

BREARLEY HOUSE PRESERVATION PLAN

SEPTEMBER 2023



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3-1: Southwest Chamber (202) with south-facing window.

Introduction

The Brearley House¹ stands at 100 Meadow Road, Lawrenceville, Mercer County, New Jersey. Located in Maidenhead Meadows Park, it was built in 1761 for the Brearley family. Hidden in the bustling area near Princeton Pike and Route 295, it is accessed via Old Meadow Road, a historic dirt lane which originally provided Lawrence Township residents access to their meadow lots in the Great Meadows, the collective grazing area for livestock.² Per the 1975 National Register Nomination, the Brearley House is locally significant for its architecture as a brick Georgian and vernacular 3-bay, center hall house. With the date of 1761 written in vitrified brick on the east gable end, the Brearley House is a rare example of a patterned brickwork house in Mercer County. Its areas of significance also include historic archaeology and exploration/settlement for its association with the Brearley family who were early settlers of Lawrence Township and politically active for generations.³

General Description

The Brearley House is a 2 1/2-story, 3 bay double pile brick dwelling with a center hall plan. Asphalt shingles cover the side gable roof which is anchored by gable end brick chimneys. The facade features a symmetrical fenestration pattern with a 6-panel wood door at the central entrance, 12/12 double hung windows with wood panel shutters on the first floor, and three 12/12 double hung windows on the second floor. The brick is laid in Flemish bond with a projecting water table. The basement and first floor windows feature segmental brick arches.

The rear elevation (south) features American common bond brick with a projecting water table. The two off-center entrances are flanked by 12/12 double hung windows with wood panel shutters. Both entrances feature 6-panel wood doors with simple door overhangs. The second-floor features 12/12 double hung windows in an asymmetrical arrangement.

Purpose and Scope of this Report

In 1990, the architecture firm Short and Ford undertook a Historic Structure Report (HSR) for the Brearley House. At that time, the building had been unoccupied for at least a few years and was in

- 1 Per the 1979 National Register Nomination, the official name of the house is the “Baker-Brearley House.” Today it is more commonly known as the Brearley House; this name will be used throughout this report.
- 2 Short and Ford Architects, “Baker Brearley House Historic Structure Report,” (January 1990, Revised December 1990), 2.
- 3 George Gottuso, Baker-Brearley House National Register Nomination (March 13, 1979), 3.

PREFACE:

I. EXECUTIVE SUMMARY



5-1: South end of the Brearley House.

fair to poor condition. The report provides a history of the house and its inhabitants, documents the existing conditions and makes recommendations for “restoration aspects” and “renovation aspects.”⁴ In 1999, the building was renovated. While no drawings of this work were made available, it appears that the work generally followed the recommendations made in the HSR.

During the 1999 renovation, surviving original materials were restored to their 18th century appearances. In several instances, original elements or materials had previously been removed; some of these were reconstructed during the 1999 renovation and others were not. For instance, in one room (Room 103) the outline and shelving shadows of a corner cupboard were left exposed in the original plaster to tell the story of its existence. Across the hall in Room 102, the corner cupboard was reconstructed based on local precedence; its existence had been documented through oral history. Around 1914, the house’s owner removed and sold the cupboard to a neighbor. In other places, 19th and 20th century features were left in place, presumably for programming and/or building needs. For instance, a mid-20th century arched opening between parlors was left in place. It is believed this was done to provide a larger space for lectures and meetings. Problematically, this arch was left in the same room where the corner cupboard was reconstructed. These two features never existed together—the corner cabinet had been removed by the time the opening was made. This is a contradiction of preservation philosophies. Leaving the arch in place follows the tenets of rehabilitation whereas reconstructing the cupboard falls within restoration. While concessions to strict adherence to preservation philosophy are often made in the field during historic building work, they are not considered best practice. These issues are noted in Section VI, ‘Existing Conditions.’

The purpose of this Preservation Plan is to examine the current condition of the historic Brearley House, complete a conditions assessment of the building materials, make prioritized recommendations for repairs, and assess the potential for additional uses and interpretation of the site.

This Preservation Plan is an update to the Short and Ford HSR and 1999 renovation. This plan documents the work from the 1999 renovation and provides a better understanding of what materials are original, what dates to other periods and what features date to the 1999 project and other more recent building maintenance upgrades. This report notes contradictions in preservation philosophies but does not recommend changing them. After 24 years, these features are now a part of the history of the house and can be retained.

4 Ibid., 119-120

Recommended Treatment Approach

The continued preservation of the Brearley House should be planned, designed and executed in compliance with the Secretary of the Interior's Standards for the Treatment of Historic Properties—Rehabilitation. This will ensure that surviving historic fabric is retained to the greatest extent possible while giving the building a continued use.

The Township of Lawrence and the Lawrence Historical Society should continue to prioritize the preservation of extant historic materials on both the interior and exterior of the building. Interior historic materials include the interior wood trim, chair rails, stairs, balustrade, fireplace surrounds in Rooms 102 and 104, and the second-floor doors, closets and floor boards. The exterior historic material is the brick including the vitrified brick pattern in the east gable end.

General Recommendations for Work

The Township of Lawrence and Lawrence Historical Society have provided good stewardship and maintenance of the Brearley House. With any structure, there is the need for minor repairs and up-grades of existing outdated mechanical systems. These repairs include: spot repointing of masonry, improved sill flashing at all windows, installation of more historically sympathetic and energy-efficient interior lighting, replacement of structural columns at the basement level, upgrading the heating system, and connecting to the public water system.

Interpretive Programs

The Brearley House is open to the public two hours every month; efforts should be made to open it more regularly. An updated interpretation in alignment with current trends in cultural heritage tourism is warranted; this could include the stories of people of color who worked for the Brearleys. The story of John Brearley and the system of indentured servitude in the 17th century could be interpreted through an exhibit. An architectural tour could expound on the Brearley House's unique architectural style including hierarchy of formal and informal spaces and how the Brearleys used the building. Underutilized spaces could be utilized for temporary exhibits including an exhibit highlighting the uniqueness of the patterned brick work architecture and the archaeological investigations that have been conducted on the property.

Owners and Stewards

Lawrence Township bought the property in 1978. Since 2000, the house has been leased to the Lawrence Historical Society who operates the house as a museum.⁵ This partnership saved the building and continues to be beneficial for the resource. A resident caretaker lives in an apartment at the second floor. Because the site is so secluded, a tenant should continue to reside here.

⁵ Lawrenceville Historical Society, “Brearley House,” <https://www.thelhs.org/1761-brearley-house>



9-1: Northern facade of the house.

Statement of Significance

Listed on the State and National Registers in 1979, “the Baker-Brearley House is a fine example in Lawrence Township of a midcentury Georgian country house. The glazed headed date in the gable end is a rare occurrence in North Jersey. The Brearley family was one of the earliest settlers of the area and represents a family that was politically active on the State and local level.”¹

In 2017, the Brearley House was included in Robert Craig’s “Traditional Patterned Brickwork in New Jersey,” National Register of Historic Places Multiple Property Documentation which documents this distinctive group of patterned brick Georgian and pre-Georgian vernacular houses characteristic of the area of the Quaker settlement of West Jersey. As the first architecture of refinement in New Jersey, these brick houses were a show of wealth, power and permanence.²

Methodology

Clarke Caton Hintz undertook this plan in the spring of 2023. Work began with a site visit to understand the current conditions of the house. The team spent a day onsite completing a non-destructive survey of the conditions and building systems. Concealed conditions may be present which merit further investigations but that is outside the scope of the current investigation. In addition to the building survey, existing documents including the Historic American Building Survey (HABS) documentation, the 1979 National Register Nomination, the 1990 Historic Structure Report, and the 2016 archaeological report were utilized to develop the recommendations outlined in this report. The recommendations contained herein are made in accordance with the Secretary of the Interior’s Standards for the Treatment of Historic Properties - Rehabilitation with consideration given to extant historic fabric and character defining features.

Organization of the Plan

This Preservation Plan is divided into three parts. The Preface provides an overview of the Brearley House and of the plan itself in two chapters. The Developmental History section provides the history of the Brearley House. This is followed by analyses of the present conditions of the house’s architectural, mechanical, and structural systems. This material informs the Treatment and Use section which provides recommendations for interpretation, use and repairs with phasing and cost estimates.

¹ George Gottuso, Baker-Brearley House National Register Nomination (March 13, 1979), 3.
² Robert Craig, Traditional Patterned Brickwork in New Jersey National Register Multiple Property Documentation Form (August 2017), E-2

II. INTRODUCTION



11-1: North facade of the Brearley House.

Team Members

The architecture firm of Clarke Caton Hintz, located in Trenton, New Jersey, was responsible for the coordination of the Preservation Plan. The Clarke Caton Hintz team included Michael Hanrahan, AIA, James Giresi, AIA, and Kalyani Bhatt, Assoc. AIA. Margaret Newman served as the architectural historian and authored several sections of the plan.

Additional analysis was provided by: Frank Tindall, PE and N Marc Lorusso, PE of Kelter & Gilligo Consulting Engineers; John Harrison, PE, of Harrison-Hamnett PC; Ian Burrow, Ph.D., FSA (ret'd) of Burrow Into History; and J. Christopher Frey, AIC PA, of Keystone Preservation Group.

Sponsoring Organizations

This plan is partly funded by a grant from the New Jersey Historic Preservation Office Certified Local Government grant.

Limitations of this Plan

The drawings from the 1999 restoration of the house were not available. Consequently, the date of some features had to be surmised from the recommendations of the 1990 Short and Ford HSR.

No invasive probes were completed. Concealed negative conditions may exist. This was outside the scope of this report.

Acknowledgements

The team wishes to thank Brenda Kraemer, Assistant Municipal Engineer, for coordinating the project, as well as Greg Whitehead, Director of Public Works, and Joe Sliwinski, Supervisor Building and Grounds for their support. This document could not have been completed without their support and cooperation.



13-1: Northwest Chamber (Room 203) facing West. The second floor of the house has several rooms dedicated to the history and development of the area around Brearley House.

Previous Studies

The Brearley House was first documented in the 1930s as part of the Historic American Building Survey (HABS), a Depression-era program developed in 1933 to record America’s architectural heritage. Spelled “Brearly” in this report, as early documentation indicates the original settler John Brearley may have spelled his name, the HABS study included one photograph and data pages that mostly chronicled the genealogical history of the family. The house was said to be owned by J. Baker Brearley who was the great grandson of the house’s builder.¹ Deed research does not support this as by the 1930s, it was no longer owned by the Brearley family. In 1979, the house was listed on the New Jersey and National Registers of Historic Places as the Baker-Brearley House. Owned by the Township of Lawrence, the house was called the “Baker-Brearley House,” named for a descendant of the builder of the house, John Brearley, who married Matilda Baker in 1805. The Bakers were another early and prominent Lawrence family.²

In 1990, Short and Ford Architects completed a Historic Structure Report on the house. This report recommended archaeological investigations be completed on the property which were done over several phases between 1996 and 2005. This work resulted in the report, “Three Houses and Three Thousand Years: Archaeological Research at the Brearley House.”³ Finally, in 2017, the Brearley House was included in Robert Craig’s “Traditional Patterned Brickwork in New Jersey,” National Register of Historic Places Multiple Property Documentation. These reports provide the foundation for this document and are used extensively throughout this plan.

The History of the Brearley House

The 1990 Short and Ford HSR fully documents the ownership and genealogical history of the Brearley family occupation of the house. This will not be repeated here; the reader is encouraged to read the full report. Instead, this section will highlight the important milestones in the life of the house.

The Brearleys were one of the founding families of Lawrence Township (then called Maidenhead). They were substantial landholders and politically prominent; several generations of Brearley men

¹ HABS NJ-342

² George Gottuso, Baker-Brearley House National Register Nomination (March 13, 1979), 3; Short and Ford Architects, “Baker Brearley House Historic Structure Report,” (January 1990, Revised December 1990), 8.

³ Ian Burrow and Joshua Butchko, “Three Houses and Three Thousand Years: Archaeological Research at the Brearley House” (December 2016).

PART I: DEVELOPMENTAL HISTORY

III. HISTORY



15-1: East gable elevation, showing ‘1761’ in vitrified brick.



Figure 2: The asymmetrical rear elevation in 1979. Gottuso, Baker-Brearley House Nomination.

held local elected office well into the 19th century from Overseer of Roads to State Chief Justice.⁴ The progenitor, John Brearley, arrived in the Delaware Valley in 1682 as an indentured servant of prominent Quakers George and Ellenor Pownall. The Pownalls settled in Chester County, Pennsylvania. Brearley moved north into New Jersey. By 1695, he had purchased 200 acres of land in Lawrence Township. In 1696, he purchased another 600 acres. It is on this second purchase where he and his descendents built houses, occupying the land for the next 220 years. There is archaeological evidence for three houses on the Brearley House site: the “mansion house” of John Brearley I, the possible house of John Brearley II and the third house, the 1761 Brearley House of this study.⁵

With the gable end date of 1761, the 1990 Short and Ford HSR attributes the construction of the house to second generation John Brearley (ca.1699-ca. 1777) and his son, James Brearley (1728-1818) as a new home for James and his young family. The archaeological report further refines this assertion concluding that John and James both lived in this house and that the second house built by John II which stood to the south of the 1761 house became a kitchen wing and slave quarter. According to this theory, John II died in the 1761 house in 1777. An inventory of his possessions at the time of his death provides some ideas of how the house may have been furnished but more importantly, indicates a space used for a variety of daily work tasks. As there is no such functional space for this in the existing building, this documentary evidence corroborates the architectural and archaeological evidence; an out kitchen building existed when the Brearley House was constructed. It is possible that James, a man who was enslaved by John Brearley II, may have slept in that location.⁶

An 1845 inventory of the next generation of the Brearley family provides a picture of the house in the mid-19th century. This is clearly delineated in Short and Ford’s report.⁷ At least five generations of the Brearley family lived in the house. The research is contradictory in the 1910s. The HSR indicates that the house was sold out of the family to Dunlevy Millbank in 1918 while the Lawrence Historical Society puts the first sale out of the family in 1914 to Dr. James Russell. Census research corroborates the latter; Russell was living in the house in 1920.⁸ From 1925-1944, the house was occupied by the Fawcett family. Oral history from a daughter, Virginia Fawcett Quinn, helped inform the HSR. This contradicts the HABS documentation. According to the post-1933 HABS report (it has been attributed

4 George Gottuso, Baker-Brearley House National Register Nomination (March 13, 1979), 3.

5 Short and Ford, 5.

6 Burrow, 2-1.

7 Short and Ford, 11.

8 “Brearley House,” Lawrence Historical Society, <https://www.thelhs.org/1761-brearley-house>; 1920 Federal Census



Figure 1: The formal front facade as documented in the HABS survey. Gottuso, Baker-Brearley House Nomination

to 1936⁹), the house was still owned by J. Baker Brearley, “the great grandson of the original owner.”¹⁰ Regardless of how and by whom, the Brearley House was eventually sold to developers. It remained a residence, rented out to the Siebert family among others. The Township bought the property in 1978 and by 1990, when it was documented in the HSR, the building was unoccupied.¹¹

While this chronology of ownership is interesting, it has limited value in understanding the Brearley House. The HSR admits as much: “historical research has added few insights into the physical fabric of architectural details of the house.” From the HSR, it is clear that by 1990, many changes had been made to the house. Room 103 was the kitchen. Fireplaces had been enclosed. Original features had been removed. Windows and doors had been changed. A bathroom had been added to the second floor. With the exception of the loss of “inside paneling, corner cupboards and fireplace facings” which was attributed to Dr. James Russell and his ownership between 1914-1920,¹² it is unclear when these changes were made and by whom. Following the 1999 quasi-restoration of the house, evolutionary evidence has been further lost.

Because the chronology of ownership is fully documented in the 1990 HSR and because evolution cannot be expounded on further, this report will focus on the elements that make the Brearley House significant and/or unusual including its architecture with its patterned brickwork and its Georgian and vernacular exterior. It is hoped that expanding on these elements may provide insights into this house that can be used to enhance its interpretation.

Traditional Patterned Brickwork in New Jersey and the Architecture of the Brearley House

The Brearley House is one of the most northerly examples of the distinctive group of patterned brick Georgian and pre-Georgian vernacular houses characteristic of the area of the Quaker settlement of West Jersey from Salem northward to the Falls of the Delaware at Trenton. According to Robert Craig in his study for the Multiple Property Documentation of traditional patterned brickwork houses, Southern New Jersey is the principal home of traditional patterned brickwork in the United States. Their construction began about 1680, in the earliest years of the West New Jersey colony and continued to be practiced, in waning fashion, until the early years of the 19th century. They were constructed almost exclusively for Quaker families and were an architecture of solid possession

9 Short and Ford, 12.
 10 HABS, 3.
 11 Short and Ford, 9; <https://www.thelhs.org/1761-brearely-house>
 12 <https://www.thelhs.org/1761-brearely-house>



Figure 3: 1849 Otley and Keily Map.²³



Figure 4: The Brearley House, standing to the east side of Meadow Road, is incorrectly identified as J.A. Phillips. Straight Run Turnpike, to the east, becomes the present-day Route 1.

for a people who had been a small, despised minority in England. These brick houses represented the ability to acquire property and substance that had been denied them in England. These houses were a show of wealth, power and permanence and were the first architecture of refinement in New Jersey. “Patterned brickwork appeared in perhaps one percent of the houses built in New Jersey in the colonial period but as architectural historian Damon Tvaryanas has noted, ‘they made an architectural statement far disproportionate to their numbers. As a group, they were the largest, most expensive, and most impressive private buildings constructed in West New Jersey, and they visually dominated the landscape of the colony.’”¹³ These buildings represent English craft influence, Quaker-led innovation, and American prosperity across the span of the 18th century.

During the years between 1675 and 1690, about 10,000 members of the Society of Friends emigrated to the Delaware Valley, mostly from England and Ireland, overwhelming a European population (British, Scandinavian, and Dutch) of fewer than 1,000. This allowed this one religious and cultural group the ability to put its stamp on the building construction of an entire region. John Brearley arrived during this wave. He arrived in 1682 from Liverpool on the ship *Friends Adventure* as an indentured servant of George Pownall, a prominent Quaker and peer of William Penn. This was a Quaker ship but as a servant, it is not clear that Brearley was Quaker. Two generations later, his descendants built a Quaker house type.¹⁴

While this house type was primarily found in South Jersey, a small number are found in the southern part of Mercer County, an area that was a cultural extension of nearby Burlington County. The Brearley House is considered a pattern brickwork house because of the date completed in vitrified brick in the east gable end. This end was chosen because it was adjacent to Meadow Lane, making it visible and prominent to all passersby. The practice of placing the year of construction of a house in the end wall of a house began as early as 1715. The time-consuming tasks involved in laying numerals must have added hours to the bricklayer’s work and cost to the building’s construction. Even a single letter or numeral would require the bricklayer to make dozens of departures from ordinary bricklaying. The fact that it was done at the Brearley House confirms this as a high-end house. In addition, the façade of the Brearley House is laid in Flemish bond. This was a more elegant and time-consuming method of construction that also would have added more cost. The relieving arches over the doors and windows of the cellar and first floor, a common feature of New Jersey architecture from

¹³ Robert Craig, Traditional Patterned Brickwork in New Jersey National Register Multiple Property Documentation Form (August 2017), E-2

¹⁴ Ibid., E-11; The Welcome Society of Pennsylvania, Ancestors, <https://www.welcomesociety.org/ancestors.html>



Figure 5: 1860 Map. The Brearley House is correctly identified as being owned by Joseph Baker Brearley.²⁴

1720 until about 1770, also are a sophisticated addition to a fine house.¹⁵

Other patterned brickwork houses in Mercer County include the William Green house in Ewing Township, probably built in the 1730s, and the Trenton Friends Meeting House, built in 1739-40. The John Rogers house (1751) is now a ruin in Mercer County Park. The John Taylor house (1769) in Yardville is still a private residence, and the Isaac Pearson house (1773) is owned by Hamilton Township.¹⁶ As one of handful of such houses in the area, the Brearley House should be celebrated. Interpretation should include information about the practice of patterned brickwork and its rarity, its sophistication and its symbolism in New Jersey architecture.



Figure 6: Brearley House in 1875²⁵



Figure 7: The Brearley House in 1905 was owned by Benjamin Pidcock who was the son-in-law of Joseph Baker Brearley.²⁶

The Brearley House is a center hall, double pile house, also known as a full Georgian. While earlier examples of this floor plan exist, generally, this house type was not built regularly until the 1760s making the Brearley House an early example of this type. In this type, the front rooms were typically the best rooms in the house often a parlor and a dining room. If, as is presumed, Room 104 was paneled, this would have been the best room in the house. The back rooms often functioned as office space, work rooms and downstairs chambers. Room 103, with its exterior door, was likely a work room or office, enabling direct access to the farm and outbuildings.¹⁷ This was the more private, workaday space in the house. Room 102 could have been a sleeping chamber but it also could have been the dining room as it was the closest to the kitchen outbuilding.

This symmetrical Georgian façade gives way to a vernacular rear elevation where utility rather than architectural mandate dictates the positioning of the openings. The rear elevation has two exterior doors, which is unusual for a formal center hall house. The HSR surmises that the location of the second entrance at the southwest corner directly into Room 103 probably indicates this room was used as a “farm office”¹⁸ as the farm outbuildings stood to the southwest of the house as is visible through historic aerial photographs.¹⁹ With the location of Meadow Lane running to the east of the house, the farm fields would have been on the west. The formal entrance to the house was on the north façade with the best rooms in front. Access to the outside rear yard was through the center door and hall but by creating a second exterior door, it indicates the working aspect of Room 103. As

15 Craig, E-22-E-33

16 Ibid., E-21

17 Gabrielle Lanier and Bernard Herman, *Everyday Architecture of the Mid-Atlantic: Looking at Buildings and Landscapes* (Baltimore: Johns Hopkins University Press, 1997), 31.

18 Short and Ford, 95.

19 “100 Meadow Road, Lawrenceville,” *Historic Aerials by Netronline*, <https://www.historicaerials.com/viewer>

described in the archaeology report, this room was probably used “for purposes related to activities in the yard and the farmstead beyond, and can perhaps be seen as a vernacular adaptation of the Georgian plan to the needs of a working farmhouse: a transition from the ‘polite’ spaces on the rest of the first floor to the workaday world outside.”²⁰ In some houses with two exterior doors on the same elevation, one door was more ornate than the other, signaling the formal visitor entrance. Unfortunately, if the doors were treated differently is unknown; this evidence is lost at the Brearley House.

A close example of this door system was found at the Taylor-Parke House in Chester County, Pennsylvania. This house is like the Brearley House in several ways. Like the Brearley House, the Taylor-Parke House was the third-generation house built on the homestead lot of the Taylors who arrived in Pennsylvania in 1702. By 1768, the grandson Abiah Taylor built a Georgian influenced house of stone now the Taylor-Parke House. It had the same twelve-over-twelve double-hung sash windows “costly features that were used only in the finest country houses.”²¹ Mostly importantly, it had an exterior door directly into a corner room. At the Taylor House, it too was surmised to have been built as an office. Taylor was a miller as well as a farmer. A window in this same corner room has an original drawer beneath the interior sill of the west wall where the door is. It is believed this was a cash drawer; people may have come here to pay for their milling jobs.²² Unlike the Brearley House, the second door of the Taylor-Parke House is on the side elevation not the rear elevation further confirming the unusual nature of the door arrangement at the Brearley House.

20 Burrows, 7-2

21 155

22 Arlene Horvath, “Vernacular Expression in Quaker Chester County, Pennsylvania: the Taylor-Parke House and Its Maker,” *Perspectives in Vernacular Architecture*, Volume 2 (1986), 157.

23 J. W. Otley, James Keily, *Map of Mercer County, New Jersey* (Camden, N.J.: L. van der Veer, 1849). Library of Congress, <https://www.loc.gov/item/2004629246/>

24 D.J. Lake and S.N. Beers, *Map of the Vicinity of Philadelphia and Trenton from Actual Surveys* (Philadelphia, PA: C.K. Stone and A. Pomeroy, 1860), New Jersey State Library, <https://dspace.njstatelib.org/xmlui/handle/10929/34112>

25 Everts & Stewart, *Combination Atlas Map of Mercer County, New Jersey* (Philadelphia: Everts & Stewart, 1875), Library of Congress, <https://www.loc.gov/resource/g3813mm.gla00126/?sp=27&r=0.23,0.456,0.699,0.315,0>

26 A.H. Mueller, *Automobile driving and trolley map of Mercer County, New Jersey, 1905: from the latest geological and actual surveys* (Philadelphia: A.H. Mueller & Co., 1905), Princeton University, <https://maps.princeton.edu/catalog/princeton-5q47rr19d>



21-1: South facade with two doors; the door on the left leads directly to Room 103.



21-2: The door's location in the corner of Room 103.

Purpose and Scope

This Archaeological Management Plan forms an integral part of the Preservation Plan for the Brearley House in Lawrence Township, Mercer County, New Jersey.¹ It has been prepared to meet the standards for such plans set out in the document Archaeological Requirements of the New Jersey Historic Trust (www.njht.org). It identifies zones of archaeological sensitivity in the immediate vicinity of the standing 1761 house, reflecting the scope of the Preservation Plan. It is not intended to address archaeological issues on the Brearley House property as a whole.

The objective of this plan is to provide clear guidance on the responsible long-term management of the significant archaeological resources associated with the Brearley House. It achieves this objective by setting out policies for the treatment of the identified zones of archaeological sensitivity.

The preservation of a historic structure like the Brearley House may on occasion require disturbance of the ground in and around it. This in turn may adversely affect significant archaeological resources pre-dating, contemporary with, or later than the standing structure. In the case of the Brearley House, these resources are quite well understood as a consequence of extensive archaeological work undertaken in 1996 and 1998-2005.

The plan sets out procedures to be followed when planning for necessary ground disturbance in the defined zones around the house. The first option must be to minimize this disturbance as far as possible.

It is strongly recommended that all disturbance be avoided in the Archaeology Preservation Zone on the north side of the house. This area contains a rare undisturbed New Jersey example of a house cellar dating to around 1700 or a little earlier. This has important research potential, as well as being a potential focus of public archaeology programming in fulfillment of the mission of the Lawrence Historical Society.

In the other zones there is a requirement to undertake professional archaeological excavation in advance of the ground disturbance. There are provisions for addressing discoveries of unanticipated significance.

For the remainder of the property, the reader is referred to Burrow, Ian and Joshua Butchko 2016: *Three Houses and Three Thousand Years: Archaeological Research at the Brearley House*, Lawrence

¹ The full Archaeological report can be found in Appendix VIII of this Preservation Plan.

IV. ARCHAEOLOGICAL EVALUATION



23-1: Stone wall underneath the addition.

Township, Mercer County New Jersey.²

Previous Archaeological Work: Review and Synthesis

The 1761 Brearley House in Lawrence Township, Mercer County, New Jersey, is one of the most northerly examples of the distinctive group of patterned brick Georgian and pre-Georgian vernacular houses characteristic of the area of the Quaker settlement of West Jersey from Salem northward to the Falls of the Delaware at Trenton. The house is owned by the Township of Lawrence and operated by the Lawrenceville Historical Society as an interpreted historic site.

In 1996, exploratory archaeological excavations were mandated by the building's listing on the State Register of Historic Places, and by anticipated funding from the New Jersey Historic Trust for the planned restoration of the house. This work identified portions of the foundations of a former attached kitchen wing and located other well-preserved archaeological resources (Hunter Research, Inc. 1997).

Major archaeological research took place from 1998 to 2005 and is fully reported in Burrow and Butchko 2016. The work fell into two parts. Firstly, extensive investigations took place around the house in 1999 in order to evaluate more fully, and then document, the archaeological resources around the house. These resources were impacted, to varying degrees, by the restoration program and by plans to construct a service wing on the footprint of the former kitchen.

The key historic discoveries were of two possible predecessors of the 1761 house: a basemented structure of perhaps before 1700, and a stone foundation which may date to before 1722. To the south of the house lies a prehistoric site used over a long period, showing evidence for a range of activities, including the manufacture of bifacial tools made of argillite. Its location, like that of the later historic occupation, probably reflects the presence of a rich variety of animal and plant resources in the extensive wetlands and meadows to the east.

The second component of the research took the form of an educational enrichment program for the 8th Grade of the Lawrence Public Schools, funded by the Lawrence Education Foundation. Following



24-1: The crawl space under the addition is an area of previous archaeological investigation.

² Copies of the report are on file at the following locations:
Township of Lawrence
Lawrence Historical Society
Lawrence Township Board of Education
New Jersey Historic Trust
Historic Preservation Office, New Jersey Department of Environmental Protection

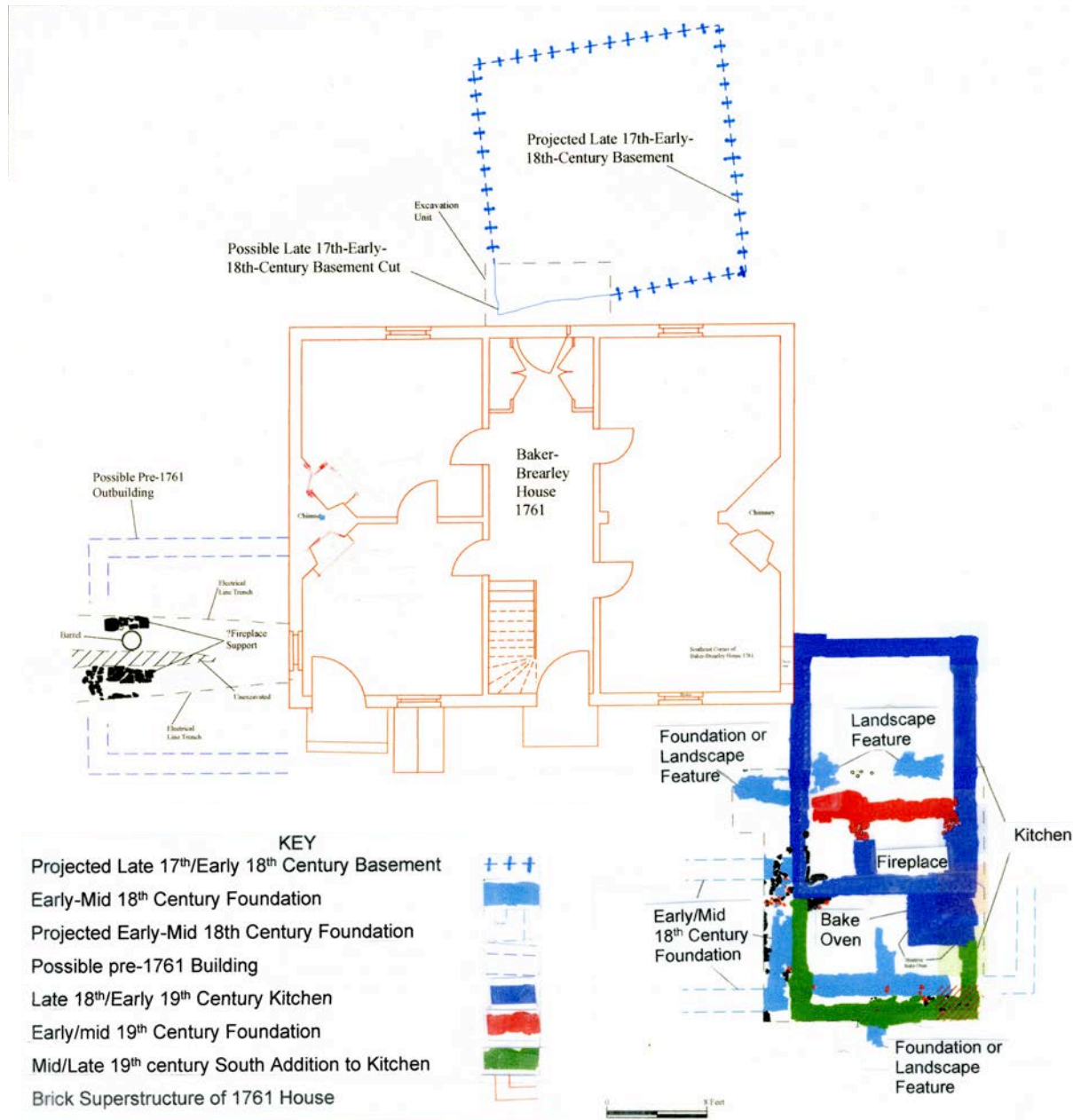


Figure A-1. Historic Archaeological Features around the 1761 Brearley House. Source: Burrow and Butchko 2016, Figure 3.1.

a small pilot program in 1998, twice-yearly programs involving the entire 8th grade class were held from 1999 to 2005. About 1800 students participated in the project over this time period. The primary focus of the program was on the archaeological survey of the grass meadow surrounding the house. This was achieved firstly by a shovel testing program which covered the greater part of the meadow, and then by the excavation of 1500 square feet of excavation units in an area of dense prehistoric occupation south of the house. Students undertook all the main tasks associated with these investigations, and also participated in other activities both in class and on site.

Several significant discoveries were made around the 1761 house (Figure A-1). First among these was the identification of a previously unknown infilled cellar or basement, estimated to be 20 feet square (Figure A-2). This lies close to the north wall of the standing house. Limited excavation suggested that the feature had been abandoned early in the 18th century, a conclusion chiefly based on the recovery of a complete English clay tobacco pipe bowl of c.1700 within the fill. It is tentatively concluded that this feature formed part of the primary house on the property, perhaps built by John Brearley I shortly before 1700.



Figure A-2. The southern part of the cellar-hole of the c.1700 house on the north side of the 1761 brick house, as excavated in 1999. The view faces west. The north foundation of the 1761 house is on the left. The small north arrow/photo scale lies on the unexcavated dark soil filling the cellar hole. At the bottom right the dark soil has been partially removed, defining the southern side of the cellar-hole. A mass of clay loam and cobbles lies within the cellar-hole fill. See Figure A-1 for location. Source: Burrow and Butchko 2016, Plate 3.8.

Excavations on the southeast side of the 1761 house confirmed that a one and a half story framed kitchen wing, on a stone foundation, had been added to the house in the late 18th or early 19th century, accessed through a new doorway opened through the southern end of the east gable wall. The primary portion of the kitchen was 15 by 20 feet and was equipped with a large cooking fireplace and bake oven. A 10 foot-long addition, probably a single story lean-to, was subsequently built at the southern end. An oral account indicates that the kitchen wing was torn down in the 1920's.

Partially incorporated into the kitchen structure were the fragments of an earlier stone foundation. This was associated with areas of cobbling and patches of occupation soil. The latter yielded a British Farthing coin of 1735, suggesting that the building dates to the first half of the 18th century. A very tentative reconstruction posits this as a two-section house, perhaps 40 feet long and 12 feet wide, on the same alignment as the 1761 house and about 12 feet to the south of it. It is possible that these remains are those of the "Mansion House" which was on the property by 1722.

Excavations in the 1761 house basement were uninformative. Monitoring observations of contractor's excavations west of the west gable identified stone walling, a barrel and a pit, but these features cannot be interpreted without additional controlled archaeological investigations.

The historic artifact assemblage of over 7700 artifacts was heavily dominated by ceramics and glass

vessel fragments. Most of the diagnostic material dates to after c. 1760, but an unknown percentage of the c.1000 red earthenware ceramics may be earlier than this and relate to the first generation Brearley occupation of the site.

The shovel-testing program recovered prehistoric material from many locations across the meadow, but there was a clear concentration of artifacts at the southern end (Figure A-3). From 2001 through 2005 work was therefore concentrated on excavation of the O and Ap horizons in five-foot-by-five-foot units here, with some limited penetration of the B horizon. Features were identified in the B horizon in several units, but these were left in place since they were considered too challenging for the 8th grade program.

A range of past human activities is discernible in the archaeological record. The manufacture and maintenance of stone tools was clearly taking place, and certainly argillite cobbles were being reduced on site and formed into bifaces, some of which were probably cached for later recovery and completion. The use of heated rocks for a variety of food preparation activities, including boiling of food in water in containers or perhaps in lined pits, seems certain. The presence of ceramic containers is a likely indicator of the presence of women, as may be the recovery of nutting stones (suggesting fall occupation?) and scrapers.

The datable artifacts suggest that the site area was frequented from at least 1600 BC, and possibly earlier, well into the Late Woodland period and even beyond. There is a possibility that there may have been some overlap between the last Indian occupation and the settlement of the Brearleys, although there is no direct evidence for this.

The artifacts and records from the archaeological project are currently (2023) stored in the attic of the kitchen wing.

Archaeological Sensitivity Zones, Policies, and Implementation

It is assumed that all activities envisaged in this section are “encroachments” under the New Jersey Register of Historic Places Act of 1970.

Encroachments are defined as: “those undertakings which adversely affect listed properties. An effect occurs when an undertaking impacts the historic characteristics for which a property is listed in the New Jersey Register”.³

3 <https://www.nj.gov/dep/hpo/2protection/njrreview.htm>



27-1 The 1999 archaeological examinations discovered a basemented structure and stone foundation which may date to before 1722.



- Shovel Test with Prehistoric Material
- Negative Shovel Test

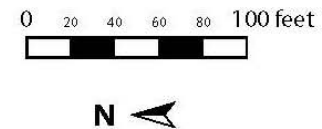


Figure A-3. Map of shovel testing, ground penetrating radar survey, and location of phase 2 excavations of the prehistoric site (black square) in the meadow surrounding the Brearley House. 1998-2005. Source: Burrow and Butchko 2016, Figure 4.1.

They will therefore require prior review and authorization under the New Jersey Register of Historic Places Act of 1970 (N.J.A.C. 7:4-7.1 (d)).

All archaeological work will be undertaken under the direct supervision of an individual who meets or exceeds the Secretary of the Interior's Professional Qualifications Standards for Archaeology.⁴ The individual will also be a Registered Professional Archaeologist in good standing.⁵

Archaeology Preservation Zone (Red)

This is an area 25 feet north-south by 30 feet east west against the north wall of the 1761 House. It encompasses the area of the c. 1700 filled-in cellar hole, which is assumed to be the first Brearley House. The emphasis here is on reducing ground disturbance to a minimum in order to conserve the archaeological remains.

1. Avoid ground disturbance as far as possible. Ground disturbance should only take place when it is absolutely essential for the stability and preservation of the 1761 building, and after other alternatives have been considered. It is envisaged that this would mean only disturbance immediately alongside the foundation.
2. Such essential ground disturbance will be preceded by prior archaeological excavation of the impacted area. Such archaeological excavation will be part of the overall cost of the specified work and will be budgeted accordingly.
3. This zoning also envisages future archaeological research and possibly the display and interpretation of historic features. Such research will meet the standards and guidelines of the State of New Jersey and the National Park Service.

Archaeology Documentation Zones (Pink)

Remaining archaeologically sensitive areas around the house and the kitchen have this designation.

In these zones, ground disturbances deemed necessary for the preservation management of the property will be preceded by prior archaeological excavation of the impacted area. Such archaeological excavation will be part of the overall cost of the specified work and will be budgeted accordingly.

4 36 CFR Part 61 and <https://www.nps.gov/articles/sec-standards-prof-quals.htm>

5 <https://rpanet.org>

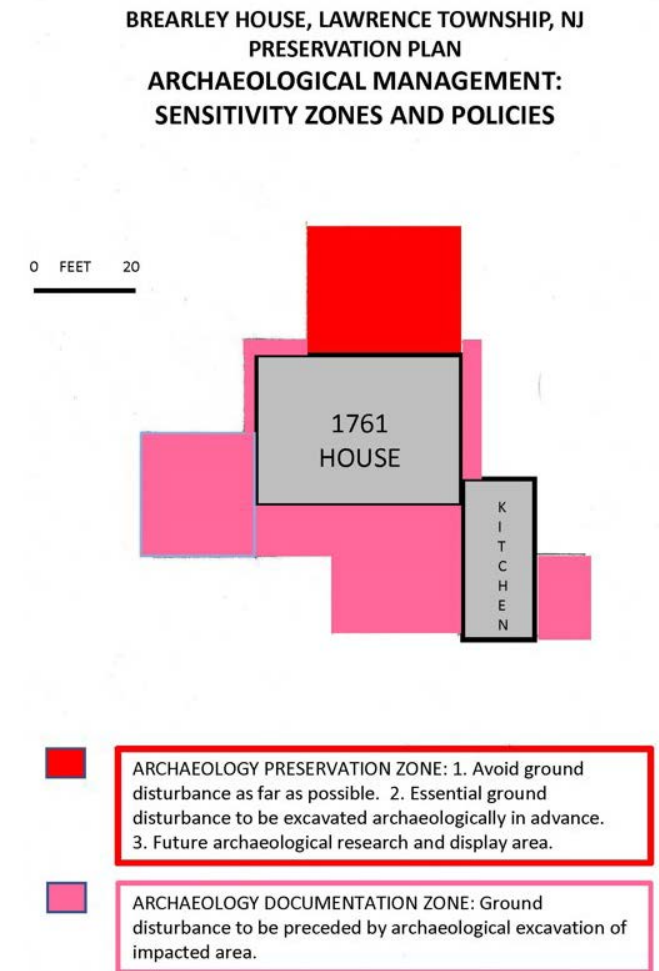


Figure A-4. Archaeological Sensitivity Zone around the 1761 Brearley House, with summary of management policies. For details see text.

Unanticipated Discoveries

It is assumed that the above procedures and policies will be sufficient to address the adverse effects of approved encroachments in the great majority of cases. However, it remains possible that resources may be encountered, such as human remains, which would require additional treatment, including modification of the encroachment. While this is considered unlikely, it remains a possibility.

Note on Archaeological Monitoring During Ground Disturbance

Because of the State Register Status of the property and high significance of the archaeological resources, archaeological monitoring during ground disturbance is not an acceptable stand-alone treatment. However, such monitoring may be recommended as a final stage following documentation which has already been carried out under the policies for the Preservation and Documentation Zones. It may be required if there are specific remaining questions which could not be fully addressed during documentation, and which can be readily answered through observation of ground disturbance by others.

Implementation

In order to ensure that the provisions of this archaeological management plan are followed as part of the overall preservation of the site, the following are strongly recommended.

1. The archaeological sensitivity zones defined on Figure A-4 will be marked on all plans, surveys or other graphics prepared for architectural, landscaping, utility or other work at the Brearley House.
2. The sponsor of any such work will ensure that archaeological resources are fully taken into account during planning, implementation and construction, and that contractors and subcontractors are fully aware of their responsibilities.
3. Time for archaeological work will be included in work schedules and timelines as necessary to ensure efficient workflow.
4. Ground disturbance of the Archaeology Preservation Zone is to be avoided wherever possible.
5. The costs of professional archaeological services will be included in all project budgets as necessary.

