MEMORANDUM

Missouri Department of Transportation
Bridge
Central Office

TO: Jay Bestgen -de

FROM: Dennis Heckman DH
State Bridge Engineer

DATE: December 14, 2007

SUBJECT: 2008 Awards For Excellence-Practical Design
Bridge Division Entry
Job No. J2P0482, Br. No. A7156
Route 151 over Route 36, Shelby County

We are pleased to submit this entry for the 2008 Awards for Excellence competition. The purpose of this project is to perform paving and earthwork for dual lanes from the end of divided lanes east of Macon to Shelbina. (2008-2012). This work includes an interchange at Route 151 and Route 36.

The following gives some background for this Practical Design Application. The bridge at this interchange had an original layout of a (60'-120'-107'-53') P/S Bulb-Tee Concrete Girder structure with a 32' roadway. The plans were completed and submitted to the Design Division May 16, 2007. The final cost estimate of the structure was $1,153,000 with an estimated 85 working days for construction. On May 25, Jay Bestgen informed Bridge that a Value Engineering Study had found they could save $600,000 in roadway costs by compressing the median through this stretch of road, which would mean a shorter bridge. It was also decided by the V.E. Team to narrow the bridge to 26' for additional savings.

The length of the bridge with the current 3 to 1 slopes would be too long for a P/S Bulb-Tee Concrete Girder so more research needed to be done to get the maximum savings. If a steel bridge was needed much of the savings would be lost due to the high cost of steel. The Construction and Materials Division looked into using rock wedges to allow steeper spill slopes. Bridge looked into using the tallest NU (Nebraska University) Girder to allow for a longer span with only a three-girder system. Both of these ideas were investigated and implemented. After the bridge plans were completed under this scenario it was discovered sight distance from one of the off ramps was an issue. At that time, strong consideration was given to increasing the roadway width from 26' to 31', which would considerably reduce the savings. Bridge office employees provided information and sketches, which enabled us to still use a 26' wide bridge by flaring the Northeast corner of the bridge to allow the proper site distance.

The final Bridge Memorandum included a (135'-124') 70" P/S Concrete NU Girder Spans (3 girder lines) with a 26' wide roadway flared at the Northeast corner of the bridge. The bridge also has rock wedges on the slopes to allow them to be 2 to 1 instead of the original 3 to 1 slopes. The final estimate was $694,000 with an estimated 60 working days. The total cost savings of the structure was $459,000 ($1,153,000 minus $694,000) with an estimated timesaving of 25 working days. The bridge was let in October '07 and awarded for $610,060.

If you have any questions regarding this submittal, please contact Kurt Gribble at (573) 526-0248.

Kg
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attachment

MoDOT PROJECTS
2008 APPLICATION FORM
(required for each entry)

Job No. J2P0482 **Route** 36 **County** Shelby

STIP Description (Scoping or Construction, state which STIP) Earthwork and paving for dual lanes from end of divided lanes east of Macon to Shelbina. (2008-2012)

Is the submittal for the entire project or just a portion of the project? Please explain: This submittal is just for the interchange at Rte 151 over Rte 36.

Project Manager (could have both) **MoDOT** Brian Haeffner **BRIDGE** Dean Franke

Key core team members as approved by the MoDOT PM (may include consultants) (limit of 9)

Brian Haeffner	Dennis Fessler	Bill Sadler
Dean Franke	Brandon Hansberry	Hossain Houshmand
Kevin Onstott	Dale Henderson	

Project Contacts: District Brian Haeffner **Bridge** Dean Franke

Project Budget:

Conceptual budget $990,000 **Initial STIP Budget** $ 1,153,000

Final STIP budget $1,244,000 **Award amount** $ 610,060

Other : Final Estimate after practical Design change = $694,000

Value Engineering study during design? yes ■ no ☐ (if yes) **Project Stage** Final Design

Total VE savings implemented $ Not Sure **VE Contact Person** Chris Knapp

Construction-stage VE (VECP)? yes ☐ no ■ (if yes) **Explain**

Total VECP savings $ **VECP Contact Person**

What would make this entry stand out from the rest of the entries when considering MoDOT's practical design philosophy? (In layman's terms - 100 words or fewer) The interchange was a 4 span bulb-tee bridge with: span 2 spanning EBL and existing roadway for construction traffic, 3:1 spill slopes, 32' roadway and 4 girder lines. It was discovered about 16 weeks before the letting that changes could be made which were: two span Nebraska girder bridge, excess fill eliminated by changing the ditches, 2:1 spill slopes with rock wedges, 26' roadway with 3 girder lines, flared end span at bent 3 to help with sight distance at a ramp. These changes shortened the bridge, cutting the cost of the bridge by half.

Send entries to: MoDOT Design Division, ATTN: Jay Bestgen
1320 Creek Trail Dr., Jefferson City, Missouri 65109

ALL ENTRIES MUST BE RECEIVED NO LATER THAN CLOSE OF BUSINESS ON DECEMBER 15, 2007.

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