historic structure report
architectural data section

august 1984

HOPEWELL VILLAGE
THE IRONMASTER'S HOUSE

NATIONAL HISTORIC SITE/PENNSYLVANIA

HISTORIC STRUCTURE REPORT
ARCHITECTURAL DATA SECTION

THE IRONMASTER'S HOUSE
HOPEWELL VILLAGE NATIONAL HISTORIC SITE
HOPEWELL, PENNSYLVANIA

by
Peter F. Dessauer

U.S. Department of the Interior / National Park Service

TABLE OF CONTENTS

		Page Number
I.	Introduction with Addendum Note	1
II.	Acknowledgements	3
III.	Administrative Data	4
IV.	Archeological Data Section with Addendums	6
V.	Historical Data Section	8
VI.	Norman Souder's Historic Structure Report	9
VII.	Architectural Data Section	18
	A. Summary of Architectural Investigations	18
	B. Geotechnical Engineer's Report	23
	C. Mechanical Engineer's Report	27
	D. Structural Engineering Report	33
	E. Electrical Engineer's Report	43
VIII.	Outline of Work to be Done (Scope of Work)	61
	A. Drainage System: North Wall	61
	B. Northwest Basement: Rooms 002-003	62
	C. Southwest Basement: Room 001	67
	D. East Wing Basement: Rooms 004-005	69
	E. Front Porch: West Elevation	73
	F. Interior Central Hall and the Main Staircase	78
	G. Northwest Parlor: Room 103	80
	H. Reinforcement of the Second Floor Framing Systems	80
	I. Main Wing Attic: Rooms 301-302	81
	J. East Wing Attic: Rooms 303-304	83
	K. Roof	83
	L. Northeast Porch and Victorian Bathroom	85
	M. All Windows Made Operable	86
	N. House Totally Repainted and Whitewashed	87
	O. Improvements to the Electrical Systems	87
	P. Routine Maintenance Program for the Ironmaster's House	89
	Q. Grading and Drainage in the Areaway	90
IX.	Cost Analysis with Addendum	93
X.	Problem: Handicapped Accessibility	95
XI.	Further Architectural Research with Addendum	98

		Page Number
XII.	Evaluation of Effect of the Recommended Treatment for the Ironmaster's House	99
XIII.	Bibliography	104
XIV.	Drawings	107
XV.	Addendum: Outline of Actual Work Performed During Project Construction	137
	A. Drainage System: North Wall	137
	B. Northwest Basement: Rooms 002-003	139
	C. Southwest Basement: Room 001	139
	D. East Wing Basement: Rooms 004-005	140
	E. Front Porch: West Elevation	141
	F. Interior Central Hall and Main Staircase	142
	G. Northwest Parlor: Room 103	143
	H. Reinforcement of Second Floor Framing Systems: Rooms 201-209	143
	I. Main Wing Attic: Rooms 301-302	144
	J. East Wing Attic: Rooms 303-304	144
	K. Main Roofs: East and West Wings	145
	L. Northeast Porch and Victorian Bathroom (Room 207)	146
	M. All Windows and Doors Repaired and Made Operable	147
	N. Exterior Stucco Repairs, Whitewash, and Painting	149
	O. Improvements to the Electrical Systems	150
	P. East Wing Footbridge, Moulder's Kitchen Porch, and Southeast Porch Steps	153
	Q. Grading	153
	R. Pest Control	153
	S. Lightning Protection	154
	T. Construction Problem Corrections	154
XVI.	Addendum: Paint Study and Painting	155
XVII.	Addendum: Dendrochronological Study	166
XVIII.	Addendum: Construction Photographs	174

I. INTRODUCTION

A previous Historic Structure Report on the Ironmaster's House, Hopewell Village National Historic Site, National Park Service, was written by Norman M. Souder, architect, and published in January 1965. The conclusion to Souder's historic structure report recommended a restoration of the building to its conjectured 1820-40 appearance; such a restoration would require the demolition and drastic alteration of several post-1840 "Victorian" features. Preferring preservation of the total building to exhibit all stages of its evolution and history, the Park Service rejected Souder's recommendation. This determination not to restore and in favor of preservation was made in a master plan review in the regional office on February 14, 1975, and cited in a memorandum dated March 6, 1975, from the Regional Director, Mid-Atlantic Region (MARO).

In 1978 under package title "102: Preserve and Rehabilitate the Ironmaster's House," funds for writing the historic structure report, working drawings for fabric renovation, and archeological research were given to the Denver Service Center, Mid-Atlantic/North Atlantic Team. Historical architects Peter Dessauer and William Howell wrote a project task directive which outlined a "Class B" investigation for a preservation and rehabilitation treatment of the house. This task directive was reviewed by the park and regional office and approved by the Acting Regional Director, MARO, August 18, 1978.

During the summer and autumn months of 1978, DSC professionals made investigations into the existing conditions of the Ironmaster's House. In conformance with the policy of preservation, historical architects Howell and Dessauer concentrated their efforts in those parts of the house showing critical signs of decay, in dire need of repair, and in spaces open for public visitation. Accordingly, archeologist Audrey Marie directed excavations in the subfloor areas of the basement rooms and under the front porch. Geotechnical engineer James Ellis examined the soil conditions on the north side of the Ironmaster's House in order to determine the need for a drainage system. Civil engineer James Mayo evaluated the structural integrity of the interior framing for the design of reinforcements necessary to upgrade the building to code standards.

Mechanical engineer Edward Turner researched the moisture and humidity problems affecting the house. Electrical engineer Ray Johanningsmeier surveyed the fire alarm and intrusion systems. The findings and recommendations of these professionals are published in this architectural data section.

Following the introduction is a list of acknowledgements, mentioning all parties involved in the project, and the administrative data section written by park superintendent Elizabeth Disrude. The archeological and historical data sections cite the works already done by Audrey Marie and Charlotte Fairbairn, respectively. Norman Souder's 1965 historic structure report gives an architectural description of the house and drawings of its evolution. The architectural data section, scope of work, and cost analysis are a maintenance report for rehabilitation. Problems in designing for the handicapped at Hopewell are discussed under a separate heading. At the end of this report are listed further topics for research concerning the Ironmaster's House and a bibliography.

Addendum note: with completion of construction work in November 1980, and the consequential corrective measures to repair minor construction problems between January and May 1982, it was determined necessary to upgrade this historic structure report - architectural data section to include the information pertinent to the building's condition since the original writing in November 1978, and approval by the MARO in January 1979, and in preparation for final printing and publication in 1984. All "Addendum" notes and sections in this historic structure report were written by project architect Peter Dessauer in May 1984, based on correspondence, submittals, and change orders during the construction work and essential to record the fabric treatments to preserve and rehabilitate the Ironmaster's House.

II. ACKNOWLEDGEMENTS

I wish to acknowledge the contributions of the following persons whose cooperation was essential for the undertaking of this project: park superintendent Elizabeth Disrude whose permission and patience allowed the completion of architectural and archeological research by DSC professionals; park staff personnel: Bill Lutz, Charles Seidel, Dan Miller, Hooper Morrow, Mike Johnson, and Wilhelmine Malizzi who contributed their time and knowledge to the project. Special thanks to Seidel and Miller for their oral histories of the maintenance work done on the Ironmaster's House; Laurence B. Coryell, special assistant to the Regional Director, and Henry J. Magaziner, historical architect for the MARO, whose approval of the task directive realized the scope and purpose of the project; Nan Rickey, Chief, Branch of Historic Preservation, Kenneth Goslin, Chief, Branch of Design, and Vance Kaminski, senior historical architect, Mid-Atlantic/North Atlantic Team, Denver Service Center; their supervision and administration facilitated cooperation between the DSC professionals and the regional officers; DSC project support specialists: James Ellis, soils engineer; Edward Turner, mechanical engineer; James Mayo and James Wolf, civil engineers; and Ray Johanningsmeier, electrical engineer; and Dr. Richard Phipps of the United States Geological Survey (USGS), National Center, Reston, Virginia, who volunteered the services of his staff for cross dating and processing dendrochronological samples from Hopewell.

Also to Audrey Marie, archeologist, with her archeological crew, and numerous participants of the Youth Conservation Corp (YCC) and the Student Conservation Association (SCA) who performed the excavations.

Special lauds to historical architect William Howell for his advice and direction given the project architect and for his time given to assist in the archeological and architectural investigations.

III. ADMINISTRATIVE DATA SECTION

A. Ironmaster's House

Located in a village near the furnace complex, the house was built in three stages spanning the years 1773 to about 1828. It served as the home of the proprietor of the furnace, from the first ownership by Mark Bird through the last owners, the Brooke and Clingan families. This house is highly visible to the visitor, not only because of its impressive size but because of its prominent and symbolic position on the hill overlooking the furnace complex and the workers' homes beyond. It is an interesting example of the structural growth of a house, in which a century of change in the owners' fortunes and tastes are recorded in its shape, size, arrangement, finishes, and appointments.

B. Order of Significance and Proposed Level of Treatment

Hopewell Village National Historic Site was established by Presidential Proclamation, Departmental Order (3FR 2039), August 3, 1938. The statement of significance accompanying the proclamation made reference to surviving historic structures and lands ". . . the old furnace, mansion house, blacksmith shop, etc., . . . associated with Hopewell Village which had importance . . . by reason of their relationship to the colonial history of the United States, . . . to be a historic site of national significance."

When the National Register of Historic Places was created in 1966, Hopewell Village National Historic Site was automatically included. This includes the Ironmaster's House or "mansion house." The level of treatment recommended is restoration.

C. Proposed Anticipated Development Work

The LCS and Development/Study Proposal No. 102 recommend full restoration of this structure, to ensure structural soundness and historical accuracy. This will allow for interpretation of the entire period of furnace operation, from its beginning in 1770 to its final "blast" in 1883. As a result of the Historic Preservation Act of 1966, today's preservation philosophy puts emphasis on the continuum of history, as demonstrated by historic structures. The Ironmaster's House, as it

appears today, possesses the integrity and authenticity which justifies preservation treatment. It presents a clear picture of its evolution and use during the entire active life of Hopewell furnace.

D. Use of Structure, Operations, and Management

Upon completion of restoration, three rooms on the first floor of the big house and the basement kitchen and dining room will be furnished in accordance with the approved furnishings plan (1978). The interiors of the parlor, library/ study, and dining room on the first floor will be highly visible from the hallway entranceway. During periods of high visitation, the moulder's kitchen and dining room will have an unrestricted flow pattern with limited access and on-site interpretation provided for the balance of the year. Implementation of the big house furnishings plan will require additional custodial and maintenance needs. Higher utility costs will be imposed after installation of humidity and heat control devices and a reliable intrusion/fire alarm system. Additional manpower requirements and utility costs include:

Interpretation and Resource Management		
Park Aid, GS-3	1.8 work year	$15,200
Maintenance/Custodial Services WG-3	.3 work year	3,250
Estimated Increase in Utility Cost $1,500 year		1,500
		$19,500

E. Studies Affecting the Project

General management plan is scheduled for completion within this fiscal year; park's interpretive prospectus was approved in 1973; development concept plan - the environmental impact statement as prepared for the resource management plan will cover this project; DSC task directive for historic structure construction drawings - preserve and rehabilitate Ironmaster's House was approved May 25, 1978; historic furnishings study/plan completed pending final approval; historic structure report (architectural section) will be completed in 1978; extensive archeological investigations, history, background, and site studies completed; and plans and specifications underway and with completion schedule of fiscal year 1978.

IV. ARCHEOLOGICAL DATA SECTION

A. A preliminary report of archeological investigations of the Ironmaster's House has been written by Audrey Marie, archeologist, Denver Service Center, Mid-Atlantic/North Atlantic Team and dated September 1978. Presently, the report has gone through review by the Mid-Atlantic Regional Office and is under further review by DSC professionals. Laboratory research of the artifacts collected from the July 1978 excavations is in progress. Archeological fieldwork in the Ironmaster's House will terminate after excavation of the north portion of the moulder's dining room (004) during the summer of 1979. The following autumn the final archeological report will be complete for publication.

Addendum: Audrey Marie's report "Archeological Investigations of the Ironmaster's House, Hopewell Village National Historic Site, 1978," was completed in January 1980, and was given final approval by the Acting Regional Director, MARO, June 9, 1980. Not only did Marie's excavations reveal new information and artifacts in association with the Ironmaster's House but, more importantly, they mitigated the impact of construction in the areas researched. As a consequence of the excavations, datable materials were salvaged from underneath the front porch (west elevation), from the east wing moulder's kitchen (Room 005), and dining room (Room 004) before grading and new foundations during construction permanently altered the stratigraphy.

B. Addendum: archeological investigations were conducted at the Ironmaster's House between May 29 and June 22, 1979, by Elizabeth Righter, archeologist with WAPORA, Inc., under purchase order No. PX-2000-9-D113. These investigations were intended to augment the previous work directed by DSC archeologist Audrey Marie during 1978, to provide additional information to support hypotheses generated by Marie's report, and to mitigate extensive disturbances planned for specific areas during construction work to rehabilitate the Ironmaster's House. Elizabeth Righter's excavations were concentrated in the following areas:

1. Testing of the north and east areaways to determine original grades.

2. Exposure of historic stone slab drain and iron drain pipes in the north and east areaways.

3. Examination and record of the depth of the east wing north wall and areaway retaining wall.

4. Exposure and photography of the interior and exterior of the cesspool in the north areaway.

5. Measured drawings of the cesspool and drains. Preparation of an archeological site map.

6. Examination of deposits in the north half of the moulder's kitchen (Room 005).

7. Investigation of a 5' wide area adjacent to archeological feature wall No. 5 under the front porch.

After the field excavations were completed, more than a year of laboratory research and writing was pursued until Elizabeth Righter prepared Final Report of 1979 Archaeological Investigations at the Ironmaster's House, Hopewell Village National Historic Site, Chester County, Pennsylvania, dated May 15, 1981. The results of Elizabeth Righter's findings and conclusions led to a compliance evaluation of no adverse effect (see Chapter XII) for construction work planned to pour a concrete pad foundation in the moulder's kitchen (Room 005), to pour a concrete footing for a new concrete masonry unit pier wall under the front porch, and to excavate behind the retaining wall for drain installation.

V. HISTORICAL DATA SECTION

See the following publications for historical data on the Ironmaster's House:

A. Fairbairn, Charlotte. "Historic Structure Report, Historical Data Section, Ironmaster's House, Hopewell Village National Historic Site," p. 32, typescript, June 12, 1963.

B. Menz, Katherine. Furnishings Plan, Sections A through F, Ironmaster's House, Hopewell Village National Historic Site, p. 150, U.S. Department of the Interior, National Park Service, Harpers Ferry Center, May 1978.

VI. NORMAN SOUDER'S HISTORIC STRUCTURE REPORT

On the following pages the important contents of Norman Souder's historic structure report, dated January 1965, are presented with some corrections and provide an excellent architectural description of the building. To avoid duplication of presented material the photographs from his historic structure report have been omitted from this report. His recommendations for restoration were not accepted for reasons already discussed in the introduction. Souder's illustrated evolution of the Ironmaster's House is still accepted as the logical sequence of the building's construction stages.

A. Foreword

The Ironmaster's House is, and appropriately so, one of the larger and more important buildings at Hopewell Village. The house has survived the ravages of time more successfully than some of the furnace buildings because it was occupied and maintained after Hopewell furnace discontinued operations. It is fortunate that no post-period alterations were attempted.

Three rooms on the first floor and the kitchen in the basement have been temporarily furnished and opened to visitors for the past several years. At the present time the Ironmaster's House incorporated all phases of its development, from a small eighteenth century house to a sizable Victorian country dwelling. A decision as to the restoration period will be necessary prior to restoration and furnishing of the house. Most of the restored buildings in the village have been to the circa 1840 period, the peak period of furnace activity.

In 1957 a superficial examination of the building was made by the writer. The dates ascribed to the various portions are general and based only on the building materials, construction methods, and design details. The chart made at that time is a part of this report.

Since that time, historian Fairbairn prepared an historical data section, Part I report. The research established the probable building dates as 1773 for the original northwest wing; 1826 for the east wing; and circa 1828 for the southwest wing.

The proposed architectural investigation will be, of necessity, a sizable project. In order to record the findings of the architectural data section, Part II report, the building fabric will have to be thoroughly examined and evaluated.

There remains a great deal which may be learned in the investigation. The basic building stages are known, but many details and indications of earlier phases are concealed by later additions and alterations.

Measured drawings of the Ironmaster's House in its present state were made by a Historic American Buildings Survey (HABS) architectural student team in the summer of 1957. The team consisted of Eugene Dunbar and Robert Belcher.

Norman M. Souder
Architect
January 1965

B. Existing Conditions - Exterior

1. Site

The house is located on a hillside in the center of the village. The terrain is such, that the grade on the north side is at the level of the first floor and at the level of the basement floor on the south. Due to the sloping site, a wide, moat-like light well was created by the construction of stone retaining walls on three sides of the kitchen wing.

2. Size

The house is a T-shaped structure, two and one-half stories high with a full basement. The front, or west wing is 24' by 53' 6" and the east wing is 22' by 36'. The porch across the front and the large light well area surrounding the east wing, increase the area occupied by the house to a rectangle 53' 6" wide by 81' long.

3. Walls

The house walls are constructed of native stone and covered with pebble dash stucco. The stucco appears on the interior of the second stage addition, indicating that the original portion was stuccoed at the time of erection, or shortly thereafter.

4. Roofs

The main roof is covered with cedar shingles. The southeast and basement porch roofs are also hinged. The bathroom extension and the front porch roofs are covered with tin.

There are two dormers on the north slope of the east wing. The north and east gables are treated in the conventional method, and the south gable is finished with a stepped parapet wall, reminiscent in design to the early Flemish and Dutch houses.

The cornices are simple box cornices with crown trim. On the front an elaborate carved frieze is placed beneath the main cornice.

5. Porches

The central portion of the front porch was erected in 1867 and the ends in 1870. The porch design consists of six octagonal, tapered columns and a railing of narrow square spindles arranged to form a lattice pattern.

The southeast porch has square posts and a railing of slender tapered dowel spindles, set vertically. Latticed panels fill the area between the top of the railing and the beam soffit. The northeast porch has a lattice from floor to soffit, in lieu of a railing. The porch at the basement kitchen entrance is a simple shed roof structure, with a shingle roof and slender square posts.

6. Fenestration

The windows are the original small paned sash except for the long Victorian two-over-two light sash on the first floor front, and two windows on the north. The sash varies in size from six-over-nine light on the first floor to four-light sash in the north gable.

7. Doors

The exterior doors vary in design. The front entrance door is Victorian, the dining room doors are of the Federal period, and the basement doors and bridge door are board and batten.

C. Existing Conditions - Interior

1. Basement

The basement is divided into three unconnected areas as a result of the three major building periods.

The basement in the original northwest portion is divided into two rooms by a stone wall at the center. The walls are roughly plastered and the flooring is earth. This portion is approached by a stair from the central hall on the first floor and a double door from the areaway on the east. The basement under the southwest section is one room, with no connection to the first floor. The floor is concrete. A door on the south wall and another on the east provide access to the area.

The basement under the kitchen wing is divided into two rooms. The walls and ceilings are plastered and the wood floors are on sleepers, set in earth. The east room is the basement kitchen with a large cooking fireplace and a winding service stair to the floors above. The second room has been called the moulder's dining room and has two outside entrances, one in the south wall, and the other in the north wall.

2. First Floor

The first floor consists of four rooms and central hall. The main staircase is late eighteenth century in style, with a curving rail and gouge-carved frieze.

The northwest parlor has Victorian woodwork and a marbelized slate mantel of the Victorian period. The southwest parlor has woodwork and mantel dating from the 1828-30 period. The dining room at the rear of the hall has the original mantel, cupboard, and woodwork of the early nineteenth century.

The first floor kitchen is of the same period as the dining room. There is a winding service stair in the northwest corner leading to the basement kitchen below, and to the servants' rooms above. At this level an exterior door leads from the stairway to a bridge across the light well.

The kitchen fireplace has a Kisterbock range set into the fireplace opening.

3. Second Floor

The second floor consists of six bedrooms, bathroom, and hallways. The south and northwest bedrooms have fireplaces with mantels of their respective periods. There are no fireplaces in the other four bedrooms.

The bathroom is built over the north porch. While there is no actual documented date for its installation, the historian's report places it between 1868 and 1871. The early fixtures are incorporated into one unit by wood framing and paneled front.

4. Third Floor - Attic Rooms

The third floor is divided into two areas. The front area consists of two large rooms which are accessible by the main stairway. The area cover the east wing is reached by the service stair in the northwest corner and consists of two rooms, obviously servants' bedrooms.

5. Interior Finishing

The walls and ceilings of the first, second, and third floors are plastered. The floors on the first floor are 4" wide yellow pine and on the second and third floors are wide pine boarding of random widths.

The types of doors and trim in the house vary greatly. There are at least seven types of doors and five types of trim dating from various periods of building and alterations.

D. Architectural Development

Preliminary investigation by the architect in 1957 revealed some of the building progression of the more obvious major additions. The known stages of development are included in sketch form as a part of this report and are described as follows:

1. Original Structure

The original building which includes the northwest parlor and central hall portion of the front of the present house, was probably erected in the latter part of the eighteenth century. Much remains to be learned about this portion. There is a stone wall in the middle of the basement serving no apparent function in the existing structure. It is known that the first floor had been greatly altered in the mid-nineteenth century.

2. First Addition

According to the examination of the walls abutting the first portion, the kitchen wing was the first extension of the house. This was at first a two-story structure with a shed roof. At some later date, the north wall was raised and the shed roof became a pitched roof with an east gable, by the addition of an attic. The kitchen wing may have been added in the early nineteenth century (circa 1825), when according to interviewees, workers were fed in the basement dining room.

3. Second Addition

The T-shaped plan was completed circa 1828-30. This is indicated by the woodwork and structural materials. This was accomplished by an addition to the front of the building at the right of the central hall, and contained the southwest parlor on the first floor level, two bedrooms on the second floor level, together with basement and attic areas.

4. Third Addition

Dr. Clingan erected the bathroom as a frame shed addition over the northeast porch sometime in the 1860s. Whether the porch existed prior to the addition of the bathroom is not known at the present time.

5. Fourth and Subsequent Additions

The long front porch was added in two stages. The first, a large porch in the center, erected in 1867, and the extensions at each end added in 1870, extended the porch the full length of the house front. At this time the original six-over-nine light sash were changed to full length two-over-two light Victorian style sash.

It is presumed that about the mid-eighteenth century the south gable was mHto the present stepped gable. There is no record of this change, nor any logical reason presented to date for this change. There is no local precedent for the gable which adds a Dutch or Flemish touch to the house. The steps were added in such a manner as to leave the line of the original gable clearly discernable.

6. Maintenance Under the National Park Service

The house has been maintained in reasonably good physical condition. The first floor has been open to visitors and has interior furnishings largely of the Victorian period.

In 1959 an electric radiant heating system was installed in the first floor ceilings. At that time, the failing summer beam over the south parlor was pulled into place by means of a wood truss installed in the attic. A system of tie rods and turnbuckles has been inserted through the second floor partitions to transfer the weight of the beam to the truss above.

Various repairs have been made as a part of the building maintenance which did not effect a change from the original, including window frame and sill, window sash, shutter, porch, and door repairs.

The house has been painted white with shutters, blinds, porches, and trim in iron oxide red. Preliminary paint studies how this red is not the original color. The earliest years of paint on the shutters and blinds were a medium green. The exterior stucco has recently been whitewashed.

Unfortunately all traces of wallpaper had been removed from the house before Hopewell Village was acquired by the National Park Service. The plaster walls indicate wallpaper was used in most rooms. The first floor kitchen, however, bears traces of innumerable coats of whitewash and paint. It is hoped that small bits of wallpaper may be found behind partitions, etc., to indicate the style and patterns used.

E. Proposed Architectural Investigation

When the architectural exploration of the building is undertaken a great deal should be learned about the structure including, it is hoped, more definite clues as to the age of the various parts. It is evident that a great deal of change has taken place in the original northwest parlor. At a late period, all of the parlor was refitted with Victorian trim. A slate mantel was painted and veined to simulate marble and fixed to the fireplace structure. This room, especially, will have to be thoroughly investigated to determine its original size and design.

Architectural investigation of the building will be an extensive undertaking. The many changes in partition walls and openings, the additions at various periods have resulted in an unusual number of door and trim types. All of these will have to be analyzed for dating. It can be anticipated that many features now unkown will be brought to light. Previous experience at Hopewell Village in the restoration of the office-store and in the archeology for the reconstruction of the Cast House, has proven that present theories and evidence can be completely changed in the light of new and more conclusive evidence.

A preliminary estimate of $10,000 is suggested as the amount required for the architectural research and investigation which will be required prior to the preparation of the Part II, architectural data section report.

F. Recommendations

The buildings at Hopewell Village have all been restored to the 1840 period. The sole variation has been the exterior of the duplex tenant house, which was restored to its building date of circa 1855.

Originally the 1840 period was chosen as the restoration date for Hopewell Village in order to represent the peak period of iron furnace production. Consequently, the village barn, office-store, tenant houses, Charcoal House, and shed have been restored to that date.

The Ironmaster's House as it now stands, represents the full span of the iron-making business, which ended in 1883.

It is recommended that the house be restored to its appearance of 1840, so that it will be consistent with the restored buildings surrounding it.

The restoration would primarily involve the removal of the large front porch, the bathroom addition, changes in fenestration, and the removal of the Victorian trim and mantel in the northwest parlor.

VII. ARCHITECTURAL DATA SECTION

The reports of the fieldwork done by DSC professionals at Hopewell Village compose the architectural data section which is basically a description of the building's condition as it existed in the summer of 1978 and recommendations for specific repairs. In this regard the architectural data section serves as an addendum and amendment to Norman Souder's earlier historic structure report and is not a repeat of the basic architectural information already presented by him. A "Summary of Investigations" describes various aspects of the project research completed by the DSC historical architects. Proposals for a drainage system are presented in James Ellis' paper entitled "Evaluation of Foundation Moisture." Civil engineer James Mayo recommends alternatives for securing the aging structure. Mechanical engineer Edward Turner proposes some simple and basic solutions for alleviating the humidity problems throughout the house. Ray Johanningsmeier surveyed the electrical apparatus in the Ironmaster's House and outlines improvements for the fire alarm and intrusion systems.

A. Summary of Architectural Investigations - Hopewell Village 1978

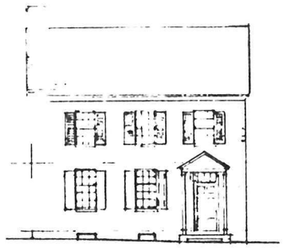
1. Measurements of the existing dimensions of the Ironmaster's House were taken by DSC historical architects Howell and Dessauer, which were transcribed into the following drawings:

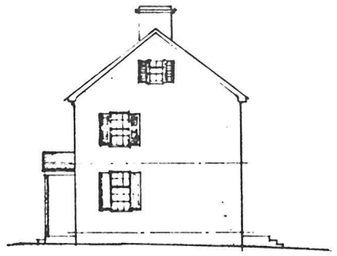
a. Plans (five) of the house were drawn more accurately than previous HABS documents and detailed with notes and dimensions.

b. Elevations (four) with dimensions were drawn to the same scale as the plans.

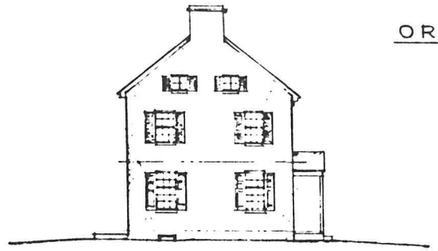
c. Plans (four) at 1/2" scale of specific areas of the house in need of repair.

d. Sections (four) through specific parts of the Ironmaster's House, i.e., the basements, attic, and front porch, were drawn to illustrate existing conditions and to facilitate further working drawings for repairs needed in these areas.

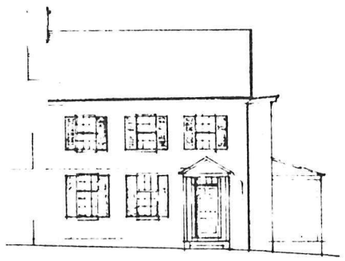




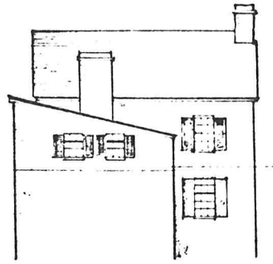




ORIGINAL HOUSE
CA. 1770 - 1800

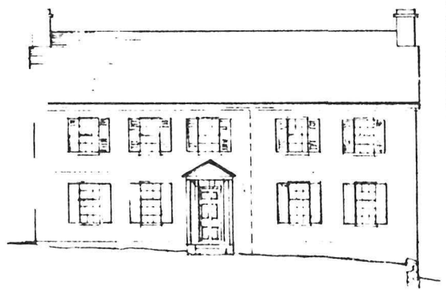








FIRST ADDITION
CIRCA 1810-1820

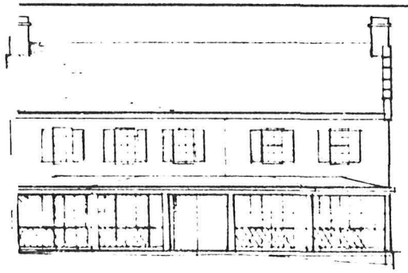




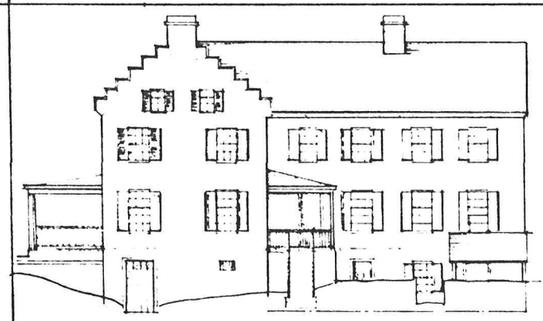




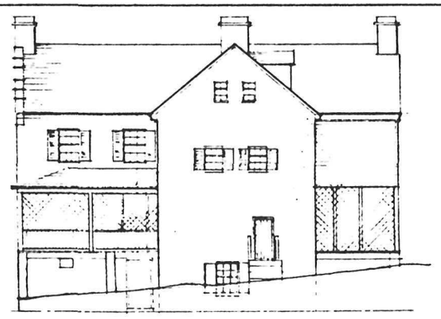
SECOND ADDITIONS
CIRCA 1830



WEST ELEVATION



SOUTH ELEVATION

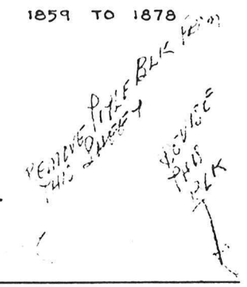


EAST ELEVATION



NORTH ELEVATION
NOT TO SCALE

VICTORIANIZATION
1859 TO 1878



BUILDING PROGRESSION

MARK	DESCRIPTION OF REVISION

RECOMMENDED _____ DATE

APPROVED _____

UNITED STATES
DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

PREPARED BY

OFFICE

TITLE OF DRAWING

LOCATION WITHIN PARK

NAME OF PARK

2. Architectural and archeological features revealed by DSC research in 1978 gave no evidence to refute Norman Souder's accepted theory concerning the building phases and dates of the Ironmaster's House, i.e., the original northwest wing built probably as early as 1773, the east (rear) wing in 1826, and the southwest in 1828. The structural evolution of the house is illustrated in Souder's historic structure report, dated January 1965. Further data to substantiate this will be published at the conclusion of the dendrochronological study.

3. The front porch: DSC research revealed and recorded the following features:

a. Seven stone foundation walls - including Feature 5 which is below grade.

b. Feature 5a - a 4" by 6-1/2" beam on log piers supporting the framing of the front porch floor.

c. Shim piece from Feature 5a - a piece of 5-1/2" by 1-1/8" tongue and groove flooring; this was probably the dimension of the floorboards on the 1870 porch.

d. Foundation footing - 2" or 3" wide ledge just below grade along the west side of the northwest wing of the house.

e. Porch framing system - 2" by 6" lumber and 6" by 8" hewn timbers.

4. The moulder's kitchen and dining room: the subfloor features were revealed and recorded, interpretated, and possible significance of these features are discussed in the archeological data section. Among them are the following:

a. Hewn timber and milled lumber sleepers

b. Remnants of a former stone wall

c. L-shape line of stones adjacent to the south side of the hearth.

5. Basement Room 001 - under southwest parlor: a spread footing foundation 3/4" to 2" wide was found under the concrete slab, south wall of the northwest wing, north wall of the basement.

6. Inspection of the building fabric revealed the need for solutions to problems in the following areas:

a. Drainage - north side of the building

b. Lack of ventilation - in the basement and throughout the house

c. Deterioration of basement floors and ceiling framework

d. Front porch framing, floor, and roof

e. Leaking roof, old gutters, and chimneys

f. Attic interior

g. Exterior paint

h. Balustrade of the main stairs, entrance hall

i. Fire alarm and intrusion system

7. Study of the hygrothermograph charts from the instruments kept in the basement Room 002 and in the attic Room 302 show the high relative humidity in those spaces. The excessive moisture in the basement rooms allows fungal attack on the wood ceilings and floors, a situation caused by the lack of proper air ventilation. Experiments by DSC historical architects Howell and Dessauer showed that

the relative humidity in basement Rooms 002 and 003 decreased drastically, as indicated by a drop of the instrument needle, when Doors 010 and 105 were opened simultaneously drawing in a circulating air current. The architects concluded that much of the humidity problem in the Ironmaster's House can be remedied by natural ventilation. This would require that all windows in the house be made operable, including the basement ventilation windows which at the time of research were closed and/or blocked by earth on the outside.

8. Encouraged by Dr. Richard Phipps of the USGS, National Center, Reston, Virginia, Howell and Dessauer took increment borer samples from the timber sleepers of the moulder's kitchen-dining room, from framing on the front porch, from joists in the ceilings of basement Rooms 001 and 003, and from prominent trees in Hopewell Park. Dr. Phipps volunteered the services of his office to analyze and cross date the borer samples in order to establish a dendrochronological time table for the park. When Dr. Phipps has finished cross dating research, the results of his findings will be sent to the Denver Service Center.

Dessauer's increment borer samples were retrieved in poor condition and could not serve as recordable data. Dr. Phipps extracted new samples, in excellent condition, during his visit to Hopewell Village during April 1-2, 1980 (see XVII - Dendrochronology Study).

B. Geotechnical Engineer's Report

The most critical problem affecting the Ironmaster's House is the excessive amount of moisture in the basement rooms caused by water vapor rising from the earth floor and condensation on the walls. Inadequate ventilation causes this excessive moisture to remain within these spaces with the result that floorboards, ceiling joists, and surface whitewash are deteriorating. To arrest this fabric deterioration and to rehabilitate the structural integrity of these rooms, the DSC professionals involved with the Hopewell Village project have devised various solutions to prevent further moisture intrusion.

Denver Service Center soils and geotechnical engineer James M. Ellis made a trip of Hopewell Village, June 19-22, 1978, to evaluate the problem of undesirable water in the foundation area of the Ironmaster's House, specifically the basement of the northwest portion, Rooms 002 and 003. Ellis discussed the results of his research and made recommendations to alleviate the problem of excessive interior condensation. A copy of his report is presented on the following pages:

EVALUATION OF FOUNDATION MOISTURE
IRONMASTER'S HOUSE
HOPEWELL VILLAGE NATIONAL HISTORIC SITE

The possibility of underground water leaking into the foundation area of the Ironmaster's House has been of great concern to the superintendent and to the regional office. The investigation, which included four excavations along and inside the north wall, has shown that the mortared, rubble stone foundation wall is intact and that no deterioration of the stone or mortar is in evidence. The excavations also disclosed that the native soil and rock that support the wall are in good condition and show no evidence of water saturation, percolation, or alteration.

The local foundation soils and rock are composed of relatively hard, interbedded, clay, and silt units which are generally horizontally oriented. Fracturing and joining within these units act to collect the annual heavy precipitation and channel it into the larger of the joints which eventually emerge in the hillsides and develop both intermittent and perennial springs. The springhouse southeast of the Ironmaster's House is one such example.

The general knowledge of the aforementioned regional ground water system led to the thinking that the presence of free water in the northwest section of the basement could be due to the migration of ground water through and under the foundation wall. It is now proposed by the writer that the majority of the undesirable water is due to

condensation. This became very apparent when a heavy rainstorm developed during the period when the excavations were in progress. The heavy charge of water vapor into the air, due to the rain, immediately began to condense into water droplets on the cool inside wall of the basement. The droplets formed throughout over the lower 4' of the wall above the dirt floor.

Water has been noted discharging from the open ends of both plastic (PE) conduit and metal conduit which carries power and communications into the house. The thought was that a breach in the conduit, somewhere prior to its entering the house, could be picking up ground water. It is the opinion of the writer that this water is also condensed water vapor that has been carried by convection into and through the tubing and precipitated or condensed on the cool wall of the tube which is buried approximately 2' below ground level. Gravity flow would carry the condensation into the basement. It is difficult to rationalize the development of a consistent thin stream of water as mentioned, but a system of intergrated, interconnected tubes has been engineered in other areas to supplement domestic water supplies and utilizes only condensation in the collector mechanism.

Recommendations:

1. Close off, by caulking or other suitable means, all openings into the conduit system to disallow circulation of air. This should be done during a period of minimal humidity. A rag plug around the wires followed by some type of asphalt product should do the job.

2. Ventilation in the basement should be improved. Existing window areas should be cleared and replaced with "crawl space" louvers.

3. Construct a moisture barrier of polyethelene, four mil, plastic film across the ceiling to protect the overhead flooring, molding, and furnishings. Also place a moisture barrier, as defined, over the dirt floor and cover it with at least 2" of gravelly sand. Smallest particle size of cover material should be approximately a No. 8 sieve size.

4. Insulate the north wall. This can be done on either side of the wall but obviously can be done more simply on the inside. Conservation of existing wall on the inside may be required, but cost of work on outside would be very high. Insulation should be carried 6" below floor grade on either inside or outside wall. Insulation of the inside wall should include construction of furring strips for attaching the insulation bats followed by some acceptable type of fiberboard. Insulation should be installed with moisture barrier out toward room. The end result is to keep the highly charged, damp air from reaching the cool north foundation wall.

The benefit of working on the outside of the wall is the development of a barrier for any soil moisture which might enter the now porous wall. It is feasible that following a long period of precipitation, the soil moisture could build up sufficient pressure to migrate through the wall and weep on the inside. As asphaltic waterproofing membrane could be applied to the wall after excavation and cleaning or an eight mil (PE) plastic film could be utilized with only minimal scaling of the wall surface.

Insulation on the outside wall could be accomplished by placing styrofoam (1") sheets over the membrane and then backfilling. The sheets have been used successfully beneath roadways to retard frost action and should serve equally well at this location. Membrane and styrofoam should be carried above the ground line to an elevation where snow melt will not get behind the system.

Although no evidence of ground water was indicated in the footing area of the wall, it might be desirable, while the excavation is open, to install an underdrain system at the base of footing elevation. This system would collect and drain off any excess soil moisture that might develop.

The installation of this sytem should include corregated (PE), heavy duty, flexible plastic, slot-perforated pipe such as produced by Advance Drainage Systems, Inc. of Columbus, Ohio (614-457-3051).

Filter material should be well-graded sand and gravel of which 100 percent by weight will pass a 1" sieve and not more than 10 percent shall pass the No. 8 sieve. A 4" diameter pipe should handle any expected water.

See enclosed maps and typical drawings for clarification.

Prepared by
James Ellis
July 14, 1978

C. Mechanical Engineer's Report

1. General

A survey of the Ironmaster's House at Hopewell Village National Historic Site was accomplished to determine the existing condition of the building and possible solutions to any problems that are found. Prior to this survey is was known that extensive fabric deterioration has and is occuring due to high humidity conditions existing in the building.

Inspection of the building revealed:

1. In addition to the electric resistance heat system located in the ceiling of the first floor, the basement areas and the moulder's kitchen and dining room areas contained a separate heating system. This system consists of electric resistance heaters which are located in Rooms 001, 002, 003, 004, and 005. This system is controlled by thermostats and a humidistat all of which are located on the wall in the northeast corner of the moulder's kitchen (Room 005). This heating system is utilized to control the humidity and temperature in the rooms where the heating elements are located.

2. Rooms 002 and 003 are basement rooms with earth floors. The earth floors in these two rooms input a large amount of water vapor throughout the building.

3. The floors of Rooms 004 and 005 are of wood laid on sleepers over earth without a vapor barrier. This condition also allows a large amount of water vapor to enter the building.

4. The building as a whole is inadequately ventilated. Consequently, water vapor entering through the basement and through the floors of Rooms 004 and 005 results in a large amount of water vapor becoming trapped within the building. The resulting water which condenses on the fabric contributes to its deterioration. At the time of the survey the hygrothermograph located in Room 002 was indicating a relative humidity of approximately 60 percent while the one in the attic was indicating approximately 70 percent.

2. Discussion

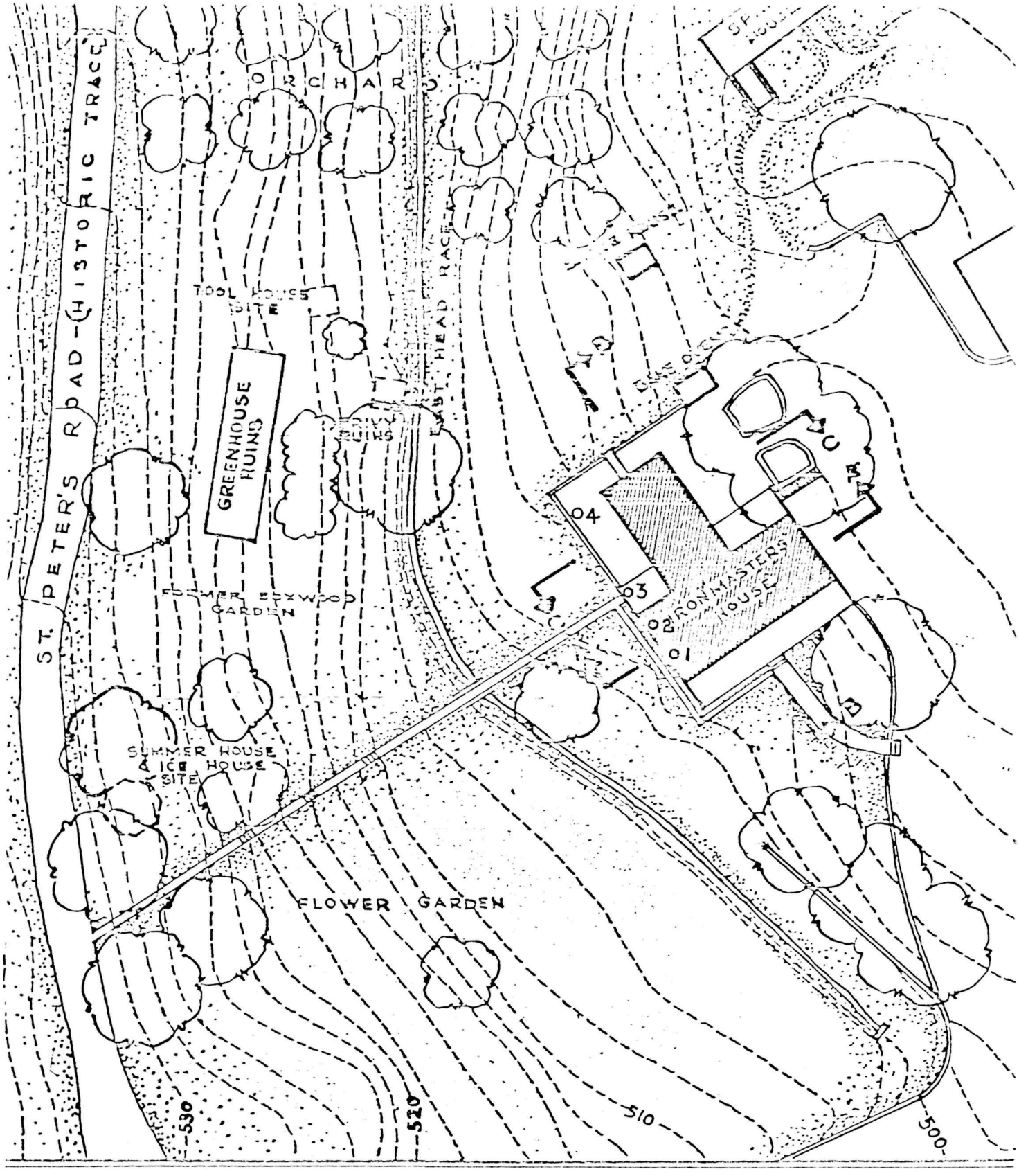
The high humidity within the building is caused primarily by water vapor intrusion from the earth floors in Rooms 002 and 003, and the earth below the wooden floors of Rooms 004 and 005 along with inadequate building ventilation. Elimination of this moisture problem will require controlling the vapor intrusion and adequate ventilation of the building. The heating system presently installed will also require modification if it is to be of any use for this problem.

3. Recommendations

a. Room 001 - open Windows 001 and 002. Install a manual louver system in these two windows. Window 004 should also be put into operable condition.

b. Room 002 - open Window 005. Install a manual louver system in this window. The old heating duct through the wall between Rooms 001 and 002 should be removed. The hole in the wall which the duct passes through should remain. The earth floor should be leveled, a vapor barrier installed, and a concrete floor laid over the vapor barrier.

c. Room 003 - install a manual louver in Window 006. The earth floor should be leveled, a vapor barrier installed, and a concrete floor laid over the vapor barrier.

