DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA

INTERDEPARTMENT CORRESPONDENCE

FILE: STP-0004-00(915), Bartow/Floyd
STP-19-1(15) & BHF-019-1(16) Bartow
P. I. Nos.: 0004915, 621500, & 621505
S.R. 140 Widening/Reconstruction

OFFICE: Engineering Services

DATE: February 1, 2008

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

TO: Kent Sager, District Engineer, Cartersville

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
ASPHALT PAVEMENT (AP)				
AP-1	Use Concrete in lieu of Asphalt Paving	Design Suggestion	No	Based on a Life Cycle Cost Analysis, Asphalt Paving was cheaper on an annualized basis.
AP-2	Reduce G.A. B. thickness	Design Suggestion	No	Because of the heavy truck traffic (14%), a minimum of 10" G.A.B. is recommended.
AP-3A	Reduce shoulder thickness	$643,077	Yes	This should be done.
AP-3B	Reduce shoulder thickness for Bike Lanes	$396,805	No	Since AP-3A will be implemented, this is no longer applicable.
AP-4	Relocate the Bike Lane to a Multi-Use Trail in the Urban Section	Design Suggestion	No	Would result in additional costs for Right of Way, drainage, and earthwork. A separate Pedestrian Bridge would also be required.

ALT No.	Description	Savings PW & LCC	Implement	Comments
ASPHALT PAVEMENT (AP) - continued				
AP-7	Eliminate Bike Lanes	$281,317 (proposed) $239,607 (actual)	Yes	The Bike Lanes (Shoulders) will be eliminated in the rural sections and the Bike Lanes will be kept in the urban section that is on the Statewide Bicycle Route.
AP-8	Utilize existing pavement to be removed (Recycle)	Design Suggestion	Yes	This should be done.
AP-10	Increase turning radii for trucks	Design Suggestion	Yes	This should be done.
AP-11	Re-evaluate the location of "Eyebrow Pavement"	Design Suggestion	No	The additional "Eyebrow Pavement" has been included where needed.
AP-12	Use Type "B" Median Crossovers	Design Suggestion	Yes	This should be done.
AP-13	Eliminate intersection @ Old Dixie Highway (Old U.S. 41) and retain right in-right out (Also see BR-4)	$67,060	No	Based on input from the Local Officials, this intersection will remain open and will be signalized.
AP-14	Remove the connection of CR 320 at Sta. 303+99.60	Design Suggestion	Yes	This should be done.
AP-15	Increase the outside shoulder to 12' with 10' paved	Design Suggestion	No	Would result in additional Right of Way and earthwork costs.
EARTHWORK (EW)				
EW-1	Use a "Bifurcated" Profile Grade in selected areas	$110,138	Yes	This should be done.
EW-2	Raise the Profile Grade in selected areas	$253,000	Yes	This should be done.
EW-3	Use More Retaining Walls (or Keystone™ Walls) in select areas	Design Suggestion	Yes	This will be done where soil conditions will allow.
EW-5	Identify local waste areas	Design Suggestion	No	It will be the Contractor's responsibility to provide a suitable waste site.

ALT No.	Description	Savings PW & LCC	Implement	Comments
BRIDGES (BR)				
BR-1	Shorten CSX Bridge	$49,934	No	Does not apply since BR-6 will be implemented.
BR-3	Use separate structures for Bikes and Pedestrians	Design Suggestion	No	Would result in additional costs for Right of Way, drainage, and earthwork. A separate Pedestrian Bridge would also be required.
BR-4	Eliminate Left Turn Lane from CSX Bridge (Also see AP-13)	$113,992	No	This Left Turn Lane goes to Old Dixie Highway (Old U.S. 41) which is being left open under AP-13.
BR-6	Use single span with walled abutments on CSX Bridge	$181,728 (proposed) $761,455 (actual)	Yes	This should be done. (A more detailed Cost Estimate resulted in the increased actual savings.)
BR-8	Combine Bike and Pedestrian walkway to 8' in lieu of 6' shoulder and 3' Bike Lane	$7,588	No	This is in the urban section that is on the Statewide Bicycle Route so the Bike Lanes will remain.
BR-9	Reduce Oothkalooga Creek bridge width by reducing median width	$212,679	No	Would not be able to provide adequate transition length for the Left and Right Turn Lanes that are just beyond the bridge.
BR-10	Use Keystone™ Wall in lieu of Concrete Retaining Walls	$1,071,224	Yes	This should be done.
RIGHT OF WAY (RW)				
RW-1	Modify Right of Way at Sta. 187+50	Design Suggestion	Yes	This should be done.
RW-3A	Reduce median widths in rural sections	$757,347	No	A more detailed Cost Estimate revised the cost savings to $560,000. This cost savings would be offset by additional Consultant re-design costs.
RW-3B	Reduce median width to 24' in rural sections	$1,071,224	No	A revised Cost Estimate which shows more accurate quantities and includes longitudinal drainage items which were omitted now shows this to be more costly by $49,000.