References

Burrow, Ian and Joshua Butchko

2016. Three Houses and Three Thousand Years: Archaeological Research at the Brearley House, Lawrence Township, Mercer County New Jersey. On file, New Jersey State Historic Preservation Office, Trenton and other repositories.

Hunter Research, Inc.

1997. Archaeological Excavations at the Baker-Brearley House, Township of Lawrence, Mercer County New Jersey. On file, New Jersey State Historic Preservation Office, Trenton.

Short and Ford Architects

1990. Baker-Brearley House, Lawrence Township, Mercer County New Jersey: Historic Structure Report. On file, Township of Lawrence.

Site and Landscape Evaluation

The Brearley House is situated at the end of Meadow Road, a single-lane gravel road located off of Princeton Pike. The road terminates at the parking lot for the Brearley House. The house is on a slight hill elevated from the surrounding meadows and lawns. The lawn is dotted with several large coniferous and deciduous trees; picnic tables are located near the northeast corner of the structure. There is a lack of defined parking, but this is not recommended to change based on the current number of visitors.



33-1: Apart from the parking lot, which is partially paved with a sidewalk leading to the visitor's entrance, the Brearley House is surrounded by meadow.

V. SITE AND LANDSCAPE EVALUATION



33-2: View of parking lot from Meadow Road along East side of the Brearley House, facing South.

Existing Conditions and Recommendations

The Brearley House is architecturally significant as a brick Georgian vernacular structure. It is a rare example of a patterned brickwork house, and is a good example of the Flemish Bond. Architectural significance of the interior elements includes woodwork details, molding and fireplaces, and the original closets.

A number of the building's elements are original, including the window sills, floorboard, chair rails in several location, and door transom at the North facade.

Several elements have been rebuilt or replaced, such as the chimneys and several of the doors. The addition dates to 1999, a time at which many repairs were made.

Abbreviations in table:

Cond = Condition

CDF = Character defining feature

Recommend = Recommendations

For more guidance and information, please see the National Park Service Technical Preservation Services Preservation Briefs: <https://www.nps.gov/orgs/1739/preservation-briefs.htm>

For the exterior masonry see the following briefs:

1. Assessing Cleaning and Water-Repellent Treatments for Historic Masonry Buildings. Robert C. Mack, FAIA, and Anne E. Grimmer.
2. Repointing Mortar Joints in Historic Masonry Buildings. Robert C. Mack, FAIA, and John P. Speweik
39. Holding the Line: Controlling Unwanted Moisture in Historic Buildings. Sharon C. Park, AIA.

For interior repair and repainting:

28. Painting Historic Interiors. Sara B. Chase.

VI. EXISTING CONDITIONS AND RECOMMENDATIONS



35-1: Looking North into Northeast Parlor (Room 101) from Southeast Parlor (Room 102)

Brearley House - North Facade

FEATURE	DESCRIPTION	PERIOD	CONDITION	CHARACTER DEFINING FEATURE	RECOMMENDATION
Foundation	Rubble stone Originally more exposed but grade was raised to increase drainage (ca. 1990) so now mostly covered	Original. Repointed in 1999	Good	Yes	Continue to maintain
Water table (39-5)	Brick in Flemish bond with grapevine profile at mortar joints	Original with spot repointing campaign in 1999	Good with limited moss	Yes	Clean using the gentlest means necessary. Follow mortar report recommendations for cleaning and repointing
Window wells (39-1, 39-3)	Stone	Added ca. 1985	Good	No	Continue to maintain
Wall (40-1)	Brick in Flemish bond with grapevine profile at mortar joints	Original with spot repointing campaign in 1999	Good with some efflorescence streaking below all four windows Missing mortar below first floor west window Moss growth at east from lost leader	Yes	Determine cause of water infiltration whether through sill or brick mortar. Repair as needed. Clean using the gentlest means necessary. Spot point necessary areas esp below first floor west window Follow mortar report recommendations for cleaning and repointing

Brearley House - North Facade

FEATURE	DESCRIPTION	PERIOD	CONDITION	CHARACTER DEFINING FEATURE	RECOMMENDATION
Arches at openings (39-1, 39-2, 39-3, 40-1, 41-1)	Two-course segmental brick arch at basement and first floor windows and at door	Original	Good	Yes	Follow mortar report recommendations for repointing
Basement windows (39-1)	Wood, 4-light awning	1999	Good	Light configuration, yes Materials, no as they date to 1999	Continue to maintain
Windows (40-1, 41-1)	Wood, 12/12 sash Wood sills and frames	1999 sash Some of the frames may be historic. Sills appear to date to 1999	Good but with mold on window sills, especially first floor	Light configuration, yes Materials, no as they date to 1999	Clean using gentle means. Repaint as required Continue to maintain
Shutters (40-1)	Paneled shutters at first floor windows	1999 based on extant pintels and one shutter dog	Good	Panel configuration is appropriate. The materials are not character defining as they date to 1999	Continue to maintain

Brearley House - North Facade

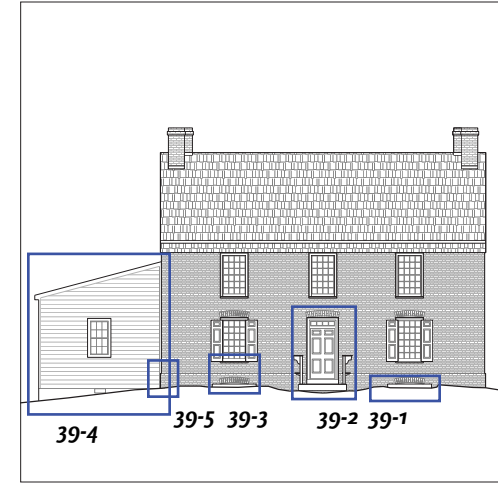
FEATURE	DESCRIPTION	PERIOD	CONDITION	CHARACTER DEFINING FEATURE	RECOMMENDATION
Door (39-2)	6-panel wood door Wood frame 4-light transom Stone sill	Door, 1999 Some of the frame may be historic, repaired 1999 Transom is original/historic Stone sill is original	Good	Panel configuration is appropriate. The materials are not character defining, as they date to 1999 Transom and stone sill are character defining	Continue to maintain
Stoop (39-2)	Wood stoop with benches at the sides	1999 based on evidence in the masonry	Fair moss growth and dirty Seems neglected		Clean gently
Cornice (41-1)	Box cornice	Mix of historic wood with 1999 repairs	Good	Yes	Continue to maintain
Roof (41-1)	Wood shingle	2020	Good	Yes	Wood shingle roof lasts 20 years.
Chimney (41-1)	Brick at east and west ends	Original but rebuilt above the roofline in 1999	Good	Yes	Continue to maintain
Leaders and gutters (40-1)	Built in gutter with leaders	1999	Fair, missing leader at east	No	Replace leader



39-1: The window wells are clear of vegetation, and should continue to regularly be cleared of leaves and debris. Moss is growing on various surfaces.



39-2: Porch has become dirty over time, porch and benches are in stable condition.



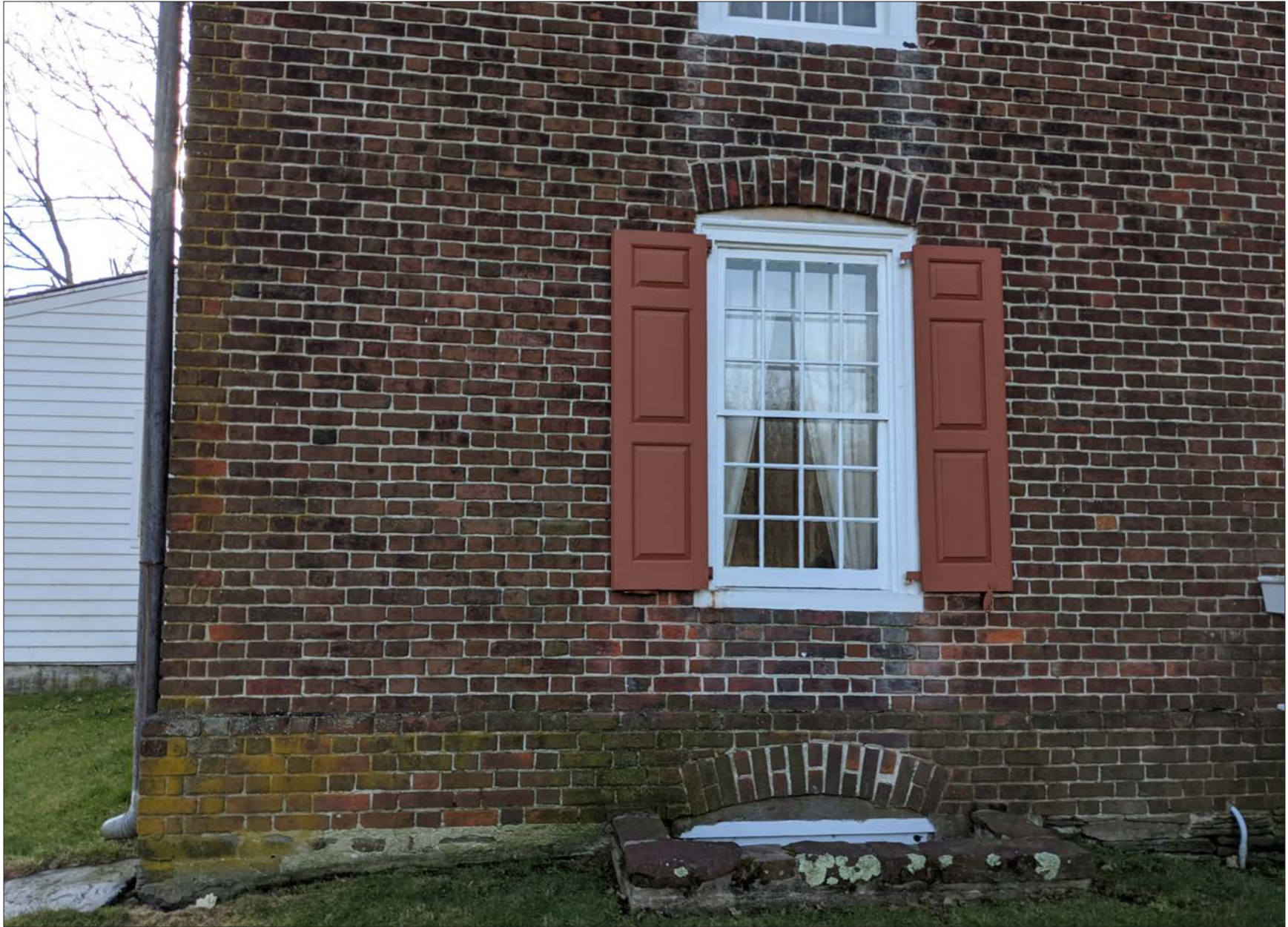
39-3: Plants should be removed from window wells and any leaks should be repaired to avoid water infiltration into the basement.



39-4: The 1990s addition is in good condition though moss is growing on the vertical surfaces.



39-5: Vegetation growing on water table and side of wall. PVC pipe should be removed if it is not performing a useful service.



40-1: Window at the North Facade showing efflorescence and areas needing mortar repointing.



41-1: North facade

Brearley House - South Elevation

FEATURE	DESCRIPTION	PERIOD	CONDITION	CHARACTER DEFINING FEATURE	RECOMMENDATION
Foundation (46-2)	Rubble stone Originally more exposed but grade was raised to increase drainage (ca. 1990) so now mostly covered	Original. Repointed in 1999	Good	Yes	Continue to maintain
Water table (46-2)	Brick laid in American common bond with grapevine profile at mortar joints	Original with spot repointing campaign in 1999	Good	Yes	Follow mortar report recommendations for cleaning and repointing
Window well	Stone	Added ca. 1985	Good	No	Continue to maintain
Cellar entrance (47-1)	Wood bulkhead door over Argillite steps	1999 Argillite steps are original	Fair with peeling paint and some deterioration	Configuration, yes but not materials	Repair/replace as needed. Repaint
Wall (47-1)	Brick in American common bond with grapevine profile at mortar joints	Original with spot repointing campaign in 1999	Good with some staining/streaking below west window sills both first and second floors	Yes	As there is water getting in at the interior, this area probably needs repointing. Follow mortar report recommendations for cleaning and repointing

Brearley House - South Elevation

FEATURE	DESCRIPTION	PERIOD	CONDITION	CHARACTER DEFINING FEATURE	RECOMMENDATION
Arches at openings (46-5, 47-1)	Two-course segmental brick arch at cellar door, basement and first floor windows and at doors Single course brick arch at center window at second floor	Original	Good	Yes	Follow mortar report recommendations for repointing
Basement window (47-1)	Wood, 4-light awning	1999	Good	Light configuration, yes Materials, no as they date to 1999	Continue to maintain
Windows (46-4, 46-5, 47-1)	Wood, 12/12 sash Wood sills and frames	1999 sash Some of the frames may be historic. Sills appear to date to 1999	Good but with staining/streaking below west windows	Light configuration, yes Materials, no as they date to 1999	Investigate to make sure water is not coming in through the windows/ sills. Repair/flash as needed
Shutters (46-4)	Paneled shutters at first floor windows	1999 based on extant pintels and patching at location of shutter dogs	Fair. Western shutter in need of repair	Panel configuration is appropriate. The materials are not character defining, as they date to 1999	Repair/replace shutter as required. Continue to maintain others.

Brearley House - South Elevation

FEATURE	DESCRIPTION	PERIOD	CONDITION	CHARACTER DEFINING FEATURE	RECOMMENDATION
Door (46-3, 47-1)	Two 6-panel wood doors Wood frames topped with parging below brick arches Stone sills	Doors, 1999 Some of the frames may be historic, repaired 1999. Parging above repaired in 1999 Argillite sill of west door may be original. It was removed from added concrete in 1999. Stone sill of center door unknown as documented as concrete in 1990	Good	Panel configuration is appropriate. The materials are not character defining, no as they date to 1999 Transom and stone sill are character defining	Continue to maintain
Landings at doors (46-2, 46-3)	Stone	1999 replaced extant concrete	Fine	No	Continue to maintain
Shed roofs (46-1)	Each door covered with shed roof	2020	Fine	No. HSR dates their addition to mid-19 th c. or later	They were added to protect the entrances. Continue to maintain
Cornice (47-1)	Box cornice	Mix of historic wood with 1999 repairs	Good	Yes	Continue to maintain
Roof (47-1)	Wood shingle	2020	Good	Yes	Wood shingle roof lasts 20 years.

Brearley House - South Elevation

FEATURE	DESCRIPTION	PERIOD	CONDITION	CHARACTER DEFINING FEATURE	RECOMMENDATION
Chimney (47-1)	Brick at east and west ends	Original but rebuilt above the roofline in 1999	Good	Yes	Continue to maintain
Leaders and gutters (46-2)	Built in gutter with leaders	1999	Fair, missing leader at east	No	Replace leader



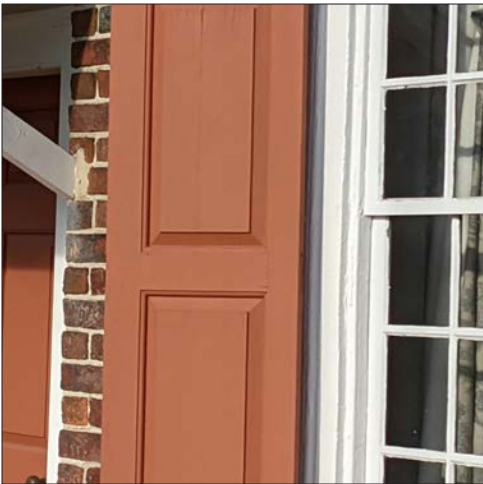
46-1: Shed roofs over doors at South elevation.



46-2: Existing downspout and foundation



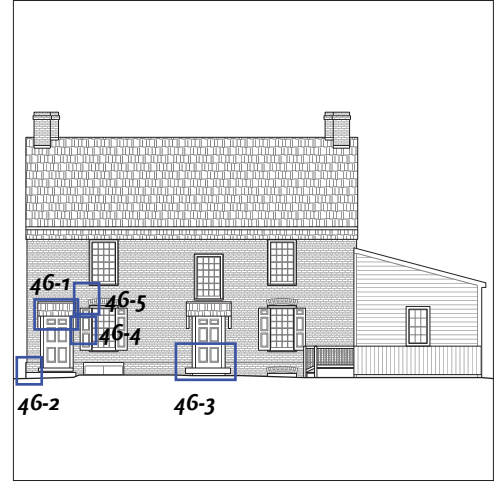
46-3: Stone step to door accessing museum.



46-4: Window shutters and frame detail.



46-5: Mortar and brick condition at South elevation.





47-1: The south elevation of the Brearley House is the nearest to the parking lot, and the house is accessed through the addition.

Brearley House - East Elevation

FEATURE	DESCRIPTION	PERIOD	CONDITION	CHARACTER DEFINING FEATURE	RECOMMENDATION
Foundation	Rubble stone Originally more exposed but grade was raised to increase drainage (ca. 1990) so now mostly covered	Original. Repointed in 1999	Good/fair Areas of lost mortar at center	Yes	Spot point center Follow mortar report recommendations for repointing
Water table (50-1)	Brick laid in American common bond with grapevine profile at mortar joints	Original with spot repointing campaign in 1999	Good/fair with significant moss	Yes	Clean using the gentlest means necessary. Follow mortar report recommendations for cleaning and repointing
Wall (50-1, 50-2, 50-3, 51-1)	Brick in American common bond with residual stucco from two historic campaigns. The bottom layer is scored "1761" in glazed brick	Original	Good with moss at north end	Yes	Continue to preserve stucco. Clean exposed brick using the gentlest means necessary. Follow mortar report recommendations for cleaning and repointing
Attic windows (51-1)	Two louvered openings with single course segmented arch lintel	Openings are original Louvers date to 1999	Good	Opening, yes Sash, no	Continue to maintain

Brearley House - East Elevation

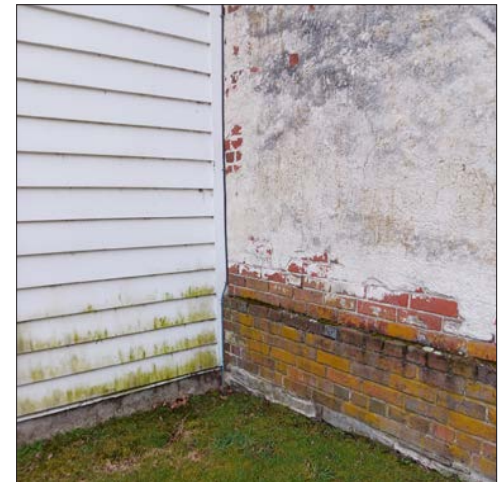
FEATURE	DESCRIPTION	PERIOD	CONDITION	CHARACTER DEFINING FEATURE	RECOMMENDATION
Rake board (51-1)	Plain, wood	1999	Good	Yes	Continue to maintain
Chimney (51-1)	Brick	Original but rebuilt above the roofline in 1999	Good	Yes	Continue to maintain
Leaders (51-1)	Leaders flank the north and south ends	1999	Necessary	No	Continue to maintain



50-1: Stucco coating on brick is deteriorating; some bricks are spalling.



50-2: Spalling and damaged bricks, coating should be cleaned and examined further.



50-3: Coating on brick is deteriorating; some bricks are spalling.



51-1: East elevation of the Brearley House; note the "1761" in vitrified brick below the louvered openings.

Brearley House - West Elevation

FEATURE	DESCRIPTION	PERIOD	CONDITION	CHARACTER DEFINING FEATURE	RECOMMENDATION
Foundation (54-4)	Rubble stone Originally more exposed but grade was raised to increase drainage (ca. 1990) so now mostly covered	Original. Repointed in 1999	Good/fair Areas of lost mortar at south end	Yes	Spot point south end Follow mortar report recommendations for repointing
Water table (54-3)	Brick laid in American common bond with grapevine profile at mortar joints	Original with spot repointing campaign in 1999	Good/fair Areas of lost mortar at south end	Yes	Spot point south end Follow mortar report recommendations for repointing
Wall (54-1, 54-5, 55-1)	Brick in American common bond with grapevine profile at mortar joints	Original with spot repointing campaign in 1999	Good	Yes	Follow mortar report recommendations for cleaning and repointing
First floor windows (54-2)	Wood, 6/6 sash Wood sills and frames	1999 sash The opening is not original; it was added at an unknown date	Good	No	Continue to maintain
Attic windows (55-1)	Two 4-light wood sash with single course segmented arch lintel	Openings are original Sash date to 1999	Good	Opening, yes Sash, no	Continue to maintain
Rake board (55-1)	Plain, wood	1999	Good	Yes	Continue to maintain

Brearley House - West Elevation

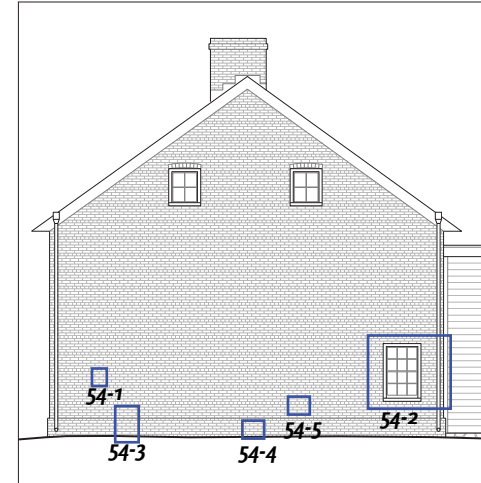
FEATURE	DESCRIPTION	PERIOD	CONDITION	CHARACTER DEFINING FEATURE	RECOMMENDATION
Chimney (55-1)	Brick	Original but rebuilt above the roofline in 1999	Good	Yes	Continue to maintain
Leaders (55-1)	Leaders flank the north and south ends	1999	Necessary	No	Continue to maintain



54-1: Miscellaneous metal object embedded in wall; location not associated with window opening or doorway. Function unknown, corrosion could cause damage to mortar and brick face.



54-2: Efflorescence at window and some spalling bricks around window. Note areas of mortar loss at lower left of image.



54-3: Pipes protruding from wall. Bricks in wall are spalling and cracked.



54-4: Gap at base of exterior masonry wall. Stucco coating has been damaged.



54-5: Mortar and brick detail. Some bricks are spalling and mortar is deteriorating.



55-1: West elevation of the house.

Brearley House - Addition

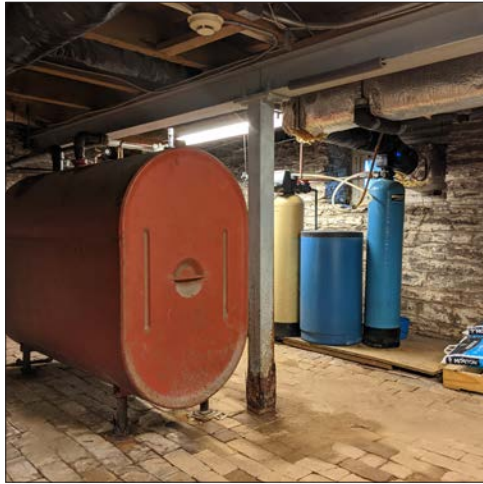
FEATURE	DESCRIPTION	PERIOD	CONDITION	CHARACTER DEFINING FEATURE	RECOMMENDATION
Foundation (57-1)	Parged	1999	Good Moss/mold especially on north	No	Clean
Wall (57-1)	Clapboard	1999	Good Moss/mold especially on north	No	Clean. Repaint as necessary
Windows (57-1)	6/6 sash	1999	Good	No	Continue to maintain
Rake boards (57-1)	Plain, wood	1999	Good	No	Continue to maintain
Shed roof (57-1)	Wood shingle	1999	Good	No	Continue to maintain
Gutters and leaders	On east side	1999	Necessary	No	Continue to maintain
Ramp (57-1)	Accessible access	1999 but with newer decking	Necessary	No	Continue to maintain



57-1: West elevation of addition showing accessible ramp and steps.

Brearley House - Basement (Room 001)

FEATURE	DESCRIPTION	PERIOD	CONDITION	CHARACTER DEFINING FEATURE	RECOMMENDATION
Floor (59-2)	Brick	Original	Good	Yes	Continue to maintain
Walls (60-1)	Rubble stone with whitewash	Original	Good with minor areas of delaminating of whitewash	Yes	Continue to maintain
Ceiling (61-1)	Floor joists	Original with some sistering, 1999	Good	Yes	Continue to maintain
Windows (61-1)	Three 4-light on north and south walls	Openings are original but sash date to 1999	Good	Opening, yes Sash, no	Continue to maintain
Door	Opening at west end of south wall topped by segmented brick arch with Argillite steps to exterior covered by wood bulkhead door	Original opening and steps with repairs to wood sill in 1999	Good	Yes	Continue to maintain
Chimney bases (601-, 61-1)	Whitewashed rubble stone bases with brick arches for back-to-back corner chimneys project at east and west walls	Original	Good	Yes	Continue to maintain
Stair to first floor (59-5)	Wood, roughly centered on south wall	1980s? Pre-1990	Fair	No	Very steep with inadequate headroom. May want to reconfigure for safety



59-1: Existing oil heating unit and water system.



59-2: Steel columns at basement level.



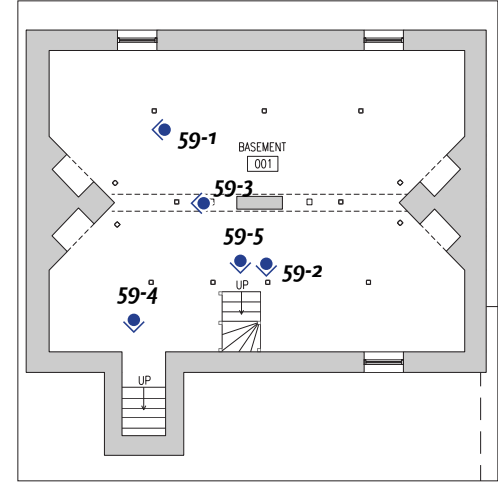
59-3: Structural columns supporting wood beam; structural steel added after 1990.



59-4: Existing sump pump.



59-5: Steps from basement to first floor. Treads and stringers appear to be recently replaced.





60-1: Building systems equipment, including oil heating and well water systems.



61-1: Existing view of rubble masonry walls and contemporary interventions including steel supports and mechanical ductwork. Flooring is generally dry with sporadic locations and periods of water infiltration.

Brearley House - Southeast Parlor (Room 102)

FEATURE	DESCRIPTION	PERIOD	CONDITION	CHARACTER DEFINING FEATURE	RECOMMENDATION
Floor (64-1)	Clear finished wooden boards	1999	Good	No	Continue to maintain
Walls (64-3)	Plaster	Original with limited repairs in 1999	Good	Yes	Continue to maintain plaster
Baseboard (64-2)	Plain	Original	Good	Yes	Continue to maintain
Chair rail	Molded chair rail	Original	Good	Yes	Continue to maintain
Ceiling	Plaster	Original with substantial repairs in 1999	Fair with some cracking and peeling paint	Yes	Confirm there is no active leaking from kitchen above. Repair as needed. Repaint
Door frame (65-1)	Molded frame No door	Frames are original on both hall and parlor side	Good	Yes	Continue to maintain
Window	12/12 sash with molded frame with interior storm	Sash and storm date to 1999 Frame is original with 1999 repairs, especially stool	Good	Frame, yes Sash and storm, no	Continue to maintain
Fireplace (65-1)	Fielded wood paneling, plaster firebox surround, brick firebox	Wood paneling is original. The plaster was repaired in 1999. The firebox had been relined; this was removed in 1999. Presumably, the firebox is original	Good	Yes	Continue to maintain

Brearley House - Southeast Parlor (Room 102)

FEATURE	DESCRIPTION	PERIOD	CONDITION	CHARACTER DEFINING FEATURE	RECOMMENDATION
Corner cupboard (64-2)	Paneled wood cupboard in corner	According to one source, this was removed ca. 1914. It was reconstructed in 1999 based on local precedence	Good	No	Although its construction presents a combination of preservation philosophies (an 18th c. corner cupboard with a 20th c. wall opening), this is a functional piece of furniture that can remain
Lighting (65-1)	Ceiling mounted exhibition lights	1999	Poor	No	Less intrusive, more energy efficient lighting should be installed. Protect historic plaster



64-1: Original wood flooring exists throughout the house and should continue to be maintained.



64-2: Reconstructed corner cupboard



64-3: Plaster at walls is cracking and needs to be repaired.



65-1: The original wood paneling should continue to be maintained.

Brearley House - Center Hall (Room 100)

FEATURE	DESCRIPTION	PERIOD	CONDITION	CHARACTER DEFINING FEATURE	RECOMMENDATION
Floor (68-5, 69-1)	Wooden boards over original	20 th century	Good	No	Continue to maintain
Walls (69-1)	Plaster Were covered with gypsum board in 1990	Original with substantial repairs in 1999	Good	Yes	Continue to maintain
Baseboard (69-1)	Plain	Original with 1999 repairs	Good	Yes	Continue to maintain
Chair rail (69-1)	Molded chair rail on east and west walls	1999 In 1990, base remained on west wall but projecting molding had been cut to install gypsum board. On east wall, chair rail had been removed entirely	Good	Its existence yes but its materials, no	Continue to maintain
Ceiling (69-1)	Plaster	Original with substantial repairs in 1999	Good/fair Sagging at north end	Yes	Repair plaster at north end. Repaint
Exterior Doors (68-1, 68-2, 69-1)	6-panel doors with molded frames 4-light transom over north door	Doors date to 1999 Frames are original with 1999 repairs Transom is original	Good	Openings and frames, yes Doors, no	Continue to maintain

Brearley House - Center Hall (Room 100)

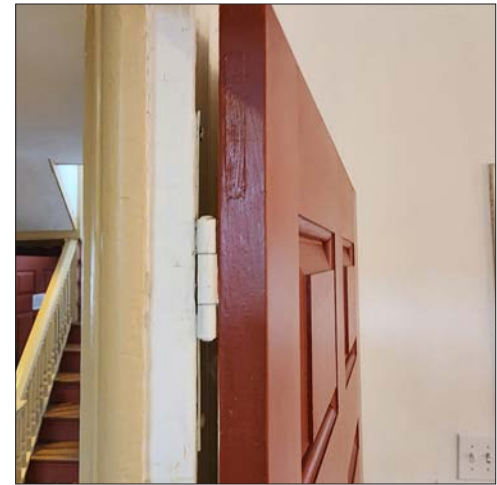
FEATURE	DESCRIPTION	PERIOD	CONDITION	CHARACTER DEFINING FEATURE	RECOMMENDATION
<p>Door to cellar (68-5)</p>	<p>6-panel with plain block casing</p>	<p>Door dates to 1999 The opening and casing dates to the 19th century Originally access to cellar was through the exterior only</p>	<p>Necessary</p>	<p>No</p>	<p>Continue to maintain</p>
<p>Stairs (68-4, 68-5)</p>	<p>Quarter turn stair to second floor</p>	<p>Original treads, risers, stringer, newel, balustrade and paneling Added molding and features were removed in 1999</p>	<p>Good</p>	<p>Yes</p>	<p>Continue to maintain</p>



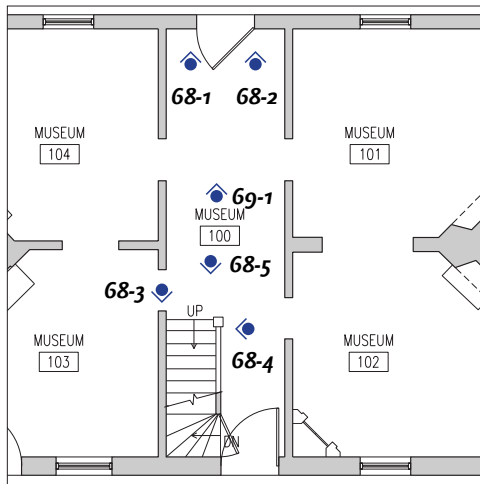
68-1: Modern door hardware.



68-2: Hardware painted to match door and frame.



68-3: Door and hinge.



68-4: Baluster and railing.



68-5: View towards stairs from first floor corridor.



69-1: First floor corridor has exit signage, thermostat, lighting, and required fire alarm pull.

Brearley House - Southwest Parlor (103)

FEATURE	DESCRIPTION	PERIOD	CONDITION	CHARACTER DEFINING FEATURE	RECOMMENDATION
Floor (73-4, 73-5)	Wide board	Original	Good	Yes	Continue to maintain
Walls (Figure 73-1)	Plaster	Original with heavy in 1999. This room had been converted to a kitchen so there were modern materials and cabinetry mounted to the original plaster	Fair Water infiltration with spongy and lost plaster on south and west walls	Yes	Confirm how water is getting in—at window sills and/or through mortar—fix exterior issue then repair plaster and repaint
Baseboard (75-1)	Plain	Original	Good	Yes	Continue to maintain
Chair rail (74-1)	Molded chair rail	Original on north wall to east of door. Other dates to 1999 based on evidence in plaster	Good	No	Continue to maintain
Ceiling (75-1)	Plaster	Original with substantial repairs in 1999	Good with minor cracking	Yes	Make minor repairs and repaint when rest of room is completed after fixing exterior infiltration issues
Door to Hall (Figure 73-2)	6-panel door with molded frame	Doors dates to 1999 Frames are original on both hall and parlor side	Good	Door, no Frames, yes	Continue to maintain

Brearley House - Southwest Parlor (103)

FEATURE	DESCRIPTION	PERIOD	CONDITION	CHARACTER DEFINING FEATURE	RECOMMENDATION
Door to north parlor, Room 104	6-panel door with plain frames in both Rooms 103 and 104	Unclear but historic. Frame is different than others and no door existed here in 1990. The door could be one of 3 original doors extant in the house. Frames could be original or 19 th c.	Good	Yes	Continue to maintain
Door to exterior (75-1)	6-panel door with molded frame	Doors dates to 1999 Frame is historic/ original	Good	Door, no Frame, yes	Continue to maintain
South window (73-4)	12/12 sash with molded frame with interior storm	Sash and storm date to 1999 Frame is original	Good with peeling paint at sill	Frame, yes Sash and storm, no	Confirm how water is getting in—at window sills and/or through mortar—fix exterior issue then repaint
West window (73-1)	6/6 sash with molded frame with interior storm	This window was added at an unknown date. The sash were replaced in 1999 when storms were added	Good	No	Continue to maintain

Brearley House - Southwest Parlor (103)

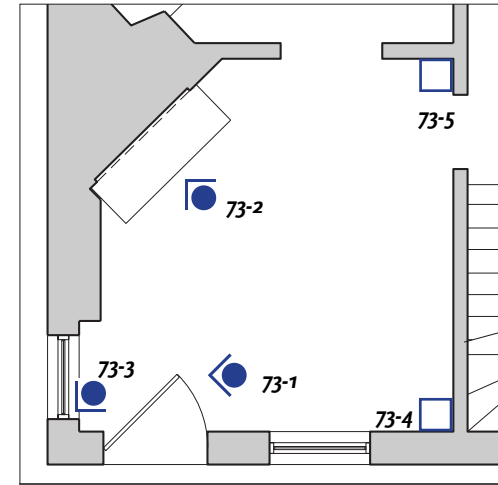
FEATURE	DESCRIPTION	PERIOD	CONDITION	CHARACTER DEFINING FEATURE	RECOMMENDATION
Fireplace Brick hearth (73-2)	Plaster with shadow of fireplace	The brick hearth is original As this room had been converted to a kitchen, the details of the fireplace had been removed. Rather than guess to the appearance, the architect plastered over the opening, leaving it blank. It now is used as a mechanical flue	Fair. Efflorescence from water infiltration in lower west section	No	Determine cause of water. Repair as necessary
Architectural evidence windows (74-1, 74-2, 75-1)	There is a window to display the original lath and the evidence of an original corner cupboard	1999. According to one source, the corner cupboards were removed ca. 1914.	Fine	No	This is a standard interpretation tool
Lighting (74-2, 75-1)	Ceiling mounted exhibition lights	1999	Poor	No	Less intrusive, more energy efficient lighting should be installed. Protect historic plaster



73-1: Significant damage to plaster below windows. Proper investigation needs to occur to mitigate water infiltration.



73-2: Fireplace has been covered over and the hearth remains exposed.



73-3: Paint at windowsill and jamb is peeling.



73-4: Areas of the original wall and floor sheathing were revealed during previous restorations.



73-5: Floor-mounted mechanical register cut into original flooring.



74-1: This window showing original lath is a standard interpretation tool.



74-2: Evidence of an original corner cupboard; removed ca. 1914. Similar to the This and the window showing original lath is a standard interpretation tool.



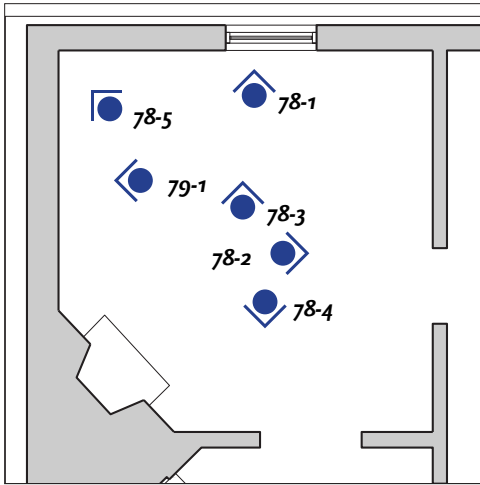
75-1: This room uses the investigation into historical finishes and construction as an interpretive tool.

Brearley House - Northwest Parlor (104)

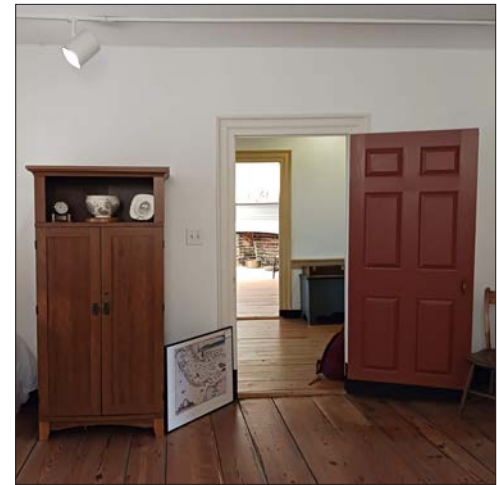
FEATURE	DESCRIPTION	PERIOD	CONDITION	CHARACTER DEFINING FEATURE	RECOMMENDATION
Floor (78-2, 79-1)	Wide board	Original	Good	Yes	Continue to maintain
Walls (78-1, 78-4, 78-5)	Plaster	Original with repairs in 1999 especially in the northwest corner. According to one source, paneling was removed from the house ca. 1914. The HSR surmises these walls may have been paneled (because of the lack of a chair rail)	Fair Peeling paint, mold and signs of water infiltration on both exterior walls	Yes	Confirm how water is getting in—at window sills and/or through mortar—fix exterior issues then repair plaster and repaint
Baseboard (79-1)	Plain	Original	Good	Yes	Continue to maintain
Ceiling (79-1)	Plaster	Original with repairs in 1999	Good with minor cracking	Yes	Make minor repairs and repaint when rest of room is completed after fixing exterior infiltration issues
Door to Hall (78-2)	6-panel door with molded frame	Doors dates to 1999 Frames are original on both hall and parlor side	Good	Door, no Frames, yes	Continue to maintain

Brearley House - Northwest Parlor (104)

FEATURE	DESCRIPTION	PERIOD	CONDITION	CHARACTER DEFINING FEATURE	RECOMMENDATION
North window (78-3)	12/12 sash with molded frame with interior storm	Sash and storm date to 1999 Frame is original	Good	Frame, yes Sash and storm, no	Continue to maintain
Fireplace (79-1)	Wood mantel, plaster firebox surround, brick hearth, brick firebox	Original	Good	Yes	Continue to maintain
Lighting (79-1)	Ceiling mounted exhibition lights	1999	Poor	No	Less intrusive, more energy efficient lighting should be installed. Protect historic plaster



78-1: Peeling of plaster and paint below window.



78-2: View toward center hallway



78-3: Significant damage to plaster under windows



78-4: Cracked paint and plaster around door frame



78-5: Peeling paint at corners of wall and ceiling; strip along wall edge removed to show previous paint finishes.



79-1: Overview of room showing fireplace, surround, and hearth. Corner of wall shows extent of previous paint analysis and investigation.

Brearley House - Northeast Parlor (101)

FEATURE	DESCRIPTION	PERIOD	CONDITION	CHARACTER DEFINING FEATURE	RECOMMENDATION
Floor (82-3, 83-1)	Clear finished wooden boards	1999	Good	No	Continue to maintain
Walls (83-1)	Plaster With early 19 th century stencil on east wall	Original with limited repairs in 1999	Good	Yes	Continue to preserve surviving stencil Continue to maintain plaster
South boxed-in arch	The original wall was removed and a new wall constructed with large opening with molded frame	ca. 1925	Good	No	While this is not period appropriate for a restoration, the opening was maintained to more easily accommodate large gatherings
Baseboard (82-3)	Plain	Original with 1999 repairs in northeast corner	Good	Yes	Continue to maintain
Chair rail (82-3)	Molded chair rail	Original except on south wall and around fireplace where it dates to the 19 th c.	Good	Yes	Continue to maintain
Ceiling (82-3, 83-1)	Plaster	Original with substantial repairs in 1999	Good	Yes	Continue to maintain

Brearley House - Northeast Parlor (101)

FEATURE	DESCRIPTION	PERIOD	CONDITION	CHARACTER DEFINING FEATURE	RECOMMENDATION
Door and door frame (82-2)	6-panel doors with molded frames	Door dates to 1999, replacing a 19 th c. door Frames are original on both hall and parlor side	Good	Frames, yes Door, no	Continue to maintain
Window (83-1)	12/12 sash within molded frame with interior storm	Sash and storm date to 1999 Frame is original	Good	Frame, yes Sash and storm, no	Continue to maintain
Fireplace (82-1, 82-3)	Wood chimney piece and mantel, plaster firebox surround	A combination of original, early 19 th c. and 1999. The HSR surmises that this room was redone in the early 19 th century and that the chair rail at the fireplace, the mantel and the stenciling all date to this remodeling.	Good	Yes	Continue to maintain
Lighting (82-2, 82-3, 83-1)	Ceiling mounted exhibition lights	1999	Poor	No	Less intrusive, more energy efficient lighting should be installed. Protect historic plaster



82-1: Detail of mantle woodwork.



82-2: Previous investigations of the interior finishes revealed stencil work.