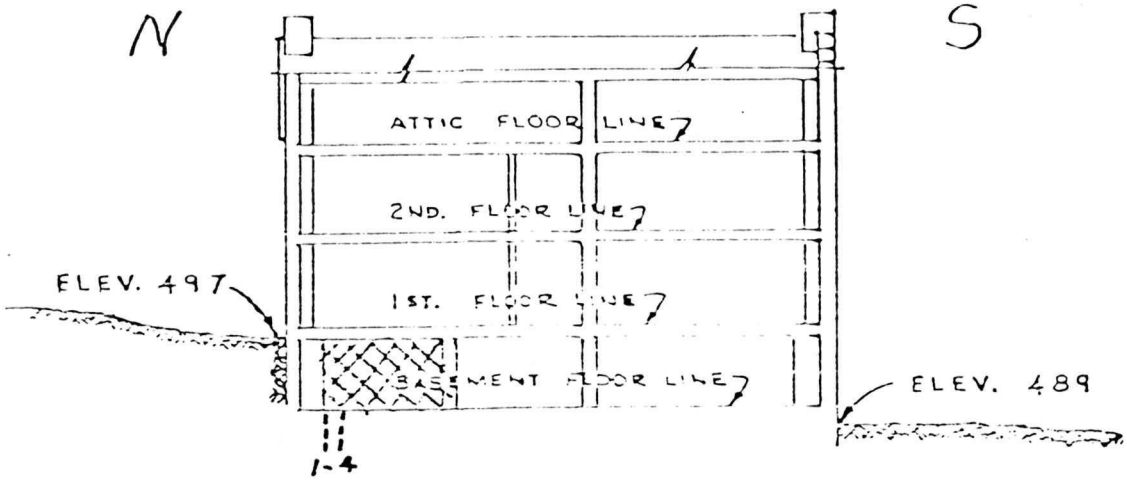


N

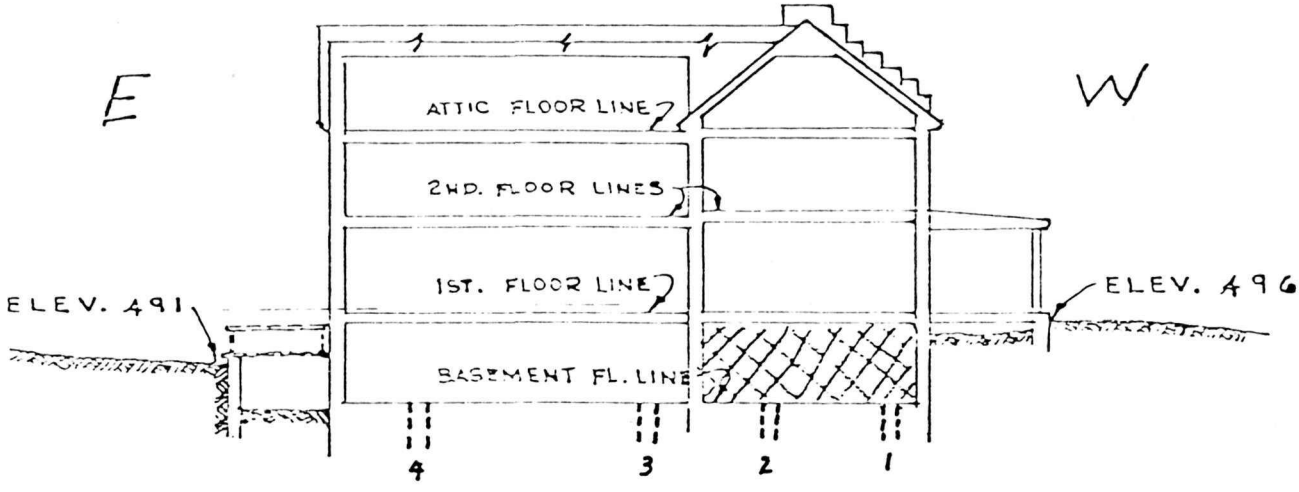
PLOT PLAN

SCALE - 1" = 40'

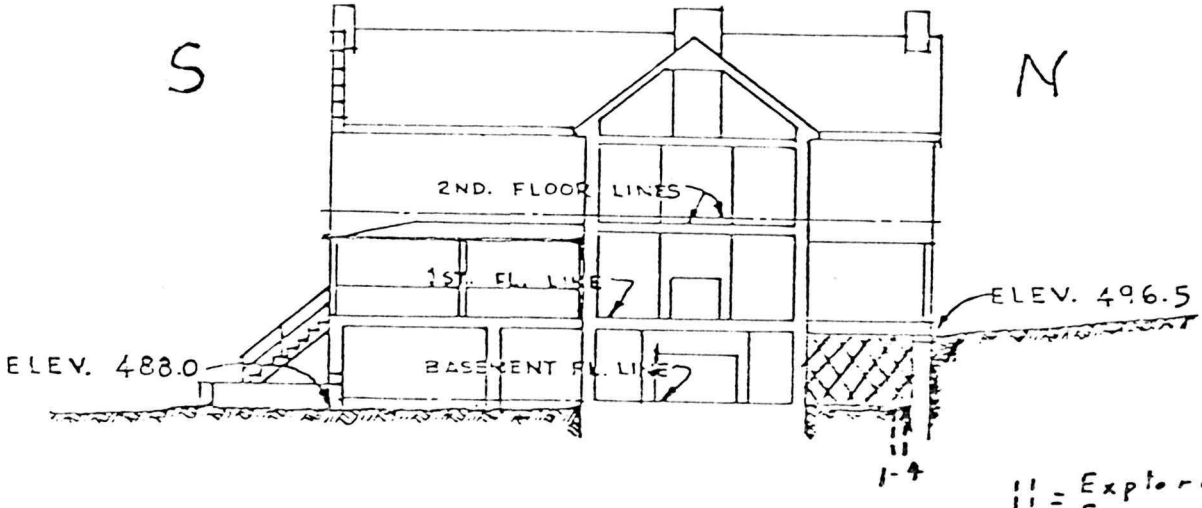
o = GEOTECHNICAL EXPLORATORY EXCAVATIONS



SECTION A-A

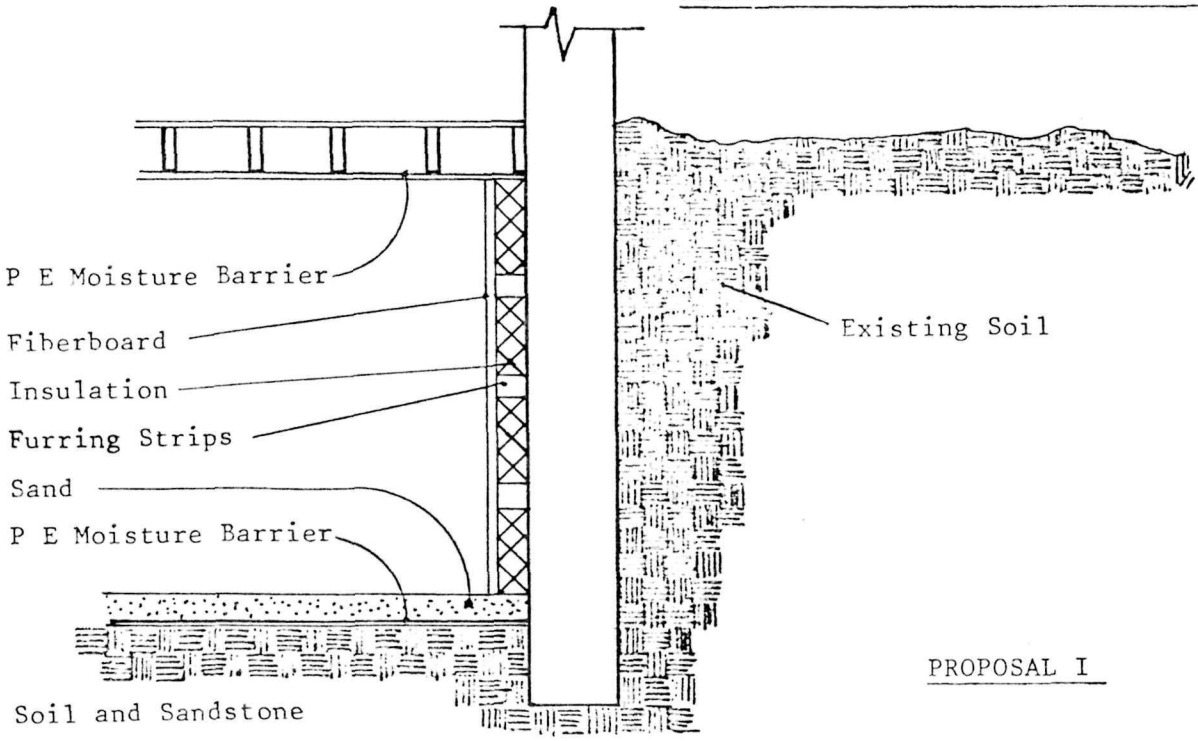


SECTION B-B

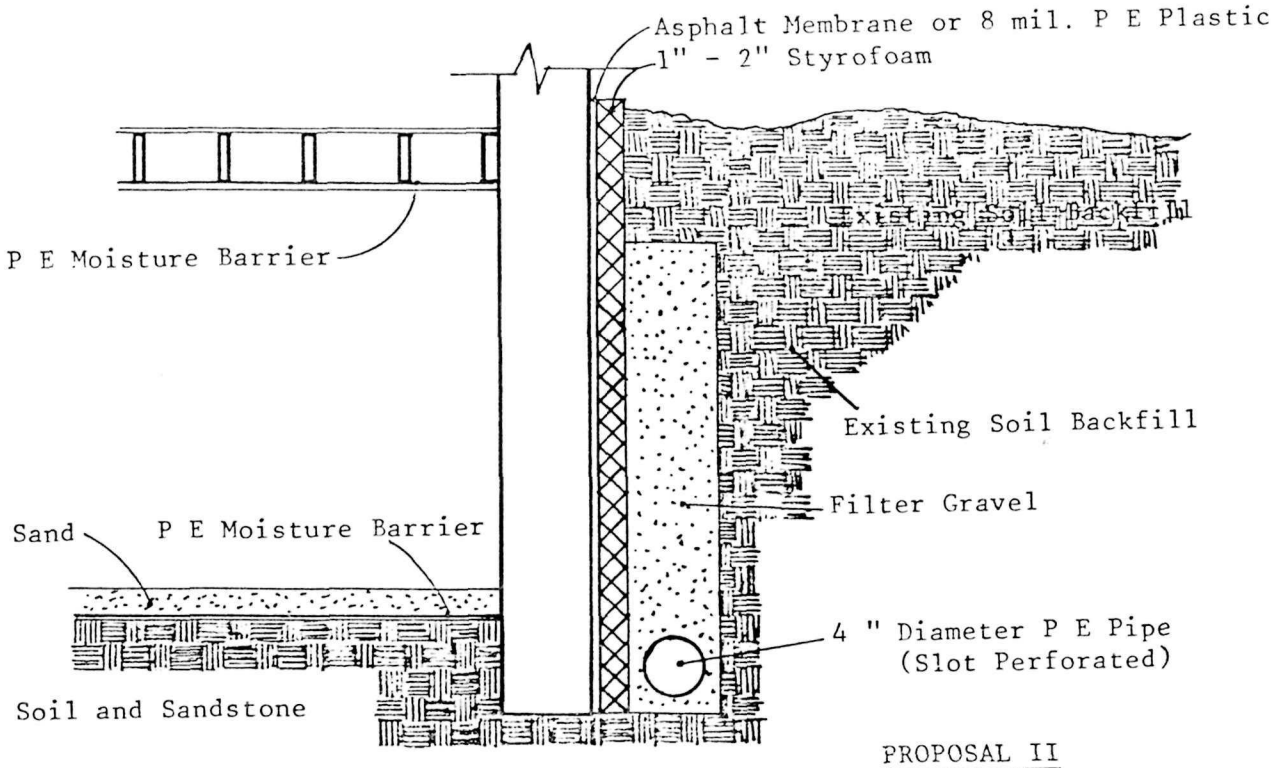


SECTION C-C

SCHEMATIC DRAWINGS OF PROPOSED PLANS TO INSULATE AND WATERPROOF THE NORTH WALL OF THE IRONMASTER'S HOUSE



PROPOSAL I



PROPOSAL II

d. Rooms 004 and 005 - Windows 007, 008, 009, and 012 should be put into operable condition. If the wood floors are to be replaced, a vapor barrier beneath the new floors should be added.

e. First floor - Windows 104, 108, 109, 110, 112, and 114 should be put into operable condition.

f. Second floor - Windows 204, 206, 210, 211, 212, 213, 214, 217, and 220 should be put into operable condition.

g. Room 301 - open hatch in flat ceiling. Add vent into chimney, open chimney.

h. Room 302 - open hatch in flat ceiling. Add vent into chimney, open chimney.

i. Room 303 - Window 305 should be put into operable condition.

j. Room 304 - Windows 306 and 308 should be put into operable condition.

k. Roof soffit should be vented all around building.

l. Front porch - soffit at north and south ends of porch should be vented.

m. A drainage system as suggested in James Ellis' report could be helpful as the north wall is the uphill side of the building.

4. Conclusions

Addition of the vapor barriers and proper ventilation of the building should reduce the humidity within the building to acceptable levels.

Prepared by
Edward Turner
October 30, 1978

D. Structural Engineering Report

1. Introduction

The Ironmaster's House is a T-shaped, two-story masonry structure with wood frame floors, roof, and partitions. The interior bearing walls are also masonry because the original structure, built in 1773, was added onto in 1826 and again in 1828.

On October 17-18, 1978, the author conducted a field investigation with the following DSC personnel:

Peter Dessauer, historical architect
Edward Turner, mechanical engineer
Ray Johanningsmeier, electrical engineer

This report deals with the structural integrity of the building and recommendations for its rehabilitation.

2. Summary

The building is in generally fair overall condition, however, there are some severe problem areas. Most of the floors, and especially the summer beams, are not strong enough to support visitor loads. Some of the floor joists in the first floor have been damaged by rot, and these areas should be corrected. The moulder's dining room and kitchen (Rooms 004 and 005) floor and the front porch floor, also show signs of decay and should be replaced.

The cracks in the walls of the bathroom are caused by the settlement of the retaining/foundation wall below. A concrete column and footing pad should be built behind the wall to support the weight of the porch and bathroom.

This report presents three alternatives:

1. Upgrade the structural system to accommodate guided tours through the house as outlined in the development/study package proposal (Form 10-238). This includes replacing the floors in the moulder's dining

room and kitchen and the front porch. The floors in the central hall and northwest and southwest parlors (Rooms 102 and 103) should be strengthened from below. A new column and footing pad should be constructed to support the northeast porch and bathroom at the northeast corner. The remainder of the floors can be strengthened by attaching steel plates top and bottom to the summer beams.

2. Upgrade the structural system to accommodate guided tours through the house. This alternative is similar to alternative 1 except that instead of reinforcing all the summer beams with steel plates, only the beams in Rooms 104 and 105 will be reinforced this way. The summer beams on the second floor will be suspended by trusses in the attic (as is already the case in the south wing).

3. Do not open the house to visitors any more than it already is. As a minimum, however, the following should be done: replace the floor in the moulder's dining room and kitchen and the front porch. Construct a new column and footing to support the northeast porch and bathroom. At the northeast corner strengthen the floor in the central hall and northwest and southwest parlors. Rebuild the end of the fire damaged summer beam in Room 104.

3. Discussion of Investigation and Alternatives

a. General

Many of the doors and windows have vertical hairline cracks over their lintels. These cracks are caused by the thermal expansion and contraction of the walls. They appear to be stable, and should not be a cause for concern.

With the exception of the floor structure in Rooms 102 and 103, the framing which was accessible was sound. There was generally no decay where the wooden structural members framed into the masonry wall. This report assumes that the framing that was not accessible is sound. If, during construction, any piece is found to be damaged or rotted, it should be replaced or strengthened.

Although the framing is sound, in many cases the sheathing adjacent to the masonry wall did show signs of decay and should be replaced. This is especially true of the porch roofs where new flashing should be installed. The flashing can then be coated with pebble dash plaster to match the existing exterior.

All new wood which will not be visible or which will be stained a dark color or painted should be pressure treated with waterborne salts. This will protect the wood from decay and insects.

b. Basement Floor

The basement is divided into three separate areas. Room 001 has exposed stone walls and a nonhistoric 3" concrete floor. Both are in good shape and no major work need be done. The archeological trench in the floor at the northeast corner should be filled and patched with concrete.

Rooms 002 and 003 have plastered stone walls in good condition. The floor is a thin, highly fracture, possibly historic, mortar matrix with 1/8" to 2" of soil over it (Preliminary Report, Archeological Investigations, Audrey Marie, typescript, September 1978). This floor has disintegrated in many areas and is not an effective vapor barrier. In order to help protect the building from future rot problems, a new vapor barrier should be installed.

The stairs leading up out of Room 002 are resting directly on the earth. The stairs have two stringers which are broken off and rotted at the bottom. The stringers should be replaced and a third stringer should be added at the center. At their bases, the stringers should rest on a concrete pad, concrete blocks, or flat stones.

Rooms 004 and 005, moulder's dining room and kitchen, have plastered stone walls in good condition and a wood floor. The wood floors show signs of rot and should be replaced. Some of the floorboards have already been replaced and are nonhistoric. The wooden sleepers, which rest directly on the earth, were not accessible at the time of this

investigation. However, upon examining a sample of the sleepers in the possession of Audrey Marie, DSC archeologist, it was determined that the sleepers are partially rotted. There are also signs of insect infestation, probably by subterranean termites or powder post beetles. It is recommended that the sleepers also be removed and destroyed. If the sleepers or flooring is to be stored or displayed elsewhere in the park, they should be fumigated by a professional exterminator first. The stairs leading up out of the kitchen have been recently rebuilt.

A new floor can be constructed as follows: remove enough earth so that there will be a mimimum of 6" to 8" of air space under all wood. Archeological excavation in the kitchen and monitoring in the dining room should be done as recommended by DSC archeologist Audrey Marie. Lay down a vapor barrier. Construct a new floor out of pressure treated 2 by 6 joists. The joists should be set on concrete blocks. The new 1-1/8" flooring should also be pressure treated, and it can be stained to resemble the original floor.

c. First Floor

Room 101, southwest parlor, has plastered walls and a wood floor. In its present condition, the floor is not adequate for visitor use. The summer beam has failed in shear on one side, where the joists frame into the beam. To correct the problem, the floorboards over the beam must be removed, and the beam should be bolted through to help hold it together. The historic floorboards can then be reinstalled. Some of the boards will have to be notched on the bottom side to accommodate the bolt heads.

If the room is to be opened to guided tours, then steel plates should be added top and bottom to form a "composite" beam. Galvanized metal joist hangars should be installed at each joist.

As an alternative to bolting the summer beam, a new steel beam and columns could be added under the summer beam to strengthen it. The columns should rest on new concrete footing pads.

Rooms 102, central hall, and Room 103, northwest parlor have platered stone walls and a wood floor. The rooms are separated by a wood frame wall.

The floor system has been damaged by the high moisture in the basement below. The summer beam has failed in shear on one side. New floor joists can be added alongside the existing joists. The new joists and cracked summer beam should rest on steel beams and columns (see Figure 1). The footing pads for the columns will have to extend through the historic mortar matrix floor below. In order to properly support the joists, 30 footing pads, 18" by 18" will be required. Fortunately, many of the pads would be located along the walls where the mortar matrix floor has been partially disintegrated. Even so, this work should be monitored by an archeologist.

Setting the joists on angles or channels anchored to the wall is not recommended. The lime mortar used is not strong enough to support the bolts. Also, the uneven surface and random stone pattern would make it difficult to mount an angle.

If the second floor is to be opened to guided tours, the stairs in Room 102, should be strenthened by adding additional stringers.

The railing and newel post are loose. This problem is aggravated by the use of the railing as a visitor barrier. In fact, a gate at the bottom of the stairs locks at the newel post. Many of the visitors, especially the younger ones, lean on the rail and gate as they try to look upstairs. If the upstairs is to be opened to visitors, the gate should be removed. If the present visitiation policy is to continue, then the gate should be removed, and a new visitor barrier should be installed. The new barrier should <u>not</u> be attached to the newel post or railing. It should be "L" shaped, providing both a gate at the bottom of the stairs and a section of barrier running along the railing.

Rooms 104, dining room, and Room 105, kitchen have plastered masonry walls and a wood floor. The floor framing is not visible, and its

condition was assumed to be sound. The member sizes were also assumed based on the floor framing which was accessible and measurements of the floor thickness. This floor is not adequate for visitor use.

Regardless of which alternative is chosen, the fire damaged end of the summer beam in Room 104 should be reconstructed. This would involve removal of some nonhistoric plaster from the ceiling below. Adequate bearing will have to be provided in the back of the fireplace, by constructing a new beam pocket, as the original beam pocket has been filled with mortar.

If Rooms 104 and 105 are to be opened to visitor access, then the floor system must be strengthened. This can best be accomplished by adding steel plates top and bottom to the summer beam to form a composite beam. To do this, the historic plaster in the ceiling along the beam will have to be removed. Also, the historic floorboards and hearths will have to be removed. Once the steel plates are installed, the floorboards should be notched to allow for the plates and bolts, and then replaced in their original locations.

d. Second Floor

Rooms 201, 202, and 203 (southwest wing) consist of plastered masonry bearing walls with wood framed floor and partition walls. None of the framing was accessible, and the member sizes were assumed based on the floor framing which was accessible and measurements of the floor thickness. In its present condition, the south wing is not adequate for visitor loads.

Excessive deflections in the summer beam were corrected in 1958 by tying the summer beam to a wood truss in the attic with steel tie rods and turnbuckles. The beam was then raised back into place.

Some of the ceilings and walls, especially in Room 201 are badly cracked. These cracks are not getting any worse and they probably occurred when the summer beam was raised back into place.

The rooms in the northwest and east wings (Rooms 204, 205, 206, 208, and 209) also consist of plastered masonry bearing walls with wood framed floors and partition walls. None of the framing was accessible and the member sizes were assumed based on the floor framing which was accessible and measurements of the floor thickness. In their present condition, these rooms are not adequate for visitor use.

If the second floor is to be opened to guided tours, all of the floor framing must be strengthened. This can be done two ways. If steel plates are used top and bottom (alternative 1) the historic flooring and the nonhistoric ceiling along the summer beam will have to be removed. This would definitely damage the heat wires in the ceiling. Since these wires cannot be spliced, they will have to be replaced.

If additional trusses in the attic are used (alternative 2) less flooring and ceiling will have to be removed. The steel tie rods from the trusses will still have to be bolted on the underside of the summer beam, and this will probably damage the heat wires. However, because of the floor plan, it will be impossible to conceal the rods in the walls. Wooden false columns can be constructed to hide the rods; however, they will have to be located in the center of the room.

Galvanized metal joists hangers or reinforcing angles should be used to strengthen the joist-summer beam connections. The joists which were notched to accommodate waste water drain (pipeway) should also be reinforced.

The bathroom, Room 207, was added to Rooms 206 and 208. Two sides are attached directly to the masonry walls, and the northeast corner is supported by a wood column. The column rests directly on the masonry retaining wall below. Cracks in the bathroom walls and in the retaining wall under the column indicate that the wall is settling, and the bathroom is settling with it.

A new concrete column and footing pad should be constructed directly behind the retaining wall to carry the loads from the bathroom.

Portions of the back of the retaining wall may have to be removed in order to make the connection between the new concrete column and the existing historic wood column.

By removing the excess weight of the bathroom from the retaining wall, settlement of the wall should stop.

As an alternative, a metal pipe column could be installed in front of the retaining wall. The pipe could then be surrounded with stone masonry to resemble the original wall.

e. Attic

Rooms 301, 302, 303, and 304 have wood frame floors and sloped plastered ceilings. The framing was not accessible. The floor framing is assumed to be similar to the second floor. It is not adequate to support visitor use. Because of the sloping ceiling, it is not recommended that the attic be opened up to visitors even if the floor is strengthened.

f. Roof

The roof is composed of wood shingles and nailers over tapered wood rafters. The rafters are pinned with 3/4" to 1" wood dowels at the ridge. At the eaves the rafters are resting on the ends of the floor joists. Due to limited accessibility, it could not be determined if the rafters were nailed to the joists or not. Denver Service Center historical architect Dessauer indicated that the shingles and nailers were to be replaced. If this is the case, then the rafters should be checked for: 1. rot, and 2. proper nailing at the eave. If they are sound and properly nailed, then the rafters will meet code requirements in their present condition.

g. Front Porch

The front porch is a wood frame structure resting on stone piers. There are some problems with rot, especially at the north end of the porch. Denver Service Center structural engineer James Wolf has made the following recommendations: if the present hewn

timbers are sound they will meet code requirements. The timbers are now spaced haphazardly. They should be realigned to a maximum of 2' 6" on center; in place of the cribbing found in one section, build up the stone wall which was uncovered by the archeological excavation (Feature 5).

The floor framing in the north end should be completely rebuilt. Use new 3 by 6 lumber, spaced at 12" on center. The area around the north end should be regraded to provide positive drainage away from the porch. Regrading on the west side of the porch should be monitored by an archeologist.

4. Recommendations

The Ironmaster's House is generally in fair condition. As a minimum, however, the following items should be done:

a. Replace flashing on all roofs

b. Install a vapor barrier in Rooms 002, 003, 004, and 005

c. Rebuild the stairs in Room 002

d. Replace the floors in Rooms 004 and 005

e. Strengthen the summer beam in Room 101

f. Strengthen the entire floor framing system in Rooms 102, and 103 (see Figure 1)

g. Replace visitor barrier at stairs in Room 102

h. Rebuild the summer beam in Room 104

i. Construct a new column to support the bathroom

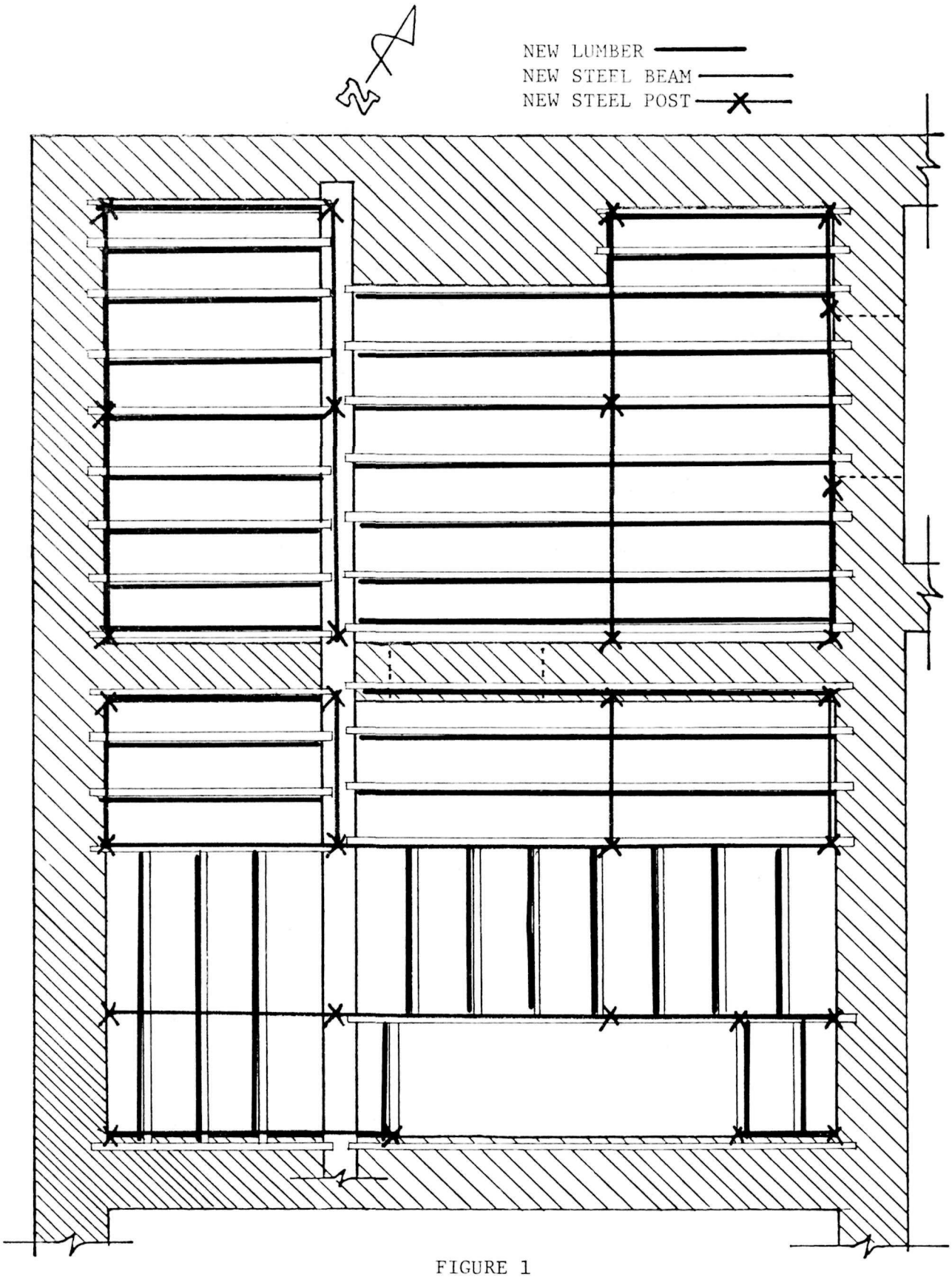


FIGURE 1
FLOOR FRAMING
ROOMS 102 & 103
SCALE ¼" = 1' - 0"

j. Rebuild the front porch

k. Replace or strengthen any members which are found to have rot or insect infestation

If the house is to be opened to visitor tours, then the following additional items should also be done:

l. Strengthen the floor in Rooms 101, 104, and 105 with steel plates

m. Strengthen the stairs in Room 102

n. Strengthen the second floor with steel plates or with trusses in the attic

o. Do not allow visitor access into the attic

Prepared by
James F. Mayo
Civil Engineer

E. Electrical Engineer's Report

1. Existing Electrical System

Electrical power to the building is fed from the main service in the visitor center underground via conduit systems. Two separate services exist: a 240-volt, 200-ampere, three-phase, three-wire circuit for heating and a 120/240-volt, 100-ampere, single-phase circuit for lighting. At the house each circuit passes through a disconnect and enters into a 100 ampere Rucker ground fault interrupter in the basement Room 003. The heating circuit is split into two separate 100-ampere circuits, one of which serves the 225 ampere "main lugs only" panel in the first floor kitchen. The other 100-ampere circuit enters a closet on the second floor and is intended to serve second floor heating circuits if they are ever installed.

The 100-ampere lighting circuit serves a 100-ampere lighting panel in the basement. This panel serves the minimal lighting and receptacles in the entire house and provides power to the Barn Store.

2. Existing Security System

The existing system consists of floor mat switches at the entrance of the restricted areas and a television camera at the entry door. If a visitor steps on one of the floor mat switches, an alarm bell rings as long as the mat is depressed. The television camera provides a view of the central hall and stairway on a monitor at the visitor center. There is no connection between the floor mat alarms and the visitor center except that a microphone located in the northwest parlor is monitored at the visitor center.

3. Existing Fire Alarm System

The existing fire alarm system is manufactured by Standard Fire Alarm and Signal, Inc. of Jenkintown, Pennsylvania. It is made up of two separate systems of sensors, each system interconnected with aluminum tubing and then connected to its respective air-horn located on the roof. Each sensor is a fixed temperature heat detector designed to release freon located in an associated pressurized bottle. The freon in turn passes through the air horn sounding the local alarm. A pressure switch located just inside the building from the respective horn is intended to sense the high pressure which in turn opens a circuit to the visitor center which triggers the telephone dialer. The local volunteer fire department prefers to be on the dialer with the potential for false alarms rather than having the potential for delay through another means.

4. Existing Telephone System

The existing telephone cables enter the basement Room 003 and serve telephones located in the first floor kitchen Room 105, the basement moulder's kitchen Room 005, and at the head of the stairway leading from the first floor to the basement. The link between the microphone and the monitors at the visitor center and chief ranger's residence as well as the microphone and monitors are owned and

maintained by the telephone company. The telephones are for intercom use only and outside calls cannot be made on them.

5. Electrical System - Recommendations for Improvements

Normally, a building is served through one service disconnect. In this case, however, since the three-phase power circuit and single phase lighting circuits have been separated, it is recommended that the service remain as is to avoid replacing the existing power cable with three-phase four-wire service.

The existing ground fault circuit interrupters were installed to prevent high resistance ground faults from starting a fire. These should remain and another be added at such time as the second floor is heated. It is noted that the power ground fault interrupter in basement Room 003 would not test properly and should be repaired.

The existing heating circuit feeders from the service location are MI (mineral insulated) type cable. Technically, these circuits are satisfactory and no change is recommended if their routing and the location of the heating controls are satisfactory.

Fluorescent lighting should be installed in basement Rooms 002 and 003. All wiring should be either in rigid, intermediate, or flexible steel conduit, electrical magnetic tubing, EMT, or Type MI, mineral insulated cable. The existing Type NM, non-metallic cable, to the receptacle at the fireplace on the first floor Room 103 should be replaced. The lamp cord serving the television camera should be replaced with permanent wiring.

Since the walls are stone with plaster surface, installation of wiring for lighting or receptacles in the walls will require the grooving of the masonry surface to allow installation of electrical cables.

Concerning the entry of water through the conduit system, it is recommended that concrete pullboxes be installed outside of the building to interrupt the existing conduit. A drain pipe should be connected between the pullboxes and the major drain pipe system that is to be

installed on the north side of the building. Any water entering the underground conduit system would drain out of the pullboxes. The conduit entry into the building would be sealed at the pullboxes.

6. Security System - Recommendations for Improvements

The existing system of floor mats provides a reasonable system for detecting entry into unauthorized areas while maintaining a low false alarm rate (perhaps zero). Additional sensors such as infrared beams could be added but the increased complexity and installation problems do not appear warranted, since the thief who would avoid the mats would likely also observe and avoid the infrared beams.

The microphone that picks up sound and is monitored in the visitor center or chief ranger's residence is used during the day only as an indicator that the alarm is sounding and should be replaced by an alarm circuit to the visitor center. At night, the effectiveness is dependent on someone monitoring the speaker. Although there would be some benefit in having the ability to listen following the sounding of an alarm, it is more important to have an alarm sound at the designated areas as a positive identification of an intrusion. The ability to listen could be maintained if the monthly charges by the telephone company are not considered too expensive.

For after visiting hours, it is thought that a more sophisticated security system should supplement the mat sensors. To minimize the disturbance of the historic fabric and at the same time provide space security rather than providing window and door switches in most areas, a system of ultrasonic sensors is recommended. The transceivers would generally be located over the entry door to each room to minimize the visual intrusion. Wiring would be one shielded twisted pair looping from one sensor to the next plus an additional wire from each sensor back to the control unit (to identify which unit alarmed). In general, wiring on second floor would go to the attic and wiring on the first floor would go to the basement before going to the control unit.

Following activation of the security alarm system, an exit delay time would provide a means to exit without setting off the alarm. In the morning, a similar delay time would allow the alarm to be deactivated before the alarm sounded following entry. Since it is proposed that the alarm will only be sounded within the historic site, a false alarm at either time although not desirable is not critical.

If desired, the ultrasonic system could be installed only in those rooms that will contain items that need protecting. As additional rooms need protection, the sensors could then be installed.

It is proposed that wiring for the ultrasonic sensors and the ionization detectors be installed on the surface. On the first floor, the surface wiring would lead down the wall over the door to the door frame and from these follow the door frame to the floor penetrating into the basement. An approximate 1/4" diameter hole through the floor or ceiling will be required at each location. Where holes exist in the proper location from the existing fire alarm tubing, they will be used. If lighting is required, the hole would have to be enlarged to approximately 3/8" diameter.

The use of passive infrared was considered, but because of the ceiling heat system, it was thought not to be as flexible as ultrasonic. Basement doors would have surface security switches. The security control panel would be in the basement. Each floor mat would be a different circuit to allow a given room to be turned off during the daytime. The ultrasonic system would be one zone and the door switches in the basement would be another.

7. Fire Alarm System - Recommendations

It is recommended that a new ionization smoke detector system be installed to replace the existing system. The control panel would be in the basement. The sensors would normally be located over the entry doorway to each room to minimize the visual intrusion. A signal would continue to be sent to the visitor center as part of the overall system.

8. Telephone System - Recommendations

Although the telephone system is open wiring to the basement, other than to perhaps dressup the installation, no modification is necessary. The present use of the telephones apparently is satisfactory.

9. Lighting

If possible when the furnishings are completed, sufficient natural lighting should be allowed to remain to provide for room viewing.

If artificial lighting is introduced, it is proposed that the lighting be fluorescent lighting over the entry doorways. This allows for all permanent wiring, whereas the use of lamps plugged into outlets introduces cords which have a greater potential for fire for the following reasons: (1) the insulation is less; (2) the circuit protection which is usually 15 amperes does not protect the cord which has a lesser rating; (3) the flexible cord tends to crack when old and is flexed. Wiring for lamps should not be run under carpeting. The requirement for receptacles would mean a greater intrusion on the fabric of the building than a single MI cable to a fluorescent lamp over each door.

Circuits for lighting on the second floor would come from the lighting panel in the basement up through the closets that now conceal the heating power circuits for the second floor, into the attic and down through the ceiling to the fixtures. Switching would also be in the basement for all display rooms.

10. Heating - Recommendations

Remove control of electric strip heaters in basement Rooms 001, 002, and 003 from the moulder's kitchen Room 005 humidistat and thermostat and provide one separate humidistat for Rooms 002 and 003, and provide one separate humidistat for Room 001.

11. Recommendations - Scope of New Work

a. Install new fire alarm systems.

b. Install new security system for evening hours.

c. Modify existing security system.

d. Provide new fluorescent lighting in basement Rooms 002 and 003.

e. Install pullbox to intercept water in conduit systems.

f. Repair 100-ampere ground fault interrupter as required.

g. Install type MI cable to receptacle of fireplace in Room 103.

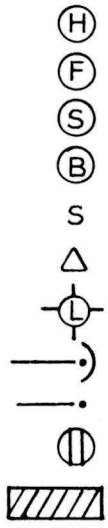
h. Install permanent wiring to television camera.

i. Install humidistats and thermostats in basement Rooms 001, 002, and 003.

j. Install protective coating for the interior side of all first floor window panes to minimize the adverse effects of sunlight on historic fabrics and objects; as recommended by Harpers Ferry Center curator, Kathy Menz.

12. Electrical Legend

For the following floor plan illustrations of electrical systems in the Ironmaster's House:



Ⓗ Existing fixed temperature heat detector

Ⓕ Proposed ionization fire detector

Ⓢ Proposed ultrasonic security sensor

Ⓑ Existing alarm bell

S Surface mounted security switches

△ Telephone

Ⓛ Existing incandescent ceiling light

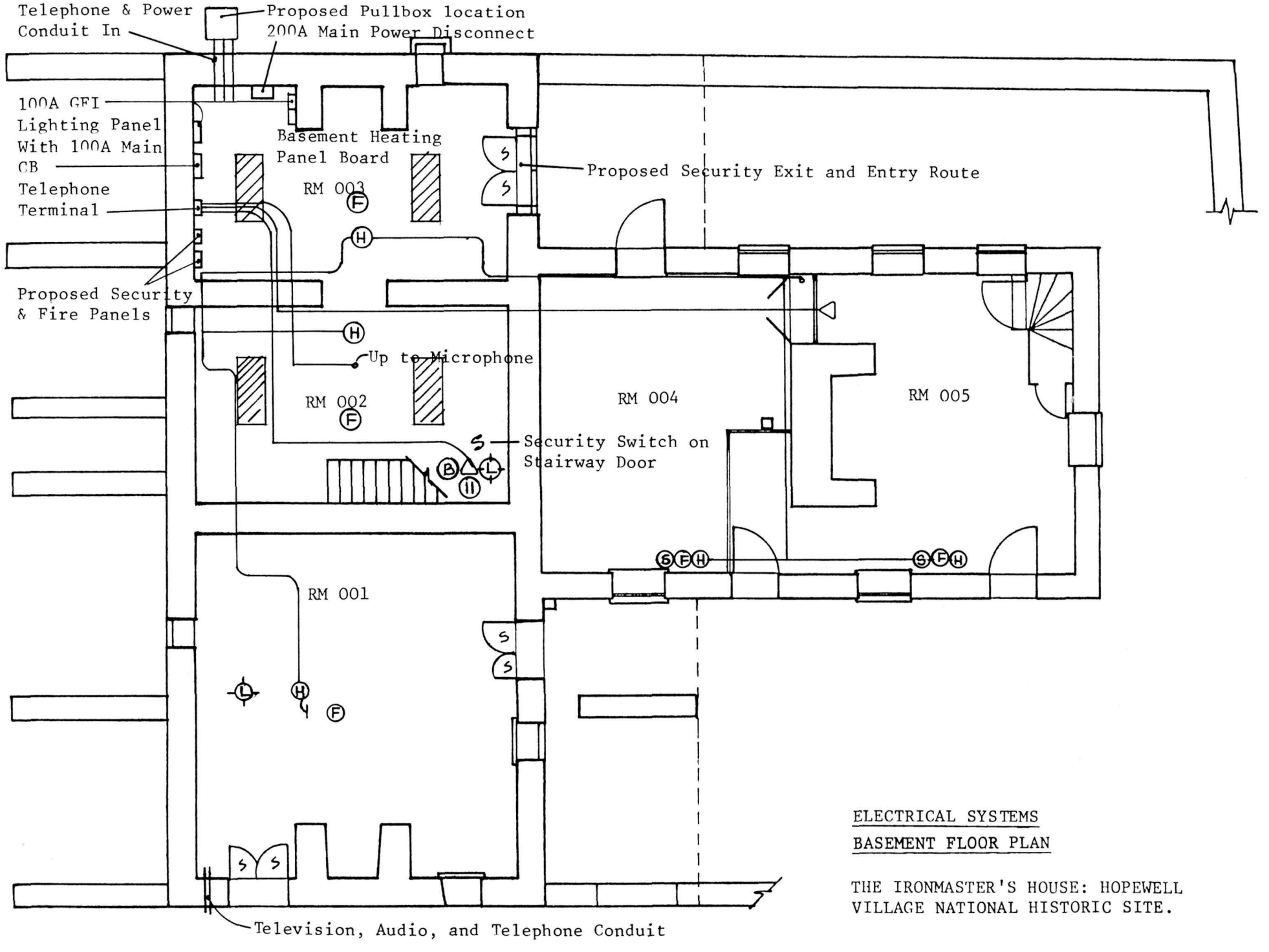
Tubing going down into floor

Tubing going up into ceiling

Existing duplex receptacle

Fluorescent strip - 2 40W lamps

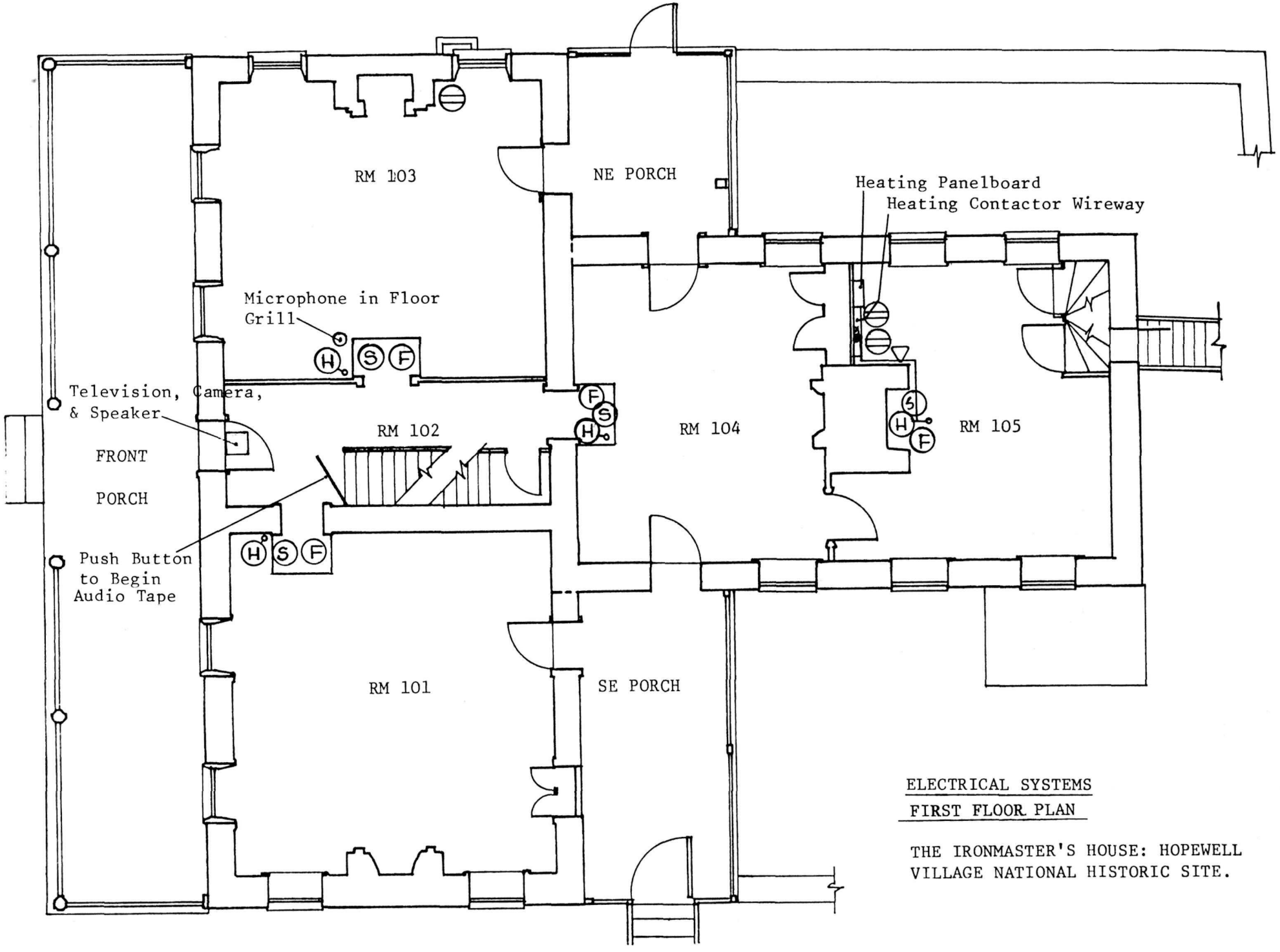
Ray Johanningsmeier
Electrical Engineer
DSC Professional Support



ELECTRICAL SYSTEMS

BASEMENT FLOOR PLAN

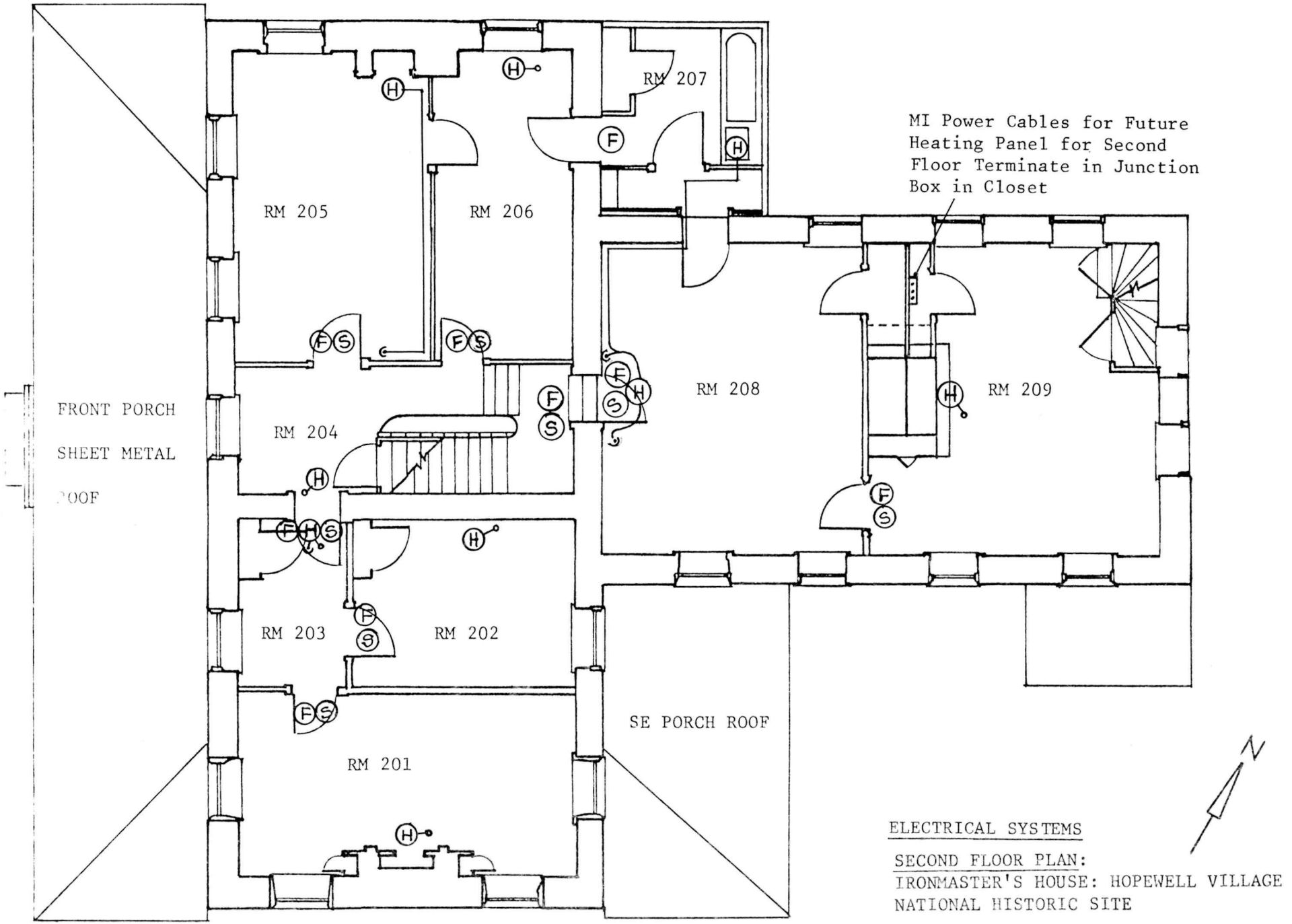
THE IRONMASTER'S HOUSE: HOPEWELL VILLAGE NATIONAL HISTORIC SITE.



