

## SECOND TOWER

### Chronology of Alterations and Use

#### *Original Construction*

The Michigan Island Second Tower was constructed in 1880 as a rear range light for Schooner's Ledge south of Philadelphia on the Delaware River. In 1916, the river's course was changed due to dredging and the light was disassembled and shipped to Michigan Island between 1918 and 1919. The light was reassembled and erected near the Old Michigan Island Lighthouse in 1929, after many years of it remaining in pieces on the beach. The Light Base, an eclectic mix of neo-classical form and Italianate detail, was delivered with the tower. The tower and its base were put into service on October 29, 1929. The radio beacon, also installed in 1929, began operating November 3. The tower's Fresnel lens was a third-and-a-half order with a focal plane 160' above Lake Superior, making this tower the tallest in the Apostle Islands. In 1972, the Coast Guard replaced the lens with a modern optic. The glass was removed sometime the following year, after it was noted that the new light reflected back into the lantern room. In 1994, the Park Service replaced the glass in an effort to slow the rusting in the lantern. The Fresnel lens is currently on display at the Visitors Center in Bayfield, Wisconsin.<sup>41</sup>

The base of the Second Tower was photographed circa 1930 with a stone circular fire pit or planter in front of the entry (Historic Image MI-06). The tower and base appear in better condition in 1974 than they do in a 1980 photograph. This is most likely due to the fact that the 1974 photo was taken only two years after seasonal habitation ceased, while the later photo reflects the damage and weathering that occurs when the Light Station is not being maintained consistently (Historic Image MI-10).

The historic 1929 drawings call for repairs to the tower that include cast iron steps, watch room and tower base cornices, and interior handrail brackets. It is unknown what the extents of these repairs were (Historic Drawing MI-02, 03, 05, and 06). There is also a construction specification document from the original construction of the tower that mentions the curtains, which, "must be of the best quality Irish linen of the width shown on the drawings" (Historic Drawing MI-04). There is no mention of curtains in the tower when it was functioning on Michigan Island, but they may have existed and served as sun protection for the lens.

#### *Significant Alterations / Current Condition*

Significant alterations to the Second Tower consist of the move and reconstruction of the tower and base from Pennsylvania to the Michigan Island, the replacement of the Fresnel lens with a modern optic and removal and reinstallation of the Lantern glass. In 2006, the Historic Structure Preservation Team of the Park Service contracted the painting of the exterior of the tower. In May of 2009, an LED-powered beacon was installed in the tower.

No alternating current electrical service or utilization equipment exists within the Second Tower. There is evidence of an old direct current generator and battery system for the Lighthouse, but none of this equipment remains.

The Second Tower and its base are in good condition.

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<sup>41</sup> List of Classified Structures, National Park Service, 2009.

## 1 Summary of Documented Work on the Building

Date	Work Described	Source of Information
1918–1919	Light tower moved from Pennsylvania to Michigan Island	LCS, 2009
1928, May 28	Survey crew comes to Island: surveys for Gull Island Light, foundation for Second Tower and height for Second Tower, and new tramway. Leaves June 10, 1928	E. Lane, MI Log, Nov 23, 1926–Aug 19, 1936
1929	Reused tower and base and new radio beacon erected and operational	LCS, 2009
1933, November 28	“Finished installing winter Light and, weather permitting, Mechanic O.H. Joyner will leave for town.”	E. Lane, MI Log, Nov 23, 1926–Aug 19, 1936
1936, August 10	“Replaced rotten sash in tower window.”	E. Lane, MI Log, Nov 23, 1926–Aug 19, 1936
1943	Light automated, keeper leaves island	J. Busch, 2008
1972	Fresnel lens replaced by a solar-powered, acrylic aero-beacon	LCS, 2009
1973	Second Tower’s brass mullions and lantern glass removed by the Coast Guard	APIS/NPS Business Office File D3423
1977	Emergency stabilization of Second Tower	APIS/NPS Business Office File D3423
1983, June 8	“Swallows nesting in stairwell; evidence of bird eggs, and could hear peeping of asbabies.” (Dan and Marilyn Lehman)	From “Excerpts from Michigan Island Volunteer Logs- 1978–1999,” page 4
1984, August 30	Coast Guard installs new lens	From “Excerpts from Michigan Island Volunteer Logs- 1978–1999,” page 5
1991, August 6	Coast Guard inspection, District Commandeer “not very happy with the rust and general condition.” (Pat Dekker/Case Dekker)	From “Excerpts from Michigan Island Volunteer Logs- 1978–1999,” page 18
1992, June 28	Coast Guard removed 4 of 6 solar charged batteries as it was found that 2 batteries were sufficient	From “Excerpts from Michigan Island Volunteer Logs- 1978–1999,” page 19
1994	The Park Service reinstalls lantern glass. Brass mullions refabricated using originals as templates, originals now in the park’s museum collection. August 16: Coast Guard replaced solar panel and installed a thin cable through the air vent from the panel to the battery box- removed existing, thicker cable.	LCS, 2009; APIS/NPS Business Office File D3423; “Excerpts from Michigan Island Volunteer Logs- 1978–1999,” page 22
1996	Interior sand blasted and repainted, lead paint removed; astragals painted white although the original astragals had been painted black – paint soon flaked off	APIS/NPS Business Office File D3423 and S. Mackreth, 2009
1999, June 22	“...[repairing] the fractured concrete sidewalk slabs leading to the steps of the ‘New Tower’...” (Gene Wilkins, VIP)	From “Excerpts from Michigan Island Volunteer Logs- 1978–1999,” page 24
2006	Exterior of tower and base repainted, lead paint removed.	HSPT Reports, 2009
2009, May	LED-powered beacon installed in the tower	NPS Records, 2009

