Historic Structures Report

De Pere Lockkeeper's House
Government Island
De Pere, Wisconsin

Jennifer L. Lehrke, AIA, LEED AP
LJM Architects, Inc.
813 Riverfront Drive
Sheboygan, Wisconsin 53081

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Introduction

Statement of Significance

The Lower Fox River Waterway System, located along the Fox River between Lake Winnebago and the Bay of Green Bay, is historically significant as a complete and operable example of a river/canal, slack water transportation system dating from the mid-nineteenth century. The De Pere Lock and Dam site is just one of the many components that contribute to this system. While initially envisioned as part of a much larger Fox-Wisconsin Waterway, the Lower Fox River portion is the only remaining system in the State. Not only is this system significant for its roles in the State's transportation history, but also in its evolution in nineteenth century constitutional and political history.

Historic Designations

The De Pere Lock and Dam Historic District was listed in the State Register and National Register of Historic Places in 1993, along with seven other lock and dam sites remaining along the Lower Fox River as part of the Waterway Resources of the Lower Fox River multiple property listing. The De Pere Lockkeeper's House, Lock, Dam, Canal, and Lockshack were identified as a contributing resources within the De Pere Lock and Dam Historic District, which is significant for its contributions to the area of transportation and engineering.

Funding Sources for Study

This Historic Structures Report has been funded by a Preserve America Grant, a National Trust for Historic Preservation Wisconsin Projects Fund Grant, the Fox River Navigational System Authority (FRNSA), the City of De Pere, Celebrate De Pere, the Union Hotel Corporation, the Boyd & Hackbarth families, local residents, and organizations committed to saving the integrity of the De Pere Lockkeeper's House for its enjoyment by future generations.

Sponsoring Individuals & Organizations

This project was commissioned by the City of De Pere Historic Preservation Commission which is comprised of Chair Mary Jane Herber and members Gene Hackbarth, Mike Fleck, Alderperson Paul Kegel, Tom Monahan, Brian Netzel, and Carla Nicks as overseen by the City of De Pere's Director of Planning & Economic Development, Ken Pabich. Gene Hackbarth and Ken Pabich provided primary project representation and were particularly helpful in the day-to-day activities related to the project.

Methodology & Timeline of Study

A Request for Proposals for a Historic Structures Report & Feasibility Study was issued by the City of De Pere's Historic Preservation Commission in June 2010. In July 2010, building site visits were offered to the field of invited consultants and proposals were due. Oral presentations and interviews of three consultants were conducted in August 2010, and LJM Architects, Inc. of

Sheboygan, Wisconsin was selected through this competitive selection process. Project funding was finalized in October 2010, and a contract was executed in November 2010.

However, preparation of a Historic Structures Report is a multidisciplinary task. Therefore, a team was assembled consisting not only of LJM Architects' architect / historic preservation consultant, who served as the project leader and principal author for the report, but also a structural engineer, mechanical engineers, electrical engineer, and other specialists. These disciplines represent the key areas of concern which were to be addressed for this property. The previously assembled information was shared with the sub-consultants in November 2010 in preparation for their December 2010 walk through of the house and site to conduct a survey of existing conditions of building materials and systems. Photographs and field measurements were also taken during this time which were later used to prepare the measured drawings included in this report.

In January and February 2011, additional historical research was conducted, focusing on the building's history, its original construction, and dating later modifications necessary to understand the evolution of the structure and its significance. Paint samples were removed for laboratory testing and analysis to determine original color schemes. Public meetings were held with the Fox River Navigational System Authority and the De Pere Historic Preservation Commission to present initial findings and give a project status report.

Consultation with the Wisconsin Department of Natural Resources began in March 2011 regarding their regulatory authority on the site and their interpretation of the City of De Pere's Floodplain Zoning Ordinance, a critical finding in this study.

As information was gathered, compared, and reviewed throughout the course of the study, the building's significance was continually evaluated, a treatment approach was selected and reviewed with the Wisconsin Historical Society, and work recommendations were developed and reviewed with the Wisconsin Historical Society.

From April through June 2011, the report was written. An initial draft of the report was presented to the De Pere Historic Preservation Commission in May 2011. A final draft was issued in June 2011 for review and comment. A final report will be issued in July 2011 and forwarded for presentation to the De Pere Common Council in August.

Organization of Document

This Historic Structures Report is one part of a two-part study of the De Pere Lockkeepers House; the other portion being an Economic Feasibility Study. A Table of Contents, included at the beginning of the joint document, illustrates the organization of this Historic Structures Report.

Individuals or Consultants Involved in Study

LJM Architects, Inc. would like to acknowledge the following consultants, sub -consultants, and individuals for their involvement and participation in this Historic Structure Report:

LJM Architects served as the primary consultants for this project. Senior Architect and Historic Preservation Consultant, Jennifer L. Lehrke, AIA, LEED AP, served as the project leader and principal author, and was assisted by Intern Architects, Katie Derksen and Bob Short, and Office Manager, Karen Lindow. Jennifer conducted the primary research and personal interviews, compiled data from the sub-consultants, and integrated it into one comprehensive report.

Due to her local familiarity, Laurel Towns, retired curator of White Pillars Museum in De Pere, Wisconsin, was retained by LJM Architects as a Project Research Assistant, scouring local sources of archival information at both White Pillars Museum and the De Pere Historical Society.

Lynn Barber, PE, sole proprietor of Barber Engineering, LLC of Oconomowoc, Wisconsin, rendered the structural assessment of the building and authored the portions of this report pertaining to it.

Ed Oleyniczak, Jr., PE, co-owner of Riverside Engineering & Design, Inc. of Suamico, Wisconsin, assessed the plumbing and fire protection aspects of the project and wrote the portions of the report pertaining to it.

Dale Pearson, PE, sole proprietor of Facility Engineering Consultants, LLC of Green Bay, Wisconsin, rendered the heating, ventilating, and air conditioning assessment of the building and authored the portions of this report pertaining to it.

Bruce E. Cottrell, President of Cottrell Design, Inc. of Green Bay, Wisconsin, assessed the electrical aspects of the project and wrote the portions of the report pertaining to it.

Eco-Manity of Elkhart Lake, Wisconsin was retained by LJM Architects to comment on the feasibility of incorporating renewable energy systems into the project. Certified Site Assessor, Brian Schwaller, rendered the solar electric or photovoltaic assessment of the site and drafted a report. Certified Site Assessor, Jon Prigge, conducted the solar hot water assessment and also drafted a report.

Architectural Conservator, David Arbogast of Arbogast Paint Analysis in Davenport, Iowa, was retained by LJM Architect as the project's paint analyst and authored the portions of this report pertaining to his work.

U.S. Heritage Group of Chicago, Illinois was contracted by Janke General Contractors of Athens, Wisconsin during their 2010 stabilization of eight lockkeeper's houses along the Lower Fox River. Tom Glab, Laboratory Manager, performed that project's mortar analysis, and his report was incorporated into this document.

Parameters and/or Limitations of Study

Information contained in this report documents existing conditions and information available to LJM Architects during the preparation of this report from November 2010 to June 2011. That information served as a basis for the recommendations made herein. As additional information becomes available

and as work is undertaken on the structure, the report should be supplemented and amended.

Areas of Future Study

This report does not constitute a complete history of the Lockkeeper's Houses. This report provides a broad overview of many topics in one publication. It is intended to be a work in progress that can lead to future research and can be updated over time as new information is collected, as future preservation projects are undertaken, and as potential future uses for the buildings are developed. This is a living document and the beginning of an ongoing historic preservation effort that will continue for years to come in the communities along the Fox River.

Acknowledgements

LJM Architects, Inc. would like to thank the following persons or organizations for their assistance in completing this report:

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Michael J. Walsh, Mayor
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Ken Pabich, Director of Planning & Economic Development
David R. Hongisto, Building Inspection & Zoning Administrator

De Pere Historic Preservation Commission

Gene Hackbarth
Mary Jane Herber, Chair
Mike Fleck
Paul Kegel, Alderperson
Tom Monahan
Brian Netzel
Carla Nicks

Fox River Navigational System Authority

Harlan Kiesow, CEO

Fox-Wisconsin Heritage Parkway

Christine Williams, Chair of Historic & Cultural Resources Committee

Wisconsin Department of Natural Resources

Richard J. Koch, Floodplain/Storm Water Specialist

Wisconsin Historical Society

Jim Draeger, Deputy State Historic Preservation Officer
Chip Harry L. Brown, III, Government Assistance & Training Specialist
Mark Buechel, Preservation Architect

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Kevin Bokay, Librarian (St. Paul District Office)
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Linden & Delores Burt, Retired Lockmaster & Wife
Dave Haefs, Fox-River Sub-Office
Karen Krepps, District Archeologist (Detroit District Office)
Ross R. Plainse, Retired Project Engineer
Brian & Maxine Ruechel, Descendant of Deceased Lockmaster & Wife
Lee Vosters, Retired Lock & Dam Supervisor

Developmental History

Methodology of Research

Due to their involvement in the 2010 stabilization of eight Lockkeeper's Houses along the Lower Fox River, LJM Architects had already done a bit a research and had accumulated archival documentation and previous reports on the De Pere Lockkeeper's House prior to being awarded the contract. These documents included the only extant sheets of the U.S. Engineer Office's 1911 plans entitled "Fox River, Wisconsin Lockmaster's Dwelling to be erected at De Pere Lock;" the "De Pere Lock and Dam Historic District" *National Register of Historic Places Registration For*m prepared by John N. Vogel in 1991; the "De Pere Lock and Dam, Lockkeeper's Residence" *Historic American Engineering Record* prepared by Great Lakes Archaeological Research Center, Inc. in 1995; the *WisDOT Economic Recovery Solicitation, Transportation Enhancements Application* for the Waterway Resources of the Lower Fox River, 1850-1941, prepared by the Fox River Navigational System Authority around 2009; and the *State of Wisconsin, Department of Transportation, Plan of Proposed Improvement, Rehabilitate Lock Keeper Houses* prepared by Omnni Associates, Inc. in 2010.

From January through February 2011, additional historical research was conducted, focusing on the building's history, its original construction, and dating later modifications necessary to understand the evolution of the structure and its significance.

Laurel Towns, a local historian and retired curator of White Pillars Museum, was brought aboard to conduct research and locate historic photographs at the De Pere Historical Society and White Pillars Museum archives which unearthed numerous newspaper accounts about the De Pere Lock & Dam and its lockmasters and several archive photographs.

Personal interviews were conducted by Jennifer Lehrke. Linden Burt, the last De Pere lockmaster, along with his wife, Delores, and U.S. Army Corps of Engineers retired head carpenter, Mike Arnoldussen, provided insight into the alterations that were done to the building in the winter of 1973-1974. Brian Ruechel, the son of Harold Ruechel, the lockmaster prior to Linden Burt, was raised in the house and lived their until his marriage to Maxine Ruechel. Brian and Maxine provided insight into the condition of the house prior to the 1973-1974 remodeling, and Brian also provided insight into the 1960s remodeling of the kitchen. This information proved to be very useful in developing and confirming the chronology of changes to the structure.

Sanborn Fire Insurance Maps were procured via a Certified Sanborn Map Report from Environmental Data Resources, Inc. in Milford, Connecticut.

Information held at the Fox River Navigational System Authority, the Kaukauna office of the U.S. Army Corps of Engineers, and the Wisconsin Historical Society was explored, and *Annual Reports of the Chief of Engineers* from 1911 through 1983 held in the federal depository at the Milwaukee Public Library were also reviewed but yielded little new information.

As information was gathered throughout the course of the study, it was compared and reviewed to other sources and to the existing conditions to arrive at the developmental history described on the proceeding pages.

Historical & Cultural Significance

While the focus of this report is the Lockkeeper's House, a brief history of Wisconsin's inland waterway transportation and, more specifically, the De Pere Lock & Dam site is worthwhile to understand the house in its broader historical and cultural context. In 1673, Marquette and Joliet discovered the Upper Mississippi River via the Wisconsin and Fox Rivers, thereby thrusting Wisconsin's internal network of lakes and rivers into importance, carrying explorers, fur traders, and missionaries into the area.[1]

However, not all of Wisconsin's waterways were navigable throughout the course of the year. During the winter, the inland rivers and lakes froze over, and in the spring massive ice flows made water travel dangerous. The Lower Fox's rapids also presented serious obstacles to river navigation.[2]

From the 1820s through the 1850s, settlers poured into the region via these water highways, and commercial trade to newly established commercial centers along the Mississippi River and Lake Michigan grew. As few roads were suitable for long-distance hauling and railroads were not built until the late-1850s, waterways were the cheapest and most efficient means of getting lead, agricultural products, timber, and other goods to market. Inspired by the 1825 opening of the Erie Canal in New York State, Wisconsin's businessmen and farmers demanded similar improvements to the state's network of rivers and lakes.[3]

Although never reaching the peak of canal construction activity that was seen in other states, such as New York, New Jersey, Pennsylvania, Ohio, and Indiana, several projects were undertaken in Wisconsin, primarily to get lead mined in the southwestern portion of the state to ports along Lake Michigan and beyond to Buffalo, Philadelphia, and New York. By 1837, two viable routes surfaced: one by means of the Fox and Wisconsin rivers to Green Bay and the other by means of the Milwaukee and Rock rivers to Milwaukee. While the later failed due to lack of legislative support and funding problems, the former was more successful.[4] A map of the waterways is included in the appendix.

In 1835, a channel deep enough for a canoe was excavated. However, additional work on improving the canal the following year was abandoned due to high water. While the Fox-Wisconsin system floundered for the next two decades, several improvements were noted at certain sites. The first dam in De Pere was built by the Fox River Hydraulic Company in 1837 and included a small 100-foot long by 20-foot wide lock. Little else is known about this lock and dam.[5]

In August of 1846, the United States made its first attempt to improve the Fox River via an Act of Congress granting land to the State of Wisconsin to provide a canal between the Fox and Wisconsin Rivers. Around 1849 or 1850, a second canal was started, just north of the 1835 canal, and in 1850, a 140-foot long by 35-foot wide lock was built at the present lock location. However, the canal was abandoned again due to problems between the state and the contractor.[6]

A July 1853 charter by the Wisconsin legislature created the Fox and Wisconsin River Improvement Company to complete the canal. Efforts to improve river navigation were made including dredging, construction of locks to carry vessels through the rapids, and construction of dams to maintain adequate water levels. Within three year's time, a navigable canal was completed so that the small steamer, the *Aquila*, voyaged from Pittsburgh via the Ohio River to the Mississippi River and then through the Wisconsin and Fox rivers to Green Bay. In August 1866, the Fox and Wisconsin River Improvement Company was sold to the Green Bay & Mississippi Canal Company, and the De Pere lock was lengthened to 165-feet in 1869.[7]

Inland water transportation soon faced stiff competition from the railroads which had extended through the Fox River Valley to Green Bay by 1862. While some freight and passenger service was diverted, river traffic along the Lower Fox River persisted as a result of the area's expanding grain, woolen mills, and wood-related industrial bases.[8]

Through an initial Act of Congress in July of 1870 and a final Act of Congress in September of 1872, the United States government bought out the Green Bay & Mississippi Canal Company and took control of the improvements along the Fox River. However, water rights remained with the State of Wisconsin. The River & Harbor Act of March 1873 outlined the United State's first improvement plan for the Fox River which authorized repair and replacement of existing improvements along the Fox and appropriated funds for the construction of additional locks and dams to further improve its navigational system; this work was completed in June 1876. A one and one-half story front gabled house was built in 1879 on the east side of the canal to house the government's local lockmaster.[9]

As river navigation was improved, river traffic grew. The steamboat became a prominent means of freight and passenger transportation on Wisconsin waterways, particularly in areas where timber was available to build them. Excursion steamboat trips became popular on many of Wisconsin's inland lakes and rivers during the 1870s and 1880s.[10]

A completely new lock, 170-feet long by 35-feet wide, was built in De Pere in 1896. A new two-story Dutch Colonial Revival style house was built on the dyke between the canal and the river in 1912; the former lockmaster's house was converted into the extant lockshack and housed the administrative functions of the lockmaster.[11] A plan of the De Pere Lock & Dam site is included in the appendix.

Economic activity along the Fox and Wisconsin rivers steadily declined after World War I as commerce turned to other transportation means such as railroads, automobiles, trucks, and planes. Bustling lake and river ports, particularly in the Fox River Valley, declined in importance. Despite this, the existing dam was rebuilt between 1929 and 1930, and the lock was rebuilt shortly thereafter. The upper half of the extant lock was rebuilt from 1934-1935, and the lower half was rebuilt from 1935-1936, creating the 36-foot wide by 146-foot long chamber which exists today. This work included cutting away of the bedrock floor to lower it, pouring concrete chamber walls, and widening the backing of the chamber walls with rock taken from the chamber floor.[12]

In these days, commercial boating traffic along the Lower Fox River, which connected the Bay of Green Bay to Lake Winnebago, was still a vital link for industries in all the communities in between. While the locks at De Pere and Neenah were the most used facilities along the Lower Fox River, commercial traffic, mostly boats containing coal to power upstream industries, began to decrease in the 1950s, causing the federal government to close the Upper Fox River to navigation in 1951. As a first step in their move to eventually abandon the Lower Fox River system, the Corps of Engineers began making changes to operate more efficiently and save money. In 1955, a system of roving locktenders, headquartered in Kaukauna, was implemented to service the locks between Menasha and De Pere when the resident lockmasters were off duty. The coal boats stopped running between 1959 and 1962, and the system's primary use was for recreational purposes.[13]

Many improvements were made at the site in 1974, including minor improvements to the lock, the construction of a two-car garage for storage purposes on the landward site, and numerous alterations to the house.[14]

However, the Lower Fox River's system of lockkeeper's houses, including the De Pere Lockkeeper's House, was abandoned by the Corps of Engineers in October 1983. Gradually, the remains of Wisconsin's inland water transportation history fell into disrepair. In an effort to document the site and promote its future preservation, the De Pere Lock and Dam Historic District was listed in the National Register of Historic Places in 1993, along with seven other lock and dam sites along the Lower Fox River, for their significance as a complete and operable example of a river/canal, slack water transportation system dating from the mid-nineteenth century. While initially operated as part of a much larger Fox-Wisconsin Waterway, the Lower Fox River portion is the only remaining system in the State. Not only is this system significant for its role in the State's transportation and engineering history, but also in its evolution in nineteenth century constitutional and political history.[15]

Architectural Significance

The De Pere Lock and Dam Historic District is significant under National Register Criterion A and C for its role in Wisconsin's transportation history and engineering. The Historic District comprises the following contributing resources: 2 contributing buildings (Lockshack and Lockkeeper's House), 3 contributing structures (De Pere Lock, Dam, and Canal), and 2 non-contributing resources (Storage Shed and Garage). A site plan showing the relationship of each resource to the Lockkeeper's House is included in the appendix.

The De Pere Lockkeeper's House, a contributing resource within the District, is an example of the Dutch Colonial Revival style, which is less formal than its Colonial and Georgian Revival predecessors. Examples of the style are most easily identified by a gambrel roof, occasionally ending with flared eaves. Clapboard, shingles, brick, and stone materials are commonly used in combination on the exteriors to give a picturesque quality. On larger homes, the symmetry of the style is often offset by a small wing on either or both sides of the gabled ends. The style was especially popular for small-scale residences in early twentieth century suburbs.

The De Pere Lockkeeper's House features the character-defining gambrel roof with flared eaves. Exterior materials are used in combination, including cream

colored stone at the foundation and basement; red brick at the first floor; and green painted wood shingles at the front and back porches, second floor gambrel ends, and dormers.

Period of significance is the length of time a property is associated with the important historic activities which qualify it for National Register listing. As the house is an integral component of the overall site, the period of significance for the De Pere Lockkeeper's House begins with its construction in 1912 and ends in 1936 when the lock was rebuilt for the last time, signifying the last major improvement to the site by the U.S. Army Corps of Engineers.

Chronology of Ownership, Construction, Alterations & Use

Ownership & Management

The history of ownership of the De Pere Lock & Dam site has predominately involved the State of Wisconsin and the United States government. From August of 1846 to July of 1853, the De Pere Lock & Dam site was owned by the State of Wisconsin. The Fox & Wisconsin Improvement Company, chartered by Wisconsin legislation, owned the site from 1853 to August 1866 when it was sold to the Green Bay & Mississippi Canal Company. The United States government took control of the site in September of 1872, and the lock and dam was operated by the U.S. Army Corps of Engineers for well over a century.[8] In September of 2004, the State of Wisconsin took ownership of the De Pere Lock & Dam, as well as sixteen other lock sites along the Lower Fox River, and the Fox River Navigational System Authority was created to refurbish and manage the system of locks.[16]

While it is important to understand the history of ownership, it is also important to understand the individuals who operated the De Pere Lock and lived fulltime at the site. A *lockmaster* was stationed at each government-owned dam along the Fox River. There were nine dams along the Lower Fox River: Menasha, Appleton, Cedars, Little Chute, Combined Locks, Kaukauna, Little Kaukauna, Rapid Croche, and De Pere. There was also lock at each of the dams and eight additional locks along the Lower Fox River. A lockmaster was required to live in the government-owned house at the lock and dam sites and take care of the grounds. A lockmaster had to have mechanical skills in the operation of the dam and lock. Many of the lockmasters were former farmers, as they not only had the required mechanical aptitude, but were also accustomed to living in rural or remote areas. A lockmaster worked throughout the year and day and night to open and close the sluice gates at the dam when necessary. A *locktender* was hired seasonally from May though October to assist a lockmaster and operate some of the eight additional locks.[17]

Little is known about the history of the De Pere lockmasters early in the lock's history. Newspaper accounts claim that the first lockmaster was a man by the name of Mr. Wilson who was followed by a Mr. Mitchell, who went on to become a lighthouse tender at Long Tail Point between Green Bay and Suamico along the shores of the Bay of Green Bay. Then there was a Captain Sutherland. John N. Paige was the De Pere lockmaster from 1866-1872, who was followed by a Mr. Mead or Weed who was studying ministry at Lawrence College in 1873. A Mr. Johnson served for part of the 1874 season and was succeeded by a Mr. Aldice or Aldis Blanchard who served as lockmaster from 1874-1875.[18]

The following is a chronological list and brief biography of the remaining lockmasters who at one time lived in the De Pere Lockkeeper's House.

John M. Paige, 1875-1923

John M. Paige was born in De Pere, Wisconsin in 1859, the son of John N. Paige who served as the De Pere lockmaster from 1866-1872. Having been raised around the locks, John M. Paige became lockmaster at the De Pere site in 1875 when he was just 16 years old. He was married in 1911,[19] and was the first to occupy the new Lockkeeper's House when construction was completed in late-July or early-August of 1912.[20]

Ripley Richards, 1923-1930

Ripley Richards was born in 1890 and raised in Oshkosh, the son of steamer captain, Warren Richards. He was appointed lockmaster for De Pere on May 1, 1923 when he, his wife, Elsa, and his daughter, Ena, moved into the Lockkeeper's House.[21] On August 1, 1930, Ripley Richards was promoted to master in charge of the Appleton 1 lock and warehouses by the U.S. Engineering Department, replacing his father-in-law, Axel Fahlstrom, who served there for over 25 years.[22]

Edward Zuehls, 1930-1942

Edward Zuehls was born in Princeton, Wisconsin on February 13, 1885. Since 1909, he worked for the government in various capacities. On September 27, 1917, he married Miss Velma Clark, the daughter of Leslie A. Clark, the Little Rapids lockmaster. Edward Zuehls was employed on the U.S. dredge *De Pere* when he was promoted to the lockmaster position in De Pere in August of 1930. He, his wife, and his son, Merlin, moved into the house soon thereafter. Edward Zuehls was also active in the community as a member of the De Pere lodge of Masons, the Odd Fellows lodge, and the Congregational Church. He died suddenly of an apparent heart attack on August 22, 1942 at the age of 57; Harry Kemnitz was a pallbearer.[23]

Harry Kemnitz, 1942-1948

Harry Kemnitz was born in 1885 in Green Bay where he was also raised and made his home. He served as a derrick operator and master of several dredges for the U.S. Engineers Office for 29 years before being appointed to the De Pere lockmaster position in October of 1942 when he and his wife moved into the house. He drowned on November 24, 1948 after accidentally stepping off the lock on his way home.[24]

Anton J. Coppus, 1949-1957

Anton Coppus served as a locktender at Little Chute and lockmaster at the White River lock before succeeding the late Harry Kemnitz as the De Pere lockmaster in 1949. He, his wife, and his daughter, Shirley, moved into the house in late-February or early-March of 1949.[25]

Harold A. Ruechel, 1957-1973

Harold A. Ruechel was born on July 7, 1913 and was raised in Oshkosh. He

Four Employes of the Appleton Project Office of the Chicago District, Army Corps of Engineers received awards recently for service. From left are John G. Wald, Kimberly; Harold Ruechel, De Pere; Henry Mau, Kaukauna; Leroy Vosters, Appleton, and Ross Plainse, Appleton. Ruechel received a 30-year service emblem, while Wald and Vosters were honored for 10 years. Mau received a cash award for an adopted suggestion. Plainse presented the awards to the men. He is project engineer at Appleton and represented the Chicago District engineer. (Post-Crescent Photo)

began working for the federal government in 1937 when he served as a locktender under the direction of the lockmaster in Menasha. He, his wife, and his son, Brian, moved into the De Pere Lockkeeper's House in 1957 after being promoted to lockmaster there. He retired in October of 1973, and died at the age of 87 in January of 2001.[26]

Linden Burt, 1974-1983

Linden Burt started as a locktender in 1965. After being promoted to lockmaster, he, his wife, Delores, and six of their seven children moved into the De Pere Lockkeeper's House in April of 1974. Numerous modifications were made between 1973-1974 to accommodate the number of children who would be living in the house. When the lockmaster positions were eliminated and the Lockkeeper's Houses were abandoned in 1983, he transferred to a government position in Sault Sainte Marie, Michigan for three years before retiring and relocating back to the rural De Pere area.[27]

Design & Construction

Plans for this two-story Dutch Colonial Revival style Lockkeeper's House were prepared in 1911 under the direction of Major G.S. Bromwill by L.M. Mann, Assistant Engineer at the U.S. Army Corps of Engineers office in Oshkosh.[28] While it is believed that the construction documents consisted of a set of four sheets, only sheets three and four could be located during the course of this study. They are included in the appendix.

Bids for the construction of the house were opened on January 2, 1912, and a contract was executed within weeks to carpenter Peter Francken and mason John J. Broekman for $3,100. The house was sited a narrow dyke of land, sometimes referred to as Government Island, on April 4, 1912, and construction took place between April and August of 1912.[29]

The house featured a full basement with a rainwater cistern in the northeast corner. On the first floor, one entered the house from a central, open air porch into the living room which was situated in the southwest corner of the house. Because the De Pere site was unique in that it had a separate Lockkeeper's Shack, the house had a formal dining room in the southeast corner in lieu of an office. In the central portion of the east side of the house was the staircase that connected the basement, first, and second floors and also provided a side entrance for the house. Occupying nearly three quarters of the northeast side of the house was the kitchen; a pantry was located in the northwest corner. Off of the kitchen was the back porch which contained the rear entrance and a coat closet. Upstairs, the house held a bathroom in the southeast corner. Three bedrooms were located in the remaining corners, each with their own small closet. Typical of houses of this time, it is assumed that the house did not originally have running water and was originally heated with a series of wood or coal fired stoves which were connected to the central chimney.

Alteration & Use

The Rabbideau Hardware Company installed a centralized hot air heating system in the house in 1926.[30] According to a sketch prepared by the U.S. Engineer Office in Appleton, the system was a large gravity fed unit, commonly called an *octopus*, with a large firepot and several large diameter ducts spanning in all directions across the basement ceiling.[31] This furnace

was presumably fueled by coal which was delivered by barges to various industries along the Fox River's lock system. As such, a small coal storage room was built in the southeast corner of the basement.

In 1927, the De Pere Lockkeeper's House was modernized with running water and baths.[32]

Similar to the other four Dutch Colonial Revival style Lockkeeper's Houses, the original open front porch was enclosed at some point in time, and that time has been a point of speculation in prior studies. Based on comparison of the background buildings in the archive photos to the Sanborn Maps, we can point to a range of time between 1930 and 1952 when this porch was enclosed. Knowing that construction work at the Lockkeeper's Houses was often undertaken during the fall to spring off-season when one lockkeeper was replaced by another, we hypothesize that the porch may have been enclosed between the fall of 1948 and the spring of 1949.

It is also believed that this cistern was vacated around this time, but certainly prior to 1957 when the Ruechel family reported that the space had been previously outfitted with a door and shelves and was used as their canning storage room.[33]

Between 1960 and 1964, the coal-fired gravity fed heating system was replaced with a new oil burning furnace and a 275-gallon oil storage tank. The former coal storage room was converted into a storage room and workshop and outfitted with a workbench.

It was also around this time period that the Ruechel family reported other modifications: the living room was carpeted, all of the windows throughout the house were replaced, and the kitchen was remodeled into a kitchenette which included new cabinets and a 12-inch square acoustical tile ceiling. The former pantry in the northwest corner was removed, a line of cabinets was placed along the west wall with the kitchen sink overlooking the river, and vinyl flooring was installed in this area. The former formal dining room in the southeast corner of the house was used as the lockmaster's personal office.[34]

In the winter of 1973 and 1974, the U.S. Army Corps of Engineers funded $14,000 in modernizations to the house, stripping the interior of its historic finishes. With the exception of the stairway, all of the original interior trim was removed and replaced with ranch casings. Nearly all of the original interior doors were replaced with hollow core flush veneer doors with new hardware. The floors were covered with wall-to-wall carpeting, the walls were either wallpapered, paneled, or both, and two-foot by four-foot acoustical panel ceilings were dropped in all the rooms except the kitchenette. It was reported by the Burt family that original dining room was subdivided to create a front closet, hall, and bathroom so that the former upstairs bathroom could be converted into a bedroom to aid in accommodating six of the Burt's seven children. The new bathroom's windows were made smaller or filled in.[35]

Similar to the other lock sites, the De Pere Lockkeeper's House was vacated in October 1983 and all but abandoned by the Corps of Engineers. According to the Ruechel family, the west side of the island has eroded significantly; there used to be a beach along the Fox River behind the house. When habited, the grounds were immaculate with flower beds throughout.

Supporting plans and elevation illustrating the chronology of alterations to the house are included in the appendix.

Prior Studies or Treatment Efforts

After seven years of sitting vacant, the building was in a state of disrepair. In 1990, Rockland resident, Dorothy Wozniak, invested $2,000 to paint the building's wood shingle siding and trim and install painted plywood over the windows to make the house lock as though it was occupied.

The De Pere Lockkeeper's House was included in the Lock and Dam Historic District which was listed in the National Register of Historic Places in 1993.

This same year, a *Report of Asbestos Inspections* was issued by Environmental Science & Engineering, Inc. of Williamston, Michigan who had performed inspections and testing at several lockmaster dwellings, including the one at De Pere. This report was included by reference in a 2000 *Fox River Environmental Baseline Assessment & Phase I Environmental Assessment Report* by Barr of Minneapolis, Minnesota which is available at the FRNSA office in Kaukauna, Wisconsin.

By 2000, the paint had faded, the roof was leaking, and the gutters had failed causing the eaves to rot. The house was again in a deteriorated state. With the Corps of Engineers either unable or unwilling to maintain the building, the De Pere Main Street Program, the De Pere Historical Society, and Dorothy Wozniak stepped in to organize the Locktender's House Repair Project, which raised nearly $4,000 from community residents to hire Marty Wyman of Ocean Sprey Painting & Restoration of De Pere to make repairs to the building. A hole in the roof was closed, and the roofing was patched. The gutters were removed and replaced, and rotted portions of the eaves were removed and replaced with new wood. The building's wood shingles, trim, and plywood window panels were re-painted.

Another decade passed, leaving the building in a deteriorated condition once again. The FRNSA successfully prepared the *WisDOT Economic Recovery Solicitation, Transportation Enhancements Application for the Waterway Resources of the Lower Fox River, 1850-1941* and obtained funding to stabilize the exterior of eight Lockkeeper's Houses along the Fox. Schematic plans and specifications were prepared for the project by Omnni Associates, Inc. which established the work scope to be undertaken at each house, as well as the construction techniques and building materials that were to be utilized in the stabilization project. Several character-defining elements were identified which were common across all the sites such as masonry, wood, roofs, windows, and entrances and porches as well as certain health and safety considerations. As the features of the houses were similar, the scope of work, materials, methods, and preservation approach was unilaterally applied across all the sites. In general the approach taken was to preserve the existing features. Features that could be repaired were repaired; features which were deteriorated were replaced in-kind with like materials; and only a few items necessitated complete reconstruction.

The 2010 stabilization work conducted at the De Pere Lockkeeper's House included the replacement of a porch pier; stabilization of the rear entry foundation; removal of a small deck at the rear entry; removal and in-kind replacement of deteriorated wood framing, sheathing, and shingles at the rear

entry; repointing of the brick walls and chimney; removal and in-kind replacement of deteriorated wood shingles, trim, soffits, and fascia; installation of custom wood shutters; new gutters and downspouts; and new asphalt shingle roofing.

Historic Documents, Maps, Illustrations & Photographs

The following historic documents, maps, illustrations, and photographs are included in the appendix.

Sanborn Fire Insurance Maps were procured via a Certified Sanborn Map Report from Environmental Data Resources, Inc. in Milford, Connecticut. Three flaws in these maps should be pointed out.

- With regards to the front porch, it is shown on the 1914, 1925, 1946, and 1953 maps to be off center and much larger. Based on archive photographic evidence and comparison to four other Lockkeeper's Houses that were built in this prototypical Dutch Colonial Revival style, we know this to be inaccurate. The front porch was always centered on the south façade, and its footprint was basically the size that it is today.
- The front porch is also shown dashed in all four of these maps indicating that it was an open air porch. Based on comparison to the other four Dutch Colonial Lockkeeper's Houses, we know that they all began as open porches, but were systematically enclosed at some point in time, and that time has been a point of speculation in prior studies. Based on comparison of the background buildings in the archive photos to the Sanborn Maps, we can point to a range of time between 1930 and 1952 when this porch was enclosed, making the 1953 map inaccurate in this regard and perhaps the 1946 map, too.
- With regards to the back porch, it is not shown on any of the maps associated with the house. As a wall section of the rear entry was found in the 1911 construction documents which corresponds to the existing rear entry, we believe that it was built in 1912 with the house.

Portions of the original U.S. Engineer Office's 1911 construction documents entitled "Fox River, Wisconsin Lockmaster's Dwelling to be erected at De Pere Lock" were located at the Fox River Navigational System Authority's office in Kaukauna, Wisconsin. It is believed that the original set contained four sheets. However, only sheets three and four remain. Sheet three contains a side porch elevation, a sectional elevation showing staircase, a half sectional elevation showing roof and dormer framing, and full scale details of much of the original porch, stair, trim and other components. Sheet four contains several door elevations, window elevations, full scale door and window frame details, and other components. These sheets proved to be very accurate and were invaluable in evaluating which elements and features were original and which were not.

As an example of the missing floor plans and elevations that would have been obtained from sheets one and two, the 1926 construction documents for the similar Dutch Colonial Revival style Cedars Lockkeeper's House are included.

Seven archive photographs were obtained from the De Pere Historical Society depicting the lock and house over time, including a wonderful close up shot of

the original front porch from the 1920s. Unfortunately, many of the photos are not dated. Where applicable, the background structures were compared to Sanborn Maps to attempt to hone in the dates.

To illustrate the chronology of alterations to the De Pere Lockkeeper's House, LJM Architects produced floor plans and elevations to depict the conditions of the house from 1912-1948, 1949-1960s, 1960s-1973, and 1974-2010.

The "De Pere Lock and Dam Historic District" *National Register of Historic Places Registration For*m prepared by John N. Vogel in 1991 was obtained from the Wisconsin Historical Society. While it contains very little information about the Lockkeeper's House, it does provide additional insight into the lock, dam ,and other structures on the site and contains a sketch map of the site, maps, and photos of the structures from 1988.

The "De Pere Lock and Dam, Lockkeeper's Residence" *Historic American Engineering Record* prepared by Great Lakes Archaeological Research Center, Inc. in 1995 was located online at the Library of Congress' website, www.loc.gov/pictures/item/WI0608. It provides a somewhat accurate narrative description of the exterior of the building and exterior photos of the house from 1995. However, the interior description and associated floor plans depict original conditions prior to the mid-1960s and not conditions as the building existed in 1995. It is assumed that Great Lakes was not granted access to the interior of the building to confirm the existing conditions.

Architectural Description

Methodology of Evaluation

The Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring & Reconstructing Historic Buildings has developed a historical overview of exterior building materials and features, building interiors, and other requirements. In addition, The Secretary has developed a set of educational publications known as *Preservation Briefs* which give information regarding historic properties and specific preservation practices. *Preservation Brief 18* is dedicated solely to the identifying and preserving character-defining elements while rehabilitation historic buildings. These documents were consulted in preparing this chapter.

Description of Exterior & Interior Conditions

Generally speaking the exterior of the De Pere Lockkeeper's House is in good condition while the interior is in poor condition. Overall descriptions of exterior and interior conditions are given in the Conditions Assessment, and detailed façade, room, and feature descriptions are given in the Treatment Recommendations portion of this report.

Identification & Description of Character-Defining Materials & Features

The Secretary of the Interior describes the following as character-defining materials and features which can be identified on the De Pere Lockkeeper's House: masonry, wood, architectural metals, roofs, windows, entrances & porches, structural systems, spaces/features/finishes, mechanical systems, and building site & setting.

Masonry

Masonry is one of the most lasting building materials seen throughout history. Masonry types seen at the De Pere Lockkeepers House includes below-grade extruded clay brick, cream color limestone and concrete foundation walls; above-grade red brick and limestone stone veneer walls; cut stone sills at door and window openings; and Portland cement based mortar throughout to bond the masonry units together.

Wood

Wood is one of the most common building materials seen in all styles and periods of history. Wood materials seen at the Lockkeeper's House include structural members (such as floor joists and decking, wall studs and sheathing, and roof rafters and decking), exterior cladding (such as cedar shingle siding, door and window trim, shutters, bed moulding, soffits, fascia, and cornices), interior finishes (such as base trim and window and door casings), and decorative features (such as stair components).

Architectural Metals

Metals such as lead, tin, zinc, copper, bronze, brass, iron, and steel were commonly used in historic buildings. Components can be quite elaborate. As for the De Pere Lockkeeper's House, there is very little in terms of architectural metals; the only feature of note would be the original exterior door hardware or knobs.

Roofs

Roofs are important for their shape, features (such as dormers and chimneys), roofing material (size, color, and pattern), and for the practicality of keeping the building weather-tight. While the roofing materials has transitioned over time from the original wood shingles, to diamond-shaped asbestos shingles, to today's three-tab asphalt shingles, the stylistically driven gambrel-shaped roof is a major character-defining element at the De Pere Lockkeeper's House along with its four dormers and chimney.

Windows

Prevailing architectural styles and technological improvements have shaped the history of windows in building construction. The De Pere Lockkeeper's House's window were temporarily removed and stored on-site. However, the original windows were wood, double hung sash windows, with a two-over-two configuration at the first floor and a six-over-six muntin pattern on the second floor.

Entrances & Porches

Often the focus on primarily elevations, entrances and porches are both functional, providing shade and shelter from the elements, and decorative, conveying a sense of architectural style. While the rear and side entrances of the De Pere Lockkeeper's House has remain unchanged, the front porch has been heavily modified. The important front door, steps, balustrades, and columns are non-extant.

Structural Systems

Exposed features of structural systems may be important in defining a building's historic character. In the case of the De Pere Lockkeeper's House, the exposed character-defining structural system is load-bearing masonry construction, evident in stone, brick, and concrete.

Interior Spaces, Features & Finishes

A floor plan's arrangement and sequence of primary or public spaces can be important in defining the character of all buildings, both monumental and modest. Interior features and finishes that make up the floors, walls, and ceilings are also important. Primary spaces at the De Pere Lockkeeper's House include the living room, stair hall, and entry. Secondary spaces such as kitchens, bathrooms, utility spaces, secondary hallways are less important in defining the character of the interior. Interior features such as hardwood floors, plaster, baseboards, window and door trim, hardware, and staircases are also important. While many of the interior historic finishes have been removed, the plan and most of the partitions have been maintained.

Mechanical Systems

Mechanical, lighting, and plumbing systems demonstrate technological advancements and introductions of modern amenities to buildings. With the exception of a handful of grilles for a forced air ventilation system which was installed during the building's period of significance, no other mechanical systems were identified which were original to the building.

Building Site & Setting

A setting is a large area or environment in which a historic property is located. The natural landscape of the Lower Fox River defines the character of the district. A building site may contains buildings or structures associated with the landscape. In the case of the Lockkeeper's House, it is one component of a site which contains a dam, lock, and lock shack all integral to the river.

Plans & Elevations of Current Conditions

Plans and elevations of current conditions were prepared by LJM Architects and are included in the appendix as they may be helpful to refer to when reviewing this document.

Recent Photographs

Hundreds of photographs were taken by LJM Architects between December 2010 and February 2011 and are included throughout this document as they pertain to its content.

Future Research

As mentioned in the following chapters, additional research and investigation should be conducted in the following areas:

- Secondary materials, such as carpet pad, carpet, vinyl, wallpaper, paneling, and acoustic and fiberglass ceiling tiles, should be removed to better assess the condition of original building materials beneath.
- The dried mud and muck in Basement Rooms B01 & B02 should be removed to better assess the condition of the floor, and the source of the water infiltration should be further investigated during and immediately after a heavy rain event and remedied.
- The source of daylight near the floor in the southwest corner of Back Closet 108 and at the ridge of the roof in Back Porch 109 should also be further investigated and remedied.
- The sanitary sewer system should be scoped with a camera to determine if it outlets into the river.

Condition Assessment

Introduction

The following qualitative conditions assessment ratings are based on definitions used in government and private industry standards.

- **Good.** This term indicates that routine maintenance is sufficient to maintain the current condition; a cyclical maintenance or repair/rehabilitation project is not specifically required to maintain the current condition or correct deficiencies.
- **Fair.** This term indicates that the feature generally provides an adequate level of service to operations. However, the feature requires more than routine maintenance attention and cyclical maintenance or repair/rehabilitation work may be required in the future.
- **Poor.** This term indicates that the feature is in need of attention and that routine maintenance is needed at a much higher level of effort to meet significant safety and legal requirements. Cyclical maintenance should be schedule for the current year and/or a special repair/rehabilitation project should be requested consistent with requirements, priorities, and long-term management objectives described in this report.

Site

The site of the De Pere Lockmaster's House is located in downtown De Pere, Wisconsin, west of the intersection of James and Front Streets. The area is served by the full complement of urban services and is accessible to the nearby downtown business district to the east. The house is situated on a small, narrow dyke, or island, and sited at approximately the midpoint of the western, or Fox River, side. The building is a freestanding structure, facing south, that stands apart from its neighbors due to its island location.

Access & Parking

The site's downtown location provides a connection to other cultural links in the area. Despite being split by the Fox River, downtown De Pere is very accessible from throughout the region. The east side neighborhood is split by Broadway Street which is also known as State Highways 57 and 32. These highways provide direct connection to other nearby communities, such Ashwaubenon, Allouez, and Green Bay. Regional transportation links are provided via Interstates 41 and 43.

Due to the inland security fencing and the island location, current access to the site is extremely difficult. Presently, access to the site and on-street parking are only available along Front Street; the location of off-street parking for the building is limited to a couple unmarked parking spaces near a storage garage on the inland side, accessed from Front Street. Pedestrian foot traffic is limited to a two-foot wide gang plank across the top of the southern lock gates.

This will not provide adequate access and parking for both tenant/operators and visitors to the site in the future. Additional off-street parking for the future use could be obtained at Voyageur Park. At this time, a bridge and river walk

are planned to be built near the northern lock gates. Once parked, visitors would enter the island from the north and take the future river walk to the building's entrance on the south side. This will improve access, but only for pedestrians and small all terrain vehicles. Passenger and emergency vehicles will not have access across the bridge.

Building Accessibility & Entry

As discussed in more detail in the Code Chapter, any future commercial use would require an accessible route for the disabled from a parking area to the building entry and throughout the first floor of the building. Currently, there is no accessible route to the building for the disabled; existing steps, high thresholds, and narrow doors pose accessibility problems. Corrective action may involve lengthy ramps, platform lifts, widening of doorways, and reconfiguration of the first floor toilet room. Providing accessibility to and through the building for a commercial use could have an adverse affect on the historic integrity of the building and should be avoided if at all possible.

On the other hand, a future residential use would not require building accessibility and would lessen the potential for adverse affects on the building. Therefore, a future residential use is strongly encouraged.

No physical evidence or historical documentation has been found to indicate that there were ever any walkways on the island. While it is assumed that the proposed bridge and river walk will provide an accessible route to the vicinity of the building, any additional walkways from the river walk to the building's three entry points should be constructed of period appropriate materials such as tamped earth, stone, brick, or crushed rock.

Grading, Drainage & Landscaping

In its current state, the west side of the site slopes steeply down to the Fox River. The east side is relatively flat. While most of the island is turf grass, the western portions of the site that slope down to the river have been covered in stone rip-rap which has been overtaken by weeds, brush, and large trees. Some of the vegetation is dense enough to block portions of the west façade of the building from view during the summer.

The portions of the site nearest the building should be re-graded to a 5% (6 inches in 10 feet) slope to properly drain water away from the building. Weeds, brush, and shrubs that are within ten feet of the west side of the building should be removed. A properly designed landscape would provide a better overall presentation to the public and enhance the identity of the building. A licensed landscape architect or landscape designer should be obtained to develop an appropriate plan. Additionally, proper funds should be set aside for ongoing maintenance of the grounds.

Envelope

The exterior envelope of the De Pere Lockmaster's House is in very good condition due to stabilization efforts that were undertaken in the summer of 2010. All the historic wood doors, windows, and trim contain lead based paint. The wood trim was properly scraped and prepped by a certified "Lead Safe Renovator" and repainted in 2010. The historic wood doors and window jambs need to be properly scrapped, prepped, and repainted.

Walls & Trim

The exterior walls of the De Pere Lockmaster's House are stone at the west side exposed basement, red brick at the first floor, and painted wood shingles at the second floor. Due to the 2010 stabilization efforts, the walls are in very good condition.

In the case of the De Pere Lockmaster's House, the walls are important aspects in contributing to the overall historic character of the building and retention and repair of these original wall materials should be employed. Each wall should be individually inspected for deterioration and repaired where necessary with like materials. There are some areas where paint is dripped on the brick which should be removed. Masonry cleaning may be necessary to smooth the appearance of the brick after removing the paint.

Windows & Shutters

The basement has four small window openings each containing an awning window with wood sash and single paned glazing vertically divided into three lights. These windows appear to be original and are in fair to poor condition. Originally, the first floor windows were uniformly sized double hung windows with wood sashes and single-paned glazing in a two-over-two muntin pattern. Although slightly smaller, the second floor windows were also uniformly sized wooden double hungs with six-over-six single pane glazing. According to the Ruechel family, the windows were replaced in the mid-1960s with more modern wooden double hung windows in their original opening sizes with a few exceptions. In the mid-1960s, the window in the west wall of the kitchen was made smaller during the kitchen and dining room remodeling project. The window in the east wall of the existing bathroom was made smaller in a similar fashion during the 1973-1974 bathroom remodeling project as evidenced by the change in brick and mortar color at this location. Also during this time, two windows on the south wall were vacated; the one in the vicinity of the bathroom was completely removed and bricked in, and the one in the vicinity of the front closet was removed and replaced with a bookshelf. All of the first and second floor sashes were removed during the 2010 stabilization project and stacked for storage in the dining room. As such they were not individually inspected. In general, the windows are believed to have been poorly maintained and in fair to poor condition. All of the window openings were outfitted with shutters in 2010 to improve building ventilation.

Windows are an important aspect in contributing to the overall historic character of a building and retention and repair of original windows should be utilized whenever possible. Each of the original awning windows should be individually inspected for operational soundness and deterioration and repaired where necessary with like materials. The windows need to be properly scraped and prepped before repainting.

Because they are not original and for the practicality of energy efficiency reasons, complete replacement of the first and second floor windows should be considered. The replacement windows should duplicate the appearance of the original windows in all regards, particularly the muntin patterns. Full scale drawings of the sash profiles appear on the 1911 plans and could be used for reference purposes.

Doors & Hardware

There are three existing exterior doors. The front door is a solid wood, stile and rail style door with six square flat panels, a square light, and original operating hardware. The door appears to be in fair condition. The side and back doors are solid wood, stile and rail style doors with three flat panels oriented horizontally and a rectangular divided light. Corresponding to those shown on the original plans, all three exterior doors appear to be original. While the front door is in fair condition, the side door in poor condition. The back door was removed during the 2010 stabilization project and stored in the dining room. As such, it was not individually inspected, but is assumed to be in poor condition as this was the most frequently used door in the house. Both the side and back door openings were outfitted with shutters in 2010.

In the case of the De Pere Lockmaster's House, the doors are an important aspect in contributing to the overall historic character of the building and retention and repair of these original doors should be employed if possible. Each door should be individually inspected for operational soundness and deterioration, and repaired where necessary with like materials. The doors need to be properly scraped and prepped before re-straining or repainting.

A future commercial use would trigger the commercial building code and provisions of the Americans with Disabilities Act which may require door and hardware alterations which would be inappropriate detractions to the historic character of the building. There are exceptions and alternative minimum standards for historic buildings as described in more detail in the Ordinance, Codes & Accessibility Review chapter of this document. Authorities having jurisdiction should be formally petitioned for leniency in allowing original doors and knob hardware wherever possible. Contrarily, a future residential use would allow the original doors and knob hardware and is recommended.

Porches

There are two existing porches: the front porch and the back porch. Originally, the front porch was open, consisting of a floor, two columns, and a roof. Around 1949, it was enclosed in its current three seasons room configuration. Corresponding to a wall section shown on the plans, the back porch appears to be original. Both porches are in fair condition due to the 2010 stabilization efforts.

Porches are also important character-defining elements that should be retained, repaired, and restored when possible. Consideration should be given to removing the front porch enclosure to restore the open porch based on the original 1911 drawings, and removing the oversized concrete pier installed on the west side of the porch in 2010 to restore the brick pier based on the 1911 drawings and the existing pier.

Roof, Gutters & Downspouts

The main roof is a gambrel configuration, a character-defining feature of the Dutch Colonial Revival style, where the lower half of the roof is very steeply pitched and conceals the second floor, and the upper half of the roof is more gently pitched and spans over the second floor. The north and south faces of the main gambrel roof are complemented by a pair of shed dormers, the shed being an extension of the upper, lower pitched roof. The main roof of the

building was likely originally shingled in wood shingles or shakes. At some point in time, the main gambrel roof was re-roofed in diamond shaped asbestos shingles which were in very poor condition, requiring abatement during the 2010 stabilization project and replacement with a weathered wood colored, three-tab asphalt shingle. The front porch has a very low pitched hip roof which was likely originally covered with a composite roofing material made for flat roofs, and periodically re-roofed through the years in a similar fashion. It was removed and replaced with an EPDM product during the 2010 stabilization. The back porch has a moderately pitched hip roof which was shingled in wood shingles until 2010 when it was removed and replaced similarly to the main roof.

The main and front porch roofs had built-in gutters lined in galvanized metal. Originally, these drained storm water down four corrugated round downspouts located on either side of the front and back porches and into a cistern located in the northeast corner of the basement. Over the years, the cistern was vacated, and the downspouts were reconfigured to drain to grade. There was no evidence that the back porch ever had gutters and downspouts. Because of their poor condition, the built-in gutters were relined, the downspouts were replaced with matching corrugated round downspouts at new locations more conducive to the site's natural drainage pattern, and the back porch received a full complement of half-round galvanized gutters and corrugated round downspouts during the 2010 stabilization project.

Although installed as a temporary stabilization measure, the existing roofing, gutters, and downspouts should last for twenty to thirty years. Three-tab asphalt shingles in a shade of gray that resembles weathered wood are a widely accepted substitution for original or historic roofing materials, but are less desirable in restoration or rehabilitation projects where historical accuracy is a priority. Consideration should be given to new wood shingles as the most historically accurate and appropriate solution. Proper ridge ventilation should be selected based upon the type of roofing and insulation materials used in the rehabilitation.

Chimney

There is a single, red brick chimney which penetrates the roof near the center of the house. It was tuckpointed and provided with a new precast concrete chimney cap during the 2010 stabilization efforts and is presumably in very good condition.

Insulation & Weatherstripping

In areas where the exterior walls and ceilings were exposed, there did not appear to be any insulation in the building.

It is likely that nearly all of the wall cavities will be opened up during future rehabilitation work to inspect or remediate mold, upgrade mechanical and electrical systems, and make repairs to the plaster. Ordinarily, if the original base and casings remain, they often pose as a deterrent to deep energy efficiency retrofits requiring furring out of the interior of masonry walls to provide insulation. However, the ranch style base and casings need to be removed and replaced with something more historically appropriate. Therefore, it is recommended that insulation and an adequate vapor barrier be installed. The insulation may be fiberglass batts, blown-in fiberglass or

cellulose, or spray applied foam. Closed cell spray foam is highly desirable due to its inherently higher R-value, air sealing, and vapor barrier qualities.

Interiors

The interior of the former De Pere Lockmaster's House is in poor condition due to lack of routine maintenance and inadequate mothballing. Overall, assessment of the interior of the building was difficult due to the amount of stored materials and miscellaneous debris in the building, the covering of original finishes with secondary materials, and the lack of lighting. Due to the age of the building, it is likely that all the walls, ceilings, and other painted components contain lead based paint. All painted surfaces need to be properly scraped and prepped by a certified "Lead Safe Renovator" or other qualified professional before repainting. The 2010 stabilization project made great progress in improving the exterior of the building. Comparatively, repairs to the interior are the next priority.

Floors

The flooring was not accessible to view in many of the rooms due to the presence of secondary, more modern materials such as carpet, carpet pad, sheet vinyl goods, and miscellaneous debris. Based upon visual inspection in those areas which were accessible to view, the original first and second floor flooring material is 2¼"-wide tongue and groove hardwood strips over a one-inch thick softwood subfloor and 3¼"-wide hardwood at the front and back porches. Overall, the wood flooring is in poor condition, but may be retained and reused.

The wood floors contribute to the overall historic character of the building and retention and repair of the original wood floors should be employed if possible. Any secondary flooring should be removed. Each floor should be individually inspected for cracking, buckling, or deterioration and repaired where necessary with like materials. Then the wood flooring should be sanded and refinished.

Walls & Ceilings

With the exception of the 1973 era walls around the existing bathroom which are comprised of wood paneling and gypsum wallboard, the remaining walls are the original plaster on wood lath. Many of them were covered with wood paneling or wallpaper in 1973. The original ceilings are also plaster, but were concealed by acoustical tile in the mid-1960s and acoustic panels in 1973. Due to the ineffective mothballing and its lack of adequate ventilation, high humidity levels within the building have caused mold to grow behind the wallpaper and the wallpaper and paint to peel off of the plaster. In general, the walls and ceilings have been poorly maintained and are in poor condition, and, unfortunately, the plaster is one of a handful of remaining historic materials in the interior of the building.

Secondary finishes, such as wood paneling and wallpaper, should be removed as they are not original to the building; samples should be retained to document different periods of occupation of the property. While it is assumed that some of the plaster will not survive the removal of the paneling, the existing plaster should be retained and repaired as much as possible. Each surface should be individually inspected for cracking, holes, and mold and repaired or replaced as necessary.

Trim

With the exception of the stair which retains its original trim, the interior trim is ranch style base and casings dating from 1973. Some pieces are missing. In general, the trim has been poorly maintained and is in fair condition.

Architectural trim is an important aspect in contributing to the overall historic character of a building and retention and repair of original wood trim should be utilized whenever possible. Each piece of remaining original trim should be individually inspected for cracking and deterioration and repaired where necessary with like materials. Complete replacement of the ranch style trim is desired; the replacement trim should duplicate the appearance of the original trim.

Doors & Hardware

The existing interior doors are hollow core flush wood doors dating from the 1973 remodeling. They come in a variety of sizes. In general, the doors are in fair condition.

Complete replacement of the interior doors is desired; the replacement doors should duplicate the appearance of the original doors in all regards. In a commercial future use, all door knobs should also be replaced with new lever handle hardware to comply with the Americans with Disabilities Act.

Stairs

For all practical purposes, there is one existing functional staircase in the building in the main stair hall on the east side of the building. It is nicely outfitted with stained wood stringers, balusters, and handrails made of ash which corresponds to the original 1911 plans. This stair is in fair condition. There was formerly a stair in the back hall. However, it was so rotten that it was removed during the 2010 stabilization project; its remains are scattered around the floor in the back porch.

Similar to other aspects of the house, stairs are an important aspect in contributing to the overall historic character of a building and retention and repair of the remaining wood stair should be utilized if code allows. Each component should be individually inspected for cracking and deterioration and repaired where necessary with like materials. Stained components need to be properly sanded and prepped before re-staining. If complete replacement is required by code, the replacement components should duplicate the appearance of the original as closely as possible. The back stair needs complete replacement based on the remaining original stair.

Cabinetry, Closets & Built-Ins

There is little in terms of cabinetry, closets, and built-ins in this building. While the closets poles and shelves in the two north bedrooms appear to be original, other closets, built-ins, and cabinetry throughout the house is not: the kitchen cabinetry was installed in the mid-1960s, and the bathroom cabinetry and southeast bedroom built-ins were installed in 1973. Like the rest of the house, there has been a lack of maintenance with regards to these components resulting in their poor condition.

Due to the potential future uses of the building, it is assumed that replacement of some of these objects may be desired in favor of something more suitable to the new use.

Structural

By Lynn A. Barber, PE of Barber Engineering, LLC

On Friday, December 3, 2010, I met at the above referenced building to observe the condition of the structure. The two story house, built in 1912, was built for Lockkeepers and their families. It was inhabited from 1912 through 1983 and has been vacant since. The building is listed on the Wisconsin and National Registers of Historic Places. The house has a full basement, a one story three season room and a one story rear entry porch. Based on the 1911 construction documents and photographic evidence, the three season room was originally an open porch.

The overall structure is in good condition. A stabilization project was completed at the house in 2010 and drawings dated August 14, 2009 were provided for review. That project included replacing the west pier supporting the three season room. An existing failed exterior wood deck on the west side of the back entry was removed. Also, six new helical piers were installed on the inside of the rear entry foundation walls.

Following are my observations and recommendations.

Foundations

The basement foundation walls consist of stone, brick and concrete. The grade slopes down to the west, exposing most of the west exterior foundation wall. The walls consist of nine courses of multi-wythe brick on top of cast in place concrete. The exposed portions of the exterior north, south, and west walls have a stone veneer. The main house basement foundation walls are in good condition.

Interior steel pipe columns were previously added in the basement to support portions of the existing first floor framing. It is unknown if these columns are bearing on concrete footings or just placed on top of the basement slab on grade. If the building is converted to a commercial use, further investigation is recommended. Most likely, new concrete footings will be required for the steel columns that support the first floor framing.

The rear entrance foundations are cast in place concrete frost walls. These foundations experienced movement, most likely from bearing at a higher elevation than the basement foundations. The soil supporting the frost foundations was most likely fill and the sloped grading may have contributed to frost heave.

A stabilization project was completed at the house in 2010 and drawings dated August 14, 2009 were provided for review. During that project, six new helical piers were installed and attached to the inside face of the west, north, and east rear entrance frost walls. These appear to be installed properly and are in good condition. An existing failed exterior wood deck on the west side of the rear entry was also removed. According to the stabilization plans, a portion of the west frost wall near the main structure basement foundation wall was to be replaced and doweled into the remaining existing walls. This

appears to have been completed.

It was not indicated for this to occur on the east concrete frost wall. A large crack was observed in this wall near the main structure basement foundation wall. I recommend replacing a portion of the east wall and doweling into the remaining existing walls, similar to the west wall.

The stabilization project included replacing the west pier supporting the front porch. This is a new two foot square cast in place concrete pier.

First Floor Framing

The first floor framing of the main house consists of 2x10 wood floor joists spaced at approximately 16 inches on center, bearing on exterior foundation walls and interior steel beams and columns. The existing interior steel I-beams are 10 inches deep and approximately 5 inches wide. The beams were not accessible for complete measurements at the time of the site visit, but the 1911 construction documents indicate a 10" deep 40# I-beam. The beams, which appear to be accurate, bear on the exterior walls and an interior concrete brick pier. Double floor joists are located under first floor bearing walls that support the second floor framing. Double floor joists are also located around the stair.

Two steel pipe columns are located in areas of the first floor framing where double joists were cut. Another steel pipe column is located on the southwest end of the stair. Deflection of the existing floor joists was most likely why this column was added. The intermediate landing of the stair appears to be hung from the first floor framing.

The first floor framing of the rear entry consists of 2x6 wood floor joists spaced at approximately 16 inches on center, bearing on exterior foundation walls. To complete the stabilization project and install the helical piers, portions of rotted floor joists, floor deck, and floor finish were removed. Additional floor joists and wall framing was observed.

The first floor framing of the screened in porch consists of 2x8 wood floor joists spaced at approximately 16 inches on center, bearing on exterior perimeter 2x12 wood beams. These beams are supported by the new cast in place concrete pier, the existing masonry brick pier, and the exterior foundation wall.

