Dry Tortugas National Park

Dry Tortugas Light Station

Ancillary Structures

Historic Structure Report

Prepared for

Dry Tortugas National Park

Southeast Region, National Park Service

by

Lord, Aeck & Sargent Architecture

2009

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2009
Historic Structure Report
Dry Tortugas Light Station
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LCS#: 091386 (New Oil House)
LCS#: 091389 (Kitchen Building)
LCS#: 091390 (Boathouse)
LCS#: 091391 (Concrete Cisterns
LCS#: 091392 (Brick Cisterns)
LCS#: 091776 (Walkways)

Cover Image: Ca. 1925 Site Plan of Dry Tortugas Light Station

The historic structure report presented here exists in two formats. A traditional, printed version is available for study at the park, the Southeastern Regional Office of the NPS (SERO), and at a variety of other repositories. For more widespread access, the historic structure report also exists in a web-based format through ParkNet, the website of the National Park Service. Please visit www.nps.gov for more information.

Dry Tortugas National Park

Dry Tortugas Light Station

Ancillary Structures Historic Structure Report

2009

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Draft National Register Nomination Form

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Dry Tortugas Light Station Materials Analysis, Dry Tortugas, Florida, Building Conservation Associates, August, 2009.

Management Summary

The Ancillary Structures of the Dry Tortugas Light Station were built to accommodate the Light Keeper's, their families and the equipment and supplies necessary to maintain the Lighthouse and support habitation in this remote location. The Light Station was originally constructed during a period of transition and significant growth within the Lighthouse Establishment. Its As a result of hurricanes and fire several of the original support buildings were destroyed. At various periods, advancements in technology and the need to modernize the Light Station have led to the site through the NPS's Volunteer-In-Parks (VIP) modification of original structures and the addition of new facilities.

The Light Station was manned by keepers or caretakers from its initial construction through the mid-1980s when it was transferred from the U.S. Coast Guard (USCG) to the National Park Service (NPS). At this time, the lamp or lighthouse optic was automated, eliminating the need for continual occupation of the site. Under the Park Service's management, public visitation to the Key has been limited however a relatively constant presence has been maintained at the



Figure 1. Undated early twentieth century view of the Dry Tortugas Light Station.

program and various research initiatives.

In October 2008, Lord, Aeck & Sargent was contracted by the National Park Service to prepare a Historic Structure Report (HSR) for the resources of the Dry Tortugas Light Station. It was decided that three documents would be prepared, the first would address the Lighthouse and Oil House, the second, the Keeper's Residence and the last document would address the remaining Ancillary Structures of the Light Station. This document addresses the Ancillary Structures, including the Kitchen Building, Brick Cisterns, Boat House, New Oil House, Concrete Cisterns, and Concrete Walkways.

During the first week of March 2009, a two member team from Lord, Aeck & Sargent (Rob Yallop and Glen Bennett) traveled to Loggerhead Key to undertake a physical inspection of the Light Station resources. In addition, Ms. Dorothy Krotzer of Building Conservation Associates also traveled to the site to collect mortar and paint samples for analysis (The results of this analysis are provided in Appendix A). Personnel from Lord, Aeck & Sargent spent a week on the island documenting the resources and collecting information to support preparation of the HSRs. A second brief visit was made to the site in June 2009.

Field notes, measurements, material sampling and photographs were collected for all of the structures as a means to record the existing conditions. With the exception of the mortar and paint sampling, no destructive testing was performed and no historic fabric was removed to facilitate the collection of information. All portions of the buildings were accessible with the exception of the Lighthouse galleries. A hurricane-proof plywood insert had been installed at the Watch Room level door, restricting access to the galleries.

Historic research included two trips to the National Archives and Records Administration in Washington D.C. and one visit to the Southeast Region National Archives and Records Office in Morrow, Georgia to review documents, drawings and photographs held primarily in Record Group 26. The files held in the archives of Everglades National Park were also reviewed and a visit was made to the USCG offices in Miami to review records pertaining to their management of the site. Numerous other secondary sources were consulted in preparation of the HSR.

Loggerhead Key and the resources of the Dry Tortugas Light Station (with the exception of the Lighthouse) were transferred to the National Park Service in 1992 when Dry Tortugas National Park was established. Current agreements call for transfer of the Lighthouse to the National Park Service in the near future, pending the fulfillment of several requirements, including completion of this report. Upon official transfer of the Lighthouse, the structure will remain an active aid to navigation and the USCG will retain management and maintenance responsibilities for the optic and its associated equipment.

The Park's General Management Plan has addressed treatment and use of the Light Station resources through the establishment of a Historic Preservation/Adaptive Use Management Zone in the center of Loggerhead Key. Without being specific, this management zone prescribes that the resource of the Light Station will be primarily reserved for interpretive and educational opportunities. The structures will also be adaptively used to accommodate critical functions such as housing for volunteers, staff and research personnel and the storage of utility components and equipment.

Summary of Recommendations

The following is a summary of the treatments recommended to preserve and rehabilitate the Ancillary Structures of the Dry Tortugas Light Station and to prepare them for continued, and potentially more intensive, use. The recommendations have been organized into three "Work Packages" presented in the general order of priority and also in response to limits on the amount of cyclical maintenance funding that can be requested by the Park in a given year. Work Package 1 represents those deficiencies that need to be addressed in the short term to address critical condition problems and issues of life safety. Following completion of this initial phase of work, the packages are generally organized to address needed repairs and rehabilitation activities. The timeline for conducting repairs assumes that the work will be completed over an approximately 10 year period.

Work Package 1 – Priority Treatments

- Replace missing shingles and conduct minor roof repairs at Kitchen Building.
- Install roof gutters and repaint cornice of Kitchen Building.
- Document and remove corroded metal anchors in exterior wall of Kitchen Building.
- Replace missing shingles and conduct minor roof repairs to Boat House.
- Remove exterior paint on Boat House.
- Repair damaged/spalled areas of concrete on Boat House
- Scrape and paint wood siding and gable ends of Boat House.
- Remove non-essential dock on west elevation of Boat House.
- Repaint Boat House.
- Conduct minor repairs to asphalt shingle roof of New Oil House.
- Grout horizontal cracks in exterior walls of New Oil House.
- Conduct minor repairs to roof flashing and soffit vent of New Oil House.
- Repaint wood cornice of New Oil House.
- Remove corroded iron pipes from Brick Cisterns.
- Grout cracking at Concrete Cisterns.

Work Package 2 – Exterior Carpentry

- Reconstruct brick columns to support front porch on Kitchen Building.
- Repaint exterior trim of Kitchen Building.
- Install new wood paneled door on Kitchen Building.
- Install new wood paneled door on Boat House.
- Install new wood paneled door on New Oil House.
- Remove existing paint and repaint New Oil House.

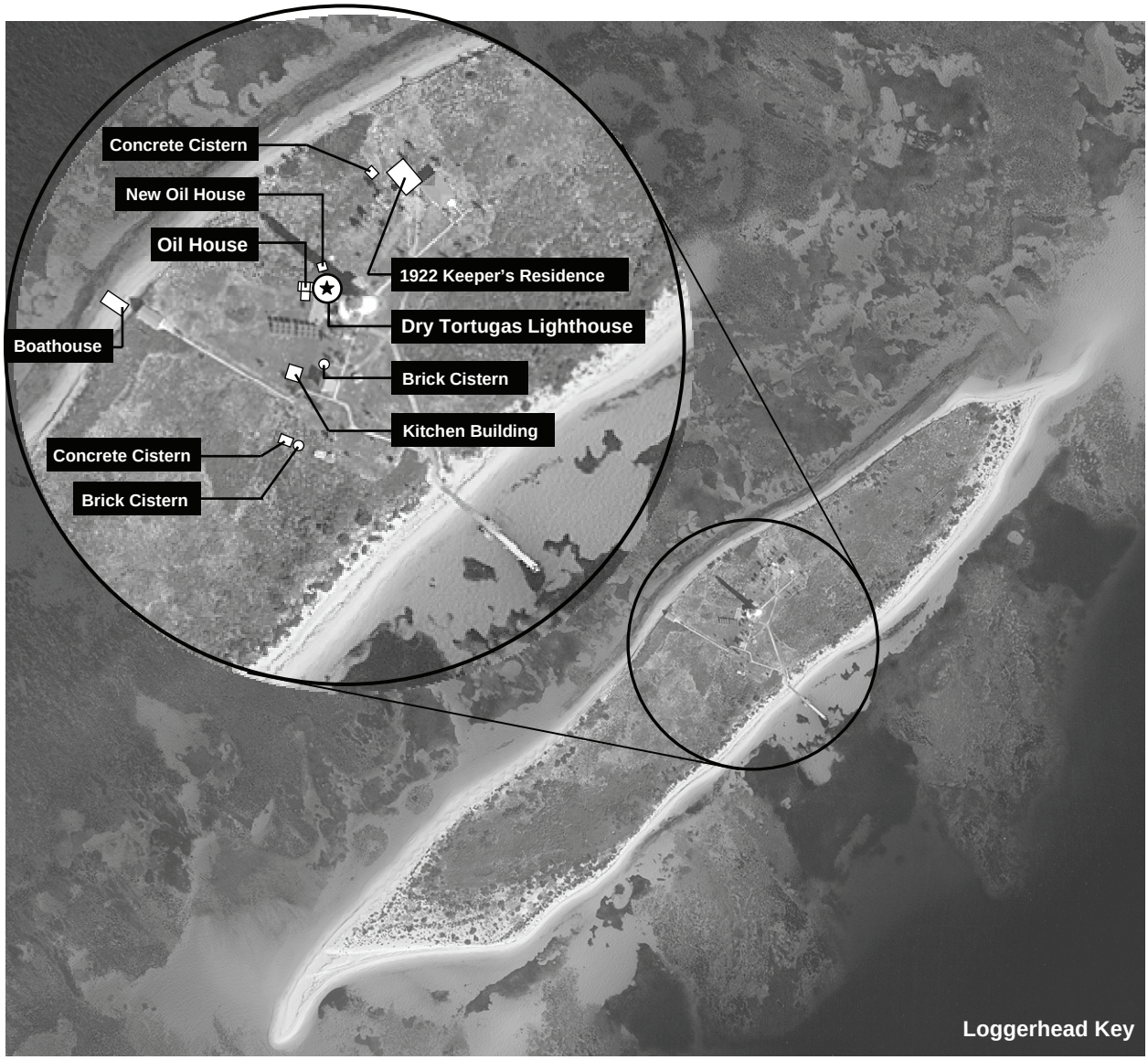
Work Package 3 – Miscellaneous Repairs

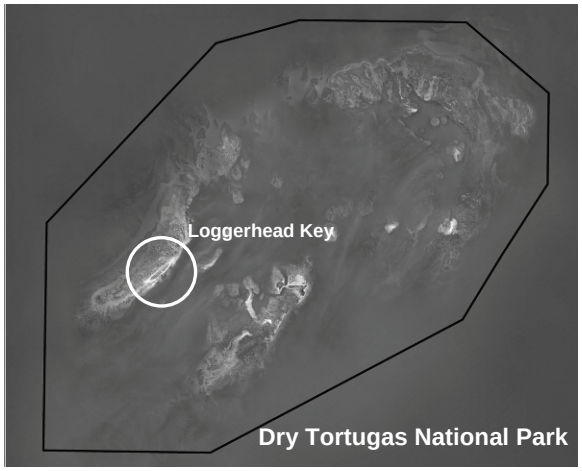
- Remove exterior paint from Kitchen Building.
- Conduct repair and repointing of exterior masonry envelope of Kitchen Building.
- Conduct interior rehabilitation and repairs on Kitchen Building.
- Repaint Kitchen Building.
- Reconstruct wood deck on Boat House.
- Conduct needs analysis and feasibility for reuse of Cisterns.
- Remove paint from Cisterns
- Conduct masonry repointing and repairs on Cisterns.
- Re-establish water tightness of Cisterns.
- Reinstall water collection system from buildings to Cisterns.
- Repaint Cisterns.
- Repair/replace damaged sections of Concrete Walkways.

Administrative Data

Resource Names and Numbers

Structure Name: Dry Tortugas New Oil House
Structure No.: HS-22





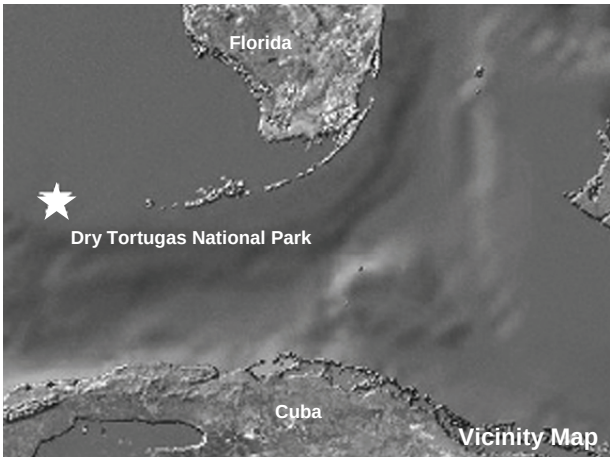


Figure 2. Maps showing location of Dry Tortugas National Park, Loggerhead Key and the individual structures of the Dry Tortugas Light Station.

List of Classified Structures No.:	091386
Structure Name: Dry Tortugas Kitchen Building	
Structure No.:	HS-25
List of Classified Structures (LCS) No.:	091389
Structure Name: Dry Tortugas Boat House	
Structure No.:	HS-26
List of Classified Structures No.:	091390
Structure Name: Dry Tortugas Concrete Cisterns	
Structure No.:	HS-27
List of Classified Structures No.:	091391
Structure Name: Dry Tortugas Brick Cisterns	
Structure No:.	HS-28
List of Classified Structures No.:	091392
Structure Name: Dry Tortugas Walkways	
Structure No.:	HS-29
List of Classified Structures No.:	091776

Resource Location

The Ancillary Structures of the Dry Tortugas Light Station (Kitchen Building, Brick Cisterns, Boat House, New Oil House, Concrete Cisterns and Walkways) are located on Loggerhead Key within Dry Tortugas National Park. Located 65 miles west of Key West Florida, Dry Tortugas National Park encompasses an area of approximately 100 square miles containing seven, small, sand and coral keys (islands) and the surrounding shoals and water. Loggerhead Key and Garden Key are the only inhabited keys within the Park. The Park's central cultural feature, Fort Jefferson, is located on Garden Key, approximately 2 ½ nautical miles east of Loggerhead Key. Access to the Park is by boat or seaplane. The visiting public generally travels to the Park on commercial ferries operated out of Key West. The primary public docking facilities and debarkation points are on Garden Key.

Loggerhead Key is the largest key in the Park measuring approximately 1 mile long and 700 yards across and containing approximately 35 acres. The Lighthouse and Oil House are among several historically significant buildings at the Dry Tortugas Light Station. The Light Station complex is located in the approximate geographic center of Loggerhead Key.

Location: Loggerhead Key, Dry Tortugas National Park
Coordinates: Latitude 24° 38' 00.021" N, Longitude 82° 55' 13.958" W
County: Monroe
State: Florida

Cultural Resource Data

In 1984, a draft National Register nomination was prepared for the Dry Tortugas Light Station by National Park Service staff as part of a submission to the USCG, Department of Transportation. No further action was taken by the USCG regarding the nomination. The National Park Service subsequently conducted a review of the nomination in 1989 anticipating a potential transfer of the Light Station from the USCG. Based on this review, the nomination was updated in 1993 and submitted to the Acting Chief Historian of the National Park Service's Washington Support Office for a second review in 1995. No further action was taken with regard to the draft nomination.

Dry Tortugas National Park was established in 1992 by Public Law 102-525 to "preserve and protect for the education, inspiration, and enjoyment of present and future generations nationally significant natural, historic, scenic, marine, and scientific values in South Florida." Under [36 CFR 60.1(b) (1)], historic units of the National Park System are automatically given National Register of Historic Places status by virtue of their incorporation into the park system. Thus, the Dry Tortugas Light Station was listed on the National Register of Historic Places as part of Dry Tortugas National Park.

The following information is taken from the draft National Register nomination for Dry Tortugas Light Station completed in 1984 and updated in 1993.

National Register Criteria A and C

Period of Significance: 1855 – present (1995)
Significant Dates: 1856-1858, 1920s
Acreage of Proposed District: 1.85

Significance

The draft national register nomination proposes a broad period of significance for the property spanning from its initial construction date through to the "present," or 1995, the year the draft nomination was submitted to the Washington Support Office. This approach suggests the Lighthouse derives its primary significance from its function as an aid to navigation and is inclusive of the entire period it has been active. This approach acknowledges all epochs of the Light Station's history including the National Park Service's management of the site during the last two decades.

Specifically, the draft nomination provides the following statement about the Light Station's significance.

> "The light station is significant primarily for its role in facilitating America's ocean-borne commerce and as a notable example of the kind of civilian public works project undertaken by Army engineers prior to the Civil War. While the lighthouse is clearly the most important structure within the boundaries of the nominated area, there were several ancillary structures built at the same time as the lighthouse, and also from the 1920s, a period in which the station was extensively modernized."

It is recommended that the draft national register nomination be updated based on the research collected in preparing the HSRs and resubmitted for formal acceptance.

Related Studies

Hellman, Robert and David M. Brewer. *Archeological Survey of Loggerhead Key, Dry Tortugas National Park*. Southeast Archeology Center (SEAC), National Park Service, 2003.

Kenneth Smith Architects Inc., and Bender & Associates, Architects P.A. for the State of Florida Department of State, Division of Historical Resources and Department of Community Affairs, Florida Coastal Management Program. *Florida Lighthouse Study* 2002

National Park Service *Draft National Register of Historic Places Registration Form* 1993

National Park Service. *General Management Plan Amendment, Dry Tortugas National Park.* 2002

National Park Service National Register Programs Division, Preservation Services Branch for the Department of Transportation, United States Coast Guard, Seventh District, *Rehabilitation Report and National Register Nomination for the United States Coast Guard Light Station, Dry Tortugas Lighthouse, Loggerhead Key Florida*. October 1984

Historical Background and Context

The historical background of the Dry Tortugas Light Station is documented by historians, Love Dean in *Lighthouses of the Florida Keys* and Neil Hurley in *Lighthouses of the Dry Tortugas: An Illustrated History*. These along with Russ Holland's *America's Lighthouses: Their Illustrated History since 1716* and Edwin C. Bearss' *Shipwreck Study-The Dry Tortugas* contributed to the development of the historical background and context. The following narrative draws upon these histories and references them when cited. The historical background also relies on the "clipping files" and other primary sources related to the Dry Tortugas Light Station found in National Archives Record Group 26.

Discovery and Early Exploration of the Dry Tortugas

Juan Ponce de Leon is credited with the discovery in 1513 of 11 sand and coral islands located at the southwestern tip of the Florida Keys. Because sea turtles were in abundance, he named the islands "Las Tortugas," meaning *the turtles*. At the time of Ponce de Leon's discovery, hundreds of turtles were present on the shores of these islands along with pelicans and the now-extinct Caribbean monk seal.[1] Several accounts describe Ponce de Leon's crews capturing over a hundred turtles in one night - turtles were a significant source of food for mariners.

The first recorded shipwreck in the area occurred in 1622 when the *Nuestra Senora del Rosario* ran aground on one of the keys of the Tortugas. The survivors and their rescuers reportedly camped on the island that would later be named Loggerhead Key.[2]

Florida was under Spanish rule from 1513 until 1763, when it was ceded to Britain. While under British rule, Las Tortugas were surveyed by T. Jefferys in 1763, by Bernard Romans in 1766, and by George Gauld in the 1770s. Gauld's maps, published in 1773, were used widely for navigation of the gulf coast off British West Florida. Due to the lack of fresh drinking water, or possibly "in contradiction to the vast tract of wet reef which at low water nearly reaches the surface," Las Tortugas eventually became known as the *Dry* Tortugas. On his charts, Gauld named the individual islands that made up the Dry Tortugas including Loggerhead "Turtle" Key.[3]

In 1783, following its participation in the American Revolution, Spain regained Florida, and maintained it as a colony until 1821. Spain encouraged settlement of the region through land grants, but Florida remained sparsely populated well into the nineteenth century. By 1845 when Florida became a state it had only 60,000 residents.

Given their location at the intersection of the Gulf of Mexico and the Atlantic Ocean where the swift Gulf Stream current flows though the Straits of Florida, the Dry Tortugas witnessed considerable shipping traffic. Westward expansion in the United States led to an increase in the transport of goods from the interior of the continent to the urban centers along the east coast. After passing through the open waters of the gulf, most ships heading east avoided the Dry Tortugas by taking a

[1] Bearss, Edwin C., *Shipwreck Study-The Dry Tortugas*, Washington, DC: Eastern Service Center-Office of History and Architecture, United States Department of the Interior, National Park Service, April 15, 1971,1.

[2] Hellmann, Robert and David M. Brewer, Archaeological Survey of Loggerhead Key, Dry Tortugas National Park,SEAC Accession No. 1341, 2003.

[3] Dean, Love, *Lighthouses of the Florida Keys,* Inc., Sarasota, Florida: Pineapple Press, 1998, 75.



Figure 3. Map produced in 1838 based on Gauld's earlier 1773 survey of the Dry Tortugas. Note the map identifies Loggerhead "Turtle" Key.

southerly route and navigating along the Cuban coastline. Stormy weather or a captain's inexperience could result in ships veering off course and foundering in the shallow reefs of the Keys. Not only did mariners have to be mindful of the hazardous sailing conditions, but they also had to keep a vigilant watch for pirates cruising these same waters in search of vessels they could exploit.

Salvaging, or wrecking as it was also known, became a lucrative business in the Florida Keys. Dozens of vessels and hundreds of men were active in the trade which became highly organized and regulated. Wreckers had to hold a license issued by the Federal Court to legitimately take part in salvaging activities. During the nineteenth century, the Keys claimed hundreds of ships carrying millions of dollars of cargo which was eventually salvaged and liquidated in the auction houses of Key West. In the Dry Tortugas, the natural harbor at Garden Key provided safe anchorage for the wreckers from where they could observe the surrounding keys and quickly respond to any ship running aground or needing assistance.[4]

Aids to Navigation in the Dry Tortugas

On August 7, 1789, the new Congress of the United States, with its ninth act, assumed responsibility for managing the nation's lighthouses and navigational aids. Prior to this, each state sited, built, and managed lighthouses as needed. The U.S. Lighthouse Establishment was the body created by the government to oversee the construction and operation of the lighthouses. Initially, Secretary of the Treasury, Alexander Hamilton, directly appointed keepers and negotiated construction contracts. Even President Washington signed and approved lighthouse contracts during the first years of his presidency. In 1792 oversight of the lighthouses was passed to the Secretary of Revenue, and then back to the Secretary of Treasury in 1820 when Stephen Pleasonton became the Fifth Auditor of the Treasury.

During the early part of the nineteenth century, after the U.S. acquisition of the Louisiana Territory, shipping through the Florida Straits increased. Lieutenant Commander Matthew C. Perry was assigned to survey the Keys in 1821, after portions of Florida became a U.S. territory. Perry noted the difficult sailing conditions and reported to Congress that four light stations would be necessary to alleviate nautical risk within the Florida Keys. These included Southwest Key, Sand Key, Key Largo and Cape Florida. Congress responded with a recommendation to build lighthouses at Key West, Cape Florida and the Dry Tortugas. In the Dry Tortugas, Garden Key was selected as the most suitable location for a lighthouse. Construction of the



Figure 4. Undated nineteenth century view of Garden Key lighthouse within the parade ground of Fort Jefferson.

Garden Key lighthouse began in August of 1824 and continued until the lamp was lit on July 4, 1826. The focal plane of the light was 70 feet above sea level and the lantern was fitted with 23 lamps and 14-inch reflectors.[5]

Despite construction of a lighthouse on Garden Key, over the next two decades, mariners continued to complain about the inadequacy of navigational aids in the Dry Tortugas. The new light was not only difficult to see in the hazy conditions of the gulf, its location six miles from the outer southwest edge of the reefs, and another eight miles from the northeastern shoals, meant that ships would find themselves in dangerous waters before the light was visible. The light constructed on Garden Key was simply not tall enough to adequately mark the hazards of the Dry Tortugas.

[4] Ibid., 78

[5] Ibid., 77.

Numerous ship wrecks, including the *Concord* and *Florence* in 1831 and the *America* in 1836, were blamed on the poor visibility of the Garden Key lighthouse. In an 1836 interview with the *Key West Inquirer*, John Thompson, assistant light keeper at Garden Key, described the need for two additional lighthouses in the Dry Tortugas—one on the easternmost and the other on the westernmost keys.[6] The newspaper endorsed Thompson's position.

Others voiced their opinion directly to the Lighthouse Board. William Whitehead, the Collector of Customs at Key West, wrote to Stephen Pleasonton in1836:

> Should it not be thought advisable to have all the appropriations made in one year, I would designate as being worthy of attention first the two light houses recommended for the Tortugas in place of the one now there. Many vessels have grounded there during the last year in consequences of inadequacy of the present light which I have every reason to believe does not arise from any neglect of those in charge.[7]

Meanwhile, in 1842, twenty-six year old Captain Horatio Gouvenor Wright was selected and charged with leading the construction of a massive fortification planned for Garden Key. Following conflicts with Spain and England regarding border disputes, President Tyler and Congress were persuaded to set aside four million dollars for military installations at Key West, Key Biscayne and the Dry Tortugas. In June 1844, President Tyler signed appropriations for the initial phase of construction of the fortification that would later be named Fort Jefferson. With the capacity to house 1,500 men, arm three tiers with 450 weapons, and to stand 50 feet off the water, Fort Jefferson was designed to be the largest "Third System" fort in America. The walls of the proposed fort were to be laid out in a manner that would encompass the existing Garden Key lighthouse and keeper's dwelling.

Shipping activity in the Dry Tortugas escalated to an unprecedented level as supplies of men and material were sent to Garden Key. Complaints about the light continued until Pleasonton finally ordered several reconnaissance trips by his staff to assess the conditions. Adam Gordon, Lighthouse Superintendent at Key West, along with Captains William H. Chase and George Dutton of the Army Corps of Engineers, were sent to the Dry Tortugas to evaluate the light on Garden Key. They agreed the light was too low and dim to provide adequate aid to navigation and recommended that the light be relocated to Loggerhead Key. In the interim, Winslow Lewis was sent to inspect the lighthouse to see if anything could be done to improve its effectiveness. Lewis made minor adjustments to the lamp, but these proved to be ineffective and complaints continued.



Figure 5. Captain Horatio G. Wright.

Lighthouse Illumination

American lighthouses of the nineteenth century, including the one at Garden Key, were lit primarily with Argand oil lamps. In 1781, Amie Argand developed a ring-shaped wick that allowed air to flow through and around the flame and thus produce a brighter, cleaner fire. The same Winslow Lewis that was

[6] Bearss, 14.
[7] Hurley, Neil E. *Lighthouses of the Tortugas, An Illustrated History*, Alexandria, Virginia: Historic Lighthouse Publishers, 1990, 18.

sent to make adjustments to the Garden Key light had developed and promoted a silver metallic, parabolic reflector assembly to be used with the Argand lamp. Lewis had successfully lobbied the Collector of Customs in Boston, Congress, and members of the Lighthouse Establishment, and his apparatus became the standard used in American lighthouses during first quarter of the nineteenth century. Lewis was paid $60,000 for a patent to the system, and most lighthouses were fitted with his apparatus by 1815.[8]

Lewis' system was an improvement on the various wicks and fuels previously used, but the Fresnel lens was concurrently being developed and would eventually surpass the Argand lamp and Lewis'parabolic reflector system in light quality and intensity.

Developed by Augustin Fresnel, a French physicist, the Fresnel lens resembled a large glass beehive surrounding a single lamp. Asked by the French Commission on Lighthouses in 1819 to help improve the illumination system, Fresnel worked with Claude Mathieu, his two brothers—Lenor and Fulgence, and Monsieur Talbouret to develop the new lamp technology. He also worked with Francois Soleil, Sr., a Parisian optician and glass manufacturer.

The design intent of the Fresnel lens was to refract all of the light emitted from the source into one concentrated horizontal beam. By compounding the light beams in the lens a stronger and brighter signal was produced. By 1821, Fresnel's design was refined into an assembly of eight panels of concentric circular lenses with catadioptric prisms at the top and bottom of the panels. The lenses were made with triangular shaped glass that concentrated the light into a narrow horizontal beam. In 1824, the first fixed Fresnel lens was constructed along with separate flash panels that were made to revolve around the light and produce two or four flashes per revolution. The flashes helped to distinguish the lights from stars or other lighthouses. This new Fresnel technology produced a bright, narrow sheet of concentrated light emitting from the lighthouse, which could be manipulated multiple ways for signaling sailors.[9]

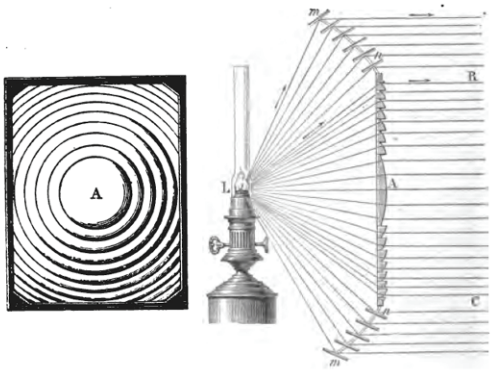


Figure 6. Schematic showing how the Fresnel lens concentrated light from a single source into a horizontal beam.

Under Pleasonton's guidance, the lighthouse system grew from 55 lighthouses in 1820, to 331 in 1852. Despite development of the French Fresnel lens and its widespread use in Europe, Pleasonton continued to favor the Argand lamps and parabolic reflector system. His reason for not using the newer Fresnel technology, he said, was based on budgetary considerations.

It has also been suggested that Pleasonton's personal friendship with Winslow Lewis translated into a loyalty to Lewis' seemingly inferior system. Pleasonton's resistance to adopt the Fresnel technology resulted in mounting criticism of the Treasury Department's management of the lighthouse system. Eventually this led Congress to direct the Secretary of the Treasury to investigate the Lighthouse Establishment. Ultimately the decision was made to:

> discharge all the administrative duties of said office relating to the construction, illumination, inspection, and superintendence of light-houses, light vessels, beacons, buoys, seamarks, and their appendages, and embracing the security of foundations of works already existing, procuring illuminating and other apparatus, supplies, and materials of all kinds for building and for rebuilding when necessary, and keeping in good

[8] Holland, Francis Ross, *America's Lighthouses: Their Illustrated History Since 1716*, Brattleboro, Vermont: Stephen Greene Press, 1972,15.

[9] Ibid., p. 18.

repair, the light-houses, light-vessels, beacons, and buoys of the United States.[10]

An outcome of the investigation was the creation of the U.S. Lighthouse Board. This newly formed body would be made up of four high ranking military officers, two from the Navy and two from the Army along with two civilians of "high scientific attainments." The Board would also divide the country into eight districts, expand inspection and engineering services, set up a central supply depot, begin publishing an annual "Light List", and encourage the use of new technology such as the Fresnel lens.

A New Light in the Dry Tortugas

The Seventh District established by the Lighthouse Board included the Dry Tortugas, extending "from Cape Carnaveral [sic] light-house, Florida, to include Cedar Keys, Florida." The office of the Superintendent of the Seventh District was located at Key West.[11]

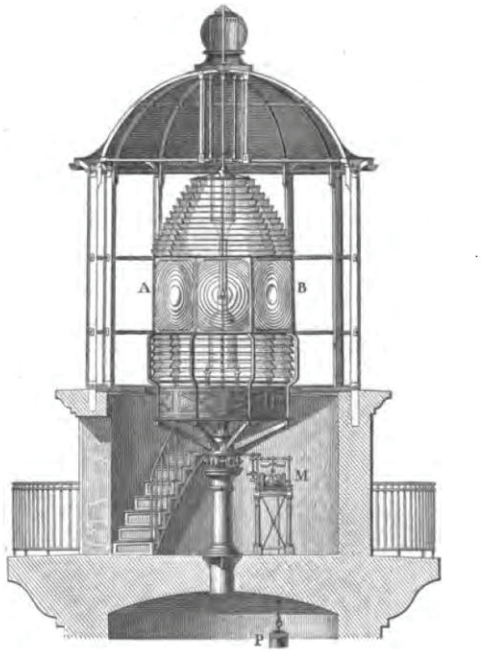


Figure 7. Section through a typical first-order lantern equipped with a Fresnel lens.

The newly formed Board began immediately equipping existing and new lighthouses with Fresnel lenses. In the Dry Tortugas, the focus of the Board was to respond to decades of complaints by providing additional navigational aids including the construction of a new lighthouse on Loggerhead Key. Additionally, the light on Garden Key was slated for retooling including the installation of a fourth-order Fresnel lens to service the immediate harbor traffic. The new lighthouse proposed for Loggerhead Key was to be equipped with a first-order lens—the largest lamp available.

In 1855 Lieutenant T.A. Jenkins, United States Secretary of the Lighthouse Board, requested that Capitan H.G. Wright, overseer of construction at Fort Jefferson, submit a preliminary sketch and estimate for the new lighthouse. Wright provided a response to Jenkins on September 23rd, but it appears there was some confusion about the final location of the lighthouse, as his preliminary sketches, estimates, and letter are prepared for a project on Garden Key.

> It is proposed to first lay a grillage, as shown on the sketch, the top of which shall be on a level of those in the bastion of the fort….I cannot make any satisfactory estimate for the keeper's dwelling, as I do not know what allowance of room for each person is authorized by the board, therefore none is submitted. There is now a wooden house, built for the keeper in 1847, which contains two lower rooms, with hall, two half attic rooms and a detached kitchen, which if sufficiently capacious, will answer the purpose for some years to come…The privy should be built over a vault communicating with the sewers of the work, the cost of vault which will be not far from $100.[12]

Ultimately the location for the new lighthouse was resolved and on August 18, 1856, Congress appropriated "for rebuilding the light-house, on a proper site, at Dry Tortugas

[10] *Light-house Appropriations Bill. Statutes at Large of the United States of America 1789-1873*, 32nd Congress, 1st sess., vol.10, August 1852, 119.
[11] *Organization and Duties of the Lighthouse Board: Regulations, Instructions, Circulars, and General Orders*, Washington DC: Government Printing Office,1871, 53.

[12] Dry Tortugas Light Station Clipping File, Appendix no. 17, H.G. Wright, Capitan of Engineers, Fort Jefferson, FL, to Lieutenant T.A. Jenkins, U.S.N., Secretary, Light-house Board, Washington, D.C., September 23, 1855, Record Group 26, NA.

and fitting it with first-order apparatus, thirty-five thousand dollars."[13]

In the same year, Wright was replaced by Captain Daniel P. Woodbury of New Hampshire. Woodbury who would now oversee construction of the fort and the lighthouse made several design changes to Wright's original proposal. According to Love Dean, Woodbury modified the dimensions of the tower, construction of the steps, masonry detailing and connection details between the lantern and the tower. He also configured the brick to corbel out below the Watch Room, forming the floor of the galley above.[14]

Construction of the lighthouse on Loggerhead Key began in 1857 and within a year the tower was complete. The first-order Fresnel lens was manufactured by the L. Sautter & Company. During the conversion to Fresnel lenses, the U.S. Lighthouse Board generally divided their purchases equally between the two primary lens manufacturers; L. Sautter & Company and Henry LePaute.

In 1852, Louis Sautter bought the business started by Francois Soleil, Sr., with whom Fresnel worked to develop the Fresnel lens. Soleil's business passed to his son-in-law, Jean Jacques Francois and onto his son-in-law, Theodore Letrouneau before it finally left the Soleil descendants. Sautter & Company shipped their first lens to America in 1853 for the lighthouse at Alcatraz Island.

Sautter continued working with the glass manufacturer St. Gobain in Paris to make bigger and better glass pieces. Through acquisition and mergers, the company evolved to include electrical generators and searchlights. The company's lights were used to illuminate the Champs-Élysées and the Arc de Triomphe in the late nineteenth century.[15]

By 1858 the lighthouse and buildings of the Dry Tortugas light station were complete. The station consisted of several structures sited in the middle of Loggerhead Key including the 150- foot brick lighthouse, a detached two story oil house, a two-story keepers' dwelling, a separate two-story kitchen, and two brick cisterns and several privies. A boathouse would not be constructed until 1871.

Keepers and their Duties

Benjamin Kerr was the first keeper assigned to the light station on Loggerhead Key. He was transferred from Garden Key in 1858 with a salary of $600 a year and brought with him, Henrietta his wife, and seven children. Kerr was employed at the Dry Tortugas light station until 1861, when he was replaced by James P. Lightbourn. Besides being named the first keeper of the Dry Tortugas Lighthouse, Kerr's notoriety stems from an incident in which both of his assistant keepers allied with his wife and one daughter to "make an attempt on his life."[16] According to G. Phillips who was stationed at Fort Jefferson at the time, Kerr and one of his daughters arrived at Garden Key in a small boat, after having escaped from Loggerhead Key. Kerr and his wife apparently reconciled and managed to finish their assignment with no further incidents.

