



**PROJECT PROFILE**

# Herbert C. Bonner Bridge

Condition Assessment | Dare County, NC



**CLIENT**

Alpha & Omega Group

**BACKGROUND**

The Bonner Bridge traverses the Oregon Inlet in Dare County, North Carolina and provides access to the southern portion of the Outer Banks including Cape Hatteras. The 2-1/2 mile long causeway bridge was built in 1962. The superstructure consists of prestressed concrete AASHTO girders supporting a cast-in-place reinforced concrete deck, except in the main spans, where steel plate girders support the bridge deck. The substructure consists of prestressed piles supporting pile caps in the approach spans and piles supporting reinforced concrete frame bents in the high level spans.

The NCDOT was planning to replace the deteriorating bridge, but the design and construction would require approximately ten years to complete. Due to this requirement, additional information on the current condition of the bridge was required to supplement the bi-yearly NBIS inspection. WJE was retained by Alpha & Omega, who performed the NBIS inspection, to assist with the condition assessment and develop repair recommendations to meet the extended service life.



**SOLUTION**

WJE performed a visual inspection of select pile bents, frame bents, prestressed girders, and concrete decks and took 176 concrete core samples. WJE engineers used numerous testing methods such as ultrasonic pulse velocity measurements, half-cell potential corrosion measurements, concrete compression strength testing, petrography of select cores, chloride analysis of select cores, and load testing of two spans. Through these methods, it was determined that the concrete was of high quality and that the thin epoxy and shotcrete patches did not perform as well as trowel applied patches. Engineers also determined the steel corrosion potential of select concrete elements and identified spalls that required repair. Load distribution factors for two deteriorated spans were determined, thus verifying that span capacities are adequate.

