

# Value Engineering Study Report

## Project SR 72 Widening & Relocation Federal Aid Project

Madison County



P.I. No. 122100  
*EDS-72(28)*



Value Management Team



Design Team:

Parsons Brinckerhoff Quade and Douglas, Inc. (PB)

March 2007



April 10, 2007

**Lisa L. Myers**  
Design Review Engineer Manager  
**Georgia Department of Transportation**  
#2 Capitol Square, Room 266  
Atlanta, GA 30334

RE: Submittal of Value Engineering Study Report  
Project Task Order No. 8 – Contract TOOESV06796  
Project SR 72 Widening & Relocation  
Project No. EDS-72(28) – P.I. Number: 122100  
County Madison

Dear Ms. Myers:

We are pleased to submit this one (1) CD-ROM copy of the PDF version of the report and one (4) hard copies of the final value engineering report for the above noted project. This Value Engineering workshop was performed during the week of March 26 – March 29, 2007. The team fielded by PBS&J was able to identify thirty eight creative ideas and, in the end produced nine alternatives that have the potential for affecting the cost of constructing these new facilities. In addition, the team has provided three design suggestions that could help create an even stronger end product as the design moves to construction.

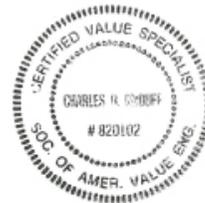
We trust that you will find this report to be in proper order. It should be noted that the results of this workshop are volatile in that they can be overcome by the events that accompany the expeditious continuance of the design process. Accordingly, we encourage an equally expeditious implementation meeting to design the disposition of the contents of this report.

Thank you very much for this opportunity to work with you and the hard working staff of the Georgia Department of Transportation.

Yours truly,

**PBS&J**

**Charles R. McDuff, PE, CVS, CCE**  
Project Manager



**Certified Value Specialist - Life**  
Certification No. 820102

# *Value Engineering Study Report*

## *SR 72 Widening and Relocation Madison County, Georgia*

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## *Executive Summary*

# *Executive Summary*

## **INTRODUCTION**

This report summarizes the analysis and conclusions by the PBS&J Value Engineering workshop team as they performed a VE study during the period of March 26 – 29, 2007 in Atlanta, at the office of the Georgia Department of Transportation. The subject of the Value Engineering study was the project for the Widening and Relocation of State Route 72 (Federal Aid Project EDS-72(28) – P.I. No. 122100) in Madison County, Georgia. The design is being performed by Parson Brinckerhoff Quade Douglas, Inc. (PB).

## **PROJECT DESCRIPTION**

Georgia DOT Project EDS-72(28), P.I. No. 122100 is located in Madison County is proposed to improve State Route 72 from a two and three lane rural roadway to a rural four lane roadway with a 20 foot raised median. It begins at SR 172 and widens SR 72 by adding two lanes with a 20 foot raised median to the north side of the existing roadway. It ends at the west Comer City limits, 3,600 feet east of South Fork Broad River for a total length of 2.8 miles. The revised concept (see enclosed documents – with hand written comment dated 22 September 2000) provides the recommendation that the western termini be revised from SR 172 to 1,800 feet east of SR 172. This shift removes the overlap with the previous project EDS-72 (35), which includes the improvement of the SR 172 intersection. The total length changes from 2.8 miles to 2.5 miles, which is from milepost 7.1 to milepost 9.6.

It is recommended that the typical section be changed from a 20 foot raised median to a 44 foot depressed median from CR 325 to project EDS-72 (39) at the west city limits of Comer. The change in typical section on the project it ties into. This would increase the right-of-way from 185 feet to 250 feet. The 20-foot median section remaining would be used to tie into the 20-foot median section for project EDS-72(35) at SR 172. This is noted as being a recommended exception to the median design guidelines.

The project has been designed to include the demolition of the existing bridge and its replacement with two bridges (one east and one westbound).

This project is rather fully described in the documentation that is located in Tab 4 of this report, entitled *Project Description*. The current new estimate for the cost of construction, provided to the VE team, totals \$21,814,126. This is composed of \$9,231,863 total construction cost, \$12,418,000 for right-of-way, and \$164,263 for reimbursable utilities.

