VE 199706

Commonwealth of Kentucky
Transportation Cabinet
Frankfort, Kentucky 40622

James C. Codell, III
Secretary of Transportation

Paul E. Patton
Governor

T. Kevin Flanery
Deputy Secretary

MEMORANDUM

TO: Value Engineering Decision Team Members
and Other Interested Parties

FROM: Daryl J. Greer, P.E.
Value Engineering Coordinator

DATE: September 10, 1997

SUBJECT: Breathitt County, KY 15
FD52 013 0015 009-026 027 D; NH 00151 030
Item No. 10-270.10
Value Engineering Study

The value engineering study for this project has been completed. Attached is a copy of the final report for your reference. Ten value opportunities for this project were presented. Five of the value opportunities involved savings totaling $5,564,000. Five of the opportunities recommended additional expenditures totaling $4,043,000.

Value Opportunity No. 1 involves raising the grade between Stations 27+280 and 28+700. This reduces excavation and improves the profile of a bridge crossing the North Fork of the Kentucky River, existing KY 15, and the railroad. A culvert would also have to be lengthened about 20 meters. The as proposed bridge was located in a sag, and providing drainage on this structure would have been difficult. The as proposed bridge also required a large sliver fill at the north abutment. This fill would be extremely difficult to construct, and bridge end problems (settlement or sliding) could have occurred. This recommendation also included lengthening the bridge to place the abutments on natural ground or in the cuts. This recommendation would require an additional expenditure of about $460,000.

Value Opportunity No. 5 involves lengthening the bridge over the railroad, the North Fork of the Kentucky River, and existing KY 15. This recommendation is similar to Value Opportunity No. 1 except that the grade of the roadway would not be raised. Lengthening the bridge would eliminate the north abutment from being placed on a large sliver fill. Abutments on large sliver fills would be prone to settlement and sliding. This proposal would require an additional expenditure of about $1,120,000.

Value Opportunity No. 1 is accepted for implementation. Comments received on the value engineering report indicated that the bridge would likely have to be lengthened during design to avoid the problems presented above. The savings from raising the grade in this area are about $1,023,000.

Value Opportunity No. 2 recommended raising the grade between Stations 40+600 to 42+250. This reduces excavation and uses more waste as embankment. The original earthwork between these stations was nearly balanced. By raising the grade the amount of fill would exceed the excavation in this section by about 1.5 million cubic meters. This would allow the use of excess fill from adjacent sections and reduce the need for waste areas. The proposed bridge over Frozen Creek would also need to be lengthened by about 20 meters, and additional quantities of culvert pipe would be required. The possible savings from this recommendation would be about $1,004,000. This value opportunity is accepted for implementation.

Value Opportunity No. 3 involves raising the grade between Stations 42+250 to 43+350. As proposed there is little fill on this section, so nearly all the excavation would be wasted. By raising the grade less excavation would be required and less material would be wasted. Some additional quantities of culvert pipe and guardrail would be required. However, by raising the grade in this area the fill slopes may spill into Boone Fork. Walls would then be needed to prevent the fills from encroaching on Boone Fork. The potential savings from this recommendation, which does not include the cost of walls, are $1,266,000. This value opportunity is not accepted for implementation.

Value Opportunity No. 4 involves adjusting the alignment to the east between approximate Stations 37+600 and 40+200. The grade through this area would also be raised. The as proposed alignment would be adjacent to existing KY 15 and could present problems with maintenance of traffic during construction. The VE alternate is located a distance away from the existing alignment and should not present maintenance of traffic problems. By taking a more cross country alignment, flatter grades can be achieved than with the as proposed alignment. However, this opportunity is not included in the environmental document. This also does not provide for access to existing KY 15 between Vancleve and Jackson. As a result, a 9.3 km section of roadway would need to be constructed in order to provide a usable segment. This proposal would require an additional expenditure of about $1,831,000. This opportunity is not accepted for implementation.

