



April 19, 2016

Ted Bartlett
Dataw Island Owner's Association
100 Dataw Club Road
Saint Helena Island, SC 29920
(843) 838-8250

RE: Dataw Drive Entry Road Bridge Inspection-2016
JMT Job No. 13-0492-003

Mr. Bartlett:

On the morning of April 19, 2016 David Osgood, P.E. of JMT, accompanied by select personnel from the Dataw Island Property Owners Association, performed a cursory inspection of the Dataw Drive entry bridge. The intent of this annual inspection was to review the current condition of the bridge and inspect the condition of the repairs performed last year.

The entry bridge on Dataw Drive is a 175 foot long by 26 wide bridge, consisting of driven pre-cast, pre-stressed concrete piles, cast in place concrete pile caps and pre-stressed hollow box beams. The bridge has an asphalt overlay for a riding surface and has architectural timber trusses on both sides.

Previous inspections had observed corrosion issues in the pile caps and in the underside of the box beams. Last year a contract was let to O'Quinn Marine Contracting to perform repairs as designed by JMT. The major repairs at the pile caps included chipping away unsound concrete, replacing deteriorated reinforcing bars where appropriate, and then re-casting the concrete cap. There were concrete delaminations and spalls at the underside of the box beams as well. However, the nature of the stressing tendons in the box beams prevent a thorough repair. If the tendons were to be exposed during the repair, they would relax the stressing that is required for their load carrying capacity and weaken the bridge. The exposed tendons are mechanical cleaned then coated with a corrosion inhibitor and then cementitious patch was applied. The intent is to arrest the corrosion on the strand.

During the demolition phase of the repair work, one panel in particular was discovered to have extensive corrosion at the pre-stressing strands. A large spalled area of concrete was removed and several broken strands were exposed. JMT analyzed the box beam, based on the original design drawings, and determined that the box beams appeared to have been cast with a sufficient number of strands to accept to loss of those strands without requiring a reduction in axle loading. A special patch was applied in this area with the intent to extend the life of that panel to match the others.

This discovery of deterioration prompted a brainstorming session to determine the options for future repairs, including replacing single panels or adding additional structure to shore the panels as they decline. Through coordination with the contractor while developing costs, it was determined that replacing a single panel is a costly undertaking. It requires deconstruction of portions of the deck and traffic control during the replacement process. Other options include shoring the panels with a steel beam or using an FRP fiber wrap product to replace the tensile capacity of the bottom flange of the box.

During the inspection on April 19th, it was observed that the piles, while mostly encased by marine growth, the pile-cap interaction zone was still exposed and appeared to be in good condition, free of spalls and cracks. The repaired areas of the pile caps appeared to be in good condition. The concrete patches were tested by sounding with hammer strikes, listening for dull hollow sounds and observing any cracks or flaking under the blows. The special repair to the problem box beam was also subjected to hammer strikes and the repair appears to be satisfactory.

The areas of concern noted by Dataw personnel were reviewed. In several areas, including a few of the previously repaired areas showed signs of leaching rust stains. These areas were limited to the stirrups that run perpendicular to the bridge span. The stirrups are used in production to support the strands during casting and provide the shear capacity required by design. The leaching rust on the bottom portion of the stirrup does not create a structural concern for the bridge. It was noted on the field notes and will be inspected annually for accelerated decay. The intent is to watch until such time as it is warranted to conduct another repair contract, or until the cost benefit suggests replacing the bridge.

Replacement of the bridge with a cast in place flat slab bridge typical of the SCDOT would cost approximately \$140 per square foot, or around \$700,000. The "flat slab" is however, a strictly utilitarian style of bridge and this is just construction cost for the new bridge. There would be additional costs incurred maintaining access to the island during construction by using a temporary bridge or phased construction. While this is a considerable sum, the cost of the repairs made last year were approximately \$200,000. It is recommended that the community consider cost-benefit of the repairs vs replacement going forward.

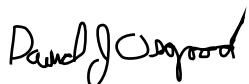
The cast in place flat slab option is listed because it is generally the best cost-benefit option in this environment. The community has other options available such as, longer spans, raising the super structure out of the spray zone and different architectural features that may be more appealing.

Overall the bridge is in good condition after the repairs were completed and the repairs have withstood very well for the first year. It is difficult to accurately predict the remaining life of the bridge or when the next repair contract will be necessary. Pre-stressed elements that are close in elevation to the salt water, as is the case, tend to have shorter than usual life spans. Part of the lower cost of pre-stressing is less concrete is used as a protective cover. This makes the steel tendons particularly susceptible to chloride attack being in the splash zone and spray zone. The tensioning of the tendon also creates a repair issue since it is difficult to slow the corrosion with a repair similar to the work on the pile caps. It is the recommendation of JMT that the community begin to prepare for the replacement or major repair work in the next 10-15 years.

If you have any questions or need further information, please do not hesitate to contact me at 843-556-2624 or dosgood@jmt.com.

Very truly yours,

JOHNSON, MIRMIRAN & THOMPSON, INC.



David Osgood, P.E.
Project Manager



Leaching rust stains from bottom of stirrups bars



Visible panel repairs



Riding surface



Bridge profile/Cap repairs



Special panel repair location