



Josh Anderson Executive Director (206) 382 - 2628 ext. 7435 Rob Corser, AIA Board of Trustees (206) 458 - 9471

Boathouse and Boat Shop Re-Roofing Design Package

July 29, 2022

Project Overview

Established in 1976, the Center For Wooden Boats is a nonprofit corporation, open to public membership and dedicated to the preservation, restoration, and dissemination of knowledge of traditional small water craft (mostly small wooden boats). Waterway 4 has served as the Center's campus since 1983 and functions as a public waterfront park, a traditional wooden boat livery, and a living and evolving maritime museum. The Center is dedicated to providing the public an opportunity to learn handson skills in all aspects of building, maintaining, and using traditional small boats. A dedicated staff supported by a strong network of volunteers maintains a fleet of small wooden boats for rental as a means of encouraging the public to get out onto Lake Union.¹

In 2021, our main floating structures, the Boathouse and Boat Shop, were granted historic landmark status by the Seattle Landmark's Preservation Board. Both structures date from the 1980's and both feature cedar shake roofs -of indeterminate age -that have been failing for several years and are now in dire need of immediate replacement. After researching available material options, consulting documents found in our archives, surveying precedents, and soliciting input from our community, we have determined that raised-seam metal roofing would be a far more appealing choice for new roofing for these structures.

In this report, we will describe our research into the origins of roofing material choices for the CWB, cite a survey of precedents for maritime working buildings around Lake Union and North America, describe our process of deliberation about design options, and describe our proposed solution for the replacement of the roofing for both of these buildings. Architectural drawings and material specifications are included. The existing roofs are in a drastic state of deterioration and are beyond repair. Water infiltration is threatening the integrity of both buildings and the need for new, more reliable, more long-lasting and easier to maintain roofs cannot be overstated.





¹ Sarah J. Martin, Landmark Nomination Report, February 17, 2021



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Existing condition of Boat Shop roof (above) and Detail of Boathouse roofing (left)

Existing Conditions

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Lake Union

There is a long history of maritime buildings along the shores and floating in the waterways of Lake Union. These have always been mainly wooden structures of industrial, nautical or residential usage featuring roofing in a variety of materials, including tar paper, asphalt shingles, cedar shake shingles and various kinds of metal roofing. This 1950's photo of Lake Union maritime buildings illustrates the variety of roof materials in use, and indicates the utilitarian nature of these vernacular structures. It is noteworthy here that cedar shakes are not visible on any of these roofs, the majority of which are asphalt. A survey of contemporary precedents will follow in the next section.







Concept drawing of CWB at Waterway 4, looking north, circa 1970 Photo: Center for Wooden Boats A Concept of CWB from Near "The OID Boathouse"

As Dick and Colleen Wagner imagined the new campus for the CWB on Lake Union in the late 1970's Dick made sketches of their vision for the floating buildings and docks. The archival images here are some of the earliest such sketches and they indicate that raised seam metal roofing was an original material choice. Later architectural drawings of these structures indicate a switch to cedar shakes, but we have no documentation about this change in roofing material choice. We speculate that at the time, cedar might still have been more readily available or less expensive. Or there might have been a donation of materials or labor. In any case, it is unclear why cedar was chosen over metal.



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The Center for Wooden Boats

Historical Background

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North America











Raised seam metal roofing is widely found on maritime structures around North America and is used on buildings both historic and new and ranging from work sheds to boat houses and coastal safety structures. There is a wide range of colors to be found -with gray and light green most common, while red is a color often found on light houses.



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Vernacular Maritime Precedents p. 3

Lake Union











Raised seam metal roofing is very common around Lake Union -on historic working buildings like the Jensen Motor Boat Company (above) and on boat sheds and floating homes both old and new. Wood shake roofing is also found but in dwindling numbers, possibly due to its high cost and difficulty to maintain. A survey of metal roof colors around Lake Union shows a predominance of gray and bronze and a lesser amount of green, with red being in the minority of colors found.

Vernacular Maritime Precedents p. 4



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Key Decision Drivers

Longevity

The Pacific Northwest has a long history of using cedar shake as a common roofing material. But the old-growth cedar reserves have been depleted and the new-growth cedar is not as durable as old-growth cedar, and they do not last much longer than 25 years. Metal roofing has a much longer predicted lifespan of 35 years or more.²

.ow Maintenance

Cedar shake roofs are known for needing a diligent and semi-annual roof maintenance schedule. Cedar shakes will sustain organic growth in the form of moss, fungus, algae, and lichen growth.² This regular maintenance comes at a cost, creating an additional and ongoing financial burden that is especially difficult for a nonprofit organization to bear. Conversely, metal roofs require little or no maintenance.