82-3: Angled wall with fireplace. Interpretation in this room includes images of fireplace prior to 1999.



83-1: Note the stencil work that has been revealed at the top of the wall leading to the center hall.

Brearley House - Addition Interior(Kitchen, restrooms, utility closet)

FEATURE	DESCRIPTION	PERIOD	CONDITION	CHARACTER DEFINING FEATURE	RECOMMENDATION
Floor (85-3)	Vinyl tile	1999	Good	No	Continue to maintain
Walls (85-4)	Modern plasterboard	1999	Good	No	Continue to maintain
Baseboard	Vinyl	1999	Good	No	Continue to maintain
Ceiling (85-1)	Modern plasterboard	1999	Good	No	Continue to maintain
Doors	6-panel door	1999	Good	No	Continue to maintain
Windows (85-1, 85-2))	6/6 sash with simple wood frames	1999	Good	No	Continue to maintain
Other (85-2, 85-4)	Kitchen and bathroom fixtures	1999	Good	No	Continue to maintain



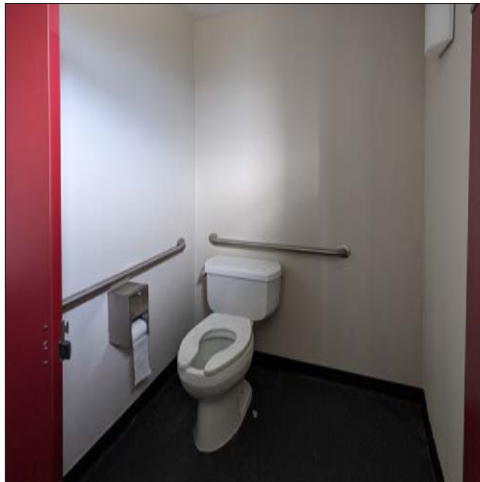
85-1: Kitchenette; linoleum flooring and contemporary cabinets and fixtures.



85-2: Women's restroom, fixtures and room dates to 1990s.



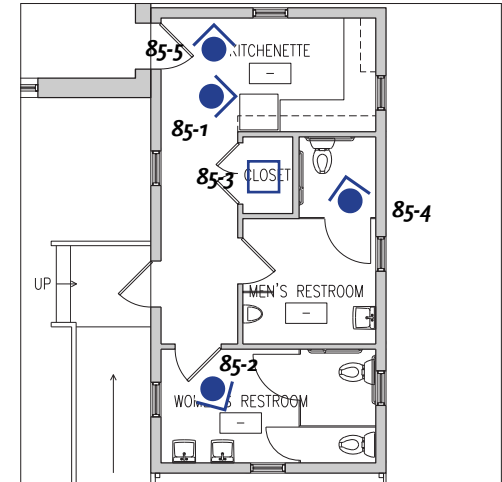
85-3: Crawl space access from inside of closet.



85-4: Contemporary accessible toilet at men's restroom.



85-5: Storage space above Kitchen wing showing connection to brick wall.



Brearley House - Second Floor Stair Hall (200)

FEATURE	DESCRIPTION	PERIOD	CONDITION	CHARACTER DEFINING FEATURE	RECOMMENDATION
Floor (87-1)	11" floorboards	Original	Good	Yes	Continue to maintain
Walls (87-1)	Plaster Were covered with gypsum board in 1990	Original with substantial repairs in 1999	Good	Yes	Continue to maintain
Baseboard (87-1)	Plain	Original	Good	Yes	Continue to maintain
Chair rail (87-1)	In northeast corner	Original	Good	Yes	Continue to maintain
Ceiling (87-3)	Plaster	1999	Good	Yes	Continue to maintain
Doors (87-2)	6-panel doors with molded frames	Original/historic doors (HSR dates some to the 19 th c.) in original frames with original/historic Norfolk latch hardware. Some have been reused from other places; most are in their original locations and retain their H-L hinges	Good	Yes	Continue to maintain
Window	12/12 sash within molded frame with interior storm at stair landing	Sash and storm date to 1999 Frame is original	Good	Frame, yes Sash and storm, no	Continue to maintain



87-1: Overview of the second floor landing looking towards interior.



87-2: Door to attic



87-3: Second floor corridor ceiling has contemporary lighting and safety equipment.

Brearley House - Caretaker Apartment (205 and 206)

FEATURE	DESCRIPTION	PERIOD	CONDITION	CHARACTER DEFINING FEATURE	RECOMMENDATION
Floor	11" floorboards	Original with repairs in 1999	Good covered with rugs	Yes	Continue to maintain
Walls (91-4, 91-5)	Plaster except for bathroom which are modern sheetrock	Original with repairs in 1999	Fair with peeling paint on all exterior walls plus within bathroom. Tenant says north wall staining has become worse	Yes	Like in other places, water is migrating in from the exterior. It is unclear if this is through the windows or through the mortar. Investigate further, fix exterior, repair interior, paint. Bathroom needs better ventilation. At north, missing leader is causing the issue. Reattach leader, clean and repoint masonry
Baseboard	In 1990 still fully extant presumably remains	Original	Unclear	Yes	Continue to maintain
Chair rail	In 1990 still fully extant presumably remains	Original	Unclear. Where it is visible, it is in good condition	Yes	Continue to maintain
Ceiling (91-5)	Plaster	Original with repairs in 1999	Good	Yes	Continue to maintain

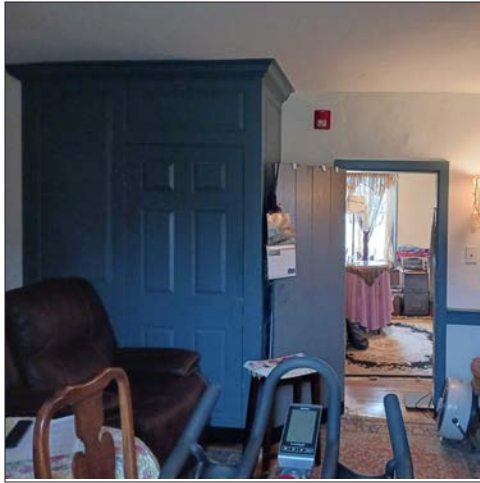
Note: This is a residence with a lot of furniture and decorations. A lot of surfaces are blocked from view making assessment difficult

Brearley House - Caretaker Apartment (205 and 206)

FEATURE	DESCRIPTION	PERIOD	CONDITION	CHARACTER DEFINING FEATURE	RECOMMENDATION
Doors to Room 200 and 203, already described Door between rooms (91-4)	Door is board and batten within a plane frame with original latch hardware	Original/historic	Good	Yes	Continue to maintain
Window (91-3, 91-5)	12/12 sash within molded frame	Sash date to 1999 Frame is original	Unable to verify	Yes	Continue to maintain
Closets in both rooms (91-1)	Paneled closets	Original	Good	Yes. These are remarkable surviving original features	Continue to protect them through maintenance
Kitchen (91-2)	Kitchen cabinets and appliances have been installed along the west wall of Room 206	1999	Fine	No	
Bathroom	A full bath was installed in the southeast corner of Room 206	1999	Fine	No	

Brearley House - Caretaker Apartment (205 and 206)

FEATURE	DESCRIPTION	PERIOD	CONDITION	CHARACTER DEFINING FEATURE	RECOMMENDATION
Fireplace	In 1990 there was an enclosed fireplace with a late 19 th /early 20 th c. mantel. This mantel has been removed but presumably the original segmental arch and any other original/historic evidence remains behind wallboard				



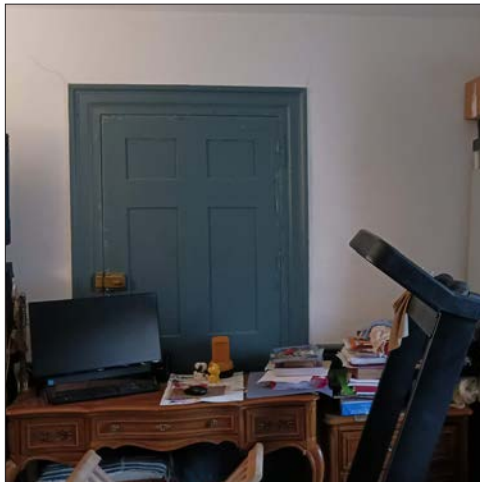
91-1: Door to bathroom from tenant kitchen.



91-2: Tenant kitchen, with cabinets and stove dating to 1990s.



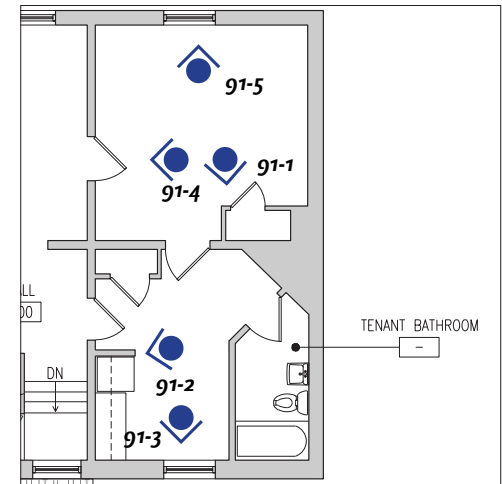
91-3: Existing conditions of the window and plaster at the tenant kitchen.



91-4: Locked door between caretaker apartment (205) and Northwest Chamber (203).



91-5: Failing plaster around window indicates possible water infiltration.



Brearley House - Southwest Chamber (202)

FEATURE	DESCRIPTION	PERIOD	CONDITION	CHARACTER DEFINING FEATURE	RECOMMENDATION
Floor (94-4)	11" floorboards	Original with repairs in 1999	Good	Yes	Continue to maintain
Walls (94-2, 94-4, 94-5, 95-1)	Plaster	Original with substantial repairs in 1999	Good/fair Peeling paint on north wall Area of loss on south wall at window corner	Yes	Water is getting in through the window and/ or mortar. Confirm from where with monitoring, fix issue and prep and paint window and frame
Baseboard	Plain	Original	Good	Yes	Continue to maintain
Chair rail (94-5)	Molded chair rail	Original	Good	Yes	Continue to maintain
Ceiling (94-4)	Plaster	Original with repairs in 1999	Good	Yes	Continue to maintain
Door	6-panel door, molded frame	Original/historic door (original door stood here in 1990) in original frames with original/ historic Norfolk latch hardware.	Good	Yes	Continue to maintain
Window (94-1, 94-2, 94-3)	12/12 sash within molded frame with interior storm	Sash and storm date to 1999 Frame is original	Good/fair with peeling paint at frame esp at sill	Frame, yes Sash and storm, no	Water is getting in through the window and/ or mortar. Confirm from where with monitoring, fix issue and prep and paint window and frame

Brearley House - Southwest Chamber (202)

FEATURE	DESCRIPTION	PERIOD	CONDITION	CHARACTER DEFINING FEATURE	RECOMMENDATION
Fireplace (95-1)	Plaster enclosed fireplace with brick hearth	Original fireplace but had been enclosed by 1990. Minimal evidence of what existed originally (possibly paneling above), but because it was not definite, this was solution: recalling a fireplace but without detail	Good	No	Continue to maintain
Lighting (94-4)	Ceiling mounted exhibition lights	1999	Poor	No	Less intrusive, more energy efficient lighting should be installed. Protect historic plaster



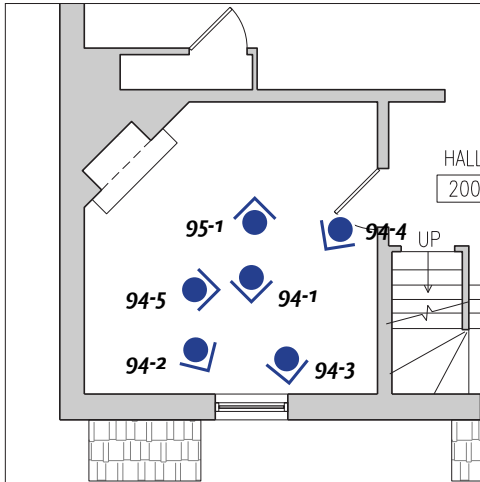
94-1: Cracked plaster ceiling and walls.



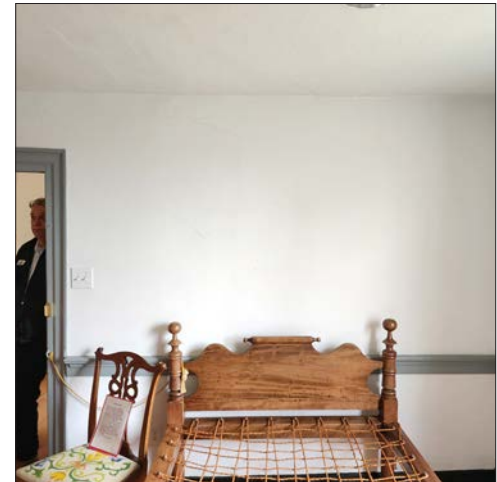
94-2: Cracked and peeling plaster around window head and ceiling.



94-3: Paint peeling at window sill.



94-4: Period room, with contemporary lighting fixtures.



94-5: Original chair rail has been maintained.



95-1: Plaster cracking above wall. Image placed on period furniture shows room prior to 1999 work.

Brearley House - Northwest Chamber (203)

FEATURE	DESCRIPTION	PERIOD	CONDITION	CHARACTER DEFINING FEATURE	RECOMMENDATION
Floor (99-1)	11" floorboards	Original with repairs in 1999. This room had been divided into 3 rooms by 1990. This was completed to insert a bathroom before 1925	Good	Yes	Continue to maintain
Walls (98-2, 99-1)	Plaster	Original with repairs in 1999	Good	Yes	Continue to maintain
Baseboard	Plain	Original	Good	Yes	Continue to maintain
Chair rail (99-1)	Molded chair rail	Original with eastern end of north wall restored (because missing) in 1999	Good	Yes	Continue to maintain
Ceiling (98-5)	Plaster	Original with repairs in 1999	Good	Yes	Continue to maintain
Door to Room 200 (99-1)	6-panel door, molded frame	Original frame Original/historic door brought (back?) in 1999 from door into Room 203 (wall since removed) with original/historic Norfolk latch hardware.	Good	Yes	Continue to maintain

Brearley House - Northwest Chamber (203)

FEATURE	DESCRIPTION	PERIOD	CONDITION	CHARACTER DEFINING FEATURE	RECOMMENDATION
Door to Room 205 (99-1)	6-panel door, molded frame	All original including original Norfolk latch and H-L hinges	Good	Yes	Continue to maintain
Window (98-1, 98-4)	12/12 sash within molded frame with interior storm	Sash and storm date to 1999 Frame is original	Good but needs cleaning	Yes	Continue to maintain
Closet	Paneled closet	Original with original door hardware and interior pegs	Good	Yes. This is a remarkable surviving original feature	Protect it through maintenance
Lighting (98-3, 98-5, 99-1)	Ceiling mounted exhibition lights	1999	Poor	No	Less intrusive, more energy efficient lighting should be installed. Protect historic plaster



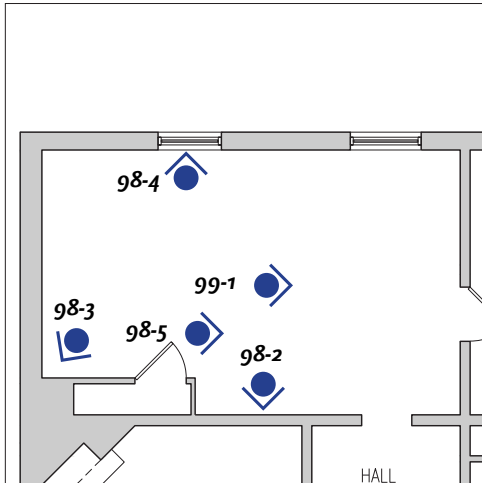
98-1: Scratches and damage to window frame



98-2: Cracked plaster at meeting of ceiling and wall



98-3: Track lighting dates to 1999.



98-4: Window frame is original, sash and storm window date to 1999.



98-5: Cracks in ceiling plaster.



99-1: Original floorboards, closets, and frame are original and should be maintained.

Brearley House - Attic (300)

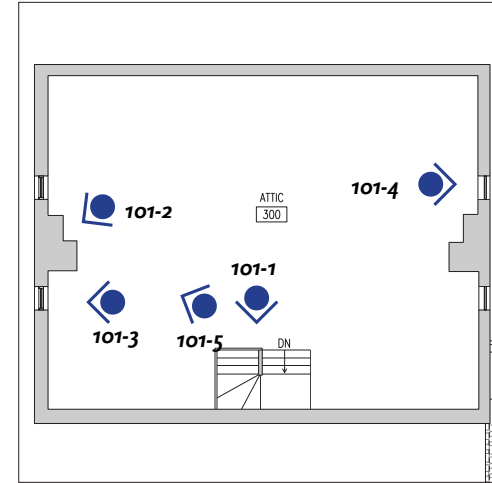
FEATURE	DESCRIPTION	PERIOD	CONDITION	CHARACTER DEFINING FEATURE	RECOMMENDATION
Floor (101-1, 101-5)	Wide boards	Original	Good	Yes	Continue to maintain
Walls (101-4, 101-5)	East and west brick end walls, partially plastered	Original. Repointed in 1999	Good	Yes	Preserve surviving plaster Continue to maintain
Ceiling (101-1)	Hand-pegged and numbered roof framing with collar ties	Original with 1999 sistering and repairs at sill plate.	Good Plastic sheeting on south, unclear why	Yes	Continue to maintain
Windows (101-3, 101-4)	4-light sash on west Louvers on east	Openings and interior frames of west windows are original Rest date to 1999	Good	Openings and west frames, yes Sash and louvers, no	Continue to maintain
Chimney stacks (101-2, 101-5)	Paired brick chimney stacks at east and west ends, partially plastered	Original. Partially repointed in 1999	Good	Yes	Continue to maintain
Stair (101-1)	Wood, roughly centered on south wall	Original/historic with some modern added plywood	Good	Yes	Continue to maintain



101-1: Stairway to second floor. Plastic sheeting has been installed to the roof joists.



101-2: Efflorescence and damaged bricks in the chimney as seen at the attic level.



101-3: Typical attic casement window.



101-4: Louvered opening and electrical outlet.



101-5: View of gable end and chimney showing spalling of bricks.

Structural Evaluation

Harrison Hamnett, a structural engineering firm in Pennington, New Jersey visited the site to perform a walkthrough condition survey of the referenced building.¹ The purpose of this work was to identify structural defects, if any, and obtain sufficient information to assess the overall structural condition of the building.

The building is a multi-wythe brick masonry wall bearing structure, see photograph 105-1. The floors are timber joists bearing on the exterior walls and a timber summer beam at midspan. Rows of steel beams have been added at midspan of the first floor joists; see photograph 104-1. These beams are supported on steel columns with new foundations. This work was completed to upgrade the existing first floor capacity to support museum type loading conditions.

The following are determinations from the survey.

1. The building is in good structural condition.
2. The first and second floor framing are adequate to support a museum type loading condition and are adequately performing to support the anticipated loads.
3. The roof framing is in good condition and is adequately supporting anticipated gravity and lateral loading conditions. See photograph 104-2.
4. The only structural defect identified was the rusting at the base of the new steel columns in the basement, see photographs 104-3 and 104-4. This is somewhat critical. As the condition worsens, the building may settle or the steel beams that were placed to upgrade the floor framing will become not as effective. These columns need to be replaced with steel columns within a timeframe of two years.

¹ The full structural report can be found in Appendix IX of this Preservation Plan.

VII. STRUCTURAL EVALUATION



103-1: View of basement showing wood, brick, and steel structural columns.



104-1: Rows of steel beams have been added at midspan of the first floor joists.



104-2: The only structural defect identified was the rusting at the base of the new steel columns in the basement.



104-3: The roof framing is in good condition and is adequately supporting anticipated gravity and lateral loading conditions.



104-4: The only structural defect identified was the rusting at the base of the new steel columns in the basement.



105-1: The building is a multi-wythe brick masonry wall bearing structure,

Building Systems Overview

This section has been prepared by Kelter & Gilligo Consulting Engineers (K&G), to evaluate the condition of the existing mechanical/electrical/plumbing (MEP) systems at the Brearley House.¹

This assessment and its accompanying recommendations assume that the Use Groups² of the facility will remain unchanged. Under this scenario, the attic and basement will be left vacant (with the exception of MEP equipment), the first floor shall provide exhibit space and the visitor entrance with restrooms, and the second floor shall provide additional exhibit space and a residence for the caretaker.

The observations and recommendations presented herein are based on visual observations that K&G performed during the course of a March 2, 2023 site visit by N. Marc Lorusso (HVAC, plumbing, and fire protection) and Frank Tindall, P.E. (Electrical and Fire Alarm). Invasive testing procedures were not utilized to support our conclusions. Sampling of materials for the presence of hazardous materials was not performed either, as that type of service is not part of our practice.

Fire Protection System

The existing structure does not presently include any sprinkler coverage or standpipes. Based on the code analysis provided in Section XI, sprinklers are not required. However, in the interest of both the life safety benefit, as well as protection of the historic structure, we would still recommend strong consideration be given to the installation of a sprinkler system at the earliest possible opportunity.

Plumbing System

Domestic water is currently provided by a shallow well water system (108-1). With construction site work for the adjacent housing development now underway, we believe the facility would be better served by a new city water service from the municipal authority. This should also negate the need for periodic water quality testing and treatment.

Domestic hot water is currently generated by an auxiliary tube bundle mounted in the building's

¹ The full Building Systems report can be found in Appendix X of this Preservation Plan.
² Current Use Groups are A3 - Museum/Gallery and R5 - Residential, single, and two-family dwelling. These use groups are expected to remain; see also Section XI, Code & Accessibility.

VIII. BUILDING SYSTEMS EVALUATION



107-1: Center Hall (Room 100) facing North.



108-1: Well water system



108-2: Fuel oil storage system

heating boiler, which is of oil fired design. Depending on the approach chosen for HVAC upgrades, the Township may want to pursue installation of a natural gas service to allow for the removal of the fuel oil storage system (108-2) when replacing the oil fired heating equipment. If so, then a gas fired water heater could also be installed to maintain the centralized domestic hot water system. If a gas service is not provided, then an electric water heater would be recommended upon replacement of the existing boiler.

Sanitary waste is handled by an underground drainage line that is piped by gravity to a pumping station that discharges to the municipal sewer system. The observed piping appears to be a combination of newer PVC and vintage cast iron materials. With replacement of fixtures or bathroom groups, all vintage piping should be replaced.

Existing plumbing fixtures appear to be of white vitreous china finish. Although the fixtures appear to be in a good state of repair, maintenance personnel have indicated that the pressure assisted water closets are in need of replacement.

Replacement of existing fixtures would also provide the opportunity to realize water savings, by specification of high efficiency fixtures and automatic activation devices. Water closets and urinals in public facilities would typically have sensor operated flush valves, while lavatories would have sensor operated faucets with anti-scald mixing valves.

HVAC System

The facility is currently heated and air conditioned by two fully ducted fan coil systems. The fan coil and distribution ducts for the first floor are located in the basement (109-1), while the second floor unit and ductwork is in the attic (109-2). Both fan coils include filters (which are in need of replacement), a heating hot water coil, a direct expansion cooling coil, and a blower fan. Cooling capacity for the Dx cooling systems is provided by grade mounted condensing units that are located adjacent to the restrooms (109-3).

Heating capacity is provided by a residential style, oil fired boiler of cast iron construction, located in the basement (110-1). The boiler and all other portions of the installation are thought to have been installed during the last renovation in the 1990s. As such, the equipment is at the end of a typical 25-year life span, and replacement should be anticipated.

Under the current conditions, ventilation is provided through natural means (i.e. operable sash). As

part of an anticipated upgrade program, the need for mechanical ventilation should be considered for exhibit spaces (based on the requirements of the exhibit materials). Consideration should also be given to the following alternatives for modernization of the heating and air conditioning installation:

Following a traditional approach, a new natural gas service would be provided, so that domestic and heating hot water could be generated with 96% efficient condensing type appliances, while cooling capacity for the replacement fan coils would be provided by high efficiency (SEER 18 minimum) condensing units.

Under a more sustainable approach, a VRF (or VRV) based solution could be employed. This approach eliminates the need for fossil fuels on site, to minimize the local carbon footprint of the facility.

Electrical System

Electrical service enters the basement underground from a 25 kVA pole mounted transformer located across the driveway (110-2). The utility company meter is also in the basement, adjacent to the electrical panels. The service is 240/120 volt, single phase, three wire residential type.

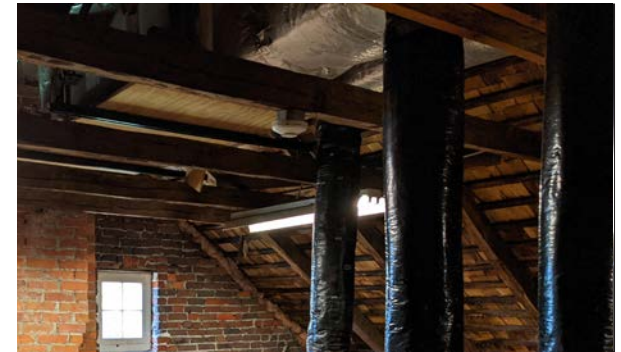
There are two electrical service panels, side-by-side in the basement, each with a 150 amp main circuit breaker (111-1, gray panels). They appear to be fed in parallel from the incoming service wireway, therefore each main circuit breaker functions as a service disconnect, as opposed to having a single main for the building. While a somewhat unusual arrangement for a house-type structure, this is allowed by code. However the size of the utility transformer will limit the available capacity to approximately 100 amps, or only the total allowable load to be placed on either one of the 125 amp mains (normal 80% loading of circuit breakers).

Permit inspection stickers indicate this installation was completed in 1999. While 25 years is normal life expectancy for HVAC systems, the same limitation is not typically anticipated with electrical panels. The two Siemens panels were of higher quality for a semi-residential installation, and appear to remain in good condition. Due to the arrangement of the installation, the incoming utility service may be able to be upgraded if the need were to arise, without replacing the already “doubled” panel layout. This may likely become relevant if an “all-electric” HVAC approach were to be implemented.

Convenience receptacles have been added in select location, both as conventional recessed wall mounted units as well as flush floor mounted locations (111-2). The ample electrical panels and



109-1: First floor fan coil and distribution ducts



109-2: Second floor fan coil and distribution ducts



109-3: Condensing units



110-1: Oil fired boiler



110-2: Fig. E-1 25 kVA transformer

branch circuit breakers should allow for easy installation of additional outlets, should any specific needs arise.

Fixed lighting throughout the occupied spaces consists primarily of recessed downlights and track mounted heads (III-3). It is anticipated that where compact fluorescent or other sources are presently used, they would be retrofit almost exclusively with LED light sources to maximize energy efficiency. Lighting controls such as occupancy sensors could also be installed, to further minimize energy usage.

While exit signs are present in the expected locations on occupied levels, and interior emergency lighting indicating lights and test switches were observed, only the exterior exit from the new wing has exterior egress lighting provided. Emergency egress lighting would be required at the front and rear exits of the main house as well.

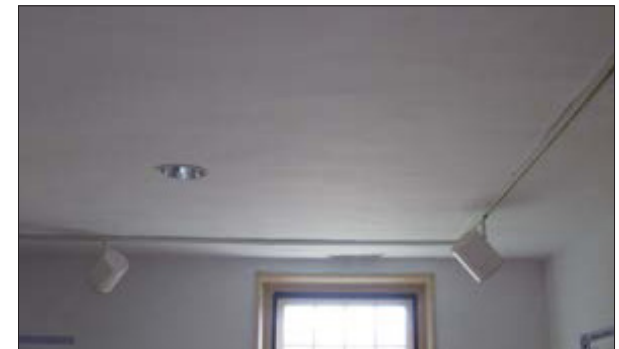
There is an Ademco Vista-100 fire alarm and security system control panel located in the basement (III-1, red panel), with full coverage smoke/heat detectors and motion sensors throughout the building, and central station monitoring. Given the historic nature of the structure, coupled with its combustible construction and lack of a sprinkler system, this was a wise decision.



111-1: Circuit breakers



111-2: E-3 Floor-mounted outlet



111-3: Fixed lighting

Characterization/Analysis of Historic Mortar¹

The intent of mortar characterization and analysis is to provide information that will be useful in understanding the history of a building and also to provide insight into materials which could be appropriate for repair or restoration campaigns. For this project, Keystone Preservation Group was asked to characterize the composition of one mortar from the Brearley House in Lawrenceville, NJ:

- Sample 1: Brick pointing mortar

The exterior of the building retains what appears to be original pointing mortar – which is somewhat remarkable given the building’s age and aggressive microclimate (exposed, four distinct seasons). In general terms, the mortar possesses physical and reactive characteristics which are consistent with what might be expected from an 18th century mortar; based on lime, sand and clay, and with visible evidence of large crystals of lime.

For this project, several formulations were created when attempting to replicate the color and texture of the historic (variables being the types of binders, sands and pigments employed). The closest match has been recommended herein, and a replication disc has been referenced below. The replication disc was mixed and cured at ambient temperatures and humidity. Noting that factors such as temperature, humidity, moisture content, tooling, and conditions with the surrounding masonry can impact the final appearance of any material, Keystone strongly recommends that mock-ups be installed within wall surfaces and allowed to cure in accordance with standard practice for a minimum of seven days before being evaluated. Pursuant to project specifications or specific direction from an Architect/Engineer, standard repair practice includes the following:

- Properly raking out joints which are to be repointed, typically to a depth of 2–2½ times the width of the joint (depending on the type of existing joint). Cleaning joints so that they are free of dirt, mold and debris. Joint-cutting must not damage the surrounding masonry.
- Stabilizing backup/bedding mortar.
- Backpointing, if required.
- Combining pointing materials (cement, lime, cement and pigment first in dry form), and adding water in sufficient measure. Allowing for initial fattening, adding more water if necessary, and

¹ The full Materials Analysis report can be found in Appendix XI of this Preservation Plan.

IX. MATERIALS ANALYSES



113-1: North-facing view from Southwest Parlor (Room 103) into Northwest Parlor (Room 104).



114-1: Sample 1 point of sampling



114-2: Sample 1, photomicrograph of mortar at 10x magnification in reflected light.

mixing to achieve a trowelable consistency.

- Pre-wetting joints and allowing them to dry to a damp condition (no pooling water).
- Installing pointing mortar in lifts to avoid shrinkage (if specified).
- Tooling pointing mortar to match the profile of the surrounding joints.
- Periodic misting or spraying for 24 hours after installation, the intent being to avoid rapid drying which can result in both shrinkage cracks and lower resistance to weathering.
- Gently cleaning laitance from the surface of the joints to expose and reveal the color of the aggregate to simulate the effects of weathering. Cleaning procedures will depend on the type and condition of the surrounding masonry as well as the scope of the project. Procedures should be identified during the installation of mock-ups and will require review and approval from the Architect/Engineer, but may include one or more of the following: scraping, brushing with stiff nylon brushes, diluted/mild acidic cleaners, water washing. For this project, half of each replication disc was scraped/brushed, sprayed with very dilute acid and rinsed thoroughly to simulate the effects of weathering. The intent of treating half of each disc was to simulate the effects of weathering.
- Final clean up.

In the summary that follows, “Natural Hydraulic Lime” refers to St. Astier’s NHL 3,5, provided by Limeworks.us (215-536-6706, www.limeworks.us), or alternately, Ecologic Mortar. Limeworks.us also provides custom inclusions which may be used to simulate the appearance of lime blebs that were found to be present in some mortar samples.

Matching the mortars discussed herein will require that a masonry contractor carefully measure, weigh, mix and cure all of the component parts, or that pre-mixed materials be considered.

Summary of Findings

Sample 1: Brick mortar

The physical properties and reactive characteristics of this mortar are consistent with what would be expected from a mix based on lime, sand and clay. It is believed to date to original construction. Joint

profile appears to be grapevine.

Physical and reactive properties

- **Color:** The core color of this mortar is light grayish brown, a shade which can be attributed to lime (white), sand (yellowgray), and clay (reddish brown). This mortar is cohesive and well-mixed, with consistent texture in different parts of the sample. Lime crystals (aka “blebs”) of lime which formed during the lime-slaking process, are visible to the naked eye.
- **Hardness:** Traditional mortars which are based primarily or completely on lime tend to be softer and much easier to crush than those which are based on cement or a combination of lime and cement. This mortar, in general terms, may be considered moderately soft. It fractures easily when struck with minimal impact from a mortar and pestle; minimal impact was required to further pulverize. These characteristics are consistent with what would be expected from a clay-bearing traditional lime mortar.
- **Reactivity:** When reacted with hydrochloric acid, this mortar produced a substantial evolution of carbon dioxide. The volume of evolved gas was consistent with what would be expected from a traditional lime mortar. A moderate quantity of soluble, non-evolving material can likely be attributed to the presence of clay, either bound into the original sand component or added to extend the original mix.

Analytical Method	
Calcimeter	x
ASTM C1324	
Basic/acid digestion	x

Reactivity	
CaCO ₃	~16.41%
Solubles	~13.65%
Sand	~ 69.89%

Aggregate

This is a fine sand based primarily on quartz and feldspar, some of which appears to be iron-bearing. Grain shape is primarily rounded to subrounded.

Screen Size	#8	#16	#30	#50	#100	#200	Pan/Fines
Sand (retained) %	0.00	2.73	34.25	41.78	17.81	3.42	Trace

Replication/Match



115-1: Sample 1, photomicrograph of extracted sands at 10x magnification in reflected light.

Based on the type and condition of the surrounding masonry, and the historical use of lime mortar, the use of a replication/matching material based on Natural Hydraulic Lime is appropriate. Noting that mock-ups will be required and that minor adjustments may be necessary after review, the following mix may be considered a starting point to replicate the appearance of this mortar:

- Limeworks Ecologic Mortar 3.5 grade – stock color – 90% DGM 050/10% DGM250 w/XF Slag Fleck
- 10% Limeworks Inclusion Simulator, by volume, to simulate visual appearance of lime crystals

The replication for this mortar is a materially-appropriate mix based on Natural Hydraulic Lime, aggregate and pigment. The use of a pre-mixed material is viewed as preferable to a field mix given that pigment would be required – a consideration which typically adds cost and complexity.

The replication mortar identified by Keystone’s laboratory is considered a very close match for the color and texture of the mortar discussed herein. The color of the aforementioned replication mortar should be reasonably indiscernible when viewed at a distance of 25 feet, which is the industry standard by which mortar matches are typically judged. It should be noted that the uncleaned surface is slightly less gray, and the cleaned surface slightly darker than the original mortar; these observations should be taken into account when selecting the desired approach for repointing. Factors including water content, in-wall moisture content, permeability of the surrounding masonry, and weather conditions during installation and cure all impact the final color of any mortar. Industry standards for preparation, mixing, installation and temperature during cure should all be monitored. The replication discs were misted periodically for 48 hours, and then brushed/scraped to remove laitance. Similar procedures, especially brushing or gentle cleaning, will be required to reproduce this characteristic in the field. The project team may opt not to clean the joints, and to leave surface laitance intact.

Methodology

The primary objective of this document is to provide direction for repair and repointing; it should not be considered a comprehensive technical/compositional analysis of existing/historic material. With direction from an architectural conservator and execution by an experienced masonry preservation contractor, the level of examination provided herein was deemed sufficient to provide basic information on the existing mortar and direction on how to match important characteristics such as color and texture.



116-1: Sample 1, brick mortar (arrow, chip at bottom of disc) and replication (left half struck, and right half prepared to resemble effect of aging/weathering.

Each specimen was examined according to properties of color, texture, hardness, homogeneity, stability and relative porosity. Samples were examined visually and microscopically with a Nikon SMZ-2T trinocular reflected light microscope and/or a Leica DMLM polarizing light microscope.

The approximate composition of the material was determined with a calcimeter conforming to the parameters of the Jedrzejewska analytical method.² This technique essentially breaks down a sample into constituent parts and provides data on the nature of the binder by gauging the extent of its reaction with hydrochloric acid (HCl). As HCl dissolves bicarbonates of calcium carbonate-based (CaCO₃) compounds found in lime and (to a lesser extent) cement binders, carbon dioxide (CO₂) is produced.³ Data obtained during experimentation was compared with published experimental standards based on known mixes to arrive at conclusions about the composition of all samples.⁴ Aggregate which forms the insoluble portion of the material was isolated, retained and washed, while extremely fine particulates were separated from solution, filtered and retained. The aggregate was dried and weighed, evaluated according to particulate size with a Standard U.S. Sieve Series Tyler Equivalent Sieve Stack, and examined microscopically for particle shape, color, opacity and mineralogy.

Petrographic analysis including examination of thin sections in transmitted polarizing light and elemental analysis would be required to identify mineral phases which are specific to different types of cementing material and to unequivocally quantify the amount of lime and/or cement present. If analysis in accordance with testing procedures described in ASTM C1324 is desired, microchemical analysis may be expanded upon with elemental analysis using techniques such as X-Ray Diffraction (XRD), petrography and/or physical characterization of thin sections using transmitted and polarized light microscopy.

2 Hanna Jedrzejewska, "Old Mortars in Poland: A New Method of Investigation," *Studies in Conservation*, Volume 5, Number 4, 132-138.

3 Calcimeter analysis provides information beyond standard gravimetric/acid digestion. Although not unequivocal and subject to interpretation, it provides data on acid-soluble portions which do not evolve carbon dioxide when reacted with HCl. This is especially important to the analysis of cementitious mortars that naturally contain complex soluble silicates which dissolve in acid but do not evolve carbon dioxide. Limitations to this analytical method include the lack of published standards on common masonry mixes and mixes which incorporate natural and artificial pigments.

4 John Stewart and James Moore, "Chemical Techniques of Historic Mortar Analysis," *Bulletin of the Association for Preservation Technology*, Volume 14, Number 1 (Washington: Association for Preservation Technology, 1982), 11-16.

Compositional Characteristics: Binders

Analyzing the nature of the binder provides information valuable in determining the composition of the original material. Binders are generally composed of calcium-carbonate based materials with impurities and additives incorporated to affect physical properties such as cure, hardness, color and durability. The data below represents the percentage weight within the sample that may be attributed to calcium carbonate, complex soluble silicates (solubles, including soluble material from cements and pigments) and aggregate.

Standards referenced below⁵ have been culled from previously-completed research and experimentation to provide benchmark data regarding compositional percentages for standard mixes. Although imperfect, experimental data below exists for compositional proportions based on weight only; conclusions are based on the mathematical conversion of weight percentages to volumetric mixes.

	Mix	CaCO ₃	Solubles	Sand
1:3	lime:sand (SM) ⁶	10.0 ± 0.4%	2.4 ± 0.7%	87.6 ± 0.3%
1:3	lime:calcareous sand (SM)	26.2 ± 1.3%	3.0 ± 0.9%	70.9 ± 2.2%
1:3	lime:clayey sand (SM)	10.2 ± 0.2%	13.2 ± 0.6%	76.6 ± 0.9%
2:5	hydraulic lime:clayey sand (JCF) ⁷	8.78 ± 0.06%	17.69 ± 3.01%	73.54 ± 2.95%
2:5	dolomitic lime:clayey sand (JCF)	6.57 ± 0.25%	10.10 ± 0.63%	83.33 ± 0.98%
2:5	high calcium lime putty: clayey sand (JCF)	13.49 ± 1.27%	5.78 ± 1.02%	80.72 ± 2.29%
1:1:5	Portland cement: high calcium lime:clayey sand (JCF)	10.60 ± 0.87%	21.76 ± 5.99%	67.65 ± 6.87%
2:1:5	lime:pozzolanic cement:sand (SM)	11.0 ± 0.1%	6.6 ± 0.4%	82.4 ± 0.3%
100%	Portland cement (SM)	7.2 ± 0.4%	92.1 ± 0.3%	0.6 ± 0.2%

⁵ In the chart, “SM” refers to standards published in Stewart and Moore’s article and “JCF” refers to data from Frey’s thesis.

⁶ Total calcium carbonate content includes soluble bicarbonates from calcareous (calcium-based) aggregate such as crushed limestone or marble dust.

⁷ Analysis performed on replication mix evaluated (five years after cure) in J. Christopher Frey Exterior Stuccoes as an Interpretive and Conservation Asset: The Aiken-Rhett House, Charleston, SC (Masters’ Thesis in Historic Preservation, University of Pennsylvania, 1997). Please note that data is provided for comparative purposes only; actual volumetric percentages will vary based on types of lime, types of sand, mix consistency, etc.

1:3	Portland cement:clayey sand (SM)	7.9 ± 0.1%	29.6 ± 1.6%	62.6 ± 1.6%
1:3	Portland cement:sand (SM)	6.4 ± 0.4%	27.4 ± 3.0%	66.2 ± 3.4%

Aggregate

Because sand is so important in determining not only how a material performs but also in producing its color and texture, a careful examination of the aggregate was conducted. Laboratory examination included visual analysis for sand grain shape and an evaluation of particle size.

Grain Shape

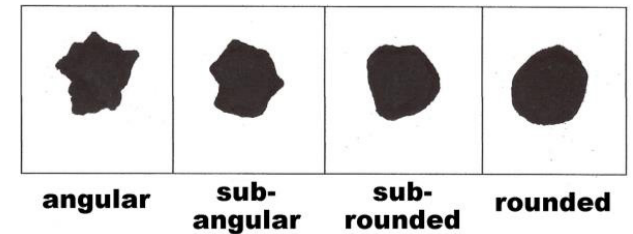
Sands are visually inspected with a Nikon SMZ-2T trinocular reflected light microscope at various magnifications. Roundness is a measure of the sharpness of a sand grain's corners and edges, regardless of overall shape of the particle. Sphericity is a measure of the overall shape of the sand grain which evaluates the degree to which the particle approaches the shape of a perfect sphere, which is extremely rare in nature. These physical properties are visually assessed using roundness scale charts, such as in image 119-1.

Particle Size

All sands were passed through a U.S. Standard Sieve Series Sieve Stack to evaluate the average distribution.⁸ The sieve screens used in this analysis possess the following dimensional equivalents:

Screen #	Tyler equivalent mesh	Opening (inches)	Opening (metric)
8	8	.0937	2.36 mm
16	14	.0469	1.18 mm
30	28	.0234	600 μ
50	48	.0117	300 μ
100	100	.0059	150 μ

⁸ Sieves are graded in a series so that particles progressively pass through a series of screens (with screen #8 representing the largest mesh and screen #200 the smallest) until they are retained. The amount of material retained on each screen is recorded and then compared with the amounts retained on other screens to provide numerical averages for different particulate sizes.



119-1: Typical grain shapes within sand components.

