National Park Service
Department of the Interior

Cape Hatteras National Seashore
Manteo, NC

Hatteras Light Station
Oil House

Historic Structure Report

The historic structure report presented here exists in two formats. A traditional, printed version is available for study at Cape Hatteras National Seashore, the Southeast Regional Office of the NPS, Denver Service Center of the NPS, 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.

Cape Hatteras National Seashore

Hatteras Light Station

Oil House

Historic Structure Report

December 2017

for

Cape Hatteras National Seashore
Manteo, NC

by

Rebecca Cybularz
Historical Architect

Historic Preservation Training Center
Office of Learning and Development
Directorate of Workforce and Inclusion (WASO)
National Park Service
Frederick, MD

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Cape Hatteras National Seashore

Hatteras Light Station

Oil House

Historic Structure Report

Approved: _____ 2/16/18
Superintendent, Cape Hatteras National Seashore — Date

Recommended: Kathleen M. Bond 3/19/2018
Acting Chief, Cultural Resources Division, Southeast Region — Date

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Executive Summary

This Historic Structure Report (HSR) was produced for the Cape Hatteras National Seashore and the Southeast Regional Office to determine the best treatment and use for the Hatteras Light Station Oil House. Use of the building is preferred as per National Park Service policies and guidelines for Cultural Resource Management and Executive Order No. 130006: *Locating Federal Facilities on Historic Properties*. This HSR will guide future rehabilitation and repair work on the building.

The project was conducted under a project agreement between the Historic Preservation Training Center (HPTC) and Cape Hatteras National Seashore (CAHA) entitled: "Prepare an HSR for Cape Hatteras Light Station" (PMIS #157627B). Funding was allocated through the Southeast Regional Office (SERO); project management was also done through SERO. HPTC, CAHA, and SERO are units of the National Park Service (NPS), U.S. Department of the Interior. NPS policies and guidelines were adhered to in the production and distribution of this HSR.

A Historic Structure Report is the primary guide to treatment and use of a historic building. It is prepared to identify and minimize the loss of character-defining features and materials and provides a basis upon which to address anticipated management objectives. This HSR aims to provide a current understanding of the historic Hatteras Light Station Oil House and meet the following goals: provide a historical background and context for the building; supply a current physical description and timeline for changes to the building; identify character-defining features for the building; document the condition of the building; and provide treatment recommendations for the proposed use of the building (see pp. 87-88 for Hatteras Light Station Oil House Prioritized Treatment List).

The historical background, context, building chronology, and technical evaluations provide an understanding of the historical integrity of the building. This information is valuable for guiding sustainable development of the Hatteras Light Station Oil House by offering research and insight to park management. The contents are used by the park when scoping new projects. These new projects contain parameters for re-use functions and physical modifications that complement resource protection and preservation goals. This HSR informs management and directs planning and construction alternatives.

Research Conducted to Produce HSR

The following activities were conducted to gain a thorough understanding of the Hatteras Light Station Oil House at Cape Hatteras National Seashore:

- Primary and secondary historic research into the sequence of changes and evolution of construction by the NPS:
    - Harpers Ferry Center Willow Springs, Charles Town, WV
    - Denver Service Center, Technical Information Center (eTIC), Denver, CO

    - Cape Hatteras National Seashore, Manteo, NC
- Architectural documentation by HABS
- Condition assessments by HPTC
- Recommended treatments by HPTC

Condition Assessment Summary

After HPTC's visit and assessment of the Oil House, investigation reveals modest maintenance deficiencies, resulting in an overall condition assessment rating of good.

It should be noted that this is a high-quality and historically significant building that cannot be replicated in today's economic environment. The maintenance deficiencies described herein, while needing to be addressed, are superficial and in no way signify justification for any treatment other than full restoration of the building and continued use. Reversal of recent out-of-character modifications is easily incorporated into any design or planning work and represents a return to the sustainable management of this historic structure.

The exterior and interior retain a high level of historic integrity dating to and/or sympathetic to the original date of construction and the date of significance for this HSR (1892-1936). Since the end of the period of significance, major changes to the original features include:

- Addition of windows (CCC era, ca. 1935)
- Replacement of structural roof system (ca. 1950)
- Removal of oil storage containers on the interior (date unknown)
- Removal of auxiliary power generating equipment on interior (date unknown)
- Relocation of the building (1999)

Overall Hatteras Light Station Oil House is in **good** condition, with a maintenance deficiency rating of **minor**, from the standpoint of NPS facility management programs (FMSS) and standards (with some features in "fair" and "poor" condition and "serious" and "critical" deficiencies).

The results of these investigations at the Oil House provide a more fully-integrated narrative of developmental history of the extant building, including changes made over the years by former owners and the NPS. It also will educate users of the building about the integrity of the historic fabric and the character-defining features so that it may be uncovered, interpreted, and preserved for future generations.

Recommendations for Treatment and Use Summary

The recommended ultimate treatments and use for the Hatteras Light Station Oil House, as determined through research for this HSR, are as follows:

- *Exterior Restoration* with the removal of non-sympathetic modern accretions and retention and preservation of character-defining features important to the historic design and

construction of the oil house by the United States government in 1892 and alterations which occurred to the building by the same through 1936.

- *Interior Rehabilitation* and preservation of character-defining features with removal of non-sympathetic modern accretions to reflect its original function. This treatment will preserve character-defining features and allow for the reversal of non-sympathetic treatments, materials, and finishes.

The treatment and use recommendations provided are meant to guide the final scope and description of the funded project and do not provide a construction or architectural program.

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Administrative Data

Project Identification

PMIS Number:	157627B
Project Title:	Prepare an HSR for Cape Hatteras Light Station
Project Location:	Cape Hatteras National Seashore, Manteo, NC

Name and Location Data

Preferred Structure Name:		Hatteras Light Station Oil House
Other Structure Name:		Small Brick Oil House
Structure Number:		HS-4A1
LCS ID:		007241
Park:		Cape Hatteras National Seashore
Park District:		Cape Hatteras Light Station
Structure's County:		Dare
Structure's State:		North Carolina
NPS Region:		Southeast
Cluster:		Atlantic Coast
Administrative Unit:		Cape Hatteras National Seashore
GPS:	Longitude:	-75.5287944781309
	Latitude:	35.2525383138723

Related Studies

Denver Service Center, National Park Service. "Relocate the Cape Hatteras Light Station." *Design Development Drawings*. October 1, 1998. NPS DSC eTIC No. CAHA 603 25006.

Denver Service Center, National Park Service. "Relocate the Cape Hatteras Light Station." *Final Construction Drawings*. October 1, 1998. NPS DSC eTIC No. CAHA 603 25006A.

Denver Service Center, National Park Service. "Relocate the Cape Hatteras Light Station." *Project Record Drawings*. December 23, 1999. NPS DSC eTIC No. CAHA 603 25006B.

Historic American Building Survey, National Park Service. "Cape Hatteras Lighthouse, Principal Keeper's Dwelling, Point of Cape Hatteras, Access Road from Route 12, Buxton, Dare County, NC." *Photos from Survey HABS NC-357-B*. 1989. Accessed at https://www.loc.gov/item/nc0477/ on June 1, 2016.

Holland, Jr., F. Ross. "A History of the Cape Hatteras Light Station, Cape Hatteras National Seashore, N. Car." Division of History, Office of Archeology and Historic Preservation, National Park Service, U.S., Department of the Interior. September 30, 1968. NPS DSC eTIC No. CAHA 603 D22.

Hurelle, Gary (Job Captain). "Design Analysis: Lightstation Move – Phase II, Historic District Contact Station & Site Development, Cape Hatteras National Seashore." May 1998, Rev. June 1998, Rev. August 1998. NPS DSC eTIC No. CAHA 603 D145.

International Chimney Corporation. "Supplemental Technical and Price Proposal: Final Proposal – Design and Construction (Design/Build) Contract to Relocate Cape Hatteras Light Station, Cape Hatteras National Seashore, Dare County, North Carolina, package CAHA 175/Request for Proposal." May 29, 1998. NPS DSC eTIC No. CAHA 603 D156.

National Park Service. "Cape Hatteras Light Station Cultural Landscape Report." Southeast Region. Cultural Resources. 2003. NPS DSC eTIC No. CAHA 603 D214.

National Park Service. "History of the Establishment of Cape Hatteras National Seashore Recreational Area." July 13, 1961. NPS DSC eTIC No. CAHA 603 D136.

National Park Service. "The Creation and Establishment of Cape Hatteras National Seashore." 2007, NPS DSC eTIC No. CAHA 603 D233.

Cultural Resource Data

National Register of Historic Places

National Register Status:	Entered – Documented
National Register Date:	March 29, 1978
National Historic Landmark?	Yes
National Historic Landmark Date:	August 5, 1998
Significance:	The Hatteras Light Station is significant at the national level under NR Criteria A and C. The station represents the operations and architecture of the U.S. Lighthouse Service on the Outer Banks of North Carolina.
NR Information System No.:	78000266

Period of Significance

The period of significance for the Cape Hatteras Light Station National Historic Landmark District, of which the Oil House is considered contributing, is 1870, the year the current lighthouse was lit, to 1936, the year the lighthouse was deactivated by the U.S. Coast Guard and the year it was acquired by the National Park Service. However, because the Oil House was not completed until 1892, the period of significance for the purpose of this HSR will be 1892-1936.

Recommended Treatment & Use

The recommended treatment for the Hatteras Light Station Oil House is exterior restoration and interior rehabilitation. The recommended use is to continue as a building within the light station's cultural landscape, the interior of which is used by park staff.

Recommendations for Cataloguing & Storage of Materials Generated by HSR

All project materials will be turned over from HPTC to the Cape Hatteras National Seashore's Museum Resource Center. Electronic files and media will be transferred via the NPS ftp network site and through archival CDs mailed to DSC. Copies of materials will also be submitted to the Southeast Regional Office.

Abbreviations (alphabetical)

BFML	Building Feature Master List
CAHA	Cape Hatteras National Seashore
CCC	Civilian Conservation Corps
CDF	character-defining feature
DKQ	Double Keepers' Quarters
DSC	Denver Service Center
FMSS	Facility Management Software System
GMP	General Management Plan
HABS	Historic American Building Survey
HPTC	Historic Preservation Training Center
HSR	Historic Structure Report
ICC	International Chimney Corporation
NPS	National Park Service
PFMD	Park Facility Management Division
PKQ	Principal Keeper's Quarters
RFP	Request for Proposal
SERO	Southeast Regional Office
SHPO	State Historic Preservation Office
TIC	Technical Information Center
USCG	United States Coast Guard
USLHB	United States Light-House Board
USLHE	United States Light House Establishment
USLHS	United States Light House Service

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Historical Background and Context

Whale-Derived Fuels

Whale-derived oils, including sperm oil, spermaceti, and whale oil, surpassed any other lighting fuels (i.e. candles) as the preferred option for lighthouse fuels by the beginning of the nineteenth century.[1]

There are differences between the three types of oils. Sperm oil, or body oil, is from sperm whale blubber and is a light straw color (fig. 1). It burns clearly and brightly, without smoke or odor, and is a great illuminant. Large quantities of sperm oil were used in public and private lighting, and lighthouses. Spermaceti is a liquid wax found in the heads of sperm whales (up to twenty-three gallons per whale). In the head, the wax is a rose-tinted, semi-transparent liquid; upon contact with air, the wax crystallizes (fig. 2). Due to its high melting point, burning cleanly and brightly without odor, and high illuminating power, spermaceti was the most valuable product of the New England whaling industry (fig. 3). Due to its cost, it was used only in wealthier private homes and almost exclusively in lighthouses. Whale oil, or train oil, are varying shades of brown in color, and typically came from right whales, bowhead whales, and humpback whales. Among other uses, whale oil has always been used as an illuminant, particularly in miners' headlamps. Whale oil was a poor substitute for the other two oils and was typically not used in lighthouses.[2]

Figure 1. A sperm whale. Spermaceti is found in its massive head cavity. Photo: New Bedford Whaling Museum, https://www.whalingmuseum.org/learn/about-cetaceans/sperm-whales-and-monodonts.

Figure 2. Blocks of spermaceti (stacked in background) await refinement, or boiling, after pressing. Photo: New Bedford Whaling Museum photo archives, Catalog # 2001.101.64.3, http://75.150.122.156/newbedphoto/.

[1] Dolin, Eric Jay. "Brilliant Beacons: A History of the American Lighthouse." New York: Liveright Publishing Corporation, 2016. p. 64.
[2] New Bedford Whaling Museum. "Whales and Hunting." Accessed at https://www.whalingmuseum.org/learn/research-topics/overview-of-north-american-whaling/whales-hunting on August 29, 2016.
Vogel, Mike. "The Light from the Whale." *The Keeper's Log. Volume XXX, No. 4.* Fall 2014. Accessed at http://www.mysticseaport.org/voyage/boston-to-mma/mike-vogel-the-light-from-the-whale/ on August 29, 2016.

American whaling became widespread during the 1760s and 1770s. Between 1770 and 1775, ships returned an estimated 45,000 barrels of oil a year; at the standard 31.5 gallons per barrel, this equals 1,417,500 gallons of spermaceti per year during this time period. This greatly impacted lighthouse illumination. When Ami Argand developed a new lamp in the 1780s which operated best with whale oils, whaling received a further boost. American Winslow Lewis developed a similar Argand-style lamp in 1810, which claimed to use half the oil as those it would replace. The United States Light-House Establishment (USLHE) inserted these oil-saving lamps into all American lighthouses.[3]

Figure 3. From left to right, spermaceti wax (in its raw form), a spermaceti candle, and spermaceti oil. Photo: Genny Anderson, http://www.marinebio.net/marinescience/06future/wham.htm.

Spermaceti "was the illuminant of choice" for the USLHE until after the Civil War. But prices would rapidly rise. In 1831, a gallon cost $0.62 ($10.67 in today's dollars). In 1843, a gallon cost $1.26 ($40.65 today). Between 1845 and 1855, the average cost was $1.77 per gallon ($49.17 today). As demand rose and supply declined, sharp price increases were noted: at one time in 1854, a gallon reached $3.84 ($109.71 today), and for a time in 1866 a gallon reached $2.56 ($38.78 today), a lot of money after the Civil War. Due to these price increases, the newly established United States Light-House Board (USLHB) looked to decreasing costs somehow, despite the new Fresnel lenses using far less oil than the Winslow lamps; this would include processing their own spermaceti[4] (and eventually lard oil and mineral oil) required for its lighthouses. Between 1867 and 1869, the USLHB built several large, underground vaults into the hillside at the General Light-House Depot at Staten Island. This "centralized control of the oil procurement process, …let the penny-pinching bureaucrats…dole out amounts calculated from the specified usage rates of the lamps and lens arrangements at each lighthouse in a given district, and…allowed for a laboratory to test the quality of the oil purchased form merchants…." The still-extant vaults, five of which are 51'-0" deep and one which is half size, have 13'-0"-high arched ceilings. Large iron storage casks lined with tin were located in the vaults, as were barrel-storage platforms equipped with trays.

[3] Vogel, "The Light from the Whale."
[4] Spermaceti was divided into two types of oil: winter pressed and summer pressed. Thicker, winter-pressed spermaceti was a higher-quality fuel.
"In the fall the spermaceti would be boiled in kettles to eliminate water and impurities; the thick liquid remaining was drained into casks, which were placed in storehouses for the winter, where cold temperatures transformed the liquid into a semisolid granular mass. When the temperature rose enough during the winter to soften the mass, the casks were opened and the contents transferred into woolen sacks that were tied off and squeezed in a large wooden screw press capable of exerting hundreds of tons of pressure. The…oil that drained out of the sacks…was the most expensive and cleanest burning of all whale oils. Because it stayed liquid at low temperatures, lighthouses used it mainly during the winter months, but even then, if the mercury dropped too far, keepers had to heat the oil on stoves before adding it to the lamps."
Thinner, summer-pressed spermaceti was of lesser quality, but a good price could still be received. After the winter pressing, the "material that remained in the sacks was reheated and drained into casks to be stored until the warm weather returned in early summer, when the contents of the casks were shoveled into cotton bags and again set upon the press. … And since it congealed at lower temperatures it was used in lighthouse during the warmer months."
Dolin, "Brilliant Beacons: A History of the American Lighthouse, " p. 65.

Altogether, this setup allowed for the storage of 85,000 gallons of oil; 35,000 gallons were stored in the barrels, ready for shipment to lighthouses.[5]

Simultaneous with self-producing, the USLHE looked to alternative fuels in a quest to reduce costs.

Experiments in Alternative Fuels

Porpoise Oil

This oil is a pale yellow, fatty oil obtained from the body, head, or jaw of a porpoise and used especially as a lubricant (fig. 4). It was also tried as a fuel in the Shell Castle (Ocracoke) and Cape Hatteras lighthouses early on (ca. 1805). Historian F. Ross Holland, Jr. summarized the experiments:

Figure 4. A Dall's porpoise, one source of porpoise oil. Source: New Bedford Whaling Museum, https://www.whalingmuseum.org/learn/about-cetaceans/phocoenidae.

> As the lights at Shell Castle and Cape Hatteras neared completion and preparations were being made to light them, someone proposed using porpoise oil in the lamps of the lighthouses rather than sperm oil as was commonly used in lighthouses of that period. A factor, undoubtedly, in this recommendation was the presence of a supply of porpoise oil. [John] Wallace, one of the owners of Shell Castle Island, had an adequate quantity on hand and was more than willing to sell it to the [USLHE]. Intrigued with the prospects of porpoise oil being equal to sperm oil in southern latitudes, the Commissioner of Revenue instructed [Collector Samuel] Tredwell to experiment with the use of the oil. In the meantime, the Commissioner had a thousand gallons of sperm oil shipped to the Outer Banks for immediate use at Cape Hatteras and Shell Island.
>
> From the beginning it appears that the experiments with porpoise oil did not go well, but Tredwell continued experiments into 1804 and purchased 158 gallons of the oil for the Cape Hatteras light. In the spring of 1804 Tredwell reported that for about four months the Cape Hatteras light had used virtually nothing but porpoise oil and it seemed to work quite well. The success they had may have been enhanced in their minds by the fact they were having considerable difficulty receiving sperm oil in good condition. Tredwell then approached Wallace to see whether he could supply consistently a sufficient quantity of the oil for the Cape Hatteras light. Wallace, a businessman who believed in obtaining every cent the market would bear for any item, said he would furnish all the porpoise oil needed provided he received a written contract and obtained the same price paid in Nantucket for sperm oil. The contract would have been a tidy one since Cape Hatteras consumed, according to estimates, 1,400 gallons of oil annually. The tests thereafter went badly, and the Cape Hatteras light returned to the use of sperm oil only. Several years later one Caleb Ballance, a porpoise-fisher, requested permission to experiment with the use of porpoise oil in lighthouses, but on the basis of the previous unsatisfactory tests at Cape Hatteras, Tredwell recommended against it.
>
> Although in 1810 Tredwell reported that the keeper of the Cape Hatteras light "has made a full Trial of the Porpoise Oil the result of which is altogether unfavorable to the use of it in the Light House," he nevertheless recommended three years later using porpoise oil as an emergency

[5] Vogel, "The Light from the Whale."

substitute when the ship carrying regular oil for Cape Hatteras was captured by the British *Dash*.[6]

After its foray into Porpoise Oil, it is assumed that sperm oil was then solely used to light Cape Hatteras lighthouse.

Rapeseed Oil

Upon consulting the French regarding that country's illumination fuel, the USLHB was told that rapeseed, or cola, oil, from a wild cabbage which grew in Europe (fig. 5), was just as good as spermaceti, but was only half the cost. Because the cabbage did not grow abundantly in the United States, in the late 1850s and early 1860s the USLHB encouraged American farmers to cultivate the crop, and even distributed seeds; this was unsuccessful. Despite this, in the late 1850s, the Board began introducing rapeseed oil into lighthouses. Soon, though, it became clear that there was insufficient supply to light all of the lighthouses.[7]

Figure 5. A field of rapeseed in France. Photo: Myrabella / Wikimedia Commons, CC BY-SA 4.0, https://commons.wikimedia.org/w/index.php?curid=33781153.

It is unknown if rapeseed oil was ever used to light Cape Hatteras Lighthouse.

