DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA

INTERDEPARTMENT CORRESPONDENCE

FILE: CSSTP-0006-00(041) Cherokee
P. I. No.: 0006041
I-75 @ Sixes Road Interchange

OFFICE: Engineering Services

DATE: October 16, 2007

FROM: Brian Summers, P.E., Project Review Engineer REW

TO: Brent Story, P.E. State Road Design Engineer

SUBJECT: **IMPLEMENTATION OF VALUE ENGINEERING STUDY ALTERNATIVES**

Recommendations for implementation of Value Engineering Study Alternatives are indicated in the table below. Incorporate alternatives recommended for implementation to the extent reasonable in the design of the project.

ALT No.	Description	Savings PW & LCC	Implement	Comments
		ROADWAY/TRAFFIC		
S-2	Reduce Median width between Ramp Termini	$330,000	No	Since the existing bridge will be retained under Alternate B-1, it will not be possible to reduce the median width due to a slight grade difference between the existing bridge and the proposed widening.
B-3	Eliminate one turn lane on bridge	$390,000	No	Based on traffic modeling simulations, two full westbound and one full eastbound turn lane are required based on the ARC traffic projections for the year 2032.
S-4	Use AC Pavement on Sixes Road in lieu of Concrete Pavement between the Ramp Termini	$140,000	Yes	This should be done.

ALT No.	Description	Savings PW & LCC	Implement	Comments
ROADWAY/TRAFFIC - continued				
S-8	Use 11' wide turn lanes on Sixes Road instead of 12' turn lanes	$115,000 (Proposed) $70,000 (Revised)	Yes	This should be done. The existing turn lane width on the existing bridge will be retained. The turn lane widths on the widened bridge will be 11'.
RAMPS				
R-1/2/4	Retain existing Ramps; widen to the inside and use AC Pavement	$4,190,000	Yes	This should be done.
BRIDGE/ALIGNMENT				
B-1	Retain existing Bridge; build parallel structure to the North Side	$1,740,000	Yes	This should be done.
S-7	Retain existing Bridge; build parallel structure to the South Side	$2,100,000	No	This alignment would impact a cemetery on the south side of Sixes Road just east of the I-575 Interchange.
S-1	Adjust Sixes Road alignment; construct bridge in one stage	Design Suggestion	No	This would result in additional Right of Way impacts since the new bridge would have to be constructed totally separated from the existing bridge.
B-7	Construct two span bridge using MSE Wall End Abutments	$665,000	No	This scenario was based on removing and replacing the existing bridge which will now be retained.
DESIGN SUGGESTIONS				
R-5	Minimize Retaining Wall	Design Suggestion	Yes	This will be done. Since the existing ramp alignment will be retained, the need for Retaining Walls will be eliminated.
R-6	Reduce length of 2-Lane NB Exit Ramp	Design Suggestion	No	Based on the Capacity Analysis the 2 Lane NB Exit Ramp is necessary to accommodate the required turning movements coming from I-575 NB to WB Sixes Road.

A meeting was held on October 4, 2007 to discuss the above recommendations. Alex Stone with JJ & G, Andy Casey, Tim Matthews and Christopher Rudd with Road Design, and Brian Summers, Ron Wishon, and Lisa Myers with Engineering Services were in attendance. Another meeting was held on October 16, 2007 with the above personnel and additional information was provided.

The results above reflect the consensus of those in attendance and those who provided input.

Approved: Gerald MR **Date:** 10/23/07
Gerald M. Ross, P. E., Chief Engineer

Approved: Shannon Shanine. **Date:** 12/10/07
for Rodney Barry, P.E., FHWA Division Administrator

BKS/REW

Attachments

c: Gus Shanine
Todd Long
Paul Liles
Tim Matthews
Chris Rudd
Jack Muirhead
Lonnie Jones
Kenny Beckworth
Nabil Raad
Ruth Forrester
Lisa Myers

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AUG 2007 REC'D Office of Engineering Services D.O.T.

INTERDEPARTMENT CORRESPONDENCE

FILE CSSTP-0006-00(041), Cherokee County
P.I. No. 0006041
I-575 / Sixes Road Interchange

OFFICE Road Design

DATE August 22, 2007

Brent A. Story

FROM Brent A. Story, P.E., State Road & Airport Design Engineer

TO Brian Summers, P.E., State Review Engineer

SUBJECT **Value Engineering Study Report Response**

This office has received and reviewed the recommendations of the Value Engineering Study Workshop Report dated July 27, 2007. Below are our responses to the recommendations:

Alternatives:

S-2 Reduce Median Width

This alternate is recommended for implementation, pending approval of a Design Variance report during Preliminary Design.

B-3 Eliminate one turn lane on bridge

The micro-simulation modeling of the 2032 traffic conditions for the proposed interchange indicates that two full length westbound left turn lanes and one full length eastbound left turn lane between the interchange ramps are not necessary to provide adequate queuing storage for left turning traffic. Given the 1000'+ distance between these ramp intersections, the traffic analysis indicates that one full length westbound turn lane with a second nested left turn lane as well as a nested eastbound left turn lane would accommodate 2032 traffic demands.