ALT No.	Description	Savings PW & LCC	Implement	Comments
DRAINAGE (DR)				
DR-1	Acquire Temporary Drainage Easements	Design Suggestion	Yes	This should be done.
DR-6	Relocate Cattle Crossing Structure at Sta. 205+80	Design Suggestion	Yes	This should be done.

A meeting was held on January 31, 2008 to discuss the above recommendations. Brendetta Walker and Beniquez Jones with PB Americas, Inc., David Moore and Joseph Ciavarro with District Preconstruction, and Brian Summers, Ron Wishon and Lisa Myers with Engineering Services were in attendance.

Additional information was provided by the Design Consultant on January 31, 2008.

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

Approved: Donald M Ross **Date:** 1/30/08
Gerald M. Ross, P. E., Chief Engineer

BKS/REW

Attachments

c: Gus Shanine
Todd Long
DeWayne Comer
David Moore
Joe Ciavarro
Paul Liles
Bill Ingalsbe
Bill Duvall
Jenny Harris-Dunham
Galen Barrow
James Magnus
Kenny Beckworth
Ken Werho
Jan Lystad
Lisa Myers

DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA

INTERDEPARTMENT CORRESPONDENCE

FILE STP-0004-00(915); STP-19-1(15); BHF-019-1(16)
P.I. No. 0004915; 621500; 621505
SR 140 Widening and Reconstruction

OFFICE Atlanta, GA

DATE January 14, 2007

FROM Curtis Dewayne Comer, P.E., District 6 Preconstruction Engineer

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

SUBJECT **Value Engineering Study - Responses**

Reference is made to the recommendations that were contained in the Value Engineering Study Final Report dated August 16, 2007 for the above referenced projects. Our responses and recommendations are as follows:

1. **Value Engineering Alternative AP-1** – Use concrete in lieu of asphalt paving.
   Approval of the VE Alternative AP-1 is not recommended.
   - A life cycle cost analysis was done to compare the costs of concrete and asphalt paving. The annualized cost of flexible pavement was $101,923 and $115,955 for rigid pavement.
   - See attached spreadsheet

2. **Value Engineering Alternative AP-2** – Reduce G.A.B. thickness.
   Approval of the VE Alternative AP-2 is not recommended.
   - The soil survey recommends a minimum 10" of GAB. The pavement design uses 12" with consideration of the high truck traffic.

3. **Value Engineering Alternative AP-3A** – Reduce shoulder thickness.
   Approval of the VE Alternative AP-3A is recommended.
   - Shoulders of reduced thickness will be used if the width of shoulder is not needed for staging construction traffic
   -

4. **Value Engineering Alternative AP-3B** – Reduce shoulder thickness for bicycle lane.
   Approval of the VE Alternative AP-3B is not recommended.
   - See response to AP-3A.
   - A paved shoulder with a combination full depth and reduced depth cross section would be subject to rutting from truck traffic that strays onto the shoulder.

5. **Value Engineering Alternative AP-4** – Relocate the bike lane to a multi-use trail in urban section.
   Approval of the VE Alternative AP-4 is not recommended.
   - Relocating the bike lane to a multi-use trail will increase the scope and cost of the project, requiring additional right of way acquisition, a pedestrian bridge, drainage design, earthwork and maintenance.
   - Additional coordination and agreements with the City of Adairsville and/or Bartow County will be required.