ELECTRICAL SYSTEMS

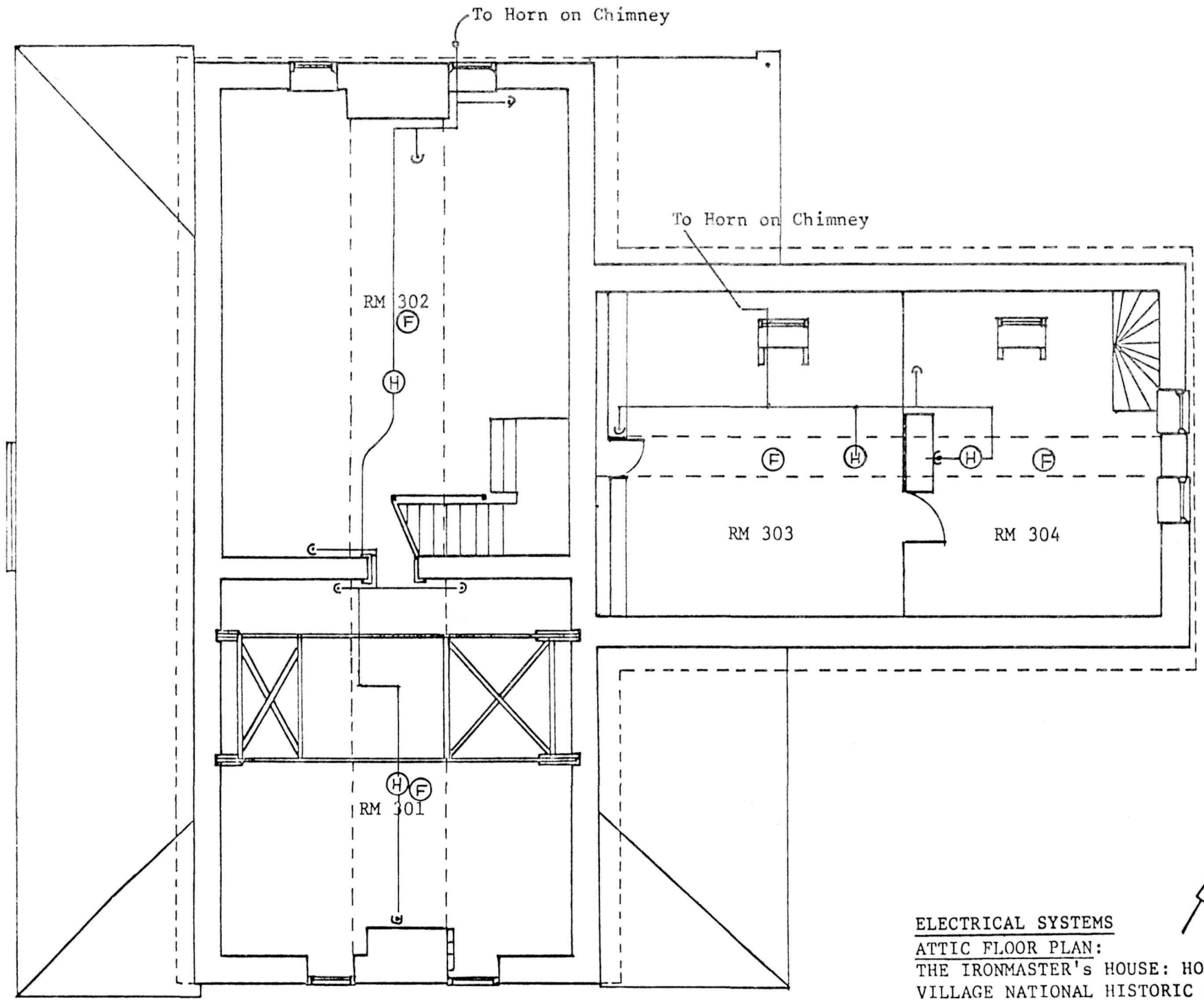
FIRST FLOOR PLAN

THE IRONMASTER'S HOUSE: HOPEWELL VILLAGE NATIONAL HISTORIC SITE.



ELECTRICAL SYSTEMS

SECOND FLOOR PLAN:
IRONMASTER'S HOUSE: HOPEWELL VILLAGE NATIONAL HISTORIC SITE



ELECTRICAL SYSTEMS
ATTIC FLOOR PLAN:
THE IRONMASTER's HOUSE: HOPEWELL VILLAGE NATIONAL HISTORIC SITE

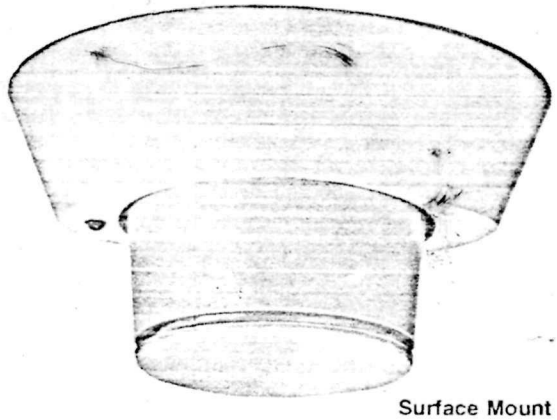
Early Warning Fire Detection and Alarm Systems

Ionization Fire Detector

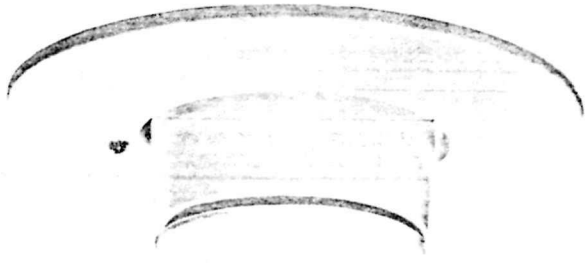
SERIES DI-4

Catalog Number **6103**

Engineer and Architect Specifications



Surface Mount



Flush Mount

MODEL DI-4 IONIZATION DETECTOR AND BASE ASSEMBLY

INTRODUCTION

The Pyr-A-Larm Model DI-4 fire detector operates on a patented ionization principle. It responds to the first traces of fire in the form of visible smoke or invisible products of combustion. Heat or flame is not required to activate the detector. The Model DI-4 detector has been developed for protection of a wide range of commercial, industrial, institutional, and residential occupancies of all types.

FEATURES

- **Flush or Surface Mounting**
- **Compact**
- **Two Sensitivities Available**
- **Screw-type Terminals**
- **Versatile**
- **New "Free Flow" POC Path**
- **Rugged**
- **Alarm Light**
- **Simple Twist/Lock Assembly**
- **Solid State Circuitry**
- **Superior Air Velocity Characteristics**

TECHNICAL DESCRIPTION

The DI-4 detector is a plug-in, dual chamber ionization detector available in two sensitivities and contains two ionization chambers together with a highly sensitive semiconductor amplifier-switching circuit. One chamber detects the presence of combustion products. The second chamber serves as a reference, to stabilize the detector's sensitivity for changes in environmental temperature, humidity, and pressure. The detector assembly locks in upon alarm; therefore it must be reset at the control panel. The DI-4 Series detectors are Underwriters Laboratories Inc. listed.

The detector operates from a 20 Vdc source, provided by the Pyr-A-Larm control panel. The detector requires a very small standby current (less than 100 microamperes), which permits the use of a 2-wire detector circuit of #18 AWG wire, reducing system installation costs. In alarm, the detector will draw approximately 70 ma, dc.

The DI-4 Series ionization detector and base assembly have been designed to meet a wide range of system design parameters. The detector itself is available in four model variations as follows:

- **DI-4** — Normal Sensitivity
- **DI-4H** — High Sensitivity
- **DI-4D** — Delayed Action, Normal Sensitivity
- **DI-4DH** — Delayed Action, High Sensitivity

To illustrate detector flexibility, the Model DI-4H, when installed at high altitude locations, will respond at normal sensitivities. With the added delay action feature, the Model DI-4D and DI-4DH will delay response approximately 30 seconds, to permit momentary transient high POC concentrations (such as a smoker's pipe being lit) without triggering the system needlessly.

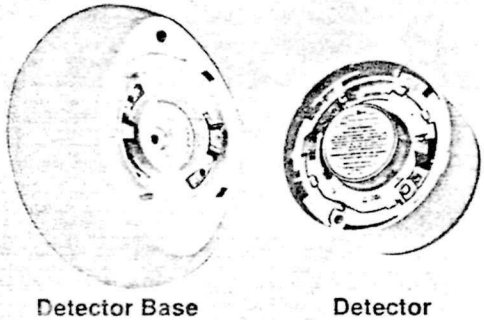
Base assemblies for either flush or surface mounting, all with screw type terminals, are available for use with any of the above DI-4 detectors as follows:

- **DB-4LS** — Surface Base with Integral Alarm Lamp
- **DB-4TS** — Surface Base with Integral Alarm Lamp and Terminal Connection for Remote Relay or Remote Alarm Lamp.
- **DB-4LF** — Flush Base with Integral Alarm Lamp
- **DB-4TF** — Flush Base with Integral Alarm Lamp and Terminal Connection for Remote Relay or Remote Alarm Lamp

A remote indicator lamp may be connected when the detector is concealed from view or a remote relay, Model RR-2, may be connected to the DI-4 where a detector-controlled function is required at or near the detector. (The Model RR-2 relay has one set of double-pole, double throw contacts rated at 120 Vac, 2 amp. resistive).

When the RR-2 is used and the control function is critical, no more than one DI-4 should be installed in a particular circuit or zone, and no other initiating devices should be installed in that same circuit or zone. An exception to this rule would be an application where a number of RR-2 relays were used, each of which was connected to the same critical control function.

DETECTOR REMOVED FROM BASE



Detector Base

Detector

Pyrotronics
A Baker Industries Company
8 Ridgedale Avenue, Cedar Knolls, New Jersey 07927

May, 1977

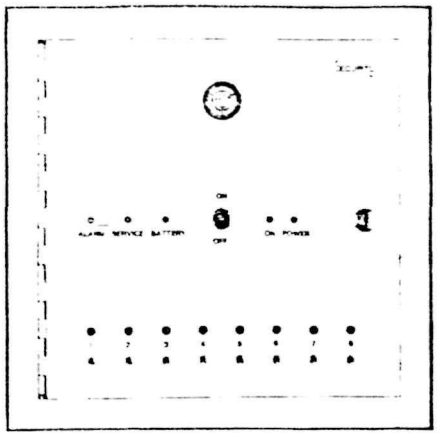
Supersedes Sheet dated 10/76

NATIONAL SECURITY SYSTEMS, INC.

DESIGN – MANUFACTURE – INSTALLATION
ALARM, DETECTION, SURVEILLANCE & COMMUNICATIONS EQUIPMENT
20 Beechwood Avenue, Port Washington, N.Y. 11050
16) 883-2444 (212) 895-6060

SECURIKEY 1000®

THE ULTIMATE CONTROL INSTRUMENT



SIZE 15-3/4" x 15-3/4" x 3-9/16" (40 x 40 x 9 cm)

The SECURIKEY 1000 Alarm Control instrument is an 8-zone panel incorporating individual arm/disarm switches, removable "swinger"* delays and latching swinger detection lamps for each zone. In addition, it provides adjustable entry and exit delays, separate non-delayed panic switch circuit, adjustable bell turn off/system reset, circuit, separate fire alarm circuit, and is able to disarm bad zones before bell reset, plus many other features in a single 100% solid state printed circuit board.

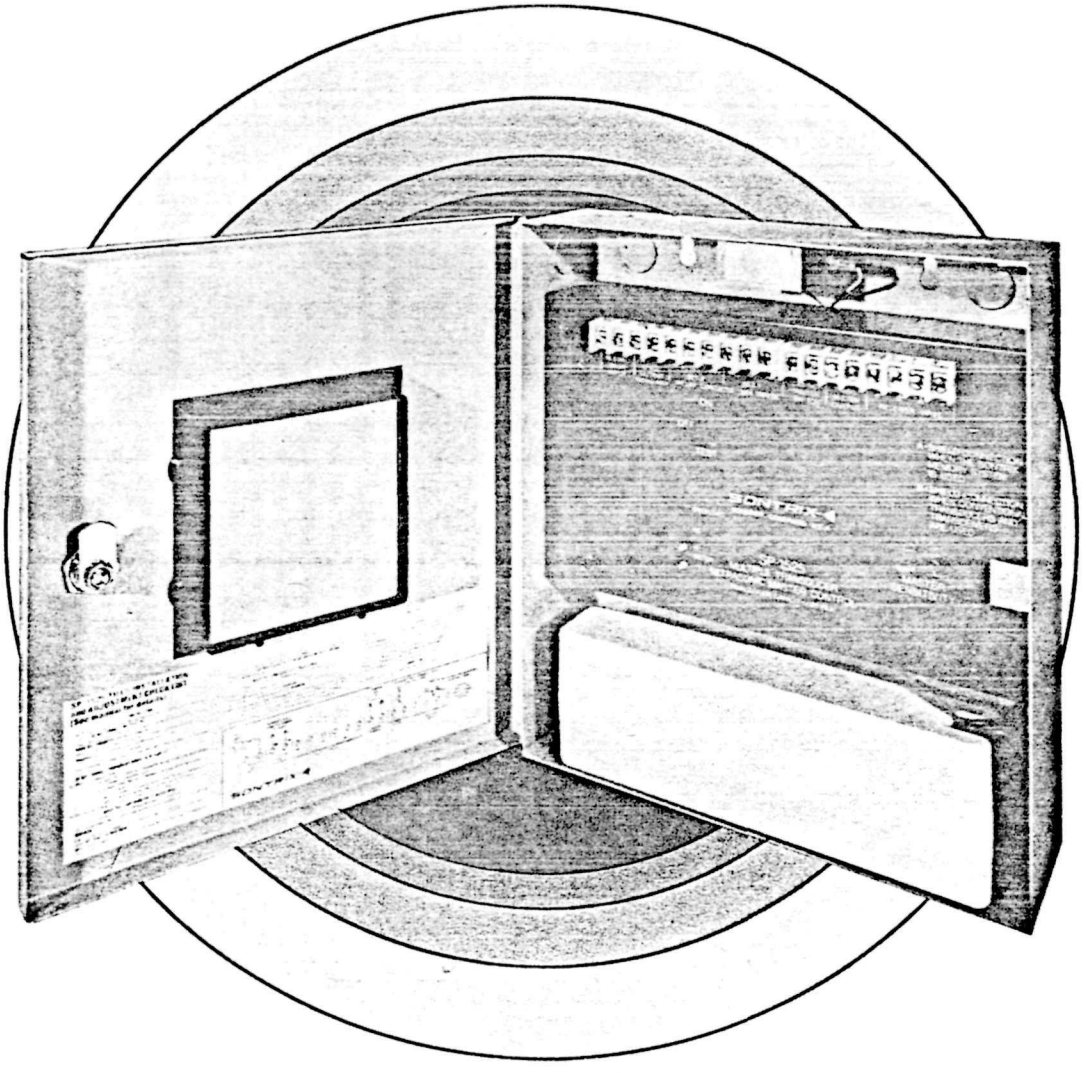
The SECURIKEY 1000 is part of a family of multi-zone control panels designed specifically to eliminate the most common causes of intermittent ("false") alarms. The system design is the result of an engineering effort commenced in 1971 and in actual use with our own customers since that time. The circuit designs have been refined to incorporate features which our service and installation crews have requested as a result of the extensive use of the system in the field. The total system approach was designed specifically for ease in installation and service in that it is extremely easy for one man to service a large system without requiring the aid of a second person to watch meter movements, light flashes, constantly resetting the alarm, etc., while giving the customer the opportunity to notify his alarm company as to which particular zone was the source of trouble. With the use of the automatic "swinger" detector in each zone, the customer is able to inform his alarm company when a zone starts getting "marginal" before that zone gets bad enough to trip the alarm.

*"SWINGER" – an unwanted, non-locatable, momentary "break" in alarm circuit of sufficient magnitude to initiate an alarm.

BUILT-IN FEATURES

8 separate switchable zones (day/night circuits)
Turning off a zone switch while system is on will "trip" alarm
3. Each zone detects a max. of 5,000 ohms loop resistance
4. Each zone uses either "open" or "closed" contacts
Automatic individual "zone disarm" (a zone restores automatically 5 min. after no "trips" have occurred on that zone)
6. 8 separate "swinger" delays (individually removable for use with vibration contacts)
8 latching solid state lamps indicating "tripped" or "off" zones
9. Separate non-delayed panic switch terminals (works as an independent 9th zone)
Entry delay adjustable to 3 minutes (all zones or zone 1 only)
Exit delay adjustable to 3 minutes (zone no. 1 only)
11. Pulsing warning tone sounds at panel (and optional remote stations) during entry delay
Steady warning tone sounds at panel (and optional remote stations) during alarm
13. Selectable 15, 30 or 45 minute "system reset" (turns off bell and resets alarm on all "good" zones–bad zones remain disarmed)
After 2nd "system reset" all previously tripped zones automatically disarm to insure no "repeats"
15. Alarm lamp indicates that alarm sounded even if "system reset" occurred
Battery condition lamp indicates if battery is not fully charged
17. System "On" and line power "On" lamps
18. All lamps are solid state and automatically disconnect from the system to conserve standby battery power during a 15% or greater line voltage failure – lamps return to their original state as soon as power resumes
19. Unique "circuit test" switch inside panel sounds warning tone during the time any zone is in a "tripped" condition & automatically stops when zone is o.k.
20. "Reverse-polarity" central office type terminals provided (which can be used as bell terminals by cutting a jumper)
21. 2 separate SPDT 2 Amp terminals provided (in addition to "reverse-polarity" terminals)
22. 24 hour standby auto-recharging 12V battery with plug-in transformer
23. Optional separate rechargeable battery for bell or siren (12VDC @ 1.5 Amps Max.)
24. Recessed mount (optional collar available for surface mounting)
25. 2 yr. warranty on solid state printed circuit board FOB our office
26. 16 gauge welded steel enclosure with hinged door, and optional tamper switch
27. Durable textured white vinyl paint
28. "ACE" key switch
29. Panel lock (optional "registered" "duo" panel lock available)
30. Optional remote key switch stations
31. Illustrated customer operating manual (24 pages)
32. Optional supervised fire alarm and fire bell relay
33. Optional dual line loop supervision converts to 16 zones
34. Optional bell supervision circuit
35. Separate disconnect jumper for zone trip, status and system reset
36. In-line bell fuse built in
37. Installation/service manual (44 pages)
38. Optional Circuit Test/Loop Status Remote Lamp Terminals.
39. Optional Alarm Trip Pulse Counting capability.
40. Optional Master/Slave Multiple Control operation.
41. Factory customizing available to your unique specifications.

IDEAL FOR MEDIUM SIZE INSTALLATIONS... THE SONTRIX SP-1525



AN ULTRASONIC INTRUSION DETECTION SYSTEM With Signal Processing And High Noise Immunity

The SP-1525 offers a higher level of signal processing with greater noise immunity without sacrificing range or sensitivity and is capable of driving up to 25 conventional transceivers or pairs of transducers. Without an adapter it can be used with the new Sontrix Memory System which pinpoints the exact location where motion has occurred.

Pyr-A-Larm

System 3

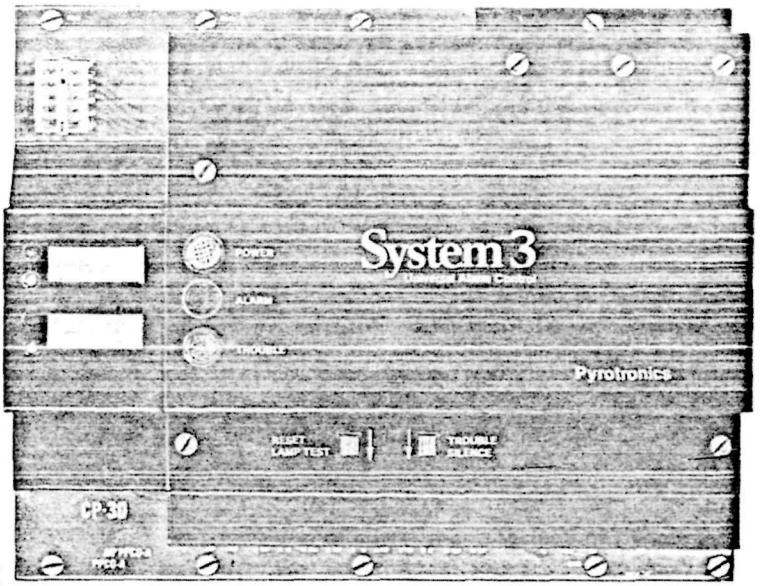
Universal Alarm Control

Control Panel

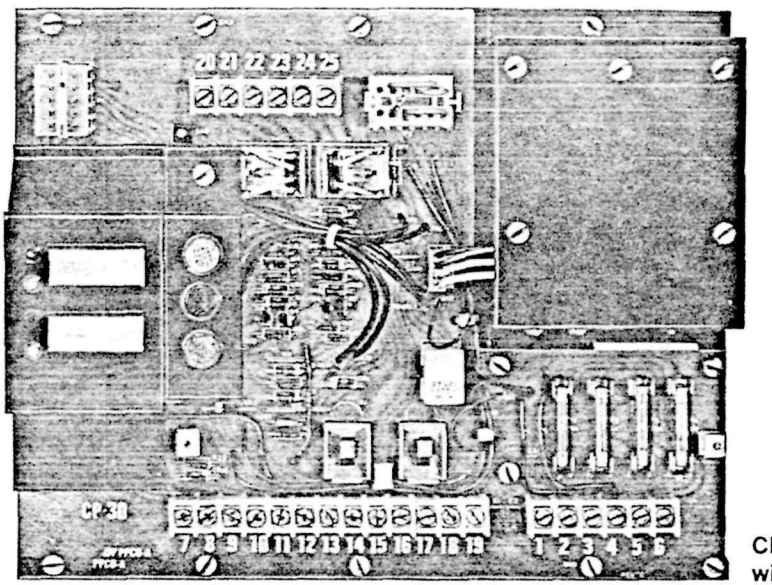
MODEL CP-30

CATALOG NUMBER 3050

Engineer and Architect Specifications



CP-30 Control Panel



CP-30 Control Panel with Cover Removed

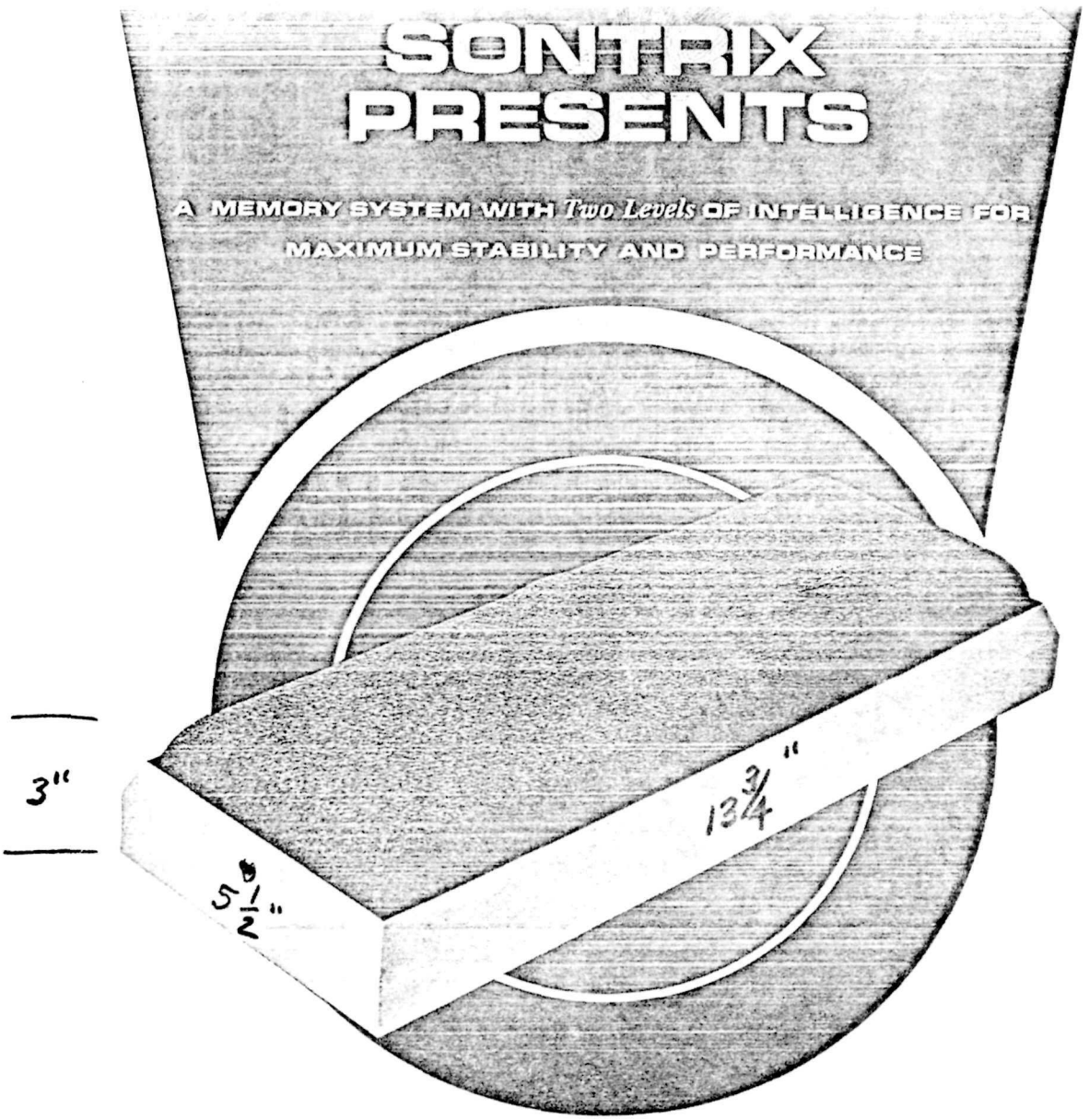
Features

- U.L. Listed
- Power For Over 200 Early Warning Detectors
- Basic One-Zone System
- Expandable
- Alarm Overrides Trouble
- Ground Detection
- Supervised Alarm Relay Coil
- Power For Two Audible Circuits

Description

The Control Panel, Model CP-30 is the basic control unit for System 3 Universal Alarm Control. It is of solid state circuitry and is designed for use in Commercial, Institutional, Life Safety, and Industrial applications. It is approved for service in accordance with NFPA Standards 72A, 72B, 72C, and 72D.

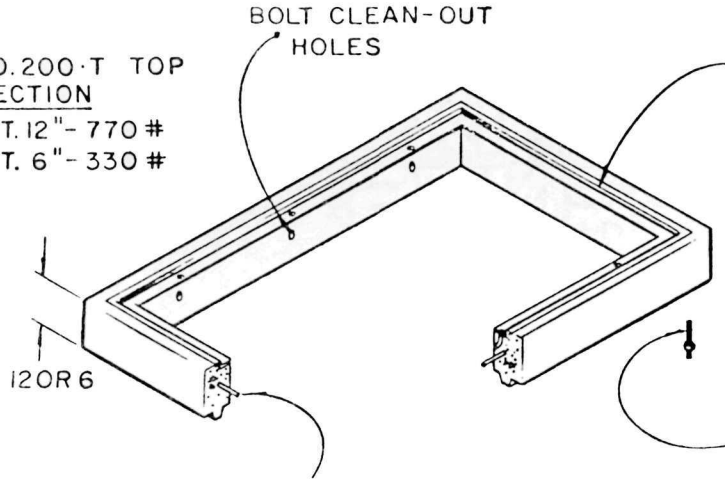
The Model CP-30 with basic power supply provides circuitry for one supervised detector circuit accommodating any



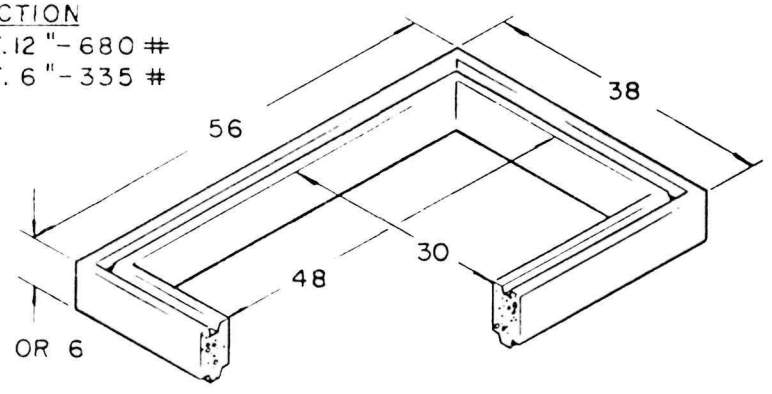
The TR-3 Transceiver with a memory!

The TR-3 transceiver can be used with any Sontrix signal processing control for maximum stability without compromising range or detection sensitivity.

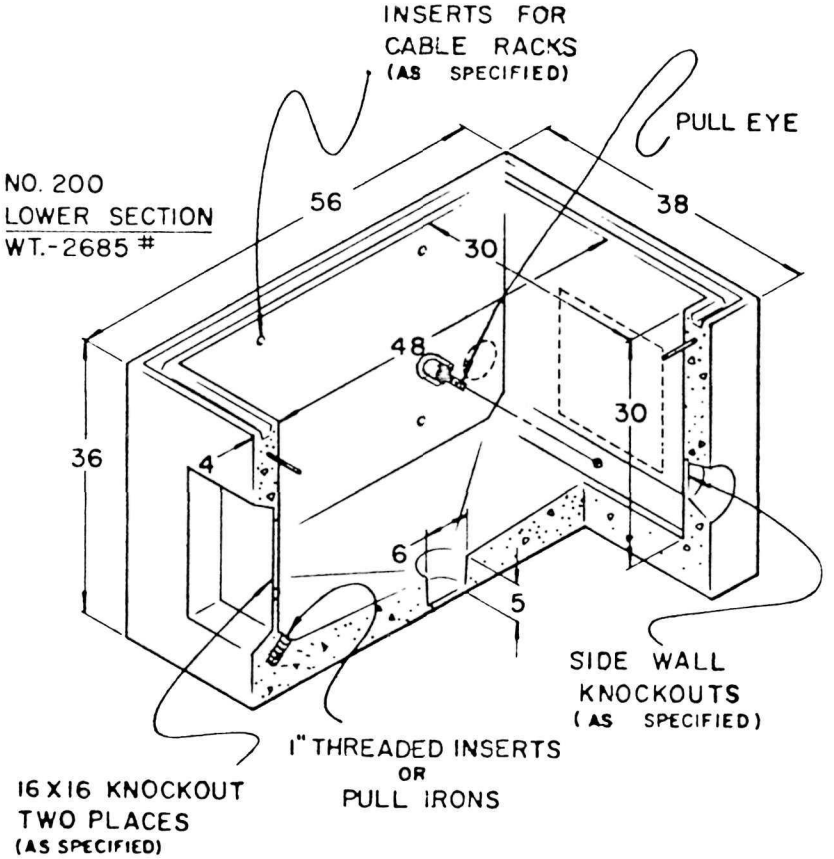
NO. 200-T TOP SECTION
WT. 12"- 770 #
WT. 6"- 330 #



NO. 200 EXTENSION SECTION
WT. 12"- 680 #
WT. 6"- 335 #



NO. 200 LOWER SECTION
WT.- 2685 #



MIN. EXCAVATION SIZE
3'8"x 5'2" x DEPTH REQ.

WHEN ORDERING PLEASE SPECIFY
PB-200 FOR 2'6" DEPTH
PB-201 " 3'0" "
PB-202 " 3'6" "
PB-203 " 4'0" "

ADDITIONAL DEPTHS IN 6" INCREMENTS ARE AVAILABLE

28 DAY CONCRETE COMPRESSIVE STRENGTH = 4500 PSI

VAULT DESIGNED FOR H-20-44 LOADING

2'6"x 4'0" PULL BOX WITH 4" WALLS

REVISED	DRAWING NUMBER
11 1-63	200 SERIES

BROOKS PRODUCTS INC.

VII. SCOPE OF WORK

The scope of work compiles in outline fashion all the problems and recommendations discussed in the professional field reports. The author has organized the outline according to specific areas of the house and all the necessary work to be done in each. Alternatives for certain problem solutions are described at length and should be given special consideration by the Regional Office of Quality Control and Compliance.

A. Drainage System: North Wall

The project architects are in favor of an exterior north wall insulation and drainage system as recommended by geotechnical engineer James Ellis. Insulation and drainage on the exterior is the best means of taking water away from the house and preventing soil moisture migration through the wall, while creating no visual intrusions on the historic fabric.

1. Waterproof the exterior north wall of the Ironmaster's House from grade level down to the bottom of the foundation along the full extent of the northwest parlor and northwest porch 35' in total. This could be best accomplished by adhering an eight mil PE plastic membrane to the wall, above the ground line and behind the plaster by 2" or more so that snow melt will not get behind the barrier.

2. Insulate the exterior north wall along the membrane with two 1" sheets of styrofoam. The styrofoam should be placed against the membrane below the ground level and should extend down to the bottom of the foundation wall. The styrofoam should be placed so that the top is 6" below grade to prevent its appearance near the surface which would create a visual intrusion on an historic scene.

3. Installation of an underdrain system at the base of the north wall which includes the following:

a. Corrugated PE, heavy duty, flexible plastic, slot-perforated pipe

b. 4" diameter pipe should be acceptable

c. Pipe laid in bed of well graded sand and gravel filter material

d. Drainage pipe should extend 100' total length from the northwest corner of the house east to its emptying point. Slope should be 1' in 100'

e. Pipe and total system should be laid in such a way as to avoid interference with landscape features, i.e., shrubs, trellis, stone pavement, and Window Well 006

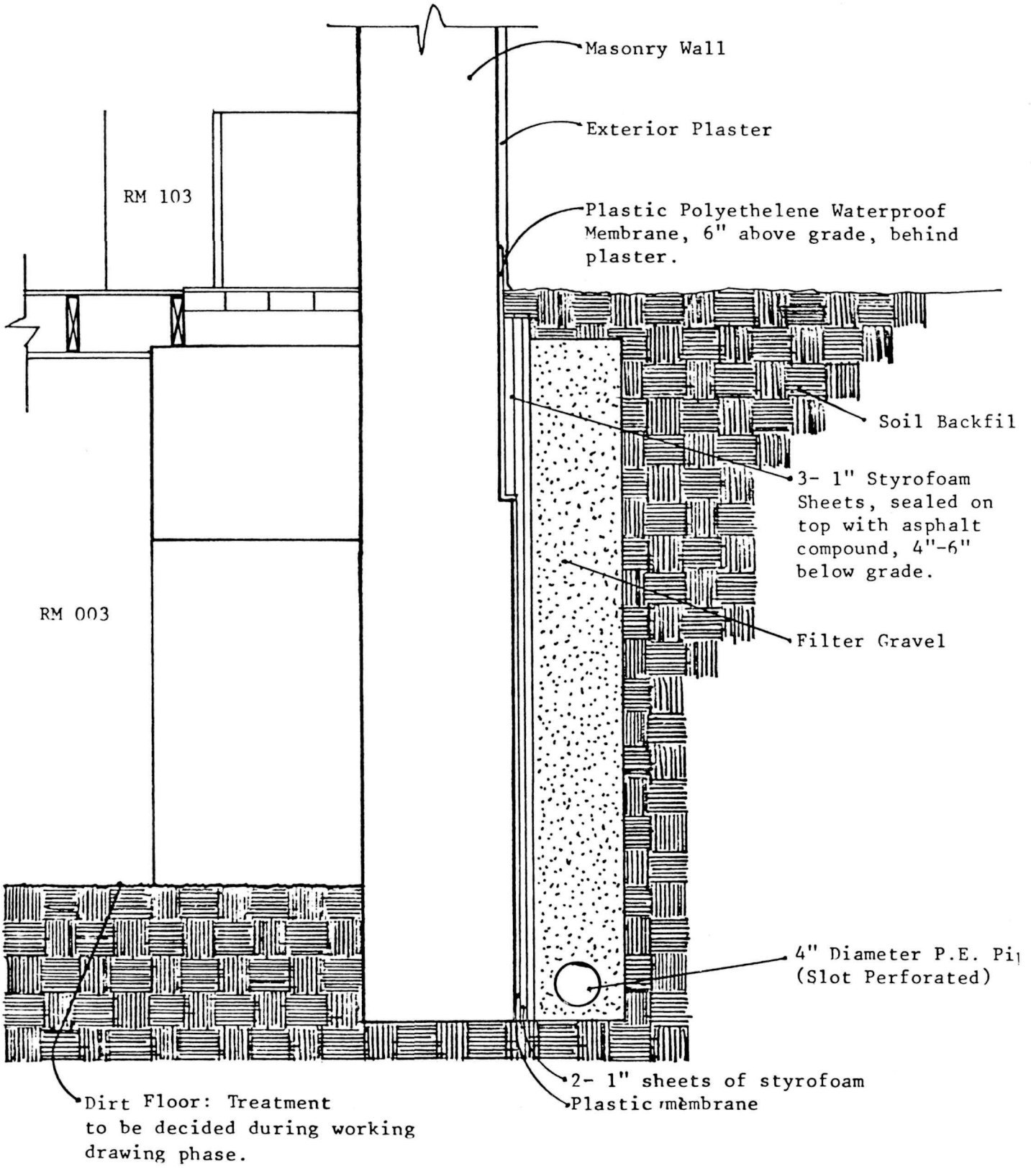
f. The proposed system is illustrated below.

B. Northwest Basement: Rooms 002 and 003

The basic problem here is excessive moisture caused by water vapor and condensation as described in James Ellis' report. Insufficient ventilation has created a humid atmosphere encouraging fungal growth and consequent rot of the wood framing, necessitating temporary posts to support the live loads of the visitors above. Built into the side of a slope, the north and west walls are cool and cause condensation on the surface. Water is dripping onto the earth floor from a broken conduit in the northwest corner of Room 003. The basement stair stringers have fallen down 2" from their original level as indicated by the plaster lines on the wall. The stair base is resting directly on the earth floor; the wood at this point is deteriorating.

Rooms 002 and 003 are not open to the public but are entered on occasion by park maintenance personnel. However, the evidence shows that the ceiling beams are rotten and the summer beam is cracking due to structural failure. Because the condition of the basement structure directly influences the security of the visiting public on the first floor, the rehabilitation and reinforcement of the fabric in these rooms is of the highest priority.

SCHEMATIC DRAWING OF ARCHITECTS' PROPOSAL FOR NORTH WALL INSULATION, WATERPROOFING, AND DRAINAGE.



Work to be done:

1. Four alternatives for treating the floor, Rooms 002 and 003:

a. Leave the earth floor as is. The geotechnical engineer James Ellis states that most of the dampness in the basement is due to humidity coming from the exterior and condensation on the walls. This alternative would preserve the lime mortar matrix stratum 1" below grade which is believed to be the original floor covering.

b. Over the earth lay a vapor barrier consisting of a plastic membrane and 2" of sand. This is a contingency procedure recommended by Ellis and by Mayo against any amounts of water vapor escaping from the ground into the room. The disadvantage of this alternative is the limited durability of a thin plastic membrane under the stress of use by park personnel.

c. Vapor barrier and concrete slab: this third alternative is recommended by the mechanical engineer Edward Turner who feels that there is enough water vapor emitted from the ground to warrant a permanent barrier. A concrete floor would provide a firm base for more maintenance activities in Rooms 002 and 003 and the added advantage of more storage space. On the other hand, installation of a concrete slab would destroy what evidence exists of an historic lime mortar matrix floor.

d. A fourth alternative is a compromise solution between "b" and "c" - a vapor barrier with a 1" thick trowel laid lime mortar floor. This solution offers the advantage of a vapor barrier and hard surface floor with little loss of head room and no damage to the historic stratum underneath.

The project architects favor leaving as much of the dirt floor and original mortar matrix stratum in situ as possible. However, the final decision concerning the floor treatment depends upon the future

maintenance needs of Hopewell Village and should await the review of all alternatives by the MARO historical architect and Office of Quality Control and Compliance.

2. If a vapor barrier and concrete slab floor is to be laid in Rooms 002 and 003, it should be designed according to the following specifications:

a. Vapor barrier - one layer of polyethylene plastic sheets, .004" minimum thickness, 6" overlap at seams, and glued to masonry at sheet seams by a mastic adhesive.

b. Concrete slab - over the plastic vapor barrier and 3 to 4" thick.

c. In order to retain enough head room, the concrete slab surface should be at the same level as the present earth floor. This would require excavating the ground down 4" in preparation for the installation of the vapor barrier/concrete slab and to retain a 7' 6" ceiling height.

d. The alternative of laying a concrete slab over the existing floor level is a possibility but is not recommendable. This would reduce headroom/ceiling height to 7' 2" under the wood beams, reduce the height of Doorway 011 to 5' 8", and require removing 4" from the bottom rise of the basement stairs. With the installation of 8" steel supports under the existing wood beams in Rooms 002 and 003, a raised concrete slab would reduce headroom at certain points to only 6' 6", creating an awkward space.

3. Steel and wood reinforcement of ceiling joists and summer beam supporting the floor of Rooms 102 and 103 above. See Mayo's report for explanation and illustration.

a. Remove all temporary wood posts in Rooms 002 and 003. These are not historic but were installed by the National Park Service in the early 1960s.

b. Perhaps as much as 10 percent of the total floor space (500 square feet) in Rooms 002 and 003 will be excavated for concrete footings of 28 steel posts supporting the reinforcement beams.

c. New 2" by 8" lumber joists should be scabbed alongside the existing joists. This new lumber should be stamp dated and pressure preservative treated.

d. The project architects believe that no plastic vapor barrier is needed at the ceiling/floor joist level of the basement, Rooms 002 and 003, as suggested in Ellis' report (see his illustration). The joists should be left open as existing to receive adequate air ventilation.

4. Seal the leaky telephone conduit in the corner of Room 003.

a. Put a rag plug or resilient plastic closed wall foam around the wire.

b. Seal the conduit with an asphalt compound or weatherproof exterior caulking compound.

5. Repair the basement stairway

a. Repair stringers as necessary

b. Elevate steps back to original level

c. Base of the stairs should rest on a dry surface, preferably a concrete pad with plastic covering or waterproofing.

d. Engineer Mayo recommends adding a third stringer to the middle of the stairs.

6. Replace lintel over the inner doorway of Entrance 010, leading from areaway in Room 003.

a. Existing lintel is rotting in the center as shown by an increment boring.

b. Lintel measuring 2-1/2" by 8-5/8" by 5' 1"

c. New lintel of preservative treated lumber

7. Remove old furnace ducting in Room 002.

a. Remove the duct in the ceiling but retain the grill in the first floor.

b. Remove the duct coming through the wall. Cut the metal duct at the wall surface and leave the opening in the wall for air circulation.

8. Repair basement ventilation Windows 005 and 006.

a. Install operable louvers on the interior face of openings 005 and 006.

b. Lower the ground level under the front porch and reconstruct the well of Window 005. The existing stone well of Window 006 can serve as a pattern for this reconstruction.

c. Install new wood lintel (preservative pressure treated lumber) over Window 005.

9. Natural ventilation - when basement windows in Rooms 002 and 003 are made operable, they can work in conjunction with the routine opening of the exterior doors (010) to create sufficient natural air circulation through the basement.

C. Southwest Basement - Room 001

The interior of the south basement room is in adequate condition evincing no deterioration of stone or mortar and no serious

moisture damage to the ceiling joists. The southern exposure, two operable doorways (001 and 002), and a 3" thick concrete slab floor account for the warmer and drier atmosphere as compared to Rooms 002 and 003. Most of the ceiling joists are in good condition although there are a few soft undersides indicating the inception of rot. The summer beam supporting the floor of Room 101 above shows a slight crack on the side of the long joists due to shear failure. Room 001 is currently used for park maintenance storage and is not open to the public.

Work to be done:

1. Coat the surface of the concrete slab with a polymer sealant.

a. The slab is not connected to the wall but floats on the ground with no plastic vapor barrier between.

b. The sealer should be painted on the concrete to penetrate and close the pores.

2. The grade level under the front porch should be lowered below the sill heights of Windows 001 and 002.

3. Operable louvers installed on the interior facing of Windows 001 and 002.

4. Windows 003 and 004 made operable by hinging the sash to the frame.

5. Northeast corner archeological trench S5-E30 and S10-E30 should be filled and patched with new concrete.

6. The heating duct in the ceiling should be removed; the grill in the first floor left in place.

7. Ventilation routine: when weather permits, louvers of Windows 001 and 002 and the sash of Windows 003 and 004 should be opened for cross ventilation and circulation.

8. The summer beam should be bolted. See Mayo's report.

D. East Wing Basement - Rooms 004 and 005

The historic fabric in the moulder's kitchen (Room 005) and dining room (Room 004) is not in good condition. Excessive subfloor moisture and consequent fungal growth are rotting the floor and baseboards. The ground on the exterior north side of these rooms is 12" higher than the interior floor level; consequently, the north wall is always damp and the worst signs of rot are evident along the floorboards and baseboard on this side. In the moulder's kitchen (Room 005) half the floor has been recently repaired; the timber sleepers were found to be rotten where they entered the north wall; new 2" by 6" lumber was scabbed against the sleepers to stabilize them. In 1975 rot required the installation of six new treads and seven new risers on the kitchen stairs. During July 1978 archeological investigation revealed that the hewn timber sleepers in both rooms (004 and 005) are loose, lack adequate support, and are infested with powder post (Lyctus) beetles. The floorboards were found to be rotting on the underside due to fungal growth caused by humidity and water vapor trapped in the 6" deep subfloor zone. Insufficient ventilation at this basement level creates a humid atmosphere; the cool temperatures of the north and west wall cause condensation on the surface which is peeling the whitewash. During past decades when the fireplaces were in use, heat from the chimney and from the stove in the first floor dining room (Room 104) charred the summer beam above the moulder's dining room (Room 004) at its east end against the chimney; at this point the summer beam is presently supported by an iron jack encased in a wood box to appear like an interior column. The summer beam above the moulder's kitchen is solid and extends to the east end of the room resting over the window lintel (010) causing it to deflect; the masonry at this point has been stabilized.