200	200	.0029	75 μ
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Materials with rough surface textures tend to be based on sands whose grains are retained on the lower-numbered screens. Smoother materials are often based on finer particulates. Well-graded materials are characterized by relatively even distribution of particulates across all screens. Data reported from the sieve gradation test provides a comparative analysis for the distribution of grain sizes.

Analysis of Selected Historic Finishes⁹

During the site visit, ten representative samples were collected from interior elements. This included cataloguing each sample, cross-sectioning each sample manually, embedding a portion of each sample in clear stable resin, and evaluating the sample microscopically at various magnifications up to 200x in color-corrected reflected light and longwave ultraviolet light.

The Brearley House was constructed in 1761 and the period of significance is 1700-1799.¹⁰

Data, Observations and Conclusions

This document constitutes an analysis of historic finishes for selected interior elements from three spaces: Rooms 100, 103, 104. Selective analyses are considered to be broad rather than comprehensive; they may be used to establish basic information on finishes which may date to original construction or a specific building campaign. The scope which was requested is limited to 10 samples, 9 of which were deemed to provide useful information.

Although it is hoped that the information provided herein is useful, this information should not be considered to be comprehensive or unequivocal for the entire building or even the rooms which were selected for study – given that information can vary from element to element, even within the same room. A comprehensive study might include as many as 8-12 samples per room.

Physical Evidence and Observations

Analysis of finishes taken from 10 samples are summarized below, and are described in greater detail within the analytical datasheets at the end of this section:

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- 9 The full Materials Analysis report can be found in Appendix XI of this Preservation Plan.
 - 10 Refer to section III for the developmental history of the Brearley House.

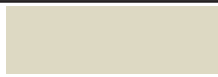


- Analysis was challenged by the fact that nearly every sample presented evidence of differing chromachronologies (number and color of layers present). Evidence suggests that some elements have lost early or intermediate finishes, possibly due to wear or to surface preparation for subsequent campaigns.
- Within Room 100, a sample from trim surrounding the front door presents evidence of what may be the earliest finish in the study – a grayish yellow paint layer corresponding to Munsell 2.5Y 7/2; this was also found to be the earliest finish on baseboards. The second layer on this sample presents as the earliest layer on other door trim in this room. is slightly lighter, but otherwise similar in color, corresponding to Munsell 2.5Y 7/2-8/2; the difference in color is nearly indiscernible, and it is not clear whether the difference is an anomaly or the result of aging.
- The earliest finish on chair rails in Rooms 103 and 104 is light gray, corresponding to Munsell N 4.5/. The earliest finish on door trim in these rooms is dark reddish brown, corresponding to Munsell 5YR 3/4.

Color matches

Digital approximations using RGB values have been integrated for illustrative purposes only; under no circumstances should they be used as a basis to re-create historic colors. Munsell Color designations and notations for the closest stock match within the Benjamin Moore line of paint products have been identified below.

Period of Interpretation: 1700-1799

Colors herein are believed to date to original construction, 1761

Element	Color Name	Munsell Color	Benjamin Moore Equivalent	Approx. Color
Room 100 door trim, baseboards	Grayish yellow	2.5Y 7/2	HC-82 Bennington Gray	
Rooms 103, 104 door trim	Dark reddish brown	5YR 3/4	HC-71 Hasbrouck Brown	
Rooms 103, 104 chair rail	Light gray	N 4.5/	CSP-25 Wool Peacoat	

Sampling

In order to produce findings that accurately portray the way a building looked at one point in time or to develop an understanding about how a building has evolved, it is essential to conduct proper site investigation and sampling. Sampling consists of cratering and examining selected elements to ensure that samples will be representative, and then removing small fragments of material for microscopic analysis. Several samples were removed from window elements, and analyzed in Keystone's conservation laboratory shortly thereafter in accordance with the following methodology.

Sample Preparation

As a component of finishes analysis, paint samples are cross-sectioned – either manually using a scalpel or embedded and then cut with a specialized saw. Both techniques were employed for this analysis. Manual cross-sectioning without embedding was used primarily for color-matching.

A portion of the sample was embedded in stable epoxy resin in order to stabilize its microstructure. Once cured, the cast sample was de-molded and cross-sectioned using a high-speed lapidary saw. The sample was then polished successively with 400-grit, 600-grit and 1000-grit sanding sheets and swabbed with mineral oil during microscopy to saturate colors and enhance stratigraphic distinctions.

Optical Microscopy and Color Matching

Analysis, photomicrography and color was completed using the following instruments:

- Leica DMLM Microscope capable of evaluating specimens in reflected incident light and transmitted polarized light at magnifications of 50x, 100x, 200x and 500x – fitted with a Nikon Coolpix 995 digital camera attached to its photo port. Reflected, color-corrected incident light is produced at 3000 Kelvin by a quartz-halogen fiber optic illumination system. Incident fluorescent light is generated by an internal mercury vapor lamp and long-pass blue filter cube capable of passing longwave ultraviolet light at wavelengths of 320-400 nm, with peak excitation ~365 nm.
- Nikon SMZ-2T Stereo Zoom Microscope capable of evaluating specimens in reflected incident light and transmitted polarized light at magnifications between 7-63x.

Colors are matched by visually comparing target layers with chips that conform to the Munsell System of Color in color-corrected incident light or natural daylight. Munsell Colors are organized

into designations by “hue” (R: Red, YR: Yellow red, Y: Yellow, GY: Green yellow, G: Green, BG: Blue green, B: Blue, PB: Purple blue, P: Purple, RP: Redpurple, N: Neutral). The “hue” designation is followed by a value designation that corresponds to the relative lightness/darkness of the color on a scale of 0 to 10, whereby 0 is absolute black and 10 is absolute white. The final number is a “chroma” designation which indicates the intensity of the color on a scale of 0 to 12, with 0 being neutral and 12 being intense. For example, a finish matching 2.5Y 8/2 would be deemed to possess a yellow hue, light in shade and neutral in intensity. Comparatively, a 5YR 5/12 finish would be orange (yellow-red), moderately-shaded, with an intense, bright color.

Munsell Color Numbers were cross-referenced with ISCC-NBS (Inter-Society Color Council and the National Bureau of Standards) color names. Munsell colors were also matched to the closest available Benjamin Moore paint products for selected periods of interpretation.

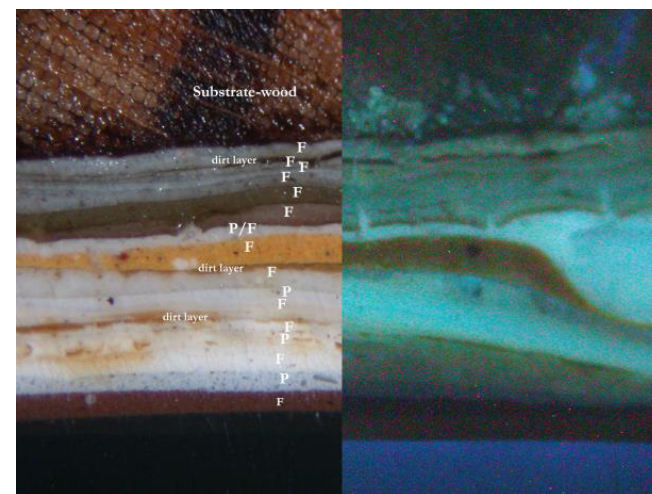
Analytical Data

Sample Locations

Sample ID	Element
01, 02	Room 100, door trim
03	Room 100, front door trim
04	Room 100, front door trim
05	Room 100, baseboard
06	Room 103, door trim
07	Room 103, chair rail
08	Room 104, door trim
09	Room 104, chair rail base
10	Room 104, chair rail cap (not useful, not used)

Analytical Datasheets

The datasheets that follow present laboratory data in the form of stratigraphic analysis and photomicrographs. The left half of each photomicrograph features a microscopic view of each sample in color-corrected reflected light. The right half depicts the sample subjected to longwave fluorescent ultraviolet light, which enhances distinctions between different layers (or paint campaigns) and




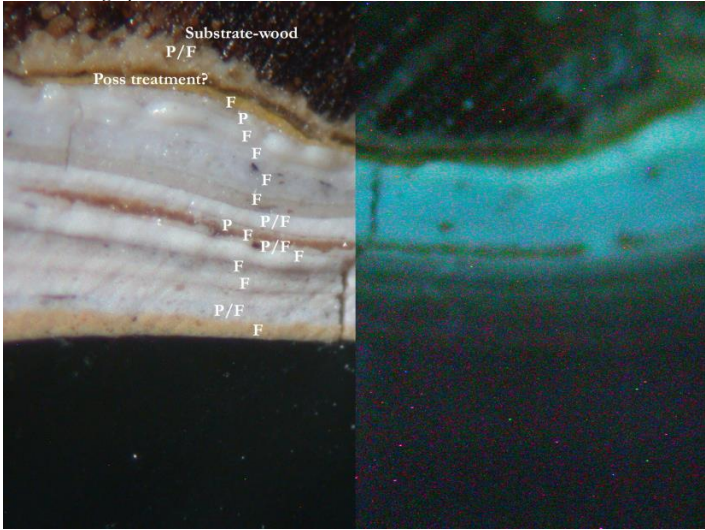
123-1: Typical photomicrograph (Sample 08) in color-corrected incident visible light (left half) and in incident long wave fluorescent ultraviolet light (right half).

materials (oil-based, latex, glaze, etc.). Notations within the datasheets include the following:

Substrate: Base substrate material (when present)

Primer (P): Denoted “P” when present. A primer layer is defined as a layer that is applied before the finish layer but is associated with the same painting campaign.

Finish (F): Denoted “F” for each campaign, including both historic and subsequent finishes which post-date the construction of the building.

Location:	Brearley House, Lawrence Township, NJ (Room 100)					
Sample:	03					
Element:	Door trim/front door					
Analysis:	<input type="checkbox"/>	Manual cross-section/RLM	<input checked="" type="checkbox"/>	Embedded cross-section/RLM	<input checked="" type="checkbox"/>	Ultraviolet fluorescence
	<input type="checkbox"/>	Binder characterization	<input type="checkbox"/>	Pigment analysis	<input type="checkbox"/>	Exposure window
Sample Location:						
Photomicrograph:						
Chromachronology:						
<u>Campaign</u>	<u>Layer</u>	<u>Munsell</u>	<u>Color Name</u>	<u>UV AF</u>	<u>Notes</u>	
Substrate	Wood					
	Primer/Finish	2.5Y 7/2	Gray yellow	Yellow		
	Finish		Mod yellow	Dark yellow		
	Finish		Yellow white	White		
	Finish		Yellow white	White		
	Finish		Yellow white	White		
	Finish		Yellow white	White		
	Primer/Finish		Yellow white	White		
	Primer		Yellow white	Dark		
	Finish		Lt gray red	Dark		
	Primer/Finish		Yellow white	Dark		
	Finish		Yellow white	Dark		
	Finish		Lt gray	Dark		
	Finish		Yellow white	Dark		
	Primer/Finish		White	Dark		
	Finish		Mod gray yel	Dark	Top coat	
Observations:						
Reference sample for this space; sample contains the greatest number of layers. Earliest finish likely original. Unclear why earliest layers are not present on other door trim samples (01, 02).						

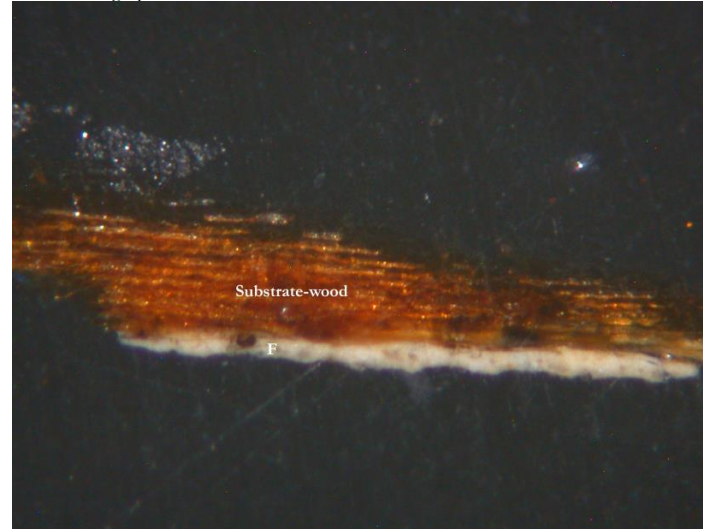
Location: Brearley House, Lawrence Township, NJ (Room 100)
Sample: 04
Element: Door trim

Analysis: () Manual cross-section/RLM (x) Embedded cross-section/RLM () Ultraviolet fluorescence
 () Binder characterization () Pigment analysis () Exposure window

Sample Location:



Photomicrograph:


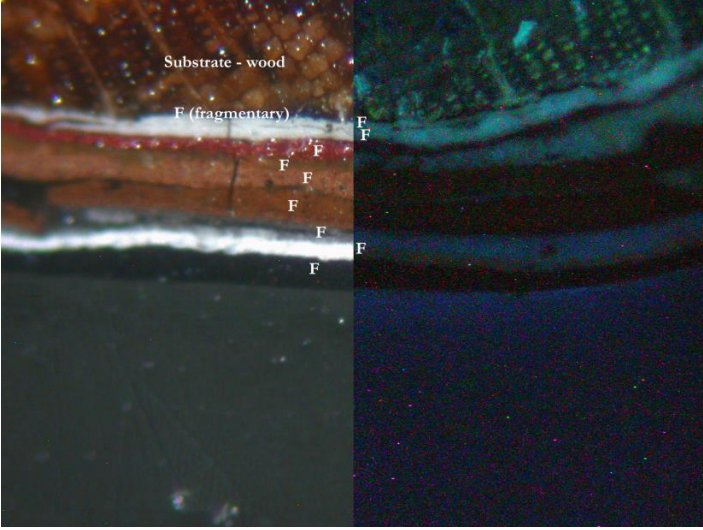


Chromachronology:

Campaign	Layer	Munsell	Color Name	UV AF	Notes
Substrate	Wood				Detachment
	Primer/Finish	2.5Y 7/2	Gray yellow	Yellow	
	Finish		Mod yellow	Dark yellow	
	Finish		Yellow white	White	
	Finish		Yellow white	White	
	Finish		Yellow white	White	
	Finish		Yellow white	White	
	Primer/Finish		Yellow white	White	
	Primer		Yellow white	Dark	
	Finish		Lt gray red	Dark	
	Primer/Finish		Yellow white	Dark	
	Finish		Yellow white	Dark	
	Finish		Lt gray	Dark	
	Finish		Yellow white	Dark	
	Primer/Finish		White	Dark	
	Finish		Mod gray yel	Dark	Top coat

Observations:

Earliest finish present in photomicrograph. Bulk sample analysis suggests subsequent layers match Sample 03

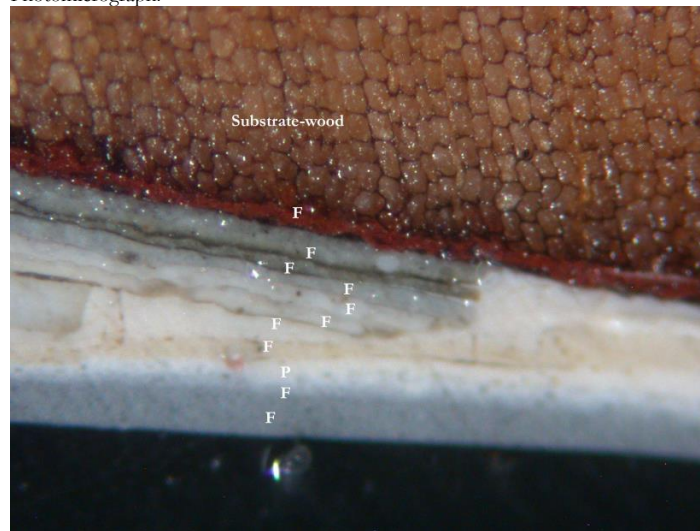
Location:	Brearley House, Lawrence Township, NJ (Room 100)					
Sample:	05					
Element:	Baseboard					
Analysis:	<input type="checkbox"/>	Manual cross-section/RLM	<input checked="" type="checkbox"/>	Embedded cross-section/RLM	<input checked="" type="checkbox"/>	Ultraviolet fluorescence
	<input type="checkbox"/>	Binder characterization	<input type="checkbox"/>	Pigment analysis	<input type="checkbox"/>	Exposure window
Sample Location:						
Photomicrograph:						
Chromachronology:						
<u>Campaign</u>	<u>Layer</u>	<u>Munsell</u>	<u>Color Name</u>	<u>UV AF</u>	<u>Notes</u>	
Substrate	Wood					
	Primer/Finish	2.5Y 7/2	Gray yellow	Yellow		
	Finish		Yellow white	White		
	Finish		Yellow white	White		
	Finish		Red	Red		
	Finish		Brown	Gray	UV phosphorescence	
	Finish		Orange brown	Dark		
	Finish		Brown	Dark		
	Finish		Dark gray	Dark		
	Finish		White	Dark		
	Finish		Black	Dark		
Observations:						
Reasonably comprehensive chromachronology. Earliest finish confirmed through bulk analysis.						

Location:	Brearley House, Lawrence Township, NJ (Room 103)					
Sample:	06					
Element:	Door trim					
Analysis:	<input type="checkbox"/>	Manual cross-section/RLM	<input checked="" type="checkbox"/>	Embedded cross-section/RLM	<input type="checkbox"/>	Ultraviolet fluorescence
	<input type="checkbox"/>	Binder characterization	<input type="checkbox"/>	Pigment analysis	<input type="checkbox"/>	Exposure window

Sample Location:



Photomicrograph:


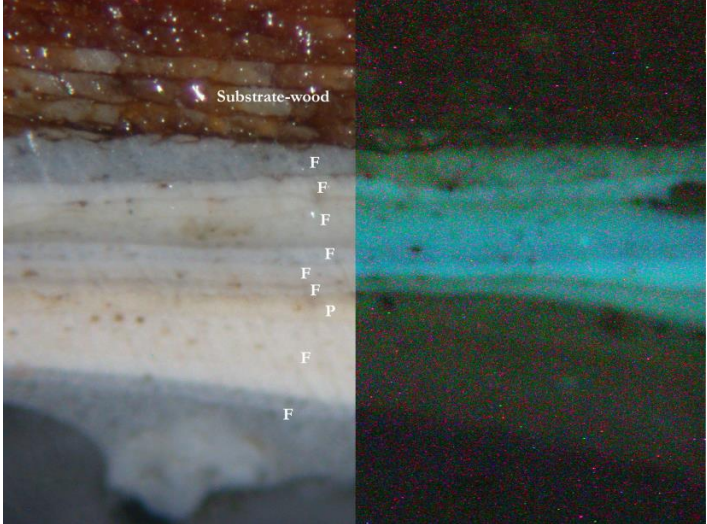




Chromachronology:

<u>Campaign</u>	<u>Layer</u>	<u>Munsell</u>	<u>Color Name</u>	<u>UV AF</u>	<u>Notes</u>
Substrate	Wood				
	Finish	5YR 3/4	Dk red brown		
	Finish		Lt gray		Oxidation at surface
	Finish		Lt gray		Oxidation at surface
	Finish		Lt gray		
	Finish		Gray white		
	Finish		Gray white		
	Finish		Yellow white		
	Finish		Lt yellow		
	Primer		White		
	Finish		Lt blue white		
	Finish		Gray		

Observations:

Earliest finish believed to be original. Color confirmed through bulk analysis, matches door trim in Room 104.

Location:	Brearley House, Lawrence Township, NJ (Room 103)					
Sample:	7					
Element:	Chair rail					
Analysis:	<input type="checkbox"/>	Manual cross-section/RLM	<input checked="" type="checkbox"/>	Embedded cross-section/RLM	<input checked="" type="checkbox"/>	Ultraviolet fluorescence
	<input type="checkbox"/>	Binder characterization	<input type="checkbox"/>	Pigment analysis	<input type="checkbox"/>	Exposure window
Sample Location:						
Photomicrograph:						
Chromachronology:						
<u>Campaign</u>	<u>Layer</u>	<u>Munsell</u>	<u>Color Name</u>	<u>UV AF</u>	<u>Notes</u>	
Substrate	Wood					
	Finish	N 4.5/	Lt gray	Gray yellow		
	Finish		Yellow white	White		
	Finish		Pale yellow	White		
	Finish		Yellow white	White		
	Finish		Yellow white	White to yel		
	Finish		Lt gray yel	Gray yel		
	Primer		Lt gray yel	Dark		
	Finish		Yellow white	Dark		
	Finish		Lt gray	Dark		
Observations:						
Reasonably comprehensive chromachronology. Earliest finish may be original to this element.						

Location:	Brearley House, Lawrence Township, NJ (Room 104)					
Sample:	08					
Element:	Door trim					
Analysis:	<input type="checkbox"/>	Manual cross-section/RLM	<input checked="" type="checkbox"/>	Embedded cross-section/RLM	<input type="checkbox"/>	Ultraviolet fluorescence
	<input type="checkbox"/>	Binder characterization	<input type="checkbox"/>	Pigment analysis	<input type="checkbox"/>	Exposure window
Sample Location:						
Photomicrograph:						
Chromachronology:						
<u>Campaign</u>	<u>Layer</u>	<u>Munsell</u>	<u>Color Name</u>	<u>UV AF</u>	<u>Notes</u>	
Substrate	Wood					
	Finish	5YR 3/4	Dark reddish brown			
Observations:	Earliest finish is likely original. Fragmentary in photomicrograph. Subsequent layers probably similar to other elements in study area.					

Location:	Brearley House, Lawrence Township, NJ (Room 102)				
Sample:	09				
Element:	Chair rail base				
Analysis:	()	Manual cross-section/RLM	(x)	Embedded cross-section/RLM	(x)
	()	Binder characterization	()	Pigment analysis	()
					Ultraviolet fluorescence Exposure window
Sample Location:					
Photomicrograph:					
Chromachronology:					
<u>Campaign</u>	<u>Layer</u>	<u>Munsell</u>	<u>Color Name</u>	<u>UV AF</u>	<u>Notes</u>
Substrate	Wood				
	Finish	N 4.5/	Lt gray	Lt gray yel	Dirt layer after
	Finish		Lt gray	Lt gray yel	
	Finish		Lt gray	Lt gray yel	
	Finish		Lt gray	Lt gray yel	
	Finish		Gray brown	White	
	Finish		Lt gray red	White	
	Primer/Finish		White	White	
	Finish		Mod gray yel	Brown yel	Dirt layer after
	Finish		Yellow white	White	
	Primer		White	White	
	Finish		Yellow white	White	Dirt layer after
	Finish		White	Lt gray	
	Primer		Yellow white	Dark	
	Finish		White	Dark	
	Finish		Lt gray	Dark	
Observations:	Earliest finish is likely original. Comprehensive chromachronology. Trim matches trim from Room 103.				

Period of Significance of the Brearley House

As defined by the National Park Service, the “period of significance is the length of time when a property was associated with important events, activities, or persons, or attained the characteristics which qualify it for National Register listing. Period of significance usually begins with the date when significant activities or events began giving the property its historic significance; this is often a date of construction.”¹ Per the National Register Nomination, the period of significance for the Baker-Brearley House is 1700-1799.

Treatment Philosophy

The preservation of the Brearley House should be planned, designed and executed in compliance with the Secretary of the Interior’s Standards for the Treatment of Historic Properties. As documented in Section VI. Existing Conditions, the work completed in 1999 was a combination of preservation philosophies. Some features were restored to their original appearance while in other places, later changes were left intact. This occurred on the interior in Room 102, for instance, where an original corner cabinet was reconstructed while the 20th century arched opening was left as is. Similarly, on the exterior, paneled doors and shutters were reconstructed with mid-18th century profiles while the 19th century roofs were kept over the south elevation doors. These accommodations are often made during a preservation project; strict adherence to a single preservation philosophy is very difficult and often unwarranted as an esoteric exercise in purity.

Because of these inconsistencies and because so much of the existing fabric dates to 1999, **rehabilitation** should be the guiding preservation philosophy at the Brearley House. Rehabilitation is defined as “the act or process of making possible a compatible use for a property through repair, alterations, and additions while preserving those portions or features which convey its historical, cultural, or architectural values.”² This philosophy will protect and preserve the existing original materials while allowing for changes as needed.

Materials that date to 1999 may deteriorate more quickly than the original. Wood windows from 1999 will not have the same life span as sash from the 18th century which were made from old growth

- 1 National Park Service National Register Bulletin, “How to Complete the National Register Form,” (1997), 42
- 2 <https://www.nps.gov/articles/000/treatment-standards-rehabilitation.htm>

PART 2: TREATMENT & USE

X. TREATMENT PHILOSOPHY, INTERPRETATION, AND USE



135-1: Northeast Parlor (Room 101), facing North.



136-1: Upper East gable end featuring '1761' in vitrified brick.



136-2: Stair balustrade

wood. Similarly, the Brearley House exterior doors date to 1999; they may not last as long as original, 18th century doors would have. In the future, when the non-historic materials from 1999 have deteriorated, replacement over repair may be necessary.

All historic materials should continue to be preserved and repaired.

Advantages and Disadvantages of Preservation

The Secretary of the Interior Standard's for the Treatment of Historic Properties identifies four preservation philosophies: Preservation, Restoration, Reconstruction and Rehabilitation. At Brearley House, *rehabilitation* is the proposed philosophy over the other three because:

Too much of the original fabric of the house has been lost to *restore* the building successfully and completely. For example, while it is believed that Room 104 may have been paneled, it is not known for sure nor is it clear what the paneling would have looked like. For this reason, the paneling was not restored in 1999 and should not be restored today. It would be conjectural and conjecture is not sound preservation practice. Restoration is not a viable philosophy for this house.

The Brearley House is extant *reconstruction* is not applicable.

While *preservation* was considered as a potential option as a guiding philosophy, it was dismissed because of the 1999 work. The objective of preservation is to retain the building as it currently exists, meaning that not only will the original historic materials and features be preserved, but so will later changes and additions to the original building. There is no reason to preserve the 1999 changes. The 1999 fabric is not historic materials and therefore, not significant. If, for instance, a shutter is in poor condition, it can be replaced rather than repaired.

The advantages of *rehabilitation*:

- New uses are allowed, assuming they maximize the retention of distinctive materials, features, spaces and special relations from the building's period of significance. If the Lawrence Historical Society decides it wants to find a new, more regular use for the building, it would be allowable under rehabilitation.
- Rehabilitation requires that the historic character of a property be retained and preserved. At the Brearley House, this means that surviving original fabric will be retained, preserved and

repaired as required while other materials will be less strictly controlled.

- Additions are allowed. While no additions are encouraged or foreseen as necessary, if the use of the building changes and more space is required, an addition is allowable under rehabilitation.
- The continued occupation by the caretaker is encouraged. Rehabilitation enables this.

The disadvantages of *rehabilitation*:

- Rehabilitation is the least strict philosophy. As an interpreted house museum, it is more typical for a stricter preservation philosophy to be used. Preservation, for instance, is more rigid than rehabilitation. It emphasizes maintaining existing over allowing new. However, because of the 1999 work, rehabilitation will guide all efforts.

Prioritized Features of Significance

The surviving original elements should be protected at all costs. Original elements, including the vitrified brick pattern in the east gable end, window openings, and some window and door trim should continue to be preserved. On the interior, original materials include the stairs, balustrade, the doors at the second floor, the second-floor closets and wood floors, the original trim, chair rails and the original fireplace mantels and surrounds in Rooms 102 and 104. These should also be preserved.

Use of Brearley House

There is opportunity for growth in expanding visiting hours and interpretation of the Brearley House. The Brearley House is open to the public two hours a month. During that time, student docents trained by the historical society lead visitors on guided tours of the building, describing architectural details in, and original uses of, each of the rooms. In addition to this two-hour period, the Society's student club, the Junior Historians, holds their semi-monthly meetings at the Brearley House. The Society also hosts special events, such as their annual New Year's Eve Hogmanay celebration, at the house. The Society is also developing plans to hold additional programming at the house.

Buildings need to have continued use and be regularly maintained or they can experience deterioration. Because the Historical Society does not regularly using the building, it is important that a caretaker remain on site. While the apartment occupies half of the second floor and this space might otherwise be used for offices or interpreted space, it is advisable that this arrangement



137-1, 137-2: Second floor doors



137-3: Historically-significant closets at the second floor and flooring throughout the house should be preserved.



138-1: Mantel in room 104



138-2: Fireplace mantel and surround in room 102

continue as the presence of the caretaker provides the building with continuous monitoring and these rooms are not required by the Historical Society for their current programs and administrative needs.

Interpretation of the Brearley House

The Brearley House is significant for its architecture and archaeology. Its association with the Brearley family and the settlement of Lawrence Township is also significant. There are interpretive opportunities in all three. Grant opportunities through the New Jersey Historical Commission, New Jersey Historic Trust, Certified Local Government Grant Program, and the New Jersey Council for the Humanities should be considered to fund the development of exhibitions and/or programming at the Brearley House.

Architecture

The Brearley House is a combination of a symmetrical Georgian façade with a vernacular rear elevation. This change would have been reflected on the interior as well with the more formal rooms across the front and the working rooms at the rear. The utilitarian nature of the rear is shown with the exterior door out of Room 103.

For this reason, all architectural tours should begin through the front door at the north side. This was the formal entrance to the house; entering here is necessary to understand the hierarchy of spaces. Room usage can be discussed on this tour with the more formal spaces at the front giving way to more utilitarian spaces at the rear. The stenciling in Room 101 could be highlighted and the possibility of paneling in Room 104 noted.

On the second floor, the original closets should be discussed as part of the significant architectural features.

The idea of the kitchen wing can be discussed; keeping the heat and smells of the cooking fire outside the main body of the house was safer but also more comfortable. This was a utilitarian outbuilding whose location formed a sheltered outdoor workspace. Originally, the cellar was only accessible from the exterior. It was not considered a part of the house so much as an extension of the workspace of the farmyard and kitchen outbuilding.

Another avenue for architectural interpretation is the rich history of patterned brickwork houses in New Jersey. These were high end houses built by the wealthiest Quakers, mostly in south Jersey.

They were signs of permanence and strength. Standing in Mercer County, the Brearley House is a rare northern example. The importance of these houses are well-understood and well-documented. Visitors to the Brearley House should be told their story.

Imitation brick blocks of red and black could be available for visitors to try to emulate the process of building a date into the wall. It would help the visitors to understand the difficulty and extra time it would have taken the mason. These houses were almost exclusively built by Quakers. Were the Brearley's Quaker? This could be researched and the story told through an exhibit.

There have been several campaigns of archaeology on the property. An exhibition should be created that discusses the findings. The exhibit could discuss the early Native American occupation of the land and could discuss the possibility that the Brearley's located here because the site had already been cleared by the indigenous people. The three generations of Brearley buildings should be described and interpreted.

The Brearley Family

John Brearley arrived in America in 1682 as an indentured servant. Within 13 years, he was able to buy 200 acres of land. What was the system of indentured servitude in 17th century England? He was a servant to a prominent Quaker. Was the Quaker system of servitude different than other religions? These ideas could be explored and told through an exhibition at the Brearley House.



139-1: Door trim



139-2: Chair rail in room 102

Introduction

Clarke Caton Hintz completed a code analysis of the Brearley House. The purpose of this analysis is to understand existing and potential building and life safety issues, as well as code inspection and accessibility issues so that Lawrence Township can improve the safety and usability of its historic structures and plan for potential capital costs.

The following codes were reviewed: International Building Code 2021, NJ edition; New Jersey's Rehabilitation Subcode; International Fire Code; and ICC/ANSI A117.1-2017; 2021 edition of the National Standard Plumbing Code.

Rehabilitation Subcode

The Rehabilitation Subcode is the part of the NJ Uniform Construction Code that deals with existing and historic buildings. This code recognizes that it is not always feasible to require an existing or historic building that is being renovated to meet all of the code requirements of new construction. This subcode allows for flexibility in various code requirements, including egress and fire protection, while setting reasonable base standards for life safety, as long as the building's use is not changed or not changed to a more hazardous use category. There are base requirements for buildings of all use groups, as well as higher base standards for larger projects and for buildings that have a more hazardous occupancy.

There are six categories of work described by the Rehabilitation Subcode: Repair, renovation, alteration, reconstruction, change of use and addition. Work of more than one category may be part of a single, larger project. Future work at the site may fall into the full range of work:

- Repair is defined as "...the restoration to a good or sound condition of materials, systems and/or components that are worn, deteriorated or broken using material identical or similar to the existing."
- Renovation is defined as "...the removal and replacement or covering of existing interior or exterior finish, trim, doors, window or other materials with new materials that serve the same purpose and do not change the configuration of space." It also includes the replacement of equipment or fixtures. These categories only require that any work being completed not cause any lessening of the existing structure's or system's capacity or accessibility, and that certain non-compliant products or practices not be used. In addition, door hardware be-

XI. CODE & ACCESSIBILITY



141-1: View from Southwest Parlor (Room 103) to Northwest Parlor (Room 104) and Center Hall (Room 100)



142-1: The addition provides an accessible entrance and necessary public restrooms.



142-2: Stone steps into the south side of the Brearley House.

ing replaced should be upgraded so that it is handicapped accessible. In the Repair category, new toilets should be “low-flow.” If restrooms are being renovated, they must be barrier free; when doors are replaced, they should also meet certain accessibility requirements.

- Alteration is defined as “...the rearrangement of any space by the construction of walls or partitions or by a change in ceiling height, the addition or elimination of any door or window, the extension or rearrangement of any system, the installation of any system, the installation of any additional equipment or fixtures and any work which reduces the load bearing capacity of or which imposes additional loads on a primary structural component.” This would include HVAC and electrical, as well as any interior reconfigurations that might be required. This type of work has more detailed requirements, including Materials and Methods, and requires greater accessibility compliance.
- Reconstruction is defined as “...any project where the extent and nature of the work is such that the work area cannot be occupied while the work is in progress and where a new certification of occupancy is required before the work area can be reoccupied.” This applies to major renovation projects, and would likely include work from the other categories.
- Additions include “...any increase in the footprint area of a building or an increase in the average height of the highest roof surface or the number of stories.” Additions and new building elements are required to comply with the provisions of the other technical subcodes of the UCC (i.e. as if it were a new building).

Historic Buildings

The Rehabilitation Subcode also addresses buildings that are listed on the State and National Registers of Historic Places. For instance, historic buildings undergoing repair, renovation, alteration, restoration or reconstruction consistent with the U.S. Secretary of the Interior’s Standards for the Treatment of Historic Properties may comply with certain Special Provisions instead of complying with the corresponding requirements of the main code. The following Special Provisions apply:

1. Materials and Methods: Exceptions are granted for materials that are exposed to view in recognition of the need to preserve the historic character of the building.
2. One-Hour Fire Resistive Assemblies: Where one-hour fire resistive construction is required, existing plaster and lath is permitted to remain and meet the requirement.

3. Means of Egress: Existing widths of existing door openings, corridors and stairways may be maintained if less than the required means of egress width, provided that the local code official finds the opening traversable.
4. Doors: Direction of swing and hardware requirements may be waived, provided that the level of accessibility and safety of egress is increased wherever possible.
5. Railings: Existing handrails may remain or may be replaced with new to match the originals, even when they do not meet code requirements for new construction. Guardrails of 42" are not required; rail height of at least 30" is acceptable and the existing baluster and rails may remain.
6. Exit Signs: Alternate locations or designs may be acceptable if the code requirements would result in damage to the building's historic character.

Detailed Code Analysis

The following building classifications currently apply:

Existing Use Group(s):

- A3 - Museum/Gallery
- R5 - Residential, single and two family dwelling

Proposed Use Group(s):

- A3 - Museum/Gallery
- R5 - Residential, single and two family dwelling

Building footprint (Ground floor): 1,752 gsf

Floor Area:

Basement:	1,297 gsf
First Floor:	1,752 gsf
Second Floor:	1,287 gsf
<u>Attic:</u>	<u>1,287 gsf</u>
Total:	5,623 sf

Building Height: 3 story (above grade)



143-1: Existing egress signage at the first floor hallway.



143-2: Existing historic handrails may remain even when they do not meet code requirements for new construction.

Change of Use

The Uniform Construction Code establishes construction requirements according to the way a building is used. The use, or function, of a building is called a use group. The Rehab Subcode also uses these same use groups. The Change of Use section governs what work must be done when a building that has been used for one use is changed to accommodate another use. For example, it details what must be done when a building that has been a home is changed into a public building. The amount of work that is required can range from nothing to a great deal. The work required is now dependent on whether a greater hazard is created. In sum, the change of use of a building means a change of the use group as defined in the building subcode or by the provisions of another subcode.

The change in the use of a space in a building may not require that the entire building undergo a change of use group, but it may mean, for example, that the change in the way the space is used may trigger the requirements of one of the technical subcodes of the UCC. For example, the plumbing subcode may require additional toilet fixtures, the electrical subcode may require ground fault circuit interrupters, or the mechanical subcode may require that the heating, ventilation, and air conditioning (HVAC) system be upgraded.

There are six hazard tables in the change of use section. It is important to remember in determining whether work must be done that each of the six tables must be consulted. The first table deals with relative use group hazard. This table categorizes all work according to hazard. The next five tables address the following technical issues: means of egress, height and area, exposure of exterior walls, fire suppression, and structural loads. These tables operate independently of one another. There are additional requirements when the work affects vertical openings, fire alarms, fire detection, smoke detectors, or some plumbing, electrical, mechanical, or accessibility provisions.

Relative Hazard Group

Existing -	3 (higher classification)
	4 (lower classification)
Proposed -	3 (higher classification)
	4 (lower classification)

The proposed higher classification requires the building to be brought up to code for all public areas, including floor framing reinforcing, new MEP systems and ADA upgrades. Life safety systems, includ-

ing fire alarm. A fire suppression system is not required for group A-3 Occupancy – 903.2.1.3 due to size.

- The fire area exceeds 12,000 square feet.
- The fire area has an occupant load of 300 or more.
- The fire area is located on a floor other than a level of exit discharge serving such occupancies.

Based on section interpretation and use, no change in use is proposed.

Plumbing Fixture Analysis

The public restrooms are handicap accessible. While the museum exists on two levels, the ground floor is accessible and at the same level as the accessible toilets. The plumbing fixtures in the apartment are not accessible and are not located on an accessible level of the building.

Handicapped Access

The main public access into the building is served by an ADA-compliant ramp which permits access into the building. The second floor, attic, and basement spaces are not accessible because they are only accessed by stairs. Due to the limited size and occupancy limitations, a LU/LA lift to the second floor does not make economical sense to add due to the limited benefit. As renovation work occurs in the building, doors should be upgraded so that they are fully accessible, except where the door and its hardware are considered to be significant, character-defining features.

Summary

No change in use is proposed. While permitted to be used as an assembly occupancy, the number of occupants is required to be limited on the second and attic levels due to only one means of egress. The second floor should be limited to 10 people maximum, and the attic and basement are not permitted by code to be occupied. The attic may only be used for light storage. The building does not have a sprinkler system or fire alarm system; see the Mechanical and Electrical Systems Assessment.

Existing non-compliant hardware is permitted to remain due to the historic importance.

Final programming of the building's use should be provided by the Township for full assessment.

Summary of Recommendations

The overall historic fabric and character is in good condition. Continued upkeep is encouraged to maintain the historic features of this house. A number of upgrades can be made to increase the efficiency of the building systems in the short and intermediate term. The amount of information presented can be overwhelming, the following pages of this chapter contain a consolidated list of all the recommendations.

In terms of the site as a whole, including the buildings and the landscape features, there are a number of interesting and compelling interpretive opportunities, including the site's importance to the town and larger area.

Funding from public sources like the New Jersey Historic Trust, which has provided a series of grants, as well as private foundations and benefactors, can and should be sought to help with on-going maintenance, needed repairs, and replacement of building systems.

Overall Treatment Recommendations for Rehabilitation

Exterior

At the Brearley House, rehabilitation means that all efforts should be made to preserve and/or repair the historic fabric from the period of significance. Specifically, this means that on the exterior the historic fabric will be repaired and where replacement is necessary will be matched in material, profile and dimension. On the exterior, this includes the exposed brick, stucco at East elevation, foundations, and cornice.

Several items are not original to the 1761 structure but were added to the building over time. This includes the shed roofs over doorways at the south elevation, window wells, and gutters. It should be noted that although the gutters and leaders are not a character defining feature, they serve a necessary purpose and should continue to be maintained.

The 1999 addition contains restrooms and storage spaces for the museum. It also allows for accessible entry into the building. Though it is not historic, the addition should be maintained as it serves a function to the Brearley House.

Interior

XII. SUMMARY OF RECOMMENDATIONS



147-1: Southerly view from Southwest Chamber (Room 202) overlooking parking lot.



148-1: Maintain historical elements



148-2: Address columns at basement level to prevent further corrosion

For the interior of the Brearley House, rehabilitation means that all efforts should be made to preserve and/or repair the historic fabric from the period of significance. Specifically, this means the existing historic fabric will be cleaned up and painted.¹ If repairs or replacement are required, they will match the historic in material, profile and dimension.

On the interior of the Brearley House, the important character defining features are the wood floors, plaster walls and ceilings, closets, historic wood trim, fireplaces and mantels, and staircase.

Impact of the Recommendations and Reasoning for the Capital Project

The Brearley House needs to be used to survive. Ideally, a use can be found that maximizes the public's access to the building while minimizing the impact this use has on the surviving historic fabric. Any work must be done sensitively to ensure the protection of the extant historic features.

The Brearley House will require capital investment. The investment necessary for any proposed use must also be considered as must the public's desire for the proposed use. If a use is not economically sustainable, it does not make sense to undertake it. Similarly, if there is no public interest in a proposed undertaking, it is foolish to do so.

Summary of Recommendations - Brearley House

- Maintain building in weather tight condition
- Repair plaster walls and mitigate water and moisture infiltration around windows
- Replace columns at basement level and/or treat to prevent further corrosion
- Replace heating system with more efficient system
- Repair and restore historic finishes based on planned programmed period rooms
- Repair window sills and jambs
- Maintain wood flooring
- Repair plaster ceilings where damaged by water
- Provide routine electrical and fire alarm upgrades

¹ Refer to the "Analysis of Selected Historic Finishes" in Section IX for analysis of historic paint colors and contemporary colors that should be used.

