



March 11, 2025

Christy Ferguson  
Town Manager  
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Dear Ms. Ferguson,

Attached is a preliminary executive summary from the in-progress structural assessment report. Please let us know if the Town has any questions between now and the upcoming regular Board meeting.

Sincerely,  
HDR Engineering, Inc. of the Carolinas

A handwritten signature in blue ink that reads 'William Fuller'. The signature is written in a cursive, flowing style.

William Fuller, EI  
*Project Manager*



# Structural Assessment

## Preliminary Executive Summary

**Disclaimer:** Please note that this letter is not a substitute for the full investigation report which is scheduled to be completed after the March regular Board meeting. The intent of this letter is to present the Board with the investigation's key initial findings and clearly state HDR's preliminary impressions and recommendations based on those initial findings, so the Board may have an opportunity to make a defensible, informed decision on potential scope curtailment before major project progress occurs. The full investigation report will expand upon the findings and recommendations in greater detail.

The recreational fishing pier and entry building in Holden Beach, North Carolina are in disrepair and have been closed off to the public. The Town of Holden Beach (Town) has asked HDR to perform a site visit and condition assessment of their historic fishing pier, shown in Figure 1.



**Figure 1 - Holden Beach Fishing Pier Plan View and Project Stationing**

On March 3, 2025, HDR conducted a site investigation and condition assessment as defined in the "Waterfront Facilities Inspection and Assessment – Manuals and Reports on Engineering Practice No. 130" published by the American Society of Civil Engineers. The deficiencies recorded have been divided into the following condition assessment categories in line with ASCE's published condition assessment ratings:

1. Good (No repairs required)
2. Satisfactory (No repairs required)
3. Fair (Low priority repair)
4. Poor (Moderate priority repair)
5. Serious (High to very high priority repairs)

6. Critical (High to very high priority repairs)

After visiting the site and performing a level I and level II condition assessment of the pier, HDR does not recommend pursuing isolated repairs or relying on the existing substructure to restore the existing timber fishing pier. The following observations and general understanding of the existing pier were used to reach this conclusion:

- The condition of the existing timber superstructure (i.e. deck boards, support joist, handrails, etc.) are heavily deteriorated, warped and/or damaged with deficiencies consisting of checks, splits and gouges and therefore would require to be entirely replaced.
  - The handrails and rail post hardware connections are in **CRITICAL** condition, particularly the eastern rail. The hardware / rail posts are damaged / heavily corroded and therefore insufficient in transferring / supporting the required OSHA rail load standards.
  - There are numerous timber deck boards inadequately connected to the supporting joists as well as several locations where the deck boards deflect excessively under pedestrian loading.
  - The spacing between the existing primary timber support joists was field measured at approximately 30-in on center at several locations. The existing deck boards were observed to be 2x6 boards. Industry standard recommendations for joist spacing is 24-in on center for serviceability requirements for typical pedestrian loading on recreational piers (assuming 2x6 deck boards).
  - Timber rotting / cross-section loss of the primary timber support joists at multiple locations was observed and in **POOR** or **SERIOUS** condition.
  - The balcony or viewing pavilion located near station 0+85 was observed to be in **CRITICAL** condition with deficiencies including failed handrails, loose deck boards, corroded steel hardware, rotted supports, and hollowed timber piles.
- The condition of the existing substructure was observed with the following deficiencies and may not support a replacement of the superstructure (deck).
  - The overall condition of pilings that could be observed from shore or the pier topsides is **FAIR**. However, multiple pilings were observed to be in **POOR** or **SERIOUS** condition, including a cluster of pilings near the shoreline at low tide. About 20% of the total existing pile bents were observed to have some piling deficiencies. Note that investigations were limited to topsides and what was observable from underneath the structure along the shoreline. Piling and pile bents beyond Station 3+75 were not able to be completely investigated due to the water level. When only considering the pile bents that were observable from both topsides and underneath, over 30% of these pile bents were observed to have some piling deficiencies
  - The overall condition of pile caps that could be observed from shore or the pier topsides is **FAIR**. However, timber rot of the pile caps supporting the timber joists was observed at several locations and thus in **POOR** condition at these locations. Variations in the size of the pile caps (some 8x8 and some 10x10) was also

observed. When only considering the pile bents that were observable from both topsides and underneath, over 25% of these pile bents were observed to have some pile cap deficiencies

- Many existing cross-bracings were observed to be in **POOR** or **SERIOUS**. There are multiple locations where cross bracing has either split or separated at its connection to the piles in several locations, rendering the member ineffective. Some bracings are broken, snapped, or missing and need to be replaced. Some bracings were observed to be connected to non-structural elements. When only considering the pile bents that were observable from both topsides and underneath, over 40% of these pile bents were observed to have some cross-bracing deficiencies.
- The majority of the existing bolted hardware connections have experienced heavy corrosion, section loss, or failure and are classified in **POOR** to **SERIOUS** condition.
- There are numerous locations of deteriorated, missing and/or failed hardware connections between the existing timber piles and the timber pile cap.
- The existing pilings are a mix of replacement and original piles. The replacement piles were noted as marine treated timber with 2.5 CCA (Chromated Copper Arsenate). The lifespan of marine timber treated with 2.5 CCA is on the order of 20-40 years. These replacement piles were installed circa 2000 and approximately 25 years old. Therefore, they are effectively near the end of their recommended service life.
- The substructure and superstructure between stations 0+00 and around 0+75 will be required to be entirely replaced in order to meet federal ADA requirements for pedestrian access.
- Insufficient and/or minimal information is available regarding the design loadings for the existing timber pier structure. It shall be noted that during the course of our investigation, the existing pier was observed to noticeably sway under cross current and normal wave loads. Additionally, several areas along the timber pier deck were observed to noticeably deflect under the investigation team's pedestrian walking load.
- The anticipated construction means and methods that would be required to perform a large quantity of the localized repairs would be similar to those needed for new construction (i.e. construction from a work barge in the water OR building out a working jetty (sand or gravel deposit) parallel to the pier. It is HDR's recommendation that machinery and/or construction equipment shall NOT be utilized atop of the existing pier deck for operations in the structures present deteriorated state and overall design. HDR also determines that a top-down construction approach would require a full substructure redesign to safely and appropriately handle construction equipment loads.

In summary, the overall condition of the existing fishing pier was assessed to be in **POOR** condition and HDR recommends replacing the timber superstructure in its entirety. The pier approach (superstructure and substructure) will also be required to be replaced in its entirety to satisfy federal ADA requirements. The existing substructure has many structural deficiencies which would require

extensive repairs and is currently at the end of its useful service life. This coupled with the fact the recommended construction methods would be similar for both repair and replacement options supports the conclusion that repairing the existing pier would not be structurally cost effective, nor would it provide the longevity or service life that results from replacing the timber fishing pier. Therefore, it is HDR's recommendation that the Town of Holden Beach consider a pier replacement option only.