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## General Physical Description

5 The tower has a wrought iron or steel skeletal framework, a wrought iron or steel cylindrical body with an  
6 interior, circular stair, and a cylindrical lantern (further testing is required to determine material). At the  
7 base of the tower is a small, neoclassical cast iron building. The base building is cross-gabled with Greek  
8 Revival (wide gable trim on all gable pediments, and simplified Doric pilasters at all corners), and

Italianate (arched, hooded windows) detailing. The plan is symmetrical with a narrow north-south unit intersecting a wider east-west unit. The south façade features the entrance door centered in the north-south unit which projects approximately 5' from the east-west unit. Flanking the entrance door in the north wall of the east-west unit are two arch-top windows centered in their respective walls. The north elevation is similarly detailed, except a single arch-top window replaces the entrance door. On the east and west elevations, a single arch-top window is centered in the east and west walls of the wider unit. The east-west unit project about 6' from the north-south unit. The circular metal stairway is located in the center of the building and has 139 risers. The tower base once was used to store batteries for the automated light and still contains cradles for the storage tanks,. It currently houses a small exhibit with historic photographs, an area map, and the book, "Instructions to Light-Keepers," (a reprinted version of the 1902 pamphlet given to the Light Keepers), for visitors to peruse (MI-ST-12).

### ***Physical Description – Architecture***

#### ***Architecture – Roof***

The tower roof is cast iron segments with a vent ball finial at the center. There are three screens at the finial vent that have been torn out. The roof of the tower base consists of painted cast iron panels, though the original drawings call for cast iron roof panels. The cornice of the base is 24-gauge galvanized iron, painted (MI-ST-22).

#### ***Architecture – Walls and Wall Finishes***

The walls of the tower base, watch room, and center cylinder are wrought iron panels riveted together, painted white (except for the black trim). The lantern walls are cast iron. The walls are original to the structure. The tower base has plaster on lath over furring attached to the cast iron exterior walls. The plaster wall finish is also original to the building.

A paint sample from the exterior of the tower base reveals a stark white paint as the oldest, a glossy clear coat of varnish, and then the current glossy white coat of paint (applied in 2006).

A paint sample from the interior of the tower base reveals three layers of latex paint, which is consistent with the most recent paint project in 1996.

#### ***Architecture – Windows***

The windows for the Second Tower are arched top, one-over-one, double-hung windows. The window sash are wood, painted white on the interior and exterior. The trim, frame, and sills are cast iron, riveted into place and painted black. Each window has an arched hood trim of metal on the exterior, accented in black. This style of shroud is consistent with Italianate architecture. The glazing in most of the sash is Plexiglas (or a similar product) and the hardware appears to be replacement lifts and sash locks. The pulleys are extant for the lower windows but not visible at the upper tower windows. There is a hole through the cast structures evidencing that pulleys used to exist on these windows as well. The frame and trim are original but the sash ages is unknown (MI-ST-11).

#### ***Architecture – Doors***

**Entry to Tower Base.** This door is wood, raised, four-panel and is original to the tower base. The door has no knob and two hinges. The exterior trim is wood, painted black and is  $\frac{7}{8}$ "  $\times$   $6\frac{3}{8}$ ". Crown molding at the exterior forms the door header and is shaped sheet metal. The interior trim is  $\frac{7}{8}$ "  $\times$  4". The dimensions for the door are 3'0"  $\times$  6'10"  $\times$  1 $\frac{3}{4}$ " (MI-ST-09 and 10).

**Lantern Door.** This original door is plate steel with a single lite. The door has screwed attachments and the handle operates the top and bottom throw bolts simultaneously. The door is 2'7" × 5'4" × 4¼" (MI-ST-20).

#### *Architecture – Exterior Trim*

The exterior trim is original and is galvanized iron as per the 1929 reconstruction drawings. The base/foundation is board-formed, painted concrete. The exposed overhang of the concrete floor also serves as a water table type of trim detail. The paint contrast scheme of the column/pilaster detailing has varied through the years as evidenced in the historic photos of 1930, 1974 and to current day.

#### *Architecture – Walk and Railing*

The perimeter walk at the Lantern level is 2'11½" wide diamond plate cast iron. The top metal rail is ½" × 2" bar stock at 3'0½" above the walk. The intermediate rail is ½" × 2" bar stock and is 1'11½" above the walk. The intermediate rail and the bottom rail are evenly spaced below the top rail and above the walk. Metal pickets are ½" diameter at 4" on center. Metal posts are 1¾" diameter at 3'9" on center with ball finials. All metal is painted and original to the structure. There is a newer painted steel angle frame installed on the south side to support solar panels (MI-ST-23).

#### *Architecture – Lantern*

The lantern has plate cast iron to 3'5" A.F.F., with screwed connections. The glazing is 6'0" high with a lattice (⅝" × 3¾") of painted welded steel with exterior brass stops bolted into the lattice on the exterior at 2'0½" on center. The glazing is stamped "CGB Safety LAN 2973 16 CFR 1201 I,II" and is installed with silicone sealant. The glazing is new and is held in place with ⅞" wide heavy brass stops bolted to the lattice frame at 7" on center. Brass handles are integral to the stops for ease of installation (MI-ST- 24 and 25). A ±6'0" diameter shallow, cone-shaped sheet metal reflector (with a ±16" diameter hole at the center) is suspended ±18" below the roof. The entire assembly is painted. The brass astragals were refabricated in 1994 using the originals as templates. The originals are in the park museum. Reportedly, shortly after the lens removal in 1972–1973, the glass was removed. The tower was open to the elements from 1973 to 1994 (MI-ST-18 and 19).

