooms to a floor. At the outbreak of the Revolution, there was also a stable, a small tenant house, and a "still house" [distillery] on the property. In November 1776, John Barnes joined the regiment of New Jersey volunteers loyal to the crown with the rank of major. He died on Staten Island in August 1777, the result of wounds received during battle. Subsequently, his wife Mary emigrated from New Jersey to England, where she sought restitution for the Trenton property that had been seized from her husband during the Revolution (Great Britain Exchequer and Audit Department AO 12/14 [1784]).

In 1764, the Hunterdon County Board of Justices and Freeholders voted to erect a new stone bridge and agreed that it was necessary to allocate £300 to undertake this project. In 1765, an act was passed by the colonial legislature for building a stone bridge over the Assunpink since the Trenton Bridge was "much out of repair, and dangerous to pass over." This act stated that Thomas Barnes, Abraham Hunt and Isaac Pearson were chosen managers of the construction, with Pearson representing Nottingham Township in Burlington County, and Hunt and Barnes representing Trenton Township in Hunterdon County. At this time, commissioners were also appointed to hear evidence concerning whether the bridge was unsound. The act further noted that Nottingham Township had begun construction of arches and abutment on the Burlington County side of the bridge. Additionally, the arches and abutment of the bridge were to be maintained by the owners of the mill (Bush 1982:350-1). As a consequence of this legislation, Hunterdon County commissioned Abraham Hunt and Thomas Barnes to complete the bridge construction project for the Township of Trenton and appropriated approximately £450 towards this end.

In 1766, the former wooden structure that was the Trenton Bridge was thus replaced with a span of stone masonry. As detailed in a later account of 1787, the new structure was "a spacious stone bridge, supported by arches built with stone and lime with a high wall on each side handsomely laid" (Trenton Historical Society 1929:329). It should be noted here that the Trenton historian, John Raum, erroneously states in a footnote that the stone bridge was constructed in 1762 (Raum 1871:169). Also of interest in the context of the new bridge construction was an account for 17 shillings and sixpence that Charles Oxford, Jr. presented to the freeholders of Hunterdon County for the erection of a lime house at the mill bridge (Hunterdon County Freeholders Minutes). Even with a brand new stone bridge spanning the creek at the Trenton Mills, there were clearly still ongoing repair and maintenance issues to take care of. In 1774, for example, the General Assembly passed an act to repair, amend and rebuild the bridge near "Hooper's Mill" (Trenton Historical Society 1929). At this time, the splitting of the cost was re-affirmed in the same proportions as in 1760, with Hunterdon County paying two-thirds of the expense and Burlington County the remaining one third.

From October 1733, when George Thomas acquired the former Trent estate from William Morris, through to the end of the colonial era, the Trenton Mills continued in the hands of wealthy and politically well-connected plantation owners. During this period, George Thomas (1733-53), Robert Lettis Hooper II (1753-65) and Robert Waln (1765-84) successively controlled the mill property. During the tenure of the first two of these owners, the mills remained closely tied to the main plantation tract centered on the William Trent House; under the third owner, the mills became a part of the vast network of real estate and trading activity in the Middle Delaware Valley controlled by the Walns, an extended family of well-known Philadelphia merchants.

George Thomas, the first of this triad of wealthy later colonial owners, appears never to have personally occupied his Trenton properties. Born and raised in Antigua, he was active in the politics of the British West Indies in the early 18th century. He moved to the Delaware Valley in the mid-1730s, serving the colonial government as Pennsylvania's Governor from 1738 until 1747, but then returned again to the West Indies to become Governor of the Leeward Islands in 1753. He retired to England in 1766 and died in 1774. Throughout the 20-year period of his ownership of the Trenton Mills and the Trent estate (which became known during his tenure as "Kingsbury"), Thomas appears to have rented out both the main house and the mill facility. Among the house's occupants was New Jersey Governor, Lewis Morris, who lived there from 1742 until 1746 (Susan Maxman Architects 1997). The principal tenant miller, at least during the early years of the Thomas ownership, appears to have still been Joseph Peace. In 1739, agents for the mill owners advertised for rent "The Grist Mills at Trenton, with two small tenements adjoining, now in the tenure of Joseph Peace" (Nelson 1894:575). If indeed Peace operated the mills from the time of William Trent through into the late 1730s, he may reasonably be seen as the day-to-day driving force behind the success of this agricultural processing enterprise.

In 1753, George Thomas sold the Kingsbury plantation, along with the mills, to the merchant, surveyor and local Trenton "squire," Robert Lettis Hooper II (West Jersey Deed U-335). Hooper was the grandson of Daniel Hooper, a Barbados plantation owner, and the son of Robert Lettis Hooper I, who had succeeded William Trent as Chief Justice of New Jersey. The younger Robert Lettis Hooper moved to Trenton in 1751 from Rocky Hill, where he also owned a sizeable mill complex located on the Millstone River. It was Robert Lettis Hooper II who laid out the street network in today's Mill Hill and Bloomsbury (the name that was substituted for Kingsbury once the colonial yoke had been cast off), and who was instrumental in subdividing and selling off substantial portions of the area to the south of the Assunpink (Trenton Historical Society 1929:598-600; Hunter 1999).

In early 1765, Robert Lettis Hooper II advertised the Trenton Mills, still often referred to as Trent's Mills, as being for sale. The accompanying description noted that the mills contained "three pair of stones, three bolting boxes, a country bolt…" and that "the whole buildings and works [were] in as compleat order as any mills in the province, having been all put in good repair, with Iron Rounds in the Trunnel Heads, and new shafts, cog-wheels, water-wheels &c." (Nelson 1902). Another advertisement, published three months later, noted the mill's substantial business and that the works and dam had recently been repaired (Nelson 1902).

Later in 1765, presumably as a result of these advertisements, Robert Lettis Hooper II conveyed the mill and adjacent property as a 29-acre tract to Robert Waln for £4,000 (West Jersey Deed AV/129). The property clearly straddled the Assunpink, as it was situated in Burlington and Hunterdon Counties, and extended west towards the Delaware River. The indenture formalizing this sale referenced all the mills, including the gristmill. A road return for what appears to be the forerunner of today's South Broad Street to the south of the Assunpink, dating from 1765 (but probably just post-dating the Hooper-to-Waln transfer), noted a route passing through the lands of Robert Lettis Hooper and Robert Waln, then proceeding along the bank "to and over the fording place lately made by the Commissioners for Building the Stone Bridge over Assanpink" (Burlington County Road Return A-20).

Robert Waln was yet another merchant from Philadelphia, whose family is perhaps best known in New Jersey for their involvement with the mill-based plantation and village community at Walnford on Crosswicks Creek. Robert Waln retained the Trenton Mills until his death in 1784, at which time the property passed to his daughter, Hannah Waln Wells (Hunter *et al.* 2009:71-72). In the twilight of the colonial era with its importing and exporting restrictions, and during the years of instability when the revolutionary conflict swirled around Trenton, it is difficult to assess the success of the mills while they were in Waln ownership. According to Toothman (1977:245), the Philadelphia and Trenton merchant firm of Coxe and Furman considered purchasing the mills from Robert Waln in the mid-1770s. However, this company decided that the asking price of £5,000 was too steep, especially since the mills were considered to require additional and extensive repairs (Coxe Family Papers 10 April 1775). Perhaps also the requirement imposed by Hunterdon County in 1765 that the mill owners be responsible for the upkeep of the bridge served as a deterrent to Coxe and Furman's projected purchase of the mill complex.

The physical layout of the bridge over the Assunpink, the Trenton Mills complex and the various other nearby features of the colonial cultural landscape is difficult to establish with any great certainty. However, one detailed map of the period survives that is of some assistance in this regard. Sometime around 1750, a *Plan of Colonel Thomas's Estate in Kingsbury* was surveyed, possibly by Robert Lettis Hooper II in 1753 around the time of his purchase of the Thomas estate (Figure 4.3). In addition to its valuable depiction of Kingsbury House (the William Trent House) and a suggested street grid and subdivision for the area extending south from Ferry Street to Lamberton, this map covers the area to the north toward the Assunpink, here identified as "Samkinck Rivulet." On the north bank of the creek, sealed from view from Kingsbury House by trees along the riverbank, a line of structures is shown, perhaps the outskirts of Trenton. The gristmill is visible immediately upstream of the bridge crossing the creek, while a road leads southwest from this spot to a building noted as "Fuller's House" (presumably a reference to the preparation of wool cloth). Interestingly, no road is shown at this time along the present-day alignment of South Broad Street; rather the depicted road seems to hug the rim of the bluff overlooking the Assunpink and heads more directly for Kingsbury House (oftentimes the mill owner's residence). At "Fuller's House" the road splits: one course heading west along the riverbank; the other – the "New York Road" – circling east around the mansion to connect with the lane leading down to the ferry (present-day Ferry Street). Elements of this road network are also apparent on the earlier map of 1714 depicting the Stacy property, just before it was acquired by William Trent (cf. Figure 4.2).

By the eve of the American Revolution, Trenton's landscape, particularly the built-up section of town north of the Assunpink, comes into greater resolution. A useful resource for visualizing this landscape is the *Trenton in 1775* map, a reconstruction based on primary source materials. (Figure 4.4). North of the Assunpink and Trent's mill, Trenton's main residential and commercial areas were arrayed along two north-south axises, King and Queen Streets (modern-day South Broad and South Warren Streets respectively). Front Street was located at the southern end of aligned roughly east-west with a terrace overlooking the floodplain at the mouth of the Assunpink. In the 1760s, the lot at the southwest corner of Front and Queen Streets and the creek frontage along the north bank of the Assunpink was acquired by John Barnes. His house, built about that time, stood on the west side of South Broad Street between Front and East Lafayette Streets overlooking the meadow along the north bank of the Assunpink to the house's southwest. The house was described as "a large and commodious mansion, two stories high, with stables and other buildings" (Trenton Historical Society 1929: 143). In

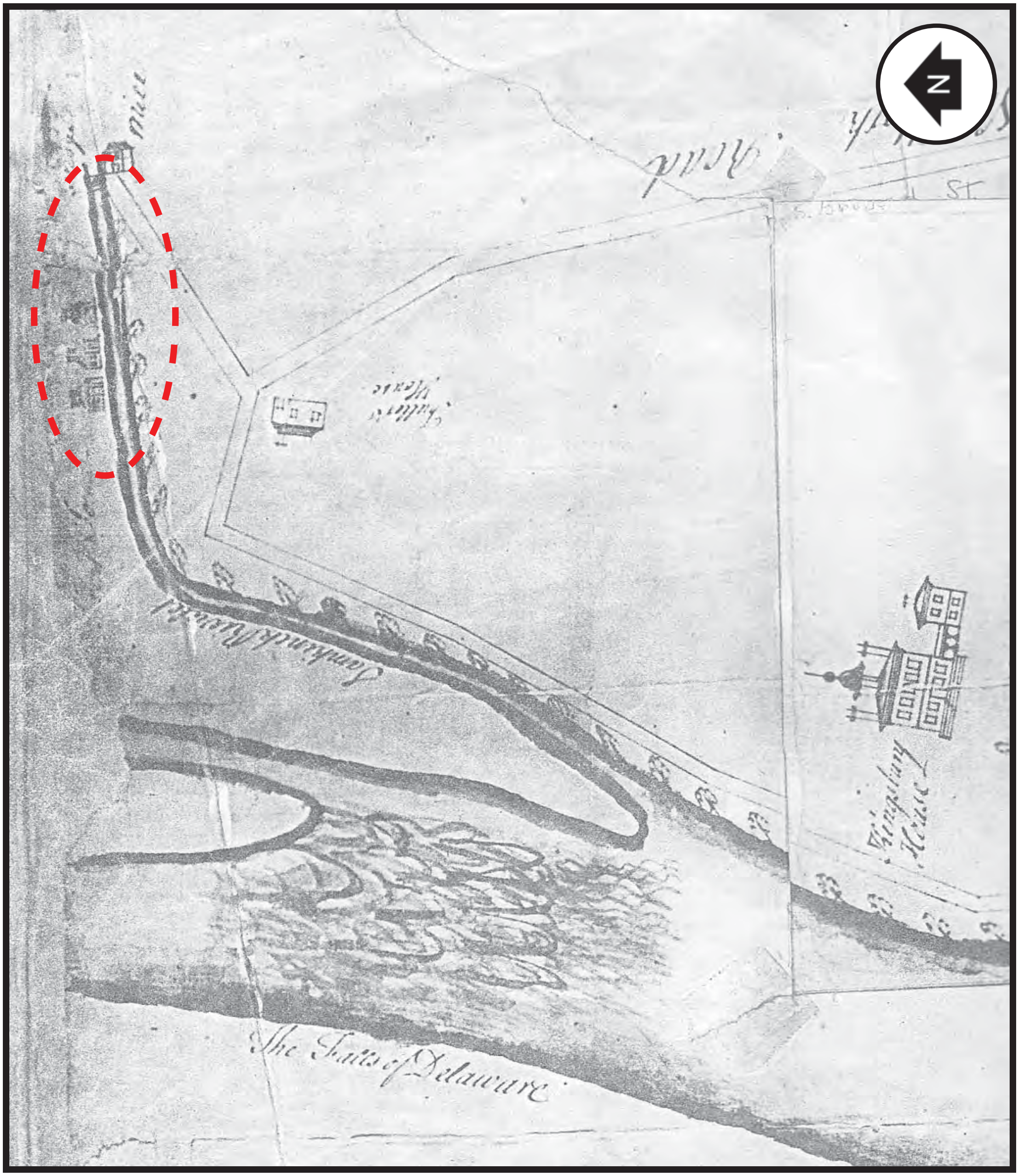


Figure 4.3. *A Plan of the Front Part of Coll Thomas's Estate in Kingsbury in West New Jersey. Circa* 1750. Scale: 1 inch: 280 feet (approximately). Study area circled.

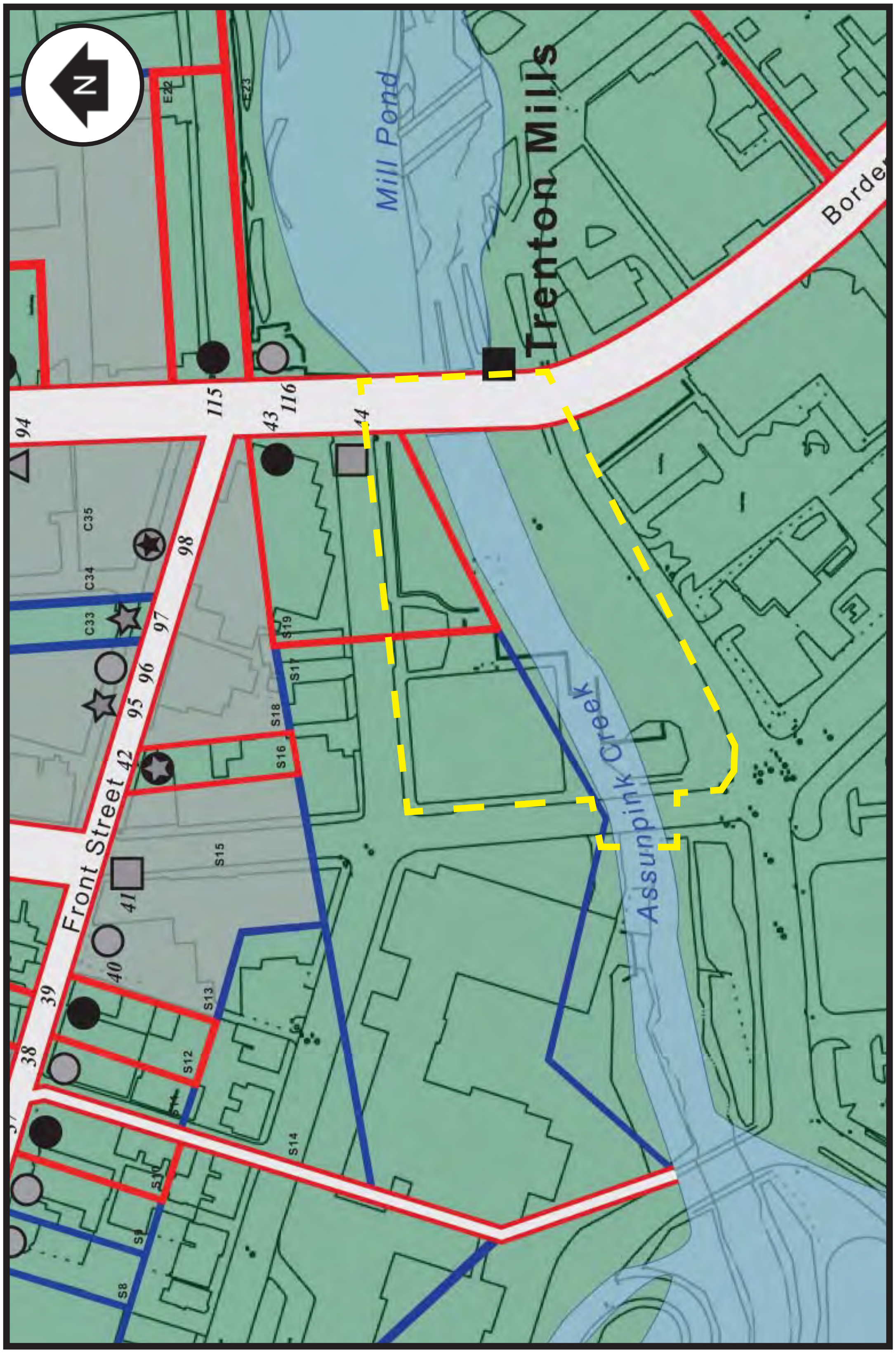


Figure 4.4. Trenton in 1775 (Portion). Source: Hunter Research, Inc. 2008.

addition to being the sheriff of Hunterdon County, Barnes was a distiller. Unfortunately, the exact location of the distillery is undocumented, but distilling required water for production and to carry away waste, so locating it near the Assunpink would have been a logical choice. Other than the Barnes distillery, there is little evidence for development of the north bank of the Assunpink within the project area prior to the American Revolution. The low-lying land downstream of the bridge was kept in meadow, probably for pasturing livestock.

D. THE FIRST BATTLE OF TRENTON

Roughly a decade after Robert Waln assumed control of the Trenton Mills in the heart of what had hitherto been a rapidly growing market town, Trenton found itself in the eye of the storm that was the American Revolution. In late 1776 Trenton and its companion port of Lamberton, a mile downstream, occupied a key strategic location between American-controlled Philadelphia and British-controlled New York. Here, ingrained in a mature colonial rural agrarian landscape, now being viewed in terms of military strongholds, maneuvers and supply lines, was a community that had thrived at the head of navigation on the Delaware River around a convergence of river navigation, ferries and overland routes. Here also was a town with one of five New Jersey military barracks, an obvious target for military usage as the Revolutionary conflict intensified.

Early on December 26, 1776, General Washington and a small Continental force entered Trenton from the northwest, surprising the Hessians who were still marginally engaged in holiday revelry in the barracks and at various residences in and around the town. Receiving word of imminent attack, the Hessian regiments under the command of Colonel Johann Rall hurriedly assembled and marched north along Queen Street toward the intersection of the Pennington and Maidenhead Roads (in the present-day vicinity of the Battle Monument).

The American troops first attacked Hessian pickets to the northwest of the town, and soon after this the Hessians opened fire on American forces gathering in the vicinity of the Hermitage, also located outside the town to the northwest. Sensing the approach of a sizeable American force, the Hessians retreated south along Queen Street and back over the Assunpink Creek past the Trenton Mills that were then being utilized by the Hessians as a commissary storehouse (Stryker 2001:381 [1898]). Although some of the retreating Hessians attempted to ford the Assunpink at the foot of King Street (present-day Warren Street), most proceeded towards the stone bridge at the foot of Queen Street. For example, after sporadic skirmishing, Lieutenant Engelhardt and his detachment, along with several soldiers of Colonel Rall’s regiment, hastened south along Queen Street towards the creek. As these troops passed the house of John Barnes, a Loyalist who had joined the British with the rank of major, they were fired upon by an advance party under Colonel Glover. The Hessians quickly fled over the bridge on toward Bordentown (Stryker 2001 [1898]; Smith 1965).

Throughout the morning, the town was in an uproar with gunfire resonating down the streets on this cold winter day. A portion of the American first division under Major General Sullivan marched along Front Street toward Queen Street in an effort to thwart the Hessians escaping over the bridge. In William Stryker’s reprinted *The Battles of Trenton and Princeton* (2001:381 [1898]), notes that in the middle of the stone bridge stood a hut, which housed a Hessian sentinel, while another guard was stationed near the mill. Men in Colonel Glover’s brigade crossed the Assunpink bridge and positioned themselves on the high ground to the south of the creek. At this point,

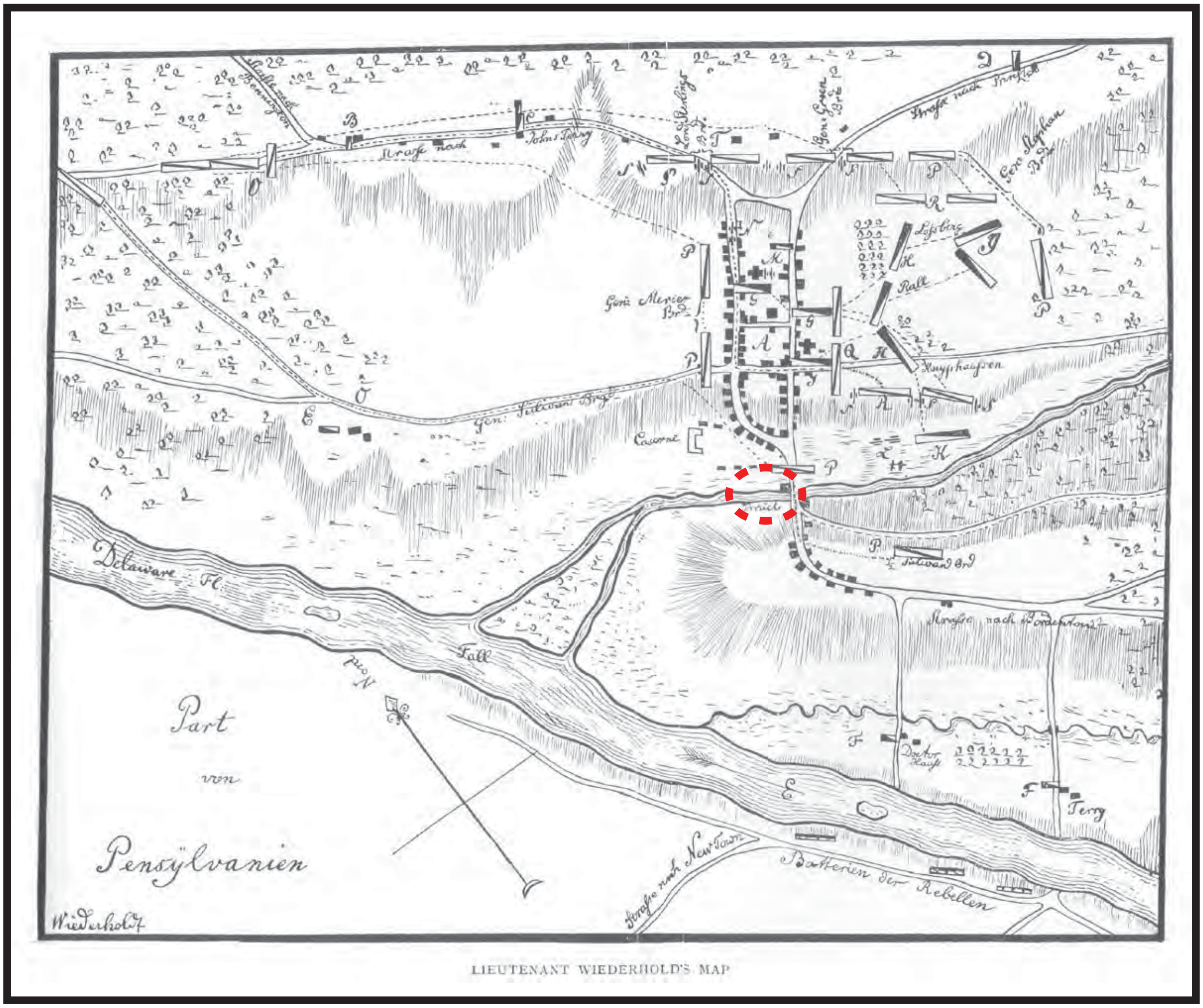


Figure 4.5. Lieutenant Wiederhold's Map of Trenton. 1776. (Reproduced in Stryker 1898). Scale: 1 inch: 2700 feet (approximately). Study area circled.

a detachment from Colonel Rall's regiment proceeded towards the bridge, but many of the Hessians fell back in the face of persistent American gunfire.

Hessian troops under Major Von Dechow also marched towards the Assunpink where they were instructed to maintain a clear passage for those retreating over the bridge. Meanwhile, as fighting continued elsewhere in the town on the north bank of the creek, Colonel Rall sent brigade adjutant Lieutenant Jacob Piel to the bridge to determine whether the way was clear. However, as he made his way to the bridge, Piel mistook the American forces for the von Knyphausen regiment and erroneously assumed the line of retreat to be secure. The Hessians then unsuccessfully attempted to escape over the Assunpink, but instead were forced to retreat out to Third and Fourth Streets. Confusion also set in after the von Lossberg cannon became stuck in the course of marching along the Assunpink valley. The von Knyphausen regiment spent valuable time attempting to retrieve this artillery piece from the swampy ground and consequently missed their opportunity to take the bridge.

Although, by this time, many Hessians recognized their pending defeat, some of the troops in the von Knyphausen and von Lossberg regiments made an attempt to ford the Assunpink at the upstream end of the millpond. These men were captured and taken prisoners by General St. Clair and Colonel Sargent. Lieutenant Wiederhold's map of the battle identifies where the Hessians lost their cannon near the Assunpink (Figure 4.5). Wiederhold's map also notes various locations where the American troops were deployed, including Sullivan's two critical positions, one to the south of the Assunpink facing the von Lossberg cannon and the other just north of the Trenton Bridge on Queen Street (marked "P" in both cases).

Other Hessians under Major von Dechow surrendered once they approached the Assunpink and saw the plight of their associates. After approximately two hours of intermittent and somewhat disorganized fighting, the Americans had effectively secured their victory. At the conclusion of the conflict, the American forces had suffered only three or four wounded, one of whom was Lieutenant James Monroe, future fifth President of the United States. On the opposing side, of the almost 1,600 troops under the Hessian command, 24 were killed (including Colonel Rall), more than 900 were taken prisoner and roughly 650 escaped to fight another day. After the American forces escorted their prisoners to the ferry below the Assunpink, they withdrew across the Delaware River into Pennsylvania (Stryker 2001 [1898]; Dwyer 1983:260; Smith 1965).

E. THE SECOND BATTLE OF TRENTON (THE BATTLE OF THE ASSUNPINK)

Immediately following the First Battle of Trenton, Washington established his headquarters in Newtown, Pennsylvania, but learning that the British had failed to reoccupy Trenton, Washington determined to return. On December 30, 1776, General Greene, with 300 men, retook the town without incident, and Washington himself followed later in the day. Upon reaching Trenton, Washington established his headquarters in the home of John Barnes near the Assunpink bridge. A few days later, on January 2, 1777, as Washington moved to build on his initial victory at Trenton with a second surprise attack on the British at Princeton, another engagement took place on the Assunpink. In this Second Battle of Trenton, also known as the Battle of the Assunpink, American forces were seeking to repel a British thrust southward into the town and made a stand on the slope on the south side of the creek. An underlying American concern here was that their forces might become trapped in Pennsylvania and the British would gain easy access downstream along the Delaware to Philadelphia.

After some preliminary skirmishing along the King's Highway (the Maidenhead Road) to the north of the town, the Americans retreated to the south of the Assunpink and regrouped as the British began to advance down Queen Street. A contemporary letter written by a British soldier narrates that the Americans "returned back to the bridge & form'd in a line—with 3000 men & 2 field ps in the Main Street—and 2 field p's secreted behind Mr. Waln's house opposite the Mill—& some Rifle men in the Mill, & artillery all along the creek…" (Stryker 2001:469 [1898]). Washington's troops' position across the bridge on the south side of the creek had the advantage of being on the higher ground; moreover, in passing the narrow bridge, the advancing British troops were packed "into a dense and solid mass." Dwyer (1983:317) notes that the arched stone bridge was barely wide enough to accommodate a horse and carriage, while Raum (1871:169) also noted that the retreating Americans took up the planks on the bridge after they had crossed. Raum's mention of planks is interesting because stone arch bridges do not have plank decks, suggesting that some portion of the span may have been purposely demolished and a temporary plank deck installed that could be removed to prevent the enemy from following across. Following their retreat through Trenton, Washington's forces then formed a three-mile long defense line along the bank and threw up earthwork defenses below the bridge. The key segment of this defensive line extended from the Delaware River along the south side of the Assunpink as far as the upstream end of the millpond (Dwyer 1983; Stryker 2001 [1898]; Trenton Historical Society 1929).

Just before dawn on January 2, 1777, the British advance guard dispatched by Lieutenant General Charles Cornwallis marched into Trenton and took up position on the north bank of the Assunpink downstream from the bridge. One Continental soldier from Rhode Island, John Howland, related that General George Washington "stood with his breast pressed close against the west rail of the bridge" before he proceeded to the meadow south of the Assunpink (Dwyer 1983:317). Here, the Americans, numbered at approximately 5,000 strong, assaulted the British and Hessians who were situated on the lower northern bank of the waterway. The British, intent on crossing the bridge, were nonetheless forced back by Washington's troops (Stryker 2001 [1898]).

According to a later account, produced in 1842, an observer recalled that "Washington's army was driven up on the east side of the Assunpink, with its left on the Delaware River, and its right extending a considerable way up the mill-pond, along the face of the hill where the factories now stand." Here, the troops covered the slope and were "placed one above the other" (Barber and Howe 1868:300). Meanwhile, the British had organized themselves into two columns. One line marched towards Greene Street to the bridge, and the other attempted to directly ford the creek. When the British came within 60 yards of the bridge, they charged and continued their advance. Cornwallis's troops made at least three separate efforts to cross the bridge, but were driven back on each occasion. Each time the British charged the bridge, they faced an onslaught of American gunfire that caused them to retrace their steps. Several of Cornwallis's detachments also attempted without success to cross the creek and position themselves behind Washington's troops. Before long, the persistent American firing across the creek slowed down the British advances and forced them into retreat.

In later years, some observers present at the time recalled that the Assunpink Creek was almost filled with the British dead (Lossing 1868:26; Barber and Howe 1868:301). Another observer more colorfully recollected that "the bridge looked red as blood" from

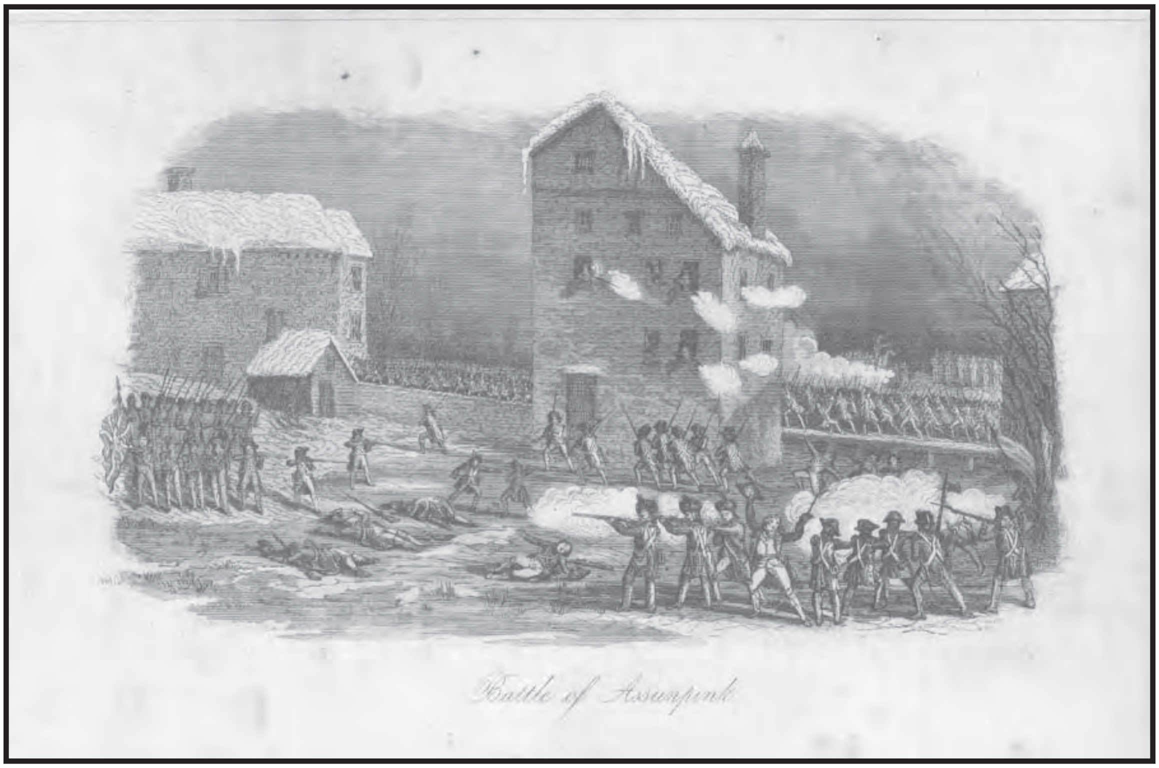


Plate 4.1. *Battle of Assunpink*. Undated. (Source: Trenton Public Library, Trentoniana Collection).

Plate 4.2. George A. Bradshaw. Etching of the Second Battle of Trenton. *Circa* 1925. (Reproduced in Trenton Historical Society 1929:172).

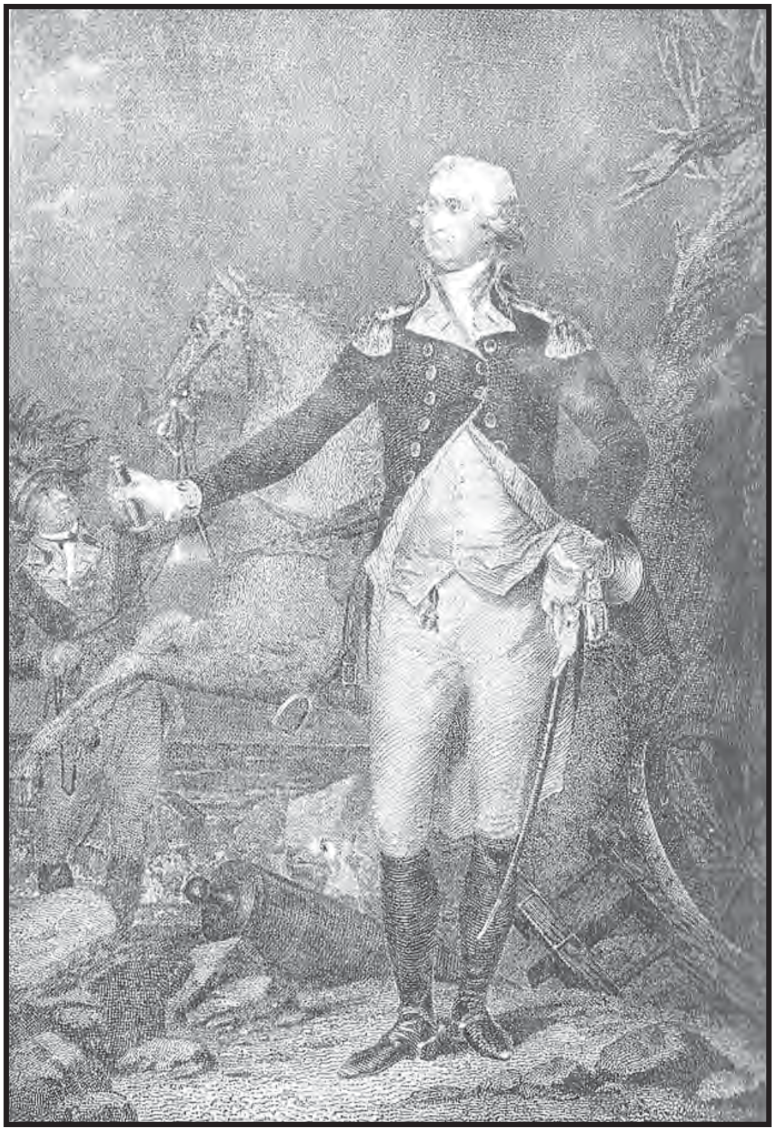


Plate 4.3. John Trumbull. *General Washington at the Bridge Over the Assunpink Creek*. 1792. (Reproduced in Stryker 1898:262).

the masses of the redcoat victims (Dwyer 1983:324). The battle is depicted in two views, which although evocative of the action, were both created long after the event (Plates 4.1 and 4.2). The second and more recent of these views, an etching produced in the early 20th century by well-known Trenton artist, George A. Bradshaw, shows the arched stone bridge of 1766 and the three-story gristmill, albeit with some rather over-emphasized topography. In this, the British are shown approaching the northern end of the bridge, while the patriots are firing upon them from the slope in the foreground.

Thus, at the bridge over the Assunpink, Washington's American forces drove back the British and set the scene for their overnight march and successful assault on Princeton the next day. An etching of George Washington posed on the bridge over the Assunpink, reproduced from a famous painting by John Trumbull, depicts the general at the scene of this important victory (Plate 4.3). In Washington's own understated words, the head of the British column "attempted to pass the Sampinck Creek, which runs through Trenton, at different places, but, finding the fords guarded, they halted…" (Stryker 1898:266 [2001]). At the conclusion of this action, the Americans had suffered at least two dead and about 20 wounded. The Hessians under British command lost eight killed, 24 wounded and around 30 were taken prisoner. The British Light Infantry force that was extensively involved in this engagement suffered much greater losses, possibly upwards of 100, and an unspecified number of wounded (Stryker 1898 [2001]; Smith 1967:16-17).

F. FROM THE AMERICAN REVOLUTION TO THE INDUSTRIAL REVOLUTION

Immediately following the Battles of Trenton and Princeton, the focus of military activity shifted mostly northward during the first half of 1777. Trenton remained essentially under American control, as did Philadelphia, the rest of the Middle Delaware Valley and the hilly hinterlands of New Jersey and Pennsylvania. The Continental Army established encampments and support facilities in the hills of Morris, Somerset and Middlesex Counties, gathering strength and keeping a watchful eye over British troop movements in the New York City area and the lowlands around New Brunswick. Half-expecting a land assault on Philadelphia across the waist of New Jersey, the Americans played a game of "cat and mouse" with the British in the Stony Brook/Millstone Valley area of central New Jersey. Ultimately, the British chose to move on Philadelphia from the south, with major naval support on the Delaware, a tactic that finally resulted in the British occupation of Philadelphia on October 19 of 1777 (Smith 1970).

In the ensuing months, the British sought to impose their will over the rest of the Middle Delaware Valley and there was considerable back and forth along the river. On November 16, Fort Mifflin, which had held out against British land and sea attacks after Philadelphia was taken, finally fell, followed a few days later by Fort Mercer on the opposite New Jersey shore of the Delaware. Through these difficult weeks and on into the summer of 1778, the Trenton/Lamberton area continued uneasily under American control, with a wary eye to British activities downstream. American ships of the Pennsylvania fleet escaped upriver on at least two occasions. Consideration was given to mooring them at the "wharfes near Trenton of Mr Richards and Mr Turrnar [sic; probably meaning "Furman"] and Hunts as safe as any I could recollect" (Pennsylvania Supreme Executive Council to John Hazlewood, December 20th 1777, quoted in Naval Documents of the American Revolution Volume 10 1996:763).

Most evidence suggests, however, that the great majority of vessels brought upriver were taken into Crosswicks and Watson's Creeks just north of Bordentown, where several of them were deliberately sunk with a view to refloating them later (Hunter Research, Inc. 1998b:3-14 to 3-18). Some were also moored at Biles Island, just south of Trenton on the Pennsylvania side of the river. Several sources indicate, though, that stores and equipment had been unloaded at Trenton Landing from the larger ships before they were scuttled, and that small galleys were operated from the Trenton/Lamberton waterfront during the winter and early spring of 1778 (Jackson 1974:292). As the naval forces were gradually depleted during this period, discharged sailors are likely to have been present on shore, both in the town of Trenton and the port village of Lamberton.

On May 8 and 9, 1778, British forces came up the river in force from Philadelphia with the express purpose of destroying the American fleet prior to the British evacuation of the city in the following month. This raid did considerable damage to ships still afloat in the Bordentown area and at Biles Island. According to Jackson (1974:297), American resistance at Biles Island deterred the British from extending the attack further upriver to Trenton. Although none of this evidence is very specific, it seems probable that the wharves along the river south of the Trenton Ferry were the scene of intermittent military activity throughout the winter and spring of 1777-78.

Finally, in June of 1778, the British abandoned Philadelphia and moved northeastward through southern New Jersey toward New York City, luring Washington's troops to the inconclusive pitched battle fought in the summer heat at Monmouth Courthouse on June 28, 1778. Over the following days, the British retired the rest of the way to New York via Sandy Hook, and central New Jersey was left in relative peace and predominantly American control for the balance of the Revolutionary War era. Several skirmishes occurred in the northeastern part of New Jersey between 1779 and 1781, mostly as a result of British sorties across the Hudson from the Loyalist stronghold of New York City. However, to all intents and purposes, New Jersey's participation in the major military events of the Revolution was now complete, and the main theater of the war shifted to the southern colonies (Lundin 1972:336-453).

Despite the southward shift of the British-American conflict after the Battle of Monmouth Courthouse, one final coda of the Revolutionary War remained to be played out in central New Jersey. This was the march of the French army commanded by the Comte de Rochambeau southward through New Jersey from Rhode Island en route to Virginia in the late summer of 1781, returning along much the same route in the late summer of the following year. In the interim, on October 19, 1781, the French army and navy assisted the Continental Army in finally forcing General Cornwallis' surrender at Yorktown, effectively concluding the military phase of the American War of Independence. The French army kept a detailed account of its itinerary from Newport, Rhode Island to Yorktown, Virginia and back, and prepared maps of the route and the communities where encampments were made. This series of extraordinarily accurate and aesthetically appealing maps and plans provides valuable insights into the cultural landscape of the eastern seaboard in the later years of the Revolution. The particular renderings dealing with the Trenton area are no exception.

Specifically, the detailed plan of Trenton, entitled *"25ᵃ Camp a Trenton…"* (Figure 4.6), which shows the French forces encamped in September of 1781 on the higher ground along the southwestern side of the road to Burlington between present-day Ferry and Cass Streets. The artillery and wagon park was located along the river on the south side of the road leading down to the ferry in preparation for the crossing over into Pennsylvania. The encampment on the return trip in early September of 1782 occupied roughly the same area as in 1781, but extended slightly further to the south. The crossing of the Assunpink is clearly visible on this map, as are the built-up area of Trenton and

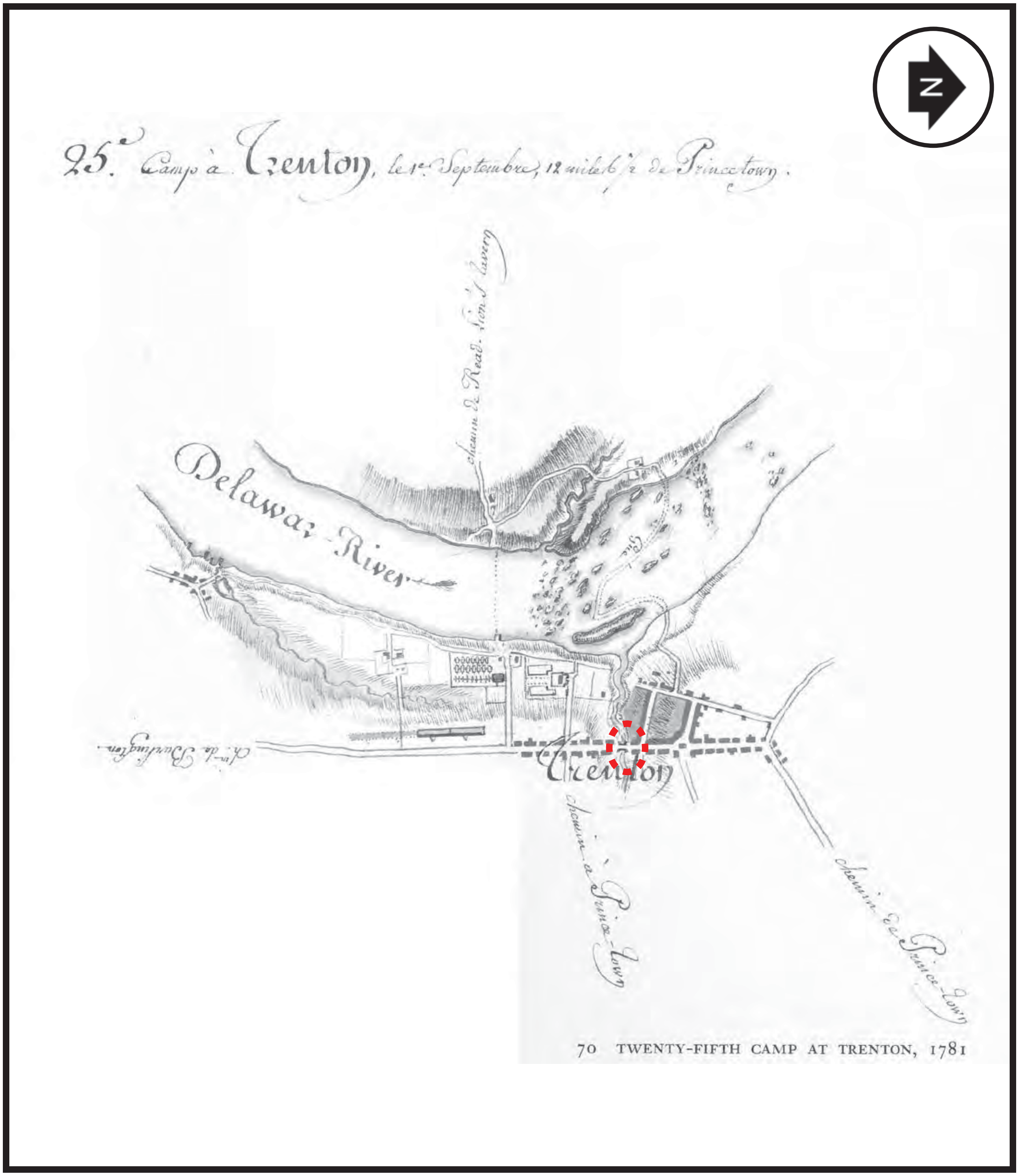


Figure 4.6. Berthier, L-A. *25a Camp à Trenton*. 1781. (Reproduced in Brown and Rice 1972). Scale: 1 inch: 3,000 feet (approximately). Study area circled.

the straight course of the road leading to Burlington, this latter feature being a strong indication that the present-day course of South Broad Street was then in existence. The accompanying narrative accounts by French officers unfortunately add little to the information on the maps. Trenton is described as "larger than Princeton but less well built and pretty," while the itinerary notes merely that "[y]ou go through the town of Trenton, crossing a stone bridge over the little river [Assunpink] that divides it in two and flows into the Delaware" (Rice and Brown 1972:I-78, 163; II-71-72).

How the Trenton Mills and the bridge over the Assunpink fared during these turbulent times is unclear. The mills continued under the ownership of Robert Waln, who was neither a rabid Loyalist nor an outright patriot. Most likely they continued in operation, but at a somewhat reduced level of production. Archival material pertinent to this topic may yet survive in the Waln papers at the Historical Society of Pennsylvania and awaits further study. *A Rough Sketch of the Southwesterly Part of Nottingham Township from the Delaware* surveyed around 1783 identifies the Trenton Mills and notes buildings to the north of the creek as well as structures opposite the mill on the western side of the "Road to Crosswicks & Bordentown" (Figure 4.7). These latter buildings may well have included dwellings owned by Robert Waln and were perhaps even occupied by him when he was visiting his Trenton properties. Although the map is somewhat stylized, the "Road to Crosswicks & Bordentown" follows a straight course south from the bridge and mill, possibly indicating an alignment that corresponds to that of present-day South Broad Street. The map also indicates the development of a new mill seat on the Assunpink downstream of the Trenton Mills, labeled Furman's Mill Seat on the map. The construction date of the Furman mill is uncertain, probably in the early 1780s, but it drew water through a head race, labeled canal on the map, with its intake located on the south side of the Assunpink near its mouth and the mill located some distance downstream near the banks of the Delaware. A few years later, in 1787, with the war concluded, an observer noted more revealingly: "At the foot of the bridge are mills for grinding and bolting wheat. These mills are contained in a very large stone building and are remarkable for the prodigious quantity and excellent quality of flour which is ground in them every twenty-four hours" (Trenton Historical Society 1929:108). Despite the rosy picture pained by the observer in 1787, it seems likely that the Furman mill took business away from the Trenton Mills and may have hastened the latter's decline over the course of the next several decades.

It was in these immediate post-war years, when Trenton was briefly a serious contender for assuming the mantle of the nation's capital, that there was a surge in real estate speculation in the area between the Assunpink and the port community of Lamberton. Towards the northern end of this area, land around the William Trent House and the frontages of the road to Bordentown and Burlington were of particular interest. Much of this area lay within a large 197-acre tract centered on the former Trent mansion, which had been acquired by Colonel John Cox in 1778. Cox (not to be confused with the numerous members of the intensely Loyalist Coxe family that traced its lineage back to Dr. Daniel Coxe, an early Governor of West Jersey) was a leading supporter of the American patriot cause, who actually took part in the Battles of Trenton and Princeton. He owned the Batsto iron foundry, which supplied ordnance to the Continental Army, and was appointed a Deputy Quartermaster-General by Congress in 1778, the year in which he assumed control of what remained of the Trent plantation. Under Cox, the former Trent property was renamed Bloomsbury in place of the Royalist-sounding Kingsbury. In 1789 Cox had a survey prepared of his 197-acre holding, probably to support the ongoing subdivision and sale of his lands, a process that had been started in earnest by Robert Lettis Hooper II in the early 1750s, and continued

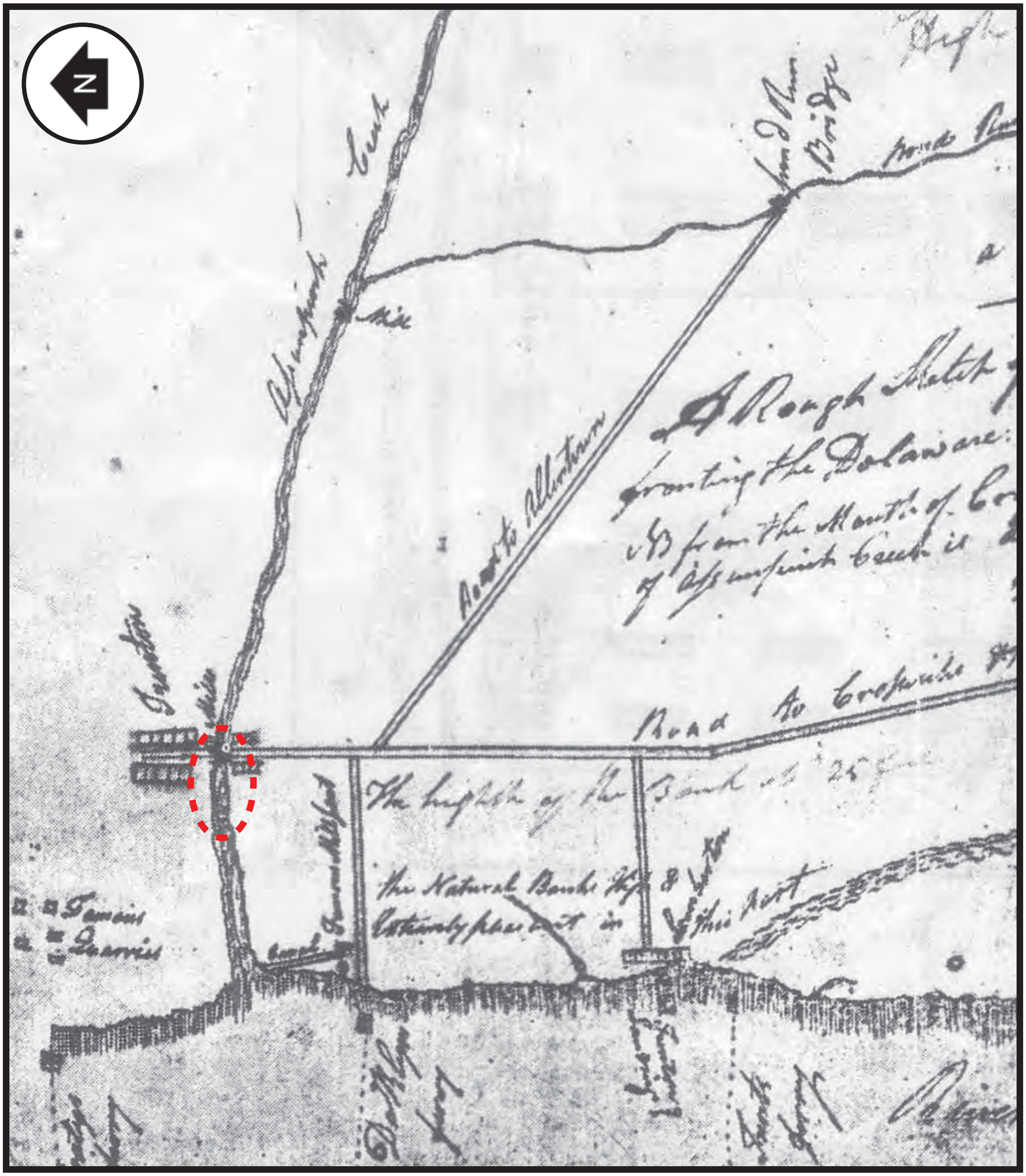


Figure 4.7. *A Rough Sketch of the Southwesterly Part of Nottingham Township fronting the Delaware …. Circa* 1783. Scale: 1 inch: 1,200 feet (approximately). Study area circled.

by Dr. William Bryant, the intervening owner of the Kingsbury/Bloomsbury property between 1769 and 1778 (Susan Maxman Architects 1997).

The resulting map from the Cox survey of 1789, entitled *A Plan and Survey of Sundry Pieces of Land Adjoining the Delaware River and Assunpink Creek belonging to Jn. Cox.* (Figure 4.8) is valuable in showing the progress of the subdivision and development on the south side of the Assunpink. In addition, the map depicts the bridge over the Assunpink Creek, the site of the Trenton Mills, the mill pond, the Furman mill race, and the paper mill recently constructed by Stacy Potts further downstream (on the present-day site of the Marriott Conference Hotel at Lafayette Yard). Even at this relatively late date, the Assunpink Creek corridor was not subject to intensive subdivision and was most likely given over to the needs of water-powered industry and meadow for livestock.

Colonel John Cox was certainly an acquaintance of George Washington of long standing and frequent speculation has been made, as yet unproven, that Washington visited Bloomsbury in the 1780s. What is quite clear, however, is that Trenton and the bridge over the Assunpink filled a special place in Washington's own heart and in the rapidly blossoming mythopoeia that was beginning to surround the nation's pre-eminent founding father. In 1789, the residents of Trenton constructed a triumphal arch for General Washington beneath which he would pass en route to New York for his inauguration as the first President of the United States.

A roughly contemporary view of the triumphal arch, which was erected at the north end of the bridge, shows the two arches and buttress of the stone bridge over the Assunpink, and notes in the accompanying caption that the structure had been "built," or more likely rebuilt and repaired, in 1780 (Plate 4.4). The 20-foot-high triumphal arch, comprised of 13 pillars that were adorned with flowers and laurel leaves, was designed and constructed under the direction of Benjamin Yard, a well-known Trenton patriot and former owner of the Trenton Steelworks on Petty's Run. An inscription on the south side of the arch read: "The defender of the mothers will be the protector of the daughters." As he passed through the arch, Washington received salutations from the city's matrons and other residents who praised him and sang in his honor. Washington subsequently thanked the women for the gracious reception, noting "the contrast between his former and actual situation at the same spot" on the Assunpink bridge (Trenton Historical Society 1929:198-204).

Following the death of Robert Waln in 1784, the Trenton Mills property stayed within the Waln family through into the early 19th century as a result of its being inherited by Waln's daughter, Hannah Waln Wells. In actuality, it appears that it was Hannah's husband, Gideon Wells, and her brother, Robert Waln, who were most involved in the mill's operations during this period. The gristmill can be reasonably assumed to have continued in operation through the last two decades of the 18th century up until late in the first decade of the 19th century. This assumption is based on the appearance of a gristmill assessed to Gideon Wells in the Nottingham Township tax ratables for the years 1803, 1805, 1806, 1807 and 1808. In each of these ratables Wells is assessed for three "houses & lots" and three gristmills (which in actuality means a single gristmill with three sets of millstones) (Nottingham Township Tax Ratable Assessments).

The gristmill was probably not faring well, however, for by 1803, records indicate that Gideon Wells was bankrupt. In that year, his life estate was conveyed to two assignees, Archibald McCall and John Dorsey, who granted the rights to a portion of the 29-acre mill tract that spanned both sides of the Assunpink, west of the bridge, to Hannah Wells' brother, Robert Waln (West Jersey Deed AV-151). Significantly, Wells was not assessed as the owner of any acreage in the tax

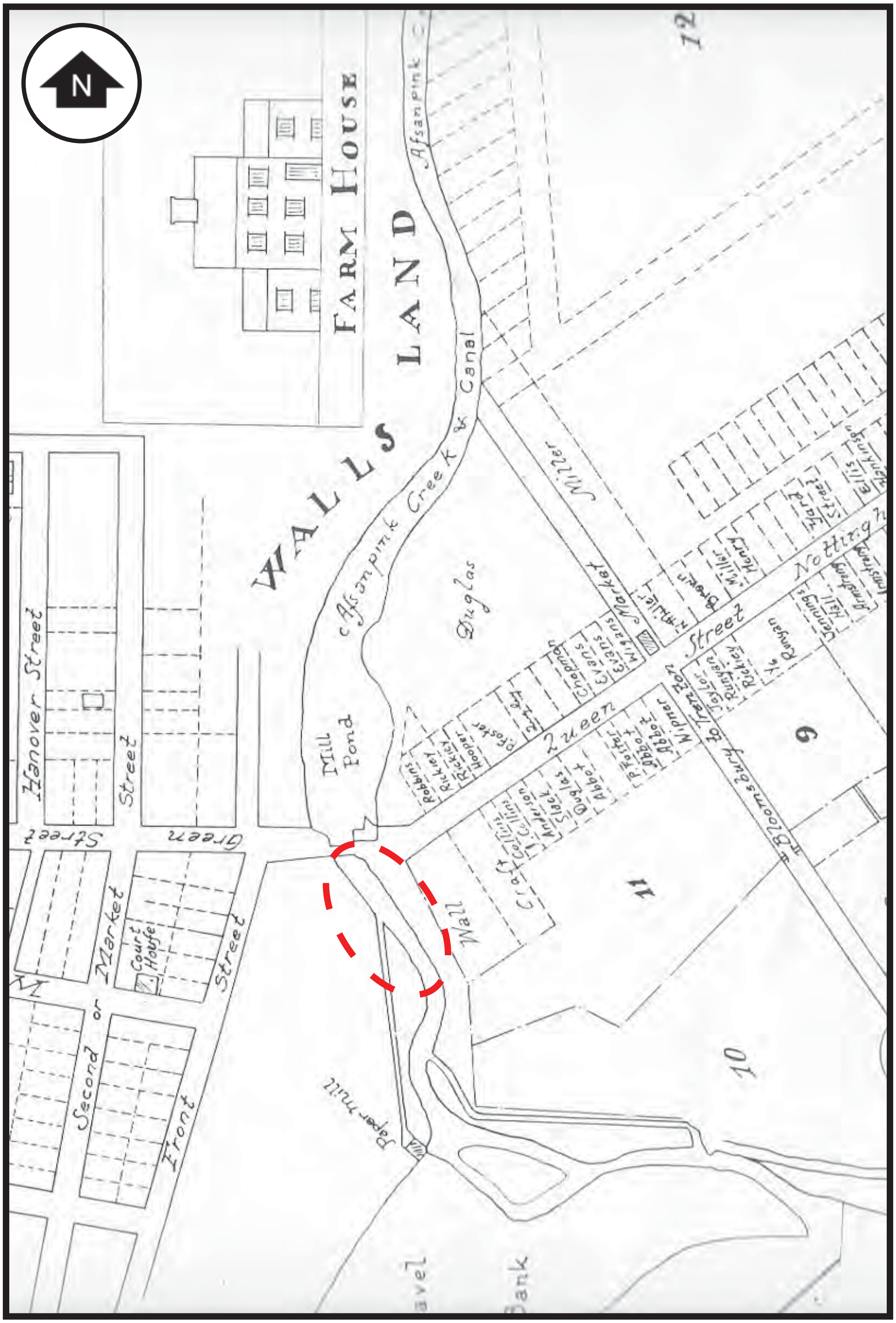


Figure 4.8. *A Plan and Survey of Sundry Pieces of Land Adjoining the Delaware River and Assunpink Creek Belonging to Jn. Cox.* 1789. Scale: 1 inch: 400 feet (approximately). Study area circled.

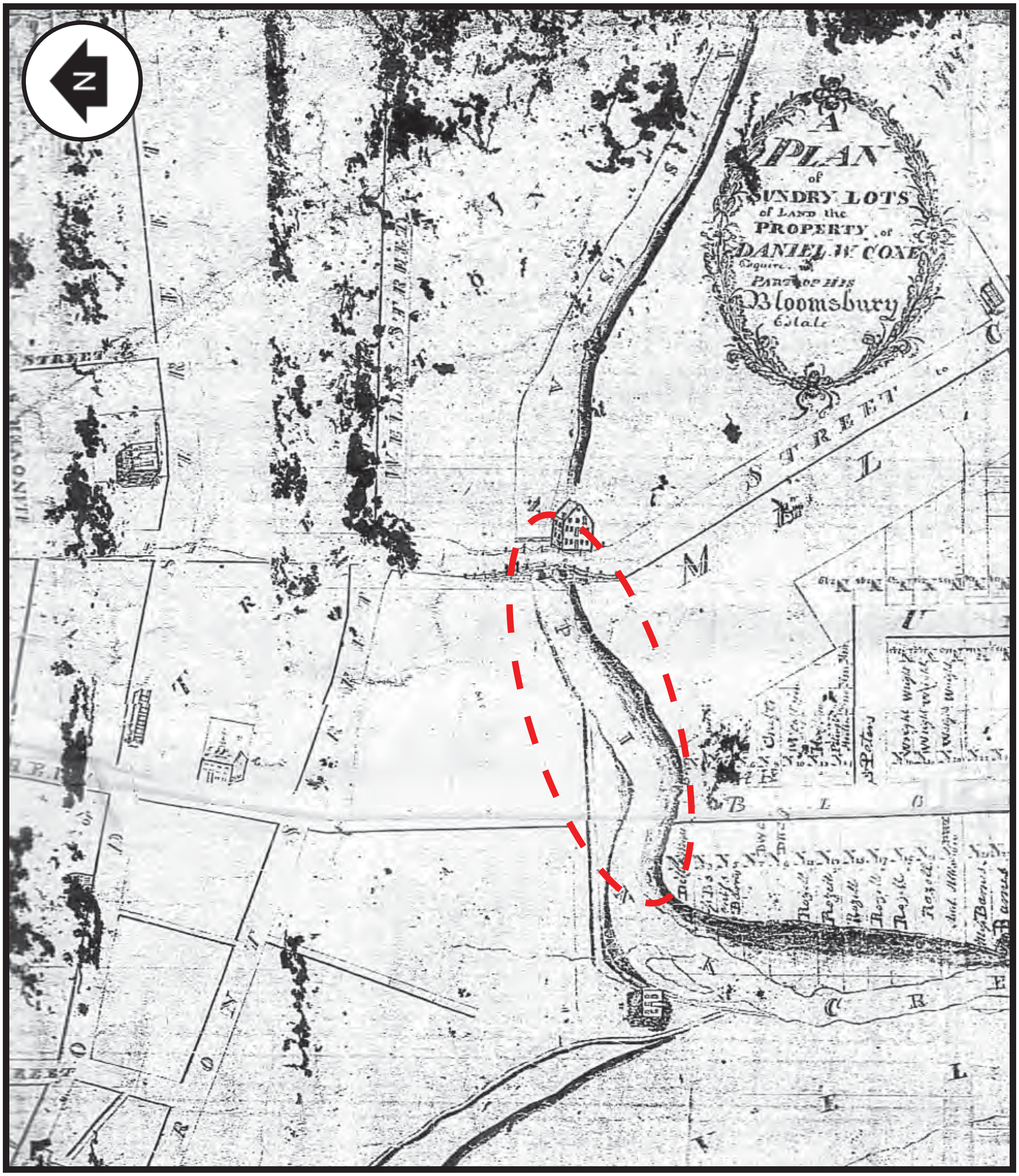


Figure 4.9. *A Plan of Sundry Lots of Land the Property of Daniel W. Coxe, Esquire, Part of His Bloomsbury Estate*. *Circa* 1804. Scale: 1 inch: 330 feet (approximately). Study area circled.