Sustainability

Metal roofs can be argued to be much more sustainable for our planet. There is no deforestation in harvesting the product. however, there is mining involved in the process of virgin steel manufacturing. However, most sheet metal products will use between 25 - 45% post-consumer recycled metal. Once the metal roof has outlived its lifespan it can also be torn off and recycled into newer metal products.² Metal roofing is also much lighter weight than wood, thus relieving loads on our flotation.

Fire Resistance

Cedar shake roofs have been known to ignite easily from the slightest spark of a cigarette or firework, or embers from a nearby wildfire. Metal roofs are inherently resistant to ignition from external fire sources.² On March 26, 2022 a large yacht docked within 50 feet of CWB was set alight and burned for hours sending embers aloft. We are very fortunate that thanks to a favorable wind directon and despite damage to one of our nearby boats, our roofs did not ignite. The image on the right shows the destroyed yacht with our boats and buildings visible just beyond.

² https://elementsmartroofing.com/metal-roofing-vs-cedar-shake-roofing-in-the-pacificnorthwest/



NRM-1000 is an architectural metal roofing system TRIM

All flashing and trim shall be fabricated by Nu-Ray Metals or a qualified fabricator. Flashings for this panel are 26 or 24 gauge steel.

INSTALLATION

For roofing applications, Nu-Ray's snap-lock panels shall be installed over solid decking (5/8" plywood, nailboard insulation or equivalent) with an underlayment of 30# (minimum) roofing felt applied horizontally from eave to ridge. Panels shall be fastened via attachment clip spaced on 24" centers (maximum). For wider clip spacing, please check with Nu-Ray Customer Service.

HANDLING

Vinyl masking is provided on all steel sheet to help protect materials where extra handling is expected.

WARRANTY

A 40-year non-prorated finish warranty can be supplied covering finish performance.



available exclusively from Nu-Ray Metal Products. It is

intended for applications over a solid substrate with

a minimum 3:12 roof pitch. Typical substrates include

plywood, nailboard insulation or equivalent. Panels are

factory roll-formed in continuous lengths. Standard

panel length is 4'0" to 44'0". For longer lengths, please

NRM-1000 roof panels feature a concealed attachment

clip system to allow thermal movement as panels

expand and contract with temperature changes. With

its custom design, the clip insures an extra-snug fit. The one-piece design of the NRM-1000 clip makes

For roofing applications, use wood-type screws fastened on 18" centers. Other screw types are available

applications over structural steel and steel decking.

check with Nu-Ray Customer Service.

installation easy.

FASTENERS



From the manufacturer:

NRM-1000 is an architectural metal roofing system intended for applications over a solid substrate with a minimum 3:12 roof pitch. Typical substrates include plywood, nailboard insulation or equivalent. Panels are factory roll-formed in continuous lengths. NRM-1000 roof panels feature a concealed attachment clip system to allow thermal movement as panels expand and contract with temperature changes. With its custom design, the clip insures an extra-snug fit.

Product specs: Underlayment

Existing roofing to be removed and any water penetration damage assessed and repaired. Underlayment is 1/2" CDX plywood.

New fascia and gutters will be installed to match metal roofing.



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Material Specification

We propose using a raised seam metal roof system by: NU-Ray Metal Products of Auburn WA

Our potential installers have identified the : NRM 1000 - Narrow Rib Clip System

24 ga panel system, kynar 500 coated paint (35 year

paint warranty). -Includes High Temperature Ice and Water

Material Decision Process

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#1 A Greenish Grey



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We explored three different color *directions* -they were:

#2 A Brownish Bronze

#3 A Cooler Silvery Grey (to match the WEC roof -above) The green was the least well received and the bronze and gray were both appreciated. The bronze was thought to be closest to the color of the existing cedar shakes, while the gray is derived from the metal roof of our new Wagner Education Center (WEC) and would provide institutional consistency.

Color Evaluation Process

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Material Color Sample - set against siding of the **Boathouse**

Material Color Sample - set against the siding of the **Boat Shop**

Our roofing suppkier was only able furnish a color sample in a 16" panel width (shown in all three images above). Our chosen Panel Width is 12" -shown in a different color in the far right image (#3). Our plan is to use the Charcoal Gray color but in the 12" panel width to better suit our smaller areas of roof.

Material Color and Panel Width Samples -12" width (left) but with Charcoal Gray color (right)





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Color Evaluation Process

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Detailed Site Plan

Entire CWB Campus -aerial site plan



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Site Plans

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EAST (west is similar)



SOUTH

NORTH



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Boat Shop Drawings

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THE CENTER FOR BOAT ⁻S

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Boathouse Drawings p. 10



Rendering under overcast skies p. 11



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