Administrative/Management

- Obtain a firm commitment from Lawrence Township to maintain, develop, promote, and adequately staff the site, including partnering with the Landmarks Commission in the pursuit of capital improvement grants by providing required matching funds
- Contract with professional landscaping services to renovate and provide regular maintenance of the grounds (trees, lawns, pathways, and courtyards)
- Contract with conservation cleaning services for regular cleaning of the home

Site Interpretation/Visitor Services

- Prepare an interpretive plan for the house and site
- Create/update and initiate implementation of a comprehensive exhibit plan for the house museum
- Develop and implement a site-wide signage plan for historic interpretive signage throughout the grounds

Archaeological Resource Management

- Develop a procedures manual for planning and executing future archaeological investigations, both for future regulatory compliance and for scholarly research

Archaeological Impact of the Recommendations and Reasoning for the Capital Project

With the exception of new lighting fixtures, the recommendations are mostly repairs of the existing structure. These repairs are required to keep water out of the interior of the house. These repairs need to be made to ensure there is no more degradation of materials. Because of its important and significant architecture, Township of Lawrence should continue to invest in the Brearley House.

The Brearley House is owned by the Lawrence Township and listed on the NJ Register of Historic Places. Therefore, all undertakings on this property including interior and exterior rehabilitation and ground disturbing activities require written authorization from the Historic Preservation Office pursuant to the NJ Register of Historic Places Act. Applications including ground disturbing activities will require archaeology.



149-1: Maintain wood flooring



149-2: Replace lighting fixtures

Prioritization and Cost Estimate

In general, this plan recommends three levels of repair: Immediate, Short Term and Long Term:

- “Immediate” are those repairs and recommendations that must be completed to remedy safety concerns or to protect the building. We recommend that these repairs be undertaken immediately and be completed within 1-2 years. In the conditions assessment, the condition of these items was generally indicated as “poor.”
- “Short Term” are those recommendations and repairs which can most efficiently be undertaken in conjunction with the overall rehabilitation of the building and/or repairs. They are based on the program requirements for new use and if delayed, will not pose a threat to the building, its fabric or its users. We recommend that work in this category be completed within 3-5 years. In the conditions assessment, the condition of these items was generally indicated as “fair.”
- “Long Term” are those repairs and recommendations which relate to the interpretation of the building and the site. Deferment of these recommendations will not create hazardous conditions for the building or its users.

Following is the prioritized list of recommendations and repairs as identified and discussed in the previous chapters of this preservation plan. It should be noted that the identified costs are conceptual in nature, intended to provide a sense of the level of investment required. They are in current, Spring of 2023 dollars, and will require significant additional investigation and design to be accurate.

Immediate Recommendations:

- Install egress lighting at doors
- Replace oil heating system with natural gas or electrical system. Install either gas-fired water heater or electric water heater depending on type of new system.
- Connect to public gas and other public utilities
- Monitor for water infiltration
- Clean mortar and bricks; repoint mortar and patch masonry
- Replace corroded steel columns in the basement

XIII. PRIORITIZATION & COST ESTIMATE



151-1: Southerly view from Southwest Parlor (Room 103) to parking lot.



152-1: Corroded steel columns



152-2: Damaged plaster

- Repair leaders
- Repair damaged plaster walls and ceilings and repaint
- Remove non-historic light fixtures and replace with less intrusive energy-efficient fixtures

Short Term Recommendations:

- Connect to Lawrence Township water system
- Install full-coverage sprinkler system
- Replace plumbing piping
- Replace toilets, sinks, and urinals with high-efficiency fixtures and automatic activation devices.
- Install more efficient ventilation at caretaker's bathroom
- Replace shutters

Long Term Recommendations:

- Provide new MEP systems: replace cooling and ventilation systems to high-efficiency condensing units
- Archaeological investigation of North lawn
- Reconfigure basement steps for safety
- Refinish flooring

We have engaged Becker and Frondorf for third party cost estimating of the required repairs and long term renovation plans for the Brearley House. Much of this work can be phased into multiple smaller projects should capital funding not be available.



153-1: Immediate recommendations include cleaning of mortar and bricks, repointing mortar, and patching masonry.

Project: Brearley House
Number: 23081E1
Client: CCH
Date: June 14, 2023
Phase: Assessment

BECKER & FRONDORF
 Construction Cost Consulting • Project Management

ESTIMATE SUMMARY

CODE	DESCRIPTION	5,630	SF	COST
A	Immediate			\$838,460
	Subtotal			\$838,460
	General Conditions / O. H. & P.		30.0%	\$251,540
	Bond		3.0%	\$33,000
	Design Contingency		20.0%	\$225,000
	Total			\$1,348,000
B	Short Term			\$269,750
	Subtotal			\$269,750
	General Conditions / O. H. & P.		30.0%	\$81,250
	Bond		3.0%	\$11,000
	Design Contingency		20.0%	\$72,000
	Total			\$434,000
C	Long Term			\$450,570
	Subtotal			\$450,570
	General Conditions / O. H. & P.		30.0%	\$135,430
	Bond		3.0%	\$18,000
	Design Contingency		20.0%	\$121,000
	Total			\$725,000
	Total - Project		\$445	\$2,507,000

Notes

Costs are current for Spring 2023; escalation is not included.
Hazardous materials abatement costs, if any, are not included.
Items noted with * are priced or quantified by others.
Estimate assumes Prevailing Wage Rates
After hours & overtime premium costs are not included.
See Transmittal For Basis of Estimate & Additional Conditions
TBD: To be Determined
NIC: Not in Contract

Alternates:

Option 2 - Oil Heat Switch to All Electric vs. Gas	1	LS	Deduct	(\$25,000)
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ESTIMATE

Proj: Brearley House
Date: June 14, 2023

CODE	DESCRIPTION	QUANTITY	UNIT	UNIT COST	COST
A	Immediate				
A1	Exterior - East Elevation	1,150	SF		
A2	- Clean Masonry/100%	1,150	SF	4.00	4,600
A3	- Remove Moss & Mold	1,150	SF	7.50	8,630
A4	- Stucco Repair Allowance	1	LS	20,000.00	20,000
A5					0
A6	Exterior - South Elevation	900	SF		
A7	- Clean Masonry/100%	900	SF	4.00	3,600
A8	- Patch Brick/10%	90	SF	150.00	13,500
A9	- Repointing/15%	450	SF	25.00	11,250
A10	Windows - Investigate Water Filtration	1	LS	1,500.00	1,500
A11	- Repair & Flash Sills as needed	1	LS	7,500.00	7,500
A12	- Replace Leader @ East	1	LS	1,000.00	1,000
A13					0
A14	Exterior - West Elevation	1,150	SF		
A15	- Clean Masonry/100%	1,150	SF	4.00	4,600
A16	- Patch Brick/15%	170	SF	150.00	25,500
A17	- Repointing/25%	300	SF	25.00	7,500
A18	- Remove Moss & Mold	1,150	SF	7.50	8,630
A19					0
A20					0
A21	Exterior - North Elevation	900	SF		
A22	- Clean Masonry/100%	900	SF	4.00	3,600
A23	- Patch Brick/10%	100	SF	150.00	15,000
A24	- Repointing/15%	150	SF	25.00	3,750
A25					0
A26					0
A27					
A28	<u>Basement</u>	1,300	SF		
A29	Steel Columns - Remove & Replace	15	EA	2,000.00	30,000
A30	- Shoring	1	LS	25,000.00	25,000
A31	- Demo Floor & SOG	15	EA	150.00	2,250
A32	- New SOG/Assume 2x2	15	EA	250.00	3,750
A33	- Column Footings	15	EA	-	Assume Existing
A34	- Reinstall Floor	15	EA	150.00	2,250
A35	Clean Mortar & Bricks - No Scope Shown	800	SF	2.00	1,600

A36	Partitions - Assume Existing	140	LF	-		NIC
A37	Repair Damages Plaster - Walls/Assume 15%	120	SF		100.00	12,000
A38	- Ceilings	1,300	SF	-		TBD
A39	Painting - Walls	800	SF		2.00	1,600
A40	- Ceilings	1,300	SF	-		TBD
A41	Monitor for Water Filtration	1	LS		1,500.00	1,500
A42						0
A43						0
A44						0
A45						0
A46						0
A47						0
A48						0
A49						0
A50	Heating System - Replace (1st & 2nd Only)	3,040	SF			
A51	Option 1 - Heating Only/Oil Heat Switch to Gas	3,040	SF		25.00	76,000
A52	- Air Conditioning	3,040	SF	-		w/ Long Term
A53	- Gas/Branch Only	1	LS		15,000.00	15,000
A54	- Gas (From Street to House)	1	LS	-		By Utility
A55	- Landscape/Hardscape @ Trenching	1	LS		7,500.00	7,500
A56	Option 2 - Oil Heat Switch to All Electric	3,040	SF		50.00	Alternate
A57	Lighting/Replace Existing @ Basement - Demo	1,300	SF		2.00	2,600
A58	- New	1,300	SF		15.00	19,500
A59	- 1st/2nd & Attic	4,330	SF	-		w/ Long Term
A60						0
A61						
A62						
A63	<u>First Floor</u>	1,750	SF			
A64	Install New Egress Lights at Doors	4	EA		1,500.00	6,000
A65	Lighting/Replace Existing - Demo	1,750	SF		2.00	3,500
A66	- New	1,750	SF		15.00	26,250
A67	Partitions - Assume all Existing	140	LF	-		Assume No Work
A68	Plaster Repair - Walls/Assume 25%	700	SF		100.00	70,000
A69	- Ceilings/Assume 50%	900	SF		150.00	135,000
A70	- Below Window	1	EA		500.00	500
A71	Painting - Walls	5,050	SF		2.00	10,100
A72	- Ceilings	1,750	SF		3.50	6,130
A73	Water Mitigation - No Scope/Allowance	1	LS		50,000.00	50,000
A74	Efflorescence @ Fireplace	30	LF		500.00	15,000
A75						0
A76						0
A77	<u>Second Floor</u>	1,290	SF			
A78	Lighting/Replace Existing - Demo	1,290	SF		2.00	2,580
A79	- New	1,290	SF		15.00	19,350

A80	Partitions - Assume all Existing	145	LF	-	Assume No Work
A81	- Perimeter	145	LF	-	Assume No Work
A82	Plaster Repair - Walls/Assume 25%	350	SF	100.00	35,020
A83	- Ceilings/Assume 50%	650	SF	150.00	97,500
A84	Painting - Walls	4,350	SF	2.00	8,700
A85	- Ceilings	1,290	SF	3.50	4,520
A86					0
A87	Plan Notes:				
A88	Clean Windows	6	EA	100.00	600
A89	Leader - Re-attach	1	EA	1,000.00	1,000
A90	Repair Mortar	3	EA	1,500.00	4,500
A91	Windows - Paint	6	EA	250.00	1,500
	Subtotal				838,460

ESTIMATE

Proj: Brearley House

Date: June 14, 2023

CODE	DESCRIPTION	QUANTITY	UNIT	UNIT COST	COST
B	Short Term				
B1	Exterior - East Elevation	1,150	SF		
B2	- Remove Delaminated Stucco/Assume 10%	120	SF	10.00	1,200
B3	- Repair Substrate/10%	120	SF	65.00	7,800
B4	- Brick Replacement/5%	60	SF	150.00	9,000
B5	- Repointing/10%	120	SF	25.00	3,000
B6					0
B7	Exterior - South Elevation	900	SF		
B8	- Repair/Replace Shutters (No Qty, Allowance)	1	LS	10,500.00	10,500
B9					0
B10					
B11					
B12	Basement	1,300	SF		
B13	Connect to Township Water - No Scope/Allowance	1	LS	75,000.00	75,000
B14	- Landscaping & Hardscape	1	LS	25,000.00	25,000
B15	Sprinkler - Full Coverage	1,300	SF	10.00	13,000
B16	- Plaster Cutting & Patching of Pipes/Walls	850	SF	15.00	12,750
B17	- Plaster Cutting & Patching of Pipes/Ceilings	1,300	SF	25.00	32,500
B18	Plumbing - Replace Piping @ New Fixtures	10	EA	5,000.00	50,000
B19	- New Fixtures/Toilet/Sinks/Urinals w/ Auto Devic	10	EA	2,500.00	25,000
B20					0
B21					0
B22					0
B23					
B24					
B25	First Floor	1,750	SF	-	No Work
B26					0
B27					
B28					
B29	Second Floor	1,290	SF		
B30	Install more Efficient Ventilation @ Tenant Bath	1	EA	5,000.00	5,000
	Subtotal				269,750

ESTIMATE

Proj: Brearley House

Date: June 14, 2023

CODE	DESCRIPTION	QUANTITY	UNIT	UNIT COST	COST
C	Long Term				
C1	Basement - General Construction	1,300	SF		
C2	- Reconfigure Steep Stairs for Safety	1	LS	7,500.00	7,500
C3	- Refinish Floors	1,300	SF	10.00	13,000
C4					
C5	First Floor - General Construction	1	LS	-	No Work
C6	Second Floor - General Construction	1	LS	-	No Work
C7	Attic	1	LS	-	No Work
C8					0
C9					
C10					
C11	New MEP	5,630	SF		
C12	Sprinkler - Basement	1,300	SF	-	w/ Short Term
C13	- 1st & 2nd Floor	3,040	SF	10.00	30,400
C14	- Attic	1,290	SF	10.00	12,900
C15	- Fire/Booster Pump	1	LS	-	NIC
C16					
C17	Plumbing - Per Fixture/Replace	10	EA	-	w/ Short Term
C18	- Hot Water Heater (Assume Electric)	1	EA	5,000.00	5,000
C19					
C20	Heating System - Replace (1st & 2nd Only)	3,040	SF		
C21	Option 1 - Heating Only/Oil Heat Switch to Gas	3,040	SF	-	w/ Immediate
C22	- Air Conditioning Replacement/VRF	3,040	SF	25.00	76,000
C23	- Gas/Branch Only	1	LS	-	w/ Immediate
C24	- Gas (From Street to House)	1	LS	-	By Utility
C25	- Landscape/Hardscape @ Trenching	1	LS	-	w/ Immediate
C26	Option 2 - Oil Heat Switch to All Electric	3,040	SF	-	Alternate
C27					
C28	Electrical	5,630	SF		
C29	Power	5,630	SF	10.00	56,300
C30	Lighting & Controls - Attic Only	1,290	SF	8.00	10,320
C31	- Basement, 1st & 2nd Floor (Immediate)	4,340	SF	-	w/ Immediate
C32	Fire Alarm	5,630	SF	-	Existing to Remain
C33	Telecom	5,630	SF	5.00	TBD

C34	Security	5,630	SF	-	Existing to Remain
C35					
C36	Walls - Plaster Cutting & Patching of MEP	8,530	SF	15.00	127,950
C37	- Painting Allowance	8,530	SF	2.00	17,060
C38	Ceilings - Plaster Cutting & Patching of MEP	3,040	SF	25.00	76,000
C39	- Painting Allowance	3,040	SF	3.50	10,640
C40					
C41					
C42					
C43	Archaeological Investigation of North Lawn	1	LS	7,500.00	7,500
	Subtotal				450,570

APPENDIX I: MAINTENANCE PLAN

BREARLEY HOUSE PRESERVATION PLAN



Maintenance Plan

Deferred maintenance is the most common cause of deterioration to historic buildings. To avoid unchecked deterioration, ongoing preventative maintenance must be completed on a regular basis. This maintenance is the most vital and cost-effective tool for the preservation of historic structures. To assist with this crucial component for the protection of the building, we recommend establishing a cyclical maintenance program. This program should include weekly, monthly, semi-annual and annual tasks including annual full-scale inspection of the exterior and interior of the building. This maintenance program should guide the present and future care of the resource.

In general, exterior elements should be examined at least once a year. Exterior maintenance should eliminate water penetration by maintaining materials and finishes and ensuring that water is directed away from the building. Also critical to the exterior maintenance is routine inspection and cleaning of roof gutters and downspouts. One of the most common causes of water damage is clogged or damaged gutters and leaders that lead to leaks or overflow. Gutters are to be inspected and cleaned at least four times annually – twice in the fall when they are most likely to become clogged with falling leaves and twice in the spring during the heaviest rains. On a fairly regular basis — approximately once every five years, or upon noticing damage — a professional should be called in to inspect the condition of the roof and roof drainage system.

Interior elements should be examined during regular housekeeping as well as with general vigilance in semi-annual inspections. Their maintenance should preserve existing materials and finishes. Replacement of interior elements is usually included as a part of major renovations. The smooth operation of doors and windows should be maintained, as unnecessary damage to the doors, windows and hardware can occur from stresses arising from ill-fitting elements.

Site maintenance should be undertaken twice annually, once in the spring and once in the fall, in addition to regular lawn mowing, leaf and snow removal, as one might maintain their own yard at home. This type of work can often be undertaken by volunteers during a well-planned work day, which is also a great way to bring community members together and develop interest in the resource.

Finally, inspections and maintenance of building systems, such as electrical and fire alarm, should be completed regularly by qualified professionals so as to maintain the systems in good working order. Inspection of the electrical system and a fire alarm system are critical to maintaining these vital systems in working order.

Because of the importance of maintenance in a historic building, a yearly maintenance and operation budget should be established. Half of the fund is generally allocated for immediate maintenance and repairs, while the remainder is saved for the replacement of major items such as roofs, etc. All maintenance inspections and repair work should be documented and kept in a maintenance log. This log should be a complete record of housekeeping and maintenance activities, details of any

work performed, materials used, dates executed, cost incurred and names of personnel and contractors involved. It should also contain the dates of inspections and detailed accounts of the findings including problem areas, plans for repair and, after repairs are complete, a description of techniques used for the repair. The notebook should be periodically reviewed for repeated repairs which may indicate a deeper problem. Digital photography should be used to document existing conditions of key locations and features around the building, as well as documenting maintenance and repair work.

The following Maintenance Schedule includes the tasks that should be included in the maintenance program. These tasks have been outlined by the frequency with which they should be conducted. Additional tasks should be added as necessary so that a thorough program is developed and maintained. Following the Maintenance Schedule is a Maintenance Log to be used to record maintenance data. An electronic version of the log is to be provided to the owner with the 100% submission of this report.

MAINTENANCE SCHEDULE

FEATURE TO BE INSPECTED	CONDITION TO INSPECT	INSPECTION FREQUENCY	REPAIR / REPLACEMENT	TREATMENT FREQUENCY	NOTES
SITE					
Gardens	Build-up against foundation	2/year	Remove from foundation	2/year	Keep mulch, leaves and foundation plantings clear of foundation, basement windows and other woodwork that may be in close proximity to the ground.
Grade	Slope back to building and fill voids	1/year	Minor grading and filling.	1/year	Maintain slope away from building. Fill voids that might develop from heavy run-off or other conditions. Correct cause.
Trees and Shrubs	Contacting and overhanging buildings	2/year	Pruning by volunteers or professionals	2/year	Trim shrubs and trees away from building to limit leaves in gutters, prevent damage from falling limbs and encourage air flow and light near building.
Walking surfaces and paths	Deflection, gravel build-up near building	Weekly	Sweeping/ Raking/ Weeding	Weekly	Keep paths and walkways swept to reduce transfer of damaging grit into building through foot traffic. Reset displaced bricks/ pavers to correct tripping hazards. Weed gravel surfaces regularly.
Snow and ice removal	At snowfall and icy conditions	Seasonally		Seasonally	Do not pile excess snow against foundation or other building elements. Avoid heavy use of salt or other ice melting products in winter. Sweep up excess material after surfaces have dried.

MAINTENANCE SCHEDULE

FEATURE TO BE INSPECTED	CONDITION TO INSPECT	INSPECTION FREQUENCY	REPAIR / REPLACEMENT	TREATMENT FREQUENCY	NOTES
ARCHITECTURAL EXTERIOR					
Roof	Surface condition/moss growth	1/year	Repair damaged shingle each year/ Replace Roof	1/year	Replace roof every 20-30 years
	Sliding or damaged shingles		Repair damaged shingle each year/ Replace Roof	1/year	Replace roof every 20-30 years
	Damaged sheathing	1/year			Regular roof repair should prevent sheathing damage
Gutters/Leaders/Drainage	Cleaning, leaks and displacement	4/year	Repair or replace. Re-align or patch seams.	At signs of distress	Clean gutters 4/year minimum. Inspect roof drainage from exterior 1/year during heavy rains
Flashing	Surface condition	1/year	Repair or replace		Coordinate major flashing work with roof repairs or replacement
Wood Trim and siding	Surface Condition	1/year	Prep and paint. Patch or replace damaged elements.	3-5 years	
	Fungus, plant growth	1/year	Clean and treat and paint with regular painting schedule	3-5 years	
	Movement, splitting & cracking	1/year	Repair or replace	at signs of distress	
	Anchor condition/ separation from substrate	1/year	re-anchor or replace	at signs of distress	
	Water staining and damage	1/year	Check cause, correct and repair.	at signs of distress	
	Insect damage	1/year	Inspection by extermination professional.	As Required	Treatment regimen to be determined by inspector.

MAINTENANCE SCHEDULE

FEATURE TO BE INSPECTED	CONDITION TO INSPECT	INSPECTION FREQUENCY	REPAIR / REPLACEMENT	TREATMENT FREQUENCY	NOTES
Masonry Foundation and Walls	Surface condition	1/year			
	Spalling, efflorescence	1/year	Clean and spot repoint	at signs of distress	Inspect cause for possible water infiltration related cause. If widespread conditions requiring spot pointing are observed, the entire foundation should potentially be re-pointed. At time of repair consideration should be given to repointing entire elevations using appropriate lime-based mortar.
	Cracking	1/year	Spot repoint	at signs of distress	
	Settlement	1/year	Correct cause of settlement	at signs of distress	
	Mortar joint condition	1/year	Spot repoint	at signs of distress	
	Plant growth	1/year	Remove	at signs of growth	
Doors	Operation	2/year	Repair, adjust door and hardware for smooth operation.	at signs of distress or binding.	
	Surface condition	1/year	Wood preservative treatment	3-5 years	
	Hardware and weatherstripping	2/year	Repair	at signs of distress	

MAINTENANCE SCHEDULE

FEATURE TO BE INSPECTED	CONDITION TO INSPECT	INSPECTION FREQUENCY	REPAIR / REPLACEMENT	TREATMENT FREQUENCY	NOTES
Windows	Operation	2/year	Repair, adjust window and hardware for smooth operation.	at signs of distress or binding.	
	Surface condition	1/year	Prep and paint. Patch areas of deterioration or damage.	3-5 years	
	Glazing	1/year	Repair	3-5 years	Partial re-glazing. Use traditional linseed oil based glazing compound. Allow to cure adequately prior to priming and painting.
	Hardware and weatherstripping	2/year	Repair	at signs of distress	

MAINTENANCE SCHEDULE

FEATURE TO BE INSPECTED	CONDITION TO INSPECT	INSPECTION FREQUENCY	REPAIR / REPLACEMENT	TREATMENT FREQUENCY	NOTES
ARCHITECTURAL INTERIOR					
Wood Flooring	Surface condition	1/year	Refinish flooring with only minimal sanding to remove old finish only.	10 years	Sweep weekly to remove abrasive dirt. Wood floors should be damp mopped monthly depending on use to remove built-up dirt. Provide period appropriate area rugs to protect floors in areas of highest foot traffic.
	Splitting	1/year	Repair using dutchman repairs or select replacement.	At sign of distress	Inspect structural support to ensure floors are properly supported throughout.
	Anchor condition	1/year	Re-secure anchors	At sign of distress	If anchors are popping, it could be the result of inadequately supported floors.
	Water staining or damage	1/year	Check cause, correct and repair.	At sign of distress	
	Buckling	1/year	Check cause, correct and repair.	At sign of distress	This could be the result of high humidity levels in the space on one side of the flooring.
Plaster	Plaster Attachment	1/year	Plaster washer attachment	At sign of distress	Inspect for underlying structural or other causes and correct prior to completing plaster repairs.
	Cracking	1/year	Repair larger cracks.	At sign of distress	Rake out joint and secure plaster on both sides of joint. Repair using compatible plaster materials. Inspect for underlying structural or other causes and correct prior to completing plaster repairs.
Interior Doors	Operation	With regular use	Trim door or adjust hardware.	At sign of distress	Trim door, adjust hardware etc. to remove stresses on door and hardware. If problem persists it could be movement in the wall that needs to be stabilized to prevent continued problems.
	Surface condition	1/year	Prep and paint.	5-7 years	
Millwork and Trim	Surface condition	1/year	Prep and paint.	5-7 years	

MAINTENANCE SCHEDULE

FEATURE TO BE INSPECTED	CONDITION TO INSPECT	INSPECTION FREQUENCY	REPAIR / REPLACEMENT	TREATMENT FREQUENCY	NOTES
STRUCTURAL					
Timber Frame	Movement Deflection	1/year ¹	Repair	at sign of distress	repair to be designed by engineer or architect
	Connection @ bearing	1/year ¹	Repair	at sign of distress	repair to be designed by engineer or architect
	Checking & splitting	1/year ¹	Repair	at sign of distress	repair to be designed by engineer or architect
	Water infiltration	1/year	Repair Leak	at sign of distress	
	Movement	1/year ¹	Repair	at sign of distress	repair to be designed by engineer or architect
	Timber deterioration	1/year ¹	Correct cause and repair	1/year	repair to be designed by engineer or architect
	Insect infestation	Monthly	Treat		treatment regimen to be determined by inspector
MECHANICAL					
	Comprehensive system evaluation ¹	1/year			Inspection by outside inspector
	Furnace inspection and cleaning ¹	1/year			Inspection by outside inspector
	Fuel tank and lines inspection ¹	1/year			Inspection by outside inspector

MAINTENANCE SCHEDULE

FEATURE TO BE INSPECTED	CONDITION TO INSPECT	INSPECTION FREQUENCY	REPAIR / REPLACEMENT	TREATMENT FREQUENCY	NOTES
ELECTRICAL	Comprehensive system evaluation ¹	1/year			Inspection by outside inspector
	Fire alarm system ¹	1/year			Inspection by outside inspector through yearly maintenance contract
PLUMBING	Comprehensive system evaluation ¹	1/year			Inspection by outside inspector
	Hot water heater, piping and fixture inspection. ¹	1/year			Inspection by outside inspector

1. An outside inspector, or structural engineer should be consulted at signs of distress in the framing.
2. The term "at signs of distress" under frequency means that a regular inspection of these items is not in general necessary but that when the element and/or adjacent material begins to show signs of deterioration then the area should be opened and the element inspected.
3. The term "regularly with housekeeping" under frequency means that separate regular inspections are not generally necessary. Instead, these elements should be examined and conditions noted when regular cleaning is taking place.

APPENDIX II: BIBLIOGRAPHY

BREARLEY HOUSE PRESERVATION PLAN



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APPENDIX III: HAZARD AND VULNERABILITY ASSESSMENT

BREARLEY HOUSE
PRESERVATION PLAN



Hazard and Vulnerability Assessment

Overview

Over the past several years, the issue of institutional “resiliency” has become increasingly important. “Institutional resiliency” is defined as the ability of an institution or community to, first, directly address the immediate impact of a disaster, hazard, shock or stress, and then its ability to successfully recover from the results of these occurrences. This resiliency is important for an institution as a whole, but also relates to its structures and facilities, both historic and more recent.

With the real and measurable increase in the frequency and severity of weather and climate-related disasters, as well as the real and perceived increase in other kinds of disasters (e.g. mass shootings, vandalism, etc.), this type of assessment is increasingly important, particularly for high-profile sites and institutions like the Brearley House. It is recommended that the Brearley House make a comprehensive assessment of its readiness to address hazards; a list of issues to consider is included at the end of this section.

Though the Brearley House is located near the Delaware and Raritan Canal and is in close proximity to Shipetaukin Creek, a regulatory floodway, the Brearley House is outside the 100- and 500-year floodplains and is not in a high-risk seismic area. The most typical hazards impacting an institution’s built and historic resources derive from weather-related events and the increasing impact of climate change. As storms become more extreme and more common, institutions need to address the vulnerabilities of their buildings. The historic building and site features on the grounds of Brearley House were constructed with high quality materials and relatively strong structure systems. They were intended to be long-lasting. Their current solid condition is a testament to the quality of the design and construction and to the Township’s on-going commitment to preserving and maintaining these historic resources. That being said, deferred maintenance can take its toll on the buildings and can increase vulnerabilities. Replacing corroded structural columns, addressing water infiltration, the replacement of aging HVAC and electrical systems, etc., are all issues that need to be addressed promptly and in a comprehensive manner.

Some of the building systems need work if they are to remain operational in an emergency. The installation of emergency generators should be considered during the next major renovation campaign. This will allow the building to continue to operate and be secure in the event of a power outage.

Security is a second major issue. Like many historic sites, the Brearley House’s grounds are open. The accessibility of the grounds and the discreet security measures are part of the attraction and charm of historic sites. Any security improvements should be made with at least two goals in mind: most important is caretaker, visitor, and staff safety; second is making sure that the interventions don’t damage or negatively impact the historic resources.

Resilience also includes the structure’s longer-term ability to recover from a disaster. Resources and suppliers should be identified in case of damage. It likely does not make sense for the site to provide longer term assistance to residents, but the Township should assess this possibility.

The list of issues on the following page is a sample Hazard Vulnerability Analysis tool, adapted from a document published by the Hospital Association of

Southern California. It provides a list of issues to review and address for public facilities:

Hazard and Vulnerability Analysis

Issues to consider for probability include:

1. Known risk
2. Historical data
3. Manufacturer/ vendor statistics
4. Subjective evaluation/ best estimate
5. Local Emergency Planning Committee input

Issues to consider for response include:

1. Time to marshal on-scene response
2. Scope of response capability and staff training
3. On-site support resources/ supplies
4. Estimated severity and duration of the incident
5. Historical evaluation of response success
6. Local Emergency Planning Committee input

Issue to consider for human impact include

1. Potential for staff death or injury
2. Potential for client death or injury
3. Emotional/ psychological impact
4. Local cultural norms

Issues to consider for property impact include:

1. Cost to replace
2. Cost to set up temporary replacement
3. Cost to repair
4. Time to recover

Issues to consider for service impact include

1. Service interruption
2. Employees unable to report to work
3. Clients unable to reach the facility
4. Library in violation of regulatory or safety standards
5. Imposition of penalties or legal costs

6. Reputation and public image

7. Financial impact/ burden

Issues to consider for preparedness include

1. Status of current plans
2. Frequency of drills
3. Training status
4. Insurance
5. Availability of alternative sources for critical supplies and services

Issues to consider for internal resources include

1. Will supplies on hand meet critical needs?
2. Coordination with local and state agencies
3. Community training
4. Other community resources

APPENDIX IV: GLOSSARY

BREARLEY HOUSE PRESERVATION PLAN



GLOSSARY

Addition: New construction added to an existing building or structure.

Alteration: Any act or process that changes a portion of the exterior architectural appearance or exceptionally significant interiors of a building, structure or object, including, but not limited to, the erection, construction, reconstruction, or removal of any exterior or interior architectural features or configuration of a structure; treatments such as sand blasting, water blasting, chemical cleaning, chemical stopping, or removal of any architectural feature, but not including changes to the color of exterior paint.

Appropriate: Especially suitable or compatible.

Apron: A flat, broad piece of finished lumber or trim placed directly under a window sill.

Areaway: An open sunken space adjacent to basement windows or doors to provide light and air and/or access to the lower level.

Balustrade: A railing with upper and lower rails, balusters, and pedestals.

Building: A building, such as a house, barn, church, hotel, or similar construction is created principally to shelter any form of human activity. “Building” may also be used to refer to a historically and functionally related unit, such as a courthouse and jail or a house and barn. Examples include: carriage house, church, courthouse, house, library, shed, stable, store, theater, train station, garage, detached kitchen, barn, or privy.

Compatible: In harmony with location, context, setting, and historic character.

Contemporary: Reflecting characteristics of the current period. Contemporary denotes characteristics which illustrate that a building, structure, or detail was constructed in the present or recent past rather than being imitative or reflective of a historic design.

Crawl Space: Any interior space of limited height, but sufficient to permit workmen access to otherwise concealed ductwork, piping, or wiring.

Crazing: Fine, random cracks or fissures in a network on or under a surface of plaster, cement, mortar, concrete, ceramic coating, or paint film.

Demolish/Demolition: Any act or process that destroys in part or whole a building, structure, or resource. This definition often refers to deliberate demolition of a building or site or allowing a building to fall into such a state of disrepair that it becomes necessary or desirable to demolish it.

Design Guidelines: The “Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings” as adopted by the

Secretary of the United States Department of the Interior, and other guidelines which may be adopted from time to time.

Dressed (stone): Finished by cutting or smoothing.

Efflorescence: An encrustation of soluble salts, commonly white, deposited on the surface of stone, brick, plaster, or mortar; usually caused by free alkalis leached from mortar or adjacent concrete as moisture moves through it.

Enlarge: To extend a building, structure, or resource beyond its existing footprint, usually through the construction of an addition or new exterior feature.

Fascia: A flat, wide, horizontal band on a wall surface, especially the bands of an architrave. (Bucher)

Fascia Board: A wide board set, vertically to cover the lower ends of rafters or the joint between the top of a wall and the projecting eaves.

Fenestration: The system (arrangement and proportioning) of openings penetrating an exterior wall system.

Flashing: Sheet metal or other flexible material formed to prevent water from entering a building or structure at joints or intersections, such as where a roof intersects a wall or chimney.

Gable: The generally triangular portion of a wall between the two sloped edges of a roof.

Gable Roof: A pitched roof with two inclined planes having equal angles that meet at a peak in the center and terminate at a vertical gable.

Gypsum Board: A wallboard having a gypsum core.

Historic Context: Patterns or trends in history by which a specific occurrence, property, or site is understood and its meaning and significance within history or prehistory is made clear. Historic contexts are historical patterns that can be identified through consideration of the history of the property and the history of the surrounding area. Historic context may relate to an event or series of events, pattern of development, building form, architectural style, engineering technique, landscape, artistic value, use of materials or methods of construction, or be associated with the life of an important person; also the setting in which a historic element, site, structure, street, or district exists.

Historic Fabric: Original or old building materials (masonry, wood, stone, metals, marble) or construction.

Historic Integrity: The ability of a property to convey its significance; the retention of sufficient aspects of location, design, setting, workmanship, materials, feeling, or associating for a property to convey its historic significance.

Historic Significance: Determines why, where, and when a property is important. Historic significance is the importance of a property with regard to history, architecture, engineering, or the culture of a state, community, or nation. The key to determining whether the characteristics or associations of a property are significant is to consider the property within its historic context. Properties can be significant for their association or linkage to events or persons important in the past, as representatives of man-made expression of culture (design/construction) or technology, or for their ability to yield important information about history or prehistory.

Integrity: The authenticity of a property's historic identity, evidenced by the survival of physical characteristics that existed during the property's historic or prehistoric period.

Jamb: The vertical piece or surface that forms the side of an opening, such as a window, door, or vault.

Joist: A structural member laid horizontally in a series from wall to wall or beam to beam, to support the weight of a floor, ceiling, or roof.

Lath: A thin, narrow strip of wood or metal used in making a supporting structure for plaster, shingles, slates, or tiles.

Leader: A vertical pipe, often of sheet metal, used to conduct water from a roof drain or gutter to the ground or cistern. Also known as a downspout.

Lintel: A horizontal beam that carries the load above an opening, such as a window or door.

Listing: the formal entry of a property in the National Register of Historic Places; also referred to as registration.

Maintain: To keep in an existing state of preservation or repair.

Mothball (Stabilization): Temporarily closing or stabilizing a building to protect it from the weather as well as to secure it from vandalism; the act or process of applying measures essential to the maintenance of a deteriorated building as it exists at present, establishing structural stability and a weather-resistant enclosure.

Muntin: A thin vertical strip of wood or metal used to separate and hold in place the panes of glass within a window sash.

National Register Criteria: The established criteria for evaluating the eligibility of properties for inclusion in the National Register of Historic Places.

National Register of Historic Places: The official list of the Nation's historic places worthy of preservation. Authorized by the National Historic Preservation Act of 1966, the National Park Service's National Register of Historic Places is part of a national program to coordinate and support public and private efforts to identify, evaluate, and protect America's historic and archaeological resources.

Newel Post: A tall and more or less ornamental post at the head or foot of a stair, supporting the handrail.

Nomination: Official recommendation for listing a property in the State and/or National Register of Historic Places.

Object: The term object is used to distinguish from buildings and structures those constructions that are primarily artistic in nature or are relatively small in scale and simply constructed. Although it may be, by nature or design, movable, an object is associated with a specific setting or environment. Examples include: boundary markers, mileposts, fountains, sculptures, etc.

Obscured: Covered, concealed, or hidden from view.

Period of Significance: the length of time when a property was associated with important events, activities, or person, or attained the characteristics which qualify it for National Register listing. Period of significance usually begins with a date when significant activities or events began giving the property its historic significance; this is often a date of construction. For prehistoric properties, the period of significance is the broad span of time about which the site or district is likely to provide information; it is often the period associated with a particular cultural group.

Pilaster: A shallow, often rectangular decorative element applied to the vertical surface of a wall, in order to create the look of a column without providing structural support.

Pointing: 1. In masonry, the final treatment of joints by the troweling of mortar or a putty-like filler into the joints. 2. The material with which the joints are filled. 3. The removal of mortar from between the joints of masonry units and the replacing of it with new mortar (repointing).

Portland cement: A strong, inflexible hydraulic cement used to bind mortar. Mortar or patching materials with a high Portland cement content should not be used on pre-1920 buildings. The Portland cement is harder than the masonry, thereby causing serious damage over annual freeze-thaw cycles.

Preservation: The act or process of applying measures necessary to sustain the existing form, integrity, and materials of an historic property. Work, including preliminary measures to protect and stabilize the property, generally focuses upon the ongoing maintenance and repair of historic materials and features rather than extensive replacement and new construction. New exterior additions are not within the scope of this treatment; however, the limited and sensitive upgrading of mechanical, electrical, and plumbing systems and other code-required work to make properties functional is appropriate within a preservation project.

Rafter: A structural member that rests on the top of a wall or other supporting surface and rises at a slope to the ridge or peak of the roof; a series of rafters supports the roof deck and eaves.

Rail: A horizontal member in the frame of a door, window, panel etc.

Reconstruction: the act or process of depicting, by means of new construction, the form, features, and detailing of a non-surviving site, landscape, building, structure, or object for the purpose of replicating its appearance at a specific period of time and in its historic location.

Refurbish: to renovate, or make clean, fresh, or functional again through a process of major maintenance or minor repair.

Rehabilitation: The act or process of making possible a compatible use for a property through repair, alterations, and additions while preserving those portions or features which convey its historical, cultural, or architectural values.

Remodel: To change a building without regard to its distinctive features or style. Often involves changing the appearance of a structure by removing or covering original details and substituting new materials and forms.

Renovate: To repair a structure and make it usable again, without attempting to restore its historic appearance or duplicate original construction methods or material.

Repair: Acts of ordinary maintenance that do not include a change in the design, material, form, or outer appearance of a resource, such as repainting. This includes methods of stabilizing and preventing further decay and may incorporate replacement in kind or refurbishment of materials on a building or structure.

Replication: Constructing a building so that it is an exact replica or imitation of an historic architectural style or period.

Restoration: The act or process of accurately depicting the form, features, and character of a property as it appeared at a particular period of time by means of the removal of features from other periods in its history and reconstruction of missing features from the restoration period. The limited and sensitive upgrading of mechanical, electrical, and plumbing systems and other code-required work to make properties functional is appropriate within a restoration project.

Retain: To keep secure and intact. In the guidelines, “retain” and “maintain” describe the act of keeping an element, detail, or structure and continuing the same level of repair to aid in the preservation of elements, sites and structures.

Rhythm: Regular occurrence of elements or features such as spacing between buildings.

Ridge: The line formed where two sloping roof surfaces meet at the top.

Riser: The vertical face of a stair step.

Rubble Stone Masonry: Stonework constructed with rubble stones of irregular size and shape.

Scale: Proportional elements that demonstrate the size, materials, and style of buildings.

Shed Roof: A roof with a single slope, with the rafters spanning from one outside wall to the opposite wall.

Shoe Molding: A molding used next to the floor on an interior baseboard.

Significant: Having particularly important associations within the contexts of architecture, history, and culture.

Sill: The horizontal structural member at the base of a wall, window, or door opening, to which vertical members are attached.

Site: The location of a significant event, a prehistoric or historic occupation or activity, or a building or structure, whether standing or ruined, or vanished, where the location itself possesses historic, cultural, or archaeological value regardless of the value of any existing structure. Examples include: battlefield, campsite, designed landscape, shipwreck, ruins of a building or structure, natural feature, trail, rock carvings, ceremonial site.

Stabilization: The act or process of applying measures to sustain the existing form, integrity, and material of a building or structure, and the existing form and vegetative cover of a site. It may include initial stabilization work, where necessary, as well as ongoing maintenance of the historic building materials.

Stile: The vertical member to which the rails of a door, window or other frame are joined.

Stop: The molding or trim on the inside face of a door or window frame against which the door or window closes.

Streetscape: The distinguishing character of a particular street as created by its width, degree of curvature, paving materials, design of the street furniture, and forms of surrounding buildings.

Structure: The term “structure” is used to distinguish from buildings those functional constructions made usually for purposes other than creating human shelter. Examples include: bandstand, bridge, canal, corncrib, dam, earthwork, fence, gazebo, grain elevator, highway, irrigation system, lighthouse, railroad grade, silo, trolley car, tunnel, and windmill

Style: A type of architecture distinguished by special characteristics of structure and ornament and often related in time; also a general quality of a distinctive character.

Tread: The horizontal surface of a step.

Vernacular: A regional form or adaptation of an architectural style.

Window Sash: The part of a window frame that holds the glazing, especially when movable; originally always wood, may also be metal, and in late-twentieth century, plastics. (Bucher)

Note: These definitions have been collected from a variety of sources, including the National Park Service, “The Secretary of the Interior’s Standards...”; Preservation Virginia’s Glossary of Preservation Terms; Illustrated Dictionary of Historic Architecture by Cyril M. Harris; The Penguin Dictionary of Architecture and Landscape Architecture by John Fleming; The Dictionary of Building Preservation edited by Ward Bucher; and Form, Space and Order by D.K. Ching.