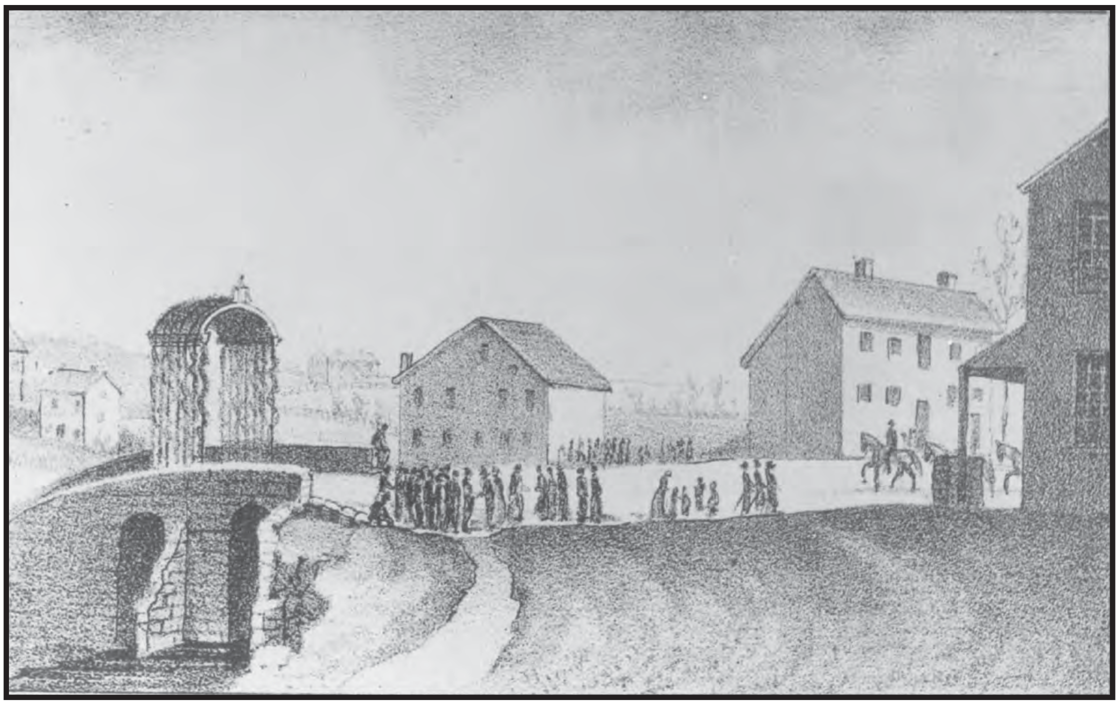


Plate 4.4. Assunpink Bridge and Triumphal Arch. Undated. (Source: Trenton Public Library, Trentoniana Collection).

ratables referenced above – the bankruptcy arrangements of 1803 are no doubt the explanation for this. At the same time that her husband signed over his life estate, Hannah Wells agreed to join in a mortgage and conveyed her interest in the mill and premises to Robert Waln pending repayment of $10,725 (the amount that Robert Waln had paid for the life estate). The life estate was then to be conveyed to her trustees, Pattison Hartshorne and Benjamin Morgan, and the profits from this transaction were to be used towards the education and support of their children. In 1804, Gideon and Hannah Wells paid off the mortgage, and the rights to Hannah and Gideon Wells' estate were transferred to the trustees (Burlington County Deed L-564 and I2-513).

Around this same time, a plan of lots belonging to Daniel W. Coxe in the Bloomsbury area was surveyed (Figure 4.9). This map, again produced as part of the ongoing development south of the Assunpink, provides some coverage of adjacent lands, including those under Wells/Waln ownership around the bridge over the creek. The map depicts with exceptional clarity the double-arched bridge over the Assunpink and the two-and-a-half story gristmill immediately upstream. Allowing for a full basement level adjacent to the creek, the mill structure was in fact likely to have been a three-and-a-half story building. Raum (1871:236) notes that during this period, in addition to the mill hydrosystem, water was drawn through a wooden pipe just below the bridge from a spring on the north side of the creek down to the Hall and Ewing distillery in Lamberton. Downstream of the Assunpink bridge, South Warren Street has been projected as extending to the creek, suggesting the impending decision to construct a bridge. Further downstream, Potts paper mill is depicted as a three-story, gable-front building, its headrace extending upstream with the intake located about midway between Warren and Broad Streets. The Furman mill's headrace is also shown, hugging the edge of a sand or gravel bar located on the south bank of the Assunpink's mouth.

G. THE ASSUNPINK BRIDGES FROM 1800 TO 1870

Throughout the first half of the 19th century, the bridge that carried Greene Street (today's South Broad Street) over the Assunpink Creek was in need of seemingly constant repair. In 1805, for example, the Hunterdon County freeholders minutes record that the bridge was to be fixed, but do not indicate the extent of this particular undertaking. In 1813, Hunterdon County resolved that the bridge over the Assunpink in the "main street" in Trenton, presumably Queen Street (today's North and South Broad Street), was again in need of repairs. Upon evaluation of the structure, it was decided that the top of the bridge would be laid with oak planks and new sleepers would also be added. However, the freeholders minutes note that these directions were not followed. Rather, during rehabilitation of the structure in 1814, three bents (sections of timber framing) were thrown away, and two bents that covered the bed of the creek were repaired and extended at the wing walls on the Trenton side. Furthermore, "the whole distance of the bents [was] thrown away" and the wing walls were raised on the Burlington County side. The freeholders minutes also note that repairs were necessary for the Assunpink bridge near Wells' mill, and involved fixing the foot of the pier and covering the top of the wall (Hunterdon County Freeholders Minutes).

Around 1804, Trenton's town government approved the construction of a second bridge over the lower Assunpink at Warren Street. The growth of Trenton and the speculation surrounding its real estate development prompted the construction, the new bridge offering a more direct route from the town center to the Cox subdivision and, perhaps more importantly, the first bridge over the Delaware River (today's Bridge Street). The Delaware River Bridge, begun in May 1804 and completed in January 1806, was a landmark in American bridge engineering, a multiple-span, trussed timber arch, completed by master bridge builder Theodore Burr (Trenton Historical Society 1929:274-275).

In February of 1822, a flood on the Assunpink swept away much of the stone bridge that carried Greene Street over the creek and similarly affected the somewhat newer stone bridge downstream at the South Warren Street crossing. The former gristmill, now being used by Gideon Wells for picking and carding cotton (see below), was also partially destroyed and some of its machinery was carried away by the flood waters. A portion of the road to the north of the creek was "washed into deep holes and gullies by the overflowing water" and damage was estimated at $5,000 or $6,000. Newspaper articles at the time reported that James Ewing's gardens near his residence along Greene Street were nearly destroyed. A temporary bridge was evidently put in place at the "upper site" (*True American*, February 23, 1822; *The Emporium,* February 23, 1822), but, from the freeholders' minutes around this time, it is clear also that the Greene Street bridge was soon after substantially repaired and to a large degree rebuilt. The committee allotted $2,000 towards the repair of the Greene Street and South Warren Street bridges, a task that was to be undertaken by William Potts (Burlington County Freeholders Minutes; Hunterdon County Freeholders Minutes).

In 1843, another serious flood occurred on the Assunpink that again devastated both the mill and the bridge. A contemporary newspaper account relates the severity of this event most vividly:

> "Trenton, Thursday, Mar. 30, 1843
>
> Flood in the Assanpink
>
> The rain and thaw of Monday caused a great freshet in the Assanpink, which creek increased rapidly during Tuesday and attained on Wednesday morning a greater height than has been known for many years or perhaps ever.
>
> On Tuesday forenoon the creek rose so that the water ran across Greene street above the factory, and the stream at night fall had become rapid and turbulent and threatened to throw down the old Ewing house, round both sides of which it was cutting deep gullies in its way back to the creek. The furniture was removed from the lower story of the house, which was flooded with water, and as the violence of the stream increased the danger to the house became more imminent, until about 9 o'clock when the water on the south side of the bridge, cut a channel across the street, and on the north side consequently subsided it.
>
> For some time before this the water had been forcing its way on the south side, through an old trunk, unused for years, running from the creek on the east side of the stone factory, to an old weave shop on the west side of Greene street; and at 8 o'clock the subterranean channel was so enlarged that the south east corner of the stone mill fell in. About 9 o'clock, the road fell in and the deep cut of the waters below was exposed, across it and through the old weave shop, down to the Assanpink.
>
> Just before it fell, people were crossing frequently, and Mr. Gaddiss of the Prison, drove over but a minute before.
>
> At 10 o'clock, the south eastern part of the stone mill fell. The channel of the waters was washed wider and wider through the night, and increased towards the south so far as to carry away a building adjoining the rear of the Factory store.

> As the cut deepened the water passing through it of course became greater, until the larger part of the creek rushed through, in a very tumultuous stream which setting across the old channel of the creek, struck against the northern shore with great violence and swept away the gardens lying there" [*State Gazette*, March 30, 1843].

Raum (1871:169, 171) reported that the waters took a southerly course, tore away the street, and "left a chasm some sixty feet wide and about twenty feet deep." He further stated that the bridge was widened this year and a south arch was also erected, although independent primary confirmation of this statement has not been found. Podmore (31 August 1957) does state, however, that the Mercer County freeholders' minutes record a sum of $2,000 being spent to erect a stone arch bridge at the site in 1843.

By 1848, local newspapers were remarking that nearly 800 persons passed over the Greene Street bridge daily, although these accounts also noted that travelers were desirous of a safer passage (*State Gazette*, March 4, 1848). In the same year, the freeholders voted down a proposal to widen the Greene Street bridge by adding footpaths (*State Gazette*, March 7, 1848). Yet Podmore (31 August 1957) notes that the structure was indeed widened in the following year.

In 1860, noted American antiquarian Benson Lossing published a view of the "Trenton Bridge and Vicinity," composed during an earlier visit made sometime between 1848 and 1852 (Plate 4.5). This view, looking southwest from the north side of the millpond, shows both the arched stone bridge over the creek and the mill nestled into the opposite riverbank. Lossing noted that the creek was dammed for the mill pond near the bridge and he also observed that the bank was being terraced at the time of his visit, most likely by Andrew Quintin who was establishing a retreat on the south side of the creek during this period. The old Trenton Mills structure, recently used as a carding facility by the Eagle Factory, is depicted in dilapidated condition, the victim of fire and flood damage. On the opposite (downstream) side of the bridge another three-story building housing the main cotton works of the Eagle Factory is also visible (Lossing 1868:26). The Greene Street bridge was supposedly widened in 1849, although this remains to be confirmed. In 1851, the bridge carrying Greene Street (by now beginning to be referenced on maps as Broad Street) over the Assunpink was paved, a welcome relief for travelers who deemed this spot particularly impassable in wet weather (Podmore 31 August 1957).

Another view of the bridge, published by Barber and Howe in 1868 (Plate 4.6), shows the downstream (west) face of the Greene Street bridge with its pair of substantial arches echoing the structure shown sketched on the Coxe map of *circa* 1804 (see above, Figure 4.9). The left or northernmost arch essentially corresponds to the arch that is still visible today, while the right arch spanned the raceway system passing through the mill. On the right, upstream from the bridge, stands the McCall Paper Mill, a large three-story stone structure that was built in 1851 by Harding & Company on the site of the old Trenton Mills (see below). The large building in the left background is the Temperance Hall, an establishment situated on the corner of South Broad and East Front Streets.

A group of three informative photographs also survive from this period, showing both the Greene Street/South Broad Street bridge over the Assunpink Creek and the McCall Paper Mill (Plates 4.7-4.9). It is believed that these photographs were taken right around the time that the bridge was widened and refurbished. The attribution of a *circa* 1870 date to these views is based in part on the appearance of the iron railing, a feature that also appears in the engraving published by Barber and Howe in 1868 (cf. Plate 4.6). The railing is visible in the view of the bridge from downstream (see above, Plate 4.7) appears to match closely the one

Plate 4.5. *View of Trenton Bridge and Vicinity.* 1848. (Source: Lossing 1860).

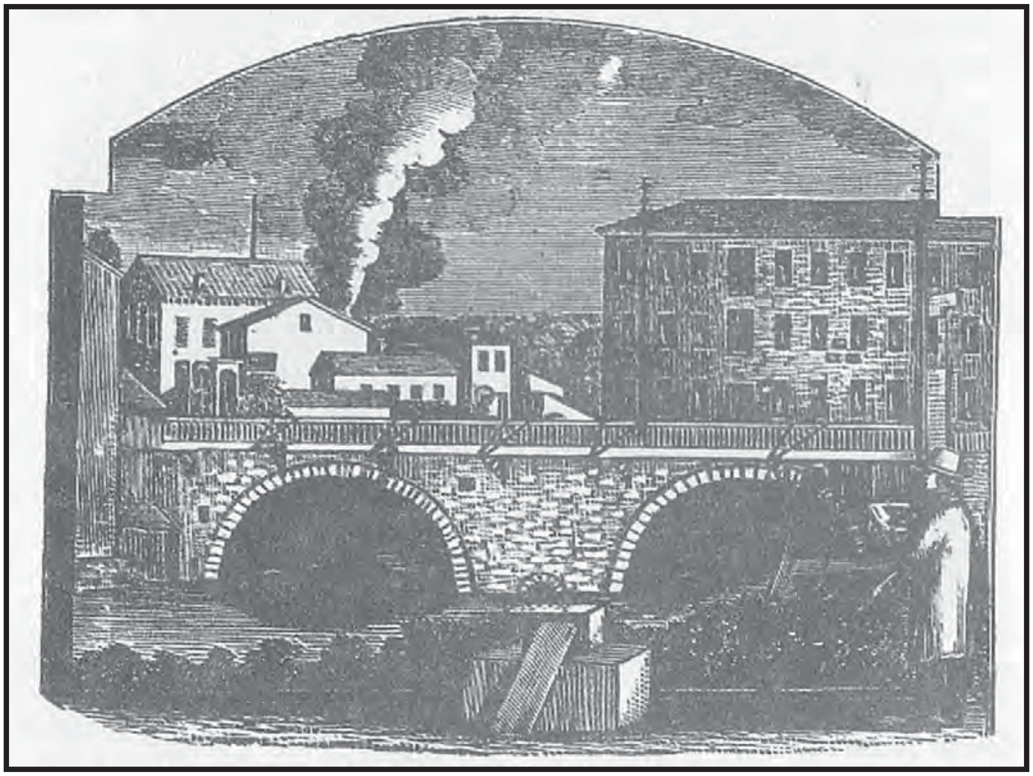


Plate 4.6. *Bridge over Assunpink Creek at Trenton, N.J.* 1868. (Source: Barber and Howe 1868).

Plate 4.7. Historic photograph of the South Broad Street bridge over the Assunpink Creek and the McCall Paper Mill. *Circa* 1870. (Source: Trenton Public Library, Trentoniana Collection).

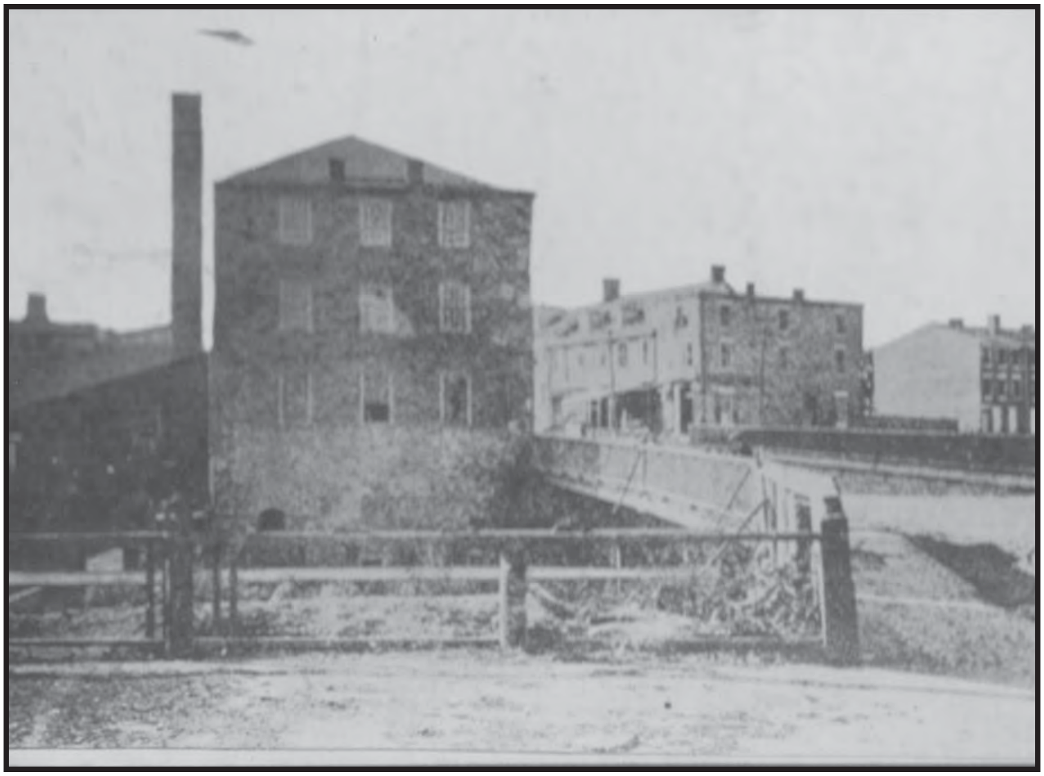


Plate 4.8. Historic photograph of the McCall Paper Mill and the Assunpink Bridge. *Circa* 1870. (Source: Trenton Public Library, Trentoniana Collection).

Plate 4.9. Historic photograph of McCall Paper Mill taken from the Assunpink Bridge. *Circa* 1870. (Source: Trenton Public Library, Trentoniana Collection).

shown in the Barber and Howe engraving. This railing was apparently replaced in 1870 and taken to Olden Avenue where it was re-erected over the creek (Cleary 1936). The dating of the two other photographs (see above, Plates 4.8 and 4.9) to the same period is also based partly on the fact they appear to show the bridge approaches immediately after the bridge widening and improvement project that was undertaken in 1870, just before the paper mill was pulled down and before the development of the Assunpink Block began to take place on the bridge itself in the mid- to late 1870s (see below).

H. THE 19TH-CENTURY MILLS ON THE SOUTH BANK OF THE ASSUNPINK

For ease of understanding, because of the multiplicity of mills along the banks of the Assunpink between South Broad and South Warren Streets from the second decade of the 19th century onwards, the history of each mill property is now separately traced through the 19th century and on into the mid-20th century (Tables 4.1-4.4). These sites are discussed in the order in which they occur from upstream to downstream (east to west) on the south bank of the creek, which also happens to be the chronological sequence in which these mill seats were developed.

Eagle Carding Mill/McCall Paper Mill (the Original Site of the Trenton Mills) (Table 4.1)

In 1814, Gideon and Hannah Wells conveyed one half of the seat of the original Trenton Mills property, including a gristmill, plaster house, bake house, mansion house and messuages to Robert Waln for $27,500 (Burlington County Deed K2-414). Apparently stemming directly from this ownership change was Robert Waln's establishment of one of the earliest textile mill complexes in the region, known as the Eagle Factory. This complex was based around the reconfiguration of the gristmill as a mill that appears to have been used primarily for picking and carding cotton (termed here the Eagle Carding Mill) and the construction of an entirely new facility (termed here the Eagle Cotton Factory) on the opposite (downstream) side of the Greene Street/South Broad Street crossing of the Assunpink Creek. The complex also included buildings on the opposite (north) side of the creek, upstream from the bridge.

This textile manufacturing facility, while not quite the first of its kind in Trenton (a smaller short-lived cotton mill was established in 1812 on Petty's Run by Joseph Fithian), was one of two large cotton factories founded by wealthy Philadelphians in Trenton in 1814-15. The other cotton mill, brought on line by 1815, was set up on the banks of the Delaware River by Daniel W. Coxe. This mill was a substantial four- or five-story brick structure, 60 by 40 feet in plan, and was powered by a wing dam in the Delaware. The building occupied a site immediately west of the Trent House, which Coxe at this time both owned and occupied. Coxe and Waln, politically well connected and with capital means at their disposal, together may be viewed as the entrepreneurs who first brought the Industrial Revolution into Trenton. Robert Waln, around the time he was setting up his cotton manufacturing facility on the Assunpink, was also an active political figure in Philadelphia, serving both in the State Legislature and as a member of the city council (Raum 1871:234-235; Mount 1992:27-29; Hunter et al. 2009: 71-75).

While Robert Waln was establishing the new cotton factory on the west side of Greene Street, his sister, Hannah Wells, retained her portion of the mill property, which still included the seat of the original Trenton Mills. In 1819, she purchased water rights that would enable her to raise the level of water in the millpond feeding the mill on this site, an action that was very likely related to the additional water power needs contingent on the textile manufacturing operations

TABLE 4.1. SEQUENCE OF OWNERSHIP
Eagle Carding Mill/McCall Paper Mill

Ownership Tenure	Name	Reference
1676-1704	Mahlon Stacy	(Unrecorded Wills Volume 4/85)
1704-1714	Mahlon Stacy Jr.	Unrecorded Wills Volume 4/85
1714-1724	William Trent	West Jersey Deed B-B-B/122
1724-1729	James Trent	(West Jersey Deed D/382)
1729-1733	William Morris	West Jersey Deed D/382
1733-1753	George Thomas	West Jersey Deed D-D/322
1753-1765	Robert L. Hooper	West Jersey Deed U/335
1765-1784	Robert Waln	West Jersey Deed AV/129
1784-1814	Pattison Hartshorne et al, trustees of Hannah Waln Wells	Gideon and Hannah Wells grant Robert Waln the rights to the property in 1803 (West Jersey Deed AV/151). Waln consequently conveys the rights to the Wells' trustees in 1804 (Burlington County Deed L/564). Although deeds do not explicate which half of the property is retained by Hannah Wells' trustees, it is likely that the mill was situated on her property since she purchased water rights for the millpond in 1819 and was held accountable for properties that were damaged as a result of flooding (Burlington County Deed Y2/441).
1820-	Robert, Richard and Lamar Wells	(Burlington County Deed Book Y2/445) Hannah Wells, who passed away in 1820, willed her ½ of the estate to three of her sons.
1820-	Charles Wells	Burlington County Deed Book Y2/444 Burlington County Deed Book Y2/445 In 1820 and 1829, Charles Wells, son of Hannah Wells, purchases a portion of the inheritance from his brothers Robert and Richard.
1829-1849	Lewis Waln	Burlington County Deed Book Y2/449 Charles Wells and Benjamin Morgan convey a portion of Hannah Wells' lands to Waln in October 1829. A month later, Lamar Wells conveys another tract, lacking a description, to Waln (Burlington County Deed Book Y2/453).
1849-1873*	Henry McCall Jr.	Mercer County Deed Book P/399

* property subdivided when Assunpink Block is created

(Burlington County Deed Y2-441). In the following year, Hannah Wells passed away and willed her portion of the estate to her three sons, Richard, Robert and Lamar, who later conveyed their inheritance to their brother, Charles Wells.

At this somewhat confusing and critical juncture in the development of the Waln/Wells cotton manufacturing operation, it is fortunate indeed that the entire Eagle Factory operations (i.e., the facilities on both sides of Greene Street represented by both the Eagle Carding Mill and the Eagle Cotton Factory) were inventoried in the federal census of manufactures compiled in 1820. This information and most of the other land transfer information from the 1820s and 1830s are presented in the following section of the chapter that traces the history of the main focus of the cotton factory complex (see below). Of particular relevance to the Eagle Carding Mill site, however, is a deed of 1829 through which Charles Wells conveyed a portion of the lands that had belonged to his mother, Hannah Waln Wells, to his cousin Lewis Waln (Burlington County Deed Y2-449). It is likely that this indenture refers to the site of the carding mill on the east side of Greene Street.

Two maps prepared in the mid-1830s provide a valuable picture of the complicated sequence of milling along the Assunpink during this period and help to place the Eagle Carding Mill more clearly within the context of the overall Eagle Factory complex. A map completed in 1833 that delineates the course of the main canal of the Trenton Delaware Falls Company (the forerunner of the Trenton Water Power) through downtown Trenton shows the section of the Assunpink upstream from the raceway (Figure 4.10). Three mill sites are depicted along the southern bank of the Assunpink between the present-day South Warren Street and South Broad Street crossings of the creek. Although unidentified on this map, the second map permits them to be identified as the Moore Flouring Mill, the Trenton Cotton Factory (later the Wilson Woolen Mill) and the Eagle Cotton Factory. On the opposite (upstream) side of the South Broad Street (then Greene Street) bridge stood the Eagle Carding Mill (on the site of the original Trenton Mills) on the south bank and another unidentified mill site, most likely related to the Eagle Factory cotton works, on the north bank.

Essentially the same cartographic information is recorded on the Gordon map of Trenton in 1836 (Figure 4.11), and this map helpfully provides a legend referencing each of the structures. The two structures on the upstream side of the Greene Street bridge, as well as the building immediately downstream on the opposite side of the bridge at the eastern end of Factory Street (all marked “11”), are all identified as part of the Eagle Cotton Factory. The structure labeled “12” is given as the Trenton Cotton Factory, while the site furthest downstream at the western end of Factory Street (marked “13”) is occupied by Moore’s Flour and Oil Mill.

The damaging flood that occurred in 1843 (see above) spelled the beginning of the end of the Eagle Carding Mill. An earlier flood had occurred in 1822 in which a portion of the Eagle Carding Mill was partially destroyed (*The Emporium*, February 23, 1822), but the facility was evidently repaired and resumed operation. The flood of 1843, however, was followed soon after by yet another destructive incident in 1846, when a fire broke out in the carding mill and its walls were severely burned. This seems to mark the end of the building’s use for textile manufacturing. As a consequence of this event, the walls were to be partially demolished, but to a point no lower than the top wall of the bridge (Historical Society of Pennsylvania, Lewis Waln Letterbooks:1820-1849; Hunter et al. 2009: 90-95).

In 1849, Lewis Waln conveyed the original Trenton Mills site and its associated 29-acre property to Henry McCall for $18,000 (Mercer County Deed P/399).

Figure 4.10. Board of Managers of the Trenton Delaware Falls Company. *Map and Profile of the Trenton Delaware Falls Company's Canal or Main Raceway*. 1833. Scale: 1 inch: 525 feet (approximately). Study area circled.

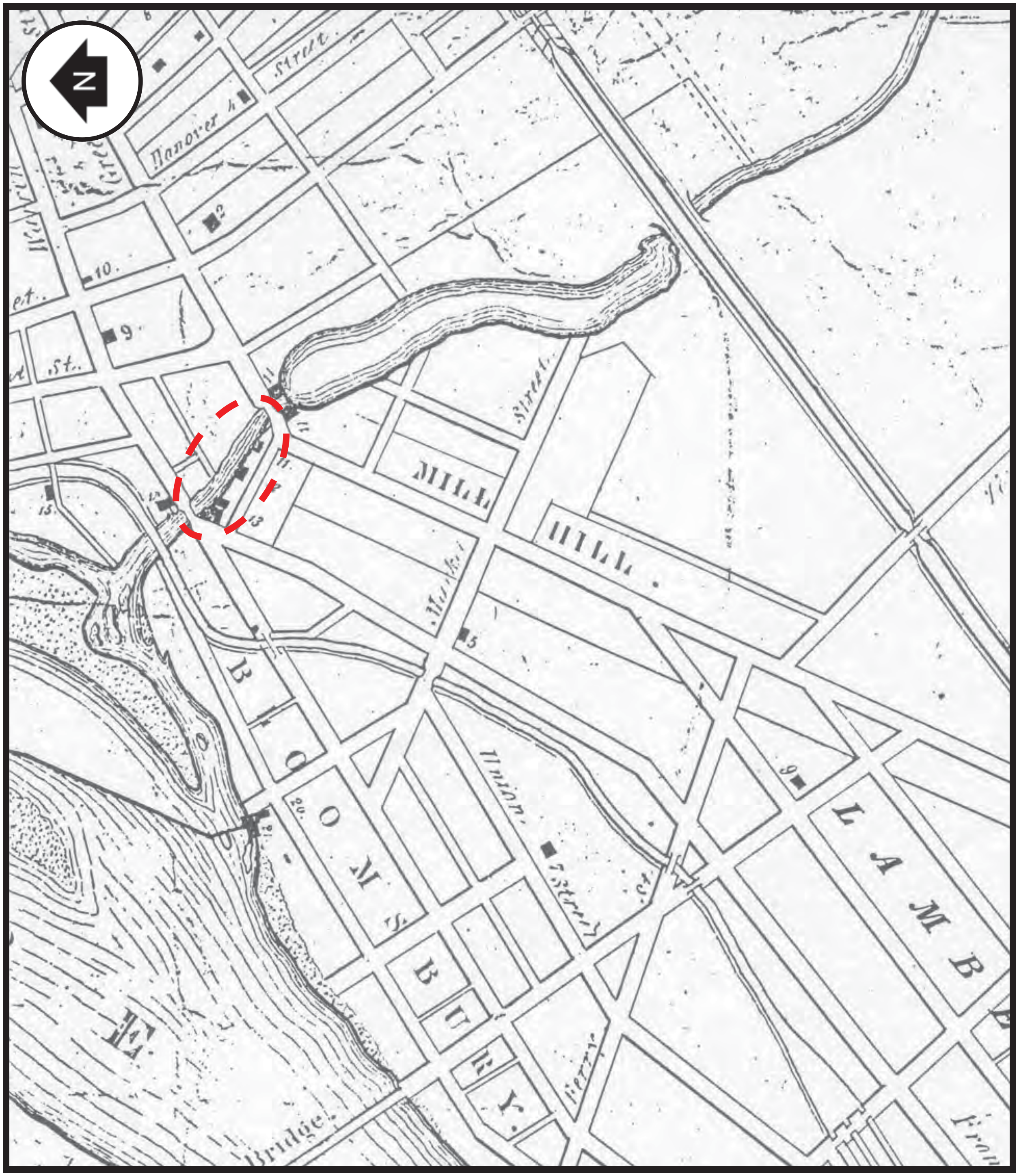


Figure 4.11. Gordon, T. *Map of Trenton and Its Vicinity*. 1836. Scale: 1 inch: 650 feet (approximately). Study area circled.

After he acquired the land, McCall hired Harding & Company in 1851 to erect a three-story stone paper mill on the site of the earlier gristmill and carding mill. According to Barber and Howe (1868:288), there were three date markers inserted into this building: "1756" - noting a major episode of modification to Trent's Mills; and "1822" and "1850" referencing respectively the principal later additions of the Eagle Factory period and the paper mill. Woodward and Hageman (1883:670), on the other hand, note that the earliest of these three dates derived from the bakery of George Bright, a structure that adjoined and shared a common wall with the mill to the south (Woodward and Hageman 1883:670).

The mill site is depicted, at a point just prior to its redevelopment for paper manufacture, on several maps produced in the late 1840s: a United States Coast Survey map of 1844 (Figure 4.12); a map delineating the properties owned by Henry McCall in 1849 (Figure 4.13); and the pair of maps showing the entire City of Trenton, both published in 1849, one by Sidney (Figure 4.14), the other by Otley and Keily (Figure 4.15). The McCall property map also shows in some detail the millpond, the raceway system and the stone dam that ran parallel to and east of the bridge over the Assunpink.

In 1851, the newly-built McCall Paper Mill was insured by the Franklin Fire Insurance Company of Philadelphia. The description accompanying the insurance survey is included here *verbatim*, since it provides crucial information about the mill building at this time:

Copy of Survey of Mill
Made by G. Harris
Agent of Franklin Fire Ins. Co.

The Franklin Fire Ins. Co. insure H. M[c]Calls Mill in Trenton. 3 Story store 36x120, with one story store building 40x60 a brick steam boiler house 7 ½x49-a frame rag boiler House with store foundations, 15 9/12x32 ft. all slate roofs, except steam boiler house which has a tin roof, together with ten brick cisterns, cemented in main building, and the head gates with their appurtenant rigging to the amount of [?]4200. Also the following machinery contained in the building to amt. Of $2800-total $7000-to wit; a large water wheel 18ft. diameter with 17ft. bucket and 2. 8in segments-2. 16 ft. 5 in. shafting-2, 3 ft. pinion wheels with 8 in.–2 fly wheels 8 ft. 3 in. diameter. 2 girders and 4 lamp frames well erected to support the main shaft-all the above area connected to and driven by the large water wheel and a small water wheel called the machine wheel-15ft. diameter 4ft. bucket + 1.4 in. segment.

The above buildings are all connected [see plan annexed] and area situated +c.

The frame rag boiler House bar [?] not to be included in Insurance

The walls in the basement story are 2 ½ ft. thick basement has four apartments (2 machinery rooms + 2 wheel pits –having 9 windows Each containing 20 lights 8x10 glass + 3 small windows under foundation of machines shop-the flooring is laid on [?] girders + is of 3 in. plank-in this story is all the machinery above named + a flight of stairs leading to this story-which is finished more room-30 windows 24 lights 8x10 glass-5 large mill doors as [?] and a cellar door all strongly hung with a suitable fastening-1st story flooring yellow pine boards (as are all flooring but basement) on 3x12 hemlock joists (15 in.

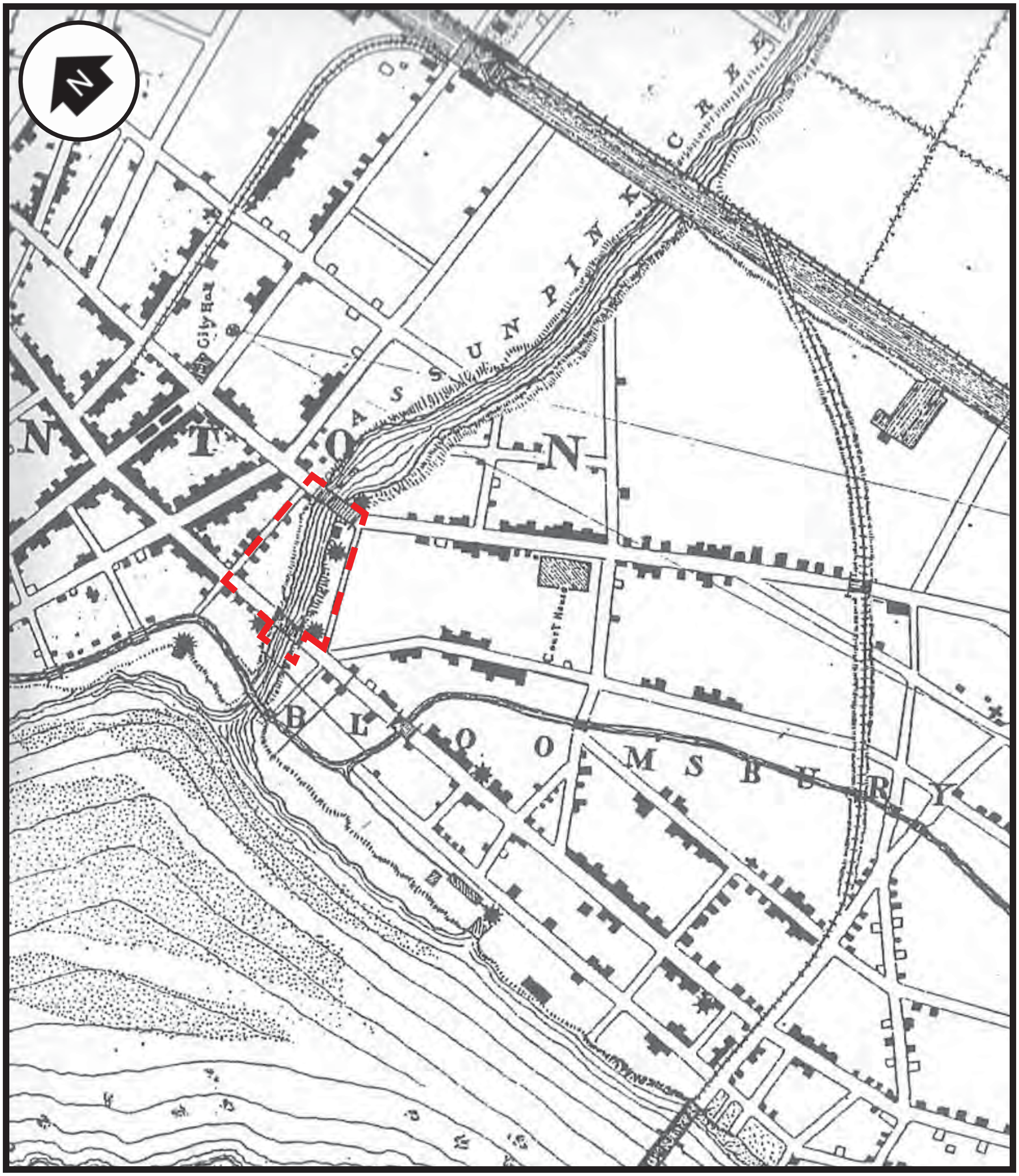


Figure 4.12. United States Coast Survey. *Delaware River from Bordentown to Trenton*. 1844. Scale: 1 inch: 650 feet (approximately). Study area outlined.

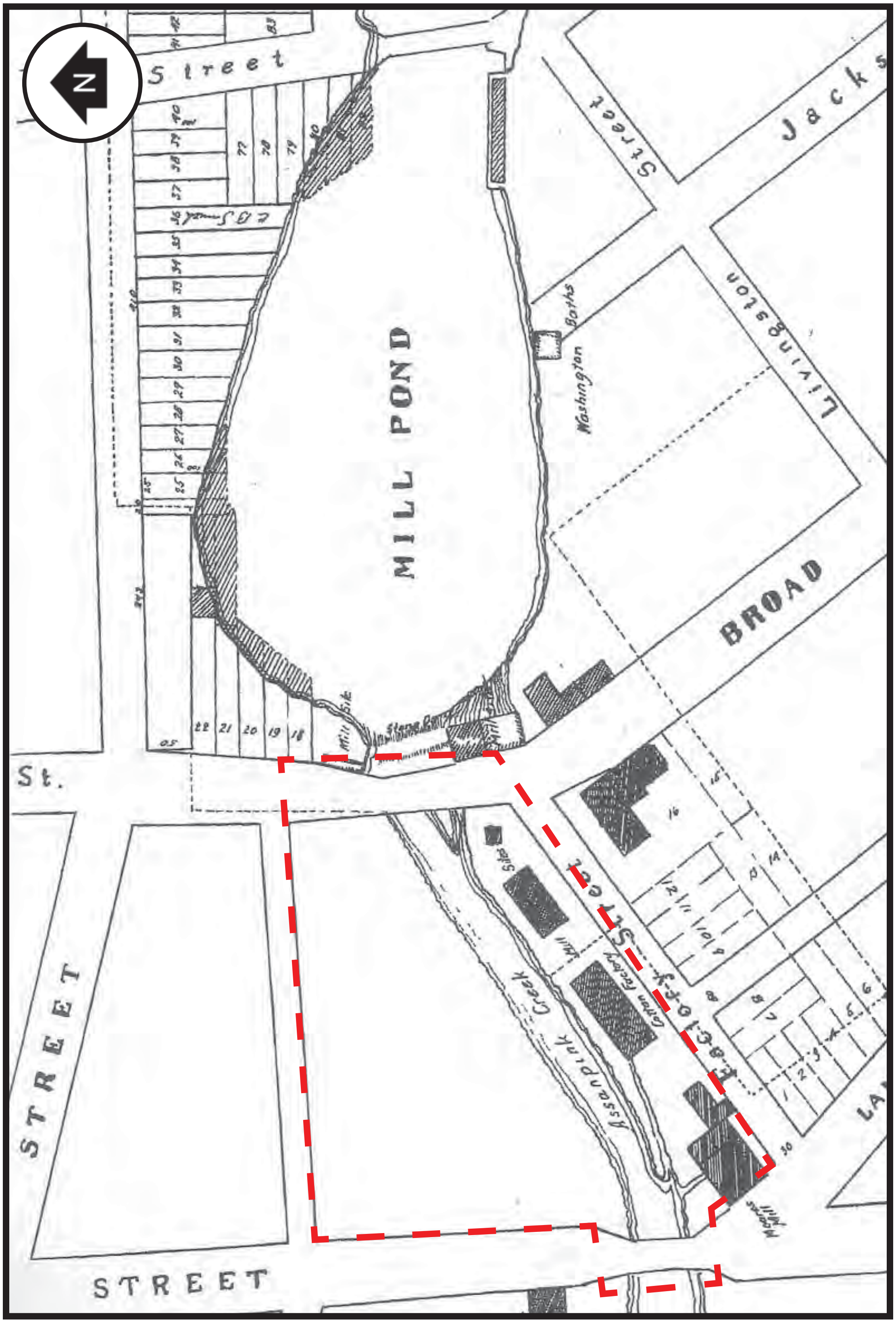


Figure 4.13. Potts, S. *Property of Henry McCall, Jr.* 1849. Scale: 1 inch: 175 feet (approximately). Study area outlined.

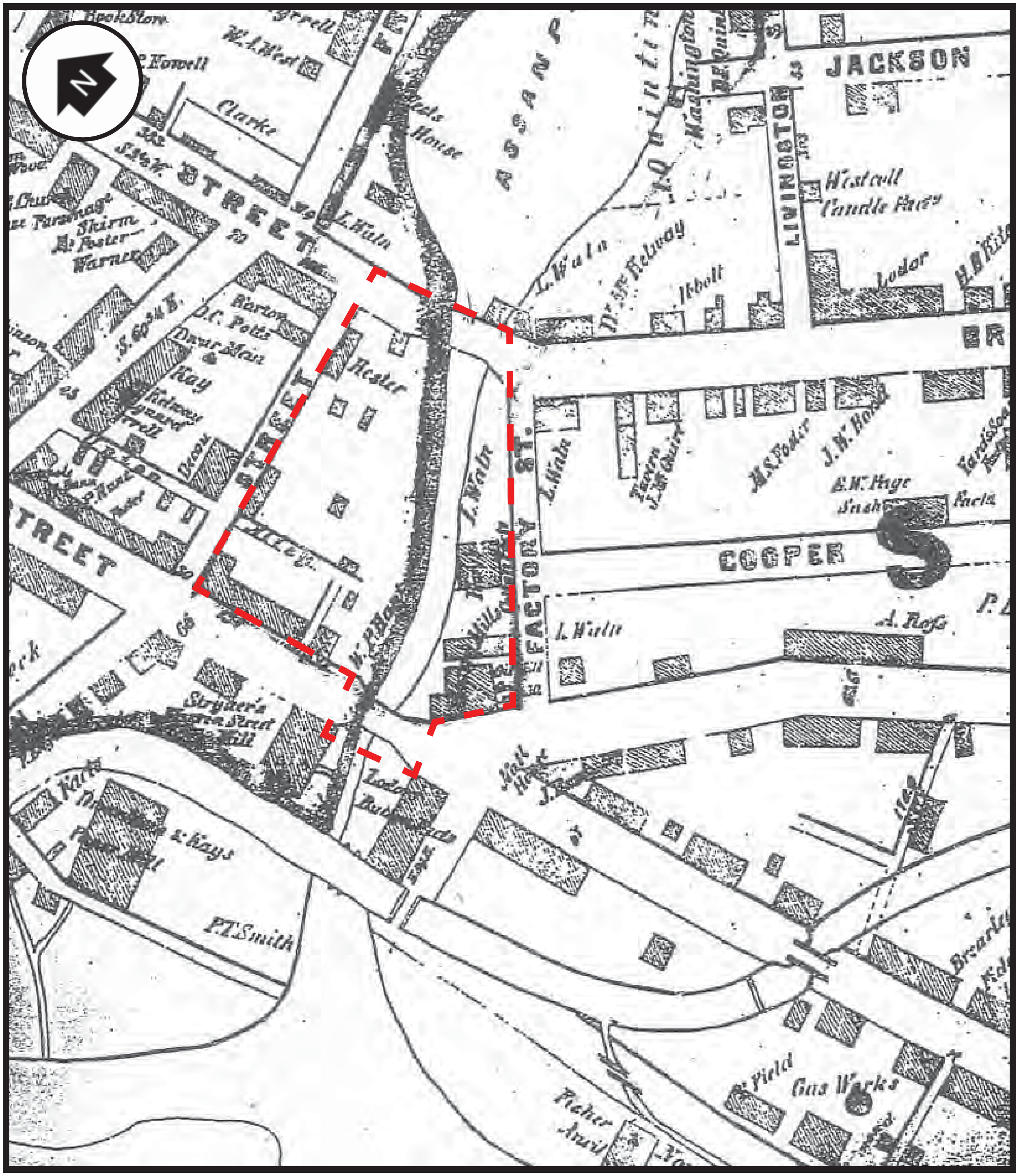


Figure 4.14. Sidney, J. *Map of the City of Trenton.* 1849. Scale: 1 inch: 200 feet (approximately). Study area outlined.

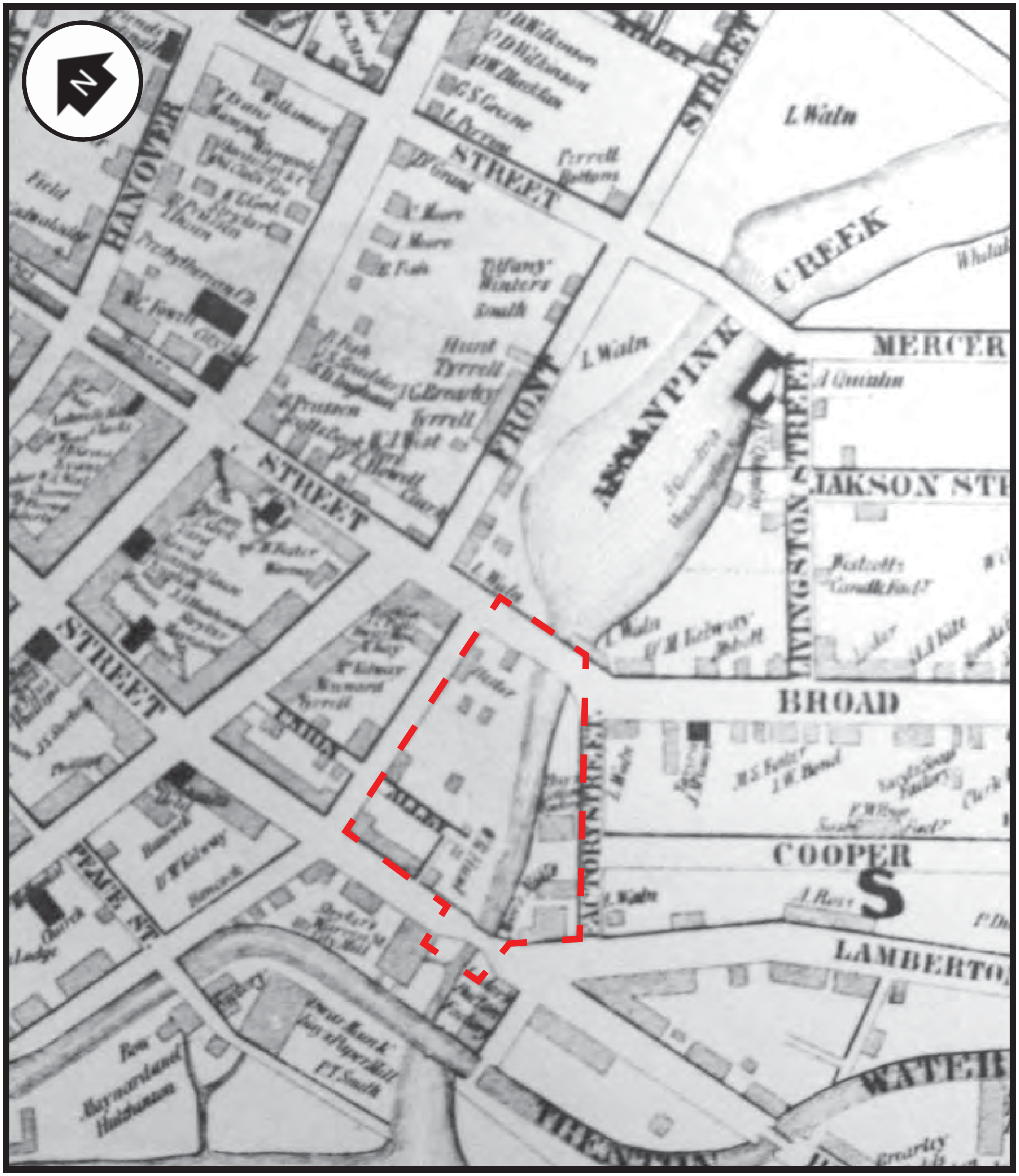


Figure 4.15. Otley, J. and J.W. Keily. Inset of Trenton in *Map of Mercer County*. 1849. Scale: 1 inch: 260 feet (approximately). Study area outlined.

center to cut) Supported by 14 pine girders each 10x12 inch with Iron columns 1st story railing planed pine boards supported by 14 pine girders each 10x12 joist 10x12-15 in. apart Each girder having 6 in. iron column-flooring over the cisterns is open in this story; this story has a box stair case leading to 2nd: at S.E. corner of story this story is machine shop 40x60-stone walls slate roof finished in one room-14 windows 24 lights 8x10 glass-1 large door-ceiling in shape of roof lined with pine boards, ploughed and ground and well jointed –at peak of roof is an air chamber about 6ftx20ft. with slat windows + slate roof-on north side of machine shop and connected to it in brick steam boiler house +c. on Eastside of main building + connected with this story is rag boiler house-frame with stone foundations-the building not included in insurance-Ind. Story-2 windows-24 lights 8x10 3 large mill doors a stair and an office door joints 15 in. apart 3x10 hemlock laid on 8x10 pine girders-14 in. Each with an oak column 7 in. square-In this story an office 9 ½ x 12 ft. in S.W. corner of room + flight of stairs leading to 3rd story-3rd story open to roof, but having 14 pine girders 6x7 in supported by 6 in. square oak columns-32 windows-20 lights 8x10 glass + 3 doors-height of basement + first story Each 10 ft. 2nd and 3rd. 8 4/12-all windows and doors have blue stone elles + heads-basement walls of main building 2 ½ ft. thick and 20 inches at Eaves-walls of machine shop 15 in. thick whole of the premises throughout are new [?] + strongly built for location of room +c. See plan connected –

Surveyed by Abr. G. Harris Agt.
Mch. 25. 1857.   for F.H.M.C.

This understood + admitted by Co. that the Rag Boiler House is Uncovered by the Insurance

W.McCall Jr.

The Above Surveyed to the best of my knowledge I [?] correct.

Apr. 30. 1857. W.McCall. Jr.

1 Large Water Wheel
2 Fly Wheels
2 Pinion Wheels
I main shaft
2 Dorms (These are no Dorms belonging to me)
1 Machine Wheel
4 Harness frames to support main shaft

And generally the rigging and Shafting appurtenant and essential to above wheels and machinery-

On Above I wish $2800 insured
Main Building-Store
Machine Shop-Store
Boiler House-Brick
Rag House-Wood on Stone foundations-one story Head gates and all pertinent rigging-
10 brick cisterns, cementing in main building
On above I wish $4200 insured

Hoisting machine omitted
[Historical Society of Pennsylvania, Franklin Fire Insurance Records]

In summary, this insurance schedule indicates that the main three-story mill building had three adjoining buildings: a one-story stone structure; a brick steam boiler house; and a wood rag boiler house (this latter building not being insured). The mill basement was defined by walls that were over two feet thick and the space was divided into four rooms, two of which housed machinery. To the north side of the mill was attached the brick steam boiler house, while the rag boiler house adjoined this structure to the east. The mill machinery was powered by a large water wheel and a smaller one that McCall termed the machine wheel. The establishment was considered "one of the best and most complete in the country" with admirable machinery and the "best specimens of printing paper" (*State Gazette*, June 2, 1851).

The Lamborn *Map of Trenton*, prepared around 1858 (Figure 4.16), is the earliest available city map that identifies the paper mill. McCall's association with the site is not referenced on the map; the mill was probably being leased by him to the firm of W.R. Fetter & Co. (the partly illegible name shown on the map). McCall is known to have also leased the paper mill to an E.B. Bingham of Newark, with its actual operation being supervised at one time or another by both a Mr. Burke and a Henry Lewis. Henry M. Lewis is listed as the operator of the paper mill in the industrial schedules of the federal census of 1860. In that year, the paper mill enjoyed a capital investment of $40,000 and was producing 900 tons of news printing paper valued at $180,000 from raw materials itemized as 1,200 tons of rags, 25 tons of chemicals and 2,000 tons of fuel (presumably coal). The mill was supplied with 100 H.P. from a combination of water power and steam. There were 26 male employees costing Lewis an average of $800 a month and 24 female employees costing him an average of $200 a month (U.S. Federal Census of 1860, Industrial Schedules).

The Lake and Beers map of the Philadelphia and Trenton vicinity, printed in 1860 (Figure 4.17), shows the mill pond and mill site, but was too small scale to allow the names of owners and operators to be indicated. A decade later, the Beers *Map of Trenton* (Figure 4.18) shows the mill in McCall's tenure, and a large three-story structure is clearly visible in the bird's eye view of Trenton published in 1872 (Plate 4.10). Around this time, according to Raum (1871:177), the mill contained eight steam engines and two paper machines that produced approximately one-and-a-half tons of paper daily. The water that was used for bleaching purposes was carried in pipes that ran along the north side of the Assunpink and then crossed the creek just above the dam.

A more precise description of the paper mills operations is provided, however, in the industrial schedules of the federal census of 1870. John B. Burke is listed in this year as the mill's agent, which was referred to as the "Greene St. Paper Mill." The mill reported a capital investment of $15,000 and a production capacity of 1½ tons of paper per day. Three water wheels were in operation, generating 60 H.P., which ran four different pairs of machines (probably the eight "engines" referred to by Raum). The mill employed 13 male workers and five female workers, whose wages totaled $10,500 for the 11 months of the year that the mill was in use. Rags, "manilla" bagging and other materials valued at $38,450 were processed into 15,106 rolls of manilla paper (valued at $53,500) and 13,900 rolls of newspaper ($1,737) (U.S. Federal Census of 1870, Industrial Schedules).

The group of three photographs surviving from this period, which show the McCall Paper Mill and the Greene Street/South Broad Street bridge over the Assunpink, have already been mentioned in the context of the bridge (see above, Plates 4.7 to 4.9). All three views date from just before the time when the paper mill was pulled down and before the development of the Assunpink Block began to take place on the bridge itself in the mid- to late 1870s (see below). The two views that provide a close-up image of the paper mill (see above, Plates 4.8 and 4.9) are especially valuable in showing the very clear seam in the masonry between the top of the basement level and the upper stories of the mill building. This seam is

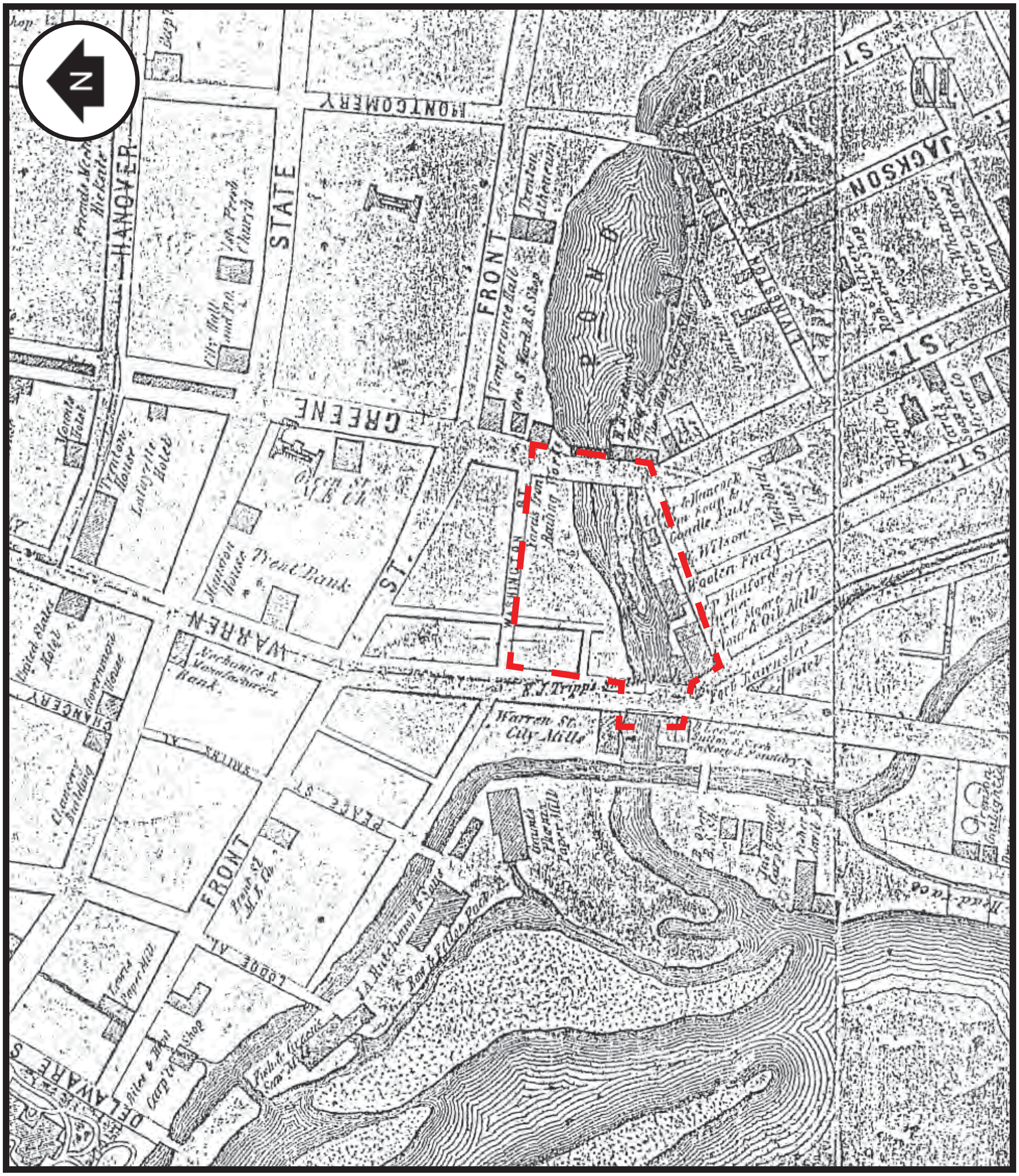


Figure 4.16. Lamborn, R.H. *Map of the City of Trenton*. 1859. Scale: 1 inch: 350 feet (approximately). Study area outlined.

Figure 4.17. Lake, D.J., and S.N. Beers. *Map of the Vicinity of Philadelphia and Trenton*. 1860. Scale: 1 inch: 875 feet (approximately). Study area outlined.

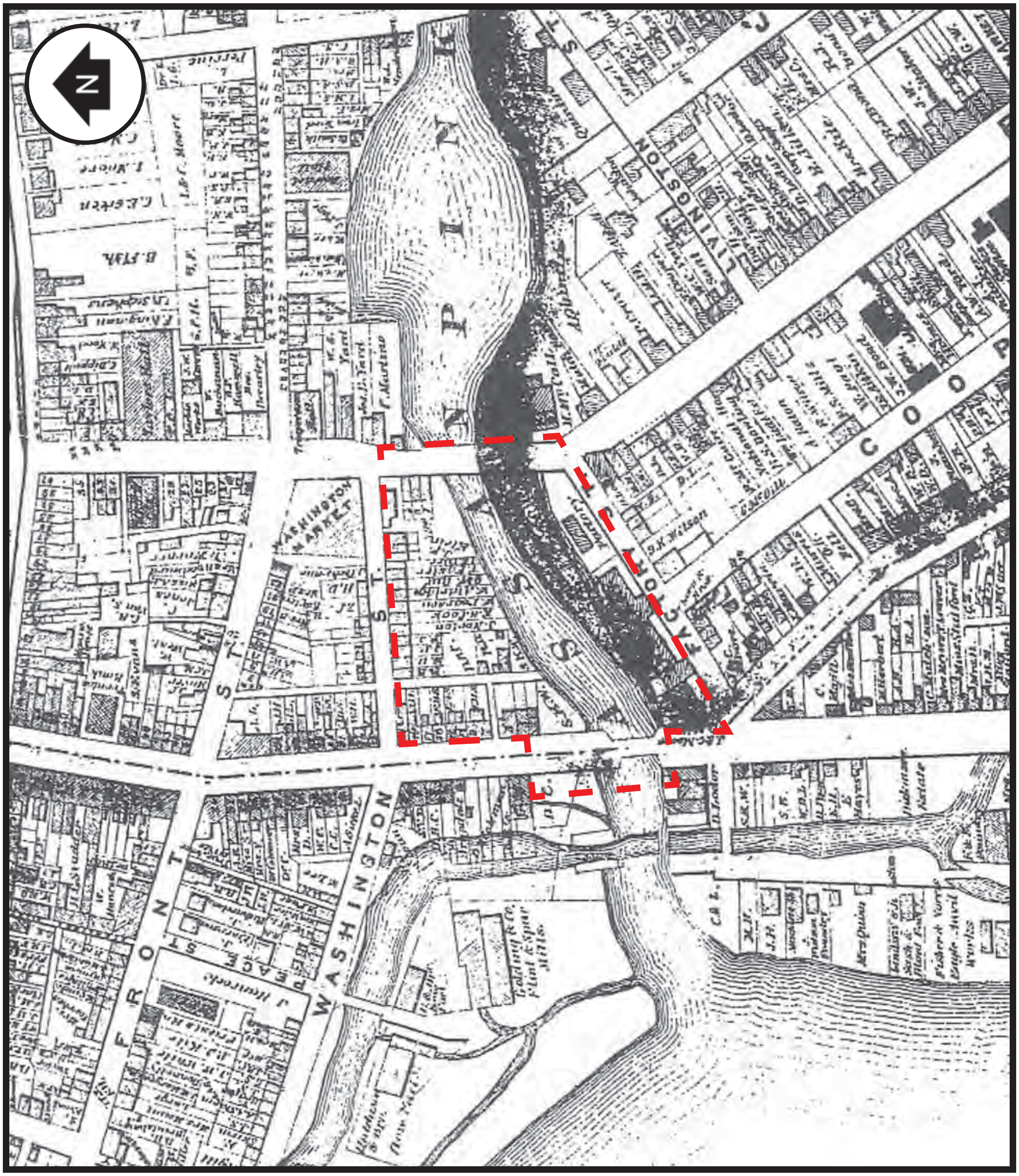


Figure 4.18. Beers, F.W. *Map of the City of Trenton*. 1870. Scale: 1 inch: 260 feet (approximately). Study area outlined.