The existing first floor joists cannot adequately support a commercial occupancy. Typically, new wood floor joists sistered to all of the existing joists will be required. If the occupancy remains residential, the floor joists are adequate. The existing double joists supporting the second floor framing are overstressed with a residential occupancy. I recommend reinforcing these, no matter the occupancy. The steel beam is adequate for a residential and commercial occupancy loading.

Second Floor Framing

The second floor framing consists of 2x10 wood floor joists spaced at approximately 16 inches on center bearing on interior wood stud walls and beams and exterior masonry brick walls. Most of this existing framing was not exposed during my visit, but is assumed to be typical throughout the second floor. Like the existing first floor, the existing second floor joists cannot

adequately support a commercial occupancy. Typically, new wood floor joists sistered to all of the existing joists will be required. If the occupancy remains residential, the floor joists are adequate. Existing headers in the first floor walls should also be investigated. Replacement or reinforcement may also be required.

Roof Framing

The roof framing of the main house consists of 2x6 wood rafters spaced at approximately 16 inches on center bearing on exterior wood stud walls. The existing framing was observed from an attic hatch that was open but not accessible at the time of my visit. There is evidence of moisture on the roof and second floor ceiling framing. Further investigation of possible rot should be performed. Compromised and rotted wood should be replaced. As part of the stabilization project, the roof was replaced. It is assumed that the leaks have been halted.

The roof framing of the rear entry consists of 2x4 wood rafters spaced at approximately 16 inches on center bearing on exterior wood stud walls. The roof framing appears to be in good condition.

The roof framing of the screened in porch was not accessible at the time of my site visit. However, there is evidence of moisture on the ceiling framing. Further investigation of possible rot should be performed. Compromised and rotted wood should be replaced. Also, verification that all roof leaks have been sealed is recommended.

This building will require reinforcement for it to be structurally sound and code compliant for a commercial occupancy. Portions of the building will require further structural inspection for member sizes and lengths. If the building remains residential in occupancy and use, the existing framing, except for the double first floor beams, is adequate.

This letter is a professional opinion of this engineer based on the information visible at the time of inspection and information provided by others. It is not an implied or expressed guarantee or warranty. If you have any questions with regard to this report or the conclusions reached, please do not hesitate to call.

Plumbing & Fire Protection

By Ed Oleyniczak, Jr., PE of Riverside Engineering & Design, Inc.

Exterior Sanitary Sewer

It appears that at one time that the Lockkeeper's building was served by a 4" cast iron sanitary sewer that penetrated the basement floor below the basement's stairway. The City of De Pere was contacted, and they did not have any information of any sanitary sewer leaving the building in their records. We therefore suspect from the evidence at the site that this sanitary building sewer may have discharged to the municipal system or into the Fox River at some point in the history of the building. This sewer was abandoned. We recommend that this sewer be capped and sealed air-tight.

There is an additional 4" sanitary sewer about 6 feet above the basement floor that also leaves the east wall of the basement below the east stairway. Due to the elevation of the sewer leaving the building, this would indicate that this 4"

building sewer may run to a septic tank or holding tank outside the building, though there was no current evidence of this at the site. According to the last lockmaster, there was a functioning septic tank located approximately twenty to thirty feet south of the house which may have discharged into the Fox River. This should be investigated further in the future. At this time we can only speculate, until the sewer is filmed or dye tested, that this sewer runs into the Fox River. We recommend that this sewer be capped and sealed air-tight.

A new building sewer should be installed and should leave the north end of the building. We recommend that this new sewer discharge to a holding tank located at the north end of the island. The holding tank location will be critical as it must be reached with a maximum 120-foot pumper hose from a honey wagon truck located on the opposite side of the existing lock system on the east side of the island. The holding tank should be sized according to the level of occupancy to minimize the frequency of having the tank pumped out. Another option would be to have the City of De Pere core a new 4" building sewer stem under the Fox River, but we believe that this installation would be cost prohibitive.

Exterior Water Service

The Lockkeeper's building has two locations of water service at the site. First is what looks like a shallow well opening in the northwest corner of the basement where a shallow point well was possibly located in the past. There is also evidence of a ¾" water line penetrating the basement floor below the basement stairway on the east side of the building. We have contacted the City of De Pere and they did not have any information of a water service to that building. Please note that even if there is no evidence of either a building water stop or an exterior well location, we still suspect that the building was possibly served at some time by a municipal water service, and indeed city water service to the house was confirmed by the last lockmaster to live there.

We recommend that a new constant pressure well system be installed at the site. The other option would be to have the City of De Pere install a new water supply system under the Fox River, but we believe that this installation would be cost prohibitive. Please note that NFPA would also require a 6" water main if the water main is shared between the domestic water supply and a sprinkler system.

Exterior Storm Drainage System

There is no existing exterior storm water detention system on the site as the roof areas drain with downspouts to grade.

Interior Domestic Water Supply System

The existing water supply system is copper. There is a water meter hook-up along the east basement wall but the water meter was removed. From what I could see, the existing system was all copper.

We recommend the replacement of the complete water supply system due to the age of the piping and also what cannot be seen hidden in the walls. The domestic water system should be replaced with copper water piping for the mains and Pex piping at the fixtures. Pex piping will not break if frozen and also acts as isolation for electrolysis in a copper piping system.

Interior Sanitary Sewer System

The existing waste system is a mix of steel piping, PVC piping, and cast iron pipe. We recommend a complete replacement of the existing waste system with PVC piping. The 3" vent through the roof, located on the east side of the roof, could be reused.

Plumbing Fixtures

The existing fixtures are in bad condition and have definitely reached the end of their useful life. The existing fixtures are not ADA compliant nor are they water conservative.

We recommend the replacement of the existing fixtures with ADA compliant and water conservative fixtures.

Water Heater

The existing water heater, a Westinghouse Clean Glass Electric Water Heater Empress 10, is in poor condition and has definitely reached the end of its useful life.

We recommend a new 20– or 40-gallon electric water heater with an insulated blanket. The gallonage varies from between 20– and 40-gallon based on the building usage. With the use of an electric water heater, the owner has the ability of shutting off the unit when it is not being used. The use of the wall switch or a time clock will save energy.

Sprinkler System

The existing building does not have a fire suppression system.

Per our discussions with the De Pere Fire Chief, a NFPA 13R system would be required for the building due to the remote island location of the project. This will be complicated as without a municipal water supply to the building to depend on and a proposed well system, water storage with associated pump will be required at the site. We have been involved with other projects on Washington Island where this was done. The cost of a storage water system at the site will still be much less than bringing a new water service over from the mainland.

Heating, Ventilating & Air Conditioning

By Dale Pearson, PE of Facility Engineering Consultants, LLC

Existing Conditions

Based on the age of the house, it is assumed that the first heating system was provided by stoves connected to the central chimney. Based on construction documents from this house, a coal or wood burning gravity furnace was installed in 1926. Large in floor registers are located on the first floor in the Dining Room, Living Room and at the stair landing are typical for gravity furnaces.

The present heating system for the Lockkeeper's House is an oil furnace

manufactured by Mueller Climatrol. Mueller Climatrol is no longer in business. A review of the furnace's serial number with a company that bought the parts inventory from the manufacturer indicated that the furnace was probably manufactured between 1960 and 1964. It is assumed that the furnace was installed during this time frame. A 275-gallon oil storage tank is located on the north walls of the basement. It was reported in a 2000 environmental assessment report that piping extended underground from the house and under the river to a fill station at the southeast end of the lock. It is unknown if this pipe still exists. Copper tubing from the oil tank to the furnace burner also remains. The furnace is well past its expected life of 20 years and should be replaced. Furnaces of this age and type were about 75% efficient. Present day furnaces are about 94% efficient.

There is an air to air heat exchanger in the furnace flue which increases the efficiency of the system. One of the supply ducts passes through the heat exchanger so more heat is added to the air stream before it discharges into the house. As stated above, older furnaces weren't very efficient so it made sense to extract heat out of the warm flue gases. Present day furnaces extract this heat before the flue gases exit so this heat exchanger wouldn't be of any use. With the age of the unit, there is also a concern that corrosion could allow flue gases to enter the air stream to the house.

Large in-floor registers are located on the first floor in the Dining Room, Living Room and at the stair landing. Registers of this type are typical for gravity furnaces so it is assumed that they were installed in 1926. Newer wall registers are installed in the Kitchen and Living Room on the first floors and the bedrooms and bathroom on the second floor. These are not from the period of significance of the house and should be replaced with registers reflecting the historic nature of the house.

The basement ductwork is in good shape. It will be more cost effective to install all new ductwork in the basement when a new system is installed. Duct sizes and locations will likely change, and it would be more expensive to try to incorporate small sections of existing duct in a new system rather than make all new duct to meet the new system requirements. Depending on the final use of the building, the ductwork from the basement up to the second floor could be reused so that walls don't need to be torn apart to install new ductwork. The interior of any existing ductwork needs to be thoroughly cleaned if it is used in a new system.

The building doesn't have any air conditioning systems at the present time. Historically, there is no evidence that the building ever had an air conditioning system.

The existing oil tank in the basement will need to be removed. The tank appears to be empty although it may have some sludge in it. The landing at the top of the basement stairs is too small to allow the tank to be turned and removed from the house in one piece. It will need to be cut into pieces so it can be removed. If a new furnace is installed in the building, it will not be an oil furnace. Wisconsin COMM 10 *Flammable, Combustible and Hazardous Liquids* Code adopts NFPA 31 *Standard for the Installation of Oil Burning Equipment*. NFPA 31 requires that aboveground tanks that are not in use be rendered vapor free, closed by cleaning, and removed from the site. Proper procedures to remove any remaining oil and flammable fumes must be followed before the tank is removed.

Other than portions of the existing ductwork none of the existing heating system can be re-used. Gravity furnaces are very inefficient and no longer manufactured. The existing oil furnace is inefficient and parts are no longer available. We recommend a new HVAC system be installed. Depending on the future occupancy of the building, outside air may be required and air conditioning will be desired. These could not be accommodated if a gravity furnace was installed.

System Recommendations

Three future uses are being explored for the Lockkeepers house. Each use has different HVAC requirements.

Use as a recreational shelter is a combination of offices and display areas. A furnace with a cooling coil condensing unit would heat and cool the building. Outside air will need to be brought into the building through the furnace to meet the building code requirements. The toilet room and janitor closet will be exhausted. The building will have a catering kitchen. The catering kitchen requires a Type II kitchen hood and an air make up unit to replace the air that is being exhausted. A Type II kitchen hood is only for removal of vapors. Cooking using liquids such as preparing soups and warming precooked food can be done under a Type II hood. Frying cannot be done under a Type II hood.

Use as an office will be similar to use as a recreational shelter. A slighter larger air conditioning system is required due to the heat from equipment generated in an office. Since there would not be a kitchen, a hood and associated air make up would not be required.

Use as tourism lodging will require a furnace with a cooling coil and condensing unit although a cooling coil and condensing unit would not be required by code. The condensing unit would be smaller than that required by the other uses. The code also does not require that outside air be brought into the building through the furnace.

The new HVAC system will probably be a gas fired furnace, or electric due to the difficulty of getting gas to the island, or a water source heat pump. New oil furnaces are about 82% efficient versus 94% efficient gas furnaces. There aren't many oil furnaces used in Northeast Wisconsin at the present time. Oil furnaces are rarely installed in new construction in our area. There isn't natural gas service to the island at the present time. Wisconsin Public Service was contacted to see if it is feasible to run natural gas to the island. It is cost prohibitive to run a natural gas line under the canal. Natural gas could be run on a bridge over the lock. Based on the above constraints, it is likely a gas fired furnace for the house will use propane. Propane delivery trucks have a long enough hose to deliver propane from the end of the drive east of the canal to a tank locate north of the Lockkeeper's House.

Determination of the selected mechanical system must include careful consideration of placement and concealment of system components so they are as unobtrusive as possible.

Sustainable System Options

Heat pumps use refrigeration to essentially transfer heat or cold between environments. In the cooling mode, refrigerant is evaporated in a coil in the fan (furnace) to take heat out of the house. The warm refrigerant is then transported to a condenser located outside the house where the heat is removed. This is essentially the same as a standard air conditioning system. In the heating mode, valves in the heat pump reverse the flow of the refrigerant. The refrigerant is evaporated in what was the condenser, thereby removing heat. The refrigerant is then transported to the house where it is condensed in the coil in the fan releasing heat into the house. The exterior (condensing) side of the unit can either be cooled by air or water. Water source heat pumps have higher installation costs but are more efficient especially in our climate. The temperature of the ground or river water is generally warmer in the winter and colder in the summer increasing the efficiency of the heat pump.

A water source heat pump can either be a ground loop system or the river could be used as a heat sink. With a ground loop system piping loops are installed either horizontally four to five feet below the surface or a 150- to 200-foot deep vertical well is drilled with a pipe loop extended to the bottom of the well. Horizontal loops would require a loop field covering 4800 to 7200 square feet depending on the building occupancy. Vertical loops need to be spaced about 10 feet apart. We would require four to six vertical loops depending on the building occupancy.

River water could be used directly in the condenser of the heat pump. This would require a filter system for the water. A filter system would require daily maintenance so it's not recommended.

A better way to use the river would be installation of piping loops in the river bed or in the bottom of the lock canal. Fluid circulating in this loop would not require much maintenance. Installation of loops in the river or lock canal would be the least expensive method of providing a heat sink for the heat pump system. Installation of the loops would require permits from both the Wisconsin Department of Natural Resources and the U. S. Army Corps of Engineers.

Solar collection could also be investigated as a source of heat. However, it is generally not a cost effective heat source in our climate.

Electrical

By Bruce E. Cottrell, President of Cottrell Design, Inc.

On Friday, December 3, 2010, we met at the location of the above mentioned project to examine the building's existing conditions. Our purpose for the site visit was to review/examine the existing electrical service and electrical distribution within the building and on the general area of the site. Following is an assessment of our observations and suggested electrical upgrades for this facility.

Service

The existing electrical service comes to the house from an underground, underwater service from the mainland near the river lock system. Currently

the electrical service is routed in a conduit underground from a pole mount transformer to the east side of the locks. At that point the electrical service conduit and conductors tap into a large electrical pull box. From the underside of this pull box, there is a conduit routed underwater to a second electrical pull box on the west side of the locks. From this second pull box the conduit and conductors are routed underground to the building's basement. Within the building's basement there is currently a 120/240 volt, single phase, 3 wire, 100 amp electrical service panel serving the building. The existing electrical panel is outdated and needs to be replaced.

Our recommendation for the main electrical service would be, if applicable, to reuse the existing electrical pull boxes on each side of the main locks for pulling new electrical service conductors to the building. On the island side of the locks, a new electrical conduit, buried underground in accordance with current utility company and National Electrical Code requirements would be routed to the building. There would be a need for a new main electrical panel installed in the building's basement. We suggest installing a 120/240 volt, single phase, 3 wire, 200 amp service with a 40 space circuit panel. We feel that a 200 amp service would be sufficient for this building.

Power & Lighting

Throughout the entire building the existing electrical devices and light fixtures are old, destroyed, or missing. The existing wiring system within the building does not comply with current electrical building codes or regulations. Although there have been building upgrades at the facility, for the most part the electrical system has not been maintained.

Within the building, there will need to be an entirely new routing of electrical conductors and installation of electrical devices and lighting fixtures. The electrical conductors can be routed as non-metallic sheathed cabling or Romex. Residential style wiring devices and lighting fixtures would be installed throughout the building. The light fixtures to be specified/installed could be of the period appearance of the building’s original construction date. There would need to be an ample amount of duplex receptacles installed to accommodate the facility’s upgraded functions and operations. All new electrical devices would need to be installed in complete compliance with all current pertinent national, state, and local codes and regulations.

Communications

Currently there is a simple, residential telephone service to the building. Again, this service to the building needs to be upgraded, and the routing to telephone outlets within the building needs to be upgraded.

As with the electrical service, the telephone service will need to be upgraded to provide voice/data services to the facility. There would be the potential of routing an all inclusive telephone, internet, cable television service to the building, dependant on the actual requirements of the building’s end users.

Alarms

At this time there is no fire alarm system at the location. In review of current Wisconsin and national electrical or national fire prevention codes, even if the building were converted to a commercial use, there would not be a need for the

installation of a fire alarm system. Our recommendation would be not to install a fire alarm system in the building. If the building were maintained as a residential facility, a typical home fire alarm and carbon monoxide monitoring system would need to be installed.

Overall, our thoughts are that the current electrical conditions of the facility are inoperable and will need an entire removal and replacement of the electrical systems. The existing electrical and telephone services need to be removed, and an upgraded service of each system needs to be installed.

Ordinance, Codes & Accessibility Review

Methodology

This preliminary ordinance, codes, and accessibility review was based on information available to LJM Architects, Inc. in Spring of 2011. LJM Architects exercised usual and customary professional care in our efforts to interpret all ordinances, codes, regulations, and laws in effect in the State of Wisconsin and the City of De Pere at the time. A reexamination of codes in effect should be undertaken when actual restoration plans are prepared.

Floodplain Zoning Ordinance

The purpose of the City of De Pere's Floodplain Zoning Ordinance is "to regulate floodplain development to protect life, health, and property...."[36] The Wisconsin Department of Natural Resources (DNR) has oversight responsibility in floodplain management activities and is available to assist the City in the administration of their ordinance. After communicating with David R. Hongisto, Building Inspector & Zoning Administrator for the City of De Pere, and Richard J. Koch, Floodplain / Storm Water Specialist at the DNR, it was determined that the City of De Pere's Floodplain Zoning Ordinance as well as Wisconsin Statutes Chapter 30 Navigable Waters, Harbors, and Navigation and Chapter 31 Regulation of Dams and Bridges Affecting Navigable Waters, all regulated by the DNR, have the potential to have a major impact on the future use of the Lockkeeper's House.

The Floodplain Zoning Ordinance allows some latitude with regards to historic structures, such as the De Pere Lockkeeper's House, that are certified by the Secretary of the Interior as contributing to the historical significance of a historic district listed in the National Register of Historic Places. Historic structures are permitted to be maintained (painting, decorating, replacement of doors, windows, and other nonstructural components), repaired (repair or replacement of existing private sewage or water supply systems or connections to public utilities), modified, or altered as long as the alteration does not preclude the structure's continued historic designation and other applicable provisions of the Ordinance are met.

The De Pere Lockkeeper's House is located on Government Island, which is considered by the DNR to be an integral component of the De Pere Dam. Despite the fact that it is not officially mapped in the floodplain and that a significant portion of the island is well above the upstream regional flood elevation, the DNR believes that this is an oversight or error and that the entire island should be classified into the Floodway District. This District is defined as "the channel of a river or stream and those portions of the floodplain adjoining the channel required to carry the regional floodwaters."[37] Due to its flood prone nature, the standards for development in floodway areas are the strictest and the most difficult to comply with.

Of the most consequence to the successful adaptation of this house, new structures intended for human habitation are prohibited in the Floodway District. This could preclude any residential, bed and breakfast, vacation

rental, inn, or other forms of lodging that were suggested during the key stakeholder meetings and strongly considered as economically viable options during the preparation of the Economic Feasibility Study portion of this project. The only permitted uses are those structures accessory to permanent open space uses such as picnic grounds, parks, wildlife and nature preserves, fishing areas, hiking trails, and other recreational uses. Voyageur Park and the planned pedestrian bridge, river walk, and wildlife viewing platform (see concept drawing in appendix) should be considered open space uses, and, according to the DNR, the proposed use of the Lockkeeper's House will need to be accessory to them in order for it to be used in the future.

The adaptive reuse of this formerly residential structure into a public venue is considered a change in use which has numerous building code and accessibility implications, requiring alterations as discussed below which have the potential to adversely affect the historic integrity of the house. Further compounding the matter, the Ordinance prohibits alterations to or changes in use of historic buildings which would effect its continued designation as a locally landmarked, eligible, or listed historic structure. Therefore, the alterations required by the change in use will need to be properly designed and integrated to ensure continued historic designation of the De Pere Lockkeeper's House after the work is complete.

Other provisions of the Ordinance require the basement and mechanical and utility equipment be elevated or flood proofed to or above the flood protection elevation, which is two feet above the upstream regional flood elevation of 589.3', or approximately 6'-5" above the existing basement floor. Flood proofing the existing stone foundation may prove to be quite costly and may have an adverse effect on the building's historic integrity; a lesser cost alternative would be to fill the basement to this elevation which would leave a 2'-8" high crawl space for mechanical and utility equipment.

In addition, any drilling for wells and/or excavations for any construction activities on the dam will need to have plans submitted to the DNR's regional dam safety engineer. This individual will review the proposed work and determine if plan approval and a permit under Chapter 31 of the Wisconsin Statutes will be needed before the work can commence.

Due to the unique property conditions, the Ordinance is subject to much interpretation. An attempt at a variance to allow more economically viable uses is strongly recommended. In either case, close examination and careful coordination with the DNR, City of De Pere, and WHS will be required during preparation of actual restoration plans in order to succeed in adaptively reusing the house.

Building Codes

The purpose of the *Wisconsin Commercial Building Code* (WCBC) "is to protect the health, safety and welfare of the public and employees by establishing minimum standards for the design, construction, maintenance and inspection of public buildings, including multifamily dwellings and places of employment." *The International Building Code – 2006* (IBC), the *International Existing Building Code – 2006* (IEBC), and the American National Standard's *Accessible and Usable Buildings and Facilities* – 2003 (ICC/ANSI Standard A117.1) are incorporated by reference to the WCBC. It is the intent of the IEBC to provide flexibility to permit the use of alternative

approaches to achieve compliance with the code insofar as they are affected by the repair and alteration of existing buildings. Furthermore, the Historic Buildings Chapter of the IEBC provides a means for the preservation of historic buildings by easing certain provisions relating to their repair and alteration.

The alteration of a public building or a place of employment may not commence unless plans for the project have been submitted to and approved by the Wisconsin Department of Commerce Safety & Buildings Division.

The following definitions, as defined by the IEBC, may be useful to understand in the context of the code and accessibility review:

- **Alteration**. Any construction or renovation to an existing structure other than a repair or addition. Alterations are classified as Level 1, Level 2, and Level 3. Level 1 alterations include the removal and replacement or the covering of existing materials, elements, equipment, or fixtures using new materials, elements, equipment, or fixtures that serve the same purpose. Level 2 alterations include the reconfiguration of space, the addition or elimination of any door or window, the reconfiguration of extension of any system, or the installation of any equipment. Level 3 alterations apply where the work area exceeds 50 percent of the aggregate area of the building.
- **Existing Building**. A building erected prior to the date of adoption of the appropriate code, or one for which a legal building permit has been issued.
- **Historic Building**. Any building or structure that is listed in the State or National Register of Historic Places; designated as a historic property under local or state designation law or survey; certified as a contributing resource within a National Register listed or locally designated historic district; or with an opinion or certification that the property is eligible to be listed on the National or State Register of Historic Places either individually or as a contributing building to a historic district by the State Historic Preservation Officer or the Keeper of the National Register of Historic Places.
- **Rehabilitation**. Any work, as described by the categories of work defined herein, undertaken in an existing building.
- **Repair**. The restoration to good or sound condition of any part of an existing building for the purpose of its maintenance.

As for any future restoration work, the Historic Buildings Chapter of the IEBC may be elected because the De Pere Lockkeeper's House is listed in the State and National Register of Historic Places. Repairs to any portion of a historic building and replacement of existing or missing features are permitted with original or like materials and original methods of construction. The only exception is replacement glazing in hazardous locations, such as glazing in doors, within 24" of a door, or less than 18" above the floor which must be replaced with safety glazing. As a general rule, repairs shall be done in a manner that maintains the existing conditions and shall not make the building less code conforming than it was before the repair was undertaken.

NFPA 101: Life Safety Code

The De Pere Municipal Code has adopted *NFPA 101: Life Safety Code* by reference. This Code addresses construction, protection, and occupancy features necessary to minimize danger to life from the effects of fire, including

smoke, heat, and toxic gases created during a fire. Robert Kiser, Fire Chief of the De Pere Fire Department was consulted during our investigations. Due to its island location, the building is difficult to deal with from a fire protection standpoint. In the Chief's opinion, fire alarms will not be considered sufficient to address these concerns.

Several options were discussed with Chief Kiser including the strategic locations of fire hydrants off the island as well as hydrant locations on the island with dedicated lengths of hoses to service the house. However, in Chief Kiser's opinion, the simplest, easiest, and most economical way to protect the De Pere Lockkeeper's House would be to install a residential grade sprinkler system meeting NFPA 13R regulations with plastic piping and heads in occupied spaces such as the living room, kitchen, dining rooms, and all the bedrooms. The closets and bathroom(s) would not need to be sprinklered. This opinion also coincides with Section 11.4.3.2 of NFPA 101 which requires water-surrounded structures to have automatic, manual, or other protection appropriate to the hazard and designed to minimize the danger to occupants in case of fire or other emergency. In addition, Section 43.10.4.11.1 requires historic buildings that do not conform to the construction requirements of the code and pose a fire safety hazard shall be protected throughout by an approved automatic sprinkler system. While it would be dealt with on a case-by-case basis, the Fire Department would accept a 13R system for this building due to its small, residential scale, despite an unknown future residential or commercial use. Sufficient water supply, perhaps from a new well, as well as an in-house pressure tank back fed from the water heater would be needed to support the system.

Accessibility

The *Americans with Disabilities Act* (ADA) is a federal law passed in July of 1990 that prohibits discrimination on the basis of disability. The statute required certain agencies to develop regulations which detail a wide range of standards applied during the design, construction, and alteration of buildings and facilities. Those standards are expressed in the *Americans with Disabilities Act Accessibility Guidelines* (ADAAG).

The rules governing both Title II and Title III of the ADA contain an exception to the general accessibility requirements where historic preservation is involved. Buildings or facilities such as this one that are listed in the National Register of Historic Places under the National Historic Preservation Act and are designated as historic under state or local law qualify for the historic building exception. The general rule is that alterations to a qualified historic building must comply with the accessibility rules unless it is determined that compliance with the requirements for accessible routes (exterior and interior, ramps, entrances, or toilets) would threaten or destroy the historic significance of the building in which case alternative requirements may be utilized. The Historic Buildings and Alterations-Level 1, 2 & 3 Chapters of the IEBC as well as ADAAG will generally trigger the following minimum accessibility requirements:

At least one site arrival point shall be accessible. Because on-site parking is not provided, an accessible parking space need not be provided. It is assumed that the new river walk and bridge will provide an accessible route to the building.

At least one main entrance shall be accessible. It is not recommended that the front entrance be made accessible because it would threaten or destroy the historic significance of the building. If a main entrance cannot be made accessible, the code allows an accessible nonpublic entrance that is unlocked while the building is occupied; *or* a locked accessible entrance with a notification or remote monitoring system. Of the two remaining entrances, we recommend that the back porch door be upgraded to provide an accessible entrance. The entrance would need to be altered to meet accessibility requirements by: 1) providing a new platform lift, and 2) reworking existing Doors 10 & 12 to accommodate a clear opening width of 32" minimum which is measured between the face of the door and the stop with the door open 90 degrees for swinging doors. The option of a ramp was not pursued because the required length and size would have an adverse impact on the appearance of the house, and it would be considered an addition which would not be allowed by the Floodplain Zoning Ordinance.

An accessible route from an accessible entrance to public spaces on the level of the accessible entrance shall be provided. An accessible route, consisting of the walking surfaces, doors and doorways, shall be provided throughout the first floor. All of the doors and doorways shall have a clear opening width of 32" minimum. There are a couple additional doors and doorways that would need to be altered to meet accessibility requirements including Door 5 at the Bathroom and Door 9 at the Dining Room.

Where toilet rooms are provided, at least one accessible toilet room shall be provided. The size of the existing toilet room is sufficient to provide an accessible unisex toilet room or a new one could be provided at the original pantry location. In either case, it would need to meet accessibility requirements by providing: 1) an ADA compliant toilet, 2) an ADA compliant wall-hung sink with lever-handled faucet in lieu of a vanity, 3) a mirror mounted with the bottom edge of the reflecting surface 40" maximum above the floor, 4) side wall and rear wall grab bars, 5) and toilet paper and paper towel dispensers at the appropriate reach ranges.

Displays and written information, documents, etc. should be located where they can be seen by a seated person. Exhibits and signage displayed horizontally (e.g., open books) should be no higher than 44" above the floor surface. We recommend that provisions be made on the first floor to equally convey the any future information and exhibits which may be displayed on other floors via text, video, photographs, drawings, etc.

Materials Analysis

Paint

By David Arbogast, Architectural Conservator of Arbogast Paint Analysis (edited)

On Friday, February 25, 2011 David Arbogast, architectural conservator, of Davenport, Iowa, received a set of seventeen paint samples from Jennifer Lehrke, AIA, of LJM Architects in Sheboygan, Wisconsin. The samples were collected from the Lockkeeper's House on Government Island in De Pere, Wisconsin by her on February 16, 2011 and were submitted for analysis to determine their historic colors.

Analysis of the paint samples was completed on Friday, March 4. Analysis was conducted using an optical Olympus microscope with magnification between 14 and 80 power. Each layer observed was color matched to the Munsell System of Color using natural north light. Only opaque, pigmented layers (i.e. paint layers) were matched.

The Munsell System of Color is a scientific system in which colors have been ranged into a color fan based upon three attributes: hue or color, the chroma or color saturation, and the value or neutral lightness or darkness. Unlike color systems developed by paint manufacturers, the Munsell system provides an unchanging standard of reference which is unaffected by the marketplace and changing tastes in colors.

The hue notation, the color, indicates the relation of the sample to a visually equally spaced scale of 100 hues. There are 10 major hues, five principal and five intermediate within this scale. The hues are identified by initials indicating the central member of the group: red R, yellow-red YR, yellow Y, yellow-green YG, green G, blue-green BG, blue B, purple-blue PB, purple P, and red-purple RP. The hues in each group are identified by the numbers 1 to 10. The most purplish of the red hues, 1 on the scale of 100, is designated as 1R, the most yellowish as 10R, and the central hue as 5R. The hue 10R can also be expressed as 10, 5Y as 25, and so forth if a notation of the hue as a number is desired.

Chroma indicates the degree of departure of a given hue from the neutral gray axis of the same value. It is the strength of saturation of color from neutral gray, written /0 to /14 or further for maximum color saturation.

Value, or lightness, makes up the neutral gray axis of the color wheel, ranging from black, number 1, to white at the top of the axis, number 10. A visual value can be approximated by the help of the neutral gray chips of the Rock or Soil Color chart with ten intervals. The color parameters can be expressed with figures semi-quantitatively as: hue, value/chroma (H, V/C). The color "medium red" should serve as an example for presentation with the three color attributes, 5R 5.5/6. This means that 5R is located in the middle of the red hue, 5.5 is the lightness of Munsell value near the middle between light and dark, and 6 is the degree of the Munsell chroma, or the color saturation which is about in the middle of the saturation scale.

The samples were collected in resealable plastic bags with the samples adhered

to pieces of cardboard having primary identification attached on their reverse sides. The samples were adhered with clear adhesive tape. Numbering on the samples was written on the bags themselves. The samples were excellent in condition. Their discussion lists the layers from the most recent at the top to the oldest at the bottom of the list. In several cases, the color observed did not match standard Munsell colors. In these cases the notation is given between the two numbers. For example, the Munsell system contains tan chips for 2.5Y 7/2 and 2.5Y 7/4, but not for 2.5Y 7/3 which lies between the two.

Subsequent to his paint analysis, Mr. Arbogast was asked to convert his Munsell system findings into the Sherwin Williams color palette, as it is our observation that most reputable painting contractors in northeastern Wisconsin use Sherwin Williams paints. These colors, as well as the Munsell system notations, are given the in Treatment Recommendations section of this report.

Mortar

By Tom Glab, Laboratory Manager of U.S. Heritage Group, Inc. (edited)

Introduction

The findings and recommendations presented in this report are premised on the results of tests performed on a mortar samples delivered to our laboratory on July 14, 2010.

The scope of testing was limited to the determination of the physical mix proportions of the major ingredients used in the mortar samples. The testing included visual examination, both with and without magnification, as well as analysis of the aggregate color, particle shape, and grain size distribution.

The samples' physical characteristics, original date of construction, and guidelines from the U.S. Department of the Interior National Park Service were used to determine the proposed mortar component recommendations as well as the aggregate ratios for the replacement mix.

U.S. Heritage Group interpreted and adjusted the proposed mortar formulation recommendation based on the information provided to us regarding: current site conditions; present condition and type of masonry; the function of the new mortar; and the degree of weather exposure. Assuming the sample provided is representative of the original mortar, the analysis and mortar-matching diagnosis detailed in this report here will give a reliable indication of the original ingredients and allow U.S. Heritage Group to recommend a historically correct mortar formulation for your project.

Samples

Sample received consisted of one sealed plastic bag with mortar pieces extracted from different locations. The samples were identified in our laboratory as USHG 10053-2 – De Pere.

Preliminary Testing

Following preliminary cleaning U.S. Heritage Group technicians visually examined the samples. The samples were consistent in color and texture which suggests they were originally made from similar ingredients. Next we compared the samples against other mortars of a similar age and appearance by

measuring their relative compression resistance. All samples were qualified for medium to high resistance to braking. This suggests they likely contain a hydraulic component (cement).

Aggregate Analysis

Next, we crushed each sample and chemically removed the binder from the aggregate using a dilute acid solution. After drying the aggregate, we viewed it under 40X magnification to determine the characteristics of the particles. A sieve separation process established the distribution of aggregate particles by a percent of total weight. We prepared a gradation charts to graphically display the color, shape, and size of the aggregate particles. The aggregate sieve sizes requisite in ASTM C144 meet ASTM E11 specification requirements. The sand weight retained on each testing sieve is shown to the right.

Testing Sieve Size		% of Sand Retained
4.75mm,	No. 4	0.0
2.36mm,	No. 4	0.0
1.18mm,	No. 4	3.0
600micro,	No. 4	13.8
300micro,	No. 4	49.5
150micro,	No. 4	25.9
75micro,	No. 4	7.8
Total Sand Weight		**100.0**

Based on the particle color and shape similarities, it appears that mortar samples were made using similar sand – probably from the same source. The aggregate was well distributed throughout the mess sizes. The material is classified as medium-sized aggregate. The aggregate appears to be sub-angular and sub-round in shape. Under magnification, the majority of the aggregate is transparent white and tan with grey particles scattered throughout the material. Remains of black pigment is found on sands' particles surface.

Binder to Aggregate Ratio

Amount of binder in this mortar sample was found to be above 45%. This mix design would be considered a binder-rich formulation. The results of this calculation can be affected by the presence of calcium carbonate in the aggregate which would have been dissolved out during the chemical wet process. This factor was considered in the evaluation of the proposed replacement formulation.

Sample	**10053-2**
Binder	61.39%
Aggregate	38.61%
TOTAL	**100.00%**

Summary of Test Results

Direct pressure testing indicates a medium to high compressive strength for all of the samples. The material reaction noted during the wet chemistry procedures indicates significant presence of a hydraulic component in the material (similar to Type N or Type O mortars).

This coupled with the sample's appearance, suggests that it was originally mixed using Portland cement, non-hydraulic hydrated lime, and sand. The use of a lime putty mortar would have been unlikely since lime inclusion were not detected in the sample. Mortars mixed with lime putty typically leave traces of white lime inclusions – the small particles of un-dissolved lime.

Based on the various tests detailed above, the sample appears to be composed of Portland cement, a carbonated non-hydraulic hydrated lime, and a river or lake sand.

Proposed Replacement Mix

In light of these findings and the intended use of the replacement material, U.S. Heritage Group recommends specifying a replication mortar formulation consisting of 1 part Portland cement, 2 parts non-hydraulic hydrated lime, and 8 parts sand.

This mix design is specified under the classification “Type O” in ASTM C270. The Portland cement should meet ASTM C150; the non-hydraulic hydrated lime should meet Type S in ASTM C207; and the sand should match the original sand as closely as possible in terms of color, size, shape, and gradation. The Type O formulation is suggested for its flexibility, adequate compressive strength.

Jobsite Mock-Up Sample

The replacement mortar sample should be field-tested through a jobsite mock-up. The mock-up sample should be installed by a qualified craftsperson who understands the curing and application details of traditional lime mortars. Once the mock-up sample is installed, appropriate precautions should be taken to ensure that the mortar is protected from wind, sun, rain, and frost to enable slow curing (i.e. carbonation) to take place.

The sample should be allowed to cure in the wall for a minimum of seven days before final color match is approved. Please see the U.S. Heritage Group guidelines on installation procedures of lime putty mortar formulations.

This information is held in confidence and becomes a permanent record at the U.S. Heritage Group laboratories located at 3516 North Kostner Ave., Chicago, IL 60641. It can be referenced at any time in the future by the property owner named above or by an authorized mason contractor involved with the restoration work. When inquiring about this match please use the project number USHG #10053.

Future Research

Excessive humidity levels within the building have caused mold to grow on the plaster walls behind the wallpaper. Future research should be conducted by an experienced professional to determine the extent of the mold growth and develop a remediation plan according to analytical methods recommended by the American Industrial Hygiene Association.

A 2000 environmental assessment report identified underground piping from the house, under the river, and to a fill station on the southeast end of the lock for the purpose of filling the heating oil tank in the basement of the house. Sampling and analysis of the surrounding soil to check for leaks and spills was recommended in the report. Future research should determine if this work occurred.

A 1993 asbestos inspection report identified asbestos in several locations: flooring under the sink, flooring in the bathroom, tape on ducts in basement, and pipe insulation in basement stairwell. It is not believed that removal of these asbestos containing materials was undertaken. Future research should determine if this is the full extent of asbestos within the building.

Treatment Recommendations

Using the Standards & Guidelines

The Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring and Reconstructing Historic Buildings promotes responsible preservation practices and protect our Nation's cultural resources by providing a philosophical basis which can be used to make essential decisions about historic buildings.

The *Standards* are general and identify four treatment options suitable for all types of historic resources: Preservation, Rehabilitation, Restoration, and Reconstruction. Preservation requires the retention of the historic building's form, features, and details which comprise the historic fabric as it was developed over time. Rehabilitation acknowledges the necessity of alterations and additions in the continued use of a historic building while retaining as much of a historic building's character as possible. Restoration depicts a building at a key point in its history, preserving historic materials from that time and removing any later alterations or additions. Primarily used for interpretive purposes, reconstruction recreates a missing historic building based on historic evidence with new materials.

The *Guidelines* assist in applying the *Standards* to specific resource types, such as buildings in this case. They pertain to buildings of all types and sizes and the work on both the interior and the exterior. They are laid out by treatment and then building materials and features and by "Recommended" practices which are consistent with the *Standards* and "Not Recommended" practices which are not. However, they are not specific in and of themselves and may require the interpretation and advice of a qualified historic preservation professional experienced in working with historic buildings.

Choosing an Appropriate Treatment

Choosing an appropriate treatment for a historic building requires careful evaluation of its historical significance, physical condition, proposed use, and code requirements.

Historical significance can be defined in many ways. Historic resources types include buildings, sites, structures, objects, or districts. They can be significant for their association with events that have made a significant contribution to the broad patterns of our history; their association with the lives of persons significant in our past; their embodiment of distinctive characteristics of a type, period, or method of construction or representative of the work of a master, or possession of high artistic value; or their potential to yield information important in prehistory or history. Resources can be locally, state, or nationally significant. Higher degrees of significance will require more protective treatments. For instance, a National Register listed individual building will frequently undergo a Preservation or Restoration Treatment whereas an individual building among many within a National Register district will often warrant a Rehabilitation Treatment.

Assessing the existing physical condition, or degree of material integrity, plays

a major role in the selection of an appropriate treatment. It should be determined if the building has survived in its original form or if it has been altered over time. If it has been altered, the alterations should be evaluated for their contribution to the building's history. Higher degrees of physical integrity will require more protective treatments. For instance, if distinctive spaces, features, and materials are relatively intact, a Preservation Treatment will be appropriate whereas a Rehabilitation Treatment is most appropriate for buildings requiring extensive repairs or alterations and additions for a new use.

The proposed use for a building also impacts the treatment selection. Some buildings continue to be used as they were historically while others are adapted for new uses. Many types of buildings lend themselves to other uses without much impact on the building's historic character-defining elements. However, specialty use buildings can be very difficult to adaptively reuse without loss of historic integrity and character-defining elements.

Code requirements need to be taken into consideration regardless of the treatment selected. Integration of code required work may adversely affect a building's historic character if thoughtlessly designed. Historic finishes need to be considered during asbestos and lead paint abatement. Accessibility requirements of the Americans with Disabilities Act should minimize visual change and loss of historic materials. In any case, changes to the historical appearance should be avoided if at all possible or minimized.

In the case of the De Pere Lockkeeper's House, a Rehabilitation Treatment was selected because it was an individual building among other structures within a National Register district and much of the building's interior historic fabric was not intact, requiring extensive repairs to accommodate a new future use.

Standards for Rehabilitation

The Secretary of the Interior defines Rehabilitation as "the act or process of making possible a compatible use for a property through repair, alterations, and additions while preserving those portions or features which convey its historical, cultural, or architectural values." The following Rehabilitation Standards provided a philosophical basis to the treatment recommendations contained within this report.

1. A property will be used as it was historically or be given a new use that requires minimal change to its distinctive materials, features, spaces, and spatial relationships.
2. The historic character of a property will be retained and preserved. The removal of distinctive materials or alteration of features, spaces, and spatial relationships that characterize a property will be avoided.
3. Each property will be recognized as a physical record of its time, place, and use. Changes that create a false sense of historical development, such as adding conjectural features or elements from other historic properties, will not be undertaken.
4. Changes to a property that have acquired historic significance in their own right will be retained and preserved.
5. Distinctive materials, features, finishes, and construction techniques or examples of craftsmanship that characterize a property will be preserved.
6. Deteriorated historic features will be repaired rather than replaced. Where the severity of deterioration requires replacement of a distinctive feature, the new material will match the old in design, color, texture, and, where

possible, materials. Replacement of missing features will be substantiated by documentary and physical evidence.

7. Chemical or physical treatments, if appropriate, will be undertaken using the gentlest means possible. Treatments that cause damage to historic materials will not be used.
8. Archeological resources will be protected and preserved in place. If such resources must be disturbed, mitigation measures will be undertaken.
9. New additions, exterior alterations, or related new construction will not destroy historic materials, features, and spatial relationships that characterize the property. The new work shall be differentiated from the old and will be compatible with the historic materials, features, size, scale and proportion, and massing to protect the integrity of the property and its environment.
10. New additions and adjacent or related new construction will be undertaken in such a manner that, if removed in the future, the essential form and integrity of the historic property and its environment would be unimpaired.[16]

Guidelines for Rehabilitating Historic Buildings

From the outset, the Rehabilitation Treatment assumes that the much of the historic fabric, including materials and character-defining features, have been damaged or become deteriorated over time and repair and replacement will be necessary. The *Guidelines for Rehabilitation* are the only treatment option which offers the latitude to alter or add onto the building to accommodate a new use and replace missing features with traditional or substitute materials.

The Rehabilitation *Guidelines* recommend identification of architectural form, detailing, materials, and features that define a historic building's character and, therefore, must be retained and preserved. These character-defining elements may include exterior materials such as masonry or wood; features such as roofs, windows, or porches; or the overall site and setting in which the building sits. "Identifying, retaining, and preserving" these elements is the first priority within the *Guidelines*.

After identifying, retaining, and preserving; character-defining materials and features shall be protected and maintained. This generally offers the least degree of intervention in preparation of other future work. Common protection and maintenance measures that were performed on during the 2010 stabilization project and should be preformed as part of a future rehabilitation project include caulking, paint removal, and re-application of protective coatings. While most rehabilitation projects required more extensive intervention, an evaluation of existing physical conditions and recommendations for work should begin at this level.

When intervention is deemed necessary because of the deteriorating physical condition of important character-defining elements, the Rehabilitation *Guidelines* recommend repair work that takes the least degree of intervention as possible via stabilization, consolidation, and conservation. Typical repair measures that were undertaken as part of the 2010 stabilization project and could be necessary in the future include repointing masonry with appropriate mortar, patching masonry, and patching and splicing wood features. On any project, the rehabilitation repair work should be documented for future research and identifiable upon close inspection, yet visually and physically compatible.

When repairs would be an inadequate level of intervention to address the physical condition, the Rehabilitation *Guidelines* allow replacement of deteriorated or missing elements with in-kind or compatible substitute materials. Missing features should be patterned from surviving prototypes, and any new materials should match the historic materials visually and physically (i.e.-old wood should be replaced in-kind with new wood). Similar to repair work, replacement work should be identifiable and documented for future research.

When an entire feature is missing, the Rehabilitation *Guidelines* prefer accurate replication of the feature based on pictorial and physical evidence. However, a compatible new design, which takes into account materials, size, and scale, is also acceptable as long as it is clearly differentiated as to not create a false historical appearance.

Some interior and exterior alterations are allowed under the Rehabilitation *Guidelines* as long as they do not destroy or radically change the building's character-defining finishes, features, materials, or spaces. Common alterations include new openings on secondary elevations, installation of new mechanical and electrical systems, and selective demolition of intrusive or detracting features. While building additions should be avoided, they may be allowed if the occupant can prove that their needs cannot be housed within the existing building.

Treatment Recommendations

The Rehabilitation *Standards* and *Guidelines* were used in developing the following treatment recommendations for this project. They are recommended practices consistent with the *Standards* and laid out by building elevation or façade and then room by room. Furthermore, the work recommendations were developed and reviewed with the Wisconsin Historical Society's Preservation Architect, Mark Buechel. Supporting Schematic plans and elevations which illustrate the intent of the recommendations are included in the appendix.

North Facade

There is a partially exposed foundation wall, consisting of cream colored limestone, near the west side of the north façade. It appears to be in good condition. However, grades should be carefully inspected in this area due to repeated erosion as well as at the back porch entry where the grade may be sloping toward the house.

The above grade walls are comprised of red brick and grey mortar, with the exception of the walls of the Back Porch which are green painted wood shingles. All of the wall materials are in good condition as a result of the 2010 stabilization project. Several corrective measures were identified:

- Remove rust stains and miscellaneous paint splatter from brick west of the Back Porch.
- Repair or replace chipped and spalling stone sill at basement window west of the Back Porch.
- Remove paint splatter from stone sill at Kitchen window west of the Back Porch.

- Remove three metal brackets and screws along the west side of the Kitchen window west of the Back Porch and repair masonry.
- Remove miscellaneous paint splatter from brick east of the Back Porch.
- Remove paint splatter from stone sill or repaint stone sill at Dining Room window east of the Back Porch.

Brick moulding, bed moulding, soffit, fascia, and cornices are of painted wood, corresponding to those profiles shown on the original plans. As a result of the 2010 stabilization project, they are in good condition.

The roof is covered with three-tab asphalt shingles in a weathered wood color which was installed during the 2010 stabilization project. It replaced an earlier red colored, diamond shaped asbestos roof tile which is believed to have replaced an original wood shingles roof. Consideration should be given to installing a wood shingle roof in the future.

East Facade

The above grade walls are comprised of red brick and grey mortar and are in good condition as a result of the 2010 stabilization project. A few defects were identified:

- Fill four holes in brick or repair masonry immediately north of side door.
- Remove paint splatter from stone sill or repaint stone sill at side door.
- Restore original window opening at Bathroom which was reconfigured in 1973-1974.

Brick moulding and cornices are painted wood, corresponding to those profiles shown on the original plans. As a result of the 2010 stabilization project, they are in good condition.

South Facade

There is a partially exposed cream colored limestone foundation wall near the west side of the south façade. It appears to be in good condition. However, grades should be carefully inspected in this area due to repeated erosion.

The above grade walls are comprised of red brick and grey mortar, with the exception of the walls of the front porch which are green painted wood shingles. All of the wall materials are in good condition as a result of the 2010 stabilization project. Several corrective measures were identified:

- Restore original window opening at Bathroom which was in-filled in 1973-1974.
- Restore original window opening at Front Closet which was in-filled in 1973-1974.
- Restore original Front Porch which was enclosed around 1949.
- Remove concrete pier at west side of Front Porch which was poorly conceived in 2010 and replace with a brick pier to match the original pier on the east side of the porch.
- Remove and replace poorly laid brick patches at former downspout penetrations through wall on either side of the Front Porch.
- Remove miscellaneous paint splatter from brick west of the Front Porch.

Brick moulding, bed moulding, soffit, fascia, and cornices are of painted wood, corresponding to those profiles shown on the original plans. As a result of the 2010 stabilization project, they are in good condition.

The main roof is covered with three-tab asphalt shingles in a weathered wood color, and the Front Porch roof is a single-ply, fully adhered EPDM; both of which were installed during the 2010 stabilization project. The main roof replaced an earlier red colored, diamond shaped asbestos roof tile which is believed to have replaced an original wood shingles roof. Consideration should be given to installing a wood shingle roof in the future.

West Facade

There is a fully exposed foundation wall, consisting of cream colored limestone, along the west façade. It appears to be in good condition. However, grades should be carefully monitored in this area due to aggressive erosion.

First floor walls are comprised of red brick and grey mortar and are in good condition as a result of the 2010 stabilization project. A few defects were identified:

- Remove miscellaneous paint splatter from brick across entire west façade.
- Remove concrete patch at foundation wall below Back Closet which was poorly executed in 2010 and replace with concrete which better matches the original in both color and texture.
- Remove paint from concrete foundation wall below Back Closet.

Corresponding to those profiles shown on the original plans, the brick moulding and cornices are painted wood. As a result of the 2010 stabilization project, they are in good condition.

Basement B01

What can be seen of the existing concrete floor in this room is in fair condition. There is evidence of some past water infiltration in the form of a thick layer of dried mud and muck near the vicinity of the base of the stair and Storage Room B02. This should be shoveled off of the concrete and disposed of, and the floor should be cleaned so a better assessment of its condition can be made.

Due to the utilitarian nature of the space, there is no base in this room.

The walls are comprised of stone and mortar and are topped by nine courses of brick, with the exception of the walls of Storage Room B02 and the Former Cistern Room B03 which are concrete masonry units (CMU) and cast-in-place concrete respectively. All of the various wall materials are in fair condition and have been whitewashed or painted white. As it is a utilitarian space, paint analysis was not performed in this room.

The door to Basement Room B01 is indicated on the attached schematic plans as Door 7. It is a 2'-2"x6'-0" solid wood, stile and rail style door with four flat panels oriented horizontally. The door and trim are stained and sealed. Corresponding to those shown on the original plans, it appears to be an original door with original wood trim and door hardware. It is in fair condition. However, it rubs on the carpet of the stair landing and does not open all the

way. The bottom of the door should be planed to allow for free range of motion.

There are three small window openings in this room, one in the north, west, and south walls. Similar to all of the windows of the building, the north window opening's sash was removed and stacked neatly with the others in the vicinity of Dining Room 106 during the 2010 stabilization work, and the opening was outfitted with a painted wood shutter. Unlike the others, this shutter does not have a ventilation opening. With its north-northwestern orientation and proximity to the ground, it is assumed that the ventilation opening was omitted in this location to prevent the intrusion of wind driven rain and snow. The exterior faces of the west and south windows have painted wood shutters with ventilation holes. However, the ventilation is obstructed by wood, two-light awning sashes on the interior faces of these openings. At a minimum, the west and south awning windows should be temporarily propped open or temporarily removed and stored on-site to allow for proper ventilation. Due to the utilitarian nature of the space, there is no trim around the window openings.

The ceiling in this room consists of exposed structure: 2x10 joists at 16" on center with 1x6 tongue and groove decking or subfloor laid at a diagonal to the joists. This structure is in good condition.

Of note is the evidence of the former downspout route to Former Cistern Room B03. A vacated opening on the south wall, to the west of the front porch, has been patched in, although somewhat poorly. On the north wall, a hole in the interior wythe of masonry remains on the east side, and approximately two-feet of corrugated, round, galvanized downspout piping projects from the wall between the window opening and the juncture of the back porch.

Also note that the basement may need to be filled as previously described as part of the negotiations between the Wisconsin Historical Society, the Wisconsin Department of Natural Resources, and the City of De Pere. While the WHS would prefer not to fill the basement, doing so is preferable over other floodproofing measures as it preserves the existing, original materials and would be easily reversed in the future. If this route is taken, the above recommendations should be disregarded.

Storage B02

It is assumed that the existing concrete floor in this room is in fair condition. However, past water infiltration has covered the floor in a thick layer of dried mud which extends into Basement B01. This should be shoveled off of the concrete and disposed of, and the floor should be cleaned to better assess its condition.

Due to the utilitarian nature of the space, there is no base in this room.

The east and south walls are stone and mortar topped by nine courses of brick, and the north and west walls are CMU. The introduction of this different material indicates that this room was added at the later date, presumably when the gravity fed furnace was installed in 1926. All of the various wall materials are in fair condition and have been whitewashed or painted white. As it is a secondary space that is not original to the building, paint analysis was not performed in this room.

The door to Storage B02 is indicated on the attached schematic plans as Door 1. It is a 2'-6"x6'-6" solid wood, stile and rail style door with four flat panels oriented vertically. The door and its 1x4 wood trim are painted. While the door and its hardware appear to be historic, there is physical and visual evidence that this door was used differently at one time; there are scars on the current latch side of the door from former hinge mortises, and there is a keyhole and other miscellaneous holes, likely from a surface mounted latch, on the current hinge side of the door. Because of this, the door is in fair to poor condition.

Similar to the window configuration in Basement B01, there is one small window opening in the south wall of this room. Similar to the south and west windows of Basement B01, the exterior face of this window has a painted wood shutter with a ventilation holes. However, the ventilation is obstructed by a wood, two-light awning sash on the interior face of the opening. At a minimum, the awning window should be temporarily propped open or temporarily removed and stored on-site to allow for proper ventilation. Due to the utilitarian nature of the space, there is no trim around the window opening.

Similar to Basement B01, the ceiling in this room consists of exposed structure: 2x10 joists at 16" on center with 1x6 tongue and groove decking or subfloor laid at a diagonal to the joists. The structure is in good condition.

Of note is the presence of a wood bench along the south wall and a corrugated, round, galvanized downspout pipe which enters the room on the south wall at the east corner, runs along the east wall, and penetrates through the north wall at the east corner where it is cut off on its former route to Former Cistern B03.

Also note that if the basement needs to be filled as previously described, the above recommendations should be disregarded.

Former Cistern B03

The existing concrete floor in this room is in fair condition, and there is no base in this room.

There are stone and mortar walls on the north and east sides and cast-in-place concrete walls the south and west sides; the interior of the former cistern has been parged smooth with concrete and/or plaster. The introduction of this different material may indicate that this room was added at the later, unknown date, although it's doubtful. All of the various wall materials are in fair condition and have been whitewashed or painted white. As it is a secondary space that is not original to the building, paint analysis was not performed in this room.

Typical of many vacated cisterns, an opening was cut into the cistern, presumably between 1949 and 1957, so the space could be utilized for storage. The door is shown on the attached schematic plans as Door 2. It is a solid wood, plank style door with a Z-brace on the interior face. The door and its 1x4 wood trim are painted and are in fair condition.

There are no window openings in this room.

Unlike the other rooms in the basement, the Former Cistern is capped with a 2x12 plank ceiling which is in fair condition.

Of note is the presence of built-in wood shelving which was added at an unknown date after the cistern was abandoned between 1949 and 1957.

Also note that if the basement needs to be filled as previously described, the above recommendations should be disregarded.

Front Porch 101

The existing floor consists of remnants of two different layers of vinyl sheet goods over gray painted 1x3¼ tongue-and-groove wood decking. It is unknown whether the decking dates from the original porch construction in 1912 or from when the porch was enclosed perhaps around 1949. However, it is consistent with historic porch flooring materials from the era. As it contributes to the overall historic character of the building, retention and repair or the wood decking should be employed if possible. Any secondary flooring materials, such as the vinyl sheet goods, should be removed to better assess the condition of the wood decking below and inspect it for cracking, buckling, rot, and any other forms of deterioration. From what can be seen of the decking through the holes in the vinyl, it is assumed to be in poor to fair condition, but salvageable. The wood decking should be repaired where necessary, sanded smooth, prepped, and repainted.

Due to the utilitarian nature of the space, there is no true base in this room, only a painted, 3/4–inch shoe molding around the perimeter.

The north wall of the Front Porch is comprised of the face brick of the main portion of the house which was likely painted when the porch was enclosed. The paint should be removed from the brick, and it should be cleaned to bring the masonry back to its original appearance. The east, south, and west walls were constructed at a later date when the original porch was enclosed. They consist of a half wall of painted 1x4 tongue-and-groove bead board wainscot topped by window openings. As it was enclosed outside of the house's period of significance, it is recommended that the porch enclosure be removed so the at the porch can be accurately replicated to its original condition based on the 1911 blueprints and photographic evidence. Along the perimeter of the top of the wall are painted 1x6 fascia boards with 2½-inch bed mouldings at the juncture of the ceiling, both of which correspond to the original porch construction shown on the 1911 plans. While the wood fascia boards and bed mouldings appear to be in fair condition, the paint is cracking and deteriorated. This trim should be properly scraped, prepped, and repainted.

The door to Front Porch 101 is indicated on the attached schematic plans as Door 3. It is a 2'-10"x7'-0" solid wood, stile and rail style door with six square flat panels and a 24-inch square light. Corresponding to those shown on the original plans, it appears to be an original door with original door hardware. The door is stained and sealed on the Front Porch side. From what can be seen on the Front Porch face, the door appears to be in fair condition. The Front Porch side of the door is trimmed with a painted wood brickmold which corresponds to the original plans. While the wood appears to be in good condition, the paint is cracking and deteriorated. This brickmold should be properly scraped, prepped, and repainted.

There is a former window opening in the north wall of this room to the east of the door. Likely when Hall 102, Bath 104, and Front Closet 110 were reconfigured and remodeled in 1973-1974, the original window sashes were

removed, and a stained and sealed five-shelf bookshelf was installed in its place. If the space is reconfigured back to its original condition, the bookshelf should be removed, and the window opening should be restored back to its historic appearance based on the original drawings and other extant window openings. There are eight window openings in this porch enclosure walls, two in the east, four in the south, and two in the west. Similar to the other windows, the sashes were removed and stacked neatly with the others in the vicinity of Dining Room 106 during the 2010 stabilization work, and the openings were outfitted with painted wood shutters with ventilation holes. There is simple, painted 1x4 wood trim around each of the window openings; some of the pieces are missing. As these windows date outside of the house's period of significance, it is recommended that they be removed so the at the porch can be accurately replicated to its original, open condition based on the 1911 blueprints and photographic evidence.

The existing ceiling consists of painted 1x2 tongue-and-groove bead board. As it is consistent with historic porch ceiling materials of the era, it is assumed to be the original porch ceiling. It is in poor condition; the paint it flaking and deteriorated, and it has buckled along the east side. The buckled should be repaired using the original or like materials, and then the bead board ceiling should be properly scraped, prepped, and repainted.

Hall 102

In general, we recommend that this room be removed so the space can be reconfigured back to its original condition.

The existing floor consists of carpet pad remnants glued to stained and sealed 1x2¼ tongue-and-groove wood flooring. As it is consistent with historic flooring materials from the era and appears throughout the house, it is assumed that the wood flooring dates from the original construction. As it contributes to the overall historic character of the building, retention and repair of the original wood floors should be employed wherever possible. Any secondary flooring materials, such as the carpet pad remnants, should be removed to better assess the condition of the wood flooring below and inspect it for cracking, buckling, and any other forms of deterioration. From what can be seen of the wood flooring through the holes in the carpet pad, it is assumed to be in poor to fair condition, but salvageable. The wood flooring should be repaired where necessary, sanded, prepped, and refinished.

Likely when Hall 102, Bath 104, and Front Closet 110 were reconfigured and remodeled in 1973-1974, the original wood base was removed and replaced with stained and sealed ranch style casing. This trim should be removed and replaced with new stained and sealed wood trim based on the original drawings and matching the component profiles in Stair 105.

The north and west walls of the Hall 102 are comprised of paneling type 1 over painted plaster. The south and east walls of Hall 102 were likely added when Hall 102, Bath 104, and Front Closet 110 were reconfigured in 1973-1974 and consist of paneling type 1 over painted gypsum wallboard. Any secondary wall coverings, such as the paneling, should be removed to better assess the condition of the plaster and gypsum wallboard below and to inspect it for cracking, holes, mold, and other forms of deterioration. From what can be seen of the plaster and gypsum wallboard through holes in the paneling and above the ceiling, it is assumed to be in poor condition. The plaster and gypsum wallboard should be repaired where necessary, prepped, and repainted

a tan color which was found during paint analysis (Sherwin Williams SW 6122 Camelback or Munsell 2.5Y 7/4).

There are no door or window openings specifically associated with Hall 102.

The existing ceiling consists of 2x4 fiberglass ceiling tiles and a suspended metal grid dropped approximately one-foot below a painted plaster ceiling. As it is consistent with historic ceiling materials from the era and appears throughout the house, it is assumed that the plaster ceiling dates from the original construction and should be retained wherever possible. Any secondary ceiling materials, such as the ceiling tiles and grid, should be removed to better assess the condition of the plaster above and inspect it for cracking, holes, mold, and other deterioration. From what can be seen of the plaster ceiling, it is assumed to be in poor to fair condition. The plaster should be repaired where necessary, prepped, and repainted a white color.