Lard Oil

The Light-House Board had tested lard oil, from rendered hogs, several times throughout its tenure, resulting in failure (lard oil burned poorly), but the Board's committee on experiments, headed by the Smithsonian's Joseph Henry, resumed these tests. With the new experiments Henry found that if the lard oil was heated to a high-enough temperature, the oil burned well. Because the oil was inexpensive and plentiful, the USLHB quickly adopted its use, becoming the exclusive fuel of larger lighthouse lamps by 1867.[8]

Because the new Cape Hatteras lighthouse was the tallest lighthouse when it was lit on September 17, 1870, it is possible that lard oil was used exclusively for several years before a switch to kerosene. In fact, a September 1900 inspection report of the light station noted that "Two large lard oil tanks from the tower have been converted into water tanks and placed as cisterns"[9]; a trivial notation proves the presence of lard at Hatteras.

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[6] Holland, Jr., F. Ross. "A History of the Cape Hatteras Light Station, Cape Hatteras National Seashore, N. Car." Division of History, Office of Archeology and Historic Preservation, National Park Service, U.S. Department of the Interior. September 30, 1868. pp. 16-18.
[7] Holland, Jr., Francis Ross. "America's Lighthouses: An Illustrated History." New York: Dover Publications, Inc., 1988. p. 23.
Dolin, "Brilliant Beacons: A History of the American Lighthouse," p. 188.
[8] Holland, Jr., "America's Lighthouses: An Illustrated History," p. 23.
Dolin, "Brilliant Beacons: A History of the American Lighthouse," pp. 188-9.
[9] Jones, W.A., Lighthouse Engineer. *Monthly progress report to Light-House Board.* October 1, 1900. Part of NARA's RG 26 Entry 3 (NC-63). Available for review at Cape Hatteras National Seashore Archives.

Kerosene

Simultaneous with experiments with and use of lard oil, the Board began exploring kerosene, or mineral oil, derived from coal. Throughout the 1850s, kerosene was in limited supply, but in 1859, after oil drilling was revolutionized, bountiful and cheap kerosene flooded the market. However, the USLHB "was reluctant to switch to kerosene, claiming that its quality at this early date of introduction was 'too volatile and combustible to be safely employed for lighthouse purposes.'" When the price of lard oil skyrocketed, the Board resumed considering kerosene.

> By the 1870s, however, kerosene was getting progressively cheaper, and the distillation process had improved to the point that the quality of the kerosene was much higher and less volatile than had been the case in earlier years. Although the board still considered lard oil the better illuminant, it slowly shifted to kerosene for economic reasons, since it was roughly half the cost. At first only the smaller-order lenses made the switch, but over time, and with the use of improved lamp designs, the use of kerosene expanded to larger lenses, to the point that by 1885 the transition from lard oil to kerosene was complete.[10]

It is unknown when Cape Hatteras switched to using kerosene exclusively, but it was used throughout much of its original service (ca. 1885-1920s). In 1892, a separate oil house was constructed at the base of the lighthouse to store oil.

Further refinements to kerosene-burning technology included the development of the incandescent oil vapor lamp (IOV). The process, which is similar to a Coleman lamp used by campers, included heating and vaporizing kerosene (fig. 6). When the gas was mixed with air and ignited by a burner under a mantle, a brilliant white light was produced. "IOV lamps were eight times brighter than traditional kerosene lamps, and better yet, they used much less fuel to generate the same amount of light." After the first IOV was installed in the North Hook Beacon at Sandy Hook, NJ in 1904, the technology spread to other lighthouses.[11]

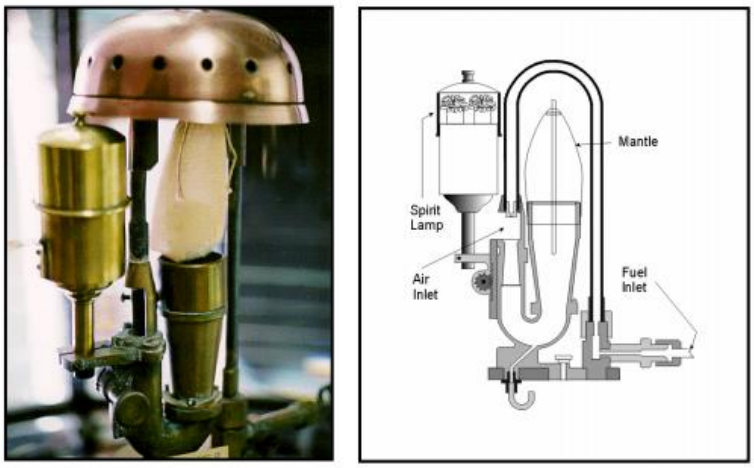

Figure 6. A Luchaire IOV lamp, left, and a sectional diagram of the lamp, right. Photos: The ALCC American Lighthouse Lamp Identification and Description Listing, accessed at https://uslhs.org/.

Cape Hatteras lighthouse was fitted with an IOV lamp in 1913 with a candlepower of 80,000.[12] It is assumed the oil house was altered to hold kerosene.

One further advancement in gas burning came with use of acetylene gas around 1910. The gas was fed to the lamp from a pressurized tank where it mixed with air and burned under a mantle, much

[10] Dolin, "Brilliant Beacons: A History of the American Lighthouse," pp. 188-9.
[11] Dolin, "Brilliant Beacons: A History of the American Lighthouse," pp. 192-3.
Holland, Jr., "America's Lighthouses: An Illustrated History," p. 23.
[12] Holland, Jr., "A History of the Cape Hatteras Light Station, Cape Hatteras National Seashore, N. Car.," pp. 16-18.

as kerosene did in an IOV lamp. To increase automation, a sun valve was added. When combined with acetylene tanks and automatic mantle chargers, sun valves opened when the sun went down in the evening, allowing the gas to ignite and light to shine, and closed with the sun rose in the morning, stopping the gas from entering the mantle. Sun valves were used particularly at lighthouses that could not be easily supplied with electricity.[13]

It is unknown if either acetylene or sun valves were used at Cape Hatteras lighthouse.

Electricity

At about the same time that kerosene fully replaced lard oil (1885), the USLHB started experiments with electricity. At this early date, carbon arc lamps were being used in commercial settings. Because of their intense brilliance, the lamps were only used outdoors, as streetlamps, and in industrial settings. As a test, the Board installed a carbon arc lamp in the Navesink Highlands, NJ lighthouse (the same site which tested the first Fresnel lens in the United States in 1841). The new lamp, equipped inside a new Fresnel bivalve lens, emitted a flash estimated at 25,000,000 candlepower! Because of the intense light, nearby residents complained and the lantern room's landward-facing panels were blackened.[14]

Around the turn of the twentieth century, the USLHB began testing electricity as a light source and then tentatively began converting lighthouses to electricity, which could not be done quickly, as many lighthouses were not near power lines. Therefore, lighthouses had to await the installation of generators, which were only added where power lines were not extant.[15]

When the Board was reestablished as the United States Light House Service (USLHS) in 1910, the new commissioner of lighthouses, George Putnam, an advocate for electrification, accelerated the process of outfitting lighthouses with incandescent lamps, instead of the earlier carbon arc lamps. "Relying on generators, batteries, and an expanding network of power lines, an ever-growing number of lighthouses were electrified, and by the 1930s the majority of them were lit with electric lamps using incandescent bulbs that were considerably brighter than the lights they replaced.[16]

During the 1920s and 1930s, the USLHS converted most of their lighthouses to electricity. With electricity came the elimination of many lighthouse keepers. The electric bulb required little attention and did not dirty the lenses and lantern panes.[17] In Putnam's quest to reduce costs, electrification helped him move toward complete lighthouse automation. "Innovative timers that turned lights on and off according to a preset schedule, along with electric devices for operating smaller fog signals, made it possible for many lighthouses to run on their own, a process that was facilitated by the use of lightbulb changers that automatically replaced burned-out bulbs with new ones."[18]

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[13] Dolin, "Brilliant Beacons: A History of the American Lighthouse," pp. 221-2.
[14] Dolin, "Brilliant Beacons: A History of the American Lighthouse," pp. 189-92.
[15] Holland, Jr., "America's Lighthouses: An Illustrated History," pp. 23-24.
[16] Dolin, "Brilliant Beacons: A History of the American Lighthouse," p. 221.
[17] Holland, Jr., "America's Lighthouses: An Illustrated History," p. 24.
[18] Dolin, "Brilliant Beacons: A History of the American Lighthouse," p. 221.

The Cape Hatteras Lighthouse was converted to electricity in 1934, and the candle power increased to 450,000; this alteration would have rendered the oil house useless for fuel storage, and was converted to house an auxiliary backup generator. After the historic lighthouse was abandoned in 1935, the replacement skeleton tower was also powered via electricity. When the light would return to the historic lighthouse in January 1950, the light would still be electrified, as it is to this day.[19]

[19] Holland, Jr., F. Ross. "A History of the Cape Hatteras Light Station, Cape Hatteras National Seashore, N. Car.,"pp. 16-18.

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Chronology of Development and Use

Early Oil House

The original 1803 Lighthouse, constructed by Henry Dearborn, included an oil vault near the tower. The vault measured 20'-0" x 12'-0" and was covered with a shed. Inside, nine cedar cisterns contained one hundred gallons of whale oil. Within a year, the cisterns were considered too small and larger ones, capable of holding two thousand gallons, replaced the old ones.[1]

Oil House Construction

After many months of planning for the new Cape Hatteras Lighthouse, a working party departed Baltimore, MD for Cape Hatteras on October 19, 1868. Also at this time, Fifth Lighthouse District Engineer W.J. Newman selected Dexter Stetson to be superintendent of construction. Work proceeded almost continuously until the lighthouse was lit on December 16, 1870.[2] Oil used to power the light at the top of the new lighthouse was stored in three large metal tanks located in niches at the bottom of the lighthouse.

On December 2, 1884, Lighthouse Engineer Jared A. Smith provided the Chairman of the United States Light-House Board (USLHB) with an estimate for constructing a coal bin and oil house (amount unknown).[3] It is assumed that the oil house was not built at this time, because on May 23, 1887, Engineer Secretary D.P. Heap wrote to James F. Gregory, a Lighthouse Engineer, that "a suitable oil room for stowing the oil is very much needed, with the exception of about 1,000 gallons, 200 boxes, the oil is stowed in recessed at the base of the tower."[4] Two weeks later, on June 8, Gregory agreed with Heap's recommendation in a letter to the USLHB.[5]

Still, in the annual report for the fiscal year ending June 30, 1887, another request was made: "A permanent structure, detached from the tower, in which to store oil, is much needed here. A portion of the oil on hand is now stored in a shed which was built for the storage of fuel for the tower, and the rest of it is stored on the floor of the tower, a manifestly improper place for it and dangerous to the tower. An oil-house can be built for $1,500."[6]

It is likely that the 1803 oil vault or another earlier oil house remained at the light station because during the last half of calendar year 1887, repairs to an oil house were estimated at $150, and on June 30, 1888 it was reported that a portion of this oil house and a coal house were destroyed by

[1] National Park Service. "Cape Hatteras Light Station." *Cultural Landscape Report.* Cultural Resources, Southeast Region. June 15, 2004. NPS DSC eTIC No. CAHA 603 D214. p. 10.
[2] Cybularz, "Cape Hatteras Lighthouse," pp. 56-70.
[3] Smith, Jared A., Lighthouse Engineer. *Letter to Chairman, United States Light-House Board.* December 2, 1884. Part of NARA's RG 26 Entry 3 (NC-63). Available for review at Cape Hatteras National Seashore Archives.
[4] Heap, D.P., Engineer Secretary. *Letter to James F. Gregory, Lighthouse Engineer.* May 23, 1887. Part of NARA's RG 26 Entry 3 (NC-63). Available for review at Cape Hatteras National Seashore Archives.
[5] Gregory, James F., Lighthouse Engineer. *Letter to Chairman, United States Light-House Board.* June 8, 1887. Part of NARA's RG 26 Entry 3 (NC-63). Available for review at Cape Hatteras National Seashore Archives.
[6] Cape Hatteras Light Station Engineer #1 Binder, Section: Annual Reports. Cape Hatteras National Seashore Archives.

fire.[7] Some relief came simultaneously, for the annual report for the fiscal year ending June 30, 1888 stated that "a small building for the storage of empty oil-cans was erected near the tower."[8]

On January 16, 1891, it was reported that an estimate was before Congress for construction of a new Assistant Keeper's Dwelling and oil house, for $5,000. No action of material purchased was to be yet taken until Congress' decision was forwarded.[9] Authorization from the USLHB was likely received in early 1892 for the construction of an addition to the Double Keeper's Quarters. It is assumed that authorization for the construction of the new oil house also came at this time.[10]

Finally, in the annual report for the fiscal year ending June 30, 1892, it was reported that a brick oil house had been constructed. The building measured 15'-6" x 13'-6" "with walls 8 feet 6 inches high and 9 inches thick, and a gable roof 4 feet high."[11] The new Hatteras Light Station Oil House would match those seen at Amelia Island, FL, and Sapelo Island, GA, both built in 1890 (see figs. 64-65).[12]

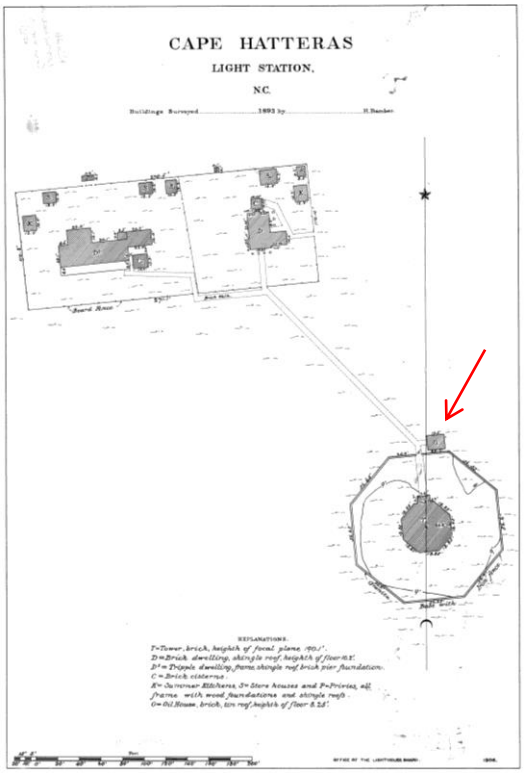

Figure 7. An 1893 site plan of the Hatteras Light Station by Bamber. The Oil House is shown adjacent the Lighthouse. Source: Cape Hatteras National Seashore Archives.

Figure 8. The Oil House in front of the Cape Hatteras Lighthouse on June 1, 1893, from the north. Photo: NARA, RG 26, LG 26 82A. Copy found in Cape Hatteras National Seashore Archives.

[7] Mallery, J.S., Lighthouse Engineer. *Letter to Chairman, United States Light-House Board.* ca. December 30, 1887.
Smith, Tillman F., Lighthouse Keeper. *Letter to J.C. Mallery, Lighthouse Engineer.* June 30, 1888. Part of NARA's RG 26 Entry 3 (NC-63). Available for review at Cape Hatteras National Seashore Archives.
[8] Cape Hatteras Light Station Engineer #1 Binder, Section: Annual Reports. Cape Hatteras National Seashore Archives.
[9] Gregory, James F., Engineer Secretary. *Letter to J.C. Mallery, Lighthouse Engineer.* January 16, 1891. Part of NARA's RG 26 Entry 3 (NC-63). Available for review at Cape Hatteras National Seashore Archives.
[10] Mahan, F.A., USLHB Engineer Secretary. *Letter to Secretary of the Treasury.* January 5, 1892. Part of NARA's RG 26 Entry 3 (NC-63). Available for review at Cape Hatteras National Seashore Archives.
[11] Cape Hatteras Light Station Engineer #1 Binder, Section: Annual Reports. Cape Hatteras National Seashore Archives.
[12] LighthouseFriends.com. "Amelia Island, FL." Accessed at http://www.lighthousefriends.com/light.asp?ID=346 on July 19, 2016.
LighthouseFirends.com. "Sapelo Island, GA." Accessed at http://www.lighthousefriends.com/light.asp?ID=326 on July 19, 2016.

In 1893, USLHB civil engineer and surveyor Herbert Bamber surveyed Hatteras Light Station. His survey drawings show how the buildings of the site related to one another and provide great detail on the sizes of the numerous buildings themselves. The Oil House is shown just to the north and outside of the perimeter fence of the Lighthouse, and is identified as being 15'-6" long, constructed of brick, and having a tin roof (fig. 7). A photograph from the same survey shows that there was no window located on the north elevation at that time (fig. 8).

In early 1895, it was reported that oil house was in excellent condition.[13] From this time through the 1930s, not much is known about the building (figs. 9-10).

Figure 9. The oil house sometime before ca.1920 (the year the cast iron fence around the base of the lighthouse was replaced). The oil house shows no window on the south elevation. Photo: Cape Hatteras National Seashore Archives. Cropped by author.

Figure 10. The south and east elevations of the oil house in 1932, from an Army Air Corps plane. No windows are yet located in the oil house. Photo: Hatteras National Seashore Archives. Cropped by author.

In 1932, Principal Lighthouse Keeper Unaka Jennette, and his family, moved out of the Principal Keeper's Quarters due to flooding from a hurricane. They would never move back in.[14]

Because of the new battle with beach erosion near the lighthouse tower, the Bureau of Lighthouses began the process to acquire land to build a new light station. Keeper Jennette owned the land which the bureau preferred. After negotiations, Jennette sold the land to the Bureau for $266,880 in 1935. Because of defects in the title and the emergency (erosion) causing the procurement of the land, both parties agreed to condemnation proceedings. This resulted in a court case, and the

[13] Bergland, Eric, Lighthouse Engineer. *Letter to United States Light-House Board.* February 13, 1895. Part of NARA's RG 26 Entry 3 (NC-63). Available for review at Cape Hatteras National Seashore Archives.
[14] Wallace, David H., Harpers Ferry Center, National Park Service. "Principal Keeper's Quarters, Cape Hatteras Light Station, Cape Hatteras National Seashore, North Carolina." *Historic Furnishings Report.* 1991. NPS eTIC No. CAHA 603 D109, p. 4.

Bureau officially acquired the land in 1936. Meanwhile, a new 150'-0"-tall skeleton tower located approximately 1½ miles WNW from the 1870 tower was completed in September 18, 1935.[15]

Simultaneously, the Civilian Conservation Corps (CCC) Company 3423 arrived at Cape Hatteras State Park on August 12, 1935.[16]

On May 13, 1936, the new skeleton tower, or the "Buxton Light," was activated. Two days later, on May 15, the light on the 1870 lighthouse was extinguished.[17]

Formation of a National Park

In 1934, at the request of the Secretary of the Interior, the National Park Service (NPS) surveyed "the seashores of the continental United States to ascertain whether there were remaining relatively unimpaired areas of such outstanding character and magnitude as to be worthy of acquisition and preservation by the people of the United States as National Seashores." The survey revealed that the Outer Banks of North Carolina "presented one of the finest opportunities to establish and preserve as a National Seashore an area of great biological interest, scenic beauty, historical value, and recreational appeal." It was recommended that the seashore be added to the national park system.[18]

Simultaneously in 1934, a "Report on Cape Hatteras Ocean Beach Project" was completed for the Director of the NPS. It included a partial photograph of the Oil House. It shows a window opening, covered with plywood, on the south elevation, a standing-seam metal roof intact, the original iron door with strap hinges intact, and a large tank (for kerosene?) located on the north side of the building (fig. 11).