The moulder's kitchen and dining room are open for the public to view the furnishings and historic displays. All necessary repairs should be made to secure the structural integrity of the floors and preserve an historic appearance without unnecessary physical intrusion.

Solutions: the following work should be done in Rooms 004 and 005 to arrest the rotting of the interior fabric, to reinforce the summer beam, and alleviate the humidity problem.

1. Waterproof and insulate the north exterior wall of the east wing along and below the ground level to the full extent of 36' and to the bottom of the masonry.

a. Waterproof with an eight mil PE plastic membrane.

b. Insulate with two 1" thick styrofoam sheets set into the ground 3" below grade and against the plastic membrane and wall.

c. Membrane and styrofoam stabilized together by a mastic adhesive.

d. The eight mil PE plastic membrane should extend 2" above grade behind the wall plaster to prevent snow melt intrusion behind the barrier.

2. Vapor barrier installed in subfloor areas.

a. Blanket the ground level with one layer of .004" polyethlene plastic.

b. Plastic layer should extend up the walls behind the baseboards and glued to the masonry by a mastic adhesive.

c. 6" overlap at plastic sheet seams, sealed by adhesive.

3. Removal of historic floor framing: hewn timber sleepers show signs of powder post (Lyctus) beetle infestation. They should be removed from the house.

a. If the park elects to keep the timbers, they should be fumigated and stored in a dry place where the beetle pest is not likely to thrive.

b. Otherwise - the timbers should be destroyed.

c. Before either fumigation or destruction, several increment borings should be taken from each of the sleepers.

4. New floor framing (see Mayo's report)

a. Composed of 2" by 6" beams of preservative treated lumber, stamp dated.

b. Floor framing supported on concrete blocks over the vapor barrier, creating a foundation and at least a 6" air space under all wood.

5. New flooring - old flooring removed and replaced by pressure preservating treated, random width, hemlock tongue and groove, 1-1/8" thick boards, stamp dated.

a. The old flooring, mostly 5-1/2" by 1-1/8" tongue and groove, should be inspected when removed. Those in good condition should be preserved and the rotted specimens discarded.

b. New flooring for the moulder's dining room should all be 5-1/2" by 1-1/8" tongue and groove to resemble the existing historic floor pattern and should be stamp dated.

c. Irregular width floorboards near the hearth of the moulder's kitchen represent the historic floor pattern. Those in good

condition should be retained in situ and new floorboards laid in place of those too poor to remain.

d. New floorboards should be stained to assume the color of the old floor.

6. Subfloor ventilation: the subfloor area of Rooms 004 and 005 should have adequate ventilation supplied by vents in the floor, located at the base of the cabinets and shelves north side of the hearth in both rooms. The vents should be painted to assume the same coloration as the floorboards.

7. New baseboard and stairway stringers as required.

a. Baseboards and stringers inspected and replaced where necessary with preservative treated wood.

b. Baseboards measure 1" by 6" with beaded edge.

8. Secure the summer beam in the ceiling Room 004/floor Room 104; see Mayo's report.

a. Summer beam inspected October 18, 1978 by Mayo and Dessauer.

b. Steel should be put in the ceiling to reinforce and support the summer beam, the exact design to be determined during construction document phase.

c. Fireplaces in the chimney should not be used; heat would further adversely affect the summer beam fabric.

9. The walls and ceilings should be rewhitewashed and the ceiling hooks left in place.

10. Proper ventilation of Rooms 004 and 005.

a. All windows and doors made operable; care taken to keep intact window and door pigboard bars.

b. Cabinet doors in Room 004 should be left ajar to allow hot air from heater to circulate.

11. Further archeological research is necessary in the north half of the subfloor area, moulder's kitchen, Room 005. This work should be completed by DSC archeologist Audrey Marie prior to the commencement of rehabilitation construction.

E. Front Porch - West Elevation

Framing for most of the porch consists of four rows of heavy timbers averaging approximately 6" deep and 8" wide; at the north section of the porch the framing is 2" by 6" milled lumber installed by the Civilian Conservation Corps (CCC) in the late 1930s. The flooring is nonhistoric 3-1/2" by 1-1/8" tongue and groove laid by the CCC which is not in good condition but has been patched at the ends where they are exposed to weathering. At the north end of the porch the floor shows signs of sag and rot, especially where the skirt board touches the ground; this is undoubtedly caused by inadequate ventilation under the porch framing. The roof is leaning foward 2" to 3" due to the absence of standard chair supports, which originally supported the six octagonal porch columns. The pilasters at the ends of the porch against the wall are still on standard chair supports and represent the proper height for the porch columns. The box beams supporting the brackets and the roof framing are in good condition. The porch ceiling should be inspected to check the condition of the joists, to look for moisture damage, and to see if there are any leaks in the flat seam sheet metal roof.

Besides being a fine example of a Victorian veranda, the front porch serves two important functions: as the entryway into the Ironmaster's House and as a gathering place to shelter the public during rainstorms. As a public avenue, the front porch should be kept in

optimum structural condition and, as the major architectural feature on the front facade of the house, it should retain an authentic historic appearance. In order to maintain this purpose, the porch needs to undergo some major repairs.

Work to be done:

1. The grade under the north half of the porch should be lowered for proper ventilation purposes, to conform to the natural even slope of the west side and to open the basement windows. The stone well of Window 005 should be reconstructed to prevent rainwater intrusion.

2. Grade level on north side of the porch should be lowered below skirt board. Rotted skirt board should be replaced.

3. New foundation; Feature 5A, a 4" by 6-1/2" beam resting on three piers of rocks and small logs, is not strong enough to support the loading requirements, nor does it rest directly under octagonal column No. 4 as do the other porch foundations. A new stronger foundation under the beams and column is needed; it can be accomplished in one of the following ways:

a. Leave Feature 5A in situ and next to it build a concrete block foundation to support the column and beams.

b. Remove Feature 5A and under the column build a concrete block foundation wall.

c. Construct a stone foundation wall under the beams and column to duplicate the other historic foundation walls.

Each of the above alternatives requires the construction of a new foundation over the remains of a previous stone wall, termed Feature 5, which exists only a few inches below grade and directly under the position of column No. 4 on the porch floor above. The final decision of how this new foundation is to be built should await the review and comment of the Mid-Atlantic Office of Quality Control and Compliance.

4. Redesign and rebuild porch framing to accommodate live load of 100 persons at 100 pounds per square foot.

a. The old hewn timbers range in size from 5-3/4" to 6" deep by 7" to 9" wide and are 10' to 20' long. These can remain in situ as long as a new foundation support is provided to replace or in addition to Feature 5A.

b. New framing should be 3" by 6" or better, double 2" by 6" at 12" on center with a 3" minimum bearing on the foundation stone walls.

c. A new beam of double 2" by 6" should span the entire length of the porch at 7" on center with the front plate to support the bases of the columns.

d. New lumber framing should be pressure preservative treated and stamp dated.

5. New flooring: 5-1/2" by 1-1/8" tongue and groove, pressure preservative treated lumber, stamp dated.

a. Old flooring totally removed and discarded.

b. Chosen flooring size 5-1/2" by 1-1/8" tongue and groove, matches conjectured size of 1870 flooring as indicated by a shim piece found in Feature 5A.

c. The wood type for the historic flooring has not yet been identified. However, the loading requirements demand a floor of board grades No. 2 common or better (No. 1 common).

d. The new floor should be painted the same dark grey as the other porch floors.

e. The porch floor molding is a hand cut variety, full of cut and wire nails, presently in a rather shattered condition since its removal for archeological research, July 1978. Further research is necessary to determine whether or not this molding is historic or what other treatments were used at the junction of the porch floorboards to the wall.

6. Octagonal columns - six in number, inspected by Dessauer, October 20, 1978.

a. Column bases of Nos. 1 and 2 are rotten up to 10" above the floor and need to be repaired.

b. Sections of column bases Nos. 4, 5, and 6 are soft and are in need of repair.

c. All columns need to be elevated on standard chair supports.

d. Insert steel pipes inside the columns to support the vertical loads.

7. Porch ceiling - inspected by Dessauer and Mayo, October 17, 1978, and found to be in good condition with the exception of rot on the roof board next to the masonry and a general lack of ventilation in the ceiling interior.

a. The ceiling space should be ventilated by soffit openings, two each at the north and south ends, measuring approximately 2-1/2" by 7" and covered with screening.

b. It is the opinion of the historical architects that the existing ceiling is historic, dated from the erection of the 1870 porch. Therefore, careful attention should be paid to preserve and not to alter this fabric.

8. Porch roof - after close inspection the architect recommends that the historic flat seam sheet metal roof be preserved in place.

a. Inspection of the porch roof October 17, 1978, did not show any signs of active water leakage through the metal into the rafters. Former leaks and cracks in the metal fabric have been adequately repaired by park personnel.

b. The roof needs to be flashed along its line of juncture with the masonry wall. This would require carefully peeling back the sheet metal, replacing the roof board which shows signs of rot, and flashing the seam where roof board and metal meet the masonry wall. The flashing exposed above the roof line can be coated with pebble dash plaster to match the existing interior.

c. All new wood used on the porch roof should be preservative treated.

d. Porch roof should be painted.

e. Porch roof is delicate and should never be subject to live loads other than what is absolutely necessary for repairs and maintenance.

9. The "V" wood gutter over the front porch steps is not historic. This was erected under the direction of Charles Seidel, park maintenance supervisor. Unless a better alternative can be found to direct rainwater from falling on the steps, this gutter should remain in place.

10. The southeast corner pilaster is infected by a Washington Bower Vine which is growing up from the ground under the porch, through the stone foundation wall where it meets the southwest corner of the house, and between the pilaster and masonry creating a fissure 1" wide.

a. The pilaster should be temporarily removed for inspection.

b. The vine should be totally removed from the surface of the masonry, its trunk dug out from the foundation wall, all avenues of its growth in the masonry sealed, and its roots excavated.

11. The underside of the ceiling box beam at the south end of the porch is rotten and needs to be replaced. It is likely that this rot is due to intrusion by branches of the Washington Bower Vine.

12. Porch windows and blinds should be made operable for ventilation purposes.

13. Porch woodwork, including windows, blinds, columns, floor, lattice, railings, and shirt board should be painted. Historic paint layers underneath the present coat should not be scraped off. A complete paint study should be conducted to determine historic paint colors.

F. Interior Central Hall and the Main Staircase

The central hall accommodates the visiting public on the first floor of the Ironmaster's House. From this room visitors can see the displays in the northwest parlor, dining room, and southwest parlor while peering over the iron grill barriers at the doorways. The barriers - 5' high, 4' long, and 2' 6" wide - successfully serve their purpose to protect the historic displays from visitor intrusion while permitting visual contact. The stairway to the second floor in the central hall is closed to public access by a gate hinged to the wall and closed by a cord and lock attached to the newel post. This gate is barely 2' 6" high, not high enough to prevent intruding visitors or, on occasion, NPS personnel from climbing over it and, in doing so, putting unnecessary stress on the gate railing and the stair newel post. The present condition of the stairway railing and balusters is not good; they are loose and do not meet code standards for security. This situation has been aggravated by visitor abuse - i.e., what seems to be an irresistible tendency by some of the

public to shake the railings, lean on them, and rock the gate in frustration or bewilderment over why they are not permitted to visit the second floor. The worst culprits of this misuse of historic property are often the crowds of school children on tour of Hopewell who inundate the central hall in mass causing uncontrolled noise and exercise. In its present state the stair gate is not adequate either as a visitor barrier nor as protection of the stair balustrade.

Recommendations:

1. Retain iron grill visitor barriers at Doorways 102, 106, and 107.

2. Secure and straighten the stair newel post.

3. Design a new gate and visitor barrier. The new gate should be located in front of the stairs and open, close, and lock independently of any part of the stairs. The audio program should be positioned on the gate. Two proposals:

a. Barrier/gate should be 5' high or more, consisting of an iron structure supporting a plexiglass screen surrounding the stairway on the exposed sides. This solution will protect the balustrade, deny public access to the second floor, and permit a view of the stairs through the plexiglass; however, the imposition of a large screen poses an intrusion on an historic interior.

b. A simpler independent gate at the front of the stairs, 3' plus, of iron frame. This poses less of an intrusion on the historic scene while denying access upstairs. However, this leaves the newel post and balustrade exposed, in which case, special work will have to be done to reinforce this fabric. A park interpreter should be on hand to supervise the behavior of the visiting public.

The choice of which of the above alternatives will be designed will await consultation between the architects and the Office of Quality Control and Compliance, Denver Service Center, and Mid-Atlantic Regional Office.

4. The park program should have a limit on the number of visitors in the central hall at one time, and during the peak visitor months, May through October, a park ranger or seasonal interpreter should be present at the house to supervise visitor behavior. Reasons for this:

a. Visitor abuse of historic fabric as already mentioned above.

b. If school children are visiting, their entry should be limited to the minimum at one time and only under strict supervision of an adult.

c. The closed circuit television camera on the ceiling of the central hall does not act as a sufficient deterrent to mischief but can have the opposite effect of incitement.

G. Northwest Parlor - Room 103

Reports from some of the park maintenance personnel state that there might be rot behind the baseboards under Windows 107 and 108 and along the chimney breasts. If any signs of rot are found, the baseboards on the north wall of Room 103 should be removed for inspection and replaced with preservative treated lumber.

H. Reinforcement of the First and Second Floor Framing Systems

1. As already mentioned, the first floor framing must be reinforced in the following way:

a. Steel beam supports for framing in ceiling Rooms 002 and 003/ floor Rooms 102 and 103, as illustrated in Mayo's report.

b. Bolts to hold summer beam together in ceiling Room 001/ floor Room 101; or, if public entrance is permitted, then steel plates should be added top and bottom to form a composite beam.

c. Summer beam to ceiling Room 004/floor Room 104 reinforced with steel and the temporary jack removed.

2. If the dining room (Room 104) and the kitchen (Room 105) are to be opened for the public, then steel plates need to be added to the floor summer beams top and bottom to form composite beams. Furthermore, if these two rooms are ever opened to the public, a manual screen should be installed in the kitchen northwest corner to hide the electrical apparatus - composed of various surface conduits, heating contractors, time clock, wire way, and panel board.

3. If the second floor is ever to be opened to the public, then the following must be done to strengthen the framing:

a. Remove the gate at the bottom of the stairs, reinforce the balustrade, and reinforce the stringers under the stairs.

b. Leave the double truss intact in attic Room 301 which holds up the summer beam of Rooms 201, 202, and 203.

c. Add steel plates to the top and bottom of all summer beams on the second floor, or suspend tierods from new trusses in the attic connecting to the beams.

Engineer Mayo discusses the adverse affects of reinforcing the second floor which include the destruction and replacement of the radiant wire heating system in the ceiling, the addition of steel at prohibitive cost to the project budget, and/or the intrusion of tierods in the second floor rooms. The Mid-Atlantic Regional Office should carefully consider the feasibility and consequences of opening the second floor to the public, and any other spaces besides what is presently on display. In order to give final direction to the project the regional office should decide in favor or against this and state its decision in a formal memorandum to the Denver Service Center.

I. Main Wing Attic: Rooms 301 and 302

These attic rooms are used to store artifacts and are not open to the public. In Room 301 there is a double truss system which by means of tierods and turnbuckles supports the summer beam in the ceiling above the southwest parlor. The flooring is random width lumber in excellent condition. There are holes in the plaster exposing the lath, the walls bulge slightly inwards due to moisture intrusion into the plaster and lath from leaks on the shingled roof.

Recommendations and work to be done:

1. Leave the double truss intact.

2. Because of the low ceiling, narrow stairs, and the presence of the truss, the attic Rooms 301 and 302 are awkward spaces which should never be opened to the public.

3. Rehabilitate the attic windows as follows:

a. Inspect fabric and replace sills, sash, frame, and lintels as necessary.

b. Repaint window exteriors.

c. Windows made operable for ventilation purposes.

4. Ventilate the attic ceiling crawl space by leaving the hatches open and venting the north and south chimneys.

a. A vent in each of the chimneys requires drilling a hole, 14" wide diameter and reinforced with galvanized pipe, through the masonry.

b. The flat metal roof caps under the chimney hoods should be vented (rectangular opening 1' by 2") and screened to allow air to circulate in the chimney shaft and through the masonry vent into the attic ceiling and crawl space.

5. Repair all holes in the attic ceiling. The lath is in good condition. Holes need to be replastered.

J. East Wing Attic - Rooms 303 and 304

The east wing attic rooms are in a deplorable condition, exhibiting holes in the plaster and lath walls, stains of bat ordure deteriorating the plaster and fabric of the chimney, and an excessive humidity problem. Because of the awkward space in the attic it should remain off limits to the visiting public.

Work to be done:

1. Repair holes in the plaster-lath walls.

2. Repair chimney:

a. Remove stains of bat ordure.

b. Replaster and rewhitewash.

c. Caulk and seal chimney-ceiling lines.

3. Make windows operable: remove and inspect fabric; replace sills, lintels, and sash as necessary.

K. Roof

1. Reshingle the entire roof, east and west wing.

a. Old shingles removed.

b. Nailers and rafters should be inspected and reinforced/replaced as necessary. New lumber should be preservative treated.

c. New shingles laid over entire roof framing.

d. See Mayo's report for detailed discussion.

2. Fiberglass insulation 3-1/2" thick laid between rafters and over the ceiling lath/plaster.

3. New flashing in the roof valleys:

a. When shingles are removed, flashing should be inspected and replaced as necessary.

b. Painted/repainted red to match sheet metal roofs of porches (front and northeast) and existing color.

4. Dormers - fair condition but can be improved.

a. Sills, lintels, and sash inspected, replaced as necessary, made operable, and repainted.

b. Roof reshingled

c. Valleys reflashed as necessary and painted.

5. North and south chimneys

a. Retain metal hoods and covers.

b. Screened vents (1' by 2') in the caps to allow air to circulate in the ceiling shaft and the attic ceiling crawl space.

c. Chimneys need to be reflashed, recaulked, replastered, and rewhitewashed.

6. South gable parapet - new step plates, preservative treated lumber, and painted.

7. East wing chimney - should be flashed with sheet metal, caulked with waterproof asphalt compound, replastered, and whitewashed. Metal roof cap retained in place.

8. Roof gutters - no evidence has been found of historic gutters nor is there a need to replace or remove the new existing "U" shape gutters installed in the autumn of 1978.

a. The new gutters should be painted white.

b. Indigenous flagstone beds should be laid at the bottom of the downspouts to act as splash blocks.

9. Roof ventilation - air vents installed in the roof soffits all around the building during repair of the roof.

a. Air vents, 2-1/2" by 7" rectangular openings, covered with screening on the inside of the soffits, and painted white.

b. Clear away mortar, stone chips, and debris covering the tops of the masonry walls in order to create a clear path for air circulation from the soffit space over the wall into the roof system.

L. Northeast Porch and Victorian Bathroom

The bathroom roof and the porch foundation were inspected by Mayo, Turner, and Dessauer October 17, 1978.

1. The Victorian bathroom roof is in adequate condition, previous leaks in the flat seam metal having been repaired with roofing cement.

a. Roof soffits need to be vented, screened, and painted.

b. Roof sheet metal should be painted.

c. Special attention should be paid to the delicate condition of the historic flat seam sheet metal door. No loads or stresses other than what is necessary for maintenance.

2. The northeast corner of the porch is sinking due to areaway wall foundation settlement under pressure of the structural loads bearing on it. Civil engineer Mayo recommends the construction of a concrete column/buttress to reinforce the bearing capacity of the foundation wall.

M. All Windows Operable

Requirements for natural and sufficient air circulation in all interior rooms of the house; this would provide ventilation necessary to remove excess humidity; best means of humidity control.

1. Window inspection:

a. Sash, frames, sills, and lintels inspected; repaired or replaced if necessary. Add weather stripping. All new wood should be preservative treated.

b. Sash sanded where necessary to make operable.

c. Shutters made operable.

2. All windows and shutters painted - special attention not to scrape off historic layers of paint underneath.

3. Windows recently repaired:

a. No. 219 - Room 209 stairwell window; new sill scabbed in place.

b. No. 112 - Room 105, first floor kitchen, southeast corner window; new sash, new frame, new lintels.

4. The window panes of the Ironmaster's House should be covered with ultraviolet glazing to protect the interior furnishings and paint from the adverse affects of prolonged exposure to solar radiation. Permission to apply glazing to the window panes should come from agreement between the Denver Service Center and the Mid-Atlantic Regional Office of Quality Control and Compliance.

N. House Totally Repainted and Whitewashed

1. An historic paint study should be made of the Ironmaster's House, interior and exterior. Until this is completed, the existing colors of the house should be maintained.

2. The total exterior, including woodwork, plaster, flashing, and sheet metal should be painted or whitewashed.

3. Interior rooms painted as needed.

4. The cracks in the northeast Victorian bathroom wall should be sealed, walls repainted. This work should be done after exterior reinforcement has been added to the northeast porch foundation.

5. Special care during construction and repainting not to scrape off the historic layers underneath the present exterior coat of paint.

O. Improvements to the Electrical Systems

1. Installation of a new fire alarm system.

a. Fire alarm panel in Room 003

b. Eighteen ionization detectors - one in every room.

2. Installation of a new security system.

a. Securikey 1000 - control panel for security system, in Room 003.

b. Sontrix SP-1525 - ultrasonic detection system which controls the Sontrix TR-3 transceivers, in Room 003.

c. Sontrix SMC-15 - pinpoints exact location of intrusion motion, in Room 003.

d. Fourteen Sontrix TR-3 transceiver sensors, located above the door heads in the interior rooms of the Ironmaster's House.

e. Seven door switches - at the basement entrances to the Ironmaster's House, in order to deactivate system when park personnel need to gain access.

f. Install alarm units at the visitor center, superintendent's house, and head ranger's residence.

3. Revise the floor mat switches - these should be connected to the central Securikey 1000 panel control in Room 003 and to the alarm circuit for the superintendent's house, the visitor center, and chief ranger's residence.

4. Fluorescent lights installed in the basement, two in Room 003 and two in Room 002.

a. Each light consists of two 40 watt lamps.

b. Should be installed after steel and 2" by 6" reinforcements are in place.

c. All wiring should be in rigid, intermediate, or flexible steel conduit, electrical magnetic tubing, EMT, or Type MI, mineral insulated cable.

5. Concrete pullbox, poured in place, located on the north side of the drain, to interrupt the leaking conduit, seal it, and channel water collected in its basin into the drainage system.

6. The power ground fault interrupter in basement Room 003 does not test properly. This should be repaired.

7. Replace existing type NM, non-metallic cable, to the receptacle at the fireplace on the first floor Room 103. Wires grooved into masonry where necessary.

8. The lamp cord serving the television camera should be replaced with permanent wiring.

9. Install one new humidistat for Rooms 002 and 003, and one new humidistat for Room 001.

a. Remove control of electric strip heaters in basement Rooms 001, 002, and 003 from moulder's kitchen humidistat.

b. Install a separate thermostat for Rooms 002 and 003 and a separate one for Room 001.

10. New interior lighting (reflective) in the display rooms, located above the door heads in box-like cornices to hide the electrical systems equipment. See the following illustration.

P. Routine Maintenance Program for the Ironmaster's House

1. Requires a daily opening and closing operation of windows and doors in every room to create good air circulation. This should be performed by one of the park employees or seasonal help in charge of house supervision.

a. Windows opened during good weather and under dry sunny conditions.

b. Windows and doors closed during nighttime, snow, rain, cold, wet, and damp weather.

2. All chimneys and fireplaces should remain closed and should not be reopened for use. Fires in the Ironmaster's House should be prohibited because this would cause heat damage to the already aged and worn fabric - i.e., the moulder's dining room summer beam, require removal of the chimney caps and hoods, and would adversely affect interior appearance and displays over a long period of time due to hydrocarbons in the air.

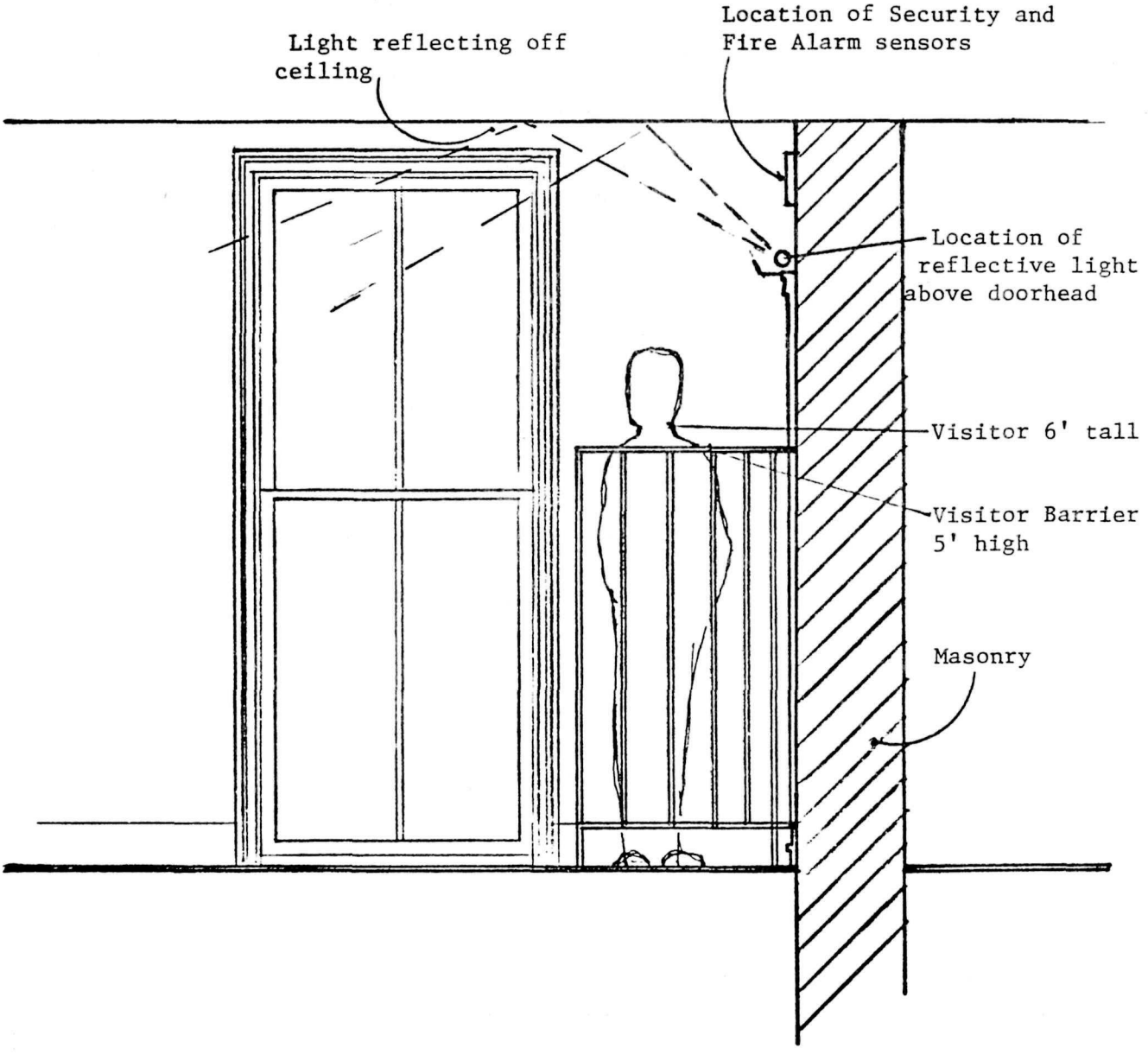
Q. Grading and Drainage in the Areaway

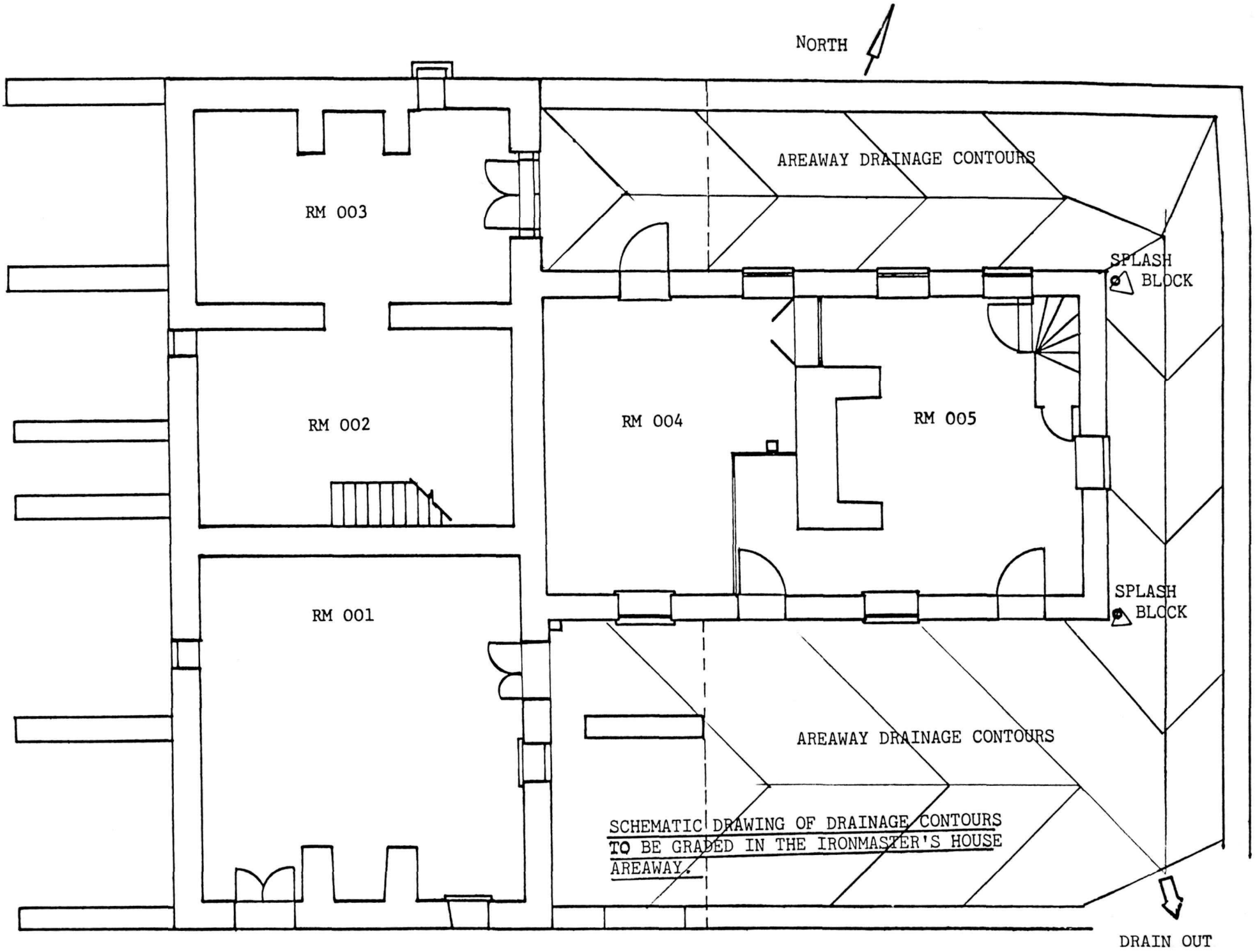
The existing contours of the areaway are sufficient for proper surface water drainage but can be improved to insure a more efficient flow. The grade level on the north side of the east wing slopes evenly around the east side to the south, descending as much as 12" or more. The south side of the east wing slopes in an easterly direction meeting the slops from the north at the southeast corner of the areaway; at this point surface water flows out over the stone steps in front of the bake oven. The avenue of drainage can be improved by straightening out the existing grades and by creating a slight swale in the middle of the stairway. This swale or "U" shape drainage channel can be made by raking no more than a 2 percent slope beginning at the middle of the bake oven step working in two directions:

1. North and west around the east wing to the double entrance to basement Room 003 and;

2. West to the masonry wall under the southeast porch. The slope of the swale need only be 1/4" per foot, requiring very little work to achieve the right contour. In order to direct water from the downspouts into the swale a bedding of indigenous flagstone should be placed as splash blocks under the outlets extending into the swale, the plan below illustrates the correct direction of drainage.

10. New interior lighting (reflective) in the display rooms, located above the door heads in box-like cornices to hide the electrical systems equipment. See following illustration.





SCHEMATIC DRAWING OF DRAINAGE CONTOURS TO BE GRADED IN THE IRONMASTER'S HOUSE AREAWAY.

IX. COST ANALYSIS

The following cost analysis is a "Class C" estimation of amounts required to accomplish the various jobs in the house areas outlined in the scope of work. In no way could this analysis cover all the work which needs to be done but accounts for a major part of it at an expenditure of $275,625 from the total construction budget of $331,000, Type 91 money. The major costs involved in the work outlined concerns labor man hours (MH). The conjectural total of $220,500 is increased by 25 percent to $275,625 to account for costs in deliveries, overhead, delays, change orders, and extra work unanticipated by DSC professionals. This cost analysis dates from December 1978 and probably will be increased 5 to 10 percent due to inflation by September 1979, for a total estimated cost of $303,187.50.

A. Addendum

1. Per memorandum dated September 14, 1979, from James W. Coleman, Jr., Acting Regional Director, Mid-Atlantic Region, the final recommendation was made to award the construction contract (No. CX-4000-9-9004) to Donald E. Reisinger, Inc., in the amount of $205,005, covering the base bid of $187,000, Additive A for $9,460, and Additive B for $8,545.

2. Upon completion of the project construction work, final payment was made by the Denver Service Center to Donald E. Reisinger, Inc., dated May 18, 1981. Final cost was $211,249.38 to include all extras, deletions, and change orders.

CLASS "C" COST OUTLINE - 1978-79

A.	Drainage System - North Wall Exterior	$20,000.00
B.	Northwest Basement - Rooms 002 and 003	11,000.00
C.	Southwest Basement - Room 001	2,000.00
D.	East Wing Basement - Rooms 004 and 005	15,000.00
E.	Front Porch	20,000.00
F.	Southeast Porch	2,000.00
G.	Central Hall - Stair Repairs	5,000.00
H.	Northwest Parlor - Room 103	500.00
I.	Reinforcement of the First and Second Floor Framing Systems	40,000.00
J.	Main Wing Attic	3,000.00
K.	East Wing Attic	2,000.00
L.	Roof	30,000.00
M.	Northeast Porch and Victorian Bathroom	5,000.00
N.	All Windows Made Operable and Treated with Glazing	27,000.00
O.	All Doors Made Operable	5,000.00
P.	House Repainted and Whitewashed	6,000.00
Q.	Improvements to the Electrical Systems, Telephone, and Heating	20,000.00
R.	Areaway Grading and Drainage	5,000.00
S.	Lightning Protection	2,000.00
	Total	$220,500.00
	Plus 25 Percent Contingency and Overhead	55,125.00
	December 1978 Total	275,625.00
	Inflation Factor: Plus 10 Percent	27,562.50
	September 1979 Total	$303,787.50

X. PROBLEM: HANDICAPPED ACCESS

The physically "handicapped" where capable of movement may be classified as people in the following conditions:

1. Confined to wheelchairs
2. Walk with difficulty (require braces or crutches)
3. Blind or see with difficulty
4. Deaf or hear poorly
5. Badly coordinated
6. Infirm from age

Persons in categories 2-6 can experience and enjoy a visit to all aspects of Hopewell Village when accompanied by a responsible person. People confined to wheelchairs are at a disadvantage because the terrain of the site prevents wheelchair traffic to the Ironmaster's House.

At present there are no accommodations for wheelchair access to the Ironmaster's House in Hopewell Village. The problem of designing for this purpose begins with transportation of the handicapped from the parking lot and visitors center to the house itself. The two pedestrian avenues available - the steps down the hillside immediately north of the house and the long gravel dirt driveway around the west side - do not permit wheelchair approach to the front entrance. In the first place the hillside is too steep at certain intervals for the standard 1' to 10' slope necessary for wheelchairs. The construction of a series of ramps on this hillside would be an intrusion on the historic landscape. The driveway, on an acceptable slope for wheelchairs, leads to the other principal buildings on exhibit in the park; however, a stone wall and steps deny access of any individual in a wheelchair to the front lawn and thus, the house. There is the possibility of bringing the handicapped from a midpoint along the driveway directly east to the house; this would

necessitate the creation of a new walkway over undulating terrain and a bridge over the depression of the raceway, again the intrusion of a modern solution on a historic landscape.

If a handicapped avenue to the house front were provided, the second problem, handicapped access into the house interior for visitation poses an equally difficult predicament. A ramp up to the porch floor at the entry or into the north side of the porch, where the ground is only 8" below the floor, would detract from the authenticity of the house facade and intrude upon the historic fabric.

Inside the Ironmaster's House there are special limitations inhibiting comfortable wheelchair movement. The front portion of the central hall, measuring 7' 3" by 7' 3-5/8" is wide enough to allow wheelchair performance, the minimum diameter for a 360 degree turn being 54" (4' 6"). Access through the front door and into the visitor barrier areas of the northwest and southwest parlors is possible since wheelchairs average 25" (2' 1") in width and the doorways are at least 34" (2' 10"). However, the hall from the beginning of the stairs running 13' 3-3/4" back to the doorway of the dining room is no more than 48" (4') wide, 6" less than necessary for a full turn to reverse direction. Wheelchair access and egress to and from the dining room doorway would require a straight run forward and straight run backwards through the hallway, an awkward situation, especially when there are many other visitors present in the space.

The visitor barriers within the southwest parlor, northwest parlor, and dining room doorways measure 2' 7" by 4' 0", just large enough for a wheelchair. The vertical iron railings of the barriers are approximately 5' 0" high, 1' higher than the eye level of a handicapped in a wheelchair, thus causing some visual impediment. If handicapped visitation to the interior of the house is ever to be realized, redesign of the visitor barriers to assure full view at their eye level is recommended.

A decision to provide handicapped avenues to the Ironmaster's House would require a commitment by the Regional Office, National Park

Service, to compromise the present policy of preservation. Normal solutions to this problem - the provision of ramps, handrails, and special paths - pose the threat of intrusion into a historic landscape and of detractive architectural additions to the front of the house. Further study is necessary to consider all design alternatives and to decide whether the annual number of visits by the handicapped and specifically those confined to wheelchairs is significant enough to justify commitment to design special accommodations for them. At present, a special study is underway involving access by handicapped visitors to historic structures throughout the National Park Service. It is recommended that a final decision on access by handicapped be delayed until the final report is published early in FY 79.

XI. FURTHER ARCHITECTURAL RESEARCH

A. Listed below are areas of investigation and record which can be undertaken in future research projects involving the Ironmaster's House:

1. A complete exterior and interior paint/wallpaper study.

2. Door and window study: photograph, measure, draw, and identify types and dates.

3. More study into the evolution of the southeast porch.

4. Feasibility study for the opening of the second floor to public visitation.

5. Subsequent to the feasibility study: section drawings, with precise dimensions, of the second floor.

6. Further architectural research is required in the northwest parlor in order to establish the evolution and dates of the north side Windows 107 and 108. Investigations should concentrate on specific areas such as the north side baseboards, windows, and hearth, and should be performed by x-ray photography or by careful removal of certain historic fabric for photographic record.

7. Further architectural research in the east wing chimneys and fireplaces, especially those on the second floor which have been closed, in order to record conditions and historic construction.

B. Addendum

1. An historic paint study for the Ironmaster's House was made by project architect Dessauer during the construction phase of the work (see Chapter XVI - Addendum: Paint Study and Painting).

2. After the final inspection (November 18, 1980) of the project construction at Hopewell Village, the project architect wrote a memorandum outlining further work to be done with historic paint studies, archeology, drainage, and structural investigations. A copy of this memorandum may be found on the following page.

XII. EVALUATION OF EFFECT OF THE RECOMMENDED TREATMENT FOR THE IRONMASTER'S HOUSE

The purpose of the recommended treatment on the structure will to maintain the present apperance and characteristics which do not differ greatly from the appearance of the house, circa 1893. A major rehabilitation of deteriorating fabric will increase the life of the building and its historical and architectural values and, thus, enhance the integrity of the historic site and the continuity of historic Hopewell Village.

In applying the Criteria of Adverse Effect, 36 CFR Part 800.9, the project architect has found the effect not to be adverse because:

1. The proposed undertaking will not result in the destruction or alteration of significant features of the property. Removal of some amounts of historic fabric dating from the 1870s (specifically the basement floors, the front porch, and the floor framing) will be required, but this material has so deteriorated that it would have to replaced regardless of the proposed action. However, to insure this action will have no adverse effect, the project architects Howell and Dessauer have recorded by measured drawings and photographs the material to be replaced and have specified renovation of materials to assume the historic appearance as practically as possible.

2. The proposed undertaking will not result in the isolation of the property from, nor alteration of, its surrounding environment. The Ironmaster's House will be temporarily closed to the public during certain months of the construction phase of rehabilitation. During this time its exterior will be visible for public view, and, when reopened, the house interior will be reinforced and safer for visitor accommodation.

3. The proposed undertaking will not introduce visual, audible, or atmospheric elements that are out of character with the property or alter its setting. As stated above, the proposed undertaking will result in a total rehabilitation of the deteriorated fabric that will benefit the future condition of the Ironmaster's House. New fire alarm,

intrusion alarm, heat, and lighting systems inside the house will not cause visible intrusions on an historic scene nor will they alter the existing historic fabric during installation but will provide essential protection for visitors and the historic features on display.

H30-DSC-THE

February 2, 1981

Memorandum

To: Assistant Manager, Mid-Atlantic/North Atlantic Team, DSC

From: Peter F. Dessauer, Architect, Branch of Historic Preservation, Mid-Atlantic/North Atlantic Team

Reference: Hopewell Village, CX-4000-9-9004, Park General, Construction Supervision, Preserve and Rehabilitate the Ironmaster's House, Pkg. No. 102

Subject: Trip Report, November 18, 1980; and Recommendations for Further Architectural Research and Preservation Construction on the Ironmaster's House

PURPOSE

To attend the final inspection of the construction phase of the project.

SUMMARY

The final inspection on November 18, 1980, of the construction phase to preserve and rehabilitate the Ironmaster's House at Hopewell Village was conducted and concluded successfully to the satisfaction of the project architect. The principal persons involved in the meeting were as follows:

Representing the Contractor:	Steven Reisinger, Construction Foreman Vernon Reisinger, Contractor E. Dick Harrington, Electrical Subcontractor George Harrington
Representing the Park:	Elizabeth E. Disrude, Superintendent Charles Siedel, Maintenance Supervisor
Representing the Region:	John Ingle, Architect
Representing Denver Service Center:	Quentin Smith, Electrical Engineer Scott Jacobs, Architect Peter Dessauer, Architect Edward J. Bleyhl, Chief of Construction Patrick McCrary, Electrician Howard Glifort, Project Supervisor

DISCUSSIONS AND RECOMMENDATIONS

During the inspection, Dessauer was able to talk with John Ingle and Superintendent Elizabeth Disrude concerning future historical and architectural research for the Ironmaster's House. Below are listed the topics of their discussions and Dessauer's recommendations.

Historic Paint Studies:

1. An historic paint study of the second floor of the Ironmaster's House has not been done. This should be accomplished for the purposes of acquiring knowledge as to the historic colors (and their approximate dates) that exist, to guide future maintenance repainting work, and, in the future, to present in the second floor a color scheme which conforms with the 1840-1870 preservation dates of the house.

2. An historic paint study of the whole exterior woodwork, especially the front porch, needs to be done for the record of paint layers and colors. The major objective is not to change the present and existing 1840 scheme (semi-gloss dark green) but to date the iron oxide red scheme (1920? or earlier?) which for so many years was thought to be a nineteenth century, even original, paint.

Construction, Archeology, and Structural Investigations:

3. In the immediate future the three downspouts (two on the east wing and one at the southeast porch) from the roof gutters should be connected underground to the drainage pipe on the north and east exterior sides of the areaway wall leading to daylight at the east side of the barn. During the recent construction project, a "T" section of P.E. pipe was installed mid-span in the pipe run between the house and barn for the specific purpose of this future connection. The installation of P.E. pipes from the downspouts to the "T" could be accomplished at a minimum cost and disturbance to existing surface fabric. However, since the east wing downspout pipes would run down, into, and through an archeologically sensitive portion of the interior areaway, preliminary investigations of the features (a nineteenth century stone drain) in that space are essential. Final design plans should preserve subterranean historic fabric while routing pipe to avoid this. And finally, archeological monitoring would be necessary during actual construction.

4. If ever and only under the condition that a future use of the second floor would involve the visitation of the public, special groups, or even special exhibits, Dessauer recommends the installation of insulation and radiant heat wires in the ceiling. Coupled with this should be a full investigation of the ceiling/attic floor framing structure for possible repairs or reinforcement.

5. If future park maintenance requirements necessitate the use of more space in the Ironmaster's House for storage of materials and equipment, it would be possible to install concrete slabs in the existing dirt floor of Rooms 002-003 to serve this purpose. Archeological test pits dug by Denver Service Center Archeologist Audrey Marie (summer, 1978) revealed the lack of artifacts and relative historic importance of the earth layers. However,

construction excavation should involve archeological monitoring. A concrete slab floor in Rooms 002-003 should include these design features:

a. An 8" depth below existing grade to include 4" of gravel bed followed by .006" polyethelene moisture barrier, reinforcement rods, and 4" of concrete.

b. The perimeter of the concrete slab next to the walls should be a 6" minimum wide, 8" deep, bed of gravel, surface level with the top of the slab, to allow rising moisture an uninterrupted escape from the ground into the atmosphere. This feature would prevent rising damp from creeping up through the interior of the stone walls and, subsequently, deteriorating the mortar—an adverse result which might assuredly occur if the total floor space, wall to wall, were slabbed without any sort of moisture release.

CONCLUSION

Dessauer shall be available to discuss his recommendations with region or park responsibiles.

Peter F. Dessauer

Approved for Distribution:

/s/ Nan V. Rickey — FEB 3 1981

Chief, Branch of Historic Preservation, Mid-Atlantic/North Atlantic Team — Date

cc:
Reg.. Dir., Mid-Atlantic
Supt., Hopewell Village
MARO-PHA-Mr. Magaziner

bcc:
DSC-TNE-Ms. Batcheler (INDE)

TNE:PFDessauer:hca:2/2/81:5545

XIII. BIBLIOGRAPHY

1. Primary Sources

Interview with Charles Seidel, June 23, 1978. Denver Service Center architects Peter Dessauer and William Howell interviewed and taped comments on the history of the fabric maintenance while on tour of the Ironmaster's House.

Interview with Dan Miller, June 26, 1978. Denver Service Center architects Peter Dessauer and William Howell interviewed and taped comments on work done and the condition of specific areas unopened by DSC research.