The *Organization and Duties of the Lighthouse Board* set forth the requirements for lighthouse keepers. A few of the fundamental requirements established by the Board are listed below:

> LIV. Keepers were required to be over 18 and be able to read and write, and be in every respect competent to discharge the duties of the keeper….
> LV. Men of intemperate habits and those who are otherwise mentally or physically incapable of performing the duties of the light keepers, must not be nominated for appointment by superintendents of lights.
> LVII. Women and servants must not be employed in the management of lights, except by the special authority of the Department.[17]

Pay was established at the keeper's appointment and was begun when they entered their duties. The keepers were permitted to select their assistants, but keepers' families were allowed to be nominated only in "rare and exceptional

[13] *Light-house and Appropriation Bill, Statutes at Large of the United States of America 1789-1873,* 34th Congress, 1st sess., August 1856, vol.11, 99.
[14] Dean, 84.
[15] Tag, Thomas, *The Sautter Lens Works Producers of the Fresnel Lens*, U.S. Lighthouse Society's, *The Keeper's Log*, Summer, 2005, www.uslhs.org.
[16] Dean, 87.
[17] *Organization and Duties of the Lighthouse Baord,* 60.

cases."[18] The keeper's duties included keeping all aspects of the light station clean and in good working order, lighting and maintaining lamps, painting and maintaining all finishes both inside and out of all buildings, and maintaining clothing and accessories necessary to service and protect the light. Other duties included providing reports to the district office, maintaining safe and dry places for cleaning supplies, and logging in and out supply deliveries. [19]

As one might expect, life on Loggerhead Key was particularly isolated. With a few exceptions, keepers remained at the light station for short durations. There were 10 keepers assigned to the Dry Tortugas station between 1858 and 1912.

During the 1860s, rations for each lighthouse keeper and assistant keeper, in addition to their salary, included:

> 40 pounds of salt pork, 52 pounds of salt beef, 100 pounds of flour, or 80 pounds of ship biscuit, 11 ½ pounds of brown sugar, 6 pounds of coffee, or 1 ½ pound tea, 5 pounds rice and 2 gallons beans or peas per quarter[20]

A break in the monotony came for the keepers and their families when on occasion they would be invited to socialize with the families of officers stationed at Fort Jefferson. Alternately at times the lighthouse keeper would host parties on Loggerhead Key, usually in conjunction with turtle turning expeditions. "Turtle turning" involved turning large turtles on their backs, thereby rendering them helpless and unable to escape. The turtle turning parties were often accompanied by the sharing of food, music, and dancing.

Later during the twentieth century, keepers were restricted to living on the island without their families. In a 1938 letter from the Superintendent of Lighthouses to the Commissioner of Lighthouses, the Superintendent advocates for familial visits for keepers during the summer months. Responding to a proposed change in policy that would eliminate this privilege, the letter emphasizes the remote and isolated conditions at the station:

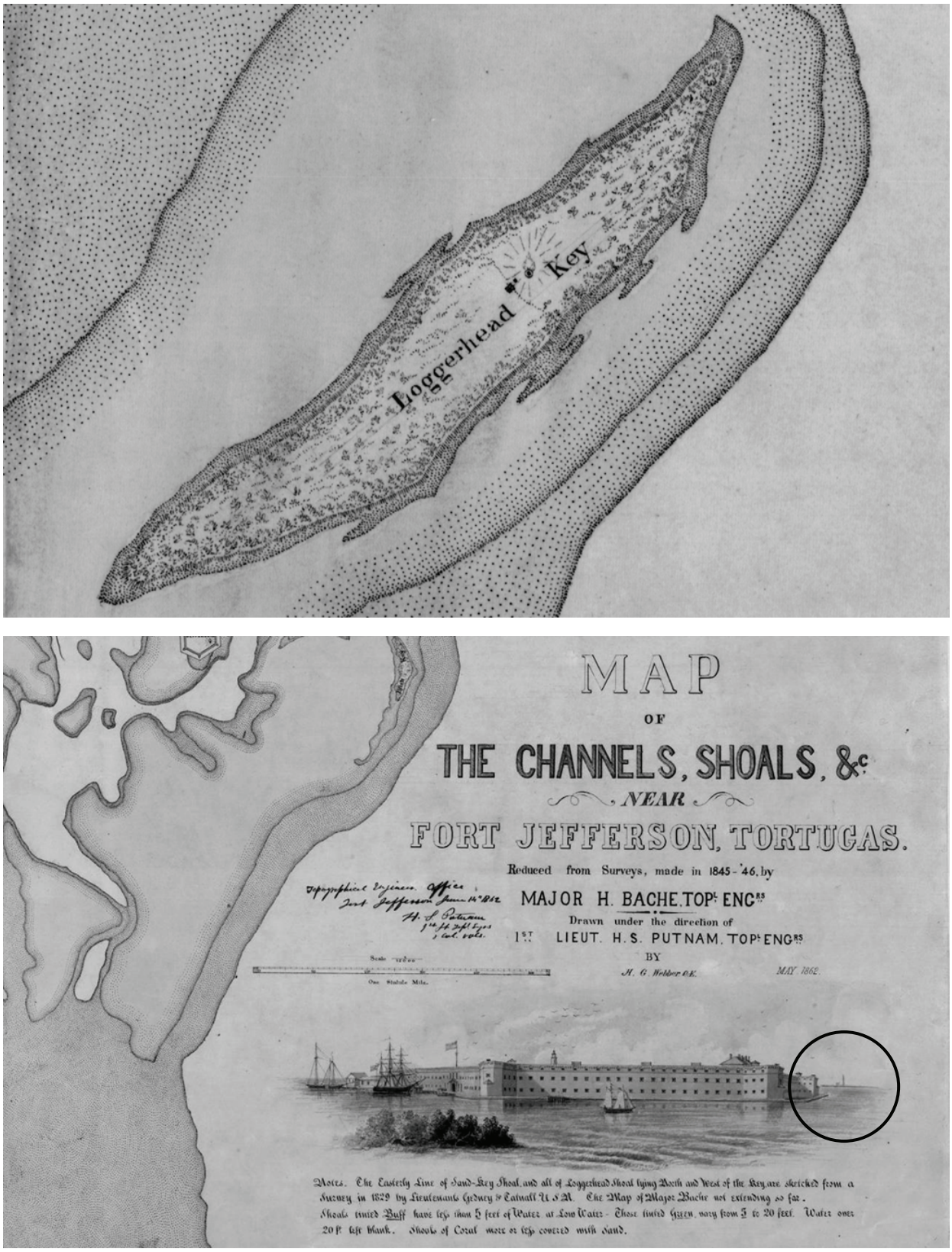
> Dry Tortugas Light station, Fla., is possibly one of the most isolated as well as attractive and efficient stations in the Service… There is no intention to make the station a resort; it is a condition that has existed for many years with nothing but beneficial results to the keepers and their families and this office believes that the best interest of the Service is being conserved in making no changes. With unrestricted privileges of this nature being enjoyed by the Carnegie Institutions Biological Station on the same reservation together with the other reasons it is recommended that no changes or restrictions in this respect be made….In reference to inquiry as to whether or not they be quartered in the station buildings, Bureau is advise that such is the case and the keepers and their families are perfectly satisfied to subject themselves to the slight inconvenience for the pleasure and privilege of having these relatives and friends with them as requested. It has been the experience of this office that these keepers feel that these dwellings are their homes, for which they pay more rent than they are worth, in addition to having to maintain homes elsewhere.[21]

Even into the 1980s, lighthouse keepers with the Coast Guard reinforced the lonesome and isolated nature of their duties. Most assignments for unwed officers were for six weeks with three weeks on shore and assignments for married officers were typically four weeks with two weeks on shore. "The biggest complaint was the absence of women and having to cook for each other."[22]

War and Disease

Florida seceded from the Union on January 10, 1861, but the Dry Tortugas remained under the command of Union forces throughout the War. The Union successfully blockaded St. Augustine, Jacksonville, Key West and Pensacola. Still, some smaller vessels

[18] Ibid.
[19] Ibid., 88-89.
[20] U.S. Lighthouse Board, *Registers of Lighthouse Keepers, 1845-1912*, National Archives Southeast Region, Morrow, Georgia.
[21] Superintendent of Lighthouses to Commissioner of Lighthouses, 08 June 1938, Record Group 26, NA, Washington, DC.
[22] Hurley, 59.



Figures 8 and 9. Portions of an 1862 map of Dry Tortugas showing the first depictions of the light station. Loggerhead Key is shown in plan (above) and the lighthouse can be seen in elevation beyond Fort Jefferson within the cartouche (below).

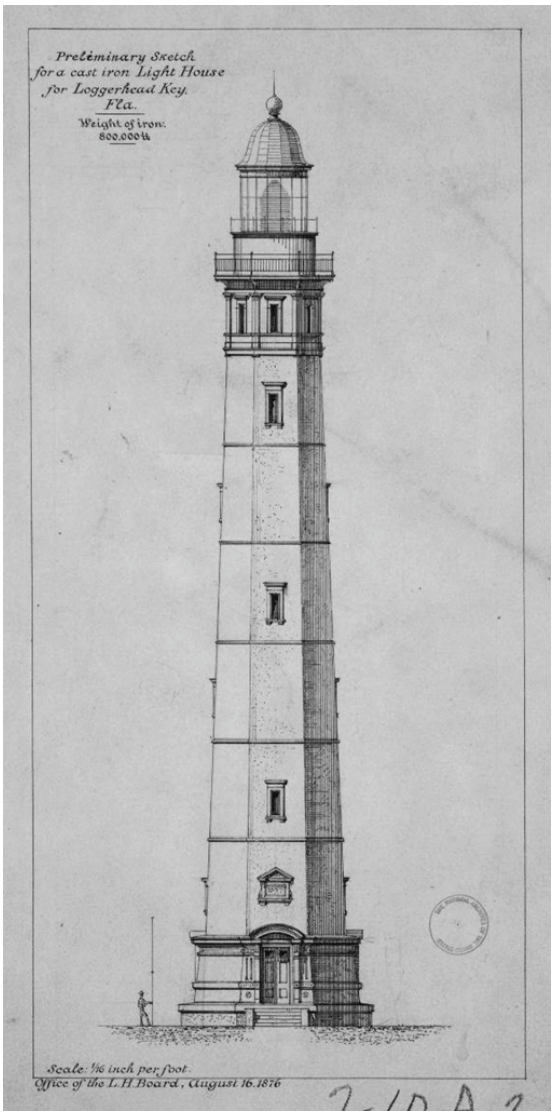


Figure 10. Elevation of iron tower proposed to replace storm-damaged masonry tower

were able to smuggle goods such as cattle, crops and salt to Confederate sympathizers. While most of the battles of the Civil War took place in other states, approximately 16,000 Floridians left home to fight in the war. The battles of Olustee (near Tampa Bay) and Natural Bridge (near Tallahassee) were both won by the Confederates and Tallahassee was the only state capital in the Confederacy not seized by Union Troops. [23]During the War, the 47th Regiment of the Pennsylvania Veteran Volunteers were stationed at Fort Jefferson and by 1865 nearly two thousand people were living on Garden Key. The installation was used primarily as a military outpost and prison during the war and was never fired upon or fired a shot in conflict.

A yellow fever outbreak in 1867 resulted in the Light Station falling into disrepair for several years. During the period between 1867 and 1871 Loggerhead Key was used as quarantine station for military personnel, which strained resources and impeded maintenance of the buildings. By 1871 the outbreak had subsided and various maintenance projects were again underway.

A second outbreak of yellow fever affected the Dry Tortugas in September of 1873, requiring all healthy soldiers on Garden Key to once again be relocated to Loggerhead Key. During the outbreak, thirty people were infected resulting in 12 casualties. The healthy were still on Loggerhead Key when the hurricane of 1873 hit the island.

The Hurricane of 1873

The hurricane that struck the Dry Tortugas on October 6, 1873, initially formed near the Leeward Islands, drifted west towards the Yucatan Peninsula, then backtracked through the lower Gulf of Mexico, before it curved northward and passed over the towns of Punta Rassa and Melbourne on the east coast of Florida. Although the track of the hurricane took the eye north of the Dry Tortugas, it delivered a damaging blow to the Light Station.

The initial evaluation of the storm-damaged Light Station was bleak. The Lighthouse was reported to be in dangerous condition and it was initially recommended that the entire tower would need to be rebuilt.

Because Loggerhead Key was still under a yellow fever quarantine and contact with the island was limited, only temporary repairs could be made following the storm.

> The walk in front of the keeper's dwelling has been cemented and the water-conductors to the cisterns repaired. The cisterns have been cleaned and repaired, and wooden shutters for the tower-windows have been made, painted and

[23] Florida Center for Instructional Technology, College of Education, *Florida's Role in the Civil War: "Supplier of the Confederacy",* University of South Florida, 2009 http://fcit.usf.edu/Florida/lessons/cvl_war/cvl_war1.htm.

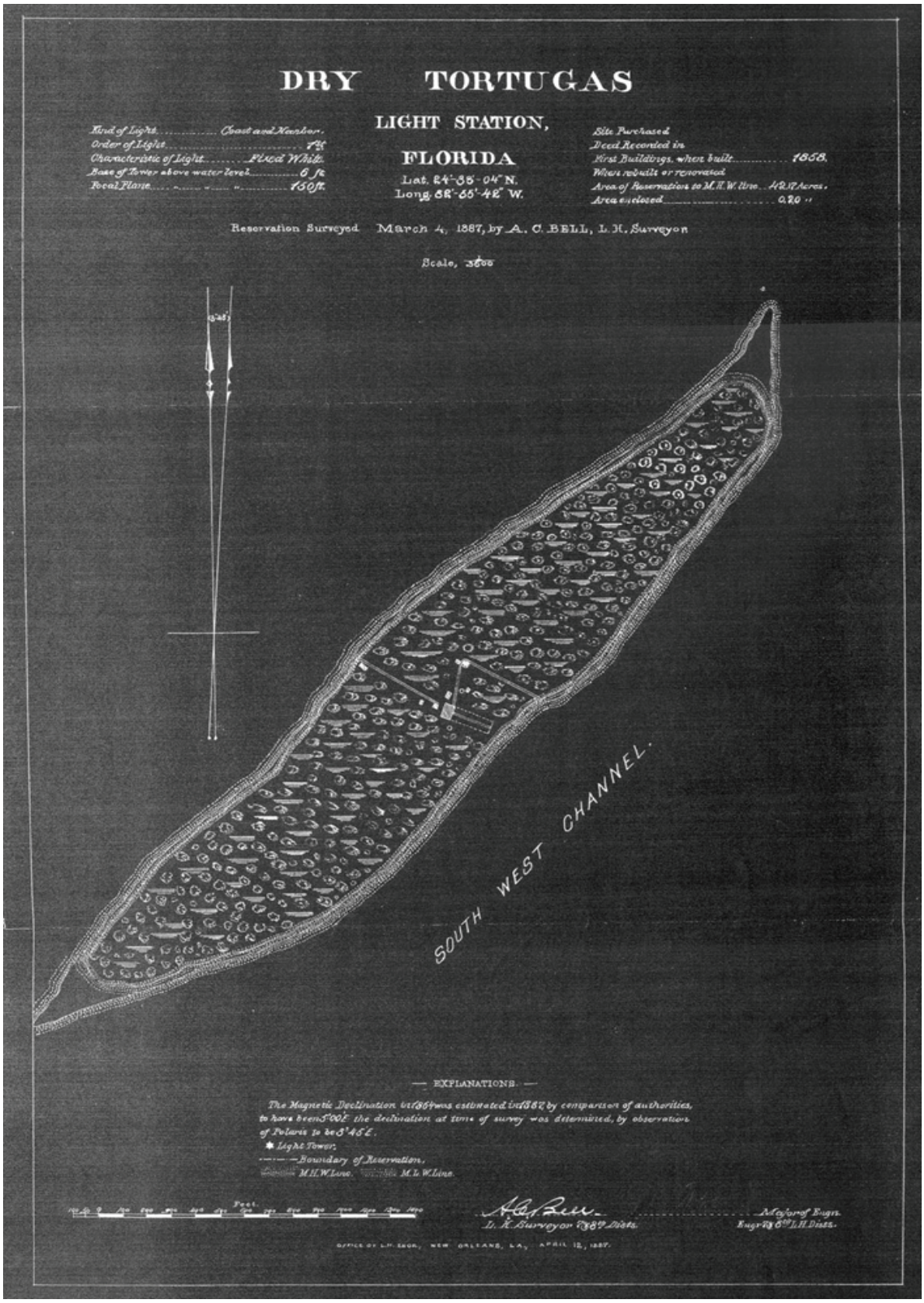


Figure 12. 1887 survey of Dry Tortugas Light Station by A. C. Bell.



Figure 11. Undated nineteenth-century view of the Dry Tortugas light station looking northeast.

> hung. It is proposed, during the coming season, to make careful examination with a view to determining on plans for the foundation of a new tower.[24]

Congress appropriated $75,000 for repairs to the Lighthouse and plans were prepared for a new structure. In contrast to the existing masonry tower, the design of the replacement structure would be entirely of cast iron.

By 1875 the upper portion of the lighthouse had been extensively repaired, anchors were extended down through the lighthouse walls to secure the lantern and the tower received its distinctive daymark. The upper portion of the tower was painted black and the lower portion was painted white. The black color was supposed to help dampen reflections, contrast with the white clouds and show a distinct color pattern for sailors.[25]

The work was completed just as a second hurricane swept through the Dry Tortguas. The repairs held and were closely monitored during the ensuing years. Ultimately it was decided that a new lighthouse would not be necessary.

During this same period, discussions were held about the inadequacies of the Garden Key Lighthouse and its placement within the parade ground of Fort Jefferson. After another hurricane damaged the Garden Key Lighthouse, plans were made to replace it with an iron structure to be located on top of bastion C of the Fort. The original Garden Key Lighthouse was demolished and on April 5, 1876, the new cast iron light tower was lit.[26]

Late Nineteenth-Century Development

> Through the late 1870s, minor repairs were made to several of the Station's structures, and in 1880, a new boathouse was built. From 1888 to 1910, Prussian George Billberry served as keeper of the Light Station. During his service, many repairs and upgrades were made to the Station buildings. From 1880 through the

[24] Ibid.
[25] Hurley, 39.

[26] Hurley, 41. The choice to construct the new tower out of iron was a strategic military decision. If the fort came under attack, a brick tower was considered more dangerous because of the heavy shrapnel produced if hit by shells.

1890s, mineral lamps—otherwise known as Luchaire incandescent oil vapor lamps (i.o.v.)—became the method of illumination. New glass was installed in the lantern, wash houses were built, structures were painted and whitewashed, wire fence was installed, and on "April 30, 1893, the characteristic of the Loggerhead Key light was changed from fixed white to fixed white with a fixed red sector."[27] The implementation of red sector lighting was a navigational advancement for its time. A red pane of glass was installed on the side or sidesof the lantern where the reefs or shoals were particularly dangerous. Shipmen knew not to navigate directly into the red light for this would signal imminently dangerous waters.

For most of the 1890s, once again Loggerhead and Garden keys were used as quarantine stations, this time for those suspected of being infected with small pox. Despite an order in 1893 from the War Department to discontinue the quarantine stations, the two keys would serve this purpose until 1900.

The Spanish American War

In 1898, the United States entered into war with Spain over the liberation of Cuba. The Dry Tortugas served as a harbor and staging area for ships in the area. The most notable incident of the war occurred with the *U.S.S. Maine*. On January 24, 1898, the ship sailed to Havana and a few weeks later it suffered a massive explosion that killed 260 of its 350 sailors and sank the battleship. At the time, the explosion was blamed on an underwater Spanish mine, and as a result, the U.S. declared war against Spain on April 21. The war cry "Remember the Maine!" stems from this incident. The war was relatively short-lived and a treaty ending the conflict was signed in December 1898.

In 1976, a Navy panel came to the conclusion that the blast on the *Maine* was the result of an onboard fire in the coal storage area. It is possible that the fire may have originated while the ship was in the harbor at Garden Key.

Bureau of Lighthouses

With the turn of the century, came a change in the management of the Lighthouse Board. In 1903, the Board was moved from the Treasury Department to the Department of Commerce. In 1910, it officially became known as the Bureau of Lighthouses. Congress intended to accomplish several objectives with this reorganization. First, it sought to demilitarize the lighthouse service. Both the Army and the Navy were not allowed a prominent role on the Board, the goal being to shed a civilian light on a primarily civilian service. Secondly, the reorganization allowed for an increase in districts to accommodate the growing number of light stations. In 1910, George R. Putnam was selected to lead the new Bureau of Lighthouses. Serving for 25 year, Putnam's most notable contributions include the introduction of radio beacons as an added means of navigation, electrification of many light stations and a retirement system for field employees.[28]

The Carnegie Institution Marine Biology Laboratory

In 1904, a portion of the northern end of Loggerhead Key was granted through a revocable lease, to the Carnegie Institute for the establishment of a research laboratory to study marine life in the Atlantic. The Institute declared in their 1904 Year Book the establishment of the Marine Biological Laboratory at the Dry Tortugas, under the direction of Alfred G. Mayor.

Mayor was a Harvard educated biologist who initially studied butterfly pigmentation. However, due to a serious eye inflammation he was forced to pursue research that relied less on work with a microscope. Jellyfish offered the perfect specimen for him to study and he subsequently published a three volume work on the species. The Dry Tortugas offered an ideal location for collecting and observing jellyfish among other tropical plants and marine life.

The laboratory complex was constructed between 1904 and 1906 and was comprised of:

[27] Hurley, 45.

[28] Holland, 38.

a main laboratory building and sleeping porch, a detached lab, a kitchen, a windmill for pumping salt water and air to aquariums, a dock, a shipways, two small outhouses and a cistern. The labs and outhouses were built in New York and shipped to Loggerhead for assembly, while the rest of the buildings were built on site. About 50 palm trees were planted around the lab to shade the buildings and provide hurricane protection. All the buildings, chemicals, lab glassware and furniture cost only $4,800. The lab's research vessel was a 57-foot-long ketch, with a 20 horsepower auxiliary engine.[29]

photographs—both black and white and color were taken there.

Although the Institute viewed Mayor as a promising individual, his selection of Loggerhead Key for the research laboratory was seen as a poor choice. It was too remote and difficult to access and receive support from the mainland. In addition, working around hurricane season left for a brief research period from May until July each year.

Mayor had some aspirations to relocate the lab to Jamaica to create a truly international biological station, but he suffered from



Figure 13. Undated view of the Carnegie Institute's Marine Biology Research Laboratory with the Dry Tortugas lighthouse in the distance.

A vast and diverse program of research was conducted at the laboratory. Some of the most notable accomplishments include groundbreaking research on coral reefs and mangrove communities, the establishment in 1908, of the Dry Tortugas as a wildlife refuge for the sooty tern, and the first underwater

tuberculosis and in June of 1922, his body was found face down on the shore of Loggerhead Key. He was 54 years old. The coroner ruled that Mayor died of "heart-failure and general debility contingent upon his tubercular condition."[30] A plaque erected in his honor in

[29] Hurley, 48. Carnegie Institute Yearbooks.

[30] Calder, Dale R. and Lester D. Stephens. *Seafaring Scientist: Alfred Goldsborough Mayor, Pioneer in Marine Biology,*

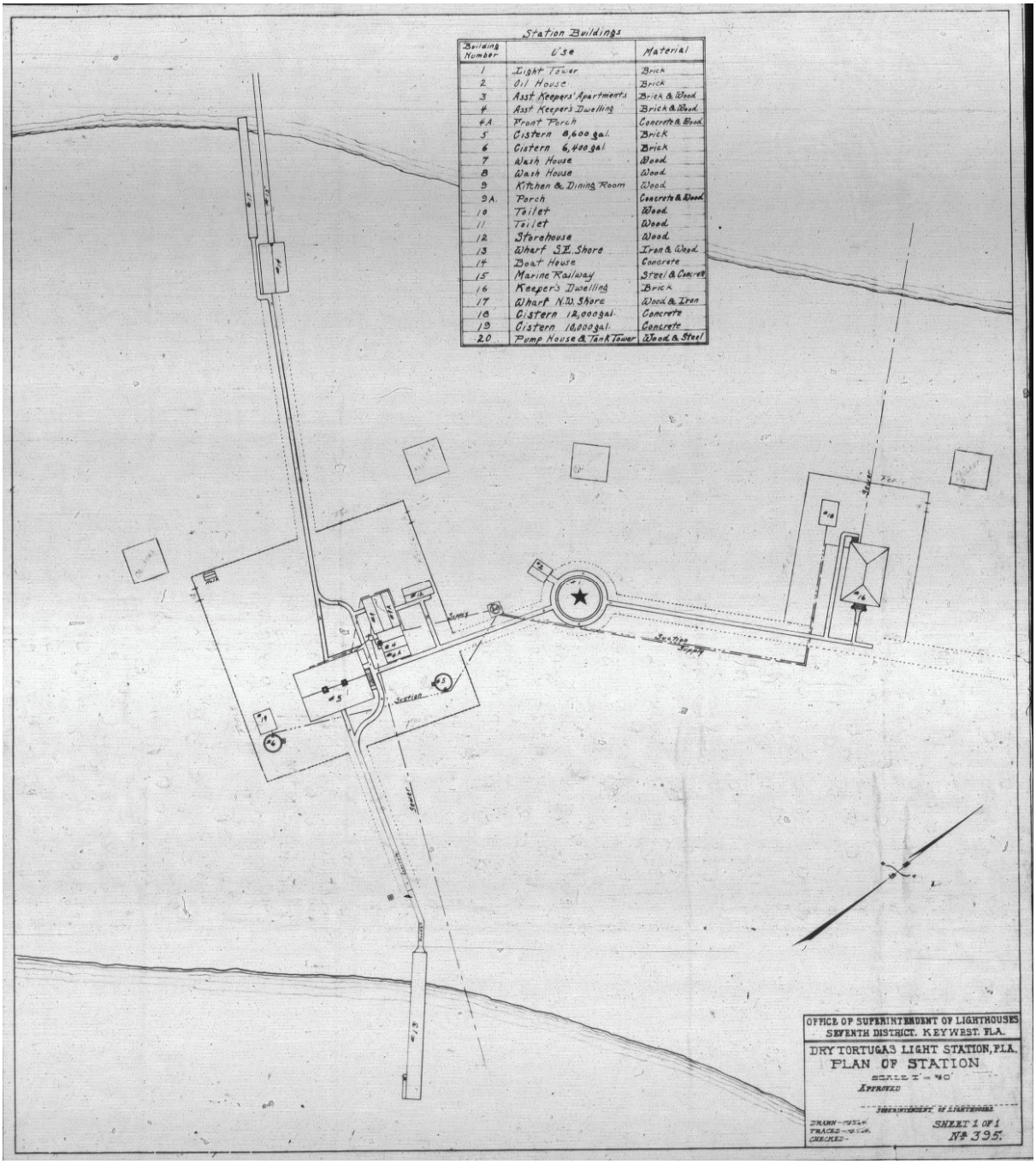


Figure 14. Ca. 1925 Plan of the Dry Tortugas Light Station.

1929 stands near the site of the former laboratory complex.

The Carnegie lab survived through the Great Depression and several hurricanes until 1939, when Carnegie President Vannevar Bush closed the laboratory. Reduced funding and a shift in philosophical focus from macro-biology to microbiology have been reasons stated for the closure.[31] During the thirty-five years of laboratory operation, more than 140 scientists visited and conducted research on,

Columbia, South Carolina: University of South Carolina Press, 147.

[31] Hurley, 49.

and in the waters surrounding Loggerhead Key.

Early Twentieth Century Modernization

The early part of the twentieth century not only included the restructuring of national lighthouse management and the birth of modern marine biology with the establishment of the Carnegie laboratory, but also ushered in modern technological advances at the Light Station. Radio beacons, electricity, concrete cisterns, a new lens and multiple construction projects were completed during this period.

Two significant hurricanes during the 1910s, once again, caused serious damage to the Light Station and the laboratory complex. The hurricane of October 10, 1910, (hurricanes were not named until the 1950s) damaged the wharf, shattered panes of glass in the tower, and severely damaged the dormitory and blew the roof off the main building at the Carnegie laboratory complex. The machine shop was moved off its foundations nearly five feet. On September 8, 1916, Congress allotted $2,800 and;

> a wrought-iron pile wharf with cast-iron caps and wooden girders, stringers, and decking was erected in place of the old wharf, which was destroyed. All work was completed in May, 1917. Amount expended to June 30, 1917, $2,631.19.[32]

As a result of damage sustained in the 1910 hurricane, the original first-order lens was replaced with a second-order lens.

A second hurricane hit the island on September 10, 1919, severely damaging the laboratory by washing away snail breeding cages and resulting in damage to all the buildings.

Fort Jefferson experienced a massive fire in 1912 that destroyed the Garden Key light keeper's dwelling, as well as the fort's barracks, kitchen and latrine. The keeper's house was not rebuilt and some years later the harbor light was deemed unnecessary for navigational purposes and decommissioned. In 1921, the lighthouse on Loggerhead Key



Figure 15. Undated view of the Garden Key Keeper's Residence with the iron lighthouse on bastion C in the distance.



Figure 16. View of Dry Tortugas Keeper's Residence shortly after completion.

became the primary navigational beacon in the Dry Tortugas.

Following the decommissioning of the light on Garden Key, the Bureau of Lighthouses took several steps to upgrade and modernize the Light Station on Loggerhead Key. In 1922, a new dwelling for the primary keeper was constructed and two new concrete cisterns installed. Five years later when the original Oil House was converted to a radio beacon equipment room, it was connected to the tower by a reinforced concrete passageway. The marine radio beacon was installed in 1926 to assist ship traffic and provide basic communication. The new technology offered a means of communicating with mariners about weather, operations, and navigational issues. The marine radio beacons were able to transmit communications to ships in storms when the lighthouse was difficult to see.

The introduction of electricity to the island was another technological advancement that changed the way the Lighthouse and Light Station operated. Powered by generators, housed in a frame addition constructed on the

[32] Ibid.



Figure 17. Image taken from the top of the tower showing the burned remains of the original keeper's dwelling.

south elevation of the former Oil House, the new electric light installed in the Lighthouse in 1931 had 3,000,000 candle-power, making the Dry Tortugas light the brightest in America. Several mariners reported that they could see the light up to 52 miles away. Before electrification, the Lighthouse had a range of approximately 19 miles. The existing incandescent oil vapor lamp was kept as a secondary system.

In 1935 Fort Jefferson was designated a National Monument by President Franklin Roosevelt and was transferred to the National Park Service.

The U.S. Coast Guard

In 1939, the duties of the Bureau of Lighthouse were amalgamated into the operation of the United States Coast Guard. Light keepers were given the choice of becoming petty officers or remaining as civilian employees. During World War II keepers were utilized as lookouts for German U-Boats in the Florida Straits. The threat of attack by enemy U-boats was real as twenty-four American ships were sunk by German submarines during the war. Coast Guard keepers also took part in beach patrols and at times had to rescue or recover victims of U-boat attacks.

During the war, there was some debate as to whether the lighthouse lights should be extinguished or dimmed. Exposing ships to enemies was considered less of a danger than running aground, so the Coast Guard implemented "dim-out" policies in which the intensity of the lamps was turned down.[33]

In March of 1945 a fire destroyed the original 1858 keeper's dwelling and damaged the adjacent kitchen building. As a result, the keeper's dwelling had to be demolished to its foundations. A second fire in 1964 destroyed several of the abandoned Carnegie laboratory structures.

Under management of the USCG the Dry Tortugas Light Station remained manned with a crew of from two, to as many as twelve personnel. From the mid-twentieth century to the 1990s, numerous projects were planned and implemented at the Station beyond the required routine maintenance and minor repairs that took up much of the time of those stationed on the island. A majority of the projects centered on upgrading and repairing the various systems that were critical to habitation of the island such as those that provided potable water, sanitary systems, and generation of electrical power. In 1967, extensive improvements were made to the tower including sandblasting the exterior and repainting the daymark.

Projects in the 1970s focused on the installation of fuel and water tanks, upgrading electrical service and providing fire protection in the 1922 Keeper's Residence or "barracks building" as it was referred to during this period. In 1975 during the construction of a new wharf on the eastern shore, a Seaman Apprentice, William H. Graves, was tragically killed. A small monument dedicated to Seaman Graves is located near the site of the accident.

In 1984, the USCG commissioned National Park Service personnel to prepare a rehabilitation report and national register nomination for the Dry Tortugas Light Station property. This project was undertaken to

[33] Hurley, 57.

document the history of the Light Station and to make recommendations for the appropriate repair of the historic lighthouse and support structures in advance of a planned automation and modernization program. The document included recommendations focused on repairs to the Lighthouse as well as both mortar and paint analysis.

The following year an extensive program of repairs was completed on the Lighthouse, and in 1986, the USCG decommissioned the existing second-order bi-valve lens after aggregate from sand-blasting operations contaminated the mecury float mechanism. As a result the lens was no longer able to rotate and was replaced with an automated 24" Directional Code Beacon (DCB-24). The new lamp was programmed to create a flashing light every 20 seconds that could be seen up to 24 miles away. The bivalve lens was removed and placed on display at the National Aids to Navigation School in Yorktown, Virginia where it remains today.[34]

The National Park Service

Following automation of the Lighthouse optic in 1986 the USCG continued to be challenged by mounting deferred maintenance and limited funding for repair or capital improvements. In an effort to reduce their burden, consideration was given to demolishing several non-essential structures including the boat house and original kitchen building. In addition, advancements in the Long Range Navigation (LORAN) system and GPS (Global Positioning System) technology, as well as the expanded use of Satellite Navigation (SATNAV) resulted in diminishing reliance by mariners on visual aids such as lighthouses and beacons.

About the same time, the National Park Service, and at least two other groups, expressed interest in taking over management of Loggerhead Key and the Light Station property from the USCG. The other groups vying for the property included the Key West Ports and Transportation Authority who was interested in establishing a marine hatchery and science camp on the island, and the Key West Art and Historical Society who expressed an interest in managing the lighthouse, but had not submitted a formal proposal.

In 1991, the Coast Guard determined that the National Park Service presented the most viable proposal and several meetings were held between the two entities to evaluate the condition of the existing resources and to discuss the logistics of a transfer. Negotiations focused on resolution of several utility issues regarding the electrical generators and septic system and also a requirement for the USCG to remove all hazardous materials from the island as a condition of transfer. Despite their desire to divest themselves of the Light Station completely, the USCG would continue to maintain the light as an active aid to navigation and provide logistical support to the Park Service as part of the agreement. Transfer of the light station also provided opportunity for the USCG to eliminate permanent staff on the island and limit its obligation to routine site visits to maintain the optic. Establishment of Dry Tortugas National Park the following year provided the ideal mechanism for formally transferring Loggerhead Key and the Light Station to the National Park Service.

Dry Tortugas National Park was created in 1992 to "preserve and protect for the education, inspiration, and enjoyment of present and future generations nationally significant natural, historic, scenic, marine and scientific values in South Florida." The Park boundaries established at the time encompassed all of the seven small islands that make up the Dry Tortugas as well as the coral reefs, shoals and waters within an approximately 100 square-mile area. As part of the enabling legislation for the Park, the USCG lands, including all of Loggerhead Key were formally transferred from the USCG to the National Park Service. The establishment of Dry Tortugas National Park also resulted in the Light Station resources being listed on the National Register of Historic Places.

Through its Volunteers-In-Parks (VIP) program, the Park Service has been able to maintain a consistent presence on Loggerhead Key for much of the last two decades. The volunteers, who stay on the island for one to several months at a time, are housed in the

[34] Dean, 99.



Figure 18. Chug used by Cuban refugees to land at Loggerhead Key in 2008.



Figure 19. Graffiti left by Cuban refugees on wall of Boathouse.



Figure 20. Aerial view of Loggerhead Key showing density of Australian Pine growth prior to de-vegetation project.

former kitchen building and perform limited repair and maintenance of the resources. More importantly their presence provides a level of security for the island that serves as a deterrent to those that may seek to damage or cause harm to cultural or natural resources.

Since the National Park Service assumed management of the Light Station they have had the additional challenge of dealing with Cuban refugees making landfall at Loggerhead Key. The Dry Tortugas have become a primary landing point for the refugees due to their proximity to Cuba and remote location.

Since adoption of the "wet foot/dry foot" policy in the mid-1990s, the influx of refugees has been steady. The wet foot/dry foot policy generally states that if a refugee is able to make landfall on U.S. soil they will be allowed to stay and can pursue citizenship, on the other hand, if they are intercepted in the waters between Cuba and the United States, they will be sent back to Cuba or to a third country.

Generally arriving at night, during periods of calm weather, the refugees cross the open waters between the two countries in make-shift boats referred to as "chugs." These chugs accumulate on the keys and intermittently have to be removed to the mainland for disposal.

After the Mariel Boatlift in 1980, the numbers of Cuban refugees attempting to enter the United States peaked again in 1994 and 2005. Refugees that make landfall within the Park are temporarily detained by the National Park Service until USCG officials can transfer them to the mainland for processing. Historic resources, primarily the Boathouse on Loggerhead Key and the casemates within Fort Jefferson on Garden Key, are occasionally used to temporarily house landed refugees. In recent years the USCG has increased its patrols in the waters around the Park reducing the number of refugees making landfall on the Keys.

The National Park Service has also recently completed an extensive landscape restoration program to remove the Australian Pine and other exotic plants from Loggerhead Key. These invasive species were introduced by Carnegie Institute personnel during the first half of the twentieth century dramatically changing the landscape character of the island. The program has been successful in removing the trees and returning the island to its pre-Carnegie appearance.

With the exception of the Lighthouse which continues to function as an active aid to navigation, the resources of the Dry Tortugas Light Station are primarily used for housing and also to shelter critical components of the island's utility systems. Volunteers from the VIP program occupy the former original kitchen building for most of the year and the 1922 Keeper's Residence is reserved for intermittent use by National Park Service personnel, researchers or contractors. The USCG also maintains a room in the Keeper's Residence for its use during routine visits to service the light. Visitation to the Park is limited by the Park's General Management Plan Amendment currently limits the numbers of visitors allowed on the island to 24. It also establishes permissible activities allowed on the island which include hiking, picnicking and exploring. The GMPA currently restricts access to the Lighthouse and Light Station buildings by the visiting public until such time as they can be made safe for this level of use.