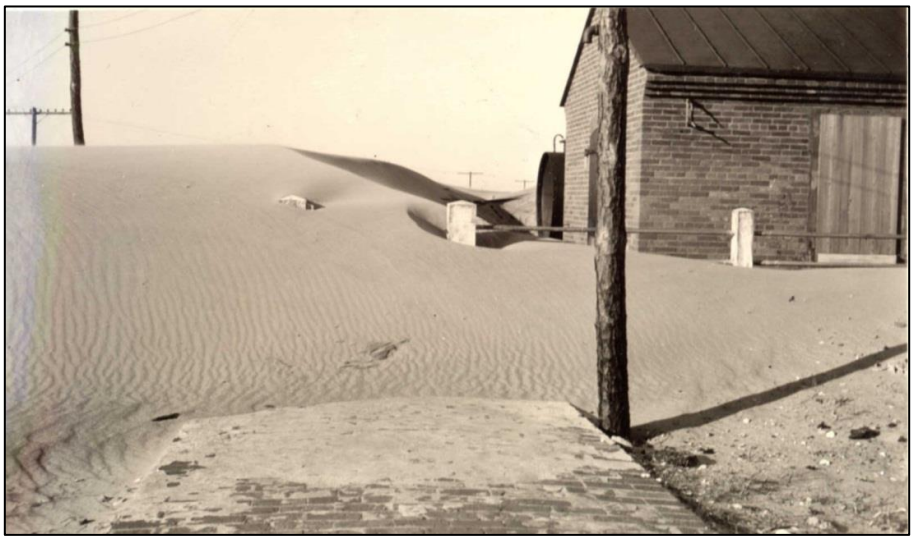

Figure 11, right. The condition of the Oil House in ca. 1934. Windows had been added by this time, but the original door and roof covering remained. Photo: Cape Hatteras National Seashore

[15] Cybularz, "Cape Hatteras Lighthouse," p. 82.
[16] Nistal-Moret, Benjamin, Southeast Regional Office, National Park Service. "Second Narrative and Analytical Report on the Findings of Historic Structure Inspection. Conclusions and Recommendations. Cape Hatteras National Seashore: Cape Hatteras Principal Keeper's Quarters (Pink House). " 1983. Box #1: CAHA 5029 Cape Hatteras Light Station Principal Keeper's Quarters Preservation Project Records, 1983- 1988. Folder #2: CAHA - Cape Hatteras Light Station Principal Keepers Quarters. Preservation Project Section 106 Case Report - 1983-1984.
[17] Cybularz, "Cape Hatteras Lighthouse," p. 83.
[18] National Park Service. "History of the Establishment of Cape Hatteras National Seashore Recreational Area." July 13, 1961. NPS DSC eTIC No. CAHA 603 D136. P.1

Archives.
On July 31, 1936, shortly after the Buxton Light was activated, Secretary of the Interior Ickes "...approved a plan to transfer the [former] Cape Hatteras Lighthouse property (about forty-four acres) to the Park Service for designation as a National Historic Site."[19]

The Department of the Interior formally requested title to the light station on August 4, 1936. On August 31, Acting Secretary of the Treasury Wayne C. Taylor notified the Secretary of the Interior that the NPS would receive the light station and its grounds.[20]

The "Cape Hatteras Lighthouse Reservation" was formally transferred to the National Park Service on November 9, 1936, with its "illuminating apparatus and other objects which add to the historical background of the lighthouse tower left intact until such time as they might again be needed by the Lighthouse Service." E.J. Byrum, the Project Supervisor for the CCC camp, had been designated the custodian of the property in September 1936, on behalf of the NPS.[21]

The transfer was publically announced on December 6, 1936. "Funds for the new NPS lighthouse were provided by the Public Works Administration, but no decision had yet been made about the final status of the surrounding area." A decision had to be made whether the lighthouse would become a national monument, a recreational area, or a historic site. Further studies were planned. In the meantime, a CCC enrollee was stationed on site to serve as a watchman.[22]

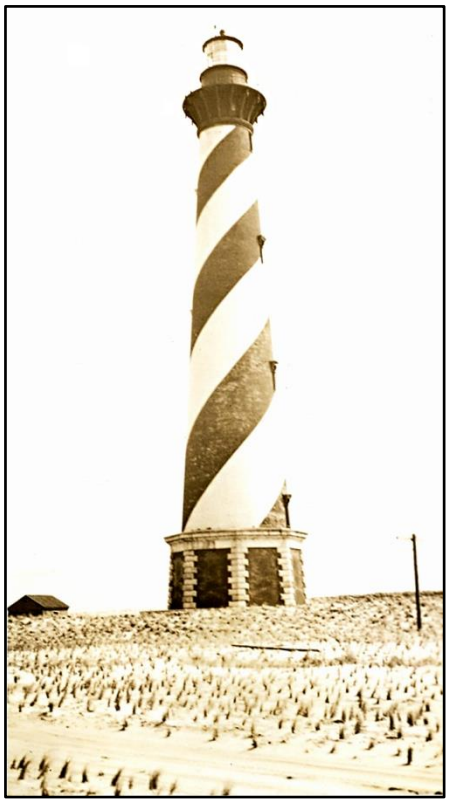

Figure 12. The Lighthouse and part of the Oil House, March 15-18, 1937. Photograph included as part of "A Field Investigation at Cape Hatteras Lighthouse" by Charles W. Porter, Assistant [illegible]. Photo: Cape Hatteras National Seashore Archives.

On March 15-18, 1937, a field investigation and photographic survey of the lighthouse was undertaken by F. E. Whitehouse and Charles Porter respectively. The field investigation included the following regarding the oil house:

> The Brick Oil House near the base of the lighthouse, primarily used for oil storage, but later used to house an electric generating plant, apparently is the original structure, because of the similarity of brick sizes, type of character of brick and methods of laying. This structure is at present in fair condition, but it is felt that a certain amount of reconditioning would be advisable. Window sash and glass should be replaced, the roof repaired, and a new door provided. The interior should be cleaned of accumulated sand and debris, and possibly the old oil drum racks reconstructed. The grading around this

[19] NPS, "The Creation and Establishment of Cape Hatteras National Seashore ,", p. 44.
[20] Yocum, Roberts, & Shelton-Roberts, "Cape Hatteras," pp. 67-68.
[21] NPS, "The Creation and Establishment of Cape Hatteras National Seashore," pp. 44-5.
[22] Ibid, p. 45.

building is in bad shape and should be studied by the Landscape Architects in connection with necessary grading within the fence which surrounds the lighthouse proper.[23]

The only photograph of the Oil House is a partial one showing only the roof (fig. 12).

On November 11, 1937, the Hatteras Light Station was transferred to the NPS. Even though the park was not operational at the time, the light station was included as part of the nation's first National Seashore.[24] However, it was not until 1939 that the property was used for any recreational or tourist use when the CCC began giving tours of the lighthouse.[25]

On February 14, 1939, "Horace A. Dough, Custodian of Kill Devil Hill National Monument, [was appointed] as acting custodian of both the Cape Hatteras and Currituck Lighthouse reservations." Byrum continued to lead CCC efforts, but received Dough's authorization and direction as needed.[26]

In preparation of the United States' likely participation in World War II, the United States Light House Service was absorbed by the United States Coast Guard (USCG) in 1939. This was part of President Franklin Roosevelt's second reorganization plan. It was announced on May 9, 1939 and became official in June 1939.[27]

In August 1939, Byrum provided a summary of work at the CCC camp. With regards to the Oil House, he noted that the three windows were recently removed and replaced with square-top window frames and that arch-top frames had originally been in place. At the time of the summary, the new frames were decayed and should be replaced with arch-topped frames.[28] It is known that the window openings were added to the oil house between 1932 and 1934. It is unknown who originally installed the window openings, but it is likely that they were ever arch-topped (see fig. 11).

Drawings for the replacement of the windows and frames in the Oil House were approved by Dough on December 8, 1939. The drawings show square-topped frames and windows, with sections of moldings to be replicated (fig. 13).[29]

CCC Job #34—the construction of new windows—was approved by March 7, 1940; the camp was waiting on supplies to complete the new windows. The Oil House was at that time used as a visitor contact station.[30] It is assumed that the work was completed soon after this date, as the CCC camp at Buxton was shut down on March 31, 1940. (All coastal CCC work would cease in 1942.)[31]

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[23] Whitehouse, F.E., Associate Engineer. "A Field Investigation of Cape Hatteras Lighthouse, Buxton, North Carolina." March 15-18, 1937. Cape Hatteras National Seashore Archives.
[24] National Park Service. "Cape Hatteras Light Station." *Website.*
[25] National Park Service. "Cape Hatteras Light Station." *Website.*
[26] NPS, "The Creation and Establishment of Cape Hatteras National Seashore," p. 45.
[27] Yocum, Roberts, & Shelton-Roberts, "Cape Hatteras," pp. 70-4.
[28] National Archives, College Park, MD. Record Group 79 Cape Hatteras National Seashore, P124, Box 19, Folder: Cape Hatteras National Seashore Correspondence.
[29] N.C. Department of Conservation and Development, in cooperation with United States Department of the Interior, National Park Service. "Cape Hatteras Seashore Project – Replacing Window & Frames of Brick Oil House." November 20, 1939, signed December 7 and 8, 1939. NPS DSC eTIC No. CAHA 603 2051 Z1.
[30] National Archives, College Park, MD. Record Group 79 Cape Hatteras National Seashore, P124, Box 19, Folder: Cape Hatteras National Seashore Correspondence.
[31] NPS, "The Creation and Establishment of Cape Hatteras National Seashore," pp. 46-7

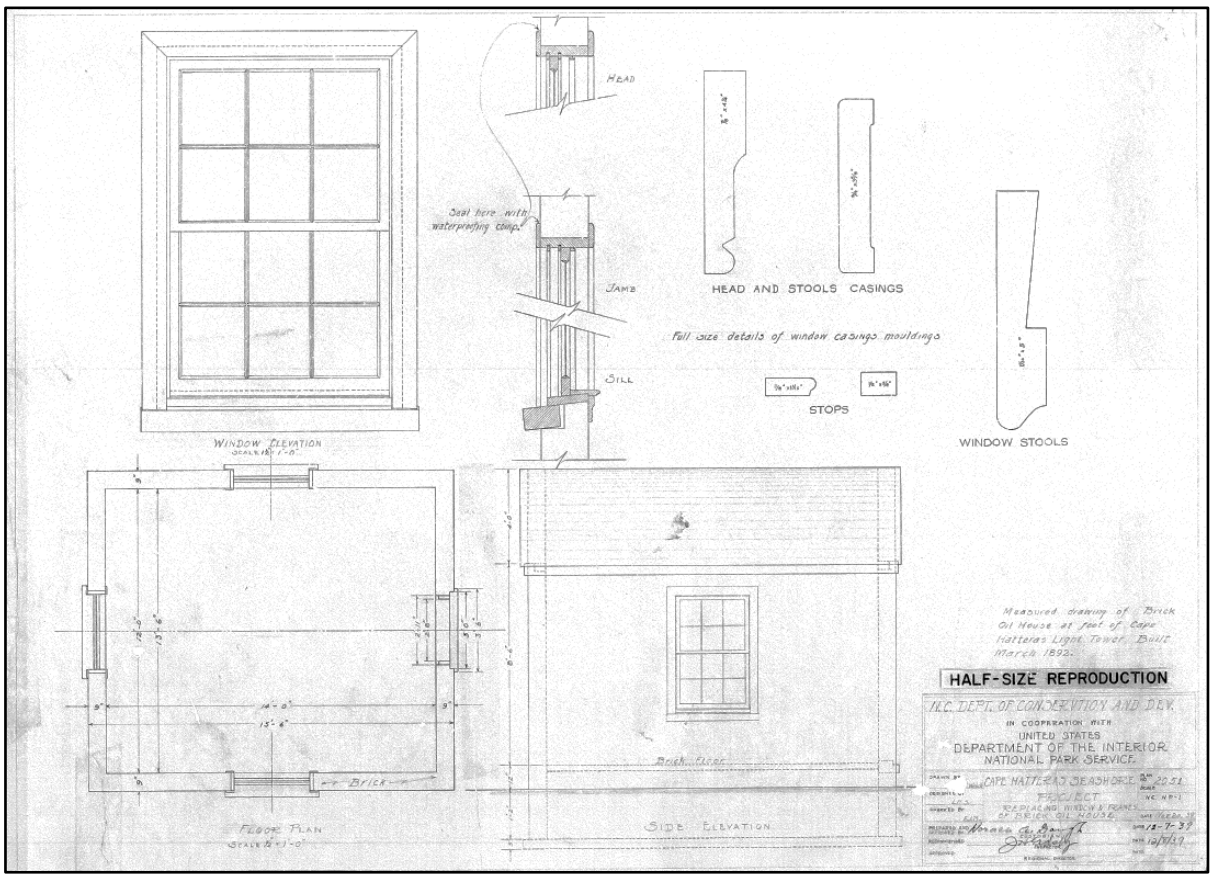

Figure 13. The November 20, 1939 drawing depicting the CCC-era repairs to the Oil House windows. Drawing: NPS DSC eTC No. CAHA 603 2051 Z1.

On June 29, 1940, the park was re-designated Cape Hatteras National Seashore Recreational Area.[32]

After much debate, on January 16, 1941, NPS Chief Historian Ronald F. Lee "recommended that the lighthouse and surrounding state park lands be together designated as a national historic site that would eventually be absorbed by...Cape Hatteras National Seashore Recreational Area."[33]

Between August 1, 1941 and June 30, 1942, a seventy-five-man "Conscientious Objectors" camp was located at Hatteras Light Station. Camps of these types, part of the Civilian Public Service, "provided those whose conscience forbad them to kill an opportunity to do work of national importance under civilian direction rather than go to war."[34] Their work included construction of a latrine and picnic shelter in the lighthouse area, construction of an electrical distribution system for the light station, and remodeling of the pump house, and alterations to the entrance road to the lighthouse area.[35]

On January 29, 1942, after the United States entered World War II, the USCG "leased the Cape Hatteras lighthouse under a special permit for use as a coastal watchtower to scout for German 'U-

[32] NPS, "History of the Establishment t of Cape Hatteras National Seashore Recreational Area," p. 2.
[33] NPS, "The Creation and Establishment of Cape Hatteras National Seashore," p. 45.
[34] Mennonite Central Committee. "Civilian Public Service." 2015. Accessed at http://civilianpublicservice.org/ on August 31, 2016.
[35] National Archives and Records Administration, College Park, MD, Record Group 79, Cape Hatteras national Seashore, Box #22, Folder: Cape Hatteras Selective Service Work Camps.

boats,' which were menacing shipping lanes even before U.S. entry into the war and sunk dozens of ships in the early months of 1942."[36] This permit would continue until August 15, 1947. During their tenure, the Coast Guard was accused of damaging the lighthouse. The Coast Guard defended itself by "…saying they cared for the lighthouse as well as they could during the time of war," but they had ceased the use of the property "sometime before the cessation of hostilities [in 1945]." This is assumed to include the other light station buildings as well. Increased security and surveillance was enacted, but little was done to the current situation through the remainder of 1947 and the early part of 1948. In April 1948, the Coast Guard requested another special permit to continue its use of the lighthouse as an aid to navigation; this included use of the oil house. It promised to restore the lighthouse, which would occur in 1949.[37]

After accusations of ill treatment by the USCG, several inspections of the property were completed. One, completed after December 1946, stated the oil house was "in need of windows and doors, frames broken."[38]

A photograph from December 1952 shows windows missing from their openings and a new asphalt-shingle roof covering (fig. 14). The original door and structural roof frame were also likely replaced at this time.

Figure 14. The oil house in December 1952; the south and east elevation windows have been removed from their openings. Photo: Cape Hatteras National Seashore Archives.

In 1953, after years of negotiations, fundraising, meetings, site visits, and surveys, the stars aligned for the formal formation of the national park. On January 12 of that year, NPS Director Conrad Wirth recommended that Secretary of the Interior Chapman approve the order to form Cape Hatteras National Seashore. (The seashore would not be formally dedicated until April 24, 1958.)[39]

After the formation of the national park, not much is known about alterations to the oil house (figs. 15-16). However, the 1984 *General Management Plan* states the Oil House was used to house the auxiliary generator for the lighthouse beacon.[40]

The Historic American Building Survey documented the Hatteras Light Station in September 1989 (fig. 17). The Oil House is seen with a louvered vent in the north elevation window opening, a non-historic door in the west elevation door opening, and an asphalt shingle roof.

[36] Ibid, p. 46.
[37] Cybularz, "Cape Hatteras Lighthouse," pp. 88-92.
[38] Yocum, Thomas, Bruce Roberts, and Cheryl Shelton-Roberts. "Cape Hatteras: America's Lighthouse." Nashville, TN: Cumberland House, 1999. p. 83-84.
[39] Cybularz, "Cape Hatteras Lighthouse," pp. 93-95.
[40] NPS, *Cultural Landscape Report*, p. 28.

Figure 15. The exterior of the oil house on August 1, 1965. Photo: Cape Hatteras National Seashore Archives. Cropped by author.

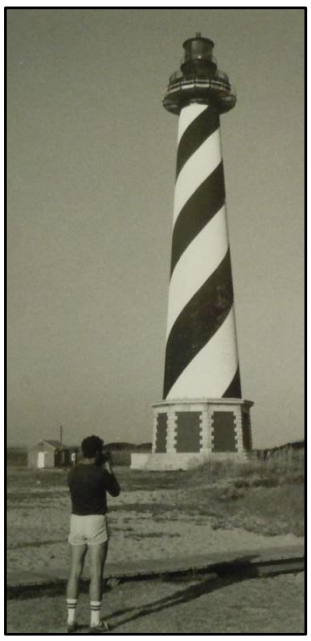

Figure 16. The exterior of the oil house in 1980. Photo: Cape Hatteras National Seashore Archives. Cropped by author.

Figure 17. The exterior of the oil house in 1989. Photo: HABS, https://www.loc.gov/item/nc0432/.

Moving a Landmark Light Station

In late 1997, after several decades of planning and studies by the federal government, independent parties, and others, the National Park Service Denver Service Center (DSC) issued a request for Qualification for firms interested in bidding on the Design-Build project to move the Hatteras Light Station. A total of six firms responded. In January 1998, after a technical evaluation panel of three evaluating DSC employees and two non-evaluating advisors chose two firms to respond to the Request for Proposal (RFP). The RFP was issued in February 1998. Six amendments were issued between March and May of that year. The final scope of work, as amended, follows:

1. Inspect all structures prior to any disturbance. Provide documentation of pre-move conditions.... Documentation will provide:
   - Basis for documentation of required repairs under this contract of damage resulting from move (e.g., cracked plaster, opened mortar joints, etc.)
   - Basis for precise reconstruction of dismantled components, if any, under this contact.
   - Basis for future reconstruction of granite fence footing by others. Specifically document the location of each granite block and mark blocks accordingly for future reconstruction.
2. Determine (within one tenth of a foot) physical relationship (horizontal coordinates and elevation of all (Lighthouse, Principal Keepers [sic] Quarters and Double Keepers [sic] Quarters, cisterns, fence footing and oil house) to one another.
3. Design support systems in preparation of moving each structure.
4. Design transportation system for lighthouse, other buildings and cisterns. Dismantling and reconstruction of cisterns may be considered. However, the preference is that the contractor should move the buildings intact to greatest extent feasible. Granite fence footing will be dismantled and placed in storage.

5. Specify techniques for clearing along move corridor and new site clearing (Historic Management Zone). This is approximately a total of 10 acres. Clean fill should be wasted within the project area to the maximum extent possible. Excess clean fill may be disposed of at a site available within 1 mile of project site. Unsuitable material and grubbing debris may be disposed of at a nearby landfill (within 80-90 miles of site.
6. Design new foundations at new site. Use the designated lighthouse position as base for locating other structures. New locations for buildings to match within one tenth of a foot existing relative positions (horizontal coordinates, vertical elevation and orientation relative to true north). Relocate all structures to finish elevations to avoid building flooding. Specific finish elevations will be determined during the design process. Provide design for rough grading at new site that will minimize wind and water erosion. Final grading will be included in a separate contract.
7. Submit design development and construction documents for all design work. NPS will review for compliance with proposal evaluation factors and contract requirements.
8. Secure the work site.
9. Schedule lighthouse move to minimize risk of exposure during move to nor'easters and hurricanes (late March to late May safest period for move). Schedule other moves at contractor's convenience within contract time frame. Schedule all other work (including demolition of most of the light house transportation system) so that contractor is clear of site by September 30, 1999.
10. Prepare old site for relocating the buildings. Cap and abandon existing connected utilities. Relocate (or demolish) existing aerial utilities at existing site as needed to accomplish work. Remove and salvage sidewalk material (from gate to lighthouse) and provide to the Park for storage.
11. Prepare route for move.
12. Implement stabilization system in preparation of moving each structure.
13. Construct move pathway and assemble equipment for transportation system for lighthouse and other buildings. Sand dunes may be removed as needed to accomplish the move. Rebuilding of the dunes will be accomplished by others. . . .
14. Document locations and top face elevation above grade of each block of granite footing surrounding the lighthouse. Remove footing and store at park where directed…for reinstallation under a separate contract. All portions of the granite block footing shall be removed, including the portion under the sand dune. Sand dunes may be removed as needed to accomplish the move.
15. Move lighthouse. At a minimum, move all portions of the lighthouse exposed at and above existing grade line.
16. Move Double Keeper's [sic] Quarters, Principal Keeper's Quarters, and Oil House. At a minimum, move all building portions exposed at and above existing grade line. The concrete pedestal in the oil house is to be removed by the contractor and provided to the Park for storage. The floor in the oil house is to be relocated intact, if feasible. If not, reconstruct with existing salvaged materials. If material cannot be salvaged, reconstruct with similar new material. Piers under the Double Keepers [sic] Quarters are to be moved intact, if feasible. If not, the piers should be dismantled, salvaged, and reconstructed with salvaged materials. If material cannot be salvaged, reconstruct with new material to achieve similar appearance.
17. Move two rain water cisterns associated with the Double Keeper's [sic] Quarters and the one cistern associated with Principal Keeper's Quarters. At a minimum, remove all portions of the cisterns, including all portions below grade. It is the Government's preference to relocate cisterns intact. If this is not feasible, reconstruct with existing or similar materials. Offeror's proposal should reflect if it is not feasible or unreasonable to relocate the cisterns intact and demonstrate means of reconstructing the cisterns in kind. Grades around relocated cisterns may be left rough and full exposure of cistern is acceptable.
18. Construct new foundations at new site and set structures onto them. Use the designated lighthouse position as base for locating other structures within one tenth of a foot of existing conditions (horizontal coordinates and elevation). New locations for all structures to match existing orientation to each other and to true north.
19. Provide final documentation of the condition of the Light Station after the move.