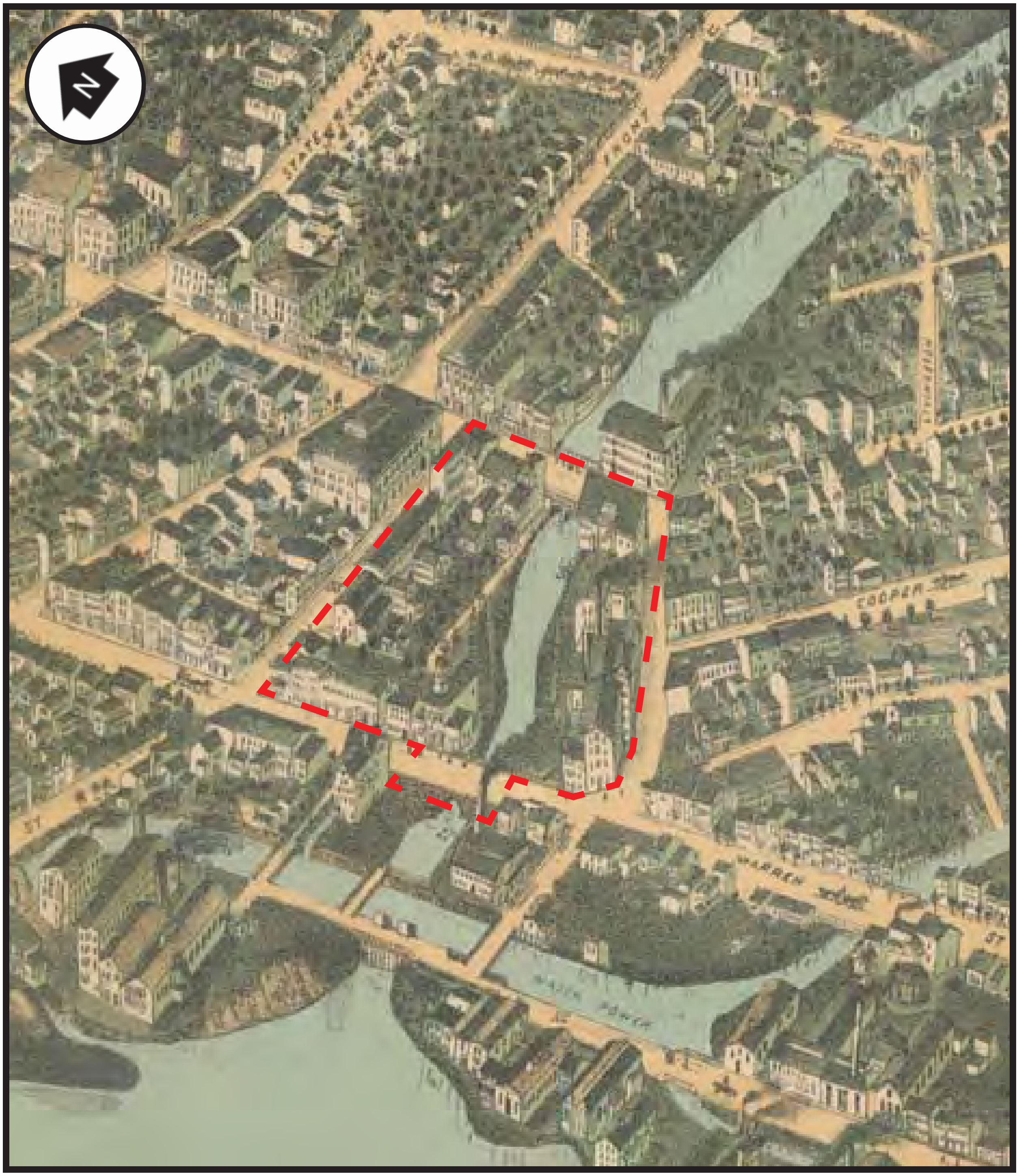


Plate 4.10. Fowler and Bailey. *Bird's Eye View of Trenton*. 1874. Study area outlined.

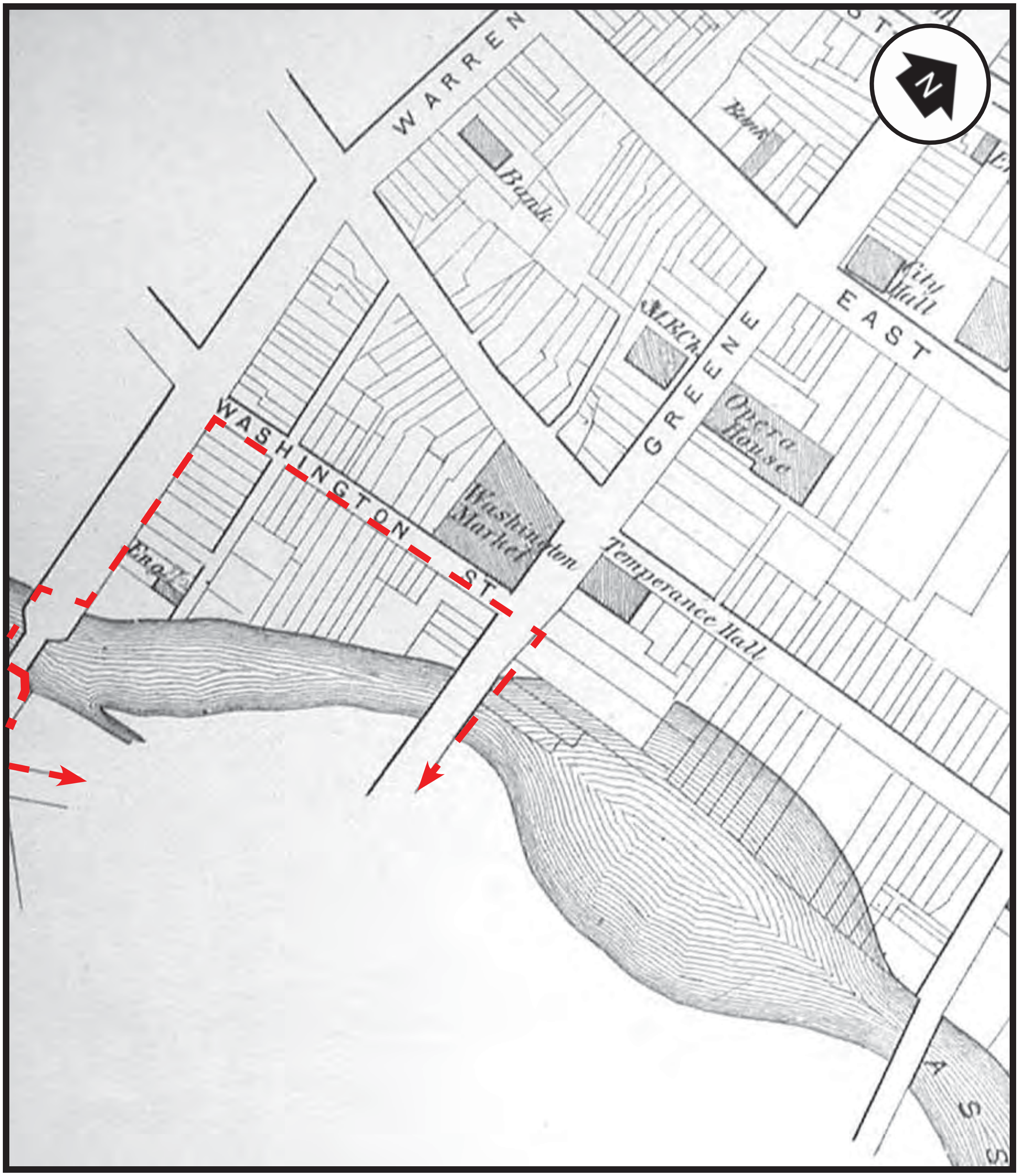


Figure 4.19a. Everts & Stewart. Map of Trenton in *Combination Atlas of Mercer County*. 1875. Scale: 1 inch: 210 feet (approximately). Northern section of study area outlined.

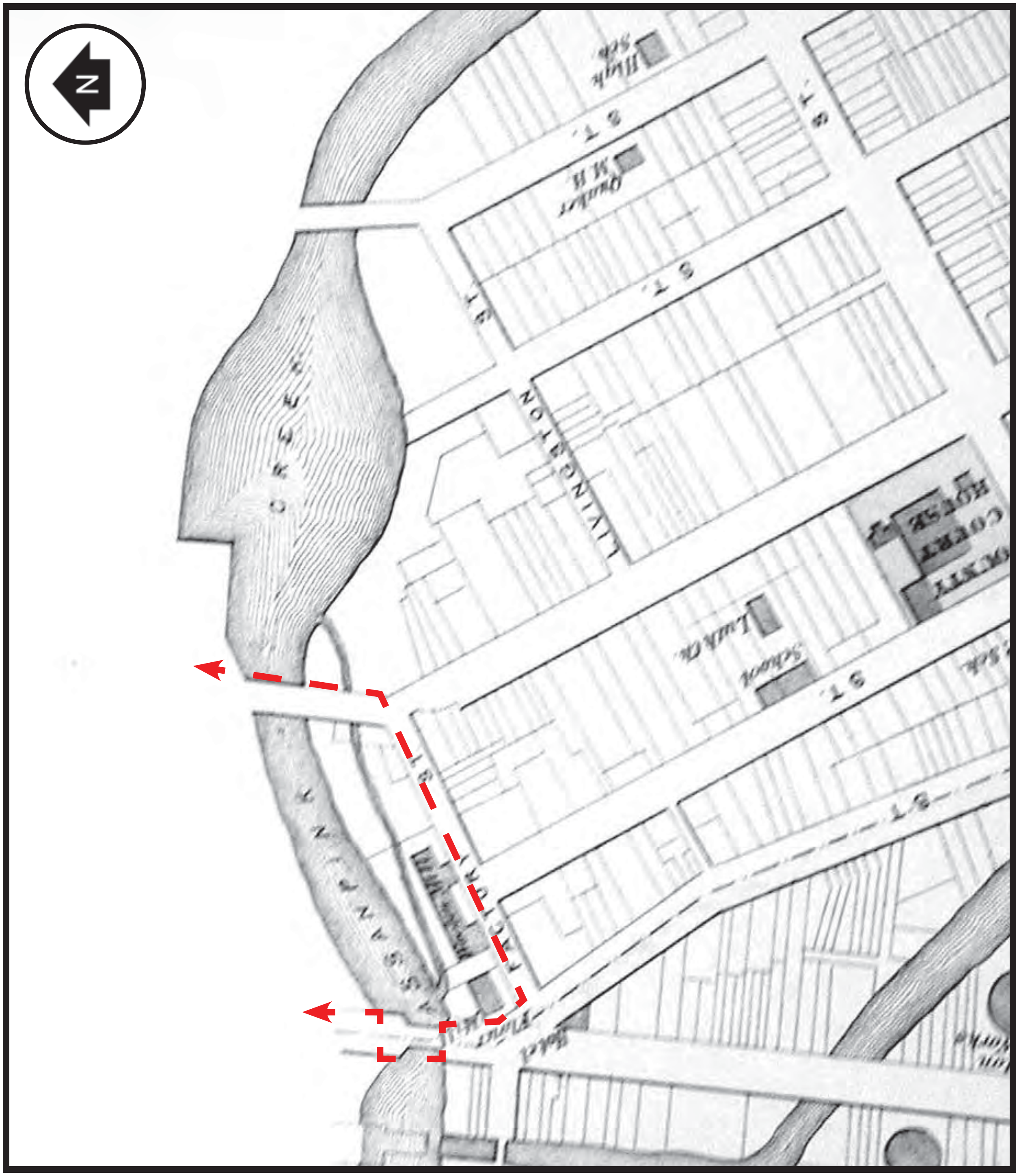


Figure 4.19b. Everts & Stewart. Map of Trenton in *Combination Atlas of Mercer County*. 1875. Scale: 1 inch: 225 feet (approximately). Southern section of study area outlined.

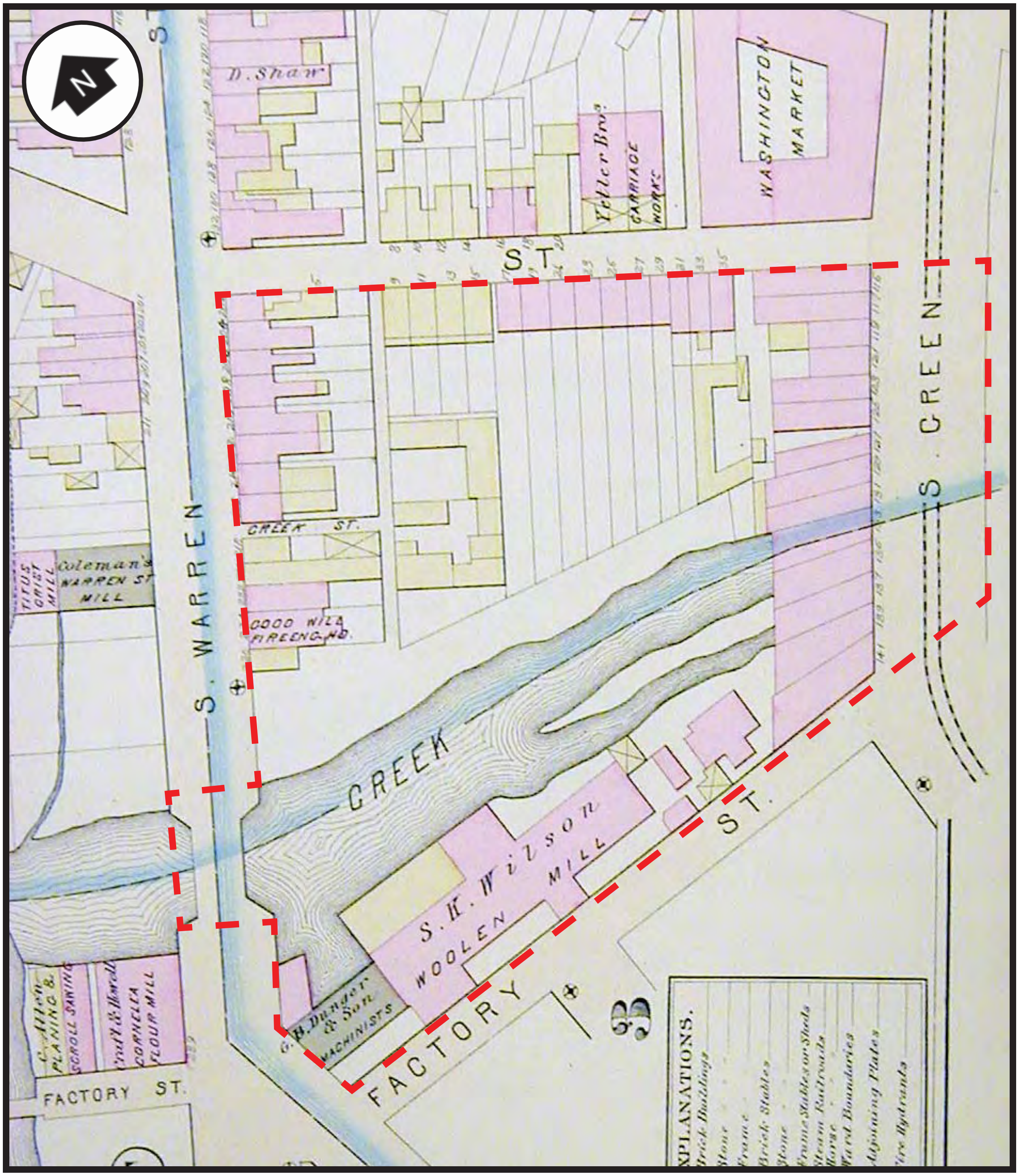


Figure 4.20. Robinson, E. and R.H. Pidgeon. *Atlas of the City of Trenton*. 1881. Scale: 1 inch: 115 feet (approximately). Study area outlined.

believed to show the break between the pre- and post-1851 mill structures, the lower and earlier "build" relating certainly to the early 19th-century cotton mill and probably also to the colonial gristmilling phase of the Trenton Mills.

In May of 1872, newspaper accounts report on a fire that began on the northwest corner of the third story of the McCall Paper Mill. The fire spread quickly and was further fueled by bales of rags and waste paper that were kept throughout the building. Consequently, the third floor of the mill was quickly gutted, approximately one third of the roof was burned, and the two lower floors suffered damage to their joists and interior woodwork. The value of the stock and machinery destroyed, which included a rag-cutter and duster, totaled $25,000 (*Daily True American*, May 9, 1872; Cleary 1922). By 1875, the mill building had evidently been dismantled, since it is conspicuously absent from the Everts and Stewart maps produced in this year (Figure 4.19b). By 1881, as shown on the Robinson and Pidgeon maps prepared in that year (Figure 4.20), the row of storefronts referred to as the Assunpink Block had been erected on the mill site along the east side of Greene Street (present-day South Broad Street) (see below).

Eagle Cotton Factory (Table 4.2)

Robert Waln, along with his brother-in-law, Gideon H. Wells, was the principal force behind the founding of the Eagle Cotton Factory on present-day Factory Street on the south bank of the Assunpink Creek, just downstream from the Greene Street bridge, sometime around 1815. The main factory building on this site measured approximately 60 feet in length by 40 feet in width, and was five stories high. At the time this factory was brought into being, Waln was corresponding with cotton mill owners in Paterson and in New England, where textile manufacturing technology was under intensive development. From the owners of mills in Paterson, for example, Waln gleaned much useful information that he applied in his newly established factory in Trenton. Waln and Wells also leased extra floor space in their factory to the textile machine builders, Wilkenson and Howe, and hired John Longstroth as the superintendent (Historical Society of Pennsylvania, Lewis Waln Letterbooks:1820-1849; Mount 1992:28; Hunter et al. 2009: 71-75).

From his correspondence with relatives and business associates, Robert Waln also anticipated that his son, Lewis, would continue the family involvement in the textile manufacturing and merchant professions. By 1819, Lewis Waln was fully engaged in these activities and had conducted business in the Delaware Valley aboard the family's ship, the Eagle. Thus, father and son, Robert and Lewis Waln, along with Robert's brother-in-law, Gideon Wells, were the three individuals largely responsible for establishing the first water-powered textile manufactories along the Assunpink in the second decade of the 19th century.

In September of 1819, Robert Waln assigned half of the mill premises at the Eagle Factory, excepting machines and implements in the mill or manufactory, to his trustees, Benjamin Morgan *et al*. (who were also acting as the assignees of Gideon Wells). It appears that the rights to the machinery were held at this time by Gideon Wells. Indeed, it appears that it was Wells, rather than Robert or Lewis Waln, who was most involved in the day-to-day operation of the Eagle Factory. This is eminently clear from the federal census of manufactures taken in 1820, where Gideon Wells himself penned the answers to the various questions submitted by the census takers and added at the bottom of the page: "The Establishment is doing pretty well considering the general depression of the Times, and does not appear to require any additional protection from the … Government. The quantities of Cotton Cloth manufactured during the year will not fall short of 480,000 yards – Gideon H. Wells Trenton Dec 13, 1820."

TABLE 4.2. SEQUENCE OF OWNERSHIP
Eagle Cotton Factory

Ownership Tenure	Name	Reference
1676-1704	Mahlon Stacy	(Unrecorded Wills Volume 4/85)
1704-1714	Mahlon Stacy Jr.	Unrecorded Wills Volume 4/85
1714-1724	William Trent	West Jersey Deed B-B-B/122
1724-1729	James Trent	(West Jersey Deed D/382)
1729-1733	William Morris	West Jersey Deed D/382
1733-1753	George Thomas	West Jersey Deed D-D/322
1753-1765	Robert L. Hooper	West Jersey Deed U/335
1765-1784	Robert Waln	West Jersey Deed AV/129
1784-1814	Hannah Waln Wells and Gideon Wells	Gideon and Hannah Wells grant Robert Waln the rights to the property in 1803 (West Jersey Deed AV/151). Waln consequently conveys the rights to the Wells' trustees in 1804 (Burlington County Deed L/564)
1814-1819	Robert Waln Jr.	Burlington County Deed Book K2/414 This indenture conveys ½ of the 29 acre property (Gideon's estate)
1819-1835	Benjamin Morgan et al. in trust of Robert Waln	(Burlington County Deed Book R2/107 which conveys a portion of Robert Waln's land to Lewis Waln but references an assignment of Waln's property to the trustees that was recorded in Philadelphia in 1819)
1829-1849	Lewis Waln	Burlington County Deed Book L/563 Lewis receives rights to ½ the property in 1822 (Burlington County Deed Book R2/107) and in 1829, he is conveyed rights to ½ the property, but continues to be a business partner with Robert Waln and Gideon Wells
1849-1852	Henry McCall Jr.	Mercer County Deed Book P/399
1852-1865	William M. Stetler and William Hancock	Mercer County Deed Book Z/18
1865-1870	William Taylor and Thomas P. Taylor	Mercer County Deed Book 60/212
1870-1874*	Levi R. Furman and Peter J. Kite	Mercer County Deed Book 79/209

* property subdivides into five lots

Also itemized in the census return were: raw materials employed (120,000 pounds of cotton valued at $24,000); number of persons employed (120 men; 60 women; 250 boys and girls); machinery (2,500 spindles [all in operation]); expenditures ($50,000 capital invested; $26,000 paid annually in wages; $10,000 in contingent expenses); and production (cotton fabric whose market value Wells stated "can not be known with any degree of accuracy"). Even allowing for the uncertain economy and Wells' probable tendency to present an optimistic prospect, it is clear that the factory was a very sizeable operation at the time (U.S. Federal Census of Manufactures 1820).

The census data of 1820 is presumed to reflect the entire Eagle Factory operations (i.e., including the carding mill and other facilities on the opposite (eastern) side of Greene Street. The greater part of the production, however, most likely took place in the Eagle Cotton Factory on the west side of Greene Street. A vast body of information about the Eagle Factory resides in the Waln Letterbooks at the Historical Society of Pennsylvania. Among the fabrics being produced around this time were muslin, gingham, chambrays, Wilmington stripes and Assunpink ticks. The coarsest cottons were shipped to Alabama and sold as fabric for clothing slaves. The mill complex, in addition to the main five-story cotton factory, included a stone building where cotton was cleaned (i.e., the carding mill), a three-story power loom building fronting on to Greene Street and the Assunpink, a dye house, a stone building for boiling yarn, a sizing house, a drying house and an office. In 1824, the machinery alone was valued at nearly $44,000 and "the number of weavers at the factory employed [was] so great as to prevent any considerable accumulation of yarn." The building housed 20 throstles (equipped with 1,824 spindles), 44 carding machines and three mules. By 1829, the factory contained eight additional carding machines (Historical Society of Pennsylvania, Lewis Waln Letterbooks:1820-1849; Mount 1992:28).

In 1821, deeds indicate that Robert Waln's trustees advertised the entire Eagle Factory property and sold it in the following year to Lewis Waln for $15,000 (Burlington County Deed R2-107). This indenture notes that many improvements had been carried out at the factory, including the installation of new machinery. While this conveyance pertains to the Eagle Factory facilities, Robert Waln and Gideon Wells also retained an interest at this time in the Trenton Cotton Factory, located to the west of the Eagle premises (see below).

In 1824, Lewis Waln and his cousin, Charles Wells, joined in a mortgage with Benjamin Morgan *et al.*, assignees of Robert Waln's estate, concerning the mill properties. Ten years later, in 1834, the trustees of Robert Waln and Gideon Wells conveyed several small lots to Lewis Waln, including a parcel on the corner of Factory and South Warren Streets, the Trenton Manufactory lot, and a lot on the north side of the Assunpink (Burlington County Deeds K3-538, K3-537, K3-232 and I3-402). Through these and other transactions it would appear that ownership control of the Eagle Factory was finally and fully passing to Lewis Waln, Robert Waln's son and Gideon Wells' nephew.

As shown earlier, maps from the 1830s and 1840s are of some help in tracing the broad evolution of milling along the Assunpink on either side of Greene Street/South Broad Street. The Trenton Delaware Falls Company map of 1833 (see above, Figure 4.10) and the Gordon Map of Trenton of 1836 (see above, Figure 4.11) – the latter possibly copied, expanded and updated from the former - both depict a series of four structures (almost certainly all mills) ranged along the south bank of the Assunpink on land belonging to Robert Waln, while a fifth structure is also shown on the opposite north bank of the creek, upstream of the Greene Street bridge. From the legend accompanying the map of 1836, it is apparent that the three buildings clustered around this bridge were all part of the Eagle Factory operations.

The United States Coast Survey map of the Delaware River from Bordentown to Trenton, prepared in 1844 (see above, Figure 4.12), depicts two mills, one on either side of the Greene Street bridge on the south bank, and one other building in the immediate vicinity. These buildings were probably all a part of the Eagle Factory complex, which by this time had just experienced the damaging flood of 1843, causing the Walns to try, unsuccessfully, to sell the factory in 1845. In 1849, Lewis Waln succeeded in selling the property containing the Eagle Factory facilities to Henry McCall, Jr. (Mercer County Deed P-399). A map prepared of McCall's land holdings in 1849 (see above, Figure 4.13) shows one large factory building and a smaller structure on the cotton factory site, but the two other maps of the City of Trenton published in the same year (see above, Figures 4.14 and 4.15) both show the site as having been cleared.

In 1852, McCall sold a portion of the site of the Eagle Cotton Factory lying to the west of Greene Street and south of the Assunpink to William Stetler and William Hancock (Mercer County Deed Z-18). Stetler and Hancock erected a soap and candle factory on the site, retaining the property until 1865, when they sold it to William and Thomas Taylor (Mercer County Deed 60-212). The soap and candle factory facility is clearly identified on the Lamborn map of Trenton produced *circa* 1858 (see above, Figure 4.16), and appears to be shown on the Lake and Beers map of the Philadelphia and Trenton vicinity in 1860 (see above, Figure 4.17).

The property changed hands again in 1870, being acquired by Levi Furman and Peter Kite (Mercer County Deed 79-209). Furman and Kite set up a carpentry shop on the site, and their business is listed in the industrial schedules of the federal census of 1870. Identified as "Carpenters & Builders," their operations reported a capital investment of $10,600 and a production valued at $50,000. The materials kept on site comprised 350,000 feet of lumber (worth $15,000) and 30 tons of coal (worth $150). No water power was being used, but the business used an eight H.P. steam engine to run several items of sawing, planning and other carpentering machinery (U.S. Federal Census of 1870, Industrial Schedules).

A historic photograph of the Furman and Kite carpentry shop shows its appearance *circa* 1870, a four-story, gable-front, clapboarded frame structure with cupola (Plate 4.11). The substantial two-section frame building in which Furman and Kite conducted their business is probably the structure depicted on the Beers map of the City of Trenton in 1870 (see above, Figure 4.18) and in the bird's eye view of 1872 (see above, Plate 4.10). By the early 1880s, however, the Robinson and Pidgeon map shows that this factory had been joined by a series of buildings on the eastern end of the property fronting on to the west side of Greene Street (see above, Figure 4.20). These latter structures represent the beginnings of the so-called Assunpink Block (see below). Later maps show the continuing survival of the carpentry shop structure into first decade of the 20th century, even as it becomes increasingly hemmed in by the Wilson Woolen Mill facility to the west and the Assunpink Block to the east (see below, Figures 4.22, 4.23, 4.24b, 4.25b, 4.26 and 4.27). By 1924, as shown on an aerial photograph (see below, Plate 4.16), the site had been redeveloped and contained row housing. The Sanborn fire insurance maps of 1927 and the Franklin survey maps of 1930 both indicate this line of row houses filling five lots (see below, Figures 4.28 and 4.29a). These buildings remained standing into the second half of the 20th century as indicated on the Sanborn fire insurance maps of 1927, updated to 1950 (see below, Figure 4.32).

Plate 4.11. Historic photograph of the Furman and Kite carpentry shop on Factory Street. Circa 1880. (Source: Trenton Public Library, Trentoniana Collection).

Trenton Cotton Factory/Wilson Woolen Mill (Table 4.3)

Roughly midway along the south bank of the Assunpink between the South Broad Street bridge and the South Warren Street bridge, north of present day Factory Street, was the site of another textile milling operation whose history followed a trajectory that ran largely parallel to and independently of the development of the Waln and Wells Eagle Factory complex. For a substantial part of its history, this mill complex was supplied with a part of its industrial energy in the form of water power drawn from the mill pond on the upstream side of the South Broad Street bridge. Water was funneled to the site under the bridge via a raceway and culvert that ran to the south of the main course of the Assunpink through the bridge's southernmost stone arch.

In 1814, Gideon Wells leased property on the south bank of the creek to Hugh Christy, Lawrence Huron and others for a term of 15 years. The indenture stipulated that the lessees were responsible for furnishing the works that were then being erected there (Burlington County Deed C2-185). This structure was evidently the brick cotton mill that Raum (1871:236) reports was erected here in 1814 by Lawrence Huron & Company. In 1824, this property, referred to as the "certain lot of land whereon the Trenton Factory now stands," was sold to James Hoy in 1824 (Burlington County Deed Book 13-399).

Information compiled on manufacturing in the United States in 1833 by the Secretary of the Treasury provides a useful summary of James Hoy's Trenton Cotton Factory. By this time the facility comprised a water-powered cotton spinning factory, noted as being founded in 1814, and a steam-powered weaving shop, established in 1829. The capital invested in the former operation was given as $69,000, and in the latter as $32,000, while the water power used in the spinning mill accounted for an annual investment of $600. Hoy reported borrowing $20,000 at a 6% rate of interest in support of the mills, and the profit on the un-borrowed portion of the investment was given as 3% per annum.

In replying to the census-taker's question: "what amount of the agricultural production of the country is consumed in your establishment, and what amount of other domestic productions?" Hoy listed "6,000 lbs. Flour, leather for belts, &c., 800 lbs., coal 80 tons, wood 300 cords, shuttles 150, pickers 500, reeds 200, heddles 150 sets, 115,000 pounds cotton, besides iron and wood work, with sheep skins, glue, list, oil 800 galls., and indigo 2,000 lbs., and copperas and lime, and dye stuffs of most all descriptions; mostly all domestic manufactures." Production was given as: 100,000 pounds of yarn valued at 17 to 60 cents per pound; 115,000 pounds of cotton at 32 to 10[0] cents per pound; 500,000 yards of cloth at 10 cents a yard; with a note being added that "the great profit was enjoyed only a few years on spinning, at its commencement, and for the last 8 months." Products were chiefly marketed in Philadelphia and sold by commission at six to eight month's credit, 5 to 7.5% for commission and guarantee.

The labor force at the factory was composed of 32 men, paid $6 a week, 80 girls, paid $3 a week, and 68 children, paid $1 a week. A 12-hour summer work day (reduced to 10 hours in winter) was imposed upon employees, and the children were allowed one quarter of the year for school, either in fall or spring. The annual wages totaled $26,000 and the cost of materials to Hoy amounted to another $52,000. The early 1830s were clearly a difficult time for textile mills and Hoy's operations produced little profit. In response to the query as to what he might do with his capital if forced to abandon his business following a lowering of tariffs on imported textiles, Hoy replied that he would employ his capital "in no other way, having none left. If I, who have been long in the business, would have to abandon it, who would purchase my property? It

TABLE 4.3. SEQUENCE OF OWNERSHIP
Trenton Cotton Factory/Wilson Woolen Mill

Ownership Tenure	Name	Reference
1676-1704	Mahlon Stacy	(Unrecorded Wills Volume 4/85)
1704-1714	Mahlon Stacy Jr.	Unrecorded Wills Volume 4/85
1714-1724	William Trent	West Jersey Deed B-B-B/122
1724-1729	James Trent	(West Jersey Deed D/382)
1729-1733	William Morris	West Jersey Deed D/382
1733-1753	George Thomas	West Jersey Deed D-D/322
1753-1765	Robert L. Hooper	West Jersey Deed U/335
1765-1784	Robert Waln	West Jersey Deed AV/129
1784-1814	Hannah Waln Wells and Gideon Wells	Gideon and Hannah Wells grant Robert Waln the rights to the property in 1803 (West Jersey Deed AV/151). Waln consequently conveys the rights to the Wells' trustees in 1804 (Burlington County Deed L/564)
1814-1819	Robert Waln Jr.	Burlington County Deed Book K2/414 This indenture conveys ½ of the 29 acre property (Gideon's estate)
1819-1835	Benjamin Morgan et al. in trust of Robert Waln	(Burlington County Deed Book R2/107 which conveys a portion of Robert Waln's land to Lewis Waln but references an assignment of Waln's property to the trustees that was recorded in Philadelphia in 1819)
1835	Lewis Waln	Burlington County Deed Book K3/232 Burlington County Deed Book I3/402 Lewis Waln receives rights to the property from Gideon Wells in 1834 (Burlington County Deed K3/231) and purchases the property the following year from the trustees of Gideon Wells and Robert Waln.
1834-1852	James Hoy	Burlington County Deed Book I3/399
1852-1903	Samuel K. Wilson	Mercer County Deed Book W/461
1903	Alfred H. Ryan	Mercer County Deed Book 260/403
1903-1904	Alryan Woolen Mills	Mercer County Deed Book 262/278
1904	James T. Stewart	Mercer County Deed Book 274/59
1904-1906	Manor Real Estate & Trust Co.	Mercer County Deed Book 274/61
1906	Barker G. Hamill	Mercer County Deed Book 286/253
1906-1942	Harry Haveson et al.	Mercer County Deed Book 289/59

would be the most unproductive stock in the United States; I could not sell it" (McLane 1969:164-166 [1833]).

James Hoy's Trenton Cotton Factory is presumed to be the centrally placed of the three structures shown on the south bank of the Assunpink between Greene Street/South Broad Street and South Warren Street on the map prepared by the Trenton Delaware Falls Company in 1833 (see above, Figure 4.10). This building corresponds with the structure labeled "12" and identified as the Trenton Cotton Factory on the Gordon map of Trenton published in 1836 (see above, Figure 4.11). In *The New Jersey Register*, compiled by Joseph C. Potts in 1837, James Hoy's cotton mill is one of several downtown Trenton mills that had been hooked into the main canal of the Trenton Delaware Falls Company, the waterway that later became better known as the Trenton Water Power. Hoy's mill, valued at $75,000, drew a 250 square-inch head of water from the canal and was producing 300,000 yards of cotton goods annually (Potts 1837). Interestingly, the mill is noted by Potts as drawing water power from the Trenton Delaware Falls Company's canal north of the Assunpink, meaning that a flume must have led off the canal's left bank and crossed over the creek to reach the mill.

Hoy's Trenton Cotton Factory quite possibly suffered a contraction in its business as a result of the Panic of 1837 and the national economy's subsequent lean years. More certain is the devastating effect of the Great Flood of January 1841, which took a heavy toll on many Trenton homes and businesses. A contemporary newspaper account reports that "[t]he dye house and lower story of Mr. Hoy's Cotton Factory were flooded for several days" (*Emporium and True American*, January 15, 1841).

The United States Coast Survey map of 1844 (see above, Figure 4.12) does not identify a mill on the Trenton Cotton Factory site (evidently a sin of cartographic omission), but the map prepared four years later showing the property of Henry McCall, Jr. (see above, Figure 4.13) shows a substantial building Labeled "Cotton Factory" with a long tail race leading downstream into the creek. The head race to the factory is not indicated, but in addition to the flume from the Trenton Water Power there was probably a culvert that ran underground from the main dam upstream from the Greene Street/South Broad Street bridge, passing south of the Eagle Cotton Mill on the original Trenton Mills site. The factory building is also shown on the other two maps of the City of Trenton published in 1849 (see above, Figures 4.14 and 4.15).

James Hoy retained ownership of the Trenton Manufactory until 1852, when he sold the property to Samuel K. Wilson for $8,000 (Mercer County Deed W-461). The mill had evidently been damaged by fire in the preceding year (Raum 1871:236), an event that may have prompted its sale. Specifically referenced in the deed transferring the mill property from Hoy to Wilson are "the Trenton Manufactory of Cotton Good, dyehouse, blacksmith shop and land". Also noted are shafting and carding equipment, throstles, mules, looms and other machinery located inside the factory. Following his purchase of the property, Wilson repaired the mill building and put it back into operation. Unfortunately, the site is only roughly depicted on the two smaller scale maps of Trenton prepared in 1859 by Lamborn (see above, Figure 4.16) and Lake and Beers in 1860 (see above, Figure 4.17), but a much expanded or entirely rebuilt facility is more clearly visible on the Beers map of the city produced in 1870 (see above, Figure 4.18), in the bird's eye view of 1872 (see above, Plate 4.10) and on the Everts and Stewart map of 1875 (see above, Figure 4.19b). Although requiring more in-depth research, quite possibly there was a substantial rebuilding phase on the site in the mid- to late 1860s, during or just after the Civil War.

The hypothesized rebuilding in the 1860s may be borne out in the industrial census data for 1860 and 1870, years for which Samuel K. Wilson provides a detailed accounting and which saw an increase in capital investment at the mill from $125,000 in 1860 to $200,000 in 1870. In the former year, the woolen mill processed 50,000 pounds of wool (valued at $25,000), 60,000 pounds of cotton ($7,200), 104,000 pounds of cotton yarn ($24,960), "drugs" ($6,000), 400 gallons of oil ($550) and other materials ($10,000) to produce 150,000 yards of "cottonades" (a thick cotton fabric) and 375,000 yards of "cassinettes" (a finer wool or cotton cloth) (value illegible in both cases). A combination of water and steam power were used to generate 60 H.P., which drove 110 looms, 6 cards and 4 mules. There were 65 male employees costing Wilson an average of $1,400 a month and 75 female employees costing him an average of $800 a month (U.S. Federal Census of 1860, Industrial Schedules).

Ten years later, Samuel K. Wilson's "Woolen & Cotton factory" was entirely steam-powered with an engine generating 100 H.P. in support of 176 looms and numerous other devices. For a full 12-month period reported in that year, the mill processed 290,000 pounds of wool ($130,500), 200,000 pounds of cotton ($50,000), "drugs" ($8,214), 1,350 tons of coal ($6,777) and "sundries" ($13,925) to make 430,000 yards of flannel (worth $163,514), 399,046 yards of two varieties of "cass" (cassinettes, worth $85,277) and 5,926 yards of "jean" ($1,777). By this time, there were 120 male employees, 112 female employees and 20 youth workers costing Wilson $73,986 in wages for the year (U.S. Federal Census of 1870, Industrial Schedules). Clearly, over the intervening years, Wilson's textile operations had expanded considerably in terms of its production, workforce and profitability.

Wilson continued running the mill and retained the mill property throughout the final quarter of the 19th century. Known chiefly as the Wilson Woolen Mill, it was also referred to as the "Upper Mill," to distinguish it from a second Wilson textile mill, commonly called the Lower Mill, on Fair Street. Throughout this period Wilson's woolen mills were one of the city's single largest employers (Trenton Historical Society 1929:543). From the sequence of late-19th-century historic maps and views (Figures 4.21, 4.22, 4.23, and 4.24b), the Wilson Woolen Mill facility on Factory Street appears to have experienced further upgrading and expansion. Eventually the mill complex expanded to the point where its buildings physically abutted the Moore's Mill property directly to the west, while Wilson also maintained a cotton warehouse on the opposite side of the Assunpink. The main complex at its peak included a machine shop, weaving room, picker house, cloth drying rooms, and a boiler room and dying room, both fronting on to the creek.

In 1877, Samuel K. Wilson purchased additional property along the McCall Paper Mill's tailrace from the Assunpink Improvement Association, presumably to facilitate the mill's continuing growth (Mercer County Deed 260-403). However, the creek and the mills along its banks continued to be subject to periodic flooding throughout the later 19th century, a perennially hazardous circumstance that was probably exacerbated by the various hydro-engineering actions of the mills themselves. One particularly large flood occurred in 1882, which, in addition to breaching the aqueduct of the Trenton Water Power just downstream, placed all of Factory Street under water, inundating the Wilson Woolen Mill and its neighbors (Plate 4.12). The Wilson mill soon resumed full operation after the flood of 1882 and was listed in the statewide inventory of water powers compiled in 1891 (Vermeule 1894) at which time the site was reported as a woolen and worsted facility powered both by the Trenton Water Power and the Assunpink Creek. The former water power source provided a 12-foot fall; the latter a 17-foot fall. Together, they generated 135 gross H.P. (100 net H.P.).

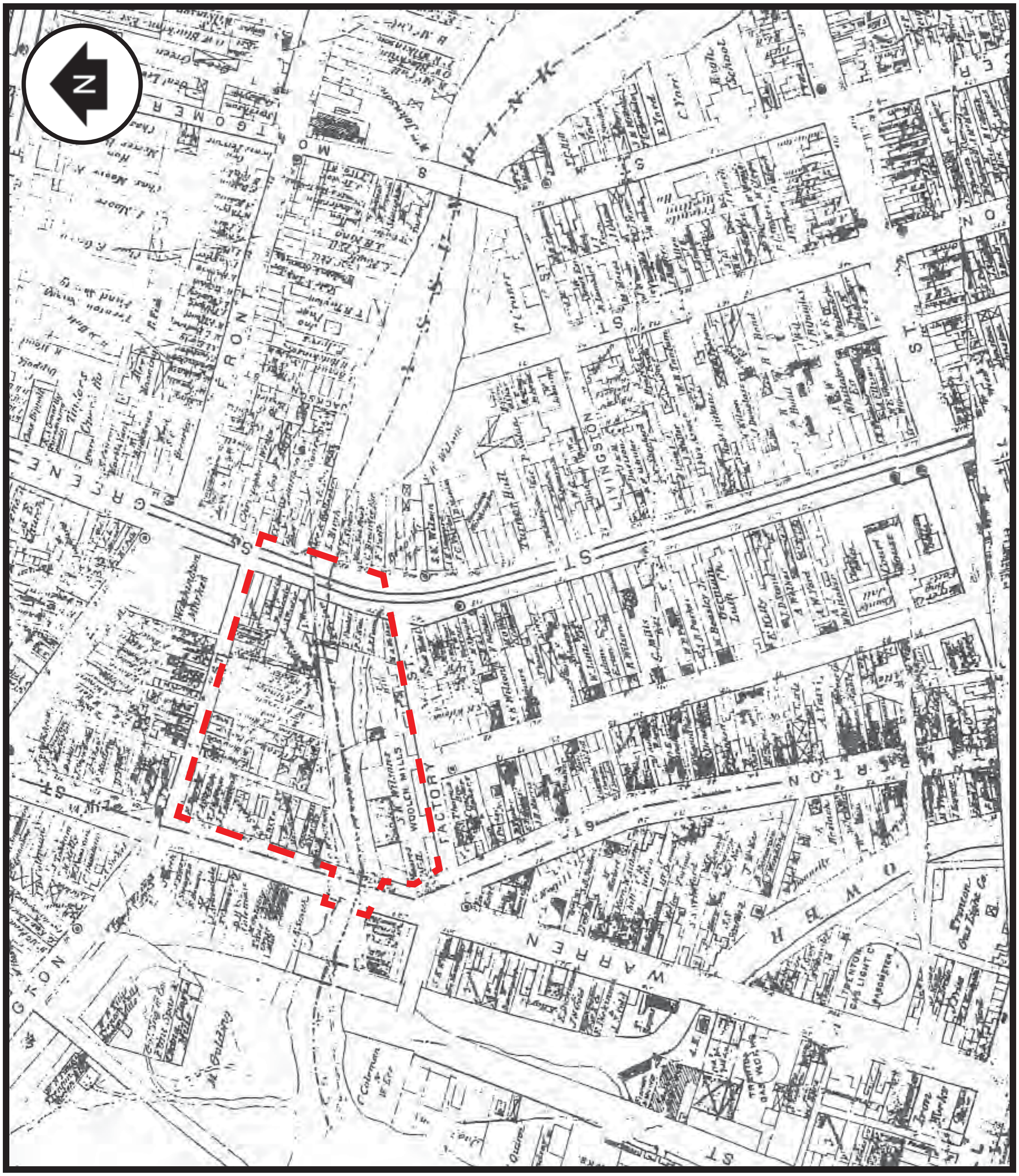


Figure 4.21. Haven, C.C. *A New Real Estate and Insurance Map of Trenton*. 1882. Scale: 1 inch: 225 feet (approximately). Study area outlined.

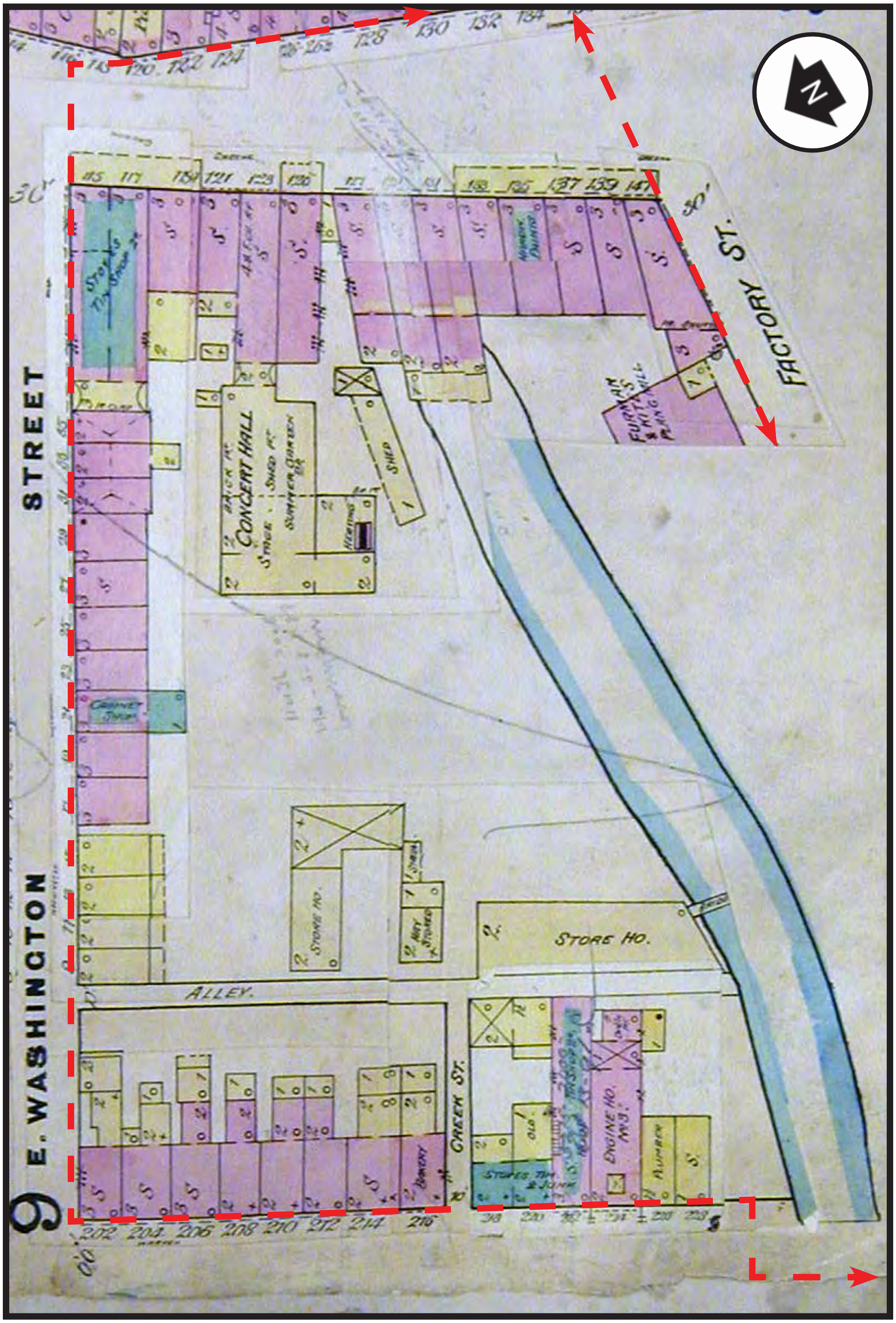


Figure 4.22. Sanborn, D.A. *Insurance Map of Trenton*.1874, corrected to 1886. Scale: 1 inch: 110 feet (approximately). Study area outlined.

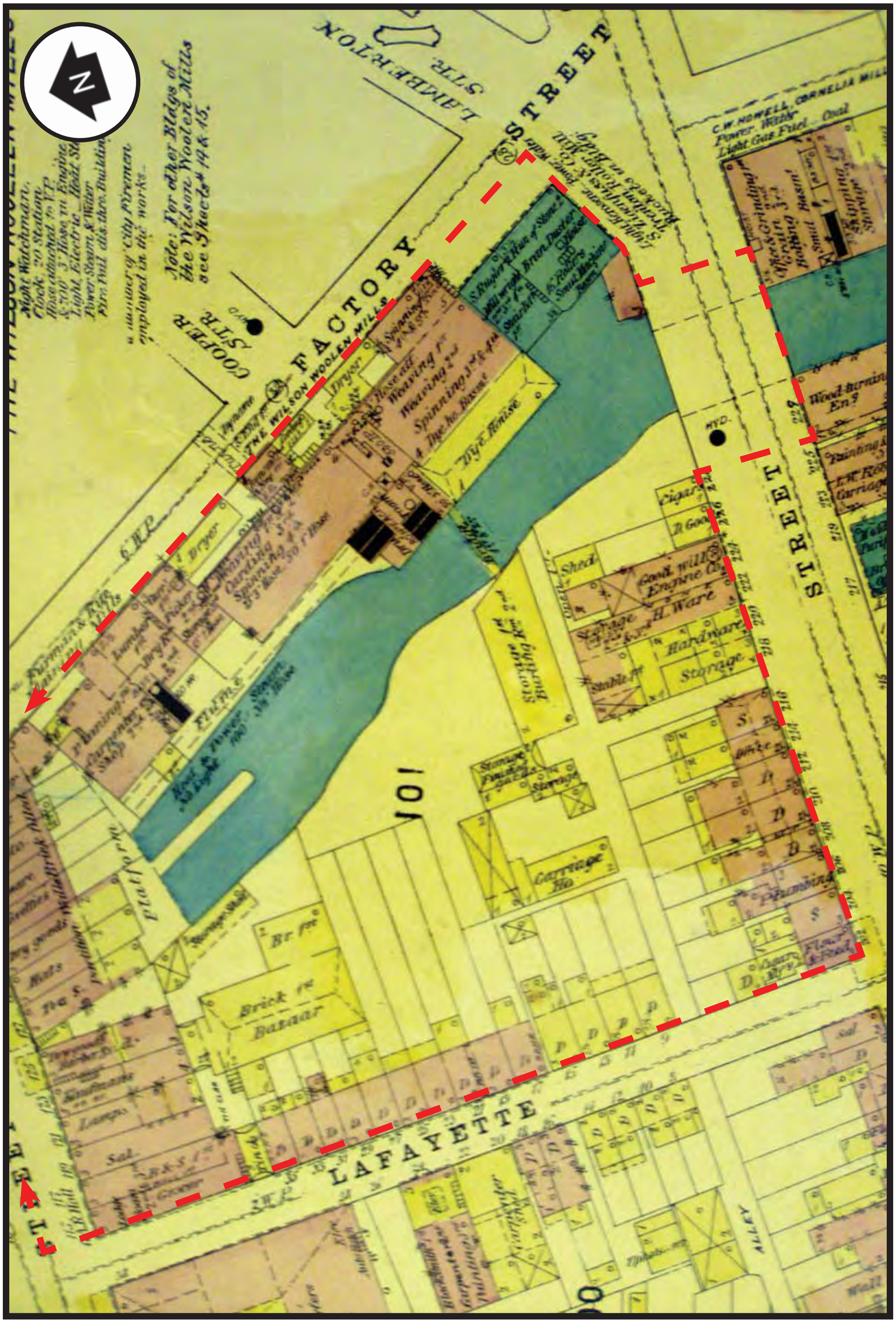


Figure 4.23. Scarlett and Scarlett. *Fire Map of Mercer County*. 1890. Scale: 1 inch: 105 feet (approximately). Study area outlined.

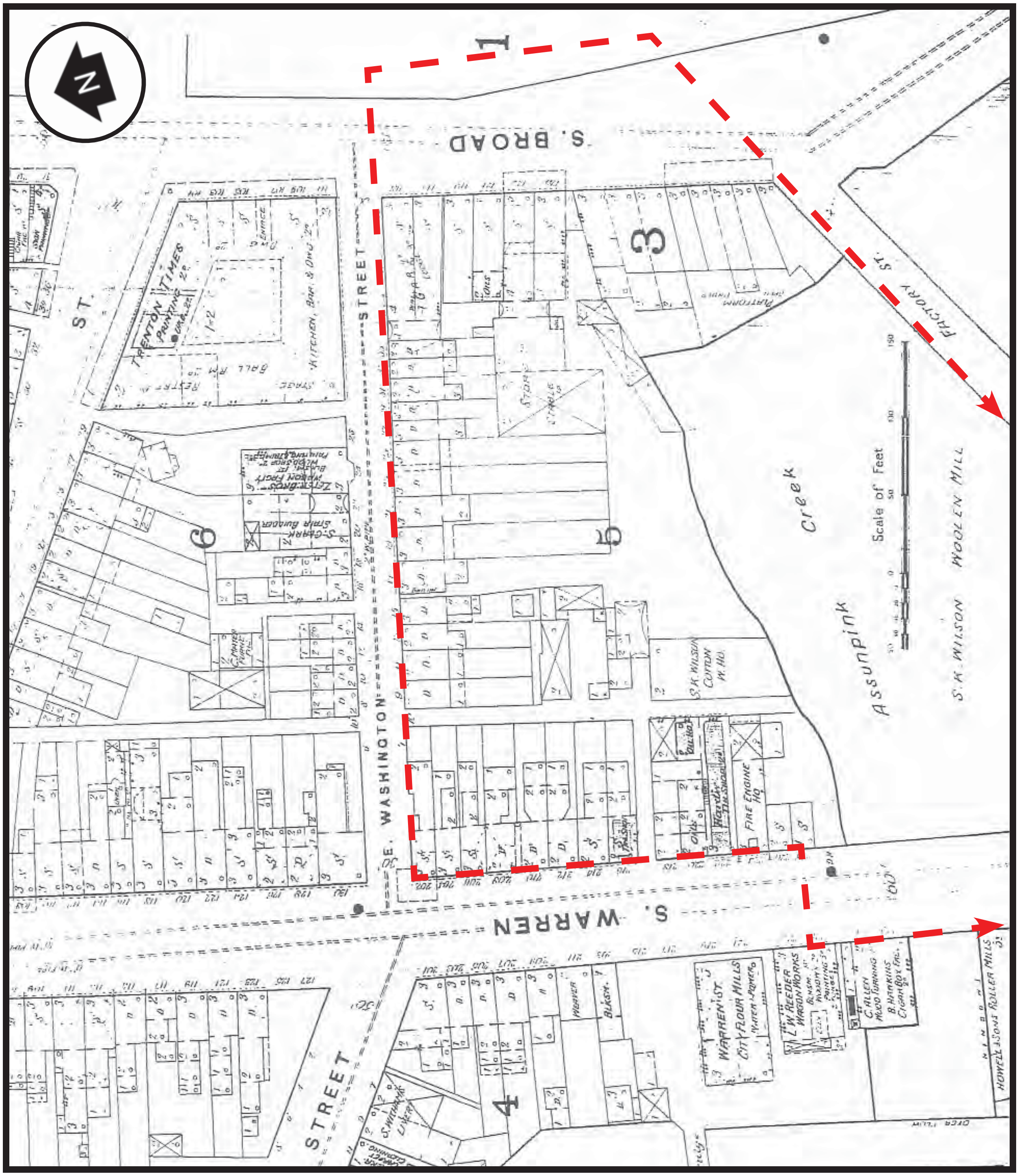


Figure 4.24a. Sanborn-Perris Map Company. *Insurance Map of Trenton*. 1890. Scale: 1 inch: 100 feet (approximately). Northern section of study area outlined.

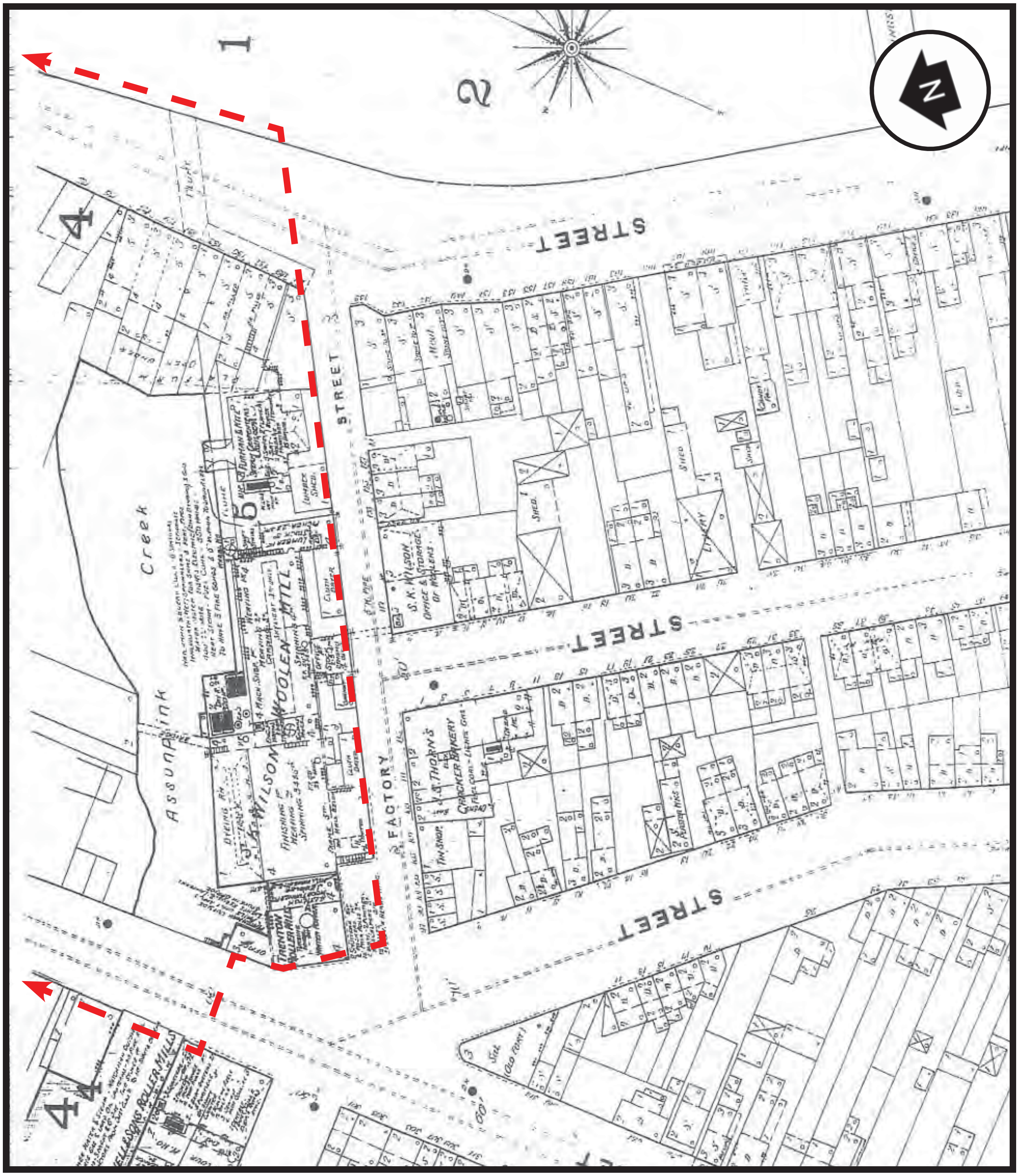


Figure 4.24b. Sanborn-Perris Map Company. *Insurance Map of Trenton*. 1890. Scale: 1 inch: 100 feet (approximately). Northern section of study area outlined.

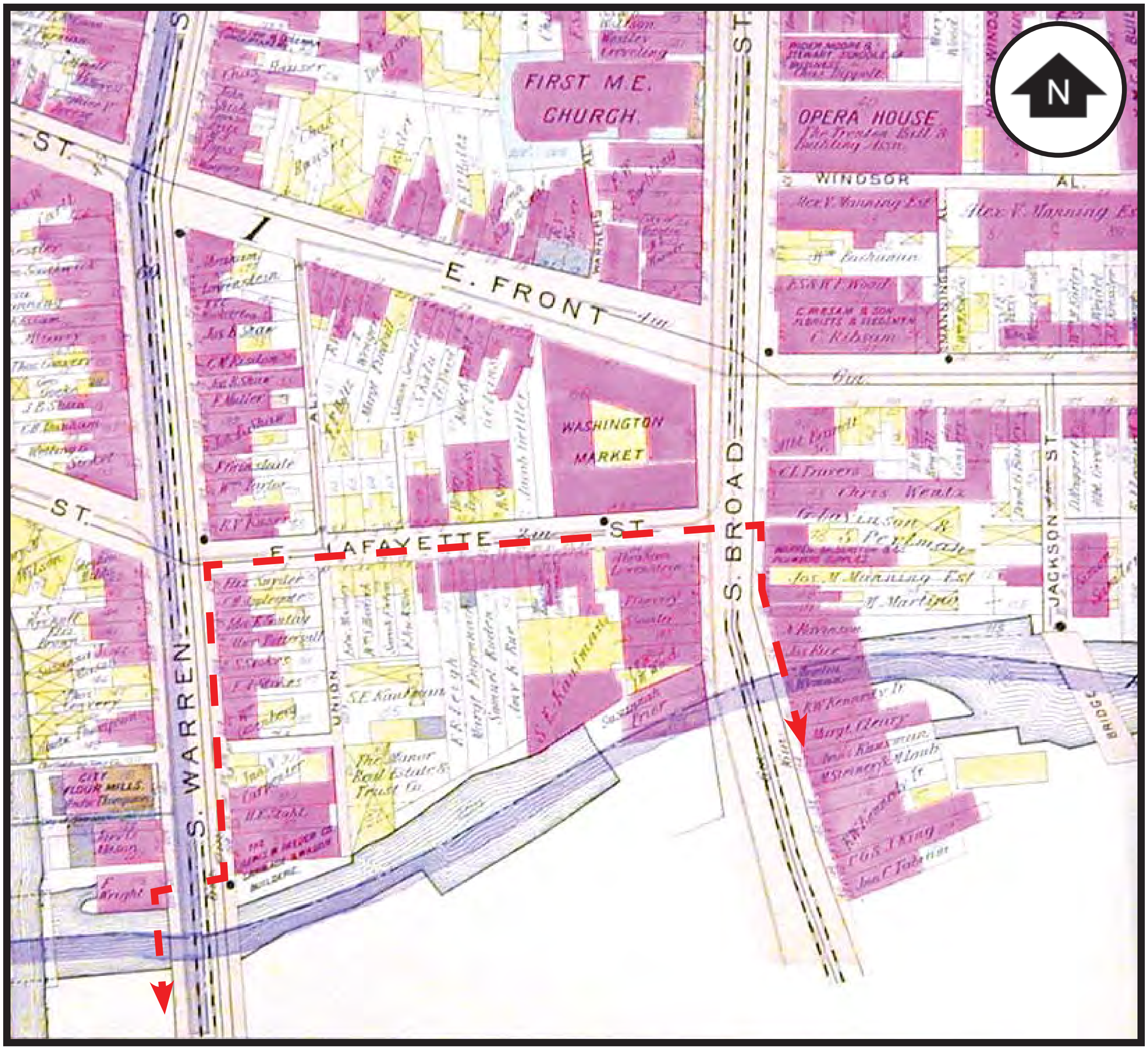


Figure 4.25a. Lathrop, J.M. *Atlas of the City of Trenton*. 1905. Scale: 1 inch: 200 feet (approximately). Northern section of study area outlined.

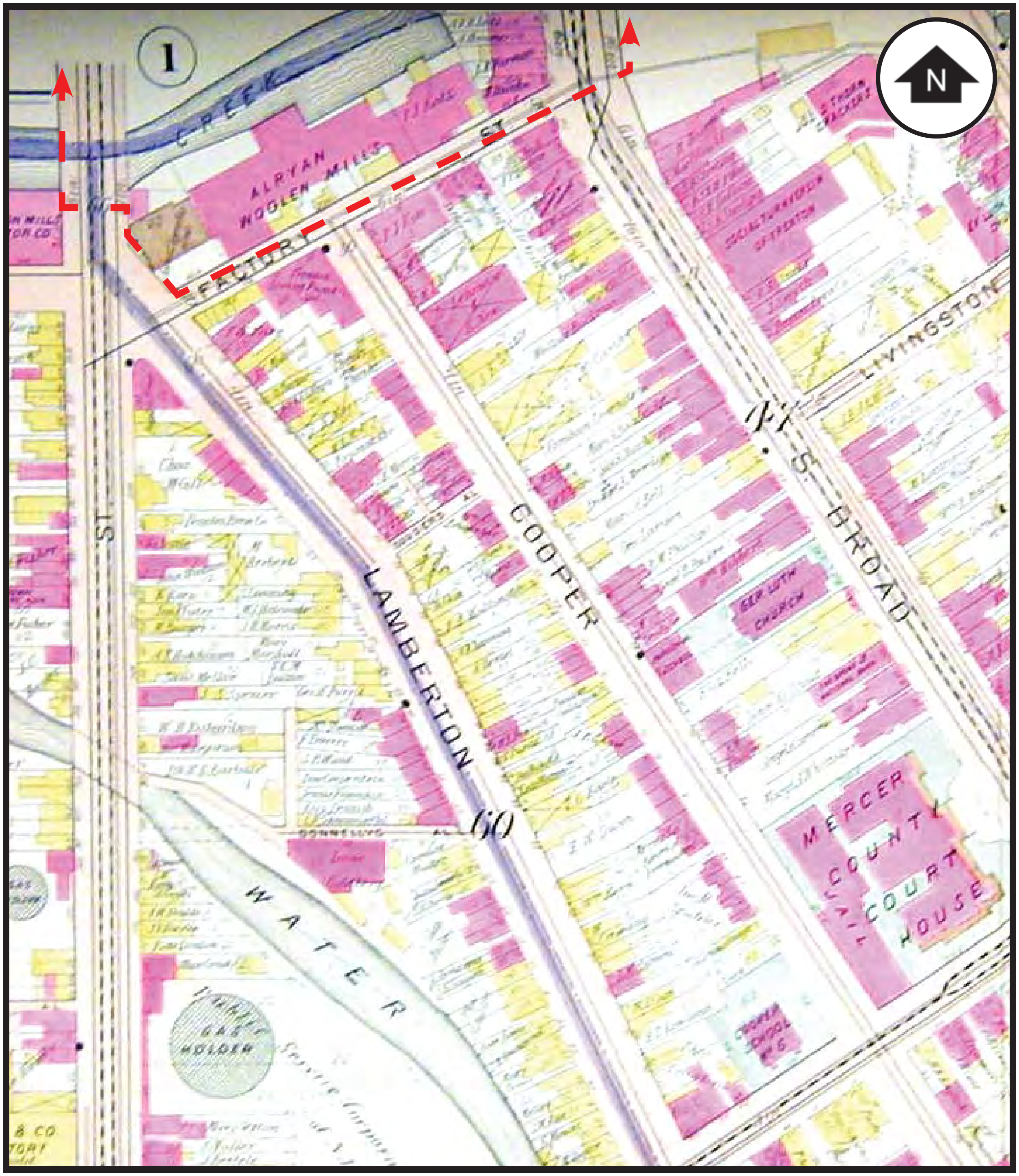


Figure 4.25b. Lathrop, J.M. *Atlas of the City of Trenton*. 1905. Scale: 1 inch: 160 feet (approximately). Southern section of study area outlined.