2. Reports and Documents

Abel, Leland J., "Historic Structure Report, Archeological Data Section, Ironmaster's House, Hopewell Village National Historic Site," p. 89, unpublished typescript, 1964.

Apple, Russell A., "Documentation for Historical Base Maps, Hopewell Village National Historic Site," p. 159, typescript with appendices, June 1956.

Appleman, Roy A., "Report on Historical Field Investigation of Hopewell Furnace, French Creek, Pa.," p. 43, typescript, August 18, 1935.

_____. "Proposed Restoration Plan for Old Iron Making Village, French Creek Project, Hopewell, Pa.," p. 44, typescript, January 15, 1936.

_____. "Verbatim Notes Taken from Mr. Harker L. Long, Birdsboro, Pa. at the Site of each Subject Discussed," p. 9, typescript, December 1935.

Borresen, Thor, "Hopewell Village," p. 38, typescript, June 5, 1940.

_____. "A Preliminary Report on Old Type Bake Ovens," p. 38, typescript plus plates, January 13, 1942.

_____. "Report on Proposed Restoration of Bake Oven, Hopewell Village, Birdsboro, Pa.," p. 4, typescript plus plates, May 7, 1940.

Collins, Franklin and Rickey, Nan, "Master Plan, Hopewell Village National Historic Site--Preliminary Draft," September 22, 1972.

Cotter, John L., "Archeological Tests, Garden Area, Ironmaster's House," November 6, 1957.

Disrude, Elizabeth E., "Statement for Management, Hopewell Village National Historic Site," p. 19, typescript, January 29, 1976.

Fairbairn, Charlotte J., "Furnishing Plan, Ironmaster's House (Hopewell Village)," p. 21, typescript, December 19, 1963.

_____. "Historic Structure Report, Historical Data Section, Ironmaster's House, Hopewell Village National Historic Site," p. 32, typescript, June 12, 1963.

Hugins, Walter E., "Preliminary Report--Interior Funishings and Arrangements of the Ironmaster's Mansion," p. 13, typescript, February 13, 1954.

_____. "The Physical History of the Hopewell Furnace Group, 1770-1883," p. 49, typescript, February 7, 1954.

Marie, Audrey, "Preliminary Report: Archeological Investigations of the Ironmaster's House, Hopewell Village National Historic Site," 40 pages, 15 drawings, Denver Service Center, Mid-Atlantic/North Atlantic Team, National Park Service, U.S. Department of the Interior, Denver, Colorado, September 1978.

Motz, J. C. Fisher, "Hopewell Village Archeology Narrative Report," p. 51, typescript, 1941.

_____. "Report on Hopewell Village Bake Ovens," 1941.

Rickey, Nan, "Interpretive Prospectus, Hopewell Village National Historic Site," 1973.

Schumacher, Paul J. F., "Archeological Field Notes, Historic Road Project Archeology," p. 35, typescript, October 19, 1956.

Souder, Norman M., "Historic Structure Report, Architectural Data Section, Ironmaster's House, Hopewell Village National Historic Site," p. 12, typescript, four plates, January 1965 (not approved).

Walker, Joseph E., A Summer Day at a Charcoal Iron Furnace, Eastern National Park and Monument Association.

_____. Hopewell Village: A Social and Economic History of an Ironmaking Community, Philadelphia: University of Pennsylvania Press, 1966.

3. Drawings: the following sets were used in research:

Five plan drawings of the Ironmaster's House from the Historic American Buildings Survey (HABS), done by Eugene Dunbar, University of Delaware, 1957.

Nine drawings-plans, sections, elevations, and building evolution of the Ironmaster's House, done by Norman Souder, architect, No. 376-28,000 dated March 1975 according to the DSC Drawing Number Record Book.

National Park Service Archeological Base Maps of Hopewell Village:

No. 2030	October 24, 1960	1 sheet
No. 3006	January 26, 1956	5 sheets

National Park Service Historical Base Maps of Hopewell Village:

No. 3007	July 27, 1956	1 sheet
No. 3012	June 26, 1956	1 sheet
No. 3038	January 19, 1962	1 sheet

National Park Service Heating System for Ironmaster's House:

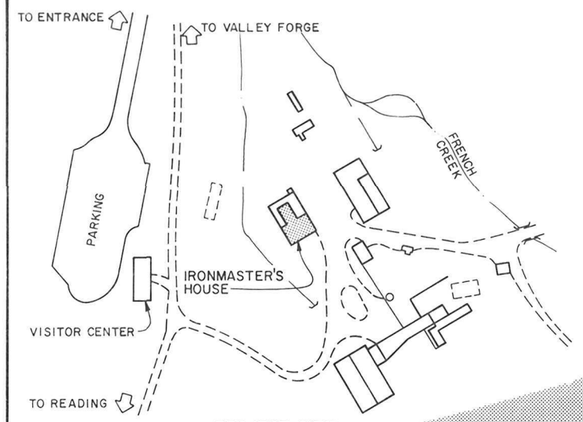
No. 3035	May 7, 1958	1 sheet

National Park Service Proposed Repairs for Deflecting Beam in the Ironmaster's House:

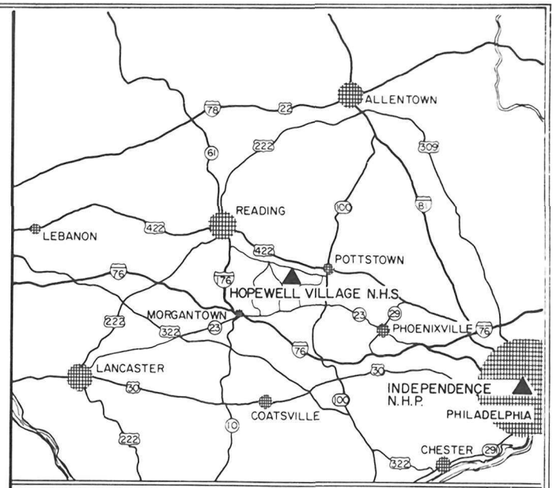
No. 3063	September 25, 1957
No. 30G3-A	March 19, 1958
No. 30631-B	May 9, 1958

XIV. DRAWINGS

The following 14 sheets of drawings (No. 376/28000A) were completed by project architect Peter Dessauer at the Denver Service Center September through December 1978. These represent a record of existing conditions as found by the architect in the Ironmaster's House during the months of field investigations in preparation for the historic structure report.



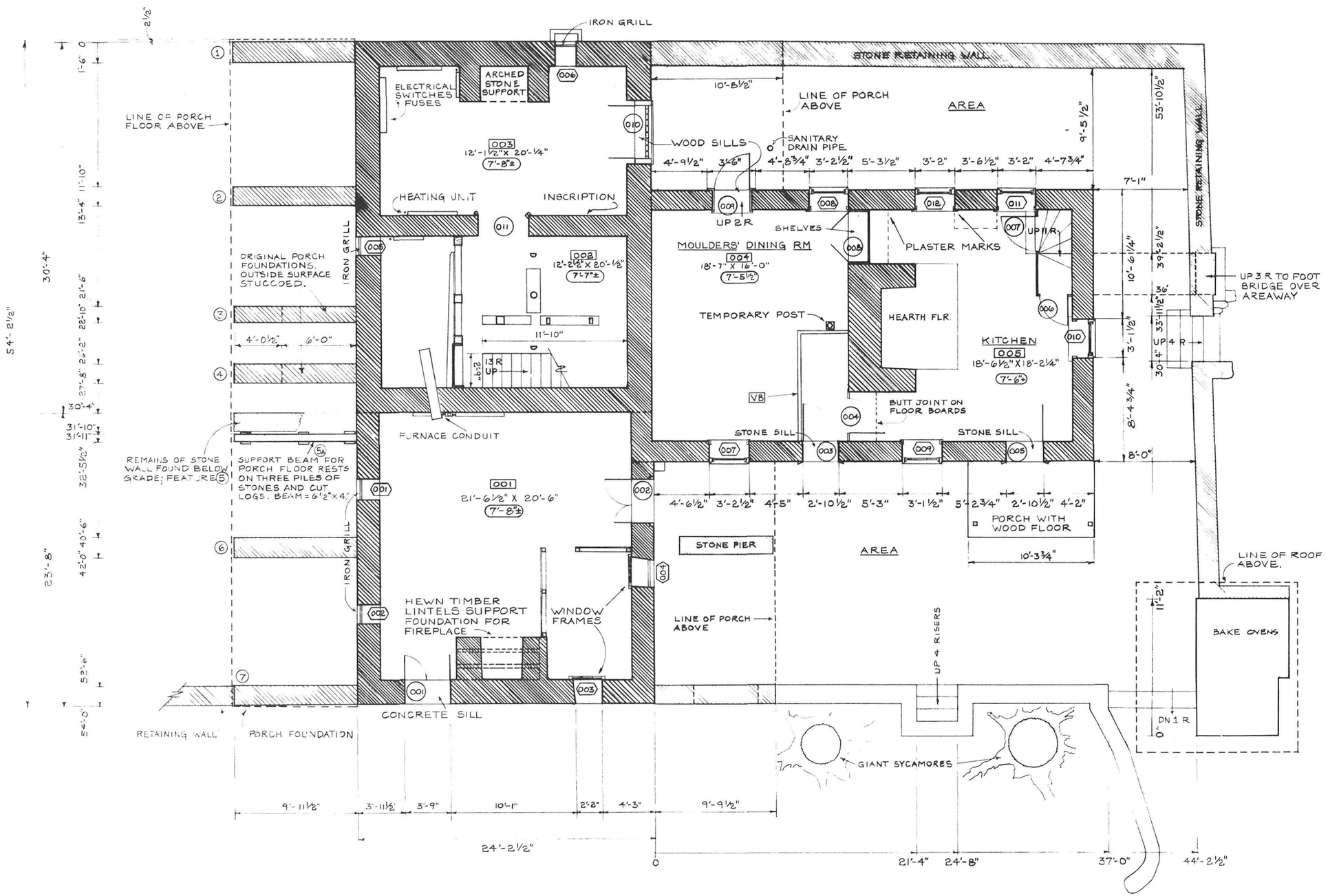
PROJECT SITE
NO SCALE



BASIC DATA · NUS-HV / 3005

EXISTING CONDITIONS HSR	PREPARED ORIGINAL	TITLE OF DRAWING: PRESERVATION & REHABILITATION	DRAWING NO 376 28000A
UNITED STATES DEPARTMENT OF THE INTERIOR	DESIGNED	LOCATION WITHIN PARK: IRONMASTER'S HOUSE	PKG NO 102
NATIONAL PARK SERVICE DENVER SERVICE CENTER	DRAWN	NAME OF PARK: HOPEWELL VILLAGE N.H.S.	SHEET 1 OF 14
	CHECKED DEC. 1978 DATE	M.A. REGION · BERS & CHESTER COUNTY · PENN STATE	

GPO 1974 678 111



NOTES: BASEMENT

001 CONCRETE FLOOR, EXPOSED STONE WALLS AND CEILING JOISTS WHITEWASHED, NO PLASTER. USE: MAINTENANCE STORAGE; NO PUBLIC ACCESS OR EGRESS.

002 EARTH FLOOR, WALLS OF WHITE ROUGH PLASTER, WALLS AND CEILING JOISTS WHITEWASHED.
ALL POSTS ARE TEMPORARY SUPPORTS, INSTALLED BY N.P.S., TO SECURE ROTTING CEILING JOISTS AND TO CARRY LIVE LOAD OF VISITORS IN HALLWAY OF FIRST FLOOR ABOVE.
STAIRS: UP 13 R: 1 R @ 6"
12 R @ 8"
12 T @ 9½"
USE: BY PARK PERSONNEL; NO PUBLIC ACCESS OR EGRESS.

003 INTERIOR CONDITIONS AND USE ARE THE SAME AS RM 002.
INSCRIPTION: DATE AND INITIAL "S-1826" INSCRIBED IN PLASTER.

011 IRON HASP AND IRON PINTLE INDICATE PREVIOUS DOOR.

004 MOULDERS' DINING ROOM
WOOD FLOOR ON HEWN TIMBER SLEEPERS RESTING ON SOIL AND STONES. WALLS AND CEILING ARE PLASTERED AND WHITEWASHED.
IRON PIPE ENCASED IN 8" X 8" WOOD BOX ACTS AS POST TO SUPPORT CHARRED SUMMER BEAM ABOVE.
USE: OPEN TO PUBLIC VISITATION TO VIEW DISPLAY.

009 UP 2 RISERS, @ 6¾" AND 7½"

005 KITCHEN
INTERIOR CONDITIONS AND USE SAME AS ROOM 004.
MARKS ON PLASTER WALLS INDICATE PREVIOUS CUPBOARD.

007 STAIRWAY UP 11 R TO FIRST FLOOR KITCHEN.

006 CLOSET UNDER STAIRWAY.

LEGEND

- MASONRY - STONE
- 7'-6"± ROOM FLOOR TO CEILING HEIGHT
- 005 ROOM NUMBER
- 006 DOOR NUMBER
- 010 WINDOW NUMBER
- VB VISITOR BARRIER

BASEMENT FLOOR PLAN

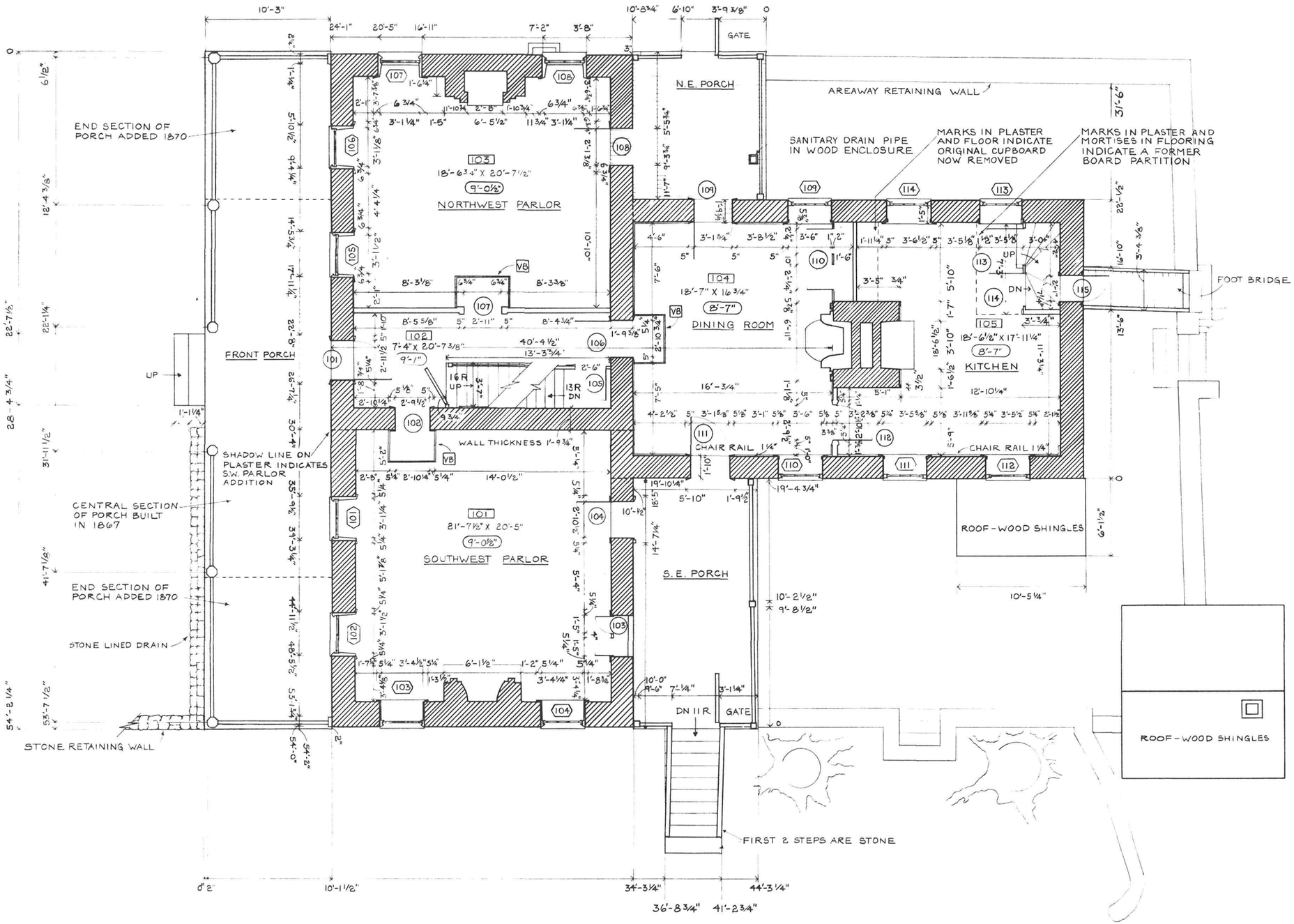
SCALE: 1/4" = 1'-0"

0 5 10 15 20 FEET

IRONMASTER'S HOUSE
HOPEWELL VILLAGE NATIONAL HISTORIC SITE
HISTORIC STRUCTURE REPORT
EXISTING CONDITIONS DRAWINGS

PREPARED	DRAWING NO.
ORIGINAL DESIGNED P. DESSAUER	376/B8000A
DRAWN VLK	PKG NO. 102
CHECKED DEC. 1978	SHEET 2 OF 14
DATE	

* GPO 1977 780-261



NOTES: FIRST FLOOR

101 SOUTHWEST PARLOR
PANEL JAMB WINDOWS
FIREPLACE: SLATE MANTLE, BLACK HEARTH, SURROUND, GREY MARBLE, CIRCA 1830

102 CENTRAL HALL
STAIRS: UP 16 RISERS TO SECOND FLOOR, DOWN 11 RISERS TO THE BASEMENT
PLASTER MARKS ON WALL INDICATE FORMER CHAIR RAIL

103 NORTHWEST PARLOR
PANEL JAMB WINDOWS
FIREPLACE: VICTORIAN SLATE MANTLE, MARBLEIZED BRICK HEARTH, OPENING REDUCED WITH BRICK TO ACCOMODATE VICTORIAN MANTLE

104 DINING ROOM
PLASTER JAMB WINDOWS
FIREPLACE: WOOD MANTLE, FLUTED PILASTERS, GOUGE CARVING 1800-1820; HOPEWELL FRANKLIN STOVE SET INTO FIREPLACE
CHAIR RAIL ON WALLS

105 KITCHEN
PLASTER JAMB WINDOWS
FIREPLACE: COAL RANGE SET INTO FIREPLACE, WOOD MANTLE

(114) ENCLOSED STAIRWAY: DOWN 11 RISERS TO MOULDERS' DINING ROOM, UP 13 RISERS TO SECOND FLOOR

(113) PLASTER SHOWS MARKS OF FORMER CHAIR RAIL

(101) FRONT ENTRANCE DOORWAY
4 PANEL VICTORIAN STYLE WITH HIPPED CENTER PANEL

(103) CUPBOARD SHELVES
REPLACE FORMER WINDOW (WINDOW SOFFIT INTACT)

(104) DOOR 104 REPLACES FORMER WINDOW

(101) (102) FRONT PORCH WINDOWS
(105) (106) CHANGED TO FLOOR LENGTH 1870 2/2 SASH

101-105 ROOM INTERIOR SURFACES
ALL ROOMS - PLASTERED WALLS AND CEILINGS; T & G WOOD FLOORING

VB VISITOR BARRIER
IRON RAILING WITH VERTICAL INSETS

FRONT, N.E. AND S.E. PORCHES
ALL HAVE T & G WOOD FLOORS

S.E. PORCH STEPS
DN TOTAL OF 11R AND 10T
9 WOOD R @ 8", 8 WOOD T @ 1'-0 1/2"
2 STONE R @ 4" AND 4"
2 STONE T @ 1'-0 1/2" AND 1'-3 1/2"

(107) (108) LINES ON FLOOR BOARDS IN FRONT OF WINDOW 108 INDICATE THAT THIS SPACE (AS WELL AS PERHAPS 107) WAS ONCE A CUPBOARD.

FIRST FLOOR PLAN

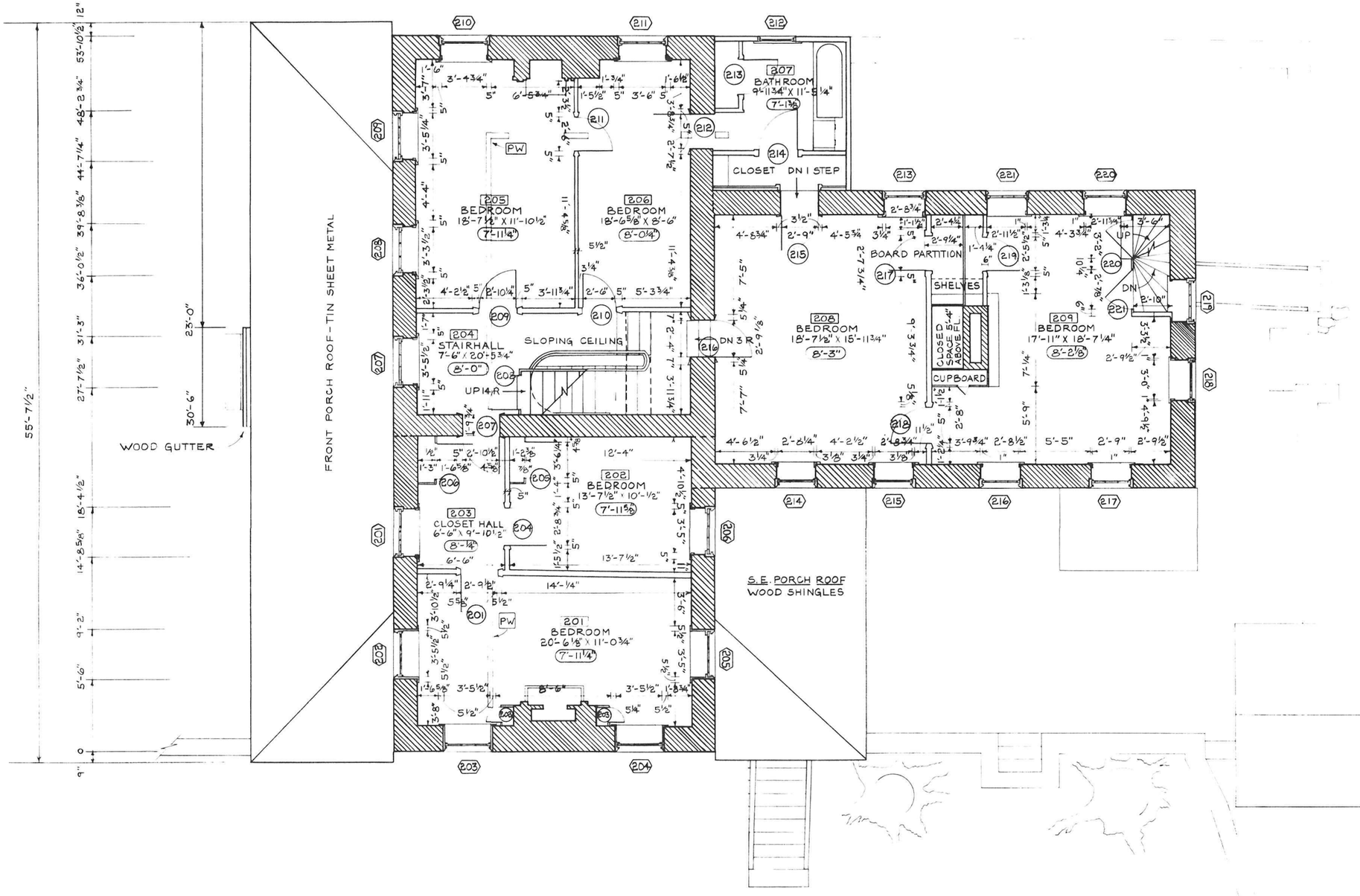
SCALE: 1/4" = 1'-0"

0 5 10 15 20 FEET

IRONMASTER'S HOUSE
HOPEWELL VILLAGE NATIONAL HISTORIC SITE
HISTORIC STRUCTURE REPORT
EXISTING CONDITIONS DRAWINGS

PREPARED	DRAWING NO.
ORIGINAL DESIGNED	376/23000CA
P. DESSAUER DRAWN	PKG. NO. 102
VLK. CHECKED	SHEET 3 OF 14
DEC. 1978 DATE	

* GPO 1977 780 261



NOTES: SECOND FLOOR

201-209 ALL ROOMS HAVE PLASTERED WALLS AND CEILINGS. ALL CLOSETS HAVE WOOD STRIPS WITH WOOD PEGS.

201-206 ALL ROOMS HAVE WOOD FLOORS MILLED T & G PINE.

201 BEDROOM FIREPLACE:
ORIGINAL WOOD MANTLE CA. 1830, SIMILAR IN DESIGN TO SLATE AND MARBLE IN ROOM BELOW 101, WITH CEMENT HEARTH AND SMALL BREAST CLOSETS ON EITHER SIDE, DOORS 202 & 203.

PW PIPEWAY:
WOOD FLOOR BOARDS COVER LEAD PIPELINE INSTALLED IN THE LATE 19/TH CENTURY FOR ACCESS TO WASHSTANDS IN THREE BEDROOMS, WASTE WATER DRAINED ON TO THE ROOF. FLOOR BOARDS OVER PIPEWAY ARE SECURED IN PLACE BY SCREWS REMOVABLE FOR ACCESS.

204 STAIRHALL:
CHAIR RAIL - ORIGINAL, CONTINUING UP STAIRWAY FROM FIRST FLOOR HALL, IS MISSING. EVIDENCE ARE PLASTER MARKS ON WALL.
STAIRWAY- DN 4 R @ 7½", 3 T @ 10"
LANDING - 7'-6" X 4'-0"
DN 12 R @ 7¼", 11 T @ 10"

216 DOOR WITH THREE STEPS:
3 R @ 8", 2 T @ 10½", 1 T @ 4¼"

205 BEDROOM FIREPLACE:
WOOD MANTEL, LATE 18/TH CENTURY, WITH MODERN CEMENT HEARTH AND LINING.

205-206 BEDROOMS:
ORIGINALLY ONE ROOM. PLASTER PATCHING INDICATES FORMER CHAIR RAIL. PARTITION END AGAINST ORIGINAL PLASTER. NO CHAIR RAIL MARKS ON DIVIDING PARTITION.

207 VICTORIAN BATHROOM
ADDED IN MID-NINETEENTH CENTURY. DOORS 218 AND 215 ARE LOCATIONS OF ORIGINAL WINDOWS IN MASONRY. FIXTURE CONTAINS LONG ZINC TUB AND WATER CLOSET IN WOOD PANELED UNIT. CLOSET HAS 4 SHELVES.

208-209 BEDROOMS: EAST WING
FLOORS HAVE RANDOM WIDTH PINE BOARDS.
SCARLINE UNDER THE PLASTER ON THE EAST AND WEST INTERIOR WALLS SHOWS EVIDENCE OF AN EARLIER SHED ROOF OVER THE EAST WING. THE EXTERIOR PITCH OF THE SHED ROOF IS INDICATED BY A LINE IN THE STUCCO OF THE EAST ELEVATION.

202-205 PANEL JAMB WINDOWS IN ROOM 201.

201 206-211 213-221 PLASTER JAMB WINDOWS IN ROOMS 202-206 AND 208-209.

220 221 209 DOORS AND ROOM OF ENCLOSED STAIRWAY, 13 R UP AND 13 R DOWN.

SECOND FLOOR PLAN

SCALE: 1/4" = 1'-0"

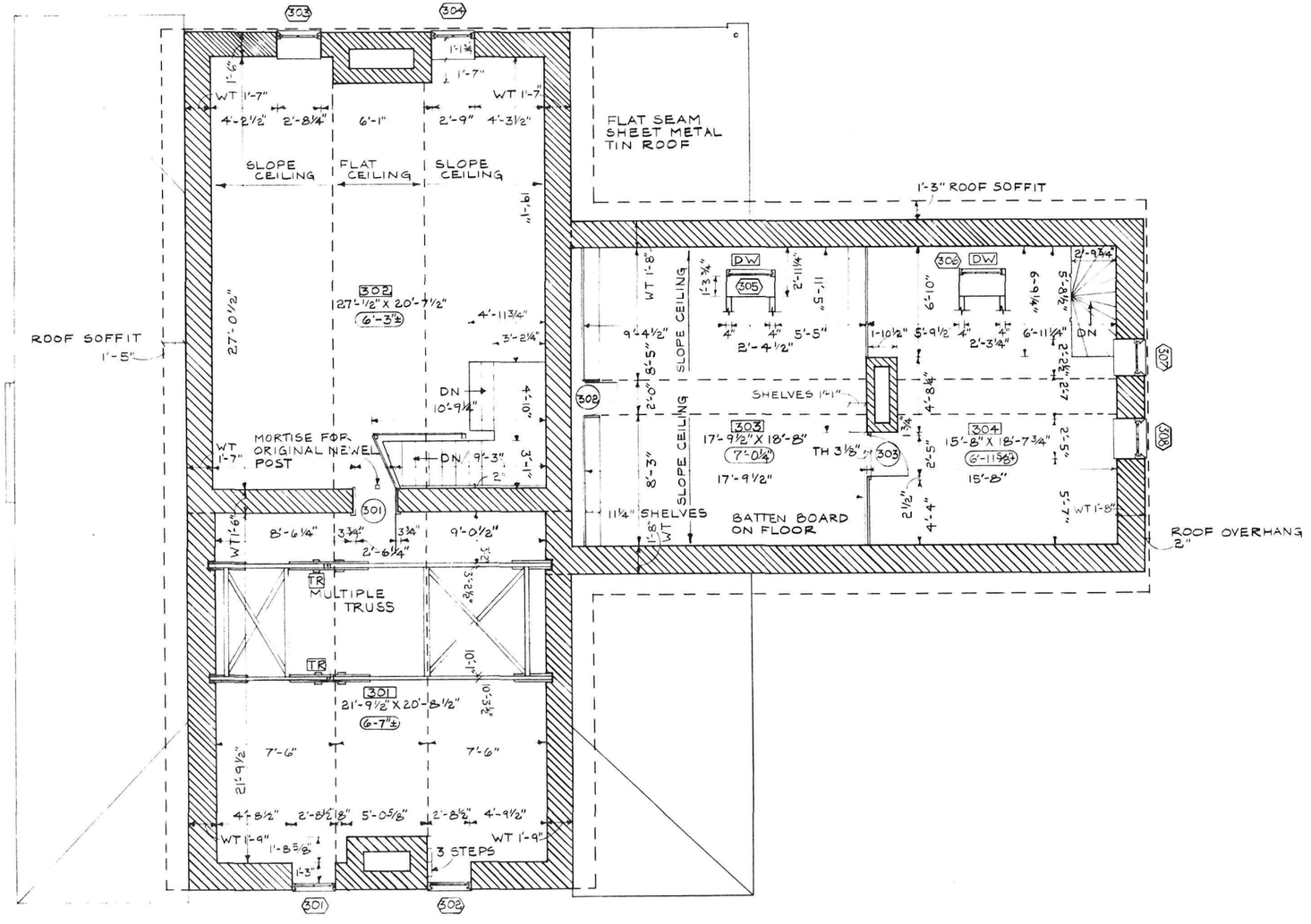
0 5 10 15 20 FEET

N

IRONMASTER'S HOUSE
HOPEWELL VILLAGE NATIONAL HISTORIC SITE
HISTORIC STRUCTURE REPORT
EXISTING CONDITIONS DRAWINGS

PREPARED	DRAWING NO.
ORIGINAL DESIGNED P. DESSAUER DRAWN VLK CHECKED DEC. 1978 DATE	376/28000A
PKG NO. 102	SHEET 4 OF 14

GPO 1977 780 281



NOTES: ATTIC FLOOR

301-304 ALL ROOMS ON THIS FLOOR HAVE EXTERIOR WALLS AND CEILINGS PLASTERED. FLOORING IS OF 1⅛" PINE IN VERY WIDE RANDOM DIMENSIONS.

301-302 BOTH ROOMS HAVE A CENTRAL FLAT CEILING, 6'-7" AND 6'-3" HIGH RESPECTIVELY, WITH SLOPES TO KNEE WALL 1'-3"± ABOVE FLOOR LEVEL.

303-304 BOTH ROOMS HAVE A CENTRAL FLAT CEILING, APPROXIMATELY 6'-11" HIGH, WITH SLOPES ON EITHER SIDE TO KNEE WALL 1'-1" ABOVE FLOOR. WOOD PARTITION WALL IS 1¾" WIDE OF BEAD EDGE BOARDS.

301 MULTIPLE TRUSS SYSTEM IN ATTIC DESIGNED BY N.P.S. IN 1958 AND ERECTED TO SECURE AND DRAW UP THE FAILING SUMMER BEAM IN FLOOR OF RM 201/ CEILING RM 101 BY MEANS OF IRON RODS AND TURNBUCKLES. TRUSS BOTTOM CORDS ARE 1½" X 5¼" AND 3½" X 5¼", ENDS RESTING IN LOAD BEARING MASONRY WALLS.

302 ATTIC STAIRS:
DN 2R @ 7¾", 1R @ 8¼", 2T @ 10½"
LANDING: 3'-3" X 7'-11"
DN 11R @ 7½", 10T @ 11"

TR TIE ROD WITH TURN BUCKLE

304 STAIRWAY: DN 13R
NO POST AND RAILING ALONG EDGE OF STAIRWELL. TWO MORTISES IN FLOOR INDICATE MISSING POST OR PARTITION.

301 302 303 DOORS ARE EDGE BEADED PINE BOARD AND BATTEN TYPE.

302 DOOR 302 PROVIDES ACCESS TO AREA UNDER ROOF OVER FRONT SECTION OF HOUSE.

301-302 DOUBLE HUNG SASH WINDOWS, 2/4 PANE, PLASTER JAMBS, AND NO ARCHITRAVE. WINDOW SILLS AT FLOOR LEVEL. WINDOW HEIGHT 4'-1¼".

303-304 SINGLE SASH WINDOWS, 4 PANES, PLASTER JAMBS, NO ARCHITRAVE.

305-306 DW DORMER WINDOWS
DOUBLE HUNG 6/6 SASH, PLASTER JAMBS WITH NO ARCHITRAVE, BEADED BOARD SIDES AND SOFFITS.

307-308 EAST ELEVATION WINDOWS
DOUBLE HUNG 2/4 SASH, PLASTER JAMBS, NO ARCHITRAVE.

WT WALL THICKNESS

306 TH DOOR THRESHOLD BOARD 3⅛" WIDE AND ¼" HIGH

301 PEBBLE DASH PLASTER ON INTERIOR NORTH WALL OF RM 301 ABOVE CEILING IN ATTIC CRAWL SPACE. FURTHER INDICATION THAT THIS WALL WAS ONCE THE SOUTH EXTERIOR WALL OF THE ORIGINAL AND EARLIEST NW PORTION OF THE HOUSE.

ATTIC FLOOR PLAN

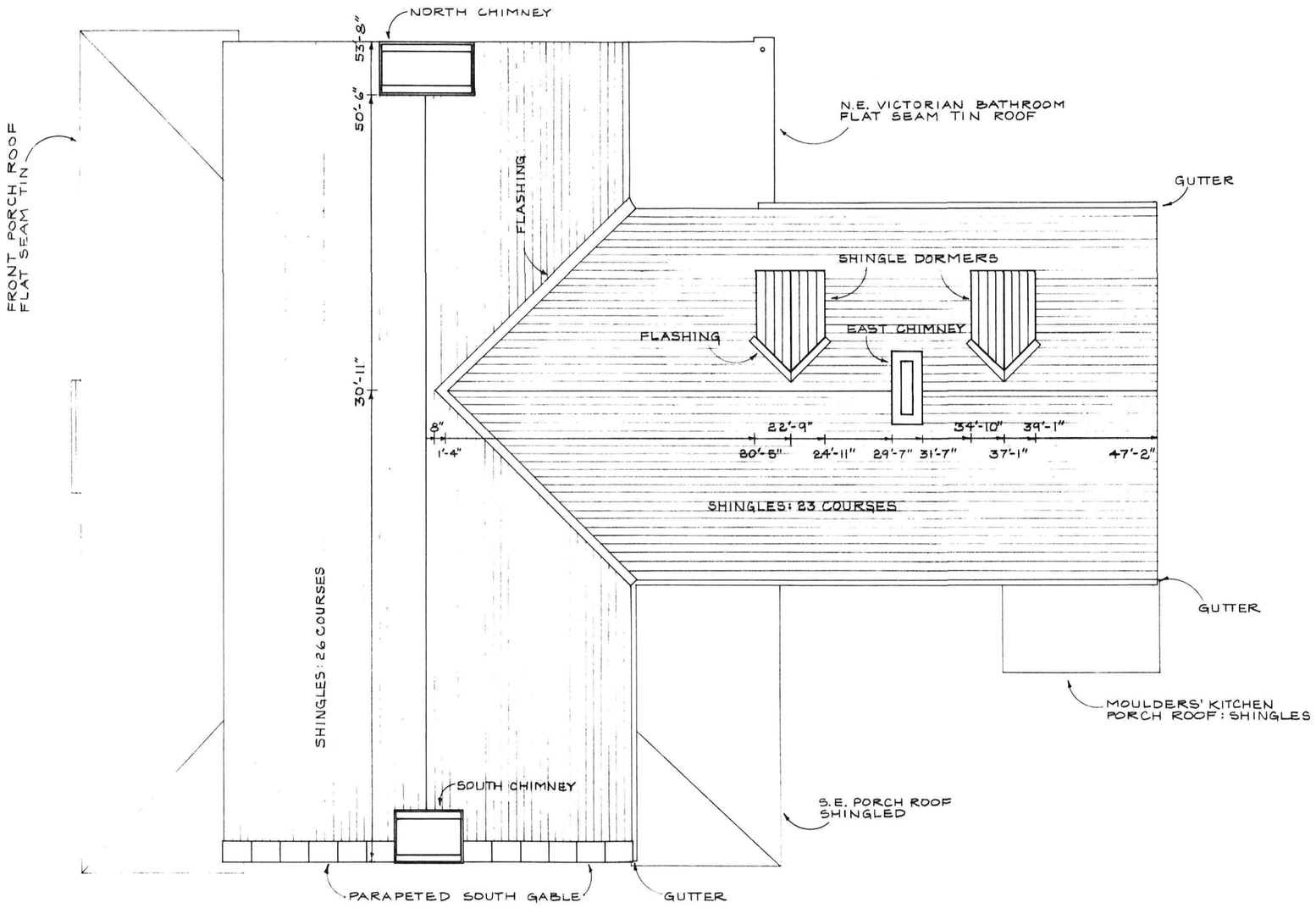
SCALE: 1/4" = 1'-0"

0 5 10 15 20 FEET

IRONMASTER'S HOUSE
HOPEWELL VILLAGE NATIONAL HISTORIC SITE
HISTORIC STRUCTURE REPORT
EXISTING CONDITIONS DRAWINGS

PREPARED	DRAWING NO.
ORIGINAL DESIGNED	370/230 A
P. DESSAUER DRAWN	PKG. NO. 102
CHECKED	SHEET 5 OF 14
DEC. 1978 DATE	

GPO 1977 781 261



NOTES: ROOF PLAN

ROOF MATERIAL: MAIN AND EAST WINGS.
26 COURSES OF WOOD SHINGLES ON EAST AND WEST SLOPES.
23 COURSES ON NORTH AND SOUTH SLOPES.

SHEET METAL FLASHING: IN VALLEY ON ROOF AT INTERSECTION OF EAST AND MAIN WINGS AND BEHIND DORMERS.

N.E. VICTORIAN BATHROOM ROOF: TIN SHEET METAL, PITCHED, SLOPING TO DRAIN PIPE HOLE.

DORMER ROOFS: SHINGLE, 4 COURSES EACH SLOPE.

PARAPETS - SOUTH GABLE: STONE WITH WOOD PLATES AS STEPS LEADING UP TO CHIMNEY.

GUTTERS: ON NORTH AND SOUTH SLOPES OF EAST WING ARE NOT HISTORIC, ARE METAL "HALF ROUND", ERECTED BY CCC CA. 1940 OR EARLIER.

NORTH AND SOUTH CHIMNEYS: COVERED BY METAL PLATES AND HOODS.

EAST WING CHIMNEY: NO HOOD; COVERED BY METAL PLATE.

ROOF PLAN

SCALE: 1/4" = 1'-0"

0 5 10 15 20 FEET

IRONMASTER'S HOUSE
HOPEWELL VILLAGE NATIONAL HISTORIC SITE
HISTORIC STRUCTURE REPORT
EXISTING CONDITIONS DRAWINGS

PREPARED	DRAWING NO.
ORIGINAL DESIGNED P. DESSAUER	376/28000A
DRAWN V.L.K.	PCIP PKG. 102
CHECKED DEC. 1978	SHEET 6 OF 14
DATE	

* GPO 1977 781 788



VERTICAL DIMENSIONS: S.W. WING

WEST ELEVATION - FRONT FACADE

SCALE: 1/4" = 1'-0"

0 5 10 15 20 FEET

IRONMASTER'S HOUSE
HOPEWELL VILLAGE NATIONAL HISTORIC SITE
HISTORIC STRUCTURE REPORT
EXISTING CONDITIONS DRAWINGS

PREPARED	DRAWING NO.
ORIGINAL DESIGNED P. DESSAUER DRAWN V.L.K. CHECKED DEC. 1978 DATE	376/28000A
PCIP PKG 102	SHEET 7 OF 14

* GPO 1977 781 771



VERTICAL DIMENSIONS
S.W. WING : SOUTH FACADE

VERTICAL DIMENSIONS
EAST WING
SOUTH FACADE

SOUTH ELEVATION

SCALE: 1/4"=1'-0"

0 5 10 15 20 FEET

IRONMASTER'S HOUSE
HOPEWELL VILLAGE NATIONAL HISTORIC SITE
HISTORIC STRUCTURE REPORT
EXISTING CONDITIONS DRAWINGS

PREPARED	DRAWING NO.
ORIGINAL DESIGNED	376/38000A
P. DESSAUER DRAWN	PCIP PKG 102
LLK CHECKED	SHEET 8 OF 14
DEC. 1978 DATE	

© GPO 1977 781-786



EAST WING VERTICAL DIMENSIONS
EAST FACADE

EAST ELEVATION

SCALE: 1/4" = 1'-0"

0 5 10 15 20 FEET

IRONMASTER'S HOUSE
HOPEWELL VILLAGE NATIONAL HISTORIC SITE
HISTORIC STRUCTURE REPORT
EXISTING CONDITIONS DRAWINGS

PREPARED	DRAWING NO.
ORIGINAL	376/28000A
DESIGNED P. DESSAUER	PCIP PKG. 102
DRAWN	SHEET 9 OF 14
CHECKED	
DEC 1978 DATE	



EAST WING VERTICAL DIMENSIONS
NORTH FACADE

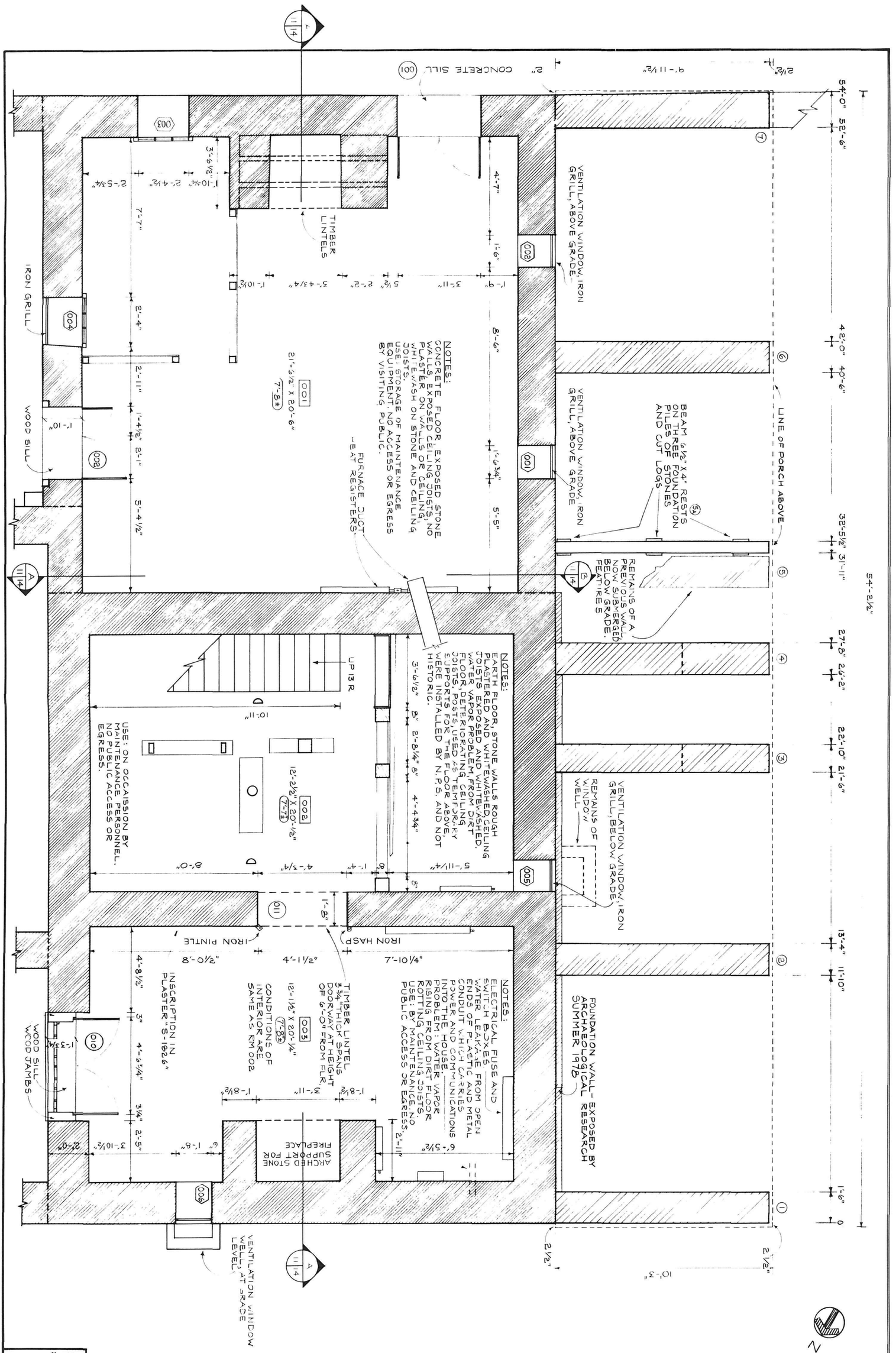
VERTICAL DIMENSIONS: N.W. WING

NORTH ELEVATION
SCALE: 1/4"=1'-0"
0 5 10 15 20 FEET

IRONMASTER'S HOUSE
HOPEWELL VILLAGE NATIONAL HISTORIC SITE
HISTORIC STRUCTURE REPORT
EXISTING CONDITIONS DRAWINGS

PREPARED	DRAWING NO.
ORIGINAL DESIGNED	376/28000A
P. DESSAUER DRAWN	PCIP PKG 102 / SHEET 10
V.L.K. CHECKED	OF 14
DEC. 1978 DATE	

© GPO 1977 811 188



BASEMENT FLOOR PLAN 001-003
FRONT PORCH FOUNDATION
SCALE: 1/2" = 1'-0"
0 5 10 15 20 FEET

IRONMASTER'S HOUSE
HOPEWELL VILLAGE N.H.S.
HISTORIC STRUCTURE REPORT
EXISTING CONDITIONS DRAWINGS

PREPARED ORIGINAL
DESIGNED P. DESSAUER
DRAWN
CHECKED DEC. 1978
DATE
DRAWING NO. 37-6/23000A
PKG NO. 102
SHEET 11 OF 14

54'-2½"

FRONT PLATE 3¾"X5¾"

SKIRT BOARD 1"X7"

BEAM RESTS ON PILE OF STONES AND LOGS

SUPPORT BEAM IS 6½" WIDE, 4" DEEP

HEWN TIMBERS OF VARIED WIDTHS AND LENGTHS APPROXIMATELY 6" DEEP

MILLED LUMBER JOISTS 5¾" DEEP

JOIST RESTING ON STONE

NEW PIECE OF LUMBER

SUPPORTS FOR WINDOW FLOORING ABOVE

FIRE ALARM

SUMMER BEAM 10½"X 10"

001

STONE FILL OVER TIMBER LINTELS

CEILING DUCT GRILL

SUPPORTS FOR FLOOR OF DOORWAY 104

UP

DUCT

FIRE ALARM

SUMMER BEAM 9½"X11"

002

003

MORTISED JOISTS INDICATE FIREBOX CONSTRUCTION

ELECTRICAL CONDUIT

NOTES:

CEILING JOISTS - RMS 001-003 REDOAK, MORTISED CONNECTIONS, DIMENSIONS 2½" X 8½". SIGNS OF DRY ROT ON JOIST DUE TO MOISTURE VAPOR EMITTED FROM THE EARTH FLOOR.