20. Closely inspect all buildings for damage occurring as result of preparation, moving, and placement on new foundation. Pre-move inspection, documentation will be baseline for determination of damages. The contractor shall repair all such damage under this contract.
21. Demolish and remove …most of the lighthouse transportation system. NPS may choose to retain a representative portion of the transportation system, (approximately 100 feet) adjoining the old lighthouse site for future interpretation. NPS will make this determination after considering if system is suitable for this purpose.
22. Leave any below-grade foundation remnants in place at old site. Back fill and level excavations at old site. Leave old site in safe condition. NPS expects damage to existing parking lots. Existing parking lots need not be rebuilt. Contractor will be required to leave existing park lot areas in a safe condition after the relocation has been accomplished.
23. Provide electrical service to lighthouse at new site. This may be a temporary aerial service. Connect service and make light functional. Design and construction for the electrical service entry into the lighthouse will be concealed. Remove existing exterior conduit mounted on the exterior of the lighthouse.
24. Provide a permanent lightning protection system for the lighthouse. Provide temporary lightning protection to the lighthouse during the move.
25. Provide as-built record drawings of move preparations, move pathway construction, and new foundations.
26. Provide temporary aircraft lighting during the move and permanent after the move.[41]

As part of the RFP process, DSC released solicitation-for-bid drawings (four-sheet set) entitled "Existing Conditions/Proposed Building Relocation" (figs. 18-20).[42] Remaining design work and specifications for the move would be provided by the contractor.

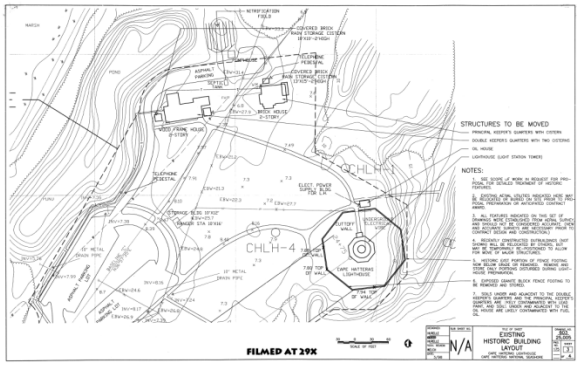

Figure 18. The existing historic building layout. Drawing: NPS DSC eTIC No. CAHA 603 25005.

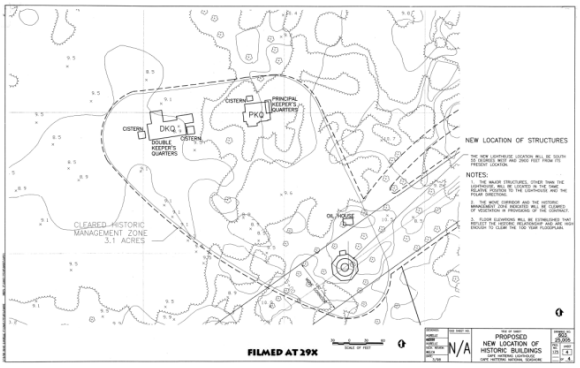

Figure 19. The proposed new location of historic buildings. Drawing: NPS DSC eTIC No. CAHA 603 25005.

[41] The following resources were supplied by Paul Cloyd, NPS DSC Historical Architect and Project Supervisor for the move:
National Park Service, Denver Service Center. "Relocate the Cape Hatteras Light Station, Package CAHA 175." *Request for Proposal.* February 20, 1998.
National Park Service, Denver Service Center. "Minutes of Cape Hatteras Light Station Pre-Proposal Conference/Site Visit." March 4, 1998.
National Park Service, Denver Service Center. "Amendment/Modification No. 1." *Amendment of Solicitation/Modification of Contract.* March 16, 1998.
National Park Service, Denver Service Center. "Amendment/Modification No. 2." *Amendment of Solicitation/Modification of Contract.* March 24, 1998.
National Park Service, Denver Service Center. "Amendment/Modification No. 3." *Amendment of Solicitation/Modification of Contract.*
National Park Service, Denver Service Center. "Amendment/Modification No. 4." *Amendment of Solicitation/Modification of Contract.* April 9, 1998.
National Park Service, Denver Service Center. "Amendment/Modification No. 5." *Amendment of Solicitation/Modification of Contract.* May 12, 1998.
National Park Service, Denver Service Center. "Amendment/Modification No. 6." *Amendment of Solicitation/Modification of Contract.* May 20, 1998.
[42] Denver Service Center, National Park Service. "Existing Conditions/Proposed Building Relocation." March 1998. NPS DSC eTIC No. CAHA 603 25005.

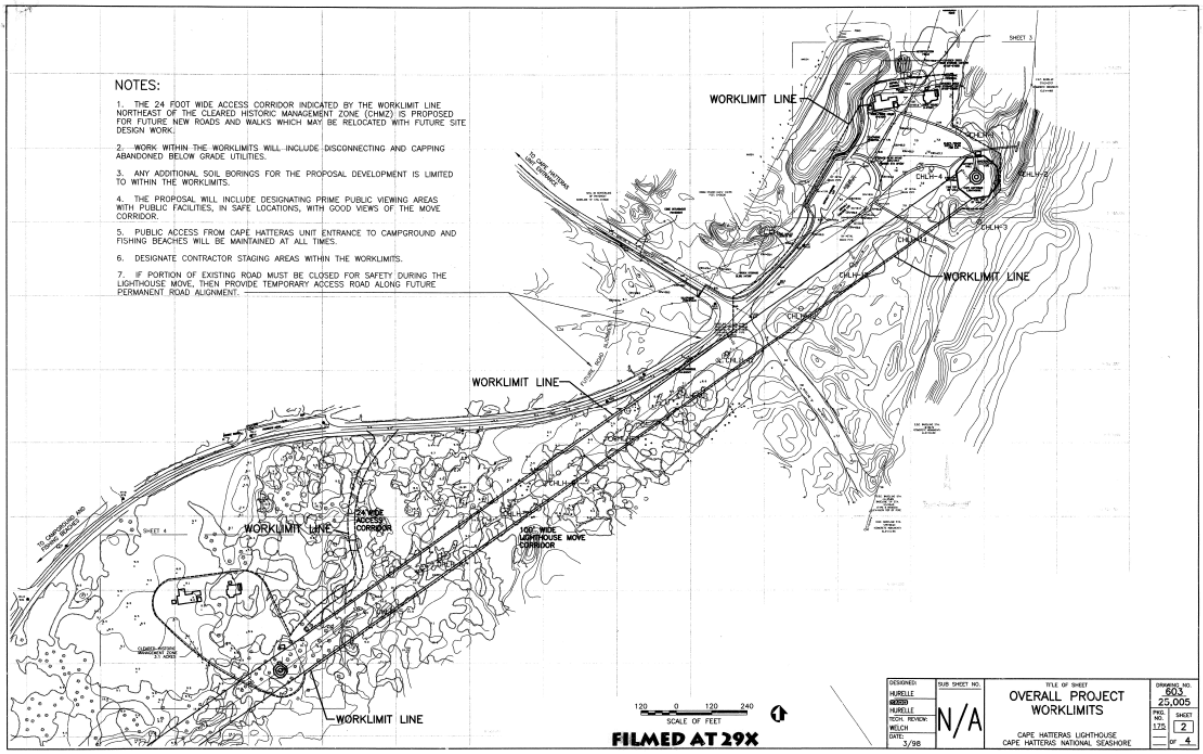

Figure 20. The overall project work limits in the solicitation for bid drawings, March 1998. Drawing: NPS DSC eTIC No. CAHA 603 25005.

International Chimney Corporation (ICC) won the contract to move the light station for their familiarity with the lighthouse and "significant advantages in their move technology."[43] Their final proposal supplementation for the move was submitted in May 1998.[44] Several additional studies and reports were completed in the fall of the same year.

In October, the first draft Design Development Drawings for the relocation were completed by DSC.[45] In April 1999, Final Construction Drawings for the relocation were completed (figs. 21-24).[46]

ICC worked with Expert House Movers, Inc. of Maryland (John Matyiko, Sr. with sons John, Jr., Joe, Jim, Jerry, and consultant Pete Friesen) to develop a plan and execute the work, with the help of architects, structural engineers, and other experts.

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[43] Cloyd, Paul C., PE/RA. "Cape Hatteras Lighthouse HSR 100% draft review." January 2016.

[44] International Chimney Corporation. "Supplemental Technical and Price Proposal: Final Proposal – Design and Construction (Design/Build) Contract to Relocate Cape Hatteras Light Station, Cape Hatteras National Seashore, Dare County, North Carolina, package CAHA 175/Request for Proposal." May 29, 1998. NPS DSC eTIC No. CAHA 603 D156.

[45] Denver Service Center, National Park Service. "Relocate the Cape Hatteras Light Station." *Design Development Drawings.* October 1, 1998. NPS DSC eTIC No. CAHA 603 25006.

[46] Denver Service Center, National Park Service. "Relocate the Cape Hatteras Light Station." *Final Construction Drawings.* October 1, 1998. NPS DSC eTIC No. CAHA 603 25006A.

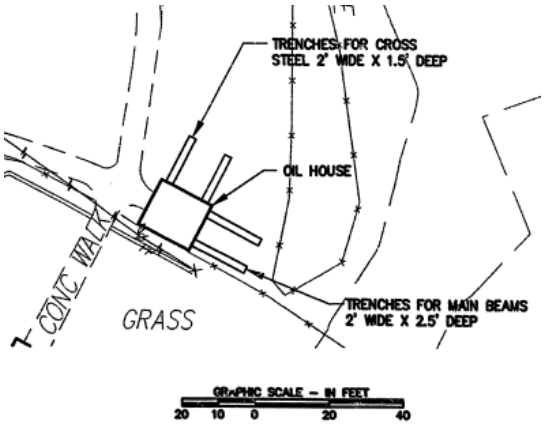

Figure 21. Plan of trenches for the main beams and cross beams for the Oil House. Drawing: NPS DSC eTIC No. CAHA 603 25006A. Sheet 11. Cropped by author.

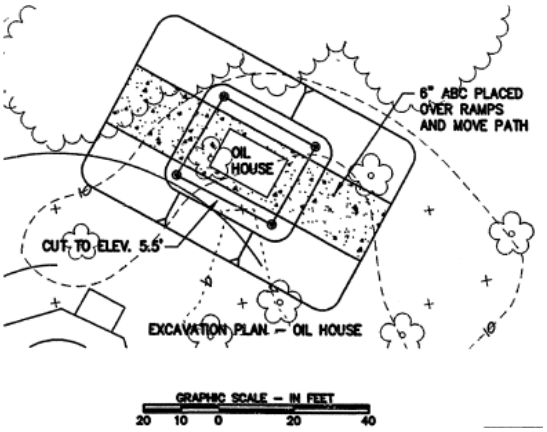

Figure 22. The excavation area for the oil house's new location. Drawing: NPS DSC eTIC No. CAHA 603 25006A. Sheet 11. Cropped by author.

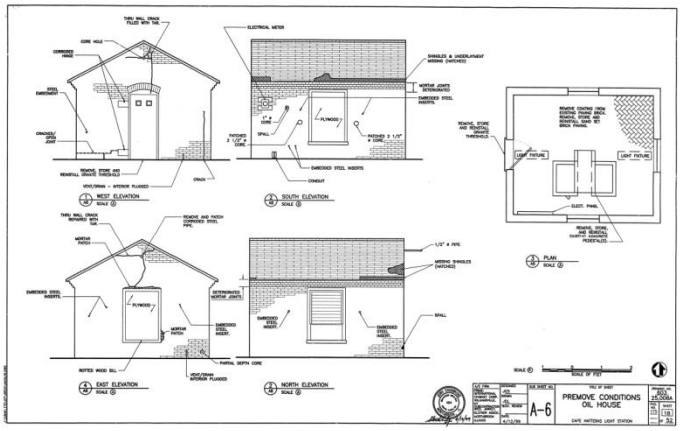

Figure 23. Pre-move condition of the Oil House. Drawing: NPS DSC eTIC No. CAHA 603 25006A. Sheet 18.

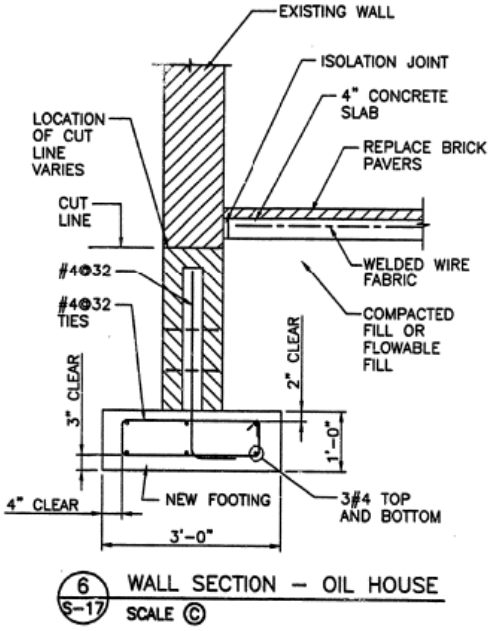

Figure 24, right. A section through the new foundation for the Oil House. Drawing: NPS DSC eTIC No. CAHA 603 25006A. Sheet 37. Cropped by author.

ICC first arrived at Cape Hatteras on December 15, 1998 to begin preparations for moving the lighthouse.[47] In January 1999 "work began in earnest." The first step was to ready the site for excavation. NPS archeologists were on site every day in order to monitor the proceedings, especially once excavation began. In order to create a temporary roadway, or "move corridor," trees were removed. The road would eventually be graded, laid with gravel, compacted, and rolled in preparation. Also during January, the brick floor and concrete generator base were systematically removed from the interior of the Oil House (figs. 25-26), the door frame was stabilized, and wood corner boards were added at each corner so that steel cable straps could be

[47] The creation of the this section of the move narrative was developed from several sources:
Cape Hatteras National Seashore Archives.
Duffus, Kevin (producer). "Move of the Century: Cape Hatteras Light." *Film.* Looking Glass Productions, Inc.: 2004.
Shelton-Roberts, Cheryl, and Bruce Roberts. "Moving Hatteras: Relocating the Cape Hatteras Light Station to Safety." Lighthouse Publications, 2015.
Cloyd, Paul C., PE/RA. "Cape Hatteras Lighthouse HSR 100% draft review." January 2016.

wrapped around the building to support it during the move, since the building has no integral floor framing system (fig. 27).

In early February, the Oil House was prepared for its move. Sand was removed from the west and east elevations of the building. Bricks were removed from the foundation wall of these elevations to allow four steel needle beams to be slid into place (see fig. 27). Main steel beams were slid under and perpendicular to the needle beams. Cribbing was then systematically placed under the main beams in order to excavate fully from around the building (fig. 28).

Underneath and perpendicular to the main beams, rocker beams were inserted, which would be directly attached to dolly wheels to be driven to its new site. On February 5, 1999 the Oil House was completely moved from its original site to a temporary holding site atop cribbing until the lighthouse would be moved (fig. 29).

Figure 25. Systematic removal of the brick floor on the interior of the Oil House. Photo: Cape Hatteras National Seashore Archives, 01/19/99.

Figure 26. The concrete foundation located in the center of the Oil House was the base for a generator used by the USCG. Cape Hatteras National Seashore Archives, 01/19/99.

Figure 27. A steel needle beam is slid into place under the Oil House. Note the extra stabilization measures at the door opening, corners, and steel cables around the building. Photo: Cape Hatteras National Seashore Archives, 03/04/99.

Figure 28. Wood cribbing supports the main beams, which support the needle beams, which support the oil house. Photo: Cape Hatteras National Seashore Archives, 03/04/99.

Figure 30, above. Locating the Oil House above the reinforced concrete footing. Photo: Cape Hatteras National Seashore Archives, 08/05/99.

Figure 29, left. The Oil House travels to its temporary holding site, until the lighthouse can be moved. Photo: Cape Hatteras National Seashore Archives, 03/04/99.

A new foundation footing was constructed at the building's new location (fig. 30). This foundation consists of a continuous reinforced concrete footing (3'-0" wide and 1'-0" deep), the top of which is approximately 4'-0" below grade (see fig. 24).

The final placement of the Oil House occurred exactly six months after its original move, on August 5, 1999. The placement occurred in reverse of its removal from the original foundation. Once the building was positioned over the new concrete footings, wood cribbing was built up to meet and support the main beams. The building was positioned approximately 2'-0" above its previous elevation (the Double Keepers' Quarters and Principal Keeper's Quarters were also placed at their original elevations relative to the new Lighthouse elevation) (fig. 31). This new elevation was to provide additional protection against flooding and shoreline erosion.

Once the cribbing fully supported the building, the rocker beams and dolly wheels could be removed. New brick-faced concrete block foundation walls (1'-0" thick) were constructed around the cribbing, main beams, and needle beams. When the building could be fully supported by the almost-complete foundation walls, the main beams and the needle beams were slid out from under the building and the foundation walls were completed. The area enclosed by the new foundation walls was to be filled with compacted or flowable fill (unknown which was used). Atop the fill was a 0'-4"-thick concrete slab reinforced with welded wire fabric, a layer of paver sand, and the original bricks in their exact original location (fig. 32).

After the foundations were completed for the Oil House, final grading was completed. The grading would slope the grade away from the base of the building.

Figure 31. Lowering the Oil House to a precise height. Photo: Cape Hatteras National Seashore Archives, 08/19/99.

Figure 32. Relaying the historic brick over a new concrete slab and sand layer. Photo: Cape Hatteras National Seashore Archives, 10/02/99

The final inspection of the Light Station occurred on October 1, 1999. Very few punch list items remained to be completed. The Letter of Final Acceptance was issued in July 2000.[48]

The final cost for relocating the Hatteras Light Station totaled $9,518,042. This figure included the following:

$1,454,000	Design Services (combined)
$7,507,000	Relocation (all buildings)
$480,000	New Foundations (all buildings)
$20,000	Lightning Protection System (lighthouse)
$28,000	Temporary Electrical Service
$24,020	Public Viewing Area (change order)
$4,872	Disposal of Fuel Tank Contents & Contaminated Soil (change order)[49]

In November 1999, the design drawings were updated to include as-built conditions (fig. 33). The drawings show that some restoration work was completed to the Oil House after its move. This included repointing through-wall cracks on the east and west elevations, replacing a rotten wood sill at the east elevation window, removing the concrete base on the interior and replacing with salvaged brick (original plan was to reinstall the base).[50]

[48] Cloyd, Paul C., PE/RA. "Cape Hatteras Lighthouse HSR 100% draft review." January 2016.
[49] Cloyd, Paul C., Contracting Officer's Representative/Project Manager, DSC, NPS. "Relocate Cape Hatteras Light Station , Phase 1." *Fact Sheet for Completion Report.* December 22, 1999.
Cloyd, Paul C., Project Supervisor, DSC, NPS. "Relocate Cape Hatteras Light Station." *Lump Sum Price Contract.* August 21, 2000.
[50] Denver Service Center, National Park Service. "Relocate the Cape Hatteras Light Station." *Project Record Drawings.* November 8, 1999. NPS DSC eTIC No. CAHA 603 25006.