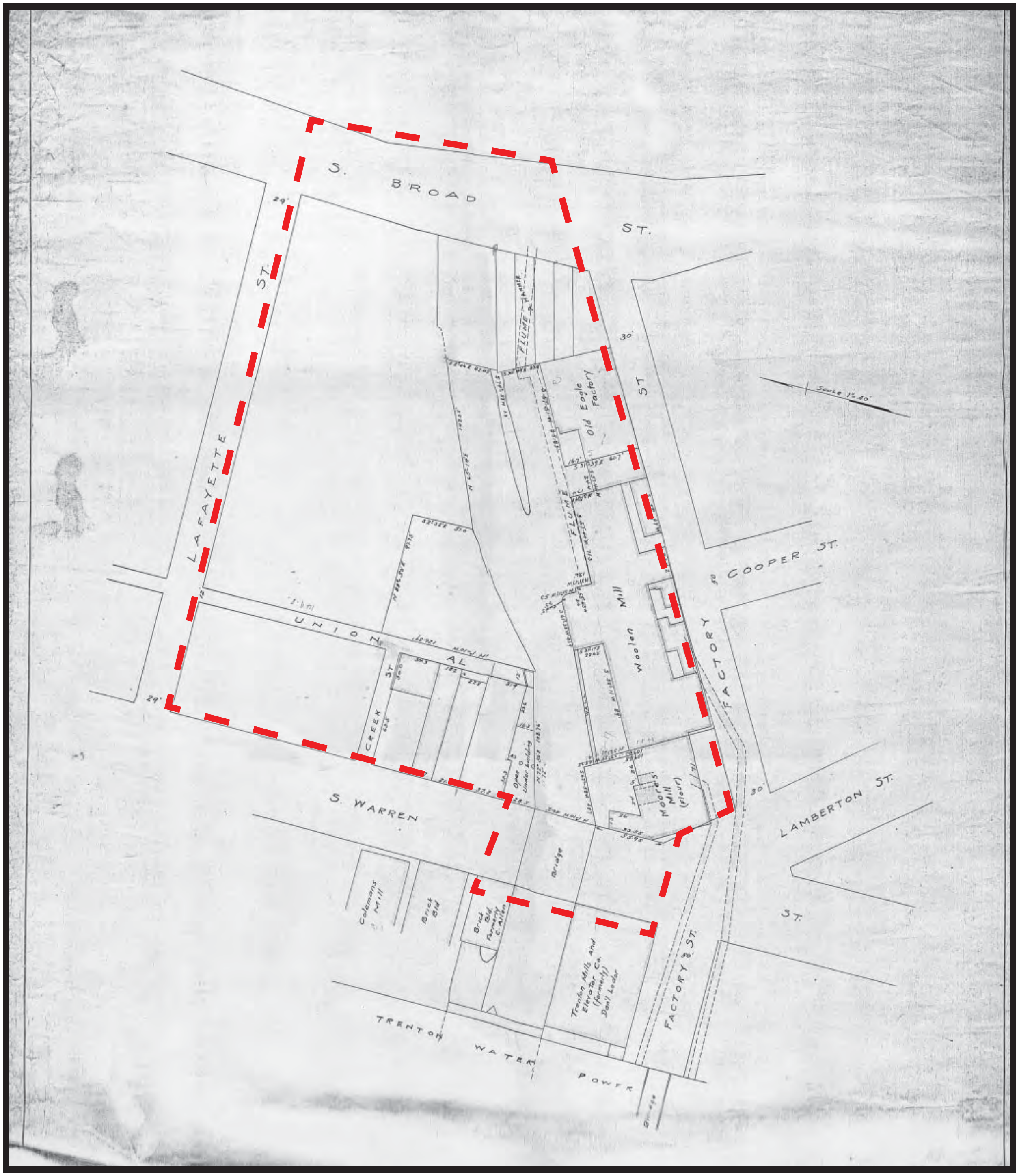


Figure 4.26. Map of the Assunpink Creek between South Broad and South Warren Streets. Circa 1905. Scale: 1 inch: 93 feet (approximately). Study area outlined. Source: City of Trenton Engineering Department.

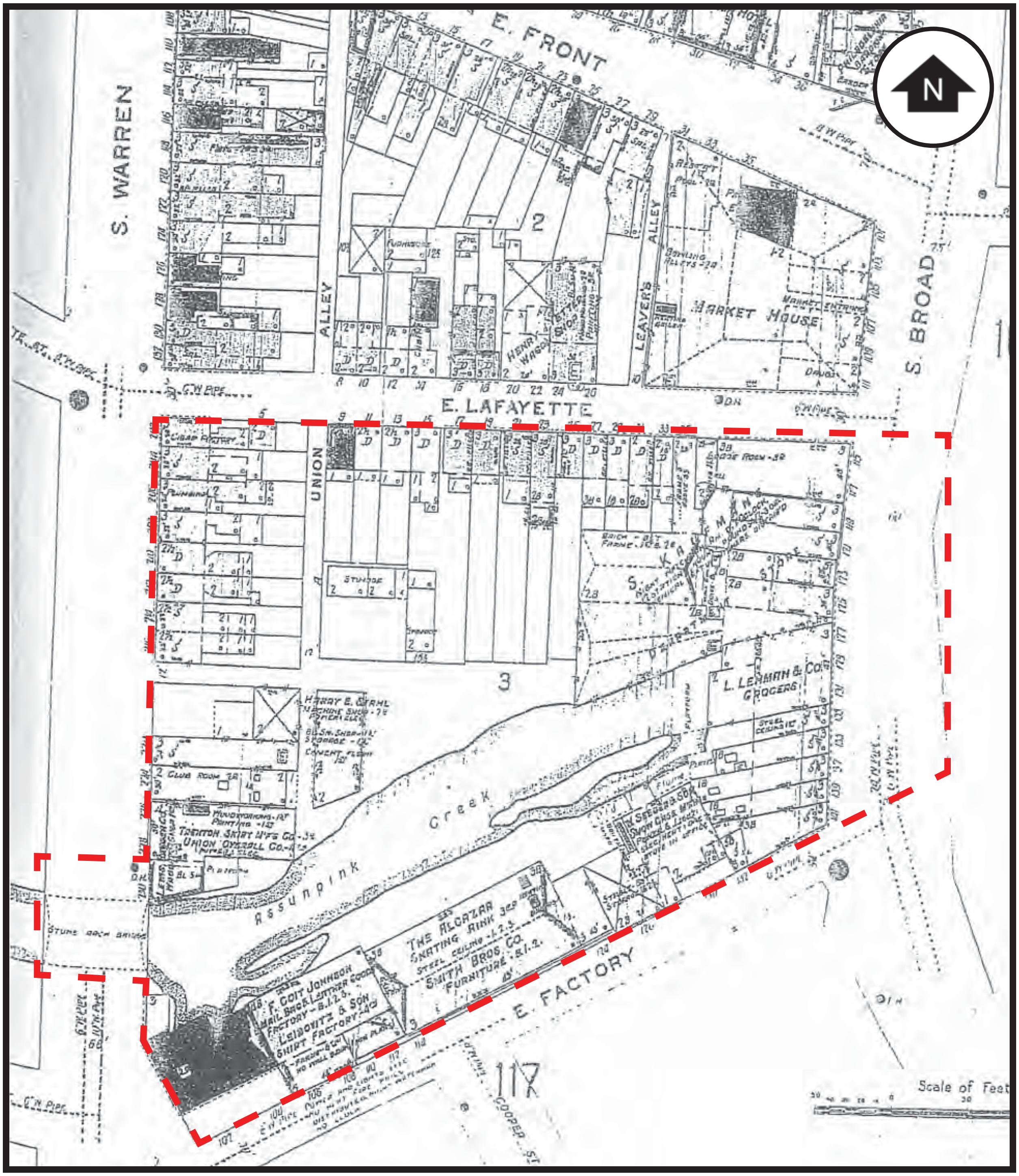


Figure 4.27. Sanborn Map Company. *Insurance Map of Trenton*. 1908. Scale: 1 inch: 100 feet (approximately). Study area outlined.

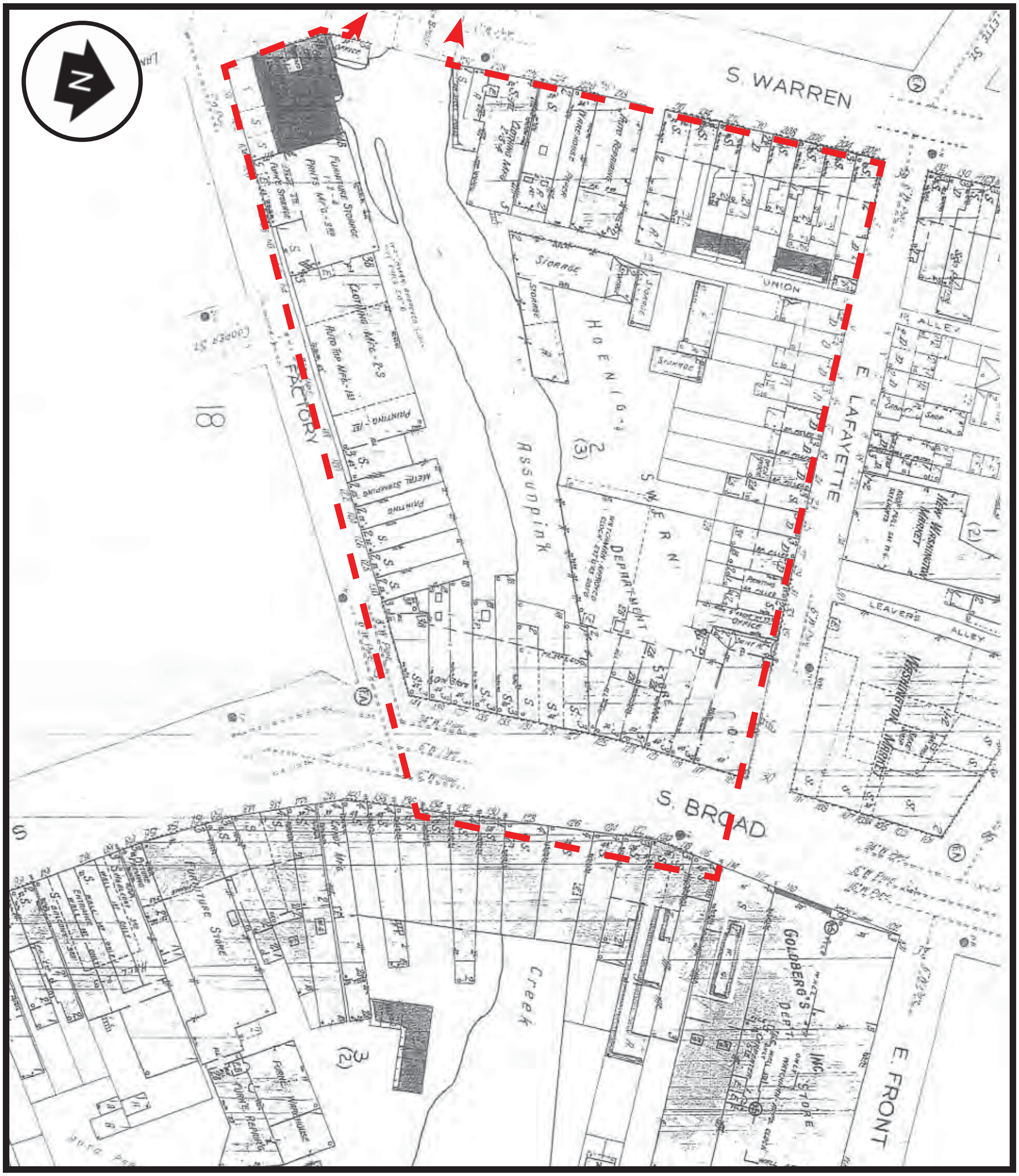


Figure 4.28. Sanborn Map Company. *Insurance Map of Trenton*. 1927. Scale: 1 inch: 130 feet (approximately). Study area outlined.

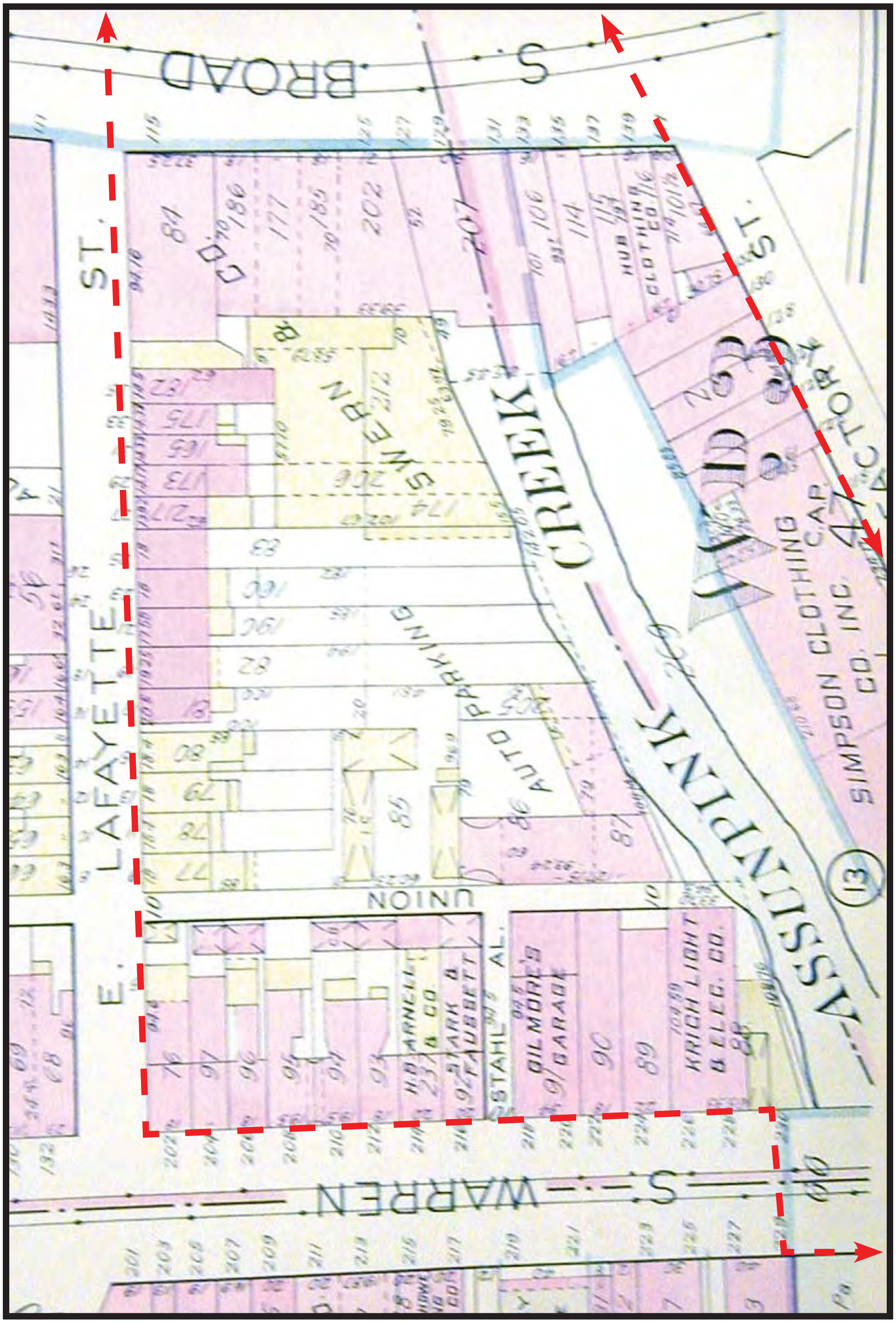


Figure 4.29a. Franklin Survey Company. *Real Estate Plat-Book of the City of Trenton*. 1930. Scale: 1 inch: 80 feet (approximately). North-western section of study area outlined.

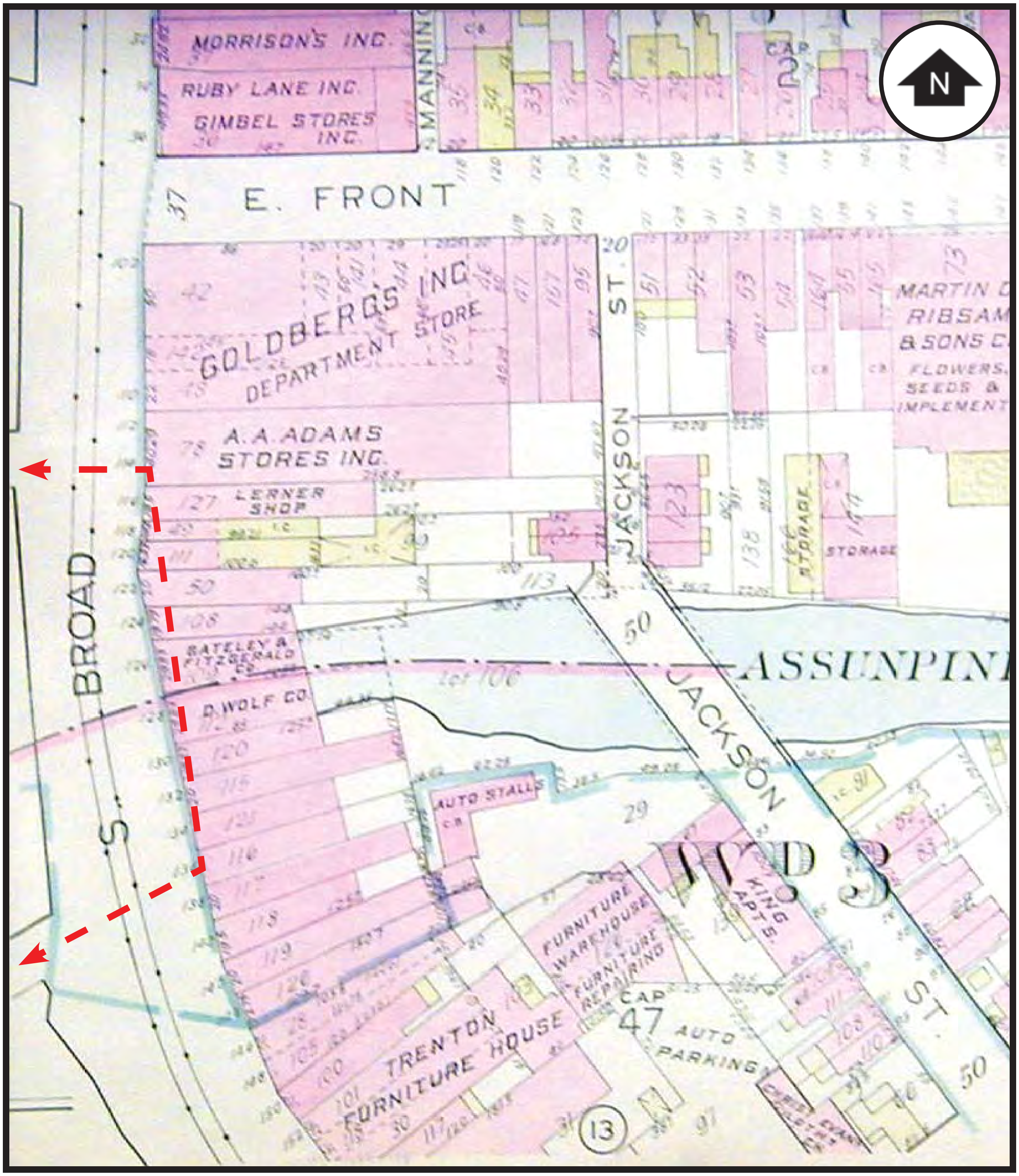


Figure 4.29b. Franklin Survey Company. *Real Estate Plat-Book of the City of Trenton*. 1930. Scale: 1 inch: 125 feet (approximately). Southwestern section of study area outlined.

Plate 4.12. Historic photograph looking down Factory Street during the flood of 1882; Wilson Woolen Mill at right. (Source: Trenton Public Library, Trentoniana Collection).

In 1903, following Samuel K. Wilson's death, his executor, Isabelle Wilson, conveyed the property to Alfred H. Ryan for $69,000 (Mercer County Deed 260-403). The deed references a "messuage, tenement, factory, buildings, woolen and worsted goods." In the same year, Ryan sold the property to Alryan Woolen Mills for $340,000 (Mercer County Deed 262-278). The Lathrop *Atlas of Trenton*, published in 1905 (Figure 4.25b), identifies the Alryan Woolen Mills on the site of the former Wilson Woolen Mill, and by this date the dying room had been removed. However, the previous year the property had been purchased by the Manor Real Estate and Trust Company who sold it to Harry Haveson, a real estate speculator and purchaser of many properties along the Assunpink Block (Mercer County Deed 274-61, 289-529 and 286-255). Other early 20th-century maps produced *circa* 1905 (Figure 4.26) and in 1908 and 1927 by the Sanborn fire insurance firm (Figures 4.27 and 4.28) and aerial photographic views from the mid-1920s (see below, Plate 4.16) show the continued existence of the mill buildings.

By 1930, the Franklin Survey Real Estate Plat-Book of the City of Trenton identifies the former Wilson Woolen Mill complex as being in the hands of the Sampson Clothing Company (Figure 4.29a and 4.29b). The Sanborn fire insurance map of 1927, updated to 1950 (see below, Figure 4.32), indicates that the main building had been adapted for different uses and that, by this time, its western end had been removed. By this time, the main building was serving as a furniture storage area on the first floor, supported a roller skating rink on the second floor, and housed a dress manufacturer on the third floor. The property was deeded to the City of Trenton in 1963 (Mercer County Deed 1684-123).

Moore Flour Mill/Trenton Roller Mills (Table 4.4)

The third and furthest downstream of the mill sites along the south bank of the Assunpink Creek between South Broad Street and South Warren Street appears to originate slightly later than those sites further upstream. Its genesis also appears to be closely tied to the construction by the Trenton Delaware Falls Company of the canal that later became known as the Trenton Water Power. This waterway, designed to bring water power for mill development into the heart of Trenton, was constructed between 1831 and 1834. The Moore Flour Mill evidently drew power both from this canal and from the Assunpink Creek.

The first clear indication of a mill in this location – in the southeast quadrant of the South Warren Street/ Assunpink Creek intersection - occurs on the Trenton Delaware Falls Company map of 1833 (see above, Figure 4.10). A single, unidentified structure is shown on this map slightly upstream from the bridge. The Gordon map of Trenton, published a few years later in 1836 (see above, Figure 4.11), shows a broadly similar arrangement of mills along this stretch of the creek and seems to depict a closely connected pair of buildings on the site which is marked "13" and identified as Moore's Flour and Oil Mill. Quite possibly, flour milling was taking place in one of the two buildings; oil milling in the other. The United States Coast Survey map of 1844 (see above, Figure 4.12) also notes a mill at this location.

The historic map evidence for this mill site originating in the early 1830s is supported by published secondary sources and by contemporary land records. According to Raum (1871:240), a stone mill was constructed here in 1834 by Joseph Moore and was initially operated by a David Brister who leased it for ten years. In 1835, Lewis Waln conveyed an eighth of an acre along this section of the Assunpink to Joseph Moore (Burlington County Deed Book L3-112). Joseph Moore, in turn, sold this parcel to Imlah Moore and Charles Moore in

TABLE 4.4. SEQUENCE OF OWNERSHIP
Moore Flour Mill/Trenton Roller Mills

Ownership Tenure	Name	Reference
1676-1704	Mahlon Stacy	(Unrecorded Wills Volume 4/85)
1704-1714	Mahlon Stacy Jr.	Unrecorded Wills Volume 4/85
1714-1724	William Trent	West Jersey Deed B-B-B/122
1724-1729	James Trent	(West Jersey Deed D/382)
1729-1733	William Morris	West Jersey Deed D/382
1733-1753	George Thomas	West Jersey Deed D-D/322
1753-1765	Robert L. Hooper	West Jersey Deed U/335
1765-1784	Robert Waln	West Jersey Deed AV/129
1784-1814	Hannah Waln Wells and Gideon Wells	Gideon and Hannah Wells grant Robert Waln the rights to the property in 1803 (West Jersey Deed AV/151). Waln consequently conveys the rights to the Wells' trustees in 1804 (Burlington County Deed L/564)
1814-1819	Robert Waln Jr.	Burlington County Deed Book K2/414 This indenture conveys ½ of the 29 acre property (Gideon's estate)
1819-1835	Benjamin Morgan et al. in trust of Robert Waln	(Burlington County Deed Book R2/107 which conveys a portion of Robert Waln's land to Lewis Waln but references an assignment of Waln's property to the trustees that was recorded in Philadelphia in 1819)
1835	Lewis Waln	Burlington County Deed Book K3/537 Burlington County Deed Book K3/538 A .12 acre property conveyed by trustees of Gideon Wells and Robert Waln
1835-1843	Joseph Moore	Burlington County Deed L3/112
1843-1899	Imlah and Charles Moore	Mercer County Deed Book F/132
1899	Frederick L. Hulme	Mercer County Deed Book 236/400
1899-1908	Eliza A. Moore	Mercer County Deed Book 236/405
1908-1912	Eliza A. Moore (1/4 interest), Anna S. Moore (1/4 interest), Trenton Trust Company (2 interest)	Mercer County Deed Book 308/421 Mercer County Deed Book 308/419 Mercer County Deed Book 308/416
1912-1914	Charles J. Fury	Mercer County Deed Book 352/423
1914-1919	Rudolph V. Kuser	Mercer County Deed Book 367/562
1919-	Harry Siegel and Harry Haveson	Mercer County Deed Book 440/22

1843 for $18,000 (Mercer County Deed F/132). The tract included mills and was noted as being situated west of the Trenton Cotton Factory lot near the dye house.

Like Hoy's cotton mill immediately upstream, Joseph Moore's flour mill and cotton mill are both referenced in Joseph C. Potts' *The New Jersey Register*, compiled in 1837, and are described as being powered in part by the canal of the Trenton Delaware Falls Company. The oil mill, valued at $20,000 drew water power via 117 square-inch head and produced 24,000 gallons of linseed oil annually. The flour mill (referred to as a gristmill) was valued at $40,000, drew water power via a 150 square-inch head and was processing 60,000 bushels of grain each year. Again, like Hoy's cotton mill, the water power is noted as being drawn off north of the Assunpink, implying use of a flume that crossed over the creek (Potts 1837).

How the Moore mills fared during the Great Panic of 1837 is unclear, but Raum (1871:240) notes that the Moore Flour Mill was damaged by fire in 1839. The property also suffered at the hands of the Great Flood that occurred in early January of 1841. Contemporary newspaper accounts note that the "lower story of Mr. Moore's oil mill …. was inundated" (*Emporium & True American*, January 12, 1841) and that "a large quantity of oil in cisterns [was] in danger of being spoiled" (*State Gazette*, January 8, 1841).

After David Brister relinquished the mill lease in the mid-1840s, Imlah Moore entered into a partnership with Peter Crozer until 1854 (Raum 1871:240). In 1845, Imlah and Charles Moore also made an agreement with Peter Cooper for the sum of $10,000 (Mercer County Deed I-13). This document concerned two square feet of water that the Moores would be permitted to draw from the main raceway belonging to the Trenton Water Power (located a short distance west of the mill). In the following year, the factory still required additional water power and an agreement was reached between the Trenton Water Power Company and Charles and Imlah Moore whereby this would be supplied to the mill via an iron tunnel (Mercer County Deed M-1). These latter arrangements concerning water usage were necessitated by the reorganization of the moribund Trenton Delaware Falls Company by the Trenton Water Power Company, an entity established by Peter Cooper in 1844-45 and soon controlled by the Trenton Iron Company.

A map of property belonging to Henry McCall, Jr. in 1849 (see above, Figure 4.13) and the two maps of the City of Trenton in the same year (see above, Figures 4.14 and 4.15) all show the location of the Moore Flour Mill in relation to other mills along the Assunpink and the Trenton Water Power. The mill complex still included an oil mill and a flour mill in the late 1850s as indicated by the Lamborn *Map of Trenton* (see above, Figure 4.16). Around 1860, however, the oil mill adjoining the flour mill was converted into a machine shop, although this is not apparent on the Lake and Beers map of 1860 (see above, Figure 4.17).

Both the flour mill and the machine shop are reported in the industrial census of 1860. The former facility, owned by Imlah and Charles Moore, disclosed a capital investment of $30,000 and water power was used to run five sets of grinding stones. The mill employed six male workers, whose average monthly wages totaled $180. In the year of record, the mill processed 31,000 bushels of wheat (valued at $43,400), 4,000 bushels of rye ($3,500), 10,000 bushels of corn ($8,000) and 3,000 bushels of buckwheat ($1,800). The ensuing product comprised 6,900 barrels of wheat flour (valued at $48,300), 400 barrels of rye flour ($3,000), 56,000 pounds of corn ($9,500), 8,500 pounds of buckwheat flour ($3,000 [illegible]) and a quantity of bran (value illegible). These figures indicate low profit margins, a common situation during this period when Midwestern flour production and rail transportation were beginning to spell the end for most East Coast flour mills (U.S. Federal Census of 1860, Industrial Schedules).

The machine shop in 1860 was owned by Barnet G. De Unger, "Machinist," who reported doing custom work making hydraulic presses. The operation was relatively small scale with a capital investment of $800, a single worker (most likely De Unger himself) earning $50 a month, with production being valued at $600 for the year (i.e., accounting for all of the monthly wage). The facility was entirely water powered (U.S. Federal Census of 1860, Industrial Schedules).

The flour mill is shown again on the Beers map of Trenton published in 1870 (see above, Figure 4.18) and on the Everts and Stewarts maps of 1875 (see above, Figure 4.19b). The flour mill and machine shop both appear again the industrial census taken in 1870, although both were now reported as being owned by the Moore brothers, Imlah and Charles. The flour mill showed a capital investment of $40,000, still employed six male hands (paid a total of $4,688 in wages for the year) and was still equipped with five sets of millstones, turned with the help of 40 H.P. generated from a single a water wheel. The mill was processing 500 bushels a day. For the year of record, in which the mill operated for 11 months, 48,000 bushels of grain valued at $70,000 were processed into 7,000 barrels of wheat flour, 1,000 barrels of rye flour, 11,000 pounds of corn meal, 100 pounds of oatmeal and 9,000 hundredweight of offal, amounting to a total value of $79,900 (U.S. Federal Census of 1870, Industrial Schedules).

The Moores' machine shop, a slightly expanded operation from that reported ten years earlier, enjoyed a capital investment of $20,000, employed three male workers and was still powered by a single water wheel. Iron and other raw materials valued at $1,290 were used in doing shafting work which was expressed as 12 tons of product valued at $4,700. The machine shop was in operation eight months of the year and the annual labor cost was $2,050 (U.S. Federal Census of 1870, Industrial Schedules).

The flour mill is represented as a four-story structure in the *Bird's Eye View of Trenton* published in 1872 (see above, Plate 4.10). This building, possibly comprising all or part of the original mill erected by Joseph Moore in the mid-1830s, resembles closely the large structure that is visible in an aerial photograph of this section of downtown Trenton in 1924 (see below, Plate 4.16). Imlah, Charles, Lydia and Eckford Moore leased the flour mill to Amos Sickles in 1877 (Mercer County Special Deed C-565). An accompanying description of the property indicates that the main four-story brick structure had a cellar and that there was also another structure that housed an office and additional rooms in an upper story. The lease agreement also included all water rights necessary to run the mill.

In 1881, the Robinson and Pidgeon Map of Trenton indicates that the flour mill building was occupied by G.B. Danger & Son, machinists (see above, Figure 4.20), yet the Haven New Real Estate and Insurance Map of Trenton of the subsequent year continues to reference the structure as Moore's Mill (see above, Figure 4.21). More specific information is given on the Sanborn fire insurance maps of 1874, corrected to 1886 (not illustrated). From this map, it is clear that the four-story flour mill of "I. Moore", also referred to as "Trenton Mills," took up most of the site, with the office structure projecting at an angle northward along the east side of South Warren Street. The machine shop was attached to the east end of the flour mill, also rose four stories, and extended back from Factory Street almost the same distance as the flour mill.

Essentially the same buildings are depicted on the fire insurance maps produced by Scarlett and Scarlett (see above, Figure 4.23) and the Sanborn-Perris Map Company in 1890 (see above, Figure 4.24b), with both maps referring to the flour mill as the Trenton

Roller Mills. The first of these maps also notes that the flour mill was being operated by S. Zigenfuss & Co., who presumably leased the mill from the Moores. A Zigenfuss flour milling operation was listed in the statewide gazetteer of water powers compiled in 1891 (Vermeule 1894). At this time, water power was supplied by the Trenton Water Power via a 12-foot fall that generated 88 gross H.P. (70 net H.P.). No mention is made of water power being derived from the Assunpink at this time.

In 1899, Charles Moore sold the flour mill complex, identified as the Trenton Roller Mills, to Frederick L. Hulme (Mercer County Deed 236-400). The mill buildings continue to be depicted in late 19th- and early 20th-century maps and views through into the late 1920s (see above, Figures 4.25b, 4.26, 4.27 and 4.28; see below Plate 4.16). By 1930, however, it appears that the property had been redeveloped to support an automotive garage, a facility that is depicted on the Franklin Real Estate Plat-Book of the City of Trenton (not illustrated). By 1955, the site had been reconfigured yet again and contained a filling station, laundry and restaurant (see below, Figure 4.32).

I. THE NORTH BANK OF THE ASSUNPINK IN THE 19TH CENTURY

During the American Revolution, the property of Loyalist Major John Barnes on the north side of the creek west of South Broad Street was confiscated and in 1784 became the property of Gideon Wells, the new owner of the Trenton Mills. Over the next half century, the property remained associated with the Wells and Waln families who owned the mill complex and likely used the former Barnes house as a residence for mill managers. During this time, the remainder of the property on the north bank remained sparsely developed (Burlington County Deed L/564; Mercer County Deed R/31).

During the middle decades of the 19th century, the immediate north bank of the Assunpink served as the rear for a mix of row houses and commercial storefronts facing on South Broad, East Lafayette and South Warren Streets. Development followed the laying out of Washington Street, later renamed East Lafayette Street, between 1833 and 1844. The United States Coast Survey of 1844 illustrates a series of about one-half dozen detached buildings facing on Washington Street (see above, Figure 4.12). Five years later, the Sydney map of 1849 (see above, Figure 4.14) and the Otley and Keiley map of 1849 (see above, Figure 4.15) show what appear to be two rows of houses facing on Washington Street, a row of buildings on the east side of South Warren Street between the Assupink and Washington Street, and several outbuildings located to the rear along the Assunpink's northern terrace, accessed by alleys from South Warren and Washington Streets.

In 1853, John F. Klein acquired the strip of land on the west side of South Broad Street adjoining the north side of the Assunpink from Henry McCall (Mercer County Deed 33/127). Klein's interest in the property appears to have been real estate development because shortly thereafter the density of building increased markedly. The Lake and Beers map of 1860 (see above, Figure 4.17), the Beers map of 1870 (see above, Figure 4.18) illustrate the progressive filling in of the street-facing lots with mostly three-story brick and frame row buildings. Many of these buildings likely held shops on their first floors in characteristic 19th-century fashion.

By the 1870s, the street frontage of the block bounded by South Warren, East Lafayette and South Broad Street had been filled, forming a sort of rear courtyard bounded on three sides by the rear of the buildings and on the south side by the Assunpink Creek. This area, which is clearly shown in the Fowler and Bailey bird's eye view of 1872 (see above, Plate 4.10) and the Fowler *View of Trenton Opposite Morrisville Island*

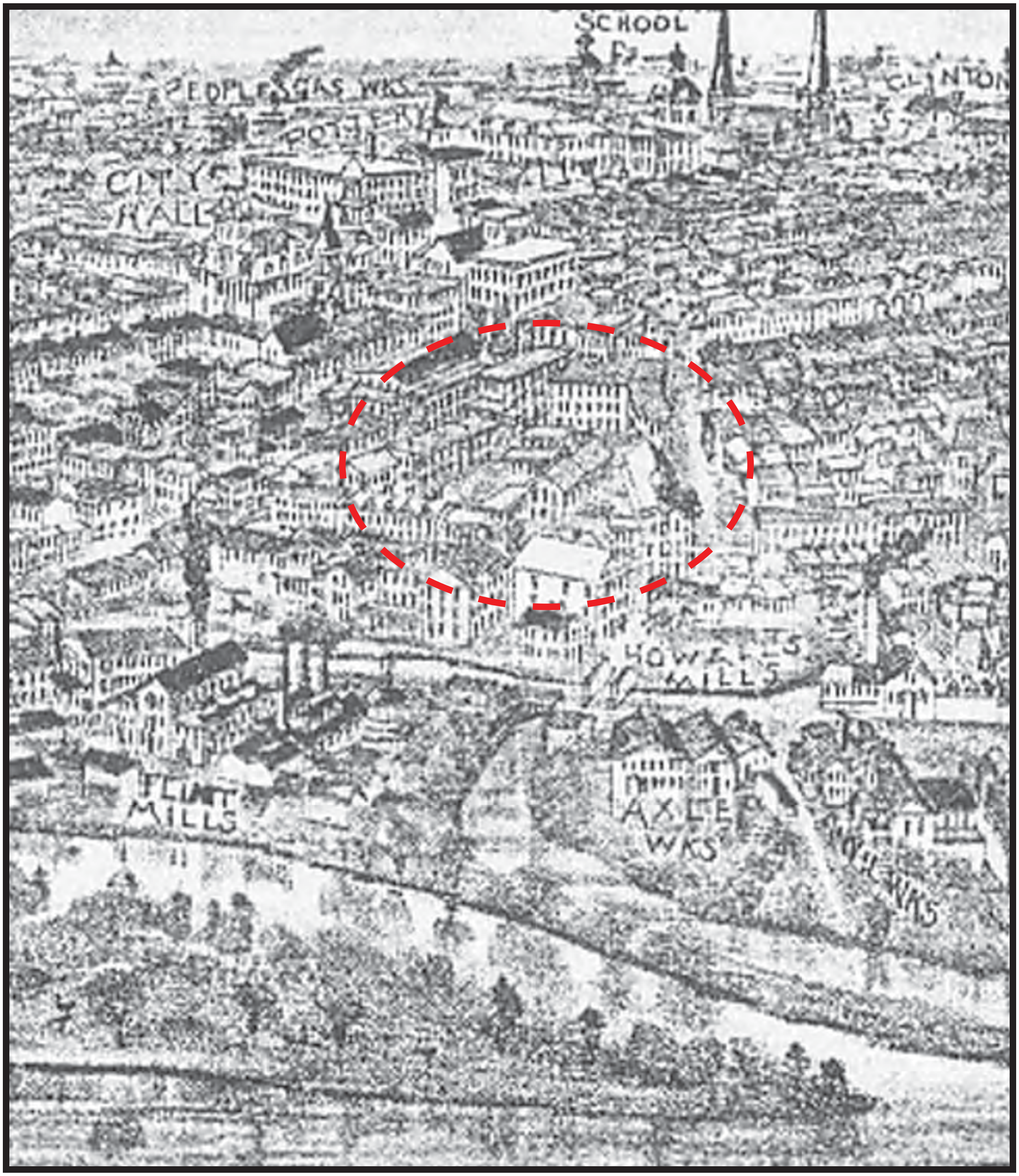


Plate 4.13. Fowler, T.M. *View of Trenton Opposite Morrisville Island*. 1893. Study area circled.

of 1893 (Plate 4.13), functioned as storage and outdoor work space. The bird's eye view indicates that a retaining wall had been built along the north bank of the creek from the South Broad Street downstream to the alley at the rear of the buildings facing on South Warren Street, representing the final filling in of the flood plain along this section of the Assunpink. The Sanborn map of 1886 locates several outbuildings in the courtyard accessed by two alleyways (see above, Figure 4.22). Along the alley located about 100 feet east and parallel to South Warren Street were two, two-story storehouses and a stable with a small attached shed, probably associated with the buildings facing onto South Warren Street. The other alley, which was pedestrian only, was located about 100 feet west of South Broad Street. Its purpose was to provide access to John Winter's Concert Hall and Garden, a two-story frame structure dating from the late 1860s or early 1870s. This building later became a storehouse for Solomon Kaufman's Department Store, as shown in the Scarlett map of 1890 (see above, Figure 4.23) and the Sanborn-Perris fire insurance map of 1890 (see above, Figure 4.24a). Kaufman purchased the property in 1889 and his main display rooms were in the brick row building at 123 South Broad Street at the southwest angle of South Broad and East Lafayette Streets. Kaufman's would later be operated as Swern's Department Store (see below).

J. THE ASSUNPINK BLOCK: A BRIDGE OF COMMERCE

Returning upstream to the South Broad Street crossing of the Assunpink Creek, this chapter section will trace the continuing history of the bridge and its immediate environs from the immediate post-Civil War era through into the second half of the 20th century. In 1870, the South Broad Street bridge over the Assunpink was widened, the structure with its iron railings on either side at that time being deemed too narrow. There has been a misconception among some local historians (notably, Cleary 1936) that the entire bridge was replaced to facilitate this widening. However, Harry Podmore (31 August 1957) notes more correctly that this improvement was carried out around the earlier bridge in a way that preserved the structure erected in the early 1840s. The guardrail of the earlier structure – removed as part of the widening project - reportedly incorporated a line of cannon that were placed there in memory of the Second Battle of Trenton. Unfortunately, these elements are not obviously apparent in the Barber and Howe engraving of 1868 (see above, Plate 4.6), nor in photographs of the bridge taken around 1870 (see above, Plates 4.7 to 4.9).

The bridge widening contract was awarded to William Johnson in early 1870 and a separate agreement for ironwork was executed with Charles Carr. Work was accomplished quickly, with new construction being superimposed over and preserving the bulk of the earlier structure. The bridge was re-opened for travel in December of the same year in which construction was begun (Podmore 1938). The two later photographs referenced above (see above, Plates 4.7 to 4.9), both taken *circa* 1870, apparently show the bridge and its new iron railing, shortly after completion of the improvements. These views also show the McCall Paper Mill, just prior to its destruction by fire in 1872 and subsequent demolition in 1874, and before the construction of the Assunpink Block.

In conjunction with the bridge improvements of 1870, the grade of Greene Street/South Broad Street extending south from State Street was raised and preliminary plans were circulated regarding the possibility of erecting buildings with stores actually over the Assunpink crossing. These suggestions most likely surfaced following the destruction of the McCall Paper Mill by fire in 1872. After examining the site, some observers pressed for the mill to be taken down in order to "straighten the awkward bend at the junction of Greene and Broad Street." Local newspapers also noted that if the dam was to be removed, then the site could be used for a row of structures. Some disapproved of the idea, however, since recreational activities on the pond would be threatened by the removal of the dam. Furthermore, opponents of building atop the bridge believed that the stores would prevent the natural flow of air currents, thus breeding "disease all along the creek." After some considerable debate, the forces in favor of building on the bridge prevailed, and the mill was dismantled in 1874 along with the dam (Cleary 1922).

Also in 1870, improvements along Greene Street/ South Broad Street required the removal of the Washington Market at the corner of Greene/South Broad and Washington Streets (present day East Lafayette Street). At this time, the building materials from which the markets were constructed were sold off and the structures were removed. In early 1874, workers began clearing the street frontages in order to lay down the building foundations for the Assunpink Block (*Daily State Gazette*, February 28, 1874). In March of the same year, the brick factory store on the McCall mill property, where cloth was measured, marked, and prepared for packing, was torn down (*Daily State Gazette*, 3 March 1874). A paper bag manufactory was then erected on the mill site, along with other commercial premises. After several more stores were erected atop the Assunpink, Greene Street was formally renamed North and South Broad Street, with the junction between "north" and "south" occurring at the intersection with East and West State Street (Woodward and Hageman 1883). To all intents and purposes, the initial build-out of the Assunpink Block was complete by the end of the 1870s, as is clearly evident in the historic map sequence for the period, and specifically in the Robinson and Pidgeon map of 1881 (see above, Figure 4.20).

As part of the research undertaken for the South Broad Street Bridge rehabilitation study, the chains of ownership for most of the storefront properties within the Assunpink Block were established. This information forms the basis for the summary history of the block that follows. The focus here is on the west (downstream) side of the block within the current project area, although information was collected for the properties on the east (upstream) side of the block and has been redacted for the purposes of this study. Several historic photographs are also in existence which show the Assunpink Block as an architecturally cohesive "main street" strip filled with late 19th- and early 20th-century buildings, below part of which lay the South Broad Street span over the Assunpink Creek (Plates 4.14 and 4.15). An aerial view of downtown Trenton, photographed in 1924, shows the densely built-up character of this section of South Broad Street to the point where it is difficult even to pick out the course of the Assunpink Creek (Plate 4.16). Another photograph taken around the same time, looking downstream from South Montgomery Street, provides a rare view of the creek passing beneath the Jackson Street bridge and then on beneath the South Broad Street bridge, where the buildings on the upstream side of the bridge are clearly visible (Plate 4.17).

Downstream Side of the Assunpink Block (West Side of South Broad Street)

In the early 20th century, on the north bank of the Assunpink, at the corner of South Broad and Lafayette Streets, stood the S.E. Kaufman Department Store, a building that was erected around the turn of the century, on the site of earlier commercial buildings (see above, Plates 4.14 and 4.15). This building was later acquired by Hoenig-Swern & Company who enlarged the business. South of this building, towards the northern end of the bridge, was 127-131 South Broad Street, purchased by John Winter in 1874 from the Assunpink Improvement Association. By the first decade of the 20th century, the Sanborn fire insurance

Plate 4.14. Historic photograph of the Assunpink Block on the South Broad Street bridge; view looking northwest toward East Lafayette and East Front Streets. Circa 1890. (Source: Trenton Public Library, Trentoniana Collection).

Plate 4.15. Historic photograph of the Assunpink Block on the South Broad Street bridge; view looking northwest toward East Lafayette and East Front Streets; the L. Lehman & Company Grocery is in the left foreground. Circa 1910. (Source: Trenton Public Library, Trentoniana Collection).

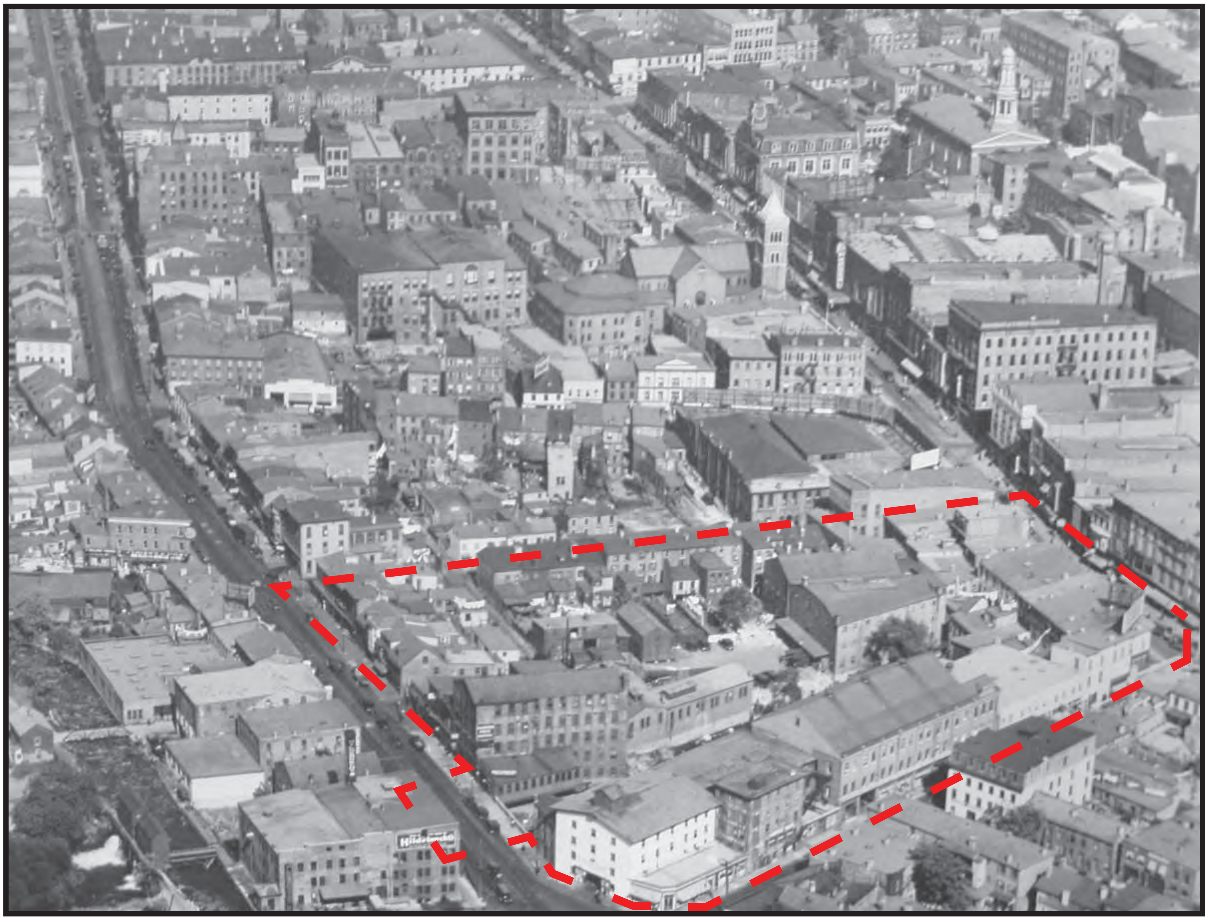


Plate 4.16. Aerial photograph of South Warren Street and South Broad Street in the Assunpink Creek area. 1924. Study area outlined. (Source: Trenton Public Library, Trentoniana Collection).

maps and historic photographs indicate that this property was leased to the Lehman & Company Grocers (see above, Figure 4.25a; Plate 4.14).

Adjacent to the south was 133 South Broad Street, which originated as a property sold to Thomas Foulds in 1876. A few years earlier in 1870, a portion of this property had been deeded to the Board of Chosen Freeholders as an easement (Mercer County Deed 80-218). The easement concerned a narrow piece of land, 16 feet wide and extending from the line of the old bridge to "the outer face of the wall of new bridge now being built." From this description it is clear that the bridge was enlarged by 16 feet along its downstream side. During this period, Henry McCall, the owner of the former mill property, permitted Foulds to build over his raceway. This property extended to the northern corner of the buttress built against the southern abutment of the stone bridge.

The next property adjacent to the south, at 135 South Broad Street, was retained by Peter Kite until it was conveyed to August Hammer in 1885. Further to the south, 137 South Broad Street, was owned by Levi Furman until 1881. In 1919, an indenture stipulates that these premises were not to be used for hardware storage for a period of ten years. 139 South Broad Street, was purchased by Harry Haveson, a real estate speculator, in 1901. A portion of Furman and Kite's carpenter shop became 141 South Broad Street. *Circa* 1874, a brick storehouse was erected on the property while a portion served as a driveway for the carpenter shop located west of the structure.

K. THE ASSUNPINK CREEK AND THE SOUTH BROAD STREET BRIDGE IN THE LATE 19TH AND 20TH CENTURIES

The destruction and demolition of the McCall Paper Mill in the early 1870s not only opened the door to enlarging the South Broad Street bridge over the Assunpink and the creation of the Assunpink Block, but also led to the filling and development of the mill pond. Floods continued, however, culminating in a particularly devastating torrent that poured down the Assunpink in late September of 1882. The riverbank on either side of the South Montgomery Street bridge was swept away, while the cellars in buildings on the Assunpink Block were flooded. A large barn on the south bank of the creek within the block was also destroyed and the floodwaters weakened the piers supporting the Assunpink Block, especially under "Prior's Row" on the western side of the bridge. While the dam for the Wilson Woolen Mill prevented debris from smashing into the block, it still caused a tremendous volume of water to crash against the foundations. Indeed, local newspapers blamed the high dam for exacerbating the overflow and heavy damage (*Daily True American*, September 26, 1882).

The filling of the mill pond eventually permitted the construction of yet another bridge across the Assunpink at Jackson Street, where a Pratt truss structure fabricated in wrought and cast iron by the South Trenton-based New Jersey Steel and Iron Company, was erected in 1888 in place of a privately-owned footbridge that occupied the former site of Washington Retreat (Podmore, September 14, 1957). The installation of this bridge may have resulted in a modification of the problematic Wilson dam, which fire insurance maps of 1890 appear to show as being integrated with the bridge support system. The dam fed a raceway that ran parallel to the south bank of the creek beneath the Assunpink Block to the woolen mill located on Factory Street.

Increasing traffic and population density in Trenton necessitated other transportation improvements beyond new streets and bridges. In 1876, the City Railway Company, incorporated a year before, was authorized to construct a horse-car line running from the city limits to Perry Street, proceeding along North and South Broad Streets and continuing to the

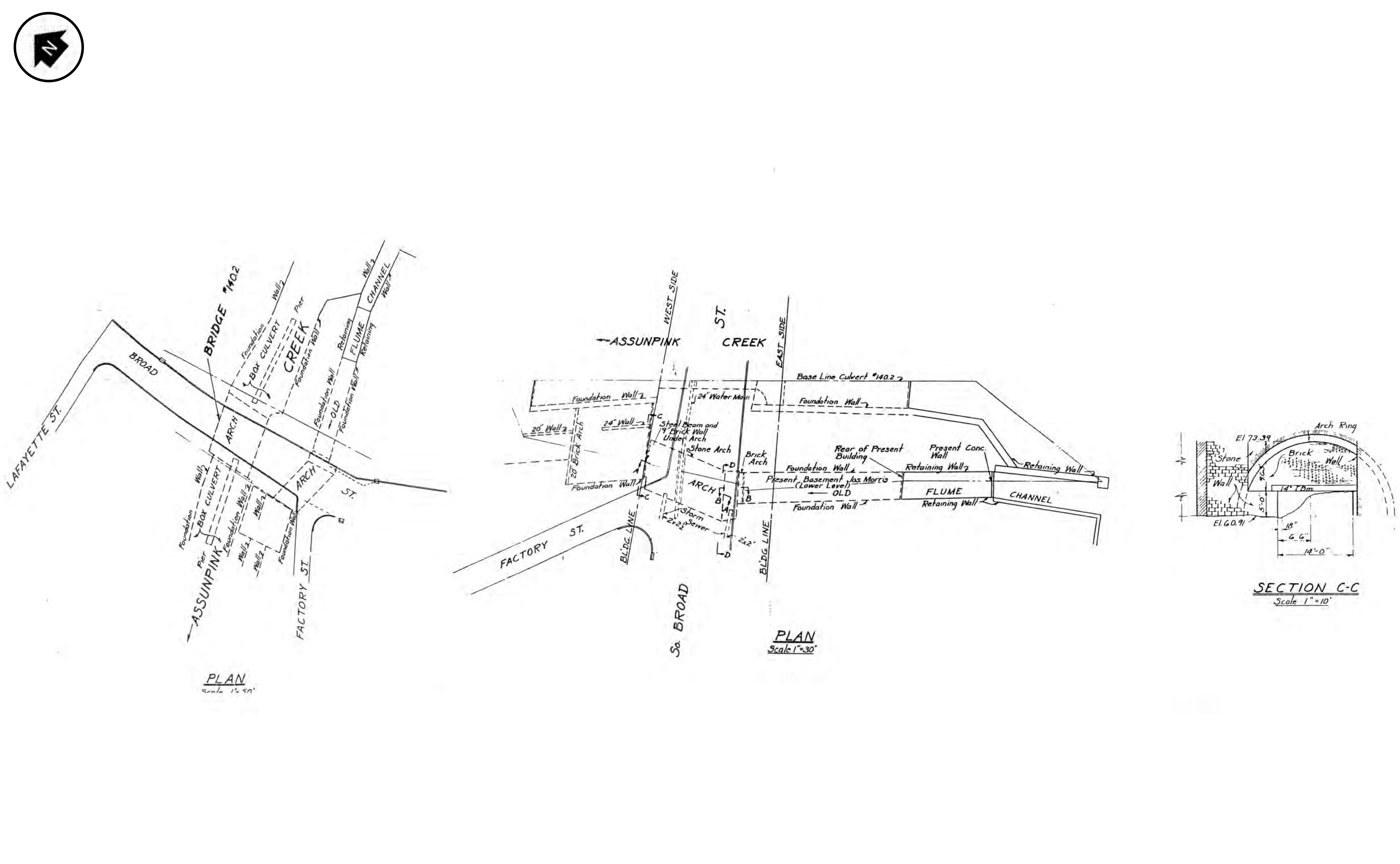


Figure 4.30. Old Flume under South Broad Street adjacent to Bridge #140.2. 1936. Source: Mercer County N.J. Engineers Office.

Chambersburg borough line. The double track was completed in August of 1876 (Trenton Historical Society 1929:292). This line is visible on several late 19th- and early 20th-century maps of the area (see above, Figures 4.21, 4.23 and 4.25a). As the cars heading north approached the hill at North and South Broad and East Lafayette Streets, an additional horse or mule usually needed to be attached to the car in order to tow it up the incline.

Lewis Perrine later acquired the City Railway Company and the Trenton Horse Railroad Company and incorporated the lines as the Trenton Passenger Railway. In 1892, the network was electrified and branched off to surrounding towns. Many residents, however, did not want the horse cars replaced and claimed that the cars would be unable to climb the Broad Street hill. The new electrified cars initially ran only along North and South Broad, Perry and Centre Streets. By 1894, many of the remaining street railway lines had been updated. The lines were in a steady decline by the 1920s as a result of the widespread adoption of the automobile and the impact of the Great Depression (Trenton Public Library, Trentoniana Collection, vertical files).

Mill Hill had by this time already peaked in terms of its residential development. While the area was still welcoming new businesses and industrial enterprise well into the 1930s, it became less residential, both as a result of a decline in the amount of available space for new homes and the flight of inner city residents to the suburbs. In place of Mill Hill, areas such as Chambersburg and Hamilton were now drawing the bulk of the area's new inhabitants and homebuilding (Old Mill Hill Society 1991). The built-out character of the downstream section of the Assunpink stream corridor is clearly apparent in an early aerial photograph of downtown Trenton taken in the 1924 (see above, Plate 4.16). This view shows both banks of the Assunpink between South Broad and South Warren Streets lined with buildings, mostly large industrial structures. Three- and four-story buildings line the South Broad Street frontages of the Assunpink Block, the lower stories of most of these structures used for commercial purposes, the upper stories occupied by offices and residents (Plate 4.18).

The Assunpink Creek stream corridor, however, was still beset by flooding problems, a situation not helped by the declining use and maintenance of the water-powered industries along its course. A flood in 1903, for example, carried away the approaches to the South Broad Street bridge (Cleary 1903). In 1906, the only active mill along this stretch of the creek, the Alryan Woolen Mill on Factory Street, was sold and the building was put to other commercial enterprises that no longer required the use of water power.

The changing character of the creek margins and ongoing threat from floods caused the city to think in terms of turning the valley itself into a park. Also in 1906, the Olmsted brothers were commissioned to plan a park along the Assunpink Creek, although the plan was not implemented. Around this time, the flume channel that supplied water to the woolen mill on Factory Street became partially filled in. In 1936, the Mercer County Engineer's Office, considering the condition of the South Broad Street bridge, produced plans of the old flume under the South Broad Street Bridge (Figure 4.30). These drawings show that at least part of the old flume channel survived beneath the Assunpink Block. Additionally, these plans document the two arches and the stone piers extending upstream and downstream from the bridge to weight of the rows of buildings above.

In the late 1940s, the Assunpink Block was still largely intact as a commercial streetscape, as shown by the Nirenstein realty map (Figure 4.31). Two major department stores – Swern's (in the southwest angle of the South Broad Street/East Lafayette Street intersection) and Goldberg's (in the southeast angle of the South Broad Street/East Front Street intersection) – effectively served as anchor stores for the

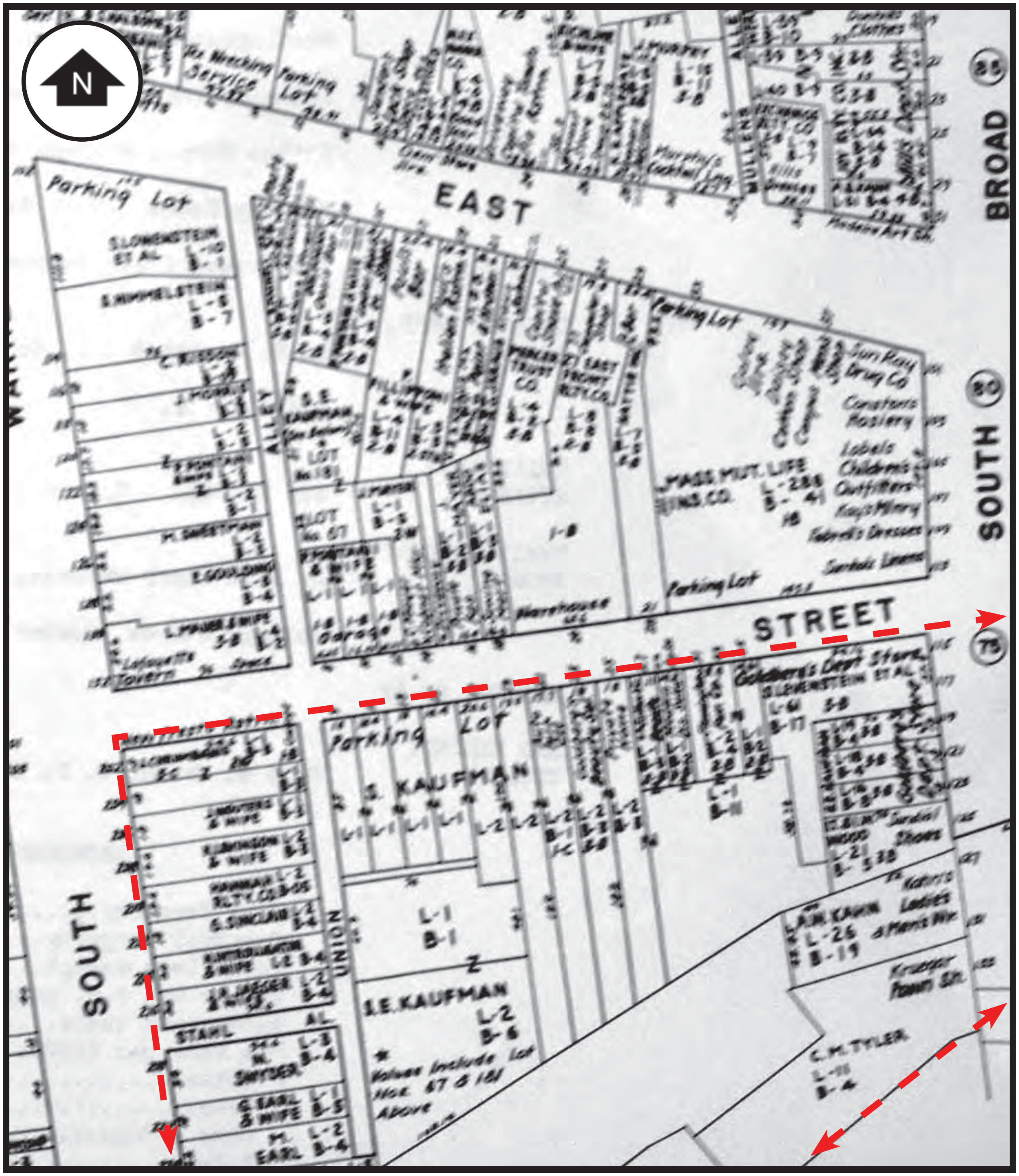


Figure 4.31. Nirenstein National Realty Map Company. *Downtown Retail Shopping Districts*. 1947. Scale: 1 inch: 80 feet (approximately). Study area outlined.