Chronology of Development and Use

Historical research conducted in the federal records of the Lighthouse Service, Coast Guard, and National Park Service, and investigation of the existing buildings during the course of the present study provide an understanding of the broad patterns of development and use of the existing Ancillary Structures at the Dry Tortugas Light Station. These structures include the Kitchen Building, Brick Cisterns, Concrete Cisterns, Boat House, New Oil House (also referred to as the Bosun's Workshop), and Concrete Walkways.

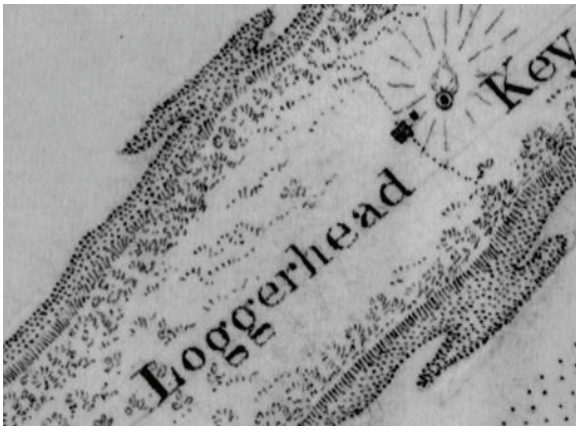


Figure 20. Close-up of an 1862 site plan of the Dry Tortugas Light Station.



Figure 21. Undated view of the Light Station buildings from the nineteenth century.

Light Station Construction

With a Congressional appropriation of $35,000, construction of the Dry Tortugas Light Station began in 1857 under the supervision of Captain Daniel Woodbury. Completed in 1858, the Light Station initially included several structures sited in the middle of Loggerhead Key. In addition to the 150 foot brick Lighthouse and detached two story Oil House, the Station also included a Keeper's Dwelling (no longer extant), Kitchen Building, Brick Cisterns, and several wash houses and privies.

The purpose of these ancillary buildings and structures was to provide living and working spaces for the keepers and their families in support of the Lighthouse operation. The extant Concrete Cisterns, Boat House, New Oil House and Concrete Walkways were constructed in the 1920s, during a period of modernization at the Light Station.

Original Keeper's Dwelling

Built in 1858, the original Keeper's Dwelling and the original brick Kitchen building were constructed to house the principal Lighthouse keeper, his two assistants, and their families.[35] No longer extant, these two buildings were located to the south of the Lighthouse and Oil

[35] Department of Commerce, Recommendation for Repairing Aids to Navigation, January 3, 1917. Record Group 26: National Archives, Washington, DC.

House, with the Kitchen Building sited just to the north of the Keeper's Dwelling.
The Keeper's Dwelling was a two-story brick building constructed with elements of the Greek Revival style. Measuring 48' x 56', each floor of the building had two rooms located off a central stair hall and there were two interior chimneys that served fireplaces, one for each side of the house. Galleries ran across the front and back of the building. The rear gallery was partially enclosed. The Keeper's Dwelling was destroyed by fire in 1945.

Kitchen Building
This two story brick building has a side-gabled roof and measures 20' by 20'. The first floor functioned as a communal kitchen, and was served by a large fireplace and bake oven. The second floor was designated as living quarters for one of the assistant keepers. [36]

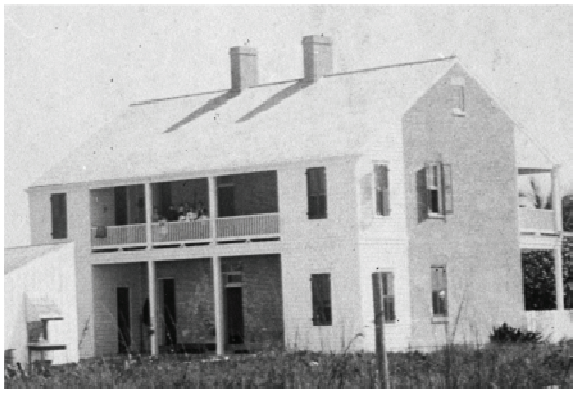


Figure 22. Close-up view of rear elevation of original Keeper's Dwelling.

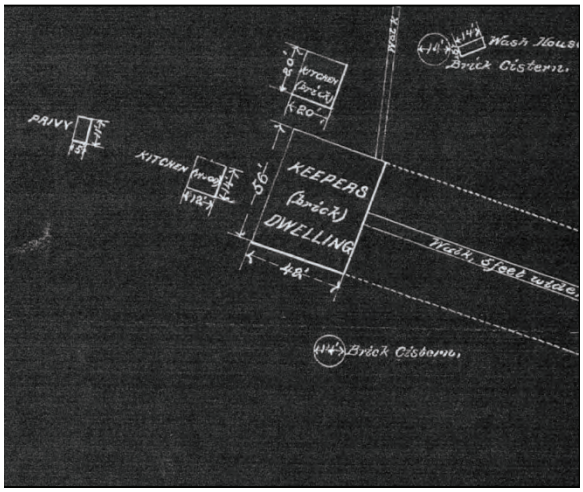


Figure 23. Detail from 1887 survey of Station showing location of original Keeper's Dwelling and Kitchen.

Brick Cisterns
Two brick cisterns were constructed as original features of the Light Station. Given that there is no natural source of fresh water on Loggerhead Key, construction of the cisterns would have



Figure 24. Late nineteenth century image of the rear elevation of original Kitchen building.

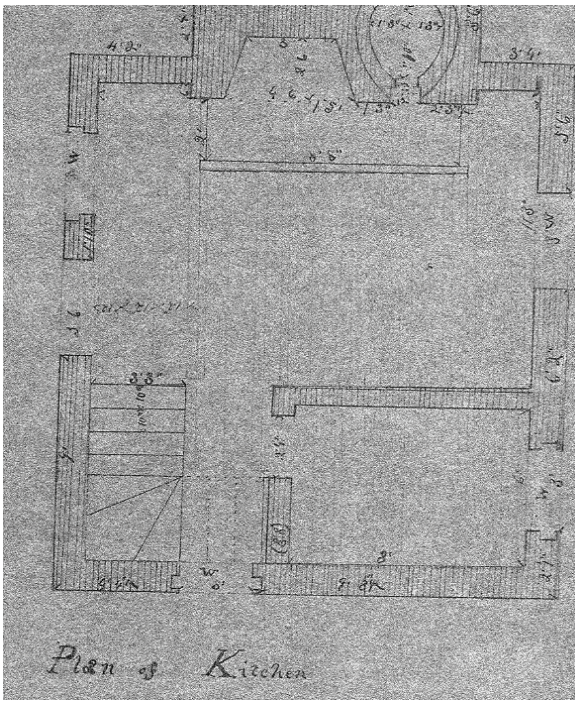


Figure 25. Undated first floor plan of original Kitchen building showing bake oven at upper right.

[36] Dean, 85.

been a priority in order to accommodate human occupation of the site. The cisterns were used to collect rainwater for general use by the keepers and their families. The circular cisterns are 14' in diameter and were constructed in close proximity to the Keeper's Dwelling and Kitchen Buildings so that rainwater falling on the building roofs could be collected and channeled to the cisterns. A system of copper gutters and iron piping, supported on stilts, carried the rainwater run-off from the building roofs to the cisterns. It is likely that water was drawn from the cisterns by a hand pump during the nineteenth century.



Figure 26. Undated view of brick cistern located adjacent to original Kitchen.

Walkways

An extensive network of concrete walkways currently extends between the main dock and all of the Light Station structures. Walkways were likely constructed as original features of the Light Station to make it easier to walk and transport supplies between the dock and the Station buildings. The material of the original walkways is not recorded on early drawings. It is possible that the walkways were initially constructed of wood and then later changed to concrete. Cementing of the walkways is mentioned in correspondence from as early as 1885. Walkways are shown on the 1887 plans of



Figure 28. Circa 1941 photo of original brick cistern adjacent to Keeper's Dwelling. Note concrete cistern in background.



Figure 27. Undated (post-1945) photo of brick cisterns adjacent to original Kitchen building (in foreground) and Keeper's Dwelling site (in background).

the Station; however the material is not indicated. The plans shows a five foot wide walkway extending from the front door of the original Keeper's Dwelling east toward the beach, a three foot wide walk extending between the Keeper's Dwelling and the Lighthouse and another five foot wide walkway from the Lighthouse to the main wharf on the east side of the Key. The smaller scale plan of the entire Key, also from 1887, shows a walkway between the Keeper's Dwelling and the boathouse on the west shore of the island. The same configuration of walkways is shown on a later plan from 1904.

Early Years

Maintenance and repair of the Light Station buildings were routine in the harsh marine environment, with support buildings such as wash houses, privies, boathouse and docks being continually repaired and often replaced following storms.

Descriptions of repairs made to the Light Station between 1858 and the turn of the twentieth century are synthesized in the clipping files for the Dry Tortugas Light Station. These files contain excerpts taken from the Annual Reports of the Lighthouse Board for each lighthouse within the system.

These records indicate that repairs were made to the roof of Keeper's Dwelling in 1860, just before outbreak of the Civil War. Begun in 1861, the Civil War had little impact on the Light Station. While Florida seceded from the Union in the early part of that year, the Dry Tortugas remained under the command of Union forces throughout the war with the 47th Regiment of the Pennsylvania Veteran Volunteers stationed at Fort Jefferson.

Following the conclusion of the War in 1865, the Light Station Annual Reports indicate that extensive repairs and renovations were made at the Station in 1866. The next year, 1867, a yellow fever outbreak occurred in the Dry Tortugas and Loggerhead Key was used as a quarantine

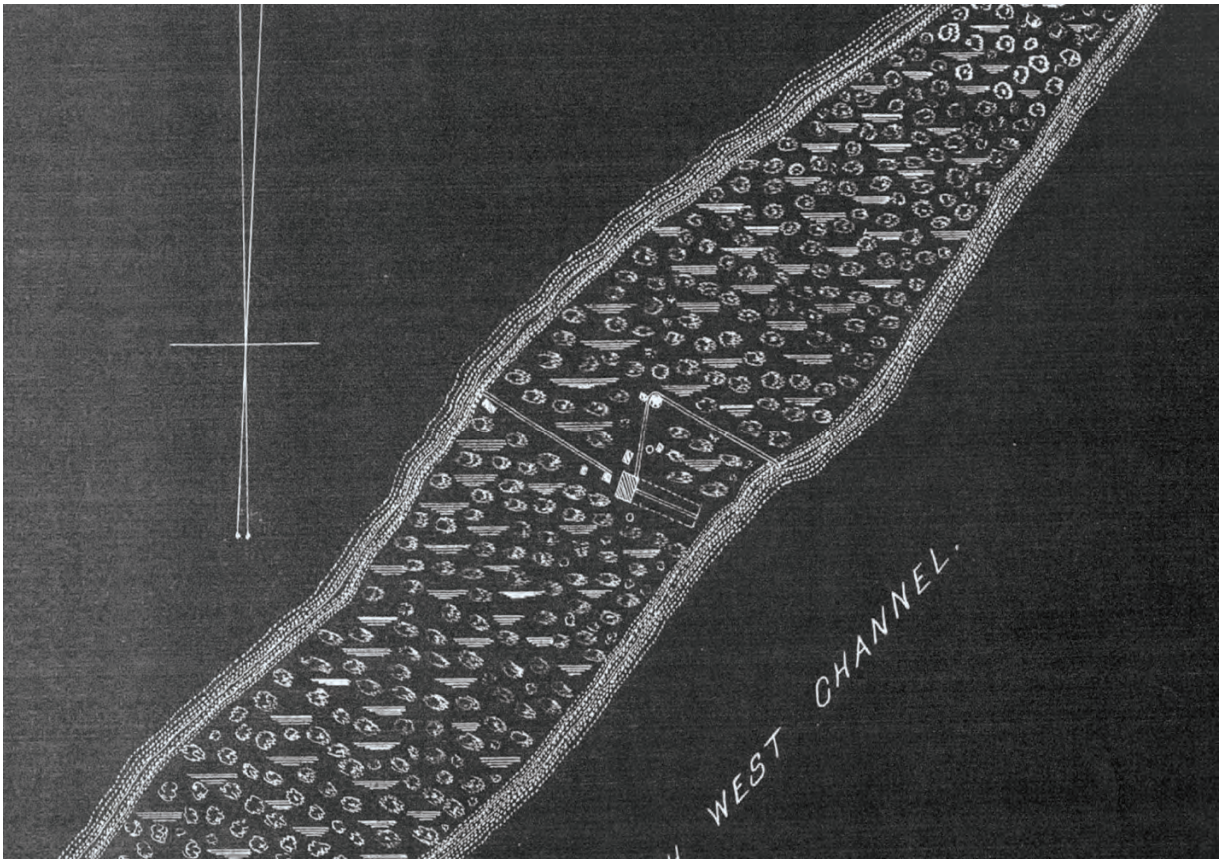


Figure 29. Detail of 1887 Light Station survey showing network of walkways between buildings.

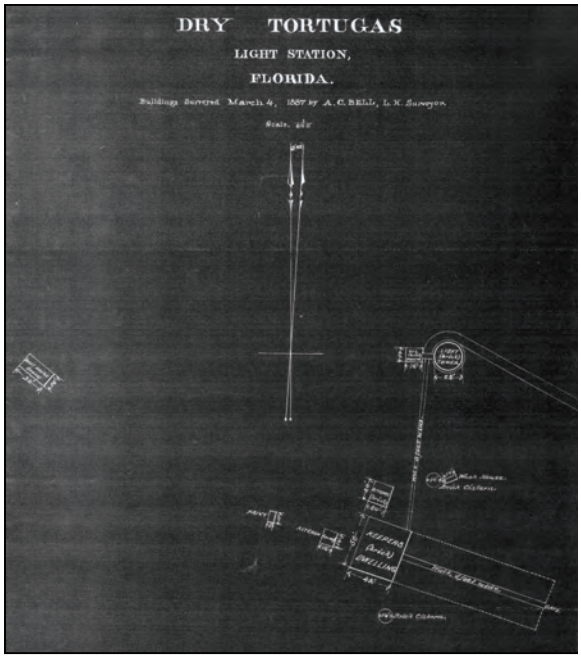


Figure 30. 1887 survey of the Light Station by A.C. Bell.

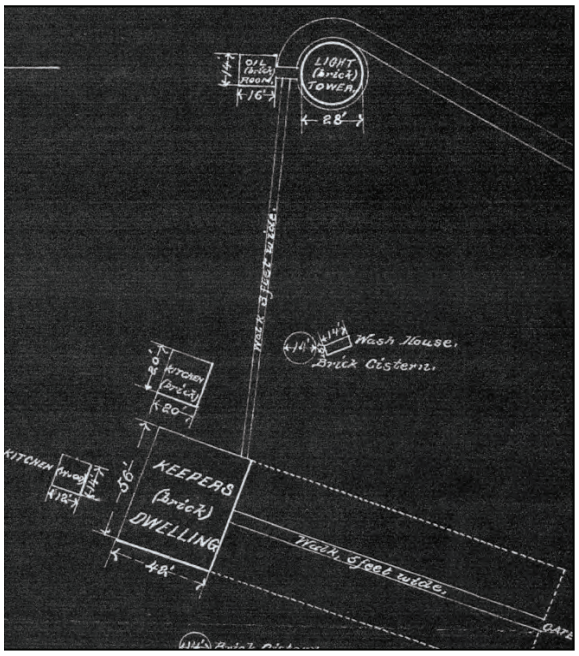


Figure 31. Close-up of 1887 small-scale plan of Light Station showing existing walkways.

station for military personnel. The housing of all healthy soldiers at Loggerhead Key strained resources at the Light Station and caused the Station buildings to fall into disrepair for several years thereafter.

A series of improvements to the Light Station followed, including the replastering of the Oil House and Kitchen in 1869.[37] The Station's first Boat House was constructed in 1871.[38]

A second outbreak of yellow fever affected the Dry Tortugas in September of 1873, requiring all healthy soldiers on Garden Key to again be relocated to Loggerhead Key. The healthy soldiers were still billeted on Loggerhead Key when the hurricane of 1873 struck the island.

Late Nineteenth Century

Hurricanes and other strong storms caused extensive damage to the Station buildings over the years. The October1873 hurricane passed to the north of Loggerhead Key causing severe damage to the Light Station. In addition to damage to the Lighthouse itself, the Station's ancillary structures were also damaged.

In a letter by the Seventh District Lighthouse Inspector to Prof. Joseph Henry, Chairman of the Lighthouse Board, the inspector describes that the dwelling and outbuildings were badly damaged with shingling blown away, gutters torn off buildings, a cistern burst above ground, plastering on ceilings and walls of dwelling and oil room damaged, fences down, and Boat House destroyed.[39]

Descriptions of damage from the hurricane also described the roof-to-cistern gutter system as having been blown away and destroyed. Given the frequency of storms in the area it is likely that the relatively fragile system of gutters would have been routinely repaired or replaced.

Because Loggerhead Key was still under the yellow fever quarantine and contact with the island was limited, only temporary repairs could be made following the storm. Eventually the upper portion of the Lighthouse was extensively repaired and repairs to ancillary structures were completed. The walk in front of the Keeper's

[37] Hurley, 39.
[38] Dean, 85.
[39] United States Lighthouse Board, List of General Correspondence, 1791-1900, National Archives and Records Administration, Washington, DC. Record Group 26. NC-31. Series 38.

Dwelling was cemented, the water-conductors to the cisterns were repaired and the cisterns themselves were cleaned and repaired. [40]

No sooner had these repairs been completed when a second hurricane struck the island in September 1875. Many doors, windows and gutters of the ancillary structures were damaged from this second storm.[41] Repairs were made to several of the Stations structures after the storm and through the late 1870s. In 1878, the Station buildings were repainted and miscellaneous repairs were completed.

The Station's second Boat House was constructed in 1880 to replace the first Boat House destroyed in the 1873 hurricane. This new wood frame Boat House measured 16' x 30' and was located on the western shore of the island. [42]

A March 4, 1887 survey of the island by A.C. Bell indicates that the Light Station consisted of the Lighthouse, Oil House, Keeper's Dwelling, brick Kitchen building, wood frame Kitchen building, wood frame boat house, two brick cisterns, washhouse, and privy.[43]

Many additional repairs and upgrades were affected at the Light Station from 1888 to 1910. The Station was thoroughly repaired and painted and two new washhouses were constructed in 1889. New wire fencing extending 728' was erected and painted in 1896. A ten foot addition was made to the boat house, a new roof and floors were installed at the Keeper's Dwelling, and walks were constructed from the Kitchen Building to the Keeper's



Figures 32. Undated view of Carnegie Institute's main laboratory building.

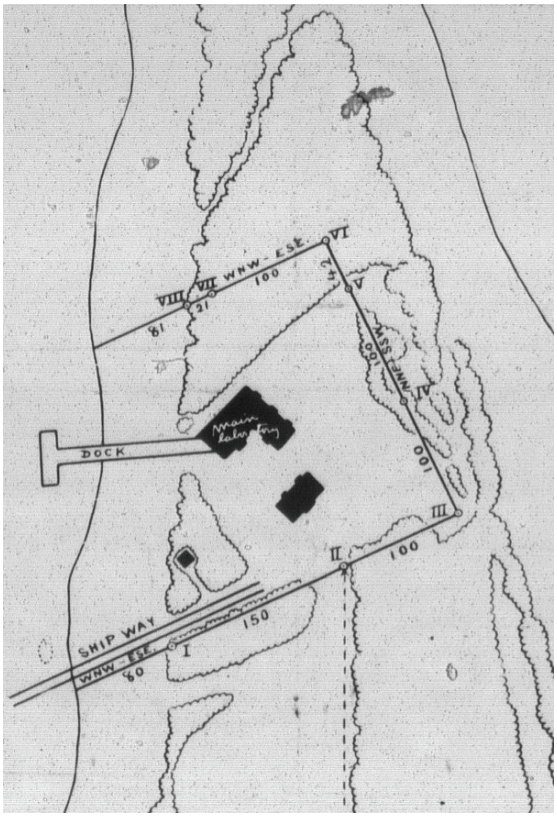


Figure 33. 1904 Site Plan of Carnegie Institute.



Figures 34. Undated view of Carnegie Institute's dock.

[40] Florida Center for Instructional Technology, College of Education, *Florida's Role in the Civil War: "Supplier of the Confederacy",* University of South Florida, 2009 http://fcit.usf.edu/Florida/lessons/cvl_war/cvl_war1.htm.
[41] Dean, 91.
[42] Hurley, 44.
[43] Survey of Dry Tortugas Light Station, Florida. A.C. Bell, L.H. Surveyor. March 4, 1887.

Dwelling and washhouse in 1899.

Early Twentieth Century

The turn of the twentieth century brought several important changes to the Dry Tortugas. In 1900, the military reservation of the Dry Tortugas, including Loggerhead Key, was transferred from the Army Department, which had controlled the area since 1842, to the Navy Department. This change of oversight took place because the Army had ceased to maintain Fort Jefferson as an active post. Instead, the Navy had



Figure 35. Undated view of plaque commemorating Alfred Mayor.

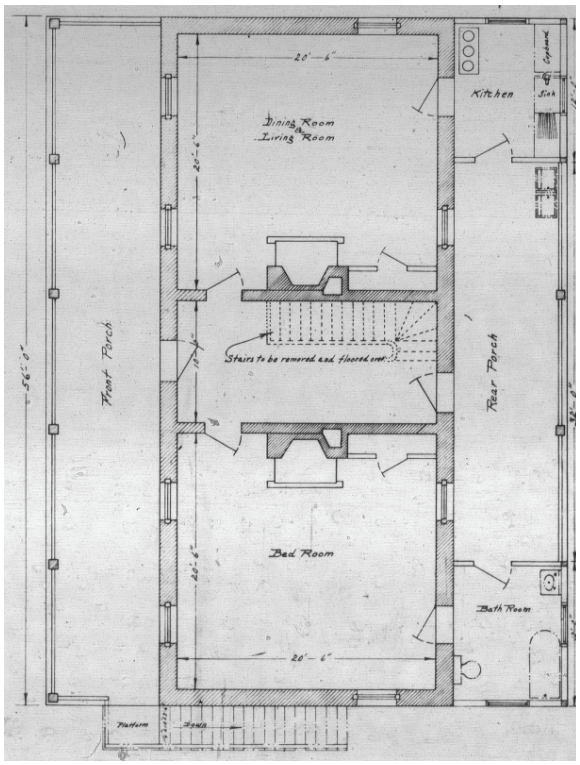


Figure 36. Keeper's Dwelling floor plan from "Repairs & Improvements" to Assistant Keeper's Apartments.

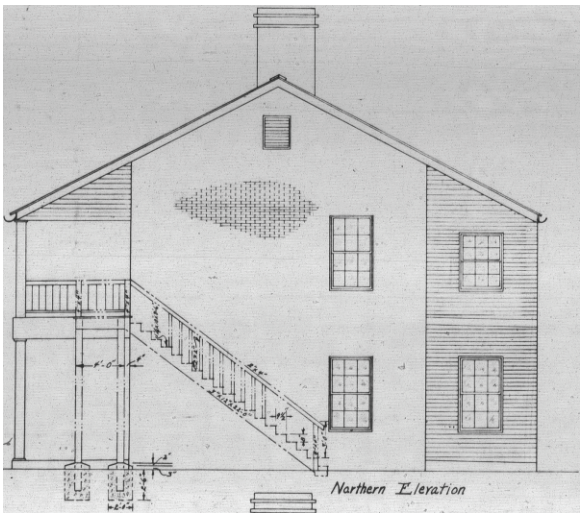


Figure 37. Northern elevation of Keeper's Dwelling from "Repairs & Improvements" to Assistant Keeper's Apartments.



Figure 38. Undated photo (Ca. 1941) of exterior stairway at north elevation of Keeper's Dwelling.

been using the Fort as a coaling station for naval vessels.

Several years later, in 1903, the management of the Light Station changed as the Lighthouse Board was moved from the Treasury Department to the Department of Commerce. In 1910, body governing lighthouses officially became known as the Bureau of Lighthouses.



Figure 39. Ca. 1941 photo of enclosed rear porch at Keeper's Dwelling.



Figure 40. Undated aerial photo (pre-1926) of Light Station with original Keeper's Dwelling in foreground.

During the next year, 1904, part of the northern end of Loggerhead Key was granted to the Carnegie Institute for the establishment of a Marine Biological Laboratory. Its purpose was to study marine flora and fauna in the Keys under the direction of Alfred G. Mayor.

Constructed between 1904 and 1906, the complex included several buildings and structures, including the main laboratory building, detached lab, kitchen, windmill for pumping salt water and air to aquariums, dock,

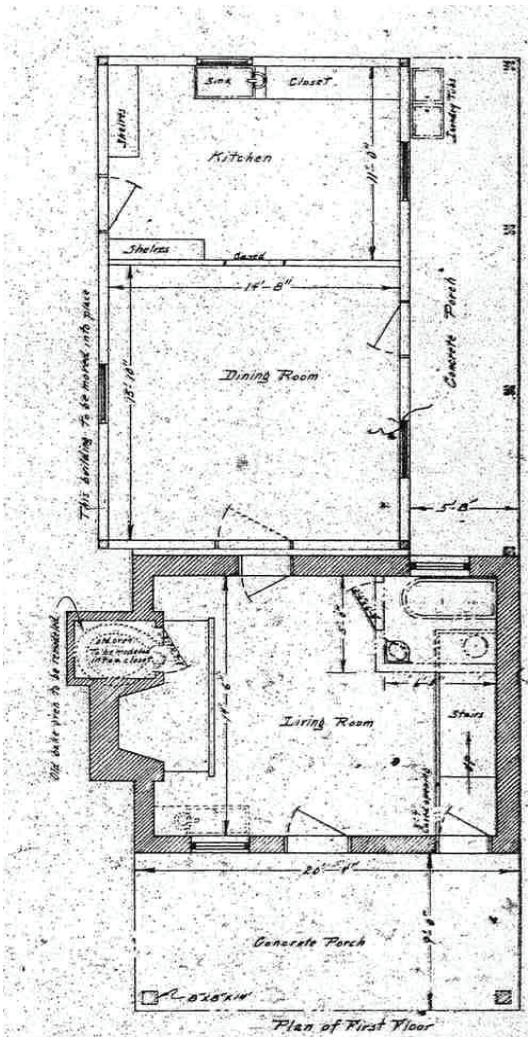


Figure 41. Close-up of Kitchen floor plan from 1922 "Repairs & Improvements" to Assistant Keeper's Dwelling.



Figure 42. Undated photo of Kitchen with brick columns.



Figure 43. Northern elevation from 1922 "Repairs & Improvements" to Assistant Keeper's Dwelling.



Figure 44. Ca. 1941 photo of kitchen/dining room attached to rear of original Kitchen Building.

shipways, two small outhouses, and cistern.[44] The Carnegie Institute operated the lab during the summer months from 1904 to 1939 when the facility was closed. The facility was abandoned in the following years, and a fire destroyed a majority of the buildings in 1969. None of the Carnegie buildings remain today, but a plaque erected in honor of Alfred Mayor is present near the site.

At the Light Station, additional improvements were implemented during the first decades of the twentieth century. In 1906, two storerooms, new porches on the Keeper's Dwelling, approximately 164' of 5' wide walkway, and 200' of 5' picket fence were constructed. Repairs were made again to the roof of the Keeper's Dwelling in 1911 following damage to the Light Station from a hurricane on October 10th of that year. A new wrought-iron pile wharf with cast-iron caps and wood girders, stringers, and decking was erected in 1917 after the old wharf was destroyed by another hurricane on July 5, 1916. Another hurricane struck the island on September 10, 1919, severely damaging the buildings at the Carnegie Laboratory and destroying the Light Station's second Boat House. Following this storm, repairs were made again to the roof of the Keeper's Dwelling.

Light Station Modernization

Following the decommissioning of the light at Garden Key in 1921, the Bureau of Lighthouses undertook the first major building program to modernize the Light Station since its original construction. This modernization included technological advances such as the installation of a radio beacon and electrical generators. Multiple construction projects also took place during this period, including renovation of the Keeper's Dwelling and Kitchen as well as construction of a new one-story brick Keeper's Residence, two concrete cisterns, and a new oil house (The original Oil House was converted to house radio beacon equipment at this time).

Original Keeper's Dwelling

The Keeper's Dwelling was extensively renovated in 1922 to house two of the assistant

[44] Hurley, 48.

keepers and their families.[45] Drawings from this period indicate that the interior stairs were removed and the central hallway floored over to provide more usable space. An exterior stairway was constructed at the north elevation to provide a separate entrance to the second floor apartment.

Floor plans from 1922 show that each apartment had a dining/living room and bedroom off the main hall. One corner of the rear porch was enclosed to house a kitchen accessible from the porch and adjacent dining/living room. The other corner of the rear porch was enclosed to accommodate a bathroom which would be accessible from the porch and adjacent bedroom. This building was renamed the Assistant Keeper's Apartments.

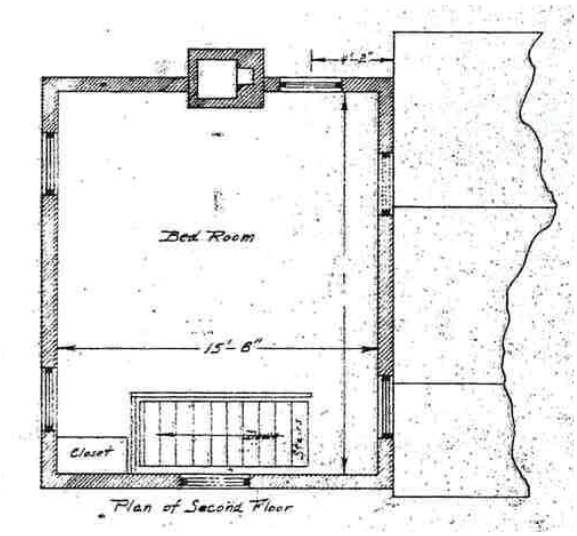


Figure 45. Second floor plan of Kitchen building from 1922 "Repairs & Improvements" to Assistant Keeper's Dwelling.

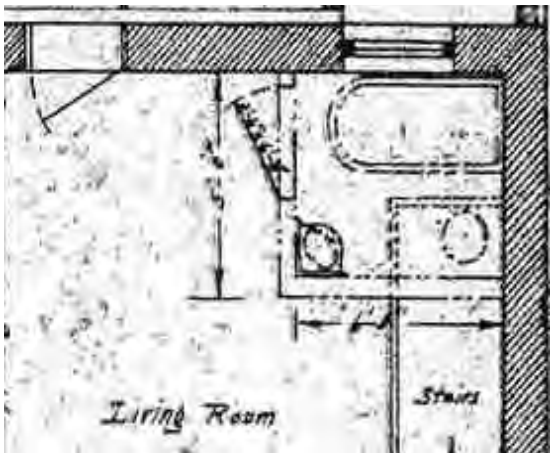


Figure 46. Close-up of bathroom on Kitchen floor plan from 1922 "Repairs & Improvements."

Kitchen

The original Kitchen building had been repurposed as the Assistant Keeper's Dwelling by the 1920s. To accommodate this use, the building was renovated in 1922. Plans for the "Repairs & Improvements" to the building indicate that a front porch and rear addition were added to the building and the interior floor plan was altered. At this time a bathroom was added, the stairs reconfigured and a door was added to the front elevation.

The roof was extended at the building's façade approximately 9' from the building to provide an overhang for a front porch. The porch roof was supported by two 8" x 8"wood columns at the corners with large timber bracing between the columns and front wall. This full-width porch was 9' deep and 20' across and had a concrete floor.

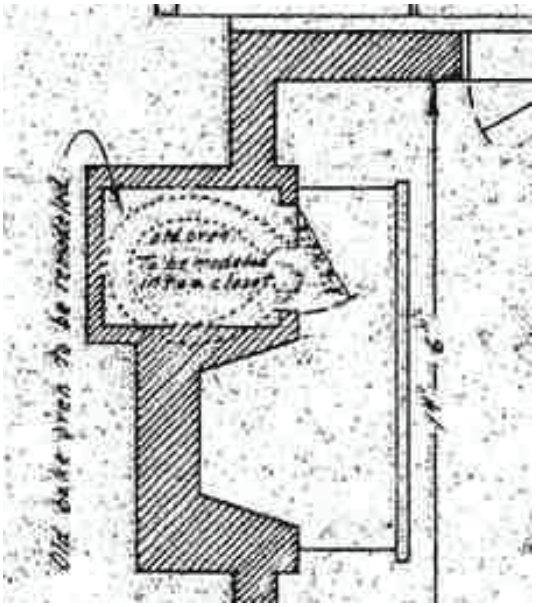


Figure 47. Close-up of brick oven Kitchen floor plan from 1922 "Repairs & Improvements."

[45] Hurley, 65.

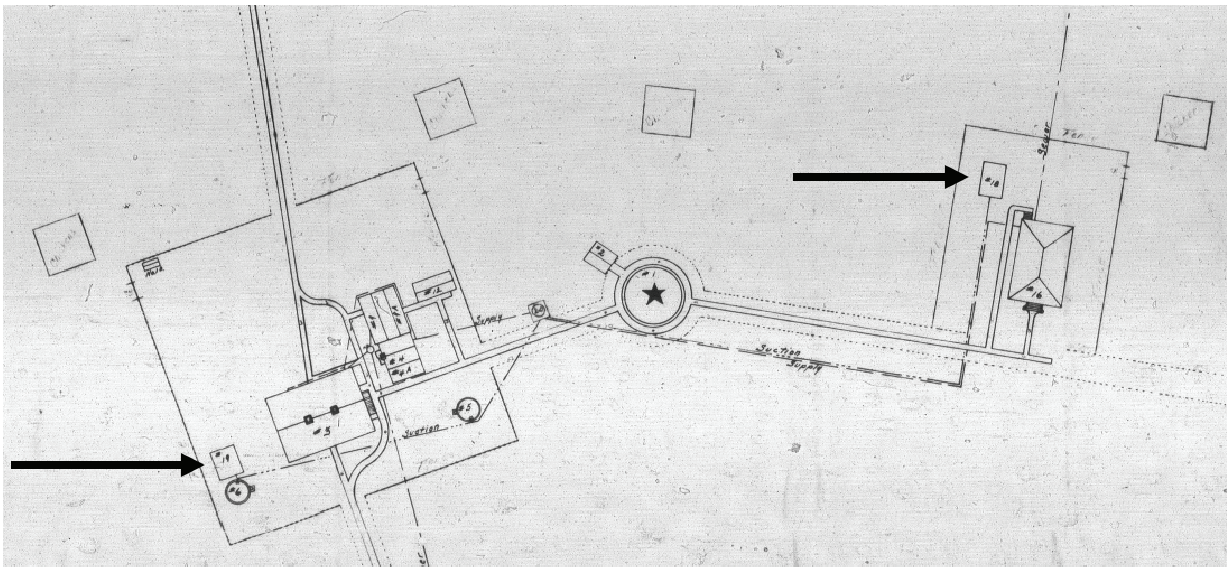


Figure 48. Close-up of 1925 Station site plan showing location of concrete cisterns.

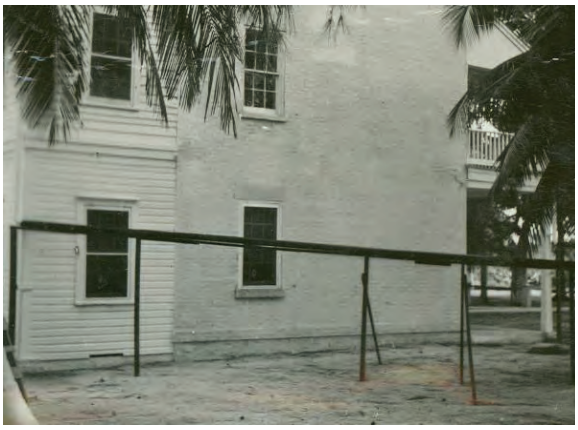


Figure 49. Ca. 1941 photo of gutters leading from Keeper's Dwelling downspouts to cisterns.



Figure 50. Ca. 1941 photo of concrete cistern adjacent to 1922 Keeper's Residence.

The plans indicate that a 14'-8" x 27' building with a full-width front porch of 5-8" depth was "moved into place" and adjoined to the rear of the original brick Kitchen building. It is unknown if the 12' x 14' wood frame kitchen building present in the 1887 Station survey was enlarged and attached to the rear of the brick kitchen or if the new addition was constructed off site and brought to the island. This one-story gable building housed a separate kitchen and dining room for the assistant keepers.

To provide living arrangements for the assistant keepers, the first floor was a living room with interior stair to the second floor bedroom. Plans show that a 5' x 6'-8" bathroom was constructed on the first floor. Plans also show that an original bake oven built into the base of the chimney was modified for use as a closet.

Concrete Cisterns

Two concrete fresh water cisterns were constructed in 1922 to increase the amount of rainwater collected from the building's water collection systems. Like the brick cisterns, these new cisterns were located in close proximity to Station buildings. A 10,000 gallon cistern was located south of the Keeper's Dwelling and a 12,000 gallon cistern was located adjacent to the new 1922 Keeper's Residence.

The new cisterns were connected to a central water tower and pump house, located between the Kitchen Building and the Lighthouse. Water was distributed from the cisterns to the Light Station buildings via underground piping. The brick cisterns were connected to the central pump house and water tower at this time.



Figure 51. Undated photo of Boat House and Marine Railway on western shore of island.