- See BR-3 response

6. **Value Engineering Alternative AP-7** – Eliminate bicycle lanes.
   Approval of the VE Alternative AP-3B is recommended.
   - With the high volume of truck traffic (14%) bicycle lanes on the paved shoulders may pose a safety concern.
   - The bicycle lanes can be removed and the paved shoulder widths can be reduced from 7.5' to 6.5'.

7. **Value Engineering Alternative AP-8** – Utilize existing roadway to be removed
   Approval of the VE Alternative AP-8 is not recommended.
   - Utilizing the existing roadway and full width shoulders will cause more environmental impacts by encroaching into the stream buffer.
   - Using the existing roadway will require us to use to existing profile

8. **Value Engineering Alternative AP-10** – Increase turning radii for trucks.
   Approval of the VE Alternative AP-10B is recommended.

9. **Value Engineering Alternative AP-11** – Re-evaluate the location of "Eyebrow Pavement".
   Approval of the VE Alternative AP-11 is not recommended.
   - The eyebrow pavement is located to safely allow U-turns

10. **Value Engineering Alternative AP-12** – Use Type "B" median crossovers.
    Approval of the VE Alternative AP-12 is recommended.

11. **Value Engineering Alternative AP-13** – Eliminate intersection @ Old Dixie highway (Old US 41) and retain right-in-right-out (Also see BR-4)
    Approval of the VE Alternative AP-13 is not recommended.
    - The City of Adairsville has requested that this intersection be open to thru traffic. Further coordination with the city will be needed to change access to the local roads.
    - This intersection is proposed to be signalized.

12. **Value Engineering Alternative AP-14** – Remove the connection of CR 320 @ Station 303+99.60
    Approval of the VE Alternative AP-14 is recommended.

13. **Value Engineering Alternative AP-15** – Increase outside shoulder to 12' with 10' paved.
    Approval of the VE Alternative AP-15 is not recommended.
    - An increased shoulder width will increase right of way and earthwork costs. Increasing the project footprint will also increase environmental impacts and encroach within the stream buffers.

14. **Value Engineering Alternative EW-1** – Use "Bifurcated" Profile Grade in selected areas.
    Approval of the VE Alternative EW-1 is recommended.
    - The roadway alignment and roadway earthwork cross sections will be reviewed to determine areas where bifurcated/split profile grades can be utilized to reduce earthwork quantities.

15. **Value Engineering Alternative EW-2** – Raise the Profile Grade in selected areas.
    Approval of the VE Alternative EW-2 is recommended.
    - The roadway alignment and roadway earthwork cross sections will be reviewed to determine areas where raising the profile grade can reduce earthwork quantities.
    - The current design mirrored the existing roadway profile while maintaining a 55 mph speed design in the event that the existing pavement was suitable for overlaying instead of full depth replacement.

16. **Value Engineering Alternative EW-3** – Use more Retaining Walls (or Keystone™ Walls) in select areas.
    Approval of the VE Alternative EW-3 is recommended.
    - Additional geotechnical data may have to be gathered to meet technical specifications

17. **Value Engineering Alternative EW-5** – Identify local waste areas.
Approval of the VE Alternative EW-5 is not recommended
    - Identifying local waste areas is not within the project scope.

18. **Value Engineering Alternative BR-1** – Shorten CSX Bridge.
Approval of the VE Alternative BR-1 is recommended.
    - See BR-6 response.

19. **Value Engineering Alternative BR-3** – Use separate structures for bikes and pedestrians.
Approval of the VE Alternative BR-3 is not recommended
    - Assuming the bike lanes are relocated out of the travelway on the roadway, separate bike lanes and sidewalks will require a pedestrian bridge, and additional right of way. The pedestrian bridge may have environmental impacts on the Oothkalooga Creek and require additional permitting from the railroad.
    - See AP-4 response.

20. **Value Engineering Alternative BR-4** – Eliminate left turn lane from CSX Bridge (Also see AP-13).
Approval of the VE Alternative BR-4 is not recommended.
    - The left turn lane facilities movement onto N. Main into the City of Adairsville.
    - See AP-13 response.