There are also nine painted cast iron screened exhaust vents (±8" diameter) at the hood above the lantern. These vents have operable fins and pulleys but operating cords or chains are not extant. The vents are companions of the nine painted cast iron intake vents at the lantern level. The intake vents are controlled by 6½" brass caps that open as they are turned. Six of the brass intake caps have been painted, two are missing and one is functional (MI-ST-21). There is a painted cast iron coved cornice at the lantern hood and below the walk. There is a painted, cast iron railing at the lantern roof.

#### *Architecture – Ceiling Finish*

The ceiling of the lantern is the underside of the roof - cast iron panels bolted together, painted white (MI-ST-21). The tower base's ceiling finish is plaster and lath over furring attached to the cast iron panels. Both ceiling finishes are original to the Second Tower.

#### *Architecture – Interior Trim*

None.

#### *Architecture – Floor*

The tower base has a concrete floor, painted gray, which is original to the building.

### *Architecture – Stairs*

This spiral staircase is cast iron and painted red. The perforated pie-shaped treads are 2” wide at the center column and 11” wide at the outside edge. Each tread is welded to hollow steel sections which slip over the central pipe column. The narrow end of each tread is strengthened with curved steel plate brackets welded to the treads and to the hollow section. At the outside back ends of each tread two additional curved brackets are welded at right angles to vertical pipe sections and to the undersides of each tread. These form the stringer and riser segments. Treads were assembled by stacking each onto the central column and bolting through the edge pipe sections. The diameter of the stairs is approximately 7’0” and the rise is 8”. The metal pipe handrail (painted red) is 3’0” above the nosing and has a 1 $\frac{3}{8}$ ” diameter. The brackets supporting the railing are located about 3’6” on center (MI-ST-13, 14, and 16). The ship’s ladder at the top of the stairs has a 1 $\frac{3}{8}$ ” diameter handrail. The ladder has eight steel treads. The steel stringers say, “Bethlehem,” and the guardrail is 3’0” from the finished floor. The ladder is painted (MI-ST-17). Both stairs and ships ladder are original to the tower.

The entry stairs into the tower base have five risers, varying in height from 10” to 2” and the treads are 10” deep and 4’ wide. These stairs are concrete with painted stringers.

### *Architecture – Accessibility*

The building is currently not accessible due to the 3’0” wide door and the 2’7” elevation change from grade to the finished floor (MI-ST-08).

### *Physical Description – Structural*

#### *Structural – Foundation*

The foundation system consists of concrete pad footings under each leg of the tower bracing and the center cylinder. The perimeter foundations of the tower base are concrete stem walls on continuous concrete footings.

#### *Structural – Floor Framing*

The floor of the tower base is a concrete slab-on-grade.

The floors of the tower watch room and lantern are constructed of cast iron plates that are bolted together. The plates are supported on the center cylinder of the tower and the exterior braces. The watch room and lantern are accessed via a spiral cast iron stair in the center cylinder.

#### *Structural – Roof Framing*

The roof of the tower base is metal panels that are bolted together. The panels are supported on the exterior walls of the tower base.

The roof of the lantern is constructed of cast iron panels that are bolted together. The panels are supported on the walls of the lantern.

#### *Structural – Wall Framing*

The walls of the center cylinder, tower base and watch room are wrought iron or steel panels that are riveted together. The walls of the watch room are supported on the watch room floor. The walls of the

1 tower base are supported on the perimeter foundations. The walls of the center cylinder are supported on  
2 four columns in the tower base that bear directly on the slab-on-grade and center concrete footing.

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4 The walls of the lantern are cast iron panels that are bolted together. The panels bear directly on the floor of  
5 the lantern.

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8 *Structural – Lateral System*

9 Lateral stability for the tower is provided by a tapered hexagonal wrought iron or steel framework that is  
10 riveted together. The framework consists of six legs that are interconnected with horizontal braces at four  
11 levels between the footings and the watch room. Additional horizontal braces extend from the legs to the  
12 center cylinder at each level. The framework is stiffened with metal x-bracing rods between adjacent legs  
13 and between each leg, the center footing and the center cylinder.

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16 *Structural – Load Requirements*

17 The required floor load capacity of the watch room is 40 psf, the required lantern floor load capacity is 100  
18 psf and the required roof snow load capacity is 32 psf.

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21 *Physical Description – Mechanical*

22 *Mechanical – Plumbing Systems*

23 None in the Tower.

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26 *Mechanical – HVAC*

27 None in the Tower.

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30 *Mechanical – Fire Suppression*

31 None in the Tower.

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34 *Mechanical – Other*

35 The only mechanical components in the Second Tower are the passive air vents at the top of the Tower.

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38 *Physical Description – Electrical*

39 *Electrical – System Configuration*

40 The only electrical equipment in the Second Tower is the Coast Guard's Light Beacon system. This  
41 consists of 3 to 12 volt direct current (dc) batteries that feed power to an LED powered beacon. The system  
42 employs a photovoltaic array, approximately 14" by 20" to charge the battery system.

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45 *Electrical – Conductor Insulation*

46 None in the Tower.

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49 *Electrical – Overcurrent Protection*

50 None in the Tower.

*Electrical – Lighting Systems*

None in the Tower.

*Electrical – Telecommunications*

None in the Tower.

*Electrical – Fire Alarm System*

None in the Tower.