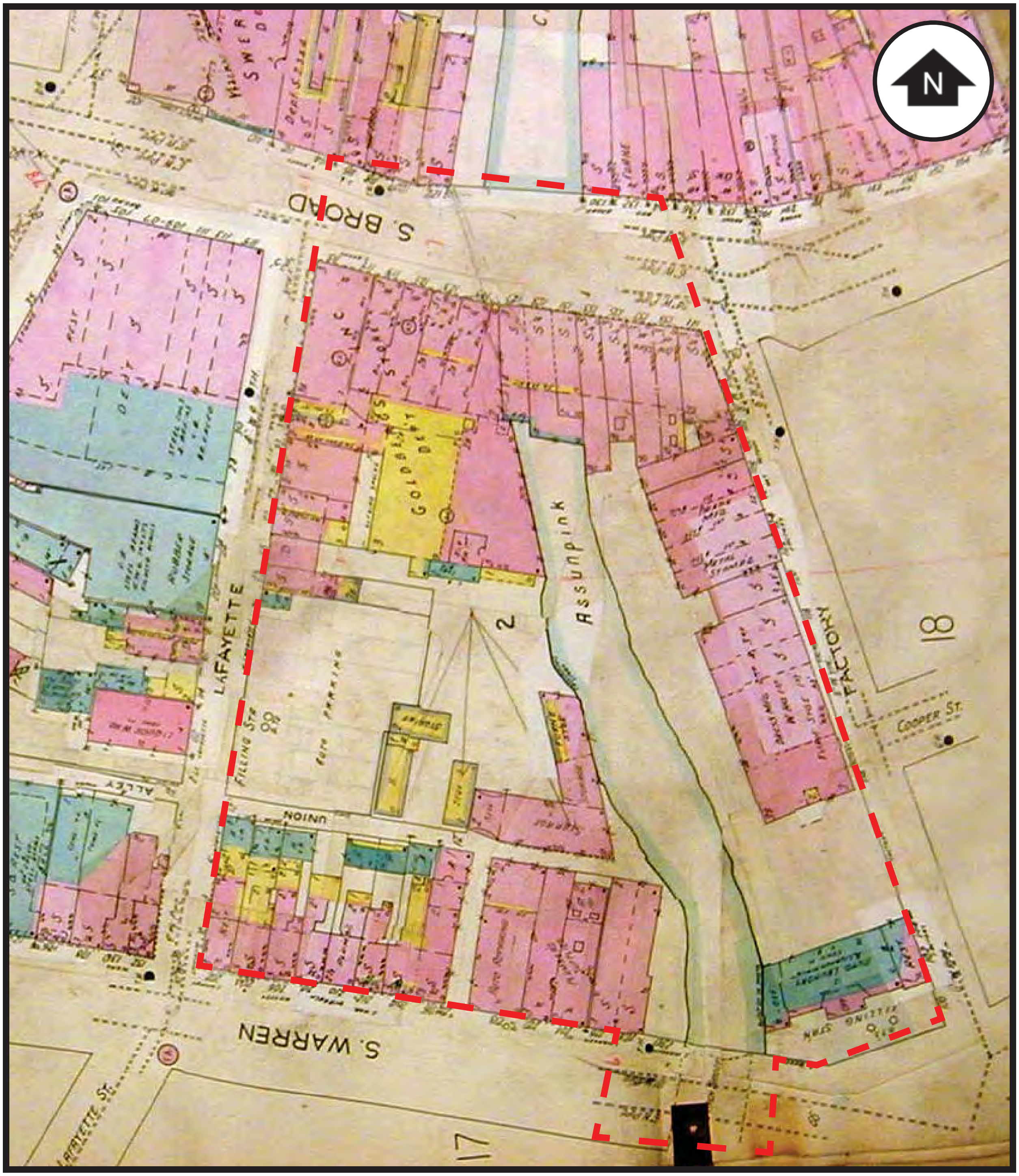


Figure 4.32. Sanborn Map Company. *Insurance Map of Trenton*. 1927, revised to 1950. Scale: 1 inch: 115 feet (approximately). Study area outlined.

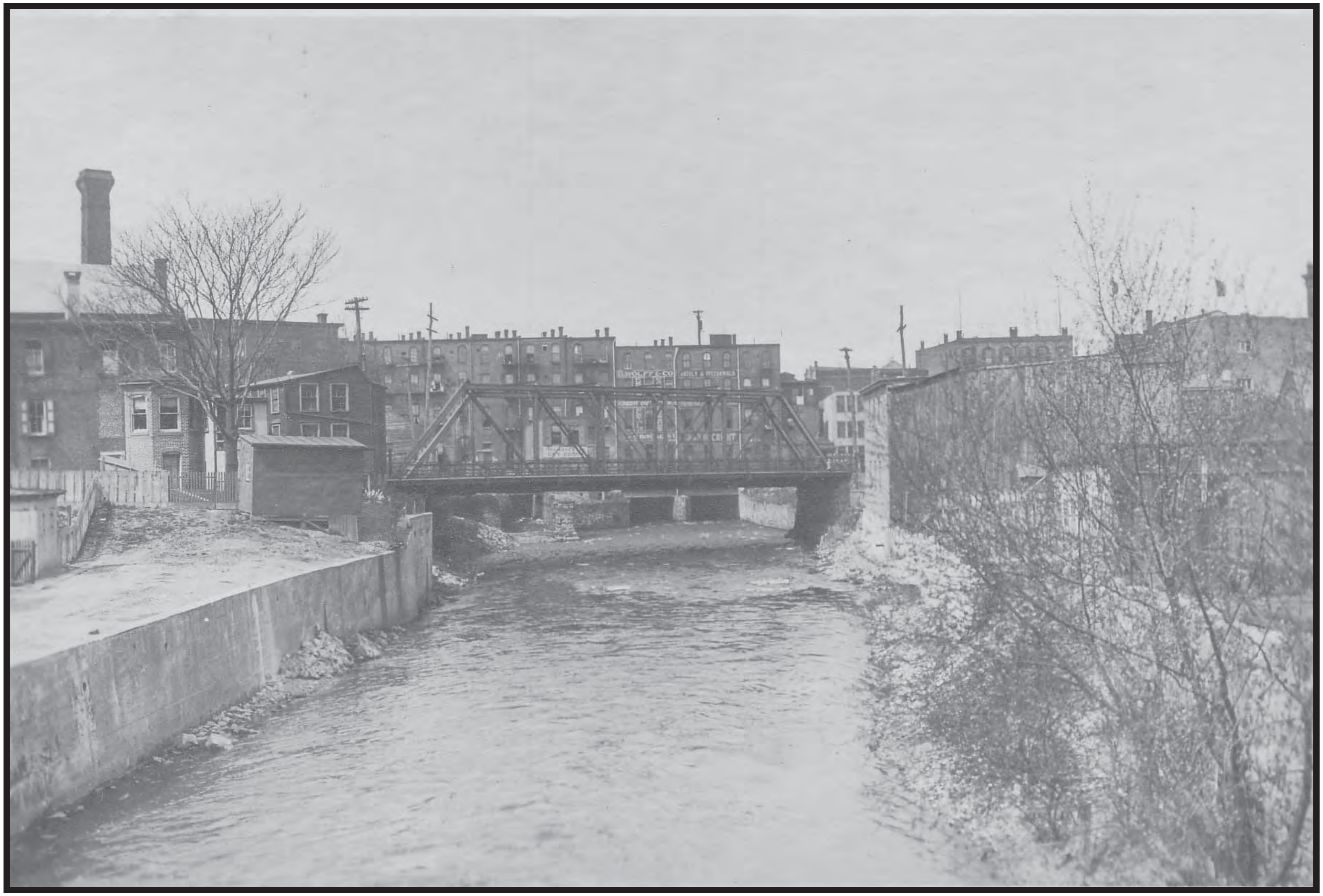


Plate 4.17. View downstream along the Assunpink Creek showing the Jackson Street bridge and the upstream side of the South Broad Street bridge beyond. Circa 1930. (Source: Trenton Public Library, Trentoniana Collection).

Plate 4.18. Historic photograph of the Assunpink Block on South Broad Street looking north from Factory Street. 1937. (Source: Trenton Public Library, Trentoniana Collection).

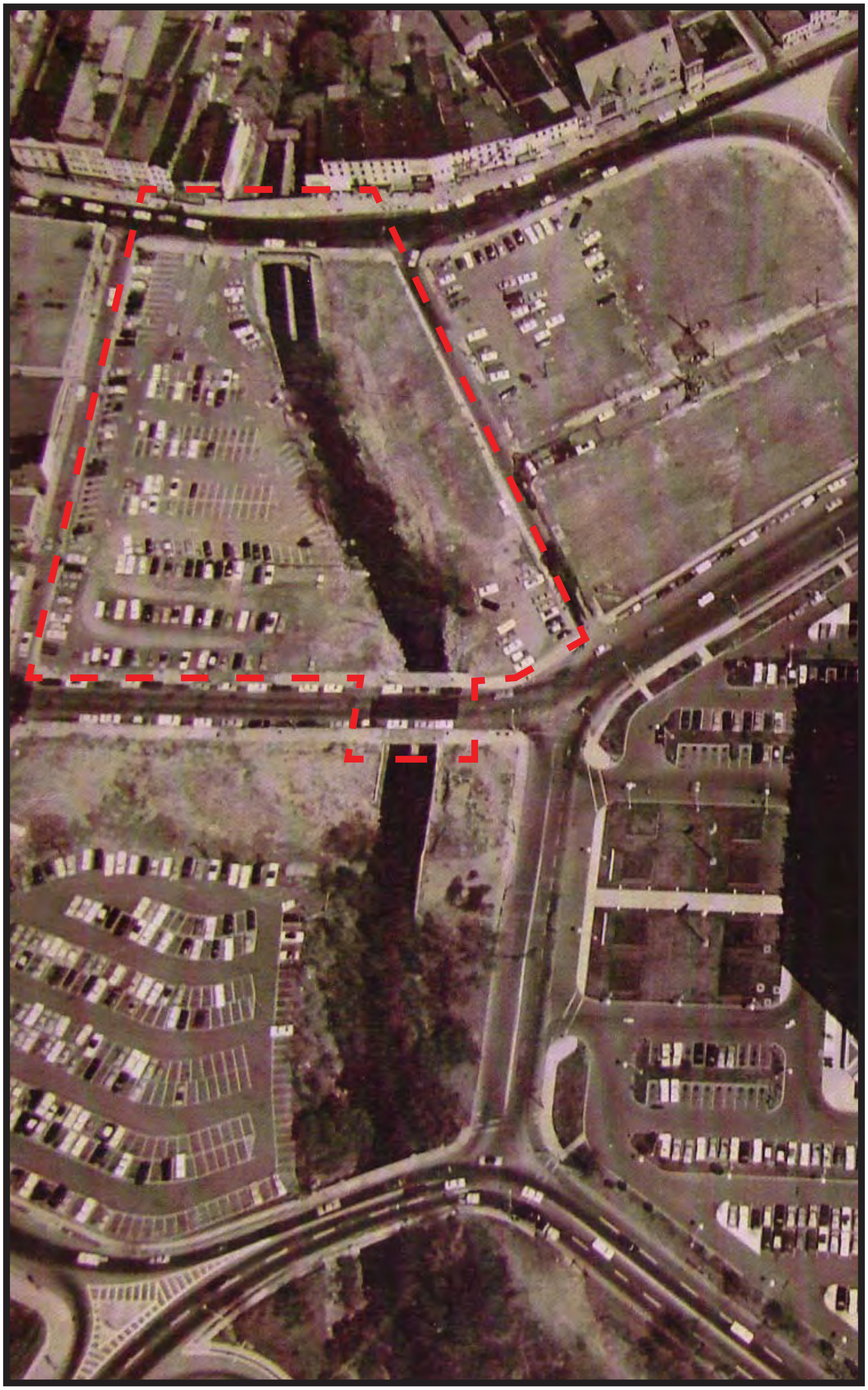


Plate 4.19. Aerial photograph of South Warren Street and South Broad Street in the Assunpink Creek area. Circa 1965. Study area outlined. (Source: City of Trenton, Engineering Department).

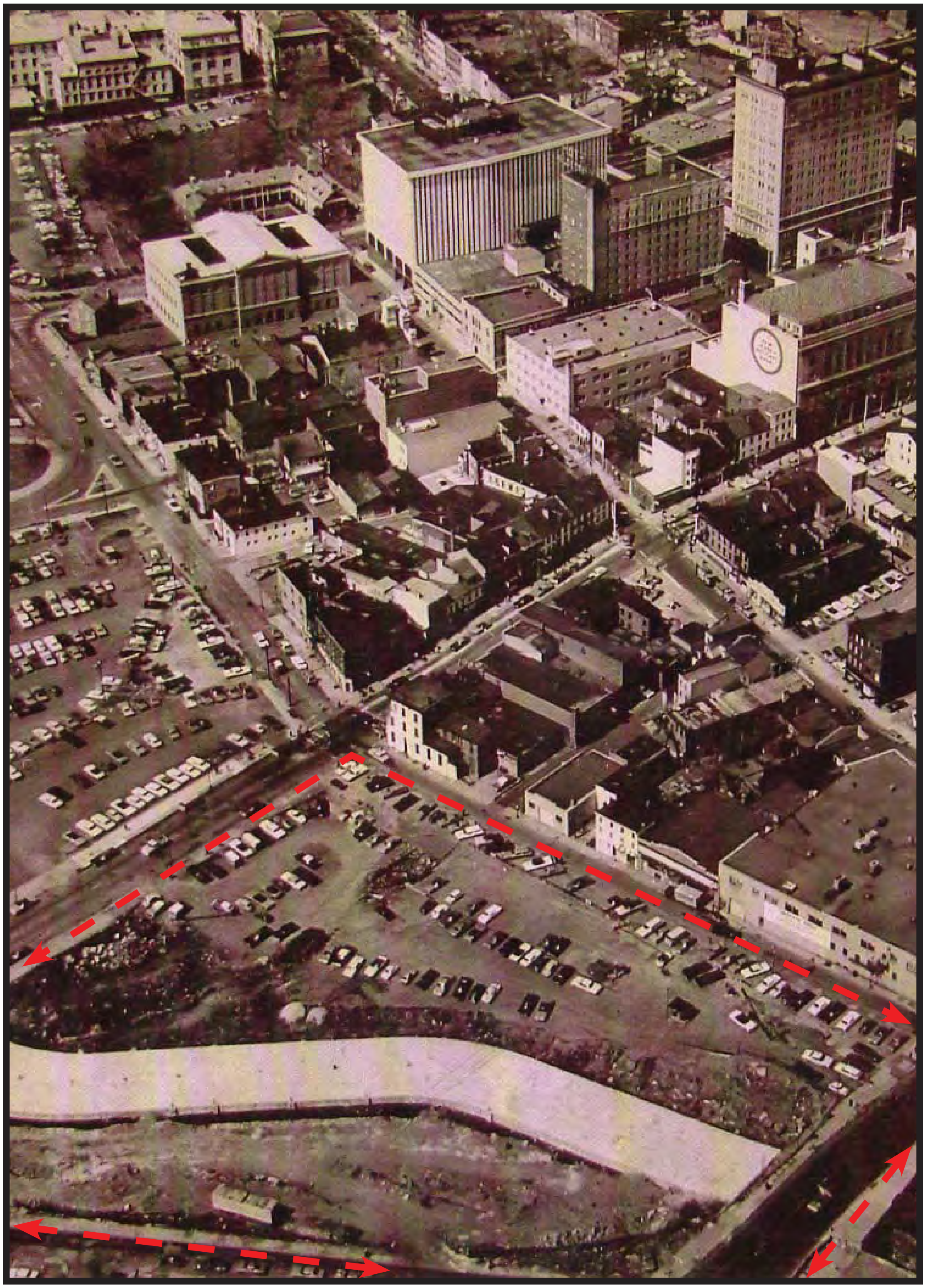


Plate 4.20. Aerial photograph of the Assunpink Creek taken during the construction of the culvert downstream of the South Broad Street Bridge. Circa 1973. Study area outlined. (Source: City of Trenton, Engineering Department).

block for most of the first half of the 20th century. By 1947, however, these two stores had swapped locations (Figure 4.32) and the first gaps in the Assunpink Block had begun to appear. Between 1947 and 1950, buildings set directly over the creek on the upstream side of the South Broad Street bridge were pulled down, following a fire.

The commercial viability of the Assunpink Block and surrounding section of Mill Hill waned rapidly through the 1950s and 1960s, and led to the periodic demolition of buildings. Buildings on the downstream side of the Assunpink block were mostly demolished in the early 1960s. A *circa* 1965 aerial photograph shows the entire block bounded by East Lafayette, South Warren, Factory and South Broad Streets cleared of buildings and largely devoted to surface parking (Plate 4.19). In 1972 the now defunct Goldberg's/Swern's department store at the corner of South Broad and East Front Streets was razed. This latter event occurred as a prelude to the creation of Mill Hill Park, which was created in the early 1970s to stem the tide of urban decay and celebrate the site of the Second Battle of Trenton (Quigley and Collier 1984:108). The park project included extensive filling and landscaping, the repair of masonry along the creek, the construction of a small outdoor amphitheater close to the site of Washington Retreat and the refurbishment (and taking out of active service) of the Jackson Street bridge. The park was officially dedicated in June of 1973.

Along with the creation of the relatively formal park area upstream from the South Broad Street crossing, the section of the valley floor downstream was extensively reconfigured down to the mouth of the creek in the mid-1960s to early 1970s. This involved the contouring of the stream channel to receive the construction of a two-cell, reinforced-concrete box culvert to carry the Assunpink between the South Broad and South Warren Street bridges (Plate 4.20). After placing the stream underground in the culvert, the surrounding area was filled and landscaped, and a New Jersey State office building with surrounding plazas was constructed at the southeast corner of South Warren and East Lafayette Streets (New Jersey State Department of Human Services at 222 South Warren Street).

Chapter 5

FIELD INVESTIGATIONS

A. THE SOUTH BROAD STREET BRIDGE

In 2002, Hunter Research, Inc. performed a detailed cultural resources field investigation of the South Broad Street Bridge for the New Jersey Department of Transportation (NJDOT) as part of a proposed bridge rehabilitation project. The bridge had been previously found eligible by the NJHPO in 1979 and eligibility was reaffirmed as a result of the NJDOT Historic Bridge Inventory conducted from 1991 to 1994 (see Appendix D for a copy of the survey form). This investigation involved a systematic visual inspection of the bridge and its immediate surroundings, coupled with the taking of notes and measurements, the annotation of maps and extensive in-field digital photography. Fieldwork was further facilitated by temporary scaffolding erected beneath the bridge. Intended chiefly for the use of structural engineers in their own bridge inspection work, the scaffolding also enabled archaeologists and architectural historians to examine the fabric of the bridge in greater detail and afforded the opportunity for the extraction of historic mortar samples (Hunter Research, Inc. 2003b: 5-1 and 5-13 to 16).

The South Broad Street Bridge investigation in 2002 was followed in 2007-08 by a Phase I/II subsurface archaeological survey performed by AECOM for NJDOT. This investigation involved trenches at each of the bridge quadrants. This survey uncovered the crown, including keystone, of the bridge's southern arch opening and provided some limited access into the former tailrace spanned by the southern arch. Following subsurface investigations, the southern arch opening was reburied (AECOM 2010). As of early 2012, final planning for the bridge rehabilitation project has yet to be completed by NJDOT.

Due to the extent of these prior cultural resources investigations for NJDOT, no additional field assessment of the South Broad Street Bridge was felt necessary at this time for the Assunpink day-lighting project other than confirming that the integrity and condition of the bridge had not changed materially or impacted its ability to meet the National Register Criteria for Evaluation. Other than normal deterioration and weathering, primarily visible in the form of loose or missing mortar of the exposed portions of the bridge, no major changes were noted. Photographs of the bridge were taken in early 2012 to document the current condition.

The presently visible portion of the South Broad Street Bridge over the Assunpink consists of a 60-foot-wide stone arch that straddles the creek in a 50-foot span (Plate 5.1). The interior height of the arch from the base of the keystone (apex of the vault) to the creek bed is approximately 14 feet. The bridge masonry shows abundant evidence of multiple "builds" and patching. While only 85 feet or so of the length of the bridge is presently visible, the entire structure is estimated to extend for a distance of around 160 feet. Much of the bridge fabric lies concealed beneath the existing roadway and behind the extensive fill that was placed to either side of the creek during the late 1960s or early 1970s when the stretch of the Assunpink between South Broad and South Warren Streets was placed within a culvert.

Geophysical and archival study reveals that a second arch opening (Plate 5.2), which spanned a raceway leading to mills further downstream, survives buried to the south of the currently visible arch. This second span was partially uncovered in 2007-08 during the

Plate 5.1. View looking east (upstream) from the New Jersey State Department of Human Services office building toward the South Broad Street Bridge. Only the crown of the bridge's northern arch opening is visible above the railing that marks the upstream end of the culvert that carries the Assunpink Creek underground (Photographer: Patrick Harshbarger, January 2012)[HRI Neg.# 10055/D6:008].

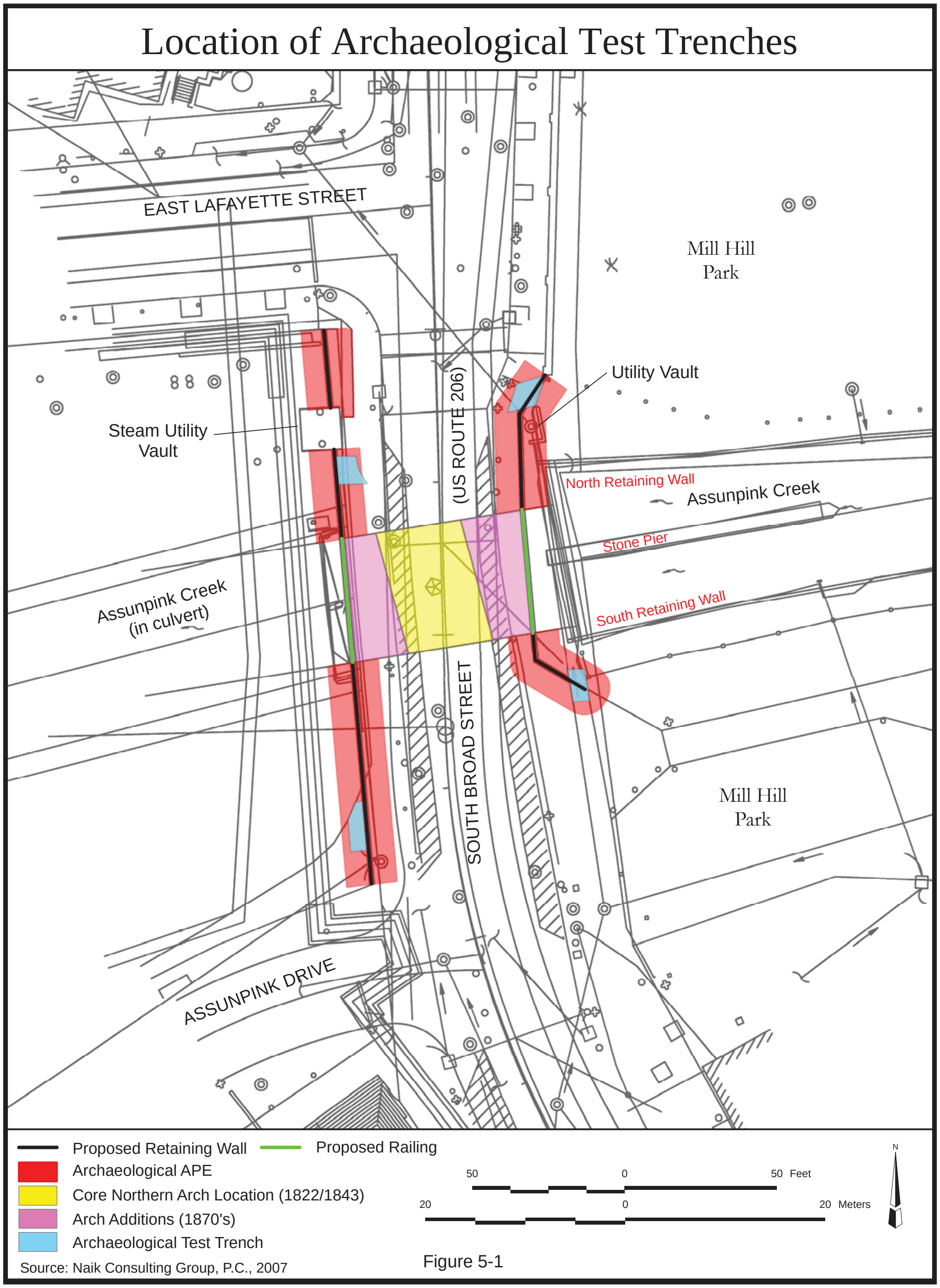


Plate 5.2. View of the west (downstream) elevation of the southern arch opening, revealed during Phase I/II archaeological excavations for the South Broad Street Bridge rehabilitation project. *Circa* 2008 (Source: AECOM 2010: Opposite p. 5-7).

before-mentioned subsurface investigations (AECOM 2008). It is also quite likely that a third (middle) arch opening, documented by a *circa* 1870 photograph (see above, Plate 4.7), exists deeply buried at the base of the bridge pier, immediately south of the main span over the creek. This third arch, was considerable shorter in span than the other two arches and may represent the tail race outfall of the McCall paper mill and/or the earlier gristmill.

The masonry in the downstream (western) face of the bridge dates essentially from 1870, when the span was improved and widened (Figure 5.1; Plate 5.3). The voussoirs and keystone that form the face of the arch are from this period; they are fashioned in sandstone and have dressed surfaces. Most of the remaining masonry also dates from 1870 and consists of random-laid sandstone blocks, each of which has a rough-dressed exterior surface. This face of the bridge, like the upstream face (see below), is distinguished by a series of four evenly spaced iron tie-rods with diamond-shaped end plates that are ranged around the arch. These rods are believed to tie the masonry of the downstream widening of the bridge to the earlier stonework at the core of the span (they do not appear to pass through the entire 60-foot width of the bridge, since they do not line up with the tie-rods on the upstream face). The northern and southern ends of the downstream face of the bridge have been recently re-pointed, while the southern end has also been re-faced in places. Some sections of the downstream face have been patched with brick masonry, especially towards the northern end of the span. This patching probably dates from the early to mid-20th century. The parapet is formed as a single layer of capstones affixed in the late 20th century.

The upper section of the northern end of the downstream face contains two features that apparently relate to buildings (now destroyed) contained within the Assunpink Block. One feature consists of a blocked opening, approximately 3.5 feet wide, which has been filled with concrete. The other feature is an opening roughly 2.5 feet wide and six feet high that accesses a small vaulted basement space. Both of these features appear to relate to below-street basements accessed from the first floor of buildings in the downstream section of the Assunpink Block. The concrete blocking of the northernmost of these two openings was likely applied at some point after 1950, following the demolition of the Assunpink Block.

The upstream (eastern) face of the South Broad Street Bridge is considerably less visible than the downstream face (Figure 5.2; Plate 5.4). Two steel I-beams and related superstructure support a sidewalk that projects out from the upstream face of the bridge an additional 15 to 18 feet, effectively obscuring the upper section of the span. An iron pipe carrying a water line crosses the creek immediately below the easternmost steel I-beam. The substantial masonry central pier that once supported the upstream portion of the Assunpink Block also partially obscures the face of the bridge.

The stone masonry of the upstream face, like the downstream face, dates largely from 1870, when the bridge was remodeled and widened. Again, the masonry is fashioned in sandstone and there are areas of brick patching, although there has been no recent re-pointing and re-facing. As a result, there are a number of voids and areas of deteriorated pointing. This face of the bridge, like the downstream face, is distinguished by a series of four evenly spaced iron tie-rods with diamond-shaped end plates that are ranged around the arch. Again, these are believed to tie the masonry of the upstream widening of the bridge to the earlier stonework at the core of the span.

Another feature of the upstream face of the bridge is the two buttress-like masonry structures applied on either side of the span at the base of the arch. This construction probably represents an attempt to protect the face of the bridge from flood and ice damage and

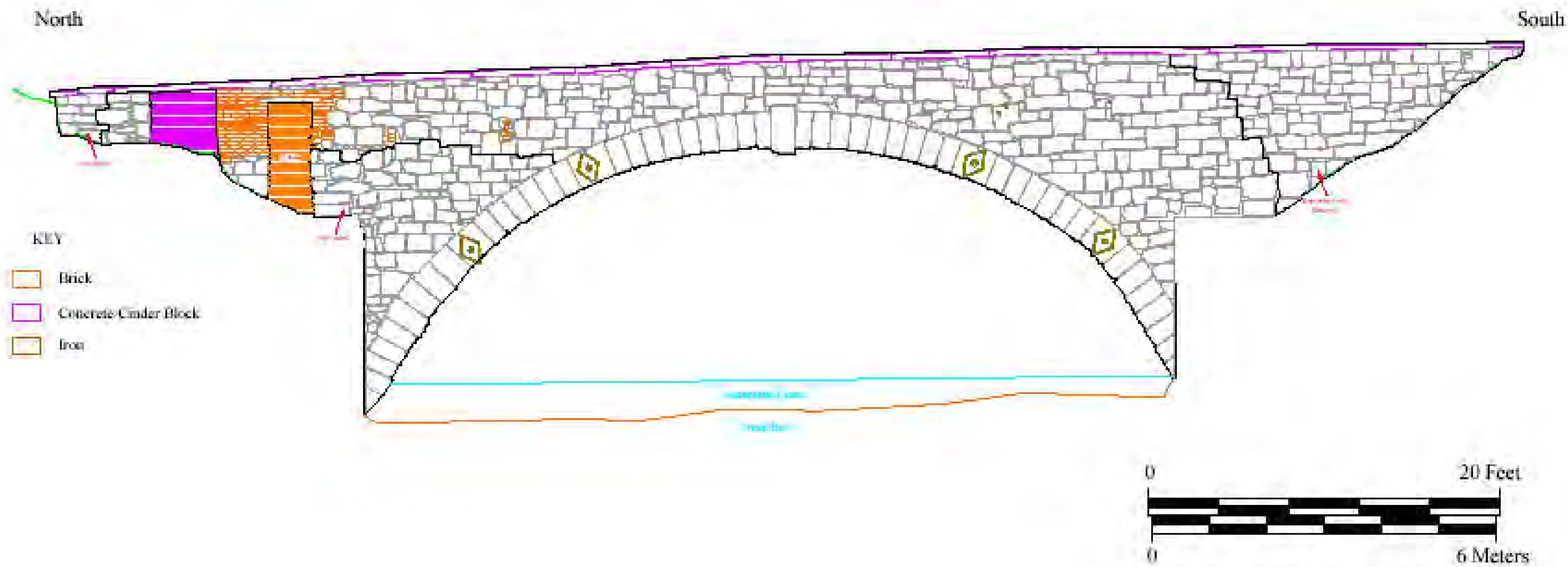


Figure 5.1. South Broad Street Bridge – West (Downstream) Elevation of Northern Arch. Source: Hunter Research, Inc. 2003b.

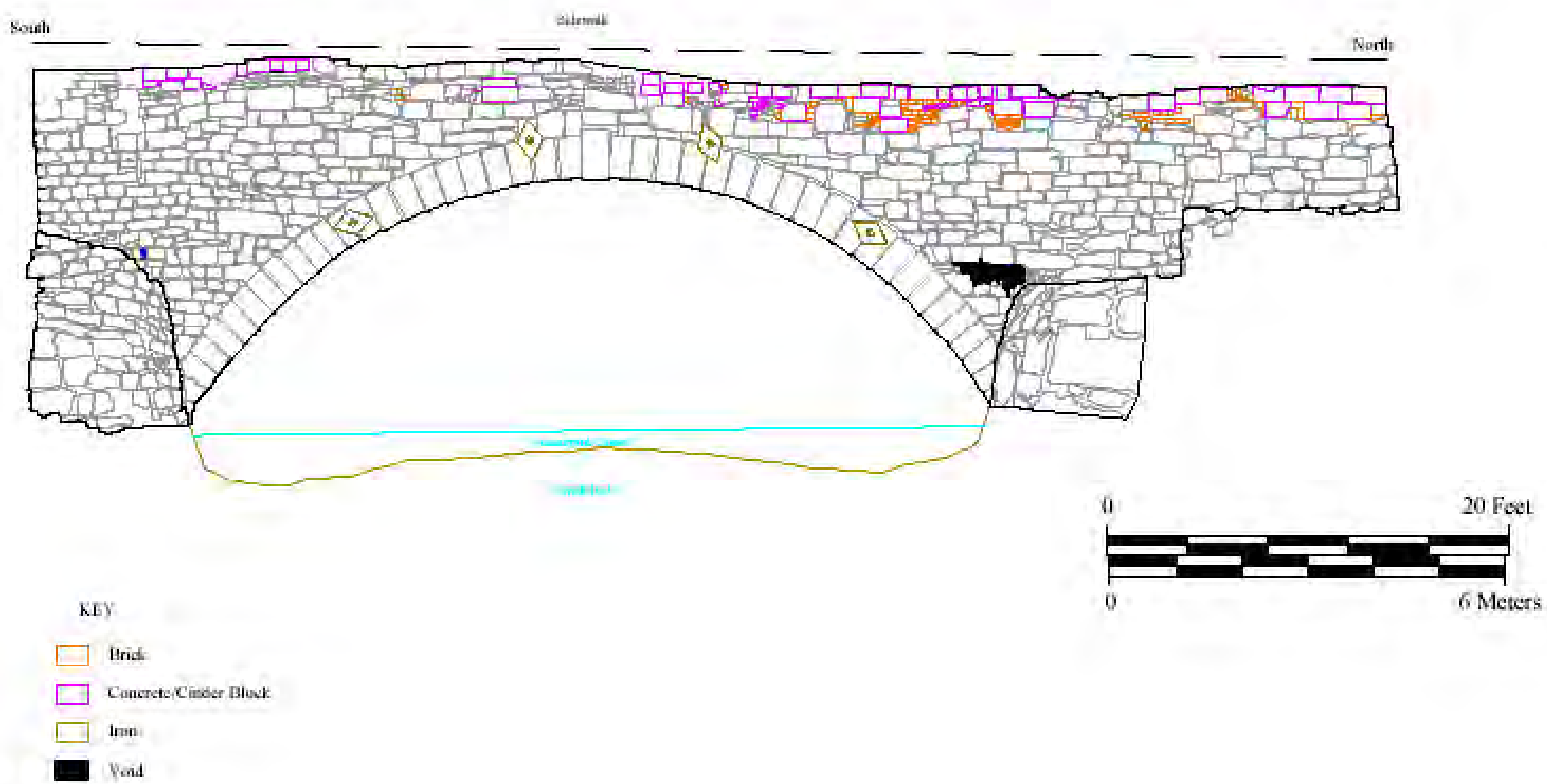


Figure 5.2. South Broad Street Bridge – East (Upstream) Elevation of Northern Arch. Source: Hunter Research, Inc. 2003b.

Plate 5.3. View looking southeast from East Lafayette Street at the west (downstream) elevation of the South Broad Street Bridge (Photographer: Patrick Harshbarger, January 2012)[HRI Neg.# 10055/ D6:006].

Plate 5.4. View looking west from the south bank of the Assunpink Creek upstream of the South Broad Street Bridge showing the bridge's east elevation. The stone wall in the stream is a remnant of the foundation of the Assunpink Block (Photographer: Patrick Harshbarger, January 2012)[HRI Neg.# 10055/D6:003].

undercutting at the base of the side walls. These buttresses abut the face of the bridge and appear to have been added subsequent to 1870, possibly in response to a later flood episode such as the ones that occurred in 1882 and 1903.

The masonry of the vaulting is mostly composed of random-laid, minimally dressed sandstone. There are numerous voids and areas of stucco-like patching that obscure the true character of the stonework. However, it is possible to make out the two seams that define the inner margins of the bridge-widening episode of 1870. These seams occur approximately 15 feet inward from the exterior faces of the bridge and they themselves define the inner core of the structure. It is not possible to assign a definite date to this core masonry, but it is reasonable to assume that this central portion of the bridge dates from one or other of the major rebuilding programs that took place after the devastating floods of 1843 and 1822.

The apex of the bridge vaulting is pierced by a substantial iron water pipe that runs down the center of South Broad Street. There are also two openings - one roughly two by three feet in cross section, the other two by one-and-a-half feet - on the northern side of the arch interior, each located about ten feet above the creek bed. These appear to be weep holes designed to drain storm water from property on the north bank into the main channel of the creek.

In 2002, Kreilick Conservation performed a mortar analysis of the South Broad Street Bridge for Hunter Research, Inc. and NJDOT. The results of this analysis were largely inconclusive. The samples were all composed of a matrix of rose, white and yellow-colored sub-angular quartz and grey, brown and red sub-rounded sandstone with some other minor constituents. The samples from the western (but not from the eastern or central) section of the bridge contained coal fragments, which is generally indicative of a post-1830 mix date (Hunter Research 2003b: Appendix C).

Upstream from South Broad Street, the Assunpink creek margins are defined by stone and concrete retaining walls of varying ages, mostly constructed within the past 125 years. While Mill Hill Park is a creation of the early 1970s, it incorporates within its limits – both consciously and unconsciously - numerous historic elements that are part of the historic fabric of the park and the Mill Hill Historic District. In the immediate vicinity of the South Broad Street Bridge, on its upstream side, are the stone pier within the creek that supported the Assunpink Block; a stretch of retaining wall along the south bank of the creek that incorporates parts of the earlier mill building[s] at this location; traces of the head race and dam built in the mid-1870s for the Wilson Woolen Mill (located downstream of the bridge), also on the south bank; and a concrete amphitheater, built in the 1970s on the site of a historic resort known as Washington Retreat. The north bank of the creek, upstream from the bridge, is lined with a stone retaining wall that dates in essence to the mid-1870s.

B. THE SOUTH WARREN STREET BRIDGE

Reconnaissance-level investigation of the South Warren Street Bridge in 2011 identified the bridge as a modern precast-concrete slab structure, built *circa* 1980. The bridge's clear span is approximately 48 feet, and its out-to-out width is approximately 68 feet. The western (downstream) elevation has a plain slab fascia topped by a blocky concrete parapet with timber handrail (Plate 5.5). Its eastern (upstream) elevation is not visible and abuts the Assunpink Creek culvert and a plaza on the south side of the State of New Jersey's Department of Human Services Building (Plate 5.6). A parapet on the upstream side, similar to the one on the downstream side, separates the sidewalk from the plaza. The bridge is supported on masonry and concrete abutments that are continu-

Plate 5.5. View looking southeast from the north bank of the Assunpink Creek west (downstream) of the South Warren Street Bridge showing the bridge's west elevation (Photographer: Patrick Harshbarger, January 2012)[HRI Neg.# 10055/D6:001].

Plate 5.6. View looking south along the east (upstream) side of the South Warren Street Bridge showing the concrete parapet at the interface between the bridge and the plaza built over the creek on the east side of the bridge (Photographer: Patrick Harshbarger, January 2012)[HRI Neg.# 10055/D6:002].

ous with the retaining walls enclosing the Assunpink downstream of South Warren Street. The walls show evidence of numerous rebuilding and repair episodes.

C. ARCHAEOLOGICAL TESTING

Archaeological fieldwork was conducted between June 13 and July 8, 2011 and involved the mechanical excavation of seven test trenches (Figures 5.3). South of the Assunpink Creek Culvert, four of the trenches (Trenches 1, 2, 3 and 5) ran roughly north-south and were 50 feet long, and one trench (Trench 4) ran east for 25 feet from the midsection of Trench 3. Two trenches were excavated north of the Assunpink Creek Culvert: Trench 6, which measured 28 feet long, and Trench 7, which measured 13 feet long. The locations of each trench were surveyed in and are marked on project plans. The trench locations south of the Assunpink Creek were altered from their originally intended locations during fieldwork to avoid utilities (especially along the eastern and northern sides of the property), soil borings and monitoring wells. A site safety and health plan was prepared for this fieldwork by Hunter Research, Inc. and Environmental Connection, Inc. (Appendix B). While this plan comprehensively addressed all potential hazards at the site, it concentrated primarily on trench excavation safety and soil contamination. A technician from Environmental Connection, Inc. was present on site monitoring air quality during the excavations (Appendix C). Personal protective equipment was worn by all field personnel and direct exposure to soils was minimized.

Excavations south of the Assunpink Creek Culvert revealed deep layers of modern fill to at least 15 feet below the ground surface (bgs) (Figure 5.3 and 5.4; Plates 5.8-5.15). Excavation was discontinued at this depth because of the infiltration of groundwater and the severely unstable sidewalls. In Trenches 1 and 2, short stone walls were observed at the very base of the excavation (approximately 15 feet bgs) running roughly east-west (Figures 5.3 and 5.4; Plates 5.8-5.11). The approximately 2-foot-thick wall in Trench 1 is possibly part of the northern foundation of the Eagle Cotton Factory. The top of this wall was identified at approximately 9 feet above sea level (asl). The wall at the bottom of Trench 2 was roughly parallel to but not in line with the wall observed in Trench 1 (Figure 5.5; Plate 5.11). Its thickness was not discernible. The dark silty soil and decayed vegetation north of this wall suggests that this wall may be the southern wall of a tailrace or overflow channel that had filled with waterborne detritus before being covered (Plate 5.11). The top of this wall was located at approximately 6.35 feet asl.

At the base of the northern half of Trenches 3 and 4 (which form a ‘T’ shape in plan), what is assumed to be a level, timber floor was identified below groundwater level at 5.6 feet asl (Figure 5.4). This feature was identified with the track hoe bucket, timber making an unique sound compared to soil, gravel and stones, which was used to roughly determine its extent. This surface was covered entirely in modern fill (Plates 5.12 and 5.13). The rate of water infiltration and the unstable nature of the trench walls precluded complete dewatering or benching the excavation more than what was attempted to obtain a better look at this feature. No other structural features were identified in this trench. Because of its location closer to the creek channel and its considerable depth, below the groundwater level, this floor may have been the bottom of the Wilson Woolen Mill’s tailrace or turbine box (or possibly a powerhouse depending upon one’s interpretation of the map) as shown on the Scarlett & Scarlett map of 1890 (see above, Figure 4.23). The excavation of Trench 5 yielded no historic deposits or features (Plates 5.14 and 5.15). Excavation of this trench terminated when a dense layer of loose stone was encountered below the water level at approximately 15 feet bgs. Samples of this stone brought to the surface in the track hoe bucket suggest that it

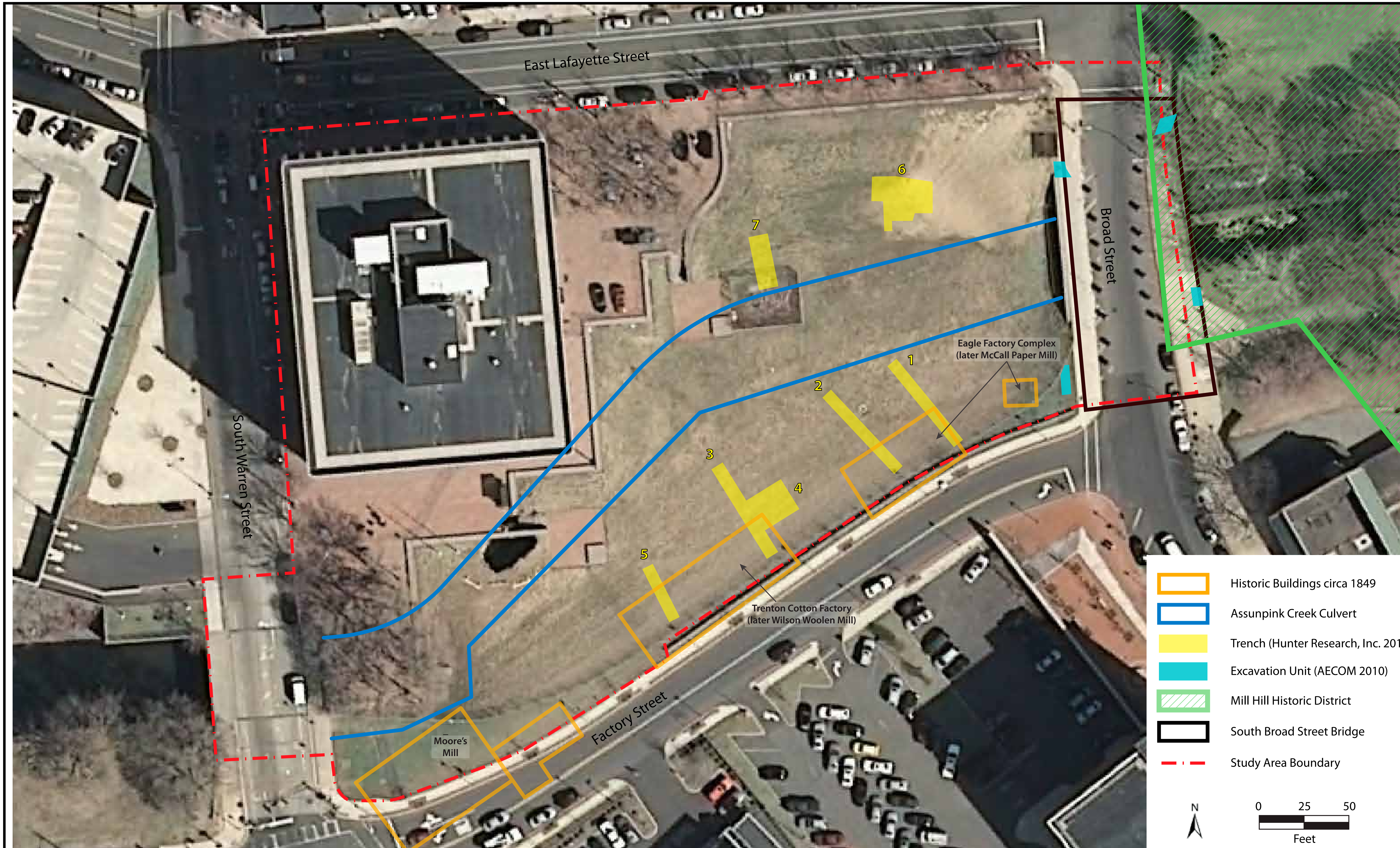


Figure 5.3. Site Plan Showing the Location of Archaeological Test Trenches.

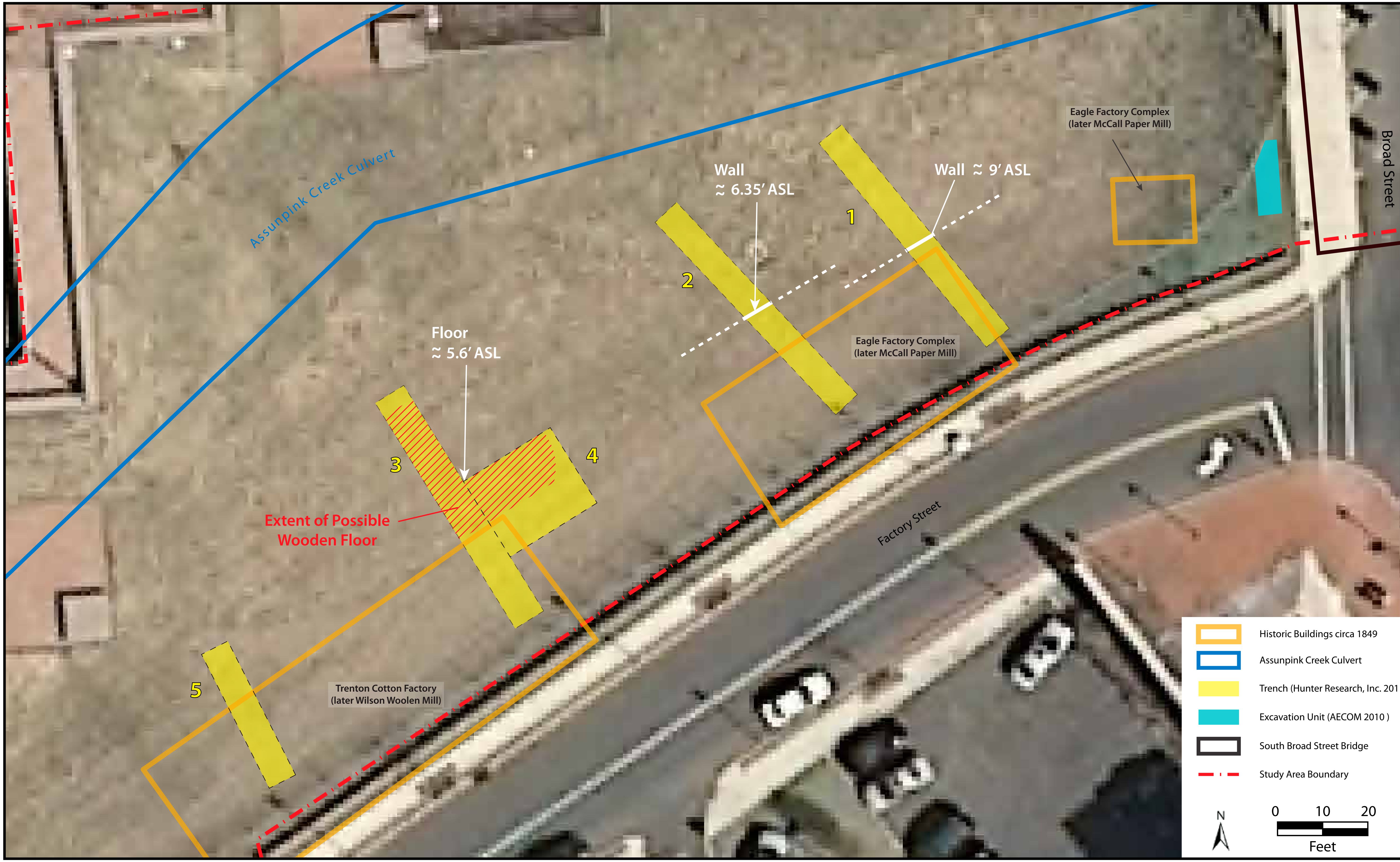
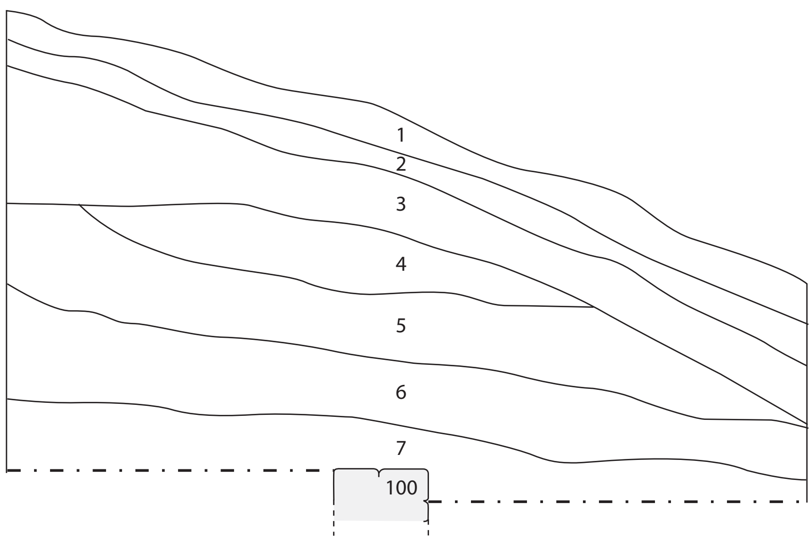


Figure 5.5. Trenches 1, 2, 3 and 4, Plan View.

Trench 1

Schematic Profile of 25-foot Section



Context List

Context	*Description [Interpretation]*	*Munsell*
1	Compact sandy loam with gravel and dense building rubble [mid-20th-century fill]	10 YR 4/2
2	Compact silty clay with dense gravel and building rubble [mid-20th-century fill]	10 YR 4/6
3	Mottled compact silty clay with gravel and building rubble [mid-20th-century fill]	10 YR 4/6, 10 YR 4/4
4	Loose traprock (blue and gray) [mid-20th-century fill]	--
5	Loose dense gravels with silty sand [mid-20th-century fill]	10 YR 4/4
6	Mottled silty clay with building rubble [mid-20th-century fill]	10 YR 4/2, 10 YR 5/6
7	Loamy silty clay [mid-20th-century fill]	10 YR 4/3
100	Stone wall [possible mid-19th-century mill foundation]	--

Figure 5.4. Trench 1, Schematic Profile.

Plate 5.7. View looking southwest showing the project site south of the Assunpink Creek culvert. Trench locations indicated with arrows (Photographer: James Lee, January 2012)[HRI Neg.#10055/ D6:025].

Plate 5.8. View looking south showing Excavation of Trench 1 in progress (Photographer: James Lee, July 2011)[HRI Neg.#10055/D3:005].

Plate 5.9. View looking south showing the wall identified at the base of Trench 1 (Photographer: James Lee, July 2011)[HRI Neg.#10055/D3:021].

Plate 5.10. View looking south showing Trench 2. The southern section of the trench was partially backfilled due to a collapse during excavation. Scale in feet (Photographer: Andrew Martin, July 2011)[HRI Neg.#10055/D1:020].

Plate 5.11. View looking south showing the wall identified at the base of Trench 2. Note the mass of sticks and branches in a dark silty context north of the wall (Photographer: James Lee, July 2011)[HRI Neg.#10055/D3:044].

Plate 5.12. View looking north showing Trench 3. Slumping sidewalls and water infiltration prevented the entire trench from being left open during the course of excavation (Photographer: Andrew Martin, July 2011)[HRI Neg.#10055/D1:031].

Plate 5.13. View looking south showing Trench 3 and Trench 4, extending to the east from the mid-section of Trench 3. Slumping sidewalls and water infiltration required the rapid refilling of the trenches (Photographer: James Lee, July 2011)[HRI Neg.#10055/D3:062].

Plate 5.14. View looking south showing Trench 5. Note the section of trench wall breaking away (Photographer: James Lee, July 2011)[HRI Neg.#10055/D3:067].

Plate 5.15. View looking north showing Trench 5. Unstable trench walls made approaching the excavation for documentation difficult (Photographer: James Lee, July 2011)[HRI Neg.#10055/D3:070].

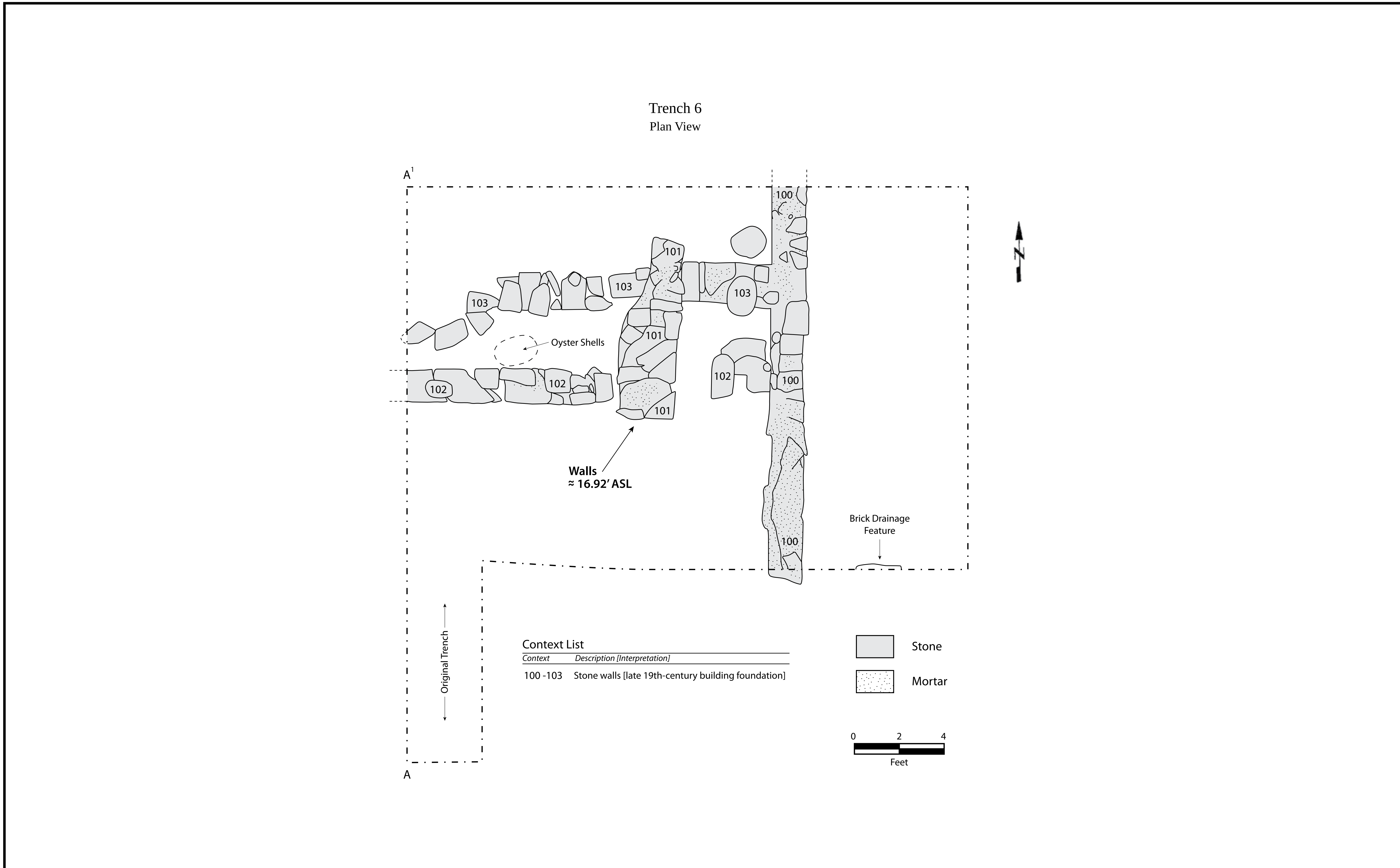
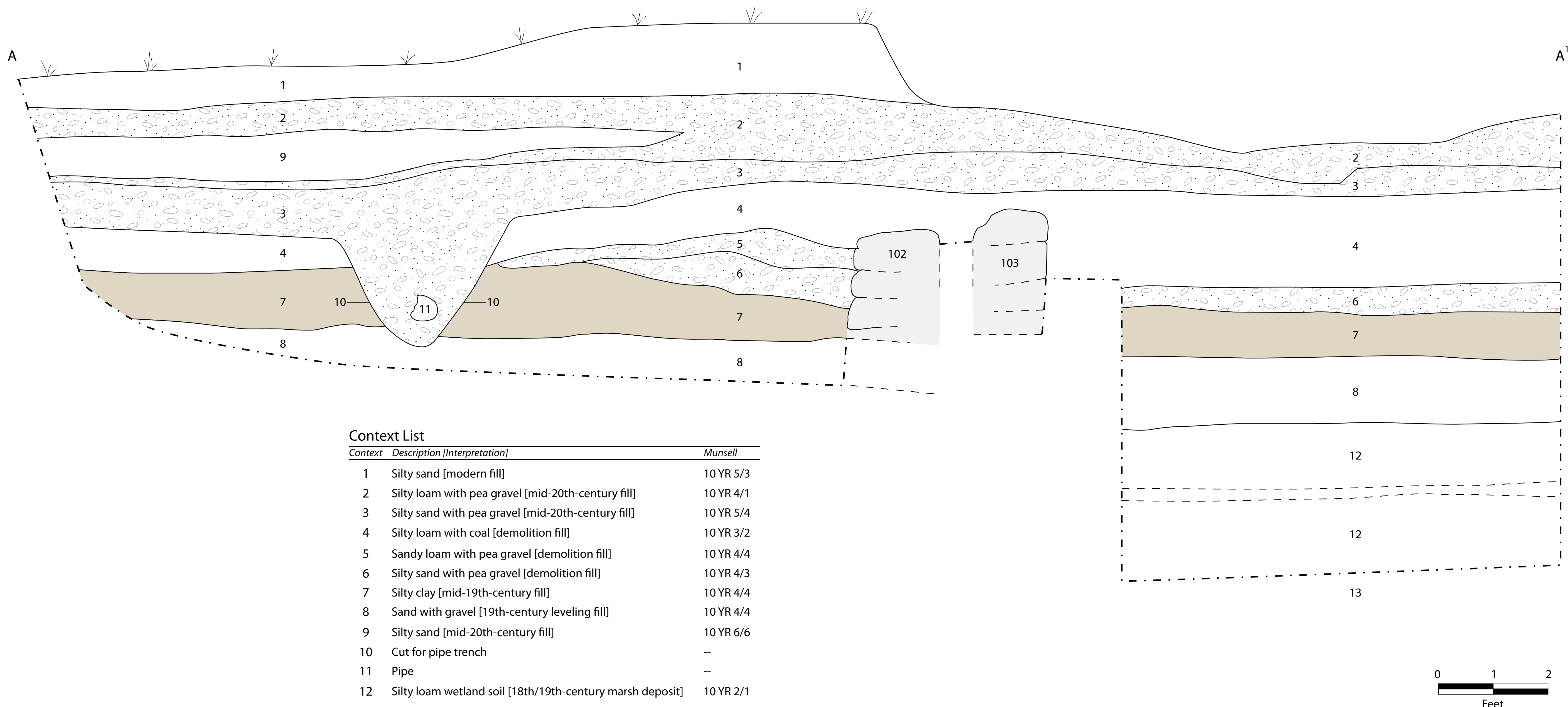


Figure 5.6. Trench 6, Plan View.

Trench 6

West Profile



Context List

Context	Description [Interpretation]	Munsell
1	Silty sand [modern fill]	10 YR 5/3
2	Silty loam with pea gravel [mid-20th-century fill]	10 YR 4/1
3	Silty sand with pea gravel [mid-20th-century fill]	10 YR 5/4
4	Silty loam with coal [demolition fill]	10 YR 3/2
5	Sandy loam with pea gravel [demolition fill]	10 YR 4/4
6	Silty sand with pea gravel [demolition fill]	10 YR 4/3
7	Silty clay [mid-19th-century fill]	10 YR 4/4
8	Sand with gravel [19th-century leveling fill]	10 YR 4/4
9	Silty sand [mid-20th-century fill]	10 YR 6/6
10	Cut for pipe trench	--
11	Pipe	--
12	Silty loam wetland soil [18th/19th-century marsh deposit]	10 YR 2/1
13	Cobbles [river bed]	--
102	Stone wall [late 19th-century foundation wall]	--
103	Stone wall [late 19th-century foundation wall]	--

Figure 5.7. Trench 6, Western Profile.

was stream cobbles and boulders. No evidence of mortared stone was observed. The sides of Trench 5 were very unstable, with notably more sand in the modern fill. The trench was backfilled immediately after completion and documentation.

While the excavation of a trench in the southwestern corner of the project site was originally planned (Figure 5.3), soil testing conducted prior to archaeological testing identified contaminated groundwater. Because of this contamination the planned trench (Trench 5) was moved closer to Trenches 3 and 4. An archaeologist was present during the soil test excavation in the originally planned test location and observed layers of modern fill extending down to at least 12 feet below the ground surface, where the contaminated groundwater was encountered.

Two trenches were excavated on the north bank of the Assunpink Creek (Plate 5.16). These trenches were much shorter because of the limited room between the Assunpink Creek Culvert and a series of utilities lines that cross the northern edge of the property. The excavation of Trench 6 identified a wall [Contexts 102 and 103] running east-west, perpendicular to the trench at approximately 4 feet below the ground surface (16.92 feet asl), overlain by several layers of modern and demolition fill (Figure 5.6; Plates 5.17 and 5.18). The trench was expanded to the east to follow this wall and identified two north-south running walls [101 and 100], the latter abutting the end of the first wall (Figure 5.6; Plate 5.18). A brick box drain was also identified in the southern wall of the trench, extending from the southwestern corner of the excavation west-east into the stone foundation wall [100] (Plate 5.19). It appears to be a contemporaneous feature.

All of the masonry features in Trench 6 lie on top of a thick context of silty clay [7] (Figure 5.7; Plates 5.20, 5.21 and 5.22). This clay in turn overlies a context of gravelly sand [8], which caps a thick context of dark brown to dark gray wet soil [12]. This latter context is interpreted as a buried wetland and is comprised of a very silty loam with thin layers of organic detritus (Plate 5.22). A layer of large cobbles [13] was identified at the base of excavation and probably represents the riverbed. This sequence of contexts is interpreted as the wetland edge of the Assunpink Creek marshland, which was filled in the mid- to late 19th century by a layer of upcast alluvial sand and gravel [8] (likely from the creek bed) and then capped with a thick silty clay [7], upon which buildings could then be constructed. The building foundations most likely belong to the “concert hall”, “brick bazaar” and department store that are successively visible in the historic map sequence. This building was built *circa* 1880 and demolished sometime between 1953 and 1957 when the site was filled, leveled and covered with a parking lot (Nationwide Environmental Title Research 2011). Artifacts recovered from this trench support this interpretation.