21. **Value Engineering Alternative BR-6** – Use single span with walled abutments on CSX Bridge.
Approval of the VE Alternative BR-6 is recommended.
    - The GDOT Bridge Design Manual indicates that MSE Wall Abutments are permissible for grade separations.
    - The bridge will be shortened and changed to a single span, but the required 25 ft. horizontal clearance to the face of wall will still be provided.
    - See BR-1 response.

22. **Value Engineering Alternative BR-8** – Combine bike and walkway to 8' in-lieu of 6' shoulder and 3' bike lane.
Approval of the VE Alternative BR-8 is not recommended.
    - A combination 8' bike and walkway in lieu of a 6' shoulder on the bridge would need to tie to a corresponding roadway typical section.
    - See AP-7 response

23. **Value Engineering Alternative BR-9** – Reduce Oothkalooga Creek Bridge width by reducing median width.
Approval of the VE Alternative BR-9 is not recommended.
    - The median width is needed to allow for the transition for the left turn lane at Hall Station.

24. **Value Engineering Alternative BR-10** – Use Keystone™ in-lieu of concrete retaining walls.
Approval of the VE Alternative BR-10 is recommended.
    - Pre-fabricated walls will be considered based on soil conditions, cost, and constructability. Final approval will be made by GDOT.

25. **Value Engineering Alternative RW-1** – Modify ROW @ Station 187+50.
Approval of the VE Alternative RW-1 is recommended.

26. **Value Engineering Alternative RW-3A** – Reduce median widths in rural sections.
Approval of the VE Alternative RW-3A is not recommended.
    - The median provides separation of the opposing traffic streams. Generally the greater the separation the greater the safety.

- One reason for the 44' median is that it facilitates the use of the Type B Median Openings. The remaining 8' of grass (this assumes 4' inside shoulders) can be depressed and carry some stormwater runoff away from the intersection.
- If the area develops in the future, the 44' median also allows a lane to be added in each direction to the inside and still have a 20' raised median.

27. **Value Engineering Alternative RW-3B** – Reduce median widths to 24' in rural section.
Approval of the VE Alternative RW-3B is not recommended.
    - See response to RW-3B.
    - A 24' median would reduce this to only a 4' grass strip (this assumes 4' inside shoulders) with much-reduced stormwater capacity.

28. **Value Engineering Alternative DR-1** – Acquire temporary drainage easement.
Approval of the VE Alternative DR-1 is recommended
    - The RW office requires all easement to be shown as permanent. The drainage easement will be shown as permanent easement and revised during right of way negotiations.

29. **Value Engineering Alternative DR-6** – Relocate Cattle Crossing structure @ Station 205+80.
Approval of the VE Alternative EW-1 is recommended.

STP-0004-00(915) Bartow/Floyd County PI No. 0004915

Flexible Pavement			**Rigid Pavement**				
AC 12.5 mm	1.5	inches	Plain PCC	12	inches		
AC 19 mm	3	inches	Econocrete	0	inches		
Base 25 mm	7	inches	GAB	12	inches		
GAB	12	inches					
Length	7.000	miles	AC Wt =	115	lbs/yd^2/in		
No. Lanes	4		TackCoat=	0.035	gal/sqyd		
Lane Width	12	ft	GAB Wt =	150	lbs/cuft		
Inside Shld	0	ft					
Outside Shld	0	ft					
Flexible Pavement Initial Construction Cost							
	Sq Yd/Mi	tons/SqYd	Tons/Mile	Cost/Ton	Cost/Mile		
AC 12.5mm	28160	165	2323	87.1	202351		
AC 19mm	28160	220	3098	80.7	249976		
Base 25 mm	28160	550	7744	82.72	640584		
GAB	28160		Cost/Yd^2	21.99	619238		
Tack Coat	2957	Gal/Mile	Cost/Gal	2.3	6801		
				Total	$ 1,718,950	/mile	
Rigid Pavement Initial Construction Cost							
	Sq Yd/Mi	Cost/Yd^2	Cost/Mile				
Plain PCC	28160	65.41	1841945.6				
Econocrete	32853	0	0				
or	Sq Yd/Mi	tons/SqYd	Tons/Mile	Cost/Ton	Cost/Mile		
Base 25 mm	32853	550	9034.66667	82.72	$747,347.63		
	Tons/Mile	Cost/Ton	Cost/Mile				
GAB	19008	21.99	417986				
				Total	$ 2,259,932	Econocrete Alternate	
					$ 3,007,279	AC Base Alternate	
Total Initial Construction Cost							
Flexible Pavement			**Rigid Pavement**				
12.5 mm	202351		Plain PCC	1841945.6			
19 mm	249976		Econocrete	0			
25 mm	640584		GAB	417986			
GAB	619238						
Tack Coat	6801						
	$1,718,950	/mile		$2,259,932	/mile		
Future Rehabilitation Cost							
Flexible Pavement: 1.5" AC "E" Overlay at 10-years and 20-years							
	Sq Yd/Mi	Lbs/SqYd	Tons/Mile	Cost/Ton	Cost/Mile		
AC 12.5mm	28160	165	2323	87.1	202351		
		Gal/Mile		Cost/Gal			
Tack Coat	28160	986		2.3	2267		
	Percent	Sq Yd/Mi		Cost/Sq Yd			
Milling	15	4224		1.23	5196		
					$ 209,813	/mile	