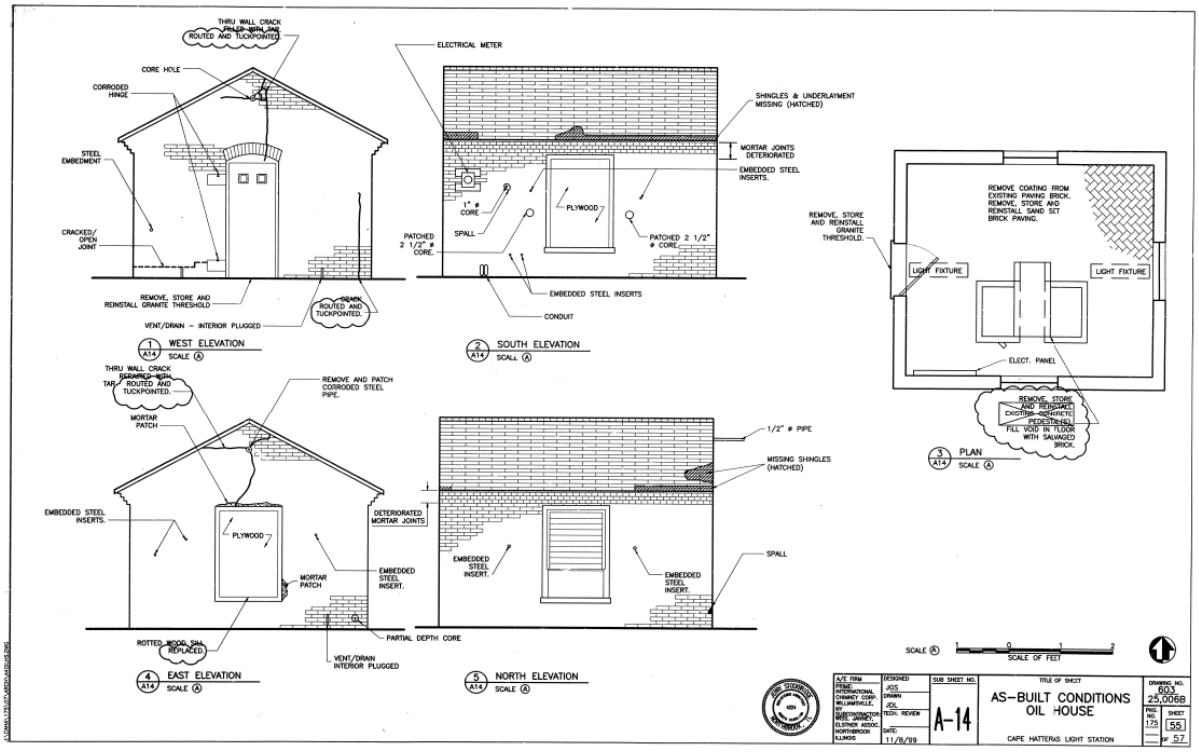

Figure 33. The condition of the Oil House after its move. Drawing: NPS DSC eTIC No. 603 25006B, Sheet A-14.

Figure 34. The light station about a year after the move project is complete. Photo: Cape Hatteras National Seashore Archives, 09/00.

Continuing Its Service

After the Oil House's move, and continuing through the present, the building has been used by Cape Hatteras National Seashore permanent and seasonal interpretive staff as a storage space.

Sometime after July 2005 a modern metal and canvas awning was installed on the west elevation for use by interpretive staff and visitors. In addition the asphalt shingle roof was replaced with a standing-seam metal roof, and the main entrance door was replaced (figs. 35-36).

Figure 35. The exterior of the Oil House on July 11, 2005. Photo: List of Classified Structures.

Figure 36. The exterior of the Oil House as seen today. Photo: HPTC, 05/12/16.

Table 1. **Hatteras Light Station Oil House Timeline**	
1802	First lighthouse completed; first keeper begins role; first dwelling in place First oil vault in place with 9 cedar cisterns holding whale oil
1803	Cisterns are too small, replaced for capacity of two thousand gallons
1868-1870	New lighthouse constructed
1884	Request made for new oil house
1887	Request made for new oil house
1888	Original oil house destroyed in fire
1892	New oil house constructed at base of new lighthouse
ca. 1932-1934	Windows installed on south, east, and north elevations
1935	CCC arrives on site
1936	New skeletal lighthouse lit; 1870 lighthouse extinguished
1937	Oil House reported in fair condition Cape Hatteras Light Station transferred to National Park Service
1940	Windows replaced by CCC CCC camp removed from Buxton
1941-1942	"Conscientious Objectors" camp located at Hatteras Light Station
1946	New windows and door needed
1950	Lighthouse reactivated with new modern lens
ca. 1952	Windows, doors, roof covering, and perhaps roof structure replaced
1953	Cape Hatteras National Seashore formed; site altered to accommodate visitors
1958	Formal dedication of Cape Hatteras National Seashore
1989	HABS documentation
1999	Lighthouse (Jun-Jul) and other structures (Feb & Mar) moved 2,900'-0"
2000	New site redeveloped
2015-2016	HABS documentation
End of Table 1.	

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Architectural Description

The Historic Preservation Training Center visited the Hatteras Light Station once over the course of research for this Historic Structure Report. This trip occurred May 9-13, 2016. A large collection of field photographs, notes, and drawings were compiled during the visit. Through this work, detailed physical descriptions of features, condition assessments, and a compilation of character-defining and non-character-defining features have been made. Additional visits were coordinated with the Historic American Building Survey for documentation of the light station (April and June 2016). Park logistical assistance was provided by the Cape Hatteras National Seashore Resource Management Division and the Southeast Regional Office of the National Park Service.

Building Feature Master List

The Building Feature Master List (BFML) is an overall outline-format checklist used for creating a physical description of the Oil House. The BFML describes features using a hierarchal structure based on industry standards adopted by the federal government—the UNIFORMAT II (ASTM E1557 Standard, 2008) used by many facility management industry leaders, including the National Park Service's Park Facility Management Division (PFMD). The BFML uses headings and sub-headings to divide architectural components, structural systems, mechanical systems, etc. into a simple organizational tool (Table 1).

A	Substructure	
	A10	Foundations
B	Shell	
	B10	Superstructure
	B20	Exterior Enclosure
	B30	Roof Closure
C	Interiors	
	C10	Interior Construction
	C20	Stairs
	C30	Interior Finishes
D	Services	
	D20	Plumbing
	D30	HVAC
	D40	Fire Protection Services
	D50	Electrical
G	Building Sitework	
	G20	Site Improvements
	G90	Other Site Work

Table 2. The basic UNIFORMAT II Building Feature Master List includes the above headings and subheadings.

Physical Description Summary

The Hatteras Light Station has undergone periods of use and non-use since its completion in 1871. The original design and construction methodology is readily apparent and has resisted attempts at modernization by retaining most of its exterior character-defining features. Despite the removal of some important exterior character-defining features (windows and exterior door), the basic character-defining materials and architectural features of the exterior of the Oil House remains intact and can instruct the nature of its care. The interior of the building lacks many of its historic character-defining features since the building's move (removal of concrete pedestal, electric generator, and oil storage containers, and replacement of structural roof frame). Future care of the building should be based on the sustainable preservation maintenance of the traditional construction materials and methodologies, not on covering or replacing historic materials with inferior imitations. Significant character-defining

features which have been removed should be installed as part of any future treatment of the Oil House.

Hatteras Light Station Oil House Physical Description

Location within the Park

Cape Hatteras National Seashore (CAHA), the nation's first national seashore, is located along the Outer Banks of North Carolina, a series of barrier islands which separate the Atlantic Ocean from Pamlico Sound and the mainland. The park stretches from Nags Head in the north to Ocracoke in the south (fig. 37). The park currently oversees the care of three light stations, including the Hatteras Light Station.

Hatteras Island, one of the barrier islands, is located about halfway between the northern and southern reaches of the park (fig. 37 inset). Just offshore of the cape (an elbow-like jut of the Outer Banks into the ocean), the Gulf Stream and the Virginia Drift, a branch of the Labrador Current, collide. The collision of currents directs southbound ships towards the Diamond Shoals, a dangerous twelve-mile-long sandbar. Hundreds, if not thousands, of shipwrecks are located within the vicinity of the Diamond Shoals, giving the area the name of *Graveyard of the Atlantic*. The Hatteras Light Station was constructed on Hatteras Island to warn ships of the Diamond Shoals. The light station comprises the Lighthouse, Oil House just to the north, Principal Keeper's Quarters to the north-northwest, and Double Keepers' Quarters to the northwest.

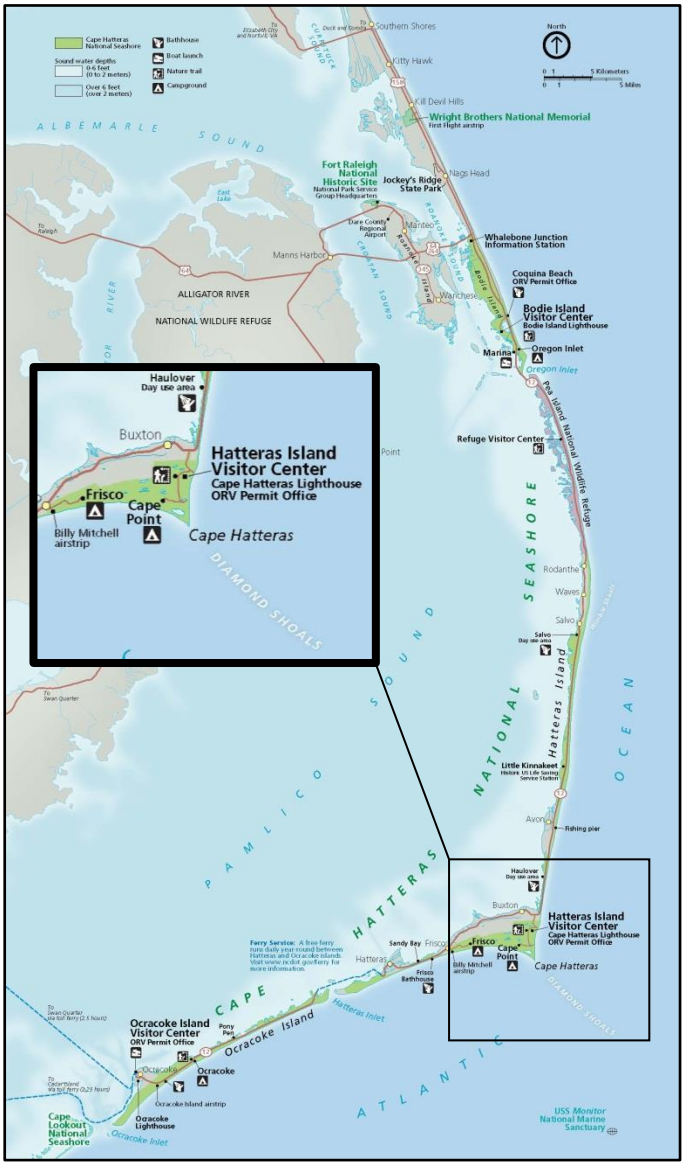

Figure 37. Cape Hatteras National Seashore is located on the Outer Banks of North Carolina. Inset: Cape Hatteras Lighthouse is located on Hatteras Island. Map: Harpers Ferry Center, 2008.

When completed in 1870, the light station was located 1,600'-0" from the Atlantic Ocean. By 1980, 110 years later, the ocean was seventy feet away from the tower on the south. Due to the encroaching sea, all of the light station buildings were moved 2,900'-0" southwest in 1999 to remove them from the ocean's reach. Since the move, the buildings are once again 1,600'-0" from the Atlantic Ocean and in their exact spatial relationship to one another as they were in their original locations (fig. 38).[1]

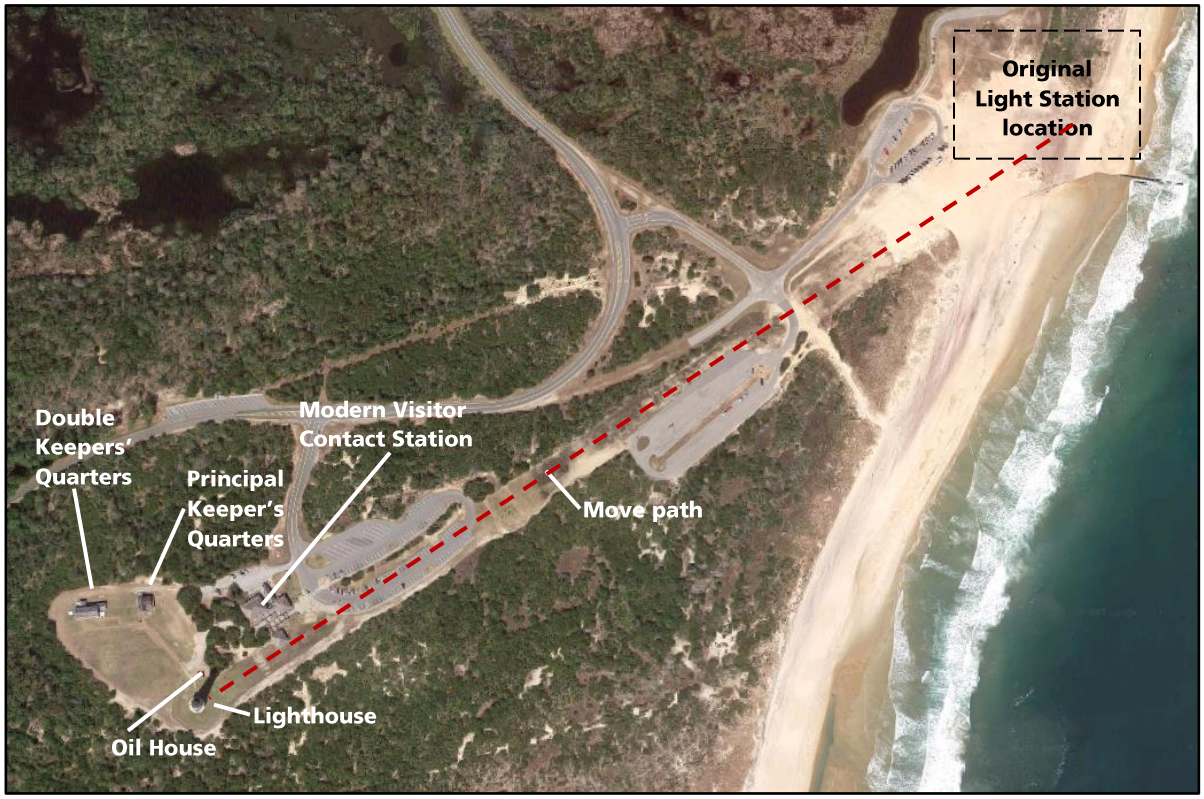

Figure 38. A Google Earth aerial view of the light station. The new location is at the bottom left, the original location is at the top right, and the move path joins the two sites. Photo: Google ©2015.

[1] The Request for Proposal required a tolerance of 0.1 foot for matching the relative positions (x, y, and z coordinates) of the light station buildings. After being positioned, one end of the Double Keepers' Quarters exceeded this tolerance due to a 0'-6" discrepancy in the x-y plane. The NPS concluded the risks of moving the building again outweighed the benefit to correct the position. For more information, see Paul Cloyd's comments on the Cape Hatteras Lighthouse HSR 100% draft, January 2016.

Exterior Overall

The prominent overall visual aspects of the Oil House are its one-story square massing (one-room) with brick exterior walls and low-sloped, standing-seam metal gable roof (figs. 39-40). A modern metal and canvas awning is located on the west elevation over the main entrance. A gravel path also leads to this entrance.

Figure 39. The Oil House from the northwest corner. The Lighthouse is located to the south. Photo: HPTC, 05/12/16.

Figure 40. The Oil House from the southeast corner. Photo: HPTC, 05/12/16.

West Elevation (fig. 41)

The west elevation is one room wide (13'-6) and one story tall, and sits on a slab-on-grade foundation under a front-facing, low-sloped gable roof. An original arched door opening is centered in this elevation (a modern wood door is in the opening). A small, historic pipe opening is located just below the peak of the roof—its use is unknown.

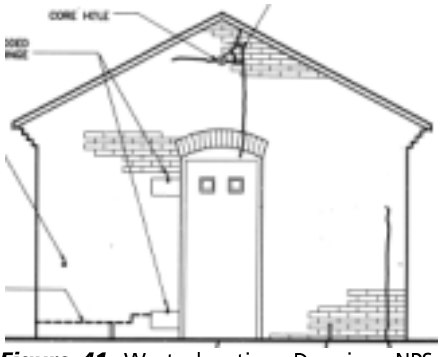

Figure 41. West elevation. Drawing: NPS DSC eTIC No. CAHA 603 25006B, Sheet A-14. Cropped by author.

South Elevation (fig. 42)

The south elevation is one room wide (15'-6") and one story tall, and sits on a slab-on-grade foundation under a side-facing, low-sloped gable roof. A CCC-era, square-topped window opening is centered in this elevation (modern painted plywood is located in the opening). A stepped brick cornice is located at the eave.

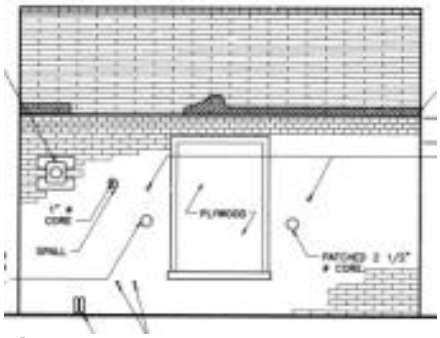

Figure 42. South elevation. Drawing: NPS DSC eTIC No. CAHA 603 25006B, Sheet A-14. Cropped by author.

East Elevation (fig. 43)

The east elevation is one room wide (13'-6) and one story tall, and sits on a slab-on-grade foundation under a front-facing, low-sloped gable roof. A CCC-era, square-topped window opening is centered in this elevation (modern painted plywood is located in the opening). A small, historic pipe opening is located just below the peak of the roof—its use is unknown.

North Elevation (fig. 44)

The north elevation is one room wide (15'-6") and one story tall, and sits on a slab-on-grade foundation under a side-facing, low-sloped gable roof. A CCC-era, square-topped window opening is centered in this elevation (modern painted plywood and a louvered vent are located in the opening). A stepped brick cornice is located at the eave.

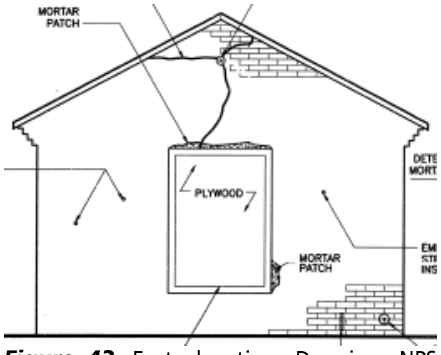

Figure 43. East elevation. Drawing: NPS DSC eTIC No. CAHA 603 25006B, Sheet A-5. Cropped by author.

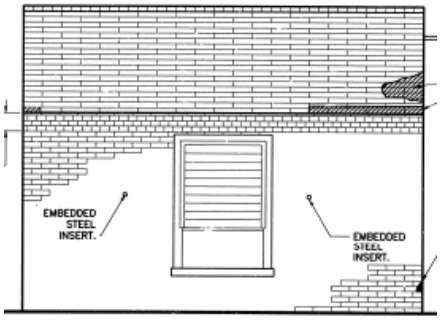

Figure 44. North elevation. Drawing: NPS DSC eTIC No. CAHA 603 25006B, Sheet A-5. Cropped by author.

Interior Organization

The Oil House is composed of a single interior room (Room 101) (fig. 45). The original exterior door opening is located on the west elevation. Three CCC-era square-topped window openings are located in the three remaining elevations, one centered in each. A brick and concrete pedestal was located in the center of the room until 1999 when it was removed prior to the building's move. This pedestal likely once held an electric generator, used by the USCG, to the power the lighthouse light. Further accessories are located within the roof framing.