The items recovered from Context 12, which stratigraphically lies below Context 8, date to the late 18th century into the middle of the 19th century (Plate 5.23; Tables 5.1 and 5.2) (see Appendix E). These artifacts, totaling 170 in number, include sherds of various types of 18th-century ceramics such as slip-trailed redware with copper-oxide decoration, redware with thick black manganese glaze, Chinese-export porcelain, local light gray-bodied stoneware and earlier creamware styles (orange and black hand-painted floral designs), as well as heavily patinated olive-green wine bottle fragments, one of which has a string rim. Ceramic types dating through the mid-19th century include ironstone china, whiteware, yellowware and stoneware. The ceramic forms, where identifiable, were primarily plates and dishes, along with a few redware and stoneware jugs and bottles.

The wet condition of the soils helped preserve a collection of large mammal bones (a small number of which displayed cut marks), clam and oysters shells, a turtle plastron and a probable horse tooth. Several

Table 5.1. Trench 6, Context 12. Artifact Count by Class and Type.

Building Materials	**27**
Brick	16
Wooden dowl	1
Iron hardware	1
Wooden plank fragments	9
Ceramic Vessel Sherds	**108**
Brown-bodied stoneware	11
Chinese-export porcelain	6
Creamware	2
Gray-bodied stoneware	2
Hard-paste porcelain	3
Ironstone	29
Pearlware	1
Redware	46
Whiteware	6
Yellowware	2
Clothing Related	**2**
Leather pieces	2
Fauna	**19**
Clam	1
Large mammal bone	14
Oyster	3
Plastron	1
Flora	**5**
Bark fragments	5
Glass Vessel Fragments	**9**
Bottle glass	9
Total	**170**

Table 5.2. Trench 6, Context 12. Ceramic Types.

Ceramic Type	Date Range	#	%
Unrefined Earthenware		**46**	**42.6%**
Redware	n/a	39	36.1%
White Slip-trailed	18th century	6	5.6%
Yellow Slip-trailed	18th century	1	0.9%
Refined Earthenware		**40**	**37.0%**
Creamware	1762-1820	2	1.9%
Pearlware	1780-1890	1	0.9%
Whiteware	1815-Present	5	4.6%
Ironstone	1840-Present	29	26.9%
Yellowware	1827-1940	2	1.9%
Porcelain		**9**	**8.3%**
Chinese Export	1660-1800	6	5.6%
Hard Paste	1660-1800	3	2.8%
Stoneware		**13**	**12.0%**
Brown-bodied	n/a	11	10.2%
Gray-bodied	n/a	2	1.9%
Total		**108**	**100.0%**

Plate 5.16. View looking east showing the project site north of the Assunpink Creek Culvert. Trench locations indicated with arrows (Photographer: James Lee, January 2012)[HRI Neg.#10055/D6:035].

Plate 5.17. View looking north showing Trench 6 during excavation (Photographer: James Lee, July 2011)[HRI Neg.#10055/D3:085].

Plate 5.18. View looking west showing archaeological features identified in Trench 6. Scale in feet (Photographer: James Lee, July 2011)[HRI Neg.#10055/D3:102].

Plate 5.19. View looking south showing the eastern half of the southern profile of Trench 6. Note the brick drain to the right of the scale rod. Scales in feet (Photographer: Andrew Martin, July 2011)[HRI Neg.#10055/D3:087].

Plate 5.20. View looking west showing the western profile of Trench 6. Note the thick clay fill (indicated with a blue arrow) underlying the foundation remains. Scales in feet and tenths of feet (Photographer: Andrew Martin, July 2011)[HRI Neg.#10055/D3:097].

Plate 5.21. View looking west showing the southern half of the western profile of Trench 6. Note the thick clay fill (indicated with a blue arrow) underlying the foundation remains. Scales in feet and tenths of feet (Photographer: Andrew Martin, July 2011)[HRI Neg.#10055/D3:099].

Plate 5.22. View looking west showing the northern half of the western profile of Trench 6. Note the dark brown to black wet soils at the base of excavation. Unstable soils prevented the cleaning of this profile. Scale in feet (Photographer: Andrew Martin, July 2011)[HRI Neg.#10055/D3:114].

Plate 5.23. Selected Historic Artifacts from Trench 6, Context 12. Plate 5.24. Selected Historic Artifacts from Trench 6, Context 12. Top row (left to right): redware with thick interior and exterior black manganese glaze (18th century); slip-trailed redware with copper oxide decoration (18th century); hard-past porcelain sherd with blue floral underglaze decoration (1680-1880); hard-paste porcelain plate base sherd with blue landscape scene (1680-1880). Top middle row (left to right): brown-bodied stoneware bottle sherd (19th century); gray-bodied stoneware jug handle (19th century); olive green mold-blown string rim bottle fragment (18th century). Bottom middle row (left to right): large mammal bone with cut marks; oyster shell. Bottom row: wood plank piece with pointed ends and nail hole (Photographer: Lindsay Lee, January 2012) [HRI Neg.#D7:001].

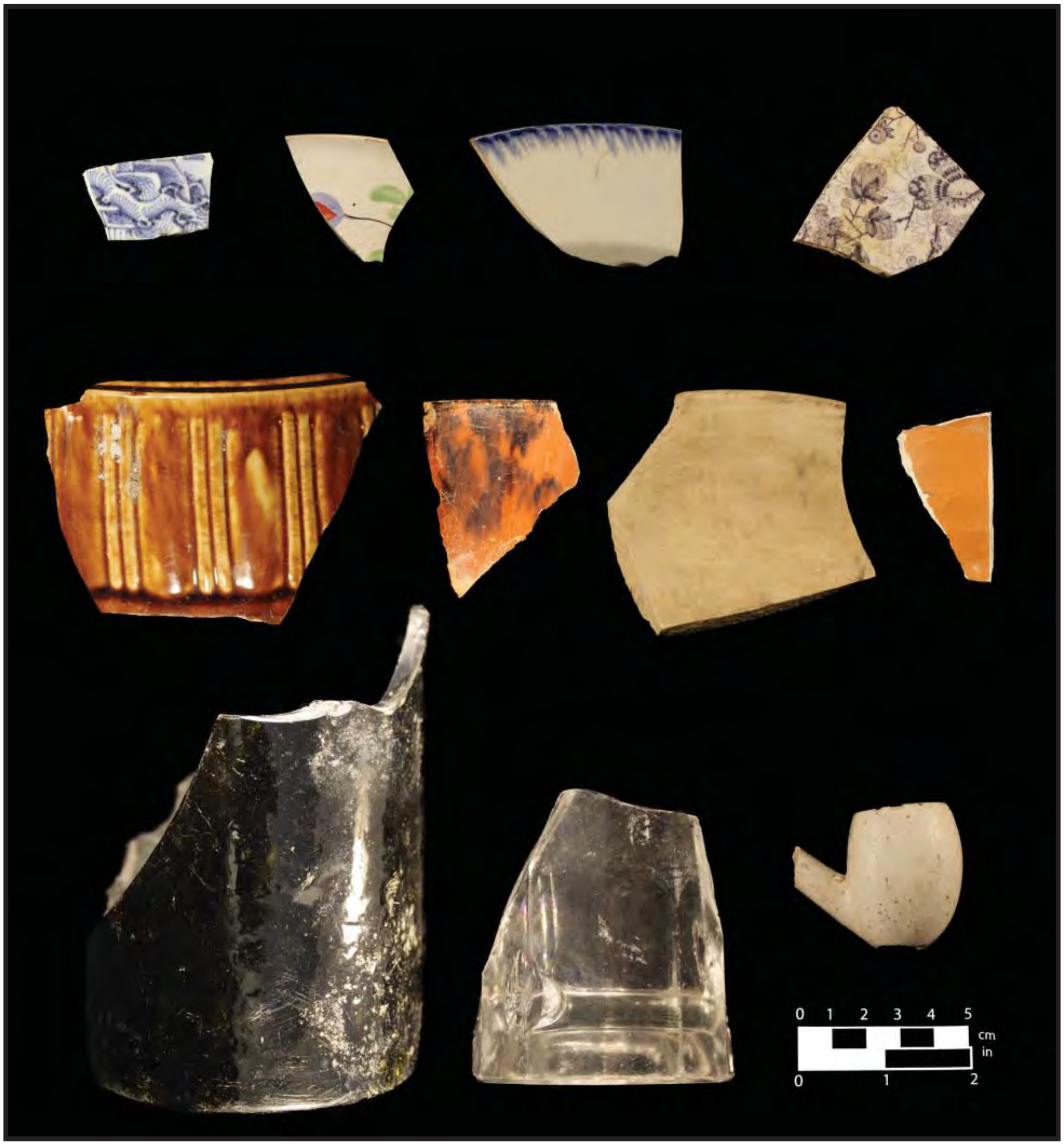


Plate 5.24. Selected Historic Artifacts from Trench 6, Context 4. Top row (left to right): hard-paste porcelain base sherd with blue floral decoration (1660-1800); whiteware rim sherd with hand-painted polychrome decoration (1815-present); ironstone rim sherds with blue shell-edged decoration (1841-1857); ironstone sherd with purple transfer-printed floral decoration (1840-present). Middle row (left to right): yellowware pitcher sherd with flint enamel glaze (1870-1920); redware rim sherd with clear lead glaze and manganese sponge decoration; gray-bodied stoneware rim sherd with Rockingham-style decoration (19th century); gray-bodied stoneware bottle sherd with Albany slip interior (19th century); ironstone waster sherd (1840-present). Bottom row (left to right): olive green bottle base and pontil; clear glass paneled mug/tankard base; ball clay pipe bowl (mid-19th to early 20th century) (Photographer: Lindsay Lee, January 2012) [HRI Neg.#D7:002].

Plate 5.25. View facing east showing the eastern profile of Trench 7. Scale in feet (Photographer: James Lee, July 2011)[HRI Neg.#10055/D3:080].

Table 5.3. Trench 6, Context 4. Artifact Count by Class and Type.

Building Materials	**3**
Hook	1
Nail	2
Ceramic Vessel Sherds	**111**
Brown-bodied stoneware	2
Gray-bodied stoneware	13
Hard-paste porcelain	1
Ironstone	52
Pearlware	10
Redware	6
Tan-bodied stoneware	1
Whiteware	4
Yellowware	22
Fauna	**10**
Large mammal	10
Glass Vessel Fragments	**10**
Curved	10
Personal Items	**3**
Smoking pipe	3
Tools/Hardware	**1**
Bakelite cap/lid	1
Total	**138**

Table 5.4. Trench 6, Context 4. Ceramic Types.

Ceramic Type	Date Range	#	%
Unrefined Earthenware		**6**	**5.4%**
Redware	n/a	6	**5.4%**
Refined Earthenware		**88**	**79.3%**
Pearlware	1780-1890	10	**9.0%**
Whiteware	1815-Present	4	**3.6%**
Ironstone	1840-Present	52	**46.8%**
Yellowware	1827-1940	22	**19.8%**
Porcelain		**1**	**0.9%**
Hard paste	1660-1800	1	**0.9%**
Stoneware		**16**	**14.4%**
Brown-bodied	n/a	2	**1.8%**
Rockingham	n/a	9	**8.1%**
Gray-bodied	n/a	4	**3.6%**
Tan-bodied	n/a	1	**0.9%**
Grand Total		**111**	**100.0%**

fragments of wooden boards, a possible shingle and an indeterminate piece of worked leather were also founded. Several bricks were recovered, including a few small glazed examples and a single early hand-made brick. The only artifact from this context that did not fit chronologically was a single fragment of clear bottle glass, which is assumed to have fallen in during excavation. The assemblage from this context appears domestic in origin with a well-rounded collection of items that one would find in the rubbish of an 18th and 19th-century household. They were likely disposed of along the marshy edges of the Assunpink Creek which is thought to have extended into the vicinity of Trench 6 prior to the stream's channelization.

No artifacts were recovered from either the sandy gravel [8] or silty clay fill [7] that overlay Context 12. Artifacts from above the clay, from Context 4, are of mixed date, mostly of the later 19th century, and, as stated above, were probably brought to the site as a fill constituent (Plate 5.24; Tables 5.3 and 5.4). Artifacts recovered from this context, in order of frequency, are 19th-century ceramics, bottle and vessel glass, large mammal bones, smoking pipe fragments, a couple of corroded nails, an iron hook and a Bakelite bottle cap.

Of the 138 specimens from Context 4 the majority are ceramics, primarily ironstone and yellowware (74 items). A few sherds of whiteware (4), pearlware (10), redware (6) porcelain (1) and various types of stoneware (16) are also present in the assemblage. The vessel forms are different from those represented in the ceramics recovered from Context 12. While the ironstone, pearlware and whiteware sherds are largely from plates, the yellowware sherds derive from at least two spittoons and a pitcher. A few large storage jars, some with decorated lids, and at least one beer bottle are among the forms represented by the stoneware sherds. The glass fragments are almost all from bottles varying in color from clear to olive green, blue green, aqua and brown, along with a clear glass tankard base. White clay pipe stem fragments and a large pipe bowl were also retained from this context. These types of items suggest a more commercial use of the property, or at least of the property from which the fill was derived; they may reflect use of the "concert hall" or "bazaar" that was located on this site in the late 19th century, hidden within the interior of this city block.

The excavation of Trench 7 yielded several layers of modern fill overlying a base context composed of large river cobbles at 10 feet bgs (Plate 5.25). A modern utility trench cut southeast to northwest across the southwestern corner of the trench. A review of aerial photographs shows a large transformer box that is no longer extant located near the southern end of this trench. No significant archaeological deposits or features were identified in this trench.

Chapter 6

EVALUATION OF SIGNIFICANCE

The information generated by these investigations was considered in terms of the criteria of evaluation, the guidelines established for making determinations concerning National Register eligibility as outlined by the U.S. Department of the Interior, National Register Program in 36 CFR 60.4 (See Chapter 1, Section D). It is the judgment of this Phase I/II archaeological survey that resources within the Assunpink Creek Restoration Project study area have the potential of meeting the significance criteria in several respects based on the land-use history outlined in this report and summarized in Table 6.1, particularly in the areas of industrial and military history; however, the ability to convey significance has been greatly diminished by the wiping away of most of the physical fabric of the 18th and 19th centuries due to subsequent urban redevelopment. The only above-ground resource over 50 years old surviving in the immediate study area is the South Broad Street Bridge, which has previously been determined by the NJHPO to be eligible under Criteria A and C, and which may also be considered a potential contributing resource to an expansion of the Mill Hill Historic District by moving the district's boundary line from the east to the west side of South Broad Street.

Questions of significance thus move from above-ground resources to subsurface resources that have yielded or may be likely to yield information important in prehistory or history under Criterion D. The fieldwork approach adopted for this project was largely geared toward determining through subsurface testing whether such subsurface resources existed or were likely to exist.

South Bank Archaeological Resources

The south bank of the Assunpink Creek between South Broad and South Warren Streets is demonstrated to have been associated with a series of water-powered mills that were emblematic of America's early industrialization and that had great consequence to the economic development and eventual urbanization of the City of Trenton. This thread of events begins with Mahlon Stacy's founding of a gristmill at the falls of the Assunpink in the late 1670s, forming the economic nucleus of what would eventually become the town of Trenton. This industrial storyline continues with the subsequent intensive development of the waterpower for a series of mills that lined the south bank of the Assunpink between South Broad and South Warren Streets from the mid-1810s to the end of the 19th century. These mills produced principally cotton and wool textiles, paper and flour, and represented a proto-industrial enclave that placed Trenton on the path to becoming a major industrial city.

Results of test trenches on the south bank have eliminated with a high level of certainty large areas of the archaeological study area from further consideration as potentially significant areas of archaeological sensitivity. Within the test trenches, no significant mill remains were identified surviving above an elevation of approximately 6 to 9 feet above sea level. Features identified below that level consisted of one or two courses of stone masonry that may represent the lower foundations of a mill wall or raceway, and a wooden floor that may form the base of a raceway, turbine pit or powerhouse. The diagnostic value of these features is limited.

TABLE 6.1. SUMMARY OF KEY EVENTS IN THE HISTORY OF THE SOUTH BROAD STREET CROSSING OF THE ASSUNPINK CREEK.

Date	Bridges	Flood Year	Mills	Date
			Mahlon Stacy erects gristmill	**1679**
c.1688	**First bridge built (timber structure on stone abutments)**			
			William Trent acquires Stacy gristmill	1714
			Trent rebuilds and expands the gristmill	**c.1714-17**
			William Morris acquires the Trenton Mills; sawmill and fulling mill also in existence	1729
1733	Bridge damaged	1733	Mill dam breached; George Thomas acquires the Trenton Mills	1733
1744	Petition submitted for construction of a stone bridge (not acted upon)			
			Robert Lettis Hooper II acquires the Trenton Mills	1753
c.1755-57	Bridge repaired		**?Hooper rebuilds/expands the Trenton Mills**	**c.1755-57**
1758	New Jersey General Assembly passes an act to build a stone bridge			
1764-66	**First stone bridge built (all masonry structure)**		Robert Waln acquires the Trenton Mills	1765
1774	New Jersey General Assembly votes to repair the bridge			
1777	**SECOND BATTLE OF TRENTON RAGES AROUND BRIDGE AND MILL ON JANUARY 2**			**1777**
c.1780	Bridge repaired			
1789	Triumphal arch erected on bridge for Washington's inaugural progress to New York			
			Robert Waln, Jr. acquires the Trenton Mills	1803
1814	Bridge repaired		**Robert Waln and Gideon Wells found the Eagle Factory; the original Trenton Mills site is converted to a carding mill**	**1814-15**
1822	**Bridge extensively rebuilt after flood damage**	1822	Carding mill partially rebuilt after flood damage	1822
1843	**Bridge extensively rebuilt after flood damage**	1843	Carding mill extensively damaged by flood , but is repaired and resumes operation	1843
			Carding mill damaged by fire and ceases operation	1846
			Carding mill partially demolished	1848-49
			Henry McCall erects a paper mill on the site of the carding mill and the Trenton Mills	**1850-51**
1870	**Bridge is enlarged, widened and improved**			
			Paper mill is destroyed by fire	1872
1873-74	**Construction of the Assunpink Block on the bridge begins**		**Paper mill is demolished and mill dam is removed**	**1874**
			Wilson Woolen Mill builds a new dam and raceway upstream of the bridge	1877-78
1882	Bridge is damaged by flooding	1882	Wilson Woolen Mill damaged by flooding	1882
1903	Bridge approaches damaged by flooding	1903		
c.1950	**Most buildings in the Assunpink Block begin to be razed**			

Generally speaking, the south bank of the study area is judged to have a low potential to yield significant archaeological resources due to the demonstrated record of deep ground disturbance indicated by testing. This evaluation is offered with a caveat that there are some limited areas where a moderate to high potential may still remain, but these areas could not be tested or proved to have significant ground disturbance due to site constraints. The principal of these areas are located in the very southeast and southwest corners of the site. NJDOT's archaeological studies have found potentially significant remnants of the South Broad Street Bridge and raceway system in the first of these corners immediately adjacent to the bridge at the northwest angle formed by South Broad Street and Factory Street. Mill and raceway remains could also exist in a narrow strip of land between the bridge's western face and the approximate location of the Veolia Energy Trenton utility lines that run parallel to South Broad Street. At the southwest corner of the study area, the Moore's Flour Mill site could not be thoroughly investigated due to environmental contamination, but a test boring did encounter what was interpreted as masonry that might be a foundation of the mill.

North Bank Archaeological Resources

Subsurface testing of the north bank yielded no culturally significant features or artifacts. Encountered were the masonry foundations of several buildings that are dated by construction technique and historic maps to the final third of the 19th century. These buildings had a variety of uses but mostly served as appendages to the row houses and commercial properties that fronted on East Lafayette and South Broad Streets. Some of the foundations encountered were thought to belong to the "concert hall", "brick bazaar" and department store that existed in the interior of the block from *circa* 1880 and the mid-1950s. This building is well documented on historic maps and in the archival record; its limited archaeological expression is not considered significant or eligible for inclusion in the National Register of Historic Places.

Some late 18th- to early 19th-century artifacts were recovered in deposits beneath the late 19th-century fill but these appear to consist of materials indiscriminately dumped along the creek edge. They lack diagnostic value of significant cultural activity and are not associated with specific buildings or subsurface features. It would appear that, prior to the late 19th-century episode of filling and construction, this section of Assunpink was bordered on the north side by a marshy wetland environment. The north bank of the Assunpink within the study area is judged to be of low archaeological sensitivity except in the narrow strip of ground between the South Broad Street Bridge and the Veolia Energy Trenton lines where bridge-related remains or resources along the western frontage of South Broad Street may be encountered.

Chapter 7

ASSESSMENT OF EFFECTS AND RECOMMENDATIONS

The National-Register listed and potentially eligible cultural resources identified by this study were considered in terms of the criteria of adverse effects (36 CFR 800.5) (see Chapter 1, Section E). A finding of this Phase I and II archaeological survey is that the Assunpink Creek Restoration Project undertaking will have an effect on the South Broad Street Bridge, a National Register-eligible resource, and on the Mill Hill Historic District, a National Register-listed resource through changes in the setting by way of removal of the Assunpink Creek box culvert, the contouring of the stream banks downstream of the bridge and the construction of a new utility bridge to carry now-buried Veolia Energy Trenton utility lines over the stream. The project undertaking also has the potential to affect limited areas of moderate to high archaeological sensitivity that were not testable during Phase I/II field investigations due to site constraints.

It is recommended that project design and landscaping be scoped both to avoid adverse effects on the South Broad Street Bridge and the Mill Hill Historic District and to enhance their historic character. It is also recommended that archaeological monitoring take place during construction within areas of potentially moderate to high archaeological sensitivity if they cannot be avoided by construction activities. A monitoring protocol should be developed that will allow for documentation of significant archaeological remains, should these be discovered during construction. Approaches to avoiding adverse effects are discussed in greater detail below.

South Broad Street Bridge

In many ways, the South Broad Street Bridge has come to embody the full significance of the study area since so little else remains from the historic period. The bridge and its predecessor spans have stood witness to Mahlon Stacy’s gristmill, the Trenton Mills, the Battles of Trenton, George Washington’s triumphal crossing in 1789, the launch of Trenton’s 19th-century industrial growth, and the urbanization of Trenton’s downtown. The bridge, due to so much of it being buried, is also in some fashion a sensitive archaeological site that may hold important clues to its history of construction and repair, to the mills that once stood adjacent to it, and to the mill raceways that carried water through its embanked approaches.

Preliminary review of project plans suggests that the Assunpink Creek Restoration Project can be designed to avoid adverse effects on the South Broad Street Bridge. More to the point, the project creates an unparalleled opportunity to enhance the bridge’s historic character and increase appreciation of what is currently a hugely undervalued historic and cultural resource, largely because of the insensitivity to which it has been treated through past urban renewal. This can be achieved through improved grading, landscaping, and an intentional plan of interpretation, quite possibly through the placement of outdoor signage within the park area that will be created by day-lighting the Assunpink.

Restoring the Assunpink Creek to a more natural profile will at the very least open to view the bridge’s main archway over the creek. Furthermore, an improved grading scheme has the possibility of restoring to some degree the bridge’s historic appearance by revealing more of the spandrel walls, wing walls and perhaps one or more of the mill raceway arches to the south of the main arch.

Work in the vicinity of the bridge will need to be approached with care to ensure that the bridge's masonry is not damaged and that proper conservation methods are considered. This work may require coordination with NJDOT. Furthermore, construction near the bridge will need to be closely monitored to document any buried raceway features uncovered and to avoid adverse effects on any buried elements of the bridge and raceway system.

Careful consideration should be given to the relocation of the Veolia Energy Trenton lines so that a new utility bridge does not visually detract from the historic bridge. Currently, these lines are buried parallel to and about 15 feet from the western face of the South Broad Street Bridge. The day-lighting of the creek will require some provision for carrying these lines over or under the stream. From the perspective of avoiding adverse effects on the bridge's setting, the preferred alternative would be to bury the lines below the stream or to relocate the utilities to another alignment, perhaps further downstream, so that the utility bridge does not to completely block views of the stone arch. If a new utility bridge is built on the current alignment due to cost or other considerations, then consultation with the NJHPO should include discussion of the bridge's length, height and aesthetics to minimize the visual impact on the historic bridge.

It is also recommended that the bridge be made a focal point of landscaping plans for the park area below the bridge. With the creek restoration, the park below the bridge will become the ideal vantage point from which to view the bridge and interpret it to the public. The restoration project provides an unparalleled opportunity to increase the public's appreciation of the strategic role this location played in development of Trenton and, particularly, in the Battles of Trenton. Currently, it is little known how strategically important this location was to the outcomes of the First Battle of Trenton on December 26, 1776 and the Second Battle of Trenton (the Battle of the Assunpink) on January 2, 1777. During both engagements, the Assunpink Creek was key terrain, an obstacle that was used to advantage by General Washington's forces in the first instance to cut off the retreat of Hessian units and force their surrender, and in the second instance to repel a determined British assault against the American line on the south bank of the Assunpink. In both battles, the South Broad Street Bridge was the key strategic crossing of the Assunpink Creek.

Landscaping treatments on the south bank of the Assunpink between South Broad and South Warren Streets might also give consideration to appropriate means for interpreting the mills that once stood there. This might take the form of landscape treatments, such as low walls that follow the outlines of the mill buildings, as shown in mid-19th-century maps. These walls might also serve as places to sit, relax and enjoy the creek. Interpretive signage telling the story of the mills and Trenton's early water-powered industries would enhance public appreciation of this lost piece of Trenton's past.

Mill Hill Historic District

The project undertaking will take place within the visual site lines of the western portion of the Mill Hill Historic District and its proposed extension to include the South Broad Street Bridge. The effects are similar to those described above for the South Broad Street Bridge, and generally, by restoring the creek to a more natural profile and appropriate landscaping and interpretation, this project may be seen as an enhancement to the historic district's setting rather than an adverse effect.

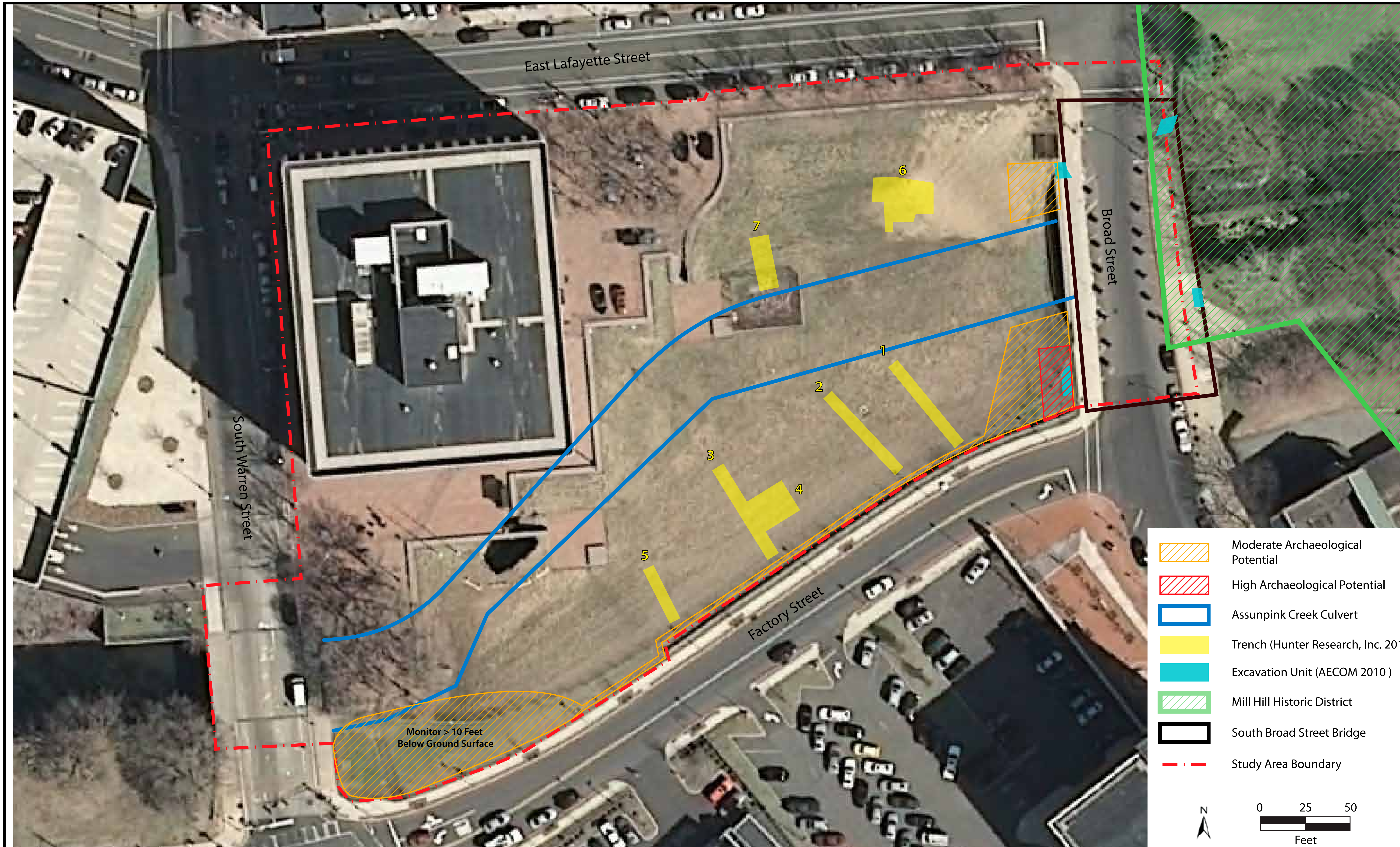


Figure 7.1. Aerial Photograph of the Project Site Showing the Location of Historic Resources and Areas of Archaeological Sensitivity/Concern.

Areas of Moderate to High Archaeological Sensitivity

Archaeological investigations have identified some areas of moderate to high archaeological sensitivity in the study area (Figure 7.1). In all instances, a program of monitoring is recommended for these areas if they cannot be avoided by project impacts.

1). Deeply Buried Mill Remains. The possibility of deeply buried mill remains exists along the south bank of the creek below a depth of 9 feet above sea level. Under current project plans, impacts of this depth are not anticipated except immediately adjacent to the culvert where it is unlikely that such remains have survived due to the work that was done to install the culvert in the early 1970s. A program of archaeological monitoring is recommended if project activities occur below a depth of 10 feet above sea level more than 10 feet from the southern edge of the existing culvert.

2). The West Side of the South Broad Street Bridge. The area within approximately 25 feet of the west side of the South Broad Street Bridge and extending as far downstream as the Veolia Energy Trenton lines is considered an area of moderate to high archaeological sensitivity. Of particular concern is the floor of the upper head race that passes under the bridge's southernmost arch and was identified by NJDOT in its Phase I/II archaeological assessment for the South Broad Street Bridge (AECOM 2010). A program of archaeological monitoring is recommended for subsurface work occurring within approximately 25 feet of the west side of the bridge. This area of moderate to high sensitivity is indicated in Figure 7.1.

3). Moore's Flour Mill Site. Based on borings, the Moore's Flour Mill site at the southeast corner of the project area has the potential to retain foundation walls and waterpower features that lie below the area of ground disturbance from redevelopment and utilities. The extent of these remains is currently unknown because environmental contamination and utilities prevented archaeological subsurface testing in the area of the former mill. A program of archaeological monitoring is recommended for subsurface working occurring within the southeast corner of the project area approximating the known footprint of the mill from atlas maps published in the 19th century.

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Appendix A

SCOPE OF WORK

EXHIBIT A

Scope of Work
Environmental Planning Services
Combined Phase I/II Archaeological Survey
Broad Street Culvert, Assunpink Creek
City Of Trenton, Mercer County, New Jersey

1.0 GENERAL INFORMATION:

1.1	Contract Number:	GS-10F-0410R, Environmental Planning (SIN 899-1)	
1.2	Contract Action:	Award Task Order	
1.3	Project Description:	Cultural Resources Investigation Broad Street Culvert, Assunpink Creek City of Trenton, Mercer County, New Jersey	
1.4	Contractor:	Wallace Roberts & Todd, LLC 1700 Market Street, 28th Floor Philadelphia, PA 19103 Phone: 215-732-5215 Fax: 215-732-2551	
1.5	Subcontractor:	Hunter Research, Inc. 120 West State Street Trenton, NJ 08608 Phone: 609-695-0122 Fax: 609-695-0147	
1.6	Point of Contact:	Contractor:	Eric Tamulonis 215-772-1471 FAX 215-732-2551 Email: ETamulonis@ph.wrtdesign.com
		USACE:	Nikki Minnichbach, District Cultural Resource Specialist, 215-656-6556 Brian Mulvenna, P.E., Project Manager, 215-656-6599

1.7 Project Overview:

The U.S. Army Corps of Engineers, Philadelphia District (USACE) is presently in the planning phase for the removal of an existing box culvert in conjunction with the restoration of a portion of the Assunpink Creek located in Trenton, New Jersey. As part of the District's needs, a combined Phase I and II archaeological investigation of the site area will be required for project compliance with Section 106 of the National Historic Preservation Act of 1966, as amended.

This investigation is intended to identify the presence or absence of potentially significant archaeological resources within the project's area of potential effect (APE) and to evaluate the eligibility of any identified resources for inclusion in the National Register of Historic Places. The effects of the stream restoration project on eligible archaeological resources are to be assessed. Recommendations are to be made as to the avoidance or mitigation of such effects if these are considered to be adverse.

The results of this archaeological investigation will be used as background characterization information for the demolition of the existing culvert and the design and construction of the new stream channel.

Philadelphia District requires the services of an archaeologist meeting the professional qualifications standards of the

National Park Service in order to provide support to this planning and design project. The archaeologist will perform the background research, site investigations, data analysis and reporting, which are detailed in this scope of work.

The project area for this investigation centers on a 500-foot section of the lower Assunpink Creek in downtown Trenton where the creek is contained within a buried box culvert known as the Broad Street Culvert. The investigation area, which is coincident with the APE, is situated in an open grassy area adjacent to the State of New Jersey Department of Human Services (DHS) building and is bounded by East Lafayette Street to the north, South Warren Street to the west, Assunpink Drive (formerly Factory Street) to the south, and South Broad Street to the east.

1.8 List of Previously Provided Information:

a. CH2M Hill Environmental Restoration Report and Environmental Assessment Lower Assunpink Creek Ecosystem Restoration Project -- Broad Street Culvert. November 2007.

b. Architect Engineer Services - Geophysical, Geotechnical and Environmental Site Investigation - Scope of Work - Assunpink Creek Restoration. August 6, 2010.

c. Hunter Research, Inc. Phase 1A Cultural Resources Investigation Lower Assunpink Environmental Restoration Project. October 2003.

d. AECOM. Historic Architectural Survey - South Broad Street (US Route 206) Bridge Rehabilitation Project, City of Trenton, Mercer County, New Jersey. May 2009.

e. AECOM. Phase I/II Subsurface Archaeological Survey - South Broad Street (US Route 206) Bridge Rehabilitation Project, City of Trenton, Mercer County, New Jersey. May 2010.

f. Wallace Roberts & Todd, LLC, et al. A Master Plan for the New Jersey Capital Park. January 2008.

2.0 TECHNICAL SCOPE OF WORK:

2.1 Project Background and Description

The Assunpink Creek Restoration Project will "day light" a section of the Assunpink Creek by removing a reinforced-concrete culvert between South Broad and South Warren Streets in Trenton, New Jersey. The project is authorized under Section 1135 of the Water Resources Development Act of 1996 to improve the quality of the environment in the public interest. The removal of the culvert will benefit adjacent businesses, provide recreational options for visitors and local residents, and provide historical and educational opportunities for the community. The culvert recently experienced a structural failure, thus its removal will also eliminate a hazard to public safety. The City of Trenton is the non-federal project sponsor.

Several alternatives were considered including complete removal of the culvert, partial removal of selected sections of the culvert, and no action. The preferred alternative is the complete removal of the culvert and realignment of the creek into a natural channel. This alternative was selected as offering the best balance of ecological benefits, structural stability, expected long-term maintenance requirements and construction cost.

A combined Phase I and II archaeological survey will be conducted for the segment of the Assunpink Creek between South Broad Street and South Warren Street. Focus will be on the existing culverted stream corridor and land extending for 50 feet on either side. The work will include limited background research, backhoe-assisted field testing, laboratory and data analysis, and preparation of interim, draft and final technical reports. Archaeological survey will be carefully coordinated with a companion geophysical, geotechnical and environmental site investigation to avoid unnecessary duplication of effort and ensure sharing of relevant data between both studies. The results of the archaeological investigations will be coordinated with NJHPO pursuant to 36 CFR 800.4 and USACE regulations.

Prior cultural resources work related to this project and other projects in the vicinity is available to provide extensive background information and historic context. The Phase 1A Cultural Resources Investigation Lower Assunpink Environmental Restoration Project (Hunter Research, Inc., October 2003) identifies known and potential cultural resources along a three-mile segment of Assunpink Creek. Potential archaeological resources on the south bank of Assunpink Creek between South Warren and South Broad Streets include buried remains of the Moore Flour Mill/ Trenton Roller Mills, the Moore Oil Mill, the Trenton Cotton Factory/Wilson Woolen Mill, and the Eagle Cotton Factory. Potentially significant features associated with these early 19th-century sites include foundation walls, raceways, and other waterpower remnants. These industrial archaeological sites potentially offer important information regarding the layout and operations of facilities that were at the heart of Trenton's development as an industrial center. The north bank of Assunpink Creek between South Warren and South Broad Streets was not as historically developed as the south bank; potential archaeological resources on the north bank of the creek include 18th and 19th-century backyard deposits. The South Broad Street stone-arch bridge bounding the east side of the APE has been previously identified as an eligible resource (NJHPO opinion 5/31/1980).

Other cultural resources work with background relevant to this project includes The Assunpink Creek in Mill Hill: A History and Consideration of Historic Interpretive Opportunities (Hunter Research, Inc., 2002); South Broad Street Bridge Cultural Resonrce Assessment (Hunter Research, Inc., 2003); the cultural resources components of A Master Plan for the New Jersey Capital Park (Wallace Roberts & Todd, LLC, et. al. 2008). Historic Architectural Survey - South Broad Street (US Route 206) Bridge Rehabilitation Project (AECOM, 2009); and Phase I/II Subsurface Archaeological Survey - South Broad Street (US Route 206) Bridge Rehabilitation Project (AECOM, 2009).

2.2 Technical Details

2.2.1 Area of Potential Effect

The Area of Potential Effect (APE) for archaeological resources is the area bounded by East Lafayette Street to the north, South Warren Street to the west, Assunpink Drive (formerly Factory Street) to the south, and South Broad Street to the east (Figure 1).

2.2.2 Identification of Interested Parties

The archaeological contractor will assist the USACE in identifying parties interested in the cultural resources aspects of the Assunpink Creek Restoration Project pursuant to Section 106 of the National Historic Preservation Act and 36 CFR Part 800. Names, mailing and e-mail addresses, and telephone numbers of points of contact for identified interested parties will be compiled by the archaeological contractor.

2.2.3 Documentary Research

A considerable quantity of background and archival information has been previously assembled for the APE and only limited additional documentary research is envisaged as part of this scope of services. The archaeological contractor is to become familiar with the results of previously undertaken research with particular attention being given to the earlier cultural resource studies conducted for the planned rehabilitation of the South Broad Street Bridge. Additional documentary research will be focused on the records of the City of Trenton Department of Public Works and Trigen, and materials relating to the design and construction of the Broad Street Culvert and of the proposed Assunpink Creek Restoration Project.

2.2.4 Historic Map and Aerial Photograph Analysis

Subsequent to the documentary research and prior to the start of archaeological fieldwork, the archaeological contractor will undertake a comprehensive examination of historic maps and aerial photographs selecting no less than five historic maps which will be overlaid on to current project plans showing existing conditions. Historic maps will be selected on the basis of cartographic accuracy to cover the full period of historic land use within the APE with particular attention being given to depiction of the location of the Assunpink Creek and nearby mill hydropower systems. Cartographic overlay will be accomplished using ArcGIS software. The purpose of this task is to provide historic mapping that can guide archaeological fieldwork.

2.2.5 Geophysical Survey

Geophysical survey of the APE will be undertaken as part of the companion geophysical, geotechnical and environmental site investigation. The interpreted results of the geophysical survey will be made available to the archaeological contractor by USACE prior to the start of archaeological fieldwork.

2.2.6 Intensive Archaeological Survey - Field Investigations

The contractor will make all arrangements for field mobilization, including location and mark-out of existing utilities, the retaining of a backhoe subcontractor and crew orientation.
Vehicles or construction equipment are **NOT** permitted within 5 feet of and/or above the existing culvert structure. Philadelphia District USACE will coordinate with the City of Trenton to secure access by the archaeological contractor to the project site. The archaeological field investigative methodology will be coordinated and approved by USACE and NJHPO prior to its implementation.

Archaeological field investigation will provisionally consist of the excavation of approximately six backhoe trenches, 25 to 50 feet in length and five to ten feet in width, extending to depths of up to 15 feet. Trench width will depend on excavation depth and soil stability. Excavation will, if possible, examine the full depth of cultural stratigraphy, but only if this can be accomplished safely. All excavations will be benched and/or shored in compliance with OSHA regulations, backfilled upon completion and the ground returned as closely as possible to its pre-excavation condition. Four trenches are anticipated extending perpendicular to the south side of the Broad Street Culvert and two trenches perpendicular to the north side (Figure 1). Deep excavation will not be undertaken within five feet of the walls of the Broad Street Culvert. Where foundations of mills or other buildings or raceway features are encountered during excavation, these will be exposed, examined, but left in place. Limited quantities of artifacts are expected and any large engineering objects (e.g., items of mill machinery) will be left in place.

Archaeological data within the excavation trenches will be recorded via detailed written notes, digital photography and in-field scale drawings of plans and profiles. The locations of trenches and archaeological features within trenches will be mapped and elevation data recorded using a laser transit.

Throughout the archaeological field investigations coordination will be maintained with the contractor(s) undertaking the geophysical, geotechnical and environmental site investigation. Qualified personnel from contractor(s) undertaking the geophysical, geotechnical and environmental site investigation will be permitted to observe and document the archaeological excavations as they occur and, if necessary, retrieve soil samples and other data from the excavation trenches. Similarly, the archaeological contractor will monitor and document tests and borings excavated by the contractor(s) undertaking the geophysical, geotechnical and environmental site investigation.

2.2.7 Laboratory and Data Analysis

Artifacts removed from the site will be processed (sorted, washed, identified and cataloged) in accordance with currently acceptable professional standards. Field data (drawings, notes, etc.) will be organized and interpreted in preparation for reporting. Artifacts and original field records gathered during the course of the archaeological investigations will be prepared for final disposition at the New Jersey State Museum in accordance with the museum's curation standards. Upon USACE acceptance of the final report the artifacts and original field records will be submitted to the New Jersey State Museum.

2.2.8 Evaluation of Eligibility

The results of the documentary research and field investigations will be considered and followed by an evaluation of identified archaeological resources in terms of their eligibility for inclusion in the National Register of Historic

Places.

2.2.9 Assessment of Effects

The effects of the Assunpink Creek Restoration Project on archaeological resources judged to meet the eligibility criteria of the National Register of Historic Places will be assessed in accordance with 36 CFR 800.5.

2.2.10 Mitigation Options

Where adverse effects on National Register eligible archaeological resources cannot be avoided, options for mitigation will be developed in consultation with USACE and NJHPO.

2.2.11 Consultation/Liaison

The archaeological contractor will maintain telephone and/or e-mail contact with the Philadelphia District Cultural Resource Specialist as work is performed to discuss any problems which might impede meeting the schedule outlined below. When justified, meetings will be held at the request of the archaeological contractor or the District Cultural Resource Specialist. The Government reserves the right to schedule meetings with the contractor upon 24-hour notice. The archaeological contractor will notify the District Cultural Resource Specialist prior to initiation of archaeological fieldwork to obtain up-to-date project information and maps.

2.3 Safety Plan

A site health and safety plan (HASP) is being developed for the geophysical, geotechnical and environmental site investigation. This HASP will also govern the archaeological fieldwork undertaken as part of this Phase I/II archaeological survey. The archaeological contractor will review this plan and adapt it as needed.

2.4 Site Access/Liability

Philadelphia District USACE will coordinate with the City of Trenton to secure the archaeological contractor access to the site. Vehicles or construction equipment are **NOT** permitted within 5 feet of and/or above the existing culvert structure.

3.0 DELIVERABLES:

3.1 Interim Report

Within three weeks of completion of the archaeological field investigation the archaeological contractor will provide to USACE an interim report summarizing the results of the survey to date. The interim report, no more than five pages of text, will preliminarily describe and interpret the results of the documentary research, historic map and aerial photograph analysis, archaeological field investigations and laboratory and data analysis, and provide a preliminary evaluation of resource eligibility and assessment of effects. A site plan, copies of field drawings and photographs will be included with the interim report. Finished drawings and a catalog of artifacts need not be submitted.

3.2 Draft Report

Five copies of a draft report shall be delivered to USACE as noted in the Period of Performance/Project Schedule following completion of the archaeological survey. The draft report shall be a professional product and an accurate representation of the content of the final report. The draft shall include a description and interpretation of total site data. The draft must be cleanly typed, complete with all figures, tables, and sections of the report Photographs and graphics shall be included to show details of the investigation. Photographs, plates, drawings, and other graphics shall appear in the same size, format, and general location in the draft report as they will appear in the final report. The draft report will be reviewed by USACE, NJHPO and the City of Trenton. A draft report will not be acceptable for review if, in the opinion of the Corps, it is not a complete draft, if it has not been properly edited, or if it does not conform to professional standards. Should the draft report not be acceptable, any additional costs to bring the report to acceptable standards will be at the archaeological contractor's own expense.

3.3 Final Report

The final report shall address USACE, NJHPO and City of Trenton review comments submitted to the archaeological contractor by USACE. The Corps may request any changes necessary to meet contract or professional requirements, one (1) reproducible unbound and four (4) bound originals (with color photographs), and five (5) additional copies of the final report must be submitted. A CD of the final report in a reproducible MS Word and MS Excel format shall be included. Due date for delivery of the final report is contingent upon the timing of the review of the draft. However, unless otherwise agreed upon, the final report copies are due as noted in the Period of Performance/Project Schedule after receipt of USACE review comments for the draft report.

3.4 Report Format and Content

Draft and final copies of the report of investigations shall reflect and report the survey as outlined in the Technical Scope of Work. They shall be suitable for publication and be prepared with reference to Federal Standards (e.g., *Secretary of Interior's Standards for Archaeological Documentation*) and in accordance with NJHPO Guidelines for Professional Archaeological Reports. Strict adherence to the format requirements of these guidelines is a prerequisite for approval of the draft and final report.

The report shall also include the following information:

A. A listing of personnel and duties for individuals involved in survey planning, survey conduct, and report preparation.

B. A detailed description of the area surveyed and all subsurface investigations.

C. A summary of conclusions and recommendations supported by the field data and analyses including recommendations for preservation in place or mitigation of adverse effect through limited data recovery or other appropriate means.

3.5 Graphic Representation of Results

Graphic representation of results to include, but not be limited to the following:

A. Project site base map(s) delineating the overall project area with each individual study area shown and labeled.

B. Project site base map(s) shall be oriented with true north up and show geodetic grids, a north arrow.

C. Detailed drawings and photographs of the project site.

3.6 Report Format Specifications

A. Each report (draft and final) shall be produced on 8 1/2" x 11" paper, single-spaced, with a 1.25" left margin. Plates should not exceed 11" in height or 20" in length if possible (larger figures may be produced, but an 8 1/2" x 11" version should be included in the report).

B. All tables shall have a number, title, appropriate explanatory notes, and a source note (as applicable).

C. All graphic presentation graphic forms shall be referred to as "Figure".

D. All figures shall have a title block containing the name of the project and the state.

E. All maps must display a north arrow, scale and key, whenever applicable.

4.0 PERIOD OF PERFORMANCE/PROJECT SCHEDULE:

Projected Time Line:

Contract Awarded	TBD
Begin Documentary Research	5 days after contract awarded
Begin Archaeological Fieldwork	30 days after contract awarded
Archaeological Fieldwork	15 days
Submit Interim Report	15 days after fieldwork begins
Submit Draft Report	45 days after completion of fieldwork
Review by District and NJ SHPO	30 days
Final Report Submission	30 days after receipt of review comments

The total time of this task order from award is 150 calendar days.

5.0 OTHER CONTRACT REQUIREMENTS:

A. As part of the supplemental documentation, appendices to the draft and final report must include a copy of the contract proposal and *curriculum vitae* for the Principal Investigator and main supervisory personnel in support of their academic and experiential qualifications for the Phase I/II archaeological survey, if these individuals were not included in the original contract proposal. Personnel must meet the minimum professional standards stated below:

1. Principal Investigator (PI). Persons in charge of a cultural resource project or research investigation contract, in addition to meeting the appropriate standards for the discipline, must have a doctorate or equivalent level of professional experience as evidenced by a publication record that demonstrates experience in project formulation, execution and technical monograph reporting. Suitable professional references may also be made available to obtain estimates regarding the adequacy of prior work. If prior projects were of a sort not ordinarily resulting in a publishable report, a narrative should be included detailing the proposed Principal Investigator's previous experience along with references suitable for obtaining opinions regarding the adequacy of this earlier work.

2. Standards for Consultants. Personnel hired or subcontracted for their special knowledge and expertise must carry academic and experiential qualifications in their own fields of competence. Such qualifications are to be documented by means of *vitae* attachments to the proposal or at a later time if the consultant has not been retained at the time of the proposal.

B. Principal Investigators shall be responsible for the validity of the material presented in their reports. In the event of a controversy or court challenge, Principal Investigators shall be required to testify on behalf of the government in support of findings presented in their reports.

C. Neither the archaeological contractor nor his representatives shall release any sketch, photograph, report or other data, or material of any nature obtained or prepared under this contract without the specific written approval of the Contracting Officer prior to the time of final acceptance by the government.

D. The archaeological contractor shall furnish all labor, transportation, instruments, survey and excavation equipment and other associated materials to perform the work required by this Scope of Work.

E. The archaeological contractor shall return all copies of reports provided by USACE when the final report is submitted.

F. Any costs associated under this section are covered under this delivery order.

6.0 FISCAL ARRANGEMENTS:

A. Partial payments of the total amount allocated shall be dispersed upon the receipt of invoices. Invoices shall be submitted monthly and reflect the amount expended on a task by task and percent completion basis. The total amount of all monthly invoices shall not total more than 90% of the agreed work order amount. The remaining 10% of the agreed work order amount shall be paid upon the receipt and acceptance of the final report and receipt of the final invoice.

B. Invoice payments shall be made pursuant to the "Prompt Payment" clause of the contract.

SECTION SF 30 BLOCK 14 CONTINUATION PAGE

SUMMARY OF CHANGES

The purpose of this modification is to incorporate supplemental work to the scope of work to complete the environmental planning services at the Assunpink Creek located in Trenton, New Jersey and compensate the contractor for his efforts.

As a result of this modification, the price has increased by $28,677.00 from $82,868.00 to $111,545.00.

The performance period of this contract is changed; completion of the purchase order is now set as 30 July 2011. All other terms and conditions remain the same.

It is understood, and further agreed, that this adjustment constitutes compensation in full and on behalf of the contractor, his subcontractors, and suppliers for all markups related thereto (both direct and indirect) and for performance of the changes within the timeframe stated.

SOLICITATION/CONTRACT FORM

The total cost of this contract was increased by $28,677.00 from $82,868.00 to $111,545.00.

ACCOUNTING AND APPROPRIATION

Summary for the Payment Office

As a result of this modification, the total funded amount for this document was increased by $28,677.00 from $82,868.00 to $111,545.00.

CLIN 0001:

AA: 96X31220000 082423 25201830JK167859 NA 96365 (CIN W25PHS022942310001) was increased by $28,677.00 from $82,868.00 to $111,545.00

SCOPE OF WORK

The additional work proposed involves the development of a health and safety plan (HASP) specifically geared to the planned archaeological field investigations and the implementation of this plan during the three-week period of field investigation. It is proposed that WRT will develop the HASP with the assistance of a subconsultant Environmental Connection Inc. and that this latter firm will undertake construction dust and contaminant monitoring during the period of archaeological fieldwork. Environmental Connection will also produce a brief report to document the monitoring activity and results.

(End of Summary of Changes)

Appendix B

NEW JERSEY DEPARTMENT OF TRANSPORTATION NEW JERSEY HISTORIC BRIDGE SURVEY FORM

NEW JERSEY DEPARTMENT OF TRANSPORTATION
BUREAU OF ENVIRONMENTAL ANALYSIS

A.G. LICHTENSTEIN
& ASSOCIATES, INC.

NEW JERSEY HISTORIC BRIDGE SURVEY

STRUCTURE #: 1100002 **COUNTY:** MERCER **OWNER:** COUNTY **ROUTE:** 9011

MILEPOINT: 000000 **TOWNSHIP:** TRENTON CITY

FACILITY CARRIED: SOUTH BROAD STREET (US 206)

NAME/FEATURE INTERSECTED: SOUTH BROAD STREET (US 206) OVER ASSUNPINK CREEK

DRAFT

TYPE: STONE ARCH **DESIGN:** ELLIPTICAL

MATERIAL: STONE **# SPANS:** 001 **LENGTH:** 000060 **WIDTH:** 0360

DATE OF CONSTRUCTION: 1843 **ALTERATION:** **SOURCE:** CO. RECORDS

DESIGNER/PATENT: UNKNOWN **BUILDER:** UNKNOWN

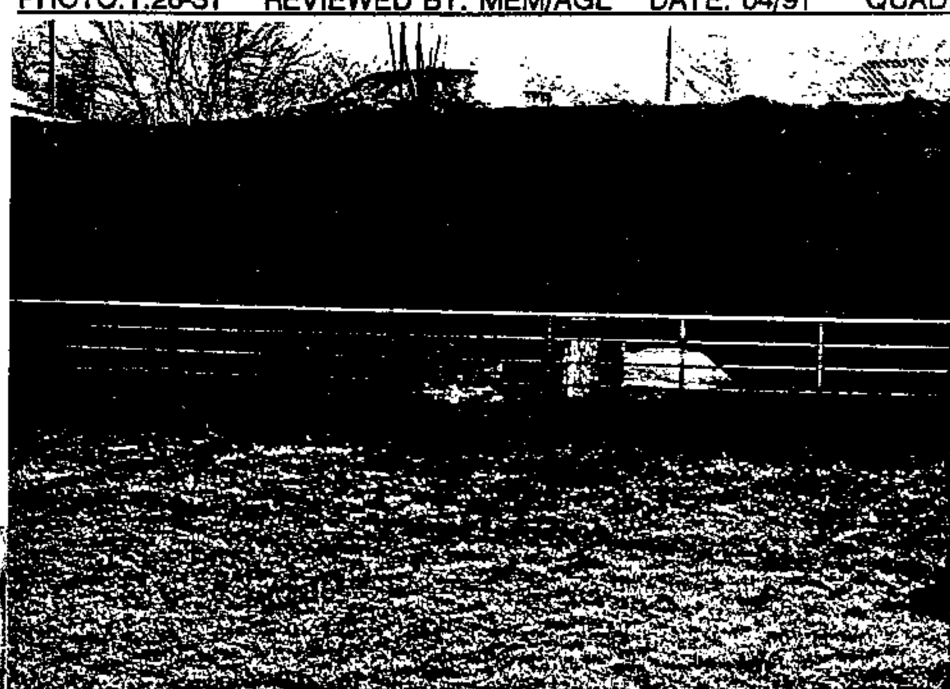
SETTING/CONTEXT: Located in downtown Trenton on the main east-west street, the 1843 stone arch bridge is not visible from the roadway. Assunpink Creek, the feature it crosses, has been diverted underground west of the bridge and it reemerges at the bridge. Open park land, created by urban renewal, is on both sides of the bridge which has been widened to 36'.

CURRENT NATIONAL REGISTER STATUS: Eligible. Determination of Eligibility. 5/31/80.

NATIONAL REGISTER RECOMMENDATION: Eligible

SUMMARY: The well-proportioned random ashlar elliptical stone arch was built in 1843 to replace the 1822 stone arch bridge lost in a freshet. On the historic main road from New York to Philadelphia, a stone arch was first built here in 1774. The bridge was widened on the east side several times, but the west elevation survives with its handsome voussoirs and keystone. It is the oldest bridge in Trenton, and is of great historical value to the community.

PHOTO:1:28-31 REVIEWED BY: MEM/AGL DATE: 04/91 QUAD: TRENTON WEST



Appendix C

HEALTH AND SAFETY PLAN

Richard W. Hunter
PRESIDENT
Ian C. Burrow
VICE PRESIDENT

SITE SAFETY AND HEALTH PLAN

COMBINED PHASE I/II ARCHAEOLOGICAL SURVEY
ASSUNPINK CREEK RESTORATION
CITY OF TRENTON, MERCER COUNTY, NEW JERSEY

Prepared by:

James Lee and Ian Burrow, Hunter Research, Inc.
James Frisbee, CIH Environmental Connection, Inc.

May 16, 2011

TABLE OF CONTENTS

EMERGENCY ACTION SHEET

EMERGENCY CONTACT PHONE NUMBERS:

HOSPITAL:

Capital Health Mercer Campus - (609) 394-4000

POISON CONTROL CENTER:

New Jersey Poison Control Center - (973) 926-8008

POLICE:

Trenton Police Department - 911

TRENCH RESCUE:

1. Inform daily before commencing deep operations (so that they are aware):
Trenton Fire Department - (609) 989-4036 or (609) 989-4037
(ask for Rescue Captain or Battalion Chief on-duty)

2. In Emergency: 911 and ask for Trench Rescue from Fire Department
    - Location
    - Time of accident
    - Number of People
    - Ground conditions

ARCHAEOLOGICAL CONSULTANT:

Hunter Research Inc.
Company Safety Officer (CSO): Ian Burrow – office: (609) 695-0122; mobile: (609) 462-2363
Site Safety Officers (SSO): James Lee – mobile: (908) 329-5331; Joshua Butchko – mobile: (908) 528-2846

HEALTH AND SAFETY CONSULTANTS TO HUNTER RESEARCH, INC.:

Environmental Connection, Inc.
Health and Safety Officer (HSO) James Frisbee, CIH – office: (609) 392-4200, mobile: (609) 203-3114

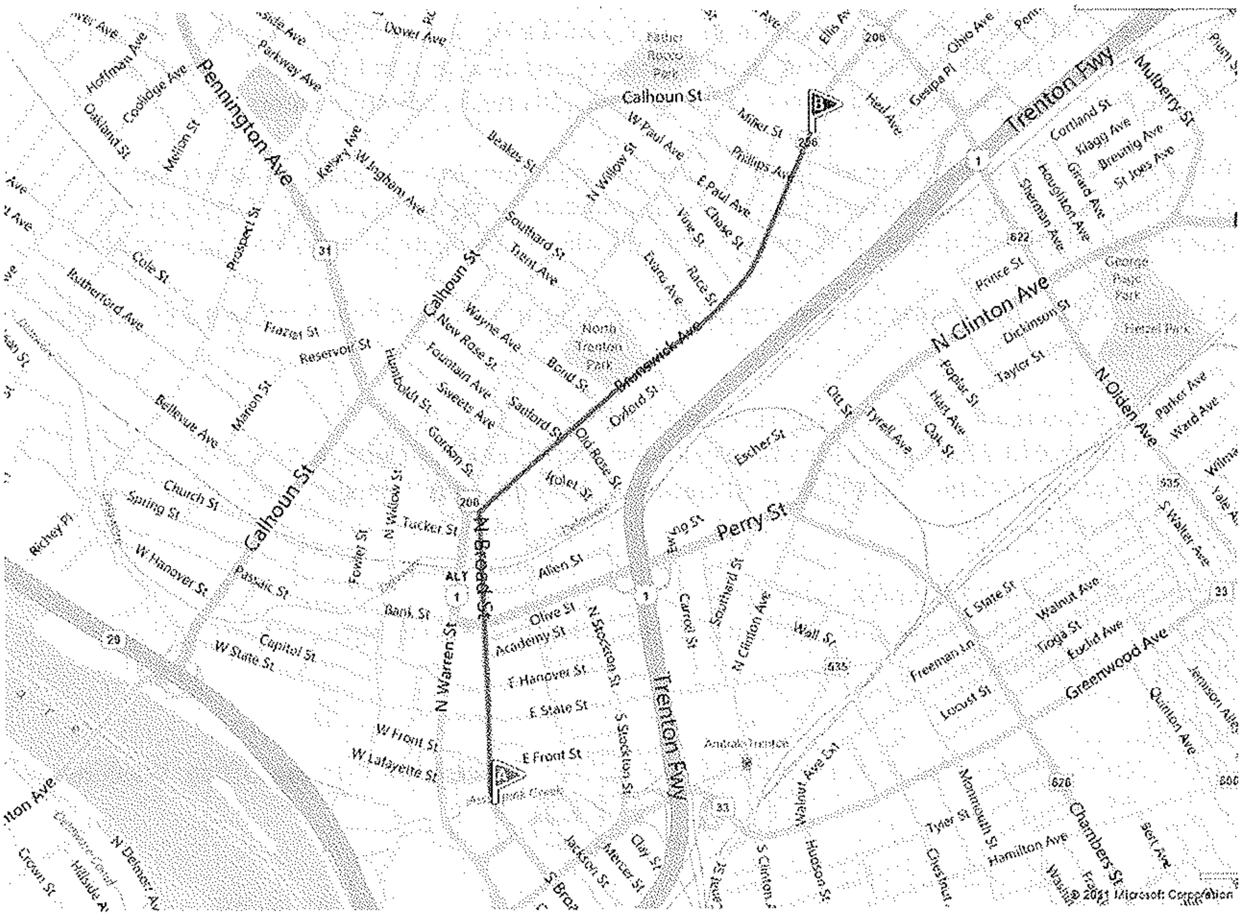
PRIME CONTRACTOR:

Wallace Roberts & Todd, LLC
1700 Market Street, 28th Floor
Philadelphia, PA 19103
Eric Tamulonis 215-772-1471

CLIENT:

U.S. Army Corps of Engineers, Philadelphia District
Wanamaker Building, 100 Penn Square East
Philadelphia, PA 19107
Brian J. Mulvenna, P.E., Project Manager 215-656-6599

ROUTE MAP to Capital Health - Mercer Campus



A. SITE SAFETY AND HEALTH PLAN (SSHP) OBJECTIVE

The purpose of this document is to provide a safe working environment for an archaeological team and other specialists undertaking a Phase I and II archaeological survey at the Assunpink Creek Restoration, City of Trenton, Mercer County, New Jersey. Work to be undertaken on the site includes the monitoring of the removal of fill materials with earthmoving machinery, hand excavation and documentation of soil profiles, and artifact processing and analysis. A detailed description of project actions is presented in Section H below.

This Site Safety and Health Plan has been prepared by Hunter Research, Inc. staff who have undertaken 40-hour Occupational Safety and Health Administration for Hazardous Waste Operations and Emergency Response Course (HAZWOPER), and by Environmental Connection, Inc. It will be bound with other pertinent information and used as a training guide and field reference for the archaeological Principal Investigator, his field staff and visitors.

While every effort has been made to ensure that this plan provides adequate protection for the operations specified, it is the responsibility of any contractor other than Hunter Research Inc. undertaking this work to satisfy themselves that the plan is adequate for their own requirements.

Standard sources of information and regulatory guidance which have been used in the preparation of this plan are:

American Conference of Governmental Industrial Hygienists
Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices. American Conference of Governmental Industrial Hygienists, Cincinnati, Ohio.

National Archives and Records Administration
1993 Code of Federal Regulations. Labor. 29 (2 Vols). U.S. Government Printing Office, Washington, D.C.

NIOSH
NIOSH Pocket Guide to Chemical Hazards. U.S. Government Printing Office, Washington, D.C.

NIOSH, and USCG, EPA OSHA
1985 Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities. U.S. Government Printing Office, Washington, D.C.

United State Army Corps of Engineers
2008 Safety and Health Requirements Manual. EM385-1-1.

B. SUMMARY OF SITE CONTAMINATION CHARACTERISTICS

1. Site Summary

Contamination characteristics of the site were documented in the *O'Brien and Gere Geotechnical Investigation Report,* dated, January, 2011. A total of nine test pits were excavated on September 16 and 17, 2011, and it was determined through the collection of soil samples and direct reading instrumentation, that some test pits to the south of the culvert had been impacted by contamination.

