

would not increase significantly since several key elements, such as main beams, would not be replaced. The result would be the outlay of \$223,126.00 with a structurally deficient bridge still in use.

## **4. MISSISSIPPI COUNTY ROAD 521 BRIDGE OVER WILKINSON DRAINAGE DITCH**

### **4.1. Background**

County Road 521 Bridge spans Wilkinson Ditch, a major Drainage Ditch which ultimately feeds into the St. James Bayou, located in Mississippi County, Missouri. The Missouri Department of Transportation (MoDOT) has numbered the bridge 0580004. The construction date of the existing structure is 1965.

### **4.2. Existing Bridge**

The existing bridge was approximately 112 feet long and 20 feet wide. It has a concrete deck supported by steel trusses on concrete abutments. The bridge pilings are timber. The piling, which showed some deterioration prior to the flood event, have been further damaged including new fractures in piles, accelerated deterioration of piles, and some piles missing entirely. The load rating was reduced from 20 tons to 10 tons because of these structural deficiencies.

Appendix I includes photographs with views of both the bridge and the waterway.

### **4.3. Roadway**

County Road 521 is a gravel road with a forty foot right-of-way. The width of the gravel surface varies, but averages approximately twenty feet. After the flood event, loose fill was placed in the scoured areas at the end of the bridge

### **4.4. Adjacent Land Use**

The land that surrounds the bridge site consists primarily of farmland. The City of East Prairie is located approximately 8.0 miles northwest of the project area. The land in the immediate area of the proposed bridge is generally flat, and is located in the direct vicinity of the Mississippi River. The Mississippi River lies only 9 miles to the east of the bridge.

Wilkinson Drainage Ditch lies perpendicular to County Road 521, and will therefore not require a skewed bridge.

### **4.5. Waterway and Drainage Basin**

County Road 521 crosses the Wilkinson Drainage, which is a man made drainage ditch that carries flow from the surrounding area. The drainage basin upstream from the County Road 521 Bridge consists of approximately 98 square miles.

The channel has a muddy bottom and is lined with brush, small trees and other debris. Many other tributaries spill into the channel along its length to allow the surrounding area to drain.

Wilkinson Drainage Ditch winds upstream from the proposed bridge to the north for approximately 18 miles. The slope of the No. 29 Ditch was calculated using the average slopes between the 5 foot contours on the USGS Quadrangle Maps. The slope is approximately 1.61 feet per mile. This value is a good indication of the slope of the entire basin lying upstream from the bridge.

#### **4.6. Environmental, Historical, and Archeological Considerations**

To avoid adversely affecting any historic or archaeological sites in the area, the State Division of Parks, Recreation, and Historic Preservation of the Missouri Department of Natural Resources should be contacted to determine if a cultural resource assessment would be required before the existing bridge could be replaced.

To identify any sensitive environmental concerns, such as concentrated shellfish production, endangered species, or critical habitat that might be adversely affected, the Missouri Department of Conservation and U.S. Fish and Wildlife Service should both be contacted during design of any replacement bridge.

#### **4.7. Observed Damage**

The interior bents supporting the ends of the trusses have compromised pile. In a previous inspection report, severe deterioration of the north pile on the east interior bent was noted with the other pile in the bent beginning to deteriorate. After the flood event, it was observed that the south pile on the east interior bent was gone. The condition of the remaining piece of pile showed severe deterioration and the absence of the pile cannot be attributed to the flood event. In addition, no scouring, displacement of riprap, lateral deflection of the trusses, or any indication of significant horizontal load could be noted. In the absence of these indicators of water induced loading, it must be concluded that the bridge has no visible damage or visible negative impact from the flood event.

#### **4.8. Cost Estimate of Replacement Bridge**

It is our opinion that repairing the damaged bridge is not cost effective. Repairing of the structurally deficient members would require major reconstruction including removal of concrete deck, removal of beams, removal of steel trusses, new piles and new abutments. The overall load rating and life span of the bridge would not increase significantly since several key elements, such as the steel beams between the trusses and the trusses themselves, would not be replaced. Preliminary construction cost estimates were compiled for a 125' long, three span, 24' wide box beam bridge to replace the damaged bridge. A total project cost estimate of \$649,413.00 was calculated. (See Appendix G for Detailed Estimate)

PROJ: Mississippi County 521 Bridge  
 JOB #: P110231  
 DATE: 8/31/2011  
 MoDOT # 0950015

**Bid Items**

ITEM	DESCRIPTION	UNITS	QUANTITY	UNIT COST	SUBTOTAL
1	CLEARING/GRUBBING	ACRE	0.5	\$4,000.00	\$2,000.00
2	CLASS A EXCAVATION	CUYD	600	\$10.00	\$6,000.00
3	EMBANKMENT COMPACTED IN PLACE	CUYD	450	\$10.00	\$4,500.00
4	CLASS 1 EXCAVATION	CUYD	36	\$20.00	\$720.00
5	REMOVAL OF BRIDGE	LS	1	\$15,000.00	\$15,000.00
6	GRAVEL SURFACING (B)	SQYD	780	\$8.00	\$6,240.00
7	TYPE 2 ROCK BLANKET - PLACEMENT	SQYD	1500	\$40.00	\$60,000.00
8	TYPE III OBJECT MARKER	EA	4	\$200.00	\$800.00
9	MOBILIZATION	LS	1	\$30,000.00	\$30,000.00
10	SEPARATION GEOTEXTILE	SQYD	1500	\$4.00	\$6,000.00
11	14" CAST-IN-PLACE PILE	LF	1520	\$58.00	\$88,160.00
12	CLASS B-1 CONCRETE (SUBSTRUCTURE)	CUYD	25	\$775.00	\$19,375.00
13	CLASS B-2 CONCRETE (SUPERSTRUCTURE CONC. ON BOX GIRDER)	SQYD	333	\$100.00	\$33,300.00
14	PRESTRESSED CONC. BOX BEAMS	SF	3000	\$65.00	\$195,000.00
15	REINFORCING STEEL (BRIDGES)	LB	3834	\$2.00	\$7,668.00
16	BRIDGE GUARD RAIL (W-BEAM)	LF	275	\$150.00	\$41,250.00
17	BRIDGE GUARD RAIL END TERMINALS	EA	4	\$500.00	\$2,000.00
18	SEEDING/MULCHING	ACRE	0.5	\$5,000.00	\$2,500.00
19	TEMPORARY EROSION CONTROL	LS	1	\$5,000.00	\$5,000.00
20	TYPE 5 COMPACTED GRAN. FILL	CUYD	38	\$50.00	\$1,900.00
21	CONTINGENCY FOR ADDITIONAL DE-WATERING, EMBANKMENT, AND PILE	LS	1	\$45,000.00	\$45,000.00

**TOTAL CONSTRUCTION CONTRACT ESTIMATE = \$572,413.00**

**Roadway Subtotal \$67,140.00**

**Bridge Subtotal \$505,273.00**

**Engineering Design \$45,000.00**

**Construction Inspection \$32,000.00**

**TOTAL PROJECT COST= \$649,413.00**