Rigid Pavement: Joint resealing at 20-years							
5280 ft/mile * 20 ft/slab = 264 slabs/mile = 264 joints/mile							
Both directions: 2 * 264 joints/mile =				528	joints/mile		
Linear feet/joint =		24	ft/joint				
Linear feet transverse joints =			12672	lnft/mile			
Linear feet longitudinal joints =			0	lnft/mile			
		Total	12672	lnft/mile			
		Unit Cost=	$ 2.87	/lnft			
		Total Cost	$ 36,369	/mile			
Rigid Pavement: Slab Replacement and Grinding at 40-years							
	Sq Yd/Mi	Percent	Cost/Yd^3	Cost/Mile			
Plain PCC	28160	5	196.80	87671			
			Cost/Yd^2				
Grinding	28160	100	2.70	76032			
			Total Cost	$ 163,703	/mile		
Traffic Control Cost							
Flexible Pavement =		$5,000	/mile				
Rigid Pavement =		$10,000	/mile				
Present Worth of Future Rehabilitation							
Discount Rate =		3	%				
Flexible Pavement							
10-year Rehabilitation Cost =			$ 214,813				
10-year Present Worth =			$ 159,841				
20-year Rehabilitation Cost =			$ 214,813				
20-year Present Worth =			$ 118,937				
Rigid Pavement							
20-year Rehabilitation Cost =			$ 46,369				
20-year Present Worth =			$ 25,673				
Total Present Worth							
Flexible Pavement				**Rigid Pavement**			
Initial Cost =		$ 1,718,950		Initial Cost =		$2,259,932	
10-yr Rehab =		$ 159,841		20-yr Rehab =		$ 25,673	
20-yr Rehab =		$ 118,937					
30-yr Salvage Value =		$ -		30-yr Salvage Value =		$ (12,837)	
		$ 1,997,728				$2,272,768	
Annualized Cost over 30-year Life							
Flexible Pavement				Rigid Pavement			
	$ 101,923	/mile			$ 115,955	/mile	

PB Americas, Inc.
COMPUTATION SHEET

Page 1 of 1
Made by SDM
Date 1/9/08
Checked by [illegible]
Date 1-9-08

Subject SR 140 over CSX RR - Bartow County
PI#621505 MSE Wall Cost Analysis

MSE Wall Cost

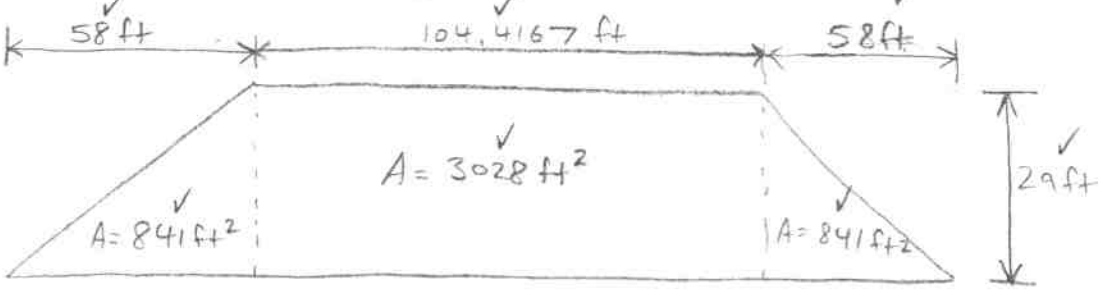
Avg Grade El @ Bents 2 & 3: $\frac{728.39 + 727.01}{2} = 727.7$