Living Room 103

Similar to Hall 102, the existing floor consists of carpet pad remnants glued to stained and sealed 1x2¼ tongue-and-groove wood flooring which is assumed to date from the original construction. As it contributes to the overall historic character of the building, retention and repair of the original wood floors should be employed wherever possible. Any secondary flooring materials, such as the carpet pad remnants, should be removed to better assess the condition of the wood flooring below and inspect it for cracking, buckling, and any other forms of deterioration. From what can be seen of the wood flooring through the holes in the carpet pad, it is assumed to be in poor to fair condition, but salvageable. The wood flooring should be repaired where necessary, sanded, prepped, and refinished.

Throughout the house, the original wood base was systematically removed and replaced with stained and sealed ranch style base. This trim should be removed and replaced with new stained and sealed wood base, based on the original drawings and matching the component profiles in Stair 105.

The north wall of the Living Room is comprised of wallpaper over painted plaster. The west and south walls have paneling type 1 over painted plaster, and the east wall has a combination of wallpaper and paneling type 1 over painted plaster. Any secondary wall coverings, such as the wallpaper and paneling, should be removed to better assess the condition of the plaster below and to inspect it for cracking, holes, mold, and other forms of deterioration. From what can be seen of the plaster where the wallpaper has fallen off of the walls, it is assumed to be in poor to fair condition, and mold is evident. The plaster should be repaired where necessary, prepped, and repainted a tan color which was found during paint analysis (Sherwin Williams SW 6122 Camelback or Munsell 2.5Y 7/4).

In addition to the description found in Front Porch 101, Door 3 has been sheathed in a piece of type 1 paneling on the Living Room side. The paneling should be removed to better assess the condition of the door. Similar to most of the other doors of the house, the Living Room side of the door has been retrofitted with a stained and sealed ranch style casing which was installed between 1973 and 1974. This trim should be removed and replaced with new stained and sealed wood trim which corresponds to the original drawings and matches the component profiles at Door 7.

There are two 2'-9"x5'-3" window openings in the Living Room, one in the south wall and one in the west. Similar to the other windows, the sashes were removed and stacked neatly with the others in the vicinity of Dining Room 106 during the 2010 stabilization work, and the openings were outfitted with painted wood shutters with ventilation holes. Similar to other window openings of the house, the windows has been retrofitted with a stained and sealed ranch style casing which was installed in 1973-1974. This trim should be removed and replaced with new stained and sealed wood trim which corresponds to the original drawings and matches the component profiles at the window in Hall 201.

Similar to Hall 102, the existing ceiling consists of 2x4 fiberglass ceiling tiles and a suspended metal grid dropped approximately one-foot below a painted plaster ceiling which is assumed to date from the original construction. Secondary ceiling materials, such as the ceiling tiles and grid, should be removed to better assess the condition of the plaster above and inspect it for cracking, holes, mold, and other deterioration. From what can be seen of the plaster ceiling, it is in poor condition. The plaster should be repaired where necessary, prepped, and repainted a white color.

Bathroom 104

In general, it is recommended that this room be reconfigured back to its original condition. However, because there has been significant past alteration in this area and the rehabilitation treatment has been elected, the future configuration and use of this space may be at the discretion of the new tenant.

The existing floor is vinyl sheet goods which is assumed to be laid over a layer of underlayment laid over stained and sealed 1x2¼ tongue-and-groove wood flooring. Any secondary flooring materials, such as the vinyl and underlayment, should be removed to better assess the condition of the wood flooring below and inspect it for cracking and other deterioration. As the wood flooring was not visible, its condition is unknown. It should be repaired where necessary, sanded, prepped, and refinished.

When Bath 104 was remodeled in 1973-1974, a stained and sealed ranch style base was installed. This trim should be removed and replaced with new stained and sealed wood base, based on the original drawings and matching the component profiles in Stair 105.

The north, east, and south walls of Bath 104 are comprised of paneling type 2 over painted plaster. The west wall of Bath 104 was likely added during the 1973-1974 remodeling and consists of paneling type 2 over painted gypsum wallboard. Any secondary wall coverings, such as the paneling, should be removed to better assess the condition of the plaster and gypsum wallboard below and to inspect it for cracking, holes, mold, and other forms of deterioration. From what can be seen of the plaster and gypsum wallboard above the dropped ceiling, it is in poor condition. The plaster and gypsum wallboard should be repaired, prepped, and repainted a light gray color (Sherwin Williams SW 6169 Sedate Gray or Munsell 5Y 8/1) which was found during the paint analysis.

The door to Bath 104 is indicated on the attached schematic plans as Door 5. It is a 2'-2"x6'-8" hollow core, flush wood door with ranch style casing which

was likely added during the 1973-1974 remodeling. The door and trim are stained and sealed and are in fair condition; however, they are not historic in their appearance. The door and trim should be removed. Any new doors into the reconfigured space should be stained and sealed solid wood, stile and rail style door with five flat panels oriented horizontally and trim which corresponds to the original drawings and matches the trim at Door 7.

There is one existing window openings in the east wall of Bath 104. Similar to the other windows, the sashes were removed during the 2010 stabilization work, and the opening was outfitted with painted wood shutter with ventilation holes. In addition, the window trim consists of stained and sealed ranch style casing which was likely added during the 1973-1974 remodeling. It is assumed that this is not an original window because: 1) the size of the existing window is slightly smaller that the remaining first floor windows which are relatively consistent in size, and 2) there is slightly different mortar color and texture on the exterior of the building just below the window sill which corresponds to the original, larger opening. The window and trim should be removed and replaced with a new stained and sealed wood window and trim which corresponds to the original drawings and matches the window in Stair 105. In addition, it is believed that a window opening on the south wall was blocked up during the 1973-1974 remodeling. If the space is reconfigured back to its original condition, the window opening should be restored to its historic appearance based on the original drawings and other extant window openings.

The existing ceiling consists of 2x4 fiberglass ceiling tiles and a suspended metal grid dropped approximately one-foot below a painted plaster ceiling which is assumed to be original. Any secondary ceiling materials, such as the ceiling tiles and grid, should be removed to better assess the condition of the plaster above and inspect it for cracking, holes, mold, and other deterioration. From what can be seen of the plaster ceiling, it is in poor to fair condition. The plaster should be repaired where necessary, prepped, and repainted a white color.

Stair 105

The existing floor consists of carpet over stained and sealed 1x2¼ tongue-and-groove wood flooring which is assumed to date from the original construction. As it contributes to the overall historic character of the building, retention and repair of the original wood floors should be employed wherever possible. The carpet should be removed to better assess the condition of the wood flooring below and inspect it for deterioration. Based on other areas of the house, the wood flooring is assumed to be in poor condition, but salvageable. The wood flooring should be repaired where necessary, sanded, prepped, and refinished.

While the original wood base was systematically removed and replaced with stained and sealed ranch style base throughout the rest of the house, this is one of the few rooms that retains its original wood base and shoe moulding as seen on the original drawings. As it contributes to the overall historic character of the building, the original wood base and shoe moulding should be retained. It appears to be in fair condition and should be repaired where necessary.

All of the walls of Stair 105 consist of wallpaper over painted plaster. Due to the number of layers of paint underneath the wallpaper, it would not seem to be original to the building and should be removed to better assess the condition of

the plaster below. From what can be seen of the plaster where the wallpaper has peeled off of the walls, it is in poor to fair condition, and mold is evident. The plaster should be repaired where necessary, prepped, and repainted a dark tan color (Sherwin Williams SW 6123 Baguette or Munsell 2.5Y 6/4) which was found during the paint analysis.

The door from Stair 105 to the exterior is indicated on the attached schematic plans as Door 8. It was not removed during the 2010 stabilization project; it is a 2'-6"x6'-6" solid wood, stile and rail style door with three flat panels oriented horizontally with a 20-inch by 26-inch divided light. The exterior face of the door is painted white and the interior face of the door and the trim are stained and sealed. Corresponding to those shown on the original plans, it appears to be an original door with original wood trim. It is in poor condition and should be repaired where necessary, sanded, prepped, and refinished. The hardware is of a newer vintage and should be replaced with something more historically appropriate.

There are no windows associated with Stair 105.

The existing ceiling is a painted plaster ceiling which is assumed to date from the original construction. It is to be in fair condition and should be repaired where necessary, prepped, and repainted a white color.

Also of note, the stair components such as the ash handrail, turned balusters, and recessed flat panel stinger boards appear to match the original drawings are in good condition. As it contributes to the overall historic character of the building, retention and repair of the original components should be employed wherever possible.

Dining Room 106

Similar to Stair 105, the existing flooring consists of carpet. The carpet should be removed to determine if there is wood flooring below it and assess its condition. Based on other areas of the house, we assume that wood flooring is located under the carpet, and it is in poor condition. The wood flooring should be repaired where necessary, sanded, prepped, and refinished.

Throughout the house, the original wood base was systematically removed and replaced with stained and sealed ranch style base. This base should be removed and replaced with new stained and sealed wood base with shoe moulding, based on the original drawings and matching the component profiles in Stair 105.

All of the walls of Dining Room 106 consist of a paneling type 3 wainscot with wallpaper above, both over painted plaster. The panel wainscot and wallpaper are not original and should be removed to better assess the condition of the plaster below and to inspect it for cracking, holes, mold, and other deterioration. From what can be seen where the wallpaper has peeled off of the walls, the painted plaster is assumed to be in poor condition and should be repaired where necessary, prepped, and repainted a bright green color (Sherwin Williams SW 6739 Eco Green or Munsell 2.5G 6/5) which was found during the paint analysis.

The door from Stair 105 to Dining Room 106 is indicated on the attached schematic plans as Door 9. While it was removed and stored during the 2010

stabilization project, it is a 2'-8"x7'-0" solid wood, stile and rail style door with three flat panels oriented horizontally with a 20-inch by 26-inch divided light, stained and sealed. Corresponding to those shown on the original plans, it appears to be an original door with original hardware. It is in fair condition. If the future use of the house remains residential in nature, the door should simply be repaired where necessary, sanded, prepped, and refinished. If the building is converted to commercial purposes, the door may need to be replaced with a similar wider door to allow for accessibility throughout the first floor. The door's trim, however, is a stained and sealed ranch style casing which added between 1973 and 1974. The trim should be removed and replaced with a new stained and sealed wood trim which corresponds to the original drawings and matches the trim profiles at Door 7.

There are two 2'-9"x5'-3" window openings in the Dining, one in the north wall and one in the east. Similar to the other windows, the sashes were removed and stored during the 2010 stabilization work, and the openings were outfitted with painted wood shutters with ventilation holes. Similar to other window openings of the house, the windows has been retrofitted with a stained and sealed ranch style casing which was installed in 1973-1974. This trim should be removed and replaced with new stained and sealed wood trim which corresponds to the original drawings and matches the trim profiles of the window in Hall 201.

The existing ceiling consists of 12x12 acoustic tiles affixed to 1x3 wood furring strips over a painted plaster ceiling, the latter of which is assumed to be original. Any secondary ceiling materials should be removed in their entirety to better assess the condition of the plaster above. From what can be seen of the plaster ceiling from holes in the acoustic tile, it is in poor condition. The plaster should be repaired as necessary, prepped, and repainted a white color.

Kitchen 107

In general, we recommend that this room be reconfigured somewhat consistently with its original condition with a large pantry room along the west wall. This will provide for ADA compliant toilet facilities and a janitor's closet or a powder room and a pantry.

Similar to Dining Room 106, the existing flooring consists of carpet. The carpet should be removed to determine if there is wood flooring below it and assess its condition. Based on other areas of the house, we assume that wood flooring is located under the carpet, and it is in poor condition. The wood flooring should be repaired where necessary, sanded, prepped, and refinished.

Throughout the house, the original wood base was systematically removed and replaced with stained and sealed ranch style base. This base should be removed and replaced with new stained and sealed wood base with shoe moulding, based on the original drawings and matching the component profiles in Stair 105.

The north and south walls of Kitchen 107 consist of a paneling type 3 wainscot with wallpaper above, both over painted plaster. The west wall, while primarily cabinetry, consists of wallpaper over painted plaster. The panel wainscot and wallpaper are not original and should be removed to better assess the condition of the plaster below. The painted plaster is assumed to be in poor condition and should be repaired where necessary, prepped, and repainted a

bright green color (Sherwin Williams SW 6739 Eco Green or Munsell 2.5G 6/5) which was found during the paint analysis.

There are no doors associated with Kitchen 107.

There are two window openings in the Kitchen, one 2'-9"x 5'-3" in the north wall and a slightly smaller 2'-1"x4'-2" one in the west. Similar to the other windows, the sashes were removed and stored during the 2010 stabilization work, and the openings were outfitted with painted wood shutters with ventilation holes. Also similar to other window openings of the house, the windows has been retrofitted with a stained and sealed ranch style casing which was installed between 1973 and 1974. This trim should be removed and replaced with new stained and sealed wood trim which corresponds to the original drawings and matches the trim profiles of the window in Hall 201.

Similar to Dining Room 106, the existing ceiling consists of 12x12 acoustic tiles, 1x3 wood furring strips, a painted plaster ceiling which is assumed to be original. The secondary ceiling materials should be removed in their entirety to better assess the condition of the plaster. From what can be seen of the plaster ceiling where some tiles have fallen off, it is in very poor condition. The plaster should be replaced as necessary, prepped, and repainted a white color.

Also of note in this room is the presence of doug-fir plywood cabinets with a plastic laminate countertop along the west wall and a small, built-in doug-fir plywood cupboard in the south wall. The Ruechel family reports that they cabinets were installed in the mid-1960s; as such, these cabinets and countertops are not original. Due to the potential future uses of the building, it is assumed that replacement of these cabinets and countertops may be desired in favor with something more suitable to the new use.

Back Closet 108

The existing floor consists of 1x3¼ tongue-and-groove wood flooring, a different flooring material from the rest of the house. The wood flooring is in poor condition and has large holes in it from the 2010 work which stabilized the foundation. Therefore, the remainder of the wood flooring should be removed, the underlying holes in the decking should be filled, and a new wood flooring which matches the existing should be installed.

There is no existing base in this room. A new stained and sealed wood base which corresponds to the original drawings and matches the base profile in Closet 207 should be installed.

The north and west walls consist of wallpaper over painted plaster; the south wall is the face brick of the main portion of the house which is painted; and the east wall is exposed 2x4 wood stud structure. Due to the presence of multiple layers of paint beneath it, we conclude that the wallpaper is not original and should be removed. The plaster is in very poor condition, much of it has already fallen off of the lath, and should be removed. The west and north walls should be insulated and a vapor retarder applied, and the west, north, and east walls should receive a new layer of gypsum wallboard. Then, the entire space should be painted a gray color (between Sherwin Williams SW 6172 Hardware & SW 6173 Cocoon or Munsell 5Y 5/1) which was found during the paint analysis.

The door for the Back Closet is indicated on the attached schematic plans as Door 11. The existing door opening is sized to accommodate a pair of 3'-0"x6'-8" sliding doors. However, the doors are not extant, and it does not seem likely that they were removed and stored during the 2010 stabilization project. The door's trim is a stained and sealed ranch style casing which should be removed. The door and trim should be replaced with a new pair of solid wood, stile and rail style door with five flat panels oriented horizontally and trimmed to match the profiles at Door 7.

There are no windows associated with this room.

Due to its utilitarian nature, the existing ceiling is plywood. It should receive a layer of gypsum wallboard and should be painted a white color. In addition, the walls do not extend fully to the structural rafters above, leaving an open shelf above the Back Closet. This should be finished with stained and sealed plywood shelf and trimmed out to be more aesthetically pleasing and historically appropriate.

Also of note is that daylight can be seen at the intersection of the west stud wall with the face brick of the main house. This area should be sealed immediately to prevent unwanted rain or snow infiltration and insect or pest infestation.

Back Porch 109

Similar to the Back Closet, the existing floor consists of 1x3¼ tongue-and-groove wood flooring. The wood flooring is in poor condition and has several sizeable holes in it from the 2010 work to stabilize the foundation. Therefore, the remainder of the wood flooring should be removed, the underlying holes in the decking should be filled, and a new wood flooring which matches the existing should be installed. If the building remains residential in use, a new back stair should be installed. If the building is converted to a commercial use, the back porch would be an ideal location to conceal an ADA compliant platform lift which would provide accessibility throughout the first floor.

This existing wood base is an old, but not original, painted wood base with shoe mould. A new stained and sealed wood base which corresponds to the original drawings and matches the base profile in Closet 207 should be installed.

The north and east walls consist of wallpaper over painted plaster; the south wall is painted face brick; and the west wall is wood paneling. Due to the presence of multiple layers of paint beneath it, we conclude that the wallpaper is not original and should be removed. The plaster is in poor condition and should also be removed. The paint should be removed from the brick, and it should be cleaned to bring the masonry back to its original appearance. The wood paneling is not original and should be removed as well. The north and east walls should be insulated and receive a vapor retarder, and the west, north, and east walls should receive a new layer of gypsum wallboard painted a dark gray color (Sherwin Williams SW 6173 Cocoon or Munsell 5Y 4.5/1) found during the paint analysis.

The door from Dining Room 106 to Back Porch 109 is indicated on the attached schematic plans as Door 10. It is a 2'-6"x7'-0" solid wood, stile and

rail style door, stained and sealed, with three flat panels oriented horizontally and a 20-inch by 26-inch divided light. Corresponding to those shown on the original plans, it appears to be an original door. It is in fair condition. If the future use of the house remains residential in nature, the door should simply be repaired where necessary, sanded, prepped, and refinished. If the building is converted to commercial purposes, the door may need to be replaced with a similar wider door to allow for accessibility throughout the first floor. The hardware is of a newer vintage and should be replaced with something more historically appropriate. Similar to the Front Porch, the Back Porch side of the door is trimmed with a painted wood brickmold which corresponds to the original plans. While the wood appears to be in good condition, the paint is cracking and deteriorated. This brickmold should be properly scraped, prepped, and repainted. The Dining Room side is a stained and sealed ranch style casing which should be removed and replaced with new stained and sealed wood trim which corresponds to the original drawings and matches the trim profiles at Door 7.

The door from the exterior to Back Porch 109 is indicated on the attached schematic plans as Door 12. While it was removed and stored during the 2010 stabilization project, it is assumed to be a 2'-6"x6'-6" solid wood, stile and rail style door with three flat panels oriented horizontally with a 20-inch by 26-inch divide light. If the future use of the house remains residential in nature, the door should simply be repaired where necessary, sanded, prepped, and refinished. If the building is converted to commercial purposes, the door may need to be replaced with a similar wider door to allow for accessibility throughout the first floor. The door opening is trimmed with a simple painted 1x4 wood casing which should be replaced with new stained and sealed wood trim which corresponds to the original drawings and matches the trim profiles at Door 7.

There is one small 2'-6"x2'-2" window openings in the north wall of the Back Porch. Similar to the other was outfitted with a painted wood shutter with ventilation holes. Similar to the door, the windows has been outfitted with a painted 1x4 wood casing. This trim should be removed and replaced with new stained and sealed wood trim which corresponds to the original drawings and matches the trim profiles of the window in Hall 201.

The existing ceiling is remnants of wallpaper over painted plaster. Similar to the walls, wallpaper is not original and should be removed, and what remains of the plaster is in very poor condition and should also be removed. The ceiling should be insulated, receive a vapor retarder and gypsum wallboard, and should be painted a white color.

As this area was re-roofed during the 2010 stabilization project, it seems rather unlikely, but daylight can be seen through the roof. This area should be inspected while it is still under warranty and sealed immediately to prevent unwanted rain or snow infiltration and insect or pest infestation.

Front Closet 110

In general, we recommend that this room be removed so the space can be reconfigured back to its original condition.

The existing floor consists of carpet and pad over stained and sealed 1x2¼ tongue-and-groove wood flooring. As it is consistent with historic flooring

materials from the era and appears throughout the house, it is assumed that the wood flooring dates from the original construction. As it contributes to the overall historic character of the building, retention and repair of the original wood floors should be employed wherever possible. Any secondary flooring materials, such as the carpet and pad, should be removed to better assess the condition of the wood flooring. From what can be seen of the wood flooring in other parts of the house, it is assumed to be in poor condition, but salvageable. The wood flooring should be repaired where necessary, sanded, prepped, and refinished.

Likely when Hall 102, Bath 104, and Front Closet 110 were reconfigured and remodeled in 1973-1974, the original wood base was removed. Due to the utilitarian nature of the Closet, a new base was not installed during the reconfiguration. A new stained and sealed wood base should be installed based on the original drawings and matching the component profiles in Stair 105.

All of the walls of Front Closet 110 were likely added when this area was reconfigured in 1973-1974 and consist of painted gypsum wallboard in fair condition. The gypsum wallboard should be repaired where necessary, prepped, and repainted. As it is a secondary space that is not original to the building, paint analysis was not performed in this room.

The door to the Front Closet is indicated on the attached schematic plans as Door 4. It is a 2'-6"x6'-8" hollow core, flush wood door with ranch style casing which was likely added during the 1973-1974 remodeling. The door and trim are stained and sealed and are in fair condition; however, they are not historic in their appearance. The door and trim should be removed.

There are no functional window openings associated with Hall 102 other than a former window opening in the south wall which was previously mentioned in Front Porch 101. If the space is reconfigured back to its original condition, the existing bookshelf should be removed, and the window opening should be restored back to its historic appearance based on the original drawings and other extant window openings.

The existing ceiling consists of painted gypsum wallboard in fair condition. The gypsum wallboard should be repaired where necessary, prepped, and repainted a white color.

Linen Closet 111

In general, we recommend that this room be removed so the space can be reconfigured back to its original condition.

The existing floor is vinyl sheet goods which is assumed to be laid over a layer of underlayment laid over stained and sealed 1x2¼ tongue-and-groove wood flooring. Any secondary flooring materials, such as the vinyl and underlayment, should be removed to better assess the condition of the wood flooring. As the wood flooring was not visible, its condition is unknown, but is assumed to be in a similarly poor condition as the rest of the house. It should be repaired where necessary, sanded, prepped, and refinished.

Likely when Hall 102, Bath 104, and Front Closet 110 were reconfigured and remodeled in 1973-1974, the original wood base was removed. Due to the

utilitarian nature of the Linen Closet, a new base was not installed during the reconfiguration. A new stained and sealed wood base should be installed based on the original drawings and matching the component profiles in Stair 105.

The east wall of the Linen Closet is comprised of painted plaster while the north, west, and south walls of the Linen Closet were likely added during the 1973-1974 remodeling and consist of painted gypsum wallboard. The plaster and gypsum wallboard are in fair condition and should be repaired, prepped, and repainted. As it is a secondary space that is not original to the building, paint analysis was not performed in this room.

The door to Linen Closet 111 is indicated on the attached schematic plans as Door 6. It is a 2'-0"x6'-8" hollow core, flush wood door with ranch style casing (on the Bath 104 side only) that dates to the 1973-1974 remodeling. The door and trim are stained and sealed and are in fair condition; however, they are not historic in their appearance. The door and trim should be removed.

There are no extant window openings associated with Linen Closet 111. However, as previously mentioned in Bath 104, a former window opening in the south wall was blocked up during the 1973-1974 remodeling. If the space is reconfigured back to its original condition, the window opening should be restored to its historic appearance based on the original drawings and other extant window openings.

The existing ceiling consists of painted plywood in fair condition which is assumed to be dropped below the original painted plaster ceiling. The plywood ceiling material should be removed in its entirety to better assess the condition of the plaster. From what can be seen of the plaster ceilings elsewhere, it is likely in poor condition. The plaster should be repaired as necessary, prepped, and repainted a white color.

Hall 201

The existing floor consists of carpet over stained and sealed 1x2¼ tongue-and-groove wood flooring which is assumed to date from the original construction. As it contributes to the overall historic character of the building, retention and repair of the original wood floors should be employed wherever possible. The carpet should be removed to better assess the condition of the wood flooring below and inspect it for deterioration. Based on other areas of the house, the wood flooring is assumed to be in poor condition, but salvageable. The wood flooring should be repaired where necessary, sanded, prepped, and refinished.

Throughout the house, the original wood base was systematically removed and replaced with stained and sealed ranch style base. This base should be removed and replaced with new stained and sealed wood base with shoe moulding based on the component profiles found in Closet 207.

All of the walls of Hall 201 consist of wallpaper over painted plaster. Due to the number of layers of paint underneath the wallpaper, it would not seem to be original to the building and should be removed to better assess the condition of the plaster below. From what can be seen of the plaster where the wallpaper has peeled off of the walls, it is in poor to fair condition. The plaster should be repaired where necessary, prepped, and repainted a golden color (Sherwin

Williams SW 6389 Butternut or Munsell 2.5Y 7/6) which was found during the paint analysis.

There are no doors specifically associated with Hall 201.

There is a 3'-0"x4'-8" window opening at the landing on the east wall. Similar to the other windows, the sashes were removed and stored during the 2010 stabilization work, and the openings were outfitted with painted wood shutters with ventilation holes. Unlike the other window openings of the house, this windows retains its original stained and sealed wood trim which corresponds to the original drawings and should be used as a template for other windows in the house.

Similar to other rooms on the first floor, the existing ceiling consists of 2x4 fiberglass ceiling tiles and a suspended metal grid dropped approximately one-foot below a painted plaster ceiling which is assumed to date from the original construction. Secondary ceiling materials, such as the ceiling tiles and grid, should be removed to better assess the condition of the plaster. From what can be seen of the plaster ceiling where tiles are missing, it is in poor condition. The plaster should be repaired where necessary, prepped, and repainted a white color. Also of note is the presence of a small attic access scuttle in the ceiling near the southwest corner of the room. The scuttle should remain for convenience sake, but should be enlarged to meet code requirements.

The stair components such as the ash guardrail, turned balusters, and recessed flat panel stinger boards appear to match the original drawings are in good condition. As they contribute to the overall historic character of the building, retention and repair of the original components should be employed wherever possible.

Southeast Bedroom 202

The existing flooring consists of carpet, and it is assumed that stained and sealed 1x2¼ tongue-and-groove wood flooring dating from the original construction will be found underneath it. The carpet should be removed to better assess the condition of the wood flooring. Based on other areas of the house, one would assume that the wood flooring will be found to be in poor condition, but salvageable. It should be repaired where necessary, sanded, prepped, and refinished.

Likely when Hall 102, Bath 104, and Front Closet 110 were reconfigured and remodeled in 1973-1974, the original wood base was removed. Due to the utilitarian nature of the Linen Closet, a new base was not installed during the reconfiguration. A new stained and sealed wood base and shoe moulding should be installed based on the component profiles found in Closet 207.

The west, north, and east walls of the Southeast Bedroom consist of paneling type 4 over painted plaster, and the south wall is painted plaster. The paneling should be removed to better assess the condition of the plaster which is assumed to be in poor condition based on the existing condition of the south wall. The plaster should be repaired where necessary, prepped, and repainted a tan color (between Sherwin Williams SW 6172 Hardware & SW 6173 Cocoon or Munsell 5Y 5/1) which was found during the paint analysis.

The door to Southeast Bedroom 202 is indicated on the attached schematic plans as Door 13. The existing opening contains a 2'-6"x6'-8" hollow core,

flush wood door with ranch style casing that was installed in 1973-1974. The door and trim are stained and sealed and are in fair condition; however, they are not historic in their appearance. The door and trim should be removed. In addition, the original drawings indicate a pivoting 12-inch high glass transom above the door, and there is evidence that it existed at one time above the ceiling. The opening should be retrofitted to allow for a new stained and sealed, solid wood, stile and rail style door with five flat panels oriented horizontally with a glass transom above and trimmed match the profiles at Door 7 and the original drawings.

There are two 3'-0"x4'-8" window openings in this bedroom, one in the south wall and one in the east. Similar to the other windows, the sashes were removed and stored during the 2010 stabilization work, and the openings were outfitted with painted wood shutters with ventilation holes. Also similar to other windows, they have been retrofitted with stained and sealed ranch style casing. This trim should be removed and replaced with new stained and sealed wood trim which corresponds to the original drawings and matches the trim profiles of the window in Hall 201.

Similar to all the other rooms on the second floor, the existing ceiling consists of 2x4 fiberglass ceiling tiles and a suspended metal grid dropped approximately one-foot below a painted plaster ceiling which is assumed to date from the original construction. Secondary ceiling materials, such as the ceiling tiles and grid, should be removed to better assess the condition of the plaster. From what can be seen of the plaster ceiling where tiles are missing, it is in poor condition. The plaster should be repaired where necessary, prepped, and repainted a white color.

Also of note is the presence of two built-in cabinets on either side of the dormer and a built-in desk in the dormer. Based on the type of casework and countertop, these components appear to have been added to the space during the 1973-1974 remodel. As they date outside of the period of significance, they may be removed if desired.

Closet 203

The existing floor consists of carpet pad remnants glued to stained and sealed 1x2¼ tongue-and-groove wood flooring. As it is consistent with historic flooring materials from the era and appears throughout the house, it is assumed that the wood flooring dates from the original construction. As it contributes to the overall historic character of the building, retention and repair of the original wood floors should be employed wherever possible. The carpet pad remnants should be removed to better assess the condition of the wood flooring. Based on other areas of the house, it is assumed that the wood floor will be found to be in poor condition, but salvageable. The wood flooring should be repaired where necessary, sanded, prepped, and refinished.

It is likely that this closet was reconfigured during the 1973-1974 remodel, and the original wood base was removed. Due to the utilitarian nature of the Closet, a new base was not installed during the reconfiguration. A new stained and sealed wood base and shoe moulding should be installed based on the component profiles found in Closet 207.

All of the walls of Closet 203 are painted plaster which is in fair condition. The plaster should be repaired where necessary, prepped, and repainted a gray-

green color (between Sherwin Williams SW 6199 Rare Gray & SW 6200 Link Gray or Munsell 5GY 6/1) which was found during the paint analysis.

The door for Closet 203 is indicated on the attached schematic plans as Door 15. It is a pair of 2'-6"x6'-8" hollow core, flush wood bifold doors with ranch style casing that was likely installed during the 1973-1974 remodel. The door and trim are stained and sealed and are in fair condition; however, they are not historic in their appearance. The door and trim should be removed and replaced with a new stained and sealed, solid wood, stile and rail style door with five flat panels oriented horizontally and trim which corresponds to the original drawings and matches the trim profiles at Door 7.

There are no windows associated with Closet 203.

Similar to the other closets on the second floor, the existing ceiling is painted plaster which is assumed to date from the original construction. The plaster is in fair condition and should be repaired where necessary, prepped, and repainted a white color.

Southwest Bedroom 205

Similar to Closet 203, the existing floor consists of carpet pad remnants glued to stained and sealed 1x2¼ tongue-and-groove wood flooring which is assumed to date from the original construction. The carpet pad remnants should be removed to better assess the condition of the wood flooring. Based on other areas of the house, it is assumed that the wood floor will be found to be in poor condition, but salvageable. It should be repaired where necessary, sanded, prepped, and refinished.

The extant stained and sealed ranch style base should be removed and replaced with new stained and sealed wood base with shoe moulding based on the component profiles found in Closet 207.

The west, north, and east walls of the Southwest Bedroom consist of wallpaper over painted plaster, and the south wall is painted plaster. Based on the numerous layers of paint found beneath, the wallpaper is not original and should be removed to better assess the condition of the plaster which is assumed to be in poor shape based on the existing condition of the south wall. The plaster should be repaired where necessary, prepped, and repainted a gray-green color (between Sherwin Williams SW 6199 Rare Gray & SW 6200 Link Gray or Munsell 5GY 6/1) which was found during the paint analysis.

The door to Southwest Bedroom 202 is indicated on the attached schematic plans as Door 14. The existing opening contains a 2'-6"x6'-8" hollow core, flush wood door with ranch style casing. The door and trim are stained and sealed and are in fair condition; however, they are not historic and should be removed. Similar to the other second floor bedroom doors, the original transom has been removed. The opening should be retrofitted to allow for a new stained and sealed, solid wood, stile and rail style door with five flat panels oriented horizontally, a 12-inch high glass transom, and trim to match the profiles at Door 7 and the original drawings.

Similar to the other bedrooms, there are two 3'-0"x4'-8" window openings in this bedroom, one in the south wall and one in the west. The sashes were removed and stored during the 2010 stabilization work, and the openings were

outfitted with painted wood shutters with ventilation holes. They have been retrofitted with stained and sealed ranch style casing that should be removed and replaced with new stained and sealed wood trim which corresponds to the original drawings and matches the trim profiles of the window in Hall 201.

Similar to all the other rooms on the second floor, the existing ceiling consists of a few 2x4 fiberglass ceiling tiles in a suspended metal grid dropped approximately one-foot below a painted plaster ceiling. The ceiling tiles and grid should be removed. The plaster ceiling is in poor condition and should be repaired where necessary, prepped, and repainted a white color.

Northwest Bedroom 206

Unlike the other bedrooms, the flooring is the Northwest Bedroom consists of stained and sealed 1x2¼ tongue-and-groove wood which is assumed to date from the original construction. Our ability to assess the condition of the wood flooring was somewhat obstructed by the large pile of debris on the floor. Based on what could be seen, the wood floor is in poor condition, but salvageable. It should be repaired where necessary, sanded, prepped, and refinished.

The extant stained and sealed ranch style base should be removed and replaced with new stained and sealed wood base with shoe moulding based on the component profiles found in Closet 207.

The west, south, and east walls of the Northwest Bedroom consist of wallpaper over painted plaster, and the north wall is painted plaster. Based on the numerous layers of paint found beneath, the wallpaper is not original and should be removed to better assess the condition of the plaster which is assumed to be in poor shape based on the existing conditions in other rooms. The plaster on the west, south, and east walls should be repaired. However, the plaster on the north wall is in very poor condition, much of it has already fallen off of the lath, and it should be removed altogether. The north wall should be insulated, a vapor retarder applied, and a new layer of gypsum wallboard. Then the entire room should be repainted a gray-green color (between Sherwin Williams SW 6199 Rare Gray & SW 6200 Link Gray or Munsell 5GY 6/1) which was found during the paint analysis.

The door to Northwest Bedroom 206 is indicated on the attached schematic plans as Door 16. The existing opening contains a 2'-6"x6'-8" hollow core, flush wood door with ranch style casing. The door and trim are stained and sealed and are in fair condition, but are not historic. Similar to the other second floor bedroom doors, the original transom has been removed. The opening should be retrofitted to allow for a new stained and sealed, solid wood, stile and rail style door with five flat panels oriented horizontally, a 12-inch high glass transom, and trim to match the profiles at Door 7 and the original drawings.

Similar to the other bedrooms, there are two 3'-0"x4'-8" window openings in this bedroom, one in the north wall and one in the west. The sashes were removed and stored during the 2010 stabilization work, and the openings were outfitted with painted wood shutters with ventilation holes. They have been retrofitted with stained and sealed ranch style casing that should be removed and replaced with new stained and sealed wood trim which corresponds to the original drawings and matches the trim profiles of the window in Hall 201.

Similar to all the other rooms on the second floor, the existing ceiling consists of a few 2x4 fiberglass ceiling tiles in a suspended metal grid dropped approximately one-foot below a painted plaster ceiling. The ceiling tiles and grid should be removed. The plaster ceiling is in very poor condition and what remains of the plaster is in very poor condition and should also be removed. The ceiling should be insulated, receive a vapor retarder and gypsum wallboard, and should be painted a white color.

Closet 207

The existing floor consists of carpet pad remnants; a stained and sealed 1x2¼ tongue-and-groove wood floor is assumed to be underneath. The carpet pad remnants should be removed to better assess the condition of the wood flooring. Based on other areas of the house, it is assumed that the wood floor will be found to be in poor condition, but salvageable. The wood flooring should be repaired where necessary, sanded, prepped, and refinished.

Unlike nearly all the other rooms of the house, the original stained and sealed wood base and shoe moulding are still present. As it contributes to the overall historic character of the building, retention and repair of the original wood base should be employed, and it should be used as a template for the wood base in other rooms on the second floor of the house.

All of the walls of Closet 207 are painted plaster which is in good condition. The plaster should be repaired where necessary, prepped, and repainted a gray-green color (between Sherwin Williams SW 6199 Rare Gray & SW 6200 Link Gray or Munsell 5GY 6/1) which was found during the paint analysis.

The door for Closet 207 is indicated on the attached schematic plans as Door 17. It is a 2'-4"x6'-8" hollow core, flush wood door with ranch style casing on the Bedroom side and what appears to be original solid wood trim on the Closet side. The door and trim are stained and sealed and are in fair condition, but are not historic. The door and ranch style trim should be removed and replaced with a new stained and sealed, solid wood, stile and rail style door with five flat panels oriented horizontally and trim which corresponds to the original drawings and matches the trim profiles at Door 7.

There are no windows associated with Closet 207.

The existing ceiling is painted plaster in fair condition which should be repaired where necessary, prepped, and repainted a white color.

Northeast Bedroom 208

The existing flooring consists of carpet, and it is assumed that stained and sealed 1x2¼ tongue-and-groove wood flooring dating from the original construction will be found underneath it. The carpet should be removed to better assess the condition of the wood flooring. Based on other areas of the house, one would assume that the wood flooring will be found to be in poor, but salvageable, condition. It should be repaired where necessary, sanded, prepped, and refinished.

The extant stained and sealed ranch style base should be removed and replaced with new stained and sealed wood base with shoe moulding based on the component profiles found in Closet 207.

The west, south, and east walls of the Northeast Bedroom consist of paneling type 1 over painted plaster, and the north wall is painted plaster. The paneling should be removed to better assess the condition of the plaster which is assumed to be in poor shape based on the existing conditions in other rooms. The plaster on the west, south, and east walls should be repaired. However, the plaster on the north wall is in very poor condition, much of it has already fallen off of the lath, and it should be removed altogether. The north wall should be insulated, a vapor retarder applied, and a new layer of gypsum wallboard. Then the entire room should be repainted a dark green color (Sherwin Williams SW 6194 Basil or Munsell 10G 5/2) which was found during the paint analysis.

The door to Northeast Bedroom 208 is indicated on the attached schematic plans as Door 18. The existing opening contains a 2'-6"x6'-8" hollow core, flush wood door with ranch style casing. The door and trim are stained and sealed and are in fair condition; however, they are not historic and should be removed. Similar to the other second floor bedroom doors, the original transom has been removed. The opening should be retrofitted to allow for a new stained and sealed, solid wood, stile and rail style door with five flat panels oriented horizontally, a 12-inch high glass transom, and trim to match the profiles at Door 7 and the original drawings.

There are two 3'-0"x4'-8" window openings in this bedroom, one in the north wall and one in the east. The sashes were removed and stored during the 2010 stabilization work, and the openings were outfitted with painted wood shutters with ventilation holes. They have been retrofitted with stained and sealed ranch style casing that should be removed and replaced with new stained and sealed wood trim which corresponds to the original drawings and matches the trim profiles of the window in Hall 201.

The existing ceiling consists of 2x4 fiberglass ceiling tiles in a suspended metal grid dropped approximately one-foot below a painted plaster ceiling. The ceiling tiles and grid should be removed. The plaster ceiling is in poor condition and should be repaired where necessary, prepped, and repainted a white color.

Closet 209

Similar to the Northeast Bedroom, the existing flooring consists of carpet, and it is assumed that stained and sealed 1x2¼ tongue-and-groove wood flooring dating from the original construction will be found underneath it. The carpet should be removed to better assess the condition of the wood flooring. Based on other areas of the house, one would assume that the wood flooring will be found to be in poor, but salvageable, condition. It should be repaired where necessary, sanded, prepped, and refinished.

Like Closet 207, the original stained and sealed wood base and shoe moulding are still present. As they contribute to the overall historic character of the building, retention and repair of the original wood base and shoe moulding should be employed.

The walls of Closet 209 are painted plaster and are in good condition. The plaster should be repaired where necessary, prepped, and repainted a dark green color (Sherwin Williams SW 6194 Basil or Munsell 10G 5/2) which was found during the paint analysis.

The opening for Closet 209 is indicated on the attached schematic plans as Door 19. The existing door opening is sized to accommodate a 2'-4"x6'-8" door. However, the door is not extant, and it does not seem likely that it would have been removed and stored during the 2010 stabilization project. The door's trim is a stained and sealed ranch style casing which should be removed. The opening should be outfitted with a new stained and sealed, solid wood, stile and rail style door with five flat panels oriented horizontally and trim which corresponds to the original drawings and matches the trim profiles at Door 7.

There are no windows associated with Closet 209.

The existing ceiling is painted plaster in fair condition which should be repaired where necessary, prepped, and repainted a white color.

Furnishings & Interior Decoration Recommendations

While the De Pere Lockkeeper's House was a government owned building, the furnishings were not supplied. As each lockmaster moved into the dwelling, they brought along their own personal furnishings and belongings. Therefore, there are no historic furnishings that are directly associated to the home and they changed frequently over time. This allows for much flexibility in the furnishings and interior decoration recommendations for the house.

In general, the furnishings should fit the use. If possible, the furnishings should fit styles prevalent during the building's period of significance, between 1912 and 1936. Furnishings recommendations are illustrated for each of the future uses in the appendix.

USGBC LEED Rating Systems

Developed by the U.S. Green Building Council (USGBC), the internationally recognized green building rating system commonly referred to as LEED (Leadership in Energy and Environmental Design) was launched in March 2000. It provides a framework for identifying and implementing green building design, construction, operations, and maintenance solutions aimed at energy savings, water efficiency, CO2 emissions reduction, improved indoor environmental quality, and stewardship of resources and sensitivity to their impacts.

LEED Rating Systems

LEED certification is available for all building types including new construction and major renovation, commercial interiors, core and shell, schools, homes, and existing buildings. LEED systems for retail, healthcare, and neighborhood development are also available in pilot testing.

Historic properties can become certified under this rating system. The USGBC has been collaborating with the National Trust for Historic Preservation to outline metrics that promote preservation activities as green building strategies. Existing buildings undergoing substantial renovations are eligible to become certified under LEED for Commercial Interiors (LEED CI), Existing Buildings: Operations & Maintenance (LEED EB: O&M), or LEED for New Construction and Major Renovations (LEED NC). Comparing the requirements of the LEED rating systems will help determine which rating system is the best suited for this project.

LEED for Commercial Interiors

LEED CI certifies the design and construction of tenant spaces for both public and private office, restaurant, healthcare, hotel/resort, and education buildings of all sizes. Its intent is to promote healthful, durable, affordable, and environmentally sound practices in tenant space design and construction. Tenants who occupy the entire building, as may be the case here, are not eligible and should pursue certification under other LEED programs.

LEED for Existing Buildings: Operations & Maintenance

LEED EB: O&M is meant to guide the ongoing operations and maintenance of existing commercial buildings. This rating system helps building owners solve building problems; improve building performance by identifying ways to use less energy, water, and natural resources; improving the indoor environment; and uncovering operating inefficiencies; and maintain and improve this performance over time. LEED EB: O&M creates a plan for ensuring high performance over time by capturing both a building's physical systems (equipment, design, land use, etc.) and the way the building is occupied and operated (waste management, temperature monitoring, commuting programs, etc.). The goal is to institutionalize a process of reporting, inspection, and review over the lifespan of the building to ensure it functions on an ongoing basis. If a project scope focuses more on operations and maintenance activities, LEED EB: O&M is appropriate. Projects involving alterations that affect more than 50% of the total building floor area,

such as this one, are not eligible and should pursue certification under the LEED NC program.

LEED for New Construction and Major Renovations

LEED NC can be applied to commercial (offices, hotels, etc.), institutional (libraries, museums, churches, etc.), and high-rise residential projects, with a focus on office buildings, and can also be applied to schools, multi-unit residential buildings, manufacturing plants, laboratories and many other building types. All commercial buildings, as defined by standard building codes, are eligible for certification under the LEED for New Construction rating system. LEED for New Construction addresses design and construction activities for both new buildings and major renovations of existing buildings. A major renovation is defined as including major HVAC renovations, significant envelope modifications, and major interior rehabilitation. For a major renovation of an existing building such as this, LEED for New Construction is the appropriate rating system.

LEED Point System

All LEED rating systems have a predefined set of prerequisites and must earn a minimum of 40 points on a 100-point scale by satisfying specific green building criteria. USGBC compares it to a nutrition label on a box of crackers claiming that the LEED scorecard provides important detail about the green aspects of high performance buildings. Points are accumulated based on documented performance in the following credit categories and their potential environmental impacts:

- Sustainable Sites (SS): Choosing a building's site and managing that site during construction are important considerations for a project's sustainability. The Sustainable Sites category discourages development on previously undeveloped land; minimizes a building's impact on ecosystems and waterways; encourages regionally appropriate landscaping; rewards smart transportation choices; controls storm water runoff; and reduces erosion, light pollution, heat island effect and construction-related pollution.
- Water Efficiency (WE): Buildings are major users of our potable water supply. The goal of the Water Efficiency credit category is to encourage smarter use of water, inside and out. Water reduction is typically achieved through more efficient appliances, fixtures and fittings inside and water-wise landscaping outside.
- Energy & Atmosphere (EA): According to the U.S. Department of Energy, buildings use 39% of the energy and 74% of the electricity produced each year in the United States. The Energy & Atmosphere category encourages a wide variety of energy strategies: commissioning; energy use monitoring; efficient design and construction; efficient appliances, systems and lighting; the use of renewable and clean sources of energy, generated on-site or off-site; and other innovative strategies.
- Materials & Resources (MR): During both the construction and operations phases, buildings generate a lot of waste and use a lot of materials and resources. This credit category encourages the selection of sustainably grown, harvested, produced and transported products and materials. It promotes the reduction of waste as well as reuse and recycling, and it takes into account the reduction of waste at a product's source.

- Indoor Environmental Quality (IEQ): The U.S. Environmental Protection Agency estimates that Americans spend about 90% of their day indoors, where the air quality can be significantly worse than outside. The Indoor Environmental Quality credit category promotes strategies that can improve indoor air as well as providing access to natural daylight and views and improving acoustics.
- Innovation in Design (ID): The Innovation in Design credit category provides bonus points for projects that use new and innovative technologies and strategies to improve a building's performance well beyond what is required by other LEED credits or in green building considerations that are not specifically addressed elsewhere in LEED. T his credit category also rewards projects for including a LEED Accredited Professional on the team to ensure a holistic, integrated approach to the design and construction phase.
- Regional Priority: USGBC's regional councils, chapters and affiliates have identified the environmental concerns that are locally most important for every region of the country, and six LEED credits that address those local priorities were selected for each region. A project that earns a regional priority credit will earn one bonus point in addition to any points awarded for that credit. Up to four extra points can be earned in this way.

The number of points the project earns determines the level of LEED certification the project receives and is based on the following progressive scale:

- Certified: 40–49 points
- Silver: 50–59 points
- Gold: 60–79 points
- Platinum: 80 points and above

A goal of LEED Silver certification, as suggested in the Request for Proposals for this report, would require the successful completion of 50-59 points.

LEED Silver Certification Strategy

Prerequisites

For this project, the following minimum predefined prerequisites will be required for LEED Registration and Certification:

SS Prerequisite 1: Construction Activity Pollution Prevention

Intent: To reduce pollution from construction activities by controlling soil erosion, waterway sedimentation and airborne dust generation.

Requirements: Create and implement an erosion and sedimentation control plan for all construction activities associated with the project.

WE Prerequisite 1: Water Use Reduction

Intent: To increase water efficiency within buildings to reduce the burden on municipal water supply and wastewater systems.

Requirements: Employ strategies that in aggregate use 20% less water than the water use baseline calculated for the building (not including irrigation).

EA Prerequisite 1: Fundamental Commissioning of Building Energy Systems

Intent: To verify that the project's energy-related systems are installed, and calibrated to perform according to the owner's project requirements, basis of design and construction documents. Benefits of commissioning include reduced energy use, lower operating costs, fewer contractor callbacks, better building documentation, improved occupant productivity and verification that the systems perform in accordance with the owner's project requirements.

Requirements: The following commissioning process activities must be completed by the project team:

- *Designate an individual as the commissioning authority (CxA) to lead, review and oversee the completion of the commissioning process activities.*
- *The owner must document the owner's project requirements. The design team must develop the basis of design. The CxA must review these documents for clarity and completeness. The owner and design team must be responsible for updates to their respective documents.*
- *Commissioning process activities must be completed for the following energy-related systems, at a minimum: Heating, ventilating, air conditioning and refrigeration (HVAC&R) systems (mechanical and passive) and associated controls; Lighting and daylighting controls; Domestic hot water systems; Renewable energy systems (e.g., wind, solar)*

EA Prerequisite 2: Minimum Energy Performance

Intent: To establish the minimum level of energy efficiency for the proposed building and systems to reduce environmental and economic impacts associated with excessive energy use.

Requirements
OPTION 1. Whole Building Energy Simulation. Demonstrate a 10% improvement in the proposed building performance rating for new buildings, or a 5% improvement in the proposed building performance rating for major renovations to existing buildings, compared with the baseline building performance rating.

OPTION 2. Prescriptive Compliance Path: ASHRAE Advanced Energy Design Guide. Comply with the prescriptive measures of the ASHRAE Advanced Energy Design Guide appropriate to the project scope.

OPTION 3. Prescriptive Compliance Path: Advanced Buildings™ Core Performance™ Guide. Comply with the prescriptive measures identified in the Advanced Buildings™ Core Performance™ Guide developed by the New Buildings Institute.

EA Prerequisite 3: Fundamental Refrigerant Management

Intent: To reduce stratospheric ozone depletion.

Requirements: Zero use of chlorofluorocarbon (CFC)-based refrigerants in new base building heating, ventilating, air conditioning and refrigeration (HVAC&R) systems.

MR Prerequisite 1: Storage and Collection of Recyclables

Intent: To facilitate the reduction of waste generated by building occupants that is hauled to and disposed of in landfills.

Requirements: Provide an easily-accessible dedicated area or areas for the collection and storage of materials for recycling for the entire building. Materials must include, at a minimum: paper, corrugated cardboard, glass, plastics and metals.

IEQ Prerequisite 1: Minimum Indoor Air Quality Performance

Intent: To establish minimum indoor air quality (IAQ) performance to enhance indoor air quality in buildings, thus contributing to the comfort and well-being of the occupants.

Requirements: Meet the minimum requirements of Sections 4 through 7 of ASHRAE Standard 62.1-2007, Ventilation for Acceptable Indoor Air Quality.

IEQ Prerequisite 2: Environmental Tobacco Smoke (ET S) Control

Intent: To prevent or minimize exposure of building occupants, indoor surfaces and ventilation air distribution systems to environmental tobacco smoke (ETS).

Requirements: OPTION 1. Prohibit smoking in the building. Prohibit on-property smoking within 25 feet of entries, outdoor air intakes and operable windows. Provide signage to allow smoking in designated areas, prohibit smoking in designated areas or prohibit smoking on the entire property.

Points

For this project, the following elective points are suggested to accumulate the 50-59 points required for Silver certification. These electives include 5-10 additional points above and beyond the silver goal to accommodate reductions in project scope or budget, construction changes, or possible rejection of points during project review.

SS Credit 2: Development Density and Community Connectivity (5 Points)

Intent: To channel development to urban areas with existing infrastructure, protect greenfields, and preserve habitat and natural resources.

Requirements: OPTION 2. Community Connectivity. Construct or renovate a building on a site that meets the following criteria:

- *Is located on a previously developed site*
- *Is within 1/2 mile of a residential area or neighborhood with an average density of 10 units per acre net*
- *Is within 1/2 mile of at least 10 basic services*
- *Has pedestrian access between the building and the services*

SS Credit 4.1: Alternative Transportation—Public Transportation Access (6 Points)

Intent: To reduce pollution and land development impacts from automobile use.

Requirements: OPTION 2. Bus Stop Proximity. Locate the project within 1/4-mile walking distance (measured from a main building entrance) of 1 or more stops for 2 or more public, campus, or private bus lines usable by building occupants.

SS Credit 4.4: Alternative Transportation—Parking Capacity (2 Points)

Intent: To reduce pollution and land development impacts from automobile use.

Requirements: CASE 1. Non-Residential Projects. OPTION 3. Provide no new parking.

SS Credit 8: Light Pollution Reduction (1 Point)

Intent: To minimize light trespass from the building and site, reduce sky-glow to increase night sky access, improve nighttime visibility through glare reduction and reduce development impact from lighting on nocturnal environments.

Requirements: For Interior Lighting, reduce the input power (by automatic device) of all non-emergency interior luminaires with a direct line of sight to any openings in the envelope (translucent or transparent) by at least 50% between 11 p.m. and 5 a.m. For Exterior Lighting, light areas only as required for safety and comfort. .

WE Credit 1: Water Efficient Landscaping (2–4 Points)

Intent: To limit or eliminate the use of potable water or other natural surface or subsurface water resources available on or near the project site for landscape irrigation.

Requirements: OPTION 2. No Potable Water Use or Irrigation

PAT H 1. Use only captured rainwater, recycled wastewater, recycled graywater or water treated and conveyed by a public agency specifically for nonpotable uses for irrigation.

PAT H 2. Install landscaping that does not require permanent irrigation systems. Temporary irrigation systems used for plant establishment are allowed only if removed within a period not to exceed 18 months of installation.

WE Credit 2: Innovative Wastewater Technologies (2 Points)

Intent: To reduce wastewater generation and potable water demand while increasing the local aquifer recharge.

Requirements: OPTION 1. Reduce potable water use for building sewage conveyance by 50% through the use of water-conserving fixtures (e.g., water closets, urinals) or nonpotable water (e.g., captured rainwater, recycled graywater, on-site or municipally treated wastewater).

WE Credit 3: Water Use Reduction (4 Points)

Intent: To further increase water efficiency within buildings to reduce the burden on municipal water supply and wastewater systems.

Requirements: Employ strategies that in aggregate use 40% less water than the water use baseline calculated for the building (not including irrigation).

EA Credit 1: Optimize Energy Performance (1–19 Points)

Intent: To achieve increasing levels of energy performance beyond the prerequisite standard to reduce environmental and economic impacts associated with excessive energy use.

Requirements:

OPTION 1. Whole Building Energy Simulation (1–19 points). Demonstrate a percentage improvement in the proposed building performance rating compared with the baseline building performance rating. project.

OPTION 2. Prescriptive Compliance Path: ASHRAE Advanced Energy Design Guide (1 point). Comply with the prescriptive measures of the ASHRAE Advanced Energy Design Guide appropriate to the project scope.

OPTION 3. Prescriptive Compliance Path: Advanced Buildings™ Core Performance™ Guide (1–3 points). Comply with the prescriptive measures identified in the Advanced Buildings™ Core Performance™ Guide developed by the New Buildings Institute.

EA Credit 2: On-site Renewable Energy (1–7 Points)

Intent: To encourage and recognize increasing levels of on-site renewable energy self-supply to reduce environmental and economic impacts associated with fossil fuel energy use.

Requirements: Use on-site renewable energy systems to offset building energy costs.

EA Credit 4: Enhanced Refrigerant Management (2 Points)

Intent: To reduce ozone depletion and support early compliance with the Montreal Protocol while minimizing direct contributions to climate change.

Requirements: OPTION 1. Do not use refrigerants.

EA Credit 6: Green Power (2 Points)

Intent: To encourage the development and use of grid-source, renewable energy technologies on a net zero pollution basis.

Requirements: Engage in at least a 2-year renewable energy contract to provide at least 35% of the building's electricity from renewable sources, as defined by the Center for Resource Solutions' Green-e Energy product certification requirements.

MR Credit 1.1: Building Reuse—Maintain Existing Walls, Floors and Roof (3 Points)

Intent: To extend the lifecycle of existing building stock, conserve resources, retain cultural resources, reduce waste and reduce environmental impacts of new buildings as they relate to materials manufacturing and transport.

Requirements: Maintain 95% of the existing building structure (including structural floor and roof decking) and envelope (the exterior skin and framing, excluding window assemblies and non-structural roofing material).

MR Credit 1.2: Building Reuse—Maintain Interior Nonstructural Elements (1 Point)

Intent: To extend the lifecycle of existing building stock, conserve resources, retain cultural resources, reduce waste and reduce environmental impacts of new buildings as they relate to materials manufacturing and transport.

Requirements: Use existing interior nonstructural elements (e.g., interior walls, doors, floor coverings and ceiling systems) in at least 50% (by area) of the completed building, including additions.

MR Credit 4: Recycled Content (1–2 Points)

Intent: To increase demand for building products that incorporate recycled content materials, thereby reducing impacts resulting from extraction and processing of virgin materials.

Requirements: Use materials with recycled content such that the sum of postconsumer recycled content plus 1/2 of the preconsumer content constitutes at least 10% or 20%, based on cost, of the total value of the materials in the project.

MR Credit 5: Regional Materials (1–2 Points)

Intent: To increase demand for building materials and products that are extracted and manufactured within the region, thereby supporting the use of indigenous resources and reducing the environmental impacts resulting from transportation.

Requirements: Use building materials or products that have been extracted, harvested or recovered, as well as manufactured, within 500 miles of the project site for a minimum of 10% or 20%, based on cost, of the total materials value.

MR Credit 6: Rapidly Renewable Materials (1 Point)

Intent: To reduce the use and depletion of finite raw materials and long-cycle renewable materials by replacing them with rapidly renewable materials.

Requirements: Use rapidly renewable building materials and products for 2.5% of the total value of all building materials and products used in the project, based on cost. Rapidly renewable building materials and products are made from plants that are typically harvested within a 10-year or shorter cycle.

MR Credit 7: Certified Wood (1 Point)

Intent: To encourage environmentally responsible forest management.

Requirements: Use a minimum of 50% (based on cost) of wood-based materials and products that are certified in accordance with the Forest Stewardship Council's principles and criteria, for wood building components.

IE Q Credit 3.2: Construction Indoor Air Quality Management Plan—Before Occupancy (1 Point)

Intent: To reduce indoor air quality (IAQ) problems resulting from construction or renovation to promote the comfort and well-being of construction workers and building occupants.

Requirements: Develop an IAQ management plan and implement it after all finishes have been installed and the building has been completely cleaned before occupancy. OPTION 1. Flush-Out. PAT H 1. After construction ends, prior to occupancy and with all interior finishes installed, install new filtration media and , perform a building flush-out by supplying a total air volume of 14,000 cubic feet of outdoor air per square foot of floor area while maintaining an internal temperature of at least 60° F and relative humidity no higher than 60%.

IE Q Credit 4.1: Low-Emitting Materials—Adhesives and Sealants (1 Point)

Intent: To reduce the quantity of indoor air contaminants that are odorous, irritating and/or harmful to the comfort and well-being of installers and occupants.

Requirements: All adhesives and sealants used on the interior of the building (i.e., inside of the weatherproofing system and applied on-site) must comply with the requirements.

IE Q Credit 4.2: Low-Emitting Materials—Paints and Coatings (1 Point)

Intent: To reduce the quantity of indoor air contaminants that are odorous, irritating and/or harmful to the comfort and well-being of installers and occupants.

Requirements: Paints and coatings used on the interior of the building (i.e., inside of the weatherproofing system and applied onsite) must comply with the criteria.

IE Q Credit 4.4: Low-Emitting Materials—Composite Wood and Agrifiber Products (1 Point)

Intent: To reduce the quantity of indoor air contaminants that are odorous, irritating and/or harmful to the comfort and well-being of installers and occupants.

Requirements: Composite wood and agrifiber products used on the interior of the building (i.e., inside the weatherproofing system) must contain no added urea-formaldehyde resins.

IE Q Credit 6.1: Controllability of Systems—Lighting (1 Point)

Intent: To provide a high level of lighting system control by individual occupants or groups in multi-occupant spaces (e.g., classrooms and conference areas) and promote their productivity, comfort and well-being.

Requirements: Provide individual lighting controls for 90% (minimum) of the building occupants to enable adjustments to suit individual task needs and preferences. Provide lighting system controls for all shared multi-occupant spaces to enable adjustments that meet group needs and preferences.

IE Q Credit 6.2: Controllability of Systems—Thermal Comfort (1 Point)

Intent: To provide a high level of thermal comfort system control1 by individual occupants or groups in multi-occupant spaces (e.g., classrooms or conference areas) and promote their productivity, comfort and well-being.

Requirements: Provide individual comfort controls for 50% (minimum) of the building occupants to enable adjustments to meet individual needs and preferences. Operable windows may be used in lieu of controls for occupants located 20 feet inside and 10 feet to either side of the operable part of a window.

IE Q Credit 7.1: Thermal Comfort—Design (1 Point)

Intent: To provide a comfortable thermal environment that promotes occupant productivity and well-being.

Requirements: Design heating, ventilating and air conditioning (HVAC) systems and the building envelope to meet the requirements of ASHRAE Standard 55-2004, Thermal Comfort Conditions for Human Occupancy.

IE Q Credit 8.1: Daylight and Views—Daylight (1 Point)

Intent: To provide for the building occupants with a connection between indoor spaces and the outdoors through the introduction of daylight and views into the regularly occupied areas of the building.

Requirements: Achieve daylighting in at least 75% of regularly occupied spaces.

IE Q Credit 8.2: Daylight and Views—Views (1 Point)

Intent: To provide building occupants a connection to the outdoors through the introduction of daylight and views into the regularly occupied areas of the building.

Requirements: Achieve a direct line of sight to the outdoor environment via vision glazing between 30 inches and 90 inches above the finish floor for building occupants in 90% of all regularly occupied areas.

ID Credit 2: LEED Accredited Professional (1 Point)

Intent: To support and encourage the design integration required by LEED to streamline the application and certification process.

Requirements: At least 1 principal participant of the project team shall be a LEED Accredited Professional (AP).

LEED Registration

For projects seeking LEED Certification, the project team must first Register the project with the Green Building Certification Institute (GBCI) at www.gbci.org. Registration establishes initial contact with GBCI and provides access to errata, critical communications, software tools, and other essential information. Registration fees for USGBC members are $900 per project, and $1200 per project for nonmembers. As LEED Registration is an option for this project, it was not included in the Opinions of Probable Construction Costs which appear in the following chapter of this report.