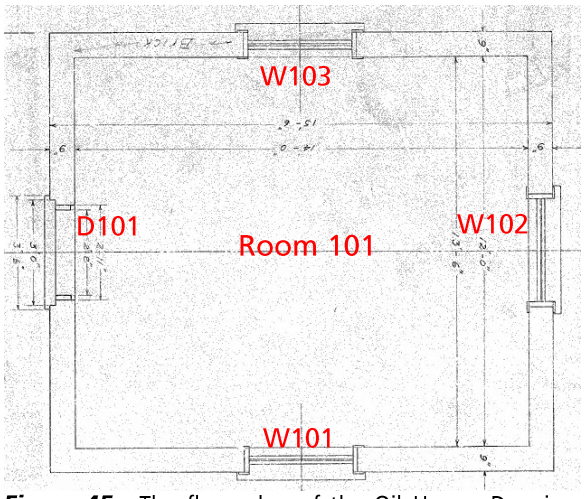

Figure 45. The floor plan of the Oil House. Drawing: NPS DSC eTIC No. CAHA 603 2051 Z1. Cropped by author.

Building Feature Master List Descriptions

A	SUBSTRUCTURE	
	A10	FOUNDATIONS
		A1010 Standard Foundation

Original Foundation

The original foundation was of brick spread foundation footings. Exact dimensions are unknown, however pictures from before the building was removed show subterranean conditions (fig. 46).

Modern Foundation

The new foundation is composed of a continuous reinforced concrete footing (3'-0" wide and 1'-0" deep), the top of which is approximately 4'-0" below grade (fig. 47). New brick-faced concrete block foundation walls (1'-0" thick) were constructed atop the concrete footing to support the moved oil house (fig. 48). The area enclosed by the new foundation walls was filled with either compacted or flowable fill (unknown which was used). See A1030 Slab on Grade Foundations for details on the interior slab on grade installed above this fill.

Figure 46. The original foundation walls were composed of brick spread footings. The holes cut in the brick are not original, but were used to insert steel beams in advance of moving the building. Photo: Cape Hatteras National Seashore Archives, 03/04/99. Cropped by author.

Figure 47. The Oil House positioned over the new continuous reinforced concrete footing. Concrete block is lined up in the background ready to be laid between the footing and the historic brick walls above. Photo: Cape Hatteras National Seashore Archives, 08/19/99.

Figure 48. Concrete block being laid between the new concrete footing and the historic walls above. Photo: Cape Hatteras National Seashore Archives, 08/19/99.

A1030	Slab On Grade Foundation

Following the infill of the new brick-faced concrete block foundation footing walls, a 0'-4"-thick concrete slab reinforced with welded wire fabric was poured (fig. 49). See C3010 Floor Finishes for details on the interior brick finish floor installed atop the concrete slab. Note: It is unknown if a concrete slab was located below the historic brick finish floor at the Oil House's original location.

Figure 49. The new concrete slab poured atop fill and supporting the brick finish floor. Photo: Cape Hatteras National Seashore Archives, 10/02/99.

B	SHELL
B10	SUPERSTRUCTURE
B1020	Roof Construction
B102001	Structural Frame

The structural roof frame is not original to 1892. HPTC conjectures that the extant roof frame was constructed in ca. 1952 when the USCG completed other alterations to the building, including outfitting the interior with an auxiliary power generator, replacing the roof covering, etc.

The roof frame, currently exposed on the interior of the building, is composed of 2x6 (nominal) rafters at approximately 24" on center (fig. 50). There is no ridge beam. At the bottom of the roof slope, the rafters sit on a wood sill plate (dimensions unknown). Wood gusset plates are located at the ridge of each pair of rafters and 2x4 lapped rafter ties are located at the midpoint of each pair of rafters. Original (to ca. 1952) plywood is located atop the rafters. Replacement plywood is located at the west and east rafter bays. All wood components of the structural roof frame are painted.

Figure 50, right. The ca. 1950 roof frame is exposed on the interior of the Oil House. Photo: HPTC, 05/12/16.

B20	EXTERIOR ENCLOSURE
B2010	Exterior Walls

The brick exterior walls of the Oil House are original. The walls are 0'-9 thick (about 3 withes); the brick is laid in 7:1 common bond (seven rows of stretchers to one row of headers). The walls have always been unpainted on the exterior (fig. 51). At the top of the walls, four rows of brick step out to create a simple cornice (fig. 52). The interior faces of the walls exhibit several layers of paint (fig. 53). The exterior and exposed interior mortar joints have been repointed with a Portland cement-based mortar (see fig. 53).

A brick jack arch is located over the 1892 exterior door opening (fig. 54); the sill is composed of slate (fig. 55). In addition, slate hinge blocks are located at the north side of the door openings, and retain historic pintels (see fig. 54).

The ca. 1930s window openings have what are likely steel lintels and wood sills (fig. 56).

Figure 51. The exterior walls of the Oil House are constructed of unpainted brick laid in a 7:1 common bond. Photo: HPTC, 05/12/16.

Figure 52, right. The brick cornice at the top of the exterior walls. Photo: HPTC, 05/12/16.

Figure 53. The interior faces of the exterior walls have been painted. Note the presence of Portland cement-based mortar. Photo: HPTC, 05/12/16.

Figure 54. A brick jack arch located at the exterior door entrance. Note also the slate embedded into the wall which holds a historic pintel for the original door. Photo: HPTC, 05/12/16.

Figure 55. The slate door threshold is covered with a modern metal threshold. Note the slate block embedded in the exterior wall and metal pintel. Photo: HPTC, 05/12/16.

Figure 56, right. The ca. 1930s window openings have steel lintels covered with wood trim and wood sills. Photo: HPTC, 05/12/16.

B201006	Sun Control Devices

A modern metal and canvas awning is located on the west elevation (fig. 57). This non-character-defining feature was added to the building sometime after July 2005.

Figure 57, right. The modern awning located on the west elevation of the Oil House. Photo: HPTC, 05/12/16.

B2020	Exterior Windows

No exterior window openings were located in the Oil House originally. Sometime between 1932 and 1934, window openings were added in the north, east, and south elevations of the Oil House by the CCC (fig. 58). In December 1939, the windows were proposed to be replaced and drawings were produced for 6/6 wood windows and surround components. The work was approved in March 1940; it is likely the new windows were completed that same month (as the CCC camp was shut down on March 31). By January 1949, the windows of the oil house had been removed (likely by vandals). The windows had not been replaced by December 1952, but they likely were at some

point due to the retention of one single-lite sash at W102. Photographs from the 1960s show the window openings were infilled with painted plywood; this condition is extant today.

W101 (south elevation) is covered with painted plywood on the exterior. On the interior, the opening exhibits a non-original, oversized upper sash (no glass extant) and plywood infill below (fig. 59).

W102 (east elevation) is covered with painted plywood on the exterior. On the interior, the opening exhibits a painted plywood panel above a ca. 1950s single-lite wood sash (glass intact) (fig. 60).

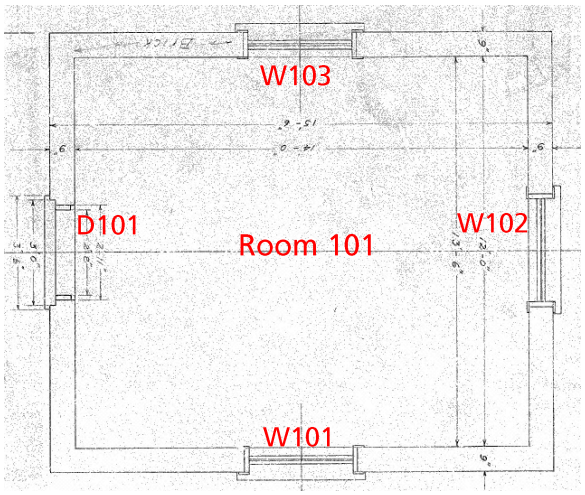

Figure 58. Oil House window numbers. Drawing: NPS DSC eTIC No. CAHA 603 2051 Z1. Cropped by author.

W103 (north elevation) is exhibits a wood louvered vent above a painted plywood panel on the exterior (fig. 61). On the interior, a plywood panel houses a metal vent (fig. 62).

Figure 59 The interior of W101. Photo: HPTC, 05/12/16.

Figure 60. The interior of W102. Photo: HPTC, 05/12/16.

Figure 61. The exterior of W103. Photo: HPTC, 05/12/16.

Figure 62. The interior of W103. Photo: HPTC, 05/12/16.

B2030	Exterior Doors

The extant exterior door was replaced by park maintenance staff in the last few years. It is composed of a modern six-panel wood door with modern wood trim and metal threshold (fig. 63). It does not acknowledge the arched opening in which it resides.

Originally the opening would likely have been filled with a metal or wood slab door and hung on the still-extant metal pintels by metal strap hinges. Replica doors in the historic style can be seen at twin oil houses at Amelia Island and Sapelo Island (figs. 64-65).

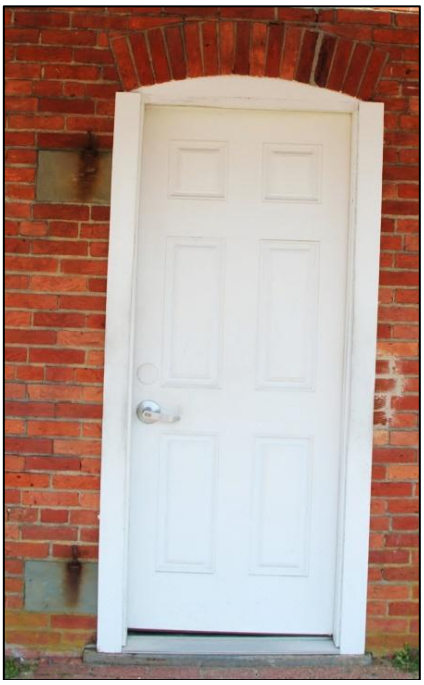

Figure 63, right. The replacement exterior door is new but is not character defining. Photo: HPTC, 05/12/16.

Figure 64. The restored 1890 Amelia Island Oil House with exterior door, strap hinges, and pintels. Photo: https://en.wikipedia.org/wiki/Amelia_Island_Light. Accessed 06/29/16. Cropped by author.

Figure 65. The restored 1890 Sapelo Island Oil House with exterior door, strap hinges, and pintels. Photo: https://vanishingcoastalgeorgia.com/2012/09/17/sapelo-island-lighthouse-1820-oil-house-1890/. Accessed 06/29/16. Cropped by author.

B30	ROOFING
B3010	Roof Coverings
B301001	Roof Finishes

The Oil House was originally covered with a standing-seam metal roof: photographs from 1893, 1932, and 1934 show standing-seam metal extant. Asphalt singles were installed on the roof in ca. 1952, likely by the USCG; asphalt shingles were extant on the building through at least July 2005. The current painted standing-seam metal roof was installed since then (fig. 66).

Figure 66. The standing-seam metal roof atop the Oil House was installed sometime since July 2005. Photo: HPTC, 05/12/16.

B301005	Gutters & Downspouts

There is no roof drainage system located at the Oil House. It is unlikely that there ever was such as system due to the utilitarian nature of the building.

C	INTERIORS
C10	INTERIOR CONSTRUCTION
C1030	Fittings

Metal components are located within the roof framing system (fig. 67). Their exact use is unknown, but is likely related to the USCG's use of the building as an auxiliary power generator. Similarly, prior to the building's move, a brick and concrete pedestal was located within the structure, which was used to support the USCG's generator (fig. 68). The pedestal was removed prior to the move; it is unknown if this feature has been retained in storage. Prior to this modern equipment, oil storage containers would have been located in the building. It is unknown when the containers were removed.

Figure 67. Metal components leftover from the Oil House's use as an auxiliary power generator. Photo: HPTC, 05/12/16.

Figure 68. A concrete and brick pedestal was still extant in the building prior to its move. Photo: Cape Hatteras National Seashore Archives, 01/19/99.

C103098	Other Casework

Simple painted interior wood trim is located around all of the windows (fig. 69). The door remains unfinished on the interior (fig.70). There are no other types of trim located in the interior of the building. The trim is likely original, as it matches that depicted on the 1939 window replication drawings.

Figure 69. Simple interior wood trim at one of the windows. Photo: HPTC, 05/12/16.

Figure 70. The new exterior door has not been trimmed out on the interior. Photo: HPTC, 05/12/16.

C30	INTERIOR FINISHES
C3020	Floor Finishes

The brick herringbone interior floor is laid over the modern concrete slab on grade (1999 move) and a layer of paver setting sand. The bricks of the floor were removed systematically and numbered and reinstalled in their exact location (fig. 71). New bricks were installed in the center of the room where a pedestal was located.

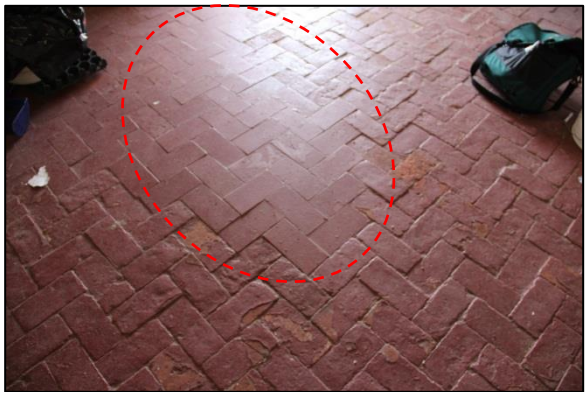

Figure 71, right. Historic bricks were relaid in their exact original location. Modern bricks were used as infill (within dotted area). Photo: HPTC, 05/12/16.

D	SERVICES
D20	PLUMBING

No plumbing system is currently extant within the Oil House.

D30	HVAC

No HVAC system is currently extant within the Oil House.

D40	FIRE PROTECTION SYSTEMS
D4010	Sprinklers

No sprinkler system is currently extant within the Oil House.

D4030	Fire Protection Specialties
D403001	Fire Extinguishers

No fire extinguishers are currently extant within Oil House.

D50	ELECTRICAL
D5010	Electrical Service & Distribution
D5020	Lighting & Branch Wiring

The modern electrical system, including panel, wiring, outlets, switches, and lighting appear to be in good condition (fig. 72).

Figure 72, right. The modern 200-amp electrical panel and a light. Photo: HPTC, 05/12/16.

D5030	COMMUNICATIONS & SECURITY
D503001	Fire Alarm Systems

No fire alarm system is currently extant within the Oil House.

D503008	Security Alarm Systems

No security alarm system is currently extant within the Oil House.

D5090	OTHER ELECTRICAL SYSTEMS
D509004	Lightning Protection System

No lightning protection system is currently extant at the Oil House.

G	BUILDING SITEWORK
G20	SITE IMPROVEMENTS
G2030	Trail
G203003	Paved Surfaces

The modern brick-paved walkway leading to the exterior door was installed after the building's move in 1999 (ca. 2000) (fig. 73).

Figure 73, right. The modern brick sidewalk leading to the exterior door of the Oil House. Photo: HPTC, 05/12/16.

G90	OTHER SITE WORK
G9087	Overall Building Site Drainage

The site drainage around the dwelling is neutral, meaning draining water can remained pooled around the building rather than draining away (fig. 74).

Figure 74, right. Neutral drainage around the Oil House. Photo: HPTC, 05/12/16.

Character-Defining Features

Each historic building is unique, with its own identity and its own distinctive character. Character refers to the visual aspects and physical features that comprise the appearance of historic buildings. Character-defining features include the overall shape of the building, its materials, craftsmanship, decorative details, interior spaces and features, as well as the various aspects of its site and environment. Identifying and preserving a building's character-defining features is essential.

A character-defining feature (CDF) is defined in Director's Order 28, *Cultural Resources Management Guidelines*, (Appendix A: Glossary) as:

> A prominent or distinctive aspect, quality, or characteristic of a historic property that contributes significantly to its physical character. Structures, objects, vegetation, spatial relationships, view, furnishings, decorative details, and materials may be such features.

In order to ascertain the important aspects of a building for future reference and analysis, character-defining features must be recorded. These are prominent or distinctive aspects, qualities, and characteristics of a historic property that contribute significantly to its physical character as represented at the time of intervention or treatment.

The process used in this assessment for determining the character-defining features was adapted from the NPS Preservation Brief #17: "Architectural Character: Identifying the Visual Aspects of Historic Buildings as an Aid to Preserving Their Character," and are in accordance with *The Secretary of the Interior's Standards for the Treatment of Historic Properties* and NPS Management Policies and Guidelines, specifically Director's Order 28, *Cultural Resource Management Guidelines.*

Preservation Brief #17 divides the assessment of character-defining features into three steps:

1. Identify the Overall Visual Aspects,
2. Identify the Visual Character at Close Range,
3. Identify the Visual Character of Interior Spaces, Features, and Finishes.

The purpose of Preservation Brief #17 is to help the owner or the architect identify those features or elements that give the building its visual character and that should be taken into account in order to preserve them to the maximum extent possible. The Brief states:

> There are different ways of understanding old buildings. They can be seen as examples of specific building types, which are usually related to a building's function.... Buildings can be studied as examples of using specific materials....They can also be considered as examples of an historical period, which is often related to a specific architectural style....
>
> There are many other facets of an historic building besides its functional type, its materials, or construction or style that contribute to its historic qualities or significance. Some of these qualities are feelings conveyed by the sense of time and place or in buildings associated with events or people. A complete understanding of any property may require documentary research about its style, construction, function, its furnishings or contents; knowledge about the original builder, owners, and later occupants; and knowledge about the evolutionary history of the building. Even though buildings may be of historic, rather than architectural significance, it is their tangible elements that embody its significance for association with specific events or

persons and it is those *tangible elements* both on the exterior and interior that should be preserved.

Therefore, the approach taken in this Brief is limited to identifying those visual and tangible aspects of the historic building. While this may aid in the planning process for carrying out any ongoing or new use or restoration of the building, this approach is not a substitute for developing an understanding about the significance of an historic building and the district in which it is located.

If the various materials, features, and spaces that give a building its visual character are not recognized and preserved, then essential aspects of its character may be damaged in the process of change.

A building's character can be irreversibly damaged or changed in many ways, for example, by inappropriate repointing of the brickwork, by removal of a distinctive side porch, by changes to the window sash, by changes to the setting around the building, by changes to the major room arrangements, by the introduction of an atrium, by painting previously unpainted woodwork, etc.

In summary, the Secretary of the Interior's Standards for the Treatment of Historic Properties embody two important goals:

1. Preservation of historic materials.
2. Preservation of a building's distinguishing character.

By succeeding at these two goals, it is likely that a building's historic integrity will be preserved.

Extant Character-Defining Features (to be retained)

Overall Visual Aspects

Shape and Mass (fig. 75)

- Shape and mass of the 1892 building (rectangular, one-story with front-facing gable roof).

Roof and Related Features (see fig. 75)

- Front-facing gable roof clad with standing seam metal.

Openings

- All window (three) and door (one) placements and openings.

Figure 75. The Oil House retains its character-defining shape and mass. The modern awning, replacement door, and plywood window infill are not character-defining features. Photo: HPTC, 05/12/16.

Note: The plywood infills located in the windows and the modern six-panel wood door are not considered character-defining features.

Projections

- Slightly projected brick stepped cornices (fig. 76).

Trim and Secondary Features

- Slate blocks with metal pintles at door opening (fig. 77).

Figure 76. The projecting brick stepped cornice is original and character defining. Photo: HPTC, 05/12/16.

Figure 77. A pair of slate blocks with metal pintles have been retained at the door opening, however the original metal door has been replaced with one that does not match the original in any way. Photo: HPTC, 05/12/16.

Setting (fig. 78)

- Configuration of Oil House in relation to other extant buildings (Principal Keeper's Quarters to the north, Double Keepers' Quarters to the northwest, and the Lighthouse to the south) at Hatteras Light Station.
- Rural, coastal location.

Figure 78. After the building's move, the Oil House retained its coastal setting and its relation to other historic buildings on site. Photo: Cape Hatteras National Seashore Archives, 09/00.

Character, Materials & Craft Details at Close Range

- 7:1 common bond brick exterior walls (fig. 79).
- Brick arch over exterior door opening (see fig. 79).
- Brick stepped cornice (fig. 80).
- Standing-seam metal roof (see fig. 80).

Figure 79. The brick arch over the door opening and common-bond brickwork are original and character defining. Photo: HPTC, 05/12/16.

Figure 80. The projecting brick stepped cornice and standing-seam metal roof are character-defining features. Photo: HPTC, 05/12/16.

Interior Visual Character

Individual Spaces, Related Spaces & Sequence of Spaces

- Retention of one utilitarian room.

Interior Features

- None.