The 2032 Build condition traffic forecasts are based on ARC projections which take into account the rapid population and employment growth expected in Cherokee County by 2032. This interchange is located in a rapidly urbanizing area of Cherokee County. Although these traffic forecasts are aggressive and are based on the best forecasting methods available, the metro-Atlanta region has many examples of interchanges where traffic demand exceeded capacity prior to their 20-year design life. As traffic volumes and demand for interstate access have increased, many interchanges within the metro-Atlanta area have become capacity constraints or choke points because of inadequate left turn storage and capacity.

By providing full length left turn lanes in both directions, this interchange concept would better separate left turning traffic from through traffic and help ensure the long term viability of this interchange. Thus it is not recommended that a left turn lane be removed from the bridge.

For these reasons, this alternative is not recommended for implementation.

S-4 AC Pavement in Sixes Road

It is well-known that major at-grade intersections with asphalt pavement sections with large truck movements exhibit excessive pavement deflections and rutting. Although the intial construction costs are reduced, the maintenance costs would be more costly over time. This increase in maintenance activity would also be a greater inconvenience to the public, as pavement rehabilitation activities would be more frequent over the lifespan of the project.

For these reasons, this alternative is not recommended for implementation.

S-8 Use 11' turn lanes

Both the existing typical and the proposed typical on the North and South side of I-575 have 12' lane widths. In order to maintain continuity through this section of roadway, it is our recommendation to continue the 12' lanes through this project as well.
For these reasons, this alternative is not recommended for implementation.

R-1/2/4 Return Existing Ramps

In the GDOT Pavement Design Manual, Chapter 11.6.1 states that due to repeated truck loadings over time, all ramps must have a full PCCP section, including all interstate interchange projects in the GDOT Construction Work Program. Based on this guideline, there is no way to effectively stage the construction of the new pavement without moving the proposed ramps away from the existing pavement.

For these reasons, this alternative is not recommended for implementation.

B-1 Retain Existing Bridge – Construct Parallel Bridge on the North Side

The approximate distances from the ends of the proposed / existing bridges to the beginning of the proposed left hand turn lanes from Sixes Road to I-575 is approximately 240'. Based on the sketches shown in the VE study, the inside bridge barriers would be located right next to each other. There will be a significant grade difference between the barriers, possibly 3 to 4', and a special design roadway barrier will be needed to attach to the bridge barriers. Assuming a profile difference between the two roadways will be 1 to 2%, it would take approximately 150' to 400' to match

the grades between the EB and WB sections. Then an attenuator would be needed at the end of each roadway barrier section. At this point in the Concept design, we do not think this is feasible and is not a preferred design.

For these reasons, this alternative is not recommended for implementation.

S-7 Retain Existing Bridge – Construct Parallel Bridge on the South Side.

This proposed layout was looked at during Concept Design and was rejected because the proposed alignment, although it was "possible" for a 45 mph roadway, would involve:

- Starting at Old Canton Highway, the proposed 4-lane project has a curve with a 350' radius that curves northward.
- The next curve, less than 100' west of the first curve, would be a 711' radius that curves southward, and is a minimum for 45 mph. Superelevation transitions between the two curves will probably be less than minimum.
- Because the existing bridge curves northward, a compound curve will be needed to match the alignment with the existing bridge. The compound curve will be near the 2:1 ratio (1100' and 2200' radii) that AASHTO states is the maximum between the radii of the two curves, resulting in a 6mph reduction in the running speeds. Again there will be a short distance between the compound curve and the 711' curve, resulting in tight superelevation transitions.
- West of the proposed bridge, a 1500' radius is needed to tie back to the existing alignment, curving northward. There will be either a very small distance between this curve and the compound curve, or this will be added to the compound curve.
- All these curves in such a short distance is not a preferred design, resulting in lower running speeds, multiple drainage challenges for a curbed roadway, reduced sight distances and overall safety.

For these reasons, this alternative is not recommended for implementation.

S-1 Adjust Sixes Road Alignment – Construct New Bridge in one Stage

This recommendation would incur additional Right of Way costs on the northeast side of the interchange, where a large development is already under construction. The VE estimate did not include all applicable costs other than just the land value when estimating the additional costs. Also – the more distance between existing and proposed alignments, the earthwork is increased, since the fill for the existing bridge cannot be used until after the new bridge approaches are completed and traffic is shifted. There is also a larger grade difference where the ramps to and from I-575 NB are located, which could cause some traffic control issues. These ramps will also need to be shifted further northward to tie to I-575 to keep a similar geometry as the existing ramps.

For these reasons, this alternative is not recommended for implementation.

B-7 Two-Span Bridge

A two-span bridge will require full-height abutments that would reduce the overall cost savings realized by reducing the bridge length. This bridge would preclude any future widening for C/D lanes in the outside spans of the current 4-span configuration.

For these reasons, this alternative is not recommended for implementation.

If there are any questions or comments concerning these recommendations, please contact Tim Matthews at (404) 656-5406.

BAS:CAC

cc: Todd Long, Director of Preconstruction
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