APPENDIX V: NATIONAL REGISTER NOMINATION

BREARLEY HOUSE
PRESERVATION PLAN



UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICENATIONAL REGISTER OF HISTORIC PLACES
INVENTORY -- NOMINATION FORM

FOR NPS USE ONLY

RECEIVED JUL 2 1979

DATE ENTERED AUG 31 1979

SEE INSTRUCTIONS IN HOW TO COMPLETE NATIONAL REGISTER FORMS
TYPE ALL ENTRIES -- COMPLETE APPLICABLE SECTIONS**1 NAME**

HISTORIC BAKER-BREARLEY HOUSE

AND/OR COMMON

2 LOCATIONSTREET & NUMBER
Meadow Road*E of Lawrenceville pa*CITY, TOWN
Lawrenceville--- NOT FOR PUBLICATION
CONGRESSIONAL DISTRICT
4thSTATE
New JerseyVICINITY OF
034COUNTY
MercerCODE
021**3 CLASSIFICATION**CATEGORY
 DISTRICT PUBLIC BUILDING(S) STRUCTURE SITE OBJECT

OWNERSHIP

 PUBLIC PRIVATE BOTH

PUBLIC ACQUISITION

 IN PROCESS BEING CONSIDERED

STATUS

 OCCUPIED UNOCCUPIED WORK IN PROGRESS

ACCESSIBLE

 YES; RESTRICTED YES; UNRESTRICTED NO

PRESENT USE

 AGRICULTURE MUSEUM COMMERCIAL PARK EDUCATIONAL PRIVATE RESIDENCE ENTERTAINMENT RELIGIOUS GOVERNMENT INDUSTRIAL TRANSPORTATION MILITARY OTHER**4 OWNER OF PROPERTY**

NAME

Township of Lawrence

STREET & NUMBER

P. O. Box 6006

CITY, TOWN

Lawrenceville

VICINITY OF

New Jersey

STATE

08648

5 LOCATION OF LEGAL DESCRIPTION

COURTHOUSE,

REGISTRY OF DEEDS, ETC. County Clerk's Office, Mercer County Courthouse

STREET & NUMBER

South Broad and Market Streets

CITY, TOWN

Trenton, New Jersey

STATE

6 REPRESENTATION IN EXISTING SURVEYS

TITLE

DATE

--- FEDERAL --- STATE --- COUNTY --- LOCAL

DEPOSITORY FOR
SURVEY RECORDS

CITY, TOWN

STATE

7 DESCRIPTION

CONDITION		CHECK ONE	CHECK ONE
<input checked="" type="checkbox"/> EXCELLENT	<input type="checkbox"/> DETERIORATED	<input type="checkbox"/> UNALTERED	<input checked="" type="checkbox"/> ORIGINAL SITE
<input type="checkbox"/> GOOD	<input type="checkbox"/> RUINS	<input checked="" type="checkbox"/> ALTERED	<input type="checkbox"/> MOVED
<input type="checkbox"/> FAIR	<input type="checkbox"/> UNEXPOSED		DATE _____

DESCRIBE THE PRESENT AND ORIGINAL (IF KNOWN) PHYSICAL APPEARANCE

The Baker-Brearley House is a two and one half story center hall Georgian residence situated off Meadow Road in an open area. The structure is brick laid in Flemish bond on the principle facade with two interior end chimneys and a water table. The first floor windows have simple square wooden trim. A simple wooden cornice runs above the second floor windows. The front steps are no longer present and the door is not the original.

The east wall has the date of construction 1761, in glazed headers. There is evidence on the east wall of an addition. According to a local resident who lived in the house as a child, the addition was one and one half stories and constructed of brick. It contained a large fireplace and was most likely used as the kitchen with quarters for the slaves, which the original builder was known to have.

The foundation is random size dark shale, perhaps from the Carter Road, a Lawrence Township quarry, as no similar stone is present on the building site. The foundation is laid with mortar. The cellar floor is covered with brick. The oak, handhewn framing is in evidence in the cellar.

A center hall divides the symmetrically arranged four rooms of the first floor. Each room has a corner fireplace that backs the fireplace in the adjoining room. The house contains most of its fine Georgian paneling the best of which is located in the east rooms. The original chair railings are still in place. Much of the original hardware survives. The symmetry of the four rooms on the second floor has been somewhat altered by the introduction of a bathroom on the north side. The bedrooms on the south side have fireplaces but those on the north have none.

There are two modern sheds and a modern greenhouse on the property as well as the ruins of an earlier barn.

8 SIGNIFICANCE

PERIOD	AREAS OF SIGNIFICANCE -- CHECK AND JUSTIFY BELOW									
__PREHISTORIC	__ARCHEOLOGY-PREHISTORIC	__COMMUNITY PLANNING	__LANDSCAPE ARCHITECTURE	__RELIGION						
__1400-1499	<input checked="" type="checkbox"/> ARCHEOLOGY-HISTORIC	__CONSERVATION	__LAW	__SCIENCE						
__1500-1599	__AGRICULTURE	__ECONOMICS	__LITERATURE	__SCULPTURE						
__1600-1699	<input checked="" type="checkbox"/> ARCHITECTURE	__EDUCATION	__MILITARY	__SOCIAL/HUMANITARIAN						
__1700-1799	__ART	__ENGINEERING	__MUSIC	__THEATER						
__1800-1899	__COMMERCE	<input checked="" type="checkbox"/> EXPLORATION/SETTLEMENT	__PHILOSOPHY	__TRANSPORTATION						
__1900	__COMMUNICATIONS	__INDUSTRY	__POLITICS/GOVERNMENT	__OTHER (SPECIFY)						
		__INVENTION								

SPECIFIC DATES

BUILDER/ARCHITECT

STATEMENT OF SIGNIFICANCE

The Baker-Brearley House is a fine example in Lawrence Township of a mid-century Georgian country house. The glazed headed date in the gable end is a rare occurrence in North Jersey. The Brearley family was one of the earliest settlers of the area and represents a family that was politically active on the State and local level.

The Baker-Brearley House was constructed in 1761 as evidenced by the glazed header treatment in the gable end. This an embellishment that is more predominant in South Jersey and is rare north of Burlington County. There is, however, another example of this approximately two miles away. The John Rogers House, also dated 1761, is listed on the National Register. The Rogers House is more distinctive in treatment having a patterned brick work gable end wall and the initials of the builders also worked into the gable end. It is possible that the same master craftsman/architect was responsible for both of these houses. Given the southerly treatment, it is likely that the architect was from Burlington City.

It is unclear who was responsible for the construction of the house. A deed search does not clarify this point. The property on which the house is located was owned by John Brearley II, son of the first Brearley settler in the area. It is known that James Brearley, the son of John Brearley II lived in the house. Either James or John II was responsible for the construction of this house. The house became known as the Baker-Brearley House after James' son John married Matilda Baker.

The house is handsomely proportioned Georgian residence in brick. The exterior is simple, perhaps in keeping the Quaker beliefs. While the window glazing and a few first floor doors are Victorian alterations, the interior woodwork remains remarkable intact. The finest paneling in the east room. Raised paneling and heavy Georgian moldings surround each fireplace. The chair rails are still intact as are the second floor doors and most of the original floor boards.

John Brearley I first settled in the area, later to be known as Lawrence Township, in the early 1690's. The Brearley family members were involved in State and local politics, holding positions ranging from Overseer of the Roads to State Chief Justice.

The Baker-Brearley House has been acquired by the municipality. An interpretation master plan is being developed.

9 MAJOR BIBLIOGRAPHICAL REFERENCES

10 GEOGRAPHICAL DATA

ACREAGE OF NOMINATED PROPERTY 22.61

QUADRANGLE NAME Princeton

QUADRANGLE SCALE 1:24,000

A 1 1 8 | 5 | 2 5 | 1 4 0 | 4 4 | 6 0 | 1 7 0 |
 ZONE EASTING NORTHING

B 1 1 8 | 5 | 2 5 | 4 2 0 | 4 4 | 6 0 | 1 8 0 |
 ZONE EASTING NORTHING

C 1 1 8 | 5 | 2 5 | 6 3 0 | 4 4 | 5 1 9 | 9 3 0 |

D 1 1 8 | 6 6 | 2 0 0 | 4 4 | 5 1 9 | 8 8 0 |

E | | | | | | | | | | | | | | | | | | | | | |

F | | | | | | | | | | | | | | | | | | | | | |

G | | | | | | | | | | | | | | | | | | | | | |

H | | | | | | | | | | | | | | | | | | | | | |

VERBAL BOUNDARY DESCRIPTION

LIST ALL STATES AND COUNTIES FOR PROPERTIES OVERLAPPING STATE OR COUNTY BOUNDARIES

STATE CODE COUNTY CODE

STATE CODE COUNTY CODE

11 FORM PREPARED BY

NAME/TITLE George M. Gottuso Municipal Manager

(William McCrea, OHP, Trenton
609-292-2023)

ORGANIZATION

Township of Lawrence

DATE

March 13, 1979

STREET & NUMBER

Municipal Square, P.O. Box 6006

TELEPHONE

(609) 896-9400, Ext. 11

CITY OR TOWN

Lawrenceville

STATE

New Jersey

12 STATE HISTORIC PRESERVATION OFFICER CERTIFICATION

THE EVALUATED SIGNIFICANCE OF THIS PROPERTY WITHIN THE STATE IS:

NATIONAL _____ STATE _____ LOCAL X

As the designated State Historic Preservation Officer for the National Historic Preservation Act of 1966 (Public Law 89-665), I hereby nominate this property for inclusion in the National Register and certify that it has been evaluated according to the criteria and procedures set forth by the National Park Service.

Deputy

STATE HISTORIC PRESERVATION OFFICER

John J. Wilson

6-19-79

FOR NPS USE ONLY

TITLE Deputy Commissioner, Department of Environmental Protection, June 19, 1979

I HEREBY CERTIFY THAT THIS PROPERTY IS INCLUDED IN THE NATIONAL REGISTER

Frederic Carl Shull

DATE

8-31-79

ATTEST: *W. J. Beebe*

KEEPER OF THE NATIONAL REGISTER

DATE August 31, 1979

CHIEF OF REGISTRATION

FHR-8-300A
(11/78)

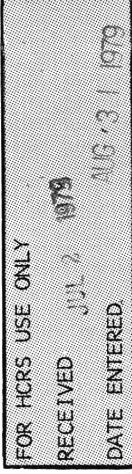
UNITED STATES DEPARTMENT OF THE INTERIOR
HERITAGE CONSERVATION AND RECREATION SERVICE

NATIONAL REGISTER OF HISTORIC PLACES INVENTORY -- NOMINATION FORM

Baker-Brearley House
Lawrence Township
Mercer County
New Jersey 034

CONTINUATION SHEET

ITEM NUMBER 9 PAGE 1



BIBLIOGRAPHICAL REFERENCES:

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FHR-8-300A
(11/78)

UNITED STATES DEPARTMENT OF THE INTERIOR
HERITAGE CONSERVATION AND RECREATION SERVICE

**NATIONAL REGISTER OF HISTORIC PLACES
INVENTORY -- NOMINATION FORM**

Baker-Brearley House
Lawrence Township
Mercer County

New Jersey
CONTINUATION SHEET

FOR HCPS USE ONLY
RECEIVED JUL 2 1979
DATE ENTERED AUG 31 1979

ITEM NUMBER 10 PAGE 1

TRACT 1

DESCRIPTION OF BAKER-BREARLEY HOUSE TRACT

Beginning at a point in the center line of Meadow Road the following courses and distances from the intersection of the Center line of Meadow Road with the southeasterly line of Princeton Pike a) N82°33'42"E 620.74 feet to a point thence b) N81°49' 24"E 417.75 feet to a point thence c) N81°56' 57"E 504.61 feet to the point of beginning and running thence:

1. N81°56'57"E 400 feet to a point thence:
2. S38°25'56" 592.55 feet to a point thence:
3. N86°37'35"E 176.42 feet to a point thence:
4. N84°23'08"E 35 feet more or less to the center of the Shipetaukin Creek thence:
5. S45°36'52"E along or near the center of the Shipetaukin Creek, 230 feet more or less to a point thence:
6. S7°36'52"E along the same, 60 feet more or less to a point thence:
7. S19°23'08"W along the same, 70 feet more or less to a point thence:
8. S3°36'52"E along the same, 55 feet to a point thence:
9. S81°56'57"W 756.86 feet to a point thence:
10. N24°12'48"W 922.80 feet to the point and place of beginning.

Containing 12.34 Ac. ±

FHR-8-300A
(11/78)

UNITED STATES DEPARTMENT OF THE INTERIOR
HERITAGE CONSERVATION AND RECREATION SERVICE

**NATIONAL REGISTER OF HISTORIC PLACES
INVENTORY -- NOMINATION FORM**

Baker-Brearley House
Lawrence Township
Mercer County
New Jersey 034

CONTINUATION SHEET

ITEM NUMBER 10

PAGE 2

FOR HCBS USE ONLY

RECEIVED JUL 2 1979

DATE ENTERED AUG 3 1 1979

TRACT 2

DESCRIPTION OF BAKER-BREARLEY HOUSE TRACT

Beginning at a point in the center line of Meadow Road the following courses and distances from the intersection of the center line of Meadow Road with the Southeasterly line of Princeton Pike a) N82°33'42"E 620.74 feet to a point thence b) N81°49' 24"E 417.75 feet to a point of beginning and running thence:

1. N81°56'57"E along the center line of Meadow Road 504.61 feet to a point thence:
2. S24°12'48"E 922.80 feet to a point thence:
3. N81°56'57"W 504.61 feet to a point thence:
4. N24°12'48"W 922.80 feet to the point and place of beginning.

Containing 10.27 Ac. ±

Property Baker - Breasley House

State N.J. (manor) Working Number 7-2-79-1603

Roll # 79001479

TECHNICAL

CONTROL

Photos 3

Maps 1

OK 7.9.79

HISTORIAN

ARCHITECTURAL HISTORIAN

Guided visit of mid 18th c. Georgian
manor house. ~~Architectural~~ Associated with early
Georgian. Significant in context of manor to J.
Study in design, but fairly good examples features excavation has
excavation construction section use Reservations to admission of
planets.

ARCHEOLOGIST

OTHER

HAER

Inventory _____

Review _____

REVIEW UNIT CHIEF

BRANCH CHIEF

KEEPER

National Register Write-up _____

Federal Register Entry _____

Send-back _____

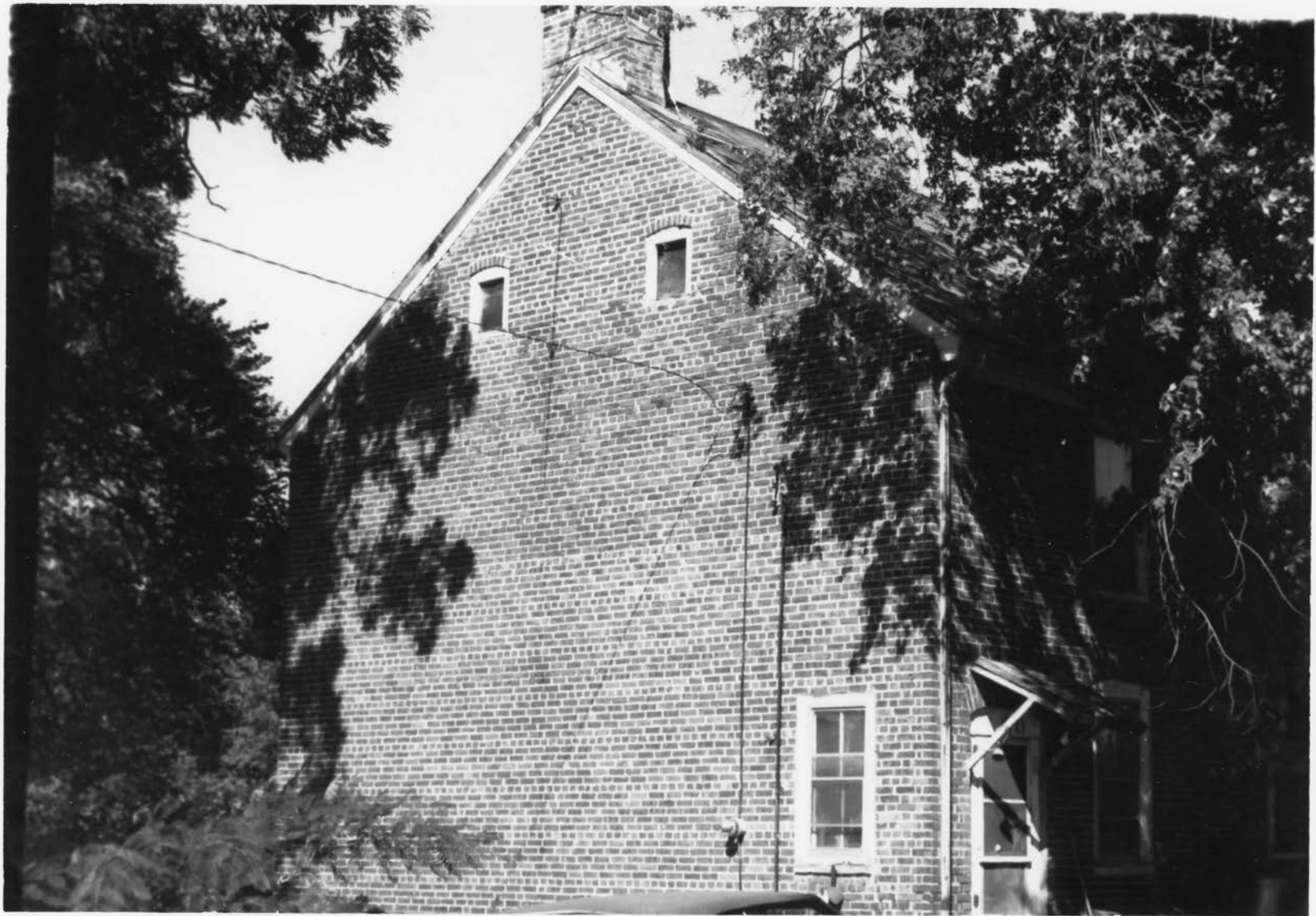
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Entered AUG 31 1979

10-2-79

United States Department of the Interior - Heritage Conservation and Recreation Service









STATE OF NEW JERSEY
DEPARTMENT OF ENVIRONMENTAL PROTECTION
TRENTON, NEW JERSEY

DANIEL J. O'HERN
COMMISSIONER

JUN 19 1979



Dr. William Murtagh
Keeper of the National Register
Heritage Conservation and Recreation
Service
Department of the Interior
18th and C Streets, N.W.
Washington, D.C. 20243

Dear Dr. Murtagh:

I am pleased to nominate the Baker-Brearley House, Lawrence,
Mercer County to the National Register.

This nomination has received the majority approval of the State
Review Committee for Historic Sites.

Should you want any further information concerning this
application, please feel free to contact the staff of the Office
of Historic Preservation, Department of Environmental Protection,
109 West State Street, Trenton, New Jersey 08625, telephone (609)
292-2023.

Sincerely,

Betty Wilson
Betty Wilson
Deputy State Historic
Preservation Officer

ENTRIES IN THE NATIONAL REGISTER

STATE NEW JERSEY

Date Entered AUG 31 1979

<u>Name</u>	<u>Location</u>
Baker-Brearley House	Lawrenceville vicinity Mercer County
Richards, Samuel, Hotel	Mays Landing Atlantic County

Also Notified

Honorable Harrison A. Williams, Jr.

Honorable Bill Bradley

Honorable Frank Thompson, Jr.

Honorable William J. Hughes

State Historic Preservation Officer
Mr. Daniel J. O'Hern
Commissioner
Department of Environmental Protection
P.O. Box 1420
Trenton, New Jersey 08625

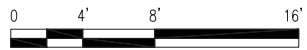
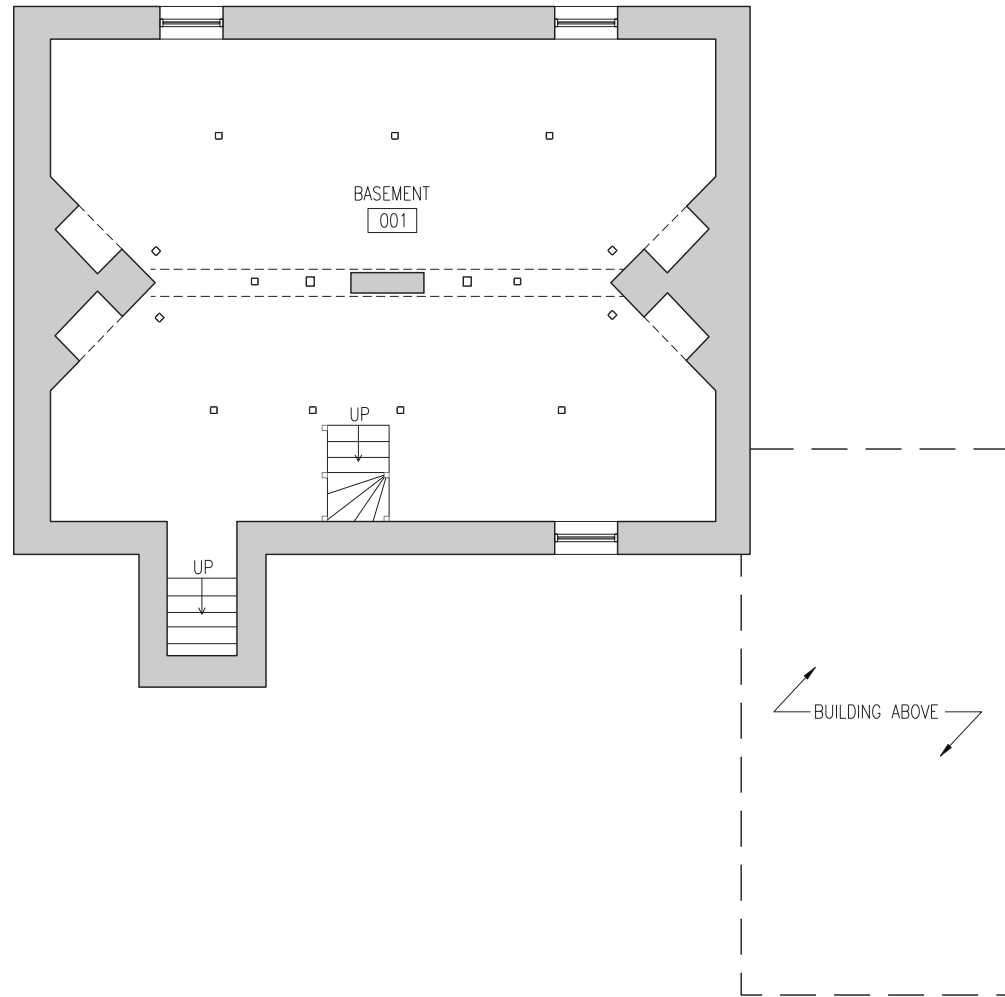
NR Byers/bjr 9/5/79

For further information, please call the National Register at (202)343-6401.

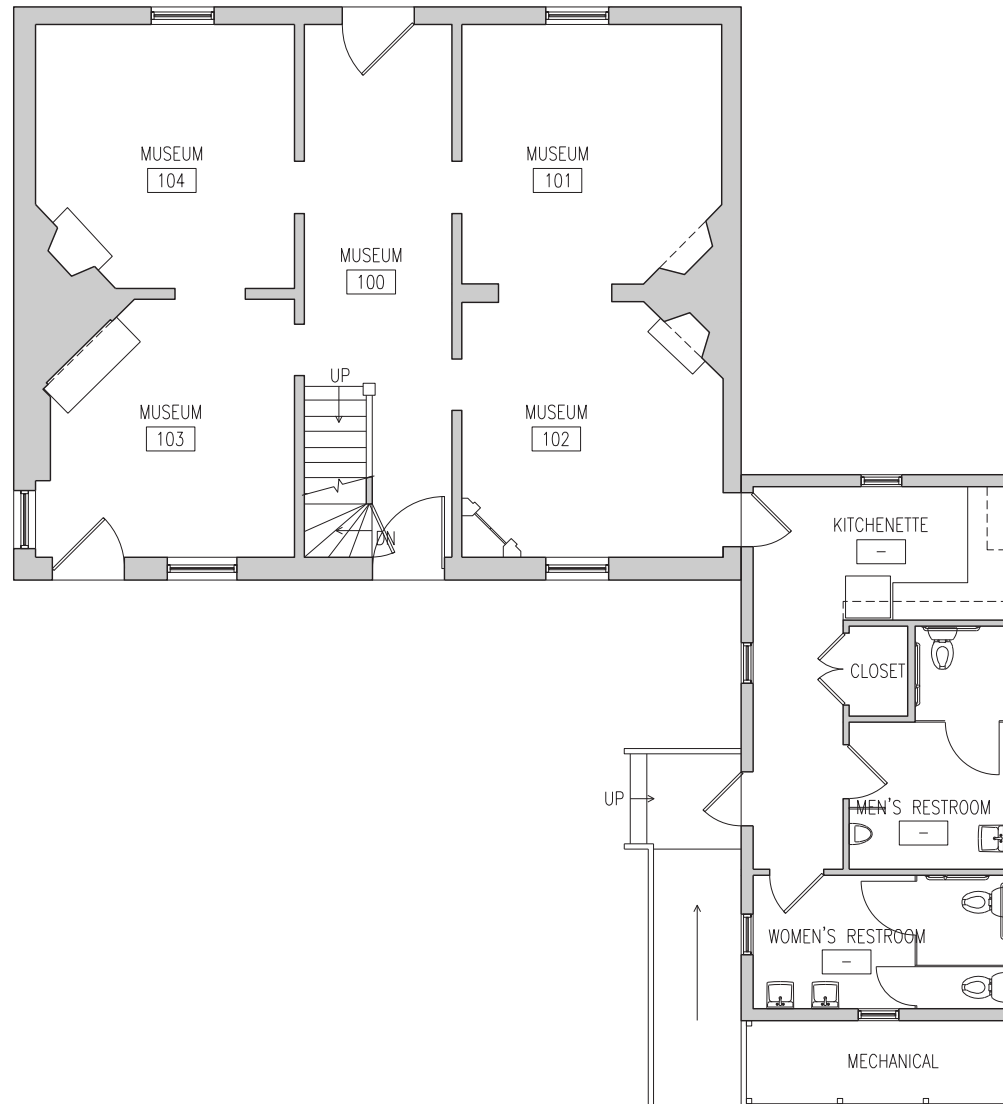
APPENDIX VI: ARCHITECTURAL DOCUMENTATION

BREARLEY HOUSE PRESERVATION PLAN

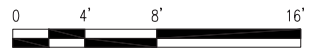
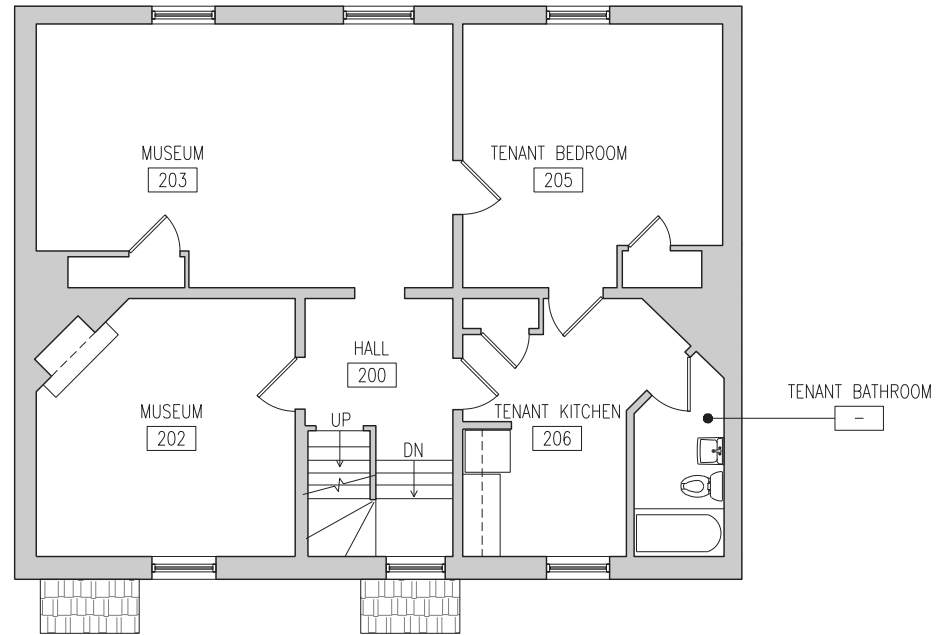




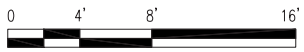
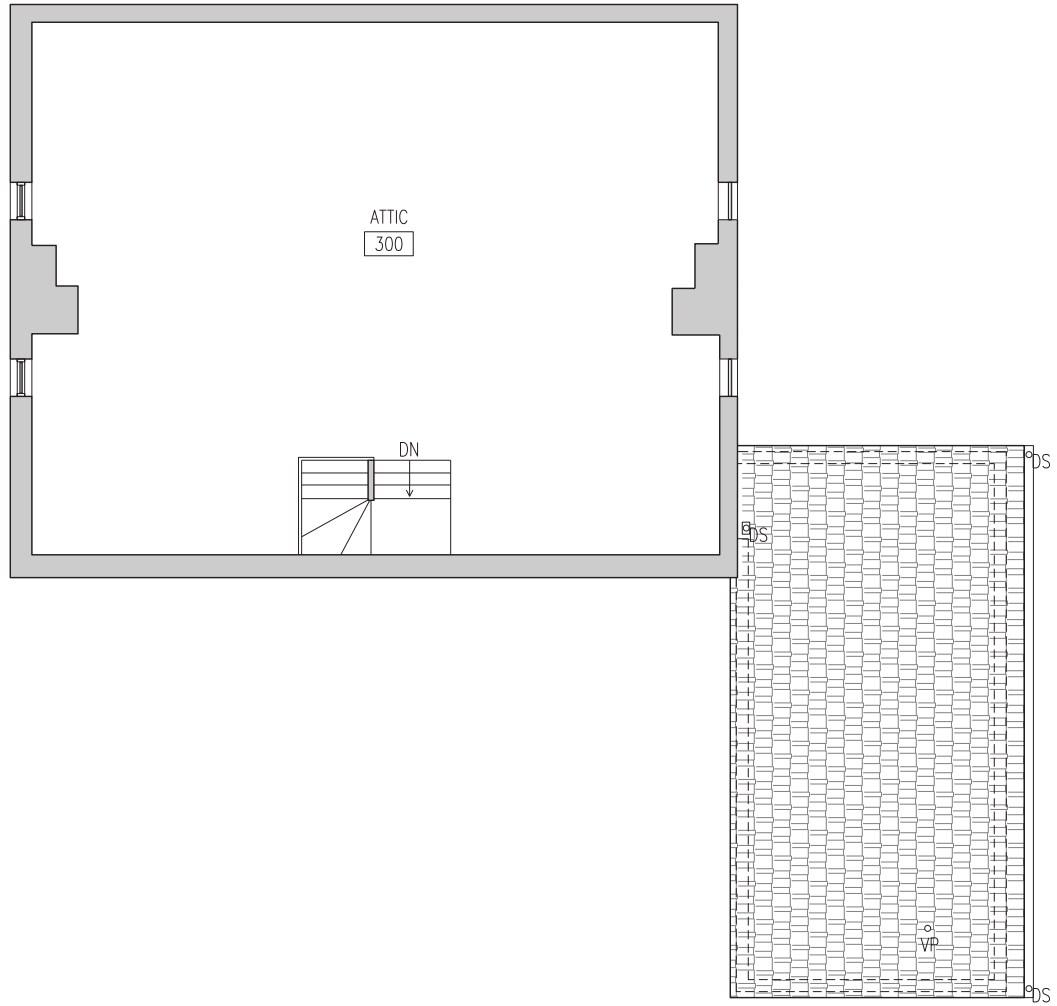
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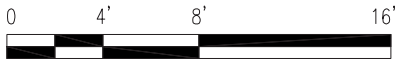
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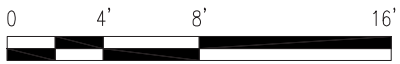
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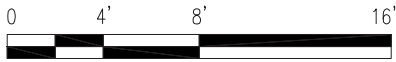
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SOUTH ELEVATION



EAST ELEVATION

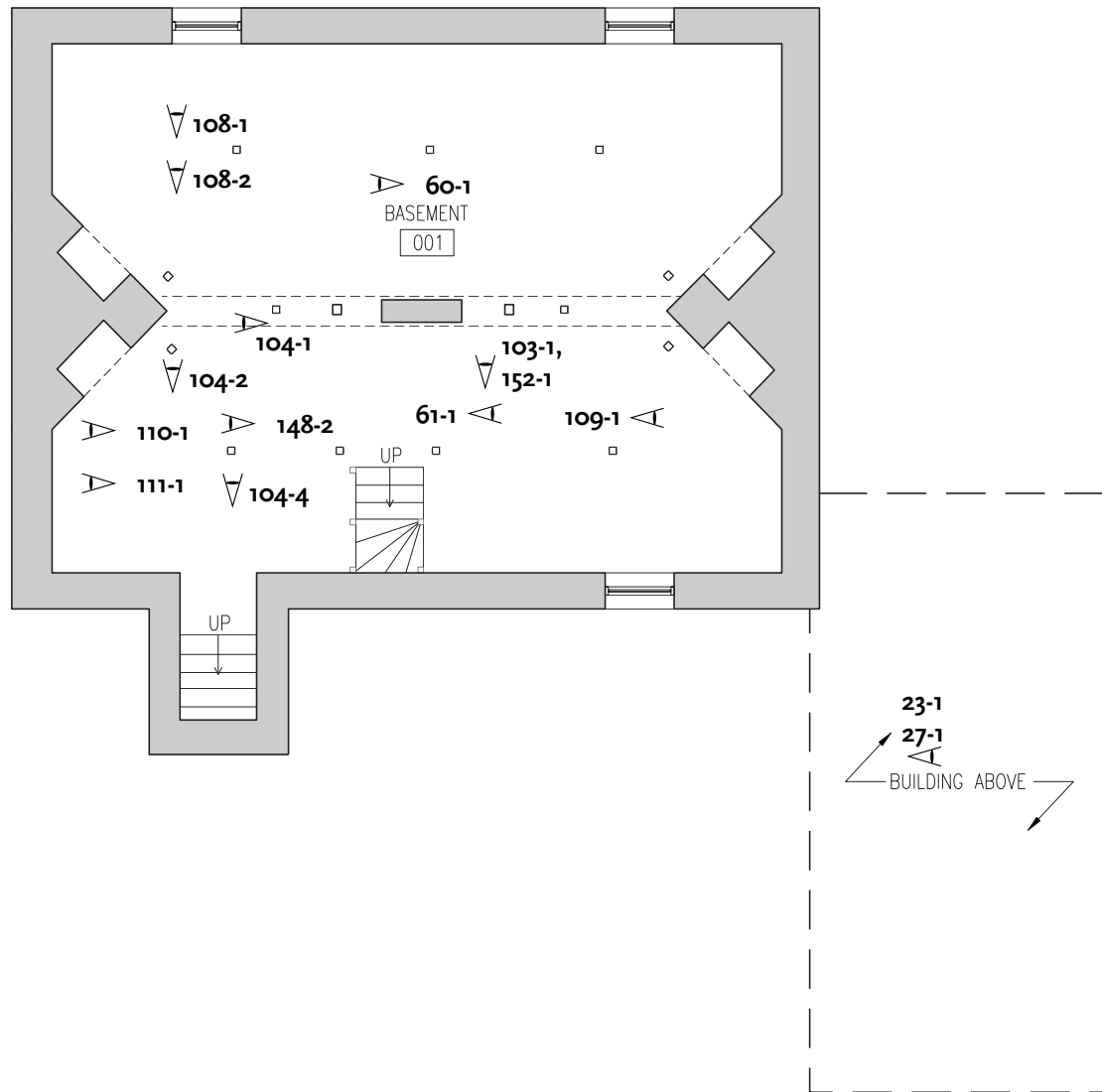


NORTH ELEVATION

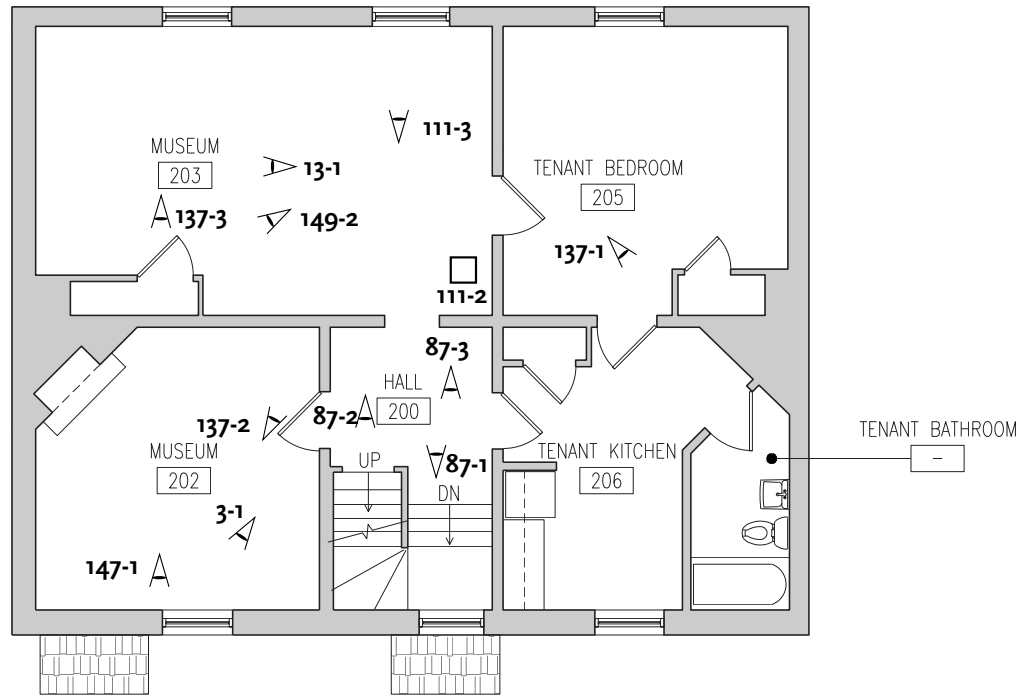
APPENDIX VII: PHOTOGRAPH APPENDIX

BREARLEY HOUSE PRESERVATION PLAN

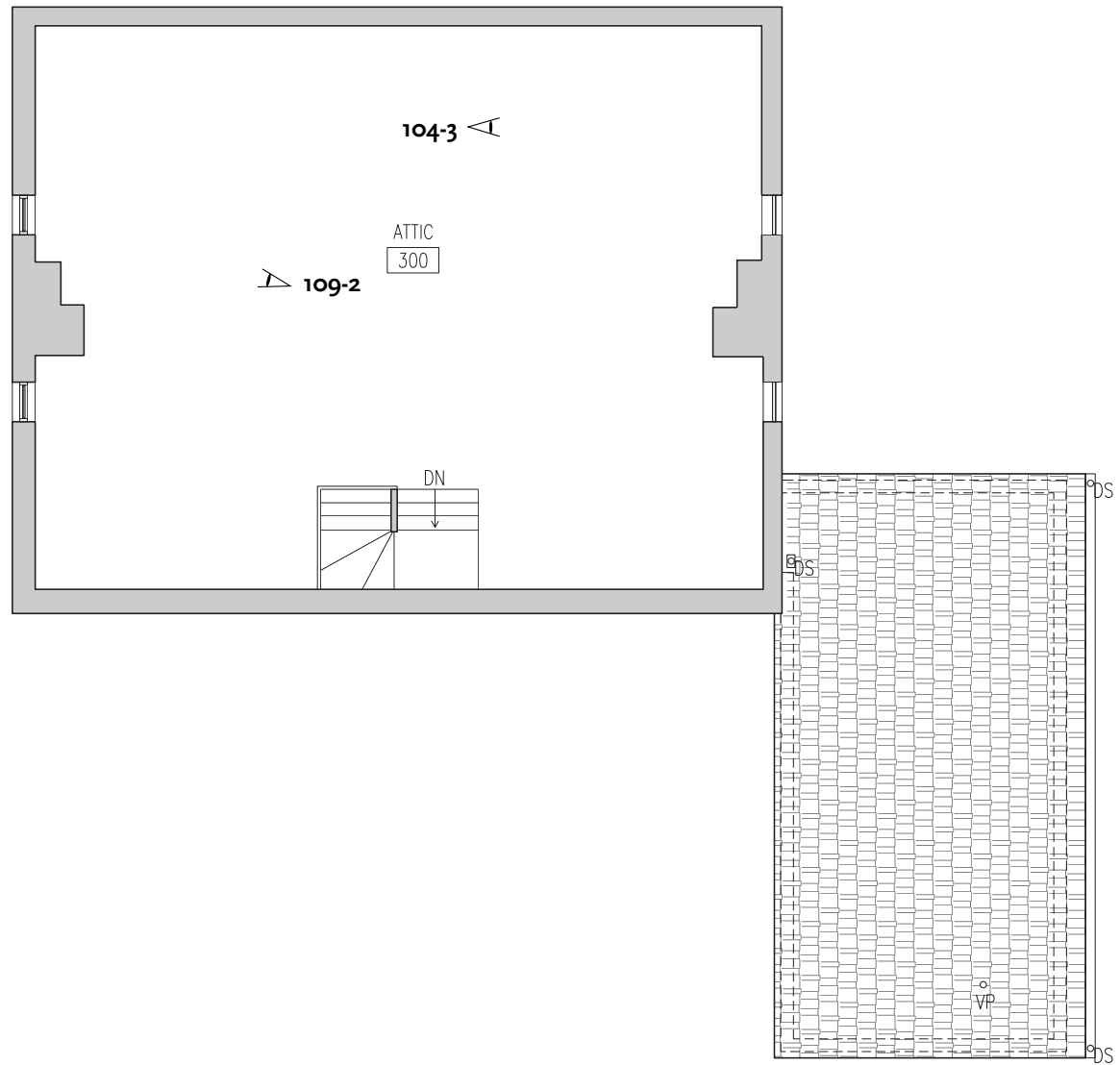




BASEMENT



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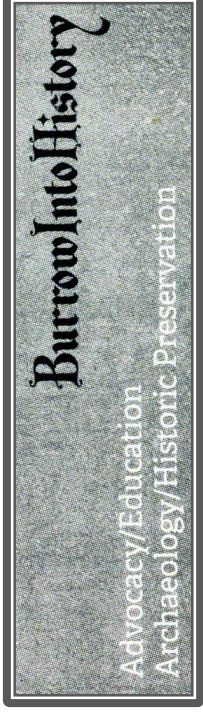


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APPENDIX VIII: ARCHAEOLOGICAL REPORT

BREARLEY HOUSE
PRESERVATION PLAN





**BREARLEY HOUSE
LAWRENCE TOWNSHIP
MERCER COUNTY
NEW JERSEY
PRESERVATION PLAN**

ARCHAEOLOGICAL MANAGEMENT PLAN COMPONENT

Submitted to:

Clarke Caton Hintz
100 Barrack Street,
Trenton, NJ 08608

Submitted by:

Ian Burrow, Ph.D. RPA
BurrowIntoHistory LLC
114 Taylor Terrace
Hopewell, NJ 08525

609-462-2363
burrowintohistory@gmail.com

May 2023 (revised July 2023)

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Previous Archaeological Work: Review and Synthesis
Archaeological Sensitivity Zones and Policies, and Implementation
References
Appendix A: Qualifications of Plan Preparer

PURPOSE AND SCOPE

This Archaeological Management Plan forms an integral part of the Preservation Plan for the Brearley House in Lawrence Township, Mercer County, New Jersey. It has been prepared to meet the standards for such plans set out in the document *Archaeological Requirements* of the New Jersey Historic Trust (www.njht.org). It identifies zones of archaeological sensitivity in the immediate vicinity of the standing 1761 house, reflecting the scope of the Preservation Plan. It is not intended to address archaeological issues on the Brearley House property as a whole.