Sampling was performed for analysis of Volatile Organic Compounds (VOC), semi-volatile organic compounds (SVOC), metals, petroleum hydrocarbons, polychlorinated byphenyls, herbicides and pesticides and hazardous waste characterization. In the areas on the south side of the culvert were Test Pits 1, 2, 3, 4, 5, 6 and 7. In the areas on the south side of the culvert were Test Pits 8 and 9.

In test pits 1, 2 and 3 the following contaminants were noted to be present in the soil:

Volatile Organic Compounds: Between 1 and 2 compounds, levels considered low
Semi-Volatile Organics: Between 22 and 24 compounds, levels low to high
Pesticides: 1- 2 compounds, low levels
Polychlorinated Byphenyls: TP-01; 1-2 compounds, low levels
Metals: Between 20 and 23 compounds, low to moderate levels

No work is scheduled to be performed in the area of TP-01, however excavation is scheduled to occur in the area of TP-02, therefore these contaminants represent a potential exposure concern.

In test pits 4, 5, 6, 7 and 8 the following contaminants were noted to be present in the soil:

Volatile Organic Compounds: Between 1 and 2 compounds, levels considered low
Semi-Volatile Organics: Between 22 and 24 compounds, levels low to high
Pesticides: 1- 2 compounds, low levels
Polychlorinated Byphenyls: TP-01; 1-2 compounds,low levels
Metals: Between 20 and 23 compounds, low to moderate levels

2. Hazard Identification

a. Chemical

The main routes of exposure to the hazardous chemicals anticipated during archaeological work are:

- inhalation of airborne semi- volatile substances
- inhalation of airborne heavy metal dusts
- absorption of chemical substances through skin contact by soils or groundwater
- ingestion from contact with contaminated protective equipment, tools and artifacts

Exposure to heavy metal contaminants during field activities may occur through inhalation or ingestion of airborne contaminated dust, or dermal contact.

Contaminants of primary concern:

Coal Tar Pitch Semi-Volatile Organic Compounds appear to be the most likely contaminants to be encountered during the site activities.

b. Other Hazards

Other hazards anticipated on this site derive from the nature of the archaeological work to be undertaken. The following hazards are anticipated:

1. Dust hazard from soil excavation and hand and power tool usage.

2. Release of volatile organic vapors to cause potential inhalation hazards from hand and power tool usage.

3. Use of hand and power tools and excavation machinery.

4. Biological hazards: plants, arachnids (ticks) and insects.

5. Heat/Cold Stressors: these issues are addressed in Standard Operating Procedures (Section F).

6. Physical hazards: trips, falls.

7. Engulfment through trench collapse.

C. ACTION LEVELS FOR AIRBORNE CONTAMINANTS

This section summarizes the determination for Personal Protective Equipment (PPE) standards in relation to specified levels of contamination. These levels are identified through the use of personal monitoring equipment to be employed at the site, and a general assessment of site contamination characteristics. The site health and safety officer (HSO) would be designated to monitor appropriate air contaminants.

Action levels are defined for Vapors/Gases and Dust.

1. Vapors/Gases

EC personnel will supervise the monitoring program to include the concentrations of volatile organic compounds (VOC) in real-time with a VOC monitoring instrument, such as a Multi-RAE Plus or equivalent instrument equipped with a Photo Ionization Detector (PID). The OSHA Permissible Exposure Limit is 0.2 mg/m^3 so the effective Action Level is 0.1 mg/m^3.

The following Action Levels are defined for Vapors/Gases:

Action Level = 0.1 mg/m^3
Action: Move to Level C PPE Regime in Section D.2

2. Airborne Dust Concentrations

EC personnel will supervise the monitoring program to include the concentrations of airborne dust in real-time with a dust monitoring instrument, such as a MIE pDR-1000 Personal Data Ram or equivalent.

Lead

Based on the following calculation, EC has determined the allowable average airborne dust concentration to be 20 mg/m^3 based on a Safety factor of 4 and given the highest detected levels of lead in the soils at the site to be 616 mg/kg.

$$\text{Action Level} = \frac{10^6 \text{ mg/kg x PEL (mg/m}^3\text{)}}{\text{Soil Concentration (mg/m}^3\text{) x Safety Factor (SF)}}$$

Dust suppression during hand excavation will consist of wetting the exposed soils with potable water sprays. The objective will be to reduce fugitive dust without saturating the soils and causing a runoff problem.

The following Action Levels are defined for Airborne Dust Concentrations:

Action Level = 20 mg/m^3

Action: Move to Level C PPE Regime in Section D.2

3. Oxygen Levels:

An Oxygen Level of 19.5% or less by volume will be deemed *Oxygen-Deficient.*
An atmosphere in which the oxygen concentration is 23.5% or more by volume will be deemed *Oxygen-Enriched.*

These values are the defined Action Levels for Oxygen.

Action: EVACUATE AREA IMMEDIATELY

D. PERSONAL PROTECTIVE EQUIPMENT (PPE) SPECIFICATIONS

Protection levels for particular actions will be determined through the monitoring program The HSO will evaluate the results and assist the Principal Investigator to determine the appropriate type of PPE to utilize. See description of modified Level D and Level C protection below.

1. Typical Level D Protection (Default PPE Regime unless changed by HSO in consultation with CSO and SSO)

(All items to meet OSHA [Occupational Safety and Health Administration] Personal Protective Equipment (PPE) Standards)

Workboots with steel toes
Tyvek Coveralls
Latex gloves with cotton overgloves
Safety goggles or glasses with sideshields
Hard hat
Dust nuisance masks (at direction of Principal Investigator or HSO and while screening soils, otherwise optional below Action Level at C.2 above)

2. Level C Protection (at Action Levels defined in C.2 above)

(All items to meet OSHA [Occupational Safety and Health Administration] Personal Protective Equipment (PPE) Standards)

a. Respiratory Protection

Appropriate respiratory protection will be available to personnel depending on the monitoring results collected and evaluated by the HSO. Refer to Appendix A for details on the respiratory protection program.

Typically, Level C respiratory protection will comprise:
Full-face air-purifying respirator
Combination High Efficiency Particulate Air (HEPA)(N-100) and Organic Vapor Cartridges. The specific type, dependent on measured concentration of contaminants, will be determined by the Health and Safety Officer.

b. Other PPE

Workboots with steel toes
Tyvek Coveralls
Latex Gloves cotton overgloves
Hard hat
Joints between garments to be sealed with duct tape

The HSO will also monitor heat or cold stress if necessary. Refer to Section I for further details on monitoring for heat or cold stress.

E. STAFF ORGANIZATION, QUALIFICATIONS AND RESPONSIBILITIES

The following organizational structure will be in place for the project:

Project Manager/Company Safety Officer

Oversees all aspects of contract, and has responsibility for developing field testing plan, and ensuring that field team has all necessary resources. This individual shall have 40-hour OSHA HAZWOPER (Hazardous Waste Operations and Emergency Response) training and eight-hour OSHA HAZWOPER supervisory training as a minimum. Will be prime liaison with the client on all contractual matters.

Principal Investigator/Site Safety Officer (SSO)

Responsible for all field operations, including implementation of Site Safety and Health Plan. Reports to Project Manager. This individual shall have 40-hour OSHA HAZWOPER training. Will liaise with HSO on practical and procedural matters. This person will also conduct frequent random inspection to assure PPE is being worn.

Site Health and Safety Officer (HSO)

The HSO will be an Industrial Hygienist (IH) or individual with experience in the use of:

a. monitoring equipment;
b. implementing safety and health programs at sites where Level C and D personal protective equipment was required;
c. experience in construction techniques and construction safety procedures;
d. working knowledge of federal, state, and local occupational safety and health regulations;
e. specific training in personal and respiratory protective equipment program implementation;
f. proper use of air monitoring equipment.

An individual from Environmental Connection, Inc. will provide these services to Hunter Research, Inc.. The HSO will be responsible to the Principal Investigator for the implementation of the Site Safety and Health Plan, and will carry out and interpret all monitoring actions and make recommendations accordingly.

The HSO will also respond to routine or non-routine emergencies in coordination with the Principal Investigator, following Emergency Procedures as specified in Section M below.

The HSO will develop and maintain safety logs, environmental and personal monitoring/sampling results, and logs for fit-testing of respirators. In the absence of the HSO the Principal Investigator will be responsible for the logs after receiving instruction from the HSO.

Archaeological Field Team

All archaeological personnel working on the site will have current OSHA HAZWOPER 40-hour certification (with eight-hour annual OSHA HAZWOPER refresher course if required).

F. STANDARD OPERATING PROCEDURES

1. All personnel working in the exclusion zone must wear PPE based on action levels established in section C at all times. Refusal to do so will be cause for disciplinary action.

2. Disposable clothing such as Tyvek coveralls will be disposed of daily as non-hazardous waste.

3. Cotton Coveralls, if used, will be laundered daily.

4. There will be a "Buddy" System, with each worker considering him/herself a safety backup to the designated partner.

5. There is an absolute prohibition of eating, drinking, chewing gum, or smoking, and of the use of alcohol or illegal drugs in the exclusion zone.

6. Fit testing of respirators includes a requirement that facial hair that would interfere with fit be removed to ensure air seal.

7. There is a commitment by Hunter Research, Inc. to the thorough training and briefing of all personnel in the contents of the safety plan.

8. Approved visitors to the site will be permitted to enter the Exclusion Zone only after signing the Health and Safety Plan and donning appropriate PPE.

9. Trenching will be carried out in conformance with Army Corps of Engineers' *Safety and Health Requirements Manual* (2008), Section 25 (see Appendix B for details). The sides of the trenches that will be excavated to a depth of five feet or more will be sloped or benched in accordance with the standard.

G. ON-SITE TASKS TO BE PERFORMED

Specific Protection Levels for all these tasks will be based on action Levels in Section C above. Protection Levels given below are for guidance.

1. Trench Excavation and Documentation

Archaeologists will direct and observe the mechanical excavation of six, 25 to 50 foot-long trenches to varying depths. Any water accumulating in trenches will be pumped into the next trench. Any trench more than 5 feet that has active groundwater infiltration will not be entered.

Selected locations within the trenches will be excavated by hand to an additional depth, using shovels, trowels and other hand tools. Excavated soils will not be screened. Artifacts recovered from soil will be wiped or washed on site to remove as much of the adhering soils as possible without damage to the artifact. Artifacts will be placed in tagged plastic bags.

Hazards:

a. Dust containing heavy metals and other contaminants.
b. Release of volatile organics into air which may pose an inhalation hazard.
c. Heavy machinery operations
d. Uneven ground
e. Trench collapse
f. Groundwater infiltration

Initial Level D PPE: upgrade to Modified Level D or C dependent on air monitoring.

2. Documentation and Record-Keeping

All the archaeological tasks on the project will be accompanied by record keeping through the use of paper or plastic media, through digital recording on computers, photography, and other media.

Hazards:

a. Dust contamination of media, which will be taken off site: inhalation and ingestion hazards
b. Ingestion is possible if precautions are not taken.

Initial Protection: Paper, mylar and other media will be kept in plastic bags on site when not in use. The bags will be wiped down with damp cloths soaked in detergent solution prior to their removal from the site. Survey and excavation equipment should be treated in a similar way and cleaned thoroughly prior to removal from the site. Equipment and instruments will be kept in plastic bags which will minimize contamination. Any materials that cannot be satisfactorily cleaned will be disposed of as non-hazardous waste.

3. Artifact Processing

Artifacts recovered during field activities will be washed, identified and cataloged.

Hazards: Dusts that can be inhaled or ingested.

Initial Protection: Artifacts will be brought to the Hunter Research laboratory in plastic bags with identifying tags. The artifacts will then be washed in detergent solution and then examined and cataloged. Artifacts will not be brushed. Dust masks and latex gloves will be worn by staff handing the artifacts during cleaning and drying. Work will take place in a well-ventilated area.

H. SITE CONTROL

Following OSHA guidelines, the site will be divided into three zones for the purposes of control of contamination and safety. The exact disposition of the Zones will be determined on site.

1. Exclusion Zone (Work Area)

This area has the greatest potential for worker exposure to hazardous conditions, and all personnel (including visitors) entering the area must wear the PPE appropriate to the task to be performed. The Exclusion Zone will comprise a defined area around the worksite and will be clearly marked with caution tape, flagging, or other appropriate fashion.

2. Contamination Reduction Zone (CRZ)

Personnel, equipment and artifact decontamination will take place in this area, which will be located adjacent to the Support Zone.

3. Support Zone (SZ)

This area will provide safety equipment, changing and rest areas. Food and drink and their consumption will be confined to this area.

I. MONITORING PROGRAM

The HSO shall be engaged to undertake the monitoring program using the instrumentation specified below.

1. Equipment

Polycylclic Aromatic Hydrocarbons (PAH)

Multi-RAE Plus or equivalent instrument, equipped with a Photo Ionization Detector (PID)

NIOSH 5506 Polycylclic Aromatic Hydrocarbons (PAH) Analysis

Dust

MIE pDR-1000 Personal Data Ram, or equivalent

2. Frequency of Monitoring

Frequencies of monitoring may be revised with the approval of the CIH and if this can be justified on the basis of a consistent body of monitoring data. Initially, representative daily monitoring will be performed and data-logged and downloaded. Exceedences of the identified action levels (unless equal or below background) shall be reported to the on-site supervisor, who shall temporarily stop work and assess a potential cause for the exceedence(s). EC shall collect air samples for laboratory analysis to determine if exceedances represent PAH.

The HSO will notify the Principal Investigator and/or personnel on an ongoing basis and when there is a need to evacuate the exclusion zone to upgrade or downgrade the PPE levels depending on the monitoring results determined.

3. Temperature (Heat/Cold Stress) Monitoring

Crew will be briefed on symptoms of heat stress (when ambient temperatures are above 80^0F) and cold stress if the work is carried out in winter. A thermometer will be located on site. Working in Level C protection will necessitate a higher level of monitoring.

J. MEDICAL PROGRAM

Baseline medical checks will be undertaken prior to and after the field investigations, and the results made available to the HSO and the individuals concerned. Checks will include bloodwork to sample for identified contaminants of concern, and respirator fitness checks. Checks will be overseen by a licensed physician responsible for the archaeological data recovery program certified in Occupational Medicine by the American Board of Preventative Medicine. The physician must provide a written certification stating that the person examined is "fit for duty" to wear the specified PPE and to perform the required work.

The medical program shall comply with CFR 29 Part 1910.134, Section 120 and CFR 29 Part 1926, Section 65. The physician shall be responsible for the determination of medical surveillance protocols and for review of examination/test results performed in compliance with CFR 29 Part 1910.Section 120(f) and CFR 29 Part 1926, Section 65(f). The HSO should ensure that medical personnel performing checks are briefed on the nature of the exposure to be encountered. First aid equipment and supplies will be available on site.

K. FIRST AID ASSISTANCE/BLOODBORNE PATHOGENS

In the event of any accident resulting in bleeding or open wounds, the injured person will be taken immediately to the Hospital (see Emergency Action Sheet) with information on the contaminants that may have affected the wound.

L. PERSONAL HYGIENE AND DECONTAMINATION

1. Personal Hygiene

In addition to the procedures described below, each individual will wash face, hands and any exposed skin in water and detergent prior to eating, drinking, or leaving the site. It is also recommended that each person shower at the end of each workday. There will be potable water in the support zone work areas in clearly marked containers. All breaks and lunch must be taken in the support zone.

2. PPE Decontamination

A Decontamination Area will be set up within the CRZ. There will be washtubs containing detergent solutions. All personnel leaving the Exclusion Zone for any reason will remove re-usable protective clothing and wash face, hands and any exposed skin in water and detergent.

3. Equipment Decontamination

Equipment used on site on a daily basis will be dropped and stored in a specified location within the CRZ. A specified area within the CRZ will be designated for equipment decontamination at the end of the project. As equipment chiefly consists of hand tools, these will be cleaned in tubs in same manner as PPE. Backhoes and other earthmoving equipment will be decontaminated according to procedures determined by the client. Sensitive instrumentation (transits, cameras, computers) will be cleaned in accordance with advice from the HSO. Equipment which cannot be satisfactorily cleaned will be disposed of as non-hazardous waste.

4. Disposal of Site Refuse

Refuse from the operations, including tyvek suits and gloves, will be disposed of as non-hazardous waste in tied plastic trash bags.

M. EMERGENCY RESPONSE

1. Emergency Equipment on Site at All Times

a. First Aid Kits meeting OSHA 29CFR 1910.151
b. Emergency eyewash kits.

2. Contingency Planning

a. Training of Personnel in Emergency Procedures
b. Posting of Instructions and Emergency Contacts. The first two pages of this plan (Emergency Action Sheet; Route Map to Hospital) will be copied and posted prominently on the site.

3. Criteria and Procedures for Site Evacuation

The Principal Investigator, on advice of the HSO, will order site evacuation under the following circumstances:

a. Concentrations of volatile organics, combustible or toxic gases or metal dusts, or Oxygen levels, exceed action guidelines in section D above.
b. Fire, explosion or minor accident occurs: e.g. incidents which appear to be contained within a limited area and are not likely to spread

4. Communications

Verbal communications will be in effect between personnel in the exclusion and the support zones, since the distance between the areas is expected to be small. Two-way radios, mobile telephones, or their equivalent, will be used if verbal communication becomes infeasible.

N. Certification by Project Personnel and Visitors

I hereby confirm that I have read this plan, understand its provisions, and will abide by them.

Name ______________________________

Signature ______________________________

Date ______________________________

Name ______________________________

Signature ______________________________

Date ______________________________

Name ______________________________

Signature ______________________________

Date ______________________________

Name ______________________________

Signature ______________________________

Date ______________________________

Name ______________________________

Signature ______________________________

Date ______________________________

Name ______________________________

Signature ______________________________

Date ______________________________

Name ______________________________

Signature ______________________________

Date ______________________________

Name ______________________________

Signature ______________________________

Date ______________________________

APPENDIX A

RESPIRATORY PROTECTION PROGRAM

The participants in the archeological investigation may be involved with respirator usage in compliance with the OSHA 29 CFR 1910.134 Respiratory Protection standard.

1. RESPIRATOR TRAINING AND FITTING

A. Facial Hair

Because of the importance to one's health of the respirator and its proper fit, personnel who must wear a respirator cannot be assigned to the site unless facial hair affecting the fit is removed.

B. Respirator Selection

Each person shall receive specific instruction on the following by the HSO:

1. Selection of respirator.
2. How to put on a respirator.
3. How to set the straps and tension for a "good fit."
4. How to determine whether the respirator fits "Comfortably."
5. How to position the respirator upon one's face.

Following this instruction, the person will then select a respirator and, initially, determine if it is comfortable. Specifically the person should:

1. Hold mask to his/her face; if the mask is not comfortable, select another size until a comfortably fitting respirator is found.
2. Check to see if there is room for eye-glasses, if worn, or talking, select another size and/or manufacturer until a respirator with room for both eye protection and talking is found.
3. Tighten the straps.
4. While wearing the mask, look at in a mirror to see if there is a good seal on the nose; face, and cheeks and that there is no facial hair preventing a good fit.
5. Keep the respirator mask on for at least 5 minutes.

C. Fit Testing

After the HSO has selected a "comfortably feeling" respirator, that respirator must be tested for "proper fit." The following criteria is again used to help determine the adequacy of the respirator fit:

1. Proper placement and tension in the straps.
2. Adequate fit across the bridge of the nose.
3. The proper distance from the nose to the chin.

4. A tendency to slip.
5. Self-observation in mirror.
6. Facial hair interference.

After checking the selected respirator against the above criteria, the face seal of the respirator must be separately tested with assistance from the HSO using three separate test procedures: positive pressure fit test, negative pressure fit test, and test chamber fit test.

1. Positive Pressure Fit Test

The following procedure shall be performed in the order stated:

a. The exhalation valve shall be blocked with one's hand.
b. While the exhalation valve is blocked, the employee shall breath out into mask.
c. The person shall closely feel for leakage around edge of mask.
d. With the specific assistance of the HSO, adjustments as needed to pass this test will be made.

2. Negative Pressure Fit Test

The following procedure shall be performed in the order stated:

a. The inhalation valve shall be blocked with one's hand.
b. While the inhalation valve is blocked, the person shall attempt to inhale.
c. The person shall closely feel for leakage around edge of mask.
d. With the specific assistance of HSO instructor, adjustments as needed to pass this test will be made.

After successful completion of these two tests, the respirator mask shall be "seated" by having the person rapidly move his/her head from side-to-side and up and down while taking a few deep breaths.

3. Qualitative or Quantitative Fit Test

The following procedure, shall be performed again, in the order stated by the HSO:

a. Deploy either a saccharin test (qualitative test) or a 0.3 micrometer DOP (quantitative test) equipment.
b. Put on the respirator and redo both the positive and negative pressure fit tests.
c. Put on the respirator hood.
d. Introduce the test solution and have the person perform the following exercises each for 60 seconds:
    1) Normal breathing.
    2) Deep breathing with breathes both deep and regular.
    3) Turning of head from side-to-side with complete movements of one head turn approximately every second.

4) Nodding of head up and down with complete movements of approximately one nod per second.
5) Talking and the reading of the "rainbow" passage paragraph aloud.

e. The fit test is immediately terminated upon detection of the sweet taste of the aerosol spray.
f. The fit test is repeated until successful results are achieved.

2. RESPIRATOR USE

A selected and properly fitted respirator will be assigned to each person for the duration of the project.

The selected and properly fitted respirator will be worn at all times within the authorized area.

3. RESPIRATOR CLEANING

All respirators will be cleaned after each use and before stored. e/she must rinse clean the outside of the respirator. Once the outside of the respirator is rinsed clean, the person can then remove the respirator. The person next cleans his/her face and properly disposes of the respirator canisters. The respirator itself is then to be cleaned as per ANSI Z88.Z-1980 and the procedure below:

a. A washing of the respirator with detergent or a cleaner sanitizer.
b. A rinsing with warm water.
c. Air drying.

4. RESPIRATOR STORAGE

The respirator will be stored in clean and dry bags or boxes, which will then be placed in a clean and sanitized location in the support zone. Additionally, storage of the respirators will be such that their natural shapes will be maintained: i.e. they will not be forced into in inappropriately-shaped containers for storage.

5. RESPIRATOR INSPECTION

The person will inspect his/her respirator daily in accordance with the manufacturer's instructions, a copy of which will be provided to each person. Any defect found will be remedied, repaired, and/or replaced before the respirator is placed back in service.

All masks will be inspected before storage, after storage, and during cleaning. Any defects are to be immediately reported to the project superintendent for correction.

No defective masks will be used at any time.

Respirator cartridges will be replaced on a time schedule based on time of use, concentrations encountered and temperature and humidity levels and/or breathing resistance. The general condition of the cartridge will be inspected as well.

6. ENFORCEMENT OF RESPIRATOR PROGRAM

Frequent random inspections will be conducted by the Principal Investigator and/or the HSO to ensure proper respirator selection, use, cleaning, and maintenance. Any deficiency will be immediately corrected before further use of the respirator will occur.

The cartridge will be replaced whenever an increase in breathing resistance is detected or during decontamination. A replacement program will be developed on site by the HSO based on time of use and concentrations encountered

Failure to wear a respirator in the regulated area is cause for immediate termination.

8. MEDICAL EVALUATION

Each person will be given an entry medical evaluation to determine if there are any anticipated health problems that would arise from the use of a respirator.

9. APPROVED RESPIRATOR USE

Respirators will be NIOSH/OSHA approved for the hazards encountered. The HSO will assist in the respirator and cartridge/filter selection.

APPENDIX B

Excavation and Trenching

The participants in the archeological investigation will be familiar with the standards for excavation and trenching detailed in the Army Corps of Engineers' *Safety and Health Requirements Manual* (2008), Section 25 (attached).

SECTION 25

EXCAVATION AND TRENCHING

25.A GENERAL

25.A.01 Excavation/Trenching Plan. An Excavation/Trenching Plan will be submitted and accepted by the GDA prior to beginning operations. At a minimum, the plan shall include:

a. Conditions: For excavations/trenches less than 5 ft (1.5 m) in depth, an AHA is required; plan is optional. For excavations or trenches greater than 5 ft (1.5 m) in depth an AHA and plan are required;

b. Identification and credentials of Competent Person;

c. Diagram or sketch of the area where the work is to be done, with adjacent and nearby structures shown;

d. Projected depth of the excavation;

e. Projected soil type and method of testing to determine soil type;

f. Planned method of shoring, sloping and/or benching;

g. Planned method for confined space entry, trench access and egress and atmospheric monitoring processes;

h. Location of utility shut offs (if required);

i. Proposed methods for preventing damage to overhead utility lines, trees designated to remain, and other man-made facilities or natural features designated to remain within or adjacent to the construction rights-of-way;

j. Plan for management of excavated soil/asphalt/concrete;

k. Plan for traffic control;

l. Digging permits (Excavation permits). All underground lines/utilities (communication lines, water, fuel, electric lines) shall be located and protected from damage or displacement. Utility companies and other responsible authorities shall be contacted to locate and mark the locations and, if they so desire, direct or assist with protecting the underground installations. The Contractor shall obtain a "Digging Permit" (excavation permit) from Base Civil Engineers or other authority having jurisdiction prior the initiation of any excavation work. Requests for the permits will be processed through the GDA.

m. Certification of UXO clearance. Where excavations are to be performed in areas known or suspected to contain explosives, unexploded munitions, or military ordnance, surface and subsurface clearance by qualified explosive ordnance disposal (EOD) personnel shall be accomplished prior to excavation work.

n. For Cofferdams: Controlled flooding plan, Fall protection, Access/egress; Evacuation procedures.

25.A.02 Excavation inspection and testing.

a. When persons will be in or around an excavation, a Competent Person shall inspect the excavation, the adjacent areas, and protective systems daily: before each work shift; throughout the work shifts as dictated by the work being done; after every rainstorm; after other events that could increase hazards, e.g., snowstorm, windstorm, thaw, earthquake, etc.; when fissures, tension cracks, sloughing, undercutting, water seepage, bulging at the bottom or other similar conditions occur; when there is a change in size, location or placement of the spoil pile; and where there is any indication or change in adjacent structures.

b. The Competent Person shall be able to demonstrate the following:

(1) Training, experience, and knowledge of:

(a) Soil analysis;

(b) Use of protective systems; and

(c) Requirements of this section, EM 385-1-1 and 29 CFR 1926 Subpart P.

(2) Ability to detect:

(a) Conditions that could result in cave-ins;

(b) Failures in protective systems;

(c) Hazardous atmospheres; and

(d) Other hazards including those associated with confined spaces.

(3) And have the Authority to take prompt corrective measures to eliminate existing and predictable hazards and stop work when required.

c. Testing for soil classification shall be of an approved method; pocket pentrometer, plasticity/ wet threadtest or visual test and shall be conducted at least daily or if conditions warrant as described in paragraph 25.A.02.a. above.

d. If evidence of a situation that could result in possible cave-ins, slides, failure of protective systems, hazardous atmospheres, or other hazardous condition is identified, exposed workers shall be removed from the hazard and all work in the excavation stopped until all necessary safety precautions have been implemented.

e. In locations where oxygen deficiency or gaseous conditions are known or suspected, or in excavations 4 ft (1.2 m) or greater in depth, air in the excavation shall be tested prior to the start of each shift or more often if directed by the GDA. A log of all test results shall be maintained at the work site. ***> See Sections 5 and 6.***

25.A.03 Protective systems.

a. The sides of all excavations in which employees are exposed to danger from moving ground shall be guarded by a support system, sloping or benching of the ground, or other equivalent means.

b. Excavations less than 5 ft (1.5 m) in depth and which a Competent Person examines and determines there to be no potential for cave-in do not require protective systems, however, a fixed means of egress shall be provided.

c. Sloping or benching of the ground shall be in accordance with 25.C.

d. Support systems shall be in accordance with 25.D.

e. Protective systems shall have the capacity to resist without failure all loads that are intended or could reasonably be expected to be applied to the system.

f. Shoring shall be used for unstable soil or depths greater than 5 ft (>1.5 m) unless benching, sloping, or other acceptable plan is implemented by the Contractor and accepted by the GDA.

25.A.04 Stability of adjacent structures.

a. Except in stable rock, excavations below the level of the base of footing of any foundation or retaining wall shall not be permitted unless:

(1) A support system, such as underpinning, is provided to ensure the stability of the structure and to protect employees involved in the excavation work or in the vicinity thereof; or

(2) A Registered Professional Engineer (RPE) has approved the determination that the structure is sufficiently removed from the excavation so as to be unaffected by the excavation and that the excavation will not pose a hazard to employees.

b. If the stability of adjoining buildings or walls is endangered by excavations, shoring, bracing, or underpinning designed by a qualified person shall be provided to ensure the stability of the structure and to protect employees.

c. Sidewalks, pavements, and related structures shall not be undermined unless a support system is provided to protect employees and the sidewalk, pavement, or related structure.

25.A.05 Where it is necessary to undercut the side of an excavation, overhanging material shall be safely supported.

25.A.06 Protection from water.

a. Diversion ditches, dikes, or other means shall be used to prevent surface water entering an excavation and to provide good drainage of the area adjacent to the excavation.

b. Employees shall not work in excavations in which there is accumulated water or in which water is accumulating unless the water hazards posed by accumulation is controlled.

(1) Freezing, pumping, drainage, and similar control measures shall be planned and directed by a registered engineer. Consideration shall be given to the existing moisture balances in surrounding soils and the effects on foundations and structures if it is disturbed.

(2) When continuous operation of ground water control equipment is necessary, an emergency power source shall be

provided. Water control equipment and operations shall be monitored by a Competent Person to ensure proper operation.

25.A.07 Protection from falling material.

a. Employees shall be protected (by scaling, ice removal, benching, barricading, rock bolting, wire mesh, or other means) from loose rock or soil that could create a hazard by falling from the excavation wall: special attention shall be given to slopes that may be adversely affected by weather, moisture content, or vibration.

b. Materials, such as boulders or stumps, that may slide or roll into the excavation shall be removed or made safe.

c. Excavated material shall be placed at least 2 ft (0.6 m) from the edge of an excavation or shall be retained by devices that are sufficient to prevent the materials from falling into the excavation. In any case, material shall be placed at a distance to prevent excessive loading on the face of the excavation.

25.A.08 Mobile equipment and motor vehicle precautions.

a. When vehicles or mobile equipment are used or allowed adjacent to an excavation, substantial stop logs or barricades shall be installed. The use of a ground guide is recommended.

b. Workers shall stand away from vehicles being loaded or unloaded to avoid being struck by spillage or falling materials.

c. Excavating or hoisting equipment shall not be allowed to raise, lower, or swing loads over or adjacent to personnel in the excavation without substantial overhead protection. Personnel shall maintain a safe distance from hoisting operation until the load has been placed.

d. Employees exposed to public vehicular traffic shall be provided with, and shall wear, high visibility apparel as per Section 05.F.

25.A.09 Employees shall not be permitted to work on the faces of sloped or benched excavations at levels above other employees except when employees at lower levels are adequately protected from the hazard of falling material or equipment.

25.A.10 When operations approach the location of underground utilities, excavation shall progress with caution until the exact location of the utility is determined. Workers shall be protected from the utility and the utility shall be protected from damage or displacement.

25.A.11 Employees entering excavations classified as confined spaces or that otherwise present the potential for emergency rescue such as bell-bottom pier holes or similar deep and confined footing, shall wear rescue equipment and maintain communication with the (confined space) attendant. ***> See Section 34.***

25.B SAFE ACCESS

25.B.01 Protection shall be provided to prevent personnel, vehicles, and equipment from falling into excavations. Protection shall be provided according to the following hierarchy ***> See Appendix Q for definitions of Perimeter protection: Class I, Class II, and Class III.***

a. If the excavation is exposed to members of the public or vehicles or equipment, then Class I perimeter protection is required;

b. If the excavation does not meet the requirements for Class I perimeter protection but is (1) routinely exposed to employees, and (2) either is deeper than 6 ft (1.8 m) or (3) contains hazards (e.g., impalement hazards, hazardous substances), then Class II perimeter protection is the minimum protection required. When workers are in the zone between the warning barricades/ flagging and the excavation, they shall be provided with fall protection as specified in Section 21;

c. If the excavation does not meet the requirements for either Class I or Class II perimeter protection, then Class III perimeter protection is the minimum protection required.

25.B.02 All wells, calyx holes, pits, shafts, etc., shall be barricaded or covered.

25.B.03 Excavations shall be backfilled as soon as possible. Upon completion of exploration and similar operations, test pits, temporary wells, calyx holes, etc., shall be backfilled immediately.

25.B.04 Walkways or bridges shall be provided with standard guardrails where people or equipment are required or permitted to cross over excavations.

25.B.05 Where personnel are required to enter excavations/trenches over 4 ft (1.2 m) in depth, sufficient stairs, ramps, or ladders shall be provided to require no more than 25 ft (7.6 m) of lateral travel.

a. At least two means of exit shall be provided for personnel working in excavations. Where the width of the excavation exceeds 100 ft (30.4 m), two or more means of exit shall be provided on each side of the excavation.

b. When access to excavations in excess of 20 ft (6 m) in depth is required, ramps, stairs, or mechanical personnel hoists shall be provided.

25.B.06 Ramps ***<See 24.B. and 24.F.***

a. Ramps used solely for personnel access shall be a minimum width of 4 ft (1.2 m) and provided with standard guardrails.

b. Ramps used for equipment access shall be a minimum width of 12 ft (3.6 m). Curbs not less than 8-in x 8-in (20.3-cm x 20.3-cm) timbers, or equivalent protection, shall be provided. Equipment ramps shall be designed and constructed in accordance with accepted engineering practice.

25.B.07 Ladders used as access ways shall extend from the bottom of the excavation to not less than 3 ft (0.9 m) above the surface.

25.C SLOPING AND BENCHING.

25.C.01 Sloping or benching of the ground shall be in accordance with one of the systems outlined in a through d below as per OSHA (*29 CFR 1926, Subpart P, Appendix B*): ***> See Figure 25-1.***

a. For excavations less than 20 ft (6 m) in depth, the maximum slope shall be 34° measured from the horizontal (1-1/2 horizontal to 1 vertical).

b. All excavations less than 20 ft (6m) in depth which have vertically lowered portions shall be shielded or supported to a height at least 18 in (.5 m) above the top of the vertical side with a maximum allowable slope of 1-1/2:1.

c. The design shall be selected from and be in accordance with written tabulated data, such as charts and tables approved by a RPE. At least one copy of the tabulated data shall be maintained at the job site during excavation. The tabulated data shall include:

(1) Identification of the parameters that affect the selection of a sloping or benching system drawn from the data;

(2) Identification of the limits of use of the data, to include the magnitude and configuration of slopes determined to be safe;

(3) Explanatory information as may be necessary to aid the user in correctly selecting a protective system from the data; and

(4) The identity of the RPE who approved the data.

d. The sloping or benching system shall be designed by a RPE. At least one copy of the design shall be maintained at the job site during excavation. Designs shall be in writing and include:

(1) The magnitudes and configurations of the slopes that were determined to be safe for the particular excavation, and

(2) The identity of the RPE who approved the design.

25.D SUPPORT SYSTEMS

25.D.01 Support systems shall be in accordance with one of the systems outlined in a through c below:

a. Designs drawn from manufacturer's tabulated data shall be in accordance with all specifications, limitations, and recommendations issued or made by the manufacturer.

(1) Deviation from the specifications, recommendations, and limitations are only allowed after the manufacturer issues specific written approval.

(2) A copy of the manufacturer's specifications, recommendations, and limitations (and the manufacturer's approval to deviate from these, if required) shall be in written form and maintained at the job site during excavation.

b. Designs shall be selected from and be in accordance with tabulated data (such as tables and charts). At least one copy of the tabulated data shall be maintained at the job site during excavation. The tabulated data shall include:

(1) Identification of the parameters that affect the selection of the protective system drawn from such data,

(2) Identification of the limits of use of the data, and

(3) Explanatory information as may be necessary to aid the user in correctly selecting a protective system from the data, and

(4) The identity of the RPE who approved the data.

c. Designed by a RPE. At least one copy of the design shall be maintained at the job site during excavation. Designs shall be in writing and include:

(1) A plan indicating the sizes, types, and configurations of the materials to be used in the protective system, and

(2) The identity of the RPE who approved the design.

25.D.02 Materials and equipment used for protective systems.

a. Materials and equipment shall be free from damage or defects that might impair their proper function.

b. Manufactured materials and equipment shall be used and maintained in a manner consistent with the recommendations of the manufacturer and in a manner that will prevent employee exposure to hazards.

c. When material or equipment is damaged, a Competent Person shall examine the material or equipment and evaluate its suitability for continued use.

25.D.03 Installation and removal of support systems **> *See Examples of Support Systems at Figures 25-1 through 25-3.***

a. Members of support systems shall be securely connected together to prevent sliding, falling, kickouts, or other predictable failure.

b. Support systems shall be installed and removed in manners that protect employees from cave-ins, structural collapses, or from being struck by members of the support system.

c. Individual members of a support system shall not be subjected to loads exceeding those for which they were designed to withstand.

d. Before temporary removal of individual members, additional precautions shall be taken to ensure the safety of employees, such as installing other structural members to carry the loads imposed on the support system.

e. Removal shall begin at and progress from the bottom of the excavation. Members shall be released slowly as to note any indication of possible failure of the remaining members or possible cave-in of the sides of the excavation.

f. Backfilling shall progress together with the removal of support systems from excavations.

g. For trench excavations: excavation material shall be permitted to a level not greater than 2 ft (.6 m) below the bottom of the members of a support system, only if the system is designed to resist the forces calculated for the full depth of the trench, and there is no indication while the trench is open of a possible loss of soil from behind or below the bottom of the support system.

25.D.04 Shield systems.

a. Shield systems shall not be subjected to loads exceeding those that the system was designed to withstand.

b. Shields shall be installed in a manner to restrict lateral or other hazardous movement of the shield in the event of the application of sudden lateral loads.

c. Employees shall be protected from the hazard of cave-ins when entering or exiting the area protected by shields.

d. Employees shall not be allowed in shields when shields are being installed, removed, or moved vertically.

e. For shield systems used in trench excavations: excavations of earth material to a level not greater than 2 ft (.6 m) below the bottom of the shield shall be permitted, only if the shield is designed to resist the forces calculated for the full depth of the trench, and there is no indications while the trench is open of a possible loss of soil from behind or below the bottom of the shield.

25.D.05 Additional requirements for trenching.

a. Installation of support systems shall be closely coordinated with excavations of trenches.

b. Bracing or shoring of trenches shall be carried along with the excavation.

c. Backfilling and removal of trench supports should progress together from the bottom of the trench. Jacks or braces shall be released slowly and, in unstable soil, ropes shall be used to pull out the jacks or braces from above after personnel have cleared the trench. ***> See Examples of Jacks at Figure 25-3.***

d. Excavation of material to a level no greater than 2 ft (0.6 m) below the bottom of the members of a trench support system (including a shield) shall be permitted, only if the system is designed to resist the forces calculated for the full depth of the trench and there are no indications while the trench is open of a possible loss of soil from behind or below the bottom of the support system.

25.E COFFERDAMS

25.E.01 If overtopping of the cofferdams by high water is possible, design shall include provisions for controlled flooding of the work area.

25.E.02 If personnel or equipment are required or permitted on cofferdams, standard railings, or equivalent protection, shall be provided.

25.E.03 Walkways, bridges, or ramps with at least two means of rapid exit, with standard guardrails, shall be provided for personnel and equipment working on cofferdams.

25.E.04 A plan (including warning signals) for evacuation of personnel and equipment in case of emergency and for controlled flooding shall be developed and posted.

25.E.05 Cofferdams located close to navigable shipping channels shall be protected from vessels in transit.

TABLE 25-1

SOIL CLASSIFICATION*

Soil Type	Criteria	Other Considerations
Stable Rock	Natural solid mineral that can be excavated with vertical sides and remain intact while exposed.	
Type A	Cohesive soil with an unconfined compressive strength of 1.5 tons per square foot (tsf) (144 kPa) or greater.	Can **not** be Type A if soil is: 1) fissured; 2) subject to vibration from heavy traffic, pile driving, etc.; 3) previously disturbed; 4) part of sloped, layered system where layers dip into excavation on a slope of 4H:1V or greater; or 5) subject to other factors requiring it to be classified as less stable material.

TABLE 25-1 (Continued)

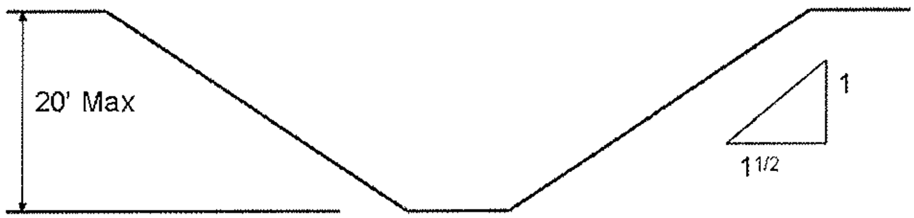
SOIL CLASSIFICATION*

Soil Type	Criteria	Other Considerations
Type B	Cohesive soil with an unconfined compressive strength greater than 0.5 tsf (48 kPa) but less than 1.5 tsf (144 kPa).	Type B soil can also be: 1) granular cohesionless soils such as angular gravel, silt, silt loam, sandy loam, and in some cases, silty clay loam and sandy clay loam; 2) previously disturbed soils except those which would otherwise be classed as Type C soil; 3) soil that meets the requirements of Type A, but is fissured or subject to vibration; 4) dry rock that is not stable; or 5) part of sloped, layered system where layers dip into excavation on a slope of 4H:1V , but only if the soil would otherwise be classed as Type A.
Type C	Cohesive soil with an unconfined compressive strength of 0.5 tsf (48 kPa) or less.	Type C soil can also be: 1) granular soils including gravel, sand, and loamy sand; 2) submerged soil or soil from which water is freely seeping; 3) submerged rock that is not stable; or 4) part of sloped, layered system where layers dip into excavation on a slope of 4H:1V or steeper.

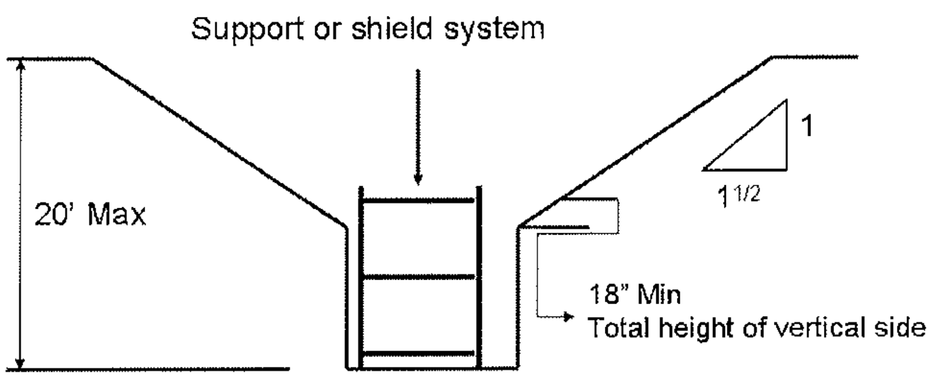
* Soil classification must be determined by a Competent Person as defined in 25.A.02

FIGURE 25-1

SLOPING AND BENCHING



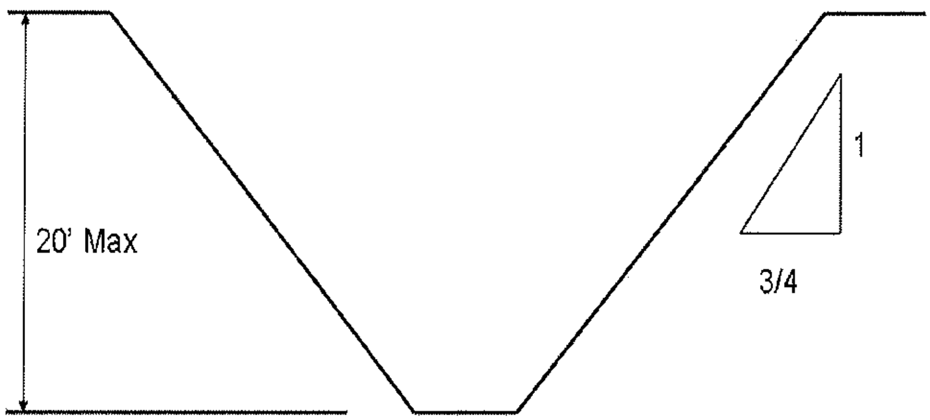
SINGLE SLOPE - TYPE C SOIL



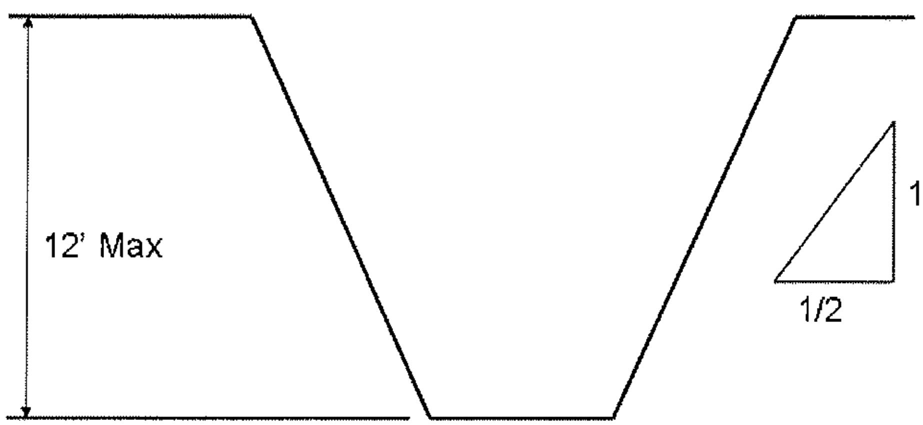
SUPPORTED OR SHIELDED VERTICALLY-SIDED
LOWER PORTION - TYPE C SOIL

FIGURE 25-1 (CONTINUED)

SLOPING AND BENCHING



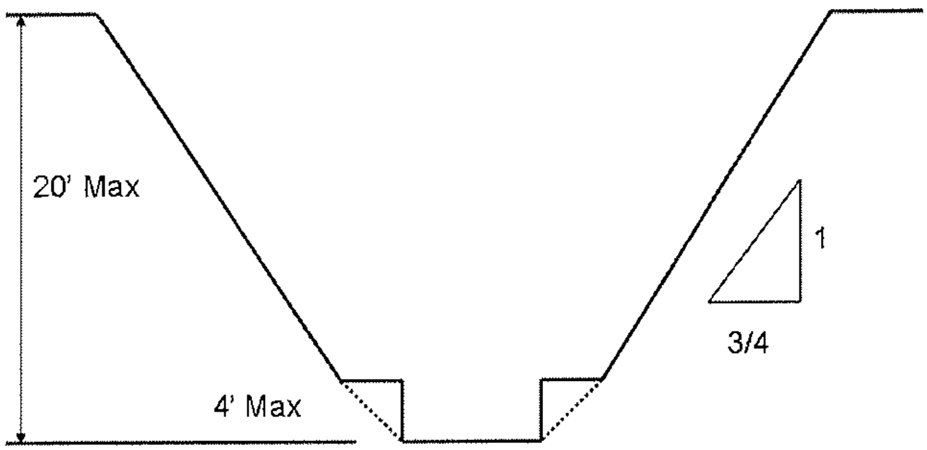
SINGLE SLOPE – GENERAL - TYPE A SOIL*



SINGLE SLOPE – SHORT TERM - TYPE A SOIL *

FIGURE 25-1 (CONTINUED)

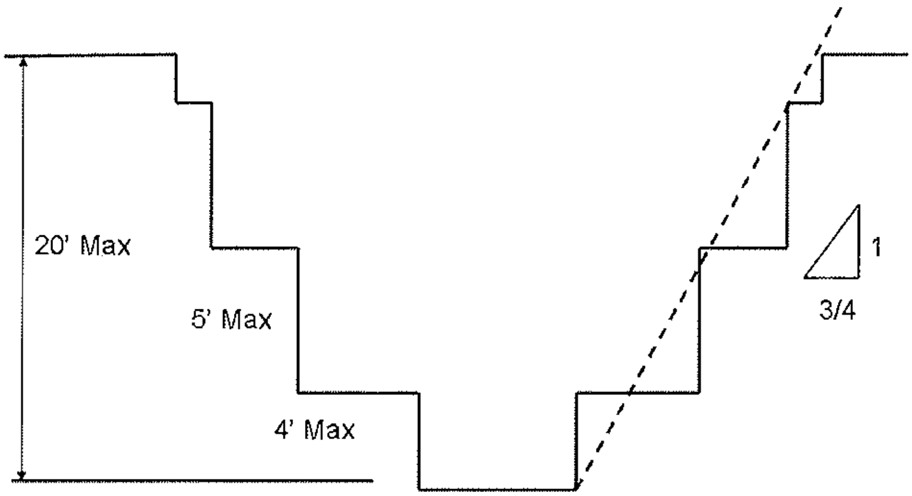
SLOPING AND BENCHING



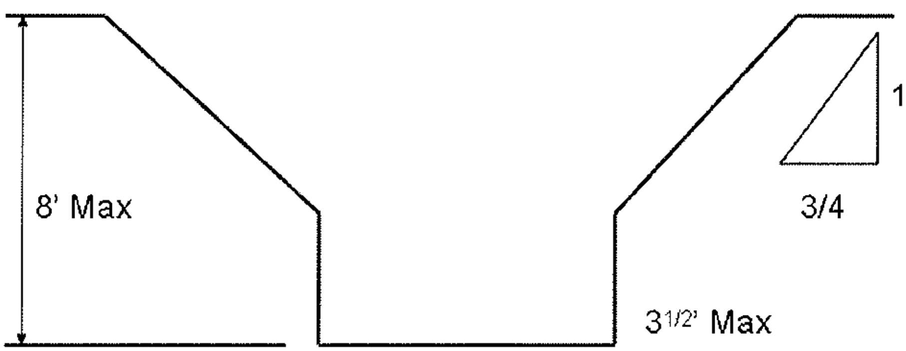
SINGLE BENCH - TYPE A SOIL *

FIGURE 25-1 (CONTINUED)

SLOPING AND BENCHING



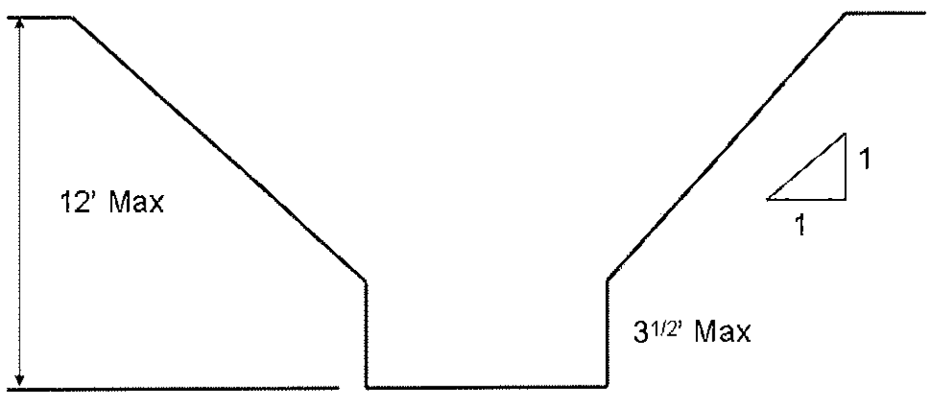
MULTIPLE BENCH - TYPE A SOIL *



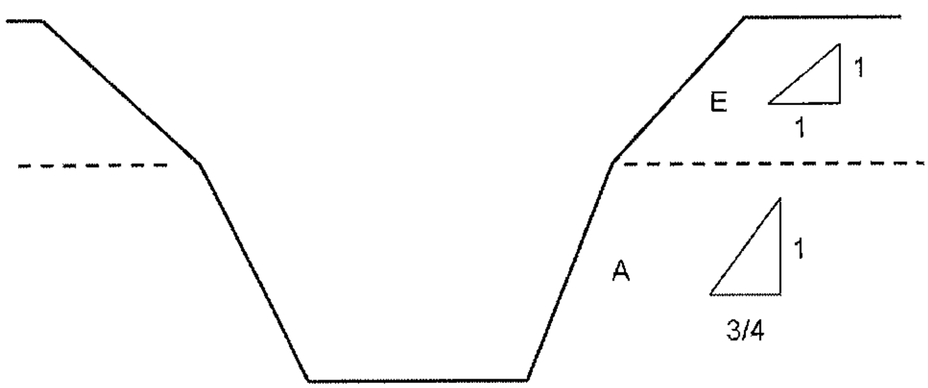
UNSUPPORTED VERTICALLY SIDED LOWER PORTION - MAXIMUM 8 FEET IN DEPTH - TYPE A SOIL *

FIGURE 25-1 (CONTINUED)

SLOPING AND BENCHING



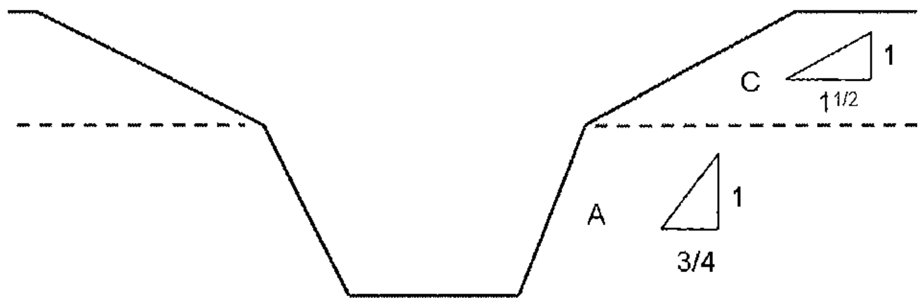
UNSUPPORTED VERTICALLY SIDED LOWER PORTION –
(MAXIMUM 12 FEET IN DEPTH) - TYPE A SOIL *



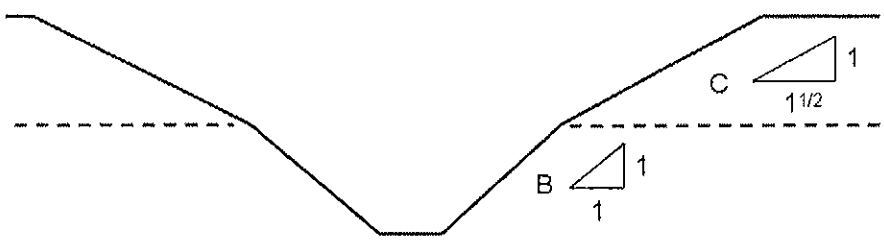
EXCAVATIONS MADE IN LAYERED SOILS - B OVER A *

FIGURE 25-1 (CONTINUED)

SLOPING AND BENCHING



EXCAVATIONS MADE IN LAYERED SOILS - C OVER A *

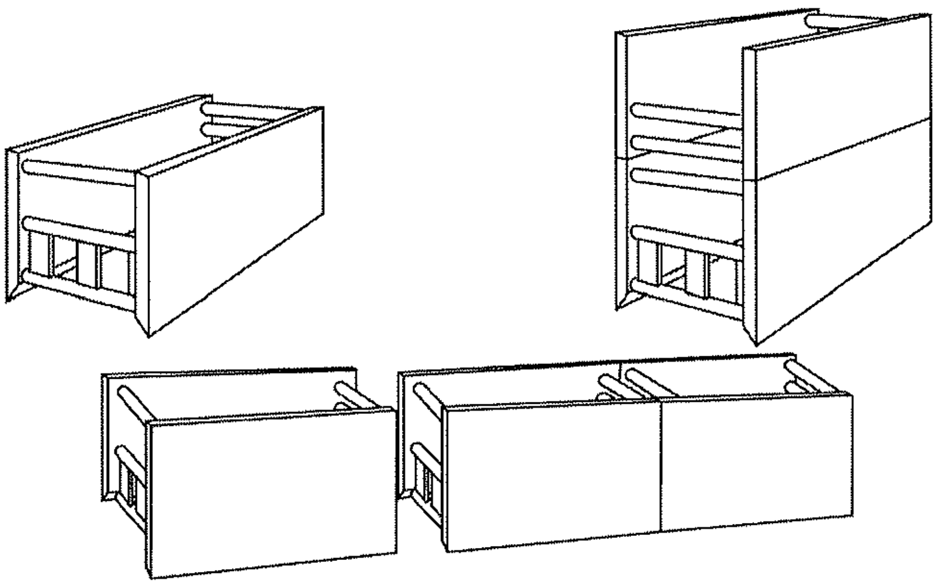


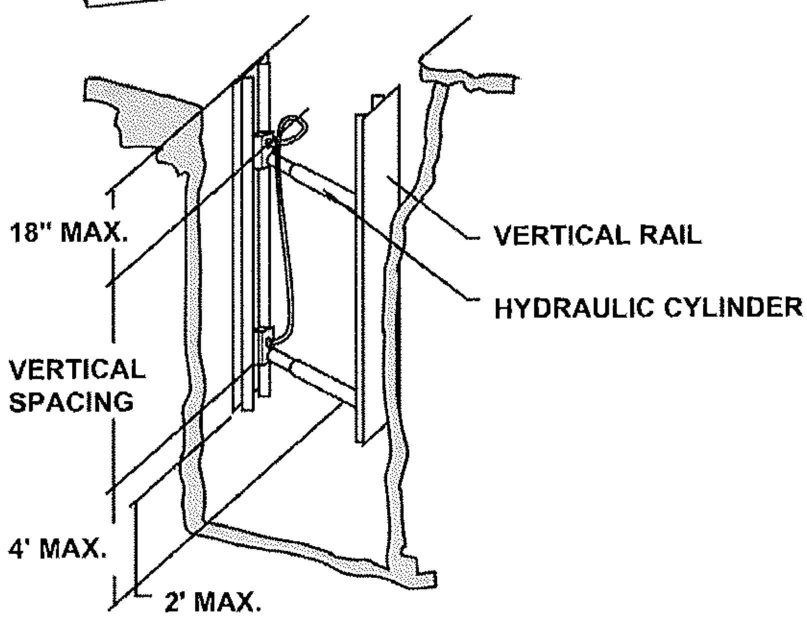
EXCAVATIONS MADE IN LAYERED SOILS - C OVER B *

* Requires the approval and identity of a Registered Professional Engineer.

FIGURE 25-2

TRENCH SHIELDS

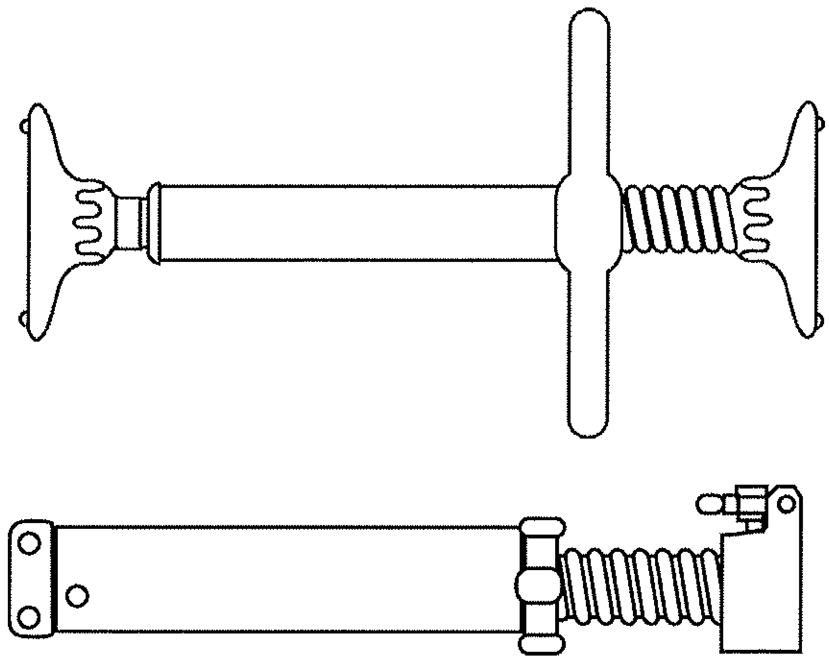


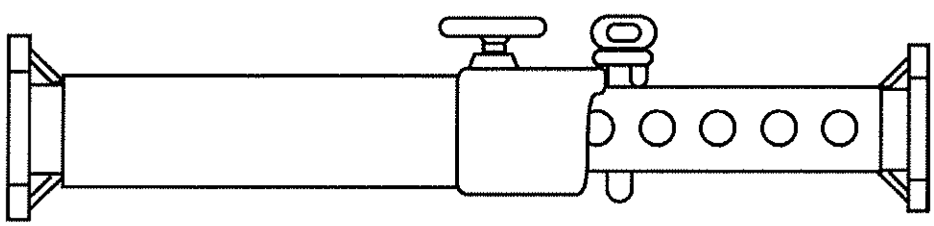


Aluminum Hydraulic Shoring

FIGURE 25-3

TRENCH JACKS





Pneumatic/hydraulic Shoring

Appendix D

ENVIRONMENTAL MONITORING REPORT

ENVIRONMENTAL CONNECTION INC
A Vertical Technologies Corporation

July 14, 2011

Mr. Richard Hunter
Hunter Research, Inc.
120 West State Street
Trenton, NJ 08608

RE: Report of Environmental Monitoring
Assunpink Creek Restoration Project
Trenton, New Jersey

Dear Mr. Hunter:

Environmental Connection, Inc., (EC) performed environmental consulting services in support of the archeological dig performed as part of the Assunpink Creek Restoration Project. Excavation activities associated with the project were performed by Hunter Research between June 16, 2011 and June 29, 2011. Prior to excavation, EC had reviewed and augmented the Site Safety and Health Plan for the project. During the excavation activities, EC performed periodic site inspections and conducted air quality measurements using direct reading instrumentation.

1.0 Air Quality Monitoring

EC established air quality monitoring criteria within the Health and Safety Plan (HASP) based on the contaminants of concern identified within the areas of excavation based on prior soil borings and associated laboratory analysis. The air monitoring criteria established Action Levels (AL) for volatile organic compounds, oxygen and dust levels and are identified in the HASP as follows:

1.1 Vapors/Gases

Photoionization Detector Reading (above Background) Action Level = 0.1 mg/m^3

EC personnel collected measurements of volatile organic compounds (VOC) in real-time with a VOC monitoring instrument, a Multi-RAE Plus equipped with a Photo Ionization Detector (PID). The OSHA Permissible Exposure Limit for the Polynuclear Aromatic Hydrocarbons is 0.2 mg/m^3 so the effective Action Level is 0.1 mg/m^3.

1.2 Airborne Dust- Lead

Dust Monitor Action Level for Lead - 20 mg/m^3
Dust Monitor Action Level as Respirable Dust- 5 mg/m^3

EC personnel supervised the monitoring program to include the concentrations of airborne dust in real-time with a dust monitoring instrument, a TSI Dust-Trak.

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Lead

Based on the following calculation, EC has determined the allowable average airborne dust concentration to be 20 mg/m^3 based on a Safety factor of 4.

$$\text{Action Level (AL)} = \frac{10^6 \text{ mg/kg x PEL } (mg/m^3)}{\text{Soil Concentration } (mg/m^3) \text{ x Safety Factor (SF)}}$$

1.3 Oxygen

An atmosphere in which the Oxygen concentration is 19.5% or less by volume will be deemed *Oxygen-Deficient* and an atmosphere in which the oxygen concentration is 23.5% or more by volume will be deemed *Oxygen-Enriched.* EC monitored oxygen levels with a TSI Multi-RAE Plus.

2.0 Monitoring

On June 13, 2011, James Frisbee, Certified Industrial Hygienist, and Ken Newsome, Industrial Hygienist, of EC were at the site to establish monitoring procedures. The HASP was reviewed by Hunter Research, inclusive of site specific safety concerns. Seven (7) pits would be excavated at pre-determined locations. EC's on-site personnel would perform monitoring of the excavations, with a focus on downwind locations of the excavation and inside the excavation pit during any necessary hand work.

EC performed monitoring at the site on June 13, 15, 17, 20, 22, 24, 27 and 29, 2011. The project team complied with the HASP, and wore personal Level D protective gear as required during the course of the project.

3.0 Monitoring Results

Attachment 1 includes a Table summarizing the monitoring data collected during the course of the project.

No elevations above the established Action Level of 0.1 ppm for volatile organics were recorded during the course of the project.

On June 13, 2011, the oxygen levels were not stable, showing drift ranging from 19.4 to 23 percent. It was determined that the oxygen sensor was failing, and was replaced the same day. All subsequent measurements were consistent and maintained in the acceptable range of 19.5 – 23.5 percent.

No elevations in dust levels were detected above the established Action Level of 20 mg/m^3 that would represent potential exposures to lead at the PEL or the Respirable Dust PEL of 5 mg/m^3.

Please do not hesitate to call with any questions you may have following review of this document. Attached are the monitoring summary table and daily event logs.