LEED Certification

Having satisfied the basic prerequisites of the program and qualified for a minimum number of points to attain the desired rating level, projects are then reviewed for their degree of compliance. LEED NC provides the option of splitting the Certification process into two phases: design and construction. Documentation for design phase credits can be submitted for review immediately proceeding the design phase while documentation for construction phases credits can be submitted during or after construction. The LEED credits, however, are not awarded until the entire project has been reviewed. Certification fees for a project of this size enrolled by USGBC members are $2,250 per project, and $2,750 per project for nonmembers. These fees were not included in the Probable Construction Costs because LEED Certification is an option for this project and not a requirement.

LEED Cost Analysis

In addition to the $3,150 - $3,950 in Registration and Certification fees, there will be additional upfront costs stemming from the following key areas:

- design and construction team fees
- fundamental commissioning fees, and
- additional construction costs.

Most likely, the design and construction teams will request an increase in their fees to account for additional time coordinating the project, incorporating the LEED prerequisites and points, and submitting the necessary documentation for the Registration and Certification processes. For a project such as this, these fees could amount to $20,000 to $25,000.

While generally required to be an outside, independent, third-party consultant, the commissioning agent can come from the design or construction teams on a project of this size. However, this does little to alleviate the amount of work required to calibrate the project's energy-related systems. Commissioning fees vary greatly from consultant to consultant and can range from $20,000 to $50,000.

In addition to these soft costs, there are hard costs associated with the actual construction of the project, which include material and system upgrades necessary to meet LEED prerequisites and points and possible introduction of

renewable energy systems. For a project such as this, these costs could amount to $20,000 to $50,000 or much, much more. It should be mentioned that the initial upfront cost of the upgrades is generally offset long term by 24-50% reductions in energy use, 40% reductions in water use, and 70% reduction in solid waste generation, and produce healthier, more productive building occupants. All of which can result in an 8-9% decrease in operating costs.

In general, $63,000 to $129,000 could easily be added to the project to obtain LEED Silver Certification. On a large project, these costs can easily be absorbed into the overall project budget. However, on a relatively small project such as this, they add a disproportionate amount to the project's budget (approximately 20-25%) and significantly impact the project's economic viability. Unless the future tenant is particularly passionate about green building and has the economic resources to back it up, it is difficult to envision that a future rehabilitation of this building will include LEED Certification. Therefore, the costs of 'going LEED" have been excluded from the Opinion of Probable Construction Costs discussed in the Prioritization & Cost Estimate Chapter.

Renewable Energy Systems

By Brian Schwaller & Jon Prigge, Certified Site Assessors of Eco-Manity (edited)

Overview & Goals

This property is managed by the Fox River Navigational System Authority (FRNSA) and is owned by the State of Wisconsin. It is known as the Lockkeepers House, and it is one of several structures comprising the De Pere Lock and Dam System. When the house was built in 1912, it was not designed with energy efficiency in mind, at least how we would consider it today. In addition to the rehabilitation of this building, the City of De Pere Historic Preservation Commission and FRNSA are interested in the feasibility of offsetting the electrical and hot water consumption for this property with the use of energy efficiency and renewable energy systems.

As it is listed in the State and National Registers of Historic Places, changes or alterations to the existing structure, including placing a renewable energy system onto it, will not be allowed. So this system will have to be a ground mounted system adjacent to the home. This would include a pipe being dug into the ground and run into the building's basement. The future tenant will have to maintain this system and regularly check on the system to make sure it's functioning properly, including possible snow removal during Wisconsin winters.

Energy Efficiency Measures

Before tackling any renewable energy system, a building should first be made as energy efficient as possible. For every $1 spent on energy efficiency, $3-$5 can be saved on the cost of a solar system. Consider the following improvements to help reduce hot water and electrical use:

- Upgrade fixtures and appliances by using Energy Star appliances throughout. Energy efficient appliances and low water use fixtures save a lot of hot water and energy. A list of energy efficient appliances is available at www.aceee.org/consumerguide/. It should be noted that here in the Midwest, as well as other cooler climates, power consumption may actually be lower than the rating this organization gives them.
- High efficiency conventional water heaters use 30- 50 percent less energy than standard models of the same size. Make sure it's properly sized and installed. Lower the water heater thermostat to between 120 -130 degrees Fahrenheit. Water hotter than that is unnecessary in most situations. Wrap the water heater in insulation if it is in an unheated area.
- Insulate all hot water pipes.
- Fix leaky faucets and shower heads promptly. A faucet that leaks 30 drops of water per minute leaks around 84 gallons per month.
- Use cold water with the garbage disposal. Cold water solidifies grease so the disposal can get rid of it more effectively.
- When washing dishes in the sink by hand, don't let the water run while rinsing. Fill one sink with wash water and the other with rinse

water. Soak pots and pans instead of letting the water run while scraping them clean.

- Whenever possible, wash only full loads. If your washer has a water selector, use the lowest practical level.
- Install low-flow shower heads or use a flow restrictor. Take quick showers instead of baths.
- Turn off the water while you shave and brush your teeth.
- Moving air feels cooler and more comfortable, and use of a fan or fans may allow air conditioning to be turned back a bit while maintaining the same comfort level.
- LCD computer displays use less energy than CRT displays, and laptop and notebook computers use significantly less energy than desktop PCs. Energy management options should be enabled on all computers.
- Lighting with compact fluorescent light bulbs uses only 25% of the energy as standard incandescent light bulbs.

This project is eligible for various financial incentives. Consider working with Wisconsin's Focus on Energy to make energy efficiency improvements to homes, businesses, or organizations prior to installing renewable energy system. Focus incentives are subject to change, and do quite frequently. Please visit http://www.focusonenergy.com/ for current reward information, requirements, and application forms.

Renewable Energy Systems

Property Description

This property is in the City of De Pere, Wisconsin, and is located on a relatively narrow dyke between the Fox River and its canal. This building is part of the De Pere Lock & Dam Historic District and is a two-story Dutch Colonial Revival style house. A gambrel-roofed rectangle, it has rectangular frame porches projecting at the front and rear. The home was built into a riverside lock embankment.

In general, there is space available on a 400-foot long strip of land south of the house to install ground mounted solar water heating and electrical systems with underground pipes run back to the house. As the FRNSA plans to remove all the trees and shrubs located along the western bank of the dyke, the "solar window" will be clear of all trees and shrubbery and 100% open from dawn till dusk 365 days a year at time of installation. However, future growth of additional trees and shrubs will have to be considered and managed from time to time to keep the solar window open.

At this time, the utility meter for this property is located in the Lock Shack, which is located approximately 80 feet north of the Lockkeeper's House, across the canal and downstream. The Lock Shack will continue to be used by the FRNSA in their operation of the lock, while the Lockkeeper's House will be leased out to another entity. Therefore, a new, separate meter will have to be installed in the Lockkeeper's House for any renewable energy system.

As the home has been vacant since the fall of 1983, there is no utility history or records available for the property. All electrical appliances have been removed. While the equipment (such as the water heater, furnace, and electrical panel) and fixtures (such as the kitchen sink and the bathroom sink,

toilet, and tub/shower) may remain, the plumbing, heating, and electrical systems were permanently shut down and vacated in 1983.

The proposed future uses that have been identified for the building include rental or tourism lodging, a park or recreational shelter, and an office.

Solar Hot Water System

Solar Hot Water Basics

Solar hot water systems consist of three major components: the solar collectors (panels), a solar storage tank, and a circulation system. Collectors for solar water heating come in two main types – flat plate collectors and evacuated tube collectors. Flat plate collectors are typically composed of an insulated aluminum box with a tempered glass front. Behind the glass is an absorber plate connected to a grid of copper pipes. Evacuated tube collectors use a set of sealed glass tubes, with each tube containing an absorber plate to absorb the solar energy.

Insulated pipes connect the collectors to a liquid-to-liquid heat exchanger which is plumbed to the solar storage tank. This tank, which is usually slightly larger than that of a traditional water heater, stores the solar-heated water and supplies it to the water heater.

Most cool-climate solar hot water systems circulate a non-toxic antifreeze mixture to heat the water in the storage tank. When the sun shines on the collectors, the fluid absorbs the solar energy and becomes hot. A pump circulates the fluid through the insulated pipes to the heat exchanger, which transfers the heat from the fluid to the water in the solar storage tank. The fluid is then pumped back to the collect and the process begins again.

Solar hot water systems are very reliable, with a long and successful track record in Wisconsin. The collectors and insulated piping can last the life of the home. The circulating pump, non-toxic antifreeze mixture, and other minor components are subject to wear and may need to be replaced periodically. The system should be checked every five to ten years by a qualified service technician.

Because solar water heaters offset the use of fossil fuels, there are environmental benefits associated with their use. These benefits are calculated in tons of greenhouse gas reduction. The estimated greenhouse gas reduction for the modeled system is listed below.

Load Analysis

Based on the suggested future uses of the building, the following assumptions were made:

- Rental or tourism lodging: 3 bedrooms with up to eight guests or residents dwelling in the property at one time; 1 kitchen sink, 1 dishwasher, 2 bathroom sinks, 2 toilets, and 1 tub/shower
- Park or recreational shelter: up to 15 visitors or patrons in the building at one time; 1 janitor's sink, 1 bathroom sink, and 1 toilet
- Office: up to 15 employees and visitors in the building at one time; 1 kitchen sink, 1 janitor's sink, 1 bathroom sink, and 1 toilet

As the rental or tourism lodging is the worst case scenario in terms of hot water use, it served as the basis for the hot water calculations and recommendations.

System Recommendations

As a solar hot water system cannot be placed on the home itself, a ground mounted system should be utilized. The best placement for the collectors would be on a narrow strip of land south of the building approximately 30-feet away to ensure a relatively short pipe run from collector to the building. A ground mounted rack designed to hold three 4' x 10' collectors mounted next to each other is recommended. The collectors need to be mounted a minimum of 5-feet off the ground to allow for snow to slide off the collectors and make a pile at the base. The recommended angle for the panels is 45 degrees facing south.

A new 120-gallon or two 60-gallon, 95% efficient electric water heater(s) and electrical panel will be located in the basement or crawl space of the building; this is also the proposed location for the new 120-gallon back up storage tank for solar hot water system.

This recommended system is projected that this system will produce 60% of the hot water demand, offsetting 25 therms per month (300 therms annually), and will eliminate 1.7 tons of carbon dioxide gas emissions equivalent to 0.3 cars/trucks not being used.

Cost Estimate

Cost estimates are computed based on an average installed cost in Wisconsin and given in the form a range based on the cost per square foot of collector for residential water-heating-only systems. The current range is $125-175 per square foot. At 120 square feet, it is anticipated that this system would cost between $15,000 and $21,000.

While not available at this time, this system may be eligible for various financial incentives in the future. Consider working with Wisconsin's Focus on Energy for rewards for small scale solar hot water systems for homes, businesses, or organizations prior to installing the renewable energy system. Focus rewards are subject to change, and do quite frequently. In the past, reward levels could be up to 30% of the total system cost or a maximum of $2,400. Please visit http://www.focusonenergy.com/ for current reward information, requirements, and application forms.

Federal Tax Credits are also available for homes and businesses (not governments or non-profits) for another 30% of the total system cost, or between $3,780 and $5,580. The current program is set to expire at the end of 2016. Please consult a tax advisor for more information.

Solar hot water systems are exempt from Wisconsin property taxes, making renewable energy an investment that can be made on a property without increasing the tax liability.

Starting in July of 2009, solar equipment has been exempt from sales and use taxes in the State of Wisconsin.

Depending upon the future lessee of the building and how they utilize these incentives, the estimated end system cost could be $8,820 to $13,020 or less, with an estimate payback period of less than ten years. In addition, the future lessee should expect an average maintenance cost of approximately $30 per year.

Solar Electric Systems

Photovoltaic Basics

Most solar electric systems installed today are direct "grid-tied" systems with no battery backup. Essentially the utility's power grid acts as the storage (in place of batteries) for any excess power produced by the solar system. This not only eliminates the cost of the batteries, it also eliminates the required monthly maintenance and periodic replacement expenses associated with them. This has been a big step forward in generating interest among the general public in installing solar photovoltaic (PV) systems. By Federal mandate, most utilities must credit the system owner for the excess electricity that their PV system generates. In many States including Wisconsin, all investor-owned and municipal utilities are required to "net meter," meaning they credit the homeowner at the retail rate for excess energy produced by solar electric systems up to 20kW in system size.

A noticeable disadvantage of direct grid-tied systems is that when there is a power outage and the utility power grid goes down, the PV system goes down as well. There is no back-up power because there are no batteries. In most areas power outages are not significant problems so this is not a major issue, and the reduced maintenance and cost of battery-less grid-tied systems more than makes up for any inconvenience. It is possible to install a battery backup option for a grid-tied system in order to maintain power to a few critical loads of the client's choosing. However, this does add significantly to the cost and reduces the operating efficiency of the system.

A PV system is a collection of photovoltaic panels connected together to create an array of the desired size (wattage). For example an array may be composed of ten, 200 watt panels forming a 2,000 watt (2 kW) system. The framed PV modules sit side-by-side on a rack, and the wires from the individual modules are connected together and then run to a "combiner box" which combines the outputs from the individual strings of modules into one larger output, which is then run to the balance of system components typically located within the home. The PV array produces DC power which, in a normal grid-tied application, is converted into AC power by an inverter and then connected to your load center (breaker box) to power the loads in the home. If more power is being produced than consumed, the excess power flows out onto the power grid through the meter, and the utility credits the homeowner's account in a relationship called "net metering."

A PV array can be mounted on a home or other building, or it can be mounted on a ground-based rack. A PV array is very sensitive to shading, much more so than a solar hot water collector. When shading exists at ground level, the roof may be the best location.

Pole-mounted arrays are seasonally adjustable with a twice yearly adjustment keeping the elevation angle better suited to the sun's seasonally changing altitudinal position in the sky. This will result in a gain of about 5% and offer less snow shading as well (typically 1 - 2% less snow shading).

Pole mounts can also be fitted with a "tracker," a rack that moves to follow the sun's position in the sky. Single axis trackers follow this movement east to west, and dual axis trackers also follow the seasonal elevation movements up and down. Trackers can increase the output of the array by 20 – 30%, but to do so they need a wide open "solar window" with little or no shading to the east and west. Tracking arrays cost more to install and also add mechanical complexity to the system design, which can translate into increased maintenance costs as well as the possibility of repair expenses.

Additional benefits of a ground-mount array are:

- Avoids re-roofing issues inherent in most roof mounts
- Operates cooler, thereby increasing power output slightly
- Less snow shading than roof mounts
- Easy access

Load Analysis

Based on the suggested future uses of the building, the following assumptions were made:

- Rental or tourism lodging: 3 bedrooms with up to eight guests or residents dwelling in the property at one time; 1 dishwasher, 1 range, 1 microwave, 1 refrigerator, 1 television, 1 home entertainment system, 2 exhaust fans, numerous light fixtures and receptacles (outlets)
- Park or recreational shelter: up to 15 visitors or patrons in the building at one time; 1 microwave, 1 refrigerator, 1 television, 1 home entertainment system, 2 computers, 1 exhaust fan, and numerous light fixtures and receptacles
- Office: up to 15 employees and visitors in the building at one time; 1 microwave, 1 undercounter refrigerator, 1 television, 1 home entertainment system, 5 computers, 1 exhaust fan, and numerous light fixtures and receptacles

As the office is the worst case scenario in terms of electrical use, it served as the basis for the electrical calculations and recommendations.

System Recommendations

As a PV system cannot be placed on the home itself, multiple pole-mounted duel axis solar tracking systems should be utilized. The best placement for the PV array would be on a narrow strip of land south of the building approximately 75-feet away to ensure the shortest pipe run as possible to the building and to avoid shading the solar water system.

The FRNSA or the future lessee will install a new 200-amp electrical panel in the basement or crawl space of the building. A pipe run will be dug connecting the pole-mounted duel axis trackers to each other and then will connect to the electrical panel and the balance of the electrical system.

With a 45-foot spacing to avoid shading between the pole-mounted trackers, the site could accommodate up to 5 separate 4 kW trackers, for a 20 kW system. In this climate, each tracker would be capable of producing 6,498

kWh per year, or 32,446 kWh combined, which would produce nearly three times the energy required for the building. There may be some benefits to maximizing the site's PV output. New electrical service for the upcoming riverwalk project will need to be blasted into the bedrock at the bottom of the river and parged over, which will be very expensive. A properly designed and sized off-the-grid PV array could be more cost effective, eliminating the need to undertake this costly utility work. However, acknowledging that this would exacerbate the house rehabilitation project's budget, a system with two 4 kW pole-mounted trackers, 8 kW total, would produce approximately 13,000 kWh per year or 100% of the building's projected electrical needs is recommended.

Cost Estimate

The cost estimate is based on the average installed cost in Wisconsin per kW of the system, which is currently $9,000 per kW. At 8 kW, it is anticipated that this system would cost approximately $72,000.

While not available at this time, this system may be eligible for various financial incentives in the future. Consider working with Wisconsin's Focus on Energy for rewards for photovoltaic systems for homes, businesses, or organizations prior to installing the renewable energy system. Note that the solar system must be at least 500W (0.5 kW) and must be installed by an installer who is certified by the North American Board of Certified Energy Practitioners (NABCEP), or an installer listed as pursuing NABCEP certification, to qualify for a Focus on Energy Reward. A list of these installers is maintained by Focus on Energy and the Midwest Renewable Energy Association (MREA). Focus rewards are subject to change, and do quite frequently. In the past, reward levels have been approximately 30% of the total system cost, or a maximum of or $16,250. Please visit http://www.focusonenergy.com/ for current reward information, requirements, and application forms.

Federal Tax Credits are available for homes and businesses (not governments or non-profits) for 30% of the total system cost, or $21,600. The current program is set to expire at the end of 2016. Please consult a tax advisor for more information. Accelerated depreciation with a 50% bonus in the first year can also be claimed.

Wisconsin is a net metering state, meaning all investor-owned and municipal utilities are mandated to credit at the retail rate (the same rate they charge) for any excess power generated by a PV system that is up to 20 kW in size. Net metering may include time of use rates as well as standard rates.

Solar electric systems are exempt from Wisconsin property taxes, making renewable energy an investment that can be made on a property without increasing the tax liability.

Starting in July of 2009, solar energy equipment has been exempt from sales and use taxes in the State of Wisconsin.

Depending upon the future use and lessee of the building and their ability maximize these financial incentives, the estimated end system cost could be between $17,115 and $49,250, with an estimate payback period of between ten and twenty years. In addition, the future lessee should expect an average maintenance cost of approximately $720 per year.

Disclaimer

The system output, sizing, costs, and financial incentives described above are rough estimates and should not be used as a guarantee of any sort. There are many variables that affect system costs in Wisconsin including:

- System - size, complexity of usage, quality & efficiency of equipment
- Contractor - credentials, reliability & solar experience
- Site - proximity to installer network, difficulty of installation (e.g. pipe run length & access), permitting & zoning considerations

To determine actual installed costs of a system at your site, solicit at least three bids from full service installers which can be seen at http://www.focusonenergy.com/fullserviceinstallers.

Contact your lawyer, accountant, and the IRS for guidance on depreciation, eligible tax credits, and other tax ramification of renewable energy systems. The information provided herein should not be considered legal advice.

Prioritization & Cost Estimates

Prioritization

Introduction

The work required to restore any building could be classified into four broad categories: sealing the envelope, planning & pre-design, design development & construction documents, and bidding & construction. Generally, the work should be prioritized and undertaken in that order.

The following qualitative maintenance deficiency priority ratings are based on definitions used in government and private industry standards.

- **Critical (Emergency / Immediate).** This category indicates an advanced state of deterioration that has resulted in the failure of a feature or may result in the failure of a feature if not corrected within one or two years. Accelerated deterioration of adjacent or related materials or systems result from the feature's deficiencies. Items in this category pose an immediate threat to the health and/or safety of the user or represent a failure to meet legislative requirements.
- **Serious (Immediate / Short-Term).** This category indicates a deteriorated conditions that, if not corrected within two to five years, will result in the failure of the feature. Ongoing deterioration of adjacent or related materials and/or features may result from the feature's deficiency. Threats to the health and/or safety of the users may occur within one to five years if the ongoing deterioration is not corrected.
- **Minor (Short-Term / Long-Term).** This category includes standard preventative maintenance practices and preservation methods which should be followed. Reduced life expectancy of affected adjacent or related materials and/or systems may result within five to seven years and beyond. Items in this category also include conditions with long-term impact within five to seven years.

Critical (Emergency / Immediate)

The first priority on any project should be to seal the envelope by making the building weather tight, vermin proof, and secure prior to beginning any work. This prevents further damage to the structure while other processes, like preservation planning, marketing, and capital campaigns, can take place. For the most part, work required to seal the envelope of the De Pere Lockkeeper's House was conducted during the 2010 stabilization project. However, several items were identified during the condition assessment that may result in the failure of a feature or cause accelerated deterioration if not addressed within the next couple of years or pose an immediate safety hazard.

- Miscellaneous debris and secondary materials, such as carpet pad, carpet, vinyl, wallpaper, paneling, and acoustic and fiberglass ceiling tiles, should be removed to better assess the condition of original building materials beneath and allow them to breath.
- The dried mud and muck in Basement Rooms B01 & B02 should be removed to better assess the condition of the floor so the source of the water infiltration can be remedied.

- Awning windows in Basement Rooms B01 & B02 should be securely propped open or temporarily removed and stored on-site to allow vented shutters to work properly.
- The source of daylight near the floor in the southwest corner of Back Closet 108 and at the ridge of the roof in Back Porch 109 should also be remedied.
- The holes in the floor of Back Closet 108 and Back Porch 109 should be temporarily covered for safety.

Serious (Immediate / Short-Term)

This document lays the foundation for the preservation planning & pre-design process for this building by conducting research into the areas of finishes, furnishings, structural, plumbing, heating, ventilating & air conditioning, and electrical. With these tasks accomplished, the building can be marketed to prospective tenants and/or a capital campaign may be undertaken to raise the funds necessary for the preparation of restoration plans for the building and for the restoration work itself. Finding a suitable future use for this building will save this building, alleviating future threats from lack of preventative maintenance.

In the meantime, several items were identified during the condition assessment that may result in the failure of a feature within the next two to five years or pose an immediate health hazard. These items also include non-historic elements which may be removed prior to beginning any rehabilitation work.

- The sanitary sewer system should be scoped with a camera to determine if it outlets into the river, and corrective measures should be developed and undertaken.
- Excessive humidity levels within the building have caused mold to grow on the plaster walls behind the wallpaper. The extent of the mold growth should be documented and a remediation plan should be developed and undertaken.
- Underground oil piping from the house, under the river, and to a fill station on the southeast end of the lock should be documented, and sampling and analysis of the surrounding soil to check for leaks and spills should be undertaken.
- Asbestos containing materials were previously identified in several locations within the house. The extent of the asbestos should be updated and remediation efforts should be undertaken.
- Additional secondary materials, such as ranch style base and casings, hollow core flush wood doors, plumbing fixtures and water heater, HVAC equipment and oil tank, and acoustic panel ceiling grids, should be removed as they are not historic and are unlikely to be re-used during a future rehabilitation project.

Minor (Short-Term / Long-Term)

Standard preventative maintenance practices and preservation methods, as described in the following chapter, should be followed by the FRNSA in both the short- and long-term until a future tenant can rehabilitate and occupy the building. Other items with long-term impact in the next five to seven years include design development & construction documents and bidding & construction.

A design team of properly educated and trained historic preservation professionals should be assembled to undertake the design development & construction documents work. The team should be headed by an architect, designer, or consultant who has been educated and trained in architectural history and historic preservation and has demonstrated experience working on National Register listed buildings, single-family residential projects and commercial projects (depending upon the future use), tax credit projects, and Section 106 compliance projects. This individual or firm should be contracted directly with the FRNSA or lessee and be aboard the project team throughout the design and construction phases to ensure consistent and ongoing compliance with *The Secretary of the Interior's Standards.* Along with their interior designer and engineers, the architect shall oversee the development of complete construction documents. These documents are written, graphic, and pictorial documents prepared to describe the scope of work and are necessary to obtain competitive bids and a building permit. While a preliminary code review was included in the scope of this report, codes can change over time; a thorough code analysis should be completed during this phase of the building's restoration. The design team should be given adequate time to prepare the construction documents as well as any other reporting required by the FRNSA, DNR, or WHS before the start of construction.

Once the construction documents are complete, bidding & construction can begin. The project should be solicited to construction teams consisting of a general contractor and appropriate subcontractors who have demonstrated experience and been regularly engaged in historic preservation projects, working on National Register listed buildings, single-family residential projects and commercial buildings, and tax credit projects. The successful construction team should also be contracted directly with the FRNSA or lessee. While it is imperative that the general contractor be brought aboard the project team at the bidding & construction phase, it is sometimes desirable to bring them aboard during the design development & construction documents phase to obtain their input on construction materials, techniques, and opinions on probably construction costs.

Preliminary Cost Estimates

Introduction

Costs can vary depending upon a number of variables including quality, overtime, productivity, size of project, location, season of year, contractor management, weather conditions, availability of skilled labor and building materials, owner's special requirements, and the final scope of the project. The opinions of probable construction costs provided below are made on the basis of information available to LJM Architects, Inc. in the Spring of 2011, the recommendations outlined in the Historic Structures Report, our assumptions of the scope of work, and our professional judgment and expertise. They are derived from in-house cost estimating software developed by LJM Architects and cross referenced with industry accepted figures from RS Means' *Building Construction Cost Data* and a reasonable square foot cost analysis from RS Means' *Square Foot Costs*. While we exercised usual and customary professional care in our efforts to develop the preliminary cost estimate, we have no control over costs or the price of labor, equipment or materials, or over the Contractor's method of pricing. We make no warranty, expressed or implied, as to the accuracy of such opinions as compared to bid or actual costs.

The opinions of probable construction costs provided below are given for each of the three identified future uses and are broken down by industry accepted categories from the latest version of MasterSpec's *MasterFormat*, a standard for organizing specifications and other written information for commercial and institutional building projects in the United States.

Prevailing Wage Rates

It is assumed that the Active Recreational Shelter will involve some governmental entity which will trigger use of prevailing wage rates, a legislative effort to provide unionized labor a fair chance to bid for government contracts. These laws requires all contractors engaged in the performance of federal, state, and local construction contracts to pay prevailing wages to their employees to ensure that nonunion contractors cannot gain an unfair bidding advantage by paying wages far below the union rate and passing the savings on to governmental bodies in lower bids. Prevailing wage rates are determined by the U.S. Department of Labor and the Wisconsin Department of Workforce Development and are based upon the particular geographic area for a given class of labor and type of project. In our experience, this generally increases the cost of construction; therefore, a factor of 10% was added to the Construction Subtotal.

Construction & Design Contingency

A construction and design contingency is an amount of money reserved to pay for unanticipated added costs of the project. These may include building code changes, local or state law changes, unforeseen building conditions, escalating materials prices, and project scope changes. Construction and design contingencies are very important on a historic preservation project such as this, especially due to the unforeseen conditions inherent in working with an existing building. Because it is early in the overall preservation planning process, a factor of 15% was included. After actual restoration plans are prepared, a reexamination of the Opinion of Probable Construction Costs should be undertaken. As they can be more precisely tabulated, the contingency may be safely reduced to somewhere in the range of 10%.

Architectural & Engineering Fees

A team of properly educated and trained historic preservation professionals should be assembled to undertake the work. These individuals or firms should be contracted directly with the FRNSA or lessee, and should be involved with the project throughout the design, construction document, bidding, and construction phases to ensure consistent and ongoing compliance with *The Secretary of the Interior's Standards.* While architectural and engineering fees can very greatly from firm-to-firm and based on the scope of services provide, a factor of 10% was included for both the Active Recreational Shelter and the Institutional Office as they are both commercial in nature and will require more extensive engineering. As it is more residential in nature and will require less engineering detail, a factor of 5% was included in the Heritage Tourism Lodging estimate.

Miscellaneous Costs

Miscellaneous costs are project-related out of pocket expenses, or reimbursable expenses, incurred by the design team. These may include state and local plan

review fees, printing, mileage, postage. Because of the commercial nature of the Active Recreational Shelter and the Institutional Office, a factor of 1% was included, while only a 0.5% factor was included in the Heritage Tourism Lodging estimate.

Annual Inflationary Increase

The overall process for any historic preservation project may take years from initial conception, to preservation planning, to a capital campaign, to design, to construction, and, finally, project completion. Annual inflation is a key driver of construction costs. Increases in global demand for construction products, cost of raw materials, and the unavailability of skilled labor make forecasting total cost of construction challenging. Over the past several decades, inflation has accounted for a zero- to nine-percent increase in construction costs per year. Therefore, an average annual inflationary increase of 5% was included in the construction budget. If the project is delayed beyond 2012, an increase of 5% should be included for each additional year.

Active Recreational Shelter

General Conditions & Requirements	$46,829
Existing Conditions	$34,205
Concrete	$3,196
Masonry	$9,953
Metals	$1,050
Wood, Plastics & Composites	$27,290
Thermal & Moisture Protection	$3,671
Openings	$46,745
Finishes	$33,956
Specialties	$4,182
Equipment	$510
Furnishings	$33,502
Conveying Equipment	$45,900
Fire Suppression	$27,000
Plumbing	$61,580
Heating, Ventilating & Air Conditioning	$24,900
Electrical	$32,600
Prevailing Wage Rates	$43,707
Construction Subtotal	$480,775
Construction & Design Contingency (15% of Construction Subtotal)	$72,116
Architectural & Engineering Fees (10% of Construction Subtotal)	$48,077
Miscellaneous Costs (1% of Construction Subtotal)	$4,808
Project Subtotal	$605,776
Annual Inflationary Increase (5% of Project Subtotal per Year)	$30,289
Active Recreational Shelter Project Total	**$636,065**

Institutional Office

General Conditions & Requirements	$45,105
Existing Conditions	$34,205
Concrete	$3,196
Masonry	$9,953
Metals	$1,050
Wood, Plastics & Composites	$27,290
Thermal & Moisture Protection	$3,671
Openings	$46,745

Finishes	$33,956
Specialties	$4,182
Equipment	$7,140
Furnishings	$29,412
Conveying Equipment	$45,900
Fire Suppression	$27,000
Plumbing	$60,300
Heating, Ventilating & Air Conditioning	$14,600
Electrical	$27,275
Construction Subtotal	$420,979
Construction & Design Contingency (15% of Construction Subtotal)	$63,147
Architectural & Engineering Fees (10% of Construction Subtotal)	$42,098
Miscellaneous Costs (1% of Construction Subtotal)	$4,210
Project Subtotal	$530,434
Annual Inflationary Increase (5% of Project Subtotal per Year)	$26,522
Institutional Office Project Total	**$556,955**

Heritage Tourism Lodging

General Conditions & Requirements	$34,579
Existing Conditions	$31,487
Concrete	$877
Masonry	$8,895
Metals	$0
Wood, Plastics & Composites	$12,728
Thermal & Moisture Protection	$3,671
Openings	$46,745
Finishes	$29,873
Specialties	$2,040
Equipment	$7,140
Furnishings	$23,664
Conveying Equipment	$0
Fire Suppression	$27,000
Plumbing	$64,100
Heating, Ventilating & Air Conditioning	$9,200
Electrical	$20,740
Construction Subtotal	$322,738
Construction & Design Contingency (15% of Construction Subtotal)	$48,411
Architectural & Engineering Fees (5% of Construction Subtotal)	$16,137
Miscellaneous Costs (0.5% of Construction Subtotal)	$1,614
Project Subtotal	$388,899
Annual Inflationary Increase (5% of Project Subtotal per Year)	$19,445
Heritage Tourism Lodging Project Total	**$408,344**

Excluded Work Items

As LEED and renewable energy systems are options for this project, rather than regulatory requirements, the costs associated with them have been excluded from the Opinion of Probable Construction Costs provided above. For a relatively small project, they add a disproportionate amount to the project's budget, significantly effecting the project's economic viability. Further information about these costs can be seen in their associated chapters.

Maintenance Recommendations

Introduction

In addition to the *Standards* and *Guidelines*, the Secretary of the Interior has developed a set of educational publications known as *Preservation Briefs* which give information regarding historic properties and specific preservation practices. *Preservation Brief 47* is dedicated solely to the maintenance of exteriors of small and medium size historic buildings.

The integrity of materials and workmanship of historic buildings, such as the De Pere Lockkeeper's House, can be preserved through routine maintenance. While every reasonable effort was made in 2010 to stabilize and protect the exterior of the De Pere Lockkeeper's House for the long-term, a monitoring and maintenance plan should be developed and implemented. The monitoring and maintenance plan should set the frequency of site visits and routine maintenance items, and the plan should be enacted until a future use can be determined and the building becomes occupied. Lack of regular upkeep can accelerate the natural process of deterioration. Rewards for consistently undertaking these repetitive tasks include the following:

- Extending the life of the structure
- Strengthening the building against strong storms and high winds
- Managing costs and disruption from widespread replacement

Maintenance Plan

A maintenance plan is a written set of procedures that prioritize tasks to account for a building's character-defining and vulnerable elements. No matter the size of a property, a thorough maintenance plan should include the following:

- Checklists for scheduled inspections with blank base plans and elevations to document required maintenance actions and record when the work is completed
- A set of base-line photographs which should be updated over time
- A list of contacts who can be called in case of emergency or complex issues
- Care and preventative maintenance procedures for specific materials
- Repair log of work completed including cost, warranty, materials, and finish and color selections, etc.

Sample checklists & repair logs, set of base-line exterior photos, list of contacts, and materials, finishes, and colors that were used during this and the 2010 stabilization project are included in the appendix.

Historic building owners should budget two to four percent of the replacement value of the building for annual maintenance costs. Scheduling of the work can be based on a variety of factors, including staff availability, the severity of the problem, manufacturer's recommendations, and seasonal appropriateness. The sample checklists in the appendix suggest spring, summer, and fall

frequencies. Spring inspections should take place after the snow melts, but prior to the wet or rainy, painting, and cooling season. Summer inspections should take place during or immediately after significant weather events, such as a severe rainstorm or unusually high winds. Fall inspections should take place after the wet or rainy season when the leaves have fallen from the trees, but before the heating season and snow falls.

Inspections and maintenance should be undertaken with the safety of workers and the protection of the historic structure in mind. Original building features should be awarded the utmost care. Health and safety issues commonly found in old buildings include lead-based paint, asbestos, animal droppings, and volatile organic compounds (VOC). It is important for inspection and maintenance personnel to use goggles, gloves, masks, closed-toe shoes and hard hats. If standing water may be present, electrical service should be temporarily turned off. Professional service should be sought when necessary.

Inspections should begin at the roof and proceed down to the foundation, working on one side of the building at a time and moving around it in a consistent direction. Observations should be recorded under the Condition Description in the Checklist, and photos should be taken to provide a visual record. The maintenance actions required to correct the deficient conditions should also be recorded and scheduled for repair. When the work is completed, it should be recorded as well.

If maintenance and repair work is contracted out, ensure contractors have experience working with historic buildings. Clearly define the scope of work in writing based on preservation *Standards* and *Guidelines* to be undertaken by the contractor. Ask for multiple references and visit sites to look at their work. Request a written, detailed cost estimate and copies of necessary business licenses and proof of insurance.

Routine & Cyclical Inspections & Maintenance

Roofs

Designed to keep water off of a building, a roof system and its components must carry water to grade and then away from the building. Gutters and downspouts should be clear of debris. Flashings around the chimney, dormers, and other appendages need to be inspected. Asphalt shingle and EPDM roof covering need to maintain a watertight seal and should be inspected by a professional roofer every five years. Chimneys should also be regularly inspected.

Inspection

Binoculars are a useful tool for inspecting the roof safely from the ground. Slip-resistant shoes and safety ropes are a must when accessing the roof. Check for debris accumulation in valleys; missing, cracked, buckling, or bubbling roof coverings; deteriorated flashing or connections, and moisture ponding at EPDM roof. Chimneys should be checked for cracked masonry, deteriorated mortar joints, or dislodged chimney caps. Gutters and downspouts should be observed from the ground during rainy weather and when ice has collected. Check for sagging gutters and accumulation of debris. The building interior should also be checked.

Maintenance

Sweep debris from shingles at valleys, chimneys, and dormers. Remove any biological growths with water and a scrub brush. Secure loose flashings. Repair broken, missing, or damaged shingles with ones that match. Repoint joints in chimney. Use garden hose to flush out debris from gutters and downspouts. Use a ladder with extension brace or bracket to avoid crushing the gutters. Patch or repair leaking seams and pin holes and correct any misalignment so water flows properly.

Exterior Walls

To prevent water from infiltrating the building and to keep pests out, exterior walls should have an even, crack-free appearance. Significant misalignment, bulging, and cracking of walls can indicate a potential structural problem. An architect or structural engineer should be consulted to identify the cause of the problem and develop appropriate corrective action. Wooden elements will require more frequent maintenance than the brick and stone.

Inspection

Exterior walls should be inspected during both dry and wet weather conditions. Check for moisture patterns or excessive damp spots accompanied by peeling paint and mold. Look for signs of movement such as misalignment, bulges, cracks in masonry, diagonal cracks in mortar joints, spalling of masonry and open joints. Check for evidence of rotting wood, insect infestation, and vegetative growth. Look for potential problems around features that penetrate the walls such as water spigots, conduit, and vents. Also check for general paint problems.

Maintenance

Trim bush branches and high grass away from walls. Wash exterior wall surfaces with water and a brush if needed to remove spider webs and dirt to uncover deterioration. Repair damaged brick and stone with compatible material and repoint loose or cracked mortar joints. Repair or replace damaged wood shingles or trim with in-kind materials and prep, prime, and paint where necessary. Remove and replace deteriorated caulks and sealants according to manufacturer's instructions. Correct any deficiencies in features that penetrate or attach to walls.

Openings

Exterior wall openings containing doors and windows and, in this case, shutters, should be in sound condition, and the joint between it and the wall should be sealed to prevent air and water infiltration.

Inspection

Inspect from both the exterior and the interior. Examine the overall condition of the material, in this case, wood. Check for water, insect, and animal infiltration, droppings, and damage. Ensure frames, doors, sashes, and shutters are not loose or misaligned. Check to make sure joint between wall and frames are sealed. Check horizontal surfaces on window sashes and window and door

sills for deterioration, cupping, and proper slope for drainage. Look for loose hardware, locking difficulties, and deteriorated weatherstripping. Also look for peeling paint or other corrosion.

Maintenance

Repair or replace broken or missing shutters. Tighten screws and lubricate door hinges. Adjust or replace weatherstripping as required. Adjust wood shutters at doors if they bind when operated. Seal perimeter cracks around window and door frames. Clean handles, locks, and other hardware with a soft, damp cloth. Temporarily remove and clean hardware before painting and reinstall once paint has dried. Prep, prime, and repaint windows, doors, shutters, frames, and sills as needed.

Foundations & Perimeter Grades

Foundation walls serve as the basis for the entire structural support of a building. Proper drainage is necessary to keep water away from the building, prevent moisture from seeping into the basement and crawl space through the foundation, and prevent damage to historic building materials close to grade. In addition, crawl spaces should be vented to lessen humidity levels to prevent rot and mold.

Inspection

Foundation and perimeter grade inspections should be coordinated with downspout inspections to ensure water is discharged away from the perimeter of the building and avoid moisture penetration into the basement and crawl space. After a storm, look for standing water near the perimeter of the building and grades that slope toward the foundation. Check for settlement cracks in foundation walls and loose or cracked mortar in stone and brick. Look for rotting wood shingles and other wooden features. Check for evidence of insect or animal infestation. Look for shrubs, brush, and turf growing against the foundation. Look for evidence of prolonged damp conditions, such as moss or mold. Check for blocked or poorly positioned downspout extensions.

Maintenance

Flush out downspouts to remove debris and leaves. Add soil to fill depressions and otherwise maintain slope of grade away from building. Maintain 6" separation between grade and wooden building elements to prevent rot. Reset downspout extensions as necessary. Remove brush and weeds and trim turf to allow air movement at foundation. Wash splash-back, algae, and mildew from foundations with water and a soft bristle brush. Repoint masonry as needed. Avoid de-icing salts and fertilizers near foundations. Use shovels and brooms to remove snow from walks adjacent to building.

Cleaning Methods

Cleaning with any product has the potential to harm historic building materials. Therefore, the gentlest means possible should always be selected when cleaning.

Cleaning should begin by protecting adjacent surfaces and conducting a

controlled and isolated test in a discreet location to identify the various methods, materials, and equipment to perform the work. The test patch should be studied to check for abrading, fading, streaking, or other damage to the material. Try using water first, rather than harsh chemicals. Low-pressure water from a garden hose can be used to flush out gutters and downspouts and soft, damp cloths can be used to wipe surfaces down. Water in combination with a natural or nylon scrubbing brush can remove tougher dirt and biological growths from building surfaces. Plastic putty knives or similar wood tools can be used for heavy buildups. Mild phosphate-free detergents can be used if necessary. Mild vinegar and water solutions or non-alkaline glass cleaners with squeegees or sponges are good for glazing.

Diluted chlorine bleach should be avoided on most surfaces as it can cause color changes, efflorescence, and other damage to surfaces. Solutions that contain ammonia can streak and stain metal hardware elements. Mineral spirits and commercial cleaners can remove and discolor original finishes and should be used sparingly. Avoid mechanical scrapers and high-pressure water without or with additives such as sand, soda, crushed nut shells as they erode surfaces and drive moisture into walls.

Conclusion

This report has focused on the De Pere Lockkeeper's House on Government Island in De Pere, Wisconsin. The small, two-story Dutch Colonial Revival style house was constructed in 1912 and underwent numerous small alterations through the years, with major interior alterations in the mid-1960s and mid-1970s which significantly affected the interior's historic integrity. Having been vacant since 1983, the interior of the house has deteriorated to the point where it now requires major repairs.

In conjunction with the De Pere Riverwalk and Wildlife Viewing Pier, the house could become an important component in the economic development of downtown De Pere once rehabilitated. This Economic Feasibility Study and Historic Structures Report were merely a first step in planning for the future of this building.

The Economic Feasibility Study involved consultations with key stakeholders which resulted in three possible uses for the house including an active recreational shelter, an institutional office, and heritage tourism lodging. Rehabilitation costs for each use were developed and were found to be significant, seriously compromising the economic viability of each use. Schematic plans and elevations were also developed for each use as a means to attract investors and prospective tenants. With today's uncertain lending practices, it was difficult to ascertain the success for the future redevelopment of the house.

The Historic Structures Report documented the unique history of the building and gave an overall conditions assessment of the site, envelope, interiors, structure, plumbing, heating, and electrical systems. Ordinances, codes, and accessibility laws were reviewed and will have a major impact on the future redevelopment of the house as well. Detailed rehabilitation recommendations were made for each façade, room, and feature. Work items were then prioritized, and rehabilitation costs associated with each of the potential future use were developed. Finally, maintenance recommendations were made which should be enacted in the interim until the building becomes occupied.

The Fox River Navigational System Authority should be applauded for their recent efforts to stabilize the exterior of the structure, and the City of De Pere should also be commended for their ongoing stewardship of this site. It is hoped that these documents set a standard which can be replicated at the other Lockkeeper's Houses located along the Lower Fox River in the years to come.

Notes

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[22]*De Pere Journal Democrat.* July 24, 1930, page 1.
[23]*De Pere Journal Democrat.* August 7, 1930, page 1 and *De Pere Journal Democrat.* August 27, 1942, page 4.
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[31]*Sketch showing Proposed Furnace Installation in Lockmaster's Dwelling at De Pere, Wis.* Appleton, Wisconsin: U.S. Engineer Office, September 1925.
[32]*De Pere Journal Democrat.* November 17, 1927, page 9.
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[34]Ibid.
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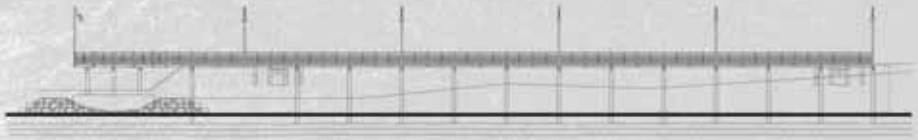
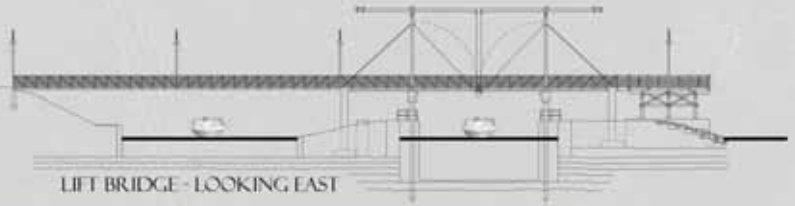
Appendix

De Pere River Walk & Wild Life Viewing Pier



BOARDWALK - LOOKING NORTHEAST



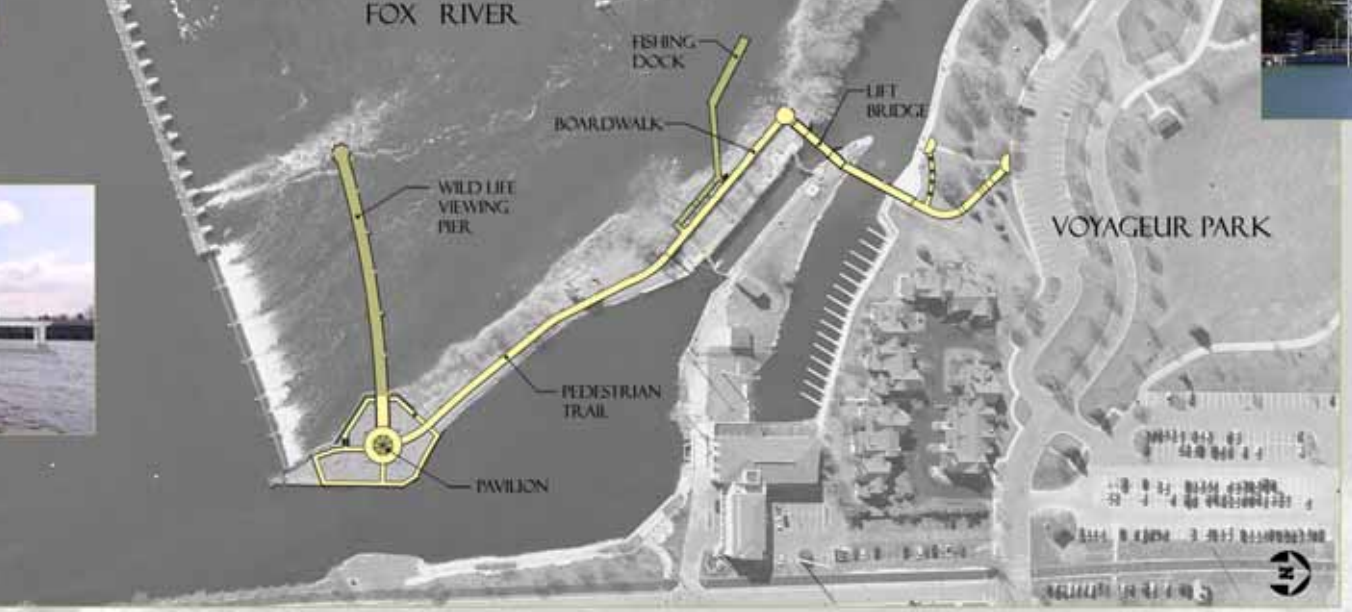
LIFT BRIDGE - LOOKING EAST

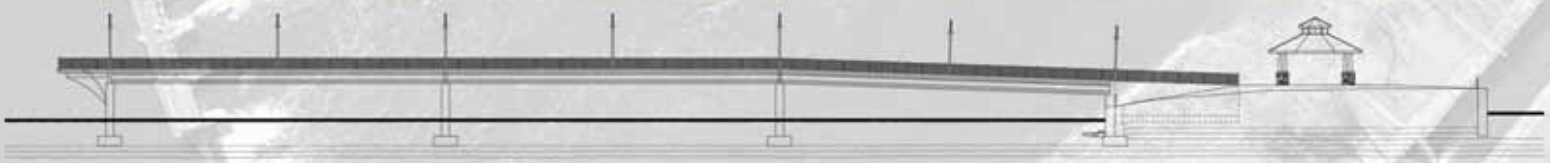
KATHERINE HARPER RIVER WALK & WILD LIFE VIEWING PIER

PAVILION

LIFT BRIDGE

WILD LIFE VIEWING PIER





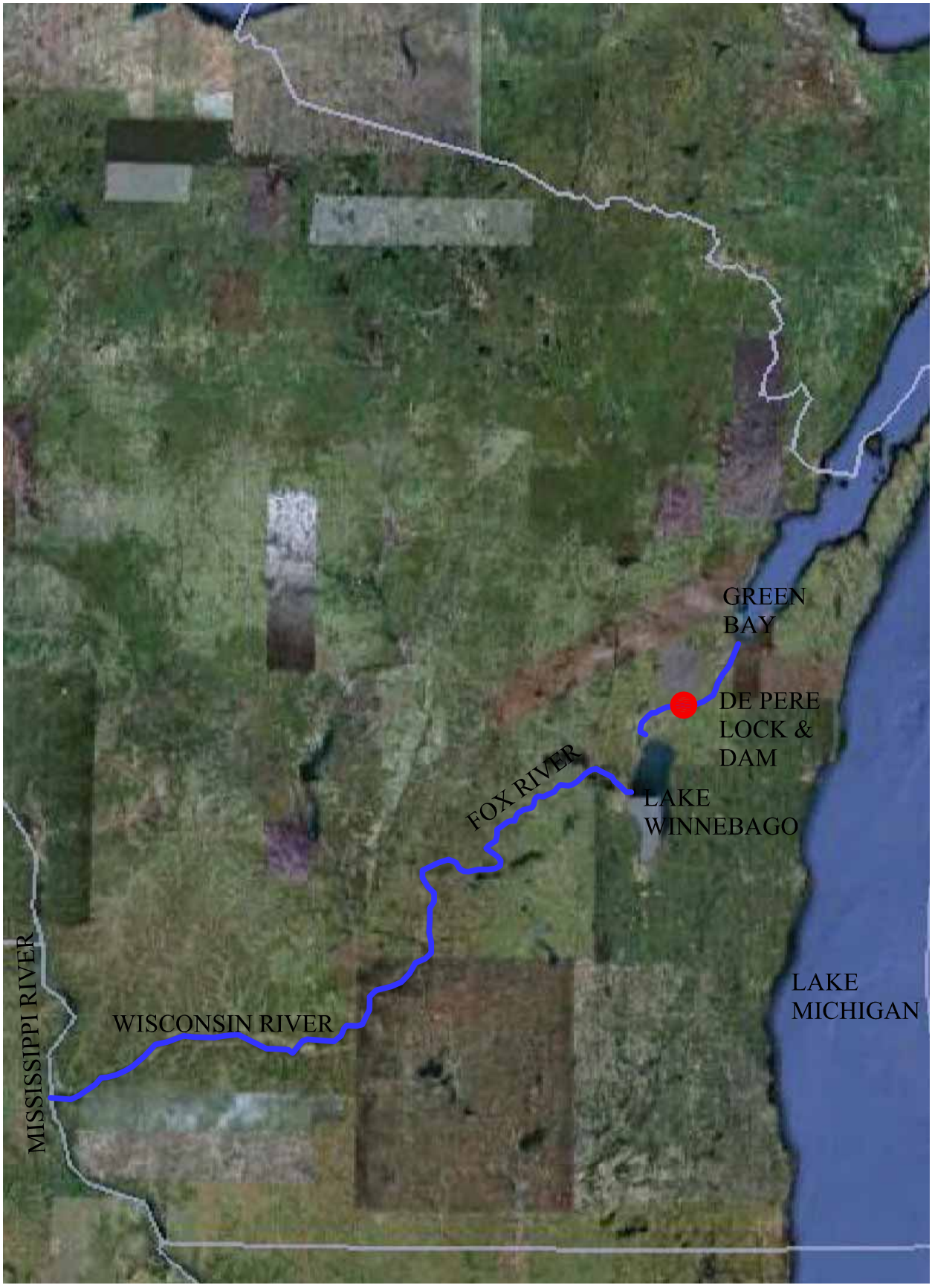
WILD LIFE VIEWING PIER- LOOKING NORTH

PAVILION

GRÄEF

Appendix

Fox-Wisconsin Waterways Map


GREEN
BAY
DE PERE
LOCK &
DAM
FOX RIVER
LAKE
WINNEBAGO
LAKE
MICHIGAN
WISCONSIN RIVER
MISSISSIPPI RIVER

Appendix

De Pere Lock & Dam Site Plan


STORAGE
SHED
GARAGE
LOCK
LOCK SHACK
CANAL
LOCKKEEPER'S
HOUSE
FOX
RIVER
DAM

Appendix

Certified Sanborn Map Report

DePere Lockkeepers House
DePere Lockkeepers House
De Pere, WI 54115

Inquiry Number: 2998702.1
February 23, 2011

Certified Sanborn® Map Report

EDR® Environmental Data Resources Inc

440 Wheelers Farms Road
Milford, CT 06461
800.352.0050
www.edrnet.com

Certified Sanborn® Map Report

2/23/11

Site Name:
DePere Lockkeepers House
DePere Lockkeepers House
De Pere, WI 54115

Client Name:
LJM Architects, Inc.
813 Riverfront Drive
Sheboygan, WI 53081

EDR Inquiry # 2998702.1

Contact: Jennifer Lehrke

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Certified Sanborn Results:

Site Name: DePere Lockkeepers House
Address: DePere Lockkeepers House
City, State, Zip: De Pere, WI 54115
Cross Street:
P.O. # NA
Project: NA
Certification # 1A10-47AC-8BA4

Maps Provided:

1953	1890
1946	1884
1925	
1914	
1900	
1895	

Sanborn® Library search results
Certification # 1A10-47AC-8BA4

The Sanborn Library includes more than 1.2 million Sanborn fire insurance maps, which track historical property usage in approximately 12,000 American cities and towns. Collections searched:

- ✓ Library of Congress
- ✓ University Publications of America
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Sanborn Sheet Thumbnails

This Certified Sanborn Map Report is based upon the following Sanborn Fire Insurance map sheets.