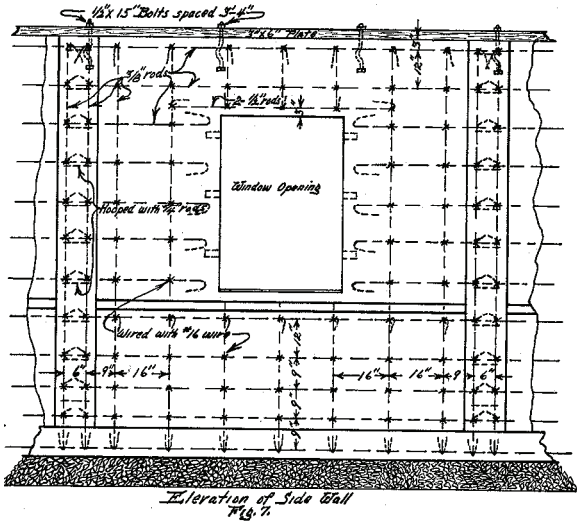


Figure 52. Close-up side wall elevation from 1921 "Boat House Reinforcing & Roof Detail" drawings.

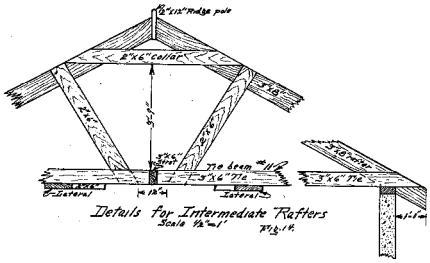


Figure 53. Detail of intermediate rafters from 1921 "Boat House Reinforcing & Roof Detail" drawings.

Boat House

The Station's third Boat House and marine railroad were constructed in 1923, after the second Boat House was destroyed by a 1919

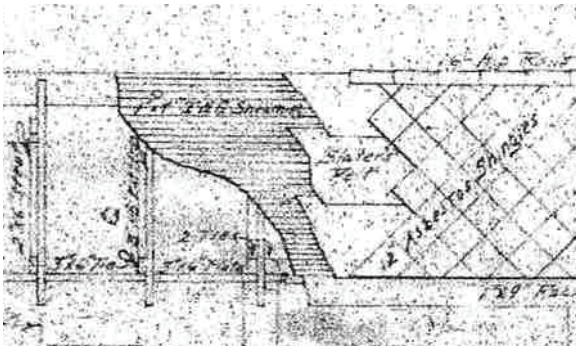


Figure 54. Close-up of roofing details from 1912 elevation of "Boat House & Marine Railway" drawings.



Figure 55. Ca. 1940s photo of side elevation of Boat House showing shuttered windows. openings.



Figure 57. Ca. 1940s photo of rear elevation of Boat House.

hurricane. The Boat House was located on the west shore of the island. Drawings of the "Location Plan and Railway Details" show that the Boat House was sited 95' from the shoreline. Drawings for this structure indicate that the Boat House was originally 42' – 9" in length x 20' in width. The Boat House walls were constructed of reinforced concrete on reinforced concrete footings to better resist the destructive winds of the frequent storms that hit the island.

The front gable roof was constructed with a timber frame structure consisting of a 2'x 12' ridge pole, 3' x 8' rafters, 2' x 6' collars, 2' x 6' struts, and 5' x **6' tie** beams. The original roofing was asbestos shingles over 1' x 4' tongue and groove wood decking. The roof ridge was covered with 16" ridge rolls. The roof edges were finished with a 1" x 8" fascia at the gable ends and a 1" x 9" fascia along the wall edges. The side elevations were divided into four bays, each containing a 3' 5" window opening. While there were no sashes installed, the openings were secured from the elements by battened wood shutters.

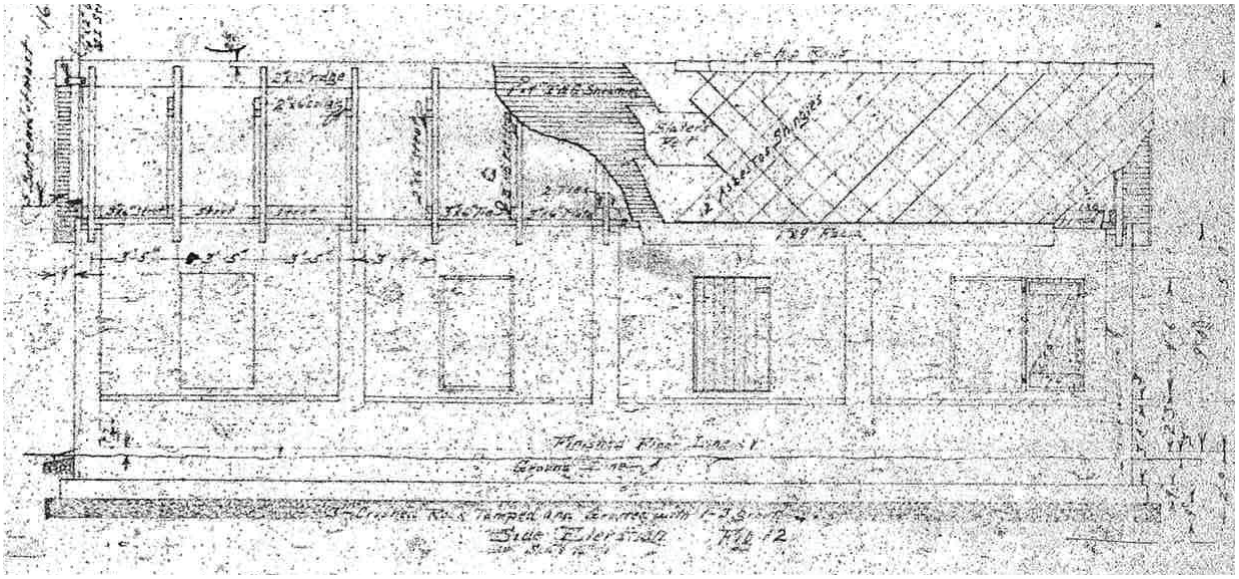


Figure 58. Close-up of side elevation from 1912 "Boat House & Marine Railway" drawings.

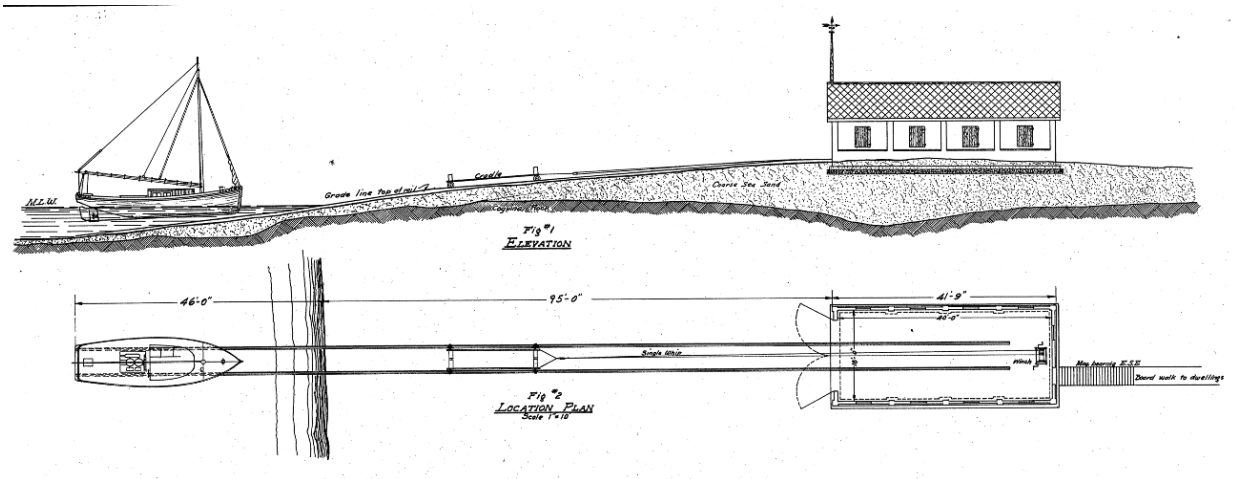


Figure 59. Elevation (above) and location plan (below) of Boat House from 1923 "Boat House & marine Railway" drawings.

There were two door openings into the structure. A five-panel wood door provided access to the rear (northwest) elevation. Large wooden double-doors provided access for the Station boat at the front (southeast) elevation. Each leaf of the double doors measured 6'-8"in width by 9'-8" in height and was attached to the frame with metal strap hinges.



Figure 60. Ca. 1941 photo of marine railway extending into the Gulf of Mexico.



Figure 61. Ca. 1941 photo of Boat House interior with rails imbedded in concrete and end of boat cradle.



Figure 62. Undated oblique view of Oil Storage Building/Bosun's Workshop adjacent to Lighthouse.

The marine railway originally extended 174', including 33' within the Boat House, 95' from the Boat house to the shore line, and 46' into the water. The railway structure consisted of 350 linear feet of 60" A.S.C.E. steel rail attached to 8" 10" creosoted stringers by 350 5" railroad spikes. The rail was supported by seventeen reinforced concrete piers. An iron cradle attached to a hand winch was used to raise and lower the Station boat.

New Oil Storage Building

In 1926, the original Oil House was repurposed from storing oil and materials to housing an electrical generator and radio beacon equipment to facilitate communication between the light keepers and mariners about weather, operations, and navigational issues.

That same year, after the original Oil House was repurposed, a new Oil Storage Building was constructed to house oil drums. Constructed of reinforced concrete, the Oil Storage Building measured 16' x 14' and was located northeast of the original Oil house/Radio Beacon building.

Love Dean, in her book "Lighthouses of the Florida Keys," states that "engineers took care to design a new oil house that was in keeping



Figure 63. Undated oblique view of Oil Storage Building/Bosun's Workshop with tower and Radio Beacon Building in background.

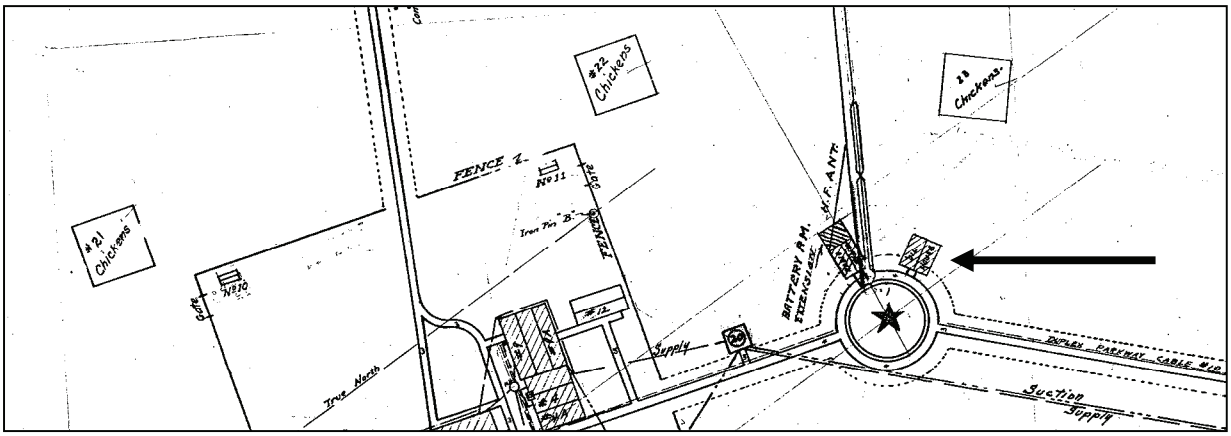


Figure 64. Close-up of 1943 Station site plan showing the new Oil Storage Building adjacent to Lighthouse and original Oil House.

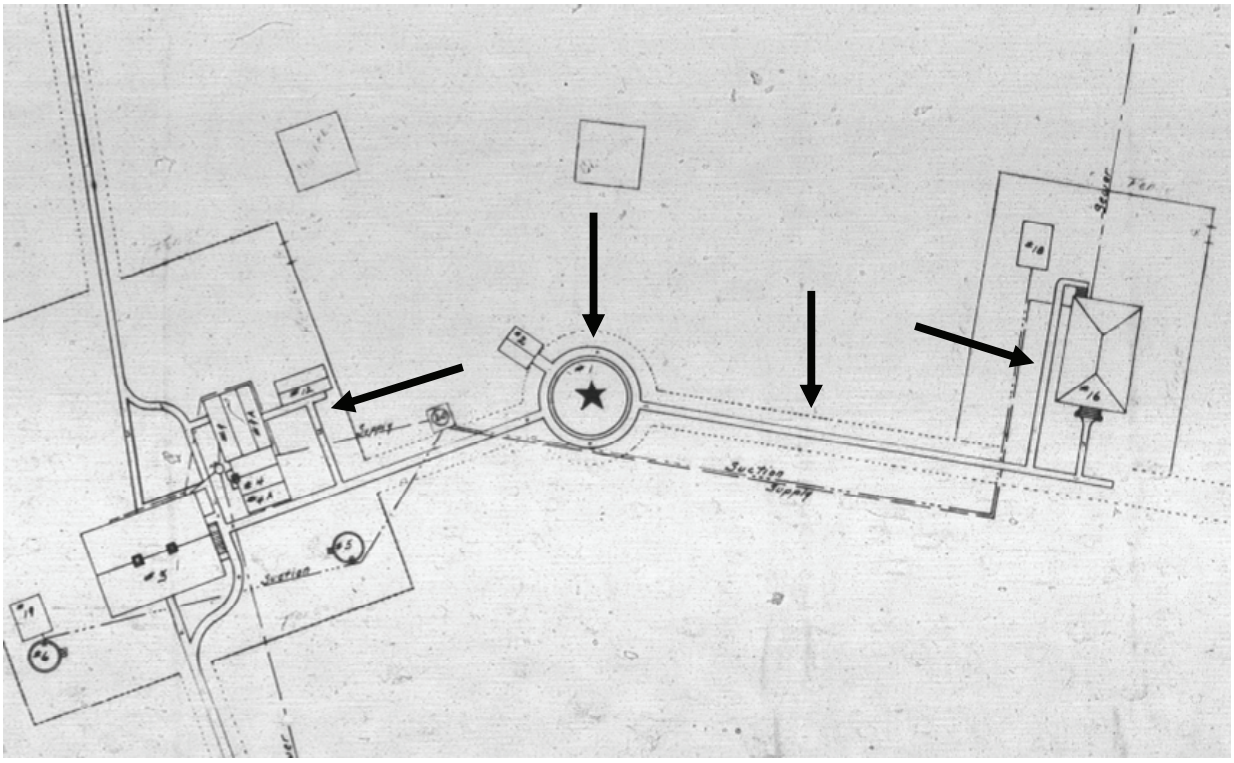


Figure65. Close-up of circa 1925 Station site plan showing location of new walkways constructed in the 1920s.

architecturally with the original buildings of the station" and that "the lintels over the door and windows, as well as the sills and frames, were crafted to duplicate the originals."[46] During the Coast Guard period, this structure was used as the Bosun's Workshop. It continues to be known as such and is used today as a workshop and equipment storage.

Walkways

In the 1920s during modernization of the Light Station, the system of walkways was significantly expanded to provide walkway access to several new buildings. Concrete walkways were constructed between the Lighthouse and the new Keeper's Residence and branches were

[46] Dean, 94.

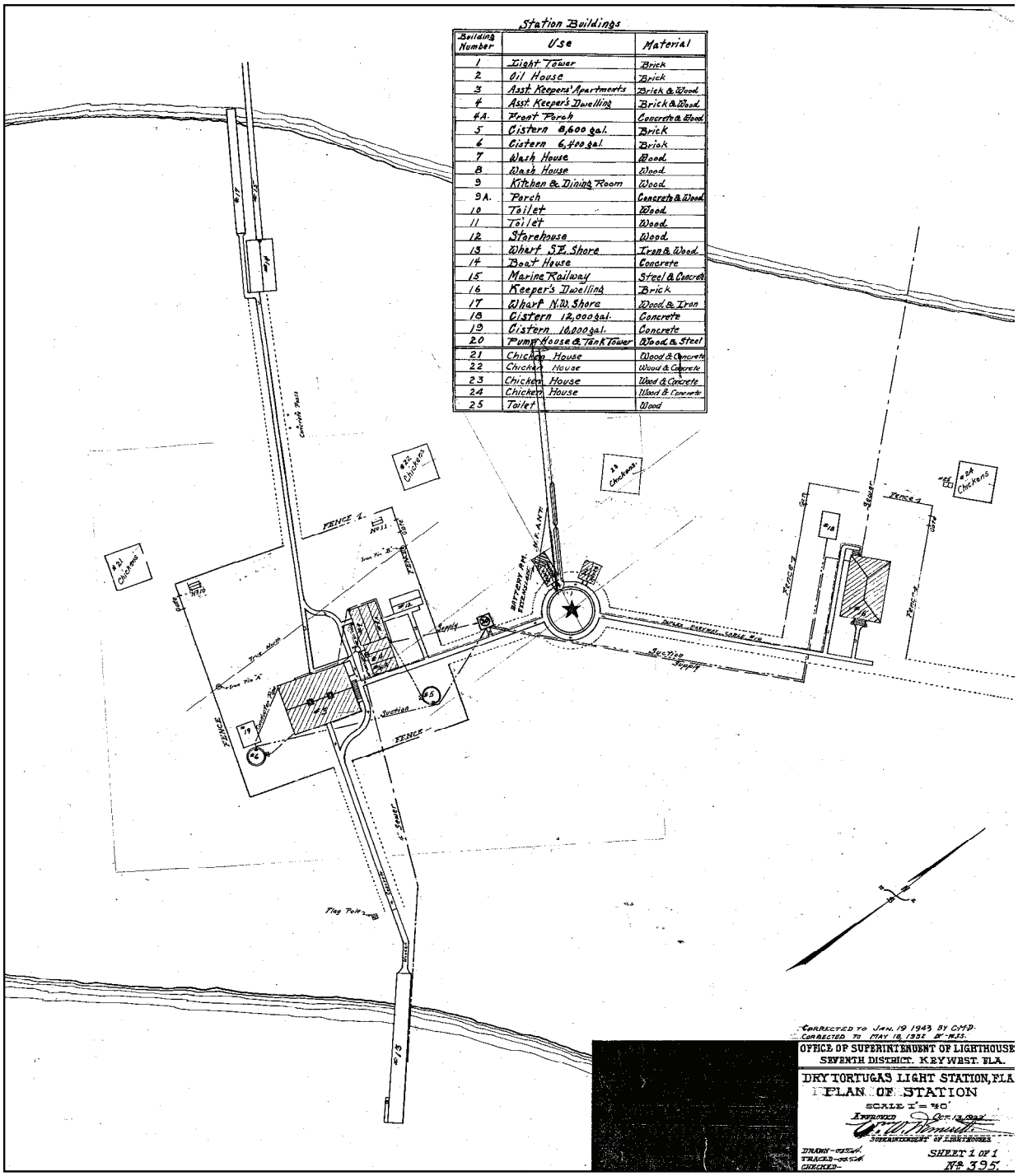


Figure 66. Site plan of Light Station dated 1923 and corrected to 1943 showing inventory of buildings at that time.

extended to the Dining Room addition at the rear of the brick Kitchen building and to the new storehouse and pumphouse. In addition, the walkway was extended around the entire perimeter of the Lighthouse. On a 1920s-era plan of the Station, the section of walkway in front of the 1922 Keeper's Residence continues to the north, past the structure, as if it were planned that the walkway would be extended to

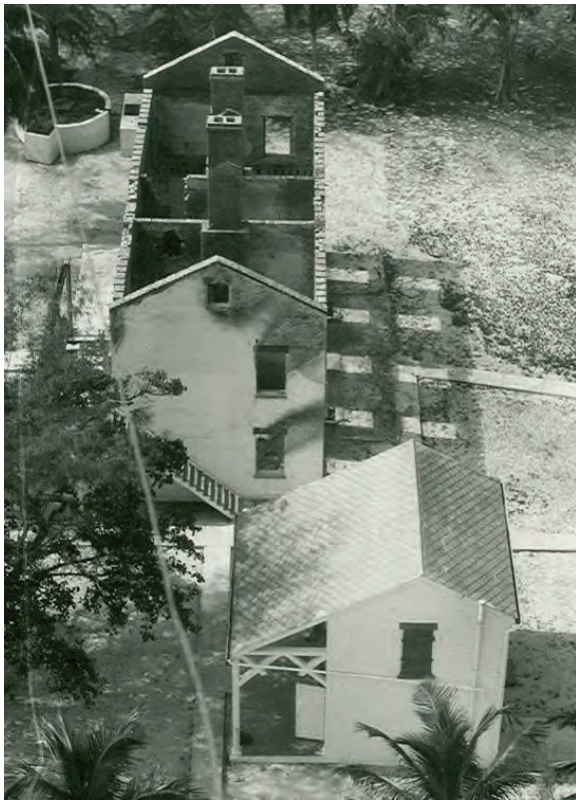


Figure 67. Undated view of fire damaged Keeper's Dwelling.

future Light Station buildings or the Carnegie research complex at the north end of the Key. There is no evidence that the walkways were extended beyond this point.

Given that concrete was being used on the site for the construction of buildings during this period, the new walkways were also constructed of concrete. It is likely that the earlier constructed walkways may have also been upgraded at this time.

Also as part of the 1920s site improvements, the main wharf was moved south to align with the Keeper's Dwelling and the five foot wide walk between the old wharf and the Lighthouse was removed. In the 1970s, an eight foot wide, concrete roadway was constructed between the wharf and the now removed Generator Building. A number of the buildings constructed as part of the 1920s modernization of the Station have not survived, however the network of walkways joining the buildings remains.



Figure 68. Undated view of Keeper's Dwelling façade showing fire damage.



Figure 69. Undated oblique view of Keeper's Dwelling showing fire damage.

Coast Guard Era Modifications

In 1939 the U.S. Coast Guard assumed management of the Light Station from the Lighthouse Board as the U.S. Bureau of Lighthouses was amalgamated into the operations of the Coast Guard. The Light Station remained manned by the Coast Guard with a crew of from two to twelve personnel.

From the beginning of Coast Guard oversight of the Station to the 1990s, numerous projects were planned and implemented at the Station beyond the required routine maintenance and minor repairs that took up much of the time of those stationed on the island. A majority of these projects focused on upgrading and repairing the various systems that were critical to habitation of the island such as potable water provision, sanitary systems, and electrical power generation.

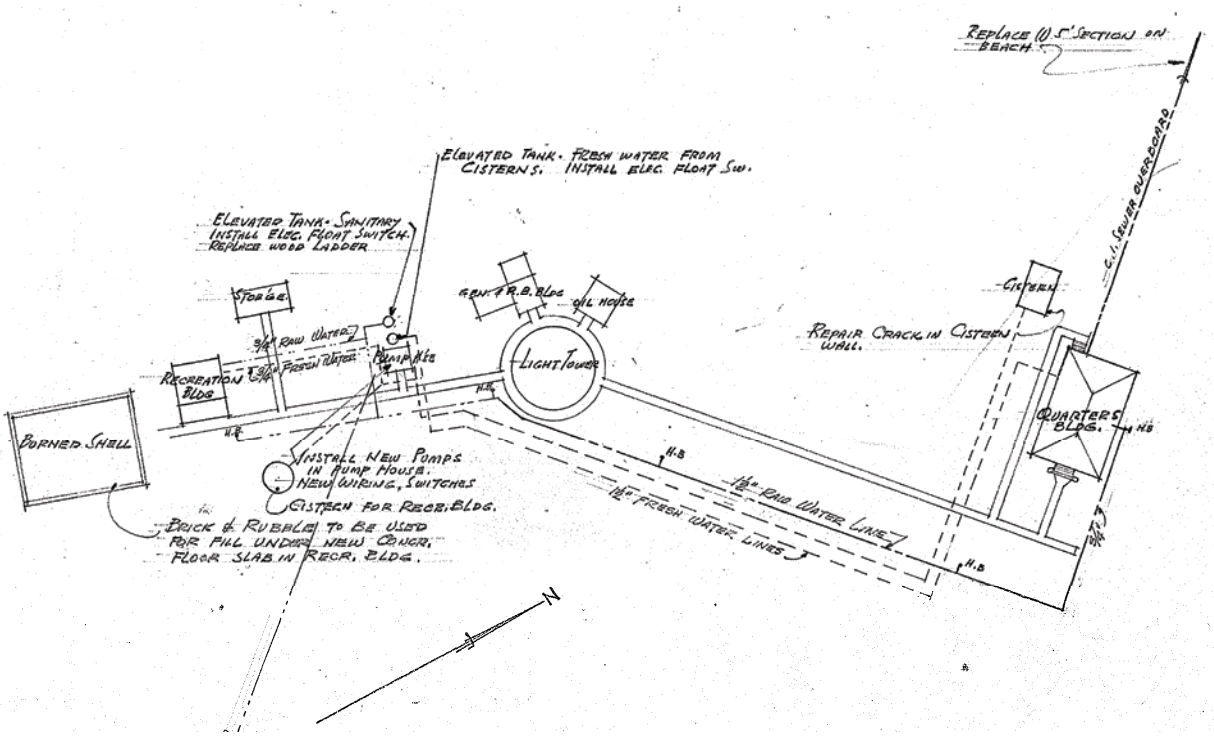


Figure 70. Close-up of Plot Plan from 1951 "Improvements to Sanitary Facilities" project.

1940s

At the beginning of this period with America's entry into World War II, construction and maintenance projects were limited. A 1923 site plan corrected to 1943 shows the inventory and location of all Station resources, including the original Keeper's Dwelling and original Kitchen building. Soon thereafter, in March of 1945, fire gutted the original Keeper's Dwelling and damaged the rear frame addition of the original Kitchen Building. Following the fire, the damaged rear section of the Kitchen building was demolished as were the frame galleries of the Keeper's Dwelling.

The brick walls of the Keeper's Dwelling were left standing for several years following the fire. Today only the outline of the original Keeper's Dwelling foundation remains visible on the site.[47]

1950s

The Coast Guard undertook a project entitled "Improvements to Sanitary Facilities" in 1951. By this time, the original Kitchen building was known as the "Recreation Building" and the

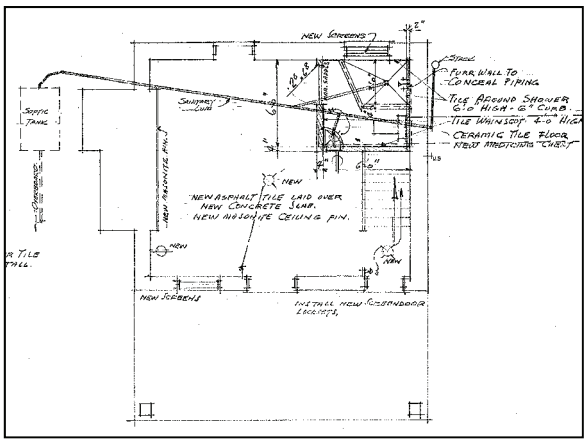


Figure 71. Close-up of first floor plan showing work on the building in 1951.

1922 Keeper's Residence was the "Quarters Building" suggesting an increase in the amount of personnel living on the island.

Under the scope of this project, two elevated fiberglass tanks were installed behind (northwest) the pump house to hold fresh water from the cisterns. In addition, a 2" salt water line was installed from the pump house to the wharf on the southeast shore. Several 1.5" fresh and

[47] Hurley, 58.

raw water lines were installed from the pump house to the dwellings and cisterns. A crack in the Quarters Building concrete cistern was repaired.

The former Kitchen Building was also renovated under the scope of this project. The fresh and raw water and sanitary lines were routed to the bathroom at the north corner on the first floor where the walls were furred to conceal the piping. Ceramic tile was laid on the bathroom floor and applied to the shower walls. Tile was also used to create a 4' wainscot on the walls.

Elsewhere in the Recreation Building, plans called for new asphalt tile flooring to be laid over a new concrete slab. The stair steps and rail were repaired where needed and termite damaged flooring was replaced on the second floor. In addition, new electrical wiring, ceiling fixtures and outlets were installed on the second floor. New windows screens and screen doors and locksets were installed on the exterior.

1960s

In 1969, a new generator and radio beacon building was constructed to the west of the existing Radio Beacon House (original Oil House). This metal building remained in service until the 1980s when it was demolished.

The Coast Guard undertook a project to install a new fresh water collection and distribution system in the late 1960s. Drawings dating from 1969 indicate that the new system operated by collecting rainwater from the roof of the new Generator and Radio Beacon Building and storing it in the cisterns. The water was carried to the cisterns and Station buildings by 1½", 2" and 3" underground PVC piping. Also as part of this project, the pump house and its elevated tank were removed.

1970s

A new wharf/small boat pier was constructed at the southeast shore of the island in 1975. After the new pier was complete, the old pier was removed. A new 8' wide concrete road was constructed from the new pier to the generator building as part of this project.

During this project, Seaman Apprentice William H. Graves was tragically killed during construction. A small monument dedicated to

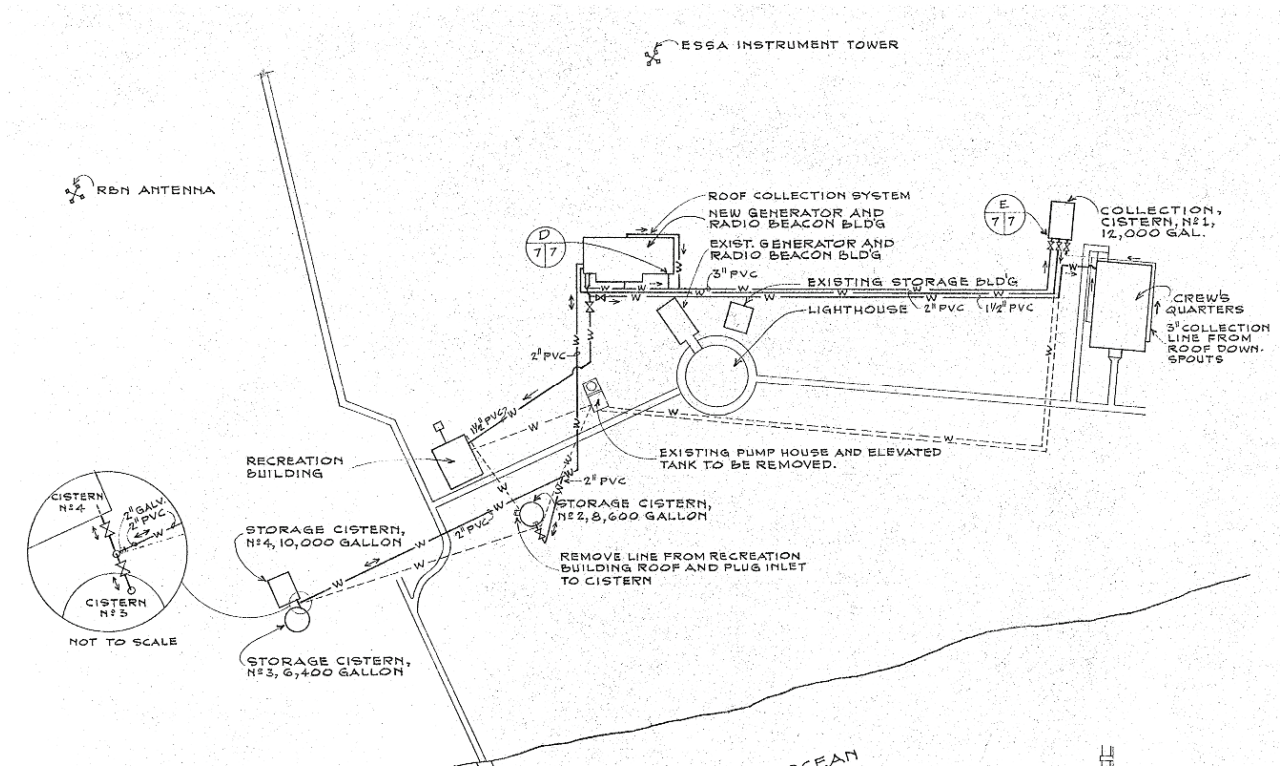


Figure 72. Close-up of 1969 "Fresh Water Collection and Distribution System" project plan.

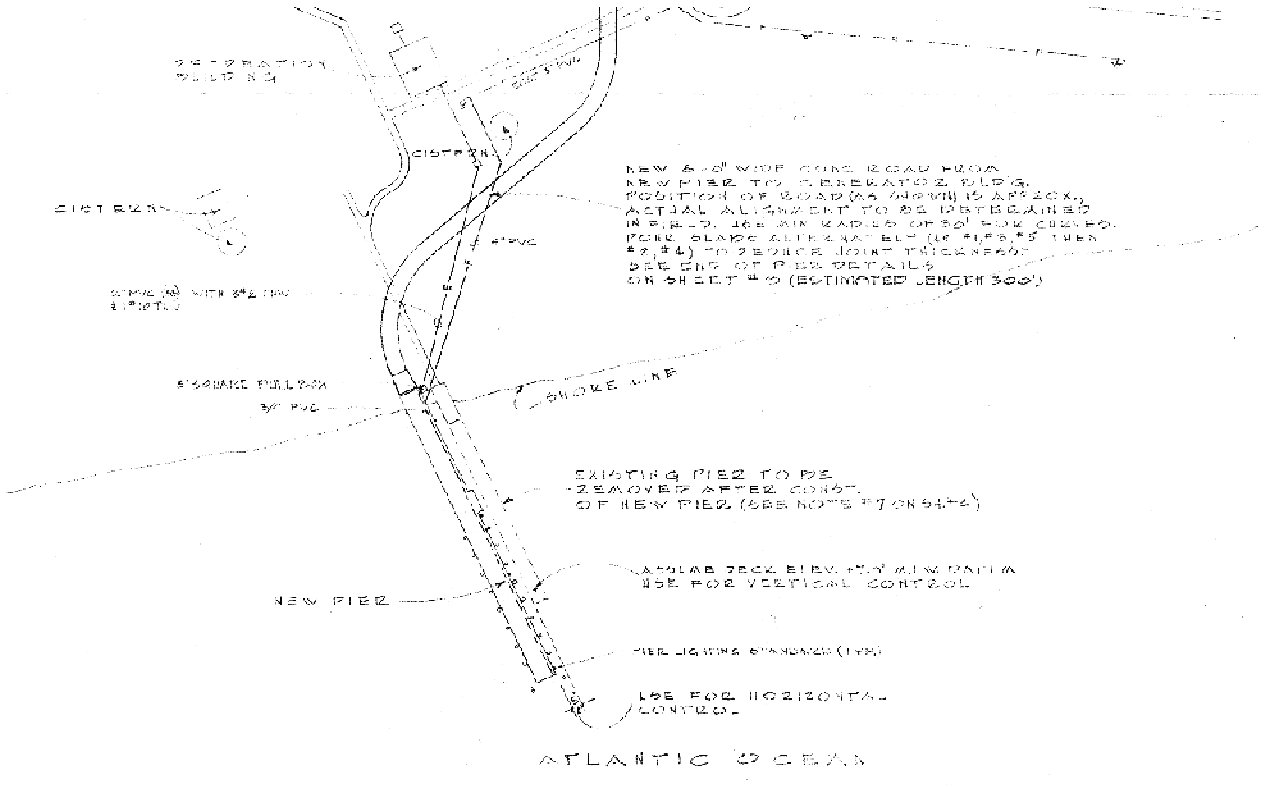


Figure 73. Close-up of 1975 "Small Boat Pier General Plot Plan.

Seaman Graves is located near the site of the accident.

Other projects at the Light Station during this decade focused on the installation of fuel and water tanks, and upgrading the electrical service.

1980s

Efforts were undertaken in the 1980s to rehabilitate the Light Station. The crew of the CGC *White Sumac* was engaged in 1982 to construct an addition to the former Oil House and complete various repairs to the Lighthouse and other buildings of the Light Station.

By 1985, the original Kitchen was being used as Visitor/Guest Quarters and was used to house members of the Coast Guard Auxiliary who had volunteered to assist the Coast Guard in the operation of the Light Station following automation.[48]



Figure 74. Monument to Seaman Graves.

Also as part of this rehabilitation effort, extensive improvements to the Light Station's electrical system were implemented. Upgrades were made to the Crew's Quarters (1922 Keeper's Residence), New Pump Room, Radio

[48] Dean, 99.