Respectfully,
ENVIRONMENTAL CONNECTION, INC.

James Frisbee, CIH
Project Manager

Attachment 1 – Monitoring Summary Table
Attachment 2 – Daily Event Logs

ATTACHMENT 1

Monitoring Summary Table

ENVIRONMENTAL **CONNECTION** INC
A Vertical Technologies Corporation

Client	: Hunter Research	Date	: 06/13/11
Project	: Assunpink Creek Restoration	Technician	:K. Newsome
Areas	: Pit(s) # 1	Project #	: 11071-01

Environmental Monitoring Data Sheet

Excavation Area	TIME	Oxygen (%)	VOC (PPM)	Dust (mg/m^3)
CONTAMINATION REDVC. ZONE	9:08	21.5	0.0	0.014
TRENCH #1 AREA	9:30	21 TO 22	0.0	0.015
TRENCH #1 AREA	9:50	21 TO 22	0.0	0.029
TRENCH #1 AREA	10:00	20.5	0.0	0.023
TRENCH #1 AREA	10:09	21 TO 22	0.0	0.026
TRENCH #1 AREA	10:14	20 TO 19	0.0	0.035
TRENCH #1 AREA	10:18	20 TO 19	0.0	0.024
TRENCH #1 AREA	10:25	20 TO 19	0.0	0.020
TRENCH #1 AREA	10:42	22.6	0.0	0.080
TRENCH #1 AREA	10:51	REZEROED 20.9	0.0	0.024
TRENCH #1 FILL IN TO MOVE TRENCH DOWN	10:57	21.3	0.0	0.043
TRENCH #1 REDIGGING	11:10	20.9	0.0	0.080
TRENCH #1 REDIGGING	11:20	20.9	0.0	0.048
TRENCH #1 REDIGGING	11:26	21.3	0.0	0.141 TO 0.048
TRENCH #1 REDIGGING	11:46	20.9	0.0	0.050
TRENCH #1 REDIGGING	11:52	20.9	0.0	0.040
CONTAMINATION REDVC.ZONE	12:32	20 TO 23	0.0	0.044
TRENCH #1 AREA	12:37	20.9	0.0	0.047
TRENCH #1 AREA	12:50	20.3	0.0	0.052
TRENCH #1 AREA	1300	20.9	0.0	0.048

Prevailing Wind Direction WINDY CONDITIONS-WEST
Weather Conditions SUNNY HIGH 79

ENVIRONMENTAL CONNECTION INC
A Vertical Technologies Corporation

Client	: Hunter Research	Date	: 06/13/11
Project	: Assunpink Creek Restoration	Technician	:K. Newsome
Areas	: Pit(s) # 1 AFTERNOON	Project #	: 11071-01

Environmental Monitoring Data Sheet

Excavation Area	TIME	Oxygen (%)	VOC (PPM)	Dust (mg/m^3)
TRENCH #1	1310	20 TO 22	0.0	0.049
TRENCH #1	1320	20 TO 22	0.0	0.048
TRENCH #1	1330	20 TO 22	0.0	0.048
TRENCH #1	1348	20 TO 22	0.0	0.025
TRENCH #1	1400	20 TO 22	0.0	0.034
TRENCH #1	1414	20 TO 22	0.0	0.030

Prevailing Wind Direction WINDS EAST
Weather Conditions CLOUDY & OVERCAST

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ENVIRONMENTAL CONNECTION INC
A Vertical Technologies Corporation

Client	: Hunter Research	Date	: 06/15/11
Project	: Assunpink Creek Restoration	Technician	:K. Newsome
Areas	: Pit(s) # 1	Project #	: 11071-01

Environmental Monitoring Data Sheet

Excavation Area	TIME	Oxygen (%)	VOC (PPM)	Dust (mg/m^3)
CALIBRATION	8:00	20.9	0.0	0.023
TRENCH #1	8:05	20.9	0.0	0.020
TRENCH #1	8:20	20.9	0.0	0.022
TRENCH #1	8:33	20.9	0.0	0.018
TRENCH #1	8:47	20.9	0.0	0.018 TO 0.022
TRENCH #1	9:18	20.9	0.0	0.025
TRENCH #1	9:25	20.9	0.0	0.040
TRENCH #1	9:36	20.9	0.0	0.020
TRENCH #1	9:45	20.9	0.0	0.019
TRENCH #1	10:00	20.9	0.0	0.035
TRENCH #1	10:10	20.9	0.0	0.045
TRENCH #1	10:23	20.9	0.0	0.051
TRENCH #1	10:40	20.9	0.0	0.058
TRENCH #1	10:50	20.9	0.0	0.067
TRENCH #1	10:52	20.9	0.0	0.045
TRENCH #1	11:03	20.9	0.0	0.050
TRENCH #1	11:18	20.9	0.0	0.052
TRENCH #1	11:31	20.9	0.0	0.067
TRENCH #1	11:44	20.9	0.0	0.044
TRENCH #1	12:00	20.9	0.0	0.031

Prevailing Wind Direction WIND IS BLOWING SOUTH FROM THE NORTH
Weather Conditions SUNNY

ENVIRONMENTAL CONNECTION INC
A Vertical Technologies Corporation

Client	: Hunter Research	Date	: 06/15/11
Project	: Assunpink Creek Restoration	Technician	:K. Newsome
Areas	: Pit(s) # 1	Project #	: 11071-01

Environmental Monitoring Data Sheet

Excavation Area	TIME	Oxygen (%)	VOC (PPM)	Dust (mg/m^3)
TRENCH #1	12:58	20.9	0.0	0.041
TRENCH #1	1311	20.6	0.0	0.034
TRENCH #1	1318	20.9	0.0	0.034
TRENCH #1	1338	20.9	0.0	0.047
TRENCH #1	1358	20.9	0.0	0.044
TRENCH #1	1408	20.9	0.0	0.054
TRENCH #1	1420	20.9	0.0	0.050
TRENCH #1	1430	20.9	0.0	0.044

Prevailing Wind Direction WIND IS BLOWING SOUTH FROM THE NORTH
Weather Conditions SUNNY

ENVIRONMENTAL CONNECTION INC
A Vertical Technologies Corporation

Client : Hunter Research
Project : Assunpink Creek Restoration
Areas : Pit(s) # 2

Date : 06/17/11
Technician :K. Newsome
Project # : 11071-01

Environmental Monitoring Data Sheet

Excavation Area	TIME	Oxygen (%)	VOC (PPM)	Dust (mg/m^3)
CALIBRATION	7:57	20.9	0.0	0.042
TRENCH #2	8:01	20.9	0.0	0.057
TRENCH #2	8:10	20.9	0.0	0.067
TRENCH #2	8:17	20.9	0.0	0.045
TRENCH #2	8:27	20.9	0.0	0.050
TRENCH #2	8:35	20.9	0.0	0.053
TRENCH #2	8:44	20.9	0.0	0.078
TRENCH #2	8:59	20.9	0.0	0.037

Prevailing Wind Direction CLOUDY OVER CAST
Weather Conditions WIND IS BLOWING NORTH

ENVIRONMENTAL CONNECTION INC
A Vertical Technologies Corporation

Client : Hunter Research
Project : Assunpink Creek Restoration
Areas : Pit(s) # 3

Date : 06/20/11
Technician :K. Newsome
Project # : 11071-01

Environmental Monitoring Data Sheet

Excavation Area	TIME	Oxygen (%)	VOC (PPM)	Dust (mg/m^3)
STAGING AREA BACKGROUND'S	10:14	----	0.0	0.0016
TRENCH #3 DOWNWIND	11:00	----	0.0	0.045
TRENCH #3 DOWNWIND	11:10	----	0.0	0.112 TO 0.050
TRENCH #3 DOWNWIND	11:25	----	0.0	0.132 TO 0.051
TRENCH #3 DOWNWIND	11:35	----	0.0	0.045
TRENCH #3 DOWNWIND	11:50	----	0.0	0.035
TRENCH #3 DOWNWIND	12:00	----	0.0	0.040
TRENCH #3 DOWNWIND	12:54	20.9	0.0	0.045
TRENCH #3 DOWNWIND	1307	20.9	0.0	0.060
TRENCH #3 DOWNWIND	1315	20.9	0.0	0.050
TRENCH #3 DOWNWIND	1330	20.9	0.0	0.046
TRENCH #3 DOWNWIND	1350	20.9	0.0	0.051
TRENCH #3 DOWNWIND	1407	20.9	0.0	0.065
TRENCH #3 DOWNWIND	1420	20.9	0.0	0.036

Prevailing Wind Direction LIGHT WIND BLOWING NORTH/WEST
Weather Conditions OVER CAST CLOUD'S

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ENVIRONMENTAL **CONNECTION** INC

A Vertical Technologies Corporation

Client	: Hunter Research	Date	: 06/22/11
Project	: Assunpink Creek Restoration	Technician	:K. Newsome
Areas	: Pit(s) # 5	Project #	: 11071-01

Environmental Monitoring Data Sheet

Excavation Area	TIME	Oxygen (%)	VOC (PPM)	Dust (mg/m^3)
AT TRENCH #5	8:00	20.9	0.0	0.025
AT TRENCH #5	8:10	20.9	0.0	0.023
AT TRENCH #5	8:25	20.9	0.0	0.008
AT TRENCH #5	8:35	20.9	0.0	0.025
AT TRENCH #5	8:45	20.9	0.0	0.030
AT TRENCH #5	9:00	20.9	0.0	0.025
AT TRENCH #5	9:20	20.9	0.0	0.030
AT TRENCH #5	9:30	20.9	0.0	0.024
AT TRENCH #5	10:00	20.9	0.0	0.020
AT TRENCH #5	10:05	20.9	0.0	0.043
AT TRENCH #5	10:15	20.9	0.0	0.044
AT TRENCH #5	10:25	20.9	0.0	0.040
AT TRENCH #5	10:35	20.9	0.0	0.035
AT TRENCH #5	10:45	20.9	0.0	0.040
AT TRENCH #5	10:55	20.9	0.0	0.030

Prevailing Wind Direction NORTH EAST WIND'S

Weather Conditions CLOUDY CHANCE OF RAIN TODAY

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ENVIRONMENTAL CONNECTION INC
A Vertical Technologies Corporation

Client : Hunter Research
Project : Assunpink Creek Restoration
Areas : Pit(s) # 6

Date : 06/22/11
Technician :K. Newsome
Project # : 11071-01

Environmental Monitoring Data Sheet

Excavation Area	TIME	Oxygen (%)	VOC (PPM)	Dust (mg/m^3)
TRENCH #6	9:30	20.9	0.0	0.040
TRENCH #6	9:40	20.9	0.0	----
TRENCH #6	9:50	20.9	0.0	----
TRENCH #6	10:18	20.9	0.0	----
TRENCH #6	10:37	20.9	0.0	-.060
TRENCH #6	10:48	20.9	0.0	--.060
TRENCH #6	11:12	20.9	0.0	-.060
TRENCH #6	11:22	20.9	0.0	-.057
TRENCH #6	12:50	20.9	0.0	-.060
TRENCH #6	1300	20.9	0.0	0.031
TRENCH #6	1315	20.9	0.0	0.054
TRENCH #6	1330	20.9	0.0	0.047
TRENCH #6	1350	20.9	0.0	0.046
TRENCH #6	1400	20.9	0.0	0.052
TRENCH #6	1425	20.9	0.0	0.045
TRENCH #6	1435	20.9	0.0	0.037
TRENCH #6	1450	20.9	0.0	0.034
TRENCH #6	1500	20.9	0.0	0.044

Prevailing Wind Direction SOUTH EAST
Weather Conditions CLOUDY CHANCE OF RAIN

ENVIRONMENTAL CONNECTION INC
A Vertical Technologies Corporation

Client	: Hunter Research	Date	: 06/27/11
Project	: Assunpink Creek Restoration	Technician	:K. Newsome
Areas	: Pit(s) # 6	Project #	: 11071-01

Environmental Monitoring Data Sheet

Excavation Area	TIME	Oxygen (%)	VOC (PPM)	Dust (mg/m^3)
TRENCH #6	8:02	20.9	0.0	0.016
TRENCH #6	8:12	20.9	0.0	0.029
TRENCH #6	8:22	20.9	0.0	0.023
TRENCH #6	8:41	20.9	0.0	0.027
TRENCH #6	8:51	20.9	0.0	0.017
TRENCH #6	9:10	20.9	0.0	0.018
TRENCH #6	9:20	20.9	0.0	0.041
TRENCH #6	9:40	20.9	0.0	0.030
TRENCH #6	10:12	20.9	0.0	0.020
TRENCH #6	10:22	20.7	0.0	0.025
TRENCH #6	11:00	20.9	0.0	0.025
TRENCH #6	11:10	20.7	0.0	0.027
TRENCH #6	11:20	20.9	0.0	0.029
TRENCH #6	11:30	20.9	0.0	0.031
TRENCH #6	11:45	20.9	0.0	0.030
TRENCH #6	1300	20.9	0.0	0.031
TRENCH #6	1310	20.9	0.0	0.036
TRENCH #6	1320	20.9	0.0	0.028
TRENCH #6	1330	20.9	0.0	0.024
TRENCH #6	1345	20.9	0.0	0.035

Prevailing Wind Direction SOUTH WINDS LIGHT
Weather Conditions SUNNY AND CLEAR SKIES

ENVIRONMENTAL CONNECTION INC
A Vertical Technologies Corporation

Client	: Hunter Research	Date	: 06/27/11
Project	: Assunpink Creek Restoration	Technician	:K. Newsome
Areas	: Pit(s) # 6	Project #	: 11071-01

Environmental Monitoring Data Sheet

Excavation Area	**TIME**	**Oxygen (%)**	**VOC (PPM)**	**Dust (mg/m^3)**
TRENCH #6	1412	21.1	0.0	0.033
TRENCH #6	1416	20.9	0.0	0.030
TRENCH #6	1426	20.9	0.0	0.033
TRENCH #6	1500	20.9	0.0	0.030

Prevailing Wind Direction SOUTH WEST WINDS LIGHT
Weather Conditions AFTERNOON CLOUDY AND OVERCAST

ENVIRONMENTAL CONNECTION INC
A Vertical Technologies Corporation

Client : Hunter Research
Project : Assunpink Creek Restoration
Areas : Pit(s) # 6/7

Date : 06/29/11
Technician: R.BROADWATER
Project # : 11071-01

Environmental Monitoring Data Sheet

Excavation Area	TIME	Oxygen (%)	VOC (PPM)	Dust (mg/m^3)
TRENCH #6	07:50	20.9	0.0	0.030
TRENCH #6	08:10	20.9	0.0	0.031
TRENCH #6	08:25	20.9	0.0	0.015
TRENCH #6	08:40	20.9	0.0	0.030
TRENCH #6	08:52	20.9	0.0	0.046
TRENCH #6	09:15	20.6	0.0	0.044
TRENCH #6	09:31	20.6	0.0	0.044
TRENCH #6	09:42	20.6	0.0	0.032
TRENCH #6	09:55	20.6	0.0	0.040
TRENCH #6	10:05	20.6	0.0	0.108
TRENCH #6	10:20	20.6	0.0	0.051
TRENCH #6	10:35	20.6	0.0	1.27
TRENCH #6	11:00	20.6	0.0	1.25
TRENCH #6	11:15	20.6	0.0	0.068
TRENCH #6	11:27	20.6	0.0	0.042
TRENCH #6	11:41	20.6	0.0	0.052
TRENCH #6	11:56	20.6	0.0	0.0022
TRENCH #6	12:10	20.6	0.0	0.015

Prevailing Wind Direction___
Weather Conditions____

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ATTACHMENT 2

Daily Event Logs

CONNECTION
A Vertical Technologies Corporation

Client	: Hunter Research	Date	: 6-13-11
Project	: Assunpink Creek Restoration	Technician	: K. [illegible]
Areas	: Pit(s) # 1	Project #	: 11071-01

DAILY EVENT LOG

TIME	EVENT
830	EC arrived on site to meet with Jim Lee of Hunter to see where they are working today.
900	EC ran background samples along with Jim Frisbee of EC. KN
940	Digging of Trench #1 is starting now. EC will run Dust/VOC/oxygen levels.
Note	(Slight drift on the high side of oxygen sensor to be evaluated.)
Note	While digging the trench, when dumping the dirt the Dust level jumped to 0.135 but then drops back to 0.019 downwind of the trench. KN
1010	Oxygen level alarm showed low oxygen at 19.2. EC is restarting the unit. KN
Note	After restarting the oxygen level is 20.9 now. KN
1017	Dust track jumped to 0.231 but went back down to 0.040 right away.
1030	EC is doing a fresh air calibration on the MultiRAE now. VOC 0.0 Oxygen 20.9 now.
1037	Trench is 15' deep now, digging has stopped for now. KN
Note	At 15' of digging the backhoe is still in fill dirt. KN
1057	This part of Trench #1 is being filled back in now no wall's found in this trench yet. KN
Note	While trench is being filled back in Dust level's jumped to 0.302 but then dropped to 0.042.
1110	Digging of Trench one has resumed now. EC is running samples now. KN
Note	Dust track jumped to 0.545 but went back down to 0.040. KN
1126	When the wind picks up the Dust track level went to 0.141 then back down to 0.018
1146	Crew is still looking for the water line before they start digging deeper. KN
Note	40' away from fence is where they are digging down the slope to find the water pipe.
1152	Crew is breaking for lunch now. KN
1232	EC is running another background set of samples before the crew goes back to work
Note	When the wind blows hard on the Dust level went to 0.059 but went back to 0.018
	Left side of the trench downwind. KN
1250	The crew is starting to dig further down in the trench now. KN
1258	The low oxygen alarm went off level 19.4. EC is going to calibrate MultiRAE now.
1300	The trench is being widened now. KN
Note	After recalibration the oxygen level is at 20.9 now. KN
1312	Dust track jumped to 0.545 but returned to 0.050. KN
1326	Oxygen alarm has went off at 20.6 now. EC is recalibrating the MultiRAE again.
Note	35' down the slope of Trench #1 and 11' down the crew has hit water level. KN
	And make one of the wall's. The hole is being cleaned out to make sure. KN
1345	Trench is cleaned out at 26' off the fence and 11' to the top of the wall.
1353	Trench is being filled back in up to 5' then they will move back another 8' and dig for
	another wall. The first wall they think is an ~~[illegible]~~ Int. wall. KN
1400	The crew has found the water pipe now 42' off the fence and 4' down 2" water pipe.
1414	Crew is digging down behind the water pipe to see if the Ext wall is right in front
	of the 2" water line, because that's what it shows on the print. KN

1 of 2

CONNECTION
A Vertical Technologies Corporation

Client	: Hunter Research	Date	: 6-13-11
Project	: Assunpink Creek Restoration	Technician	: K. Newkerque
Areas	: Pit(s) #	Project #	: 11071-01

DAILY EVENT LOG

TIME	EVENT
14 26	The trench digging is done now it's 50' long now. The trench is being filled back in to a 5' depth. On the back side of the water pipe at 5' down the crew has found a cement slab. On Wensday they will expand the width of the trench to 10' so they can get in it safly to clean off this area and the back of the [illegible] wall to get pictures of it. B.C. is leaving the site to return to B.C. office now. — KN

2 of 2

CONNECTION

A Vertical Technologies Corporation

Client	: Hunter Research	Date	: 6-15-11
Project	: Assunpink Creek Restoration	Technician	: K. NewBorne
Areas	: Pit(s) # 1	Project #	: 11071-01

DAILY EVENT LOG

TIME	EVENT
800	EC is on Site now Calibrating the Fresh Air on the MultiRae and getting the Dust Trak ready to go, For more digging at Trench #1. — KN
801	Trench #1 is being widened so the crew can get in the trench to see if they Found the EXT wall and what the slab is that they found on Monday. — KN
825	EC has check the Oxygen Level in the Trench before the crew start's Cleaning the Dirt away to Finde the EXT wall and to See what the Slab is. — KN
NOTE	Hunter Research is having the digging being done on the other Side of the 2" Pipe, they couldent Finde the wall in this area. — KN
835	EC is going back to Office to Pick up battery's for the Dust Trak. — KN
850	EC is back on site now, Dust Trak is working now. — KN
925	Crew is still digging looking for the EXT wall. — KN
1000	crew is taking a break now. — KN
1040	crew is going back to work on digging in Trench #1 looking for the EXT wall. — KN
1052	EC has checked the oxygen level in Trench #1, it's still at 20.9. — KN
1200	Crew & EC are breaking for lunch. — KN
1240	EC is Calibrating the MultiRae Fresh Air now. — KN
1258	Crew is getting in the Trench the Oxygen Level is Still at 20.9. — KN
1318	EC has tested the Oxygen Level now in Trench #1 so the men can dig By hand the Oxygen Level is still 20.9 in the trench. — KN
Note	Ground water coming thru Trench #1 has oil sheen on top of water about 13' down, at Manhole level of ground down. — KN
1400	The Trench hole is being Filled back in up to 5' on the Left Side of 2" water Line. Then the digging will be done deeper on the right side OF the water Line. — KN
1445	Trench is being Filled back in now to 5' From ground Level no wall was Found today;
1500	EC is Leaving the Site now. END of Shift. — KN

1 of 1

CONNECTION
A Vertical Technologies Corporation

Client	: Hunter Research	Date	: 6-17-11
Project	: Assunpink Creek Restoration	Technician	: K. Newsome
Areas	: Pit(s) #2	Project #	: 11071-01

DAILY EVENT LOG

TIME	EVENT
745	Kenneth Newsome of EC is now on site to monitor the Trench digging by Hunter Research. KN
750	Crew is going to work on digging out Trench #2 Today. KN
817	Crew is getting in the Trench to see if they found booth will EC is going in to check the oxygen level befor they go in. KN
900	Trench #2 is done and now is being filled back in so they can dig out Trench #3 when they determen wher they want Trench #3 to be. KN
Note	The rest of Trench #1 is also be filled back in now. KN
1000	Trench #1 is still being back filled with Dirt. KN
1023	Jim Lee has arrived on site to lay out where Trench #3 will be on the site.
1058	Trench #3 is Layed out now. Trench # still needs to back filled, so digging of Trench #3 will start on Monday 6-20-11. EC is leaving the Site. KN

1 of 1

CONNECTION
A Vertical Technologies Corporation

Client	: Hunter Research	Date	: 6-2-11
Project	: Assunpink Creek Restoration	Technician	: K. Newsome
Areas	: Pit(s) #3	Project #	: 11071-01

DAILY EVENT LOG

TIME	EVENT
800	EC is on site, but crew will not be on site until 930 or 1000 today. EC is going back to office now. — KN
900	EC is back on site awaiting the arrival of the Hunter Research crew. — KN
938	One of the crew has arrived on site to open the gate. — KN
Note	Light wind from south to north, over cast clouds. — KN
1025	Two of the crew is on site, waiting on Backhoe operator to arrive on site. — KN
1052	The Operator is now on site, to dig Trench #3. — KN
1100	Trench #3 digging is starting now. EC is running sample's while trench is being done. — KN
Note.	when the wind pick's up the Dust Trak jumps + 0.112 but goes back down to 0.050.
1141	The First Part of Trench #3 5' to 15' of Fence is being Filled back in now. — KN
1200	Crew is breaking for lunch now. — KN
1250	Crew is going back to work from lunch now on digging out Trench #3. — KN
1350	Crew has found the 2" water line in Trench #3 now. — KN
1420	Operator is widening the Trench at the back Side of the 2" water Line, So the crew can safley get in to the Trench on Tus to see if they have found a wall. The front of the trench is going to be filled back in as well. — KN
1440	Trench has been widened behind the 2" water Line, Now the trench is being Filled in in front of the 2" water Line. EC is Leaving the site now. — KN

1 of 1

CONNECTION
A Vertical Technologies Corporation

Client	: Hunter Research	Date	: 6-22-11
Project	: Assunpink Creek Restoration	Technician	: K. Newsome
Areas	: Pit(s) # 5	Project #	: 11071-01

DAILY EVENT LOG

TIME	EVENT
800	Kenneth Newsome of E.C. is now on Site, to monitor the Trench digging.
Note	Trench #3 & #4 are Part of each Other. The crew has Found what they think is a
	wood floor under the water level. KN
810	Today the crew is going to dig out Trench #5 40' to the south of Trench #3 & 4.
825	Digging of Trench #5 has started now. KN
930	The First Part of the Trench #5 is being back filled in. Nothing was found digging
	5' down in this Part of the Trench. After filling it in the crew will be moving
	back, to dig more of Trench #5. KN
958	Trench digging of Trench #5 has started again. KN
1045	Trench #5 is still be work on by Hunter research. KN
1058	Digging has Stoped now so Hunter Crew can take some mesurement's. KN
1130	Trench #5 is done the crew didn't Find anything in this trench. The rest
	of the day will be Spent back filling in the rest of trenchs 3 & 4 as well as #5.

CONNECTION
A Vertical Technologies Corporation

Client	: Hunter Research	Date	: 6-24-11
Project	: Assunpink Creek Restoration	Technician	: K. Newsome
Areas	: Pit(s) # 6	Project #	: 11071-01

DAILY EVENT LOG

TIME	EVENT
730	Kenwith Newsome of EC is now on Site. Hunter Research crew is going to be
	moving the equipment to the other side of the Property to dig Trench's #6 & #7. — KN
845	Flat bed truck has arrived on Site to move the equipment to the other side
	for the digging of Trench #6 & #7 now. — KN
930	The crew is Starting to dig Trench #6 now. EC will be monitoring the dig.
Note	Dust Trak is not working, EC will need to get New Batterys. — KN
950	Crew is going to Suit up to Shovel in the Trench by hand now. — KN
1015	EC has checked the Oxygen Level in the trench it is at 20.9 so the crew can dig.
1030	The Hunter research crew has found a wall in Trench #6 They are clearing
	away more dirt by hand to see witch way the wall runs. — KN
1118	The crew is trying to find the back side of the wall now. — KN
1145	Crew is breaking for Lunch now. — KN
1250	Crew is going back to work From Lunch now. — KN
1400	Trench #6 is beeing widened to See where the wall runs to. — KN
1405	It has Started to rain now. EC is Still monitoring the digging of trench #6.
1425	The rain has Stoped now. EC is back at the trench monitoring the Dust & Oxygen.
1500	Crew is done digging for today. EC is returning equipment to the Office. — KN

1 of 1

120 North Warren Street $ Trenton, New Jersey 08608 $ tel: 609-392-4200 $ fax: 609-392-1216
e-mail: info@vtihq.com $ web: vtihq.com

CONNECTION
A Vertical Technologies Corporation

Client	: Hunter Research	Date	: 6-27-11
Project	: Assunpink Creek Restoration	Technician	: K. Newsome
Areas	: Pit(s) # 6	Project #	: 11071-01

DAILY EVENT LOG

TIME	EVENT
745	Kenith Newsome of EC is now on site. Crew will be digging more of trench
	#6 today to see where the wall runs to that they found on Fri. 6-24-11. — KN
850	Crew is still tracking the wall in Trench #6. — KN
1015	Crew is taking a water break now. — KN
1030	Crew is back to work hand digging around the wall's now. — KN
1030	Crew is on hold while the Dirt is being moved so the backhoe can reposition.
1100	Crew is going back in to Trench #6 now to dig around the wall's to see the
	thickness of the wall's. — KN
1150	EC & the Hunter crew are breaking for Lunch now. — KN
1300	Crew is going back to work in Trench #6 from Lunch now. — KN
1345	Crew is still cleaning and digging the dirt around the wall's in Trench #6. — KN
1412	The Oxygen Level went from 20.9 to 21.1 in trench #6 now. — KN
1416	The Oxygen Level in the trench went back to 20.9. — KN
1500	Crew is done for the day. EC is taking the equipment back to EC's office.

1 of 1

120 North Warren Street $ Trenton, New Jersey 08608 $ tel: 609-392-4200 $ fax: 609-392-1216
e-mail: info@vtihq.com $ web: vtihq.com

CONNECTION
A Vertical Technologies Corporation

Client	: Hunter Research	Date	: June 21 2011
Project	: Assunpink Creek Restoration	Technician	: Ryan Broadwater
Areas	: Pit(s) # [illegible]	Project #	: 11071-01

DAILY EVENT LOG

TIME	EVENT
0700	Ryan Broadwater - Representing Environmental Connection arrives at
	site ("hereafter "EC") [illegible] from Hunter Research on site
	and [illegible].
0730	Crew on site with 1 excavator and 3 [illegible] crew. EC
	informed that [illegible] excavation at Pit #1 [illegible]
	[illegible] - [illegible] will be done [illegible]
	excavation in ~~[illegible]~~ trenches [illegible].
0750	EC calibrates and places Dusttrak and MultiRAE Pro
	adjacent to excavation area. Sensors placed to
	[illegible] readings [illegible] from [illegible]
08:30	Crew begins excavation of [illegible] wall
	structure in Trench 6. Refer to [illegible] log for
	[illegible] readings.
0900	Excavation [illegible]. EC [illegible] [illegible]
	[illegible] [illegible] - no problems observed.
0930	[illegible] continues [illegible]. EC recommends
	frequent water breaks and retreat from direct sun [illegible]
0945	Work continues.
1015	Crew activates excavator to remove additional
	material from Trench #6.
1031	Tim Lee from Hunter Research on site. Site [illegible] with
	EC.
11:0[illegible]	[illegible] now complete. Crew continues
	hand excavation in Trench 6.
11:30	EC completes readings on Dusttrak and MultiRAE Pro - No
	action levels detected.
12:00	Excavation activities for project now complete. - EC completes
	final visual assessment of work area.
12:30	EC departs site

RB 6-21-11

120 North Warren Street $ Trenton, New Jersey 08608 $ tel: 609-392-4200 $ fax: 609-392-1216
e-mail: info@vtihq.com $ web: vtihq.com

Appendix E

ARTIFACT INVENTORY

APPENDIX E
ARTIFACT INVENTORY

Trench 6 Context 4 **Catalog # 1**

1	Historic Building Materials, Ferrous metal, hook, fragment, corroded	Row #	3
2	Historic Building Materials, Ferrous metal, nail, unidentified form, fragment, corroded	Row #	2
1	Historic Ceramic Vessel Sherds, Coarse Earthenware, Redware, hollow ware, rim, glazed both surfaces, clear lead glaze with manganese sponging	Row #	48
1	Historic Ceramic Vessel Sherds, Coarse Earthenware, Redware, unidentified form, body, unglazed exterior, exterior surface missing, black manganese glaze	Row #	37
1	Historic Ceramic Vessel Sherds, Coarse Earthenware, Redware, unidentified form, body, glazed both surfaces, lead/manganese glaze	Row #	40
3	Historic Ceramic Vessel Sherds, Coarse Earthenware, Redware, unidentified form, rim, unglazed exterior, exterior surface missing, clear lead glaze with manganese flecks	Row #	35
1	Historic Ceramic Vessel Sherds, Porcelain, hard paste, unidentified form, base, blue underglaze, blue, blue floral scene	Row #	57
1	Historic Ceramic Vessel Sherds, Refined Earthenware, Ironstone, bowl, base and body, undecorated, paneled, 1840-Present	Row #	32
1	Historic Ceramic Vessel Sherds, Refined Earthenware, Ironstone, cup, base, undecorated, 1840-Present	Row #	27
1	Historic Ceramic Vessel Sherds, Refined Earthenware, Ironstone, plate, base fragment, undecorated, 1840-Present	Row #	22
1	Historic Ceramic Vessel Sherds, Refined Earthenware, Ironstone, plate, base fragment, undecorated, 1840-Present	Row #	23
4	Historic Ceramic Vessel Sherds, Refined Earthenware, Ironstone, plate, rim, undecorated, multiple vessels, 1840-Present	Row #	30
5	Historic Ceramic Vessel Sherds, Refined Earthenware, Ironstone, unidentified form, base fragment, undecorated, multiple vessels, 1840-Present	Row #	24
7	Historic Ceramic Vessel Sherds, Refined Earthenware, Ironstone, unidentified form, rim, undecorated, multiple vessels, 1840-Present	Row #	29
4	Historic Ceramic Vessel Sherds, Refined Earthenware, Ironstone, unidentified form, body fragments, undecorated, multiple vessels, 1840-Present	Row #	28
1	Historic Ceramic Vessel Sherds, Refined Earthenware, Ironstone, unidentified form, base and foot ring, undecorated, 1840-Present	Row #	25
9	Historic Ceramic Vessel Sherds, Refined Earthenware, Ironstone, unidentified form, body fragments, undecorated, multiple vessels, 1840-Present	Row #	21
5	Historic Ceramic Vessel Sherds, Refined Earthenware, Ironstone, unidentified form, rim and body, non scalloped, non incised shell edge, blue, multiple vessels, 1841 - 1857	Row #	20
6	Historic Ceramic Vessel Sherds, Refined Earthenware, Ironstone, unidentified form, base and body fragments, transfer printed, purple, purple transfer print design featuring tree leaves and flowers, 1840-Present	Row #	19
1	Historic Ceramic Vessel Sherds, Refined Earthenware, Ironstone, unidentified form, base fragment, undecorated, 1840-Present	Row #	26
6	Historic Ceramic Vessel Sherds, Refined Earthenware, Ironstone, waster, base, body, and rim fragments, undecorated, multiple vessels, 1840-Present	Row #	31
5	Historic Ceramic Vessel Sherds, Refined Earthenware, Pearlware, unidentified form, rim, undecorated, "beaded" rim, 1780-1830	Row #	34
1	Historic Ceramic Vessel Sherds, Refined Earthenware, Pearlware, unidentified form, rim, blue underglaze, blue, interior surface glazed, 1795 - 1840	Row #	58
3	Historic Ceramic Vessel Sherds, Refined Earthenware, Pearlware, unidentified form, body and rim, dipped/annular, same vessel, decorated with blue and white bands, 1790 - 1820	Row #	43
1	Historic Ceramic Vessel Sherds, Refined Earthenware, Pearlware, unidentified form, handle and body, undecorated, 1780-1830	Row #	33
1	Historic Ceramic Vessel Sherds, Refined Earthenware, Whiteware, unidentified form, rim, hand painted, polychrome glaze, hand painted floral design, 1820-Present	Row #	55
1	Historic Ceramic Vessel Sherds, Refined Earthenware, Whiteware, unidentified form, rim, transfer printed, blue, transfer printed floral design, 1815-Present	Row #	54
1	Historic Ceramic Vessel Sherds, Refined Earthenware, Whiteware, unidentified form, base, transfer printed, blue, transfer printed landscape scene, 1815-Present	Row #	53
1	Historic Ceramic Vessel Sherds, Refined Earthenware, Whiteware, waster, handle	Row #	56

2	Historic Ceramic Vessel Sherds, Refined Earthenware, Yellowware, pitcher, body, flint enamel glaze, blue and brown, mottled blue and brown decoration, 1870 - 1920	Row #	61
2	Historic Ceramic Vessel Sherds, Refined Earthenware, Yellowware, unidentified form, rim and body, embossed, embossed floral design, 1820 - 1940	Row #	36
2	Historic Ceramic Vessel Sherds, Refined Earthenware, Yellowware, unidentified form, base and body fragment, undecorated, yellow, 1820 - 1940	Row #	18
4	Historic Ceramic Vessel Sherds, Refined Earthenware, Yellowware, unidentified form, body, yellow, multiple vessels, 1820 - 1940	Row #	39
5	Historic Ceramic Vessel Sherds, Refined Earthenware, Yellowware, unidentified form, rim, body and base, dipped/annular, same vessel, decorated with a blue band, 1820 - 1940	Row #	41
3	Historic Ceramic Vessel Sherds, Refined Earthenware, Yellowware, unidentified form, body, dipped/annular, same vessel, decorated with brown and white bands, 1820 - 1940	Row #	42
4	Historic Ceramic Vessel Sherds, Refined Earthenware, Yellowware, unidentified form, rim, body and base, yellow, same vessel, 1820 - 1940	Row #	38
2	Historic Ceramic Vessel Sherds, Stoneware, Brown-bodied, bottle, base and body, under-fired, 19th century	Row #	47
1	Historic Ceramic Vessel Sherds, Stoneware, Gray-bodied, bottle, body, Albany slip interior, brown, 19th century	Row #	59
2	Historic Ceramic Vessel Sherds, Stoneware, Gray-bodied, hollow ware-planter, rim and body, orange wash, early 20th century	Row #	60
1	Historic Ceramic Vessel Sherds, Stoneware, Gray-bodied, unidentified form, lid, albany slip-unglazed interior, pieces mend, embossed floral design, body pinkish and underfired, possible local production, possibly late 18th more likely 19th century	Row #	44
1	Historic Ceramic Vessel Sherds, Stoneware, Gray-bodied, unidentified form, body, Rockingham-type glaze, body has slight orange peel effect, 19th century	Row #	51
1	Historic Ceramic Vessel Sherds, Stoneware, Gray-bodied, unidentified form, rim, Rockingham-type glaze, 19th century	Row #	52
3	Historic Ceramic Vessel Sherds, Stoneware, Gray-bodied, unidentified form, rim and body, Rockingham-type glaze, 19th century	Row #	49
4	Historic Ceramic Vessel Sherds, Stoneware, Gray-bodied, unidentified form, base and body, Rockingham-type glaze, same vessel, 19th century	Row #	50
1	Historic Ceramic Vessel Sherds, Stoneware, Tan-bodied, hollow ware, base and body, albany slip-glazed interior and exterior	Row #	46
10	Historic Fauna, Bone, large mammal, fragment, large mammal bones w/ cut marks	Row #	1
1	Historic Glass Vessel Fragments, Glass, curved, bottle, base and pontil, blue/green	Row #	15
1	Historic Glass Vessel Fragments, Glass, curved, bottle, base and pontil, olive green	Row #	12
1	Historic Glass Vessel Fragments, Glass, curved, bottle, fragment, brown	Row #	13
1	Historic Glass Vessel Fragments, Glass, curved, bottle, body, embossed, aqua, embossed with a large "S", also with "JNoS"	Row #	10
1	Historic Glass Vessel Fragments, Glass, curved, bottle, base and pontil, olive green	Row #	11
1	Historic Glass Vessel Fragments, Glass, curved, bottle, base, aqua	Row #	9
1	Historic Glass Vessel Fragments, Glass, curved, bottle, mouth, aqua	Row #	16
1	Historic Glass Vessel Fragments, Glass, curved, bottle, fragment, green	Row #	14
1	Historic Glass Vessel Fragments, Glass, curved, mug/tankard, base and body, paneled, clear/uncolored	Row #	17
1	Historic Glass Vessel Fragments, Glass, curved, unidentified form, fragment, clear/uncolored	Row #	8
1	Historic Personal Items, Ball Clay, smoking pipe, bowl, fragment, Mid 19th to early 20th century	Row #	4
1	Historic Personal Items, Ball Clay, smoking pipe, stem, fragment, 3/32", Mid 19th to early 20th century	Row #	6
1	Historic Personal Items, Ball Clay, smoking pipe, stem, fragment, dot and diaper, 5/64", Mid 19th to early 20th century	Row #	5
1	Historic Tools/Hardware, Bakelite, cap/lid, fragment, ribbed, blakc	Row #	7

Total Artifacts in Context 4: 138

Trench 6 Context 12 **Catalog # 2**

11	Historic Building Materials, Coarse Earthenware, brick, fragment	Row #	44
5	Historic Building Materials, Coarse Earthenware, brick, fragment, glazed	Row #	45

1	Historic Building Materials, Ferrous metal, hardware, strap, fragment, corroded	Row #	19
1	Historic Building Materials, Wood, dowl, fragment	Row #	35
1	Historic Building Materials, Wood, plank fragments, whole, nail hole in the center, a 7 inch by 1.5 inch piece of wood plant, both ends pointed with a nail hole in the center	Row #	8
8	Historic Building Materials, Wood, plank fragments, fragment	Row #	7
1	Historic Ceramic Vessel Sherds, Coarse Earthenware, Redware, unidentified form, clear lead glaze	Row #	38
1	Historic Ceramic Vessel Sherds, Coarse Earthenware, Redware, unidentified form, base, slip trailed interior, yellow, 18th century	Row #	37
3	Historic Ceramic Vessel Sherds, Coarse Earthenware, Redware, unidentified form, unglazed	Row #	43
2	Historic Ceramic Vessel Sherds, Coarse Earthenware, Redware, unidentified form, body and base, glazed both surfaces, multiple vessels, black manganese glaze	Row #	15
3	Historic Ceramic Vessel Sherds, Coarse Earthenware, Redware, unidentified form, body and handle, glazed both surfaces, multiple vessels, clear lead glaze with manganese sponging	Row #	29
6	Historic Ceramic Vessel Sherds, Coarse Earthenware, Redware, unidentified form, body and rim, multiple vessels, both surfaces missing	Row #	18
6	Historic Ceramic Vessel Sherds, Coarse Earthenware, Redware, unidentified form, body and rim fragments, slip trailed interior, white, 18th century	Row #	36
9	Historic Ceramic Vessel Sherds, Coarse Earthenware, Redware, unidentified form, body, glazed interior, multiple vessels, exterior surface missing, lead/manganese glaze	Row #	16
2	Historic Ceramic Vessel Sherds, Coarse Earthenware, Redware, unidentified form, body, glazed both surfaces, multiple vessels, black manganese glaze	Row #	14
3	Historic Ceramic Vessel Sherds, Coarse Earthenware, Redware, unidentified form, body, glazed both surfaces, multiple vessels, black manganese glaze	Row #	13
5	Historic Ceramic Vessel Sherds, Coarse Earthenware, Redware, unidentified form, glazed interior, lead and manganese glaze with copper oxide decoration, mid 18th century	Row #	34
5	Historic Ceramic Vessel Sherds, Coarse Earthenware, Redware, unidentified form, base, glazed both surfaces, multiple vessels, lead/manganese glaze	Row #	17
4	Historic Ceramic Vessel Sherds, Porcelain, Chinese Export, plate, base and body, underglaze, blue, blue landscape scene, 1680 - 1880	Row #	33
2	Historic Ceramic Vessel Sherds, Porcelain, Chinese Export, unidentified form, fragment, hand painted overglaze-red enamel, red, 1600 - 1800	Row #	48
2	Historic Ceramic Vessel Sherds, Porcelain, hard paste, unidentified, fragment, undecorated	Row #	49
1	Historic Ceramic Vessel Sherds, Porcelain, hard paste, unidentified, fragment, hand painted underglaze, blue, blue floral design, 1680 - 1880	Row #	46
1	Historic Ceramic Vessel Sherds, Refined Earthenware, Creamware, unidentified, fragment, undecorated, 1790 - 1820	Row #	51
1	Historic Ceramic Vessel Sherds, Refined Earthenware, Creamware, unidentified form, fragment, hand painted, burnt orange and black, burnt orange and black floral design, likley pre 1800, 1762 - 1820	Row #	52
16	Historic Ceramic Vessel Sherds, Refined Earthenware, Ironstone, unidentified form, base and body frag, glazed both surfaces, multiple vessels, 1840-Present	Row #	30
1	Historic Ceramic Vessel Sherds, Refined Earthenware, Ironstone, unidentified form, body, embossed floral design, 1840-Present	Row #	31
10	Historic Ceramic Vessel Sherds, Refined Earthenware, Ironstone, unidentified form, fragment, undecorated, 1840-Present	Row #	12
2	Historic Ceramic Vessel Sherds, Refined Earthenware, Ironstone, unidentified form, fragment, undecorated, burned, 1840-Present	Row #	11
1	Historic Ceramic Vessel Sherds, Refined Earthenware, Pearlware, unidentified form, hand painted underglaze, blue, 1780 - 1820	Row #	40
2	Historic Ceramic Vessel Sherds, Refined Earthenware, Whiteware, unidentified, fragment, transfer printed, blue, 1815-Present	Row #	50
4	Historic Ceramic Vessel Sherds, Refined Earthenware, Whiteware, unidentified form, base and body, multiple vessels, 1815-Present	Row #	32
2	Historic Ceramic Vessel Sherds, Refined Earthenware, Yellowware, unidentified form, rim and base fragments, yellow, 1820 - 1940	Row #	10

APPENDIX E (Cont.)
ARTIFACT INVENTORY

3	Historic Ceramic Vessel Sherds, Stoneware, Brown-bodied, bottle, 19th century	Row #	39
7	Historic Ceramic Vessel Sherds, Stoneware, Brown-bodied, bottle, base and body, multiple vessels, 19th century	Row #	28
1	Historic Ceramic Vessel Sherds, Stoneware, Brown-bodied, pipe, fragment	Row #	47
1	Historic Ceramic Vessel Sherds, Stoneware, Gray-bodied, unidentified form, handle, clear lead glaze, 19th century	Row #	41
1	Historic Ceramic Vessel Sherds, Stoneware, Gray-bodied, unidentified form, handle, clear lead glaze, 19th century	Row #	42
2	Historic Clothing Related, Leather, unidentified, unidentified form, fragment	Row #	9
13	Historic Fauna, Bone, large mammal, fragment, cut	Row #	1
1	Historic Fauna, Shell, clam, whole	Row #	5
3	Historic Fauna, Shell, oyster, whole	Row #	4
1	Historic Fauna, Tooth, large mammal, fragment	Row #	2
1	Historic Fauna, Turtle/tortoise shell, scute, plastrom, whole	Row #	3
5	Historic Flora, Wood, bark fragments, fragment	Row #	6
1	Historic Glass Vessel Fragments, Glass, bottle, devitrified	Row #	20
1	Historic Glass Vessel Fragments, Glass, bottle, neck, olive green, mold blown, v tooled, string rim	Row #	22
1	Historic Glass Vessel Fragments, Glass, bottle, base and pontil, aqua, devitrified	Row #	23
2	Historic Glass Vessel Fragments, Glass, bottle, body, amber, devitrified	Row #	24
1	Historic Glass Vessel Fragments, Glass, bottle, body, blue	Row #	25
1	Historic Glass Vessel Fragments, Glass, bottle, body, clear/uncolored	Row #	26
1	Historic Glass Vessel Fragments, Glass, bottle, burned	Row #	27
1	Historic Glass Vessel Fragments, Glass, bottle, base and pontil, blue	Row #	21

Total Artifacts in Context 12: 170

Total Artifacts in Trench 6 : 308

Total Number of Artifacts: 308

*** Item Discarded in Laboratory**

Appendix F

RESUMES

Richard W. Hunter
PRESIDENT
Ian C. Burrow
VICE PRESIDENT

RICHARD W. HUNTER
President/Principal Archaeologist, Ph.D., RPA

EDUCATION

Ph.D., Geography, Rutgers University, New Brunswick, New Jersey, 1999.
Dissertation Title: *Patterns of Mill Siting and Materials Processing: A Historical Geography of Water-Powered Industry in Central New Jersey*

M.A., Archaeological Science, University of Bradford, England, 1975

B.A., Archaeology and Geography, University of Birmingham, England, 1973

EXPERIENCE

1986-present President/Principal Archaeologist
Hunter Research, Inc., Trenton, NJ

Founder and principal stockholder of firm providing archaeological and historical research, survey, excavation, evaluation, report preparation, historic exhibit development and public outreach services in the Northeastern United States. Specific expertise in historical and industrial archaeology (mills, iron and steel manufacture, pottery manufacture), historical geography, historic landscape analysis, historic interpretive design and public outreach products. Participation in:

- Project management, budgeting and scheduling
- Proposal preparation and client negotiation
- Hiring and supervision of personnel
- Supervision of research, fieldwork, analysis and report preparation
- Historic exhibit development, popular and academic publications and public presentations

1999-2004 Faculty Member, Certificate in Historic Preservation
Office of Continuing Education, Drew University, Madison, NJ

Courses: The Role of Archaeology in Preservation
25 Years of Public Archaeology in New Jersey

1983-1986 Vice-President/Archaeologist
Heritage Studies, Inc., Princeton, NJ

Principal in charge of archaeological projects. Responsibilities included:

- Survey, excavation, analysis, and reports
- Client solicitation, negotiation, and liaison
- Project planning, budgeting, and scheduling
- Recruitment and supervision of personnel

1981-1983 Principal Archaeologist
Cultural Resource Group, Louis Berger & Associates, Inc., East Orange, NJ

Directed historical and industrial archaeological work on major cultural resource surveys and mitigation projects in the Mid-Atlantic region. Primary responsibility for report preparation and editing.

1979-1981 Archaeological Consultant, Hopewell, NJ

1978-1981 Adjunct Assistant Professor, Department of Classics and Archaeology, Douglass College, Rutgers University, NJ

1978-1979 Research Editor
Arete Publishing Company, Princeton, NJ

Prepared and edited archaeological, anthropological, and geographical encyclopedia entries (*Academic American Encyclopedia*, 1980).

1974-1977 Archaeological Field Officer
Northampton Development Corporation, Northampton, England

Supervised archaeological salvage projects executed prior to development of the medieval town of Northampton (pop. 230,000).

Experience included:

- Monitoring of construction activity
- Supervision of large scale urban excavations
- Processing of stratigraphic data and artifacts
- Preparation of publication materials

1969-1970 Research Assistant
Department of Planning and Transportation, Greater London Council

SPECIAL SKILLS AND INTERESTS

- waterpowered mill sites
- canals and urban water powers
- iron and steel manufacture
- pottery manufacture
- historic cartography
- scientific methods in archaeology
- historic sites interpretation and public outreach

PUBLICATIONS

“Steel Away: the Trenton Steel Works and the Struggle for American Manufacturing Independence.” In *Footprints of Industry: Papers from the 300th Anniversary Conference at Coalbrookdale, 3-7 June 2009*, edited by Paul Belford, Marilyn Palmer and Roger White. *BAR British Series* 523 [2010] (with Ian Burrow).

“On the Eagle’s Wings: Textiles, Trenton, Textiles, and a First Taste of the Industrial Revolution.” *New Jersey History* 124, Number 1, 57-98 [2009] (with Nadine Sergejeff and Damon Tvaryanas).

“The Historical Geography and Archaeology of the Revolutionary War in New Jersey.” In *New Jersey in the American Revolution*, edited by Barbara J. Mitnick, pp.165-193. Rutgers University Press [2005] (with Ian C.G. Burrow).

“Lenox Factory Buildings Demolished.” *Trenton Potteries* 6(2/3):1-19 [2005].

Fish and Ships: Lamberton, the Port of Trenton. New Jersey Department of Transportation and Federal Highway Administration [2005] (28-page booklet).

Power to the City: The Trenton Water Power. New Jersey Department of Transportation and Federal Highway Administration [2005] (24-page booklet).

Rolling Rails by the River: Iron and Steel Fabrication in South Trenton. New Jersey Department of Transportation and Federal Highway Administration [2005] (24-page booklet).

Quakers, Warriors, and Capitalists: Riverview Cemetery and Trenton's Dead. New Jersey Department of Transportation and Federal Highway Administration [2005] (24-page booklet) (with Charles H. Ashton).

"Keeping the Public in Public Archaeology." In: *Historic Preservation Bulletin*, pp. 6-9. New Jersey Department of Environmental Protection, Division of Parks and Forestry, Historic Preservation Office [2004].

"A Coxon Waster Dump of the Mid-1860s, Sampled in Trenton, New Jersey." In: *Ceramics in America*, edited by Robert Hunter, pp. 241-244. University Press of New England [2003] (with William B. Liebeknecht and Rebecca White).

"The Richards Face – Shades of an Eighteenth-Century American Bellarmine." In: *Ceramics in America*, edited by Robert Hunter, pp. 259-261. University Press of New England [2003] (with William B. Liebeknecht).

"The Pottery Decorating Shop of the Mayer Arsenal Pottery Company." *Trenton Potteries* 4(2):1-7 [2003].

"Minutes of the Potters Union (Part 2)." *Trenton Potteries* 4(1):1-5 [2003].

"Minutes of the Potters Union (Part I)." *Trenton Potteries* 3(4):1-5 [2002].

"Eighteenth-Century Stoneware Kiln of William Richards Found on the Lamberton Waterfront, Trenton, New Jersey." In: *Ceramics in America*, edited by Robert Hunter, pp. 239-243. University Press of New England [2001].

"William Richards' Stoneware Pottery Discovered!" *Trenton Potteries* 1(3):1-3 [2000]. Reprinted in *Bulletin of the Archaeological Society of New Jersey* 59:71-73 [2004].

"Trenton Re-Makes: Reviving the City by the Falls of the Delaware." *Preservation Perspective* XVIII (2): 1, 3-5 [1999]

"Mitigating Effects on an Industrial Pottery." *CRM* 21(9):25-26 [1998] (with Patricia Madrigal).

From Teacups to Toilets: A Century of Industrial Pottery in Trenton, Circa 1850 to 1940, Teachers Guide sponsored by the New Jersey Department of Transportation, 1997 (with Patricia Madrigal and Wilson Creative Marketing).

"Pretty Village to Urban Place: 18th Century Trenton and Its Archaeology." *New Jersey History*, Volume 114, Numbers 3-4, 32-52 [Fall/Winter 1996] (with Ian Burrow).

Hopewell: A Historical Geography. Township of Hopewell [1991] (with Richard L. Porter).

"Contracting Archaeology? Cultural Resource Management in New Jersey, U.S.A." *The Field Archaeologist* (Journal of the Institute of Field Archaeologists) 12, 194-200 [March 1990] (with Ian Burrow).

"American Steel in the Colonial Period: Trenton's Role in a 'Neglected' Industry." In *Canal History and Technology Proceedings* IX, 83-118 [1990] (with Richard L. Porter).

"The Demise of Traditional Pottery Manufacture on Sourland Mountain, New Jersey, during the Industrial Revolution." Ch. 13 in *Domestic Potters of the Northeastern United States, 1625-1850.* Studies in Historical Archaeology, Academic Press [1985].

PROFESSIONAL AFFILIATIONS

Registry of Professional Archeologists (RPA) [formerly Society of Professional Archeologists] (accredited 1979; certification in field research, collections research, theoretical or archival research)
Preservation New Jersey (Board Member, 1994 - 2003)
New Jersey State Historic Sites Review Board (Member, 1983 -1993)
Society for Historical Archaeology
Society for Industrial Archaeology
Society for Post-Medieval Archaeology
Historical Metallurgical Society
Council for Northeast Historical Archaeology
Archaeological Society of New Jersey (Life Member; Fellow, 2011)

OTHER AFFILIATIONS

Mercer County Cultural & Heritage Commission (Commissioner, 2011 – present)
Trenton Downtown Association (Board Member, 1998 – present; Board Chair, 2007 - 2008)
Trenton Museum Society, (Trustee, 2011 – present)
Port of Trenton Museum Foundation (Board Member 2003 – present)
Hopewell Township Historic Preservation Commission (Member, 1998 - 2006; Chair 2003 - 2004)

J. PATRICK HARSHBARGER
Principal Historian/Architectural Historian, M.A.

EDUCATION

M.A., History and Museum Studies, University of Delaware, Hagley Program in Industrial History & Heritage, 1990

M.P.A., Public Administration, Florida International University, 1988

B.A., History, magna cum laude, Brown University, 1984

EXPERIENCE

2010-present Principal Historian/Architectural Historian
Hunter Research, Inc., Trenton, NJ

Technical and managerial responsibilities for survey, evaluation and recording of buildings and structures for selected historic architectural projects. Technical and managerial responsibilities for historical research. Participation in:

- Historic structures survey and evaluation
- Section 106 area of potential effect, identification, eligibility evaluation, effects assessments and mitigation
- Preparation of Historic American Building Survey/Historic American Engineering Record (HABS/HAER) documentation
- Overall site direction and day-to-day management
- Oversight of historical and archival research for all company projects
- Report and proposal preparation

1996-present National Editor
Society for Industrial Archeology Newsletter

1991-2010 Senior Historian / Preservation Planner
TranSystems [Lichtenstein Consulting Engineers], Langhorne, PA

Senior Historian responsible for advancing transportation and architectural projects through the Section 106 and 4(f) regulatory processes. Responsibilities included:

- Field recording and photography of buildings and structures
- Interpreting historic landscapes
- Surveying, evaluating, interpreting, documenting, and rehabilitating historic properties
- Preparing statewide historic bridge surveys
- Preparing histories of transportation departments, transportation systems and bridges
- Designing exhibits, outdoor interpretive signs, and interpretive brochures/flyers
- Researching and writing National Register of Historic Places Nominations
- Researching and writing National Park Service HABS/HAER/HALS documentation

1991-2009 Historian / Editor
McKelvey Museum Services, Wilmington. DE

Historian and editor on a project-by-project basis for the development of interpretive plans, exhibits, historic documentation, collections care, and long range plans for historic sites, museums, and gardens.

1984-1986 Museum and Historic Sites Administrator
Slater Mill Historic Site, Pawtucket, RI

SPECIAL SKILLS AND INTERESTS

- public interpretation and exhibit development
- bridges and roads
- canals and railroads
- water-powered mill sites
- iron and steel manufacture and fabrication methods
- industrial architecture and structural building systems
- reinforced concrete and pre-stressed concrete
- industrial heritage tourism

PUBLICATIONS

National Guidelines for Historic Bridge Rehabilitation or Replacement. Washington, D.C.: National Cooperative Highway Research Program/Transportation Research Board, Mar. 2007. [Published by the American Association of State Highway Officials in 2008.]

Society for Industrial Archeology Newsletter, Editor. Mr. Harshbarger has been the editor of the SIA's quarterly newsletter editor since 1996. The SIA, with more than 1,800 members, is an organization dedicated to the interpretation and preservation of the industrial heritage in the U.S. and Canada. In his capacity as newsletter editor, he has become familiar with the issues and challenges associated with survey, evaluation, and interpretation of industrial and engineering sites throughout North America.

Defining Historic Roads. Proceedings of the 6th Preserving the Historic Road in America Conference. Albuquerque, N.M., 2008.

"Two Pioneering American Motorways." *Engineering History and Heritage*. [Forthcoming, accepted for publication, September 2009.]

Strategies for Historic Evaluation of Standard Highway Bridges, 1920-1960. Proceedings of the Preserving the Recent Past 2 Conference, Philadelphia, October 2000.

So Your Dualized Highway is 50 Years Old? Is It Historic? Proceedings of the Preserving the Historic Road in America Conference. Morristown, New Jersey, April 2000.

Editor and Historian, *Delaware's Historic Bridges: Survey and Evaluation of Historic Bridges with Historic Contexts for Highways and Railroads*. 2nd Ed. Revised. Dover: Delaware Department of Transportation, 2000.

Editor. *Abstracts of American Truss Bridge Patents, 1817-1900.* Society for Industrial Archeology, 2009.

"Metal Truss Bridges and Their Builders in Historical Perspective: Some Thoughts from A Case Study of the Phoenix Bridge Company." *Spans of Time*. Ithaca, New York: Historic Ithaca, 1999.
Robert John Prowse, New Hampshire State Bridge Engineer. New Hampshire State Historic Preservation Monograph Series. 2009.

PROFESSIONAL AFFILIATIONS

Society for Industrial Archeology, Editor and Board Member
Vernacular Architecture Forum, Member
Society for the History of Technology, Member
Association for Preservation Technology, Member

Richard W. Hunter
PRESIDENT
Ian C. Burrow
VICE PRESIDENT

JAMES S. LEE, III
Principal Investigator, M.A., RPA

EDUCATION

M.A., Archaeology, University of Durham, Durham, United Kingdom, 1996

B.A., Anthropology and History, Rutgers University, New Brunswick, New Jersey, 1995

EXPERIENCE

2001-present — Principal Investigator/Report Manager
Hunter Research, Inc., Trenton, NJ

Technical and managerial responsibilities for survey, evaluation and mitigation of selected archaeological projects. Technical and managerial responsibility for report production. Participation in:

- overall site direction and day-to-day management
- development and implementation of research, excavation and analysis strategies for prehistoric and historic archaeological sites
- report and proposal preparation
- supervision of cartographic and GIS product, graphic design, photography and report layout
- hiring and supervision of personnel

2001 — Crew Chief
Kittatinny Archaeological Research, Stroudsburg, Pennsylvania

- survey and excavation
- supervision of field personnel
- stratigraphic and artifact analysis

1997-2001 — Principal Investigator/Project Manager
Cultural Resource Consulting Group, Highland Park, New Jersey

- overall site direction and day-to-day management
- development and implementation of research, excavation and analysis strategies for prehistoric and historic archaeological sites
- report and proposal preparation
- hiring and supervision of personnel

1997-2000 — Laboratory Supervisor
Cultural Resource Consulting Group, Highland Park, New Jersey

Technical and managerial responsibilities for laboratory components of archaeological projects. Participation in:

- management of laboratory operations
- supervision of laboratory personnel
- computerization of artifact data
- prehistoric and historic ceramic analysis
- preparation of artifact inventories and writing of artifact sections of reports

EXPERIENCE, continued

1996-1997 Field Technician
Cultural Resource Consulting Group, Highland Park, New Jersey

PROFESSIONAL AFFILIATIONS

Society for Industrial Archaeology
Archaeological Society of New Jersey, Recording Secretary
Society for Pennsylvania Archaeology
New York State Archaeological Association
Canal Society of New Jersey
Warren County Morris Canal Committee
Society for Industrial Archeology
Eastern States Archaeological Federation

HUNTER RESEARCH

Richard W. Hunter PRESIDENT
Ian C. Burrow VICE PRESIDENT

ALISON K. HALEY
Historian, MS

EDUCATION

M.S., Historic Preservation, University of Pennsylvania School of Design, Philadelphia, PA 2010
B.A., History, Wake Forest University, Winston-Salem, NC, 2006

EXPERIENCE

2010-present
Historian,
Hunter Research, Inc., Trenton, New Jersey

Execution of research in support of historic, historic architectural and archaeological studies including:

- review of primary and secondary source materials
- title research
- genealogical investigation
- review of historic cartographic material
- selected contribution to reports

2009
Conservation Technician
Philadelphia Museum of Art, Philadelphia, PA

- documented existing conditions of a severely weathered 18th century wooden cornice
- determined historically accurate paint color via cross-section analysis
- prepared surface for finishing, primed and painted surface

2007-2008
Sales and Marketing Coordinator
Ascend Media/Michael J. Hennessey & Associates, Princeton/Plainsboro, NJ

- assisted publisher with budget and marketing plans
- coordinated advertising sales for *Pharmacy Times* magazine

2006-2007
Research Assistant and Surveyor
Richard Grubb & Associates, Cranbury, NJ

- recorded architectural features of over 5,000 buildings in 20 historic districts in Camden, NJ

2002-2006
Student Assistant
Z. Smith Reynolds Library, Winston-Salem, NC

- operated Readex and microfilm/fiche machines
- learned department-specific filing systems
- assisted patrons with periodical searches and original source research

FOREIGN STUDY

Summer 2009
International Conservation, Cornwall, England
Produced design development drawings for the restoration and adapative reuse of The English Garden House and Mount Edgcumbe House and Country Park

Fall 2003
Flow House, Vienna, Austria
Coursework: History, Architectural History and Literature

Appendix G

NEW JERSEY HISTORIC PRESERVATION OFFICE BIBLIOGRAPHIC ABSTRACT

APPENDIX G

New Jersey Historic Preservation Office
Bibliographic Abstract

HUNTER RESEARCH, INC.

Location:	Assumpink Creek between Broad Street and Warren Street, City of Trenton, Mercer County, NJ
Drainage Basin:	Delaware River
U.S.G.S. Quadrangle:	Trenton West, N.J. - PA.
Project:	Combined Phase I/II Archaeological Survey, Assunpink Creek Restoration, City of Trenton, Mercer County, New Jersey, Technical Report
Level of Survey:	I/II
Cultural Resources:	South Broad Street Bridge

Appendix H

PROJECT ADMINISTRATIVE DATA

APPENDIX H

Project Administrative Data

HUNTER RESEARCH, INC.
PROJECT SUMMARY

Project Name:	Combined Phase I/II Archaeological Survey, Assunpink Creek Restoration, City of Trenton, Mercer County, New Jersey, Technical Report
Level of Survey:	I/II
HRI Project Reference:	10055
Date of Report:	January 2012
Client:	U.S. Army Corps of Engineers, Philadelphia District
Prime:	Wallace, Roberts & Todd, LLC
Review Agency:	New Jersey Historic Preservation Office
Agency Reference:	
Artifacts/Records Deposited:	Hunter Research, Inc., Trenton, N.J.

PROJECT CHRONOLOGY

Date of Contract Award:	6/28/2010
Notice to Proceed:	
Background Research:	July 2011 to January 2012
Fieldwork:	June - July 2011
Analysis:	August 2011
Report Written:	January 2012

PROJECT PERSONNEL

Principal Investigator(s):	Richard Hunter, James Lee, Patrick Harshbarger
Background Researcher(s):	Alison Haley
Field Supervisor(s):	Andrew Martin
Field Assistant(s):	Glen Keeton, Joshua Butchko
Analyst(s):	Joshua Butcko
Draftperson(s):	Katie Rettinger, Lindsay Lee
Report Author(s):	Richard Hunter, Patrick Harshbarger, James Lee