1953 Source Sheets

Volume 1, Sheet 11

1946 Source Sheets

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1925 Source Sheets

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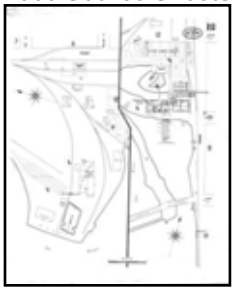
1914 Source Sheets

Volume 1, Sheet 9

1900 Source Sheets

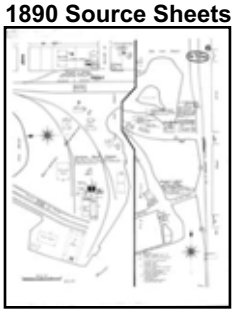


Volume 1, Sheet 12

1895 Source Sheets

Volume 1, Sheet 12

1890 Source Sheets

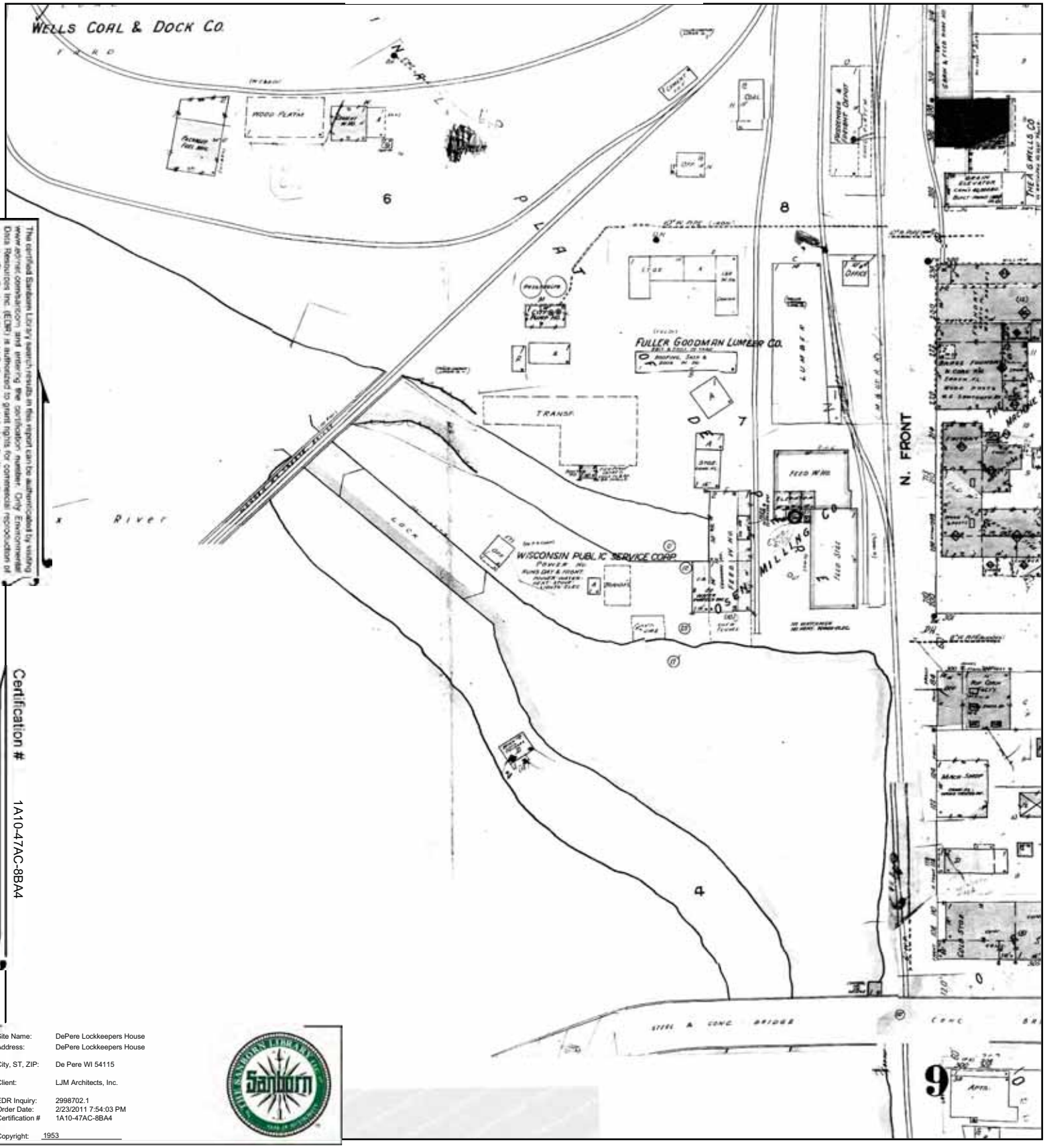


Volume 1, Sheet 6

1884 Source Sheets

Volume 1, Sheet 5

1953 Certified Sanborn Map



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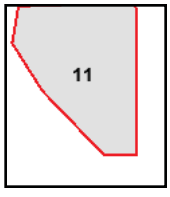

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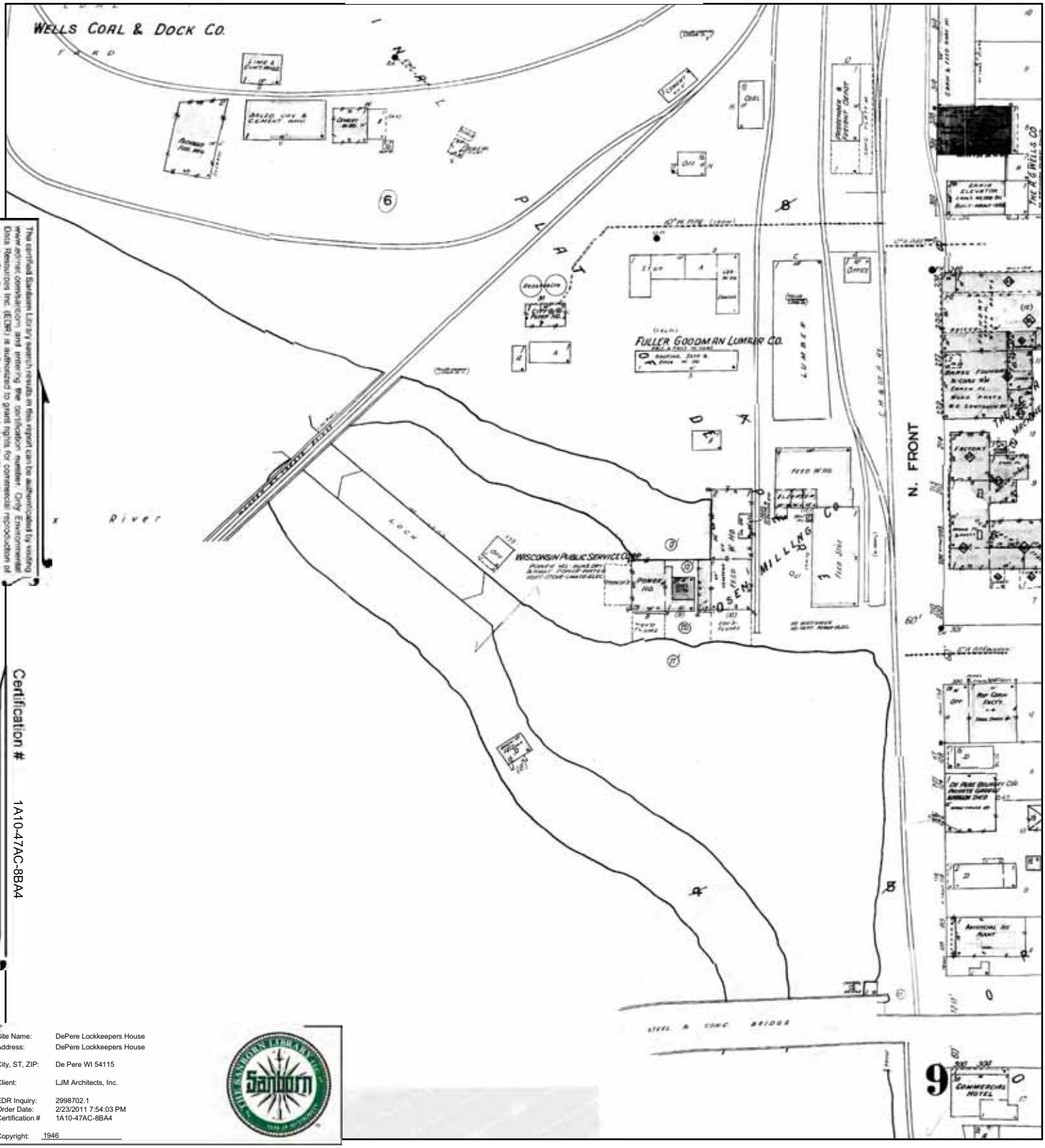
1946 Certified Sanborn Map



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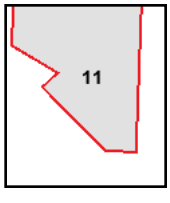

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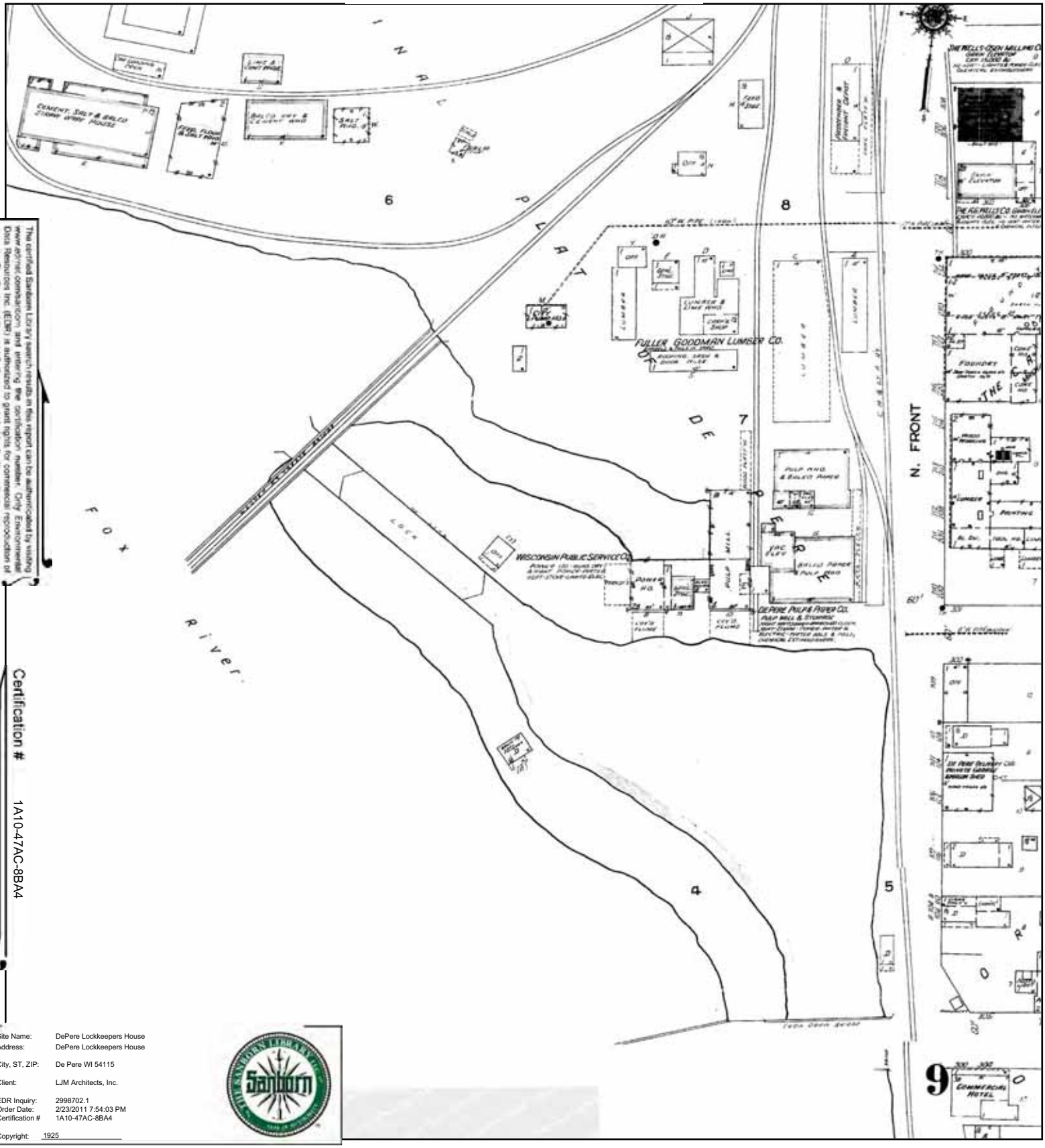

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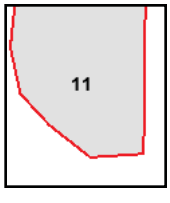

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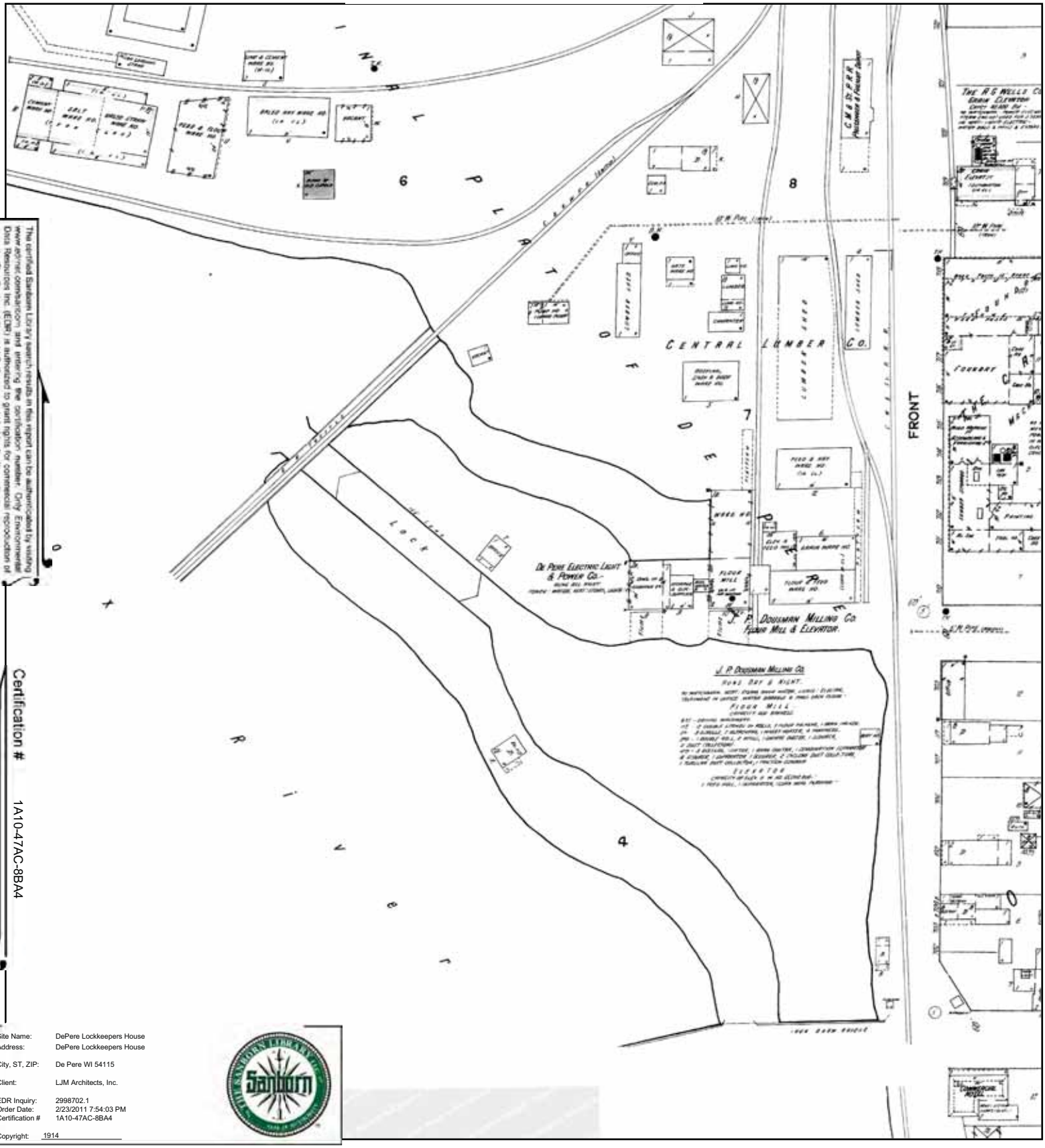

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Address: DePere Lockkeepers House
City, ST, ZIP: De Pere WI 54115
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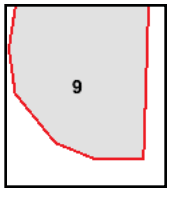

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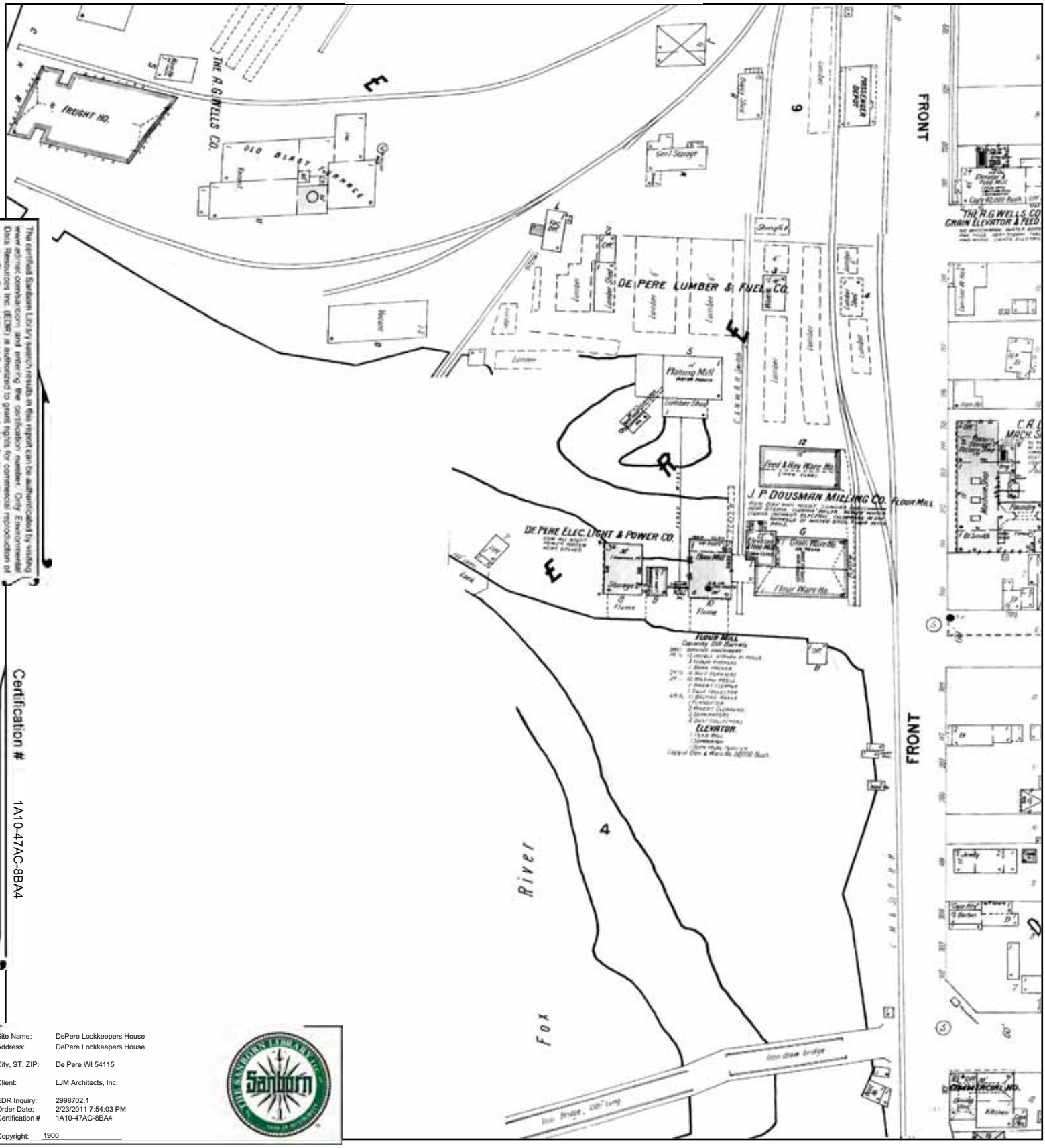

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Copyright:	1900

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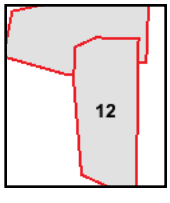

Volume 1, Sheet 12

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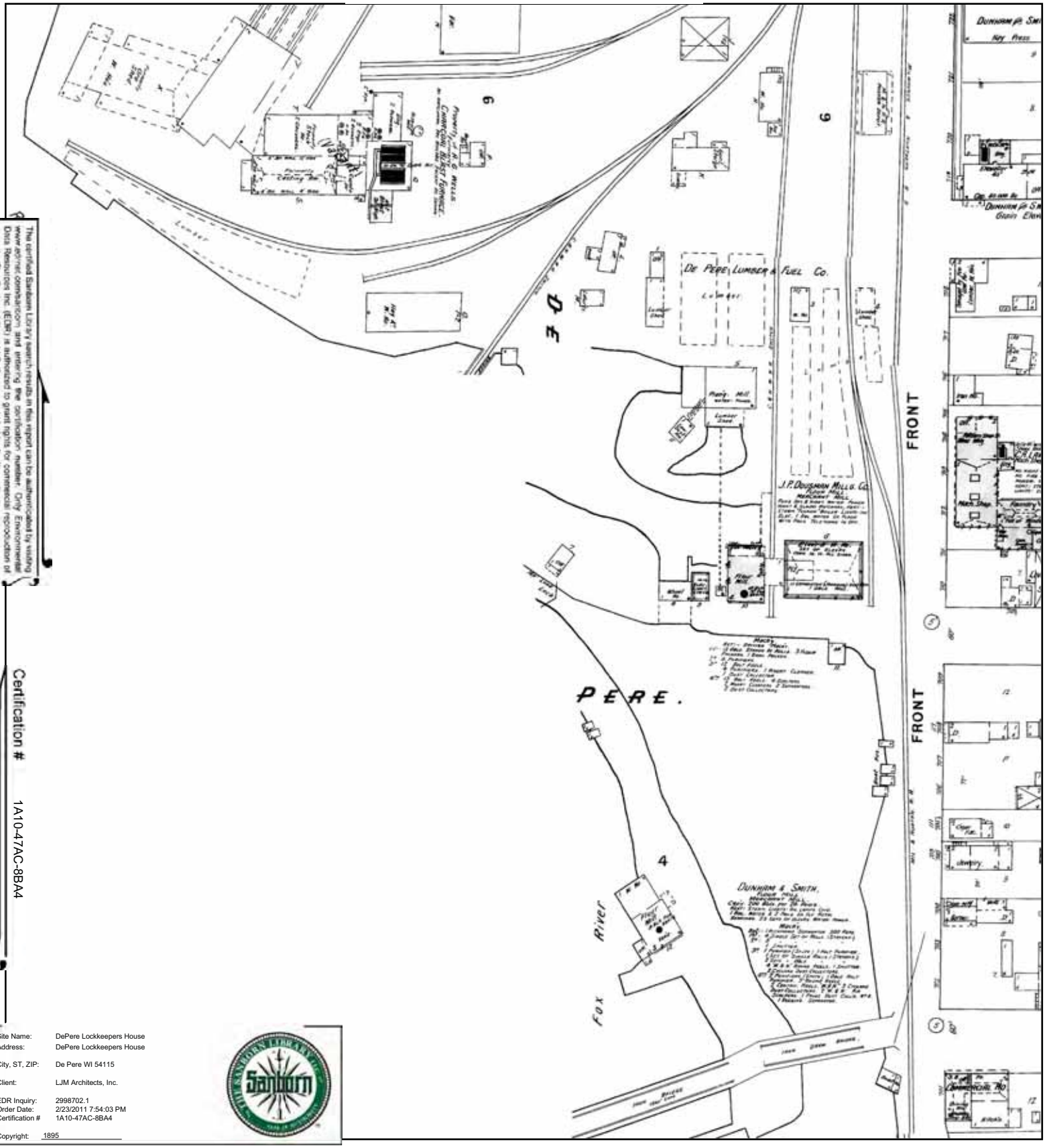

Certification # 1A10-47AC-8BA4

Site Name: DePere Lockkeepers House
Address: DePere Lockkeepers House
City, ST, ZIP: De Pere WI 54115
Client: LJM Architects, Inc.
EDR Inquiry: 2998702.1
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Certification # 1A10-47AC-8BA4
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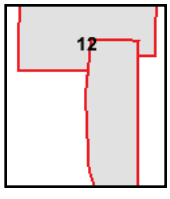

Volume 1, Sheet 12

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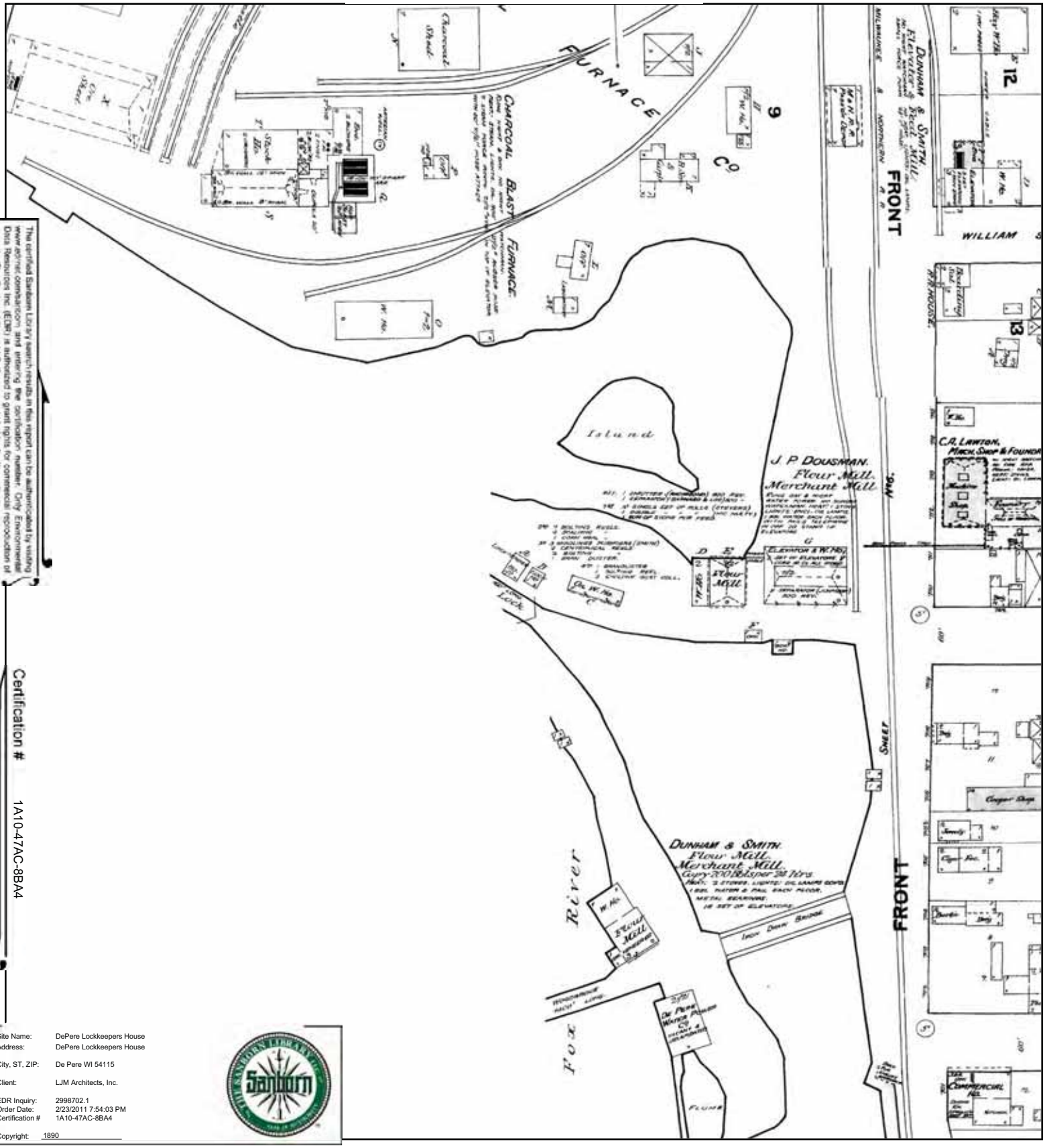

Certification # 1A10-47AC-8BA4

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City, ST, ZIP:	De Pere WI 54115
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Copyright:	1890

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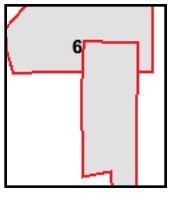

Volume 1, Sheet 6

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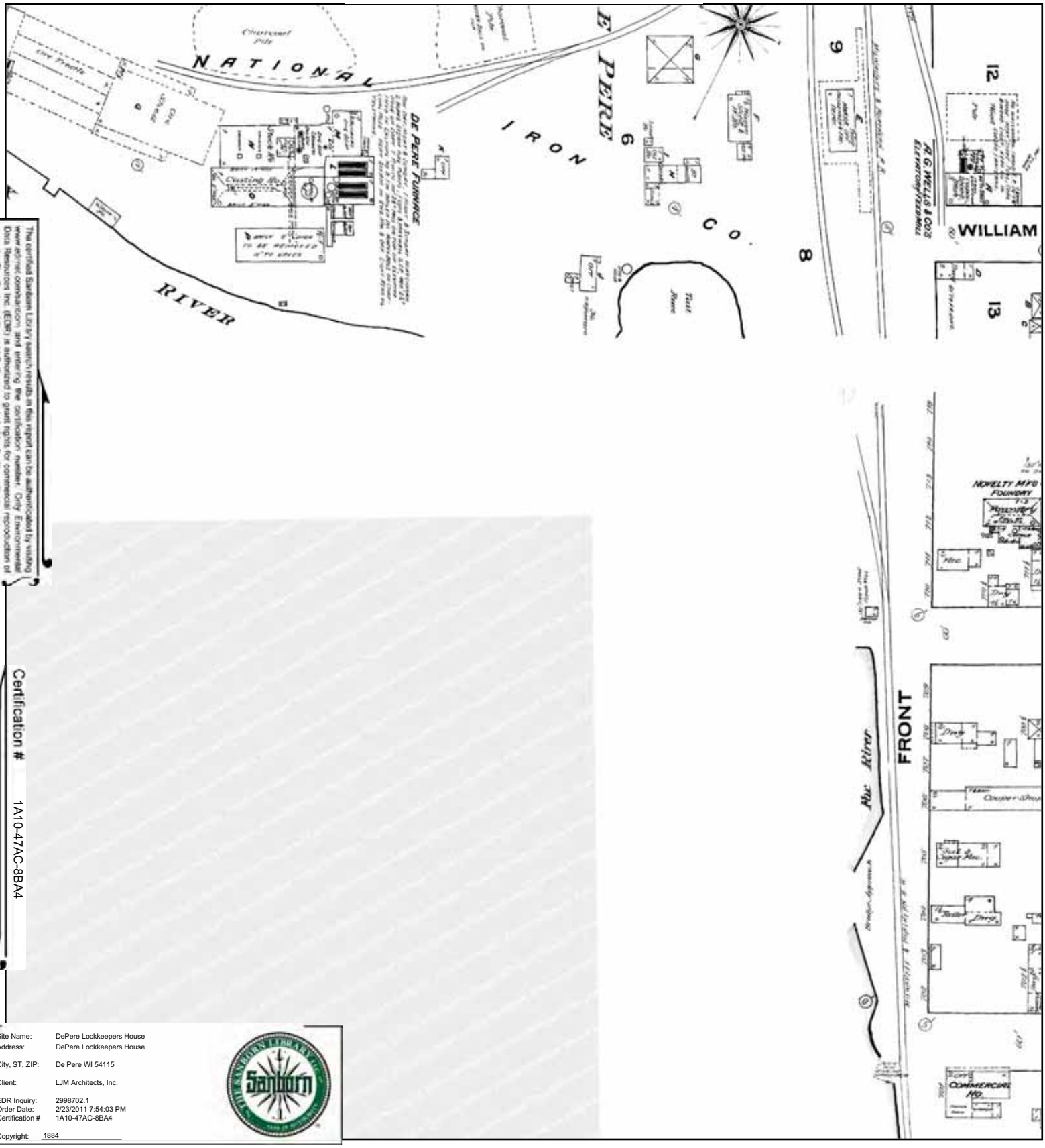

Certification # 1A10-47AC-8BA4

Site Name:	DePere Lockkeepers House
Address:	DePere Lockkeepers House
City, ST, ZIP:	De Pere WI 54115
Client:	LJM Architects, Inc.
EDR Inquiry:	2998702.1
Order Date:	2/23/2011 7:54:03 PM
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Copyright:	1884

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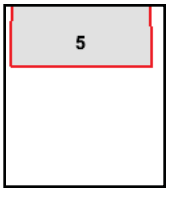

Volume 1, Sheet 5

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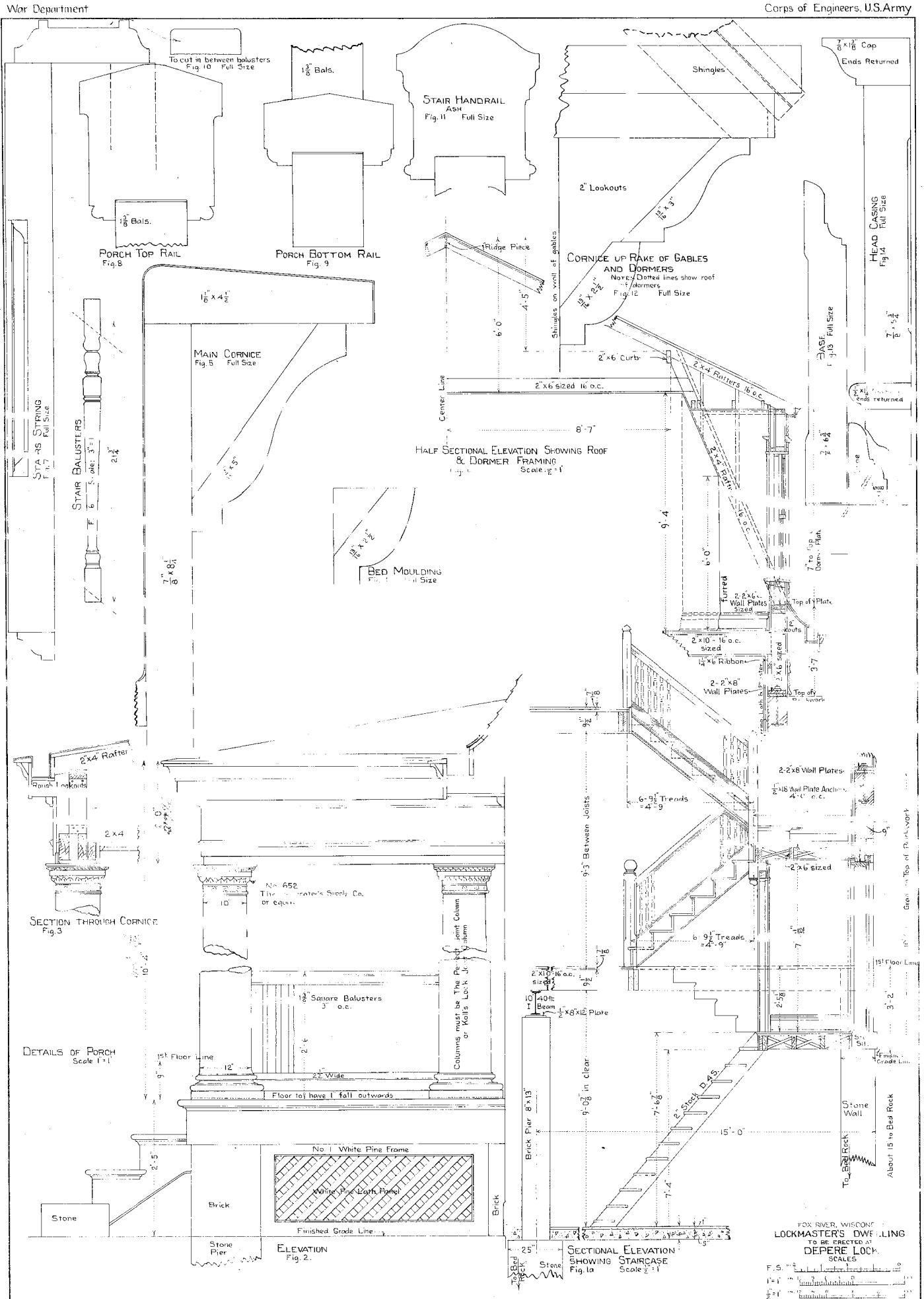
Appendix

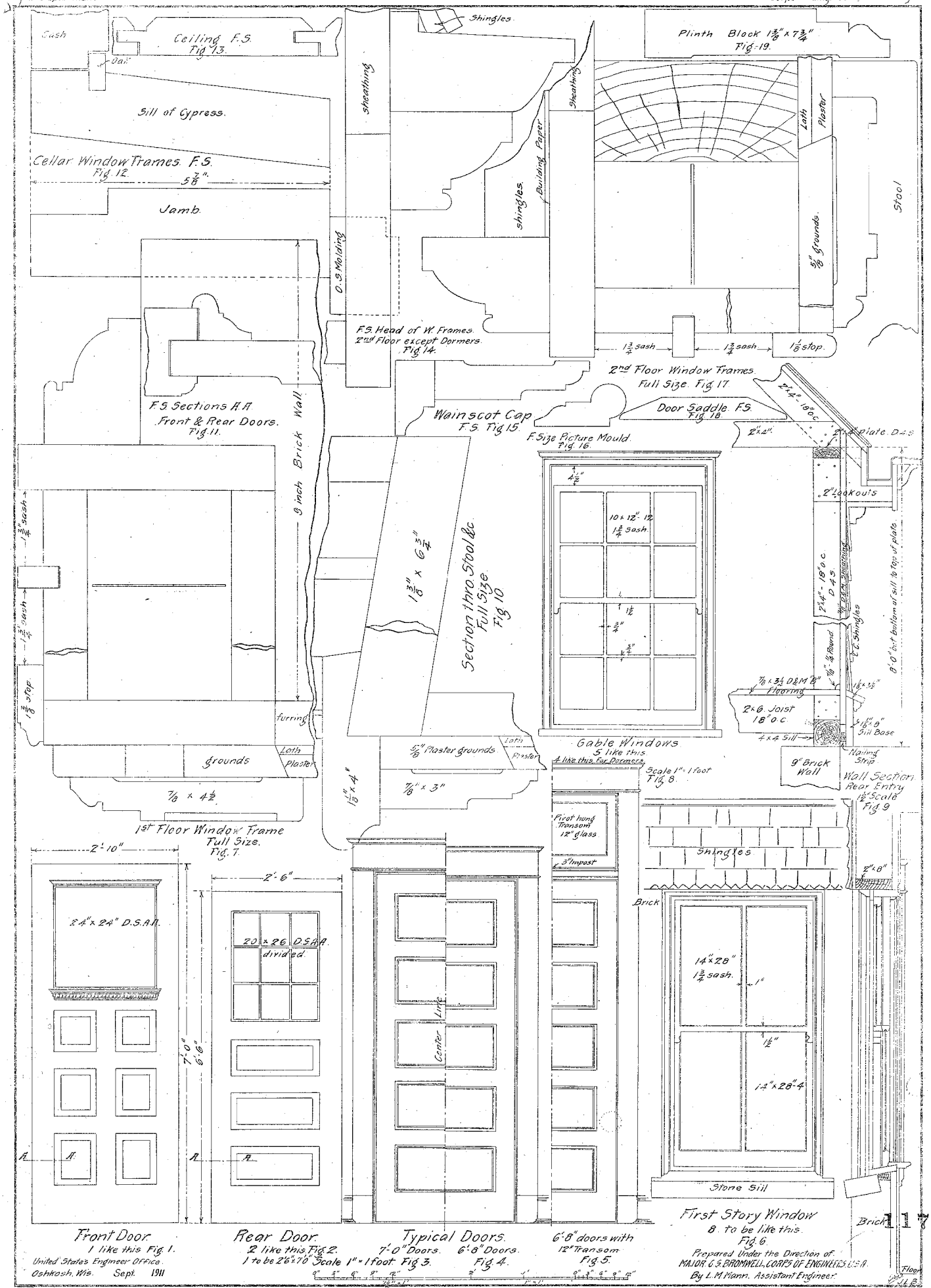
Lockmaster's Dwelling to be Erected at De Pere Lock


To cut in between balusters Fig. 10 Full Size
1 3/8" Bals.
1 3/8" Bals.
Porch Top Rail Fig. 8
Porch Bottom Rail Fig. 9
Stair Handrail Ash Fig. 11 Full Size
Shingles
7/8" x 1 1/8" Cap Ends Returned
2" Lookouts
1 1/8" x 3"
Cornice up Rake of Gables and Dormers
Notes: Dotted lines show roof of dormers
Fig. 12 Full Size
Head Casing Fig. 14 Full Size
Base Fig. 13 Full Size
Ridge Piece
Shingles on wall of gables
6'-0"
4'-5"
1 1/8" x 4 1/2"
Main Cornice Fig. 5 Full Size
Stair Balusters
Stair String Fig. 7
Scale: 3" = 1'
2 3/4"
1" x 5"
7/8" x 8 1/2"
1 1/8" x 2 1/2"
Bed Moulding
2"x6" Curb
2"x4" Rafters 16" o.c.
2"x6" sized 16 o.c.
Center Line
8'-7"
Half Sectional Elevation Showing Roof & Dormer Framing
Scale: 1" = 1'
2"x4" Rafter
9'-4"
6'-0"
Furred
2-2"x6" Wall Plates Sized
Top of Plate
2" Louvers
2"x10"-16" o.c. sized
1/4"x6" Ribbon
2"x6" sized
3'-7"
2-2"x8" Wall Plates
Top of Brickwork
7" to Top of Dorm. Floor
2"x4" Rafter
Raised Lookouts
2"x4"
Section through Cornice Fig. 3
No. 652 The ... Supply Co. or equal
10"
Joint Column
Columns must be The Pe... or Wells Lock Jr.
10'-4"
1 1/2" Square Balusters 3" o.c.
Details of Porch Scale 1" = 1'
1st Floor Line
12"
2" Wide
Floor to have 1" fall outwards
No. 1 White Pine Frame
White Pine Lath Panel
Brick
Stone
Stone Pier
Finished Grade Line
Elevation Fig. 2.
2-2"x8" Wall Plates
1/2"x18" Wall Plate Anchors 4'-0" o.c.
6-9 1/2" Treads = 4'-9"
9'-3" Between Joists
2"x6" sized
2"x10"-16" o.c. sized
10"-40 lb. I Beam
1/2"x8"x12" Plate
Brick Pier 8'x13'
9'-0 7/8" in clear
1st Floor Line
Finished Grade Line
2" Stock D.A.S.
15'-0"
7'-6 7/8"
7'-4"
Stone Wall
To Bed Rock
About 15 to Bed Rock
25"
Bed Rock
Stone
Sectional Elevation Showing Staircase Fig. 1a Scale 1/2" = 1'
Fox River, Wisconsin
Lockmaster's Dwelling
To be erected at
Depere Lock
Scales
F.S. 1/2" = 1'
1" = 1'
1/2" = 1'

War Department

LOCK HOUSE FOX RIVER WIS.

Corps of Engineers, U.S. Army



United States Engineer Office. Oshkosh, Wis. Sept. 1911

Prepared Under the Direction of MAJOR G.S. BROMWELL, CORPS OF ENGINEERS U.S.A. By L.M. Mann, Assistant Engineer.

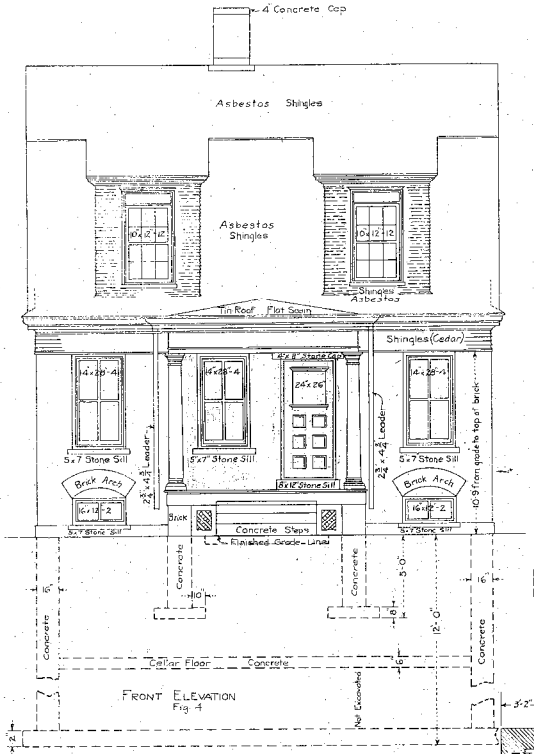
1-1 2-3

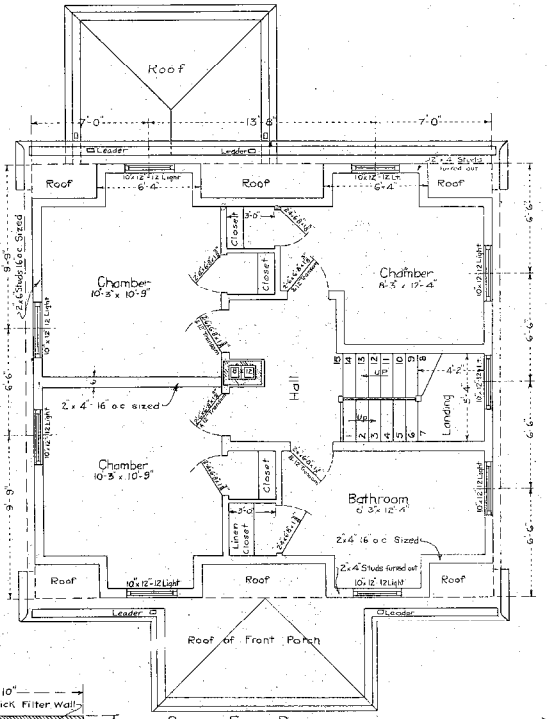
Floor

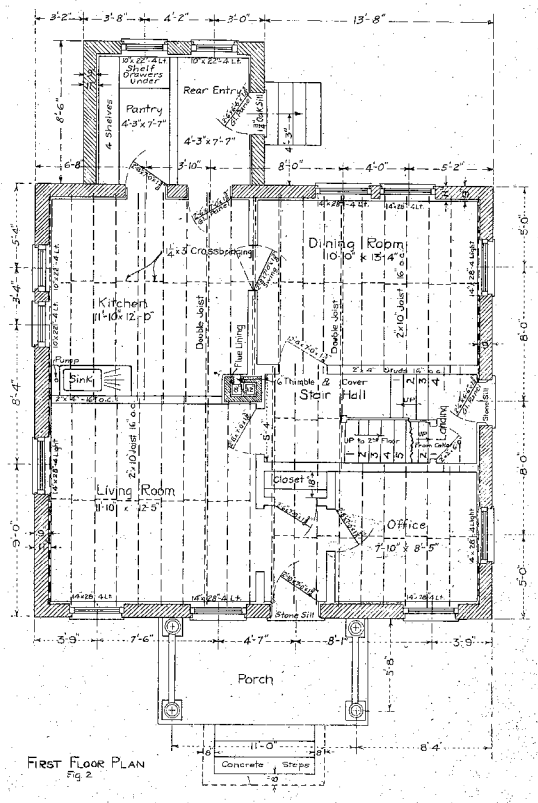
LOCK HOUSE, DEPERE LOCK, WIS. 4 Plates - Plate No. 4

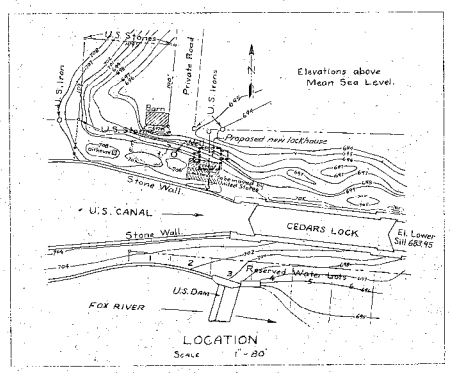
Appendix

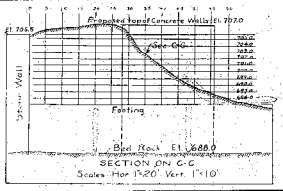
Proposed Lockhouse at Cedars Lock

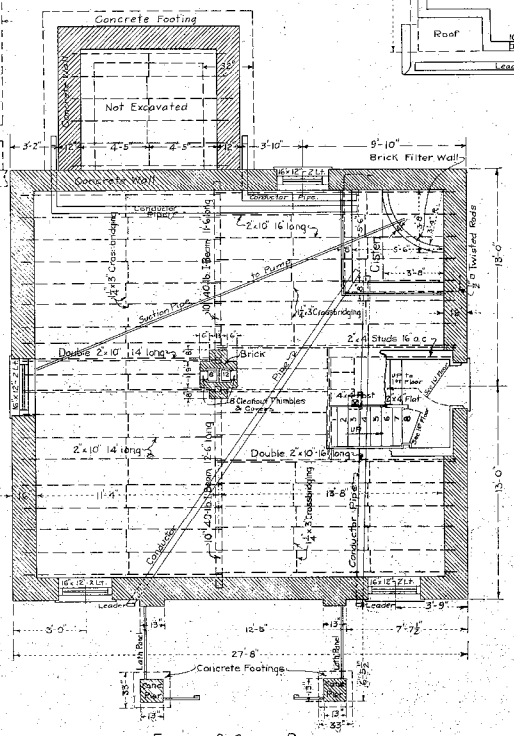












Note: See Sheet No. 2 for furnace layout waterworks, electric wiring, etc.

PROPOSED
LOCKHOUSE
AT
CEDARS LOCK

In U.S. Sheets Sheet No. 1 Scale: 1"=4'-0"

U.S. Engineer Office, Appleton, Wis. Feb. 1926.

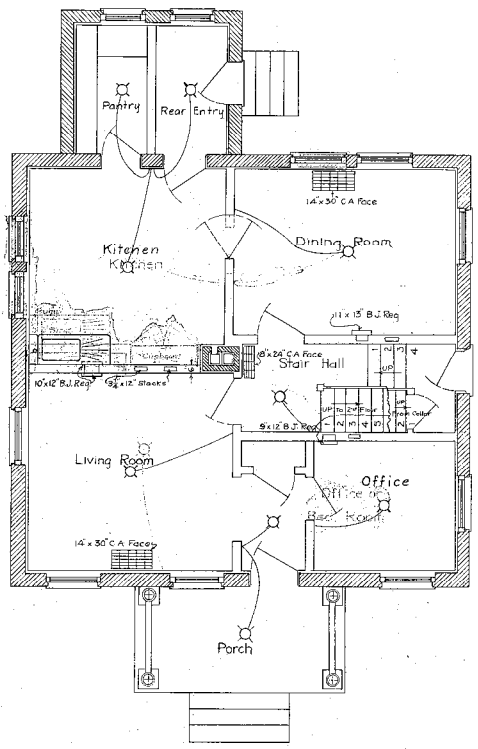
Submitted: Assistant Engineer

Approved: Major, Corps of Engineers

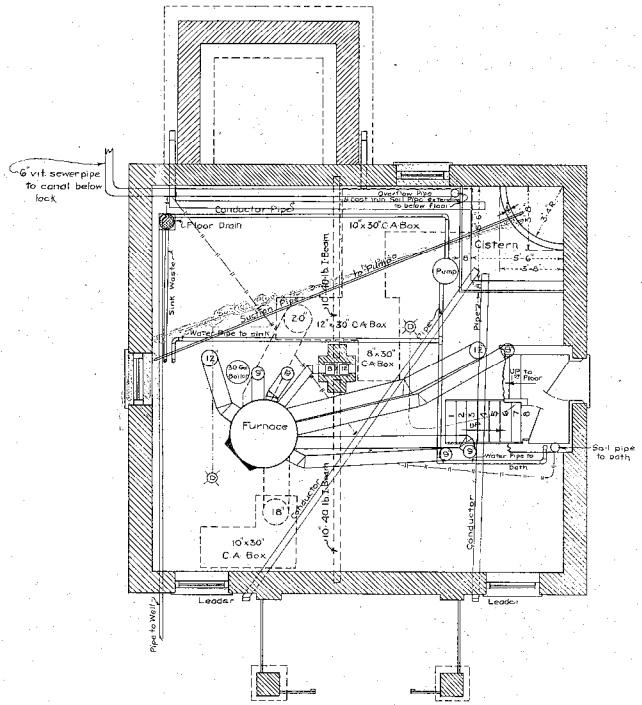
Traced By: J.M.H.
Checked By: A.P.R.

To accompany letter dated Apr. 21, 1926.

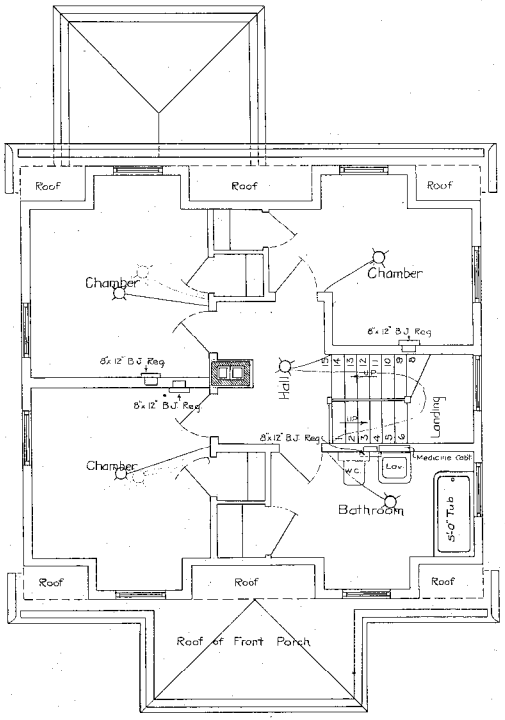
FILE NO. 1-A-88 (16a)



FIRST FLOOR
Fig. 2



BASEMENT
Fig. 1.



SECOND FLOOR
Fig. 3.

PROPOSED
LOCKHOUSE
AT
CEDARS LOCK

In 5 Sheets Sheet No. 2. Scale: 1"=4'

U.S. Engineer Office, Appleton, Wis., Feb. 1926.

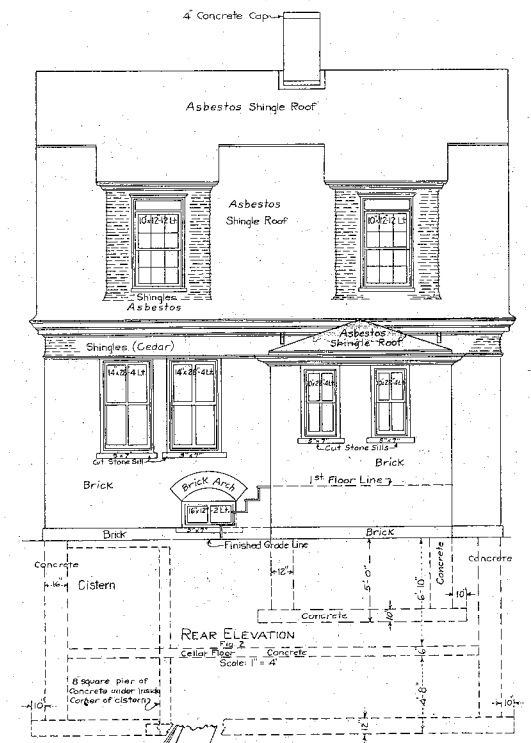
Submitted: Approved:

Assistant Engineer. Major, Corps of Engineers.

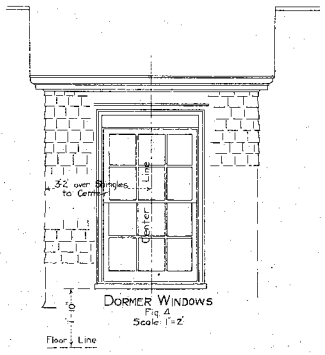
Drawn & Traced By: J.M.H.

To accompany letter dated Apr. 21, 1926. Checked By: A.F.E.

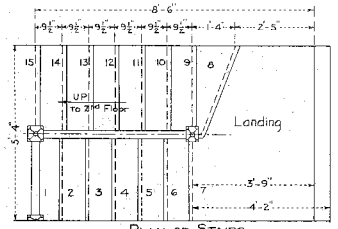
FILE NO 1-A-8 (16a)



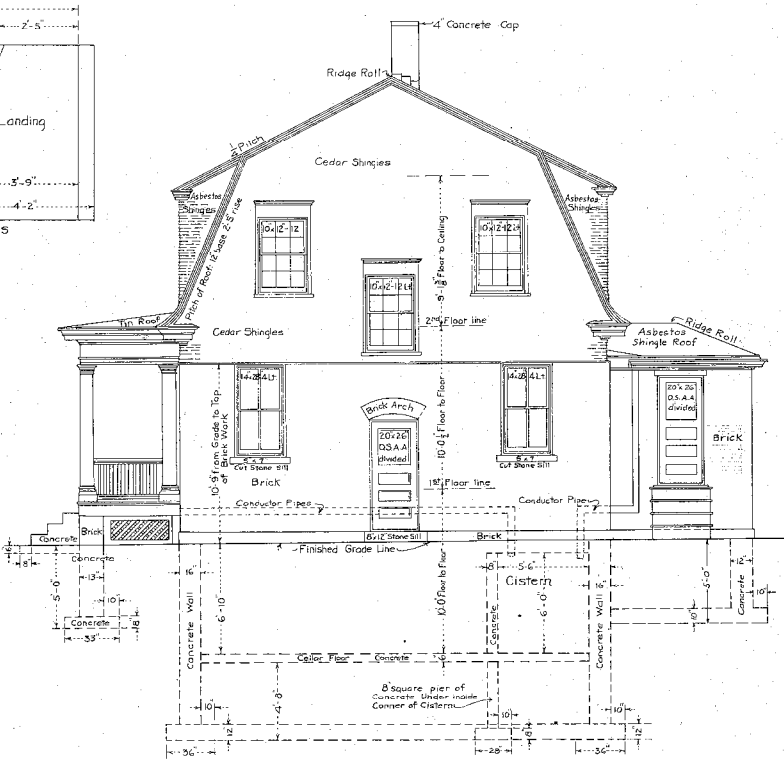
REAR ELEVATION
Fig 2
Scale: 1" = 4'



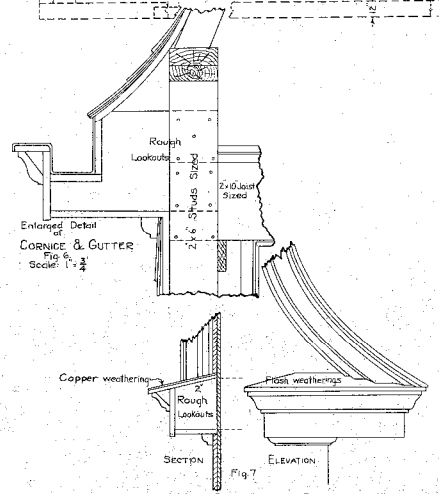
DORMER WINDOWS
Fig 4
Scale: 1"=2'



PLAN OF STAIRS
Fig 3
Scale: 1" = 2'

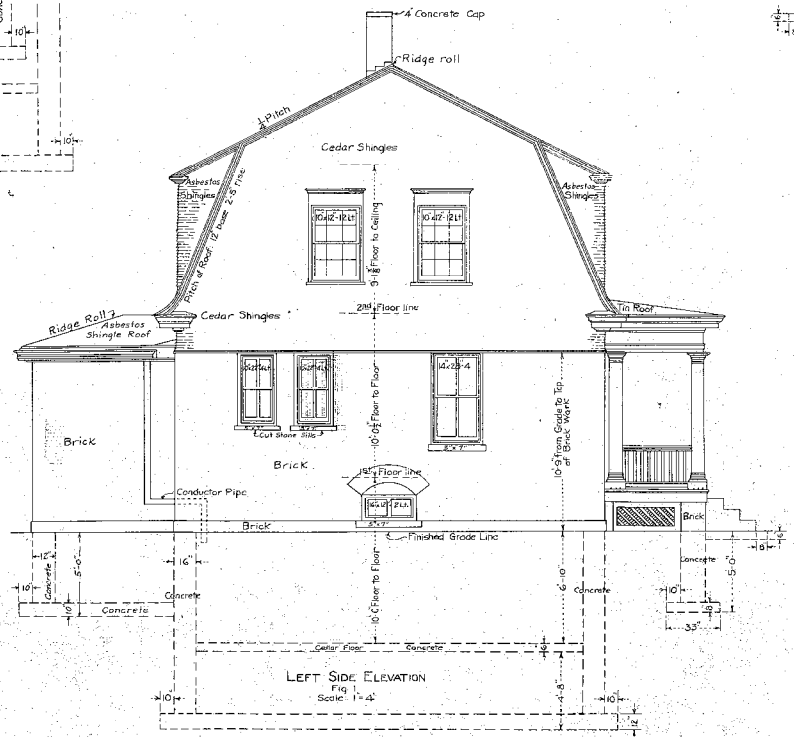


RIGHT SIDE ELEVATION
Fig 8
Scale: 1" = 4'



CORNICE & GUTTER

MITRE RETURNS ON GABLES
2 Rights & 2 Lefts
Scale: 1"=1"



LEFT SIDE ELEVATION
Fig 1
Scale: 1"=4'

PROPOSED
LOCKHOUSE
AT
CEDARS LOCK

In 3 Sheets Sheet No 3 Scales: 1"=3/4", 1", 2" & 4"

U.S. Engineer Office, Appleton, Wis. Feb 1926.

Submitted: Assistant Engineer.

Approved: Major, Corps of Engineers.

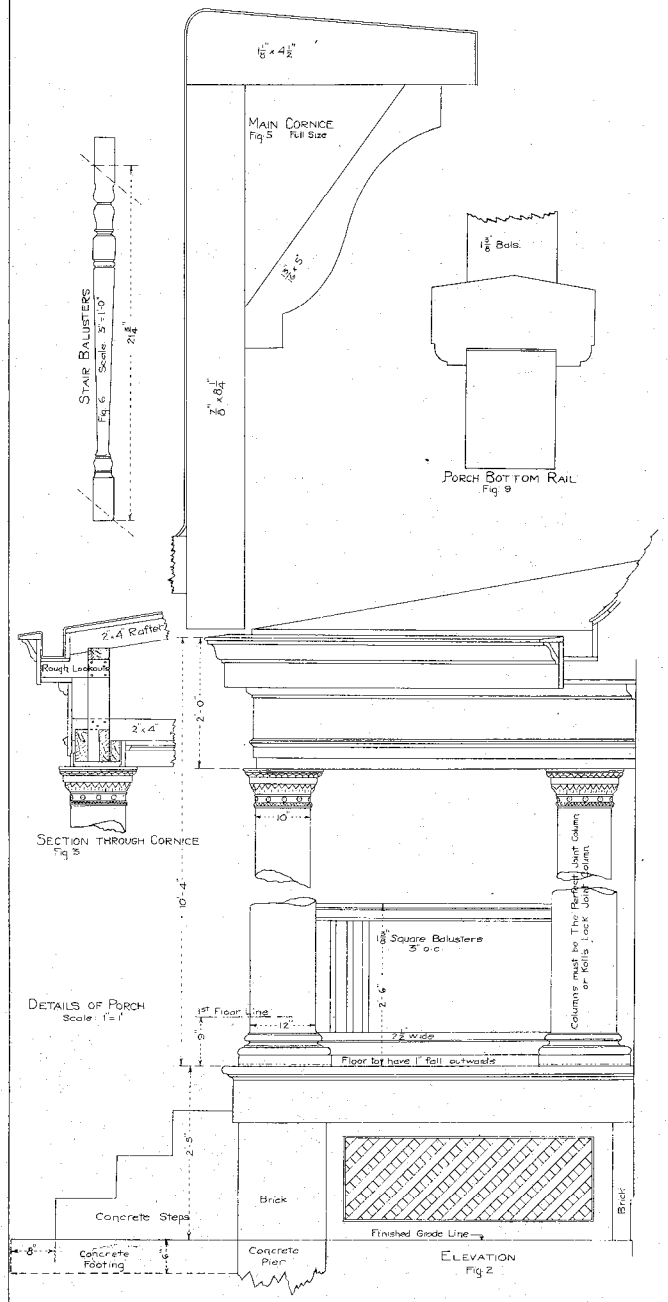
To accompany letter dated Apr. 21, 1926.

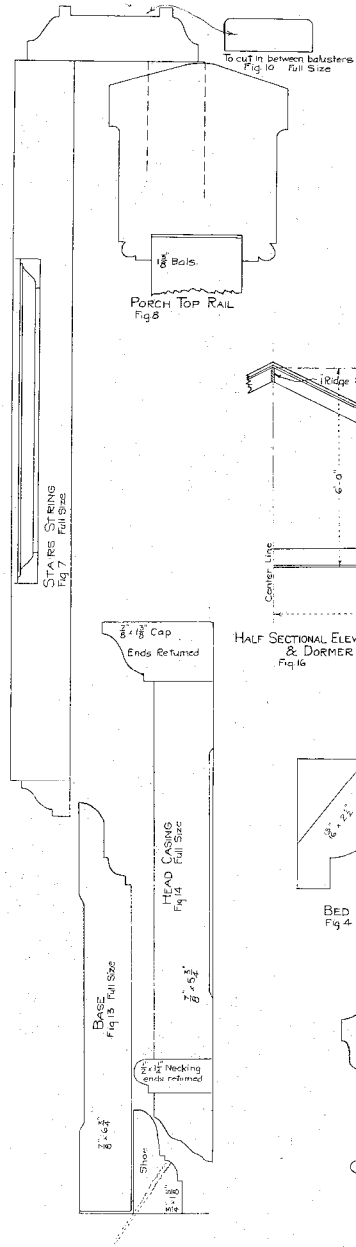
Traced By J.M.H.
Checked By A.F.B.

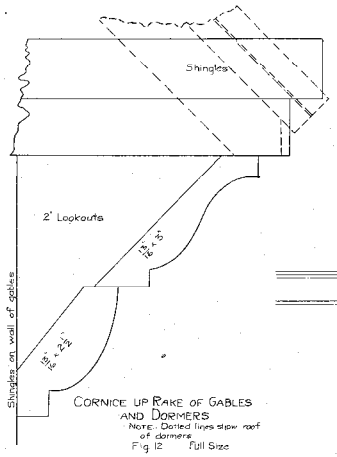
FILE NO. 1-A-8 (16a)

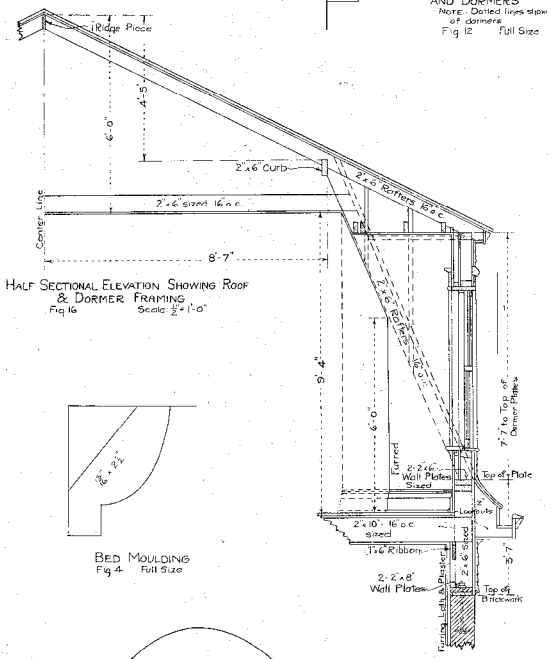
WAR DEPARTMENT

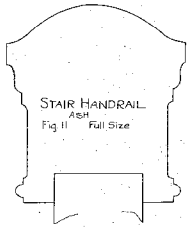
CORPS OF ENGINEERS U.S. ARMY

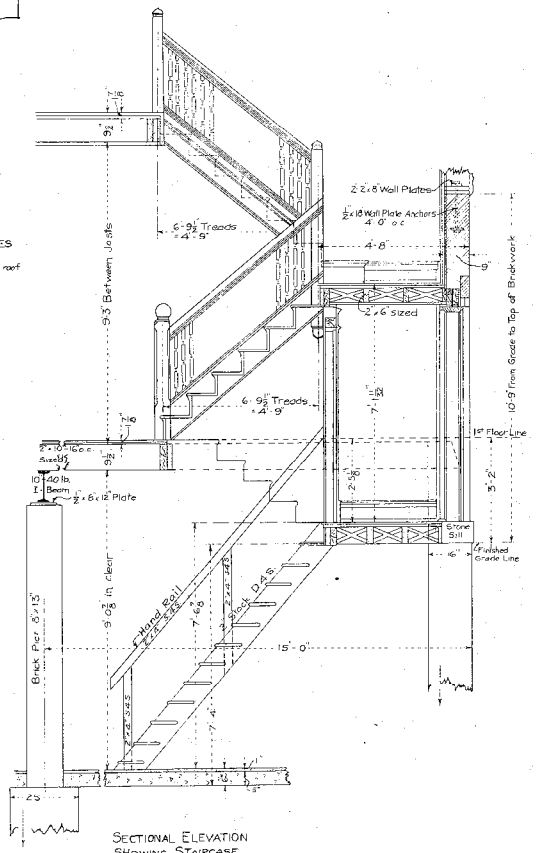












PROPOSED

LOCKHOUSE AT CEDARS LOCK

In 5 Sheets Sheet No. 4. Scales: 1" & ½"=1'-0" & Full Size.