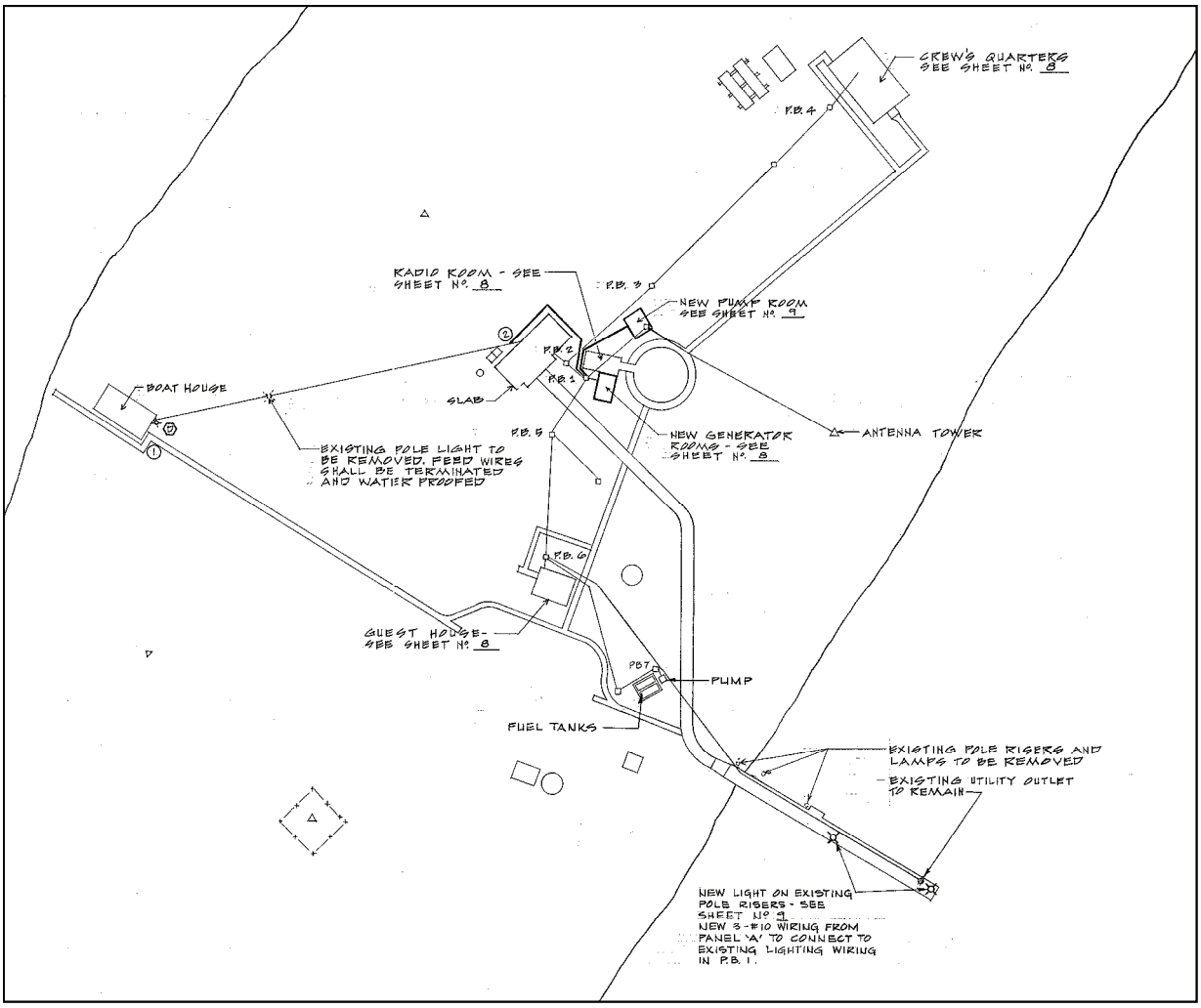


Figure 75. Close-up of 1985 "Dry Tortugas Rehabilitation Electrical Plans."

Room, New Generator Rooms, Pier, and Guest House (original Kitchen Building).

Notes from the 1985 "Dry Tortugas Rehabilitation Electrical Plans" show that all electrical components were to remain in use and that ceiling-mounted fluorescent fixtures were to be installed at the first and second floors of the Guest House. In addition, circuits to air conditioners, water heater, and stove were disconnected and existing breakers, wiring and outlets were removed.

Also as part of this rehabilitation effort, upgrades were made to the Station's potable water system. Information from the "Dry Tortugas Rehabilitation New Potable Water Plot Plan & Details" indicates that a new fresh water pump (located in the 1926 New Oil House) and a 220 gallon pressure tank were installed to carry fresh water from the existing potable water storage tanks west of the Crews Quarters (1922 Keeper's Residence) to the Station buildings.

As part of this project, a new solar domestic water heating system was installed at the Crews Quarters. This system consisted of a flat-plate solar collector with a 120 liter storage tank and piping to bring cold water to the system and deliver hot water to the plumbing fixtures.

National Park Service Modifications

The Dry Tortugas National Park was established in 1992 and Loggerhead Key and the Light

Station property were transferred at that time from the Coast Guard to the National Park Service. With the exception of the Lighthouse, which continues to function as an active aid to navigation, the resources of the Dry Tortugas Light Station are primarily used by the National Park Service for housing and sheltering critical components of the island's utility systems.

Given that the Lighthouse has remained an active aid to navigation since the transfer, the Coast Guard has continued to maintain the Lighthouse and Oil House. The Park Service has undertaken the maintenance of all other buildings at the Light Station.

Through its Volunteers-In-Parks program, the Park Service has maintained a consistent presence on Loggerhead Key for much of the last two decades and committed resources to the protection and upkeep of the Station's historic buildings.

The presence of these volunteers provides a level of security for the island and assistance to the Park in performing limited repair and maintenance of the buildings and systems at the Station. The volunteers stay on the island from one to several months at a time, and occupy the former original Kitchen building throughout most of the year. The 1922 Keeper's Residence

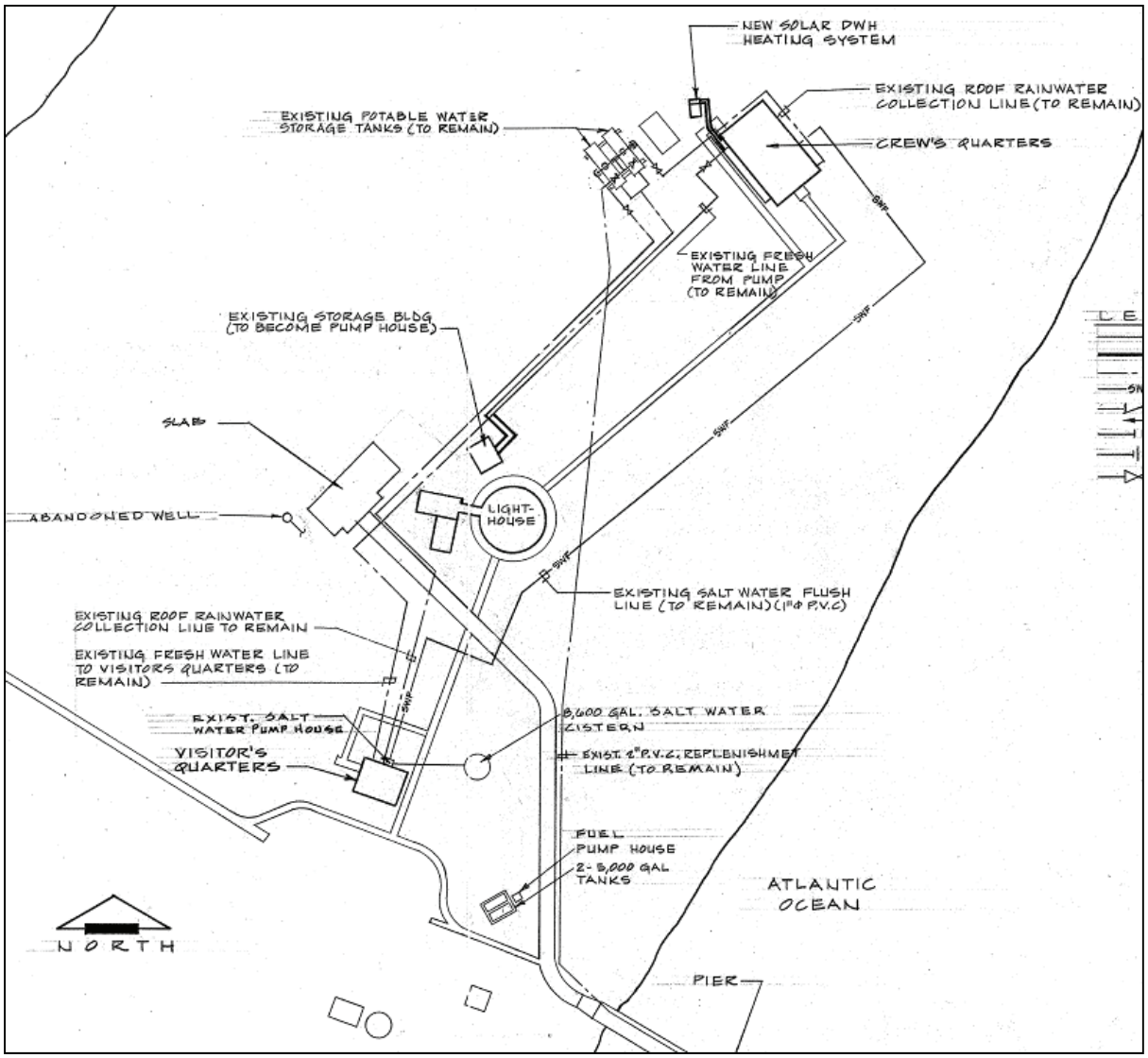


Figure 76. Close-up of 1985 "Dry Tortugas Rehabilitation New Potable Water Plot Plan & Details."

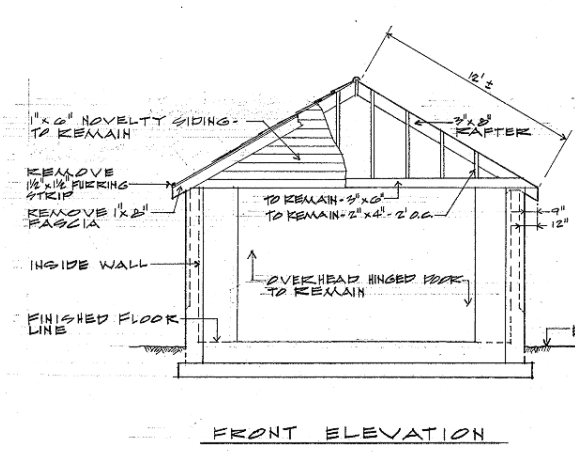


Figure 77. Close-up of front elevation from Boat House "Existing Roof Plan & Elevations."

is reserved for intermittent use by National Park Service personnel, researchers or contractors. The USCG also maintains a room in the Keeper's Residence for its use during routine visits to service the light.

Various projects have taken place since the transfer of the Light Station. The Coast Guard

replaced the Boat House roof in 1992. Drawings dated February 20th of that year show the existing tongue & groove sheathing, roofing felt, asbestos shingles and ridge rolls were removed and replaced with new plywood sheathing, No. 15 roofing felt, and asphalt shingles and ridge rolls. In addition, new 1" x 8" fascia and metal drip edge were installed at the gable ends and 1" x 9" fascia along the sides of the building. All

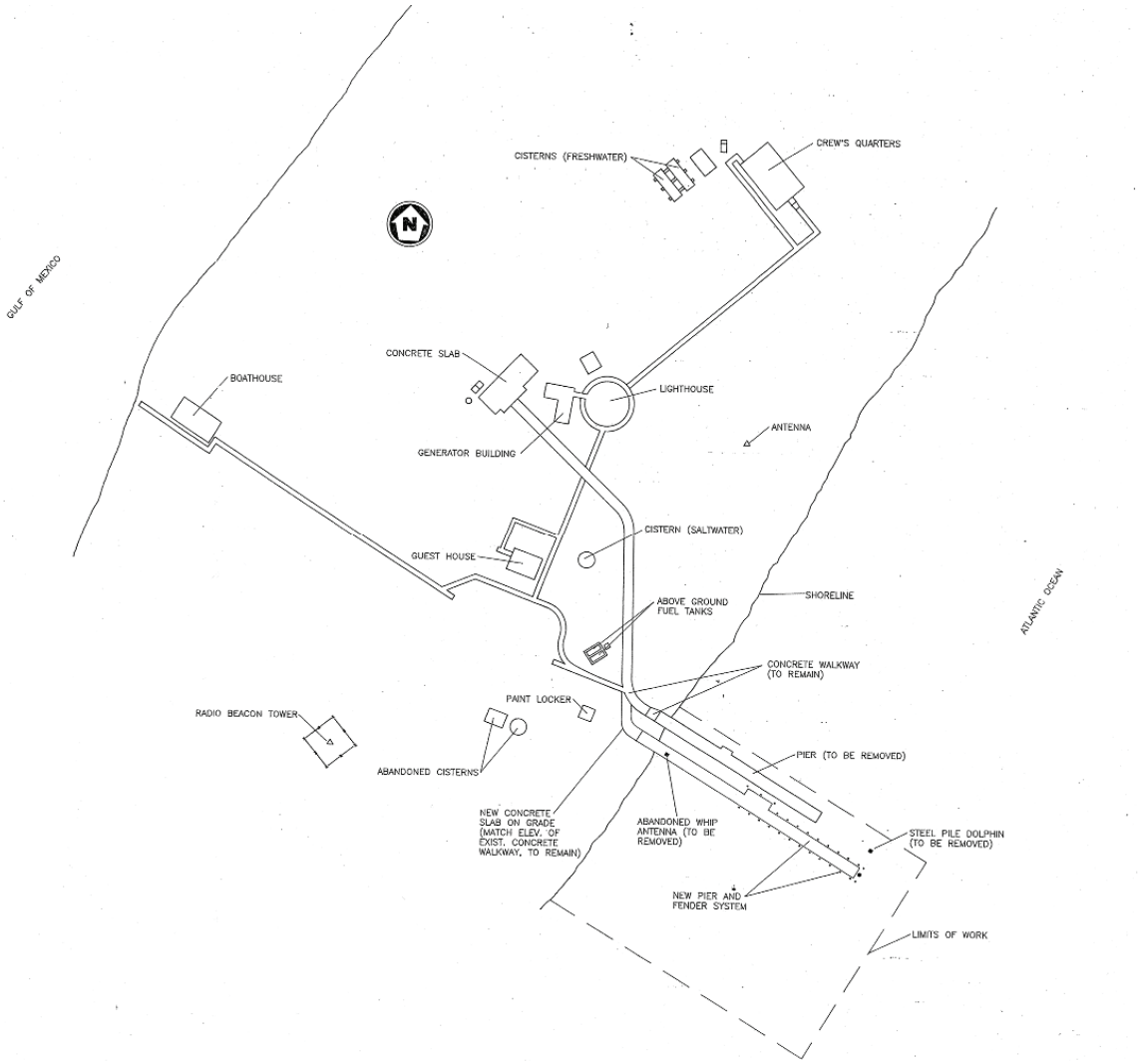


Figure 78. Close-up of 1993 "General Plot Plan" to "Replace Pier."

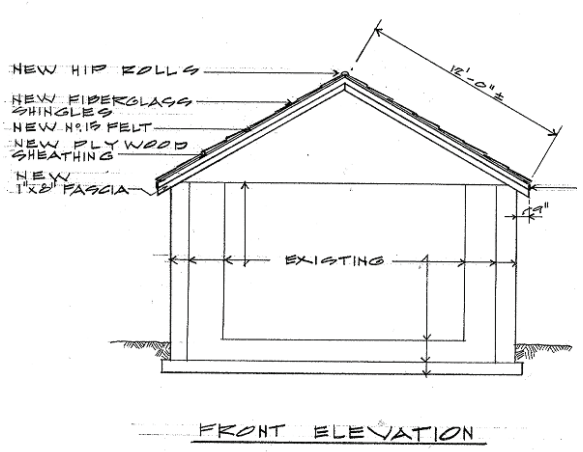


Figure 79. Close-up of front elevation from Boat House "New Roof Plan & Elevations."

roof structural elements and the novelty siding in the front gable end were retained. The National Park Service also replaced the Boat House's wood shutters in 2006.

At the Kitchen Building, the National Park Service repointed damaged masonry joints and installed new doors and windows in 2002 and replaced the septic system in 2003.

Other projects that took place during the 1990s include the repair of the cistern adjacent to the original Kitchen building in 1992, replacement of the pier and fender system at the southeastern shore in 1993, and emergency repair of the underground fuel lines in 1998.

More recently, the Station's diesel fuel generator system was abandoned in 2002, and a photovoltaic solar array was installed for the generation of electrical power.

In 2003, two 3,000 gallon above-ground diesel fuel storage tanks and their associated components were removed from the Station. A water and wastewater disposal system was installed, and the septic system for the Keeper's Residence was installed.

The National Park Service has also recently completed an extensive landscape restoration program. Through this effort, the Australian Pine and other invasive species brought to the island during the first half of the twentieth century were removed.

Ancillary Structures Timeline

1852	**Congress establishes the Lighthouse Board. Florida, including the Dry Tortugas is assigned to the 7th District.**
1856 – August 18th	**Congress appropriates $35,000 for first order lens and lighthouse at Dry Tortugas (Loggerhead Key). Captain Daniel Woodbury in charge of design and construction.**
1858	**Dry Tortugas Light Station completed – included the Lighthouse, two-story brick Keeper's Dwelling, two-story detached brick Kitchen building, two-story free-standing brick Oil House, two brick water cisterns, and wash houses and out houses.**
July 1, 1858	Lantern lit at Dry Tortugas Lighthouse.
1860	Repairs made to roof of Keeper's Dwelling.
1861- 1865	**Civil War**
1866	Extensive repairs and renovations made to Dry Tortugas.
1867	Yellow fever outbreak on Garden Key. Loggerhead Key used for quarantine.
1868	The plastering in the Kitchen building is damaged and needs repairs.
1869	Oil House and Kitchen replastered.
1871	First Boat House constructed.
1873	Yellow fever outbreak on Garden Key. Loggerhead Key used for quarantine.
1873 – October 6th	**Dry Tortugas Light Station severely damaged by hurricane.**
1875	Walkway in front of the original Keeper's Dwelling was cemented and water-conductors to the cisterns were repaired.
1878	Station repainted and miscellaneous repairs completed.
1880	New Boat House, 16 by 30 feet in plan was constructed on western shore of the Key.
1887	A survey of the Light Station and island, including tracings of the reservation and buildings. by A.C. Bell.
1889	"This station was thoroughly repaired. Two new washhouses were built. All new work was painted or whitewashed."
1896	"Some 728 feet of wire fence were put up and painted. Various minor repairs were made."

1898		**Spanish American War**
	1899	A ten foot addition was constructed at the Boat House. A new roof and floors were installed at the Keeper's Dwelling. Walks were constructed from the Keeper's Dwelling to Kitchen and washhouse.
1900		**Military reservation of Dry Tortugas transferred from the Army Department to the Navy Department.**
1903		**Management of Light Station changed from the Treasury Department to the Commerce Department.**
1904-1905		**"The Carnegie Biological Laboratory was granted a site for laboratory buildings on the light-house reservation, and the limits of this grant were surveyed and marked."**
	1906	"Two storerooms and new porches were built. About 164 feet of walk, 5 feet wide, was built, as was some 200 feet of picket fence 5 feet high. Various repairs were made."
1910		**Light House Board reorganized as the U.S. Bureau of Lighthouses (better known as the Lighthouse Service) under the Department of Commerce.**
	1910	October 10tn hurricane damaged roof of Keeper's Dwelling.
	1911	Repairs made to roof of Keeper's Dwelling.
1914-1918 World War 1		**World War I**
	1916	Old wharf destroyed in hurricane of July 5, 1916.
	1917	"The act of September 8, 1916, appropriated $125,000 for repairing and rebuilding aids to navigation. Gulf of Mexico, from which an allotment of $2,800 was made for this station. During the year a wrought-iron pile wharf with cast-iron caps and wooden girders, stringers, and decking was erected in place of the old wharf, which was destroyed. All work was completed in May, 1917. Amount expended to June 30, 1917, $2,631.19."
	1919	September 10tn hurricane destroyed Boat House and damaged Carnegie buildings.
	1920	Repairs made to roof of original Keeper's Dwelling.
	1921	Garden Key Light House decommissioned.
1922		**Period of modernization at Light Station begins.**
	1922	Request made for telephone system between watch room and keeper's residences.
	1922	Keeper's Dwelling and original kitchen building extensively renovated and addition made at rear of Kitchen.

1922	New Keeper's Residence constructed to provide housing for the principle keeper and family.
1922	Two concrete water cisterns constructed.
1923	New (third) Boat House and marine railroad constructed on west (Gulf of Mexico) shore.
1926	Original Oil House repurposed to house radio beacon equipment including construction of a concrete passageway connecting oil house to lighthouse.
1926	New Oil House constructed following conversion of the original oil storage building.
1939	**U.S. Bureau of Lighthouses is amalgamated into the operations of the U.S. Coast Guard**
1939	**Carnegie Institute ceases operations at Marine Research Laboratory.**
1940-1945	**World War II**
1943	Front section of original Kitchen building being used as Assistant Keeper's Dwelling and rear section of building being used as Kitchen & Dining Room.
1945	Fire gutted the original Keeper's Dwelling and damaged the Kitchen & Dining Room section of the original Kitchen building. The remaining brick walls of the Keeper's Dwelling were demolished several years after the fire.
1951	Improvements made to sanitary facilities, including installation of two elevated fiberglass water tanks, renovation of original Kitchen building, and construction of concrete block paint locker.
1964	Fire destroys majority of abandoned structures of the Carnegie Institution's former Marine Research Laboratory.
1969	Fresh water collection and distribution system installed. New generator and radio beacon building constructed.
1975	New wharf/small boat pier constructed at southeast shore. New 8' wide concrete road constructed from pier to generator building. Seaman Apprentice William H. Graves killed during construction of the pier.
1977	Proposal by National Park Service to install solar power electrical generation system for Fort Jefferson and Dry Tortugas light station operations.
1982	Extensive repairs and improvements made to Lighthouse and Light Station structures by USCG crew of *White Sumac*
1984	Development of draft National Register of Historic Places nomination form for Dry Tortugas Light Station.
1985	Extensive improvements to Light Station's electrical system and improvements to potable water system.
1987	The Light was automated. Members of the Coast Guard Auxiliary volunteered to run the Station along with the Coast Guard.

1992	Dry Tortugas National Park established and Loggerhead Key and Light Station property transferred from USCG to the National Park Service.

1992	Coast Guard Aid to Navigation (ANT) team members stay in the 1922 Keeper's Residence when on the island, as do contractors and other visitors. National Park Service volunteers who typically stay on the island for two to four week shifts stay in the original Kitchen building.
1992	Boat House roofing replaced. Original kitchen building saltwater cistern repaired.
1993	New pier and fender system constructed at southeastern shore.
1998	Emergency repair of underground fuel lines
2002	Exterior masonry repaired and new doors and windows installed at the Kitchen Building.
2002	Photovoltaic solar array installed for generation of electrical power. Diesel fuel generator system abandoned.
2003	Two 3,000 gal. above-ground diesel fuel storage tanks and associated components removed from site. Diesel fuel system no longer necessary. Electrical power generation provided by photovoltaic array.
2003	Installation of water and wastewater disposal system at Station.
2003	Kitchen building septic system replaced.
2006	Shutters replaced on the Boat House.
2008	NPS completed extensive landscape restoration program.
2009	Development of HSRs for Light Station.

Physical Description

The description of construction characteristics, existing conditions and character-defining features for each of the Station's Ancillary Structures is presented below. The construction characteristics and existing conditions address the structural systems, exterior features, interior features and utilities and are organized by component, room and system.

Kitchen Building

The Kitchen Building at the Dry Tortugas Light Station was constructed in 1858 as an original element of the Station. The building is located south of the Lighthouse and faces east.

The building was built as a communal kitchen for the three keepers and their families living in the Keeper's Dwelling. The second floor was later used as living quarters for one of the assistant keepers.

This two-story load-bearing brick masonry building was constructed in a square plan measuring 20' x 20'. The building has a wood-frame roof structure. Architectural drawings from 1922 indicate that the first and second floor structure was wood frame. The ground floor framing was removed in 1951 and a concrete slab poured at that time. The side gable roof is covered with composition asphalt shingles. The exterior wall finish is brick laid in a common bond and painted white.

Early architectural plans show the first floor space divided into two rooms, a smaller room in the northwest corner and the larger room occupying the rest of the floor.

These plans show a brick fireplace and bake oven built into the base of the chimney at the midpoint of the south wall. A winder set of stairs in the northeast corner to the second floor is accessible just inside the primary entryway. The second floor is a single room.

The Kitchen Building has undergone a series changes in use and corresponding modifications over time. The building was converted from a kitchen to the Assistant Keeper's Dwelling by the early 1920s. To accommodate this new use, the building was extensively renovated in 1922. Changes to the building made at this time include the construction of a front porch and a rear addition as well as alterations to the interior floor plan.

The building did not originally have a porch. In 1922, a full-width front porch was added to the building. The engaged front porch extends approximately nine feet from the façade and its roof is supported by two square wood columns with bracing between the columns and front wall.

A rear addition was created by "moving into place" an existing one-story frame building. This one-story gable addition with a full-width side porch was adjoined at the rear of the Kitchen Building and served as a separate kitchen and dining room for the assistant keepers. This rear addition was removed in the mid 1940s after it was damaged by the fire that destroyed the adjacent Keeper's Dwelling.

In order to provide living arrangements for multiple keepers, a bathroom was constructed on the first floor under the north stair. Plans from this period show that the oven built into the base of the chimney was converted to a closet.

Also by 1922, drawings for repairs and improvements to the building show the stairs as a straight run from the first to second floors, rather than the winder stairs shown in the earlier plans for the building. It is not known whether the winder stairs were constructed as designed or if the stairs were changed at a later date.

By the 1950s, the Kitchen Building/ Assistant Keeper's Dwelling had again been converted to

use as a Recreation Building for USCG personnel. Plans for renovation of the building from 1951 show that ceramic tile was installed in the bathroom, new asphalt tile flooring laid over the concrete slab, masonite ceiling finish was applied to the first floor ceiling, damaged wood flooring was replaced on the second floor, and new electrical wiring, ceiling fixtures and outlets were installed.

In the early 1980s, electrical upgrades were implemented including the installation of ceiling-mounted fluorescent fixtures and the replacement of electrical service for the air conditioners, water heater, and stove. By 1985, the original Kitchen was being used as Visitor's Quarters for members of the Coast Guard Auxiliary.

Today, the Kitchen Building is known as the Guest House and is used as quarters for participants in the National Park Service's Volunteers-In-Parks program.

Kitchen Building Character-Defining Features

The identified character-defining features of the Kitchen Building include:

- Location of the Kitchen Building south of the Lighthouse and east to west siting of the building with the primary façade facing east towards Fort Jefferson.
- Square plan and two-story height.
- Load-bearing brick masonry wall structure laid in Common bond.
- Mortar comprised of natural cement and local carbonate sand.
- Exterior masonry wall finish of white paint.
- Side gable roof with wood frame structure.
- Corbeled cornice and wood fascia.
- The configuration of historic exterior door and window openings.
- The doors and windows are considered character-defining features of the building, however the existing units diminish the historic character of the resource.
- Stone lintels at door and window heads and window sills.
- Front porch with timber supports.
- Interior wood stair with bull-nose treads and rail to second floor.
- Bead-board wall and ceiling finishes, tongue and groove flooring, and millwork on second floor.

Structural Systems

Foundation: The level of grade around the perimeter of the Kitchen building did not permit access to the building's foundation. The exterior load-bearing masonry walls extend below grade. Undated early drawings of the Kitchen Building show load-bearing brick masonry walls extending approximately 1'-6" below grade.

Existing Condition: No cracking of the lower exterior walls that would suggest active settlement or movement of the foundation was noted. The foundation appears sound.

Floor Structure: The first floor of the Kitchen Building is a concrete slab installed in 1951. Architectural drawings from 1922 show the floor framing of the first and second floors to be wood frame with joists spanning the building from north to south.

The 1951 construction drawings prepared for a project to improve the sanitary system show that that a new concrete slab was to be poured at the first floor. It is likely that the floor framing was removed and the slab poured over a compacted sand base.

Existing Condition: Though the first floor slab is covered with clay tile, no cracking or signs of settlement or deterioration were observed. Installation of floor and ceiling finishes prevented visual inspection of the second floor framing members. However, no sagging or

appreciable deflection of the second floor was detected.

Roof Structure: Access to the attic of the Kitchen building is through an 18" x 26" wood hatch located in the south end of the second floor ceiling. The side gabled roof of the building is framed with 1¾" x 6" (actual) circular-sawn rafters spaced between at 16" to 17½" on center. There is no ridgeboard present. The ceiling joists are 2" x 6" circular-sawn members spanning east to west. An 11" circular metal attic vent is located near the roof peak in the east gable at the south side of the building.

Historic images of the Kitchen building show a brick chimney penetrating the roof at the south end of the building. The chimney has been removed above the roof line but remains intact within the attic space. It is possible that the chimney was dismantled when the brick fireplace and oven were removed in the early 1920s.

Existing Condition: The attic space was dry at the time of inspection and no evidence of moisture was observed. No evidence of termite damage was observed.

Exterior Features

Roofing: The side gable roof of the Kitchen Building is clad with gray, three-tab asphalt composition shingles installed in 1992. Reference to the Kitchen Building's original roofing material is not recorded in the historic documentation, but was most likely slate. An undated (nineteenth century) image of the Light Station shows the building with a standing seam metal roof. Later twentieth century photos taken Ca. 1941 show the building with what appears to be hexagonal asbestos shingle roofing.

The roof sheathing, visible from the attic space, consists of both 1" x 4" butt-jointed wood at the front gable and plywood at the rear gable.

The building has a single-run metal gutter spanning the length of the building south to north with a single S-shaped section of downspout attached to direct rainwater off the building. The building originally had copper gutters attached to cast iron piping that directed rainwater to the adjacent brick cistern as part of a fresh water collection system. Historic images show a gutter along the eave at the rear (west) elevation.

Existing Condition: The existing composition shingle roofing is in sound condition and functioning satisfactorily as there is no indication of moisture infiltration or damage within the attic. There are several shingles missing (at the front gable) and others with bent edges (along the north edge of the south gable) that need to be repaired and/or replaced.

Roof Eave and Cornice: The cornice on the north and south gable ends is comprised of a simple 1" x 5" unfinished rake board overlapped with what appears to be galvanized metal flashing. At the east and west elevations, the top of the exterior wall is corbelled out for one course creating a simple masonry cornice. The corbel is painted white like the exterior walls. At the west elevation, the roof eave has a slight projection beyond the cornice and consists of an unfinished 1" x 5" fascia board overlapped with metal flashing. There is no cornice at the east elevation as the roof extends beyond the wall face to form the front porch.

Existing Condition: The painted finish of the cornice is weathered and deteriorated. The overlapping metal flashing is curled up and damaged along the south elevation.

Exterior Walls: The exterior walls of the Kitchen Building are load-bearing brick masonry. The exterior face of the stretcher bricks measure 2" x 8" with ½" masonry joints and are laid in a common bond pattern with a header row every sixth course. The exterior face of the brick walls are painted white. The interior face of the bricks viewed from the attic space, are a pink salmon color with dark inclusions. The mortar joints are flush with the wall face.

Paint analysis and archival records indicate that the building was not painted during the nineteenth century. Analysis of the paint sample taken at the east elevation of the buildings' exterior shows only four layers of non-historic white paint. In addition, an early undated images of the Light Station show the Kitchen Building as unpainted.

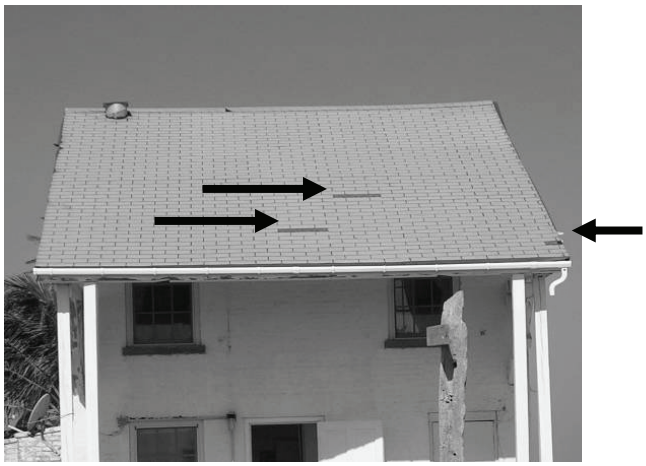


Figure 80. Missing shingles on front gable.



Figure 81. Damaged flashing at rake board.

sampling and analysis of the Kitchen Building mortar indicates that its composition is one part natural cement to one-and-one-half part local carbonate sand containing coral and shell fragments. The analysis indicates that the mortar did not contain any lime. Analysis further indicates that this mix is common to all the original buildings at the Light Station.

Existing Condition: The painted finish on the exterior walls is deteriorated and is chipped and flaking due to weathering. The exterior masonry has experienced moderate erosion of mortar due to weathering, requiring repointing for approximately 10% to 15% of the joints. More detailed descriptions of masonry damage are provided below by elevation. Visual inspection further indicates that areas of the masonry have been previously repointed. National Park Service staff indicates that areas of the exterior masonry were repaired most recently in 2002.

There is no evidence of tooling of the mortar joints which were generally brought flush with the face of the brick.

East Elevation

The east, or front, elevation of the Kitchen Building faces the eastern shore. This elevation contains a full-width porch. This porch was created in 1922 by extending the roof approximately 9' to provide a roof overhang for the porch.

The original plans for the porch show that it was to be supported by two 8" x 8" wood columns 14' in length. Circa 1941 photos show that the porch was supported by two square wood columns with wood bracing between the columns and front wall.

Later undated (post-1948) photos show the porch supported by two square brick columns with a portion of the wood bracing still in place. Today, porch is supported by four small square wood columns and the wood bracing. Remnants of the brick columns are present at the base of the wood columns.

The two entrances to the Kitchen Building are located on this elevation. Three six-over-six double-hung windows are located on this elevation, including a single window on the first floor and two widows at the second floor.



Figure 82. Two entrances & doors at east elevation.

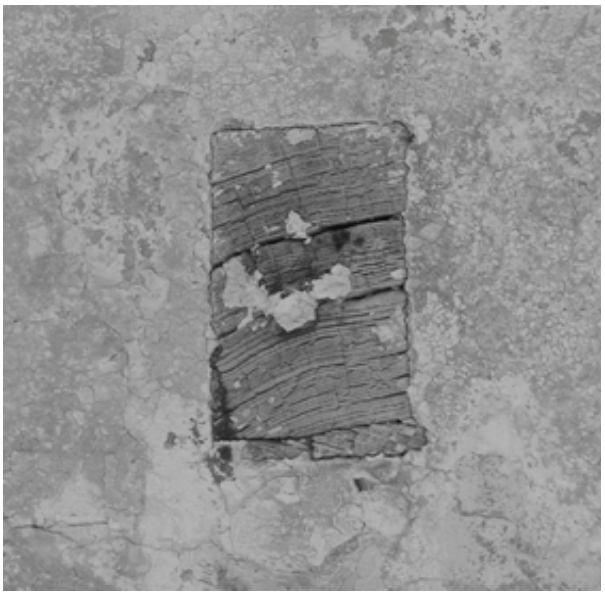


Figure 83. Blocking embedded in masonry walls, adjacent to various window openings.



Figure 84. Deteriorated mortar at cornice on east elevation.

Existing Condition: The east elevation masonry is generally in sound condition. The mortar between the porch roof rafters is cracked and deteriorated. A stair-step crack in the mortar joints extends from the south corner of the second floor window on the south side of the elevation down to the middle of the lintel above the first floor window. The painted finish at this elevation is in sound condition, primarily because it is protected by the overhanging porch roof.

West Elevation

An undated nineteenth century photo of the Light Station shows that this rear elevation originally contained a door and window on the first floor and two windows on the second floor.

Most of this elevation was covered by the rear Kitchen & Dining Room addition that was attached to the rear of the building in the early 1920s. As previously described, this rear section of the building was demolished sometime after the 1945 fire that destroyed the original Keepers' Dwelling. The ghost lines of the addition's gable roof can be seen in the extant west masonry wall.

This elevation currently contains two window openings, one on the north side of the second floor with a six-over-six double-hung window and one directly below on the first floor with a smaller six-over-six double-hung window. The lower portion of the first floor window opening has been infilled between the bottom of the existing window and the original window sill below. An original first floor door opening and second floor window opening on the south side of this elevation have been enclosed with concrete block and brick respectively. The concrete lintels and window sill are present within the masonry wall.

Evidence of a small arched opening on the north side of the elevation below the first floor window was noted during inspection. This opening likely provided access to the crawlspace that would have been present below the original first floor framing. Now infilled with masonry, the distinct outline of a segmental brick arch can be discerned within the masonry wall. Two steel propane tanks, a small air compressor and an outdoor shower are located at this elevation

Existing Condition: The painted wall finish at the west elevation is deteriorated, particularly at the lower sections of this elevation. An area of the masonry in between the second floor windows has been patched. The head joints just below the eave has experienced a loss of mortar. A vertical crack in the mortar joints is present between the



Figure 85. West (rear) elevation of Kitchen Building. Note the ghosting left by the Kitchen/Dining Room addition that was removed after the 1945 fire.



Figure 86. Outline of brick segmental arch at north side of west elevation.

second and first floor windows at the north side of this elevation, extending from the south corner of the second floor sill down to the south corner of the first floor window. Another masonry crack is present below the north corner of the infilled rear doorway. A third crack is present at the south corner of the infilled window on the south side of this elevation, extending down from the cornice approximately seven courses.



Figure 87. New and rusted propane gas tanks at west elevation.

North Elevation

The second floor of the north elevation contains a window opening. This opening has a six-over-six double-hung window with granite lintel and stone sill. National Park Service staff indicates that this granite lintel was installed in 2004. A small sloped-roof shed has been attached to the wall on this elevation.

Existing Condition: The painted wall finish is deteriorated throughout the north elevation. Several cracks in the masonry adjacent to the top of the second floor window have been repaired and no further movement has been indicated. A crack is present just below the gable roof peak, extending across the face of the wall and down approximately four courses. Numerous corroded metal anchors are embedded in the west side of the wall.

South Elevation

The second floor of the south elevation contains a window opening. This opening contains a six-over-six double-hung window with a granite lintel and concrete sill. This granite lintel was installed by the National Park Service in 2002.

The lower portion of this elevation contains the projecting brick structure that once housed the brick oven and firebox associated with the building's original fireplace. This fire box extension is painted the same white color as the exterior walls of the building.

Existing Condition: Deterioration of mortar joints has occurred on this elevation. Several have been replaced around replaced lintel of the second



Figure 88. Conditions sketch for west elevation.

floor window. Pockets of mortar deterioration are present throughout the elevation. There is a brick missing at the top of the gable end just below the ridge. Several long cracks seem to emanate from a central location just east of the second floor window. Given their configuration it is possible that these cracks may have been caused by an impact that could have occurred during a storm. The painted wall finish at this elevation is weathered.