*Electrical – Lightning Protection*

Lightning protection consists of brass air terminals and brass or copper down-cables. Each leg of the Tower is bonded to the ground via a copper or brass grounding strap.

***Physical Description – Hazardous Materials***

Landmark Environmental collected 12 bulk samples from a total of 12 different types of suspected Asbestos Containing Materials (ACMs) at Michigan Island. Of the 12 suspect ACMs that were sampled and analyzed, a total of 2 samples collected from 2 suspect ACMs resulted in concentrations of greater than 1% (positive for asbestos).

*Hazardous Materials – Asbestos*

The following suspected ACMs were not sampled due to inaccessibility or park limitations regarding potential for damage to structures. Asbestos is assumed to be present at the following locations:

1. Adhesives (Multiple varieties of miscellaneous adhesives were seen on stairs and around windows).

Materials within the Second Tower were observed to be in good condition.

*Hazardous Materials – Lead Containing Paint*

Detectable lead is assumed to be present at the following locations:

1. Exterior Painted Surfaces.

The park has reported that the LCP was removed from the interior of the Second Tower in 1996 and the exterior in 2006. Testing was not conducted to confirm the extent or completeness of removal.

Paint chip debris was noted on localized areas of surface soils surrounding the Second Tower. Paint chips were seen in areas up to 10' from the structure where there was little vegetative ground cover.

*Hazardous Materials – Lead Dust*

Surface wipe-sampling for lead dust analysis was not conducted in the Second Tower because it is an uninhabited structure.

*Hazardous Materials – Lead in Soils*

Historical paint maintenance activities such as manual scraping, power-washing, sanding, abrasive blasting or the general poor and peeling condition of exterior LCP may have created the potential to impact the surrounding soil. Areas of the surface soils adjacent to the structure were observed to have LCP debris and additional areas may exhibit LCP debris or lead-contaminated soils, but are not observable due to

1 vegetative cover surrounding the structure. Preliminary lead-in-soil sampling was performed to assess  
2 whether these near-structure soils contain lead concentrations above applicable soil standards.  
3

4 One four aliquot soil sample was collected from the ground surface soils at the roof (drip-line)  
5 approximately 3' from the foundation wall. A second four aliquot soil composite sample was collected  
6 from the ground surface soils at low lying areas outside the drip-line.

- 7 1. Analysis of the composite drip-line soil sample resulted in 8,289 milligrams of lead per  
8 kilogram of soil (mg/kg).
  - 9 2. Analysis of the composite low lying areas outside the drip-line resulted in 7,053  
10 milligrams of lead per kilogram of soil (mg/kg).
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12

#### 13 *Hazardous Materials – Mold*

14 Inspections of the structure were performed to identify the readily ascertainable visual extent of mold  
15 growth. Moisture testing in building materials was not performed nor was sampling of building materials  
16 performed for microbial analysis. Mold was not visually identified.  
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## Character-Defining Features

**Mass/Form.** Conical steel tower with exterior bracing and a lantern set off with a decorative cornice all set on a Neoclassical style one-story, symmetrical base.

**Exterior Materials.** Cast and wrought iron and steel with concrete elements, all painted white with black trim.

**Openings.** Arched double hung windows (one-over-one) at both the tower base and the tower. Italianate hoods at the windows' exteriors.

**Interior Materials.** Exposed cast and wrought iron walls and other structural elements and concrete floors and plaster walls all painted.

## General Condition Assessment

In general the Michigan Island Second Tower is in good condition. The spiral metal stairs, the cast and wrought iron walls and railing, the metal ships ladder, the metal lantern members, and the metal door all are in good condition. The tower base is an unusual cast iron structure that provides an area for storage or other uses that the other cylindrical light towers do not offer.

Structurally, the Second Tower is in good condition with the exception of the cracked column bases in the tower base.

Mechanically, there are no systems in the tower except for the passive vents located in the lantern level.

Electrically, no alternating current electrical service or utilization equipment exists within the Second Tower.

The following section is a discipline-by-discipline, component-by-component condition assessment of the building. Refer to Volume I, Chapter 2: Methodology for definitions of the condition ratings.

### Condition Assessment – Architecture

#### Architecture – Roof

Condition: Good

The roof of the Second Tower and its base are both in good condition.

#### Architecture – Walls and Wall Finishes

Condition: Good

The exterior and interior cast and wrought iron walls are in good condition. The plaster finish in the tower base is also in good condition with the exception of the south wall which has cracking and peeling paint at the ceiling and wall intersection. According to the park staff, this is suspected to be from condensation.

*Architecture – Windows*

Condition:      *Fair*

The window trim and frame (cast parts) are in good condition with minor rusting at joints and connections. The wood sash are in good condition but are no longer operable. The Plexiglas product is inconsistent with the historic character of the windows. Moreover, the sash may be retrofits based on the evidence of the pins at joints and the router marks.

*Architecture – Doors*

Condition:      *Fair*

**Entry to Building and Tower.** This door is in fair condition as the bottom rail is loose and the base of the exterior trim is rotted and weathered. The hardware for the door is in poor condition as the knob is missing.

**Lantern Door.** The door is in good condition.

*Architecture – Exterior Trim*

Condition:      *Good*

All of the trim has been painted recently and is in good condition.

*Architecture – Walk and Railing*

Condition:      *Good*

The walk and railing are in good condition.

*Architecture – Lantern*

Condition:      *Good*

The paint is in good condition but the glazing has a few cracks at the corners. The silicone is also in good condition. Two of the brass intake caps are missing, six of the caps are painted shut, and all chains and cords are missing for the exhaust vent system. Overall, the lantern is in good condition.