The objective of this plan is to provide clear guidance on the responsible long-term management of the significant archaeological resources associated with the Brearley House. It achieves this objective by setting out policies for the treatment of the identified zones of archaeological sensitivity.

The preservation of a historic structure like the Brearley House may on occasion require disturbance of the ground in and around it. This in turn may adversely affect significant archaeological resources pre-dating, contemporary with, or later than the standing structure. In the case of the Brearley House, these resources are quite well understood as a consequence of extensive archaeological work undertaken in 1996 and 1998-2005.

The plan sets out procedures to be followed when planning for necessary ground disturbance in the defined zones around the house. The first option must be to minimize this disturbance as far as possible.

It is strongly recommended that all disturbance be avoided in the Archaeology Preservation Zone on the north side of the house. This area contains a rare undisturbed New Jersey example of a house cellar dating to around 1700 or a little earlier. This has important research potential, as well as being a potential focus of public archaeology programming in fulfillment of the mission of the Lawrence Historical Society.

In the other zones there is a requirement to undertake professional archaeological excavation in advance of the ground disturbance. There are provisions for addressing discoveries of unanticipated significance.

For the remainder of the property, the reader is referred to Burrow, Ian and Joshua Butchko 2016: *Three Houses and Three Thousand Years: Archaeological Research at the Brearley House, Lawrence Township, Mercer County New Jersey!*

i Copies of the report are on file at the following locations:

Township of Lawrence
Lawrence Historical Society
Lawrence Township Board of Education
New Jersey Historic Trust
Historic Preservation Office, New Jersey Department of Environmental Protection

PREVIOUS ARCHAEOLOGICAL WORK: REVIEW AND SYNTHESIS

The 1761 Brearley House in Lawrence Township, Mercer County, New Jersey, is one of the most northerly examples of the distinctive group of patterned brick Georgian and pre-Georgian vernacular houses characteristic of the area of the Quaker settlement of West Jersey from Salem northward to the Falls of the Delaware at Trenton. The house is owned by the Township of Lawrence and operated by the Lawrenceville Historical Society as an interpreted historic site.

In 1996, exploratory archaeological excavations were mandated by the building's listing on the State Register of Historic Places, and by anticipated funding from the New Jersey Historic Trust for the planned restoration of the house. This work identified portions of the foundations of a former attached kitchen wing and located other well-preserved archaeological resources (Hunter Research, Inc. 1997).

Major archaeological research took place from 1998 to 2005 and is fully reported in Burrow and Butchko 2016. The work fell into two parts. Firstly, extensive investigations took place around the house in 1999 in order to evaluate more fully, and then document, the archaeological resources around the house. These resources were impacted, to varying degrees, by the restoration program and by plans to construct a service wing on the footprint of the former kitchen.

The key historic discoveries were of two possible predecessors of the 1761 house: a basemented structure of perhaps before 1700, and a stone foundation which may date to before 1722. To the south of the house lies a prehistoric site used over a long period, showing evidence for a range of activities, including the manufacture of bifacial tools made of argillite. Its location, like that of the later historic occupation, probably reflects the presence of a rich variety of animal and plant resources in the extensive wetlands and meadows to the east.

The second component of the research took the form of an educational enrichment program for the 8th Grade of the Lawrence Public Schools, funded by the Lawrence Education Foundation. Following a small pilot program in 1998, twice-yearly programs involving the entire 8th grade class were held from 1999 to 2005. About 1800 students participated in the project over this time period. The primary focus of the program was on the archaeological survey of the grass meadow surrounding the house. This was achieved firstly by a shovel testing program which covered the greater part of the meadow, and then by the excavation of 1500 square feet of excavation units in an area of dense prehistoric occupation south of the house. Students undertook all the main tasks associated with these investigations, and also participated in other activities both in class and on site.

Several significant discoveries were made around the 1761 house (Figure A-1). First among these was the identification of a previously unknown infilled cellar or basement, estimated to be 20 feet square (Figure A-2). This lies close to the north wall of the standing house. Limited excavation suggested that the feature had been abandoned early in the 18th century, a conclusion

chiefly based on the recovery of a complete English clay tobacco pipe bowl of c.1700 within the fill. It is tentatively concluded that this feature formed part of the primary house on the property, perhaps built by John Brearley I shortly before 1700.

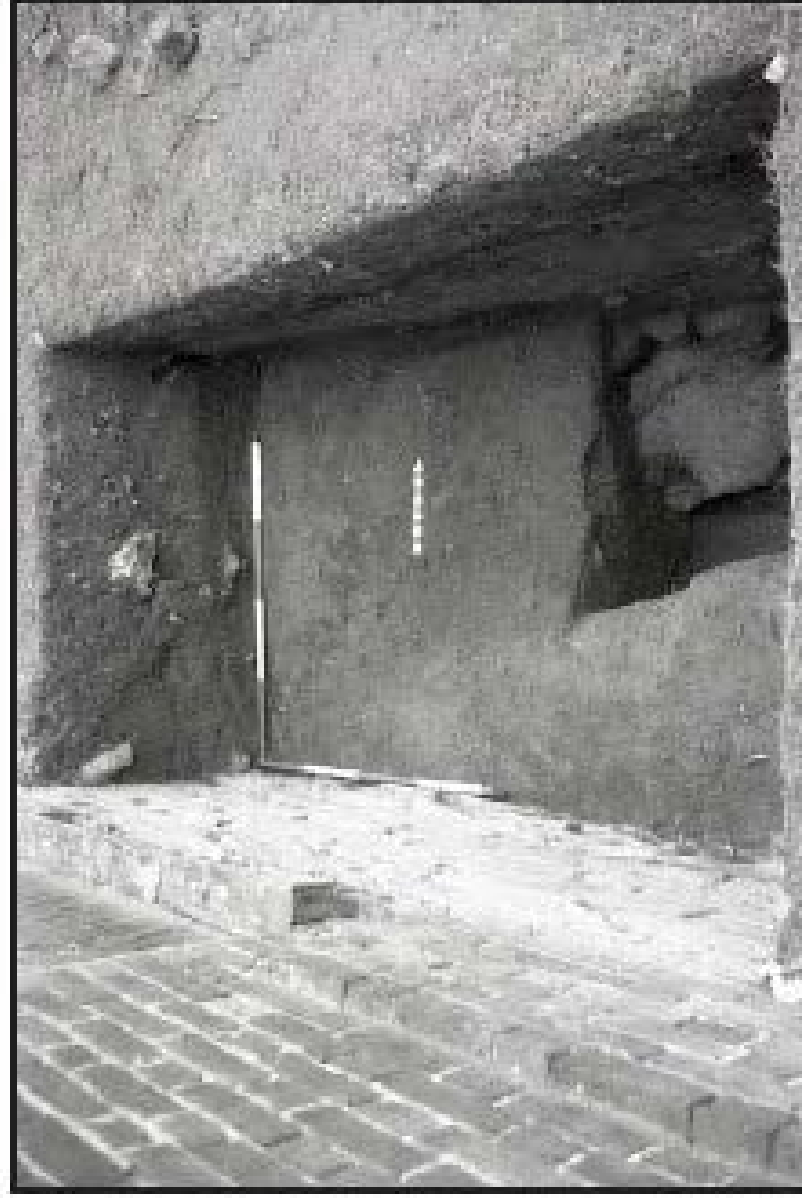


Figure A-2. The southern part of the cellar-hole of the c.1700 house on the north side of the 1761 brick house, as excavated in 1999. The view faces west. The north foundation of the 1761 house is on the left. The small north arrow/photo scale lies on the unexcavated dark soil filling the cellar hole. At the bottom right the dark soil has been partially removed, defining the southern side of the cellar-hole. A mass of clay loam and cobbles lies within the cellar-hole fill. See Figure A-1 for location. Source: Burrow and Butchko 2016, Plate 3.8.

Excavations on the southeast side of the 1761 house confirmed that a one and a half story framed kitchen wing, on a stone foundation, had been added to the house in the late 18th or early 19th century, accessed through a new doorway opened through the southern end of the east gable wall. The primary portion of the kitchen was 15 by 20 feet and was equipped with a large cooking fireplace and bake oven. A 10 foot-long addition, probably a single story lean-to, was subsequently built at the southern end. An oral account indicates that the kitchen wing was torn down in the 1920's.

Partially incorporated into the kitchen structure were the fragments of an earlier stone foundation. This was associated with areas of cobbling and patches of occupation soil. The latter yielded a British Farthing coin of 1735, suggesting that the building dates to the first half of the 18th century. A very tentative reconstruction posits this as a two-section house, perhaps 40 feet long and 12 feet wide, on the same alignment as the 1761 house and about 12 feet to the south of it. It is possible that these remains are those of the "Mansion House" which was on the property by 1722.

Excavations in the 1761 house basement were uninformative. Monitoring observations of contractor's excavations west of the west gable identified stone walling, a barrel and a pit, but these features cannot be interpreted without additional controlled archaeological investigations.

The historic artifact assemblage of over 7700 artifacts was heavily dominated by ceramics and glass vessel fragments. Most of the diagnostic material dates to after c. 1760, but an unknown percentage of the c.1000 red earthenware ceramics may be earlier than this and relate to the first generation Brearley occupation of the site.

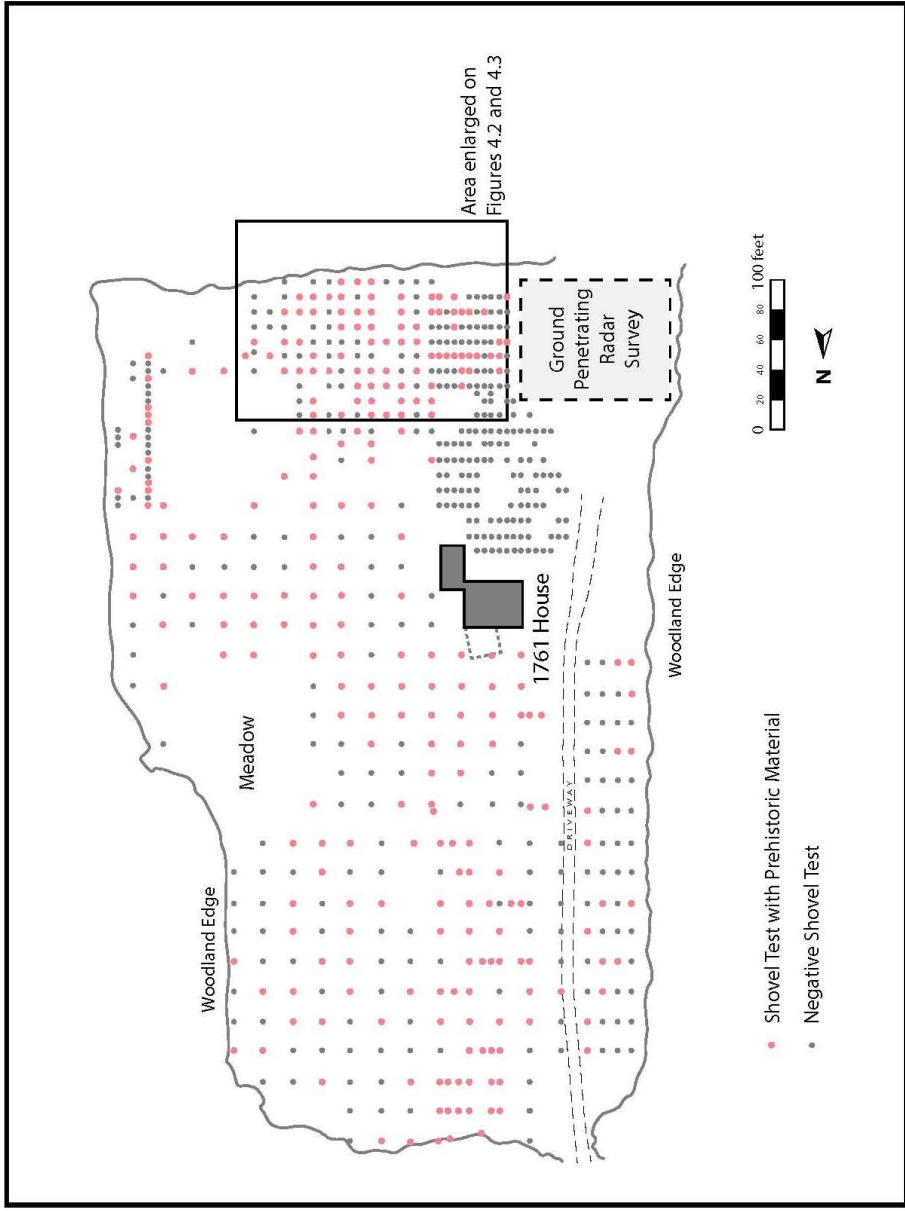
The shovel-testing program recovered prehistoric material from many locations across the meadow, but there was a clear concentration of artifacts at the southern end (Figure A-3). From 2001 through 2005 work was therefore concentrated on excavation of the O and Ap horizons in five-foot-by-five-foot units here, with some limited penetration of the B horizon. Features were identified in the B horizon in several units, but these were left in place since they were considered too challenging for the 8th grade program.

A range of past human activities is discernible in the archaeological record. The manufacture and maintenance of stone tools was clearly taking place, and certainly argillite cobbles were being reduced on site and formed into bifaces, some of which were probably cached for later recovery and completion. The use of heated rocks for a variety of food preparation activities, including boiling of food in water in containers or perhaps in lined pits, seems certain. The presence of ceramic containers is a likely indicator of the presence of women, as may be the recovery of nutting stones (suggesting fall occupation?) and scrapers.

The datable artifacts suggest that the site area was frequented from at least 1600 BC, and possibly earlier, well into the Late Woodland period and even beyond. There is a possibility that

there may have been some overlap between the last Indian occupation and the settlement of the Brearleys, although there is no direct evidence for this.

The artifacts and records from the archaeological project are currently (2023) stored in the attic of the kitchen wing.



4.1. Map of Shovel Testing 1998-2000. See Figures 4.2 and 4.3 for details of units excavated 2000-2005 within inset. Shovel tests producing prehistoric material are indicated.

Figure A-3.

**BREARLEY HOUSE, LAWRENCE TOWNSHIP, NJ
PRESERVATION PLAN
ARCHAEOLOGICAL MANAGEMENT:
SENSITIVITY ZONES AND POLICIES**

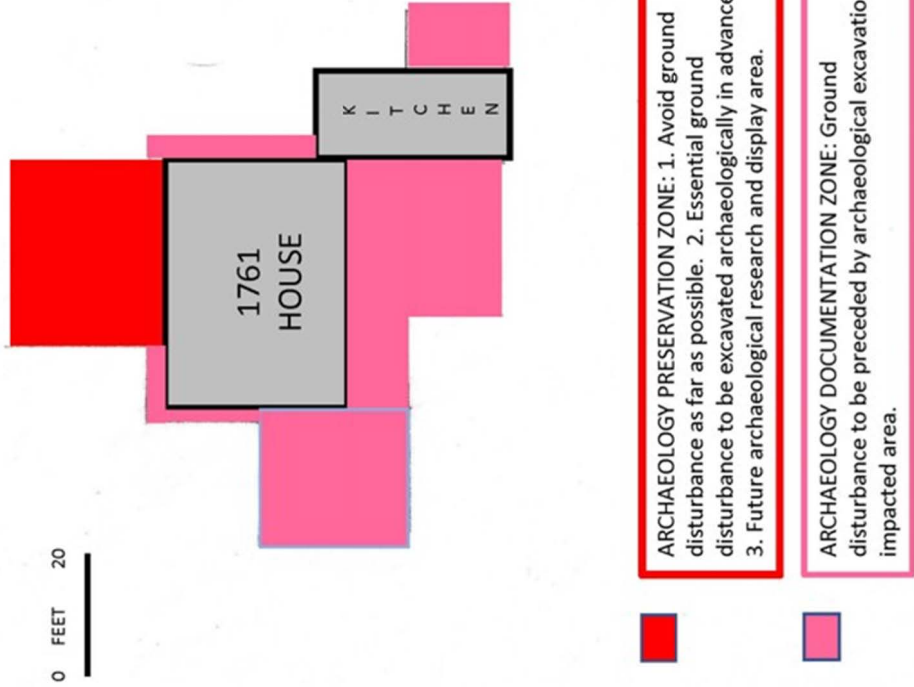


Figure A-4.

**ARCHAEOLOGICAL SENSITIVITY ZONES, POLICIES AND IMPLEMENTATION
(Figure A-4)**

It is assumed that all activities envisaged in this section are “encroachments” under the New Jersey Register of Historic Places Act of 1970.

Encroachments are defined as:

“ those undertakings which adversely affect listed properties. An effect occurs when an undertaking impacts the historic characteristics for which a property is listed in the New Jersey Register ”. <https://www.nj.gov/dep/hpo/2protection/njrreview.htm>

They will therefore require prior review and authorization under the New Jersey Register of Historic Places Act of 1970 (N.J.A.C. 7:4-7.1 (d)).

All archaeological work will be undertaken under the direct supervision of an individual who meets or exceeds the Secretary of the Interior’s Professional Qualifications Standards for Archaeology (36 CFR Part 61 and <https://www.nps.gov/articles/sec-standards-prof-quals.htm>). The individual will also be a Registered Professional Archaeologist in good standing (<https://rpanet.org>).

ARCHAEOLOGY PRESERVATION ZONE (Red)

This is an area 25 feet north-south by 30 feet east west against the north wall of the 1761 House. It encompasses the area of the c. 1700 filled-in cellar hole, which is assumed to be the first Brearley House. The emphasis here is on reducing ground disturbance to a minimum in order to conserve the archaeological remains.

1. Avoid ground disturbance as far as possible. Ground disturbance should only take place when it is absolutely essential for the stability and preservation of the 1761 building, and after other alternatives have been considered. It is envisaged that this would mean only disturbance immediately alongside the foundation.
2. Such essential ground disturbance will be preceded by prior archaeological excavation of the impacted area. Such archaeological excavation will be part of the overall cost of the specified work and will be budgeted accordingly.
3. This zoning also envisages future archaeological research and possibly the display and interpretation of historic features. Such research will meet the standards and guidelines of the State of New Jersey and the National Park Service.

ARCHAEOLOGY DOCUMENTATION ZONES (Pink).

Remaining archaeologically sensitive areas around the house and the kitchen have this designation.

In these zones, ground disturbances deemed necessary for the preservation management of the property will be preceded by prior archaeological excavation of the impacted area. Such archaeological excavation will be part of the overall cost of the specified work and will be budgeted accordingly.

UNANTICIPATED DISCOVERIES

It is assumed that the above procedures and policies will be sufficient to address the adverse effects of approved encroachments in the great majority of cases. However, it remains possible that resources may be encountered, such as human remains, which would require additional treatment, including modification of the encroachment. While this is considered unlikely, it remains a possibility.

NOTE ON ARCHAEOLOGICAL MONITORING DURING GROUND DISTURBANCE.

Because of the State Register Status of the property and high significance of the archaeological resources, archaeological monitoring during ground disturbance is not an acceptable stand-alone treatment. However, such monitoring may be recommended as a final stage following documentation which has already been carried out under the policies for the Preservation and Documentation Zones. It may be required if there are specific remaining questions which could not be fully addressed during documentation, and which can be readily answered through observation of ground disturbance by others.

IMPLEMENTATION

In order to ensure that the provisions of this archaeological management plan are followed as part of the overall preservation of the site, the following are strongly recommended.

1. The archaeological sensitivity zones defined on Figure A-4 will be marked on all plans, surveys or other graphics prepared for architectural, landscaping, utility or other work at the Breatley House.
2. The sponsor of any such work will ensure that archaeological resources are fully taken into account during planning, implementation and construction, and that contractors and subcontractors are fully aware of their responsibilities.
3. Time for archaeological work will be included in work schedules and timelines as necessary to ensure efficient workflow.
4. Ground disturbance of the Archaeology Preservation Zone is to be avoided wherever possible.
5. The costs of professional archaeological services will be included in all project budgets as necessary.

REFERENCES

- Burrow, Ian and Joshua Butchko
2016. *Three Houses and Three Thousand Years: Archaeological Research at the Brearley House, Lawrence Township, Mercer County New Jersey*. On file, New Jersey State Historic Preservation Office, Trenton and other repositories.
- Hunter Research, Inc.
1997. *Archaeological Excavations at the Baker-Brearley House, Township of Lawrence, Mercer County New Jersey*. On file, New Jersey State Historic Preservation Office, Trenton.
- Short and Ford Architects
1990. *Baker-Brearley House, Lawrence Township, Mercer County New Jersey: Historic Structure Report*. On file, Township of Lawrence.

APPENDIX A: QUALIFICATIONS OF PLAN PREPARER

Ian Charles Burrow, Ph.D., FSA (retd.)
 BurrowIntoHistory LLC
 Registered Professional Archaeologist 10267
 114 Taylor Terrace
 Hopewell, NJ 08608
 Email BurrowIntoHistory@gmail.com
 Phone 609-462-2363

QUALIFICATIONS

- Over forty years of professional experience in cultural heritage management in the United Kingdom and the United States.
- Active participation in national professional organizations concerned with CRM in both countries (American Cultural Resources Association [past-President and Vice-President for Government Relations], the Register of Professional Archaeologists [past-President], and the UK Association of County Archaeologists [Chair 1984-86].
- Experience in working with individuals in both Executive and Legislative branches of government in Washington D.C.
- Familiarity with operation of Historic Preservation programs at all levels of government and in the non-profit/advocacy setting
- Business Partner in for-profit cultural resource management company from 1991 to 2015
- Extensive network of contacts within the cultural resource management industry and with historic preservation organizations.
- Owner of BurrowIntoHistory LLC, established August 2015
- Registered Professional Archaeologist 10267
- Experience in all aspects of archaeological research, fieldwork, analysis, reporting and publication
- Rapid and accurate synthesizer and communicator of complex information
- Excellent writing skills
- Effective public speaker and presenter to all audiences

EDUCATION

Ph.D., History and Archaeology, University of Birmingham, England, 1979

B.A., History and Archaeology, University of Exeter, England, 1971

ELECTED AND APPOINTED POSITIONS IN HISTORIC PRESERVATION AND RELATED AREAS

- 2017- Advisory Board Member, Stoutsburg-Sourland African-American Museum, Skillman, New Jersey
- 2019-2022 New Jersey Historic Trust: Consulting Services relating to archaeological provisions in grants under the New Jersey Register of Historic Place Act of 1970
- 2016-2023 Board Member and Trustee, the Hopewell Museum, Hopewell Museum (Non-profit museum) .
- 2015-2017 Steering Committee member, *Preservation50* (a national association of organizations, government agencies, foundations, corporations, and other entities celebrating, promoting, and building on the 50th anniversary of the National Historic Preservation Act of 1966: www.preservation50.org)
- 2012-2016 Vice-President for Government Affairs, American Cultural Resources Association (national association of for-profit cultural resource management companies: www.actra-crm.org)
- 2010-2012 President, Register of Professional Archaeologists (national accreditation register for professional archaeologists: www.rpanet.org)
- 2007 Appointed Panel Member, The White House *Preserve America Summit*, New Orleans 2007,
- 2004-2005 President, American Cultural Resources Association
- 2002-2011 Friends of the New Jersey State Museum (Trustee 2002-2011; Vice President 2009-2011)
- 2002-2005 New Jersey Historical Commission. Grants Review Panel Member
- 1984-1986 Chair, Association of County Archaeological Officers, UK

PROFESSIONAL EXPERIENCE AND CAREER

- 2015- Founder and Owner of BurrowIntoHistory, LLC, providing advocacy and education in Historic Preservation and Archaeology
- 1988-2015 Vice President and Principal Archaeologist
Hunter Research, Inc., Trenton, NJ
- Vice President and stockholder of firm providing archaeological and historical research, survey, excavation, evaluation, report preparation and public outreach services in the Northeastern United States. Responsible for:
Project management, budgeting and scheduling
Technical and synthetic writing

Proposal preparation, contract negotiation and management
Hiring and supervision of personnel
Supervision of research, fieldwork, analysis and report preparation
Development of public outreach initiatives
Design and Oversight of internship program
Company safety policy as Company Safety Officer, including oversight of HAZWOPER certification.

1995-2014 Consultant Archaeological Reviewer for Township of Evesham, New Jersey, Planning and Zoning boards. Reviewing cultural resource surveys mandated by the Township's Land-Use Ordinance

1986-1988 Director
Oxford Archaeological Unit, Oxford, England

1975-1986 County Archaeologist
Counties of Somerset (1979-86) and Shropshire (1975-79), England

TEACHING AND ACADEMIC EXPERIENCE

2018-19. Professional Consultant for *Battle Lab: The Battle of Princeton* (HUM 350/ART 302). Princeton University

2017 (Fall Semester) *Archaeology in Historic Preservation* Rutgers-Camden/MARCH Historic Preservation continuing education program.

2016 (Spring Semester) University of Delaware Department of Anthropology. Introduction to Historical Archaeology Freshman Class.

2014-present Rutgers University, New Brunswick, New Jersey. Associate Member of the Graduate Faculty, Department of Art History, Program in Cultural Heritage and Preservation Studies (CHAPS).

2010-present Rutgers University, New Brunswick, New Jersey. Adjunct Professor, Department of Art History,
Program in Cultural Heritage and Preservation Studies (CHAPS).

Designed and Taught:

Special Topics in Historic Preservation: Archaeology and Historic Preservation (Spring 2011)

Special Topics In Historic Preservation: The New Brunswick Region: A Case Study In Archaeology, Land-Use And Historic Preservation (Fall 2013)

Guest lecturer on Archaeology and Historic Preservation, Bloustein School of Planning, Rutgers University 2013 - present

2008-present Rider University, Lawrenceville, New Jersey. Adjunct Professor, Departments of History and Continuing Education
Designed and Taught:
World History
Introduction to Historical Archaeology

2006-2008 Drew University, Madison, New Jersey. Adjunct Professor
School of Continuing Education Historic Preservation Certificate Program

1998-present New Jersey Council for the Humanities Speakers' Bureau Member

1986-1988 University of Oxford, England. Department of External Studies, Adult Education Tutor

Designed and Taught: The Oxford Smithsonian Seminar, Summer Schools for the University of South Florida

1974-1986 Universities of Birmingham and Bristol, England. Continuing Education Tutor
Designed and Taught: Numerous semester-long courses and day-schools on archaeological and historical topics.

SPECIAL SKILLS AND INTERESTS

Cultural Resource and Heritage Management
National Historic Preservation Policy
Archaeological education and public outreach
Master planning for historic sites
National Register of Historic Places Nominations
Archaeology and standing buildings
Urban archaeology
18th -century military sites
English medieval history and archaeology
Pseudo- and Fringe-Archaeology and attitudes to the past

PROFESSIONAL AFFILIATIONS AND AWARDS

2019 McGimsey/Davis Award For Outstanding Service to Professional Archaeology and Cultural Resource Management. Register of Professional Archaeologists.
2018 New Jersey Historic Preservation Award for “A Gentleman’s Pursuit: The Commodore’s Greenhouse” –Historic Morven
2017 Podmore/Dwyer Historic Award, Lawrence Township, New Jersey
2016 President’s Award for Outstanding Service to the American Cultural Resources Association
2015 Recipient of the New Jersey Historical Commission Richard J. Hughes Award for significant contributions to the scholarly and public history of New Jersey

24th Annual New Jersey Historic Preservation Award 2014 for Petty's Run Archaeological Explorations and Site Preservation

Registered Professional Archaeologist (10267) since 1999,
Fellow of the Society of Antiquaries of London (retired)
Archaeological Society of New Jersey: elected Fellow 2011

REFERENCES AND LIST OF PUBLICATIONS

Available on request

APPENDIX IX: STRUCTURAL REPORT

BREARLEY HOUSE
PRESERVATION PLAN



Harrison-Hamnett, P.C.
Consulting Structural Engineers

Principals

John N. Harrison, PE.
Donald M. Hamnett, PE
Mark W. Gaffney, PE
Forrest W. Harrison, PE

Senior Associates

Craig M. Block
William J. Bocchieri, PE
Richard C. Miller, PE
Richard S. Poll, PE
Steven J. Renaud, PE

Associates

Samantha Fioravanti, PE
Kent F. Harrison, PE
Ian W. Slatas, PE
Scott W. Hamnett

MEMORANDUM

To: Mr. James Giresi
Clarke Caton Hintz

From: John N. Harrison, P.E.
Harrison-Hamnett, P.C.

Date: March 23, 2023

Re: Brearley House
100 Meadow Road
Lawrenceville, New Jersey

As per your request, the writer visited the site to perform a walkthrough condition survey of the referenced building. The purpose of this work was to identify structural defects, if any, and obtain sufficient information to assess the overall structural condition of the building.

The building is a multi-wythe brick masonry wall bearing structure. See Photograph 1. The floors are timber joists bearing on the exterior walls and a timber summer beam at midspan. Rows of steel beams have been added at midspan of the first floor joists. See Photograph 2, 3. These beams are supported on steel columns with new foundations. This work was completed to upgrade the existing first floor capacity to support museum type loading conditions.

The following are our determinations.

1. The building is in good structural condition.
2. The first and second floor framing are adequate to support a museum type loading condition and are adequately performing to support the anticipated loads.
3. The roof framing is in good condition and is adequately supporting anticipated gravity and lateral loading conditions. See Photograph 3.
4. The only structural defect identified was the rusting at the base of the new steel columns in the basement. See Photographs 4, 5. This is somewhat critical. As the condition worsens, the building may settle or the steel beams that were placed to upgrade the floor framing will become not as effective. These columns need to be replaced with steel columns within a timeframe of 2 years.

We trust this information is helpful. If you have any questions, please do not hesitate to contact our office.

John N. Harrison, P.E.
N.J.P.E. #31198

enclosure

40 Knowles Street
Pennington, New Jersey 08534

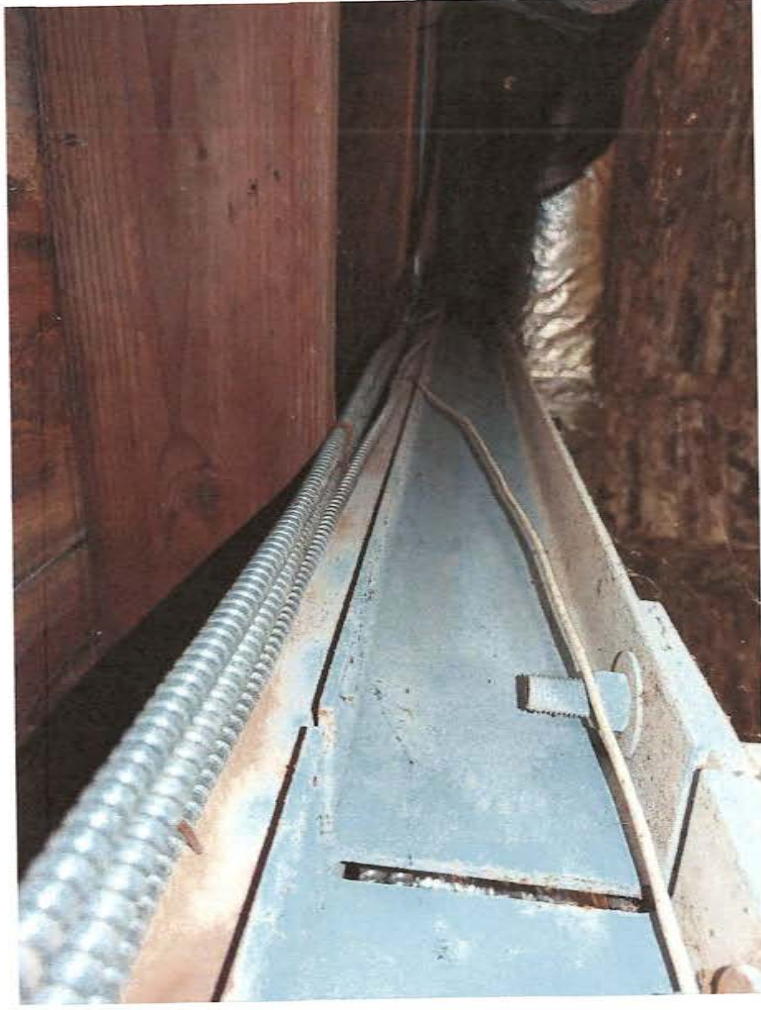
Phone 609-818-1808

55 Company Street, Suite B
Christiansted, St. Croix USVI
00820

Harrison-Hamnett, P.C.
Consulting Structural Engineers
PHOTOGRAPHS – BREARLEY HOUSE



Photograph 1



Photograph 2

40 Knowles Street
Pennington, New Jersey 08534

55 Company Street, Suite B
Christiansted, St. Croix USVI
00820

Harrison-Hamnett, P.C.
Consulting Structural Engineers



Photograph 3



Photograph 4

40 Knowles Street
Pennington, New Jersey 08534

Phone 609-818-1808

55 Company Street, Suite B
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00820



Photograph 5

40 Knowles Street
Pennington, New Jersey 08534

Phone 609-818-1808

55 Company Street, Suite B
Christiansted, St. Croix USVI
00820

APPENDIX X: BUILDING SYSTEMS REPORT

BREARLEY HOUSE
PRESERVATION PLAN



TOWNSHIP OF LAWRENCE BREARLEY HOUSE



100 MEADOW ROAD
LAWRENCEVILLE, NEW JERSEY 08648

MECHANICAL & ELECTRICAL CONDITIONS ASSESSMENT AND RECOMMENDATIONS

PREPARED FOR:

Clarke Caton Hintz
100 Barrack Street
Trenton, NJ 08608

Issue Date: March 31, 2023
Revised: July 25, 2023

PREPARED BY:

KELTER & GILLIGO Consulting Engineers
196 Princeton-Hightstown Rd, Bldg 1A, PO Box 777
Princeton Junction, NJ 08550
(609) 799-8336
Email: info@kandg-pc.com

K&G Project No. 3083

MECHANICAL/ELECTRICAL OVERVIEW:

This section has been prepared by Kelter & Gilligo Consulting Engineers (K&G), to evaluate the condition of the existing mechanical/electrical/plumbing (MEP) systems at the Brearley House. We understand the MEP systems report will become an integral part of a Preservation Plan that Clarke Caton Hintz (CCH) is preparing.

This assessment and its accompanying recommendations assume that the Use Group of the facility will remain unchanged (refer to Section XII for definition of Use Groups). Under this scenario, the attic and basement will be left vacant (with the exception of MEP equipment), the first floor shall provide exhibit space and the visitor entrance with restrooms, and the second floor shall provide additional exhibit space and a residence for the caretaker.

The observations and recommendations presented herein are based on visual observations that K&G performed during the course of a March 2, 2023 site visit by N. Marc Lorusso (hvac, plumbing and fire protection) and Frank Tindall, P.E. (electrical and fire alarm). Invasive testing procedures were not utilized to support our conclusions. Sampling of materials for the presence of hazardous materials was not performed either, as that type of service is not part of our practice.

FIRE PROTECTION SYSTEM:

The existing structure does not presently include any sprinkler coverage or standpipes. Based on the code analysis provided in Section XII, sprinklers are not required. However, in the interest of both the life safety benefit, as well as protection of the historic structure, we would still recommend strong consideration be given to the installation of a sprinkler system at the earliest possible opportunity.

PLUMBING SYSTEM:

Domestic water is currently provided by a shallow well water system (Photo 1). With construction site work for the adjacent housing development now underway, we believe the facility would be better served by a new city water service from the municipal authority. This should also negate the need for periodic water quality testing and treatment.

Domestic hot water is currently generated by an auxiliary tube bundle mounted in the building's heating boiler, which is of oil fired design. Depending on the approach chosen for hvac upgrades, the Township may want to pursue installation of a natural gas service, to allow for the removal of the fuel oil storage system (Photo 2) when replacing the oil fired heating equipment. If so, then a gas fired water heater could also be installed to maintain the centralized domestic hot water system. If a gas service is not provided, then an electric water heater would be recommended upon replacement of the existing boiler.

Sanitary waste is handled by an underground drainage line that is piped by gravity to a pumping station that discharges to the municipal sewer system. The observed piping appears to be a combination of newer PVC and vintage cast iron materials. With replacement of fixtures or bathroom groups, all vintage piping should be replaced.

KELTER & GILLIGO consulting engineers
196 Princeton-Hightstown Road, Bldg 1A, PO Box 777, Princeton Junction, NJ 08550
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Existing plumbing fixtures appear to be of white vitreous china finish. Although the fixtures appear to be in a good state of repair, maintenance personnel have indicated that the pressure assisted water closets are in need of replacement.

Replacement of existing fixtures would also provide the opportunity to realize water savings, by specification of high efficiency fixtures and automatic activation devices. Water closets and urinals in public facilities would typically have sensor operated flush valves, while lavatories would have sensor operated faucets with anti-scald mixing valves.

HVAC SYSTEM:

The facility is currently heated and air conditioned by two fully ducted fan coil systems. The fan coil and distribution ducts for the first floor are located in the basement (Photo 3), while the second floor unit and ductwork is in the attic (Photo 4). Both fan coils include filters (which are in need of replacement), a heating hot water coil, a direct expansion cooling coil, and a blower fan. Cooling capacity for the Dx cooling systems is provided by grade mounted condensing units that are located adjacent to the restrooms (Photo 5).

Heating capacity is provided by a residential style, oil fired boiler of cast iron construction, located in the basement (Photo 6). The boiler and all other portions of the installation are thought to have been installed during the last renovation in the 1990's. As such, the equipment is at the end of a typical 25 year life span, and replacement should be anticipated.

Under the current conditions, ventilation is provided through natural means (i.e. operable sash). As part of an anticipated upgrade program, the need for mechanical ventilation should be considered for exhibit spaces (based on the requirements of the exhibit materials). Consideration should also be given to the following alternatives for modernization of the heating and air conditioning installation:

- Following a traditional approach, a new natural gas service would be provided, so that domestic and heating hot water could be generated with 96% efficient condensing type appliances, while cooling capacity for the replacement fan coils would be provided by high efficiency (SEER 18 minimum) condensing units.
- Under a more sustainable approach, a VRF (or VRV) based solution could be employed. This approach eliminates the need for fossil fuels on site, to minimize the local carbon footprint of the facility.

ELECTRICAL SYSTEM:

Electrical service enters the basement underground from a 25 kVA pole mounted transformer located across the driveway (Photo 7). The utility company meter is also in the basement, adjacent to the electrical panels. The service is 240/120 volt, single phase, three wire residential type.

There are two electrical service panels, side-by-side in the basement, each with a 150 amp main circuit breaker (Photo 8, gray panels). They appear to be fed in parallel from the incoming service wireway, therefore each main circuit breaker functions as a service disconnect, as opposed to having a single main for the building. While a somewhat unusual arrangement for a house-type structure, this is allowed by code. However the size of the utility transformer will limit the available capacity to approximately 100 amps, or only the total allowable load to be placed on either one of the 125 amp mains (normal 80% loading of circuit breakers).

Permit inspection stickers indicate this installation was completed in 1999. While 25 years is normal life expectancy for hvac systems, the same limitation is not typically anticipated with electrical panels. The two Siemens panels were of higher quality for a semi-residential installation, and appear to remain in good condition. Due to the arrangement of the installation, the incoming utility service may be able to be upgraded if the need were to arise, without replacing the already “doubled” panel layout. This may likely become relevant if an “all-electric” hvac approach were to be implemented.

Convenience receptacles have been added in select location, both as conventional recessed wall mounted units as well as flush floor mounted locations (Photo 9). The ample electrical panels and branch circuit breakers should allow for easy installation of additional outlets, should any specific needs arise.

Fixed lighting throughout the occupied spaces consists primarily of recessed downlights and track mounted heads (Photo 10). It is anticipated that where compact fluorescent or other sources are presently used, they would be retrofit almost exclusively with LED light sources to maximize energy efficiency. Lighting controls such as occupancy sensors could also be installed, to further minimize energy usage.

While exit signs are present in the expected locations on occupied levels, and interior emergency lighting indicating lights and test switches were observed, only the exterior exit from the new wing has exterior egress lighting provided. Emergency egress lighting would be required at the front and rear exits of the main house as well.

There is an Ademco Vista-100 fire alarm and security system control panel located in the basement (Photo 8, red panel), with full coverage smoke/heat detectors and motion sensors throughout the building, and central station monitoring. Given the historic nature of the structure, coupled with its combustible construction and lack of a sprinkler system, this was a wise decision.



Photo 1



Photo 2



Photo 3

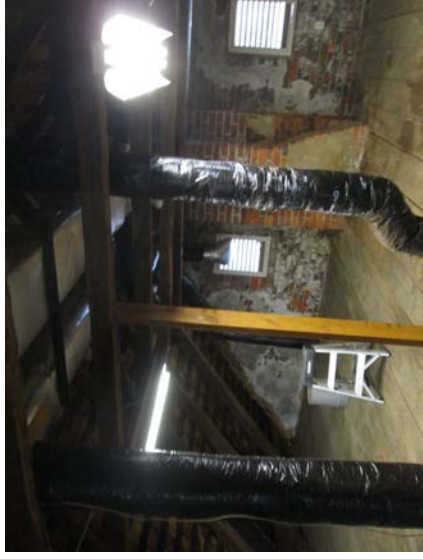


Photo 4



Photo 5



Photo 6



Photo 7



Photo 8



Photo 9



Photo 10

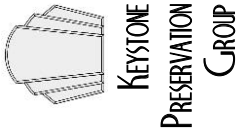
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APPENDIX XI: MATERIALS ANALYSES REPORTS

BREARLEY HOUSE
PRESERVATION PLAN





**KEYSTONE
PRESERVATION
GROUP**

HISTORIC PRESERVATION
ARCHITECTURAL CONSERVATION

CHRISTOPHER FREY,
PRESIDENT/PRINCIPAL CONSERVATOR

CHARACTERIZATION/ANALYSIS OF HISTORIC MORTAR BREARLEY HOUSE: LAWRENCEVILLE, NJ



AUGUST 19, 2023

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Project Team

Project: Brearley House
Lawrenceville, NJ

Architect: Clarke Caton Huntz

Conservator: Keystone Preservation Group
Christopher Frey

Characterization/Analysis of Historic Mortar

Introduction

The intent of mortar characterization and analysis is to provide information that will be useful in understanding the history of a building and also to provide insight into materials which could be appropriate for repair or restoration campaigns. For this project, Keystone Preservation Group was asked to characterize the composition of one mortar from the Brearley House in Lawrenceville, NJ:

- Sample 1: Brick pointing mortar

The exterior of the building retains what appears to be original pointing mortar – which is somewhat remarkable given the building’s age and aggressive microclimate (exposed, four distinct seasons). In general terms, the mortar possesses physical and reactive characteristics which are consistent with what might be expected from an 18th century mortar; based on lime, sand and clay, and with visible evidence of large crystals of lime.