Surface Materials and Finishes

- Exposed brick walls (painted) (fig. 81).
- Brick floors (fig. 82).
- Exposed roof framing (fig. 83).

Figure 81. Painted brick walls seen on the interior of the building. Photo: HPTC, 05/12/16.

Figure 82. Character-defining brick floors were re-laid and patched after the building's move. Photo: HPTC, 05/12/16.

Figure 83. The roof framing is exposed on the interior of the building. Photo: HPTC, 05/11/16.

Missing Character-Defining Features
(to be reconstructed in future phases of treatment)

- Metal entrance door with strap hinges.
- 6-6 double-hung wood windows in each opening.
- Various oil-storage, kerosene-storage, and power-generating equipment.

Non-Character Defining Features
(to be removed in future phases of treatment)

- Plywood infill in each window opening.
- Modern door in door opening.
- Modern metal and canvas awning.

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Condition Assessment

The conditions assessment definitions used for this HSR are based on those outlined in the NPS PFMD's Asset Management Process (AMP), the Facilities Management Software System (FMSS), and the Facility Condition Assessment Survey (FCAS) and adapted for use by HPTC. For the purpose of this report, these definitions were strictly adhered to as a way to qualitatively assess the current condition of the Hatteras Light Station Oil House.

Qualitative Condition Ratings

Good

- Routine maintenance should be sufficient to maintain the current condition; and/or
- A cyclic maintenance or repair/rehabilitation project is not specifically required to maintain the current condition or correct deficiencies.

Fair

- The feature generally provides an adequate level of service to operations, but
- The feature requires more than routine maintenance, and
- Cyclic maintenance or repair/rehabilitation work may be required in the future.

Poor

- Feature requires immediate attention;
- Routine maintenance is need at a much higher level of effort to meet significant safety and legal requirements;
- Cyclic maintenance should be scheduled for the current year; and/or
- A special repair/rehabilitation project should be requested consistent with park requirements, priorities, and long-term management objectives.

Maintenance Deficiency Priority Ratings (10-Year Rating Period)

Minor – Short-Term/Long-Term Priority

- This rating indicates standard preventative maintenance priorities and preservation methods have not been follow; or
- There is reduced life expectancy of affected adjacent or related materials and/or systems within 5 to 10 years and beyond; or
- There is condition with a long-term impact within 5 to 10 years and beyond.

Serious – Immediate/Short-Term Priority

- This rating defines a deteriorated condition that if not corrected within 1 to 5 years will result in the failure of the feature; or

- A threat to the health and/or safety of the user may occur within 1 to 5 years if the ongoing deterioration is not corrected; or
- There is ongoing deterioration of adjacent or related materials and/or features as a result of the feature's deficiency.

Critical – Immediate Priority

- This rating defines an advanced state of deterioration which has resulted in the failure of a feature or will result in the failure of a feature if not corrected within 1 year; or
- There is accelerated deterioration of adjacent or related materials or systems as a result of the feature's deficiencies if not corrected within 1 year; or
- There is immediate threat to the health and/or safety of the user; or
- There is failure to meet a legislated requirement.

Not Rated

- The feature was not rated as it was not extant at the time of the report or is non-contributing, removed, and not planned to be replaced.

Code Compliance

Both NPS policies and federal regulations stipulate that when an historic structure is preserved and/or rehabilitated, attempts should be made to meet applicable nationally-accepted model building codes to the maximum extent feasible. Compliance with nationally-accepted codes does not automatically trigger a complete code-based upgrade. Alternative criteria exist for alterations to historic structures; these typically encourage flexibility in the literal application of the code intent.

The *Public Buildings Amendment of 1988* instructs Federal agencies to follow "to the maximum extent feasible," as determined by the administrator or head of the agency, the "…nationally recognized model building codes and other applicable nationally recognized codes such as electrical codes, and fire and life safety codes." The National Park Service intends to consult pertinent national, state, and local codes, and typically applies to most strident code requirements. The Southeast Regional Office (NPS) Structural Fire Safety leader will be the Authority Having Jurisdiction (AHJ) for final determination of code applications for these structures.

The National Park Service has prepared Design Standards for all construction projects, including those affecting historic structures.[1] The design standard presents all codes that should be reviewed and includes the most recent copies of the following major codes and applicable laws, policies, codes, directives, standards, and NPS guidelines. The design standards present requirements for accessibility, civil, and environmental engineering, landscape architecture, architecture, including roofing and waterproofing, structural, mechanical, safety and fire protection, electrical, lighting, and sustainability disciplines.

Major codes, laws, standards, and guidelines that are part of the NPS Design Standards include:

[1] Denver Service Center. "Design Standards." *Denver Service Center Workflows.* National Park Service, Department of the Interior. 2009. Accessed at http://www.nps.gov/dscw/dstandards.htm on March 6, 2012.

- *Architectural Barriers Act Accessibility Standard* (ABAAS) for Federal Facilities, 2004
- *International Building Code* (IBC), 2009
- *International Existing Building Code* (IEBC), 2009
- *National Fire Protection Association 101* (NFPA 101), Life Safety Code
- *National Historic Preservation Act of 1966* (NHPA), amended
- *The Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring, and Reconstructing Historic Buildings* (36 CFR 68), 1995
- *The Secretary of the Interior's Standards for the Treatment of Historic Properties and the Guidelines for the Treatment of Cultural Landscapes*
- *The Secretary of the Interior's Standards and Guidelines for Archeological Documentation*
- *Uniform Code for Building Conservation*
- *Building Construction and Safety Code* (NFPA 5000)
- *National Fire Protection Association 70* (NFPA 70), National Electrical Code
- *Installation of Lightning Protection Systems* (NFPA 780)
- *Code for the Protection of Cultural Resource Properties* (NFPA 909)
- *Code for the Fire Protection of Historic Structures* (NFPA 914)
- *Safeguarding Construction, Alteration, and Demolition Operations* (NFPA 241)
- *Director's Order (DO) 5oB, Risk Management* (Manual 50B)
- *Director's Order (DO) 58, Structural Fire Management* (Manual 58)
- *5 U.S.C § 7902* (Safety Program)
- *15 U.S.C § 2225* (Fire Prevention and Control)
- *29 U.S.C § 668* (Occupational Safety and Health)
- *40 U.S.C § 619* (Construction, Alteration, and Acquisition of Public Buildings)

Summary of Conditions

Table 3. **Hatteras Light Station Oil House Summary of Conditions**

UNIFORMAT II Outline Data			Condition Rating	Deficiency Rating
A	SUBSTRUCTURE			
A10	FOUNDATIONS			
A1010	Standard Foundations		GOOD	MINOR
A1030	Slab On Grade Foundation		GOOD	MINOR
B	SHELL			
B10	SUPERSTRUCTURE			
B1020	Roof Construction			
B102001	Structural Roof Frame		GOOD	MINOR
B20	EXTERIOR ENCLOSURE			
B2010	Exterior Walls		FAIR	MINOR
B201006	Sun Control Devices		GOOD	MINOR
B2020	Exterior Windows		POOR	MINOR
B2030	Exterior Doors		GOOD	MINOR
B30	ROOFING			
B3010	Roof Coverings			
B301001	Roof Finishes		GOOD	MINOR
B301005	Gutters & Downspouts		N/A	N/A

(Table 3 continued)

C	INTERIORS			
C10	INTERIOR CONSTRUCTION			
C1030	Fittings		FAIR	MINOR
C103098	Other Casework		FAIR	MINOR
C30	INTERIOR FINISHES			
C3020	Floor Finishes		GOOD	MINOR
D	SERVICES			
D20	PLUMBING		N/A	N/A
D30	HVAC		N/A	N/A
D40	FIRE PROTECTION SYSTEMS			
D4010	Sprinklers		N/A	N/A
D4030	Fire Protection Specialties			
D403001	Fire Extinguishers		POOR	CRITICAL
D50	ELECTRICAL			
D5010	Electrical Service & Distribution		GOOD	MINOR
D5020	Lighting & Branch Wiring			
D5030	Communications & Security Systems			
D503001	Fire Alarm Systems		N/A	N/A
D503008	Security Alarm Systems		N/A	N/A
D5090	Other Electrical Systems			
D509004	Lightning Protection System		N/A	N/A
G	BUILDING SITEWORK			
G20	SITE IMPROVEMENTS			
G2030	Trail			
G203003	Paved Surfaces		GOOD	MINOR
G90	OTHER SITE WORK			
G9087	Overall Building Site Drainage		POOR	SERIOUS

End of Table.

Oil House Condition Assessment

Note: Additional photographs of all building features are found in the physical description section.

A	SUBSTRUCTURE
A10	FOUNDATIONS
A1010	**Standard Foundations**

The modern brick-faced concrete block foundation footing walls are in overall good condition, based on condition of adjacent systems.

Condition Rating: GOOD
Deficiency Rating: MINOR

A1030	**Slab On Grade Foundations**

The modern concrete slab on grade is in overall good condition, based on condition of adjacent systems.

Condition Rating: GOOD
Deficiency Rating: MINOR

B	SHELL
B1020	Roof Construction
B102001	**Structural Roof Frame**

The ca. 1952 structural roof frame is in good condition.

Condition Rating: GOOD
Deficiency Rating: MINOR

B20	EXTERIOR ENCLOSURE
B2010	**Exterior Walls**

The brick exterior walls are in overall fair condition. Biological growth, from roof water splashback, is located at the base of the brick walls (fig. 84). The presence of Portland cement-based mortar could cause erosion or spalling of the brick (figs. 84-85). On the interior, the paint is flaking, a concern if it is lead-based paint (fig. 85).

Condition Rating: FAIR
Deficiency Rating: MINOR

Figure 84. Biological growth present at the base of the exterior wall due to splashback from water draining from the roof. Note the presence of Portland cement-based mortar (not original). Photo: HPTC, 05/12/16.

Figure 85. The paint on the interior of the walls is peeling and degraded. Note the presence of Portland cement-based mortar (not original). Photo: HPTC, 05/12/16.

B201006	Sun Control Devices

The modern awning is in good condition; however the non-character-defining feature negatively detracts from the historic building.

Condition Rating: GOOD
Deficiency Rating: MINOR

B2020	Exterior Windows

The exterior window openings are in varying states of decay with peeling and degraded paint, rotting wood, rusting fasteners, etc. (fig. 86). Furthermore, the plywood and vent infills negatively detract from the historic building.

Condition Rating: POOR
Deficiency Rating: MINOR

Figure 86, right. An example of one of the deteriorating and non-character-defining window openings. Photo: HPTC, 05/12/16.

B2030	**Exterior Doors**

The modern six-panel wood replacement door is in good condition; however the non-character-defining feature negatively detracts from the historic building.

Condition Rating: GOOD
Deficiency Rating: MINOR

B30	ROOFING
B3010	Roof Coverings
B301001	**Roof Finishes**

The modern (since 2005) standing-seam metal roof of the Oil House is in good condition and matches what was present historically.

Condition Rating: GOOD
Deficiency Rating: MINOR

B301005	**Gutters & Downspouts**

There is no roof drainage system located at the Oil House, and it is likely that one never was. Based on biological growth from water splash back along the base of the exterior walls, a roof drainage system may be warranted.

Condition Rating: N/A
Deficiency Rating: N/A

C	INTERIORS
C10	INTERIOR CONSTRUCTION
C10230	**Fittings**

Extant interior fittings (metal components at ceiling) remain in a stable condition. Missing interior fittings (concrete pedestal and oil containers) detract from the interpretation of the space.

Condition Rating: FAIR
Deficiency Rating: MINOR

C103098	**Other Casework**

The historic interior trim is in varying states of decay with peeling and degraded paint, rotting wood, rusting fasteners, etc.

Condition Rating: FAIR
Deficiency Rating: MINOR

C30	INTERIOR FINISHES
C3020	**Floor Finishes**

The interior historic brick floor is in good condition and is a character-defining feature of the building.

Condition Rating: GOOD
Deficiency Rating: MINOR

D	SERVICES
D20	**PLUMBING**

No plumbing system is currently extant within the Oil House.

Condition Rating: N/A
Deficiency Rating: N/A

D30	**HVAC**

No HAVC system is currently extant within the Oil House.

Condition Rating: N/A
Deficiency Rating: N/A

D40	FIRE PROTECTION SYSTEMS
D4010	**Sprinklers**

No sprinkler system is currently extant within the Oil House.

Condition Rating: N/A
Deficiency Rating: N/A

D4030	Fire Protection Specialties
D403001	**Fire Extinguishers**

No fire extinguishers are currently extant within the Oil House.

Condition Rating: POOR
Deficiency Rating: CRITICAL

D50	ELECTRICAL
D5010	**Electrical Service & Distribution**
D5020	**Lighting & Branch Wiring**

The modern electrical system, including panel, wiring, outlets, switches, and lighting appear to be in good condition.

Condition Rating: GOOD
Deficiency Rating: MINOR

D5030	Communications & Security Systems
D503001	**Fire Alarm Systems**

No fire alarm system is currently extant within the Oil House.

Condition Rating: N/A
Deficiency Rating: N/A

D503008	**Security Alarm Systems**

No security alarm system is currently extant within the Oil House.

Condition Rating: N/A
Deficiency Rating: N/A

D5090	Other Electrical Systems
D509004	**Lightning Protection System**

No lightning protection system is currently extant at the Oil House.

Condition Rating: N/A
Deficiency Rating: N/A

G	BUILDING SITEWORK
G20	SITE IMPROVEMENTS
G2030	Trail
G203003	**Paved Surfaces**

The ca. 2000 brick-paved walkway is in good condition.

Condition Rating: GOOD
Deficiency Rating: MINOR

G90	OTHER SITE WORK
G9087	**Overall Building Site Drainage**

The neutral drainage around the building's foundation, along with the lack of a roof drainage system creates a serious situation. These conditions allow excess water to sit around the building, on a site with an already-high water table.

Condition Rating: POOR
Deficiency Rating: SERIOUS

Part 2 | Treatment and Use

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Requirements for Treatment and Use

The treatment and use of the Hatteras Light Station Oil House must be considered within a framework of applicable laws, agreements, and policies. These mandates govern a wide range of management issues beyond the preservation, protection, and interpretation of the Cape Hatteras National Seashore's cultural resources. They extend to issues of visitor and staff use, agricultural lease, safety, and universal accessibility, among others. Additionally, the Cape Hatteras National Seashore Foundation Statement is discussed below.

Cape Hatteras National Seashore Foundation Statement

A foundation statement is "a formal statement of [a park's] core mission to provide basic guidance for all planning and management decisions: a foundation for planning and management." The document includes the definition of the park purpose, the park significance statements, primary interpretive themes, fundamental resources and values, and special mandates.[1]

Park Purpose:

> The purpose of Cape Hatteras National Seashore is to permanently preserve the wild and primitive character of the ever-changing barrier islands, protect the diverse plant and animal communities sustained by the coastal island process, and provide for recreational use and enjoyment that is compatible with preserving the distinctive natural and cultural resources of the nation's first national seashore.[2]

Park Significance: This section identifies seven reasons why the park's resources are significant enough to warrant national park designation. Two directly relate to the Hatteras Light Station buildings:

> Significance Statement 6: Its artifacts, historic sites, and geographic setting provide tangible links to understanding humankind's ability to adapt in a harsh and changing coastal environment in isolation from the mainland. These links, which are of deep symbolic significance to local villagers, include lighthouses, shipwrecks, Native American sites, and more.
>
> Significance Statement 7: Numerous historical events of national significance have occurred on or near its shores including four centuries of shipwrecks, the United States government's response to protect maritime commerce during the Civil War and World War II, and the experimental development and use of new technology.[3]

Primary Interpretive Themes: This section is based on the stated park purpose and significance. Two themes directly relate to the Hatteras Light Station buildings:

> Topic: History and Heritage – Within this dynamic and once isolated barrier island system, unique cultures have evolved which serve as a testament to humankind's relationship with the boundary of land and sea.

[1] National Park Service. "Foundation Statement: Cape Hatteras National Seashore, North Carolina." September 2011, pp. 6-7.
[2] Ibid, p. 9.
[3] Ibid, pp. 10-10-11.

> Topic: Stewardship and Preservation – Stewardship of the national seashore and preservation of its history provides future opportunities for people to access, experience, and learn about coastal dynamics/cultural change.[4]

Fundamental Resources and Values: This section identifies attributes "which warrant primary consideration during park planning and management because they are critical to achieving the park's purpose and maintaining its significance." The Oil House is identified as a fundamental resource under "Historic structures, archeological sites, and cultural landscapes."[5] Another identified important value is the story of "the movement and preservation of the Cape Hatteras Light Station."[6]

Outer Banks Group Climate Action Plan

On September 29, 2015 the *Climate Action Plan* for Cape Hatteras National Seashore and the other entities of the Outer Banks Group was finalized.[7] The plan acknowledges that climate change threatens the cultural and natural resources which the NPS strives to preserve. Directives and guidelines provide information on how to take action through adaptation and mitigation to climate changes. These directives and guidelines include the following, among others:

- Executive Order No. 13693: "Planning for Federal Sustainability in the Next Decade"
- Green Parks Plan (NPS)
- 2012-2014 Climate Change Action Plan (NPS)
- Climate Change Response Strategy (NPS)

The plan further defines strategies that CAHA enact to meet required mitigation and adaptation goals. These include:

1. Reduce Greenhouse Gas emissions resulting from activation by operations
2. Increase climate change education and outreach
3. Actions for adapting cultural and natural resources to a changing climate

Strategy 3 most directly affects the Hatteras Light Station. It further states:

> Climate change threatens the cultural and natural resources that the Outer Banks Group is known for and so the Outer Banks Group has considered actions to take to adapt to climate change. In the context of climate change, adaptation is an adjustment in natural or human systems that moderates harm or seeks out beneficial opportunities in response to change. Adaptation may include a variety of social, economic, or ecological responses such as adapting the location, structure, or function of Outer Banks Group facilities in anticipation of climate change. Given the potential impact from climate change, it is important to closely monitor

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[4] Ibid, pp. 12-13.
[5] Ibid, pp. 14-15.
[6] Ibid, p. 16.
[7] National Park Service, U.S. Department of the Interior. "Cape Hatteras National Seashore, Wright Brothers National Memorial, & Fort Raleigh National Historic Site." *Climate Action Plan.* Signed September 29, 2015. Accessed at http://www.nps.gov/subjects/climatechange/upload/CAHA_Action-Plan-final-9-29-15.pdf on December 15, 2015.
Additional information on how the National Park Service is planning for and addressing climate change, can be found through the following sources:
Rockman, Marcy. "An NPS Framework for Addressing Climate Change with Cultural Resources." *The George Wright Forum, vol. 32, no. 31 (2015).* pp. 37-50. Accessed at http://www.georgewright.org/321rockman.pdf on December 15, 2015.
National Park Service, U.S. Department of the Interior. "Preserving Coastal Heritage." *Summary Report, April 3-4, 2014, Federal Hall National Monument, New York City.* Accessed at http://www.achp.gov/docs/preserve-coastal-heritage.pdf on December 15, 2015.

cultural and natural resources and identify those that are most at risk. From this identification, the Outer Banks Group can work towards reducing the risk or documenting the resources to try and keep a record of them. Presented below are the actions that are currently under way and which comprise the Outer Banks Group's progress to date, and those actions that the Outer banks Group will pursue.

Progress to Date

- Relocated Cape Hatteras Lighthouse and other buildings away from eroding seashore.

Adaptation

1. Incorporate climate adaptation into all levels of NPS planning
   - Monitor resources for climate impacts
   - Develop management strategies to increase the adaptive capability of park resources and facilities
   - Identify species and resources most at risk
     - Conduct climate science within parks

Evaluate Progress and Identify Areas for Improvement

By taking the actions established in the goals above, the Outer Banks Group plans to reduce its emissions to the specified goals. Achieving these goals will require an ongoing commitment by the Outer banks Group, which may include subsequent emission inventories, additional mitigation and adaptation actions, and reevaluation of goals. Presented below are the actions that the Outer Banks Group will pursue.

Monitoring – Planned Actions

1. Monitor progress with respect to reducing emissions and use this to drive continual performance
   - Track progress on climate friendly actions through the environmental management system.