Doors: There are two door openings to the Kitchen Building, both located on the east elevation. The main entry is located in the center of the elevation and provides access to the main room on the first floor. The four-panel wood door is 1¾" thick with a contemporary metal door knob and is attached to the frame by three metal butt hinges. A large concrete lintel painted white and smaller concrete threshold painted grey are intact above and below the door. Wood blocks are set in the wall on the south side of this doorway indicating the presence of shutter



Figure 89. Areas of previous repairs.



Figure 90. North elevation of Kitchen Building.

catches used to securely open the door/screen door in the past.

A second door is located at the north side of the elevation and provides access directly into the stair hall leading to the second floor. The modern flush wood door has a contemporary metal door knob and deadbolt and is attached to the frame by three metal butt hinges. A wood lintel painted white and wood sill painted grey are also Ca-1941 photos of the Kitchen building show four-panel wood doors at both openings and later undated (post 1948) photos show two-panel screen doors at both openings. Information from National Park Service staff indicates that the two existing doors were installed in 2002. As noted above, the rear doorway at the west elevation has been infilled with concrete block.

Existing Condition: The primary door is in poor condition. There are horizontal cracks at the panel joints along the top edge of the center rail and vertical cracks in the lower right panel. The center and lower rails are also cracked and exhibit some rot due to water damage. A ¼" piece of plywood has been nailed horizontally across the bottom two panels to stabilize the door. The concrete sill at this doorway is chipped in several locations where the interior floor tile was installed on top of the threshold.

The second door and frame are in good condition. The wood is solid and the joints are sound. The lower right corner of the wood lintel is damaged.

Windows: Historic images of the Kitchen building from the late nineteenth century show six-over-six double hung windows with light-

colored painted finish on the sash and frames. Pre-1945 photos of the Kitchen building show six-over-six double-hung windows and a one over-one window at the south elevation. A later undated (post-1945) photo shows the single window on the north elevation enclosed by a vertical board shutter with Z-bracing. Later undated (post 1948) photos show three- and



Figure 91. South elevation of Kitchen Building.



Figure 92. South elevation of Kitchen Building.



Figure 93. Several cracks emanate from a central location. It is possible that this damage may have been caused by a tree or other projectile hitting the building during a storm.

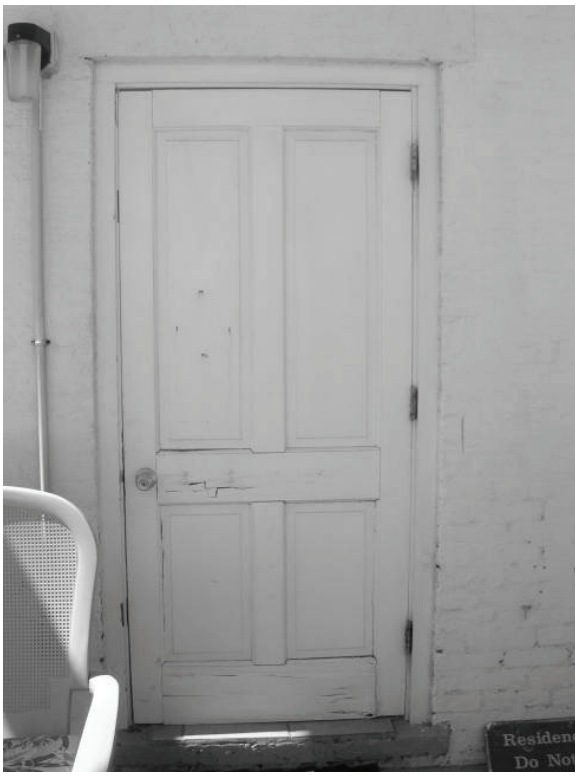


Figure 94. Exterior face of front door with cracking.

five-pane awning windows with unfinished aluminum frames. The Kitchen building currently contains seven windows. There are two windows at the first floor and five windows at the second floor. There are three windows at the east elevation, two windows at the west elevation, and one window at both the north and south elevations. As noted above, window openings at the west elevation have been infilled at the time of construction of the rear addition.



Figure 95. Interior face of front door with cracks and ¼" plywood brace.

Information from National Park Service staff indicates that all existing windows at the Kitchen building were installed in 2002. All of the existing windows are contemporary six-over-six double hung windows with vinyl sash and frames. Though these windows are not wood, they do have true divided lights that match the six-over-six pane configuration of the original windows.

NPS staff also indicate that the granite lintels were reinstalled in two windows on the east and west elevations in 2004. There are no wood or metal shutters on the windows. However, wood blocks are set in the wall adjacent to existing windows indicating that shutters had been installed in the past. In addition, an undated photograph shows the window in the north elevation covered by what appears to be a vertical board wood shutter.

Existing Condition: The existing window sash and frames are in sound condition. The interior areas around windows were dry and absent of any moisture damage during inspection. The painted finishes of the concrete lintels and sills are in a deteriorated condition. In many instances, the paint finish is flaking and chipping off the lintels and sills.



Figure 96. Typical condition of painted concrete window lintels.



Figure 97. Typical condition of painted concrete window sills.

Interior Features

The interior floor plan of the Kitchen Building remains much as it existed after the building was renovated in 1922. The First floor is comprised of two rooms. The primary entrance provides entry into a large space that serves as the living area and kitchen (in the southwest corner). A bathroom is located in the northwest corner. A straight-run stair ascends to the second floor along the north wall.

The second floor is a single undivided bedroom space with a small closet in the northeast corner of the room.

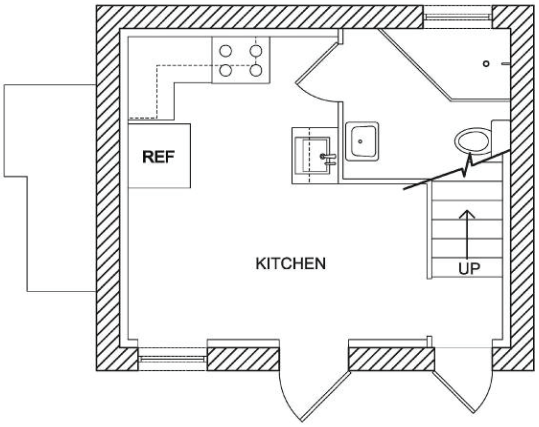


Figure 98. Existing first floor plan of Kitchen Building.

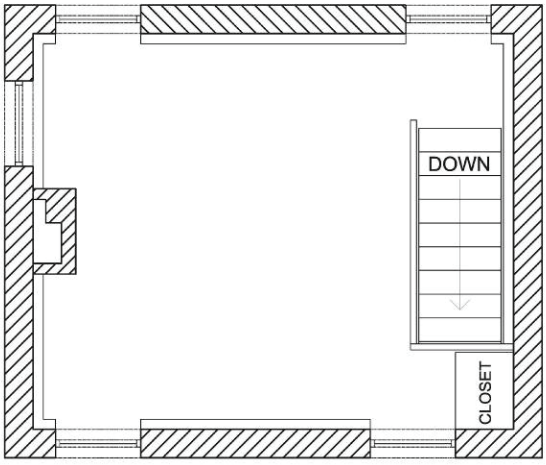


Figure 99. Existing second floor plan of Kitchen Building.

Room KB101:

This room comprises approximately three-quarters of the first floor. It is the main living room and kitchen/dining space in the building. A kitchen counter, stove and refrigerator are located in the southwest corner of the room. A sink is located at the north wall adjacent to the bathroom.

Floor: The 1951 drawings for "Improvements to Sanitary Facilities" indicate that asphalt tile was laid over the concrete slab at that time. The existing floor is contemporary clay tile laid over the concrete slab. The tile is 12" square and solid brown in color.

Walls: The walls are covered with modern



Figure 100. Interior view of first floor living area facing east.



Figure 101. Interior view of first floor kitchen area facing west.

vertical wood paneling. The fireplace and bake oven originally located at the south interior wall are paneled over with the vertical paneling and there is indication of their presence on the interior. There is also no indication of the previously-existing rear door at the west wall.

Ceiling: The 1951 drawings for repairs and improvements to the building indicate that a masonite ceiling finish was to be applied to the first floor ceiling at that time. No indication of masonite exists today. The ceiling is clad with 4¼" butt-jointed boards running east to west.



Figure 102. Wood stairs and railing in Kitchen Building.



Figure 103. Deteriorate ceiling finish and wall boards above bathroom door.

Stair: A flight of stairs 3'-¾" in width ascends in a straight run along the north wall up to the second floor. The stairs have 8¾" enclosed risers. The treads measure 10" and have a bull nose. A 2" x 2½" rounded wood rail is attached to the south wall. The stairs and railing are painted grey, though a layer of red paint is visible beneath the top layer.

Molding: A 3" baseboard painted gray is present in this room. There is no base-molding or shoe-molding. A 3" crown molding painted white is located at the wall/ceiling juncture throughout the room. The window opening in the east elevation has a flat 6" wide casing at the head and jambs. The jamb casings terminate into the head.

Existing Condition: Items noted in the condition of the finishes in Room KB101 include the build-up of paint layers, deteriorating and damaged paint finishes, and loose boards and moldings. The vertical wall paneling is rough and split at its lower end above the bathroom door. The ceiling paint finish above the bathroom door is cracking and peeling. A metal housing from an earlier light fixture appears to have been for a single-bulb fixture. There is no socket in the fixture. The metal housing is rusted. A fluorescent fixture is installed over the earlier fixture housing.

The stairs are in sound condition. The wood is solid and joints are sound. The painted finish of the stairs and rail is deteriorating with areas of chipped and flaking paint, revealing a layer of red paint beneath the gray top coat.

Room KB102:

The bathroom is located in the northwest corner of the first floor underneath the stairs. The 1922 plans for repairs and improvements to the building show that a 5' x 6'-8" bathroom was constructed on the first floor underneath the stairwell.

Floor: The bathroom flooring is black, white and peach colored ceramic tile. The tile is laid in



Figure 104. View of bathroom door and entry facing north.

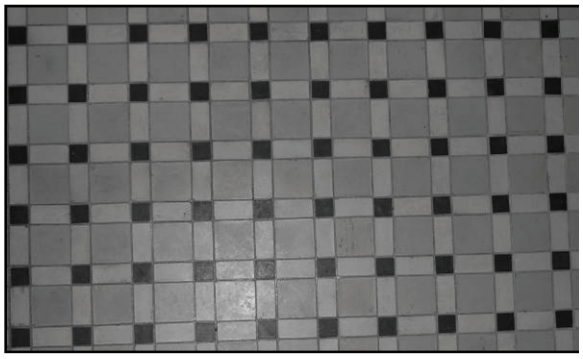


Figure 105. Close-up ceramic tile pattern of bathroom floor.

a square pattern with a 2" peach tile surrounded by 1" x 2" white tiles at the sides with 1" black tiles at the corners. This tile pattern is repeated on the floor of the shower.

Walls: The bathroom walls are plaster with a tile wainscot extending 4' up the wall. The wainscot is comprised of 3" square gray tile with a curved black cap.

Door: The bathroom door is a four-panel wood door. This door has a mortised lockset with round metal knobs and faceplate, and is attached to the frame by two metal butt hinges.



Figure 106. View of ceramic tile at shower and window. Damaged tile at window edge.

Ceiling: The ceiling is clad with 4¼" butt-jointed boards.

Molding: The wall & ceiling juncture is trimmed with a single piece of 1¼" wood crown molding. There is no other molding present.

Existing Condition: Items noted in the condition of the finishes in Room KB102 include the build-up of paint layers, deteriorating and damaged paint finishes and damaged ceramic tile. The tile just below the window is chipped.

Room KB201:

The second floor is a single large room with a full-height closet located in the northeast corner of the room.

Floor: The flooring of the second floor is 3¼" tongue and groove flooring running east to west.



Figure 107. View of second floor facing south.

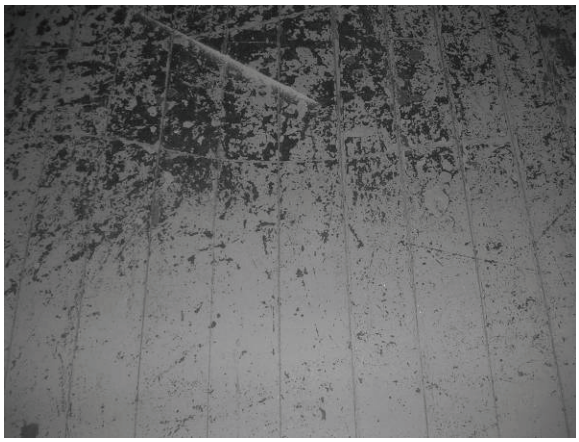


Figure 108. Close-up of tongue and groove flooring at second floor.



Figure 109. View of horizontal tongue and groove walls at second floor – facing northeast.

The flooring is currently painted grey, though earlier layers of red and a darker grey paint are visible where the paint is chipped.

Walls: The walls are clad with 4¼" and 5¼" horizontal tongue and groove boards. The window opening at the south side of the west wall has been covered with 4¼" horizontal tongue and groove boards.

A full-height closet is located in the northeast corner of the room. The closet is formed of 3" butt-jointed vertical wood painted white and has double doors of 3¼" vertical tongue and groove bead board also painted white. The door is attached to the closet wall with four metal butt hinges painted white. The doors are secured by a metal hasp and slide latch.

The chimney at the south wall of the second floor has been encased with 3¼" horizontal tongue and groove bead board.

Ceiling: The ceiling is clad with 4½" tongue and groove boards painted white running north to south. The ceiling angles down at a 30 degree pitch to meet the walls at the east and west sides reflecting the profile of the roof structure.



Figure 110. View of closet at second floor.

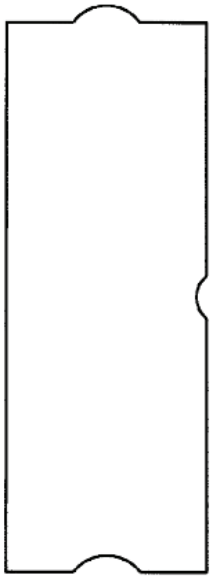


Figure 111. Profile of tongue and groove wood paneling at closet.

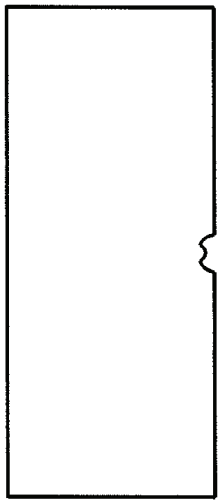


Figure 113. Profile of tongue and groove wood paneling covering chimney.

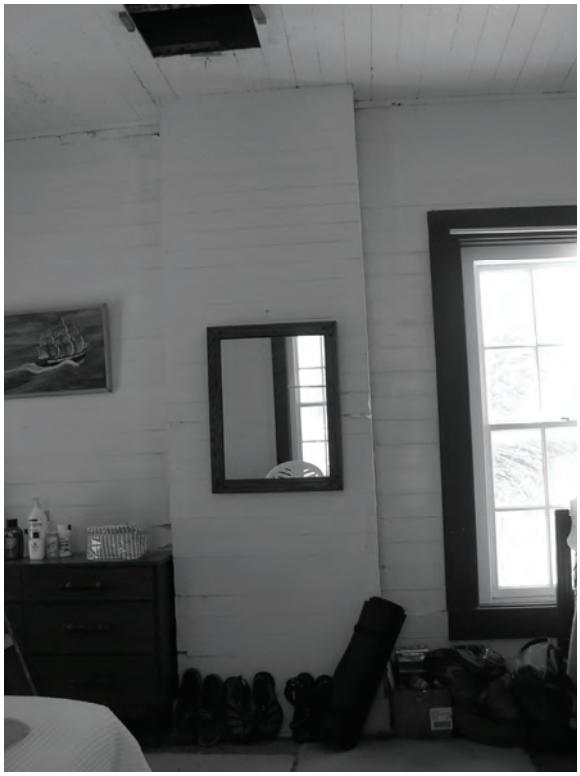


Figure 112. View of horizontal tongue and groove encasing chimney.



Figure 114.Close-up of ceiling and molding at ceiling/wall juncture.

Molding: A simple 1" quarter-round molding is located along portions of the north and south walls at the wall ceiling joint. There is no crown molding present at the east and west walls. A flat 5" baseboard with a ½" rounded shoe mold painted white is present throughout the room. The window openings on the second floor have flat 6" wide casing at the head and jambs painted brown. The jamb casings terminate into the head.

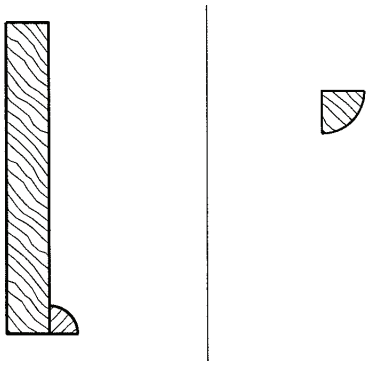


Figure 115. Profile of floor board and ceiling molding at second floor.



Figure 116. Deteriorated paint finish at the second floor ceiling.



Figure 117. Deteriorated floor finish at the floor on second floor.

Existing Condition: Items noted in the condition of the finishes in Room KB201 include the build-up of paint layers, deteriorating and damaged paint finishes, and loose boards and moldings. The ceiling and wall paint finishes are cracked and peeling in several locations. Several boards enclosing the chimney are loose. The metal hasp and slide latch hardware at the closet are rusted. The painted floor finish is also deteriorated, revealing layers of red and dark grey paint beneath the top coat. The metal housing for the previous lamp-type fixtures in the ceilings is rusted.

Utilities

Electrical System: Electrical power is provided to the Kitchen building and other Light Station structures by the photovoltaic (PV) system installed by the National Park Service in 2002. Prior to installation of the PV system, electricity was produced by two diesel-powered generators. Following installation of solar panels by the Coast Guard to power the lighthouse optic, the National Park Service installed an expanded PV system to service all of the Light Station structures. Electricity is delivered to the Light Station structures through underground conduits.

The electrical service for the Kitchen Building is routed through underground conduit that enters the north side of the building. The wiring is routed to a surface-mounted, eight-circuit distribution panel on the west wall of the first floor.

The electrical wiring is routed from the distribution panel to the ceiling fixtures in rigid, surface-mounted metal conduit. The existing non-historic fluorescent ceiling fixtures were installed in 1985.

Existing Condition: The photovoltaic array has an anticipated useful life of 20 years, which leaves approximately 13 years before it will need to be replaced. The lifespan of the system's individual components and batteries ranges from eight to ten years. Regular maintenance of the system is required primarily due to the effects of the environment on individual system components. The existing PV system has sufficient capacity to service the demand required to operate the Station buildings.

The electrical system components of the Kitchen Building are fully operational. The metal conduit, distribution panel, and electrical switches, fixtures and outlets are intact and in operable condition. The modern fluorescent light fixtures and surface-mounted conduit diminish the historic character of the building interior.



Figure 118. Close-up of eight-circuit distribution panel at Kitchen Building.



Figure 119. Fluorescent light fixture ad rigid metal conduit at second floor.

Gas: The Kitchen building has a propane gas system for the kitchen stove. Two steel gas supply tanks are located at the exterior. The gas supply lines enter the house through the west wall and connect to the kitchen stove.

Existing Condition: The propane gas system is in operable condition. One propane tank appears to be relatively new due to the absence of any rust, while the second tank is corroded with rust.

HVAC: The Kitchen Building has a split air conditioning system installed in the fall of 2005. The system consists of two wall-mounted Sanyo cooling units and a single compressor. One cooling unit is located on the south wall of the first floor and the other on the west wall of the second floor. The compressor for both units is



Figure 120. Propane gas tanks at west elevation.



Figure 121. Sanyo cooling unit on first floor.



Figure 122. Air compressor at west elevation.



Figure 123. Plumbing pipes at north elevation.

located outside at the west elevation. The electrical wiring between the compressor and units is routed along the south elevation in PVC conduit where the wiring penetrates the south wall to connect to the first floor unit. The metal conduit encased wiring for the second floor unit is routed through the flooring and up the interior face of the west wall.

Existing Condition: The function of the units was tested and found to be in working order during. The portion of the conduit housing the electrical wiring visible at the exterior and interior of the building was in sound condition with no holes evident. National Park Service personnel report that the unit is sized appropriately for the building and the solar system and that there have been no reports of problems with the system since its installation

Plumbing: Water is supplied to the Kitchen Building by the reverse osmosis potable water system. Water is pumped to the building through an underground PVC supply line from holding tanks located in the south addition to the original Oil House . Hot water is provided by a passive solar hot water heater located to the west of the building.

There are four plumbing fixtures in the building, including a stainless steel single basin sink mounted on the north wall adjacent to the bathroom, and a sink, shower and toilet in the bathroom.

The fresh water lines and sanitation lines penetrate the north wall of the building to connect with the fixtures in the bathroom. The bathroom sink and kitchen sink share a common wall.

Existing Condition: The plumbing system is in operating condition. No signs of active or past leaking from the piping were observed at the time of inspection.

Brick Cisterns

The character-defining features of the Brick Cisterns include:

- Location of Cisterns adjacent to original Station buildings – south of the remains of the

original Keepers Dwelling and east of the Brick Kitchen Building.

- Circular plan of cisterns with rectangular intake extension.
- Load-bearing brick masonry structure of two-wythe thickness laid in Common bond.
- White painted finish.
- Sand-covered top surface of cisterns.

The brick cisterns are approximately 14 feet in diameter with two-wythe, painted brick walls laid in a common bond, with headers occurring every seven to eight courses. The bricks of the cisterns range in color from yellow to salmon and have dark inclusions similar to the bricks used to construct the Lighthouse and other original Light Station structures. According to drawings from the 1960s, the brick cistern located east of the Kitchen has an 8,600 gallon capacity while the cistern located south of the Keepers' Dwelling is smaller with a 6,400 gallon capacity.

Each of the cisterns has an approximately 40" by 40" brick extension that served as the inlet for the water and likely contained some kind of sand filtering system. The box inlet has parged side walls and a floor that slopes from 18" to 24" where there is a small (4" x 4") hole that allowed water to enter the reservoir. The reservoir or holding tank, is constructed of brick with a shallow vaulted ceiling. The side walls of the reservoir are parged however the ceiling is exposed brick.

The top of the cistern walls form a parapet above the top of the reservoir. A layer of sand, 8"-10" thick has been laid over the top of the reservoir and is contained by the side walls. There is a circular access hole in the center of the cistern. A concrete cap, made in 1989, covers the access hole. Water was present in both cisterns at the time of inspection.

Neither of the brick cisterns is being used by the National Park Service at this time and there are currently no plans to integrate them back into the water utility system.



Figure 124. Opening in the brick extension of east brick.



Figure 125. View of south brick cistern facing south.



Figure 126. Deteriorated mortar joints and bricks at lower courses of south brick cistern.



Figure 127. View of intake box at south brick cistern.



Figure 128. Cracks at intake box of south cistern.

Existing Conditions

South Cistern: The southern-most brick cistern is located adjacent to the ruins of the original Keeper's Dwelling. The height of this cistern is 4' above grade, one foot lower than the east cistern. The painted finish of this cistern is severely weathered exposing the underlying brick.

A significant horizontal crack in the middle of the cistern at the eighth course above grade extends around the entire perimeter of the structure. The cause of this cracking is not clear. There is no evidence of any metal installed at this location. There was no evidence that water from the cistern is leaking from this crack. In addition, stair step cracking was observed in several locations. The stair step cracking is more indicative of uneven settlement of the structure. Galvanized piping connects this cistern with the adjacent 1922 concrete cistern located just to the west.

Many of the bricks in the lower courses have spalled or cracked and in some locations the surface of the bricks has been blackened. This damage is almost certainly a result of the fire that consumed the adjacent original Keeper's Dwelling. There also appears to be widespread separation between the mortar and brick. This is likely the result of the mortar being allowed to dry too quickly during the initial construction.

There is evidence that the intake box was originally separated into two compartments. The parged finish of the intake box has deteriorated at the inlet. At the time of inspection, the cistern was approximately half full with water.

East Cistern: The masonry walls of the east cistern are experiencing stair-step or settlement cracking in at least two locations. In addition several severe cracks have formed at the intake box due to the corrosion of a pipe through the side wall. The pipe has corroded, expanded and resulted in stress-cracking of the surrounding masonry.

Some minor deterioration of the mortar beneath the painted finish was observed as well as evidence of previous repointing. The painted finish of this cistern was found to be in relatively good condition. At the time of inspection, the cistern was approximately half full with water.

Boat House

The Dry Tortugas Light Station Boat House was constructed of reinforced concrete in 1923. The building is located on the western shore of the island. The existing boathouse is the third structure built for this purpose. The first boat house, constructed in 1871, was destroyed by the hurricane of October 1873. The Station's second Boat House was constructed in 1880 and was destroyed by a hurricane that hit the island in September of 1919. The 1887 survey of the island shows that the second boat house was a wood frame structure measuring 16' x 30'. The two previous structures were built in a



Figure 129. Roof framing at Boat House.



Figure 130. Gable roof of Boat House.

approximately the same location as the existing structure.

The extant Boat House is a one-story building with reinforced concrete walls and foundation and a wood frame roof structure. It is a rectangular building measuring 42'–9" long by 20' wide. The roof structure is comprised of 2¾" x 7½" rafters, 1¾" x 12" ridge pole, 1¾" x 5½" collar beams and 2¾" x 5½" struts. The roof is clad with asphalt composition shingles installed by the Coast Guard in 1992.

The structure has one doorway and eleven window openings, with four window openings on both the north and south elevations, two on the west elevation, and one window on the east elevation. While there are no sashes present in the openings, the buildings' interior is secured from the elements by vertical wood shutters with Z-bracing. The existing shutters were replaced by the National Park Service in 2006, replicating the historic shutters.

A marine railway and pier were historically associated with the Boat House. The marine railway originally extended 174', including 33' of rail inside the Boat House, 95' from the Boat House to the shore line, and 46' into the water. The railway structure consisted of 350 linear feet of 60" A.S.C.E. steel rail attached to 8" x 10" creosoted stringers by 350 5" railroad spikes. The rail was supported by seventeen reinforced concrete piers.

An iron cradle attached to a hand winch was used to draw the Station boat out of the water and into the Boat House. Only remnants of the marine railway and pier exist today, including the steel rail embedded in the Boat House floor, portions of two concrete piers on the beach, and portions of the pier structure in the water.

The Boat House became the Recreation Building for the Station during the era of Coast Guard management of the Light Station. The building is used today to house the pump for the salt water desalination system and as storage for various types of maintenance equipment and supplies.

The Boat House has been used in recent years to temporarily house Cuban refugees that have landed on the island. Several examples of graffiti left by refugees remain present on the interior walls of the building.

Character-Defining Features

The character-defining features of the Boat House include:

- Location of the Boat House at the western shore and east to west siting of the building with the primary façade facing west.
- Rectangular plan and one-story height.
- Reinforced concrete wall structure and wood novelty siding in gable end walls.
- White paint finish on exterior and interior of walls.
- Front gable roof with wood roof structure.



Figure 131. Missing roofing shingles at north elevation.



Figure 132. Metal flashing and eave fascia at north elevation.

- Rough window openings covered with wood shutters
- Interior concrete floor and steel marine railway rails embedded in the floor.

Structural Systems

Foundation: The level of grade around the perimeter of the Boat House did not permit access to the building's foundation. The exterior reinforced concrete walls extend below grade.

Architectural drawings dated 1921 show reinforced concrete walls extending approximately 1'-9" below grade to a 9" reinforced concrete foundation laid on top of a 9" layer of crushed rock over a layer of water-tamped sand.

Existing Condition: No cracking of the lower exterior walls that would suggest active settlement or movement of the foundation was noted.

Floor Structure: The existing floor of the Boat House is poured—in-place concrete panels that measure 61" x 75". Architectural drawings from 1921 show the floor as a 3" slab poured atop a 6" layer of crushed rock. Thirty-three feet of the 2" marine rail is embedded in the concrete with the rails 5'-1½" apart.

Existing Condition: The concrete floor panels are in sound condition. No cracking or signs of settlement or deterioration were observed. The railway track embedded in the floor is solid and not loose, though the surface of the track is rusted.

Roof Structure: The front gable roof of the Boat house is framed with 2¾" x 7½" rafters that extend from the 3" x 6" wall plate up to a 1¾" x 12" ridge pole. The roof rafters are tied together by horizontal collar beams measuring 1¾" x 5½" and 2¾" x 5½" struts extending diagonally from the wall plate to the principal rafters. The rafters and struts are secured at the wall plate by 3" x 6" ties.

Existing Condition: The roof framing appears sound. The structural members are solid and the joints sound. The attic framing and interior of the Boat House were dry at the time of inspection and no evidence of active or past leaks was observed. No evidence of active termites or past termite damage was observed on the roof structure.

Exterior Features

Roofing: The front gable roof of the Boat House has a 30 degree slope and is clad with gray three-tab asphalt composition shingles, also found on the Kitchen Building. This roofing was installed in 1992. The drawings from this project show 1" x 4" tongue & groove sheathing, roofing felt, asbestos shingles and ridge rolls were removed and replaced with new plywood sheathing, No. 15 roofing felt, asphalt shingles, and new ridge

rolls. The building does not currently have gutters or downspouts and there is no evidence these features were ever present on the building.

Existing Condition: The existing composition shingle roofing is in sound condition and functioning satisfactorily. There was no indication of active or past moisture infiltration or damage on the interior of the structure. However, there are several shingles missing from the roofing that should be replaced.

Roof Eave: The roof has a 9" projecting eave on all sides. The eave has a 1" x 8" wood fascia board painted white and exposed roof rafters along the north and south sides of the structure. A 1" x 9" wood raking fascia board is present at the west elevation. There is no fascia along the gable end at the east elevation. Three inch metal flashing painted green covers approximately one-quarter of the fascia board at the north, south and west elevations and is bent down over the edge of the roof decking at the east elevation.

Existing Condition: The exposed roofing members and fascia boards are in fair condition. Though generally sound, the painted finish of the exposed rafters, decking and eave fascia is weathered. The edges of the exposed roof decking at the gable ends are split and rotted in several locations. Many of the roofing nails protruding through the bottom of the roof decking are rusted causing discoloration of the painted finish. The roof flashing is bent away from the structure in multiple locations. At the east elevation, the damaged flashing has allowed moisture to deteriorate the exposed roof decking. A horizontal crack is present at the west side of the eave fascia on the north elevation.

Exterior Walls: The Boat House walls are constructed of cast-in-place reinforced concrete painted white. The 1921 architectural drawings for the Boat House show that the reinforced concrete walls have 3/8" round rods of mild steel spaced 16" horizontally and 9" vertically. The walls are 6" and 9" thick with 12" thick columns at the corners and spaced equidistantly along the north and south elevations.

Horizontal 1" x 5" wood novelty siding painted white covers the upper portion of the gable end walls at the east and west elevations.

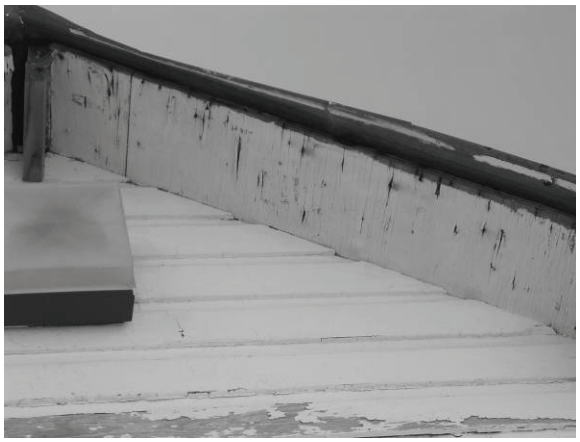


Figure 133. Damage flashing and deteriorating roof decking at east elevation.



Figure 134. Horizontal crack in eave fascia at east elevation.

Existing Condition:

The reinforced concrete walls are cracked, spalled and delaminated at numerous locations, sometimes exposing the internal rebar. This damage has been caused by internal stress in the walls created by oxidation and associated expansion of the reinforcing bars imbedded in the wall structure. This damage to the concrete has exposed the rebar in numerous locations and allowed moisture to penetrate the wall structure further exposing the rebar to the elements and causing continued corrosion of the steel. The continuous presence of moisture within the wall structure has degraded the concrete over time. A more detailed description



Figure 135. Concrete and framed walls of Boat House.



Figure 136. East elevation of Boat House. 134. Horizontal crack in eave fascia at east elevation.



Figure 137. Weathered novelty siding in gable end at east elevation.

of the specific damage locations is provided below by elevation.

East Elevation

The east elevation of the Boat House faces east toward the Kitchen building and the site of original Keeper's Dwelling. The exterior wall is reinforced concrete with wood novelty siding in the upper gable end wall. This elevation contains the single entry into the structure and one window.

Existing Condition: The concrete wall at the east elevation appears sound. There were no instances of oxide jacking observed in this elevation. The painted finish on the novelty siding in the gable end wall in the east elevation is deteriorated due to weathering. The paint is chipped and flaking in multiple locations. Many of the nail heads used to secure the siding are rusted and staining the exterior finish.

West Elevation

The west elevation faces towards the gulf waters. The exterior wall is reinforced concrete with wood novelty siding present in the gable end wall. This elevation contains two windows. A 4" x 13" deck comprised of 2" x 4" wood is located at this elevation. The piping for the salt water desalinization system intake enters the structure at the northwest corner of this elevation.

Originally, this elevation contained large double wood doors. The railway and a pier were extended from this elevation into the water. This opening has been infilled with a wood frame wall and clad with vertical tongue and groove siding. The two existing window openings have been cut into this replacement siding.

Existing Condition: Horizontal and vertical cracks from oxide jacking are present in the upper portion of the south wall on this elevation. A larger crack extends across the face of the wall and smaller cracks extend vertically down from the top of the wall.

The painted finish on the drop siding in the gable end wall is deteriorated due to weathering. The paint is chipped and flaking in multiple locations. The paint finish of the "Dry Tortugas National Park Loggerhead Key" sign is also



Figure 138. West elevation of Boat House.



Figure 139. Deteriorated paint finish of novelty siding and signage at west elevation.



Figure 140. Wood deck at west elevation.

deteriorated due to weathering. There is a small rectangular hole in the west elevation gable end likely for a former exterior light fixture. This hole is allowing wind-drive rain to enter the structure. Many of the nails used to secure the drop siding are rusted and staining the siding finish.

The vertical wood boards between the concrete wall and framed-in wall section of the west elevation are deteriorated and have multiple holes along their lengths from wood-boring insects.

A wood deck located on the west elevation is unstable. The dock is not adequately secured to the structure. The 4" square wood post and stacked stone foundation supports are loose. There is no foundation support at the southwest corner of the dock.

North Elevation

The north elevation is comprised of reinforced concrete walls with novelty siding present in the gabled end. This elevation contains four shuttered window openings.

Existing Condition: The north wall appears structurally sound but is in poor condition. Damage to the concrete wall from oxide jacking has occurred at multiple locations. Horizontal and vertical cracking occurs at all of the window openings. In some locations the concrete has spalled exposing the internal rebar. A large vertical section of the concrete wall at the upper portion of the northwest corner is spalled off and the corroded rebar is exposed.

South Elevation

The south elevation is identically to the north elevation containing four shuttered windows equally spaced within the reinforced concrete wall.

Existing Condition: The wall appears structurally sound but in poor condition. Similar to the north elevation, damage to the wall from oxide jacking has occurred in multiple locations. Horizontal and vertical cracking, as well as significant spalling is present along this elevation.



Figure 141. Damaged vertical framing at west elevation.



Figure 142. North elevation of Boat House.



Figure 143. Example of damage to concrete walls at north elevation.

Doors: There is one door opening in the structure, located on the east elevation. The door is 32" in width by 78½" in height and is comprised of a single sheet of plywood set on a frame of 2" x 3" wood with a single 2" x 4" set diagonally on the interior face of the door for bracing. The door is painted black on the exterior and white on the interior. The door is attached to the interior door casing by two metal butt hinges. A metal hasp and padlock are present to secure the door. A 5" rounded concrete threshold is present in the door opening. Architectural drawings and historic photographs show that the original door at this opening was a traditional five panel wood door. Historic drawings and images also show wooden double-doors on the east elevation that provided access for the Station boat. Each door measured 6'-8" in width and 9'-8" in height and was comprised of diagonal wood set in a wood frame forming upper and lower panels. These doors were attached to the frame with three metal strap hinges. These doors were removed and the opening framed-in and clad with 1" x 5" vertical tongue and groove wood.

Existing Condition: The existing single entry door is soundly attached to the frame and in operable condition. The wood comprising the door and its joints are solid. The exterior painted finish is weathered due to exposure to the elements. The concrete threshold is worn and chipped along its length. The hasp and padlock are operable though rusted.

Windows: The structure has eleven window openings. Four window openings are located on the north and south elevations. Two window openings are located within the infill on the west elevation and one opening is located on the east elevation. The openings measure 3'-5" in width and 4'-6" in height. There are no window sashes in the openings, nor have there been historically. These openings are secured by shutters of 1" x 4" vertical tongue and groove wood with Z-bracing on the interior face. The outward opening shutters are attached to the 2" x 4" wood frames by exterior metal strap hinges. The shutters are secured by metal slide latches located on both the exterior and interior of the openings. These shutters, painted green, were installed in 2006 by the National Park Service and replicate the appearance of the historic shutters.



Figure 144. South elevation of Boat House.



Figure 145. Example of damage to concrete walls at south elevation.



Figure 146. View of wood door at front entry.

Existing Condition: The window shutters and frames are in good operating condition. The wood components are solid and the joints and painted finish are sound. The interior areas around openings were dry and absent of any apparent moisture damage, indicating that the shutters and frames are water tight. Many of the slide latches on the exterior of the shutters are rusted. The nails securing the two window shutters at the west elevation are rusted and staining the painted finish.