*Architecture – Ceiling Finish*

Condition:      *Good*

The underside of the roof in the Tower is in good condition but it does have minor rust. The Tower base's plaster ceiling is in good condition with the exception of the peeling and cracking paint in the southwest corner.

*Architecture – Interior Trim*

Condition:      *Good*

The plaster and cast iron base surround in the Tower base is in good condition.

*Architecture – Floor/Foundation*

Condition:      *Good*

The concrete floor is in good condition with minor chipped and cracked paint and a possible water stain at the south end of the Tower base.

*Architecture – Stairs*

Condition:      *Good*

The spiral staircase and the steel ladder are both in good condition. The entry stair to the Tower base is in good condition.

*Architecture – Accessibility*

Condition:      *Poor*

This building is not accessible.

***Condition Assessment – Structural***

*Structural – Foundation*

Condition:      *Good*

The foundations are in good condition.

*Structural – Floor Framing*

Condition:      *Good*

The floors of the tower base, lantern, and watch room are in good condition.

*Structural – Roof Framing*

Condition:      *Good*

The roof of the tower base and lantern are in good condition.

*Structural – Wall Framing*

Condition:      *Good*

The walls of the center cylinder, tower base, watch room, and lantern are in good condition with the exception of the cast iron column bases in the tower base. Two of the column bases are cracked and further investigation is needed (MI-ST-26 and 27).

*Structural – Lateral System*

Condition:      *Good*

Lateral stability of the Tower is good.

*Structural – Load Requirements*

Condition:      *Good*

The roof and floor framing have adequate capacity to support the required loads.

***Condition Assessment – Mechanical***

*Mechanical – Plumbing Systems, HVAC, and Fire Suppression*

Condition:      *N/A*

*Mechanical – Other*

Condition:      *Fair*

The passive air vents at the top of the tower are in fair condition, but they do not provide adequate ventilation to prevent condensation.

***Condition Assessment – Electrical***

*Electrical – System Configuration*

Condition:      *Good*

The Coast Guard's Light Beacon system is in good condition.

*Electrical – Conductor Insulation, Overcurrent Protection, Lighting Systems, Telecommunications, and Fire Alarm System*

Condition:      *N/A*

*Electrical – Lightning Protection*

Condition:      *Fair*

Lightning protection system appears to be intact. However, over time, connections deteriorate and components corrode. The integrity of the system cannot be assured.

On one leg of the Second Tower, a cable appears to have been cut, and left extending out away from the tower. This cable might be a down-cable for the lightning protection grounding system. Alternatively, the observed cable might have been part of an old antenna system that has been abandoned. The exact purpose and nature of this cable is unknown.

***Condition Assessment – Hazardous Materials***

Refer to "Physical Description – Hazardous Materials" for detailed descriptions of locations and conditions of hazardous materials.

## Ultimate Treatment and Use

This building operated as a light tower from 1929 to 1943 when the Fresnel lens was removed and an automated light was installed.

The Tower is currently used as guided visitor access with artifacts on the main level for visitors to review. The proposed use for the building will remain as is with self-guided access at the main level and guided visitor access to the tower.

Rehabilitation is the recommended treatment for the building.

## Requirements for Treatment

Compliance requirements for treatment currently include laws, regulations, and standards as outlined by the Park Service and listed in Volume I, Administrative Data section of this report.

The recommended treatments are tailored to the preferred alternative as the outcome of the Value Analysis/CBA for the project. As individual buildings are rehabilitated, specific alternatives will present themselves during design and construction. The following section is a discipline-by-discipline, component-by-component description of the treatments proposed for the rehabilitation of the building. Refer to Volume I, Chapter 2: Methodology for the priority rating definitions.

### *Treatment Recommendations – Architecture*

#### *Architecture – Roof*

Priority:        *Low*

Monitor and verify/provide sealant at all roof panel joints.

#### *Architecture – Walls and Wall Finishes*

Priority:        *Moderate*

Repair damaged plaster and repaint using the paint analysis to guide the color selection. Coordinate with enhanced ventilation work. Monitor and verify/provide sealant at all exterior joints.

#### *Architecture – Windows*

Priority:        *Moderate*

Replace Plexiglas with glass at sash. Verify/provide operability to all sash to facilitate ventilation. Repair cast components that have minor rust and repaint. Investigate replacing one lower sash of a north window with a secure louver to enhance ventilation.

#### *Architecture – Doors*

Priority:        *Moderate*

Repair damaged entry door bottom rail and base of trim with epoxy stabilization. Scrape, sand, and repaint. Replace the missing knob with finish to match original. Add a security gate at the base of the tower stair.

*Architecture – Exterior Trim*

Priority:            *Low*

No recommendations at this time.

*Architecture – Walk and Railing*

Priority:            *Low*

No recommendations at this time.

*Architecture – Lantern*

Priority:            *Moderate*

Provide two new brass intake vent cap controls and repair six which are painted shut. Verify operation of all ventilation components. Repair select areas with cracks at glazing.

*Architecture – Ceiling Finish*

Priority:            *Moderate*

Repair damaged plaster and repaint using the paint analysis to guide the color selection. Coordinate with enhanced ventilation work.

*Architecture – Interior Trim*

Priority:            *Low*

No recommendations at this time.

*Architecture – Floor/Foundation*

Priority:            *Low*

No recommendations at this time.

*Architecture – Stairs*

Priority:            *Low*

No recommendations at this time.

*Architecture – Accessibility*

Priority:            *Low*

Provide program access through interpretive wayside exhibits.