U.S. Engineer Office, Appleton, Wis., Feb 1926

Submitted: Approved:

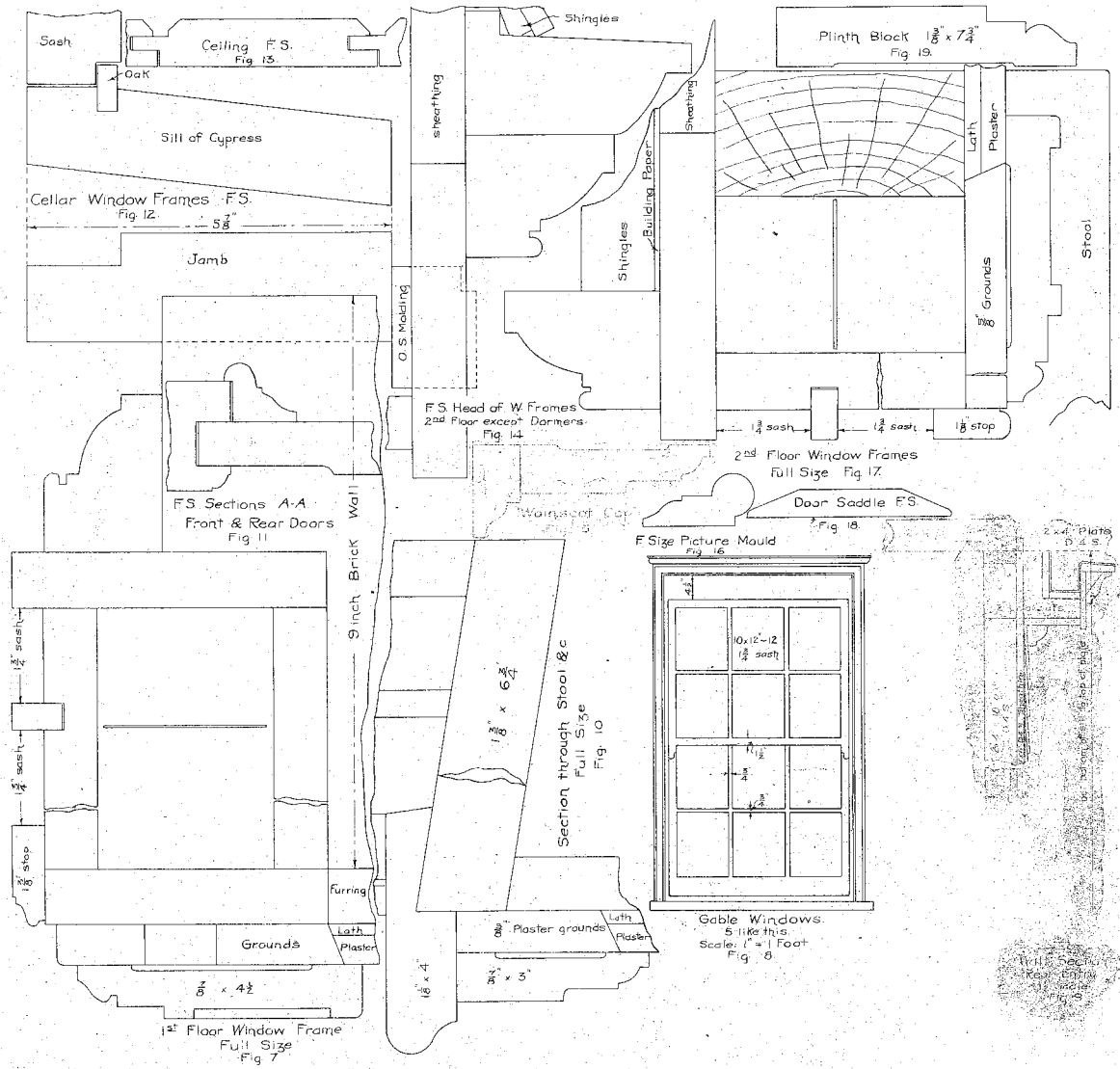
Assistant Engineer. Major, Corps of Engineers.

To accompany letter dated Apr. 21 1926.

Traced By J.M.H.

Checked By A.F.F.

FILE NO. 1-A-8 (16a)



PROPOSED

LOCKHOUSE

AT

CEDARS LOCK

In 5 Sheets Sheet No. 5 Scales 1"&½"=1'-0"

U.S. Engineer Office, Appleton, Wis., Feb. 1926.

Submitted: Assistant Engineer

Approved: Major, Corps of Engineers

To accompany letter dated Apr. 21, 1926

Traced By J.M.H.

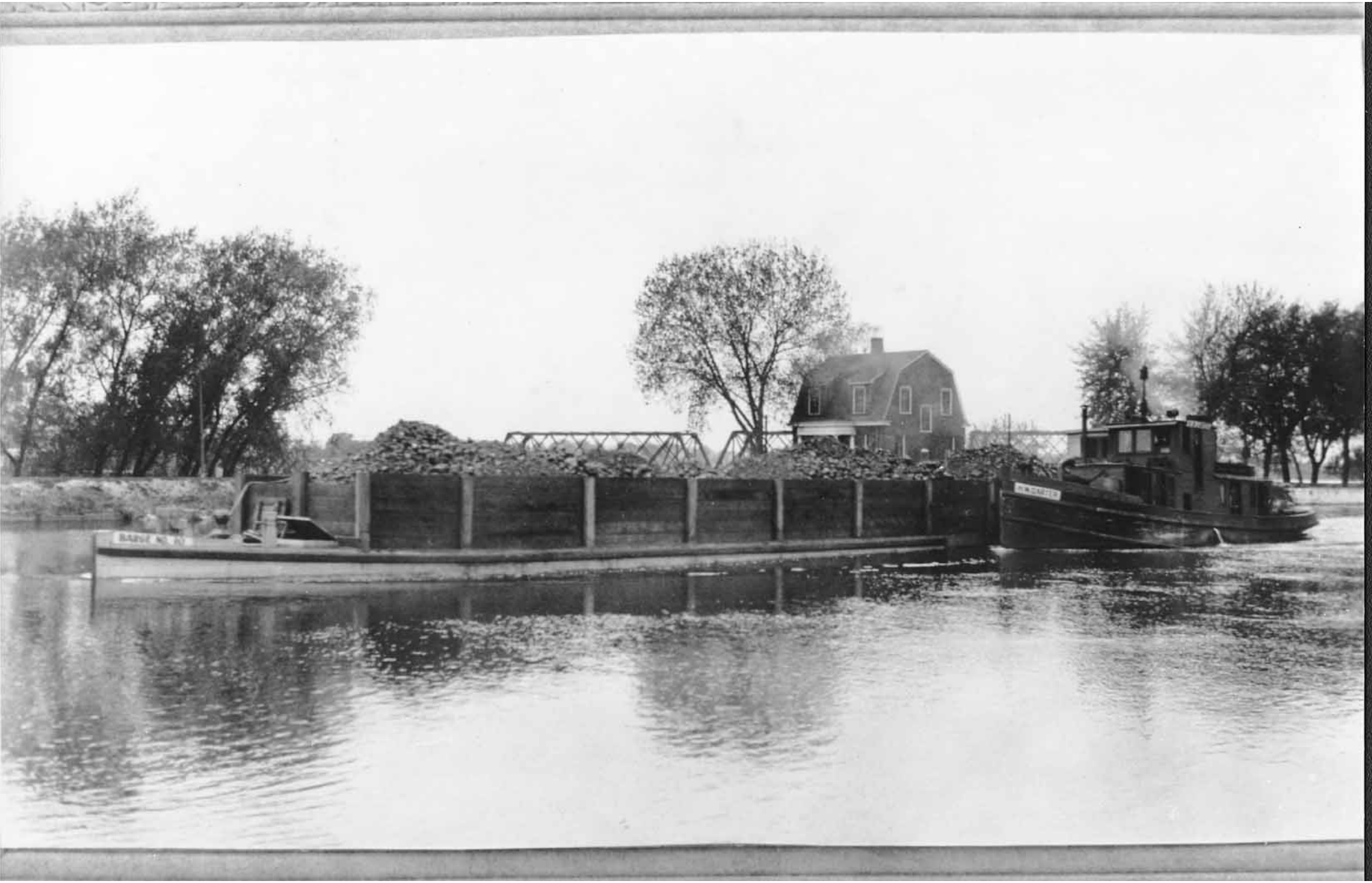
Checked By A.T.E.

FILE NO. 1-A-1 (16a)

Appendix

Archive Photographs

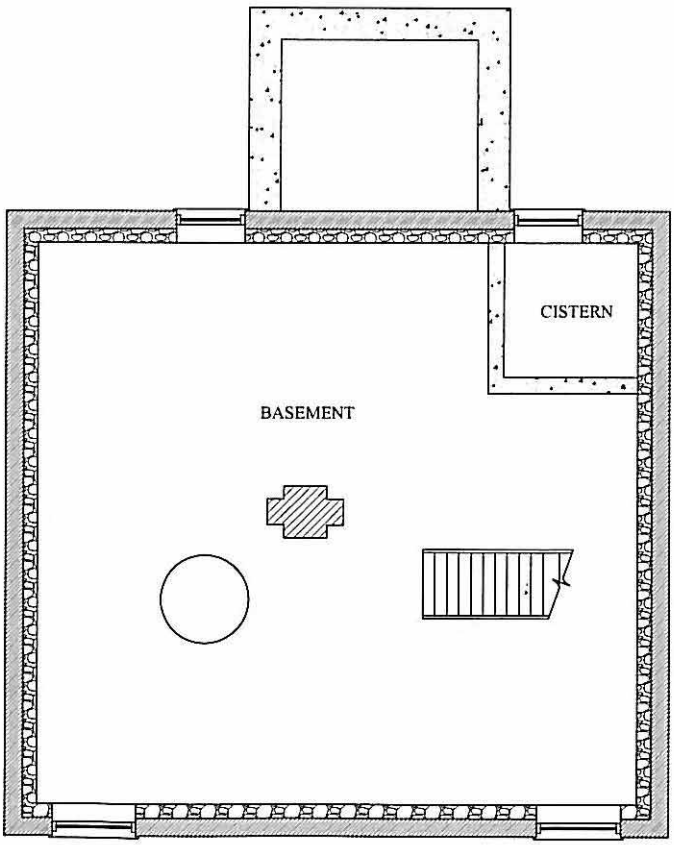

FUSSER




THE LOCKS
DE PERE, WIS. 9

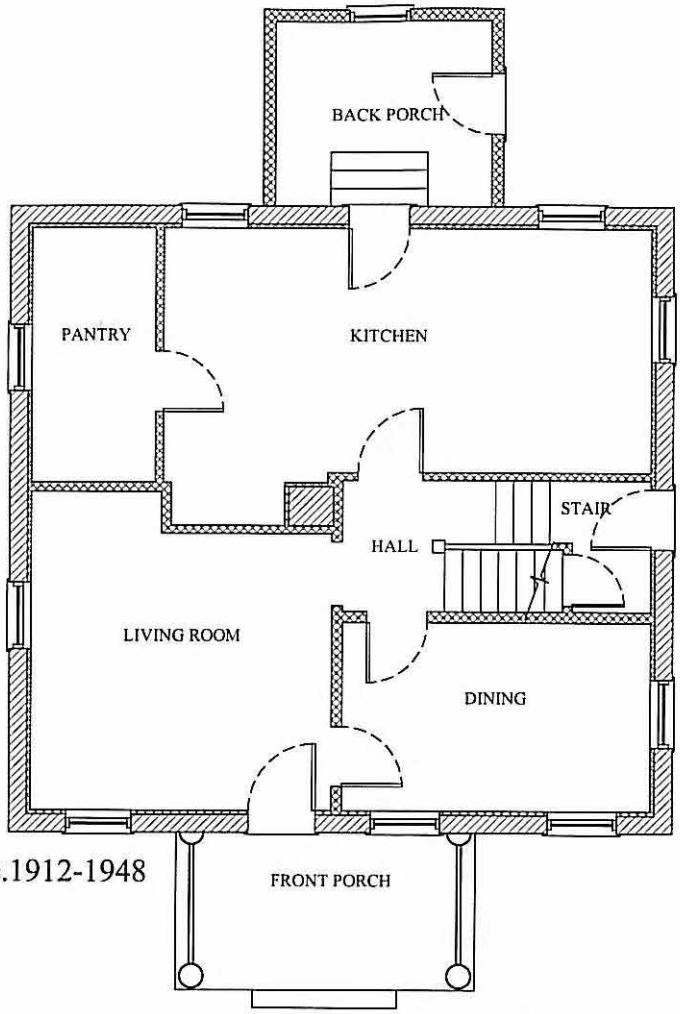
Appendix

Plans and Elevations c. 1912-1948



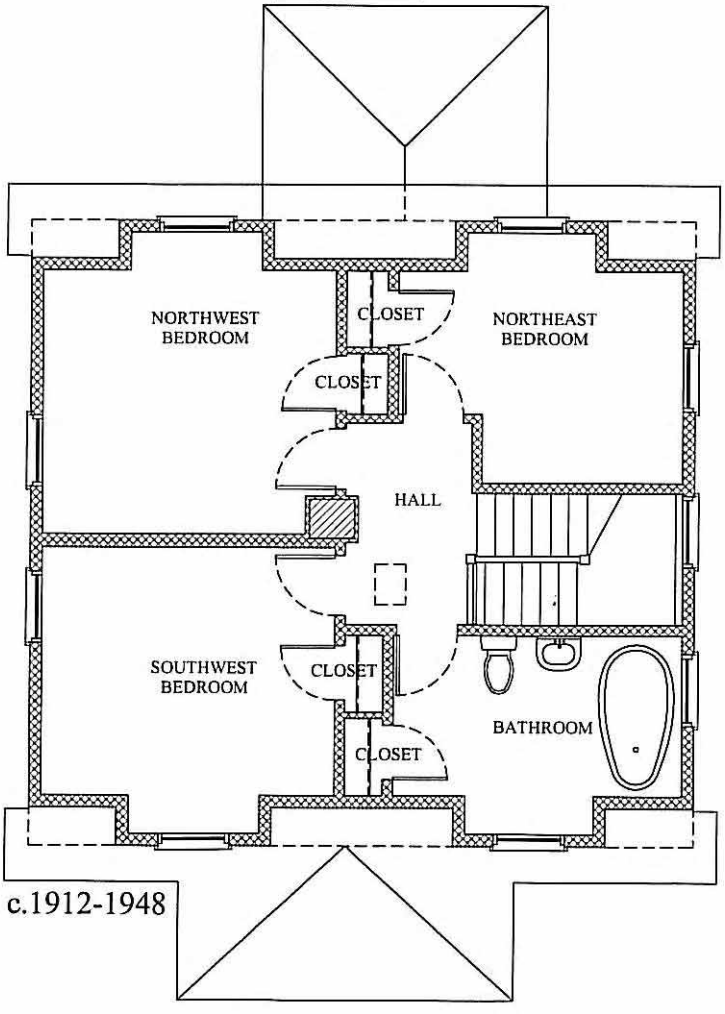
DE PERE LOCKKEEPER'S HOUSE c.1912-1948
BASEMENT FLOOR PLAN

0 4 8



DE PERE LOCKKEEPER'S HOUSE c.1912-1948
FIRST FLOOR PLAN

0 4 8



DE PERE LOCKKEEPER'S HOUSE c.1912-1948
SECOND FLOOR PLAN

0 4 8

DE PERE LOCKKEEPER'S HOUSE c.1912-1948
SOUTH ELEVATION

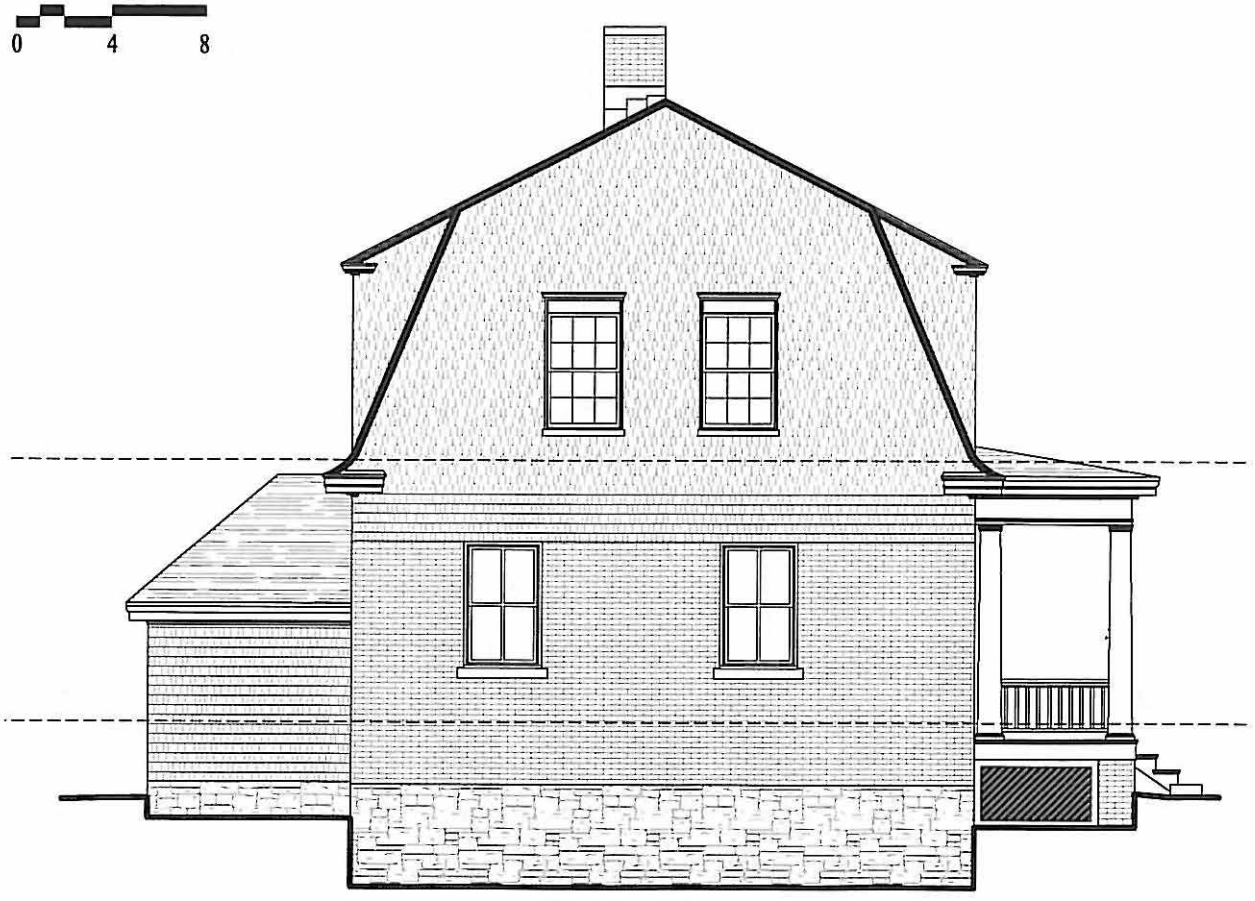
0 4 8

DE PERE LOCKKEEPER'S HOUSE c.1912-1948
EAST ELEVATION

0 4 8

DE PERE LOCKKEEPER'S HOUSE c.1912-1948
NORTH ELEVATION

0 4 8

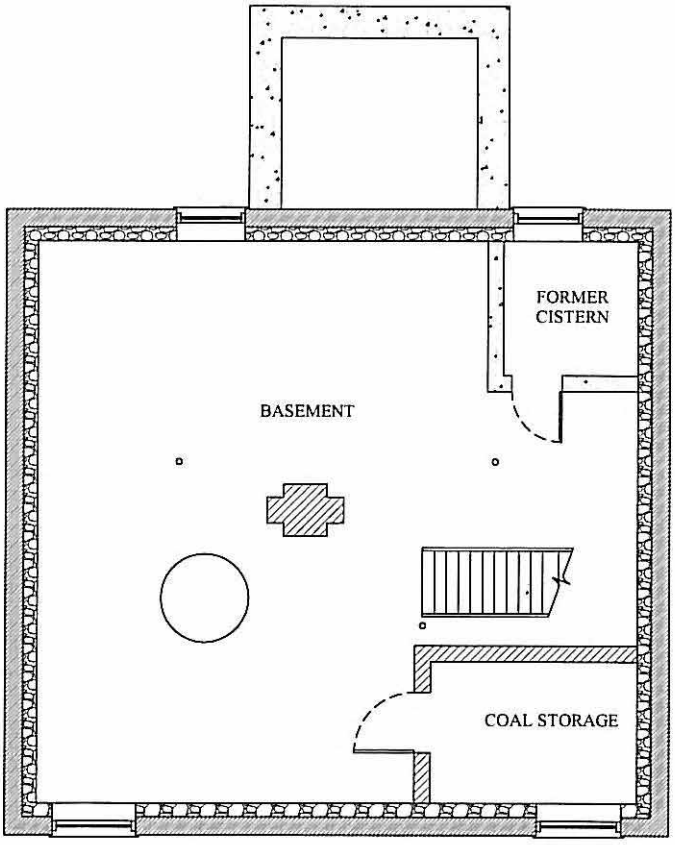


DE PERE LOCKKEEPER'S HOUSE c.1912-1948
WEST ELEVATION

0 4 8

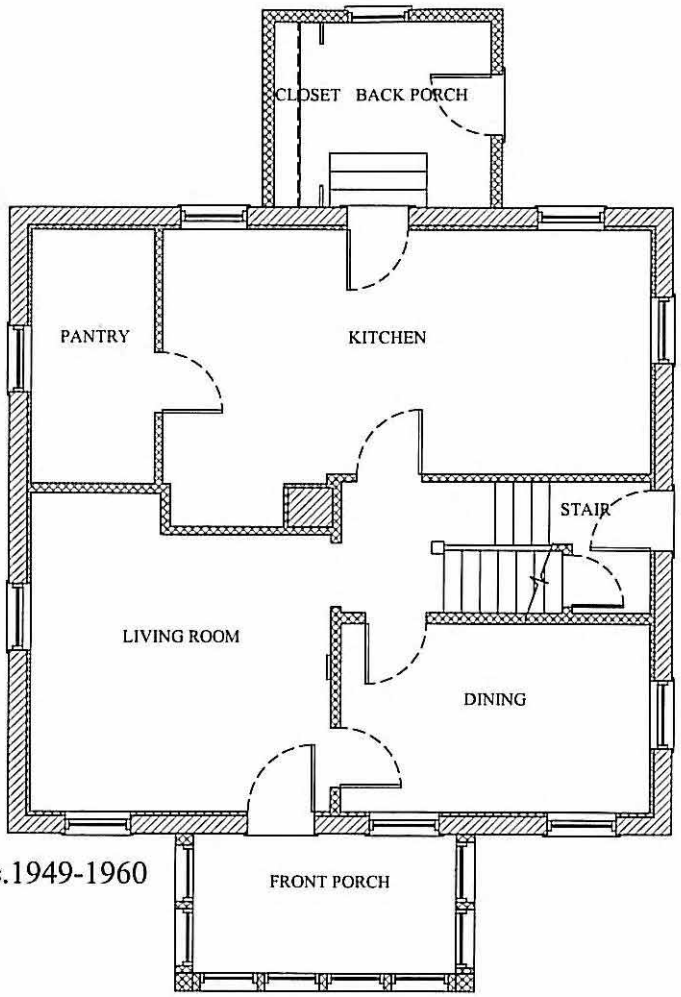
Appendix

Plans and Elevations c. 1949-1960s



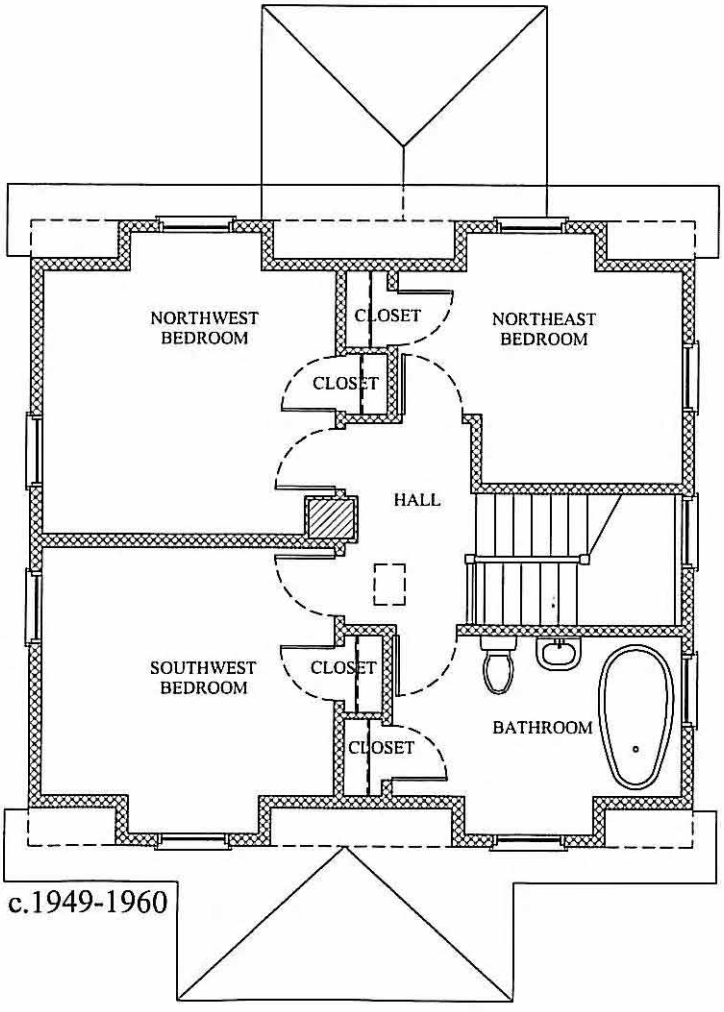
DE PERE LOCKKEEPER'S HOUSE c.1949-1960
BASEMENT FLOOR PLAN

0 4 8



DE PERE LOCKKEEPER'S HOUSE c.1949-1960
FIRST FLOOR PLAN

0 4 8



DE PERE LOCKKEEPER'S HOUSE c.1949-1960
SECOND FLOOR PLAN

0 4 8

DE PERE LOCKKEEPER'S HOUSE c.1949-1960
SOUTH ELEVATION

0 4 8

DE PERE LOCKKEEPER'S HOUSE c.1949-1960
EAST ELEVATION

0 4 8

DE PERE LOCKKEEPER'S HOUSE c.1949-1960
NORTH ELEVATION

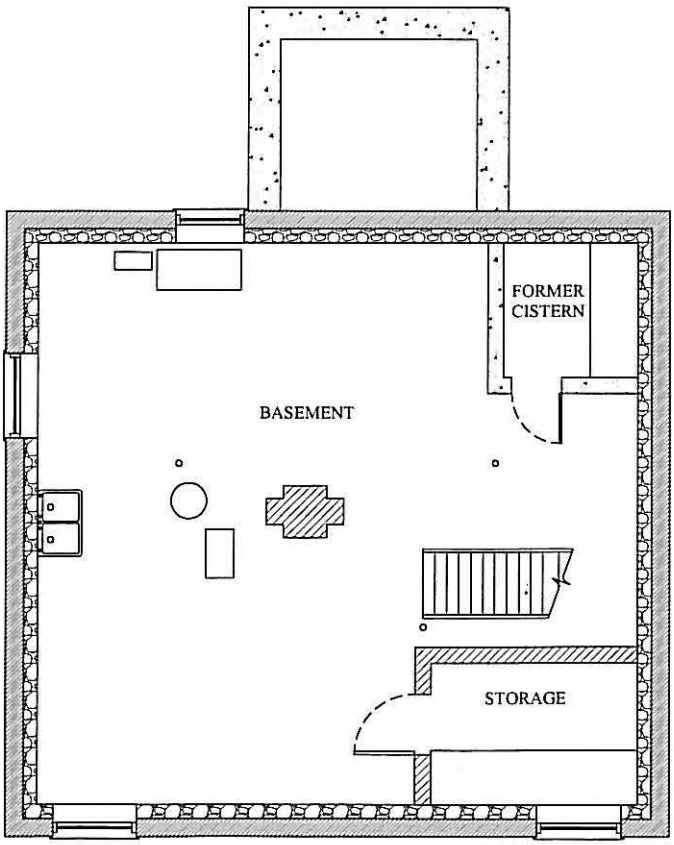
0 4 8

DE PERE LOCKKEEPER'S HOUSE c.1949-1960
WEST ELEVATION

0 4 8

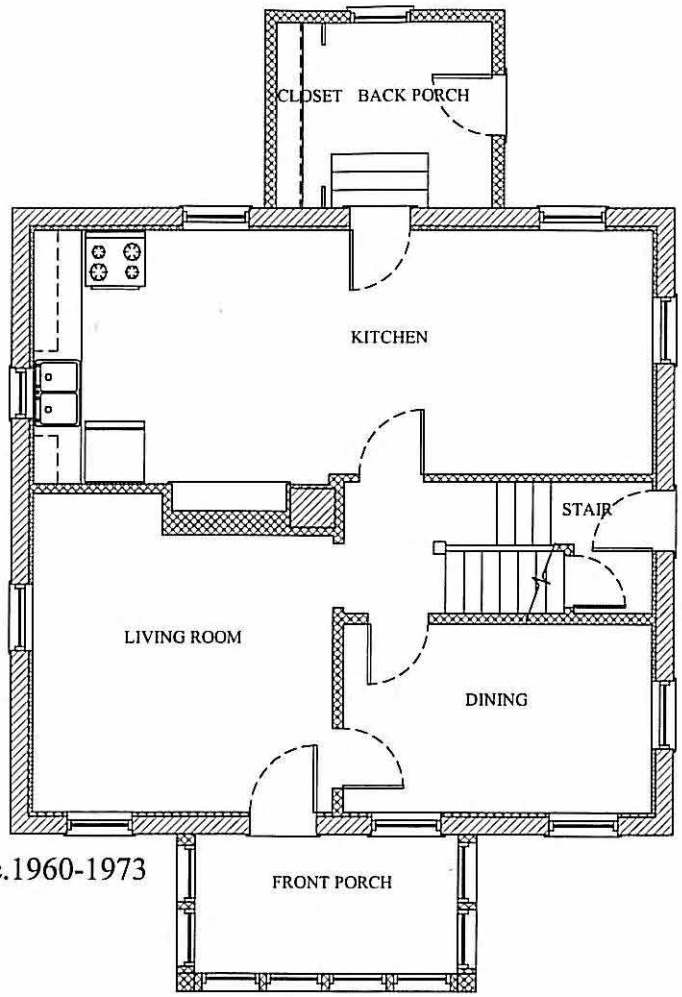
Appendix

Plans and Elevations c. 1960s-1973



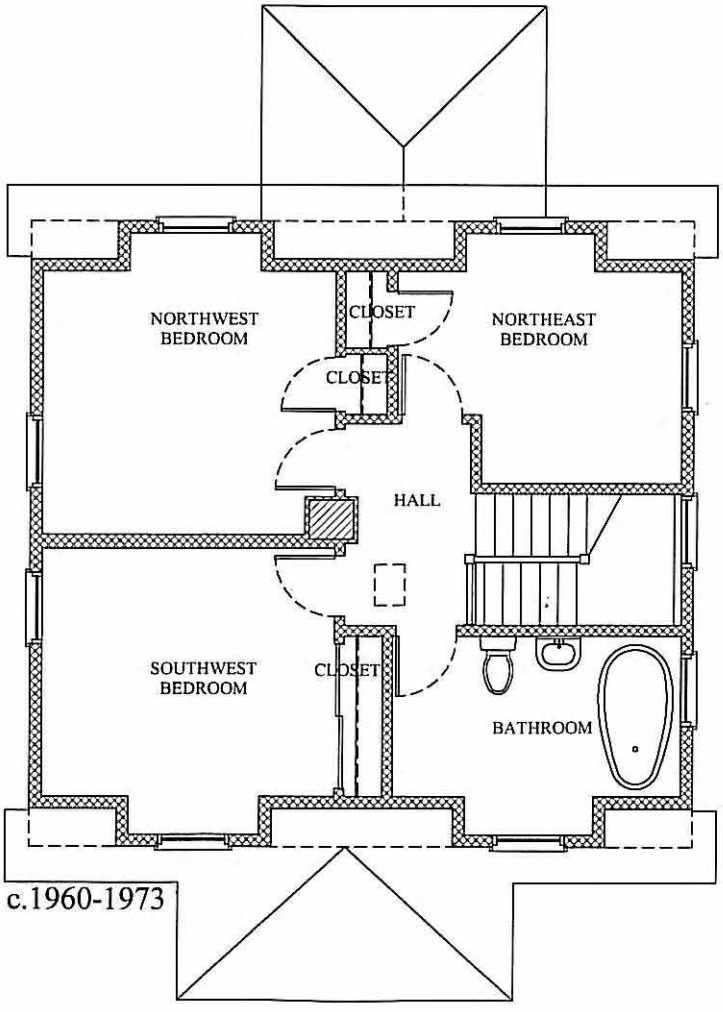
DE PERE LOCKKEEPER'S HOUSE c.1960-1973
BASEMENT FLOOR PLAN

0 4 8



DE PERE LOCKKEEPER'S HOUSE c.1960-1973
FIRST FLOOR PLAN

0 4 8



DE PERE LOCKKEEPER'S HOUSE c.1960-1973
SECOND FLOOR PLAN

0 4 8

DE PERE LOCKKEEPER'S HOUSE c.1960-1973
SOUTH ELEVATION

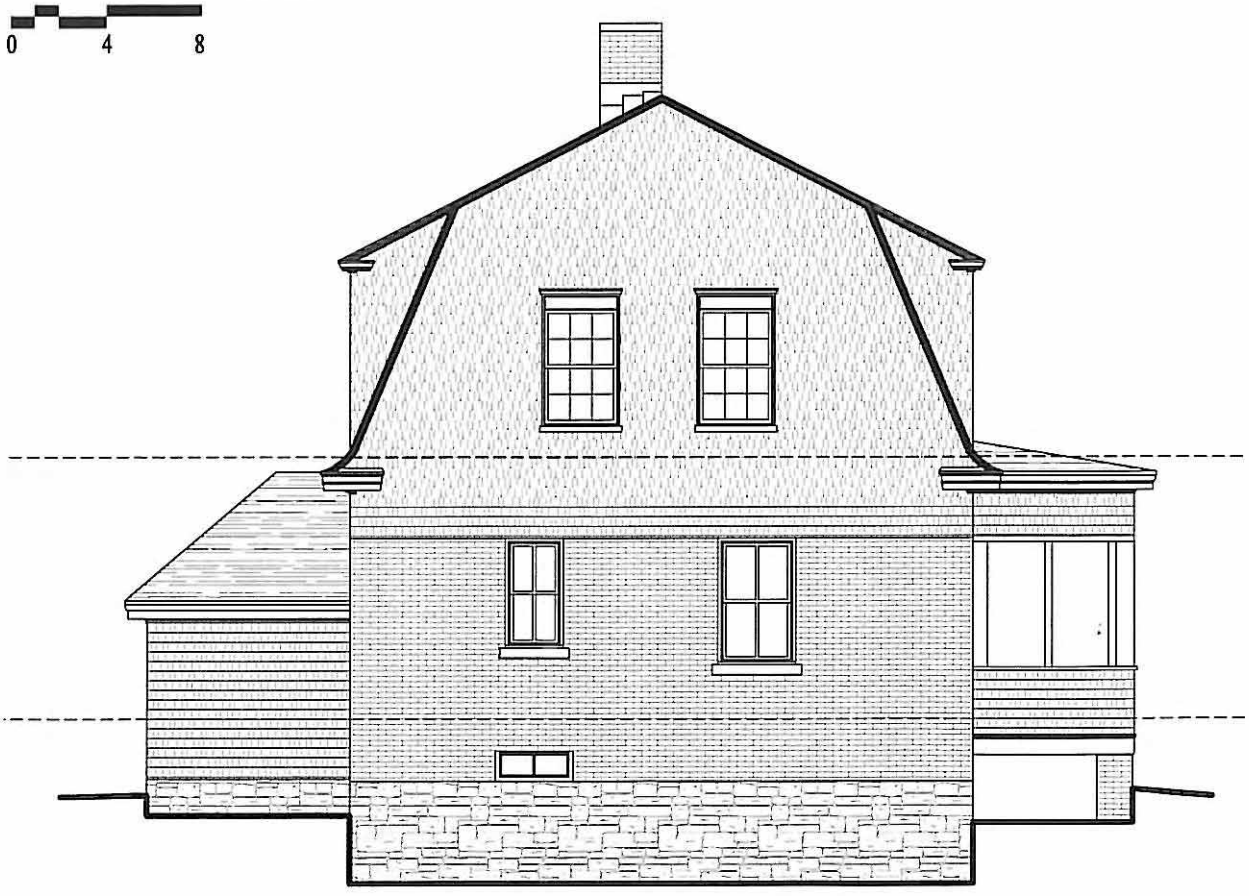
0 4 8

DE PERE LOCKKEEPER'S HOUSE c.1960-1973
EAST ELEVATION

0 4 8

DE PERE LOCKKEEPER'S HOUSE c.1960-1973
NORTH ELEVATION

0 4 8

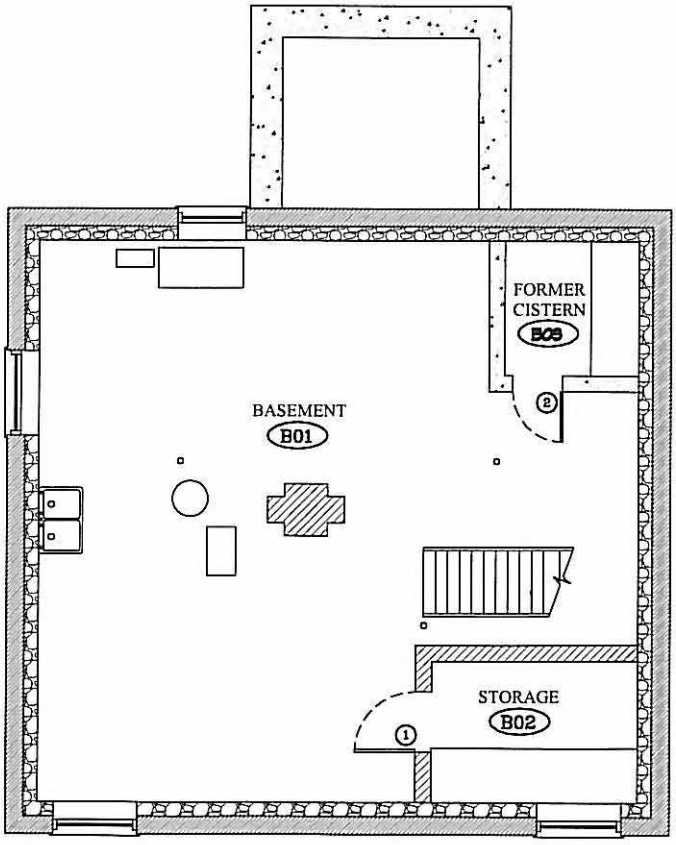


DE PERE LOCKKEEPER'S HOUSE c.1960-1973
WEST ELEVATION

0 4 8

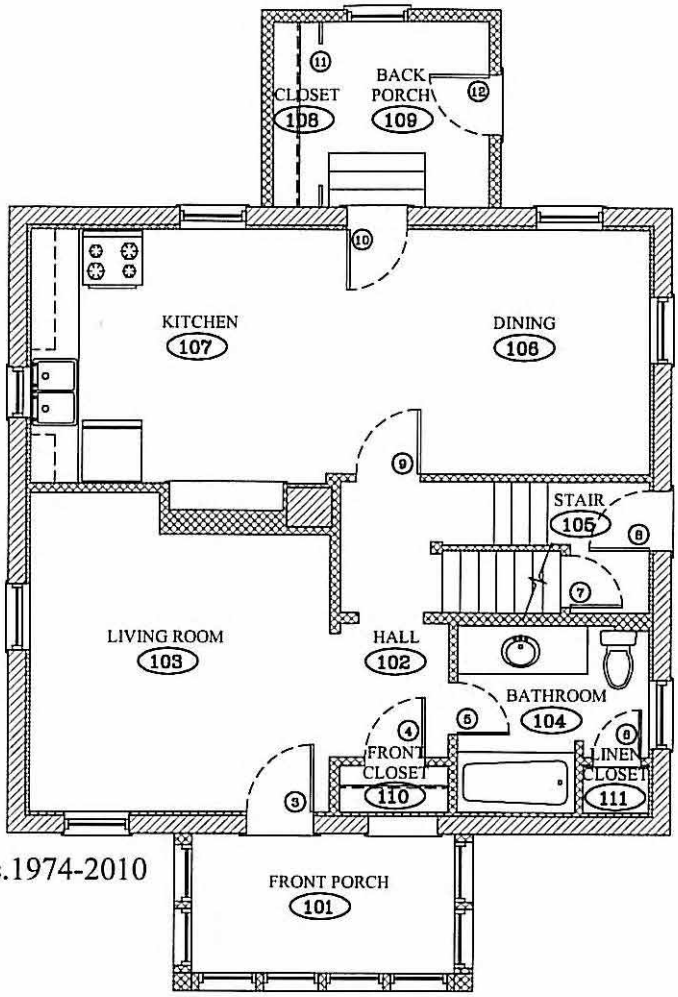
Appendix

Plans and Elevations c. 1974-2010



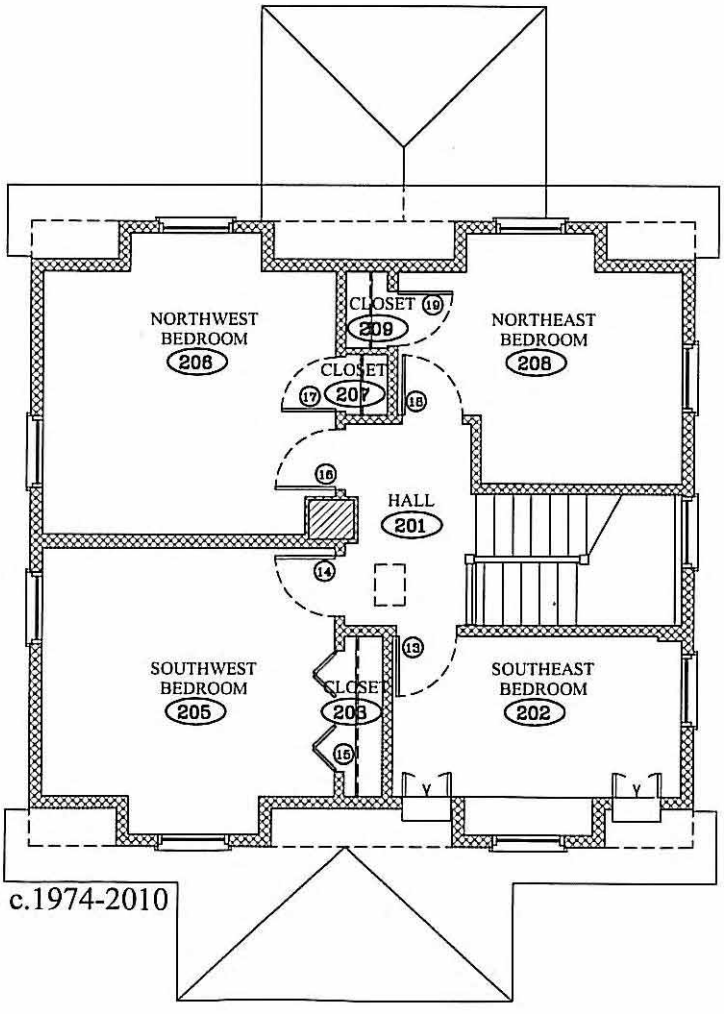
DE PERE LOCKKEEPER'S HOUSE c.1974-2010
BASEMENT FLOOR PLAN

0 4 8



DE PERE LOCKKEEPER'S HOUSE c.1974-2010
FIRST FLOOR PLAN

0 4 8



DE PERE LOCKKEEPER'S HOUSE c.1974-2010
SECOND FLOOR PLAN

0 4 8

DE PERE LOCKKEEPER'S HOUSE c.1974-2010
SOUTH ELEVATION

0 4 8

DE PERE LOCKKEEPER'S HOUSE c.1974-2010
EAST ELEVATION

0 4 8

DE PERE LOCKKEEPER'S HOUSE c.1974-2010
NORTH ELEVATION

0 4 8

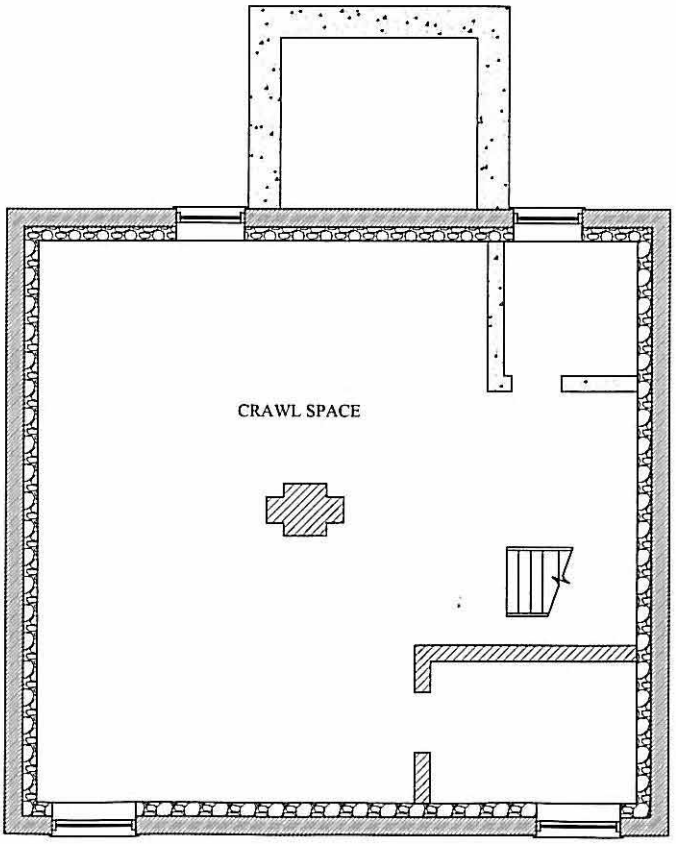
DE PERE LOCKKEEPER'S HOUSE c.1974-2010
WEST ELEVATION

0 4 8

Appendix

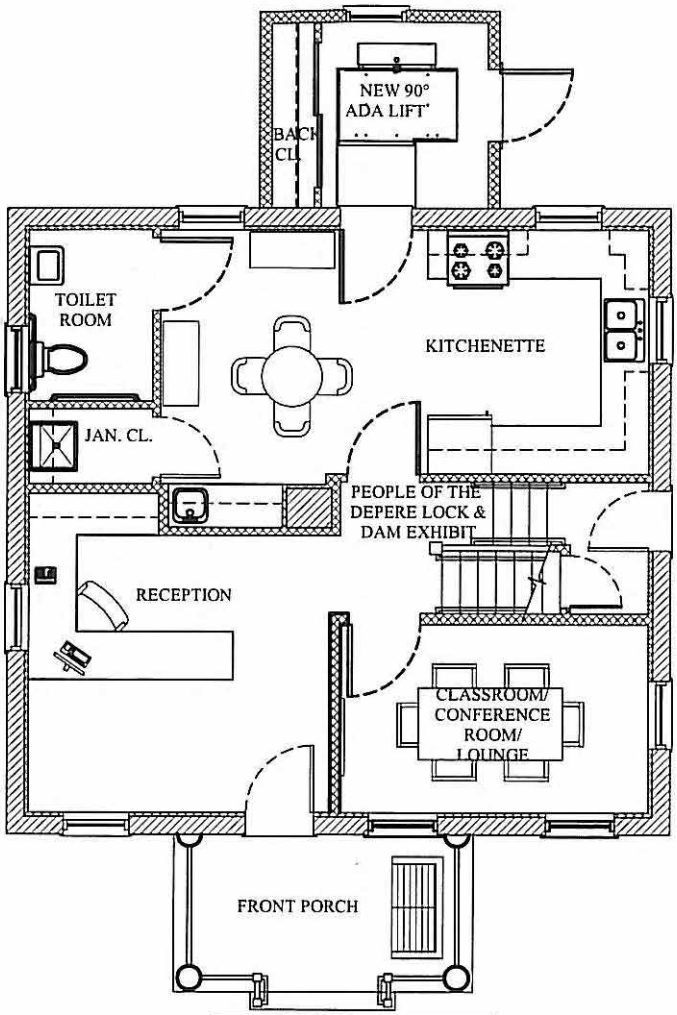
Proposed Plans and Elevations

- Active Recreational Shelter
- Institutional Office
- Heritage Tourism Lodging



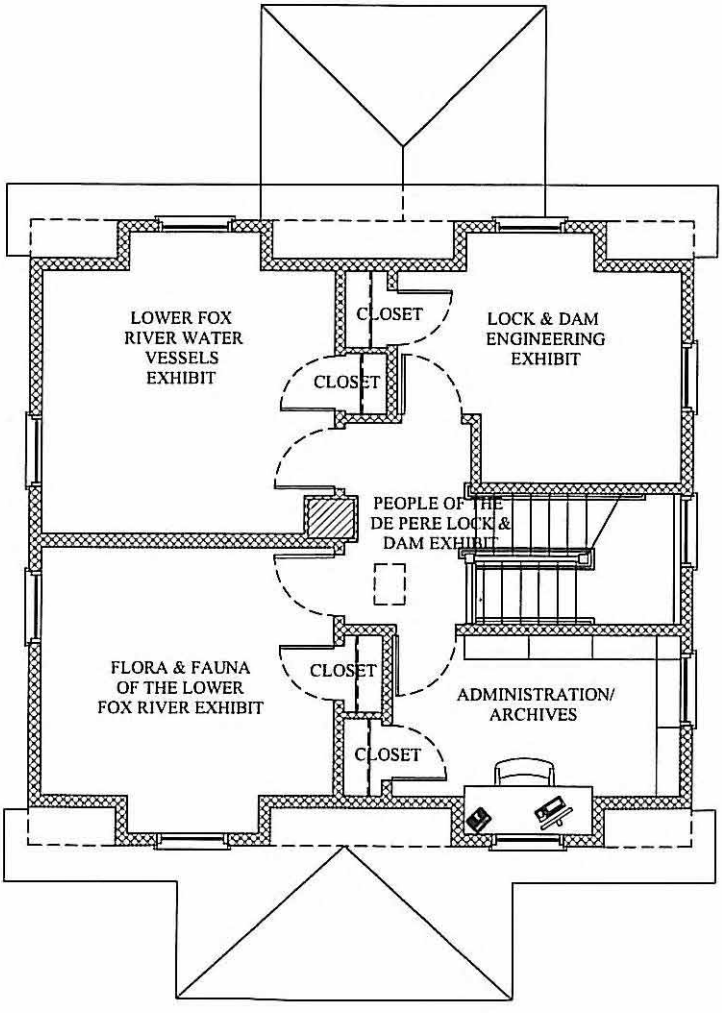
PROPOSED ACTIVE RECREATION SHELTER
DE PERE LOCKKEEPER'S HOUSE
BASEMENT FLOOR PLAN