Super Str. Depth = 4 ft
Cap Depth = 2 ft

Top of Wall ≈ 727.7 − 6 ft = 721.7

Base of Wall = 695 (ex. grd.) − 2 ft = 693

Wall Ht = 721.7 − 693 = 28.7 ft ≈ 29 ft



Total Wall Area = 4710 × $35 per sf × 2 walls = **$329,700**
Wall Cost

Bridge Shortening Savings

Can shorten approx 55 ft from each end, 110 ft total

(104.4167)(110 ft)($795 per sf) = **$1,091,155**
Bridge Savings

Total Savings = $1,091,155 − $329,700 = **$761,455**
Total Savings

* See Value Engineering Report Comment BR-6

Wishon, Ron

From: Walker, Brendetta [WalkerB@pbworld.com]
Sent: Thursday, January 31, 2008 4:49 PM
To: Wishon, Ron; Myers, Lisa; joe.ciavarro@dot.state.ga.us; Moore, David
Cc: Jones, Beniquez
Subject: SR 140 Reduced Median Width Calculations
Attachments: Reduced Median Width Calculations.pdf

Ron,
Here are the calculations that were done to look at the costs of reducing the median widths on SR 140.

Brendetta H. Walker, PE
Senior Engineer

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PARSONS BRINCKERHOFF COMPUTATION SHEET

Page 1 of 3

Made by RM

Date 11/31/08

Checked by

Date

Subject Value Analysis Design Alternatives
RW-3A Retaining Median Wall 32'

32' Median Earthwork Savings

3150 LF – Length of wall section

Soil excavation of wall section, in approx Sta 1490+50
49061 cy (based on earthwork notes)

49061 cy = 1324647 cf

1324647 cf ÷ 3150 = 420.52 sf

For average width of earthwork (10')
420.52 = 2'
210

A 32' median is reduced 12' from original 44' design

Median = 12'

Approximate earthwork reduction = 12 x 2 x 3150 = 75,600 cy
= 28,000 cy

ROW Acquisition 8.68 x 50,000 = $434,000
Earthwork 28,000 x 4.50 = $126,000

RW-3A Savings $560,000

PARSONS BRINCKERHOFF COMPUTATION SHEET

Subject Value Analysis Design Alternate
TW 3B Widening Median Width = 24'

Page 2 of 3
Made by Burton
Date 1/31/08
Checked by
Date

24' Median Earthwork Savings

31500 = Length of typical Section

Soil excavation 490,111 cy = 13246197 cf

13246197 ÷ 31500 = 420.52 sf

42052 ÷ 210 = 2' Average = 20'

Approximate earthwork reduction = 20 x 2 x 31500
= 1260000 cf
= 46667 cy

Longitudinal drainage Approximately

126 catch basins @ 500' x 2000 = $252,000
12,000 cf 18" RCP x 36 = $432,000

60,000 LF Curb & Gutter x 15 = $900,000

subtract Median Drains
84 Catch Basins, 12000 cf 12" RCP

Drainage
41 x 2000 = $82,000 Catch Basins
$900,000 Curb & Gutter
[$982,000]

PARSONS BRINCKERHOFF
COMPUTATION SHEET

Page 3 of 3
Made by R. Walker
Date 1/31/08
Checked by
Date

Subject Value Analysis Design Alternate
RW-3B Retaining Wall [illegible] 4'

Earthwork Savings 96,667 x 4.50 = $210,000

R/W Savings 14.46 x 50,[illegible] = $723,[illegible]

$933,[illegible]

Less Drainage Cost: -$882,000

RW-3B Savings $ -49,000

Longitudinal Drainage System negates
Cost Savings