National Historic Preservation Act

Section 106 of the National Historic Preservation Act (NHPA) mandates that federal agencies, like the National Park Service, take into account the effects of their actions on properties listed or eligible for listing on the National Register of Historic Places and gives the Advisory Council on Historic Preservation (ACHP) a reasonable opportunity to comment.[8] The Oil House is listed as a contributing structure in the Cape Hatteras Light Station National Historic Landmark District and any undertakings (typically expenditure of federal funds) will be reviewed in accordance to NPS policy and federal historic preservation laws including the *Programmatic Agreement Among the National Park Service (U.S. Department of the Interior), the Advisory Council on Historic Preservation and the National Conference of State Historic Preservation Officers for Compliance with Section 106 of the National Historic Preservation Act* (2008).[9]

Section 110 of the NHPA clarifies the broad historic preservation responsibilities of Federal agencies with the intention of ensuring that historic preservation is fully integrated into the ongoing programs of all Federal agencies by identifying, protecting, and avoiding unnecessary damage to historic properties. Additionally, each agency is required to use historic properties available to it

[8] The NHPA of 1966 was last amended in 2006. A downloadable copy is located at (http://www.achp.gov/nhpa.html).
[9] A copy of this agreement can be found on the NPS's website at (http://www.nps.gov/policy/106agreement.pdf).

and when managing these properties, must consider preservation of their historic, archaeological, architectural, and cultural values.[10]

Executive Order No. 11593

Executive Order No. 11593: Protection and Enhancement of the Cultural Environment (1971) mandates that "the Federal Government shall provide leadership in preserving, restoring, and maintaining the historic and cultural environment of the Nation."[11] Responsibilities of federal agencies include:

- Nominating "...to the Secretary of the Interior all sites, buildings, districts, and objects under their jurisdiction of the control that appear to qualify for listing on the National Register of Historic Places."
- Exert caution "…during the interim period until inventories and evaluation…are completed to assure that any federally owned property that might qualify for nomination is not inadvertently transferred, sold, demolished, or substantially altered."
- "Initiate measures to assure that where as a result of Federal action or assistance a property listed on the National register of Historic Places is to be substantially altered or demolished, timely steps be taken to make or have made records, including measured drawings, photographs, and maps, of the property, and that copy of such records then be deposited in the Library of Congress as part of the Historic American Buildings Survey or Historic American Engineering Record for future use and reference."
- "Initiate measures and procedures to provide for the maintenance, through preservation, rehabilitation, or restoration, of federally owned and registered sites professional standards prescribed by the Secretary of the Interior."

Executive Order No. 13006

Executive Order No. 13006: Locating Federal Facilities on Historic Properties (1996) mandates that "the Federal Government shall utilize and maintain, wherever operationally appropriate and economically prudent, historic properties and districts…." Furthermore, "any rehabilitation or construction that is undertaken pursuant to this order must be architecturally compatible with the character of the surrounding historic district or properties."[12]

Secretary of the Interior's Standards

Treatment to the Hatteras Light Station Oil House is to be guided by *The Secretary of the Interior's Standards for Historic Preservation Projects.*[13] Descriptions of the four standards are as follows:

> Preservation: "the act or process of applying measures necessary to sustain the existing form, integrity, and materials of an historic property. Work, including preliminary measures to protect and stabilize the property, generally focuses upon the ongoing maintenance and repair of historic materials and features rather than extensive replacement and new construction.

[10] More information on Section 110 can be found on the NPS's website at (http://www.nps.gov/hps/fapa_110.htm).
[11] A copy of this E.O. can be found on the NPS's website at (http://www.nps.gov/history/history/online_books/anps/anps_7b.htm).
[12] A copy of this agreement is located on the ACHP's website at (http://www.achp.gov/EO13006.html).
[13] Weeks, Kay D. and Anne E. Grimmer. "The Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring & Reconstructing Historic Buildings." United States Department of the Interior, National Park Service, Cultural Resource Stewardship and Partnerships, Heritage Preservation Services, Washington, DC, 1995.

> New exterior additions are not within the scope of this treatment; however, the limited and sensitive upgrading of mechanical, electrical, and plumbing systems and other code-required work to make properties functional is appropriate within a preservation project."
>
> Rehabilitation: "the act or process of making possible a compatible use for a property through repair, alterations, and additions while preserving those portions or features which convey its historical, cultural, or architectural values."
>
> Restoration: "the act or process of accurately depicting the form, features, and character of a property as it appeared at a particular period of time by means of the removal of features from other periods in its history and reconstruction of missing features from the restoration period. The limited and sensitive upgrading of mechanical, electrical, and plumbing systems and other code-required work to make properties functional is appropriate within a restoration project."
>
> Reconstruction: "the act or process of depicting, by means of new construction, the form, features, and detailing of a non-surviving site, landscape, building, structure, or object for the purpose of replicating its appearance at a specific period of time and in its historic location."

Because the Oil House stands intact, reconstruction is not a treatment consideration.

Director's Order 28

DO-28 Cultural Resource Management Guideline is intended to guide the National Park Service through successful cultural resource management through three steps[14]:

- Research: "identify, evaluate, document, register, and establish other basic information about cultural resources;"
- Planning: "ensure that this information is well integrated into management processes for making decisions and setting priorities;" and
- Stewardship: "planning decisions are carried out and resources are preserved, protected, and interpreted to the public."[15]

Through the development of this HSR, the research and planning (for treatment and use) of the Oil House is addressed. The general preservation philosophy integrated into this HSR is best represented by the following:

> Better to preserve than to repair, better repair than restore, better restore than [re]construct. It is ordinarily better to retain genuine old work of several periods, rather than arbitrarily to 'restore' the whole, by new work, to its aspect at a single period.[16]

Decisions for the future stewardship of the Hatteras Light Station Oil House are under the purview of Cape Hatteras National Seashore. As part of NPS-28 "stewardship focuses on five major activities:

- Control of treatment and use,

[14] A copy of NPS-28 can be found at http://www.nps.gov/history/history/online_books/nps28/28contents.htm.
[15] NPS-28, p. 1.
[16] The Advisory Board on National Parks, Historic Sites, Buildings, and Monuments policy statement (1936). NPS-28, p. 2 .

- Monitoring conditions of deterioration and structural failure,
- Protecting from human and environmental threats,
- Retaining or delegating responsibility for structures, and
- Developing the skills, knowledge, and attitudes needed to support the program."[17]

A Call to Action

In 2011, National Park Service Director Jon Jarvis put forth his vision for NPS employees and partners "to commit to actions that advance the service toward a shared vision for 2016 and our second century."[18]

Action Item #25, "What's Old is New," addresses preservation actions: "Modernize historic preservation methods and technologies, show how historic structures can be made sustainable, and support efforts to rebuild the economic vitality of rural and urban communities by updating the *Secretary of the Interior's Standards and Guidelines for the Treatment of Historic Properties* in consultation with historic preservation partners."

Additionally, creativity and flexibility are encouraged when applying these Actions and should not hinder the day-to-day operations of the NPS.

International Building Code

According to the 1988 Amendment to the Public Buildings Act, any building constructed or altered by a Federal agency must, "to the maximum extent feasible, be in compliance with one of the nationally recognized model building codes and with other applicable nationally recognized codes." The International Building Code (IBC) is one of the allowable recognized model building codes.[19]

Treatments of the building and its site are to be guided by the International Building Code (IBC).[20] Threats to public life, safety, and welfare are to be addressed; however, because the Hatteras Light Station Oil House is historic, alternatives to full legislative and code compliance are recommended where compliance would needlessly compromise the integrity of the historic building with the removal of character-defining features or infringement upon the National Historic Landmark characteristics of the site and/or structures.

Accessibility

With no construction activity to initiate changes, it is premature to recommend accessibility design modifications to the Hatteras Light Station Oil House. Additionally, an accessibility assessment was not included in the scope of work for this project and therefore recommended accessibility

[17] NPS-28, p. 127.
[18] More information on A Call to Action is located on the NPS website at (http://www.nps.gov/calltoaction/).
[19] The General Services Administration had more information on this amendment and other accepted building codes at (http://www.gsa.gov/portal/content/101288).
[20] IBC is overseen by the International Code Council. More information is located at http://www.iccsafe.org/CS/Pages/default.aspx.

treatments will not be provided. However, it should be noted that modifications may be likely as property use evolves and rehabilitation work commences. The most appropriate response will take into account scoping and technical design requirements of the Architectural Barrier Act Accessibility Standards and skillful application of preservation principles to preserve the historic character and historical integrity of this property.[21] Refer to NPS Preservation Brief #32: "Making Historic Properties Accessible" for more information.[22]

[21] The Architectural Barrier Act Accessibility Standards are under the authorization of the United States Access Board. More information can be found through Access Board's website (http://www.access-board.gov/aba/).
[22] Jester, Thomas C. and Sharon C. Park. "Making Historic Properties Accessible." Preservation Brief 32. Washington, DC, September 1993. Accessible at (http://www.nps.gov/hps/tps/briefs/brief32.htm).

Preferred Ultimate Treatment and Use

The Hatteras Light Station Oil House was used as a utilitarian structure since its construction in 1892 through 1932, when the last lighthouse keeper moved out. The building remained vacant until it was used by the CCC from 1935 through 1940 (major window alterations occurring during this time period). After the CCC camp was disbanded, the building was not used again until ca. 1948, when the USCG retained a special use permit for the building (renovation occurring in ca. 1952). The Coast Guard used the Oil House through 1999, when it was removed. Since that time, the building has been used by interpretation staff for storage.

Because there are no funded and/or active projects occurring at the Oil House presently, the ultimate treatment and use recommendations provided are meant to guide the ultimate treatment and do not provide a construction or architectural program. The identification of resource impacts should be fully assessed once a construction or architectural program is finalized.

Considering the applicable laws, agreements, and policies discussed above, the Preferred Ultimate Treatment for the Hatteras Light Station Oil House is as follows:

- *Exterior Restoration* with the removal of non-sympathetic modern accretions and retention, preservation, and restoration of character-defining features important to the historic design and construction of the building by the United States government in 1892, and alterations which occurred to the building through 1936.
- *Interior Rehabilitation* and preservation of character-defining features with removal of non-sympathetic modern accretions to reflect its original function. This treatment will preserve character-defining features and allow for the reversal of non-sympathetic treatments, materials, and finishes.

Also, considering the applicable laws, agreements, and policies discussed above, the Preferred Ultimate Use of the Hatteras Island Oil House is to continue its use as storage for park employees.

Alternatives for Treatment and Use

There are no identified alternatives for treatment and use at this time for the Hatteras Light Station Oil House.

Recommended Treatments by Feature

Treatment Timeframes

As part of the planning process required by NPS-28, the recommended treatments for each feature have been divided into different timeframes. The "Emergency" timeframe is for features that must be addressed as soon as possible within the next year, and are the items which are in the most dire condition (poor and critical). The "Immediate" timeframe is for features that must be repaired or replaced in the next one to three years, and are often the items which are in the worst condition (poor and critical). The "Short-Term" timeframe is for features which should be addressed in the next three to five years and are likely the items which are in moderate condition (fair and serious). Features found to be in good condition with a maintenance deficiency of minor have been categorized in the "Long-Term" timeframe. Typically these features currently require routine maintenance to maintain their current condition employing preventative maintenance methodologies but there is a reduced life expectancy within the five- to ten-year period and beyond.

Recommended treatments for items with an emergency need (Timeframe: *Emergency (within 1 year*), urgent need (Timeframe: *Immediate (1-3 years*), less urgent need (Timeframe: *Short-Term (3-5 years*), and minor need (Timeframe: *Long-Term (5-10 years)*, as described above are included under the Uniformat II layout by condition and deficiency rating in the Recommended Treatments for the Hatteras Light Station Oil House section below.

Table 4. **Hatteras Light Station Oil House Prioritized Treatment List**

Major Group Element	Group Element	Individual Element	Specific Element	Sub-Element	Condition Rating	Deficiency Rating
POOR						
D50 SERVICES	D40 FIRE PROTECTION SYSTEMS	D4030 Fire Protection Specialties	D403001 Fire Extinguishers		POOR	CRITICAL
G BUILDING SITEWORK	G90 OTHER SITEWORK	G9087 Overall Building Site Drainage			POOR	SERIOUS
B SHELL	B20 EXTERIOR ENCLOSURE	B2020 Exterior Windows			POOR	MINOR
FAIR						
B SHELL	B20 EXTERIOR ENCLOSURE	B2010 Exterior Walls			FAIR	MINOR
C INTERIORS	C10 INTERIOR CONSTRUCTION	C1030 Fittings			FAIR	MINOR
C INTERIORS	C10 INTERIOR CONSTTRUCTION	C1030 Fittings	C103098 Other Casework		FAIR	MINOR
GOOD						
A SUBSTRUCTURE	A10 FOUNDATIONS	A1010 Standard Foundations			GOOD	MINOR
A SUBSTRUCTURE	A10 FOUNDATIONS	A1030 Slab On Grade Foundations			GOOD	MINOR
B SHELL	B10 SUPERSTRUCTURE	B1020 Roof Construction	B102001 Structural Roof Frame		GOOD	MINOR
B SHELL	B20 EXTERIOR ENCLOSURE	B2010 Exterior Walls	B201006 Sun Control Devices		GOOD	MINOR
B SHELL	B20 EXTERIOR ENCLOSURE	B2020 Exterior Doors			GOOD	MINOR
B SHELL	B30 ROOFING	B3010 Roof Coverings	B301001 Roof Finishes		GOOD	MINOR
C INTERIORS	C30 INTERIOR FINISHES	C3010 Floor Finishes			GOOD	MINOR
D SERVICES	D50 ELECTRICAL	D5010 Electrical Service & Distribution			GOOD	MINOR
		D5020 Lighting & Branch Wiring				

(Table 4 continued)

G BUILDING SITEWORK	G20 SITE IMPROVEMENTS	G2030 Trail	G203003 Paved Surfaces	GOOD	MINOR
NOT RATED, NOT APPLIACABLE, or UNKNOWN					
B SHELL	B30 ROOFING	B3010 Roof Coverings	B301005 Gutters & Downspouts	N/A	N/A
D SERVICES	D20 PLUMBING			N/A	N/A
D SERVICES	D30 HVAC			N/A	N/A
D SERVICES	D40 FIRE PROTECTION SYSTEMS	D4010 Sprinklers		N/A	N/A
D SERVICES	D50 ELECTRICAL	D5030 Communications & Security	D503001 Fire Alarm Systems	N/A	N/A
D SERVICES	D50 ELECTRICAL	D5030 Communications & Security	D503008 Security Alarm Systems	N/A	N/A
D SERVICES	D50 ELECTRICAL	D5090 Other Electrical Systems	D509004 Lightning Protection System	N/A	N/A
End of table.					

Oil House Recommended Treatments

D403001 Fire Extinguishers	POOR	CRITICAL

Timeframe: *Emergency (within 1 year)*

A fire extinguisher should be located in the building. The local fire marshal, representative from the fire department, or fire protection engineer should be consulted for recommendations on size and placement of fire extinguisher. This system should meet building codes and emergency training should be provided to the NPS site staff.

G9087 Overall Building Site Drainage	POOR	SERIOUS

Timeframe: *Immediate (1-3 years)*

Neutral drainage around the building should be corrected immediately. Minor regarding of the soil to create positive drainage near (within 12'-0") the building should be completed on all elevations. Every effort should be made to ensure water is running away from the building. The addition of small swales to direct water away from the building could be used.

An engineer specializing in coastal environments and grading and drainage design should be hired to complete a final drainage plan for the building.

B2020 Exterior Windows	POOR	MINOR

Timeframe: *Short-Term (3-5 years)*

Wood windows should be replicated to match the details seen in the 1939 CCC drawing of the replacement of the windows. The windows should be assembled using traditional techniques.

For further information, consult NPS Preservation Brief #9 *The Repair of Historic Wooden Windows.*

B2010 Exterior Walls	FAIR	MINOR

Timeframe: *Immediate (1-3 years)*

The paint in the interior face of the exterior walls should be tested for lead. If positive, the peeling and flaking paint should be scraped and stabilized.

C1030 Fittings	FAIR	MINOR

Timeframe: *Ongoing*

The extant interior fittings should be retained. Re-introducing other missing interior features should be considered.

C103098 Other Casework	FAIR	MINOR

Timeframe: *Short-Term (3-5 years)*

Wood window interior trim should be replicated to match the details seen in the 1939 CCC drawing of the replacement of the windows.

A1010 Standard Foundations	GOOD	MINOR

Timeframe: *Ongoing*

The modern footing and foundation walls have no noted deficiencies. If deflection is noted at any time, further investigation into these systems will be required.

A1030 Slab On Grade Foundations	GOOD	MINOR

Timeframe: *Ongoing*

The slab on grade has no noted deficiencies. If deflection is noted at any time, further investigation into this system will be required.

B102001 Structural Roof Frame	GOOD	MINOR

Timeframe: *Ongoing*

The structural roof frame has no noted deficiencies. If deflection is noted at any time, further investigation into this system will be required.

B201006 Sun Control Devices	GOOD	MINOR

Timeframe: *Immediate (1-3 years)*

The modern metal and canvas awning is not a character-defining feature and detracts from the historic building and surrounding cultural landscape. It should be removed. An alternative means for shading/shelter is the oil house itself; once operable windows are restored, the building will

provide excellent shelter. Another option is a shade sail. If installed separate from any historic buildings, along an accessible route, the modern feature will not detract from the cultural landscape.

B2020 Exterior Doors	GOOD	MINOR

Timeframe: *Immediate (1-3 years)*

The modern wood six-panel door is not a character-defining feature and detracts from the historic building. It should be removed and replaced with a metal or wood slab door hung on the still-extant metal pintels with metal strap hinges. The new door should match that is seen in historic photographs and those which are still extant at Amelia Island and Sapelo Island light stations.

B301001 Roof Finishes	GOOD	MINOR

Timeframe: *Ongoing*

The service life of the standing-seam metal roof can be extended several decades, or longer, if properly maintained and repaired, as needed.

Traditional field repair techniques, though not needed at this time, are thoroughly detailed by the Sheet Metal and Air Conditioning Manufacturers Association's (SMACNA) "Standard Practice in Sheet Metal Work" (http://www.smacna.org/store/product/?Product_code=1175) and illustrated in NPS Preservation Brief 4: Roofing of Historic Buildings. Future minor imperfections can be corrected via spot-brazing and painting techniques. The paint system should be renewed every 3-5 years, depending on exposure and weathering.

Good roof practice for maintenance must be observed including cleaning of gutters and downspouts, cleaning of roof surface, and maintenance of roof surface. When working on roof, all persons should be restricted to rubber-soled boots or sneakers.

C3010 Floor Finishes	GOOD	MINOR

No work is required at this time.

D5010 Electrical Service & Distribution D5020 Lighting & Branch Wiring	GOOD	MINOR

No work is required at this time.

G203003 Paved Surfaces	GOOD	MINOR

No work is required at this time.

B301005 Gutters & Downspouts	N/A	N/A

No work is required at this time.

D20 Plumbing	N/A	N/A

No work is required at this time.

D30 HVAC	N/A	N/A

No work is required at this time.

D4010 Sprinklers	N/A	N/A

No work is required at this time.

D503001 Fire Alarm Systems	N/A	N/A

No work is required at this time.

D503008 Security Alarm Systems	N/A	N/A

No work is required at this time.

D509004 Lightning Protection System	N/A	N/A

No work is required at this time.

Effects of Recommended Treatments

The potential effects of the recommended treatments for preservation are outlined in Table 5. The table is ordered by prescribed timeframe: immediate first and short-term second. Effects to historic fabric, recommended mitigating measures, and beneficial outcomes are examined. Treatment recommendations which include periodic housekeeping and maintenance, reassessment, or are in good and minor conditions, are not discussed.

Table 5. **Hatteras Light Station Oil House Recommended Treatment Effects**

Recommended Treatment	Potential Effect on Historic Fabric	Mitigating Measures	Beneficial Effects
Immediate (1-3 years)			
Correct neutral drainage by regrading around exterior perimeter.	Adverse effect: Regrading could cause grade to slightly alter from historic level.	Removal of detrimental drainage issue around building.	Allow water to flow away from building.
Remove modern awning.	No adverse effect.	N/A	Remove non-character-defining feature.
Restore historic wood or metal slab door and strap hinges at existing door opening.	No adverse effect.	N/A	Reinstallation of missing character-defining feature.
Short-Term (3-5 years)			
Restore wood windows and wood trim at existing window openings.	No adverse effect.	N/A	Reinstallation of missing character-defining features.
End of Table 5.			

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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 the 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.

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