Interior Features

The interior of the Boat House is a single undivided space. The interior houses the pump for the salt water desalinization system, which is located in the northwest corner. The remainder of the interior is used for equipment storage.

Floor: The existing floor of the Boat House is exposed concrete panels poured to form a slab. The panels measure 61" x 75".

Walls: The walls are exposed reinforced concrete painted white. The interior face of drop siding on the gable end walls are painted white, though the paint finish is deteriorated in multiple locations.

Ceiling: There is no ceiling in the Boat House, with the roof structure exposed.

Molding: There is no crown molding or baseboard in the Boat House. The door opening in the east elevation has a flat 1" x 5" casing at the head and jambs. The north jamb and head casings are painted white and the south jamb casing is unfinished, indicating that it may be a recent replacement. The jamb casings terminate into the head.

Existing Condition: The condition of the interior concrete floor is sound. No cracking or signs of settlement or deterioration were observed. The interior face of the reinforced concrete walls have experienced cracking and delamination due to the oxide jacking described above. As is the case on the exterior, deterioration of the concrete walls in concentrated around the window openings.



Figure 144. South elevation of Boat House.



Figure 145. Example of damage to concrete walls at south elevation.



Figure 146. View of wood door at front entry.

Utilities

Electrical System: Electrical power is provided to the Boat House and other Light Station structures by the photovoltaic (PV) system installed by the National Park Service in 2002.

The electrical service for the Boat House is routed underground through conduit to a metal switch box surface-mounted to the exterior wall at the northeast corner of the building. The wiring is routed through the wall in 1" grey PVC conduit to a surface-mounted six-circuit distribution panel on the north wall. The electrical wiring is routed from the distribution panel to surface-mounted switches and outlets, three fluorescent fixtures mounted to the roof framing, and the desalinization system pump. A square metal security light is located in the gable end wall at the east elevation.

Existing Condition: The photovoltaic array has an anticipated useful life of 20 years, which leaves approximately 13 years before it will need to be replaced. The lifespan of the system's individual components and batteries ranges from eight to ten years. Regular maintenance of the system is required primarily due to the effects of the environment on individual system components.

The electrical system components of the Boat House are fully operational. The PVC conduit, switches, fixtures and outlets are intact and operable. The metal switchbox and distribution panel are operable but the surface of the box and panel housing is severely rusted. There were no reported conditions or operational issues reported by National Park Service personnel.

New Oil House

The character-defining features of the New Oil House include:

- Location of the New Oil House northwest of the Lighthouse.
- Rectangular plan and one-story height.
- Reinforced concrete wall structure.

White painted finish on exterior walls.



Figure 147. Example of typical wood shutters at window openings.

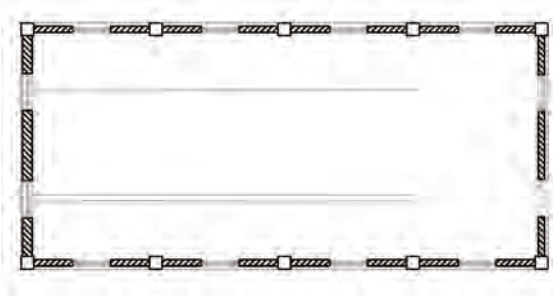


Figure 148. Existing interior floor plan of Boat House.



Figure 150. Concrete panel flooring inside Boat House.

- Front gable roof with triangular steel truss structure.
- Un-partitioned interior space with concrete floor and two-tone paint scheme of gray and white.

The New Oil House, more recently referred to as the Bosun's Workshop was constructed in 1926 at the time the original Oil House was repurposed to serve as the Radio Beacon building. The original drawings were not located as part of the research effort. The building is a small, one-room, reinforced concrete structure with a front-facing gable roof.

The building has a central door on the east elevation and a single window opening in the west elevation. There are no openings in the north and south elevations. The original horizontal paneled wood door has been replaced with a modern flush ply-wood door.

The original six-over-six, double-hung window and frame historically present in the west elevation has been removed. The original window opening has been in-filled with brick except for the top one foot of the opening which contains a wood louver to ventilate the interior.

The roof structure consists of a series of simple triangular trusses made up of steel angles. The trusses rest on the exterior walls. Steel purlins span between the trusses to support the wood roof decking. The roof is clad with asphalt shingles matching those currently installed on the original Oil House. Historic images of the structure show a corrugated metal roof on the building during the mid-twentieth century. The floor is concrete. The box eave and wide rake-board of the New Oil House differ slightly from the minimalist design of the eaves on the original Oil House.

The interior of the New Oil House is single un-partitioned space. The north side of the space contains an intermediate platform or shelf that is supported on 6" x 6" posts. This area is used for storage while the south side of the space contains a workbench and tool storage. There is no ceiling in the space. The interior has a two-tone paint scheme, the walls are painted grey to a height of 70" and above this they are white.



Figure 151. View of interior door face with flat wood casing.



Figure 152. Example of damage to interior face of concrete walls.



Figure 153. Metal switch box ad northeast corner of building.

Electrical service enters the building through a mast on the west elevation. Electricity powers several outlets and two modern four foot fluorescent lights.

New Oil House Existing Conditions

The New Oil House is in generally good condition. Horizontal cracking of the exterior walls was noted on the north, south and west elevations. Based on the pattern of the cracks it is likely that they correspond to the corrosion and expansion of embedded reinforcing. The horizontal crack on the north wall appears that it may be the result of a cold joint in the concrete. A cold joint is created when a wall is not constructed in a single pour but time is allowed to elapse between pours. In most cases, the cracks extend through the wall to the interior. As is the case with the other reinforced concrete structures, these initial signs that the reinforcing has begun to corrode are concerning because if not addressed the damage will continue to worsen and accelerate.

The roof and roof decking appear to be in good condition. The wood soffit and fascia elements are experiencing weathering of the painted finish and to some degree the underlying wood. One of the soffit vents is missing its frame and screen. The flashing at the roof edge is slanted inward towards the fascia. This condition directs water towards the building instead of away from the building.

The flush plywood door is delaminating and the painted finish on the frame is severely deteriorated. The white paint applied to the building exterior is flaking and falling off.

Concrete Cisterns

The character-defining features of the Concrete Cisterns include:

- Location of Cisterns adjacent to Station dwellings – south of original Keepers Dwelling site and west of 1922 Keepers Residence.

Rectangular plan of cisterns.



Figure 154. Close-up of six-circuit distribution panel in corroded condition.



Figure 155. View of New Oil House façade and entry facing west.

- Load-bearing concrete construction of cisterns.
- Exterior finish of white paint.

Two, rectangular, reinforced concrete cisterns are also located on the Light Station property. Constructed in the 1920s, the concrete cisterns were built during a period of modernization of the Light Station. Like the brick cisterns, the concrete cisterns differ slightly in capacity. The cistern located next to the 1922 Keeper's Residence has a capacity of 12,000 gallons and measures approximately 11'-6" X 19' while the cistern located south of the former Keeper's Dwelling is slightly smaller at 10,000 gallons and measures 11'-6" X 16'. When constructed, the cisterns were connected to the central water tower and pumphouse located south of the Lighthouse. Water was distributed to the Light Station building by underground piping.

Approximately one half of the concrete cisterns are buried below grade. The structures are made entirely of concrete. The walls of the cisterns range from 4" in thickness, for the bottom and 8" in thickness for the sidewalls. The concrete cap is 6" thick with an internal layer of "Clinton wire cloth". A terra cotta vent originally penetrated the top of the cistern, opposite the access hatch. Two, round bar straps with a turnbuckle have been fastened around the perimeter of each cistern. Presumably the straps were installed due to some indication that the structure's side walls were leaning outward, cracking or separating.

The interior of the cistern adjacent to the Keeper's Residence is coated with a black tar or painted finish.

The interior of the cistern located south of the Keeper's Dwelling ruins has no finish, however a mesh cistern liner has been installed within the reservoir. The concrete cisterns are not being actively used at this time. There was only a small amount of water in each of the cisterns at the time of inspection. A wood cover has been placed over the access hatch.

Neither of the concrete cisterns is being used by the National Park Service at this time and there are no plans to integrate them back into the water utility system.



Figure 156. Interior view of the New Oil House walls and tool storage.



Figure 157. Cracks in mortar joints at the north elevation of New Oil House.



Figure 158. View of south concrete cistern.

Concrete Cisterns Existing Conditions

North Cistern: This cistern is located just southwest of the 1922 Keeper's Residence. The round bar strap along the bottom of the cistern has corroded to the point of failure and is no longer performing its intended purpose.

The exterior painted finish of the cistern is deteriorated. The concrete structure is experiencing cracking in various locations. Two significant cracks emanate from the access hatch and a crack spans the width of the concrete top at its western end. There is also some cracking of the sidewalls at the corners of the structure and horizontally in line with the bottom strap. It appears the strap may have been the cause of the horizontal cracking. Several generations of patching and repair was noted. The iron piping entering the cistern at is eastern end is severely corroded to the point of failure.

South Cistern: The southernmost concrete cistern is experiencing similar condition problems. The upper strap is loose and therefore no longer providing support to the structure. The pattern of cracking in the top of the cistern is similar to that which was observed on the north cistern. One difference is the presence of a diagonal crack at all four corners of the top slab. Attempts have been made to patch significant vertical cracking at the corners of the cistern.

Given that a liner has been installed within the reservoir it can be assumed that the cracking has compromised the water-tightness of the cistern. The piping between the brick and concrete cisterns is extremely corroded and does not appear to be functional.

Concrete Walkways

The character-defining features of the Concrete Walkways include:

- Location and layout of walkways at the Station.
- Concrete construction of walkways.

The network of concrete walkways that join the buildings of the Light Station with the main dock were constructed during several different building episodes. With a few exceptions, the existing walkways primarily date from the 1920s



Figure 160. Damaged concrete walkway extending west toward Kitchen Building.



Figure 161. Damaged concrete walkway extending west, with the solar array to the north.

when the Light Station was "modernized" and several new buildings were constructed. A site plan from this period shows the new buildings and the connecting walkways as "additions." This same plan shows the walkways extending from the original Keeper's dwelling to the dock on the east shore and the boathouse on the west shore as existing as not being replaced. This would make these the earliest surviving sections of walkway. Over time, individual slabs have been replaced, repairs made and in several locations, angled slabs have been added at walkway intersections. For the most part the slabs are four to six inches in thickness.

A number of the buildings constructed as part of the 1920s modernization of the Station have not survived, however the network of walkways joining these building sites remains intact. Today the walkways exist as a mosaic of construction and repairs made during the twentieth century. Differences in color and texture of the concrete can be seen however no documentation exists that records when the walkways were repaired or individual slabs replaced. In very general terms the earliest sections of walkway appear the lightest in color. Those constructed during the 1920s tend to have a pinkish hue and then finally the more recent repairs and slab replacements appear the darkest in color. The finish of all of the walkways is smooth with only a few of the most recently added sections having a textured surface or edging.

Concrete Walkways Existing Conditions

The main spine of the walkway system extending from the original Keeper's Dwelling, north around the perimeter of the Lighthouse and then to the 1922 Keeper's Residence is constructed of 3' x 5' slabs that are 4" to 8" thick. This section of walkway is in relatively good condition with only 5-6 slabs at is southern end exhibiting extensive cracking. By contrast, the branches that extend off this main spine, north and south of the original Kitchen Building are extensively cracked and in very poor condition. This includes the pre-1920s section of walk that extends east from the ruins of the original Keeper's Dwelling to the dock. The pre-1920s walkway to the boathouse is in fair condition. The concrete roadway installed in the 1970s is constructed of 8' x 10' concrete slabs that are 6" thick. The roadway remains in good condition.

Requirements for Treatment and Use

The treatment and use of the Dry Tortugas Light Station Ancillary Structures must be considered within a framework of applicable laws, policies and agreements. These various mandates govern a wide range of management issues beyond the preservation, protection and interpretation of the Park's cultural resources. They extend to issues of visitor and staff use, safety, and universal accessibility among others.

The National Historic Preservation Act

Section 106 of the National Historic Preservation Act mandates that Federal agencies, including the National Park Service, take into account the effects of their actions on properties listed or eligible for listing in the National Register of Historic Places. The goal of this directive is to encourage agencies to avoid or minimize adverse impacts to cultural resources and to make sure preservation is fully considered as part of the planning process. The Section 106 process also requires consultation with parties outside the National Park Service that may have an interest in the property.

In 1995, in an effort to expedite the review process, a programmatic agreement was made between the Advisory Council and the NPS that allows for a categorical exclusion of some activities from the full Section 106 review process. These excluded activities are limited to routine repairs and maintenance that do not alter the appearance of the historic structure or involve widespread or total replacement of historic features or materials.

Accessibility

The National Park Service is committed to providing persons with disabilities the highest feasible level of physical access to historic properties.

The Architectural Barriers Act of 1968, the Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1990 set forth the federal mandate for making buildings and facilities more accessible. The guidelines that accompany these Acts as well as the Uniform Federal Accessibility Standards (UFAS; 41 CFR 19.6; 49 FR 31528) provide design direction for accessibility modifications to historic structures in the national park system. With regard to outdoor developed areas such as trails, beaches and picnic and camping areas, the National Park Service has adopted the U.S. Access Board's Outdoor Environments guidelines.

Given that full compliance with these mandates in many cases would require alteration of significant features of a historic property, provisions have been made within the Acts for achieving alternative means of compliance. Given that the Kitchen Building will be used as housing, options for providing full accessibility should be explored.

In addition to building and site related accessibility issues, the primary challenge at the Dry Tortugas Light Station is accessing the site itself. Although at least one of the commercial vessels used to transport visitors to the park is accessible and equipped to accommodate a wheelchair, currently the only debarkation point within the park is on Garden Key.

There are currently no public docking facilities provided at Loggerhead Key. Thus there is currently no accessible route that could bring a mobility-impaired visitor to Loggerhead Key or the Light Station. If accessible access to the island could be

established, improvements to the wharf and walkways would have to be completed to access the Light Station itself. Due to the topography of the Key, providing an accessible route from the dock to the Light Station may require significant alteration of the historic landscape.

Recognizing its obligation to make the Park accessible to the widest audience possible, the Park has outlined its management direction in the General Management Plan Amendment.

Make visitor and management facilities as accessible as practicable, depending on the nature of the area and of the facility, to persons with visual, hearing, mobility, and mental impairments. Strive to provide the highest level of accessibility possible to facilities, programs, and services consistent with the nature of the area, the conservation of resources and the mandate to provide a quality experience for everyone.

Meet accessibility standards on visitor transportation vessels and aircraft with the limits of marine and aircraft design and safety requirements. Work with organizations that encourage and enable use of the park areas by special populations, which will increase awareness o f the needs of these populations and help to ensure that potential visitors with particular needs are aware of the opportunities offered at the Dry Tortugas.

International Building Code

As a matter of policy, the National Park Service has adopted the International Building Code which establishes minimum regulations for the design and installation of building systems with an emphasis on preserving public health and safety. Its requirements are applicable to both new construction and the repair and alteration of existing buildings.

Full compliance with IBC requirements is not mandatory for historic buildings where there is no threat to life safety.

3407.1 Historic Buildings: The provisions of this code related to the construction, repair, alteration, addition, restoration and movement of structures, and change of occupancy shall not be mandatory for historic buildings where such buildings are judged by the building official to not constitute *a distinct life safety hazard* [emphasis added].

Alternatives to full code compliance can be sought where compliance would needlessly compromise the integrity of the historic building.

DO #58 and NFPA Code 914

Among many other issues, the National Park Service Management Policies address the protection of historic resources against fire. Section 5.3.1.2 of the policy document states that:

In the preservation of historic structures and museum and library collections, every attempt will be made to comply with national building and fire codes. When these cannot be met without significantly impairing a structure's integrity and character, management and use of the structure will be modified to minimize potential hazards rather than modifying the structure itself.

NFPA Code 914, "Fire Protection of Historic Structures" has been adopted by the National Park Service.

The Secretary of the Interior's Standards

Treatment of historic resources associated with the Light Station is to be guided by *The Secretary of the Interior's Standards for the Treatment of Historic Properties*. These standards provide a framework for planning and implementing responsible preservation practices and ensuring there is a philosophical consistency to the work. A series of guidelines have been developed to accompany the standards and assist with their interpretation.

Additionally, the *Preservation Briefs* published by the National Park Service provide technical guidance for the appropriate treatment of a variety of materials, features and conditions found in historic buildings.

Cooperative Agreements with USCG

When Dry Tortugas National Park was established in 1992 the U.S. Coast Guard determined the facilities on Loggerhead Key to be "excess to its needs" and transferred the property (the entire key) to the National Park

Service. The transfer of property excluded the Lighthouse with the stipulation that the USCG would continue to "maintain and utilize" the structure for its own purposes, primarily as an active aid to navigation.

In 2007 the USCG and National Park Service entered into a cooperative agreement regarding the use of facilities and utilities on Loggerhead Key. This agreement requires the NPS to reserve a room within the Keeper's

Residence for the exclusive use of USCG personnel and provide water and power to the building. Among other minor items the USCG agreed to provide propane and gasoline storage tanks to the island and to refrain from making modifications to the Keeper's Residence with the exception of rehabilitating the rainwater collection system.

In 2008 a Memorandum of Agreement was prepared between the USCG and the NPS that establishes the parameters for the formal transfer of ownership of the Lighthouse to the NPS. Transfer of the Lighthouse is contingent upon several requirements, one being completion of this Historic Structure Report. Upon transfer of the Lighthouse the USCG will retain ownership of the lens and associated equipment and require continued access to the Lighthouse to maintain this equipment.

Ultimate Treatment and Use

The Dry Tortugas Light Station has served continuously as an aid to navigation since its light was first lit in 1858. The Ancillary Structures have continued to support the operation of the Station up to the present.

The Park's General Management Plan Amendment (GMPA) calls for the resources of the Light Station to be preserved and protected according to the Park's authorizing legislation and also that they be managed to support operational needs and visitor use. An important outcome of the GMPA has been the establishment of management zones that prescribe the types and levels of visitor use and the amount of manipulation of the natural or cultural setting that is appropriate for different areas of the Park.

The GMPA has addressed treatment and use of the Light Station resources through the creation of a Historic Preservation/Adaptive Use (HP/AU) Management Zone. One of four management zones established within the Park, the HP/AU Zone applies to those areas that contain historic and cultural resources and where the visitor experience will be primarily focused on educational and interpretive opportunities.

Two management zones have been applied to Loggerhead Key. The HP/AU Zone encompass the resources of the Light Station in the center of the Key with the remainder of the island falling within a Research Natural Area Zone.

The parameters established by the GMPA for Loggerhead Key, limit the number of visitors that can be on the island to 24 (12 originating from the commercial carriers and 12 from private vessels). This number has been established as an initial baseline that may be adjusted in the future pending the results of a monitoring program and the completion of the re-vegetation project.

Permissible uses within Loggerhead Key's HP/AU zone include unrestricted picnicking, hiking, and exploring. However, the GMPA currently restricts visitor access to the buildings until such time as the structures can be made safe and the appropriate programs are in place to support this level of use.

Since the transfer of Loggerhead Key and the Light Station to the National Park Service in 1992, public visitation to the Key has been limited. Existing concession agreements do not include provisions for transporting visitors from Garden Key to Loggerhead Key. Therefore the site has only been accessible to those reaching the island by private vessel.

Looking forward however, the Park is exploring ways that it can improve public access to the Key through renewed concession agreements. In addition, consideration is being given to utilizing the Light Station resources as a "base of operations" for an expanded program of scientific investigation and research associated with the areas status as a Research Natural Area (RNA).

The RNA covers a 46 square mile area that is designated as a marine reserve designed to restore ecological integrity and capacity for self-renewal by minimizing human disturbance. The RNA complements the adjacent Tortugas Ecological Reserve of the Florida Keys National Marine Sanctuary (FKNMS). Together the RNA and the larger Tortugas Ecological Reserve will help to ensure the success of both marine and terrestrial ecosystems while offering outstanding opportunities for scientific research and public education.

Recommended Ultimate Treatment and Use

It is recommended that the ultimate treatment and use of the Dry Tortugas Ancillary

Structures – Kitchen Building, Brick Cisterns, Boat House, Concrete Cisterns, New Oil House and Concrete Walkways – remain consistent with the guidelines established in the GMPA for the Historic Preservation/Adaptive Use Management Zone. As the name implies, this zone calls for the preservation, protection and interpretation of cultural resources yet recognizes the need to adaptively use these structures to accommodate critical functions, such as housing, sheltering essential equipment and utility components and the maintenance of the Lighthouse optic as an active navigational aid.

The Recommended Ultimate Treatment for the Ancillary Structures is rehabilitation. Actions taken should preserve or replace in-kind existing character-defining features during future projects to correct condition issues or upgrade building systems.

In keeping with the decision to restore elements of the Lighthouse to their pre-1967 appearance, this same date should be used to make decisions about the rehabilitation of the Ancillary Structures.

The exterior character defining features of the structures should be maintained to facilitate the interpretation of the Light Station. Interior spaces should continue to be adapted to the contemporary needs of operating the Light Station while retaining existing interior character-defining features.

This treatment approach would maintain the character-defining features of the building exteriors and thereby facilitate interpretation of the structures' evolution over time. This approach would allow the Park Service to rehabilitate interior spaces as resources become available to best use these spaces to support the functions necessary to operate the Station while preserving the existing interior character-defining features for possible interpretive purposes in the future.
This approach has the following advantages:

- Addresses deferred maintenance and needed repairs to prevent further deterioration or loss of historic fabric.
- Preserves in place building fabric from the full spectrum of the Station's history.
- Presents each Ancillary Structure in its evolved state of use with all its physical additions and deletions up to the present.
- Provides opportunities for interpreting the full history and evolution of the Ancillary Structures.
- Increases visitors' understanding of the evolution of the Station as it met changing needs, uses and building technologies.
- Allows for the necessary changes and upgrades to interior spaces and building systems to maintain the Station as an active aid to navigation and marine research facility.

This approach has the following disadvantages:

- Presents an incremental ad hoc set of modifications that could be difficult to interpret without reliance on the use of secondary interpretive devices such as photographs and narratives to explain the history of each Ancillary Structure.
- By reducing the opportunities to experience the original or a specific period in the Station's history, reduces the visitor's opportunity to understand the daily life experiences of the keepers during early periods of significance.
- Eliminates the opportunity for visitors experience the interior spaces of the Station.
- Misses an opportunity to restore the Light Station to earlier period of significance, including its original 1858 character or that of the 1920s period of modernization.

Alternatives for Treatment and Use

In addition to the Ultimate Treatment recommended above, three other alternatives are discussed below. Two of these alternatives are restoration-based to specific periods in Station history that have merit for interpreting the period of significance based on these earlier periods. The third alternative would facilitate interpreting the Station to a specific period of significance while enabling contemporary uses through a combination of restoration and rehabilitation treatments.

Alternative 1:

Alternative 1 considers returning the appearance of the Station structures to the period of the Light Station's original 1858 construction. This alternative is based on establishing the period of significance for the Light Station to the 1858 period of its initial construction when the Station consisted of the Lighthouse, detached two-story Oil House, two-story Keeper's Dwelling, detached two-story Kitchen Building, Brick Cisterns, and several wash houses and privies.

This alternative would require restoration of the exteriors and interiors of the Ancillary Structures to their 1858 appearance. It would facilitate interpretation of the Station's original physical layout as well as the appearance of building exteriors and interiors. This approach would have the following advantages:

- Addresses deferred maintenance and needed repairs to prevent further deterioration or loss of historic fabric.
- Facilitates opportunities to interpret the Ancillary Structures from their original period of use.
- Provides the visitor with an opportunity to understand the daily activities of the early keepers and their families at the Station by experiencing the same configuration of physical spaces.

This approach would have the following disadvantages:

- Restores the structures to a period for which there is the least amount of available documentation.
- Result in a loss of operational function in return for limited visitation.
- Misses the opportunity to interpret additional Ancillary Structures constructed after the original period of construction (e.g. Concrete Cisterns and New Oil House) as well as changes to existing Ancillary Structures over time.
- Sacrifices efficiency of interior function and minimizes ability to serve contemporary needs at the Station.

Alternative 2:

Alternative 2 considers returning the appearance of the Station structures to the period of modernization at the Light Station during the 1920s. This alternative is based on establishing the period of significance for the Light Station to the 1920s period of modernization. This period includes a significant amount of new construction and changes in building use and technologies that

took place at the Station, including construction of the Keeper's Residence, Concrete Cisterns, and new concrete walkways.

This alternative would require restoration of the exteriors and interiors of the Ancillary Structures to their 1920s appearance. It would facilitate interpretation of the evolution of the Station's physical layout as well as the appearance of building exteriors and interiors from its period of construction through the 1920s.

This approach would have the following advantages:

- Addresses deferred maintenance and needed repairs to prevent further deterioration or loss of historic fabric.
- Restores the physical characteristics of each structure to an important period in the Station's history.
- Presents each structure in its evolved state with all physical additions and deletions at that point in time.
- Facilitate interpretation of the Light Station during the period of greatest historic change at the island.
- Provides the visitor with an opportunity to understand the daily activities of the 1920 Station personnel by experiencing the same configuration of physical spaces.
- Restores the structures to a significant period in its history for which there is a substantial amount of available documentation.

This approach would have the following disadvantages:

- Misses the opportunity to preserve in place building fabric from a broad spectrum of the Station's history including the physical additions and deletions up to the present.
- Sacrifices efficiency of interior function and minimizes ability to serve contemporary needs at the Station.
- Would result in a loss of operational function in return for limited visitation.

Alternative 3:

Alternative 3 considers returning the exterior appearance of the Station structures to the 1920s period of modernization at the Light Station while enabling contemporary uses of the interior spaces. This alternative is based on establishing the period of significance for the Light Station to the 1920s period of modernization. This alternative would restore the exteriors of the Ancillary Structures to their 1920s appearance for interpretative purposes and rehabilitate the interiors for continued contemporary uses. This alternative would facilitate interpretation of the Station's physical layout and exterior building appearances to the 1920s while enabling the continued evolution of interiors uses and treatments.

This approach would have the following advantages:

- Addresses deferred maintenance and needed repairs to prevent further deterioration or loss of historic fabric.
- Restores the exterior physical characteristics of each structure to an important period in the Station's history.
- Presents each structure in its evolved state with all its physical additions and deletions at that point in time.
- Facilitate interpretation of the Light Station during the period of greatest historic change at the island.
- Provides the visitor with an opportunity to understand the

physical layout and exterior character of the Station during this period of modernization.

- Restores the exterior of the structures to a significant period in its history for which there is a substantial amount of available documentation.

- Allows for the necessary changes and upgrades to interior spaces and building systems necessary to maintain the Station as an active aid to navigation and marine research facility.

This approach would have the following disadvantages:

- Misses the opportunity to preserve in place building fabric from the full spectrum of the Station's history.

- Reduces the opportunity for the visitor to personally experience the interior spaces of the Ancillary Structures.

Recommendations for Treatment and Use

Kitchen Building

The Kitchen Building at the Dry Tortugas Light Station has generally been well-maintained. The building has now served longer as housing that it had as a space to prepare community meals for the Light Station personnel. Along with this evolution of use, and the need to repair and replace damaged or worn-out components, has come changes to the building's fabric. These modifications have occurred throughout the periods of oversight by the Bureau of Lighthouses, Coast Guard, and National Park Service.

Roof

The roof of the Kitchen building is performing well and is not currently in need of replacement. However, it is recommended that the few missing and damaged asphalt shingles be replaced with shingles matching the existing roofing material. It is also recommended that gutters be installed at the west elevation and downspouts at both the east and west elevations.

While the cornice is generally sound and attached, it is recommended that the wood cornice be repainted white. Although images taken after 1967 show the cornice as a dark color, it is thought the images are showing the raw wood and not a painted finish. In addition, it is recommended that the damaged roof flashing overlapping the cornice along the south elevation be repaired (or replaced if necessary) to provide appropriate protection for the cornice from rainwater.

Historic images appear to reveal that the wood columns and bracketing along the front elevation of the porch were removed between 1945 and the 1960s. The wood columns were replaced with brick columns during this period. Today temporary wood posts support the porch roof. It is therefore recommended that the brick columns be reconstructed to support the porch roof.

Exterior Walls

The exterior masonry joints have experienced moderate mortar erosion as well as some cracked joints. It is recommended that all cracked and deteriorated joints be repointed and those areas monitored for any future movement. Based on inspections made during the development of the HSR it is estimated that approximately 15% to 20% of the exterior walls should be repointed.

It is also recommended that the corroded metal anchors on the north elevation be documented and then removed prior to repointing. Continued corrosion and expansion of these elements may result in localized damage to the masonry.

Repointing mortar should match the composition of the existing mortar. The restoration mortar recommended in the finish analysis should consist of one part natural cement as the binder and one and one-half part natural carbonate sand (component ratio of 1:1.5). Mock-ups should be prepared to ensure the most accurate match in color and texture possible between the historic and restoration mortars.

The paint analysis revealed that the Kitchen Building has four layers of non-historic acrylic-based paint on the exterior walls. Even though the exterior walls were originally unpainted, the extant white finish on the masonry walls should be maintained and repainted. In addition, historic images also

show that the sills and lintels on the front elevation of the Kitchen Building were also painted a dark color some time prior to 1941. This finish scheme remained present until sometime after 1967 and therefore it is recommended that a dark finish be applied to the sills and lintels. Paint analysis did not specifically test these locations and therefore additional sampling may be necessary.

Prior to repainting, the existing paint should be tested to determine if lead is present and, if so, removed and abated.

Doors

The Kitchen building received new doors in 2002. The existing four-panel door at the central entry is in a deteriorated condition. It is recommended that this door be replaced with a new door matching the character of the existing door. The new door should be made out of a durable species and a finish system applied that is resistant to weather and termites. The new doors should be painted the same dark color as the sills and lintels.

Windows

The existing windows were installed in the Kitchen building in 2002 and are in good condition. It is recommended that these windows be retained to reflect the evolution of window units employed at the Kitchen Building. It is also recommended that the window lintels and sills be repainted a dark color as part of the exterior wall repainting.

Kitchen Building Interior

It is recommended that the existing interior finishes be retained to convey the evolution of historic material changes to the interior of the building. These finishes include the flush board ceiling, window casing, and straight run stairs and railing in Room KB101; ceramic tile floor and wainscot, four-panel wood door with mortised lockset, and flush board ceiling and crown molding in Room KB102; and the tongue and groove flooring, horizontal flush board walls, closet with bead board doors, and bead board ceiling in Room KB201.

Based on the build-up of multiple paint layers as well as deteriorated paint finishes in other areas throughout the interior of the Kitchen Building, it is recommended that interior surfaces be properly repaired and repainted. These painted finishes likely contain lead and therefore consideration should be given to its removal. It is recommended that hazardous materials testing be conducted to determine if lead is present in the interior paint layers. If present, the existing paint should be removed and abated before repainting.

Electrical System

It is recommended that users of the Station's housing facilities be better educated about the limits of the electrical system and energy saving measures that will help mediate demand during peak usage periods and reduce strain on the system.

Accessibility

Providing increased public access to Loggerhead Key carries with it several limitations and challenges. Assuming that transportation to the Key is resolved, visitors to Loggerhead would likely disembark onto the main dock on the east shore of the island and then walk a short distance on concrete walkways to the Light Station. The incline from the dock to the Light Station is gradual but in certain areas exceeds permissible slope limits for wheelchair use. In addition, wind-blown sand often covers the surface of the concrete walks.

Given this difficulty of providing barrier-free access to Loggerhead Key and the Light Station buildings, providing full access to the interior of the Kitchen Building may not be a practicable expectation.

In the event an accessible route to the building is established it would be necessary to construct a ramp to provide access to the first floor.

Regulated Materials

Based on the likely presence of lead in the paint, it is recommended that an environmental survey of the building be conducted to define the content, location and quantity of identified hazardous materials.

Fire Suppression

Installation of a fire suppression system in the Kitchen Building may not be practical based

on the effects of the salt-laden environment would have on system components and the lack of available fresh water. It is recommended that protection of the building and occupants be provided through a smoke detection system and accessible extinguishers.

Brick and Concrete Cisterns

Reusing both the brick and concrete cisterns for their original purpose of collecting rainwater for use on the Key presents the most logical approach to their treatment and use. The challenges faced by the original occupants of Loggerhead Key persist today and the need for fresh water remains. Although the island's fresh water needs are currently being met by a reverse osmosis (RO) system, maintaining the cisterns as a source for fresh water could reduce reliance on this system or serve as a back-up in case the RO system goes down. The cisterns should therefore be made functional and incorporated into the island's water utility system. The system of gutters and piping that fed the cisterns should also be recreated. The cisterns are important character-defining features of the Light Station and are integral to telling the story of what life was like on the Key. Further, the need to use sustainable strategies in this remote location, such as capturing rainwater, desalinating sea water and using photovoltaic and passive solar power is an interesting and important side story that could be told as part of the interpretive program.

The structural stability of the brick cisterns will to some degree govern the feasibility of reusing them to store fresh water. Continued movement of the structures will result in further settlement cracking which will in turn compromise the water-tightness of the reservoirs. Therefore prior to making extensive repairs or planning to incorporate the cisterns into the fresh water system, a program of crack monitoring should be undertaken to determine if the structures are continuing to settle. If the brick or concrete reservoirs cannot be made water tight due to continued movement an option may be to use a bladder or liner system within the reservoir.

If the cisterns are found to be stable, the cracking of the masonry and concrete side walls should be repaired and the reservoirs reparged or lined to make them water tight. Iron pipes or other elements that are causing the masonry or concrete to crack should be documented and removed or replaced with non-ferrous materials. In addition, if the rainwater conductor system is reinstalled at the brick cistern east of the Kitchen Building, the sand filter at the intake box should also be recreated for interpretive purposes. The structures should be painted white once the masonry and concrete repairs have been completed.

Boat House

The Boat House at the Dry Tortugas Light Station is currently suffering from the severe degradation of the building's reinforced concrete walls. Although the Lighthouse, Keeper's Residence and other Ancillary Structures are also experiencing similar effects due to the corrosion of embedded iron elements, the extent of damage to the Boat House is the most severe. This condition threatens the long term preservation of the building.

The Boat House has undergone minor changes in use and to some degree configuration over time. Some elements associated with its use as the station boat house have deteriorated or been removed such as the marine railway and the double doors on the west elevation.

Roof

The roof of the Boat House is performing well and is not currently in need of replacement. However, it is recommended that the few missing and damaged asphalt shingles be replaced with shingles matching the existing roofing material.

While the wood components of the eave are generally sound and attached, it is recommended that the eave be repainted white. In addition, it is recommended that the damaged flashing overlapping the eave be repaired and/or replaced to provide appropriate protection for the eave from the elements.

Exterior Walls

Long-term maintenance and repair of the Boathouse's concrete envelope will be a

challenge. The processes of water infiltration and corrosion of internal reinforcing are difficult to arrest once started. Close monitoring of the concrete's condition will be important and it will be imperative that cyclical maintenance be performed to increase the longevity of this structure. For these reasons it may not be practicable to preserve the existing structure in its current state for the long term.

It is recommended that all damaged areas of the exterior concrete walls be treated by cleaning and removing corroded reinforcing, applying a durable epoxy finish to the remaining metal and patching the spalled areas with replacement concrete or epoxy mortar. The following steps are recommended;

- chip away all loose concrete at spalled areas,
- remove concrete to exposing all surfaces of the existing rebar,
- It may be necessary to replace sections of rebar where it has deteriorated
- square the edges of the concrete repair area,
- clean rebar to a bright finish with wire brush,
- paint rebar with corrosion-inhibitor / bonding agent,
- patch hole with special latex modified compound appropriate for use in marine environments.

The interior and exterior painted finish of the Boat House has deteriorated. We recommend that it be repainted following repair of the spalled concrete. This will provide another level of protection against moisture and salt infiltration. The painted finish on the drop siding in the gable end walls is weathered from exposure to the elements. These areas should be scraped, cleaned and repainted white. Prior to removal of the existing paint layers, the existing paint should be tested to determine if lead is present and, if so, removed and abated.

Windows

The existing wood shutters were installed in the Boat House in 2006 and are in good condition. It is recommended that the existing shutters be retained and receive regular maintenance to avoid deterioration.

Building Interior

It is recommended that the existing historic interior concrete flooring with embedded rails, walls and exposed roof structure be retained to convey the historic character of the interior. Damage to the interior face of the concrete walls should be repaired following the approach outlined above for the exterior walls.

Graffiti left on the interior walls by Cuban refugees should be preserved or at a minimum, documented in order to record this period of Boat House's history.

New Oil House

The horizontal cracking of the concrete walls is in its earliest phases and has not progressed to the point of spalling the concrete. In this case it may be possible to grout the joints with a Portland cement or latex patching mix as a temporary repair measure designed to inhibit water infiltration and slow or delay the processes of corrosion. Alternatively for a comprehensive repair, the corroded metal will need to be treated as similarly described for the other concrete structures, including exposing the metal on all sides, mechanically removing the corrosion and painting the metal with a zinc primer and two coats of epoxy paint. Following this, the crater produced to expose the metal should be patched with a latex modified compound suitable for marine environments.

It is recommended that the roof flashing be reworked to direct water away from the structure and the wood cornice be primed and painted. The soffit vent that is missing a frame and screen should be repaired. The roof does not currently require treatment. Circa 1967 images of the building show that it had a metal roof during this period without a wood cornice (only a rake board). It is recommended that when the existing roof requires replacement that it be returned to its ca. 1967 appearance. The rakeboard and eaves as well as the lintels, sills and door should be

painted a dark color based on that shown in ca. 1967 images.