For this project, several formulations were created when attempting to replicate the color and texture of the historic (variables being the types of binders, sands and pigments employed). The closest match has been recommended herein, and a replication disc has been referenced below. The replication disc was mixed and cured at ambient temperatures and humidity. Noting that factors such as temperature, humidity, moisture content, tooling, and conditions with the surrounding masonry can impact the final appearance of any material, Keystone strongly recommends that mock-ups be installed within wall surfaces and allowed to cure in accordance with standard practice for a minimum of 7 days before being evaluated. Pursuant to project specifications or specific direction from an Architect/Engineer, standard repair practice includes the following:

- Properly raking out joints which are to be repointed, typically to a depth of 2–2½ times the width of the joint (depending on the type of existing joint). Cleaning joints so that they are free of dirt, mold and debris. Joint-cutting must not damage the surrounding masonry.
- Stabilizing backup/bedding mortar.
- Backpointing, if required.
- Combining pointing materials (cement, lime, cement and pigment first in dry form), and adding water in sufficient measure. Allowing for initial fattening, adding more water if necessary, and mixing to achieve a trowelable consistency.
- Pre-wetting joints and allowing them to dry to a damp condition (no pooling water).
- Installing pointing mortar in lifts to avoid shrinkage (if specified).
- Tooling pointing mortar to match the profile of the surrounding joints.
- Periodic misting or spraying for 24 hours after installation, the intent being to avoid rapid drying which can result in both shrinkage cracks and lower resistance to weathering.
- Gently cleaning laitance from the surface of the joints to expose and reveal the color of the aggregate to simulate the effects of weathering. Cleaning procedures will depend on the type and condition of the surrounding masonry as well as the scope of the project. Procedures should be identified during the installation of mock-ups and will require review and approval from the Architect/Engineer, but may include one or more of the following: scraping, brushing with stiff nylon brushes, diluted/mild acidic cleaners, water washing. For this project, half of each replication disc was scraped/brushed, sprayed with very dilute acid and rinsed thoroughly to simulate the effects of weathering. The intent of treating half of each disc was to simulate the effects of weathering.
- Final clean up.

In the summary that follows, “Natural Hydraulic Lime” refers to St. Astier’s NHL 3.5, provided by Limeworks.us (215-536-6706, www.limeworks.us), or alternately, Ecologic Mortar. Limeworks.us also provides custom inclusions which may be used to simulate the appearance of lime blebs that were found to be present in some mortar samples.

Matching the mortars discussed herein will require that a masonry contractor carefully measure, weigh, mix and cure all of the component parts, or that pre-mixed materials be considered.

Summary of Findings

Sample 1: Brick mortar

The physical properties and reactive characteristics of this mortar are consistent with what would be expected from a mix based on lime, sand and clay. It is believed to date to original construction. Joint profile appears to be grapevine.

Physical and reactive properties

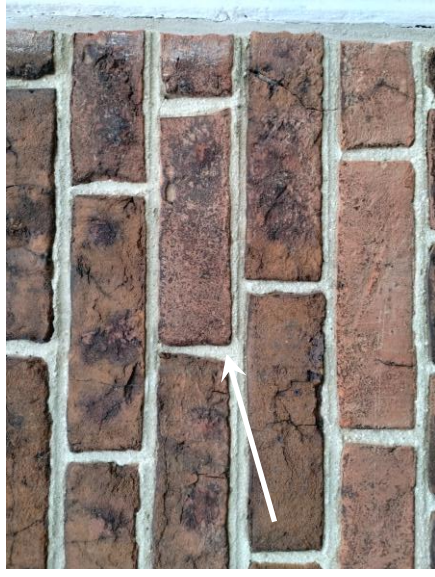
- **Color:** The core color of this mortar is light grayish brown, a shade which can be attributed to lime (white), sand (yellowgray), and clay (reddish brown). This mortar is cohesive and well-mixed, with consistent texture in different parts of the sample. Lime crystals (aka “blebs”) of lime which formed during the lime-slaking process, are visible to the naked eye.
- **Hardness:** Traditional mortars which are based primarily or completely on lime tend to be softer and much easier to crush than those which are based on cement or a combination of lime and cement. This mortar, in general terms, may be considered moderately soft. It fractures easily when struck with minimal impact from a mortar and pestle; minimal impact was required to further pulverize. These characteristics are consistent with what would be expected from a clay-bearing traditional lime mortar.
- **Reactivity:** When reacted with hydrochloric acid, this mortar produced a substantial evolution of carbon dioxide. The volume of evolved gas was consistent with what would be expected from a traditional lime mortar. A moderate quantity of soluble, non-evolving material can likely be attributed to the presence of clay, either bound into the original sand component or added to extend the original mix.

Analytical method

Calimeter	✓
ASTM C1324	
Basic/acid digestion	✓

Reactivity

CaCO ₃	~16.41%
Solubles	~13.65%
Sand	~ 69.89%



Sample 1, point of sampling.



Sample 1, photomicrograph of mortar at 10x magnification in reflected light.



Sample 1, photomicrograph of extracted sands at 10x magnification in reflected light.

Aggregate

This is a fine sand based primarily on quartz and feldspar, some of which appears to be iron-bearing. Grain shape is primarily rounded to subrounded.

Screen Size	#8	#16	#30	#50	#100	#200	Pan/Fines
Sand (retained) %	0.00	2.73	34.25	41.78	17.81	3.42	Trace

Replication / Match

Based on the type and condition of the surrounding masonry, and the historical use of lime mortar, the use of a replication / matching material based on Natural Hydraulic Lime is appropriate. Noting that mock-ups will be required and that minor adjustments may be necessary after review, the following mix may be considered a starting point to replicate the appearance of this mortar:

- Limeworks Ecologic Mortar 3.5 grade – stock color – 90% DGM 050 / 10% DGM250 w / XF Slag Fleck
- 10% Limeworks Inclusion Simulator, by volume, to simulate visual appearance of lime crystals



Sample 1, brick mortar (arrow, chip at bottom of disc) and replication (left half struck, and right half prepared to resemble effect of aging / weathering).

The replication for this mortar is a materially-appropriate mix based on Natural Hydraulic Lime, aggregate and pigment. The use of a pre-mixed material is viewed as preferable to a field mix given that pigment would be required – a consideration which typically adds cost and complexity.

The replication mortar identified by Keystone’s laboratory is considered a very close match for the color and texture of the mortar discussed herein. The color of the aforementioned replication mortar should be reasonably indiscernible when viewed at a distance of 25 feet, which is the industry standard by which mortar matches are typically judged. It should be noted that the uncleaned surface is slightly less gray, and the cleaned surface slightly darker than the original mortar; these observations should be taken into account when selecting the desired approach for repointing. Factors including water content, in-wall moisture content, permeability of the surrounding masonry, and weather conditions during installation and cure all impact the final color of any mortar. Industry standards for preparation, mixing, installation and temperature during cure should all be monitored. The replication discs were misted periodically for 48 hours, and then brushed / scraped to remove laitance. Similar procedures, especially brushing or gentle cleaning, will be required to reproduce this characteristic in the field. The project team may opt not to clean the joints, and to leave surface laitance intact.

Methodology

The primary objective of this document is to provide direction for repair and repointing; it should not be considered a comprehensive technical/compositional analysis of existing/historic material. With direction from an architectural conservator and execution by an experienced masonry preservation contractor, the level of examination provided herein was deemed sufficient to provide basic information on the existing mortar and direction on how to match important characteristics such as color and texture.

Each specimen was examined according to properties of color, texture, hardness, homogeneity, stability and relative porosity. Samples were examined visually and microscopically with a Nikon SMZ-2T trinocular reflected light microscope and/or a Leica DMILM polarizing light microscope.

The approximate composition of the material was determined with a calclimeter conforming to the parameters of the Jędrzejewska analytical method.¹ This technique essentially breaks down a sample into constituent parts and provides data on the nature of the binder by gauging the extent of its reaction with hydrochloric acid (HCl). As HCl dissolves bicarbonates of calcium carbonate-based (CaCO₃) compounds found in lime and (to a lesser extent) cement binders, carbon dioxide (CO₂) is produced.² Data obtained during experimentation was compared with published experimental standards based on known mixes to arrive at conclusions about the composition of all samples.³ Aggregate which forms the insoluble portion of the material was isolated, retained and washed, while extremely fine particulates were separated from solution, filtered and retained. The aggregate was dried and weighed, evaluated according to particulate size with a Standard U.S. Sieve Series Tyler Equivalent Sieve Stack, and examined microscopically for particle shape, color, opacity and mineralogy.

Petrographic analysis including examination of thin sections in transmitted polarizing light and elemental analysis would be required to identify mineral phases which are specific to different types of cementing material and to unequivocally quantify the amount of lime and/or cement present. If analysis in accordance with testing procedures described in ASTM C1324 is desired, microchemical analysis may be expanded upon with elemental analysis using techniques such as X-Ray Diffraction (XRD), petrography and/or physical characterization of thin sections using transmitted and polarized light microscopy.

¹ Hanna Jędrzejewska, "Old Mortars in Poland: A New Method of Investigation," *Studies in Conservation*, Volume 5, Number 4, 132-138.

² Calclimeter analysis provides information beyond standard gravimetric/acid digestion. Although not unequivocal and subject to interpretation, it provides data on acid-soluble portions which do not evolve carbon dioxide when reacted with HCl. This is especially important to the analysis of cementitious mortars that naturally contain complex soluble silicates which dissolve in acid but do not evolve carbon dioxide. Limitations to this analytical method include the lack of published standards on common masonry mixes and mixes which incorporate natural and artificial pigments.

³ John Stewart and James Moore, "Chemical Techniques of Historic Mortar Analysis," *Bulletin of the Association for Preservation Technology*, Volume 14, Number 1 (Washington: Association for Preservation Technology, 1982), 11-16.

Compositional Characteristics
 Binders

Analyzing the nature of the binder provides information valuable in determining the composition of the original material. Binders are generally composed of calcium-carbonate based materials with impurities and additives incorporated to affect physical properties such as cure, hardness, color and durability. The data below represents the percentage weight within the sample that may be attributed to calcium carbonate, complex soluble silicates (solubles, including soluble material from cements and pigments) and aggregate.

Standards referenced below⁴ have been culled from previously-completed research and experimentation to provide benchmark data regarding compositional percentages for standard mixes. Although imperfect, experimental data below exists for compositional proportions based on weight only; conclusions are based on the mathematical conversion of weight percentages to volumetric mixes.

Mix	CaCO ₃	Solubles	Sand
1:3 lime:sand (SM) ⁵	10.0 ± 0.4%	2.4 ± 0.7%	87.6 ± 0.3%
1:3 lime:calcareous sand (SM)	26.2 ± 1.3%	3.0 ± 0.9%	70.9 ± 2.2%
1:3 lime:clayey sand (SM)	10.2 ± 0.2%	13.2 ± 0.6%	76.6 ± 0.9%
2:5 hydraulic lime:clayey sand (JCF) ⁶	8.78 ± 0.06%	17.69 ± 3.01%	73.54 ± 2.95%
2:5 dolomitic lime:clayey sand (JCF)	6.57 ± 0.25%	10.10 ± 0.63%	83.33 ± 0.98%
2:5 high calcium lime putty: clayey sand (JCF)	13.49 ± 1.27%	5.78 ± 1.02%	80.72 ± 2.29%
1:1:5 Portland cement: high calcium lime:clayey sand (JCF)	10.60 ± 0.87%	21.76 ± 5.99%	67.65 ± 6.87%
2:1:5 lime:pozzolanic cement:sand (SM)	11.0 ± 0.1%	6.6 ± 0.4%	82.4 ± 0.3%
100% Portland cement (SM)	7.2 ± 0.4%	92.1 ± 0.3%	0.6 ± 0.2%
1:3 Portland cement:clayey sand (SM)	7.9 ± 0.1%	29.6 ± 1.6%	62.6 ± 1.6%
1:3 Portland cement:sand (SM)	6.4 ± 0.4%	27.4 ± 3.0%	66.2 ± 3.4%
1:3 Roman cement: sand (SM)	8.5 ± 0.6%	16.1 ± 0.2%	75.3 ± 0.4%

⁴ In the chart, “SM” refers to standards published in Stewart and Moore’s article and “JCF” refers to data from Frey’s thesis.

⁵ Total calcium carbonate content includes soluble bicarbonates from calcareous (calcium-based) aggregate such as crushed limestone or marble dust.

⁶ Analysis performed on replication mix evaluated (five years after cure) in J. Christopher Frey *Exterior Stuccoes as an Interpretive and Conservation Asset: The Aiken-Rhett House, Charleston, SC* (Masters’ Thesis in Historic Preservation, University of Pennsylvania, 1997). Please note that data is provided for comparative purposes only; actual volumetric percentages will vary based on types of lime, types of sand, mix consistency, etc.

Aggregate

Because sand is so important in determining not only how a material performs but also in producing its color and texture, a careful examination of the aggregate was conducted. Laboratory examination included visual analysis for sand grain shape and an evaluation of particle size.

Grain Shape

Sands are visually inspected with a Nikon SMZ-2T⁷ trinocular reflected light microscope at various magnifications. Roundness is a measure of the sharpness of a sand grain's corners and edges, regardless of overall shape of the particle. Sphericity is a measure of the overall shape of the sand grain which evaluates the degree to which the particle approaches the shape of a perfect sphere, which is extremely rare in nature. These physical properties are visually assessed using roundness scale charts, such as the one pictured below.



Typical grain shapes within sand components.

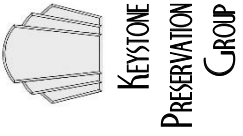
Particle Size

All sands were passed through a U.S. Standard Sieve Series Sieve Stack to evaluate the average distribution.⁷ The sieve screens used in this analysis possess the following dimensional equivalents:

Screen #	Tyler equivalent mesh	Opening (inches)	Opening (metric)
8	8	.0937	2.36 mm
16	14	.0469	1.18 mm
30	28	.0234	600 μ
50	48	.0117	300 μ
100	100	.0059	150μ
200	200	.0029	75μ

Materials with rough surface textures tend to be based on sands whose grains are retained on the lower-numbered screens. Smoother materials are often based on finer particulates. Well-graded materials are characterized by relatively even distribution of particulates across all screens. Data reported from the sieve gradation test provides a comparative analysis for the distribution of grain sizes.

⁷ Sieves are graded in a series so that particles progressively pass through a series of screens (with screen #8 representing the largest mesh and screen #200 the smallest) until they are retained. The amount of material retained on each screen is recorded and then compared with the amounts retained on other screens to provide numerical averages for different particulate sizes.



**BREARLEY HOUSE
LAWRENCE TOWNSHIP, NJ**

HISTORIC PRESERVATION
ARCHITECTURAL CONSERVATION

FINAL REPORT: SEPTEMBER 7, 2023

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**PREPARED FOR:
CLARKE CATON HINTZ**

**PREPARED BY:
KEYSTONE PRESERVATION GROUP**

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Project Team

Project: Brearley House
Lawrence Township, NJ

Architect: Clarke Caton Hintz

Materials Analyst: Keystone Preservation Group:
Christopher Frey

Section A: Analysis of Selected Historic Finishes

A.1 Introduction

This report constitutes an analysis of selected historic architectural finishes from the Brearley House in Lawrence Township, NJ. As consultant to Clarke Caton Hintz, Keystone Preservation Group has completed the following:

- One site visit, during which representative samples were collected from interior elements.
- Analysis of 10 paint samples, which included cataloging each sample, cross-sectioning each sample manually, embedding a portion of each sample in clear stable resin, evaluating the sample microscopically at various magnifications up to 200x in color-corrected reflected light and longwave ultraviolet light.
- Submission of a pre-final report on findings on September 5, 2023.

Although no primary research was completed in conjunction with this finishes analysis, research provided by Margaret Newman indicates that the Brearley House was constructed in 1761.¹ The period of significance is 1700-1799.

¹ Margaret Newman, Executive Summary for the Brearley House, 2023.

A.2 Data, Observations and Conclusions

Objective

This document constitutes an analysis of historic finishes for *selected* interior elements from three spaces: Rooms 100, 103, 104. *Selective* analyses are considered to be broad rather than comprehensive; they may be used to establish basic information on finishes which may date to original construction or a specific building campaign. The scope which was requested is limited to 10 samples, 9 of which were deemed to provide useful information.

Although it is hoped that the information provided herein is useful, this information should not be considered to be comprehensive or unequivocal for the entire building or even the rooms which were selected for study – given that information can vary from element to element, even within the same room. A comprehensive study might include as many as 8-12 samples per room.

Physical Evidence and Observations

Analysis of finishes taken from 10 samples are summarized below, and are described in greater detail within datasheets in *Section C*:



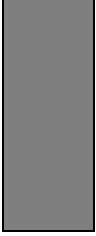
- Analysis was challenged by the fact that nearly every sample presented evidence of differing chronochronologies (number and color of layers present). Evidence suggests that some elements have lost early or intermediate finishes, possibly due to wear or to surface preparation for subsequent campaigns.
- Within Room 100, a sample from trim surrounding the front door presents evidence of what may be the earliest finish in the study – a grayish yellow paint layer corresponding to Munsell 2.5Y 7/2; this was also found to be the earliest finish on baseboards. The second layer on this sample presents as the earliest layer on other door trim in this room. is slightly lighter, but otherwise similar in color, corresponding to Munsell 2.5Y 7/2-8/2; the difference in color is nearly indiscernible, and it is not clear whether the difference is an anomaly or the result of aging.
- The earliest finish on chair rails in Rooms 103 and 104 is light gray, corresponding to Munsell N 4.5/3/4. The earliest finish on door trim in these rooms is dark reddish brown, corresponding to Munsell 5YR 3/4.

A.3 Color matches

Digital approximations using RGB values have been integrated for illustrative purposes only; under no circumstances should they be used as a basis to re-create historic colors. Munsell Color designations and notations for the closest stock match within the Benjamin Moore line of paint products have been identified below.

Period of Interpretation: 1700-1799

Colors herein are believed to date to original construction, 1761

<u>Element</u>	<u>Color Name</u>	<u>Munsell Color</u>	<u>Benjamin Moore Equivalent</u>	<u>Approx. Color</u>
Room 100 door trim, baseboards	Grayish yellow	2.5Y 7/2	HC-82 Bennington Gray	
Rooms 103, 104 door trim	Dark reddish brown	5YR 3/4	HC-71 Hasbrouck Brown	
Rooms 103, 104 chair rail	Light gray	N 4.5/	CSP-25 Wool Peacoat	

B.1 Sampling

In order to produce findings that accurately portray the way a building looked at one point in time or to develop an understanding about how a building has evolved, it is essential to conduct proper site investigation and sampling. Sampling consists of cratering and examining selected elements to ensure that samples will be representative, and then removing small fragments of material for microscopic analysis. Several samples were removed from window elements, and analyzed in Keystone's conservation laboratory shortly thereafter in accordance with the following methodology.

B.2 Sample Preparation

As a component of finishes analysis, paint samples are cross-sectioned – either manually using a scalpel or embedded and then cut with a specialized saw. Both techniques were employed for this analysis. Manual cross-sectioning without embedding was used primarily for color-matching.

A portion of the sample was embedded in stable epoxy resin in order to stabilize its microstructure. Once cured, the cast sample was de-molded and cross-sectioned using a high-speed lapidary saw. The sample was then polished successively with 400-grit, 600-grit, 600-grit and 1000-grit sanding sheets and swabbed with mineral oil during microscopy to saturate colors and enhance stratigraphic distinctions.

B.3 Optical Microscopy and Color Matching

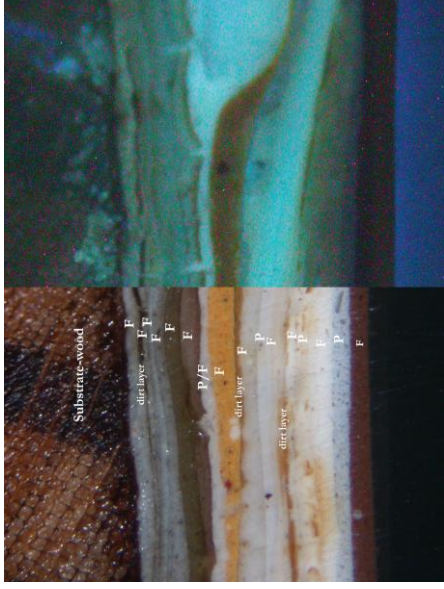
Analysis, photomicrography and color was completed using the following instruments:

- Leica DMLM Microscope capable of evaluating specimens in reflected incident light and transmitted polarized light at magnifications of 50x, 100x, 200x and 500x – fitted with a Nikon Coolpix 995 digital camera attached to its photo port. Reflected, color-corrected incident light is produced at 3000 Kelvin by a quartz-halogen fiber optic illumination system. Incident fluorescent light is generated by an internal mercury vapor lamp and long-pass blue filter cube capable of passing longwave ultraviolet light at wavelengths of 320-400 nm, with peak excitation ~365 nm.
- Nikon SMZ-2T Stereo Zoom Microscope capable of evaluating specimens in reflected incident light and transmitted polarized light at magnifications between 7-63x.

Colors are matched by visually comparing target layers with chips that conform to the Munsell System of Color in color-corrected incident light or natural daylight. Munsell Colors are organized into designations by “hue” (R: Red, YR: Yellow red, Y: Yellow, GY: Green yellow, G: Green, BG: Blue green, B: Blue, PB: Purple blue, P: Purple, RP: Red-purple, N: Neutral). The “hue” designation is followed by a value designation that corresponds to the relative lightness/darkness of the color on a scale of 0 to 10, whereby 0 is absolute black and 10 is absolute white. The final number is a “chroma” designation which indicates the intensity of the color on a scale of 0 to 12, with 0 being neutral and 12 being intense. For example, a finish matching 2.5Y 8/2 would be deemed to possess a yellow hue, light in shade and neutral in intensity.

Comparatively, a 5YR 5/12 finish would be orange (yellow-red), moderately-shaded, with an intense, bright color.

Munsell Color Numbers were cross-referenced with ISCC-NBS (Inter-Society Color Council and the National Bureau of Standards) color names. Munsell colors were also matched to the closest available Benjamin Moore paint products for selected periods of interpretation.



Typical photomicrograph (Sample 08) in color-corrected incident visible light (left half) and in incident long wave fluorescent ultraviolet light (right half).

Section C: Analytical Data
C.1 Sample Locations

Sample ID	Element
01, 02	Room 100, door trim
03	Room 100, front door trim
04	Room 100, front door trim
05	Room 100, baseboard
06	Room 103, door trim
07	Room 103, chair rail
08	Room 104, door trim
09	Room 104, chair rail base
10	Room 104, chair rail cap (not useful, not used)

C.2 Analytical Datasheets

The datasheets that follow present laboratory data in the form of stratigraphic analysis and photomicrographs. The left half of each photomicrograph features a microscopic view of each sample in color-corrected reflected light. The right half depicts the sample subjected to longwave fluorescent ultraviolet light, which enhances distinctions between different layers (or paint campaigns) and materials (oil-based, latex, glaze, etc.). Notations within the datasheets include the following:

- Substrate: Base substrate material (when present)
- Primer (P): Denoted “P” when present. A primer layer is defined as a layer that is applied before the finish layer but is associated with the same painting campaign.
- Finish (F): Denoted “F” for each campaign, including both historic and subsequent finishes which post-date the construction of the building.

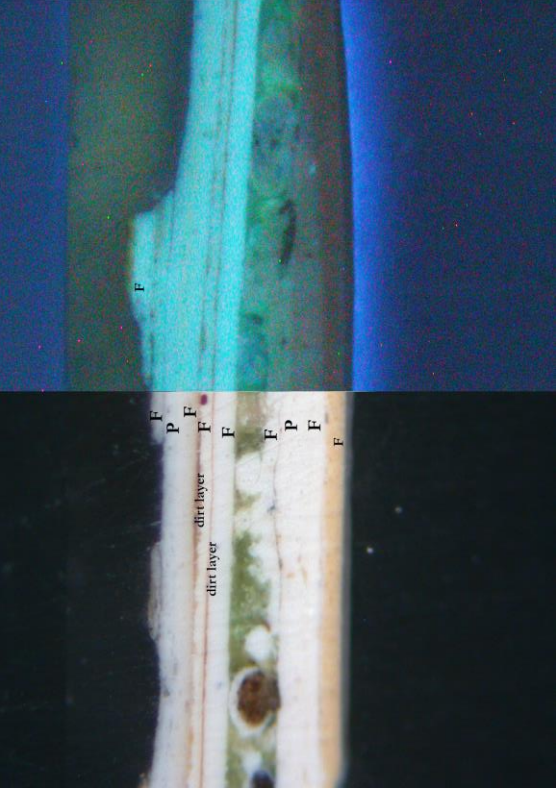
Brearley House: Lawrence Township, NJ
 Analysis of Selected Historic Finishes

Location:	Brearley House, Lawrence Township, NJ (Room 100)			
Sample:	01, 02			
Element:	Door trim/outer, inner			
Analysis:	<input type="checkbox"/>	Manual cross-section/RLM	<input checked="" type="checkbox"/>	Embedded cross-section/RLM
	<input type="checkbox"/>	Binder characterization	<input type="checkbox"/>	Pigment analysis
				Ultraviolet fluorescence
				Exposure window

Sample Location:



Photomicrograph:



Chronachronology:

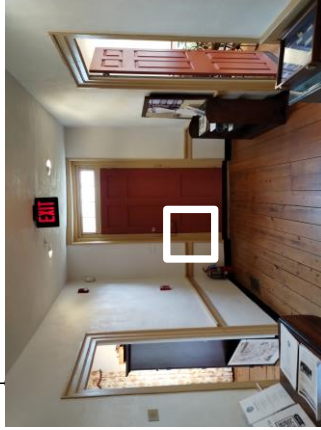
Campaign	Layer	Munsell	Color Name	UV AF	Notes
Substrate	Wood				
	Finish	2.5Y 7/2-8/2	Lt gray yellow	White	Layers fully detached from substrate
	Finish		Yellow white	White	
	Primer		Yellow white	White	
	Finish		Yellow white	White	Dirt layer after
	Finish		Yellow white	White	Dirt layer after, contamination?
	Finish		Yellow white	Dark	
	Primer		White	Dark	
	Finish		White	Dark	
	Finish		Mod gray yel	Dark	Top coat

Observations:

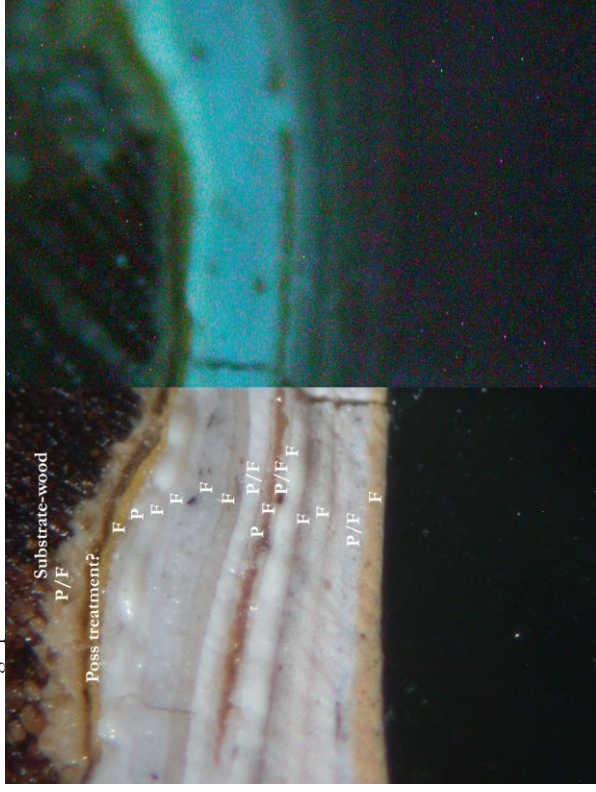
Earliest finish slightly lighter than Sample 03. Unclear whether this is an anomaly, but color is similar enough to be considered indiscernible.

Location:	Brearley House, Lawrence Township, NJ (Room 100)			
Sample:	03			
Element:	Door trim/ front door			
Analysis:	()	(x)	(x)	(x)
	()	()	()	()
	Manual cross-section/RLM		Embedded cross-section/RLM	
	Binder characterization		Pigment analysis	
				Ultraviolet fluorescence
				Exposure window

Sample Location:



Photomicrograph:



Chronachronology:

Campaign	Layer	Munsell	Color Name	UV AF	Notes
Substrate	Wood				
	Primer/Finish	2.5Y 7/2	Gray yellow	Yellow	
	Finish		Mod yellow	Dark yellow	
	Finish		Yellow white	White	
	Finish		Yellow white	White	
	Finish		Yellow white	White	
	Primer/Finish		Yellow white	White	
	Primer		Yellow white	Dark	
	Finish		Lt gray red	Dark	
	Primer/Finish		Yellow white	Dark	
	Finish		Yellow white	Dark	
	Finish		Lt gray	Dark	
	Finish		Yellow white	Dark	
	Primer/Finish		White	Dark	
	Finish		Mod gray yel	Dark	Top coat

Observations:

Reference sample for this space; sample contains the greatest number of layers. Earliest finish likely original. Unclear why earliest layers are not present on other door trim samples (01, 02).

Breartley House: Lawrence Township, NJ
 Analysis of Selected Historic Finishes

Location:	Breartley House, Lawrence Township, NJ (Room 100)			
Sample:	04			
Element:	Door trim			
Analysis:	() Manual cross-section/RLM	(x) Embedded cross-section/RLM	() Ultraviolet fluorescence	() Exposure window
	() Binder characterization	() Pigment analysis	()	()

Sample Location:



Photomicrograph:



Chronachronology:

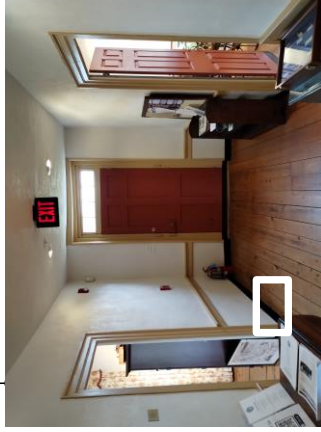
Campaign	Layer	Munsell	Color Name	UV AF	Notes
Substrate	Wood				Detachment
	Primer/Finish	2.5Y 7/2	Gray yellow	Yellow	
	Finish		Mod yellow	Dark yellow	
	Finish		Yellow white	White	
	Finish		Yellow white	White	
	Finish		Yellow white	White	
	Primer/Finish		Yellow white	White	
	Primer		Yellow white	Dark	
	Finish		Lt gray red	Dark	
	Primer/Finish		Yellow white	Dark	
	Finish		Yellow white	Dark	
	Finish		Lt gray	Dark	
	Finish		Yellow white	Dark	
	Primer/Finish		White	Dark	
	Finish		Mod gray yel	Dark	Top coat

Observations:

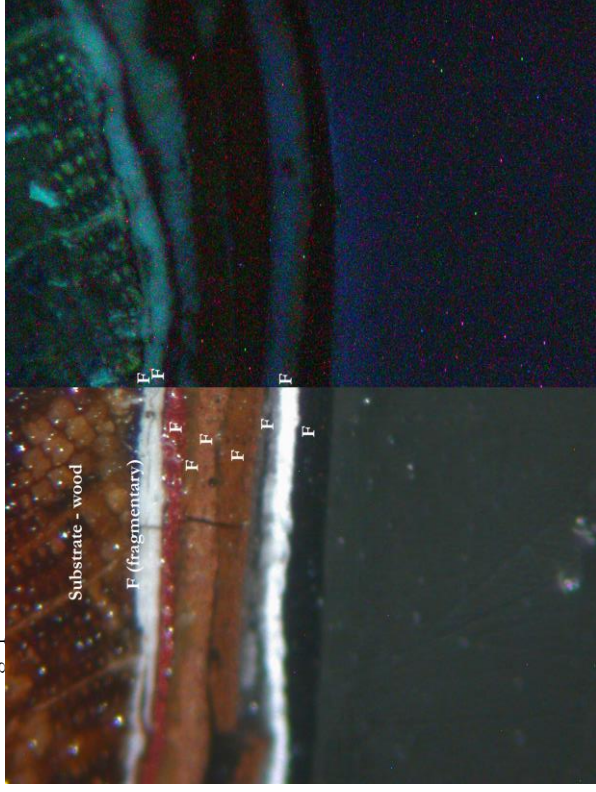
Earliest finish present in photomicrograph. Bulk sample analysis suggests subsequent layers match Sample 03

Location:	Brearley House, Lawrence Township, NJ (Room 100)			
Sample:	05			
Element:	Baseboard			
Analysis:	() Manual cross-section/RLM	(x) Embedded cross-section/RLM	(x)	Ultraviolet fluorescence
	() Binder characterization	() Pigment analysis	()	Exposure window

Sample Location:



Photomicrograph:



Chromachronology:

Campaign	Layer	Munsell	Color Name	UV AF	Notes
Substrate	Wood				
	Primer/Finish	2.5Y 7/2	Gray yellow	Yellow	
	Finish		Yellow white	White	
	Finish		Yellow white	White	
	Finish		Red	Red	
	Finish		Brown	Gray	UV phosphorescence
	Finish		Orange brown	Dark	
	Finish		Brown	Dark	
	Finish		Dark gray	Dark	
	Finish		White	Dark	
	Finish		Black	Dark	

Observations:

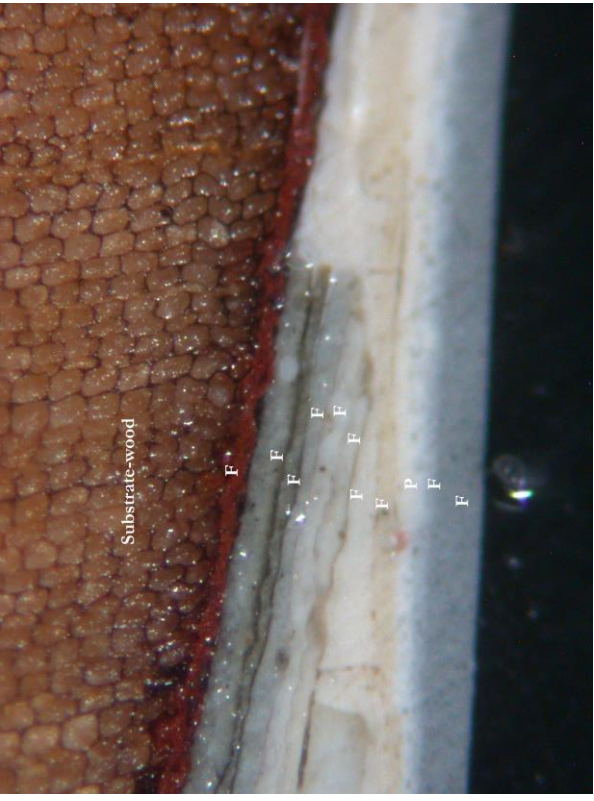
Reasonably comprehensive chromachronology. Earliest finish confirmed through bulk analysis.

Location:	Breartley House, Lawrence Township, NJ (Room 103)			
Sample:	06			
Element:	Door trim			
Analysis:	() Manual cross-section/RLM	(x)	Embedded cross-section/RLM	() Ultraviolet fluorescence
	() Binder characterization	()	Pigment analysis	() Exposure window

Sample Location:



Photomicrograph:



Chronachronology:

Campaign	Layer	Munsell	Color Name	UV AF	Notes
Substrate	Wood				
	Finish	5YR 3/4	Dk red brown		
	Finish		Lt gray		Oxidation at surface
	Finish		Lt gray		Oxidation at surface
	Finish		Lt gray		
	Finish		Gray white		
	Finish		Gray white		
	Finish		Yellow white		
	Finish		Lt yellow		
	Primer		White		
	Finish		Lt blue white		
	Finish		Gray		

Observations:

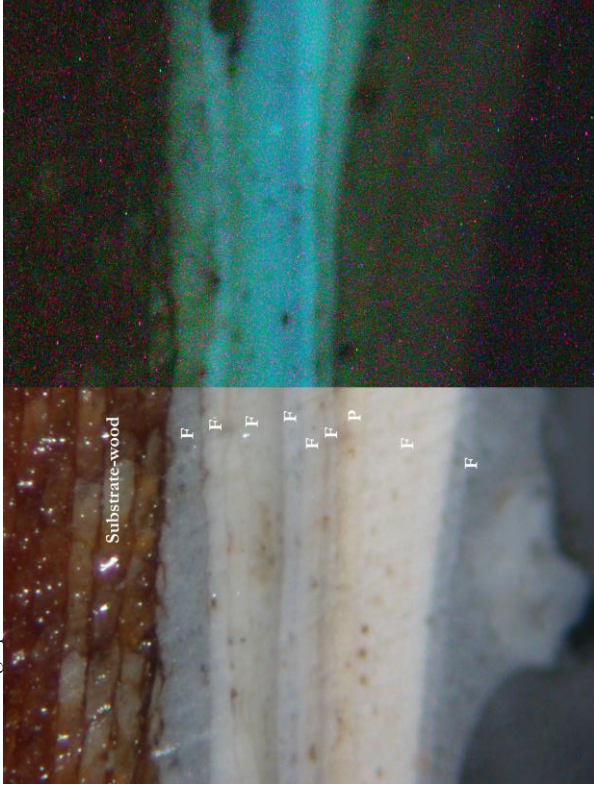
Earliest finish believed to be original. Color confirmed through bulk analysis, matches door trim in Room 104.

Location:	Brearley House, Lawrence Township, NJ (Room 103)			
Sample:	7			
Element:	Chair rail			
Analysis:	() Manual cross-section/RLM	(x) Embedded cross-section/RLM	(x)	Ultraviolet fluorescence
	() Binder characterization	() Pigment analysis	()	Exposure window

Sample Location:



Photomicrograph:



Chromachronology:

Campaign	Layer	Munsell	Color Name	UV AF	Notes
Substrate	Wood				
	Finish	N 4.5/	Lt gray	Gray yellow	
	Finish		Yellow white	White	
	Finish		Pale yellow	White	
	Finish		Yellow white	White	
	Finish		Yellow white	White to yel	
	Finish		Lt gray yel	Gray yel	
	Primer		Lt gray yel	Dark	
	Finish		Yellow white	Dark	
	Finish		Lt gray	Dark	

Observations:

Reasonably comprehensive chromachronology. Earliest finish may be original to this element.

Location:	Brearley House, Lawrence Township, NJ (Room 104)				
Sample:	08				
Element:	Door trim				
Analysis:	()	Manual cross-section/RLM	(x)	Embedded cross-section/RLM	()
	()	Binder characterization	()	Pigment analysis	()

Sample Location:



Photomicrograph:



Chronochronology:

Campaign	Layer	Munsell	Color Name	UV AF	Notes
Substrate	Wood	5YR 3/4	Dark reddish brown		

Observations:

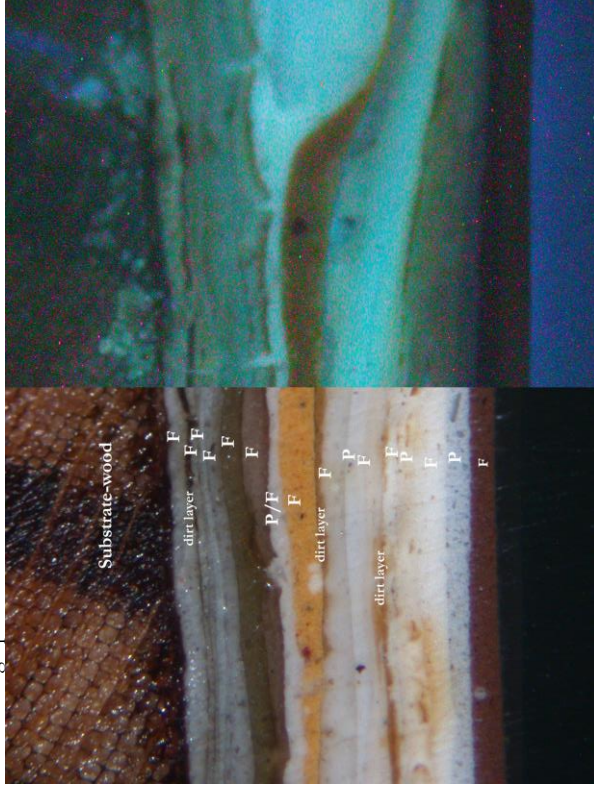
Earliest finish is likely original. Fragmentary in photomicrograph. Subsequent layers probably similar to other elements in study area.

Location:	Brearley House, Lawrence Township, NJ (Room 102)			
Sample:	09			
Element:	Chair rail base			
Analysis:	()	(x)	()	(x)
	()	()	()	()
	Manual cross-section/RLM	Embedded cross-section/RLM	Pigment analysis	Ultraviolet fluorescence
	Binder characterization			Exposure window

Sample Location:



Photomicrograph:



Chromachronology:

Campaign	Layer	Munsell	Color Name	UV AF	Notes
Substrate	Wood				
	Finish	N 4.5/	Lt gray	Lt gray yel	Dirt layer after
	Finish		Lt gray	Lt gray yel	
	Finish		Lt gray	Lt gray yel	
	Finish		Lt gray	Lt gray yel	
	Finish		Gray brown	White	
	Finish		Lt gray red	White	
	Primer/Finish		White	White	
	Finish		Mod gray yel	Brown yel	Dirt layer after
	Finish		Yellow white	White	
	Primer		White	White	
	Finish		Yellow white	White	Dirt layer after
	Finish		White	Lt gray	
	Primer		Yellow white	Dark	
	Finish		White	Dark	
	Finish		Lt gray	Dark	

Observations:

Earliest finish is likely original. Comprehensive chromachronology. Trim matches trim from Room 103.