NW CORNER OF PORCH IS SAGGING, DUE TO ROT OF FRAMING FABRIC AT THAT POINT. SKIRT BOARD ROTTING WHERE TOUCHING GRADE LEVEL.

PRESENT PORCH BOARDS ON FLOOR OVER FRAMING IS NON-HISTORIC, LAID BY CCC CIRCA 1940'S. FLOORING IS T&G 3½" X 1⅛", FIR OR CEDAR.

HISTORIC PORCH BOARDS: NAIL HOLES ON HEWN TIMBER PORCH FRAMING SHOW NAIL SPACING 2½" APART. THE 1870 HISTORIC FLOORING WAS PROBABLY T&G 5⅝"X 1⅛" AS EVINCED BY A SHIM PIECE OF THAT SIZE USED IN THE FRONT PILE SUPPORTING THE WOOD FOUNDATION BEAM DESIGNATED FEATURE NO. 5A.

BASEMENT CEILING PLAN: RMS 001-003
FRONT PORCH FRAMING PLAN

SCALE: 1/2" = 1'-0"

0 5 10 15 20 FEET

IRONMASTER'S HOUSE
HOPEWELL VILLAGE N.H.S.
HISTORIC STRUCTURE REPORT
EXISTING CONDITIONS DRAWINGS

PREPARED	DRAWING NO.
ORIGINAL	37 a/28000 A
DESIGNED P. DESSAUER	
DRAWN VLK	PKG NO. 102
CHECKED DEC. 1978	SHEET 12 OF 14
DATE	

GPO 1977 780 261

NOTES: 004 & 005

WALLS AND CEILINGS - PLASTERED AND WHITEWASHED. MOISTURE VAPOR CAUSING CONDENSATION ON WALLS AND FLAKING WHITE-WASH.

FLOOR BOARDS - T & G, 5⅝" X ⅞", HEMLOCK, IN DETERIORATING CONDITION DUE TO MOISTURE VAPOR FROM SOIL UNDER TIMBER SLEEPERS. DEFLECTION IN PLACES CAUSED BY DETERIORATION AND/OR LACK OF ADEQUATE STONE SUPPORT OF SLEEPERS.

HEWN TIMBER SLEEPERS - OF VARIOUS WIDTHS, 5"-6" DEEP, SIGNS OF SURFACE ROT, IN PLACES NOT ADEQUATELY SUPPORTED BY STONES.

WOOD SILL
WOOD FLOOR BOARDS
MOULDERS' DINING ROOM
004
18'-7" X 16'-0"
HEWN TIMBER SLEEPERS REST ON STONES AND EARTH.
TEMPORARY POST SUPPORT FOR CHARRED CEILING SUMMER BEAM. IRON PIPE IN 8" X 8" WOOD BOX.
POST RESTS ON FLOOR BOARDS, 2X4'S, AND STONE
SHELVES
UP 2 R
SANITARY DRAIN PIPE
LINE OF PORCH ABOVE
STONE SILL
FIREPLACE MANTLE BEAM
STONE HEARTH FLOOR
MARKS ON PLASTER INDICATE FORMER CUPBOARD
KITCHEN
005
18'-6½" X 18'-2½"
WOOD FLOOR ON PORCH
006 CLOSET
UP 11 R

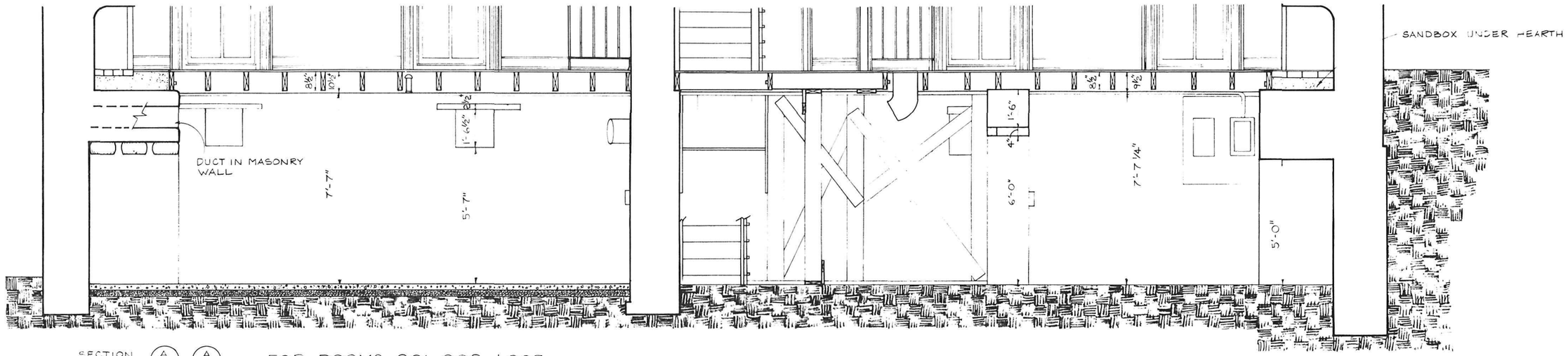
BASEMENT FLOOR PLAN
ROOMS 004 AND 005
SCALE: 1/2" = 1'-0"

0 5 10 15 20 FEET

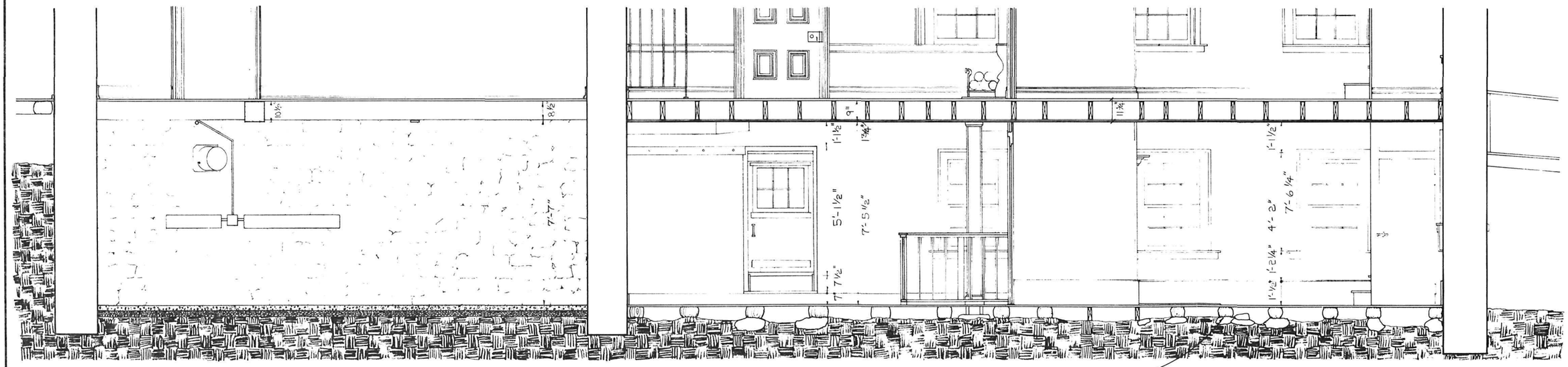
IRONMASTER'S HOUSE
HOPEWELL VILLAGE N.H.S.
HISTORIC STRUCTURE REPORT
EXISTING CONDITIONS DRAWINGS

PREPARED	DRAWING NO.
ORIGINAL	376/28000A
DESIGNED P. DESSAUER	PKG. NO. 102
DRAWN V.L.K.	SHEET 13 OF 14
CHECKED	
DATE DEC. 1978	

* GPO 1977 780 281



SECTION A/11|14 A/12|14 FOR ROOMS 001, 002, & 003



SECTION B/11|14 B/12|14 B/13|14 FOR ROOMS 001, 004, & 005

BASEMENT ROOM SECTIONS

SCALE: 1/2" = 1'-0" SEE PAGES 11, 12, & 13

0 5 10 15 20 FEET

IRONMASTER'S HOUSE
HOPEWELL VILLAGE NATIONAL HISTORIC SITE
HISTORIC STRUCTURE REPORT
EXISTING CONDITIONS DRAWINGS

PREPARED	DRAWING NO.
ORIGINAL DESIGNED	37/23000 A
P. DESSAUER DRAWN	PKG NO. / SHEET 14
VLK CHECKED	OF 14
DEC. 1978 DATE	

GPO

XV. ADDENDUM: OUTLINE OF ACTUAL WORK PERFORMED DURING PROJECT CONSTRUCTION

Emphasis on final choices of alternatives discussed in Chapter VIII and modifications to the contract documents made during the construction work, written by project architect Peter F. Dessauer, May 1984.

Contract No. CX-4000-9-9004
Contract dates: October 16, 1979 - November 19, 1980
"As built" project drawings No. 376/41004A

Project Personnel

Vernon L. Reisinger, general contractor, Donald E. Reisinger, Inc.
Stephen L. Reisinger, contractor's field supervisor
E. Dick Harrington, electrical subcontractor
Howard Glifort, project supervisor, Denver Service Center
Jake Tothero, part time project supervisor, Denver Service Center
Elizabeth Disrude, park superintendent, Hopewell Village
Charles Seidel, maintenance supervisor, Hopewell Village
Michael K. Johnson, chief ranger, Hopewell Village
Henry J. Magaziner, regional historical architect, Mid-Atlantic Regional Office
Penelope Batcheler, historical architect and historic paint consultant, DSC Philadelphia office
Edward J. Bleyhl, chief of construction, Denver Service Center
James Mayo, structural engineer, Denver Service Center
Quentin Smith, electrical engineer, Denver Service Center
Peter F. Dessauer, project architect, Denver Service Center
Scott Jacobs, project architect, Denver Service Center

A. Drainage System: North Wall

1. Excavation along the exterior north wall of the Ironmaster's House (Rooms 003 and 103) and the retaining wall of the areaway involved the removal of existing bushes, concrete pad, and trellis, while avoiding underground electrical conduit and historic lead pipes.

2. Trenching for the north wall drainage and downspout drainage extended approximately 72' along the north retaining wall to the northeast corner, turning south along the east retaining wall for 60' to the southeast corner, around the bake ovens, and due south for another 175' to daylight on the east side of the large barn. Trenching reached a depth of approximately 8'+ at the north wall of the northwest wing.

3. The stone surfaces of the walls exposed by trenching were treated:

a. 25' along the northwest portion of the house: surface mopped with hot asphalt to form waterproof membrane from 6" above grade behind exterior stucco (pebble dash plaster) to bottom base of stone wall. Three 1" thick styrofoam sheets, sealed on top by cold application of asphalt compound, 6" below grade were installed to insulate the wall.

b. The north retaining wall, 48' along its extent from the northwest basement Room 003 to the northeast areaway corner, was "gunnited" with cement mortar to fill existing dry joints between stones.

4. Two drain lines installed in trenching:

a. 4" diameter, corrugated polyethylene (PE) pipe, non-perforated, extending from northeast porch roof downspout.

b. 4" diameter, corrugated polyethylene (PE) pipe, perforated, in a 24" wide gravel bed wrapped in engineering filter fabric, under compacted soil at the bottom of the retaining wall.

c. 4" diameter, non-perforated pipe "tee" installed in the 175' run from areaway southeast corner to daylight for future connections with other downspout leaders.

5. A concrete pullbox was installed, where shown on the construction drawings to interrupt the leaking conduit.

6. After the drainage systems were installed, the trenches were backfilled, concrete walkway reinstalled at the northeast porch, and new barberry shrubs planted.

7. Installation of drainage system and grading was monitored by archeologist Ellen Seidel of the C & O Canal restoration team.

B. Northwest Basement: Rooms 002 and 003

1. The original dirt floor with original mortar matrix stratum was left in situ, except where disturbed to pour concrete footings for pipe columns.

2. All temporary wood posts were removed.

3. The leaking telephone conduit in the corner of Room 003 was sealed.

4. New copper chromium arsenate (CCA) treated 2 by 8 lumber joists, steel "I" beams, and steel pipe columns were installed to support the ceiling joists and summer beam as per structural engineer Mayo's plan.

5. The existing basement stairs were reinforced with a third center stringer. The bottom tread was removed and replaced by a concrete pad, which elevated the stairs back to their original level and based them on a dry surface.

6. New CCA treated wood lintels were installed over entrance Doorway 010 and Window 005.

7. Window Well 005 was reconstructed to resemble Window Well 006, with a concrete pad foundation and bed of gravel.

8. Stainless steel insect screens and manual operable louvers were installed in Windows 005 and 006.

9. Old furnace ducting in Room 002 was removed, leaving the grill in the floor of Room 103 and the duct opening in wall between Rooms 001 and 002 for ventilation.

C. Southwest Basement: Room 001

1. New fill, gravel, vapor barrier, and concrete slab was installed to cover the archeological trench, northeast corner.

2. The concrete floor was brush treated with an application of polymar sealant.

3. New 2 by 8 lumber joists, CCA treated, were scabbed onto existing ceiling joists and reinforced with hangers.

4. New steel "I" beams on steel pipe columns were erected to support the loads of the summer beam.

5. A new steel window grill was fabricated and installed for window opening 003. The original, rusted, and missing grills were removed and inventoried in park storage.

6. Stainless steel insect screens were flush mounted on the inside of the grills at Windows 001, 002, 003, and 004. Manual operable louvers were installed at Windows 001 and 002.

7. New wood frames were made and installed on the interior of window openings 003 and 004. Existing sashes were hinge mounted on these frames and made operable.

D. East Wing Basement: Rooms 004 and 005

1. All existing flooring and wood sleepers in soil were removed. Most wood fabric was discarded because of its deteriorated and insect infested condition. Some exemplary pieces were retained by the park.

2. 4" bed of gravel was laid on grade over which was laid a .006" polyethylene vapor barrier and a 4" concrete foundation slab. Two by 4 CCA pressure preservative wood sleepers were ramset into concrete. A new 5-1/2" by 5/4" tongue and groove flooring, CCA treated pine, was installed on the sleepers to recreate the basic historic floor pattern.

3. In Room 004 the existing baseboards were removed because of rot found on their back side. New boards, CCA treated and in sizes/profiles to match existing were installed.

4. A new left door was milled, provided, and installed for cupboard 008 in Room 004. New door was made to match existing right hand door.

5. The temporary post in Room 004 was removed. The burnt end of the summer beam under the firebox of the fireplace in Room 104 was removed. The summer beam end was supported on two steel angles which extended into the beam pocket of the stone wall. Wood 2-by blocking was bolted into the steel angles to relieve wood floor joists.

6. The summer beams supporting the floors of Rooms 104 and 105, in the ceilings of Room 004 and 005, were reinforced with continuous steel plates top and bottom.

7. Ceiling joist (for floors of Rooms 104 and 105) connections to the summer beams were all reinforced with hangers.

E. Front Porch: West Elevation

1. Existing porch floor, floor molding, skirt boards, sill plate, eight octagonal columns, south end box beam, and Washington Bower Vine were removed. This material was discarded because of its either nonhistoric, patched, or deteriorated condition.

2. The existing timber floor framing was left in situ, brush preservative treated, and extensively reinforced with double 2 by 6 CCA treated joists, scabs, and blocking.

3. A new concrete masonry unit wall on concrete pad foundation was built next to archeological Feature 5A to provide bearing for the floor framing.

4. A new 18" by 18" stone pier was built under column No. 4.

5. New sill plate, 5-1/2" by 5/4" tongue and groove flooring, skirt boards, and floor molding were installed to replicate

historic design. The floor was sloped 2-1/2" over its 10' 3-1/2" width for drainage. All lumber and milled items were CCA treated.

6. Six new octagonal columns were fabricated to replace existing. The columns were mounted and supported on interior steel pipe columns, welded to base plates and steel chair standards to resemble the original historic stirrup shape rough hardware.

7. The venting and installation of insect screening in the porch roof soffits was deleted from project work.

8. The south end box beam was dismantled, the rotten fabric discarded, and rebuilt.

9. New sheet metal roof:

a. Existing historic flat pan metal roof was measured and drawn, then removed.

b. New sheet metal roof was .015 gauge terne coated stainless steel (TCS), flat pans in sizes 20" by 28", with cleated sweat soldered folded lock seams. The pans were installed with staggered joints conforming to standard installation practices and do not duplicate the haphazard and patched condition of the original roof.

c. The roof sheet metal bent up at the juncture with the stone wall forming a base flashing. Counter flashing was regleted into the stone and covered with stucco (pebble dash plaster).

F. Interior Central Hall and Main Staircase

1. The main staircase balustrade was repaired in a more economic manner. The whole balustrade was not dismantled. Newel post and spindles were secured by fasteners driven up into their bases from the undersides of the stair treads.

2. The stair stringers and framing were reinforced with CCA treated lumber blocking.

3. Wood trim painted and walls papered. See Chapter XVI Addendum: Paint Study and Painting.

G. Northwest Parlor: Room 103

1. No special work or research was done during the construction contract at the fireplace or baseboards under Windows 107 and 108.

H. Reinforcement of Second Floor Framing Systems: Rooms 201 and 209

1. Summer beams in floor framing of Rooms 204, 205, 206, 208, and 209 were reinforced with 3/4" by 4" steel plates on top and bottom sides. The tension rod bearing plate and tension strap to the summer beam in the floor of Rooms 201, 202, and 203 (from truss in attic Room 301) were replaced with new material. The Victorian bathroom, Room 207: see L below.

2. Steel plate reinforcements for existing lead water pipe grooves in floor joists were deleted from contract work and not installed as originally shown on the contract drawings.

3. New CCA treated 2 by 6 lumber was scabbed to existing floor joists and jointed to the summer beams with joist hangers. Special care was taken to avoid damaging the existing lead water pipes running from Room 201 to Room 208.

4. New 2 by 4 wood nailers, CCA treated, applied to joists on underside as nailing base to which was applied 1/2" thick radiant heat gypsum baseboard.

5. New first floor ceiling: radiant heat cables (Smith-Gates) were stapled to baseboard on ceilings in Rooms 101, 102, 103, 104, and 105. The ceiling was finished with radiant heat plaster - 5/16" thick brown coat and 1/16" thick finish coat.

6. A steel pipe column was installed in the north wall of the central hall (between Rooms 102 and 103) to support the summer beam in the ceiling. Pipe is located approximately 2' 0" from Doorway 107.

7. Measured drawings of the second floor existing framing and conditions were made by the contractor.

I. Main Wing Attic: Rooms 301 and 302

1. Existing timber double truss in Room 301 left intact.

2. The attic floor framing was not opened for inspection, documentation, or repairs. Because of budget limitations and the exclusion of public visitation to these rooms, no work was done to the attic floor or second floor ceiling.

3. The north chimney (Room 302) and south chimney (Room 301) were each vented with a 14" diameter ceramic pipe covered with stainless steel insect screen.

4. The existing attic ceiling hatchways were each given plywood covers.

5. New lath and plaster was installed to cover all gaps and holes in attic walls and ceilings.

6. In the southeast corner of Room 301 two loose wall stones were tuck pointed.

J. East Wing Attic: Rooms 303 and 304

1. The attic floor framing was not opened for inspection, documentation, or repairs.

2. The east wing chimney, from the attic floor up through the roof, was dismantled and the materials discarded. The existing brick and plaster was deteriorated crumbling, much acerbated by deposits of bad ordure. A new chimney was built of special hand-made bricks,

custom fabricated by Cushwa and Sons, to match historic size, texture, and color. A 12" ceramic pipe vent with stainless steel insect screen was installed in the new chimney to ventilate the flue and attic rooms. The chimney surface was plastered.

3. New lath and plaster was installed to cover all gaps and holes in the attic walls and ceilings.

K. Main Roofs: East and West Wings

1. All existing shingles and nailers on roof surfaces were removed. Existing valley flashing was removed.

2. The east wing chimney was dismantled, rebuilt with new matching brick, and stuccoed (pebble dash plaster), as described in J-2.

3. During examination of the open roof, portions showing rot were discovered, which required repairs to both east gable and north gable cornice returns, replacement of 40' of cornice (ogee crown) molding along the west elevation, reinforcement of the east wing dormers with 2 by 4s, and two new rafters installed on the south end of the west wing roof.

4. Terne coated stainless steel (TCS) flashing was installed in the following areas:

a. Along ridges, in valleys, along gable ends, along south parapets, and around chimneys.

b. The chimney and parpet base and counterflashings (regleted into stone) were covered with stucco.

5. Between rafters blankets of insulation (J M Thermatite Plus) were laid in place, 2" thick, leaving an air space of 1-1/2". Over the insulation and rafters sheets of .006" polyethylene were stapled down as a vapor barrier.

6. New CCA treated 1 by 3 wood shingle lath (nailers) and 24" edge grained, No. 1 royal grade, western red cedar shingles were installed to recover the roof surfaces.

7. Existing hoods on the north and south chimneys were vented, screened, and painted. The east wing chimney hood was retrieved from park storage, vented, screened, reinstalled on the chimney, and painted.

8. Field supervisor Stephen Reisinger found a small plastic capsule in the east wing roof containing a message and date (1953) from two workmen who had installed the existing roof being replaced by project work. This capsule and message were delivered to the park artifact collection.

9. Measured drawings of the east and west wing existing roof framing and conditions were made by the contractor.

L. Northeast Porch and Victorian Bathroom: Room 207

1. A 12' 0" long W10 by 19 steel beam was imbedded in the stone retaining wall under the north side of the northeast porch. This improved the bearing capacity of the stone retaining wall which showed signs of past foundation settlement.

2. To inspect the floor, walls, and ceiling framing of Room 207 the existing plaster, lath, and floorboards were removed. With the framing exposed, considerable water damage was discovered on the framing fabric from the leaky roof.

3. Room 207, framing repairs with CCA treated lumber:

a. The existing floor joists were reinforced with 2 by 4s scabbed to the sides.

b. New northeast corner post, new studs, new top lintel plate, and new sill plate were installed to replace existing rotted members.

c. New exterior siding; approximately 15 percent replacement.

4. After framing repairs were completed, new lath and plaster was installed on the walls and ceiling.

5. The existing historic sheet metal roof on the Victorian bathroom was measured, drawn, and removed. A new flat pan, cleated, folded lock seam, terne coated stainless steel (TCS) metal roof was installed, similar to the front porch roof, with underlayments of felt and rosin paper. New wood blocking was installed to provide the in-built gutter with sufficient slope to downspout and to prevent water freeze daming, a condition on the original roof which caused so much cracking in the metal seams and subsequent water leakage into the east wall.

6. The existing sheet metal downspout connection was removed and replaced by a new connection, 24" long, of terne coated stainless steel.

M. All Windows and Doors Repaired and Made Operable

1. As a result of the MARO safety officer's visit to the project construction site on July 3, 1980, it was determined that many of the Ironmaster's House doors did not function properly and posed a hazard to visitors who needed to use them for access, egress, and fire escape. Therefore, it was determined necessary to refit, repair, and paint the following doors: 005, 006, 007, 101, 103, 104, 105, 106, 108, 109, 110, 111, 112, 113, 114, 115, 210, and 216. Bronze weatherstripping was applied to all exterior doors.

2. A new mortise lock, 19th century reproduction by Ball and Ball, was installed on the front door 101.

3. All window sash were taken down and repairs made to the opening frames. In the shops of Donald E. Reisinger, Inc., each window sash was repaired in the following manner:

a. Glass panes with cracks were replaced.

b. Damaged muntins replaced.

c. Missing or broken sash locks were replaced with new cast iron sash locks (V150-226 by Ball and Ball) with porcelain knobs.

d. Solar protection film, color FSW-100-50 bronze, by Madico, Inc., was applied on the interior side of all glass panes.

e. All sash were prime painted.

4. All sash were refit into their original openings, sash weights adjusted, and bronze weatherstripping installed at jambs and on sills.

5. Solar shading: it was determined that Windows 103, 104, 107, 108, 109, and 110 needed extra solar shading to protect interior furnishings from the adverse effects of prolonged solar radiation. Six pull down solar screens were installed on the interior sides of these windows, manually operable, with clear color FSW-100 C1 HCX fade shield by Madico, Inc.

6. The existing wrought iron grill for window opening 003 was removed and replaced by a reproduction grill fabricated in light steel.

7. Field inspection of the window shutters required the fabrication and installation of new panels and hardware to replace existing damaged, dilapidated, missing, and inappropriate pieces. Existing surface mounted pintels and hinges were removed and replaced by drive pintles with strap hinges. The existing shutters and hardware on Windows 007 and 009 were used as reproduction samples. James Peters fabricated the new metal window hardware. The contractor milled and fabricated the new wood shutters. Scope of work to restore the window

shutters included but was not limited to the removal of existing features and replacement with new material as per the following plan:

Window	Shutters	Drive Pintles	Strap Hinges	Hook and Eye Dogs
008	2	4	4	2
010	2	4	4	2
011		2	2	
012	2	4	4	2
103	2			
104	2			
203	2			
204	2			
211	___	2	2	___
Totals	14	16	14	6

8. Shutter painting: all existing shutters were removed from their windows for inspection. Those designated for replacement by the contracting officer were used for historic paint study purposes. Special care was taken not to totally eliminate existing layers of historic paint during the restoration process on those shutters designated for reuse. New and reusable shutters were shop primed and painted before hardware installation and final remounting on window openings. See XVI Addendum: Paint Study and Painting.

9. Approximately 12 new three barrel hinges on shutters were provided and installed to replace existing broken hinges.

N. Exterior Stucco Repairs, Whitewash, and Painting

1. Stucco repairs: 50 square feet of new pebble dash plaster was applied to restore the eroded stucco surface over the stones on the south elevation just under the south chimney. The formula for new stucco followed the park's specifications for pebble dash plaster.

2. Whitewash: the summer season whitewashing of the Ironmaster's House, performed annually with a lime base whitewash, posed continued maintenance problems and prohibitive costs for the park. In search of a more permanent cover material to be applied to the exterior stucco surface with the longevity of ten years+, the park requested that a water base white paint be included in the specifications. During the

construction work, Superintendent Elizabeth Disrude discovered that other stone and stuccoed historic buildings in the vicinity of Hopewell Village had been successfully covered with cement base paints. To follow this example a white cement base paint called "dry lock ready mixed sealer" (manufactured by United Gilsonite Laboratories, Scranton, Pennsylvania) was chosen for application over the entirety of the Ironmaster's House exterior stucco surface, stone areaway retaining walls, and the bake ovens. When applied, this paint satisfactorily matched the appearance of historic lime whitewash.

3. Exterior and interior woodwork, floors, plaster walls, and ceilings: see XVI Addendum: Paint Study and Painting.

4. A36 steel: all structural steel surfaces were given three coats of Rustoleum paint:

a. Shop coat - 678 quick drying red primer

b. Field primer - 7086 gray primer

c. Finish coat - 50 percent 2764 flat white
50 percent 412 flat black
Corporation, Evanston, Illinois

5. New concrete block foundation wall was painted flat black latex, Pittsburgh Paint Company.

O. Improvements to the Electrical Systems: modifications to recommendations made in Chapter VIII and to contract drawings and specifications.

1. Provision and installation of six new thermostats (Rooms 005, 101, 103, 104, and 105) to replace existing thermostats in the same locations. Thermostat Model T42 A10542, manufactured by Honeywell, with lockable opaque covers. All new opaque covers were painted to match wall colors.

2. Fire alarm system (Section 16721 of the specifications):

a. Bell mentioned in part 2-3 of the specifications was instead used for the security alarm and located in the first floor closet of the Ironmaster's House off Room 102. It was connected to the specified AE-30 module.

b. Provision and installation of wiring for a future second floor horn to be located in the closet, Room 213.

c. Provision and installation of one fire horn (Pyr-A-Larm, catalog No. HIS-0-24 DC-1 .8K) in the first floor closet off Room 102. It was connected to the CP-31 located at the visitors center.

3. Intrusion detection system (Section 16727 of the specifications).

a. Six passive IP-16 infrared intrusion detection units were deleted. In their place ten IP-37 units were installed, each recess mounted and connected to 18 AWG wiring imbedded in plaster.

b. The intrusion detection sensors were divided into the following four zones:

Zone 1 - Rooms 001 and 003
Zone 2 - Rooms 004 and 005
Zone 3 - Room 102
Zone 4 - Rooms 101, 103, 104, and 105

Each of these zones was wired to separate zones in the visitor center panel. For this purpose one additional ZN-31 dual contact input module was installed.

c. Provision and installation of four D.P.D.T. switches in a lockable enclosure to allow shunting of each zone. The switches were located in the first floor closet off Room 102. When any zone is

shunted, the AE-30 trouble light will come on to indicate that the bell circuit is open.

d. Provision and installation of one "Sonalert" (security alarm buzzer) at the visitor center to give an audio indication of a security alarm condition. It is driven with a SR-30 supplemental relay module.

e. Provision and installation of two SM-30 switch modules to allow switching off the security bell, the "Sonalert," Zone 2 and Zone 3.

4. Humidity control: three new humidistats (Tradeline H46 C1000) were installed, one each in Rooms 001, 002, and 005.

5. Lighting:

a. Although recommended, no new interior reflective lighting was installed in the display rooms.

b. Six new flourescent light fixtures:

3 - 1' by 4', 40W lamp fluorescent fixture in Room 003

3 - l' by 4', 40W lamp fluorescent fixture in Room 002

6. New terminal board was installed on the west wall of basement Room 003 for fire alarm and intrusion detection.

7. Trenching to install 225' of new 1-1/2" conduit and ten pair cable No. 16 was deleted from the project. It was not required since existing telephone lines leased by the park were used to interconnect the visitors center with the Ironmaster's House, thus providing fire alarm and intrusion detection reporting.

P. East Wing Footbridge, Moulder's Kitchen Porch, and Southeast Porch Steps

1. East wing footbridge: the existing top rails were reinforced with new bottom rails, posts, and balusters. Two new treads and one new riser board were installed.

2. Moulder's kitchen porch:

a. Roof - removed existing shingles, shingle nailers (lath), front lintel plate, and fascia. Installed new shingles and CCA treated nailers, lintel, and fascia. The juncture of shingle roof and building surface was flashed and counterflashed with TCS and stuccoed over.

b. Removed existing skirt boards, floorboards, and two posts and replaced them with CCA treated material.

3. Southeast porch steps - to meet public safety codes two new bottom rails, six new posts (three per side), two new replacement rails, and 24 balusters (12 per side) were added to the existing porch steps and existing single top rail.

Q. Grading

1. Removed 12 cubic feet of earth at the northwest corner of the front porch and 30 cubic feet of earth from under the front porch to create proper drainage slopes and open ventilation through basement Windows 001, 002, and 005.

R. Pest Control

1. Termite control - a chemical solution, composed of 1 percent C-100 technical chlordane emulsifiable concentrate to 99 percent water, was injected in the soil along a path 3' 0" wide around the perimeter of the house at the foundation level and underneath the front porch.

2. Powder post beetle control - a coarse spray of lindane 20EC was applied to all existing historic framing exhibiting "pin hole" evidence of past powder post beetle infestation.

S. Lightning Protection

1. Twelve copper/nickel tip lightning protection air terminals were installed on the roof chimneys, dormers, and ridges, connected together by copper cable which was grounded at the southeast corner of the southeast wing.

T. Construction Problem Corrections

1. As per memorandum dated December 4, 1981, from Superintendent Elizabeth Disrude to Chief, Branch of Construction Contracts, Denver Service Center, the general contractor Vernon Reisinger was obliged by contract guarantee period to repair problems on the Ironmaster's House as a result of his work. These problems with action to be taken are listed in the memorandum and include minor problems such as cracked plaster, peeling paint, a loose hinge, and loose boards. Corrective measures to repair these problems were instigated by the contractor January-May 1982.

XVI. ADDENDUM: PAINT STUDY AND PAINTING

An historic paint study for the Ironmaster's House was instigated by a request made by superintendent Elizabeth Disrude on February 19, 1980. The superintendent wanted this study done in order to give the first floor display rooms (Rooms 101-105) a more accurate 1840s appearance and to justify the existing green for the window shutters instead of the iron oxide red color (original date unknown) previously used on all the exterior wood trim. Historic paint data (i.e., from the periods 1826 through 1883) was also needed in conjunction with the furnishings and wall finishes which were being developed by the Harpers Ferry Center. It was determined feasible for project architect Dessauer to pursue the study under the supervision of historical architect and historic paint expert Penelope Batcheler at the DSC Philadelphia office. The work undertaken to accomplish this study, its findings, and conclusions are described below.

A. Consultation and Paint Sampling

During the week of March 10-14, architect Dessauer traveled to Philadelphia and Hopewell Village. Meeting with Penelope Batcheler in her Philadelphia office, he was instructed concerning the skills involved in extracting and saving historic paint samples from woodwork. At Hopewell Village 36 samples of the woodwork paint from the principal rooms of the Ironmaster's House were collected.

B. Paint Sample Analysis

1. During the week of April 14, architects Peter Dessauer and David Arbogast (Southeast/Southwest Team) analyzed the samples in the DSC laboratory using an optical Bausch and Laumb stereoscopic microscope with magnification between seven and thirty power. The various layers of the samples were identified and color matched to the Munsell System of Color using natural north light.

2. The analysis revealed two principal woodwork finishes used in the house. The oldest sections of the house revealed off-white paint as their earliest woodwork finishes. This paint was matched to Munsell 2.5Y 9/2, which is similar to Pittsburgh Paint Company color

"Alabaster" STD32. The original paint appeared to be a white lead-based paint with linseed oil as the medium. Replacement paint should be an oil type paint using white lead and having a semi-gloss finish.

3. Later additions (circa 1868-70) to the interior decorative trim of Room 103 contain, as their earliest finish, graining simulating wood. This appeared to be contemporaneous with graining applied to the remainder of the house over the off-white paint. Graining can be identified as a two-coat process with the first coat being either off-white or beige and the second coat being varnish. Nothing except graining performed by a professional grainer can simulate the effect produced by the original graining. It is recommended that if such an effect is to be restored (as it should be if any historical consistency is to be achieved in the house) then the services of a professional grainer must be used.

4. The first floor kitchen proved to be an exception to the remainder of the house. Because of its historic function it contained more layers of paint than the other rooms and all of the layers were of moderate to dark colors, as opposed to the primarily off-white shades used in the other rooms. The only off-white paint used on the kitchen woodwork appears to have been an original prime coat and, therefore, it is not recommended as a suitable restoration color. Three colors, in order of historic use, appeared to date from the historic period. They are gray (Munsell N 5.0/), very dark sage (Munsell 10Y 3/1), and light brown (Munsell 2.5YR 6/2). The light brown paint appeared to be contemporaneous with the graining used in the other rooms and is recommended for restoration. Equivalent Pittsburgh Paint colors for the three paints are as follows: gray, "Gray Velvet" D4752; very dark sage, "Falcon Wing" N7633; and light brown as a mixture of "Rosy Tan" M3603 and "Agate Gray" M3752; as no single Pittsburgh color could match the historic color.

C. Consultation with Norman Souder

The weekend of April 19-20, the project architect taped an interview with Souder, now retired from the National Park Service, about his 15 years of research and restoration at Hopewell Village, and his

findings in the Ironmaster's House which led to a recommendation of a complete restoration to the 1840 period. The present construction project would preserve the post-1840 additions to the house, maintaining an approximately 1870 appearance with the Victorian front porch. Concerning historic paint colors, Souder remembered finding the exact same evidence for off-whites and varnish graining on the interior wood trim. Samples were taken at the park and sent to Philadelphia for microscope inspection. Prior to the late 1960s when the shutters and railing were finally painted green and the rest of the wood trim white, the exterior woodwork had been painted an iron oxide red. Souder explained that red was not an historic color but was datable to the 1920s when the owner Mrs. Edward Brooke painted all her residential properties in this manner. The sources for this information were informants interviewed by the National Park Service when they acquired the property in 1935 and a Brooke Mansion in Birdsboro which no longer exists.

D. Consultation with Superintendent Disrude

On April 21-22, project architect Dessauer met with superintendent Elizabeth Disrude to discuss interior and exterior paints for the Ironmaster's House. Presenting his interior paint study, Dessauer compared notes with the superintendent's own investigations and the recommendations from Dr. Roger Moss of the Philadelphia Victorian Society Atheneum who was advising the superintendent concerning Victorian color schemes. They decided to retain the existing exterior paint scheme to maintain that Souder found to be the mid-19th century appearance. Because of the compatibility and availability of the company's "historic colors" and the beneficial cooperation of company consultant Mr. Castellucci, it was decided to specify Pittsburgh Paints, PPG Industries.

E. Justifications and Final Paint Schedule

The project paint schedule representing final decisions for painting the Ironmaster's House, the justifications for paint color selections, and the actual schedule were decided upon May 7, 1980.

PAINT ANALYSIS

Region: Mid-Atlantic	**Park:** Hopewell Village NHS
Structure: Ironmaster's House	**Structure #:**
Sample #: Typical paint layer pattern	**Location of Sample:** Room 101
Date Taken: 3/12/80	Southwest parlor, first floor; interior wood trim
By: P. F. Dessauer	
Date Examined: 4/4/80 and 4/15/80	**Substrate:** Wood
By: P. F. Dessauer/Arbogast	**Top Color:** Pittsburgh Burma Gold

Historic Date	Layer Description (color, varnish dirt, etc.)	Munsell #	Pittsburgh paint colors equivalent to Munsell No's. Characteristics
1960s-1970s	Off White	10 YR 9/2	Pittsburgh Burma Gold
"	Off White	10 YR 9/2	M-644; 20-150, lo luster
	White	N 9.5/	
	White	N 9.5/	
	Off White	2.5 Y 9/2	Alabaster Std 32
	Off White	2.5 Y 9/2	" "
1870?	Varnish (graining)		
	Off White	2.5 Y 9/2	Alabaster Std 32
	Off White	2.5 Y 9/2	" "

Further Observation, Documentation, Comment or Sketches:

Typical historic paint pattern on existing wood trim of Room 101, the southwest parlor, first floor of the Ironmaster's House, with one exception: the interior baseboards of Room 101 do not have the white N 9.5/ layers which are evident on the other samples.

PAINT ANALYSIS

Region: Mid-Atlantic	Park: Hopewell Village NHS
Structure: Ironmaster's House	Structure #:
Sample #: Typical paint layer pattern	Location of Sample: Room 102
Date Taken: 3/12/80	First floor central hall, interior
By: P. F. Dessauer	wood trim and stairway
Date Examined: 4/3/80 and 4/15/80	Substrate: Wood
By: P. F. Dessauer/Arbogast	Top Color: Pittsburgh Burma Gold

Historic Date	Layer Description (color, varnish dirt, etc.)	Munsell #	Pittsburgh paint color equivalent to Munsell No!s. Characteristics
	Off White	10 YR 9/2	Pittsburgh Burma Gold
1974	Off White	10 YR 9/2	M-644; 20-150, 1o luster
1974	White	N 9.5/	

Further Observation, Documentation, Comment or Sketches:

Typical nonhistoric paint pattern for all existing wood trim in Room 102 (the central hall), the dining room fireplace mantel (Room 104), and the following doors and doorways: 101, 102, 106, and 107, where all previous historic paint layers were removed by park maintenance circa 1974. The project architect conjectures that originally the wood trim in Room 102 had a similar paint history to Room 101.

PAINT ANALYSIS

Region: Mid-Atlantic	**Park:** Hopewell Village NHS
Structure: Ironmaster's House	**Structure #:**
Sample #: Typical paint layer pattern	**Location of Sample:** Room 103
Date Taken: 3/13/80	Northwest parlor, first floor, interior wood trim
By: P. F. Dessauer	
Date Examined: 4/4/80 and 4/15/80	**Substrate:** Wood
By: P. F. Dessauer/Arbogast	**Top Color:** Pittsburgh Burma Gold

Historic Date	Layer Description (color, varnish dirt, etc.)	Munsell #	Pittsburgh paint equivalents to Munsell No's. Characteristics
1960s-1970	Off White	10 YR 9/2	Pittsburgh Burma Gold
	Off White	10 YR 9/2	M-644; 20-15, lo luster
	White	N 9.5/	
	White	N 9.5/	
	Off White 2.5Y 8.5/3 or	2.5Y 9/2	Alabaster Std 32
	Off White 5 GY 9/1 or	2.5Y 9/2	" "
1870?	Dark Varnish (graining)		
	Off White - prime coat	2.5YR 8/2	

Further Observation, Documentation, Comment or Sketches:

Typical historic paint pattern on existing wood trim of Room 103, the northwest parlor; exception - doorway ~~and door~~ 107 where the historic paint layers were removed by park maintenance personnel circa 1974, then primed and painted Pittsburgh Burma Gold.

PAINT ANALYSIS

Region: Mid-Atlantic	Park: Hopewell Village NHS
Structure: Ironmaster's House	Structure #:
Sample #: Typical paint layer pattern	Location of Sample: Room 104
Date Taken: 3/11/80	The first floor dining room, interior wood trim
By: P. F. Dessauer	
Date Examined: 4/3/80 and 4/15/80	Substrate: Wood
By: P. F. Dessauer/Arbogast	Top Color: Pittsburgh Burma Gold

Historic Date	Layer Description (color, varnish dirt, etc.)	Munsell #	Pittsburgh paint colors equivalent to Munsell No's. Characteristics
1960s-1970	Off White	10 YR 9/2	Pittsburgh Burma Gold
"	Off White	10 YR 9/2	M-64; 20-150 lo luster
	Green Blue	2.5 G 6/2	
	White	N 9.5/	
	Off White	2.5 Y 9/2	Alabaster Std 32
	Vanish (graining)		
	Off White	2.5 Y 9/2	" "
1870?	Varnish (graining)		
1870?	Off White	2.5 Y 9/2	" "
	Off White	2.5 Y 9/2	" "
	Off White	2.5 Y 9/2	" "

Further Observation, Documentation, Comment or Sketches:

The above listing presents the existing paint layer pattern (typical, with few exceptions) on the historic interior wood trim of Room 104, the first floor dining room, Ironmaster's House. Exceptions: dining room fireplace mantel and door 106, which have no historic layers, these having been removed by park maintenance personnel circa 1974.

PAINT ANALYSIS

Region: Mid-Atlantic	**Park:** Hopewell Village NHS
Structure: Ironmaster's House	**Structure #:**
Sample #: Typical paint layer pattern	**Location of Sample:** Room 105
Date Taken: 3/13/80	East wing kitchen, first floor, Room 105, wood trim
By: P. F. Dessauer	
Date Examined: 4/15/80	**Substrate:** Wood
By: D. Arbogast	**Top Color:** Pittsburgh Burma Gold

Historic Date	Layer Description (color, varnish dirt, etc.)	Munsell #	Pittsburgh paint equivalents to Munsell No's. Characteristics
1975	Blue	7.5 B 7/4	M-237 Kashmir Blue
	Blue	7.5 B 7/4	20-6, lo luster oil
	Dark Blue	5 B 5/1	
	White	N 9.5/	
	Gray	N 5.5/	
	Cream - Tan	2.5 Y 7/4	
	Sage	10 Y 5/1	
	Sage	10 Y 4/1	
	Light Brown	2.5 YR 6/2	Mixture of Rosy Tan
	Light Brown	2.5 YR 6/2	M3603 and Agate Gray
	Light Brown	2.5 YR 6/2	M3752
	Gray	N 5.0/	Gray Velvet D4752
	Very Dark Sage	10 Y 3/1	Falcon Wing N7633
	Off White primer	5 Y 8.5/1	

Further Observation, Documentation, Comment or Sketches:

There are numerous exceptions to the above historic typical paint pattern in Room 105, first floor, east wing chimney. However, the above includes most of the common colors and is presented for simplicity and clarity. The interior chair rail on the south wall is a modern replacement (circa early 1970s) and has only the Pittsburgh M-237 Kashmir Blue paint.

1. Rooms 101 and 104: the wood trim is being painted an off-white color to match the original historical paint layers within the time frame of the mid-19th century. Since there is no evidence of original wall colors or wallpaper, a color sympathetic to the period has been chosen.

2. Room 102: the existing paint on the wood trim is Pittsburgh "Burma Gold" which, according to Norman Souder, matches original paint layers he found before park maintenance removed them. In order to ease maintenance cleaning of the central hall (perpetrated by mass visitor manual handling of the fabric), a darker nonhistoric color has been chosen for the wood trim. The walls above the chair rail will be paper and below the chair rail painted in colors sympathetic to the period.

3. Room 103: the existing wood trim in the northwest parlor dates from about 1870. Historic accuracy to an original appearance would necessitate varnish graining of the fabric. However, because graining is cost prohibitive to the project at this time, an off-white color has been chosen for the trim. This choice assumes the conjectured coloration of previous wood trim in the parlor during the 1840 and 1850 decades prior to the 1870 remodeling and graining and, in this manner, perpetuates the park's decision, to exhibit the house as much as possible in its mid-19th century appearance. If funds are available in the future, the park and regional office may choose to grain the northwest parlor to show this room as its existing trim was originally varnished. Because no evidence of historic wallpaper or wall paint exists, a color sympathetic to the period has been chosen for the walls.

4. Room 105: in the first floor kitchen the choice of Pittsburgh "Falcon Wing" resembles one of mid-1800 wood trim colors found in the paint analysis and is an improvement over the nonhistoric existing color "Kashmir Blue."

5. Rooms 004 and 005: the wood surfaces will be painted "Falcon Wing" to maintain, as in Room 105, a 19th century interior "work area" appearance.

6. The new exterior paint scheme will match the existing (mid-1800 appearance). However, a darker more historic green, lo-luster, has been chosen as an improvement over the present high gloss green for the shutters and railings.

Paint Schedule for Ironmaster's House
Construction Project, CX-4000-9-900A
Preserve and Rehabilitate the Ironmaster's House
Hopewell Village National Historic Site

NOTE: Pittsburg Paint colors specified below, unless indicated otherwise.