The flush wood door should be replaced with a horizontal wood paneled door that matches that shown in historic images of the structure. The infill should be removed from the window opening on the west elevation and a six-over-six, wood, double-hung window should be installed.

Walkways

It is recommended that the existing network of walkways be preserved and repaired as a record of the Light Station plan from the 1920s. The walkways record the physical layout of the station and provide context that will help the visitor envision those resources that are no longer extant. The walkways are also important for the practical purpose of walking and transporting materials between the Light Station resources. The walkways that are cracked and deteriorated should be replaced with new slabs that match as closely as possible the visual characteristics of the existing slabs. Factors to consider when replacing deteriorated sections of walkway include color, aggregate size and finish. A method of marking replaced slabs with the date of construction should be implemented. It is estimated that 35% of the existing slabs will need to be replaced.

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APPENDIX A

Draft National Register Nomination

Museum Curator

H3223 (SER-OCR)

Memorandum

To: Acting Chief Historian, WASO

From: Deputy Associate Regional Director, Cultural Resources, Southeast Region

Subject: Submittal of National Register Nomination for Dry Tortugas Light Station, Dry Tortugas National Park

This nomination was initially prepared in 1984 by the Southeast Regional Office for the United States Coast Guard (USCG). The draft nomination was sent to the Seventh District Office of the Coast Guard that year. The USCG took no further action regarding the nomination. In 1989 the Superintendent of Everglades National Park requested that we seek a review of the nomination because the Coast Guard had expressed an interest in the National Park Service (NPS) assuming management of the Dry Tortugas Light Station on Loggerhead Key. In November 1989 a copy of the draft nomination was sent to the Chief Historian with a request for review by his office and the National Register. It was returned in early 1990 with specific comments and suggestions. For a variety of reasons nothing was done with the nomination until early 1993.

At that point we contacted the USCG and were able to retrieve the original photographs taken in 1984 and sent to their Miami office. Historian Len Brown went over the comments from the National Register staff, made the suggested changes, and updated it in accordance with National Register Bulletin 16A. We also field checked the photographs and determined that they still represented existing conditions. Marilyn Harper of the Register staff suggested this. Because the process of transfer of the property from USCG to the NPS had not been completed the nomination was not pursued for another year and a half. In November of 1994, the Superintendent of Everglades and Dry Tortugas National Parks indicated that we could submit the nomination.

Since it was reviewed five years ago, we ask that it be given a second review and, unless there are major problems, that it be entered on the National Register of Historic Places.

bcc:
Supt. EVER

LBrown: LB: 2/14/95

NPS Form 10-900
(Rev. 10-90)

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 for individual properties and districts. See instructions in How to Complete the National Register of Historic Places Registration Form (National Register Bulletin 16A). Complete each item by marking "x" in the appropriate box or by entering the information requested. If any item does not apply to the property being documented, enter "N/A" for "not applicable." For functions, architectural classification, materials, and areas of significance, enter only categories and subcategories from the instructions. Place additional entries and narrative items on continuation sheets (NPS Form 10-900a). Use a typewriter, word processor, or computer, to complete all items.

1. Name of Property

historic name: Dry Tortugas Light Station

other names/site number: NA EVER

2. Location

street & number: NA _..cation ___
city or town: Loggerhead Key Dry Tortugas_____ _____ vicinity ___
state: Florida _____ code 12_ county: monroe_____ code 087____
zip code 33130___

3. State/Federal Agency Certification

As the designated authority under the National Historic Preservation Act of 1986, 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. I recommend that this property be considered significant ___ nationally ___ statewide ___ locally. (___ See continuation sheet for additional comments.)

_____ _____
Signature of certifying official Date

_____
State or Federal agency and bureau

In my opinion, the property ____ meets ____ does not meet the National Register criteria. (___ See continuation sheet for additional comments.)

_____ _____
Signature of commenting or other official Date

_____
State or Federal agency and bureau

4. 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 Keeper Date of Action

5. Classification

Ownership of Property (Check as many boxes as apply)

___ private
___ public-local
___ public-State
X__ public-Federal

Category of Property (Check only one box)

___ building(s)
X__ district
___ site
___ structure
___ object

Number of Resources within Property

Contributing	Noncontributing	
_5____	0___	buildings
_1___	_____	sites
_4___	_2___	structures
_____	_____	objects
10___	2___	Total

Number of contributing resources previously listed in the National Register _____

Name of related multiple property listing (Enter "N/A" if property is not part o a multiple property listing.) _____

6. Function or Use

Historic Functions (Enter categories from instructions)

Cat:	Sub:
TRANSPORTATION	Water-related
DOMESTIC	Institutional

Current Functions (Enter categories from instructions)

Cat:	Sub:
TRANSPORTATRION	Water-related
DOMESTIC	Institutional

7. Description

Architectural Classification (Enter categories from instructions)

LATE 19TH/EARLY 20TH CENTURY AMERICAN MOVEMENT--Bungalow

OTHER--Lighthouse

Materials (Enter categories from instructions)

foundation Not Known

roofs Copper/Asphalt; Sheetmetal; Asphalt Shingle; Metal Shingle

walls Brick

other

Narrative Description (Describe the historic and current condition of the property on one or more continuation sheets.)

8. Statement of Significance

Applicable National Register Criteria (Mark "x" in one or more boxes for the criteria qualifying the property for National Register listing)

_X__ A Property is associated with events that have made a significant contribution to the broad patterns of our history.

____ B Property is associated with the lives of persons significant in our past.

_X__ C Property embodies the distinctive characteristics of a type, period, or method of construction or represents the work of a master, or possesses high artistic values, or represents a significant and distinguishable entity whose components lack individual distinction.

____ D Property has yielded, or is likely to yield information important in prehistory or history.

Criteria Considerations (Mark "X" in all the boxes that apply.)

____ A owned by a religious institution or used for religious purposes.
____ B removed from its original location.
____ C a birthplace or a grave.
____ D a cemetery.
____ E a reconstructed building, object,or structure.
____ F a commemorative property.
____ G less than 50 years of age or achieved significance within the past 50 years.

Areas of Significance (Enter categories from instructions)
_TRANSPORTATION_____
_ENGINEERING_____
_____
_____
_____
_____
_____
_____

Period of Significance ____1855 to Present_____
____1856 to 1858_____
____1920s_____

Significant Dates _1856-58_____
_1920s_____
_____

Significant Person (Complete if Criterion B is marked above)
_____NA_____

Cultural Affiliation _____NA_____
_____
_____

Architect/Builder _Captain Daniel P. Woodbury, U.S. Corps of Engineers_____

Narrative Statement of Significance (Explain the significance of the property on one or more continuation sheets.)

9. Major Bibliographical References

(Cite the books, articles, and other sources used in preparing this form on one or more continuation sheets.)

Previous documentation on file (NPS)
_NA preliminary determination of individual listing (36 CFR 67) has been requested.
NA_ previously listed in the National Register
NA_ previously determined eligible by the National Register
NA_ designated a National Historic Landmark
NA_ recorded by Historic American Buildings Survey # _____
NA_ recorded by Historic American Engineering Record # _____

Primary Location of Additional Data
___ State Historic Preservation Office
___ Other State agency
_X_ Federal agency
___ Local government
___ University
___ Other
Name of repository: __U.S. Coast Guard__Miami, FL._____

10. Geographical Data

Acreage of Property __1.85_____

UTM References (Place additional UTM references on a continuation sheet)

	Zone	Easting	Northing		Zone	Easting	Northing
1	17	305600	2725500	3	__	_____	_____
2	__	_____	_____	4	__	_____	_____

___ See continuation sheet.

Verbal Boundary Description (Describe the boundaries of the property on continuation sheet.)

Boundary Justification (Explain why the boundaries were selected on a continuatio sheet.)

11. Form Prepared By

name/title__Stuart Johnson, Historian (1984) _Updated Len Brown ,Hist. (1993)_

organization__SE Region,__National Park Service_____ date__January__1995_____

street & number__75__Spring__St.__SW_____ telephone_404-331-5989____

city or town____Atlanta_____ state_GA_ zip code __30303_____

Additional Documentation

Submit the following items with the completed form:

Continuation Sheets

Maps

A USGS map (7.5 or 15 minute series) indicating the property's location.
A sketch map for historic districts and properties having large acreage or numerous resources.

Photographs

Representative black and white photographs of the property.

Additional items (Check with the SHPO or FPO for any additional items)

Property Owner

(Complete this item at the request of the SHPO or FPO.)
name _____

street & number_____ telephone_____

city or town_____ state_____ zip code _____

Paperwork Reduction Act Statement: This information is being collected fo applications to the National Register of Historic Places to nominate propertie for listing or determine eligibility for listing, to list properties, and to amen existing listings. Response to this request is required to obtain a benefit i accordance with the National Historic Preservation Act, as amended (16 U.S.C. 47 et seq.).

Estimated Burden Statement: Public reporting burden for this form is estimate to average 18.1 hours per response including the time for reviewing instructions gathering and maintaining data, and completing and reviewing the form. Direc comments regarding this burden estimate or any aspect of this form to the Chief Administrative Services Division, National Park Service, P.O. Box 37127 Washington, DC 20013-7127; and the Office of Management and Budget, Paperwor Reductions Project (1024-0018), Washington, DC 20503.

The

Dry Tortugas are located approximately 65 miles west of Key West, Florida, and 90 miles north of Cuba. These islands are the last in the 150 mile string of reefs and islands that make up the Florida Keys. There is no fresh water on the islands.

Loggerhead Key, one of the ten islands in the Dry Tortugas group, is approximately 4,200 feet long and 700 feet wide at its widest point (photo no. 1, maps 1--USGS Quad. and 2). Early reports indicate that vegetation on this island, as in the rest of the Dry Tortugas, was sparse consisting of scrub brush, cacti, and grass. At present, however, the island has a relatively thick vegetative cover. This is likely attributable to the fact that scientists from the Carnegie Institute introduced a variety of non-indigenous plants in the first decade of this century including coconut palms, azaleas, date palms, rubber trees, bananas, and ornamental cacti.

Historically there have been only two complexes of structures on Loggerhead Key. The main complex, the Dry Tortugas Light Station, is the subject of this nomination and is described in detail later in this section. However, from 1904 to 1939, the Carnegie Institute of Washington, D.C. maintained several buildings and structures at the northern tip of the island which were used during the summers as a marine biology laboratory (drawing 5). This site is heavily overgrown and, except for one ruined frame building, no structures survive. There are still several very deteriorated concrete specimen tanks and a plaque erected in honor of the first director of the laboratory, Alfred G. Mayer. The property lacks physical integrity and it does not appear that it would meet National Register criteria. Therefore it is not included in this nomination. However it should be assessed under Criteria D as an archeological property.

The Dry Tortugas Light Station is situated near the center of the island. Within the boundaries of that portion of the Station being nominated to the National Register are 12 structures (drawing 3). Of these two post-date World War II, and are considered to be intrusions. The rest of the structures date from 1856-58, the period of original construction, and the 1920s, a period in which the Lighthouse Service modernized the station to a considerable extent. A description of each structure (including intrusions) within district boundaries follows. One building outside the district is also described. This is the generator building that was constructed in the early 1960s.

A. **Lighthouse** Drawings: 2 to 5

Built in 1856-58, the Dry Tortugas Lighthouse is a conical shaped brick tower that is 150 feet in height and topped by a lantern containing a first order lens. Walls at the base of the lighthouse are approximately 8 feet 9 inches thick, and the diameter of the tower at that point is approximately 28 feet. From the base a winding staircase of cut granite blocks leads to a watch room

beneath the lantern. The diameter of the tower at this point (to the exterior surface of the watch room walls) is approximately 13.5 feet. Beginning approximately 12 feet beneath the watch room, the exterior of the tower is corbelled out to form the floor of an exterior gallery around the watch room. Resting atop the watch room is an iron lantern with a polygonal arrangement of windows. The roof and finial are of copper and have been coated with roofing asphalt. There is a narrow gallery around the lantern. The bottom half of the tower is painted white, while the upper half is painted black. This color scheme is not original, but apparently dates to about 1984.

U.S. Corps of Engineers Captain H.G. Wright, the officer in charge of construction of Fort Jefferson on Garden Key, developed schematic plans for the lighthouse in 1855. More detailed drawings of the lighthouse as well as other structures in the complex were produced in 1857, apparently by Wright's successor at Fort Jefferson, Captain Daniel P. Woodbury. These drawings show that the lighthouse has changed little since originally constructed.

Aside from routine maintenance, the only substantive repair of the facility came as a result of an 1873 hurricane which necessitated in 1875 the virtual reconstruction of a nine foot section of the tower directly beneath the lantern. This was accomplished by cutting out the existing masonry in narrow vertical sections and rebuilding each section before moving on to the next. Other repairs included the extension of the lantern anchors downward into the masonry being reconstructed to better secure the lantern to the tower. These repairs cost $75,000.

Construction of the Dry Tortugas Lighthouse was completed in 1858 with the installation of a first order Fresnel lens supplied by L. Sautter and Company of Paris, France. This lens was illuminated by oil lamps and its range was 20 miles. Initially the character of the light was fixed white, but in 1893 the character was changed to fixed white with a fixed red section. In 1909 the Lighthouse Service purchased a new first order bivalve lens from Henry Lepaute of Paris, France. The next year the character of the light was changed from fixed to flashing, and in 1922 parallel screens for the bivalve lens were installed. Sometime after World War II, the Coast Guard converted the illuminating apparatus for the lens to electricity. The light had a nominal range of 28 miles. The Coast Guard removed the classical lens in February 1987 and replaced it with a new automated system consisting of a rotating 24" high intensity lens with two emergency lights. The original lens is at the National Aids to Navigation School USCG Reserve Training Center, Yorktown, Virginia.

B. **Bosun's Workshop** (Former Oil Storage Building) Drawings 3 and 8

This 16' by 14' one story structure of formed concrete was built in 1926 to replace the original oil storage building that had been converted to house radio equipment. The roof is gabled and covered with corrugated metal. The single rear window has been filled in, the only apparent change to the building. Despite its

utilitarian nature, this structure is clearly linked to the modernization effort at the light station during the 1920s. In addition, its simple rectangular form and flat door and window sills and lintels give this structure an appearance that is very similar to the original oil house and kitchen.

C. **Radio Room** (Original Oil Storage Building) Drawings: 3, 5, and 8.

Built in 1856-58, this two story, brick structure measures 16' by 14' and originally served as a storage building for the oil used to illuminate the lamps in the lighthouse. The roof is gabled and covered with sheet metal. The c. 1900 photograph of the light station shows the building unpainted and with an internal chimney (since removed) against the south wall. Originally freestanding, this building was connected to the lighthouse in 1926 by a 12' by 6'4" passageway of formed concrete during the same time that it was converted to house radiobeacon equipment. It is interesting to note that original 1857 construction drawings for the lighthouse and other buildings in the complex called for the oil storage building to be connected to the lighthouse tower. After World War II, additional poured concrete additions were built against the south and west walls of the structure. Other changes to the exterior of this structure include the relatively recent installation of metal jalousie windows. On the interior, wooden stairs (presumably original) along the north wall lead to the second floor. On the walls and ceiling, 1" by 4" beaded panelling remains although it has been partially obscured on the walls by the subsequent installation of modern artificial panelling. Despite changes to this building it is still clearly identifiable as one of the original structures in the light station complex.

D. **Crew's Quarters** (Former Keeper's Residence) Drawings: 3 and 8.

Built in 1922 as the residence for the principal lighthouse keeper and his family, this building is a one story brick bungalow with a hipped roof covered with asphalt shingles. A front porch partially wraps around the northeast side of the house. Its roof is supported by tapered wooden columns resting on brick piers trimmed in coral stone. The piers themselves, the porch foundations, and the brick balustrade for the porch steps are all built of the same yellowish brick as the rest of the house except that a diamond pattern of contrasting red brick was "woven" into the masonry at the time of construction. A small rear porch serves as an outdoor service area for the kitchen. It has a shingled side wall, and its foundation is patterned in a fashion similar to that of the front porch. The buildings's exterior is apparently unaltered with the exception of the metal jalousie windows which have been substituted for the original double hung wooden windows. In addition, air conditioning units have been placed in several windows. The interior plan has been altered and wallsurfaces (originally plaster) have been covered with modern sheet panelling. The building is an excellent example of the bungalow style, one of the most common suburban housing types of the period. The choice of this style by the Light House Service was part of the overall modernization of the station which took place during the 1920s.

E & K. **Concrete Cisterns** Drawings: 4, 5, and 8.

These cisterns were built in 1922 to replace the original brick cisterns at the light station. Each measures 16′ by 10′ by 8′6" with approximately 4′ extending above the ground level. Cistern K collected rainwater from the original keeper's quarters, and Cistern E collected water from the new keeper's quarters built in 1922. These cisterns played an important role in the 1920s modernization of the light station. Unlike the older brick cisterns, water from the new cisterns was pumped to the plumbing systems which were installed in the light station buildings at this time.

F. **Fiberglass Water Tanks** INTRUSION

These tanks were installed between 1951 and 1977 and have replaced the concrete cisterns in function. They are noncontributing elements.

G. **Paintlocker** INTRUSION

This concrete block structure was built about 1951 and is used to store paint and flammable liquids. A noncontributing structure.

H. **Guest House** (Original Kitchen Building) Drawings 4, 5, 7, and 8.

Built in 1856-58, this two story brick structure measures approximately 20′ by 17′. It has a gabled roof covered with metal shingles. On the front of the building, the roof extends out from the building some 9′ and is supported on brick columns to form a porch. This was added when the building was renovated in 1922, and it is not known if the present porch replaced an earlier one. The building was unpainted originally, but is now painted white. Jalousie windows have replaced the original wooden, double-hung sash and the rear door has been filled in by concrete block. The interior has been changed considerably and the only remaining original feature appears to be the stairs leading to the second floor. The 1922 renovation plans for the building show that there was a bake oven built into the base of the chimney. This was modified for use as a closet, and the chimney stack above the roof was removed. The upstairs may have served as quarters for one of the assistant keepers. The building is now used to house visitors and work parties. Despite changes, this building retains the original form and character evident in the c. 1900 historic photographs.

I. **Foundation of Original Keepers Quarters** Maps/Drawings: 3 to 5 and 8.

Built in 1856-1858, this structure originally housed the principal lighthouse keeper, his two assistants, and their families. The 1857 construction drawing for the light station called for a frame dwelling, but brick was the actual construction material. As revealed by the c. 1900 historic photograph and a 192 renovation plan this structure was a two story, brick dwelling with Greek Revival features. Each floor had two rooms off a central stair hall, and there were two

nterior chimneys, one for each side of the house. Galleries ran across the front nd back of the structure with the rear gallery being partially enclosed. This uilding burned in 1945, and the site was razed several years later leaving only he outline of the foundation. Although the building itself is gone, its site is till significant in terms of understanding the original layout of the light tation.

& L **Brick Cisterns** Drawings: 5 and 8.

hese structures were built in 1856-58 to collect rainwater for general use by the ight station keepers and their families. Each cistern is 14' in diameter and xtend 4' above the ground. As seen in the c. 1900 photograph, cistern J ollected rainwater via the guttering system of the lighthouse keepers house. istern L collected water in a similar manner from the kitchen building. Although he cisterns have apparently been unused since the 1920s, when new concrete isterns were built, they are nevertheless important original features of the ight station. They show how a constant water supply was maintained in an area ithout natural water, and they are also important in defining how the original ight station was laid out and how it functioned.

Generator Building

he metal building lies just outside the district boundaries. It was excluded rom the district due to its recent construction date--post 1960.

Summary Paragraph

The Dry Tortugas Light Station on Loggerhead Key has been in continuous operation since 1858 serving as an aid to navigation for vessels cruising the Florida Straits between the Gulf of Mexico and the Atlantic Ocean. Officers of the U.S. Corps of Engineers who were in charge of the construction of Fort Jefferson on nearby Garden Key also planned and supervised the erection of the 150 foot brick lighthouse and several support structures in 1856-58 for the U.S. Lighthouse Board. Thus the Dry Tortugas Light Station is significant primarily for its role in facilitating America's ocean-borne commerce and as a notable example of the kind of civilian public works projects undertaken by Army engineers prior to the Civil War. While the lighthouse is clearly the most important structure within the boundaries of the nominated area, there were several ancillary structures built at the same time as the lighthouse, and also from the 1920s, a period in which the station was extensively modernized.

Loggerhead Key, the westernmost island in the Dry Tortugas group, is located approximately 65 miles west of Key West, Florida, and 90 miles north of Cuba. The Dry Tortugas are the last in the 150 mile string of coral reefs and islands that make up the Florida Keys. The Spanish explorer, Ponce de Leon, discovered the islands in 1513 during his first Florida expedition and called them "Las Tortugas" for the large number of green sea turtles he found there. Over time, the islands became known as the Dry Tortugas due to the absence of fresh water.

By mid-sixteenth century, homeward bound Spanish ships carrying silver mined in Peru and New Spain sailed a standard course across the Gulf of Mexico and through the Florida Straits and the Bahama Channel in order to take advantage of the Gulf Stream which would carry them into the Atlantic and north along the east coast of Florida. Later on, ships sailing to and from the colonial ports that were established on the Gulf Coast added to this traffic. Speed was the advantage of this route, but there were hazards as well. Once ships passed the Dry Tortugas at the entrance to the Florida Straits, they were vulnerable to pirate attack and could be driven onto hidden reefs and shoals by tropical storms and hurricanes.

The first advance in navigation in the Dry Tortugas came while the British controlled Florida. George Gauld surveyed the islands in the early 1770s for the Board of Admiralty and published a chart of the Tortugas in 1773 that mariners relied on for the next 75 years. Gauld also named the islands, including Loggerhead (originally Loggerhead Turtle) Key.

Additional improvements to navigation in the Dry Tortugas did not come until Spain ceded Florida to the United States in 1821. By this time trade between Atlantic and Gulf Coast ports was burgeoning, and the number os ships passing through the Florida Straits was increasing. Loss of ships and their cargoes due

o storms in the Florida Keys, by then considered to be within the territorial aters of the United States continued to be a problem. This was compounded by reckers who carried on a lucrative and sometime illegal, business of salvaging recked American ships which they sold along with their cargoes in the British ahamas. Attacks by Caribbean based pirates still occurred with regularity. o protect American shipping interests in the Keys, the United States purchased he island of Key West in January 1822 as a base of operations. In March of hat year, Lt. Commander Matthew C. Perry took formal possession of the island nd reconnoitered the surrounding area. in his report to the Secretary of the avy, Perry emphasized the need to halt piracy and to curb the excesses of the reckers. He also recommended that four lighthouses be built in the Keys ncluding one in the Dry Tortugas.

ater in 1822, Captain David Porter sailed to Key West with a small squadron of hips to combat piracy in the Caribbean, and by 1828 a U.S. District Court had een established in Key West to license wreckers and to require them to sell alvaged cargoes and vessels in U.S. ports.

n regard to the need to build lighthouses in the Keys, Congress acted promptly y allocating funds for this endeavor in 1822, but the overall objective of uilding enough lighthouses to make the keys genuinely safe for shipping proved o be a difficult and lengthy task that was not completed until after the Civil ar. Nevertheless, by the end of 1826, three lighthouses were in service ncluding one in the Dry Tortugas, a 65 foot high brick tower with fixed light n Bush Key, three miles east of Loggerhead Key. It was soon apparent that it as not adequate to warn mariners of the shoals and reefs in the area. Ship recks continued, and ship captains complained that in stormy weather it was mpossible to safely gauge their distance from the light. In 1836, Captain John hompson, the keeper of the light, recommended that two other lighthouses be uilt in the Tortugas. Article published in the American Coast Pilot, a popular ournal about maritime issues, also singled out the Bush Key light for riticism.

o steps were taken to correct the situation until 1845 when Simon Pleasonton, ifth Auditor of the Treasury, ordered Adam Gordon, the Lighthouse uperintendent at Key west to determine if complaints about the Dry Tortugas ight were valid. Gordon took advantage of the fact that the U.S. Corps of ngineers was studying the Dry Tortugas to determine what kinds of ortifications to build there, and he secured the recommendations of Engineer aptains William H. Chase and George Dutton who both agreed that to be ufficiently visible the Dry Tortugas light should be relocated to Loggerhead ey and that the new lighthouse should be 120 feet high. The Lighthouse Board, owever, took no action aside from having the existing light adjusted.

s part of a 1851 study of United States lighthouses, the Lighthouse Board sent circular letter to captains of packets and mail boats for recommendations.

he responses regarding the Dry Tortugas light were not positive. Some captains eplied that they routinely avoided the Tortugas altogether, preferring to use he better marked Cuban coast as their point of reference. Others said that nly a new first order light would make the Tortugas safe.

inally, the Lighthouse Board took action in August 1855 when the Secretary of he Board, Naval Lieutenant T.A. Jenkins, wrote to U.S. Corps of Engineers aptain H.G. Wright, the officer in charge of the on-going construction of Fort efferson on Garden, formerly Bush, Key. Jenkins requested that he provide onstruction cost estimates and preliminary plans for a new Dry Tortugas ighthouse. Wright responded in September by submitting to the Lighthouse Board ost estimates, a description of materials, and a sketch of a 150 foot brick ighthouse tower designed to accommodate a first order Fresnel lens. The next ear Congress allocated $35,000 for the project and construction was begun. By his time Wright had been reassigned to another duty station, and Captain Daniel . Woodbury had been placed in charge of the continuing work at Fort Jefferson s well as the new lighthouse on Loggerhead Key. The brick lighthouse as well s several support structures including a two-story residence for the lighthouse eeper, a kitchen building, an oil storage building, and two cisterns--all built f brick--were completed in 1858. The lighthouse was officially placed in ervice on July 1 of that year. The 1826 lighthouse on Garden Key was reduced o the status of a fourth order harbor light. An 1873 hurricane damaged the lder structure severely and in 1876 the Lighthouse Board erected a new wrought ron tower on one of the bastions of Fort Jefferson. This lighthouse, still tanding today, was also designed and built under the supervision of Army ngineers.

he fact that the U.S. Corps of Engineers played a major role in the onstruction of the Dry Tortugas Light Station on Loggerhead Key was not an solated occurrence. The U.S. Corps of Engineers, first organized in 1802, had ajor responsibilities in regard to improving navigation on rivers and streams nd developing America's harbors including the construction of a significant umber of lighthouses. Other lighthouses in the Florida Keys that were either esigned and/or built by the engineers include the Carysfort Reef Lighthouse 1848-1852), the Sand Key Lighthouse (1851-53), and the Sombrero Key Lighthouse 1854-58).

ne Dry Tortugas remained in Union hands during the Civil War, and the operation f the new lighthouse on Loggerhead Key was not hindered in any way. In 1867 nd 1873, Loggerhead Key served as a quarantine station for military personnel uring yellow fever epidemics at Fort Jefferson. Again the operation of the ight station was apparently not affected.

n the post-Civil War period, one of the most notable features of the operation f the Dry Tortugas Light Station was the continual round of maintenance ctivities and repairs needed to keep the lighthouse and other structures in a

sable condition despite frequent storm damage and the day-to-day problems ssociated with the harsh marine environment. Congressional appropriations for epairs were frequent. The most serious threat to the lighthouse resulted from he 1873 hurricane. In 1875 the virtual reconstruction of a nine foot section f the tower immediately beneath the lantern was completed at a cost of $75,000. ven after the repairs were finished, the Lighthouse Board considered the ossibility of building a new tower, but the ability of the lighthouse to eather several subsequent storms convinced the board that a new tower was not eeded.

.C. Bell, surveyor of lighthouses for the seventh and eighth districts, mapped oggerhead Key and the light station in 1887. His work showed that the station ad changed very little since its construction thirty years earlier. This emained true until the 1920s. The major changes on Loggerhead Key from 1880 o 1910 were administrative in nature and had little impact on the station tself. In 1888, the War Department approved a request by the Treasury epartment to reserve Loggerhead, Garden, and Bird Keys as possible sites for uarantine stations, presumably in case of future Yellow Fever outbreaks. It oes not appear that the islands were actually used for this purpose in ubsequent years. In 1900 the military reservation of Dry Tortugas, including oggerhead Key, was transferred to the Navy Department from the Army who had ontrolled the area since 1842. This came about, because Fort Jefferson was no onger an active army post, but was used instead by the Navy as a coaling tation for ships of war. Four years later the Carnegie Institution of ashington was permitted to build a marine biology research station on the orthern tip of the island. Until the outbreak of World War II, this facility erved as a summer laboratory for scientists who studied marine flora and fauna n the Keys. In 1908 Loggerhead Key was recognized as a bird sanctuary by xecutive Order of President William H. Taft.

epairs to the Dry Tortugas Light Station were constant and frame structures uch as the wash house, privies, boathouse and docks had to be replaced on everal occasions. During 1920s, however, the Lighthouse Service undertook the irst major building program on the island since the station's original onstruction. The original keepers quarters and the kitchen building were efurbished and a brick bungalow was erected as the residence of the lighthouse eeper. The oil storage building was equipped with an electrical generator and adio equipment, used primarily to monitor and respond to calls from ships in istress. Electricity does not appear to have been supplied to other buildings n the island at this time. Other new construction during the 1920s included formed concrete addition to the former oil storage building to connect it to he lighthouse tower, a new storage building, and a boathouse. The original rick cisterns were apparently capped at this time and new cisterns of formed oncrete were constructed..

In administrative change of some importance was the inclusion in 1935 of Loggerhead Key within the boundaries of Fort Jefferson National Monument. In 1939 the Lighthouse Service merged with the U.S. Coast Guard, and the following year the Coast Guard and the National Park Service entered into a formal agreement in which the Coast Guard retained all management responsibilities for Loggerhead Key and the Dry Tortugas Light Station.

Additional changes to the Dry Tortugas Light Station did not come until the completion of World War II. In 1945, the original keepers quarters burned and its ruins were razed several years later. Other changes in the post-war period included the construction of a metal generator building, the erection as a 365 foot high antenna, the addition of modern communication equipment to the lighthouse tower, and the construction of two formed concrete additions to the original oil storage building. Despite these and more recent changes, the light station still retains the basic qualities it possessed in the 1920s when the Lighthouse Service upgraded the original 1856-58 station to meet more modern needs.

MAJOR BIBLIOGRAPHICAL REFERENCES

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ection 10

erbal Boundary Description:

roceed from center of lighthouse base 65 feet due east to a point on the istoric District boundary. From that point proceed 114 feet due north; 122 eet due east; 141.5 feet due north; 239 feet due west; 343 feet due south; 20 feet due east; 220 feet due north; 45 feet due east; and 87.5 feet north o point of beginning.

oundary Justification:

he boundary selected encompassess the historic buildings that comprise the istrict as shown on Map 3 and described above.

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nited States Department of the Interior
ational Park Service

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ONTINUATION SHEET

ection ____ Page __

Dry Tortugas Light Station___
name of property
__Monroe, Florida_____
county and State

==========

IST OF PHOTOGRAPHS

ith a few exceptions these photographs were taken by Stuart Johnson, National ark Service, in January 1984. The original negatives are filed with the United tates Coast Guard, Seventh District Office in Miami, Florida. Though taken ten ears ago these photos were field tested in 1993 and were determined to ccurately portray existing conditions.

hotograph #

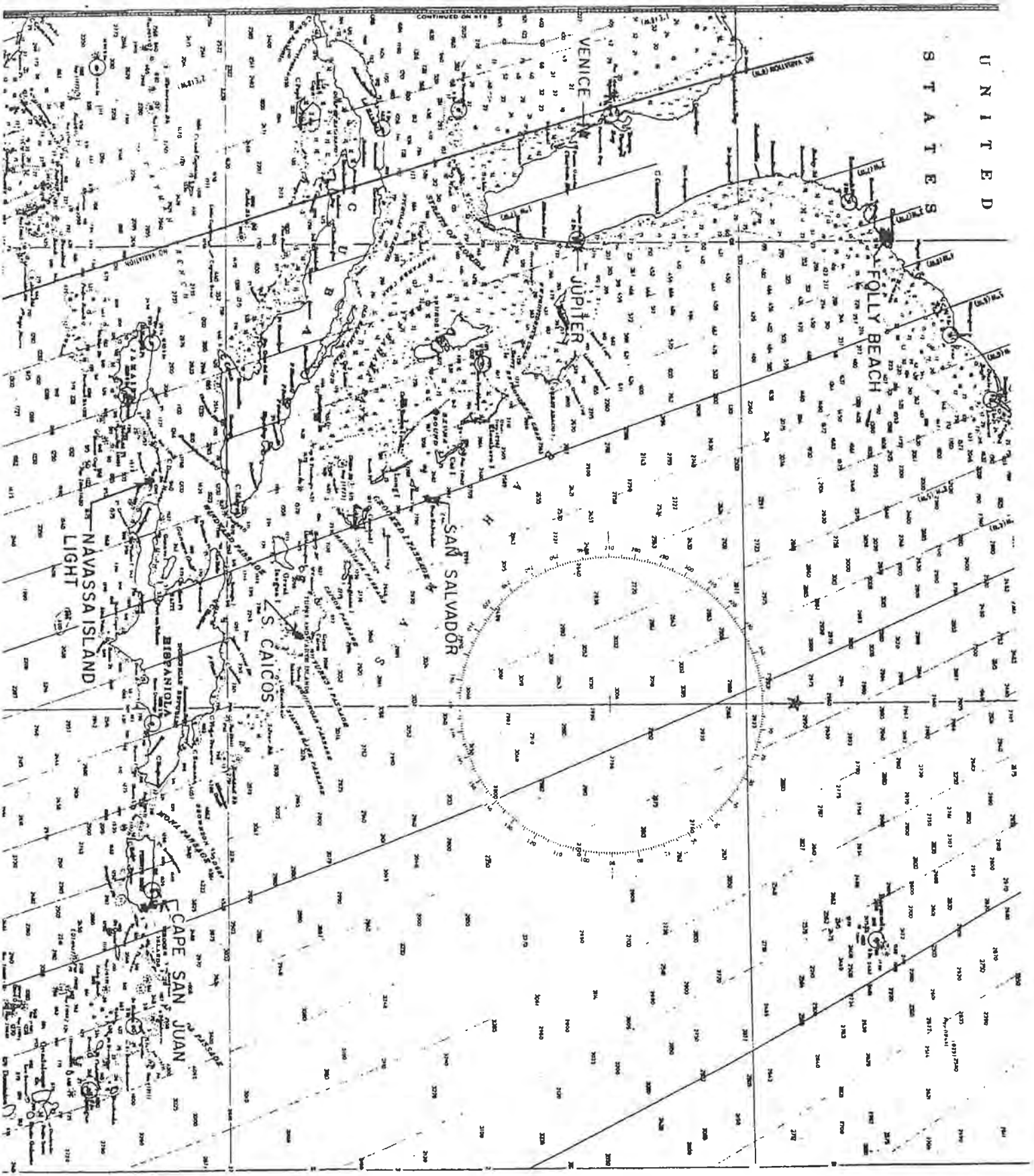
1. Loggerhead Key--aerial view looking northwest. Lighthouse is in right center of the picture. Photographer: Richard Ramsden, NPS. Negative filed with U.S. Coast Guard, Seventh District Office.
2. Not included.
3. Dry Tortugas Lighthouse and Radio Room, looking NW. Dry Tortugas Light Station. Buildings A and C.
4. Watchroom and lantern of lighthouse, looking NW. Building A.
5. Interior of lighthouse showing spiral granite steps.

6. Entry at base viewed from connector with radio room.
7. Dry Tortugas lighthouse, iron door from watchroom to gallery at top of lighthouse. Building A.
8. Bosun's Work Shop (formerly the Oil House), looking west. Dry Tortugas Light Station. Building B.
9. Bosun's Work Shop (formerly the Oil House). looking southwest
10. Radio Room at Dry Tortugas Light Station, looking NE.

11. Radio Room, looking NW. Building C.
12. Crew's Quarters (formerly Keeper's Residence), Dry Tortugas Light Station, looking west. Building D.
13. Crew's Quarters (formerly Keeper's Residence), looking east.
14. " " " " " , looking north.
15. Brick cistern at former kitchen building, Dry Tortugas Light Station, looking SE. Structure L.

16. Brick cistern and concrete cistern that served original Keeper's Residence. Looking south. Structures J and K.
17. Guest House, primary facade, facing west. Dry Tortugas Light Station. Building H
18. Guest House, original kitchen, Building H. Facing west.
19. Guest House, note remnants of chimney, facing north.
20. Interior stairs of guest house (Building H).

21. Dry Tortugas Light Station Complex showing original features. Looking South. Guest House and cistern that served original kitchen are in right foreground.
22. Metal Generator Building, looking north. Dry Tortugas L.S. Located outside of historic district. Noncontributing structure.
Photograph by Richard Ramsden, NPS. Filed USCG, Miami, FL.



Dry Tortugas Light Station Area Map
Loggerhead Key, Florida
Map #2

1 Keepers Residence
2 Asst Keepers Residence
3 2d & 3d Keepers Residence
4 Radio
5 Oil House
6 Boat House
OFFICE OF SUPERINTENDENT OF LIGHT-HOUSES
SEVENTH DISTRICT, KEY WEST, FLA.
BAY TORTUGAS LIGHT STATION
PLAN
Scale 1"=80'
Approved June
Superintendent
Washington, D.C.
No 701

APPENDIX B

Materials Analysis

(see Dry Tortugas Lighthouse HSR for this information)





As the nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering sound use of our land and water resources; protecting our fish, wildlife, and biological diversity; preserving the environmental and cultural values of our national parks and historical places; and providing for the enjoyment of life through outdoor recreation. The department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people by encouraging stewardship and citizen participation in their care. The department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.

NPS 364/105056 August 2010