0 4 8



PROPOSED ACTIVE RECREATION SHELTER
DE PERE LOCKKEEPER'S HOUSE
FIRST FLOOR PLAN

0 4 8

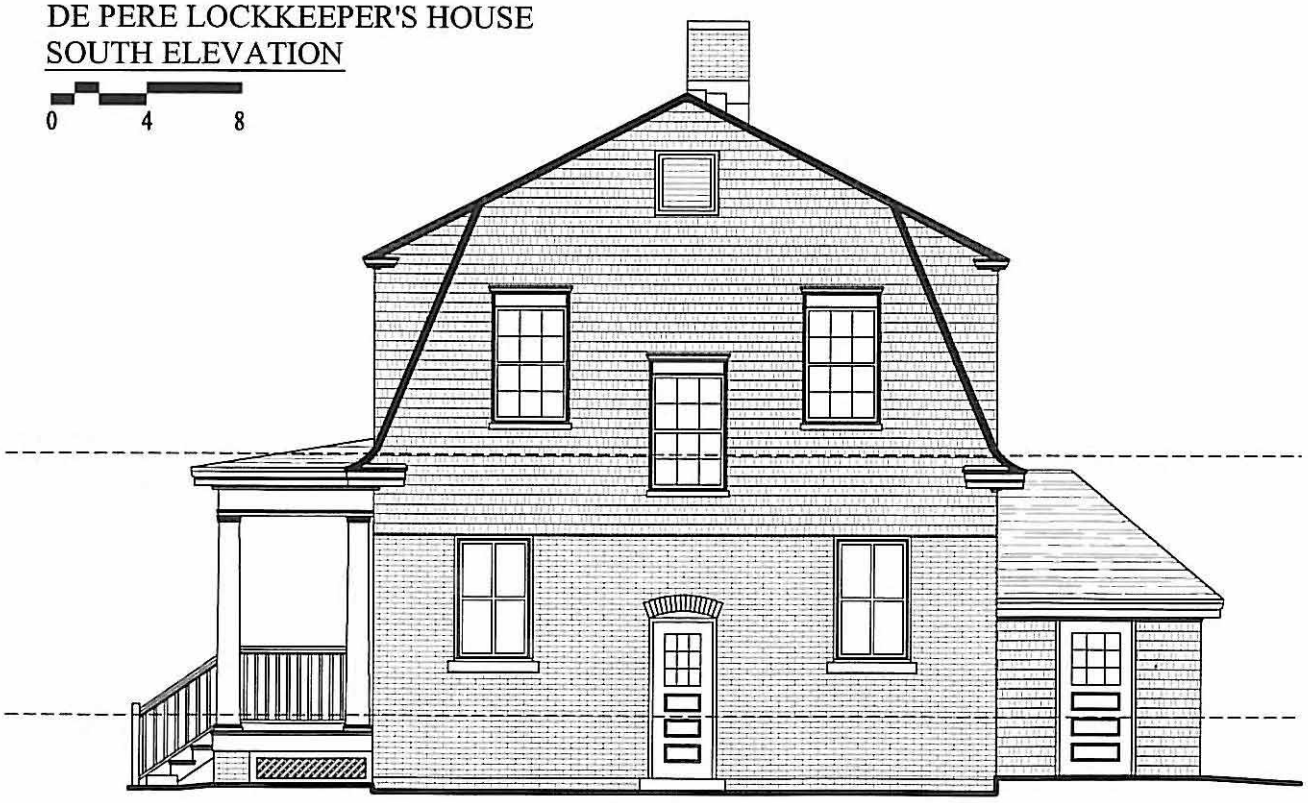


PROPOSED ACTIVE RECREATION SHELTER
DE PERE LOCKKEEPER'S HOUSE
SECOND FLOOR PLAN

0 4 8

PROPOSED ACTIVE RECREATION SHELTER
DE PERE LOCKKEEPER'S HOUSE
SOUTH ELEVATION

0 4 8

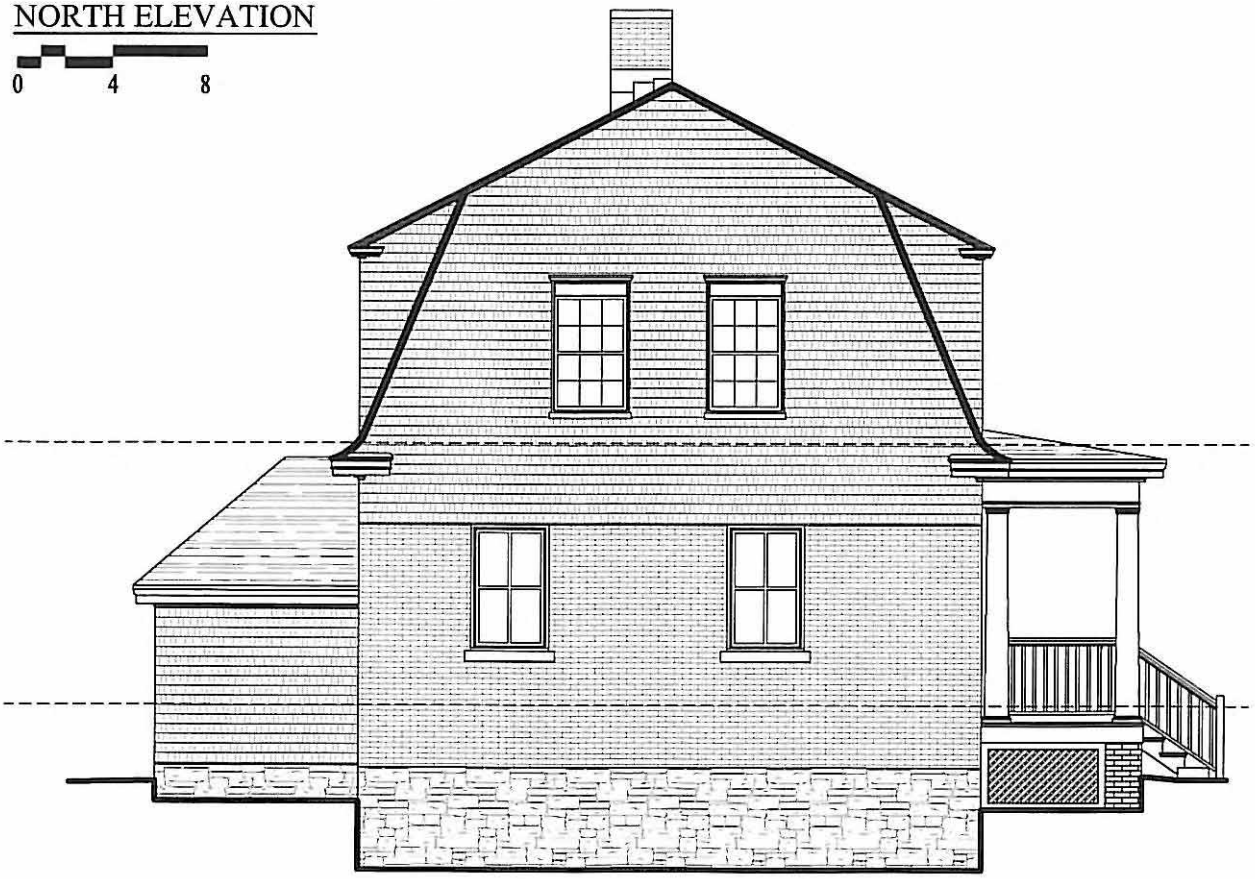


PROPOSED ACTIVE RECREATION SHELTER
DE PERE LOCKKEEPER'S HOUSE
EAST ELEVATION

0 4 8

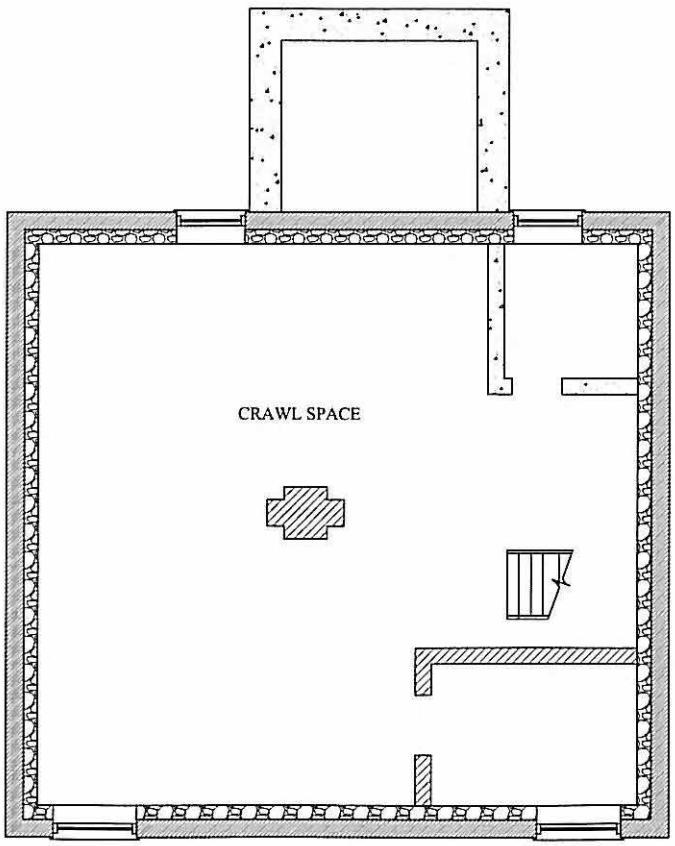
PROPOSED ACTIVE RECREATION SHELTER
DE PERE LOCKKEEPER'S HOUSE
NORTH ELEVATION

0 4 8



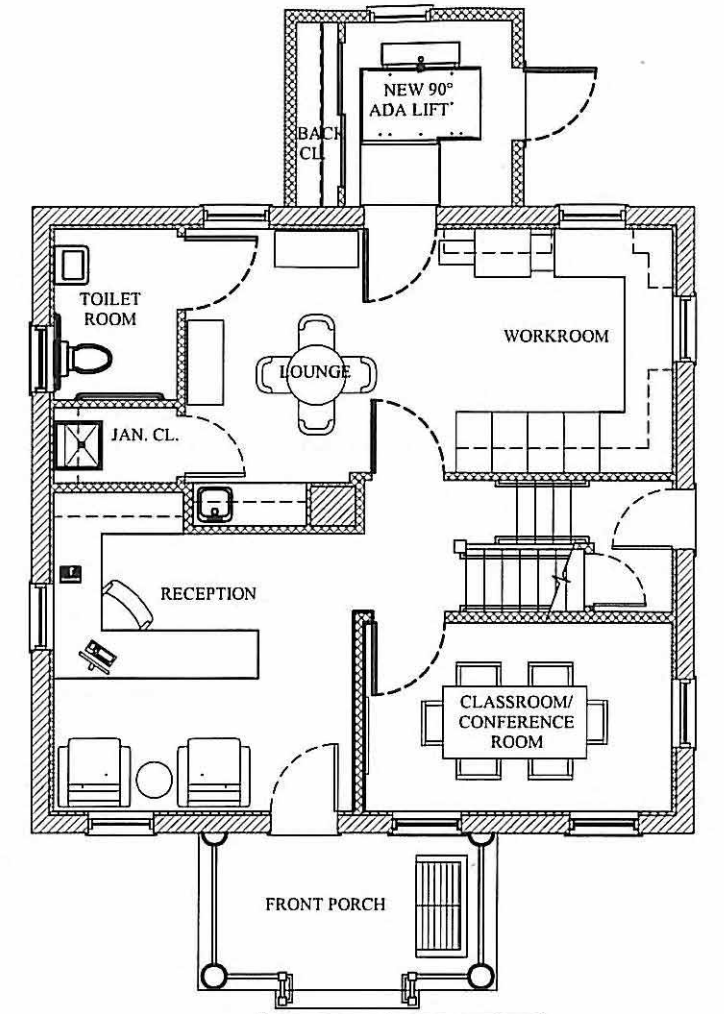
PROPOSED ACTIVE RECREATION SHELTER
DE PERE LOCKKEEPER'S HOUSE
WEST ELEVATION

0 4 8



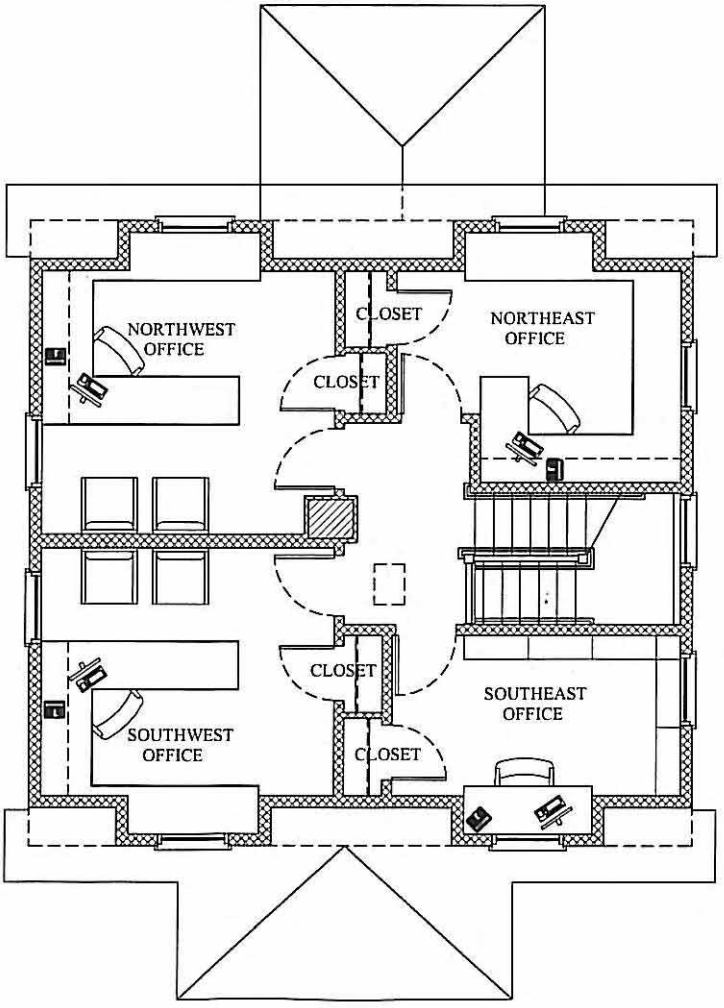
PROPOSED INSTITUTIONAL OFFICE
DE PERE LOCKKEEPER'S HOUSE
BASEMENT FLOOR PLAN

0 4 8



PROPOSED INSTITUTIONAL OFFICE
DE PERE LOCKKEEPER'S HOUSE
FIRST FLOOR PLAN

0 4 8

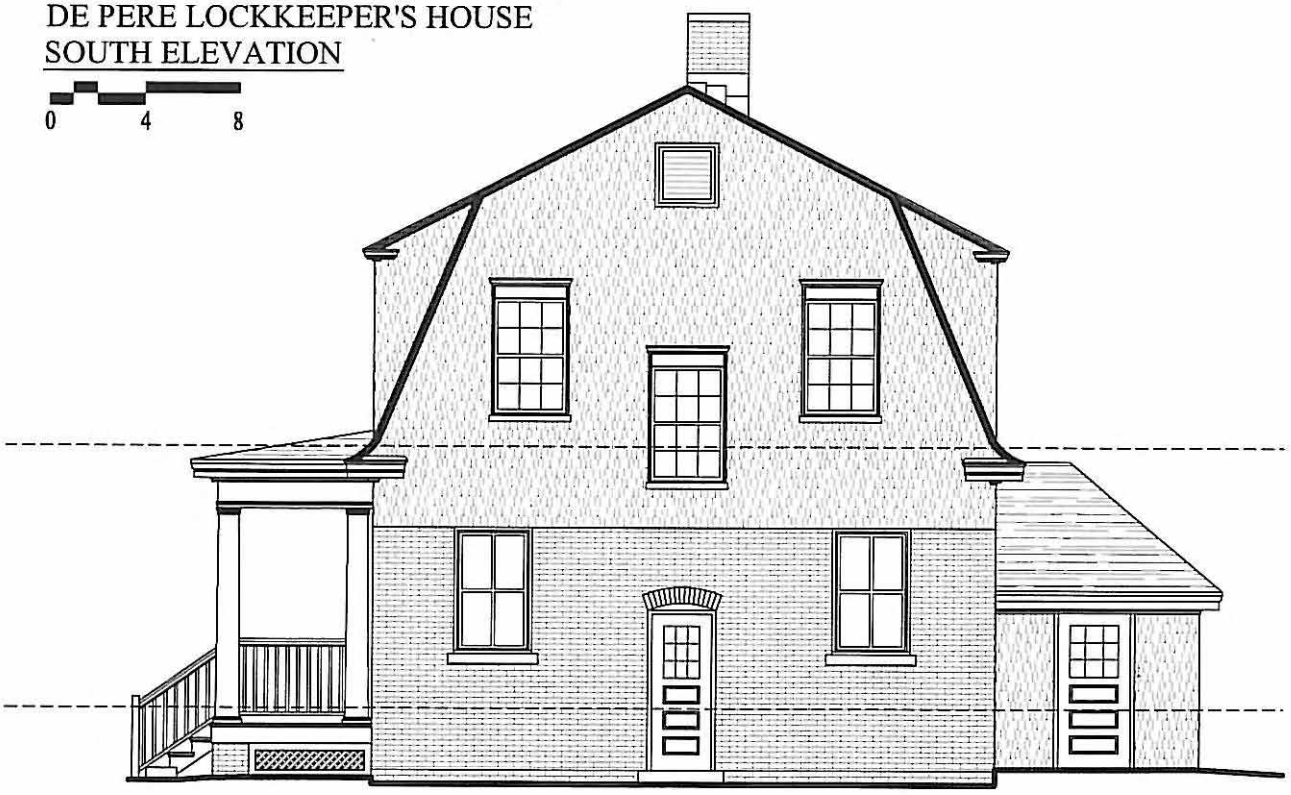


PROPOSED INSTITUTIONAL OFFICE
DE PERE LOCKKEEPER'S HOUSE
SECOND FLOOR PLAN

0 4 8

PROPOSED INSTITUTIONAL OFFICE
DE PERE LOCKKEEPER'S HOUSE
SOUTH ELEVATION

0 4 8



PROPOSED INSTITUTIONAL OFFICE
DE PERE LOCKKEEPER'S HOUSE
EAST ELEVATION

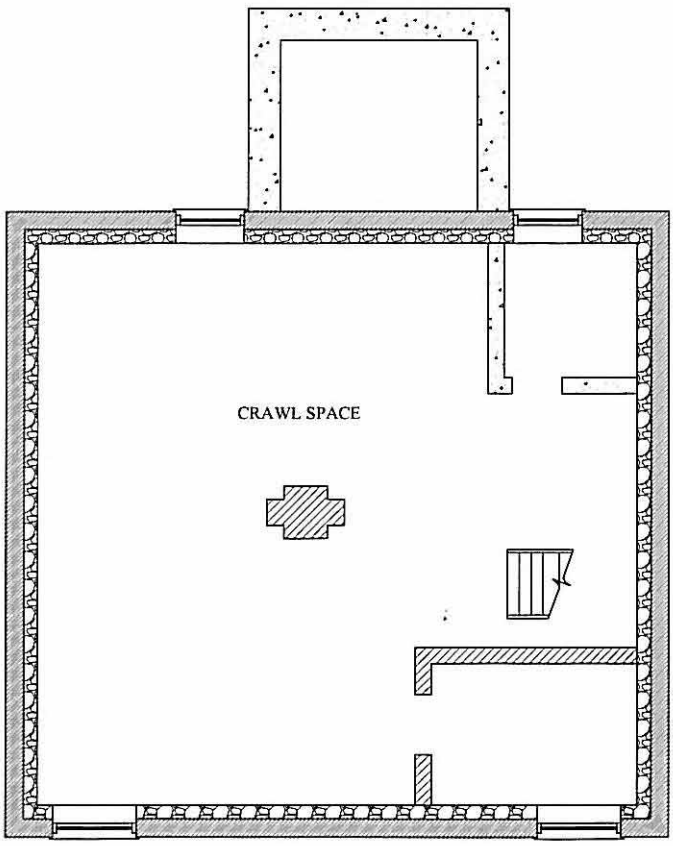
0 4 8

PROPOSED INSTITUTIONAL OFFICE
DE PERE LOCKKEEPER'S HOUSE
NORTH ELEVATION

0 4 8

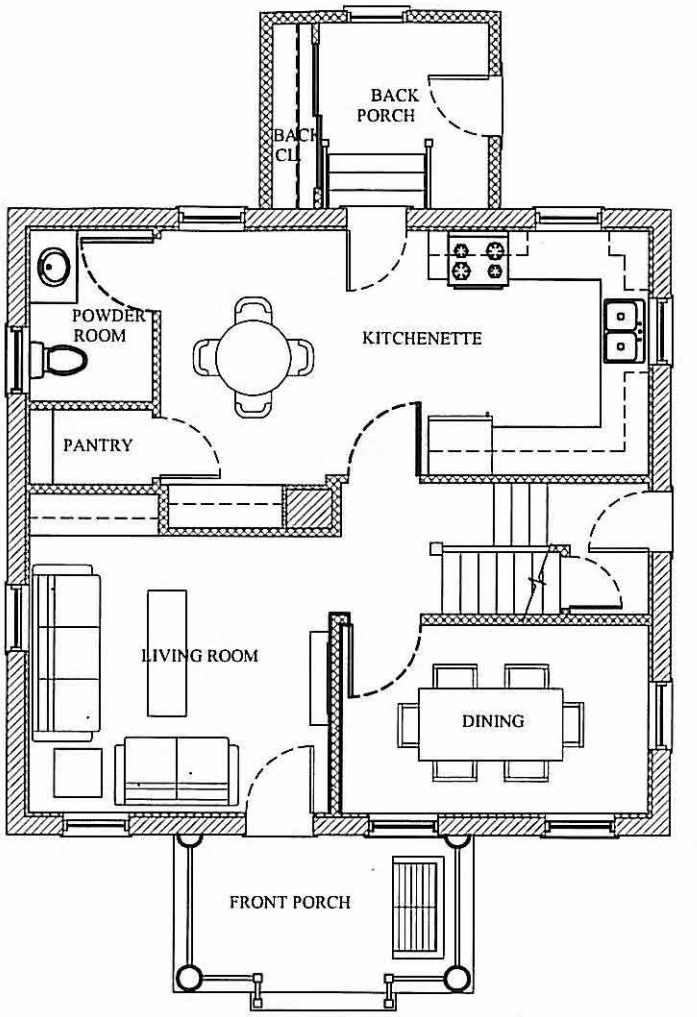
PROPOSED INSTITUTIONAL OFFICE
DE PERE LOCKKEEPER'S HOUSE
WEST ELEVATION

0 4 8



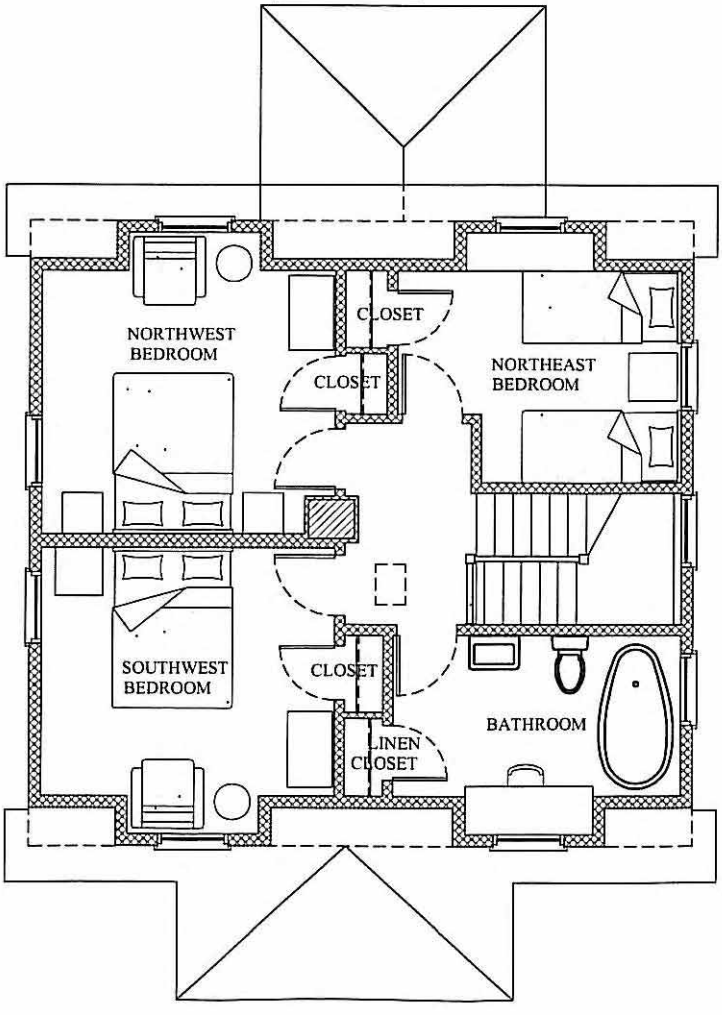
PROPOSED HERITAGE TOURISM LODGING
DE PERE LOCKKEEPER'S HOUSE
BASEMENT FLOOR PLAN

0 4 8



PROPOSED HERITAGE TOURISM LODGING
DE PERE LOCKKEEPER'S HOUSE
FIRST FLOOR PLAN

0 4 8



PROPOSED HERITAGE TOURISM LODGING
DE PERE LOCKKEEPER'S HOUSE
SECOND FLOOR PLAN

0 4 8

PROPOSED HERITAGE TOURISM LODGING
DE PERE LOCKKEEPER'S HOUSE
SOUTH ELEVATION

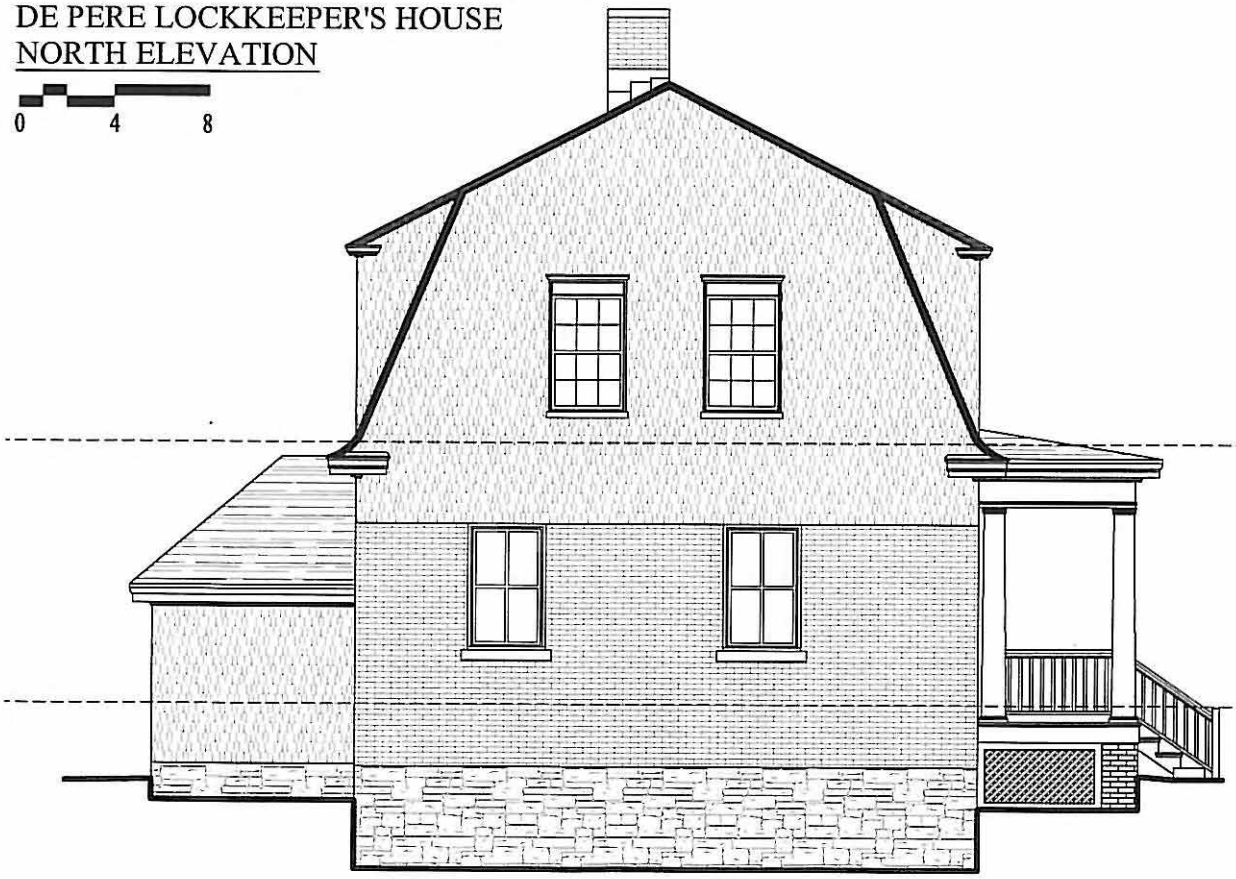
0 4 8

PROPOSED HERITAGE TOURISM LODGING
DE PERE LOCKKEEPER'S HOUSE
EAST ELEVATION

0 4 8

PROPOSED HERITAGE TOURISM LODGING
DE PERE LOCKKEEPER'S HOUSE
NORTH ELEVATION

0 4 8



PROPOSED HERITAGE TOURISM LODGING
DE PERE LOCKKEEPER'S HOUSE PROPOSED
WEST ELEVATION

0 4 8

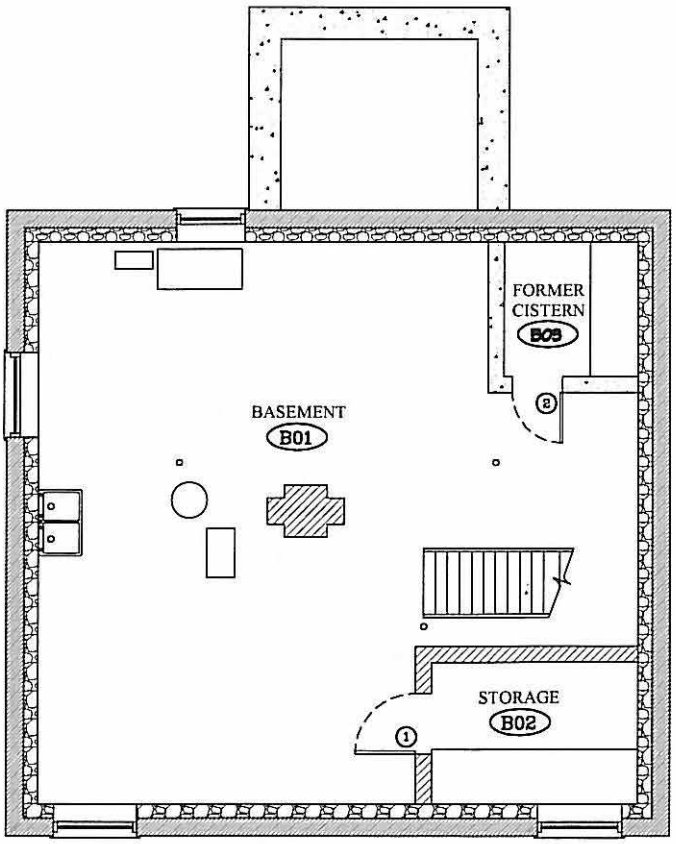
Appendix

Building Inspection Checklists & Repair Logs

- Spring
- Summer
- Fall

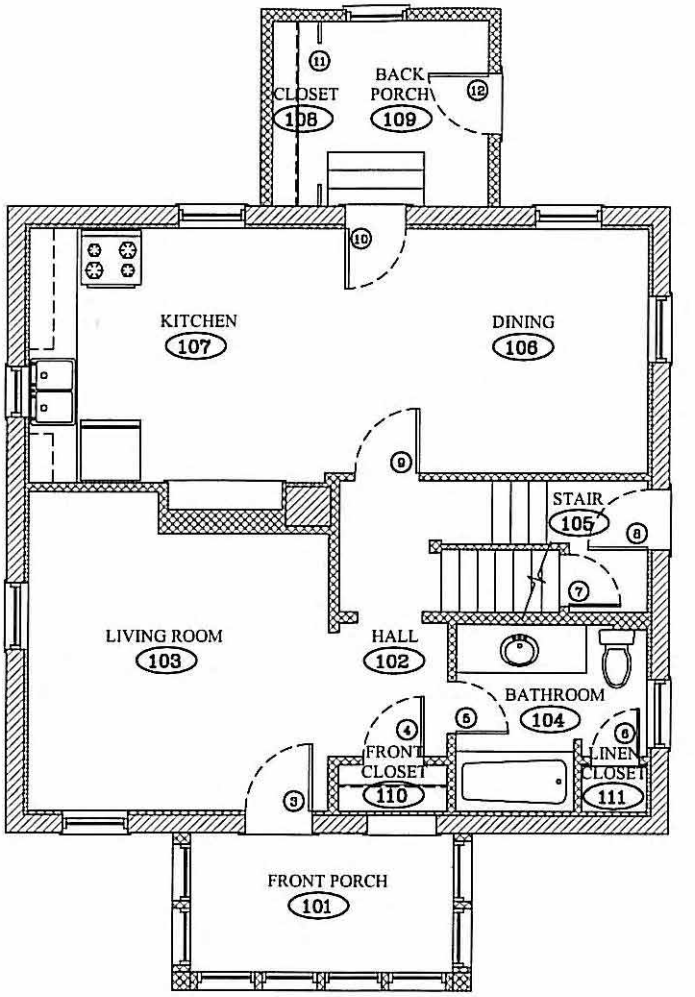
De Pere Lockkeeper's House

Spring Building Inspection Checklist & Repair Log			Inspection Date:	
Building Feature	**Material(s)**	**Condition Description**	**Maintenance Action Required**	**Work Done**
Roofs				
Gutters	Berger 5" Half Round Galvanized Metal			
Downspouts	Berger 4" Corrugated Round Galvanized Metal			
Attic				
Exterior Walls				
Masonry	Red Brick			
Mortar	U. S. Heritage Group #10053-2			
Finish Carpentry & Arch'l Woodwork	Western Red Cedar, Select Knotty			
Wood Shingles	Certigrade 1 Red Cedar Shingles			
Joint Sealants	Sika Corp. Sikaflex -15LM in White			
Paint	Sherwin Williams A-100 Exterior Latex Satin in SW7008 Alabaster or ProMar Exterior Solid Color Acrylic Latex Stain in SW6440 Courtyard			
Penetrations & Attachments				
Openings				
Doors Shutters & Frames	Western Red Cedar, Select Knotty			
Windows Shutters & Frames	Western Red Cedar, Select Knotty			
Door & Window Hardware				
Weatherstripping				
Sills				
Joint Sealants	Sika Corp. Sikaflex -15LM in White			
Paint	Sherwin Williams A-100 Exterior Latex Satin or ProMar Exterior Solid Color Acrylic Latex Stain in SW7008 Alabaster			
Foundations & Perimeter Grades				
Stone	Cream Lannon Stone			
Masonry	Red Brick			
Mortar	U. S. Heritage Group #10053-2			
Grade	Top Soil & Rip Rap			
Vegetation	Turf			
Basement/Crawlspace				



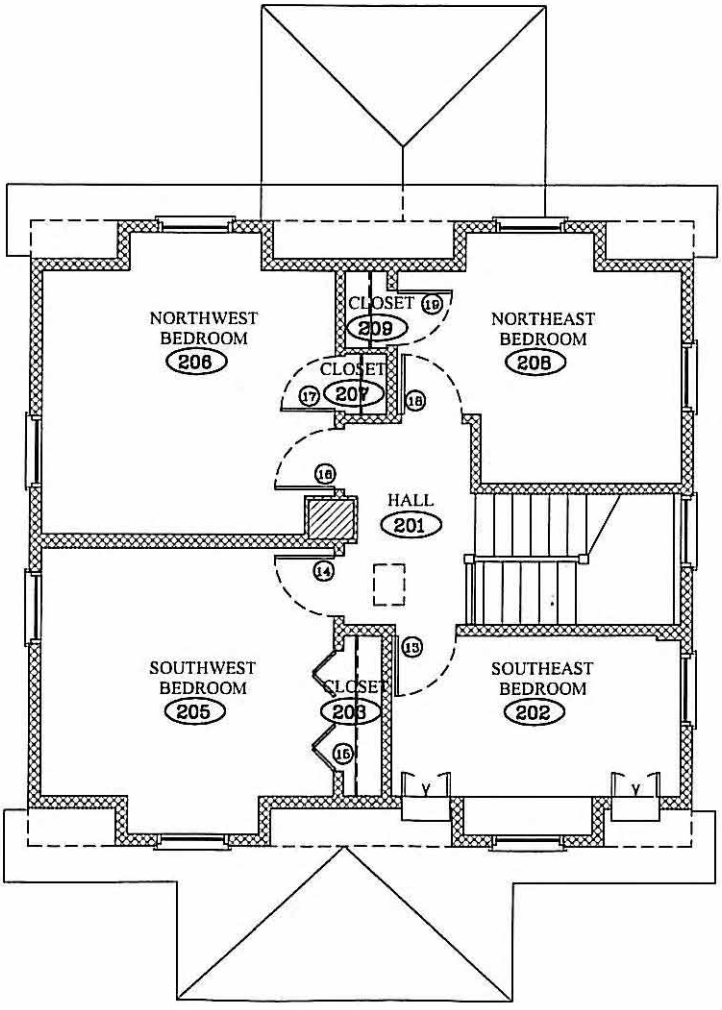
DE PERE LOCKKEEPER'S HOUSE
BASEMENT FLOOR PLAN

0 4 8



DE PERE LOCKKEEPER'S HOUSE
FIRST FLOOR PLAN

0 4 8



DE PERE LOCKKEEPER'S HOUSE
SECOND FLOOR PLAN

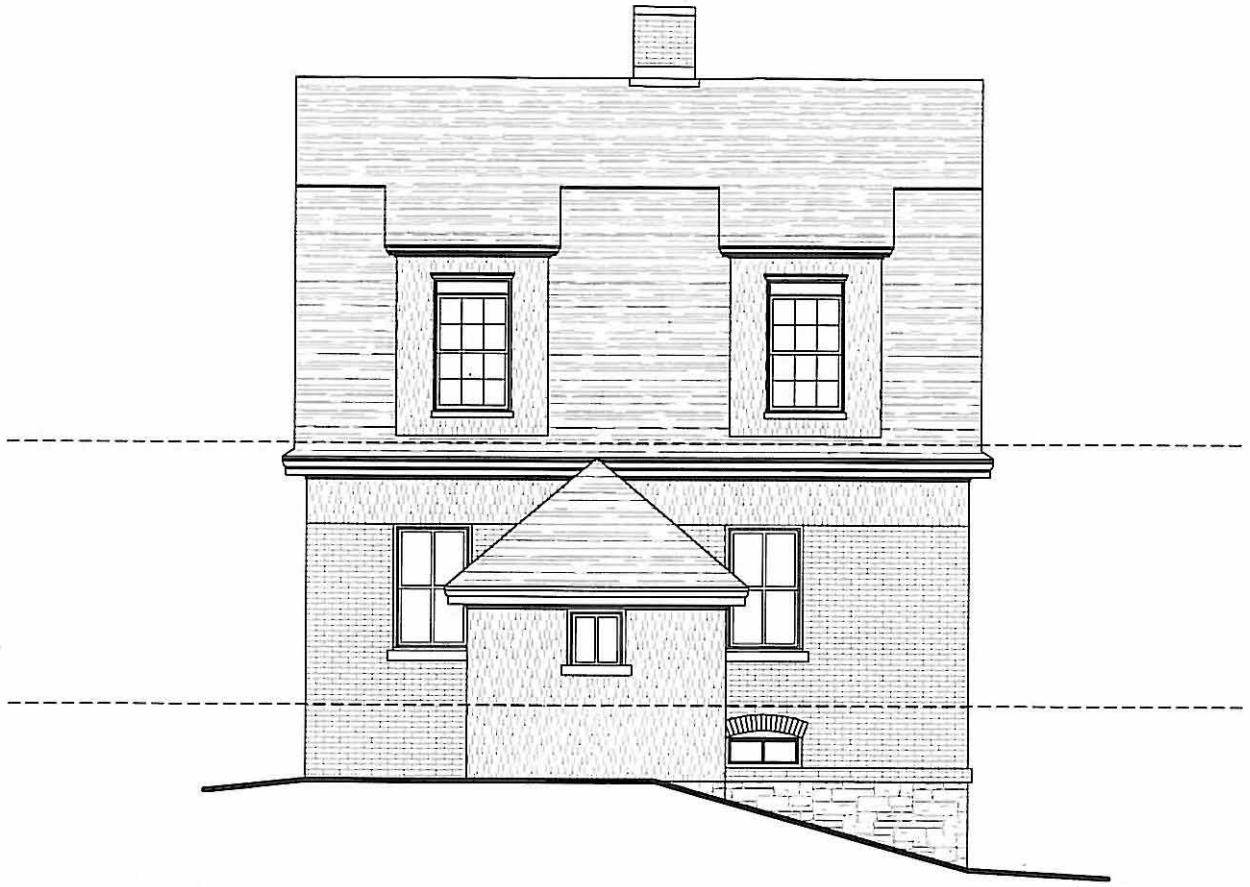
0 4 8

DE PERE LOCKKEEPER'S HOUSE
SOUTH ELEVATION

0 4 8

DE PERE LOCKKEEPER'S HOUSE
EAST ELEVATION

0 4 8



DE PERE LOCKKEEPER'S HOUSE
NORTH ELEVATION

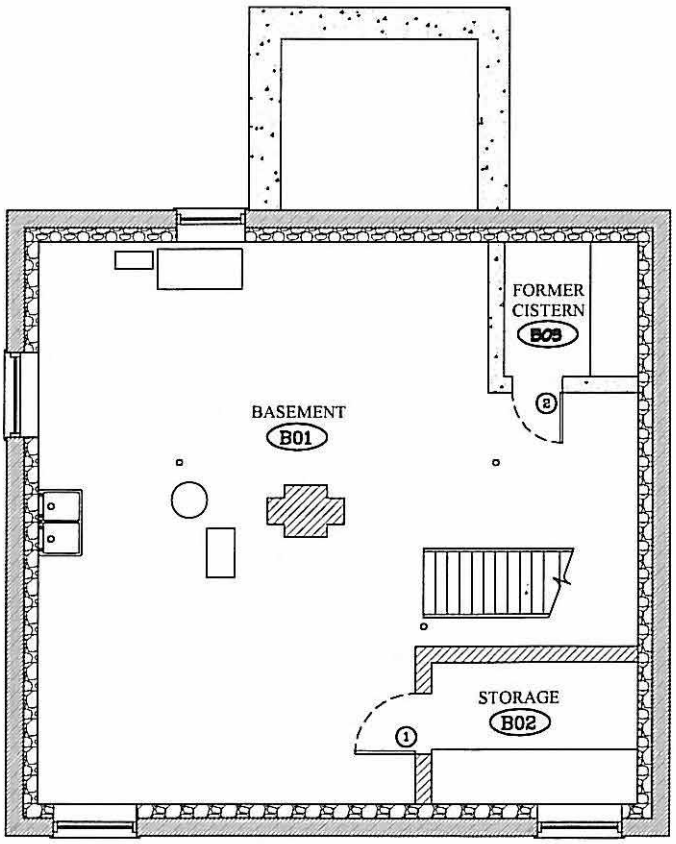
0 4 8

DE PERE LOCKKEEPER'S HOUSE
WEST ELEVATION

0 4 8

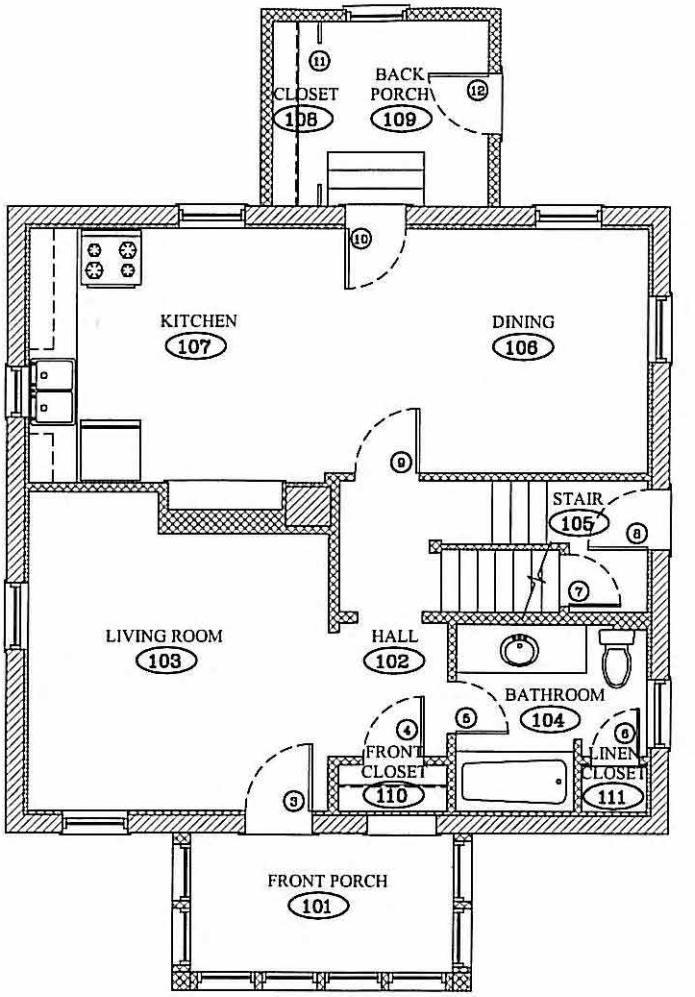
De Pere Lockkeeper's House

Summer Building Inspection Checklist & Repair Log			Inspection Date:	
Building Feature	**Material(s)**	**Condition Description**	**Maintenance Action Required**	**Work Done**
Roofs				
Gutters	Berger 5" Half Round Galvanized Metal			
Downspouts	Berger 4" Corrugated Round Galvanized Metal			
Attic				
Foundations & Perimeter Grades				
Basement/Crawlspace				



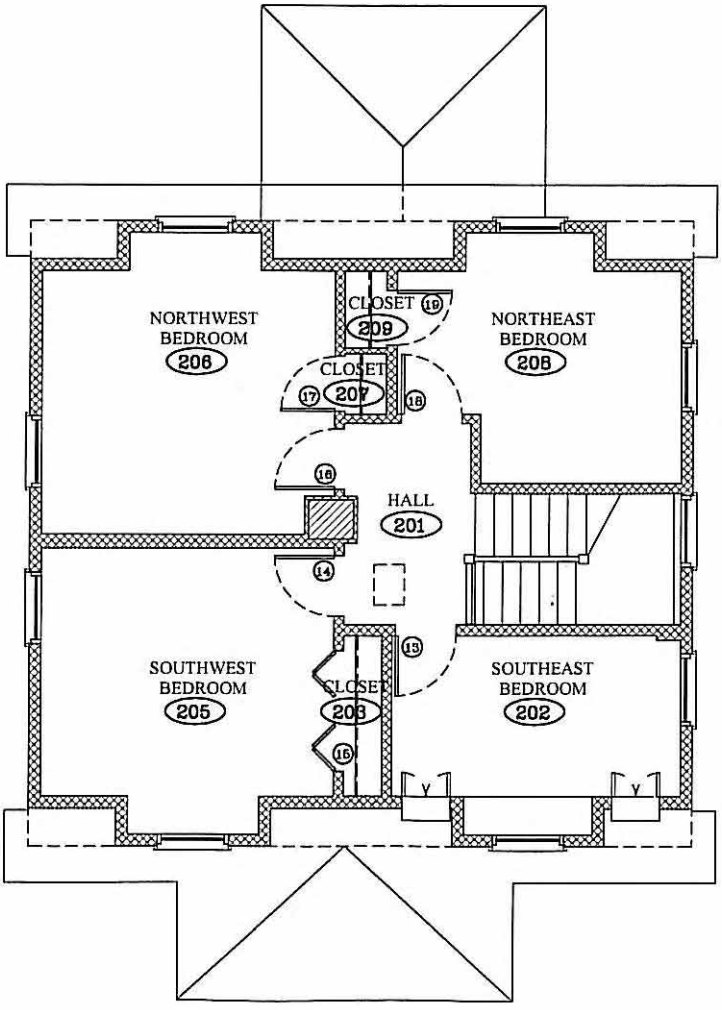
DE PERE LOCKKEEPER'S HOUSE
BASEMENT FLOOR PLAN

0 4 8



DE PERE LOCKKEEPER'S HOUSE
FIRST FLOOR PLAN

0 4 8



DE PERE LOCKKEEPER'S HOUSE
SECOND FLOOR PLAN

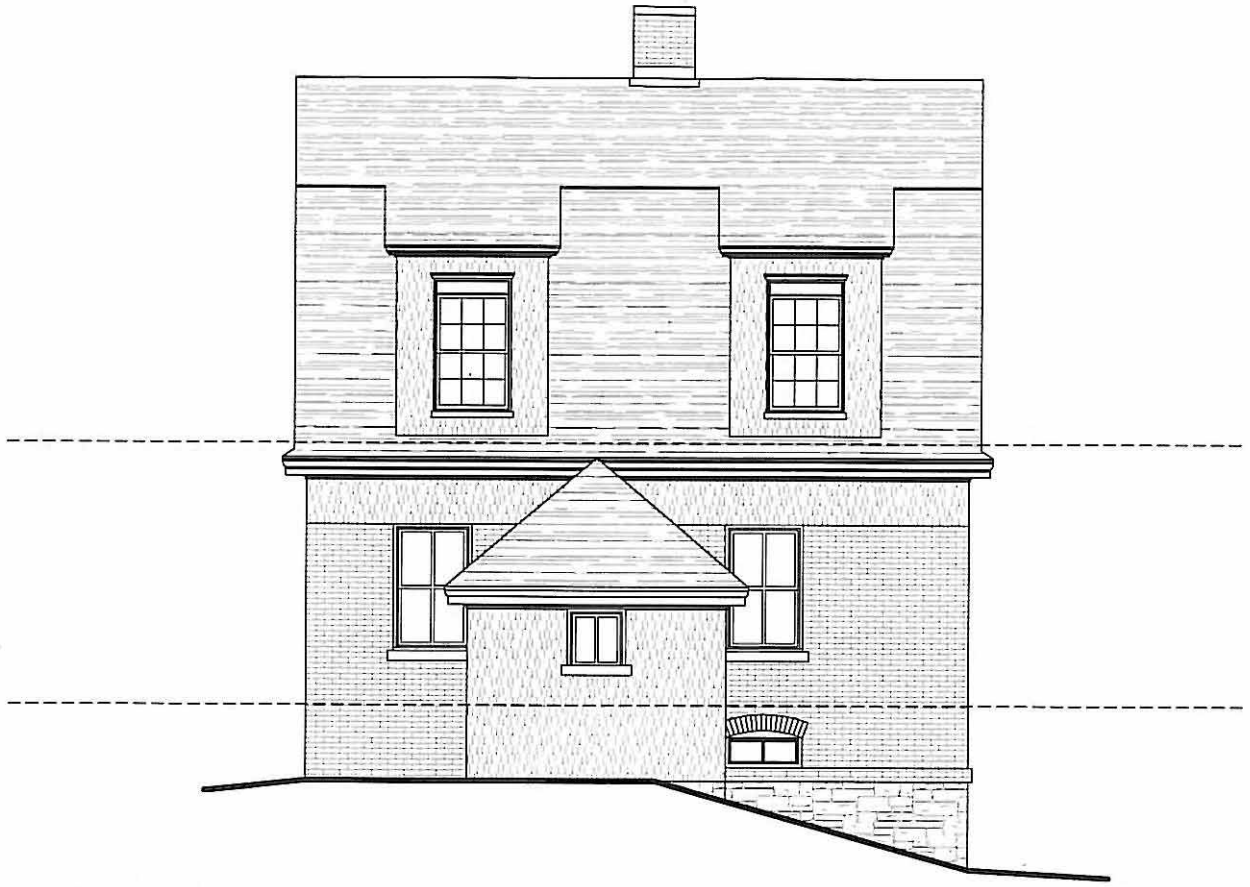
0 4 8

DE PERE LOCKKEEPER'S HOUSE
SOUTH ELEVATION

0 4 8

DE PERE LOCKKEEPER'S HOUSE
EAST ELEVATION

0 4 8



DE PERE LOCKKEEPER'S HOUSE
NORTH ELEVATION

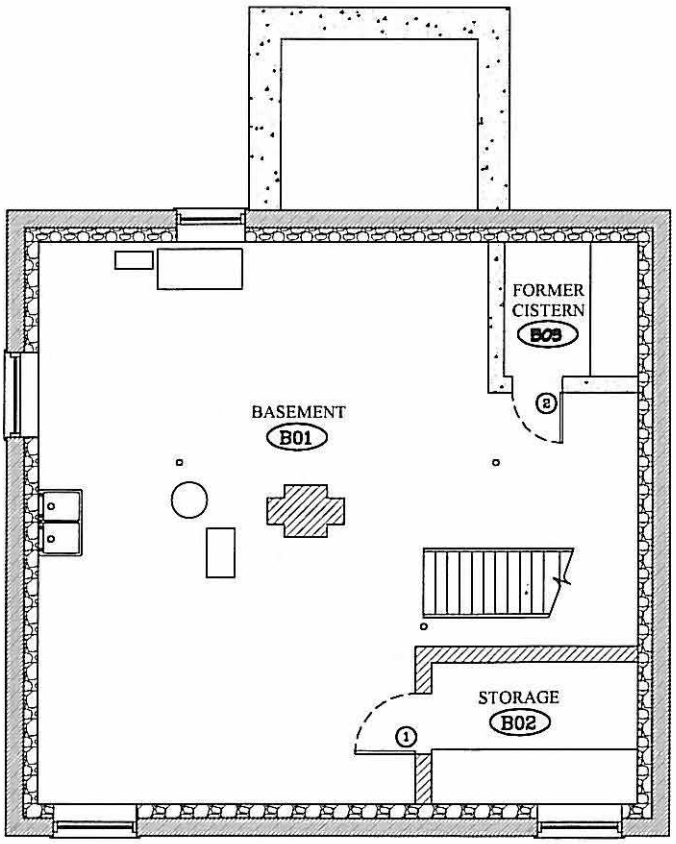
0 4 8

DE PERE LOCKKEEPER'S HOUSE
WEST ELEVATION

0 4 8

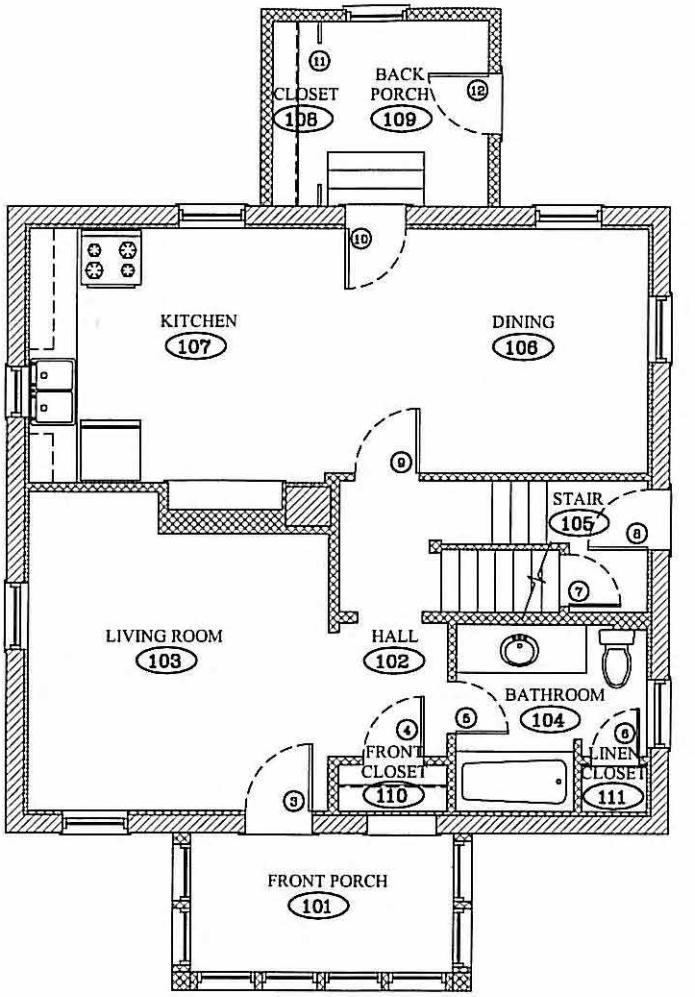
De Pere Lockkeeper's House

Fall Building Inspection Checklist & Repair Log			Inspection Date:	
Building Feature	**Material(s)**	**Condition Description**	**Maintenance Action Required**	**Work Done**
Roofs				
Asphalt Shingles	Owens Corning Supreme AR Three-Tab Asphalt Shingle in Weathered Wood			
EPDM Roofing	Johns Mansville Single Ply Roofing, Fully Adhered			
Gutters	Berger 5" Half Round Galvanized Metal			
Downspouts	Berger 4" Corrugated Round Galvanized Metal			
Chimney	Red Brick			
Chimney Cap	PAC-CLAD Kynar 500 in Granite			
Flashing	PAC-CLAD Kynar 500 in Bone White or Dark Bronze			
Penetrations & Attachments	Vent Stack			
Attic				
Openings				
Doors Shutters & Frames	Western Red Cedar, Select Knotty			
Windows Shutters & Frames	Western Red Cedar, Select Knotty			
Door & Window Hardware				
Weatherstripping				
Sills				
Joint Sealants	Sika Corp. Sikaflex -15LM in White			
Paint	Sherwin Williams A-100 Exterior Latex Satin or ProMar Exterior Solid Color Acrylic Latex Stain in SW7008 Alabaster			
Foundations & Perimeter Grades				
Stone	Cream Lannon Stone			
Masonry	Red Brick			
Mortar	U. S. Heritage Group #10053-2			
Grade	Top Soil & Rip Rap			
Vegetation	Turf			
Basement/Crawlspace				



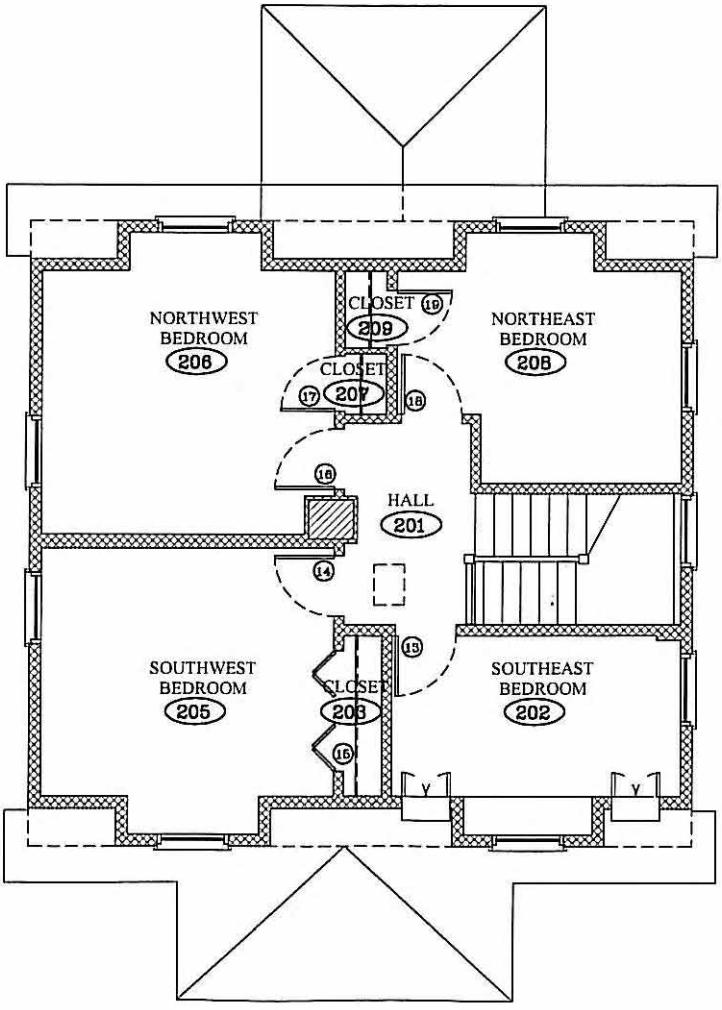
DE PERE LOCKKEEPER'S HOUSE
BASEMENT FLOOR PLAN

0 4 8



DE PERE LOCKKEEPER'S HOUSE
FIRST FLOOR PLAN

0 4 8



DE PERE LOCKKEEPER'S HOUSE
SECOND FLOOR PLAN

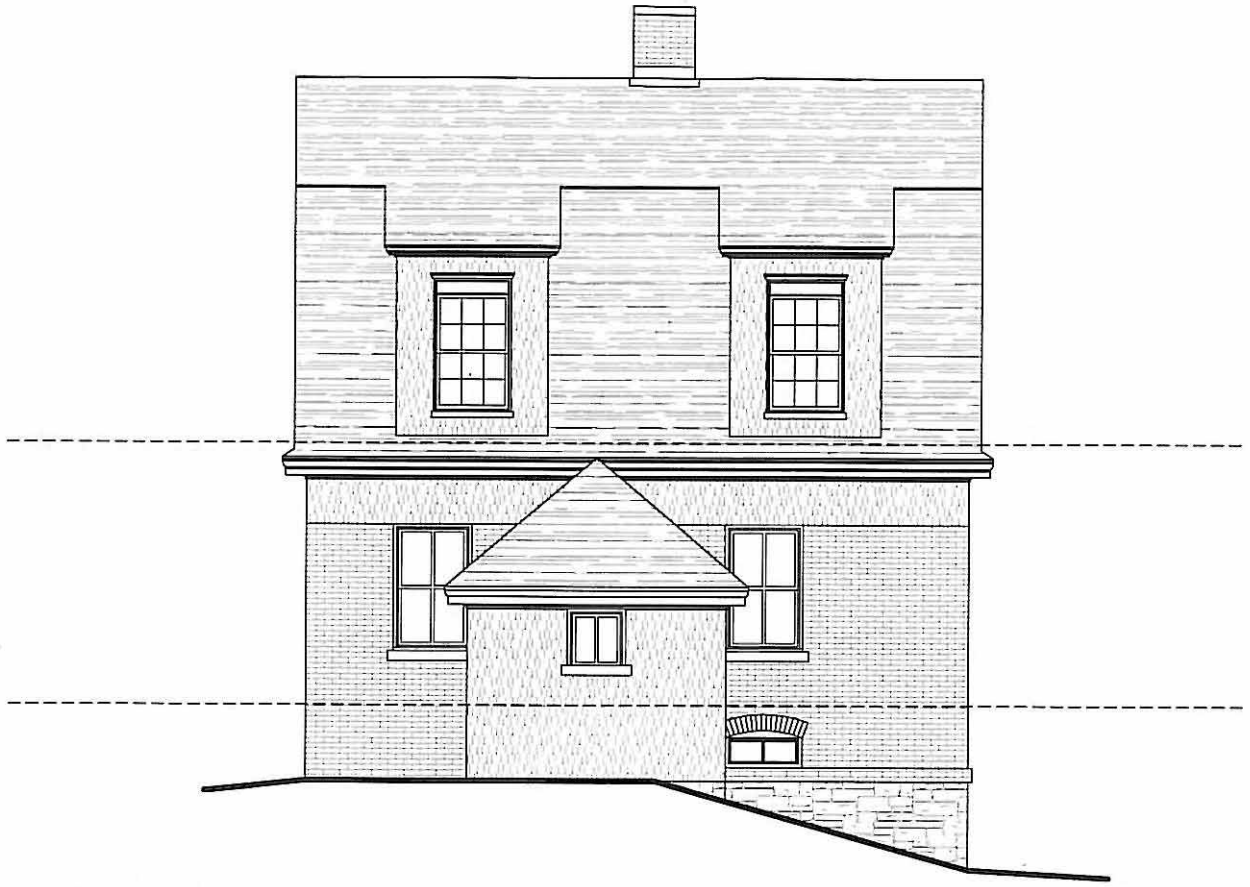
0 4 8

DE PERE LOCKKEEPER'S HOUSE
SOUTH ELEVATION

0 4 8

DE PERE LOCKKEEPER'S HOUSE
EAST ELEVATION

0 4 8



DE PERE LOCKKEEPER'S HOUSE
NORTH ELEVATION

0 4 8

DE PERE LOCKKEEPER'S HOUSE
WEST ELEVATION

0 4 8

Appendix

Baseline Exterior Photographs

Appendix

List of Contacts

List of Contacts

Owner
Harlan Kiesow, CEO
Fox River Navigational System Authority
1008 Augustine Street
Kaukauna, Wisconsin 54130
(920) 759-9833
lock269735@sbcglobal.net

Architecture/ Historic Preservation
Jennifer L. Lehrke, AIA, LEED AP
Senior Architect & Historic Preservation Consultant
LJM Architects, Inc.
813 Riverfront Drive
Sheboygan, Wisconsin 53081
(920) 458-4800
jlehrke@ljmarchitects.com

Structural
Lynn Barber, P.E.
Barber Engineering, LLC
135A North Main Street
Oconomowoc, Wisconsin 53066
(262) 567-5380
lynn@barberengineering.com

Plumbing
Edward Oleyniczak, P.E.
Riverside Engineering & Design, Inc.
1740 Riverside Drive
Suamico, Wisconsin 54173
(920) 434-9031
riverside@newbc.rr.com

Heating, Ventilating & Air Conditioning
Dale Pearson, P.E.
Facility Engineering Consultants, LLC
2301 Riverside Drive, Suite 7
Green Bay, Wisconsin 54301
(920) 445-0430
dpearson@facility-engineering.com

Electrical
Bruce Cottrell, President
Cottrell Design, Inc.
1500 Temple More Lane
Green Bay, Wisconsin 54313
(920) 490-9415
cottrelldesign@new.rr.com

General Construction
Steve Janke, President
Janke General Contractors, Inc.
1223 River View Lane
Athens, Wisconsin 54411
(715) 257-7901
Steve.janke@jankegeneralcontractors.com

Mortar
Tom Glab, Laboratory Manager
U. S. Heritage Group, Inc.
3516 North Kostner Avenue
Chicago, Illinois 60641
(773) 286-2100
info@usheritage.com

Roofing
Evan Byers
Security-Luebke Roofing
2550 Progress Way
Kaukauna, Wisconsin 54130
(920) 858-0893
ebyers@ribblegroup.com

Painting
Jim Cops
Cops Construction, Inc.
N1810 Van Cops Drive
Kaukauna, Wisconsin 54130
(920) 766-9970
jimc@copsbuilds.com

Appendix

Materials, Finishes & Colors

e i ini e

n

Masonry Cleaning	Diedrich Technologies, Inc., 606 Multi-Layer Paint Remover
Mortar	U. S. Heritage Group, Project Number USHG #10053-2

d i p i e

Exterior Finish Carpentry & Architectural Woodwork	Western Red Cedar, Select Knotty

e i e e i n

Asphalt Shingles	Owens Corning Supreme AR Shingles, Three-Tab, in Weathered Wood
Wood Shingles & Shakes	Certigrade 1 Red Cedar Shingles
EPDM Roofing	Johns Mansville Single Ply Roofing, Fully Adhered over JM Fesco Roof Board, ½" Retro-fit Board
Sheet Metal Flashing & Trim	
Gutters	Berger 5" Half Round Gutter, Galvanized
Downspouts	Berger 4" Corrugated Round Downspout, Galvanized
Chimney Cap	PAC-CLAD Kynar 500 in Granite
Flashing	PAC-CLAD Kynar 500 in Bone White & Dark Bronze
Joint Sealants	Sika Corporation, Sikaflex – 15 LM in White

ini e

Exterior Painting	
Primer	Sherwin Williams, Exterior Oil-Based Wood Primer in White
Paint	Sherwin Williams, A-100 Exterior Latex Satin in SW7008 Alabaster
Stain	Sherwin Williams, ProMar Exterior Solid Color Acrylic Latex Stain in SW6440 Courtyard

Appendix

De Pere Lock & Dam Historic District
National Register of Historic Places
Registration Form

NPS Form 10-900
(Rev. 8/86)
Wisconsin Word Processor Format (1331D)
(Approved 3/87)

OMB No. 1024-0018

United States Department of the Interior
National Park Service

NATIONAL REGISTER OF HISTORIC PLACES
REGISTRATION FORM

This form is for use in nominating or requesting determinations of eligibility for individual properties or districts. See instructions in Guidelines for Completing National Register Forms (National Register Bulletin 16). Complete each item by marking "x" in the appropriate box or by entering the requested information. If an item does not apply to the property being documented, enter "N/A" for "not applicable." For functions, styles, materials, and areas of significance, enter only the categories and subcategories listed in the instructions. For additional space use continuation sheets (Form 10-900a). Type all entries. Use letter quality printer in 12 pitch, using an 85 space line and a 10 space left margin. Use only archival paper (20 pound, acid free paper with a 2% alkaline reserve).

1. Name of Property

historic name De Pere Lock & Dam Historic District

other names/site number N/A

2. Location

street & number Fox River at James Street N/A not for publication

city, town De Pere N/A vicinity

state Wisconsin code WI county Brown code 009 zip code 54115

3. Classification

Ownership of Property	Category of Property	No. of Resources within Property	
		contributing	noncontributing
___ private	___ building(s)		
___ public-local	X district	2	2 buildings
___ public-State	___ site	___	___ sites
X public-Federal	___ structure	3	___ structures
	___ object	___	___ objects
		5	2 Total

Name of related multiple property listing:

Waterway Resources of the Lower Fox River

No. of contributing resources previously listed in the National Register N/A

4. State/Federal Agency Certification

As the designated authority under the National Historic Preservation Act of 1966, as amended, I hereby certify that this ___nomination ___request for determination of eligibility meets the documentation standards for registering properties in the National Register of Historic Places and meets the procedural and professional requirements set forth in 36 CFR Part 60. In my opinion, the property ___meets ___does not meet the National Register criteria. ___See continuation sheet.