***Treatment Recommendations – Structural***

*Structural – Foundation*

Priority:            *Low*

No recommendations at this time.

*Structural – Floor Framing*

Priority:            *Low*

No recommendations at this time.

*Structural – Roof Framing*

Priority: Low

No recommendations at this time.

*Structural – Wall Framing*

Priority: Unknown

The two cracked column bases should be investigated further to determine if the cracks are structurally significant.

*Structural – Lateral System*

Priority: Low

No recommendations at this time.

***Treatment Recommendations – Mechanical***

*Mechanical – Plumbing Systems and Fire Suppression*

Priority: N/A

*Mechanical – HVAC*

Priority: Moderate

The existing passive air vents at the top of the tower do not provide sufficient ventilation to prevent condensation inside the tower. Additional passive ventilation is recommended.

***Treatment Recommendations – Electrical***

*Electrical – System Configuration*

Priority: Low

No recommendations at this time.

*Electrical – Conductor Insulation, Overcurrent Protection, Lighting Systems, Telecommunications, and Fire Alarm System*

Priority: N/A

*Electrical – Lightning Protection*

Priority: Moderate

Existing lightning protection is old and its effectiveness has not been established. It is recommended that a LPI (Lightning Protection Institute) certified inspector perform an inspection of the lightning system and provide findings and recommendations in accordance with LPI-175.

***Treatment Recommendations – Hazardous Materials***

*Hazardous Materials – Asbestos*

Priority:            *Low*

Recommend sampling of suspect asbestos containing materials, including adhesives.

*Hazardous Materials – Lead-Containing Paint and Lead Dusts*

Priority:            *Low*

No recommendation at this time.

*Hazardous Materials – Lead In Soils*

Priority:            *Moderate*

Recommend further soils characterization to confirm applicable regulatory requirements.

*Hazardous Materials – Mold/Biological*

Priority:            *Low*

No recommendation at this time.

*Hazardous Materials – Petroleum Hydrocarbons*

Priority:            *Low*

No recommendation at this time.



## Alternatives for Treatment

The following are several considerations of alternatives for the proposed treatments:

1. Consider retaining existing Plexiglas.

## Assessment of Effects for Recommended Treatments

The following table includes an analysis of the major treatment recommendations which affect Section 106 Compliance:

Recommended Treatment	Potential Effects	Mitigating Measures	Beneficial Effects
1. Adding a security gate at the base of the light tower	Installation of a security gate will be a modern element.	Design a gate that will be as unobtrusive as possible.	- Allows NPS better security over the resource - Improves safety for visitors
2. Additional Hazardous Testing and Mitigation	Mitigation of hazardous material may require removal of historic materials.	Any mitigation will need to be evaluated for benefit and implemented sensitively to minimize damage to the resource.	- Improves safety for visitors and staff - Removes hazards from the cultural resource
3. Add new ventilation elements (i.e. replace sash with secure louvers)	Removal of character defining feature (sash) and replacing with a modern material	Verify operation and efficiency of existing ventilation elements prior to introduction of new.	- Increased ventilation will aid in the preservation/ longevity of the historic fabric

1 ***Second Tower Photographs, 2009***



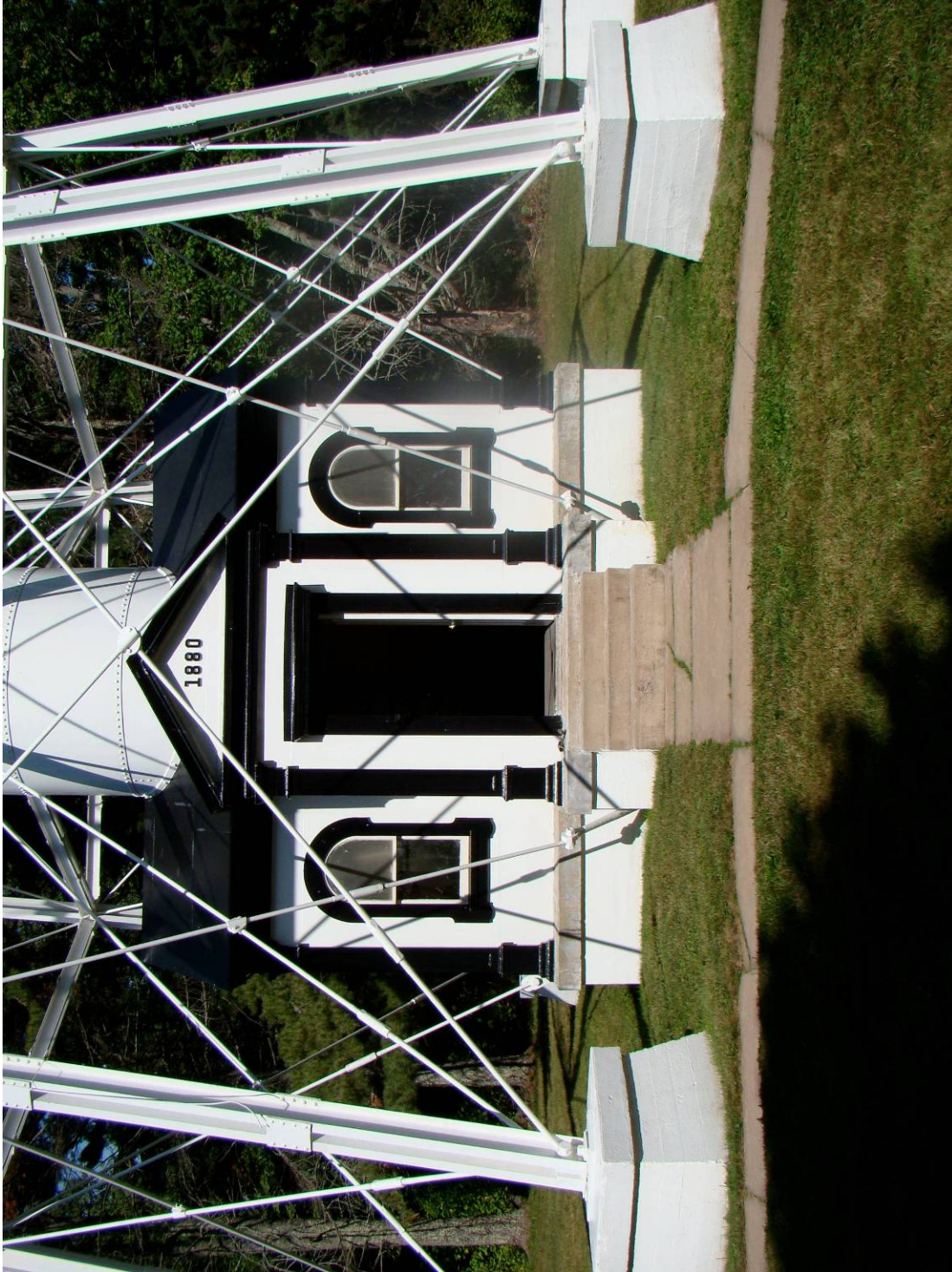
2  
3 *MI-ST-01: Aerial from Old Michigan Lighthouse, 2009 (Source: A&A DSC00578)*



