

The precast concrete, post-tensioned segmental box-girder bridge at Pier 2 nears completion. The bridge was constructed using the balanced-cantilever method.

to be considered for deeper sections of longer spans.

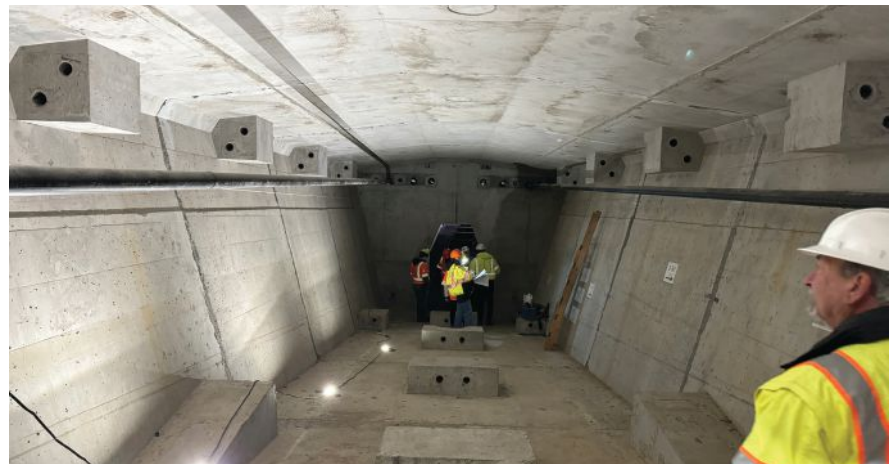
NCDOT incorporated the bridge design into their larger design-bid-build project for widening I-26. The bridge was designed by in-house EFLHD bridge design engineers. NCDOT is administering the project, and the National Park Service (NPS) will be the owner of the bridge upon final acceptance. The close relationship between the NPS and EFLHD, based on decades of partnership, played a crucial role in ensuring that the bridge would meet NPS's aesthetic-context sensitivities. Steel formwork was required for the precast concrete pier and superstructure segments to produce smooth, clean lines, and a Natina treatment was used on the galvanized pedestrian rail to produce a rustic weathered look. The abutments were clad with stone masonry that NPS specifically approved for use on the bridge. Lastly, the same stone masonry was used on the custom-designed bridge approach parapet and guard wall.

### Design Challenges

The unbalanced spans of 165-275-165 ft over I-26 caused issues with the anticipated 10,000-day, long-term tensile stresses at the soffit of the main span. The main span required eight pairs of bottom-slab, internal continuity tendons, and two pairs of external continuity tendons. Because of the parabolic curve of the

superstructure soffit, the addition of internal tendons in the bottom slab resulted in increased tension in the bottom slab near the midspan portion of the 275-ft main span. The external tendons anchored high into the pier-table segments counteracted this tension and added compression back into the joints at midspan. The shorter end spans required four pairs

Interior of Pier 2 cantilever, facing the pier diaphragm.



### AESTHETICS COMMENTARY

by Frederick Gottemoeller

Interstate 26 (I-26) through northern South Carolina, North Carolina, and eastern Tennessee is one of the most scenic stretches in the Interstate Highway System. In that same area, the Blue Ridge Parkway makes accessible one of the most attractive landscapes on the East Coast. This new bridge, built where the two corridors cross, lives up to the visual quality of its surroundings and the symbolism of its role. The bridge acknowledges the significant expansion of the highway

below by spanning it all in a single 275-ft jump. That span's arched soffit creates a visual gateway to the scenic areas beyond. The same arched soffit combines with the reciprocally arched soffits of the side spans to visually reflect the loads on the structure: the bridge is thickest over the piers, where its support forces are concentrated, and thin everywhere else. The setting called for innovation, and the design team provided it, developing methods to make precast concrete

segmental box construction possible in this isolated area.

The final necessary step in this endeavor was attention to the finish and details, and the design and construction team provided that, too. Steel formwork for the precast concrete pier and girder segments met the National Park Service's requirements for surface precision, whereas the stone abutment masonry and colored metal for the railings ensured a seamless fit of the new bridge into the aesthetics of the Blue Ridge Parkway. It is unfortunate that travelers on the parkway won't share with the travelers on I-26 the view of the masterpiece that is carrying them across the interstate.