## VALUE ENGINEERING PROCESS

The Value Engineering team followed the seven step Value Engineering job plan as promulgated by the Georgia Department of Transportation. This seven step job plan includes the following:

- Investigative
- Analysis
- Speculation
- Evaluation
- Development
- Recommendation
- Presentation

This report is a component of the Presentation Phase. As part of the VE workshop in Atlanta, the team made an informal presentation of their results on the last afternoon of the workshop. This report is intended to formalize the workshop results and set the stage for a formal implementation meeting in which alternatives and design suggestions will typically be accepted, accepted with modifications, or rejected for cause. The worksheet that follows, along with the formally developed alternatives and design suggestions can be used as “score sheet” for the implementation meeting. It is also included in this report to identify, on a summary basis, the results of the workshop. The reader is encouraged to visit the third tabbed section of this report for a review of the details of the study results. Tabbed section number four includes information about the project itself and tabbed section number five goes into more detail about the process of Value Engineering, as used in this workshop.

Again, as mentioned earlier, the enclosed Summary of Alternatives and Design Suggestions, coupled with the documentation of the developed alternatives in the tabbed section of the report entitled *Study Results*, should provide the reader with the information required to fully evaluate the merits of the alternatives that the VE team documented during their work in the study.

## CONCLUSIONS AND RECOMMENDATIONS

The Value Engineering job plan worked well during this team effort. The information phase included an excellent presentation by the Project Delivery Team from Georgia DOT and by their consultant design team leader from PB. What was highlighted in that presentation and in the analyses subsequently performed by the VE team was that the following items emerged as the high cost centers of interest for this Value Engineering workshop:

- Right-of-Way
- Asphalt Pavement

- Unclassified Excavation
- Graded Aggregate Base Course
- Construction of West Bound Bridge
- Construction of East Bound Bridge

Weighing heavily on the final cost for the first four of the items listed above was the make-up of the typical section for the roadway. Most notably, most of the typical section application calls for the use of a 44' wide depressed median, necessitating a 250' wide final right-of-way width, hence, making the cost of the right-of-way exceed the total construction cost. Some of the offerings by the VE team, to help address all of these key costs, are depicted in the third tabbed section of this report entitled *Study Results* and are summarized below:

**Asphalt Pavement** – the team noted in alternative AP-1 that there appeared to be an opportunity to make use of some of the transitional pavement near the beginning of the job – pavement slated for removal and replacement. It is pointed out that this pavement might be reused in place resulting in nearly \$500,000 in construction cost savings. Alternative AP-9 suggests the possibility of reducing the thickness of the pavement strata in the rural pavement typical section. This appeared to be normally acceptable practice, however, the pavement design emerged from the in-house process in a format more closely reflecting an urban or suburban design section. If this alternative is found to be acceptable, approximately \$300,000 in cost savings may be realized.

**Unclassified Excavation** – alternative UE-3 calls for the consideration of going from the current roadway typical section with a 44' depressed median to a 36' depressed median. This approach maintains some of the rural “feel” for the roadway’s appearance while not yielding the benefits of a wide median, but significantly reducing the earthwork and some of the right-of-way costs. The approximate cost savings associated with this alternative is \$1.5 million. There is also a Design Suggestion that encourages the fine tuning of the vertical alignment to help make sure that the unclassified excavation is minimized.

**Construction of Bridges** – there are four alternatives that relate to the bridges that are to be constructed. Alternative UE-1 and -3 could work together to create possible cost savings of approximately one million dollars. The key decision relates to whether or not the currently designed turning lane (on the Eastbound Bridge) is deemed to be necessary to handle the limited traffic turning onto Brickyard Road. The other two alternatives variations on this theme.

**Right-of-Way** – the largest potential cost savings is based on very significant reductions in the right-of-way taking width. This would be accomplished through the reduction of the depressed median width to 20 feet (from 44') and substitution of a 20' wide raised median for the entire length of the project. This is a rather radical departure from the current roadway typical section, however, the cost of this decision is close to four million dollars.

These and the other alternatives and design suggestions may be reviewed more thoroughly where they are documented in the third tab of this report entitled *Study Results*.