I. INTERIOR PAINT COLORS:

Room	Woodwork/Trim Lo-lustre Oil	Walls-Flat	Ceilings-Flat	Floors
101 SW Parlor	Philadelphia Trim (Historic Colors Chart)	Old Linen P2535	Blossom White P2537	
102 Central Hall	Boulder City (Historic Colors Chart)	Below Chair Rail: Scotts Bluff (Historic Colors Chart)	Blossom White P2537	Note: Stain stair treds and rail to match existing color.
103 NW Parlor	Alpine White P2526	Silver Lining P2753	Blossom White P2537	
104 Dining Rm.	Philadelphia Trim (Historic Colors Chart)	Old Linen P2535	Blossom White P2537	
105 Kitchen	Falcon Wing N-7633	Blossom White P2537	Blossom White P2537	
004 Moulders' Kitchen	Falcon Wing N-7633	Bridal White P2534	Bridal White P2534	Rez Stain "Split Rail"
005 Moulders' Dining Rm.	Falcon Wing N-7633	Bridal White P2534	Bridal White P2534	Rez Stain "Split Rail"

II. EXTERIOR PAINT COLORS:

Exterior wood trim = window, sash, lintels, casings, sills, muntins, barge boards, cornices, moldings, soffits, faccias, brackets, columns, doors, door architraves, lattice work, caps, box beams, clapboards, and porch ceilings.	Low Gloss Oil White 1-110
Window shutters; window hardware; top and bottom porch, stair, and footbridge railings.	Oil-Semi Gloss-8-22 Green Metal Roof Paint
Porch floors; porch floor moldings, porch steps, porch chair standards for porch columns, 4 x 4 blocking under lower porch railings, and footbridge floor.	Lo-luster, Pewter Gray, 3-418
Chimney hoods (rustoleum paints) prime with 5769 - red primer rustoleum latex. Top coat with 5778 - flat black rustoleum.	

XVII. ADDENDUM: DENDROCHRONOLOGICAL STUDY

(written by project architect, Peter F. Dessauer, May 1984)

Since the inception of the project field research in July 1978, DSC architects William Howell and Peter Dessauer and archeologist Audrey Marie had been in contact with Dr. Richard Phipps of the USGS in Reston, Virginia. Dr. Phipps is a dendrochronologist and director of the USGS tree ring laboratory. The project professionals contacted Phipps to request his assistance in starting a dendrochronological study of the Hopewell Village National Historic Site area and historic structures, specifically the Ironmaster's House. The objective of this study would be a collection of increment borer samples for purposes of cross dating with other dendrochronological banks in order to verify construction dates and building evolutions within the park.

Volunteering his time and services to the National Park Service, Dr. Phipps visited Hopewell Village April 1-2, 1980. Receiving permission from superintendent Elizabeth Disrude and project supervisor Howard Glifort, Phipps proceeded to make 12 increment borer extractions from six of the existing original summer beams in the Ironmaster's House. Following this trip to Hopewell Village, he recorded the samples on the tree ring laboratory computer at the USGS office in Reston, Virginia. The samples were mounted for inspection and storage and constituted the beginning of the Hopewell dendrochronological data bank. A report, dated April 10, describing each sample and the procedures used for their extraction was sent from Phipps to architect Dessauer at the Denver Service Center. A copy of this report is included in this section of the historic structure report.

By telephone conversation on August 7, 1980, Phipps told project architect Dessauer that he had successfully, although only tenatively, cross dated the Ironmaster's House samples with a Hudson River valley data bank. Temporary conclusions from this study were as follows:

1. The white oak beams of the east wing were cut circa 1825.

2. The white oak beams of the southwest wing were cut circa 1828.

3. The yellow popular beams of the northwest wing were cut circa 1799.

The dates for the white oak beams suggest that the east and southwest wings were completed by 1830 when a consensus report cited 19 persons residing in the house, and that the east wing was built before the southwest wing. This information matches the opinions of contemporary historian Charlotte Fainbairn, of historical architect Norman Souder, and of archeologist Leland J. Abel, all of whom have made a career of studying the Ironmaster's House and have published their findings in historic structure reports.

There has always been controversy concerning when the northwest wing was originally built. Historical evidence indicates that the northwest wing is the oldest part of the house, the original portion built either as a separate house for Mark Bird as early as 1772-73; or, as such as John Bishop, James Old, Matthew Brooke, and Thomas Brooke, who were in residence at Hopewell at various times between 1796 and 1800; or, as the initial phase of mansion building by Clement Brooke who resided there 1810-47. A map drawn in 1805 shows a house on or near the site of the present Ironmaster's House. If this house was the existing northwest wing, Dr. Phipps' conclusion suggests that it was built just a few years prior to 1805.

Although the tentative readings from initial cross dating offer both corroborative and new evidence to the Ironmaster's House research, the dendrochronological study is far from complete. The following work still needs to be done:

1. Collection of increment boring samples from the park to create a complete Hopewell Village dendrochronological data bank.

2. Proper storage and computer processing of sample information.

3. Cross dating on the Ironmaster's House samples and the park data bank with other Mid-Atlantic, North Atlantic regions, park, and existing dendrochronological data banks.

4. A series of reports by Dr. Phipps and his USGS division publishing the results of their research and final conclusions.

In order for the above to become reality, a definite commitment by the Mid-Atlantic Regional Office in response to a stated need by park management and by the Mid-Atlantic Division of Cultural Resources is required. It is the opinion of the project architect that the Denver Service Center and Mid-Atlantic Regional Office should consider the time and costs involved with planning, funding, and managing a dendrochronological project by the USGS tree ring laboratory. Establishing such a study for Hopewell Village National Historic Site in the future would set a beneficial precedent and create a useful instrument for cultural resource data gathering throughout the Mid-Atlantic Region.

United States Department of the Interior
Tree-Ring Laboratory
GEOLOGICAL SURVEY
RESTON, VA. 22092
Mail Stop #461

April 10, 1980

Mr. Peter Dessauer
Historic Preservation
National Park Service
Denver Service Center, P. O. 25287
Denver, Colorado 80225

Dear Peter:

Enclosed are some notes concerning the tree-ring samples taken from six of the summer beams in the Ironmaster's House at Hopewell, April 1 - 2, 1980. The sampling procedure went without a hitch. All people at Hopewell with whom I came in contact, but most notably Betty Disrude and Howard Glifort, were quite helpful and congenial.

In looking over the notes I see that our description of sample provenance is based entirely on location of beams and joists, but included no direct measurements to features (walls) which will remain exposed after completion of renovation. For my purposes I don't need more exact locations. However, if location of beams and joists is not already recorded somewhere, and if location of sample points is desired for inclusion on, for example, floor plans, then measurements from side walls to beams and from end walls to sample points might be desirable.

I should have the material mounted and surfaced by the time of your visit in late April. I also hope that I will have had the chance to cross-date the samples with each other. There is also an outside chance that I might be able to crossdate the samples with data we have from the Blue Ridge in northern Virginia and data from the southern Hudson River valley.

Sincerely,

Richard L. Phipps

Richard L. Phipps
Research Botanist (Ecology)

Enclosure

I. Tree-ring sampling of summer beams in Ironmaster's House, Hopewell, April 1-2, 1980.

A. Objective: To determine approximate construction date(s) by dating the year(s) that the trees were cut from which summer beams were made.

B. General approach: Obtain samples from summer beams. Cross-date outer rings of beams with inner rings of local, living trees to obtain cutting dates. (If living trees are not old enough to cross-date with beams, it may be necessary to include intermediate step to obtain data from other old buildings of intermediate age.)

C. Collection of samples from beams: Since the objective is to eventually determine cutting date it was important to obtain samples from points along beams where the outside of the tree (with or without bark) was present and sound.

D. Examination: Renovation procedures had exposed a number of the summer beams. It was noted that all beams had bark (or a smooth surface where there had been bark) on at least one edge, usually near one end. Because of normal taper in tree trunks, the beam-end with bark was assumed to represent the upper part of the trunk. It was also noted that joints where joists were mortiсed into the summer beam were identified (presumably during original construction) by matching roman numerals carved into the tops of the joists and beams. Since the numerals were consecutive we could note direction of numbering.

E. Procedure: Sampling was done with a German sampler which looks much like an oversized plug cutter. The sampler cuts a hole 3 cm diameter, leaving a core sample 2 cm in diameter. The maximum hole depth which can be drilled without removal of the core is 15 cm. After removal of the core, the hole can be drilled deeper, yielding additional core. It was desirable to obtain samples along radii (that is, at right angle to tree-ring boundaries). Since sampling was from a flattened edge of each beam (where bark was or had been), the most probable direction of radii was diagonal to the faces of the beam, approximately toward the center of the beam. It was felt desirable to come as near as possible to sampling a complete radius so as to maximize the number of rings available for cross-dating. All radii sampled were greater than 15 cm; hence, each sample was composed of at least two pieces. Also, hidden cracks or checks in the beams resulted in some of the samples being broken into additional pieces. Core holes were filled by driving a 1¼ inch closet rod into the hole and sawing off the excess flush with the beam. The sample number was marked in roman numerals with green wax pencil (not expected to be permanent) on the outer end of the closet pole plug.

Two cores were taken from each of six beams, and a third core from one beam, for a total of thirteen cores. No cores were taken from beams between the second and third floor (not exposed). The beam under the floor of the northwest parlor (exposed in the basement) was examined and found to be unsuitable for sampling. No obvious bark-edges were noted and the outer surfaces appeared soft or "punky." It is probable that at best only a crude approximation of cutting dates would have been possible from the examination of this beam. The beam under the southeast parlor floor was not examined. Since it was anticipated that it would remain exposed in the basement even after restoration, it can, if necessary, be sampled at a later date.

II. Sample provenance

A. Southwest parlor
Ceiling (samples 4 and 5)
Oak beam, with butt at outside wall, upper end at hallway wall
Joists numbered from outside wall
Sample No. 4 (nearest to hallway)
between joists XIII and XIV, 7½ inches from centerline of XIII
joist XIII is 1st joist from hallway wall

Sample No. 5 (farther from hallway)
between joists IX and X, 10 inches from centerline of IX
joist IX is 5th joist from hallway wall.

B. Hallway and northwest parlor
Ceiling (samples 3, 6, and 7)
Yellow poplar beam, with butt at outside wall, upper end at southeast parlor wall.
Joists numbered from outside wall

Sample No. 3 (in hallway)
between joists XII and XIII, 4 inches from centerline of XIII
joist XIII is 1st joist in hallway from northwest parlor wall.

Sample No. 6 (near hallway wall)
between joists XI and XII, 6 inches from centerline of XII
joist XII is at hallway wall.

Sample No. 7 (near outside wall; no bark surface)
between joists II and III, 9½ inches from centerline of joist III
joist III is 2nd joist from outside wall, and 9th joist from hallway wall.

C. Dining room
Ceiling (samples 2 and 9)
Oak beam, with butt probably at fireplace and upper end at hallway wall
Joists numbered with kitchen joists starting at endwall of kitchen

Sample No. 2 (about midway in room)
between joists XV and XVI, 7 inches from centerline of XVI
joist XVI is 6th joist from fireplace wall

Sample No. 9 (on hallway side of room center)
between joists XVI and XVII, 8½ inches from centerline of XVI

D. Floor (samples 1 and 8)
Oak beam, butt location uncertain, probably hallway
Joists numbered from hallway wall

Sample No. 1 (nearest to fireplace)
between joists VIII and IX, 6 inches from center line of VIII
joist VIII is 3rd joist from fireplace wall, counting front of hearth as 1st.

Sample No. 8 (on hallway side of room center)
between joists III and IV, 3½ inches from centerline of III.
joist III is 8th joist from fireplace wall.

E. Kitchen

Ceiling (samples 10 and 13)

Oak beam, butt probably at fireplace with upper end at outside wall
Joists numbered from outside wall

Sample No. 10 (near center of room)
between joists V and VI, 4 inches from centerline of V
joist V is 4th joist from outside wall

Sample No. 13 (nearest outside wall)
between joists II and III, 4½ inches from centerline of III.
joist III is 2nd joist from outside wall

F. Floor (samples 11 and 12)

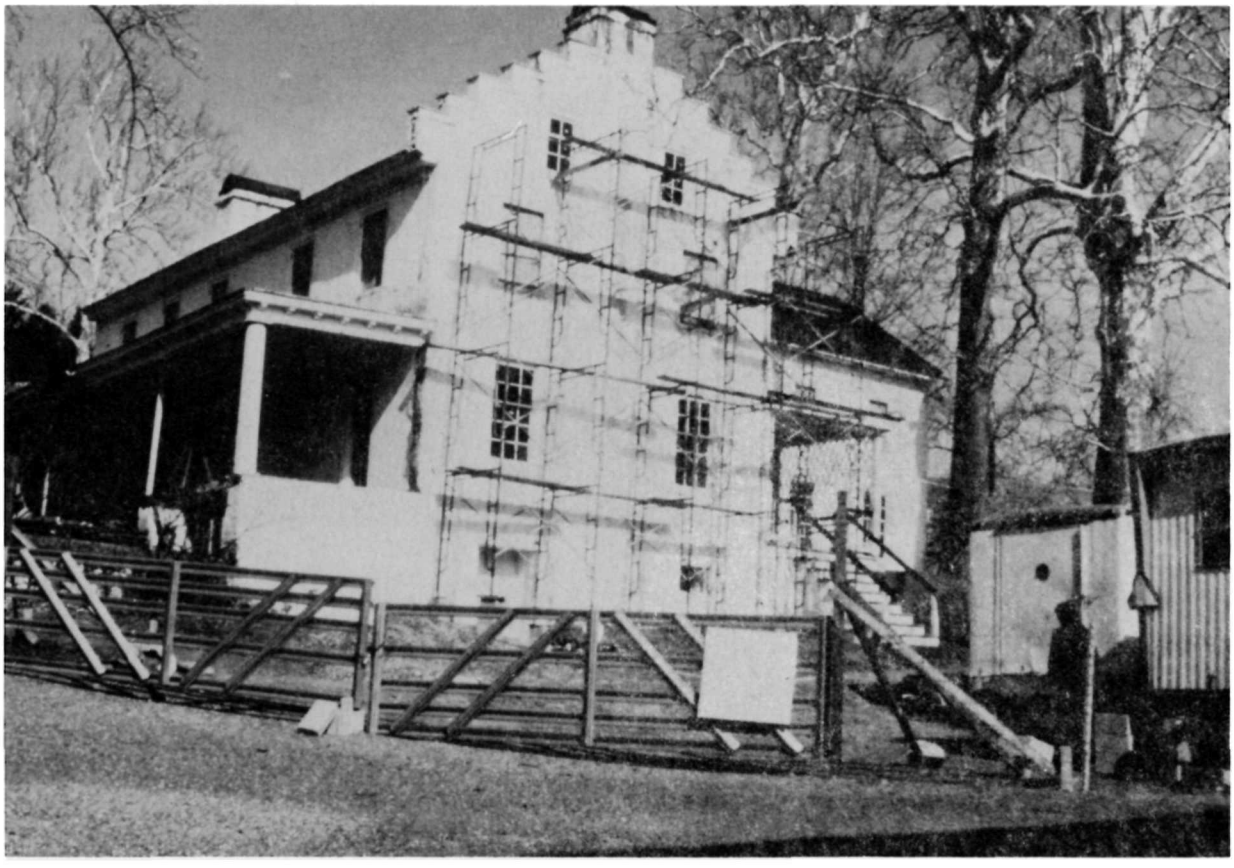
Oak beam, butt probably at fireplace with upper end at outside wall
Joists numbered from outside wall

Sample No. 11 (nearest outside wall)
between joists I and II, 7 inches from centerline of I
joist I is at outside wall

Sample No. 12 (near center of room)
between joists V and VI, 5 inches from centerline of VI
joist VI is 5th joist from outside wall.

XVIII. ADDENDUM: CONSTRUCTION PHOTOGRAPHS

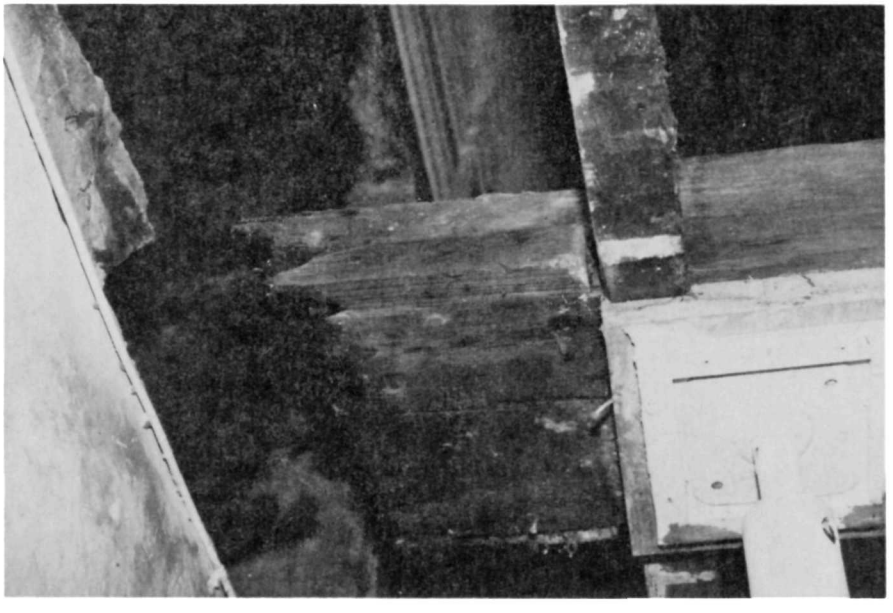
The purpose of this addendum is to show photographs of existing conditions and work completed on the Ironmaster's House during the construction phase. The main emphasis of the photographs is the existing historic floor, wall, roof, and porch framing, much of which was never revealed, examined, or recorded until this project. Although now covered by original and new finished materials, the existing framing has been sufficiently, although not completely, documented within the limits of the project scope. The final set of "as built" drawings (No. 376/41004A) contain plans of existing condition floor framing and roof framing. These drawings as well as numerous other photographs of the Ironmaster's House fabric are in the possession of the park and the DSC project architect and are available upon request for future reference and information.



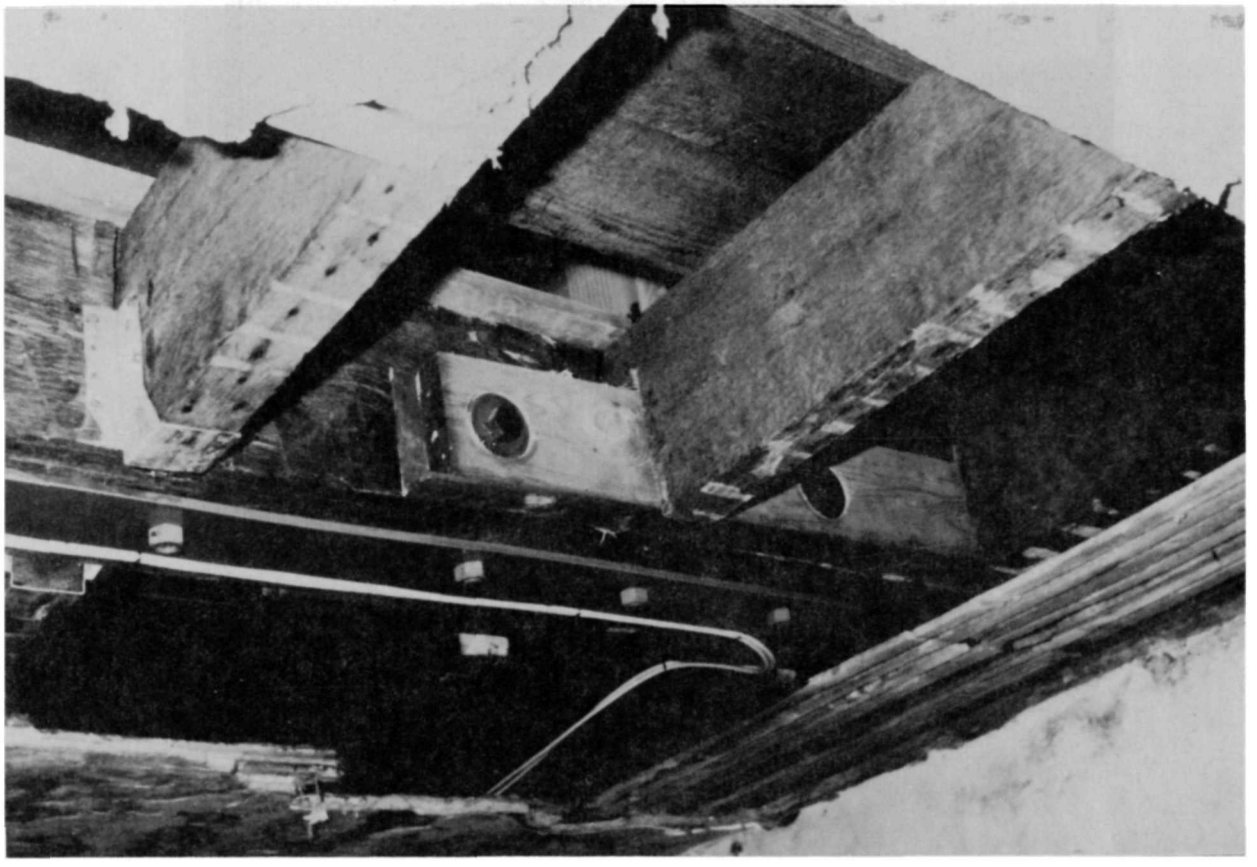
1. Ironmaster's House: view of south elevation, west front porch, southeast porch/steps, and construction yard. DSC project supervisor Howard Glifort standing next to trailer, March 15, 1980.



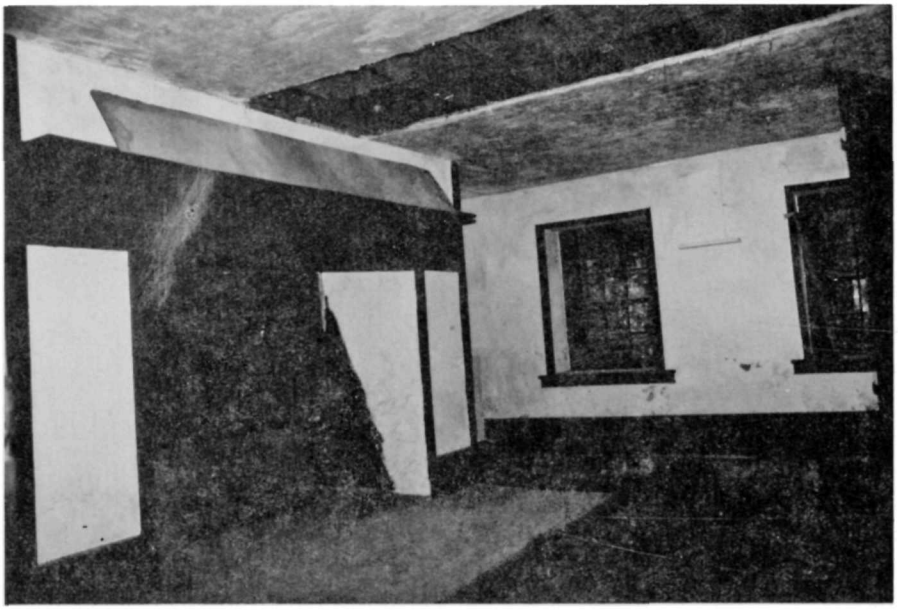
2. Room 004: moulder's dining room. Existing ceiling summer beam exposed; flooring removed, December 13, 1979.



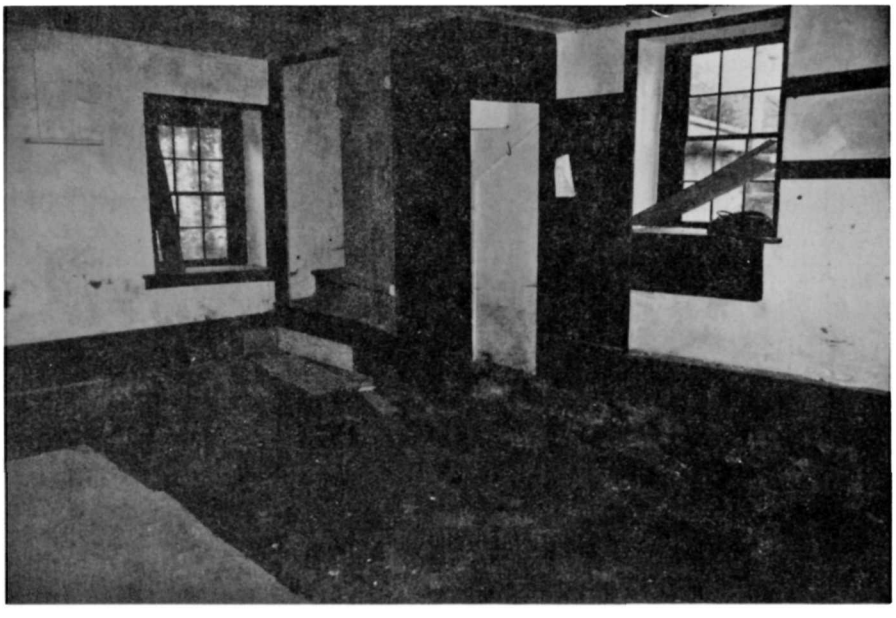
3. Room 004: moulder's dining room. Existing ceiling summer beam; charred end at east wall pocket, exposed and cleaned, supported on a temporary steel pipe column, December 13, 1979.



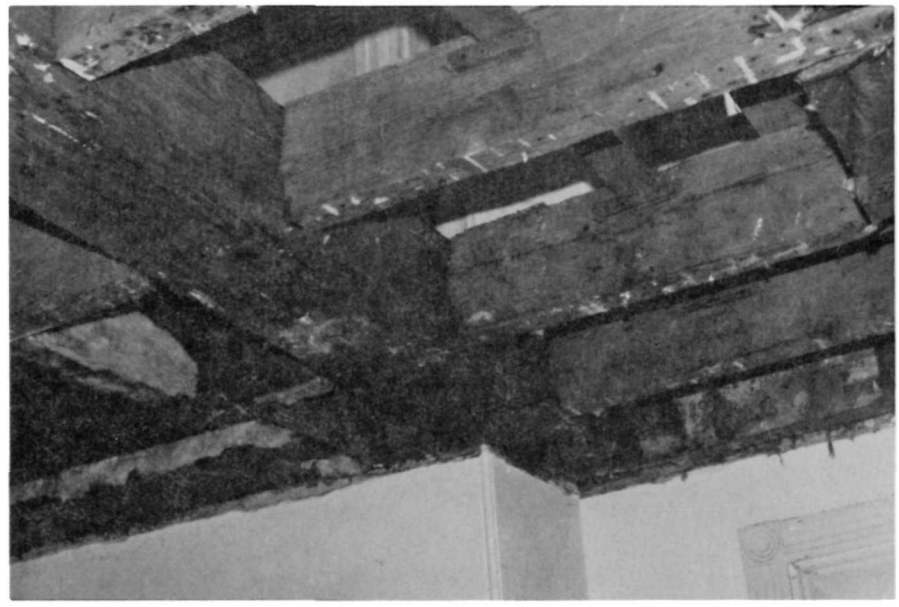
4. Room 004: moulder's dining room. Existing ceiling summer beam reinforced with new steel plates and new steel channels and existing joists reinforced with new hangers at east wall pocket. Pipe column removed, May 1980.



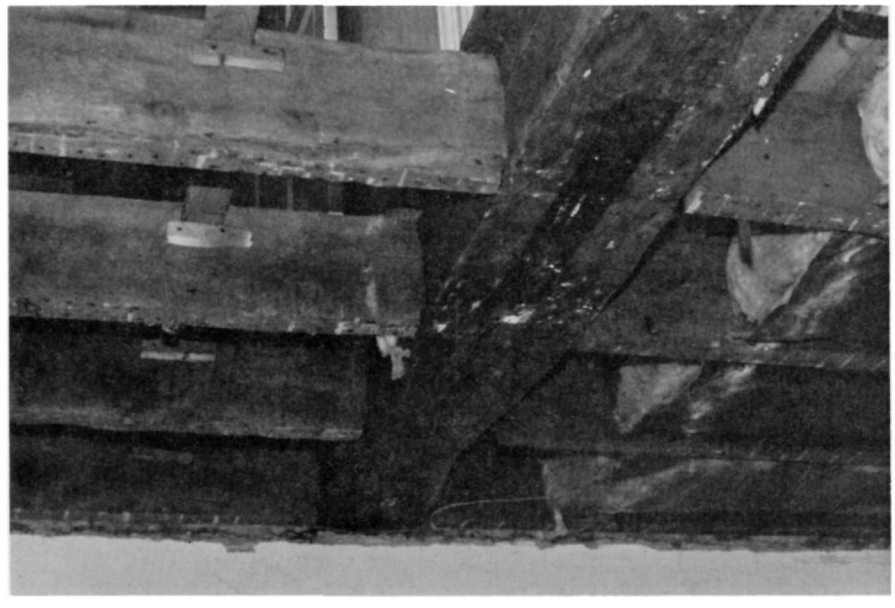
5. Room 005: moulder's kitchen. Existing ceiling summer beam exposed; flooring removed. View towards west side fireplace and hearth, December 13 1979.



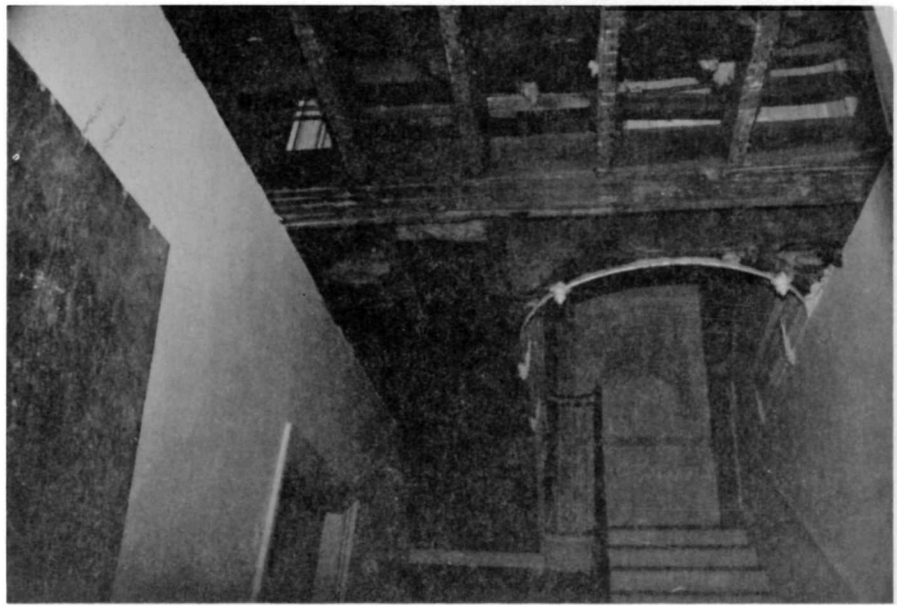
6. Room 005: moulder's kitchen. Existing doorways 007 and 006; flooring removed. View towards the northeast corner and east wing stairs, December 13, 1979.



7. Room 101: southwest parlor. Existing ceiling summer beam and framing exposed at south wall pocket adjacent to chimney and near Window 103, December 13, 1979.



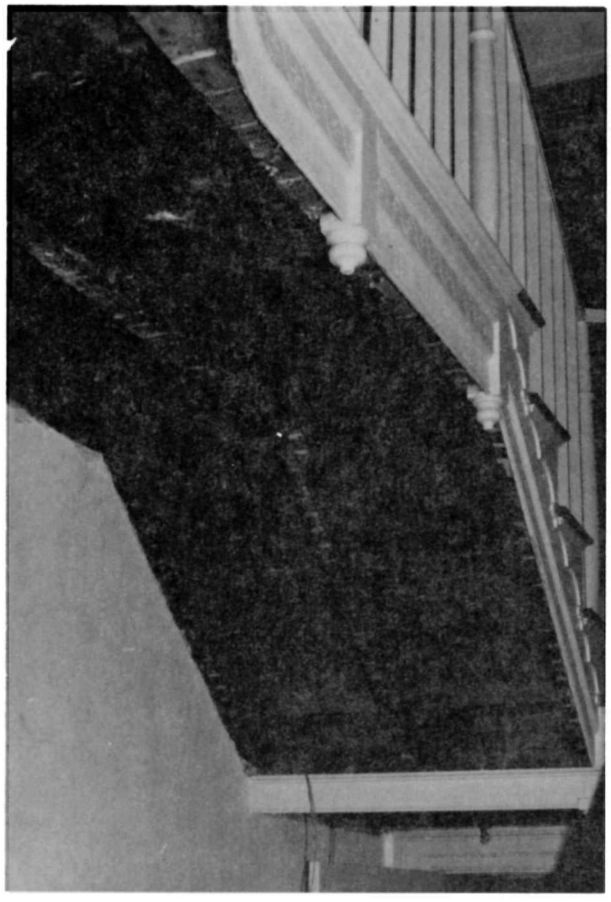
8. Room 101: southwest parlor. Existing ceiling summer beam and framing exposed at north wall over Doorway 102. Existing tension rod plate on underside of summer beam, December 13, 1979.



9. Room 102: central hall. View of existing ceiling summer beam and framing; existing stair carriage exposed, December 13, 1979.



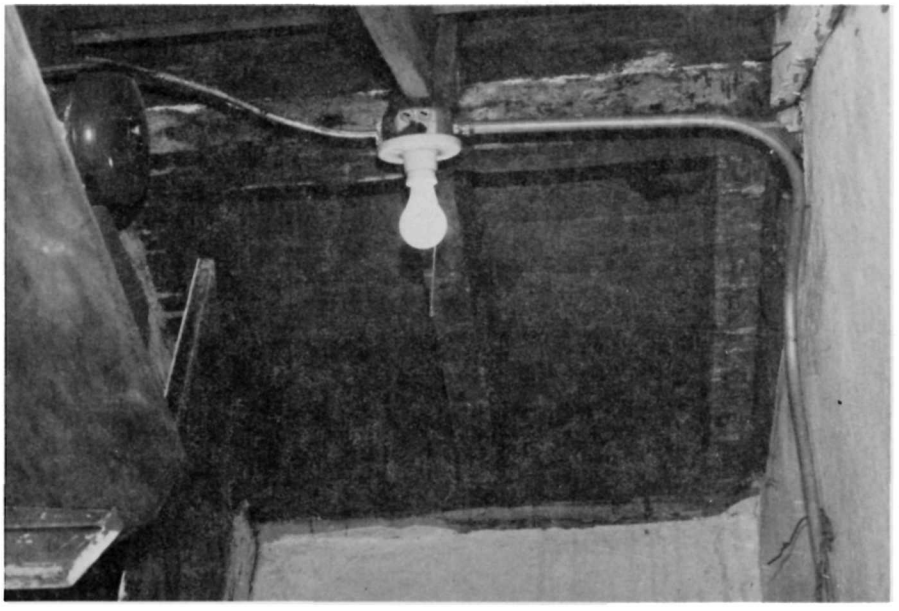
10. Room 102: central hall. View of existing ceiling summer beam and framing and stairwell trim. View towards front Doorway 101, December 13, 1979.



11. Room 102: central hall. Existing stair carriage exposed over Doorway 106, December 13, 1979.



12. Room 102: central hall. Existing stair landing framing exposed, above Doorways 105 and 106, December 13, 1979.



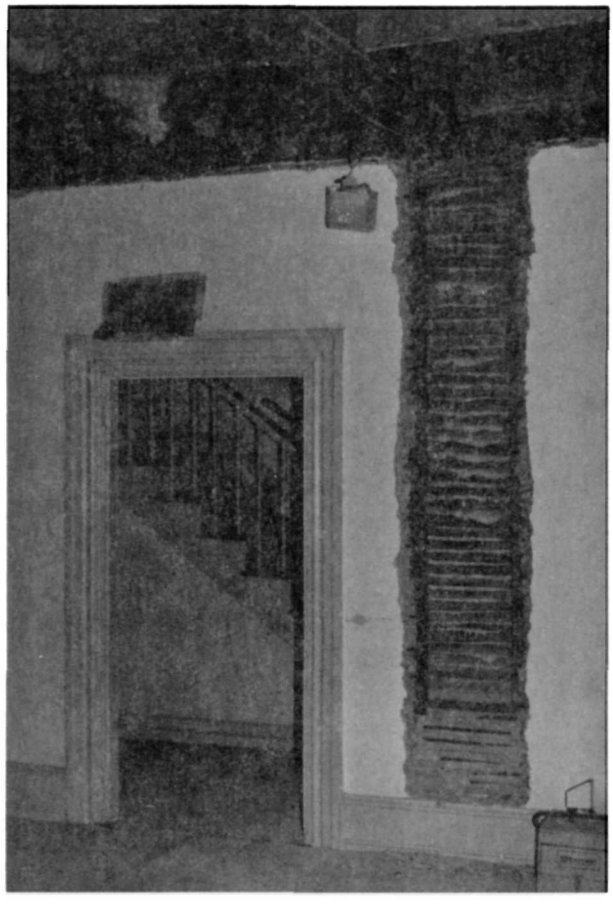
13. Room 102: stair landing framing in ceiling of enclosed stairs leading from Door 105 down into basement Room 002, December 13, 1979.



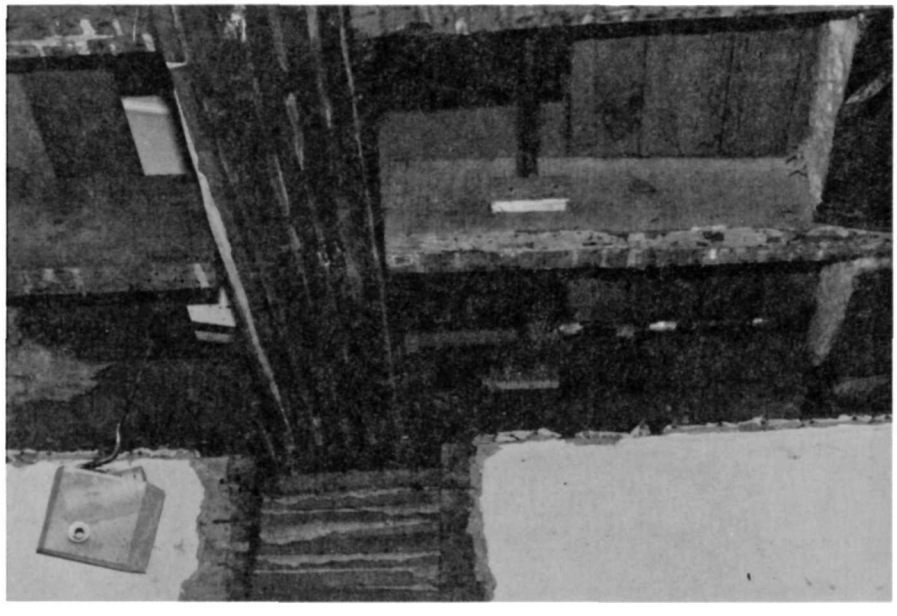
14. Room 102: central hall. Existing ceiling summer beam and framing over south side wall above Doorway 102, December 13, 1979.



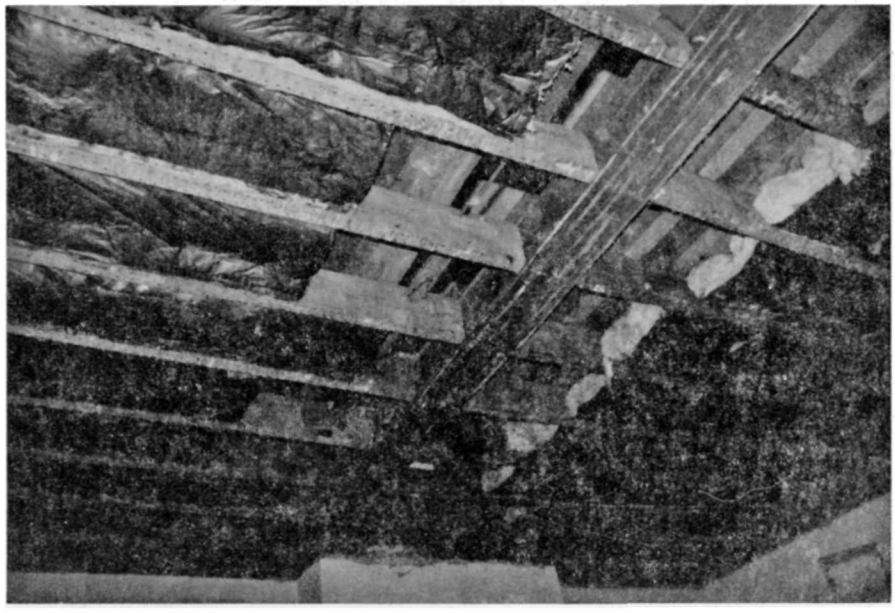
15. Room 102: central hall. Existing ceiling summer beam reinforced with new steel plates and existing joists reinforced with new hangers, May 1980.



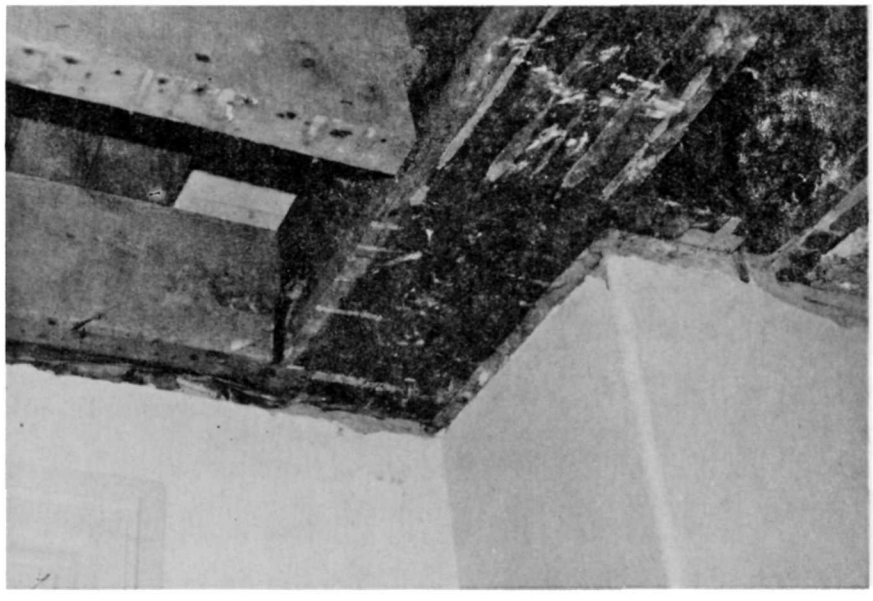
14. Room 103: northwest parlor. Existing summer beam and joists in ceiling exposed. Portion of wall opened for installation of steel support. View towards south wall and Doorway 107, December 13, 1979.



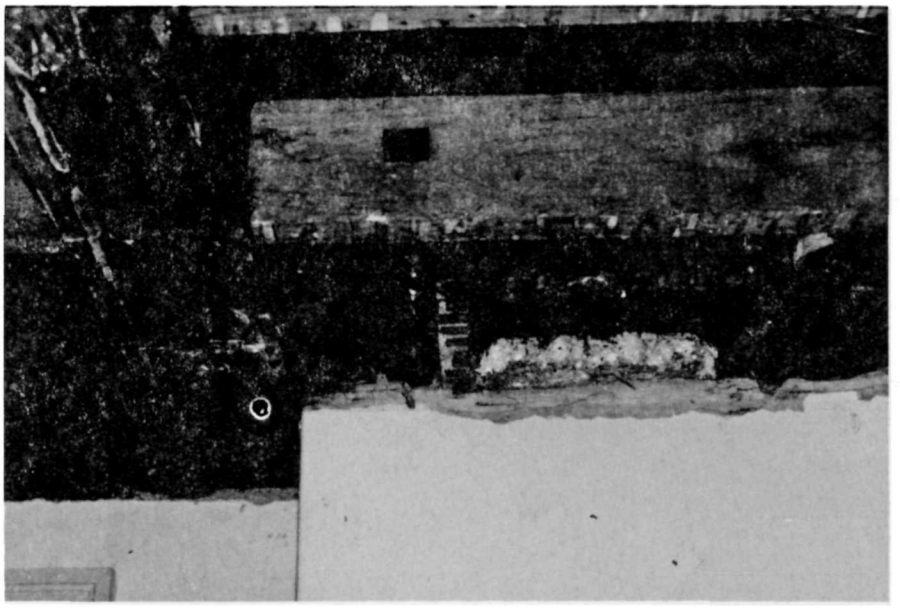
15. Room 103: northwest parlor. Existing ceiling summer beam and joists over south side wall, December 13, 1979.



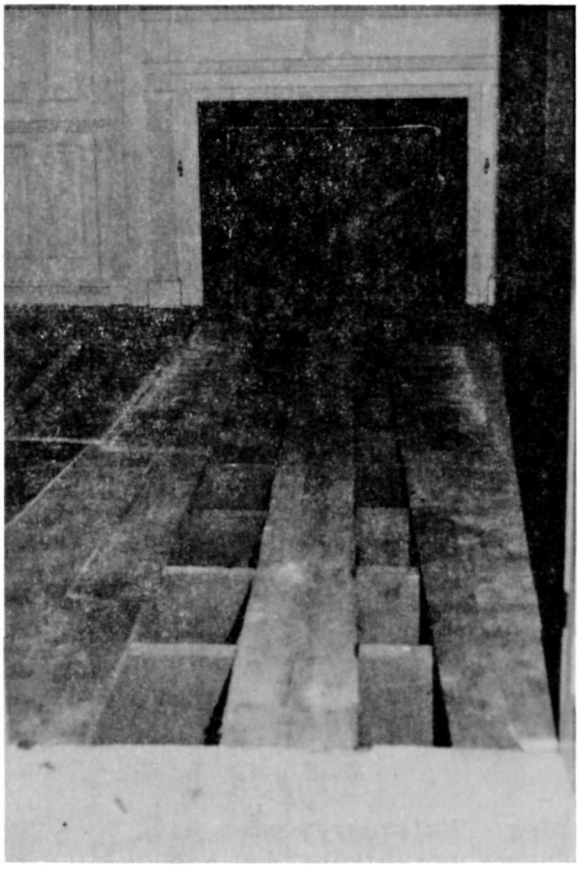
16. Room 103: northwest parlor. Existing ceiling summer beam, josts, and insulation exposed. View towards north wall and chimney, December 13, 1979.