1  
2

*MI-ST-02: West elevation, 2009 (Source: A&A DSC00680)*





*MI-ST-03: Tower base south elevation, 2009 (Source: A&A DSC00821)*

1  
2  
3





MI-ST-04: Tower base east elevation, 2009 (Source: A&A DSC00824)

1  
2





MI-ST-05: Tower base north elevation, 2009 (Source: A&A DSC00825)

1  
2  
3





MI-ST-06: Tower base west elevation, 2009 (Source: A&A DSC00826)

1  
2  
3



MI-ST-07: Entry stair foundation and column base (Source: A&A IMGP2789)



MI-ST-08: Entry stair, east elevation (Source: A&A DSC00823)





- 1
- 2 *MI-ST-09: South entry (primary) door (Source: A&A 102\_9572)*
- 3



- 4
- 5 *MI-ST-10: South entry (primary) door, interior (Source: A&A 102\_9574)*



MI-ST-11: Typical window, interior face (Source: A&A CIMG3596-A)



MI-ST-12: Current exhibit along east wall (Source: A&A CIMG3586)



MI-ST-13: Tower stairs, east elevation (Source: A&A CIMG3572)



MI-ST-14: Tower base ceiling detail (Source: A&A CIMG3595)



1  
2

*MI-ST-15: Lantern, 2009 (Source: A&A DSC00584)*

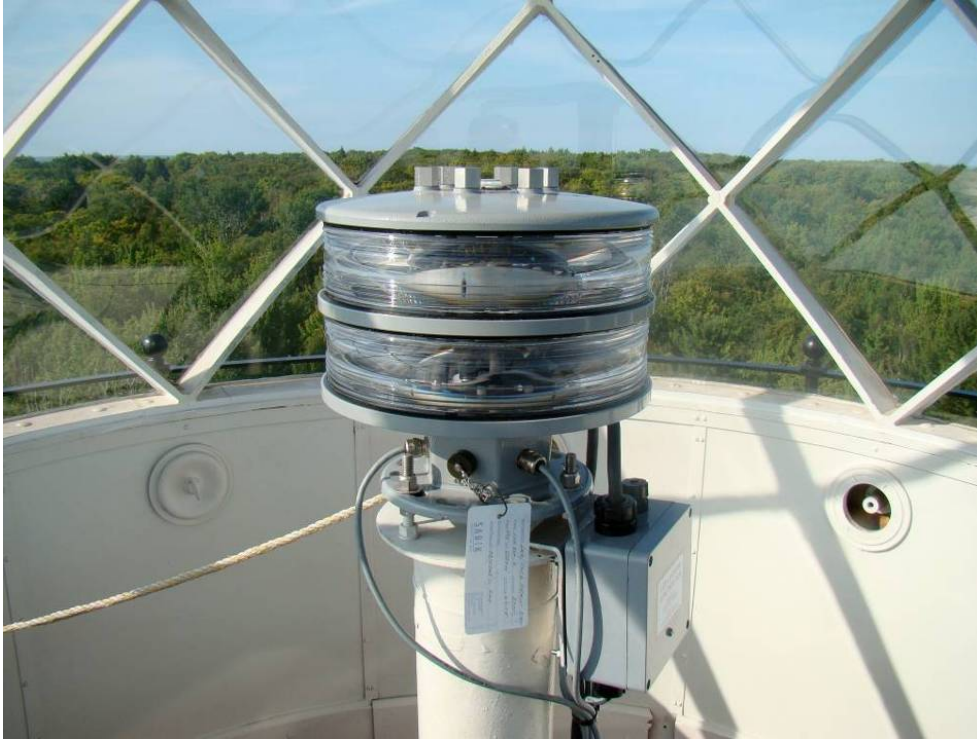




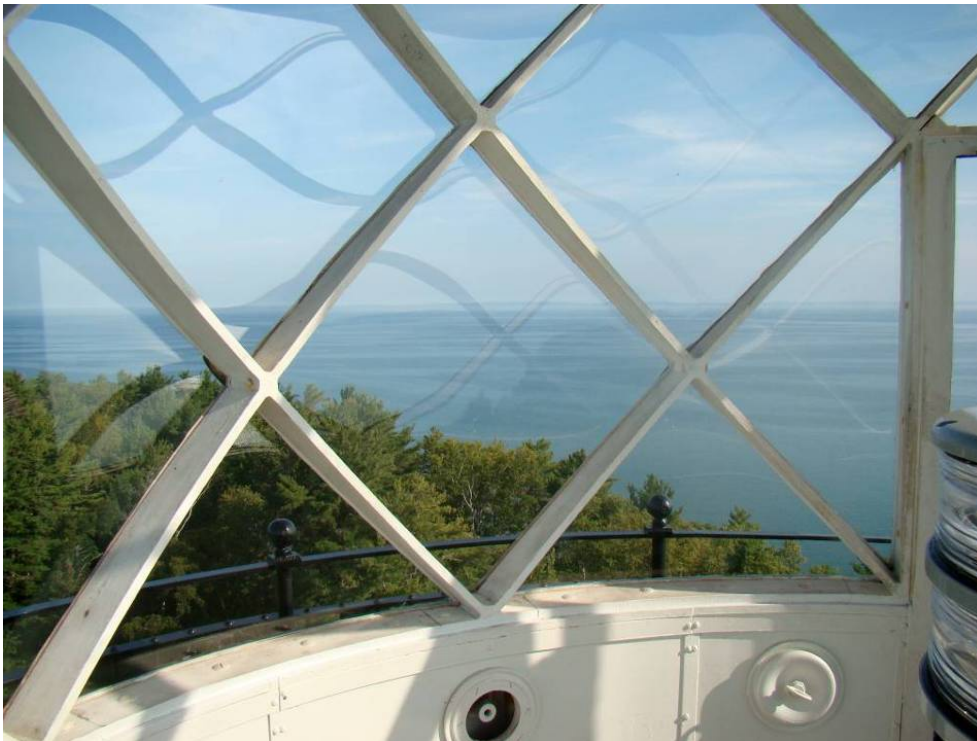
MI-ST-16: Tower stairs, looking down (Source: A&A DSC00621)



MI-ST-17: Ship's ladder to lantern (Source: A&A 100\_9641)



MI-ST-18: Lantern (Source: A&A 100\_9633)



MI-ST-19: Lantern, looking southeast (Source: A&A DSC00619)



1  
2 *MI-ST-20: Lantern door (Source: A&A 100\_9640)*  
3



4  
5 *MI-ST-21: Lantern ceiling (Source: A&A 100\_9632)*





1  
2 *MI-ST-22: Lantern roof (Source: A&A IMGP2769)*  
3

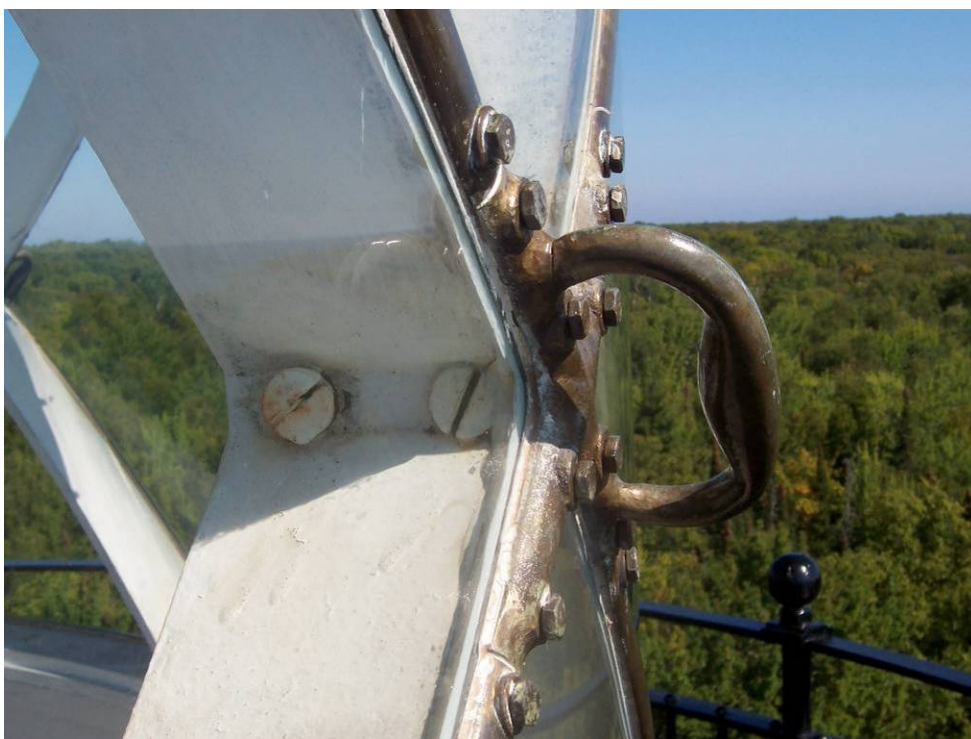


4  
5 *MI-ST-23: Lantern railing and walkway (Source: A&A 100\_9638)*





MI-ST-24: Lantern glazing, walkway, and railing (Source: A&A IMGP2782)



MI-ST-25: Lantern glazing and brass stop detail (Source: A&A 100\_9637)



MI-ST-26: Crack in column base (Source: Martin/Martin)



MI-ST-27: Crack in column base (Source: Martin/Martin)