

## Jumper Creek Bridge Replacement

In 2007, the Florida Department of Transportation (FDOT) conducted a biannual inspection of the bridge that conveyed Sumter County Road 311W (CR 311W) over Jumper Creek. The inspection revealed significant deterioration of the bridge's substructure and deck, and it was tagged as structurally deficient. As such, it was programmed for replacement by FDOT in 2011.

CR 311W is located adjacent to I-75, just west of the City of Bushnell. When I-75 was constructed in the 1960's, it cut off access to several properties on the west side of I-75. To maintain access, FDOT constructed an extension to the main road located east side of I-75. The extension, CR 311W, crosses beneath I-75 and continues south along the west side of I-75. CR 311W extends for about 1½ miles before it dead ends, and it provides access to six properties located on the west side of I-75. The area is extremely rural, with agriculture and livestock being the primary land uses.

About ½-mile south of where CR 311W crosses beneath I-75, the road was conveyed over Jumper Creek by a one-lane, timber bridge. The bridge was built in 1960, had a total length of 212 feet, and provided 11 feet of clear width from curb to curb. The original structure had timber piles, timber decking, and a 6-inch high timber curb.



Standard FDOT bridge design would have replaced the existing bridge with a new concrete and steel structure. In addition, full implementation of FDOT roadway standards would have required two 12-foot lanes with 8-foot outside shoulders. Barrier walls would also have been required along the outside of the new structure to keep errant vehicles from falling off the bridge.



Discussions with property owners along CR 311W revealed that, in general, they wanted to limit any future growth and changes to the area. They were concerned that a large, concrete and steel bridge would open a gateway to potential development. The design team decided to explore potential Context Sensitive Solutions (CSS) that could achieve a Practical Design as well.

Because the existing roadway was very low volume, less than 10 vehicles per day, it was decided to keep the one-lane typical section. In addition, shoulders were not included on the new bridge. The relatively low design speed (30 mph) combined with the expectation that only local users would be traversing the bridge helped give the design team comfort with these decisions. The clear width of the bridge was expanded from 11 feet to 14 feet to provide a little extra margin of error for drivers. By maintaining the one-lane typical section, the design team was able to meet the needs of the bridge users and save on construction costs.

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The bridge materials were also identified as a potential Context Sensitive Solution. Instead of constructing the new bridge entirely of concrete and steel, the new structure incorporates timber as well. The substructure consists of steel piles and concrete pile caps. These elements are not easily visible and are not considered to intrude on the rural character of the area. Because of the durability of the concrete and steel, the bridge substructure should remain in place for 75-100 years.

The bridge deck, however, was constructed using glued laminated timber (glulam). By using glulam to construct the bridge deck, FDOT was able to save up-front construction costs over a much costlier concrete and steel alternative. Also, the look of the timber preserved the rural feel of the area and was met with much enthusiasm by the road users.



In addition to maintaining a one-lane bridge typical section and using timber as a construction material, the new bridge eschewed the use of barrier wall. In this case, the old bridge had been in place for nearly 50 years without any recorded incidents where an errant vehicle drove off the bridge. As a mix between CSS and Practical Design, the design team decided to replace the existing timber curb in-kind on the new structure. This approach not only saved money on barrier wall construction,

but it also helped to preserve the character of the area.



One final way in which the new design achieved both CSS and Practical Design was in the maintenance of traffic (MOT). Initial design proposed to purchase a temporary right-of-way easement adjacent to the existing bridge and construct a temporary bridge to the west of CR 311W. However, during the design process, the idea came about to enter into negotiations with the three affected property owners about potentially cutting off their access during construction. By closing the road during construction, FDOT was able to save dollars that would have been spent on the temporary bridge and shorten the project schedule. This design decision had the added benefit of minimizing the project footprint, which allowed for minimal encroachment on the vegetation in the area.