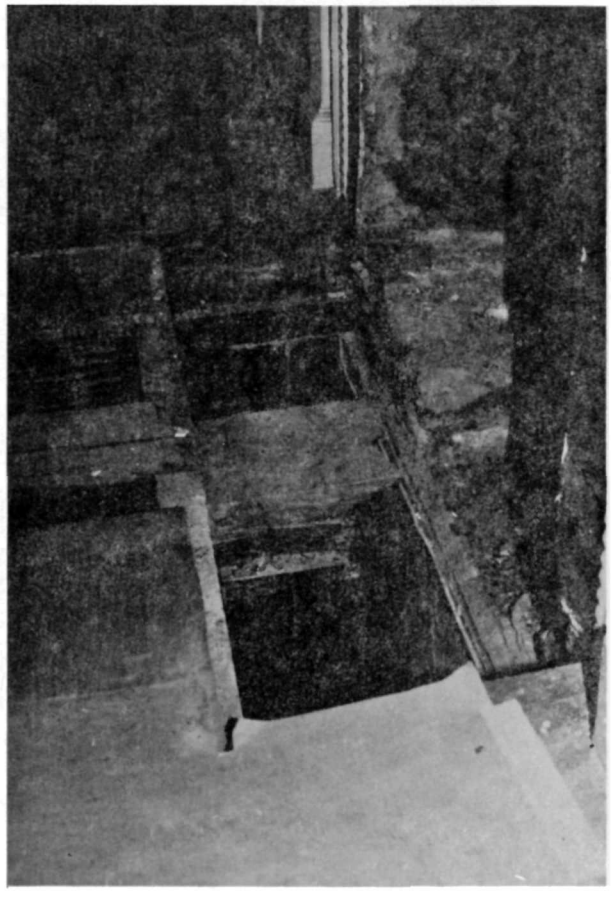
17. Room 103: northwest parlor. Existing summer beam at north wall pocket, adacent to chimney and Window 107, December 13, 1979.



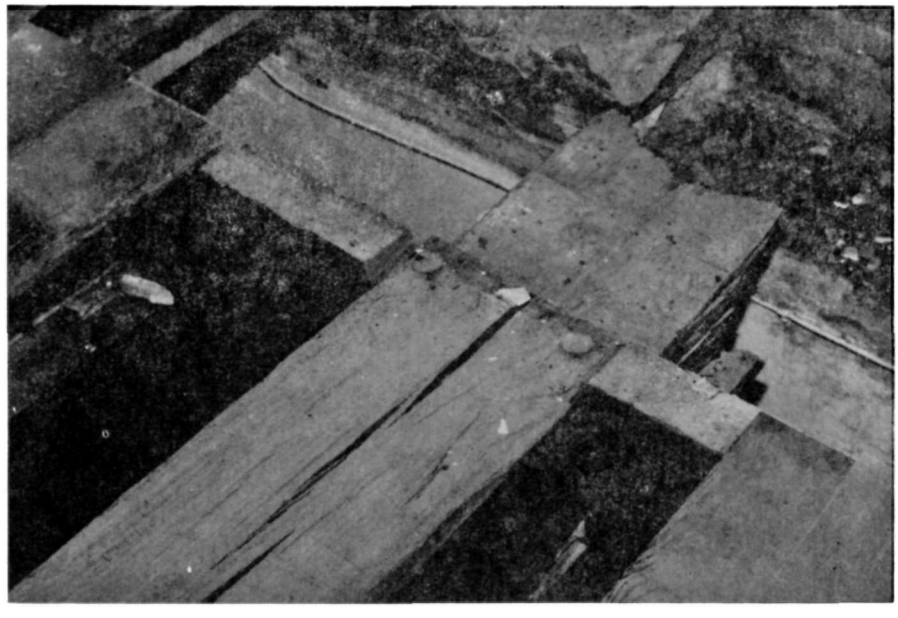
18. Room 103: northwest parlor. Existing summer beam, joists, and hearthbox in ceiling at north side of room, above fireplace and adjacent to chimney, December 13, 1979.



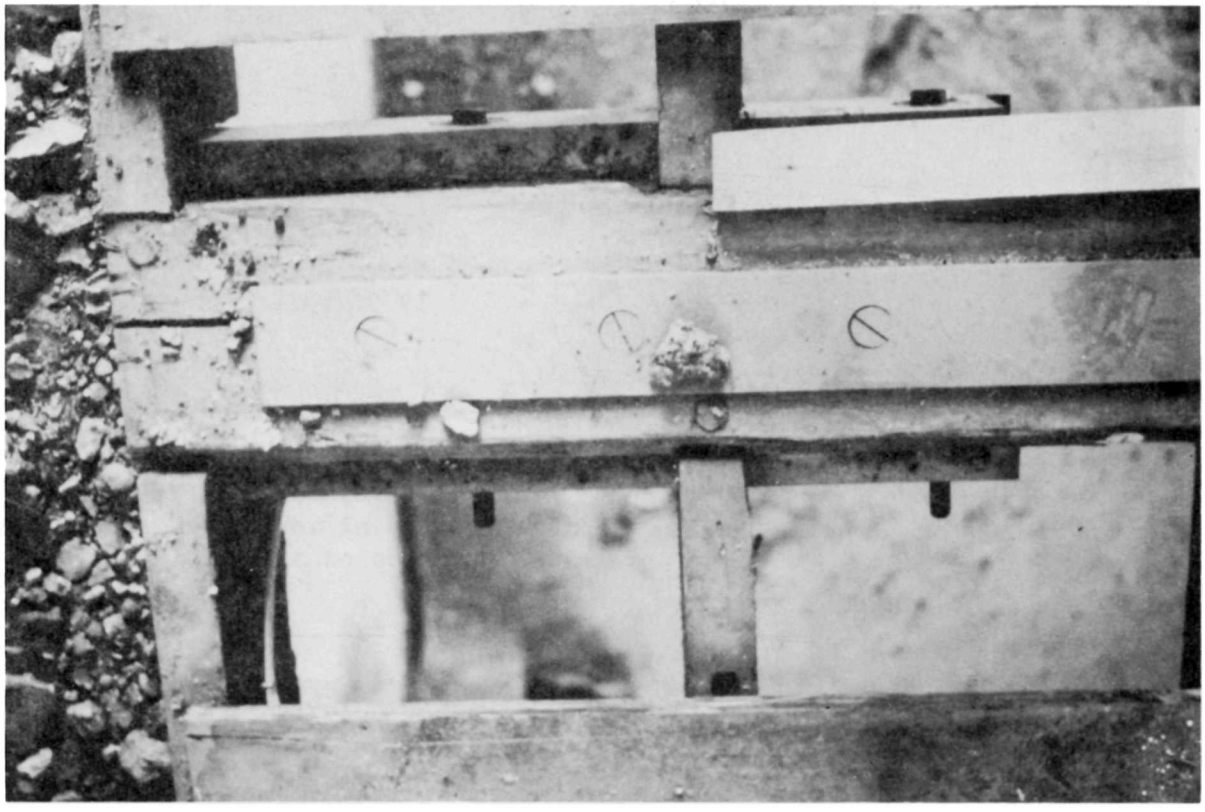
19. Room 104: east wing dining room. View towards east wall fireplace showing exposed summer beam and framing in floor, December 13, 1979.



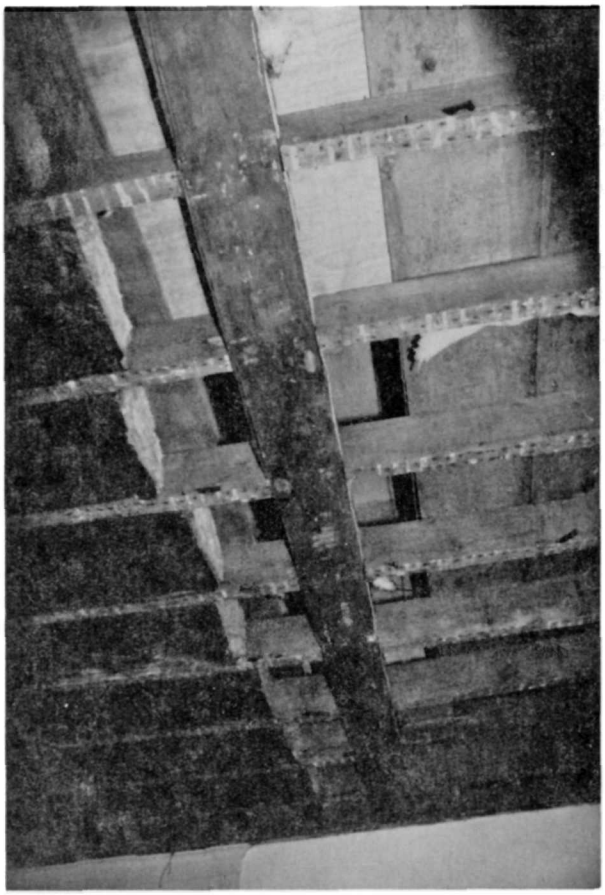
20. Room 104: east wing dining room. Charred end of existing floor summer beam at east wall fireplace pocket, December 13, 1979 (refer to photograph 3).



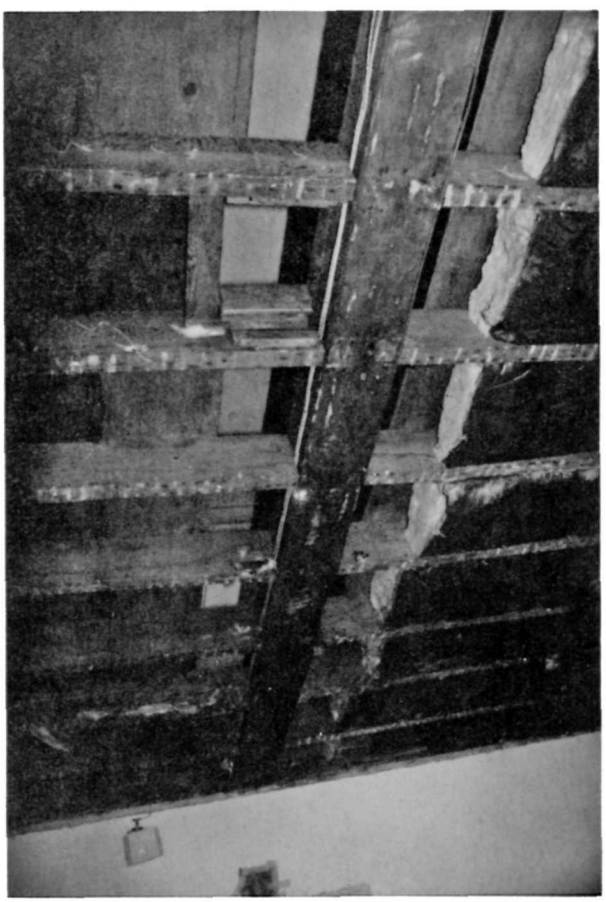
21. Room 104: east wing dining room. Charred end of existing floor summer beam at east wall fireplace pocket. Joists mortised and pegged into summer beam, December 13, 1979 (refer to photograph 3).



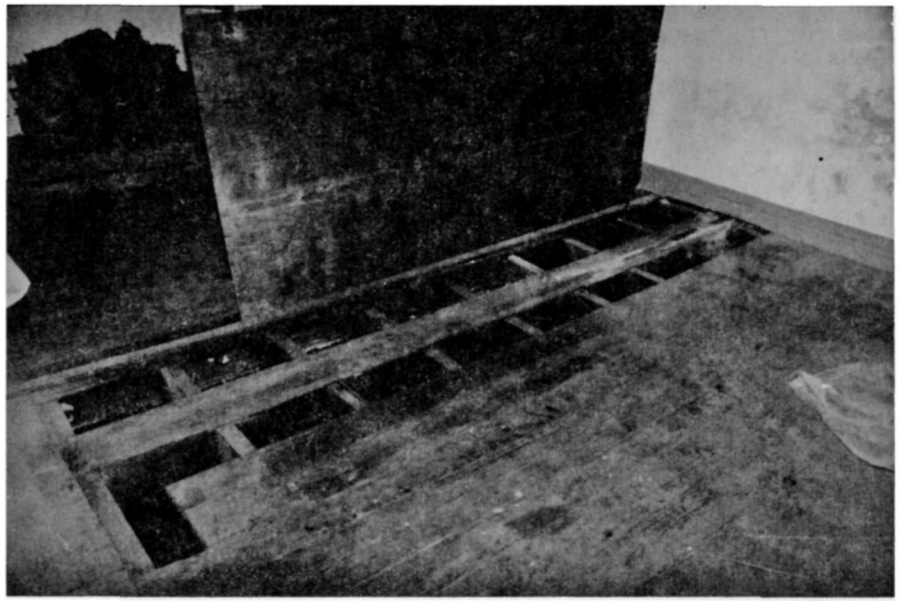
22. Room 104: east wing dining room. Top view of existing floor summer beam reinforced with new steel plates (top and bottom) and new steel channels extending into the stone fireplace pocket on the east wall, April 1980 (refer to photograph 4).



23. Room 104: east wing dining room. View towards east wall of existing ceiling summer beam and joists, December 13, 1979.



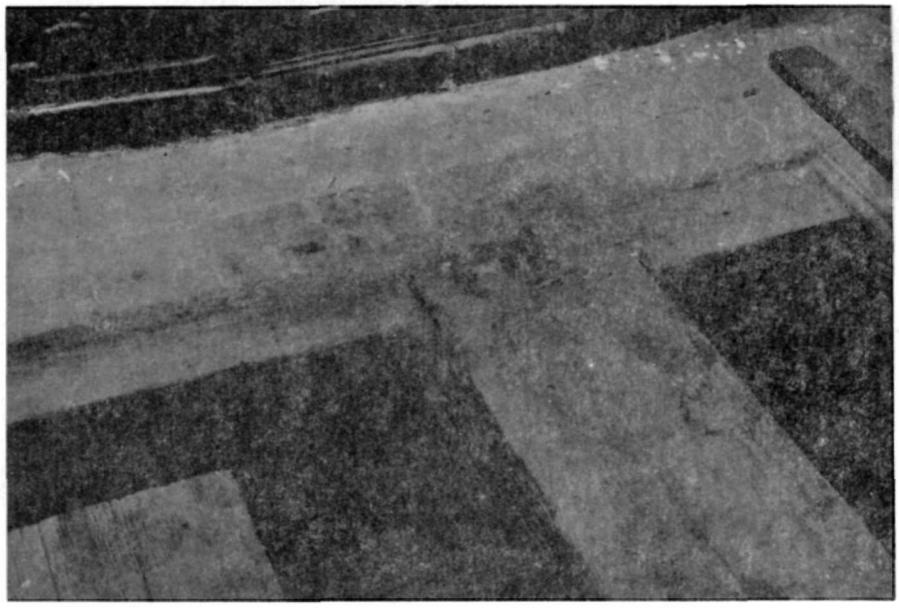
24. Room 104: east wing dining room. View towards west wall of existing ceiling summer beam and joists. Blocking between joists for what was possibly at one time a forced air floor grill, December 13, 1979.



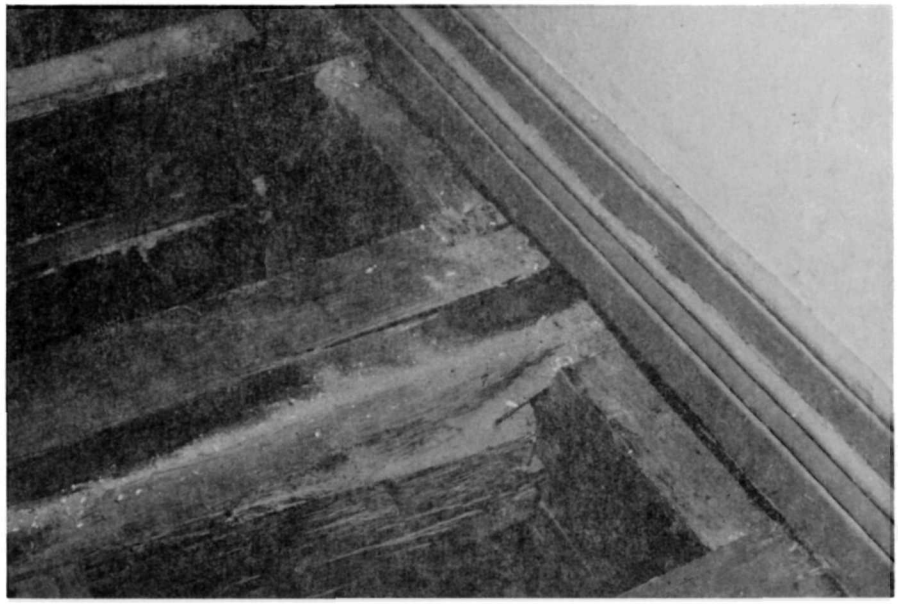
25. Room 105: east wing kitchen. Existing floor framing - summer beam and joists, December 13, 1979.



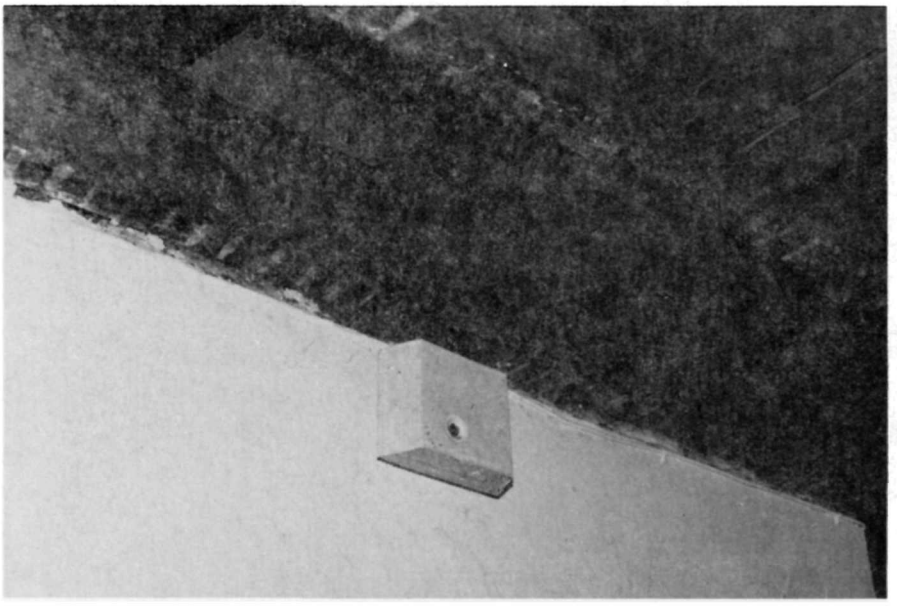
26. Room 105: east wing kitchen. Existing stove in fireplace at west wall. Existing floor framing - summer beam and joists, December 13, 1979.



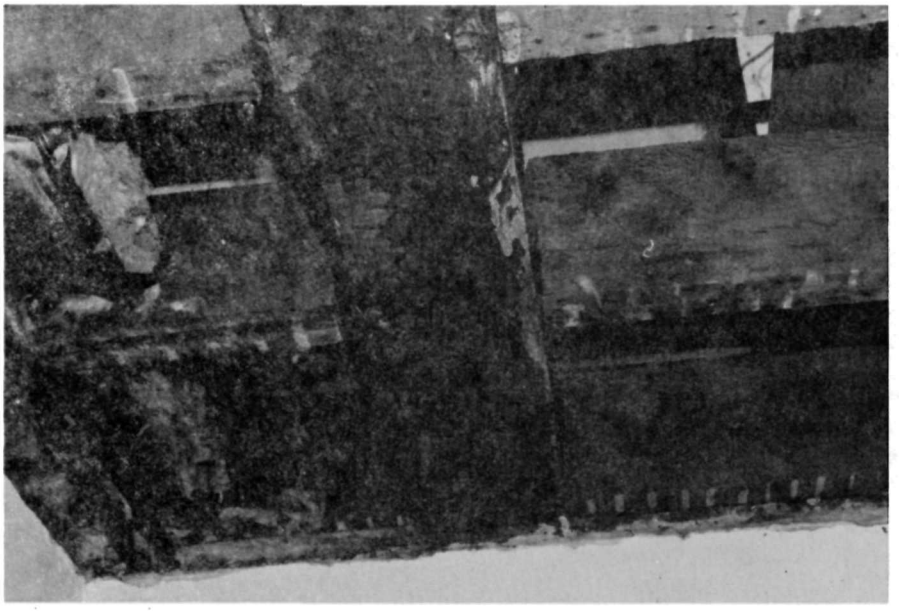
27. Room 105: east wing kitchen. West end of existing floor summer beam pocketed into hearth, December 13, 1979.



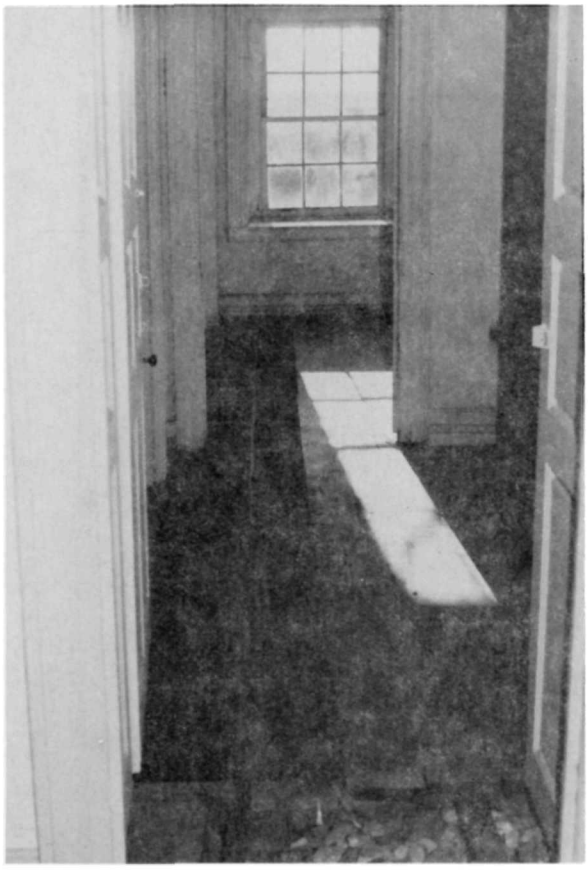
28. Room 105: east wing kitchen. East end of existing floor summer beam pocketed into stone wall, December 13, 1979.



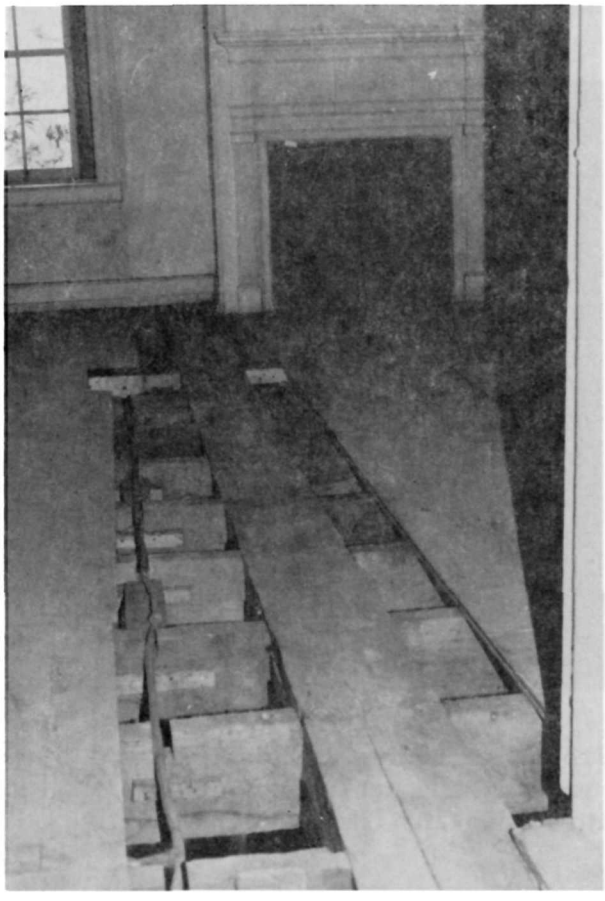
29. Room 105: east wing kitchen. View of existing ceiling summer beam pocketed into west wall above stove, December 13, 1979.



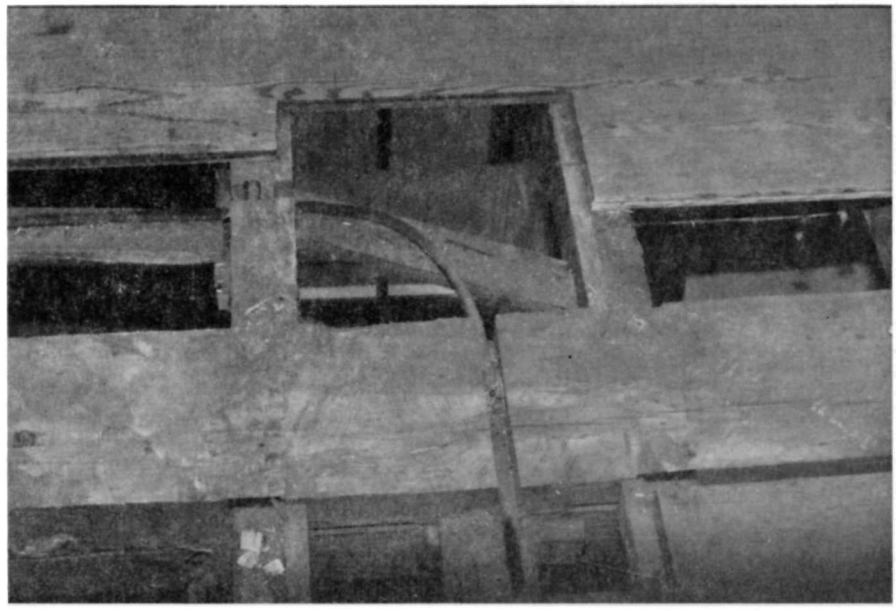
30. Room 105: East wing kitchen. View of existing ceiling summer beam pocketed into west wall, December 13, 1979.



31. Rooms 203 and 201: second floor bedrooms. View south through Doorways 207 and 201. Flooring temporarily removed to expose existing summer beam, joists, and lead water pipe, December 13, 1979.



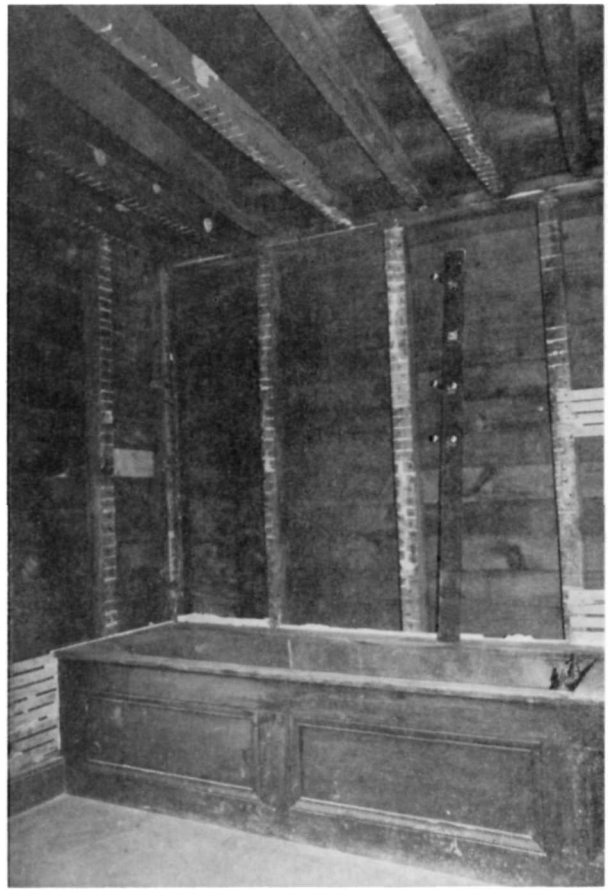
32. Room 205: second floor bedroom. View north through Doorway 209. Flooring temporarily removed to expose existing summer beam, joists, and lead water pipe, December 13, 1979.



33. Room 205: second floor bedroom. Existing load water pipe making turn through floor summer beam; changes direction from north to east towards Room 207, December 13, 1979.



34. Room 205: second floor bedroom. Existing lead water pipe and floor summer beam passing through Doorway 209 from Room 204 (stairhall) into Room 205 (bedroom), December 13, 1979.



35. Room 207: Victorian bathroom. Historic lath and plaster removed to expose existing wall studs and ceiling/roof framing, December 13, 1979.



36. Room 207: Victorian bathroom. Existing ceiling/roof framing above Doorways (1-r) 214, 212, and 213, December 13, 1979.



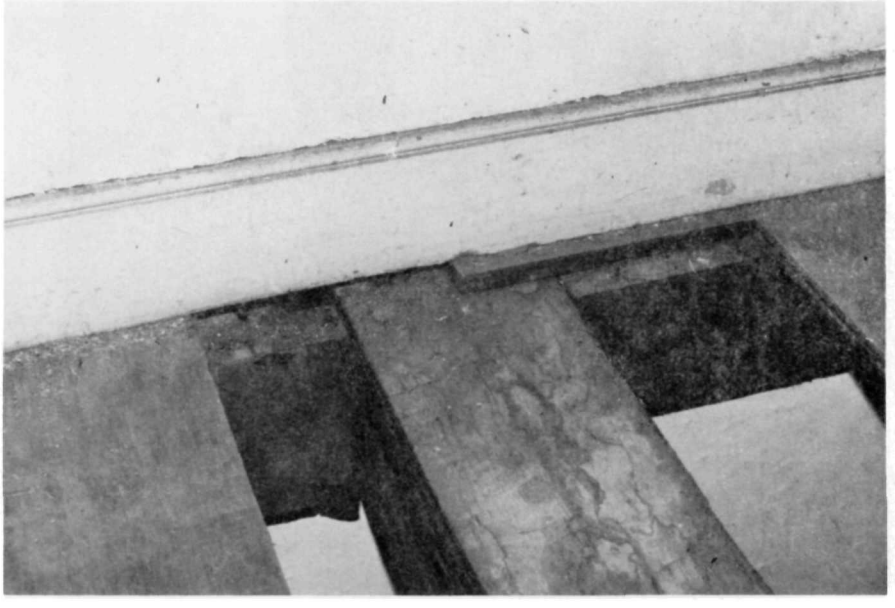
37. Room 207: east wing bedroom. Existing floor summer beam, joists, and lead water pipe exposed for record and inspection. View towards Doorways (1-r) 216 and 215 and northwest corner showing ghost lines in wall plaster of pre-1826 shed roof on the east wing, December 13, 1979.



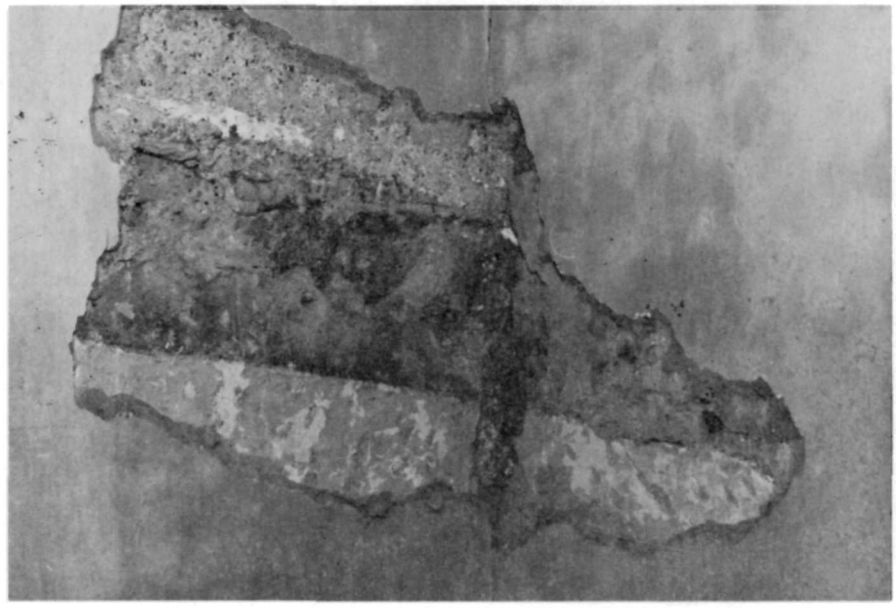
38. Room 207: east wing bedroom. Existing floor summer beam, joists, and lead water pipe exposed. View towards the northeast corner between Doorways (1-r) 215 and 217 and Window 213, December 13, 1979.



39. Room 207: east wing bedroom. Existing lead water pipes (circa 1870?), connections and downflow at closet and Doorway 217, December 13, 1979.



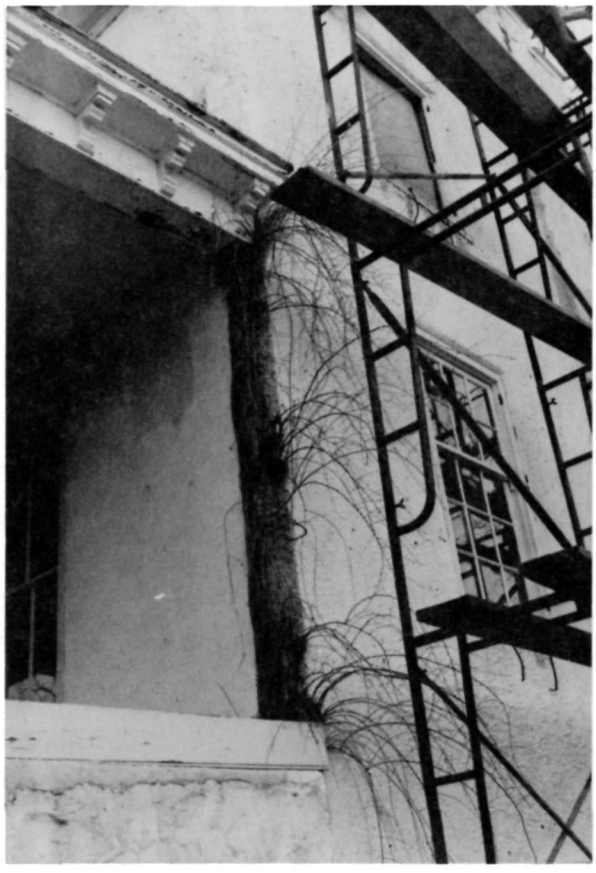
40. Room 207: east wing bedroom. Existing floor summer beam pocketed into east wall. Joists mortised and pegged into summer beam, December 13, 1979.



41. Room 209: east wing bedroom. Existing southeast corner ghost line in wall plaster indicating existence and slope of pre-1826 shed roof on the east wing, December 13, 1979.



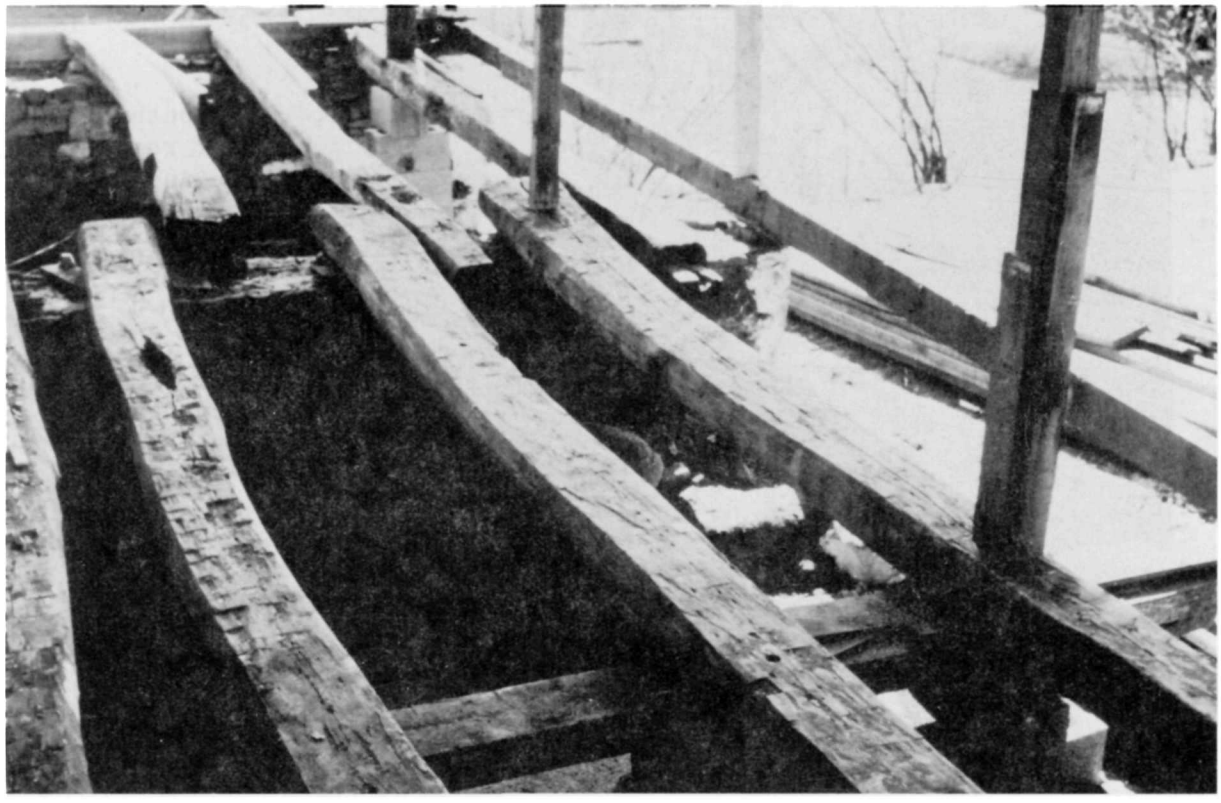
42. Room 209: east wing bedroom. Existing floor summer beam and joists exposed for record and inspection, December 13, 1979.



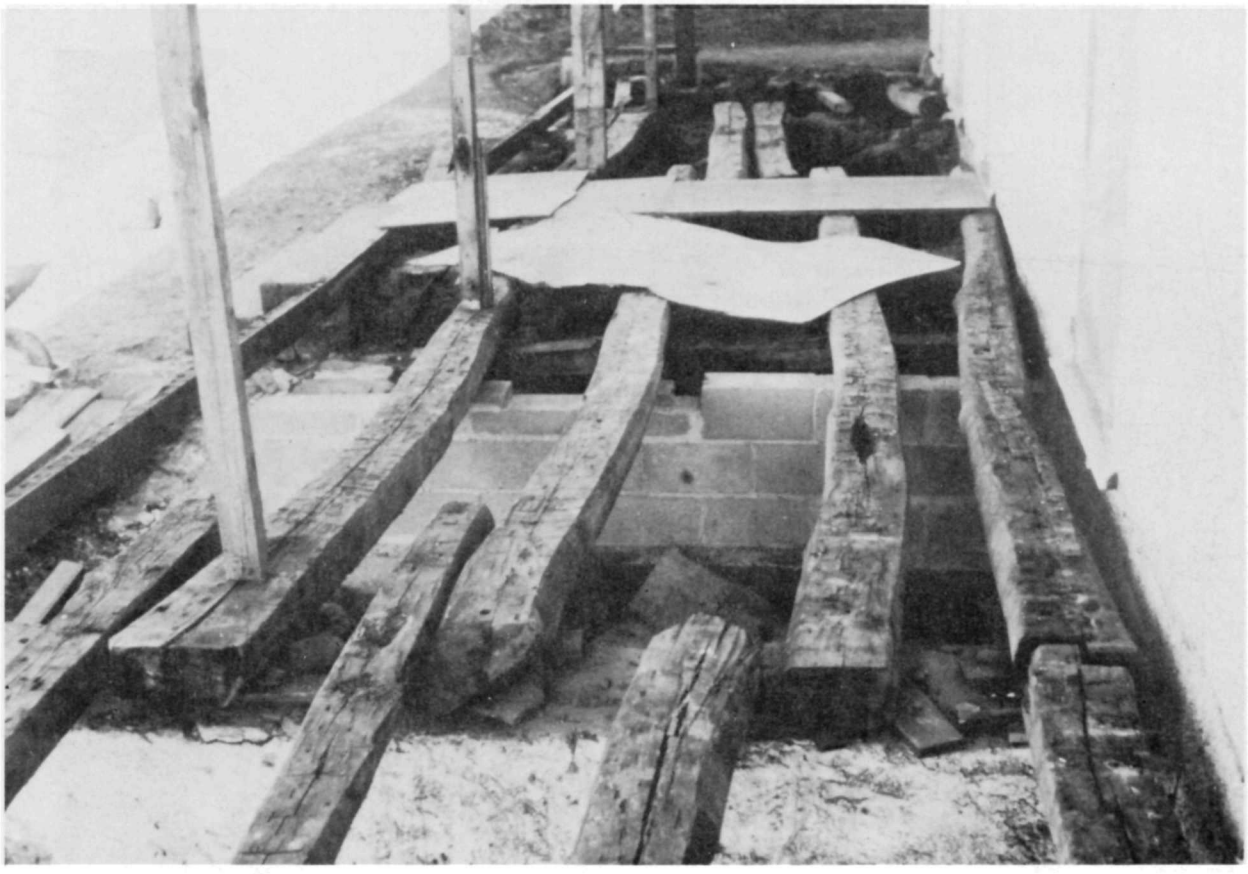
43. Front porch. Southwest corner pilaster removed to expose existing Washington Bower Vine, cause for wood rot in porch box beam, April 1980.



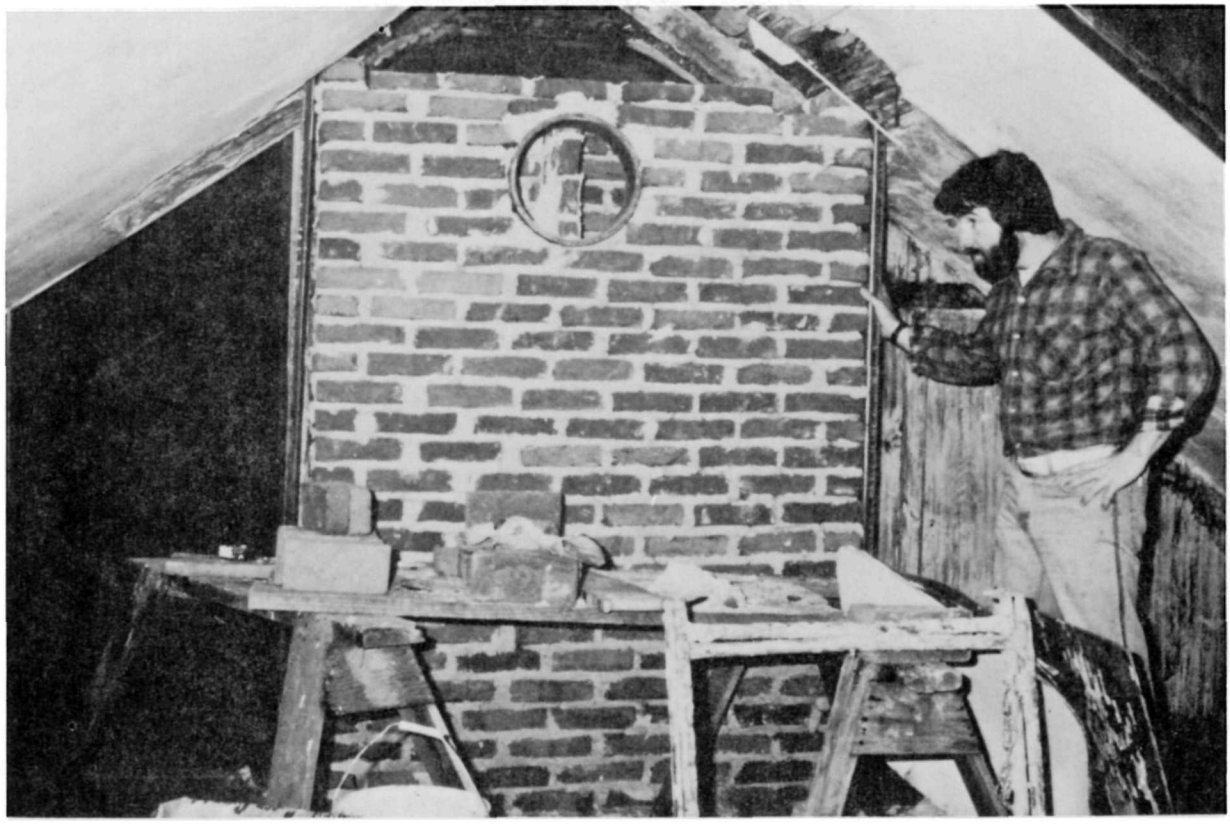
44. Front porch. Existing historic cribbing and stone pier next to new concrete foundation for new concrete masonry unit foundation wall, for support under column 4, April 1980.



45. Front porch. Existing timber floor framing, dating possibly from the porch extensions of 1868-70; exposed for cleaning, brush preservative treatment, and additional framing reinforcement. View south over foundation walls 4, 5, and 6, March 15, 1980.



46. Front porch. Existing timber floor framing, exposed for treatment and additional framing reinforcement. View north along foundation walls 5, 4, 3, 2, and 1. New concrete masonry unit foundation wall to support column 4, April 1980.



47. Room 304: east wing attic. Reconstruction of the east wing chimney from base at attic floor up through roof. Mason Stephen Reisinger standing next to his work, May 1980.



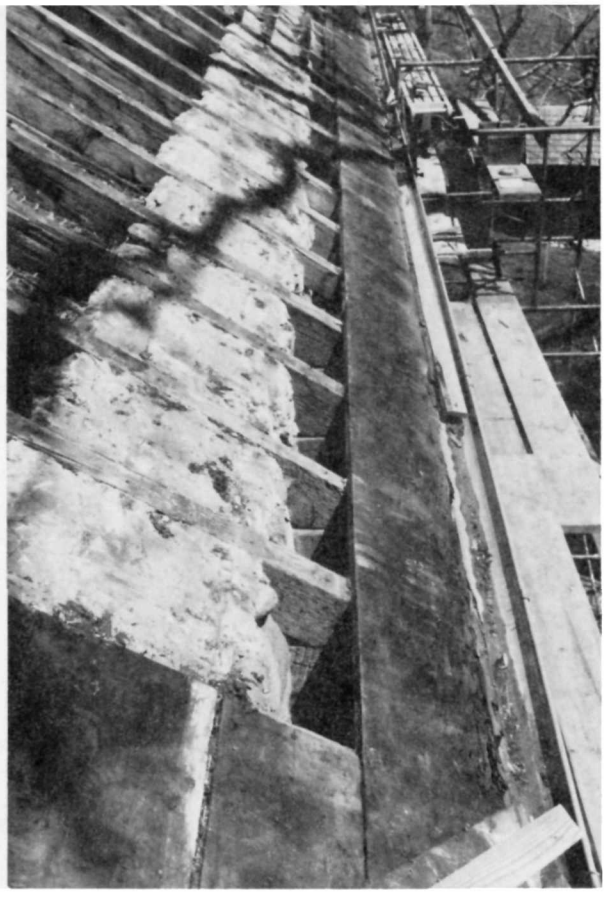
48. East wing roof. South slope exposed, showing existing rafters, collar beams, shingle lath (nailers), lath and plaster, starter board, and gutter. Contractor's field supervisor Stephen Reisinger inspecting existing conditions before restoration work, April 1980.



49. East wing roof. Existing rafter collar beam and nailers at east gable and along ridge, April 1980.



50. East wing roof. Existing rafters, nailers, and starter board at eaves of south slope, April 1980.



51. East wing roof. View along south slope showing existing rafters passing through stone wall into eaves and outrigger of joists. Existing lumber in place as shingle lath (nailer) starter board and as sheathing where east and west wing roofs join, April 1980.



52. East wing roof. View up along rafters of the south slope, exposing interior attic plaster lath and collar beams under ridge line, April 1980.

U.S. GOVERNMENT PRINTING OFFICE: 1984—776-065/4115 REGION NO. 8

As the Nation's principal conservation agency, the Department of the Interior has basic responsibilities to protect and conserve our land and water, energy and minerals, fish and wildlife, parks and recreation areas, and to ensure the wise use of all these resources. The department also has major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.

Publication services were provided by the graphics staff of the Denver Service Center. NPS D-50