Signature of certifying official — Date

State or Federal agency and bureau

In my opinion, the property _X_ meets ___does not meet the National Register criteria. ___See continuation sheet.

Signature of commenting or other official — Date

State Historic Preservation Officer-WI

State or Federal agency and bureau

5. National Park Service Certification

I, hereby, certify that this property is:

___ entered in the National Register
___ See continuation sheet

___ determined eligible for the National Register. ___ See continuation sheet

___ determined not eligible for the National Register.

___ removed from the National Register.

___ other, (explain:) _____

Signature of the Keeper — Date

6. Functions or Use

Historic Functions (enter categories from instructions)	Current Functions (enter categories from instructions)
Transportation/water related	Transportation/water related
Domestic/single dwelling	Domestic/single dwelling (vacant)

7. Description

Architectural Classification (enter categories from instructions)	Materials (enter categories from instructions)
	foundation Concrete
Other: Lock	walls Concrete
Other: Concrete Dam	Brick
Colonial Revival	roof Asphalt
	other Wooden shingles
	Steel

Describe present and historic physical appearance.

The De Pere Lock Historic District is located on the northeast shore of the Fox River, at that point in De Pere where the Main Avenue bridge crosses the river. Although the area immediately north of the lock once contained several industrial buildings, it is generally clear now -- a small water power mill being the District's lone neighbor to the north. Across the river is the large industrial complex of the Nicolet Paper Company. The District contains three structures, the lock, dam and canal segment, all of which are contributing. It also contains four buildings, the lockkeeper's house, lockshack, storage shed and garage, the first two of which are contributing elements.

De Pere Lock (Contributing):

The present lock, which is oriented on an NW/SE axis was completed in 1936. It replaced one of composite construction. The 146 by 36 foot lock chamber and wing walls are comprised of concrete, the sides of which contain a pipe railing. Each of the lock's four miter gates is constructed of steel. Adjacent to each gate is a concrete platform that contains a tripod. A vertical shaft extends the height of the tripod. A handle is fixed to the top of the shaft, while the bottom of the shaft contains a gear that drives a horizontally placed spar, the end of which is attached to a lock gate. (It is a horizontal rack and pinion system.) Depending on which way the handle is turned, the spar is either taken in, thus opening the lock gate, or it is pushed out, in which case the gate closes. The chamber is flooded by six butterfly valves that are set in the floor of the lock, immediately upstream from the structure. As the valves are opened, water passes down into a culvert with a 90 degree turn, which then directs it under the upstream sill and straight into the chamber. Each valve is adjusted by a geared mechanism that sits on the lock's coping. A metal shaft connects the valve to the adjusting mechanism, three of which are placed adjacent to each of the upstream corners of the lock. The chamber is discharged through six small butterfly valves found at the bottom of the two downstream gates. There are three valves per gate. These valves are operated by the levers atop each gate. The gates contain a cat-walk that facilitates moving from one side of the lock to the other. The lock provides 8.9 feet of lift as it moves crafts from the 586.66 feet above sea level upper pool to the 577.3 foot above sea level lower pool. It can be filled in two minutes and forty-five seconds, while it can be discharged in two minutes and eight.

Details about the lock's construction, as well as about subsequent changes and major maintenance activities prior to 1953, are as follows:

1934 Lock reconstruction scheduled in three phases. First to be from December

X See continuation sheet

1934 to March 1935, and second from December 1935 to March 1936. Budgeted at $80,000.00 and $85,000.00 respectively.[1]

1935 Work began: "The upper half of the old composite lock was removed and rebuilt last winger in concrete, including the upper wing walls, valve platform, miter sill, installation of gates, etc., at a cost of $116,659.99."[2]

1936 Lock construction completed at additional cost of $114,193.17.[3]

1945 All below water steel painted.[4]

Dam (Contributing):

This dam is a concrete structure with an overall length of 981.6 feet. Completed in 1930, it is located at the south end of the short canal segment associated with the site. The dam creates the pool that floods the canal in which the De Pere lock is located. It is generally oriented on an SSW/NNE axis.

Anchored to the river's rock bottom, the dam consists of three sections. The eastern section, which is 296.5 feet, and the western section, which is 334.6 feet, are concrete spillways. The spillways are twenty-one feet wide, and fix the maximum level

[1] Annual Report of the Chief of Engineers, 1932: Extract - Report upon the Improvement of Rivers and Harbors in the Milwaukee, Wis., District (Washington, D.C.: Government Printing Office, 1932), 1042.

[2] Annual Report of the Chief of Engineers, 1935: Extract - Report upon the Improvement of Rivers and Harbors in the Milwaukee, Wis., District (Washington, D.C.: Government Printing Office, 1936), 1184.

[3] Annual Report of the Chief of Engineers, 1936: Extract - Report Upon the Improvement of Rivers and Harbors in the Milwaukee, Wis., District (Washington, D.C.: Government Printing Office, 1937), 1189.

[4] Annual Report of the Chief of Engineers, 1945: Extract - Report upon the Improvement of Rivers and Harbors in the Milwaukee, Wis., District (Washington, D.C.: Government Printing Office, 1946).

X See continuation sheet

of the pool the dam creates at 586.66 feet above sea level (it maintains about a nine foot head). The middle portion of the dam is 355 feet, and contains fourteen concrete sluiceways, each of which contains a thirteen by twenty foot, steel Tainter gate. The gates are operated by a "crab," a small electrically operated mechanism that moves from gate to gate on a track. The "crab" contains a wench, to which the chain on each end of the gate is attached. As the wench is activated, the chain is taken in or let out, and the height of the gate is adjusted accordingly. A steel catwalk, which facilitates inspections and maintenance, extends the length of the dam.

Placed atop the dam is a single story front gabled shed that was erected to shelter the electric "crab." Spanning the abutments adjacent to the eastern most Tainter gate, the lift house is reached by a metal catwalk that then passes it and continues the entire length of the dam. It is clad with drop siding, roofed with asphalt singles, and has walls bounded with pilaster strips. The single window in each side wall and the panelled door at the right of the lockside endwall have simple surrounds. A pair of heavy wooden doors in the opposite endwall swing out to allow passage of the "crab" to whatever gate must be adjusted. This small building has a remarkably heavy frame. The side wall sills are the bottom chord of a triangular, internal truss, above and below which the studs are pieced.

Details about the need for the new dam, as well as its construction, are as follows:

1927 Dam deteriorated and needed to be rebuilt in concrete as soon as possible, according to Corps.[5]

1929 Sluiceway portion of dam rebuilt at a cost of $77,027.61. Spillway construction still in progress, with incurred costs of $10,583.84 to that time.[6]

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[5] Annual Report of the Chief of Engineers, 1927: Extract - Report Upon the Improvement of Rivers and Harbors in the Milwaukee, Wis., District (Washington, D.C.: Government Printing Office, 1927), 1301.

[6] Annual Report of the Chief of Engineers, 1929: Extract - Report upon the Improvement of Rivers and Harbors in the Milwaukee, Wis., District (Washington, D.C.: Government Printing Office, 1929), 1364.

X See continuation sheet

1930 Dam construction completed at total cost of $100,484.29.[7]

Canal (Contributing): circa 1850s

Approximately 1,500 feet of the Lower Fox navigation canal are located within this district. Approaching the lock from the south, the canal makes a forty-five degree turn to the northwest. It is in that latter portion of the canal in which the lock is located. The canal's depth does not exceed six feet and its width is generally 100 feet across the top, although there is a 300 foot wide basin in the canal, south of the lock. Embankments are built of flat stones laid several courses high and concrete coping. This particular feature is deteriorating, indeed it is gone in several places around the canal.

Lockshack (Contributing):

This is a 1.5 story front gabled building that is used as the locktender's station. Clad with drop siding and roofed with asphalt shingles, it has walls bounded by pilaster strips, and plain window and door surrounds. The building rests on a more recent cement foundation built into the landward lock embankment. This foundation, entered by a (downstream) side door, serves as a storage basement. The front, left-side entry and right, front window are shielded by a full-width, shed-roofed canopy supported by triangular brackets with kingposts. There ate two windows in each side wall, and one window centered in the rear wall. the main floor has two rooms; a front, plainly panelled office, and a rear storeroom and stair hall. An enclosed staircase leads to a short attic lighted by multipaned horizontal windows in front and rear gables.

This building is thought to have been the lockkeeper's house in the late nineteenth and early twentieth century. Its date of construction, therefore, is presumed to be

[7] Annual Report of the Chief of Engineers, 1930: Extract - Report Upon the Improvement of Rivers and Harbors in the Milwaukee, Wis., District (Washington, D.C.: Government Printing Office, 1930), 1451.

X See continuation sheet

1879, the year in which a new lockkeeper's house was built.[8]

Lockkeeper's House (Contributing):

This structure is a two story colonial Revival house of the type most common to keepers' houses on the system. A gambrel-roofed rectangle, it has rectangular frame porches projecting at the front (downstream) and rear. Built into the riverside lock embankment, it has an exposed, windowless foundation. The brick first story has windows with stone sills. The upper-story gable is clad with wooden shingles and has two windows (all windows are covered with plywood) surmounted by a louvered attic vent. The roof has a molded cornice with endwall returns. The upper roof slope extends front and rear as pairs of shed-roofed dormers with molded cornices with sidewall returns. A brick chimney projects at the middle of the roof. Windows and doors throughout are covered with wooden panels.

The house was built in 1912, at a cost of $3,052.00.[9]

Storage Shed (Non-contributing):

This is a small modern, metal structure with a gently sloping, single plane roof.

Garage (Non-contributing):

This modern frame structure has a hipped roof.

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[8] Annual Report Upon the Improvement of the Harbors of Milwaukee, Racine, and Kenosha, Lake Michigan, and Improvement of the Fox and Wisconsin Rivers, in charge of D.C. Houston, Major of Engineers, Bvt. Colonel, U.S.A.; Being Appendix AA of the Annual Report of the Chief of Engineers for 1879 (Washington, D.C.; Government Printing Office, 1879), 1544.

[9] Annual Report of the Chief of Engineers, 1912: Appendix JJ - Report Upon the Improvement of Rivers and Harbors in the Milwaukee, Wis., District (Washington, D.C.: Government Printing Office, 1912), 2531; Annual Report of the chief of engineers, 1913: Appendix JJ -Report Upon the Improvement of Rivers & Harbors in the Milwaukee, Wis., District (Washington, D.C.: Government Printing Office, 1913), 2798.

___ See continuation sheet

8. Statement of Significance

Certifying official has considered the significance of this property in relation to other properties: ___nationally X statewide ___locally

Applicable National Register Criteria X A ___B X C ___D

Criteria Considerations (Exceptions) ___A ___B ___C ___D ___E ___F ___G

Areas of Significance (enter categories from instructions)
Transportation

Period of Significance
1930-1941

Significant Dates
1936[1]
1930[2]

Cultural Affiliation
N/A

Significant Person
N/A

Architect/Builder
N/A

State significance of property, and justify criteria, criteria considerations, and areas and periods of significance noted above.

Statement of Significance:

The De Pere Lock and Dam are significant components in the Lower Fox River Waterway System, a system which, as discussed in Cultural Resource Management in Wisconsin, was initially envisioned as part of the larger Fox-Wisconsin Waterway.[3] Originally constructed by private interests between 1850 and about 1860, and rebuilt by the US Army Corps of Engineers between 1872 and 1941, the Lower Fox River system operated between Lake Winnebago and Green Bay. It is historically significant as a complete and operable mid-nineteenth century example of a river/canal, slack water transportation system, the technology of which was so well suited that it works effectively today. It is the only such system extant in Wisconsin. The system is also significant for its role in the evolution of Wisconsin's nineteenth century political and constitutional history. Further, it is an interesting chapter in the transportation history of the state.

[1]Annual Report of the Chief of Engineers, 1936: Extract - Report Upon the Improvement of Rivers and Harbors in the Milwaukee, Wis., District (Washington, D.C.: Government Printing Office, 1937), 1189.

[2]Annual Report of the Chief of Engineers, 1930: Extract - Report Upon the Improvement of Rivers and Harbors in the Milwaukee, Wis., District (Washington, D.C.: Government Printing Office, 1930), 1451.

[3]Barbara Wyatt, ed., Cultural Resource Management in Wisconsin (Madison: State Historical Society, Historic Preservation Division, 1986), Transportation 2/2.

X See continuation sheet

History:

The De Pere Dam was responsible for creating the pool that flooded the canal in which the De Pere Lock was located. It is that combination of lock and dam that enabled water craft to navigate the rapids at that point as they began the trip upriver or completed their trip downriver.

___ See continuation sheet

Verbal Boundary Description: *see note Section 10, page 2

Those parts of the private claims in Brown County, Wisconsin, described as beginning at a stone monument at the intersection of the North line of James Street with the West line of River Street in the City of DePere according to the plat of DePere recorded November 2, 1835, in deed book D, page 199 and redrawn and re-recorded April 2, 1870 in said Brown County, from which stone the Northeast corner of the Northeast Quarter of Section 29, Township 23 North, Range 20 East of the Fourth Principal Meridian (Recorded as Corner R-9 in Brown County Surveyors' Office) bears South 74 degrees 45 minutes 42 seconds West, 7084.33 feet; thence North 00 degrees 57 minutes 49 seconds East 76.30 feet, along the West line of said River Street to a stone monument; thence continuing North 00 degrees 57 minutes 49 seconds East, 2 feet, more or less, to the Southwesterly shore line of the tail race; thence Northwesterly, along the said Southwesterly shore line, a total distance of 265 feet, more or less, to the intersection of the Northeasterly shore line of the United States Canal; thence Northwesterly, across said canal, a total distance of 495 feet, more or less, to the intersection of the Northeasterly shore line of the Fox River; thence Southeasterly, a total distance of 600 feet, more or less, upstream along said Northeasterly shore to a rebar with an allied cap stamped "USAED DETROIT BOUNDARY MARK" which bears North 78 degrees 44 minutes 51 seconds West 242.08 feet from the Point of Beginning; thence South 49 degrees 57 minutes 57 seconds East 182.32 feet, to a rebar with an allied cap stamped as before; thence South 14 degrees 22 minutes 27 seconds East 80.20 feet to a rebar with an allied cap stamped as before; thence continuing South 14 degrees 22 minutes 27 seconds East, 39.52 feet, to a rebar with an allied cap stamped as before; thence South 39 degrees 44 minutes 27 seconds East 282.18 feet to a rebar with an allied cap stamped as before; thence South 23 degrees 16 minutes 40 seconds East, 75.05 feet (measured - South 23 degrees 46 minutes 30 seconds East, 75 feet recorded), to a one inch square bolt set in concrete; thence Southeasterly, 11.4 feet, more or less, to the intersection of a limestone abutment with the limestone wingwall; thence South 23 degrees 05 minutes East, 35.3 feet along said limestone abutment to the Westerly face of concrete wingwall of the United States Dam; thence South 53 degrees 51 minutes East 15.3 feet along said wingwall; thence South 20 degrees 24 minutes 41 seconds East, 41.5 feet along the Westerly face of the concrete abutment of the United States Dam; thence along the riverside face of the concrete abutment, being a curve concave Northerly, a distance of 20 feet, more or less, to the intersection with the Westerly line of the United States Canal; thence Northerly and Northwesterly a total distance of 488 feet, more or less, along the Westerly shore line of the United States

X See continuation sheet

Canal to the intersection of the Westerly line of said River Street extended Southerly; thence North 00 degrees 57 minutes 49 seconds East, 156.75 feet more or less, along said Westerly line extended, and across the canal basin to the stone at the Point of Beginning, in the City of DePere, Brown County, Wisconsin, and containing 2.83 acres, more or less. All bearings are true.

*The property boundary descriptions given have not been audited or verified. They are not, at any time, to be used for any legal boundary descriptions. They are used here only for the purpose of describing the approximate property location.

___ See continuation sheet

9. Major Bibliographical References

United States Army Corps of Engineers. Annual Reports. Washington, D.C.: Government Printing Office, 1872-1951.

Previous documentation of file (NPS):
___preliminary determination of individual listing (36 CFR 67) has been requested
___previously listed in the National Register
___previously determined eligible by the National Register
___designated a National Historic Landmark
___recorded by Historic American Buildings Survey #_____
___recorded by Historic American Engineering Record #_____

___ See continuation sheet

Primary location of additional data:
_X_State Historic Preservation Office
___Other State agency
___Federal agency
___Local government
___University
___Other
Specify repository:

10. Geographical Data

Acreage of Property 2.8

UTM References:

	Zone	Easting	Northing
A	1/6	4/1/5/4/1/0	4/9/2/2/1/2/0
B	/	/ / / / /	/ / / / / /
C	/	/ / / / /	/ / / / / /
D	/	/ / / / /	/ / / / / /

___ See Continuation Sheet

Verbal Boundary Description

See continuation sheet

_X_ See Continuation Sheet

Boundary Justification

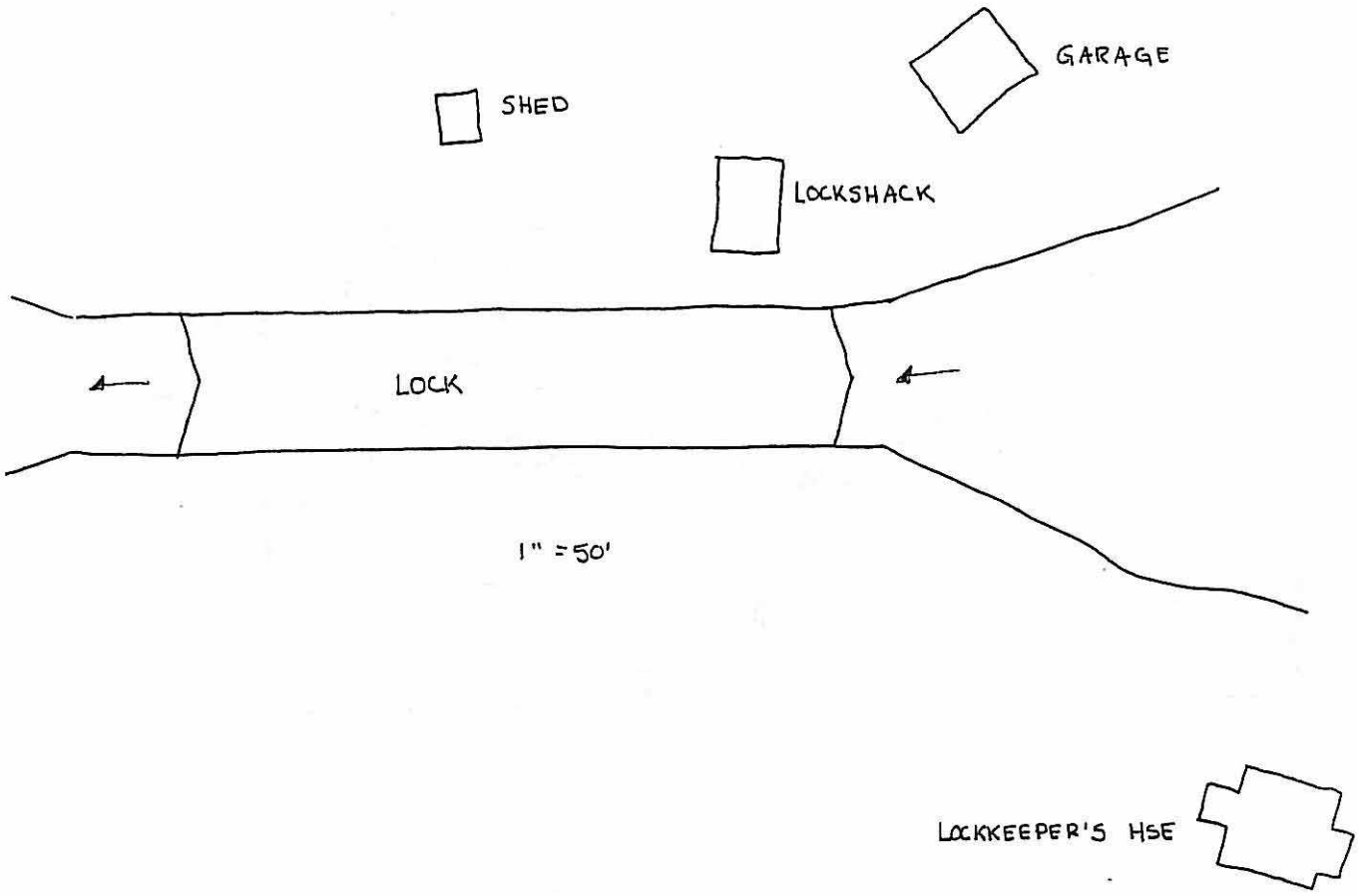
This boundary encompasses an appropriate setting, and includes that area immediately adjacent to, and historically associated with the subject property.

___ See Continuation Sheet

11. Form Prepared By

name/title John N. Vogel
organization J.N. Vogel, Ph.D. Consulting Hist. date 01 October 1991
street & number 301 North 73rd Street telephone (414) 258-6598
city or town Milwaukee state Wisconsin zip code 53213

SKETCH MAP

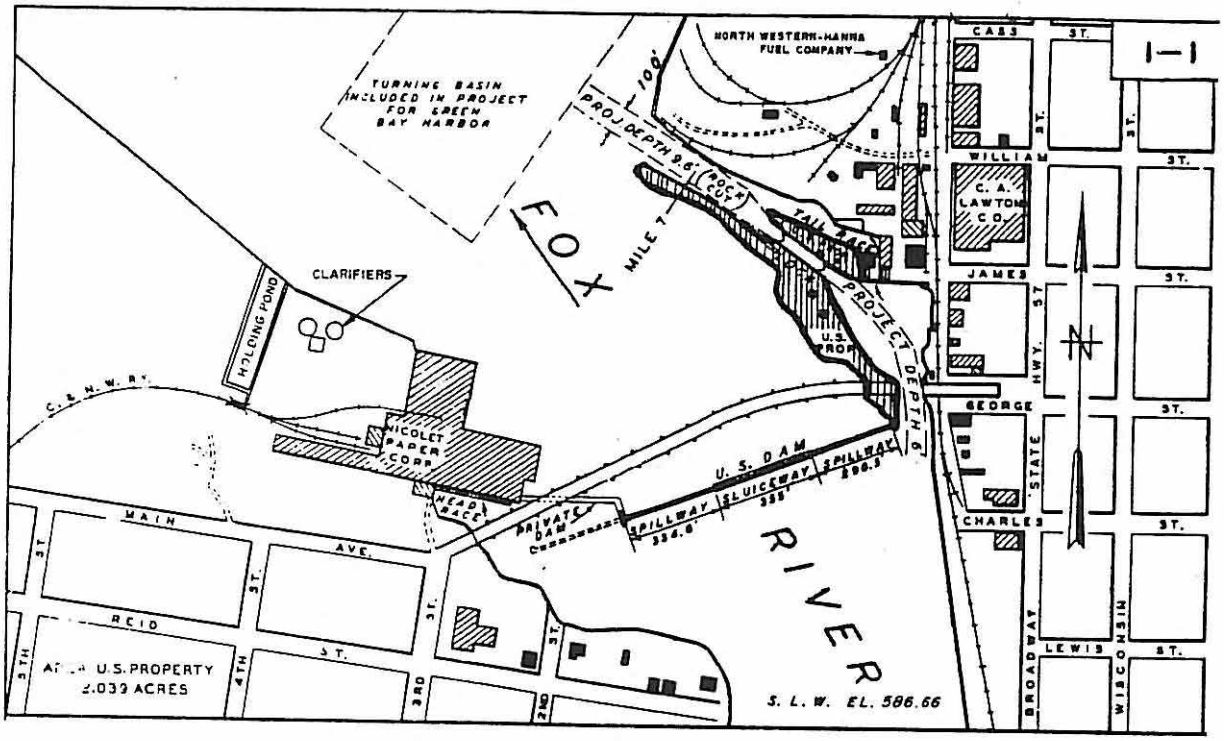


LOCK

DE PERE LOCK AND DAM HISTORIC DISTRICT

Waterway Resources of the Lower Fox River

Brown Co.



DE PERE LOCK AND DAM
FOX RIVER
WISCONSIN

IN 1 SHEET

SHEET NO. 1

SCALE OF FEET

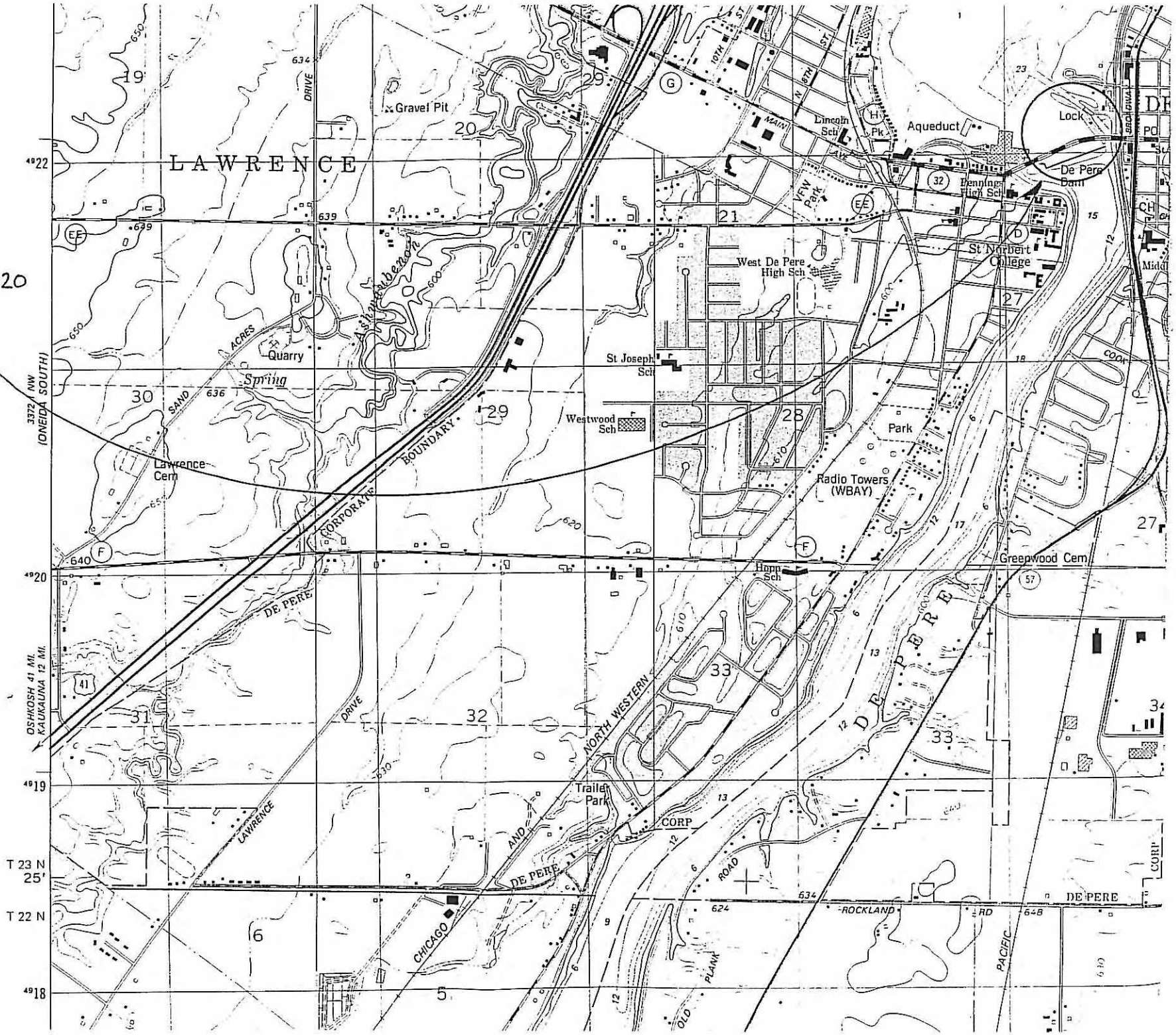
100 0 500 1000 1200

CORPS OF ENGINEERS CHICAGO, ILLINOIS

30 JUNE 1972

De Pere Lock

16/415410/4922120



NPS Form 10-900a
(Rev. 8-86)
Wisconsin Word Processor Format
Approved 2/87

United States Department of the Interior
National Park Service

NATIONAL REGISTER OF HISTORIC PLACES
CONTINUATION SHEET

Section number Photographs Page 1

DE PERE LOCK AND DAM HISTORIC DISTRICT (Dam)
Fox River at James Street
De Pere, Brown County
Photo by Bill O'Brien
October 1988
View to Southwest
Photo #1 of 5

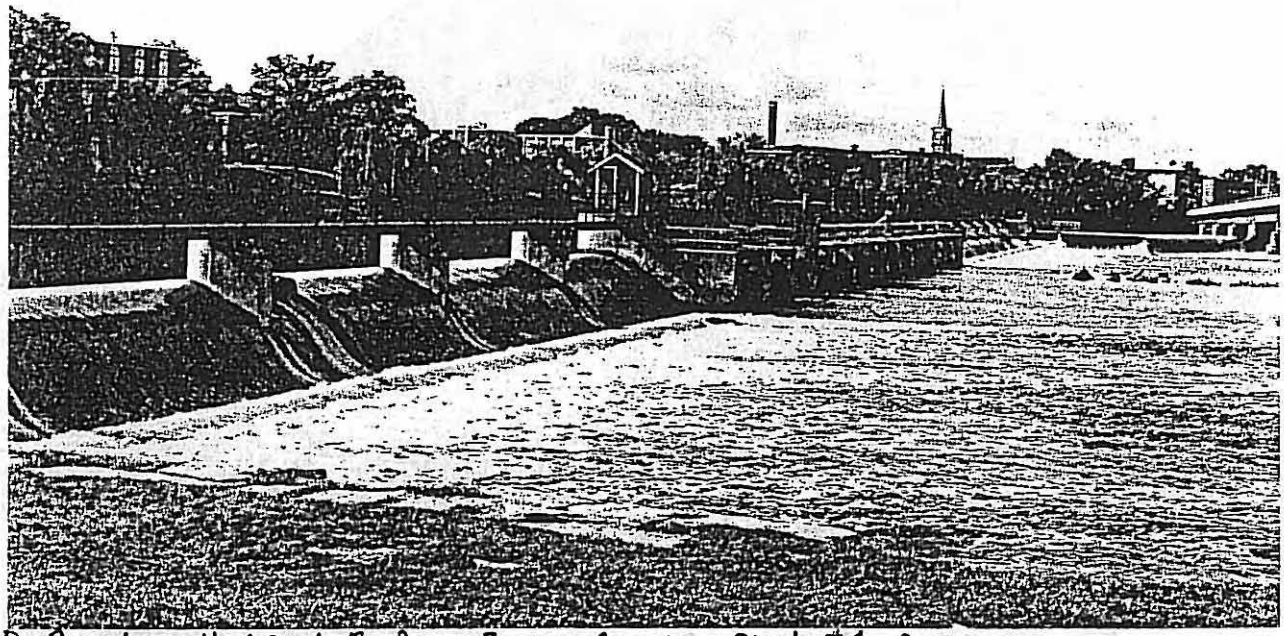
DE PERE LOCK AND DAM HISTORIC DISTRICT (Dam lift-house)
Fox River at James Street
De Pere, Brown County
Photo by Bill O'Brien
October 1988
View to West Southwest
Photo #2 of 5

DE PERE LOCK AND DAM HISTORIC DISTRICT (Lockkeeper's house)
Fox River at James Street
De Pere, Brown County
Photo by Bill O'Brien
October 1988
View to North Northeast
Photo #3 of 5

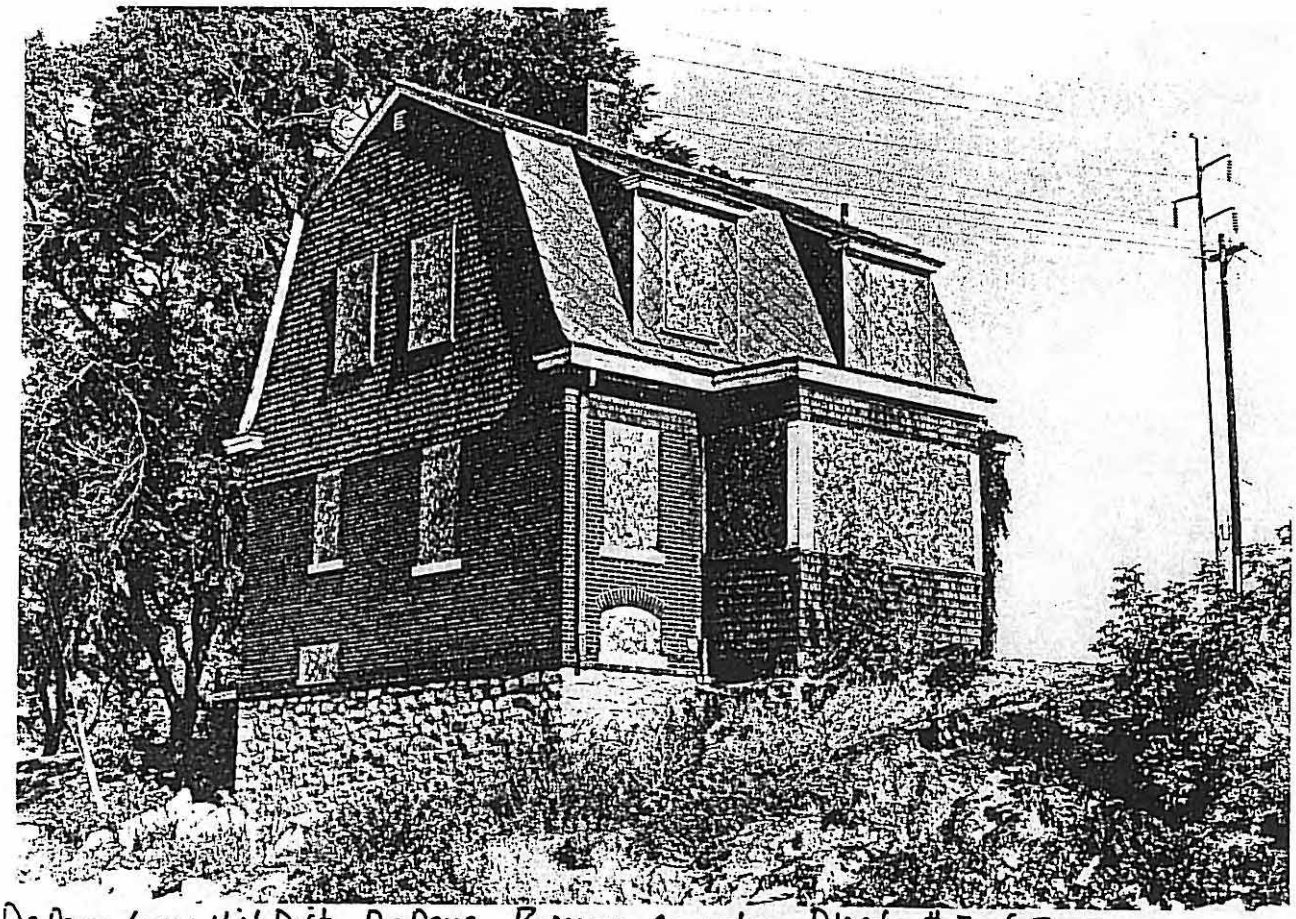
DE PERE LOCK AND DAM HISTORIC DISTRICT (Lockshack)
Fox River at James Street
De Pere, Brown County
Photo by Bill O'Brien
October 1988
View to Northeast
Photo #4 of 5

DE PERE LOCK AND DAM HISTORIC DISTRICT (Lock)
Fox River at James Street
De Pere, Brown County
Photo by Bill O'Brien
October 1988
View to West Northwest
Photo #5 of 5

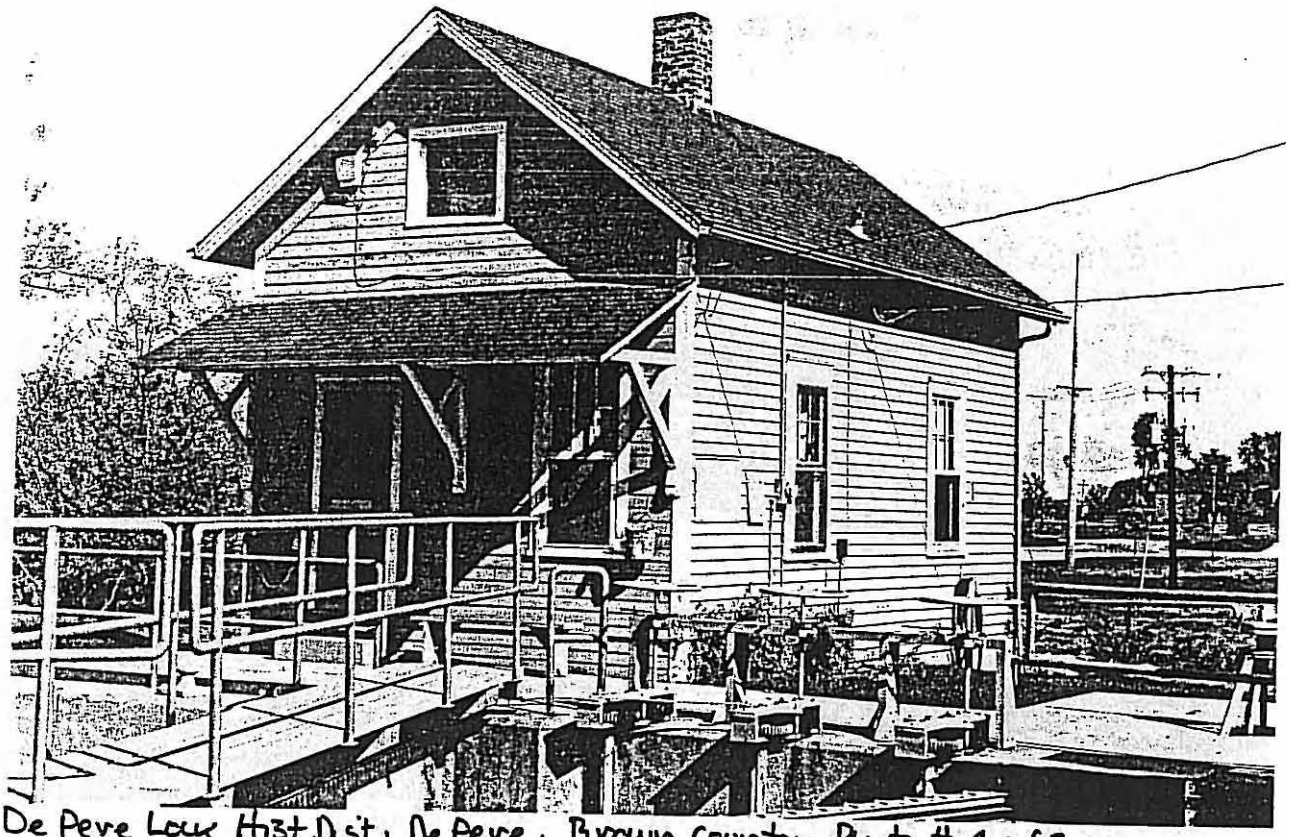
___ See continuation sheet



De Pere Lock Hist Dist, De Pere, Brown County, Photo #1 of 5



De Pere Lock Hist Dist, De Pere, Brown County, Photo #3 of 5



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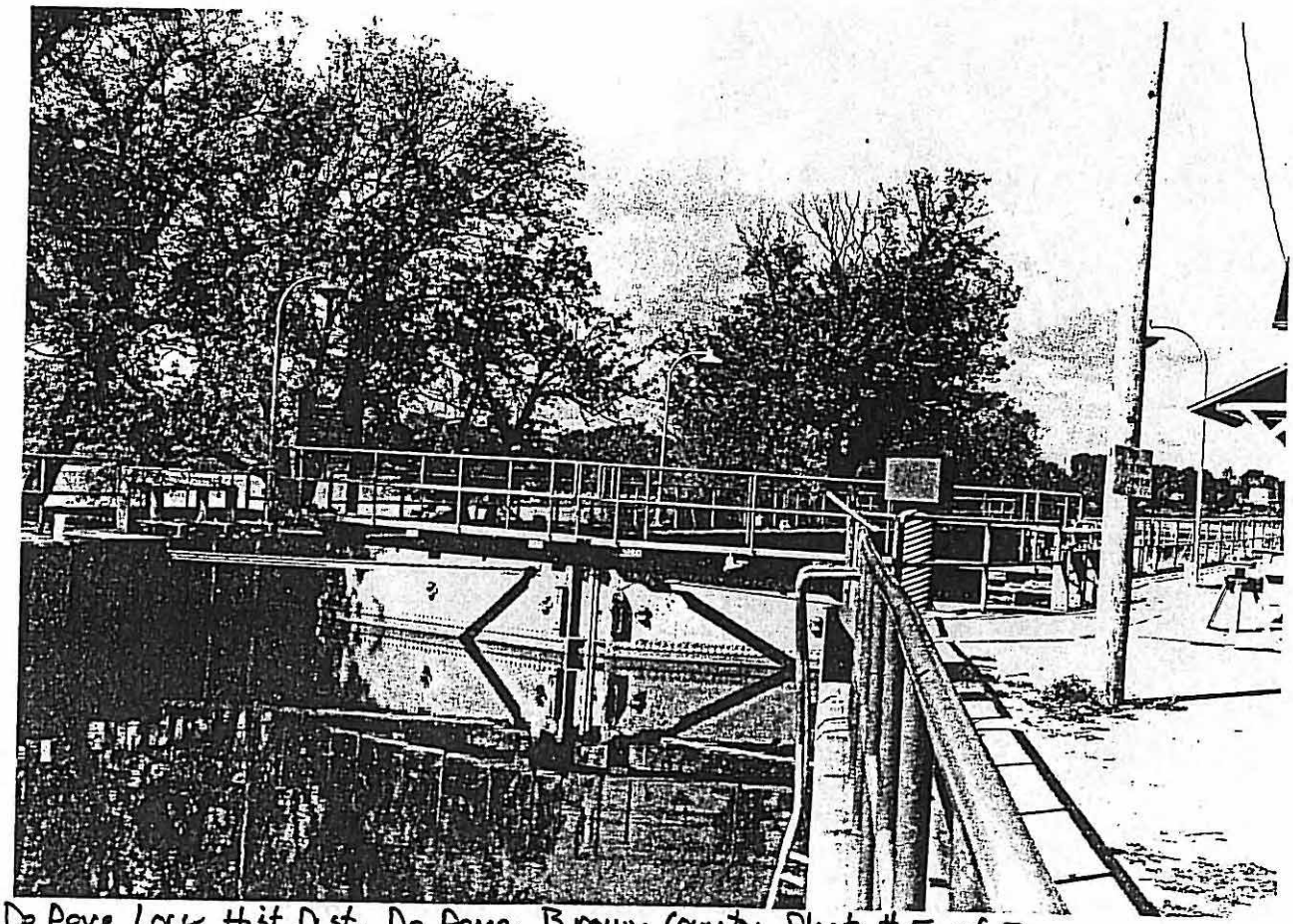


De Pere Lock Hist Dist, De Pere, Brown County, Photo # 5 of 5

Appendix

De Pere Lockkeeper's Residence
Historic American Engineering Record

HISTORIC AMERICAN ENGINEERING RECORD

HAER WIS 5-DEPER, 2A-

DE PERE LOCK AND DAM, LOCKKEEPER'S RESIDENCE

HAER NO. WI-86-A

Location:	The lockkeeper's house at the De Pere Lock and Dam Complex is located approximately 80 feet southwest of the upstream entrance to the lock, in French Lots PC 28 and 32, T23N,R20E, Civil Towns De Pere and Lawrence, Brown County, Wisconsin. UTM: 16/415390/4922200; USGS Quadrangle: De Pere, Wisconsin 7.5' series
Date of Construction:	1912
Engineer:	United States Army Corps of Engineers with Contractors
Architect:	United States Army Corps of Engineers with Contractors
Present Owner:	United States Army Corps of Engineers, Detroit District
Present Use:	Vacant.
Significance:	The Lockkeeper's house served as an on-site residence for the lockkeeper responsible for controlling the locks. In addition, the house served as a residence for the lockkeeper's family. The residence functioned as part of the daily operation of the De Pere Lock and Dam Complex.
Project Information:	This documentation was undertaken in 1995 in accordance with requirements detailed in a June 19, 1994 letter from Gregory D. Kendrick, Chief, History Branch, NPS to Dale Monteith, Acting Chief, Planning Division, USACOE, Detroit District. The Lower Fox system remains basically operational but was placed in caretaker status by the USACOE in 1982. The USACOE plans to divest itself of the Lower Fox system as soon as is feasible; therefore, NPS requested this documentation. All documentation conforms to HAER standards. Dr. John D. Richards, Principal Investigator; Georgia A. Lusk, Patricia B. Richards, and Robert J. Watson, Project Archivists with Great Lakes Archaeological Research Center, Inc.; Joseph Paskus, Project Photographer.

LOCKKEEPER'S RESIDENCE

The Lockkeeper's house at the De Pere lock facility was constructed in 1912. The house is situated approximately 80 feet northwest of the upstream entrance to the lock. The house is a 1-1/2 story, Colonial Revival style dwelling characteristic of residences built for the Fox River locks system. The home has a gambrel roof with flared eaves, four shed-roofed dormers, and a full poured concrete basement. The roof and dormers are clad with asbestos shingle.[1]

The first story is of brick construction from grade to a height of 10 feet 9 inches; above this the exterior is clad in cedar shingles over wood frame. The front entry is attached to the southside of the house. The front entry is protected by a flat asbestos shingled roof. Rear entry is provided by an enclosed entryway with a hipped asbestos shingled roof attached to the northside of the dwelling. A third entry is located at the center of the east side of the lockmaster's house. Horizontal dimensions of the dwelling are 26 feet north-south and 27 feet 8 inches east-west; maximum height from foundation to roof peak is about 28 feet.[2] Interior walls are constructed with 2 inch by 4 inch studs spaced 16 inches on center. The floor joists are 2 inches by 10 inches also spaced 16 inches on center.

The cellar walls and floor are constructed from poured concrete. Wall thickness is 16 inches; floor thickness is 6 inches. The furnace is located in the southwest quadrant of the cellar, and a brick chimney is situated in the cellars approximate center. A cistern with an interior brick filter wall occupies the northeast corner of the cellar.[3] The cistern is fed by two inset pipes; an outlet pipe leads from within the filter wall to a pump located next to the kitchen sink.

The first floor plan of the De Pere Lockkeeper's house consists of four rooms, a staircase hallway, and a staircase leading to the second floor. Floor to ceiling height is 10 feet 1/2 inches. Accessed by the rear entry at the north of the first floor is an 11 foot 10 inch by 12 foot kitchen. The kitchen is located in the northwest corner of the house, and is equipped with a pump and sink in its southwest corner. A pantry is built into the rear entry, and is accessed through a door immediately west of the rear entrance.[4]

All first floor windows are glazed with four panes of either 14 inch by 28 inch or 10 inch by 22 inch glass. Paired windows are situated on the west of the kitchen. To the east of the kitchen is located a 10 foot 10 inch by 13 foot 4 inch dining room. The kitchen and dining room are separated by a 2 foot 8 inch wide swinging door.[5] Paired windows are located on the north wall of the dining room, and a single window occupies the east wall.

A door leading to the staircase hallway and the side exit is located on the south wall of the dining room. At the bottom of the stairs leading to the second floor, an interior door leads to the living room.[6]

The living room, located in the southwest corner of the first floor, measures 11 feet 10 inches by 12 feet 5 inches. It has a single window on the west wall, and two windows on the south wall.[7] The front entryway is located off the living room, and exits to the front porch.

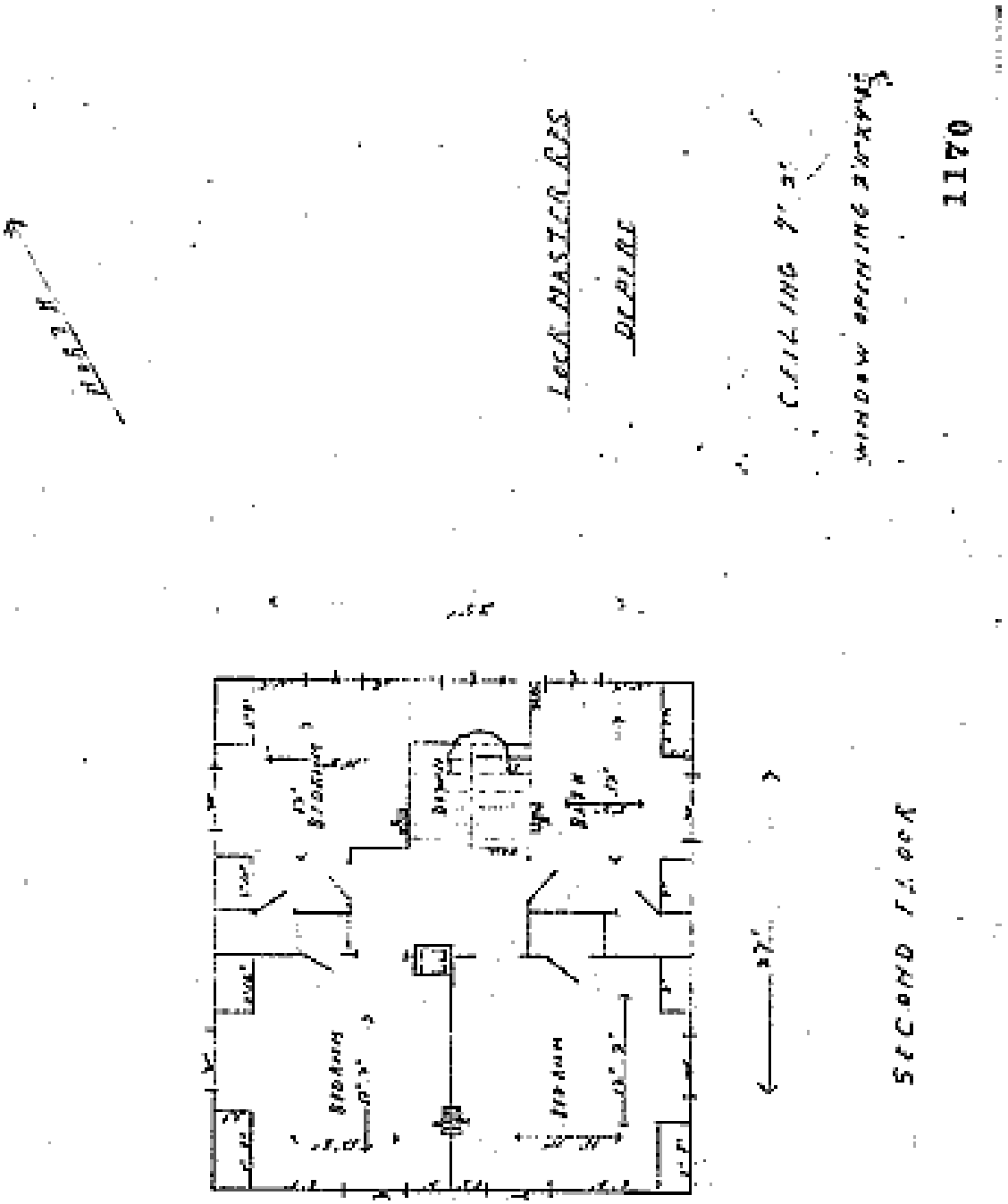
Located to the east of the living room is a small 7 foot 10 inch by 8 foot 5 inch office equipped with a closet immediately opposite the front door. Two windows are located within the office, one on the east wall, and one on the south wall.[8]

The second floor plan consists of three rooms with closets, a hall, and a bathroom with a linen closet. Floor to ceiling height of the second floor is 9 feet 1 3/8 inches. A rail and spindle staircase with a central landing leads to the second floor. The staircase enters into a centrally

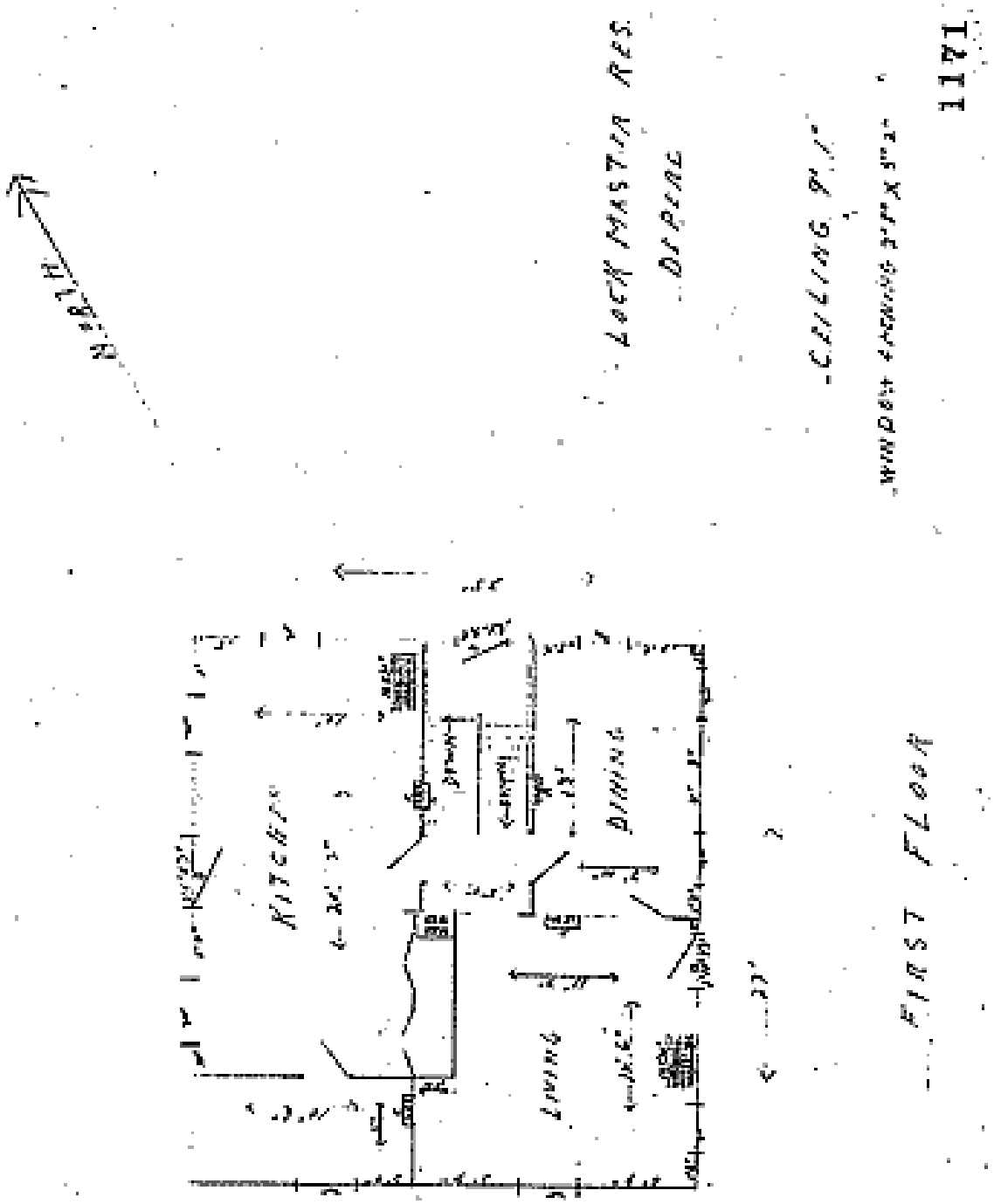
located hallway which accesses all of the second floor rooms through a series of interior doors. All upstairs windows are glazed with 12 panes of 10 inch by 12 inch glass. The northwest room is 10 feet 3 inches by 10 feet 9 inches with north and west facing windows. The northeast room is 8 feet 3 inches by 8 feet 3 inches with north and east facing windows. The third room, located in the southwest corner of the second floor is 10 feet 3 inches by 10 feet 9 inches with west and south facing windows. The bathroom is 6 feet 3 inches by 12 feet 4 inches and has east and south facing windows.[9]

ENDNOTES

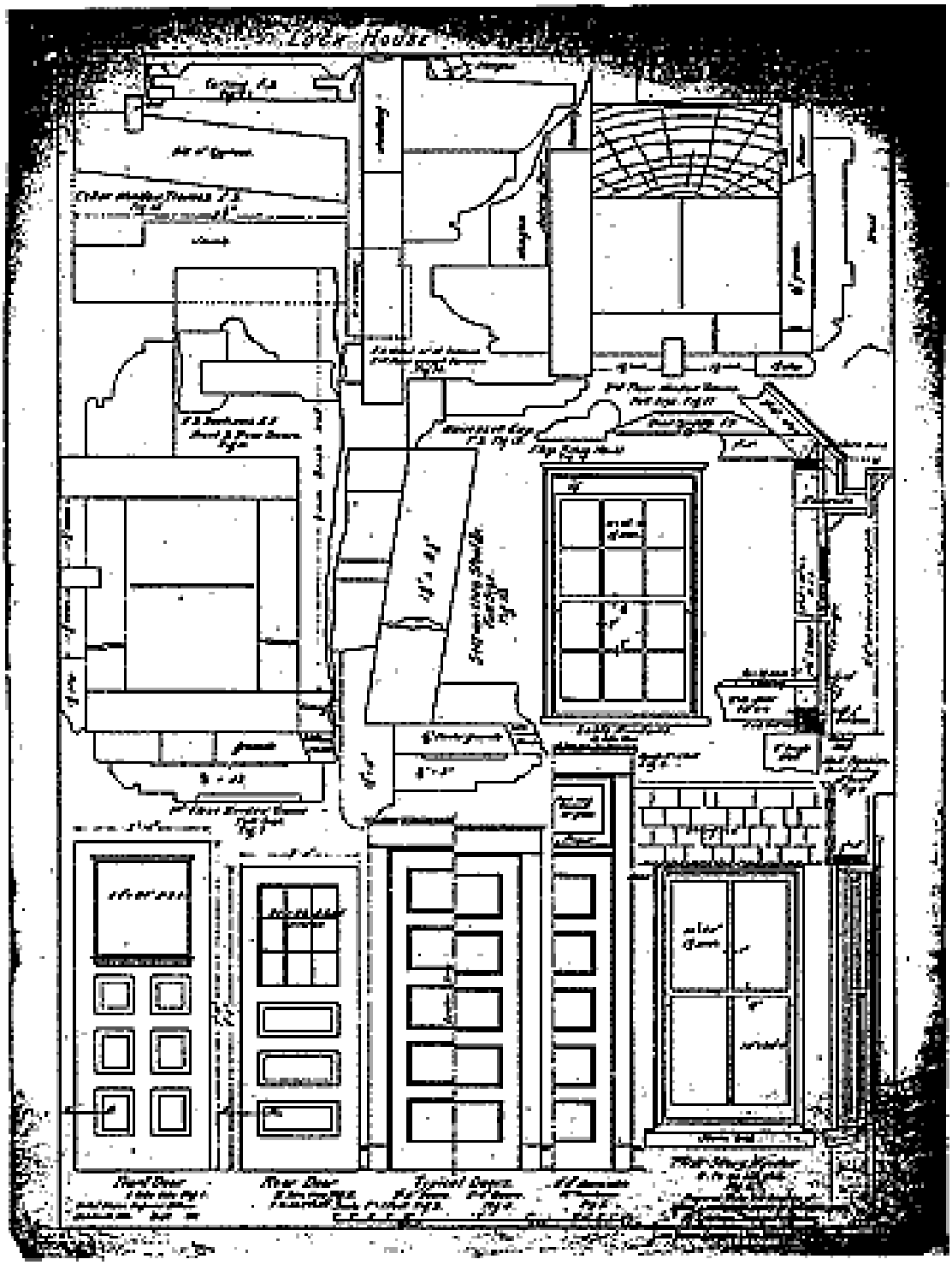
1 USACOE, De Pere Proposed Lockhouse, File No. 1171.
2 Ibid.
3 Ibid.
4 Ibid.
5 Ibid.
6 Ibid.
7 Ibid.
8 Ibid.
9 Ibid.



Photocopy of drawing of Locknaster's Residence at De Pere, Second Floor, File No. 1170.



Photocopy of drawing of Lockmaster's Residence at De Pere, First Floor, File No. 1171.



Photocopy of plans of Lockmaster's Residence at De Pere, First Story Window, File No. 1172-3.

DePere Lock and Dam, Lockkeeper's Residence
Approximately 80 feet southwest of the
upstream entrance to the lock
DePere
Brown County
Wisconsin

HAER No. WI-86-A

HAER
WIS
5-DEPER,
2A-

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD
Rocky Mountain System Support Office
National Park Service
P.O. Box 25287
Denver, Colorado 80225-0287

HISTORIC AMERICAN ENGINEERING RECORD

INDEX TO PHOTOGRAPHS

DePere Lock and Dam, Lockkeeper's Residence
Approximately 80 feet southwest of the upstream entrance to the lock
DePere
Brown County
Wisconsin

HAER No. WI-86-A HAER WIS 5-DEPER, 8A-

The Lower Fox River Waterway begins in Menasha, Winnebago County, Wisconsin, and extends 37 miles through De Pere, Outagamie and Brown Counties to Green Bay, Wisconsin. However, for shelving purposes at the Library of Congress, Menasha in Winnebago County was selected as the "official" location for the Lower Fox River Waterway.

Photographer: Joseph Paskus, July 1995

WI-86-A-1 VIEW SOUTH, Lockkeeper's residence

WI-86-A-2 VIEW WEST, Lockkeeper's residence


HAER NO WI-86-A-1


HAER NO. WI-86-A-2