Value Opportunity No. 6 involves shortening the bridge over the railroad north of Jackson from twin, three span bridges to single span parallel structures on MSE abutments. This alternate would reduce structure length, would eliminate piers in the railroad right of way, and would require less substructure. It was noted in the review of the value engineering report that the railroad involved has not allowed the use of MSE walls adjacent to their tracks. The Rail Section of Highway Design indicated that it may be possible to get approval from the railroad if appropriate explanations are given. The possible savings from this alternate are about $860,000.

This value opportunity is accepted for implementation with the understanding that railroad approval and geotechnical analyses may necessitate the use of a three span bridges.

Value Opportunity No. 7 involves the parallel structures crossing the North Fork of the Kentucky River and KY 15 just north of Jackson. The bridges have a 17° left skew over the river and a 17° right skew over KY 15. This creates a trapezoidal section of bridge with variable span lengths. This complicates design, fabrication, and cost. The value engineering recommendation proposes a 4-span bridge over the river, a embankment section, and a single span bridge on MSE abutments over KY 15. This simplifies design and construction of the bridges. The single span structure over KY 15 eliminates a pier in the median and allows for future widening of KY 15. The possible savings from this recommendation is $1,275,000. This value opportunity is accepted for implementation with the understanding that hydraulic and geotechnical analyses must be completed to see if it is feasible.

Value Opportunity No. 8 involves the interchange north of Jackson. The alternate to the as proposed partial cloverleaf interchange was a tight diamond. The diamond interchange gives a simpler traffic operation and has less right of way impact. However, bridges over the river would be required for the ramps, and the bridge over the railroad (see Value Opportunity No. 6) would probably have to be widened for the ramp taper. These facilities would have to be constructed to provide no rise in the 100 year flood. The value engineering team originally thought that access to the trailer park would be eliminated, but further review showed that some access to the trailer park would have to be provided. While the initial value engineering opportunity indicated that possible savings would be about $1,164,000 with a diamond interchange, the addition of access to the trailer park would make this recommendation about break even. The consultant has been instructed to look at the diamond interchange to determine its feasibility.

Value Opportunity No. 9 involves extending the structure over Boone Fork near the KY 205 intersection to provide a grade separation. The as proposed intersection has both existing KY 15 and KY 205 meeting at grade. This requires left turns across traffic. By extending the structure, KY 205 can pass under the bridge and tie in directly to existing KY 15. Ramps to the as proposed KY 15 can be constructed to eliminate the need for left turns across traffic. Review of the value engineering report indicated that an additional culvert would be needed, encroachment on the flood plain may be an issue, and longer span lengths for KY 15 over Little Frozen Creek and KY 205 may increase costs. The value engineering report indicated an additional cost of about $179,000 for this recommendation. With the additional considerations listed above, the additional cost may be closer to $500,000. With the recent concerns about at grade intersections on high speed facilities, the consultant has been instructed to investigate this recommendation further.

Value Opportunity No. 10 involves the construction of a connector road from as proposed KY 15 to Jackson. The as proposed connector was to intersect proposed KY 15 at Station 34+080, cross the river, and tie directly into the downtown area. This connector would be on a 7% grade and would require the acquisition of an historic building. This is not recommended

unless no other feasible alternate exists. The value engineering alternate is to build a connector farther south on proposed KY 15 near Lick Branch. This connector would cross the river and connect to KY 1812 south of Jackson approximately halfway between Jackson and Quicksand. This alignment would provide a second access point for Jackson and more direct access for the residents of Quicksand. Some realignment of KY 1812 would be necessary. This recommendation would require an additional expenditure of about $552,500 over the cost of a downtown connector. This recommendation is not included in the current environmental document and is considered to be beyond the scope of this project. However, this recommendation can be implemented in the future as a stand alone project.

The possible savings from the implemented recommendations are about $4,162,000. We request that the value engineering staff be informed about the status of these recommendations for reporting to FHWA.

We would like to thank those who participated or assisted in making this a successful value engineering study. Please contact this office if you have any additional information or need additional information.

cc: P. Lambert
C. Raymer
W. Crace
J. Sacksteder
D. Newman
G. Best
J. Stone
S. Goodpaster
B. Madden
P. Doss - FHWA
WMB
Ventry Engineering