**SUMMARY OF ALTERNATIVES & DESIGN SUGGESTIONS**

Georgia Department of Transportation  
 EDS-72(28) -- Madison County -- P.L. No. 122100

Alternative Number	Description of Alternative	Initial Cost Savings	COMMENTS	FINAL DISPOSITION
<b>(AP) ASPHALT PAVEMENT</b>				
AP-1	Selectively use sections of existing asphalt	\$492,870		
AP-9	Use reduced pavement section for rural depressed median section	\$317,055		
<b>(UE) UNCLASSIFIED EXCAVATION</b>				
UE-3	Reduce the width of the depressed median	\$1,546,614		
UE-4	Adjust profile grade to minimize earthwork	Design Suggestion		
<b>(RB) REMOVE BRIDGE</b>				
RB-1	Keep portions of existing bridge	Design Suggestion		
<b>(CB) CONSTRUCTION OF BRIDGES</b>				
CB-1	Shorten westbound bridge	\$299,640		
CB-2	Combine east and westbound bridges	\$458,503	Includes keeping turn lane	
CB-3	Combine east and westbound bridges	\$840,420	No turn lane	
CB-8	Eliminate turning lanes at Brickyard Road	\$408,030		
<b>(RW) RIGHT-OF-WAY</b>				
RW-1	Use 20 foot raised median for entire length of project	\$3,974,863		
<b>(MD) MISCELLANEOUS IDEAS</b>				
M-1	Review location of precast median barrier in stage construct	\$258,104		
M-2	Relocate intersection of Brickyard Road	Design Suggestion		

## *Study Results*

# *Study Results*

## **Introduction**

This section includes the study results presented in the form of fully developed value engineering alternatives that include descriptions of the original design, description of the alternative design configurations, opportunities and risks associated with the alternatives, sketches, calculations and technical justification for these alternatives. For the most part, these fully developed alternatives represent an array of choices that clearly could have an impact on the eventual cost and performance of the finished project.

The documented alternatives also include three Design Suggestions. As their name implies, these are short write-ups making note of VE perspectives on technical issues and sharing some thoughts for consideration as the design moves forward.

This introductory sheet is followed by a *Summary of Alternatives & Design Suggestions* table which provides the reader with the listing of the developed alternatives and design suggestions and an indication of their potential cost impact on the project. This table may also be used as a “score sheet” during an implementation meeting if desired. It should be noted that the alternatives that are included, which have cost estimates attached are not necessarily representative of the final cost outcome for each alternative. Some of these alternatives have components that are mutually exclusive so they may not be added together.

The users of this report are asked to consider these alternatives and design suggestions as a smorgasbord of choices for selection and use as the project moves forward.

## **Cost Calculations**

The cost calculations are intended only as a guide to the approximate results that might be expected from implementation of the alternatives. They should be helpful in making clear choices as to the pursuit of individual alternatives.

The composite mark-up of 10% for the construction cost comparisons was derived from the cost estimate for the project. This estimate can be found in the section of this report entitled *Project Description*.

**SUMMARY OF ALTERNATIVES & DESIGN SUGGESTIONS**

Georgia Department of Transportation  
 EDS-72(28) -- Madison County -- P.L. No. 122100

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M-2	Relocate intersection of Brickyard Road		Design Suggestion	

# Value Analysis Design Alternative



PROJECT: GEORGIA DEPARTMENT OF TRANSPORTATION  
 Project No. EDS-72(28) – Madison County – P.I. Number: 122100

ALTERNATIVE NO.:  
**AP-1**

DESCRIPTION: **SELECTIVELY USE SECTIONS OF EXISTING ASPHALT**

SHEET NO.: 1 of 5

**Original Design:**

The original design specifies construction of a full depth 23.5 inch pavement section. The first 3700 linear feet of construction closely follows the vertical and horizontal alignment of the existing road. Construction would require removal of the existing asphalt and aggregate base material.

**Alternative:**

The alternative design would utilize much of the existing roadway pavement during the reconstruction of the new westbound lane. The existing roadway would be overlaid with asphaltic concrete leveling to obtain the proper grade and cross slope and then resurfaced with 12.5 mm superpave.

**Opportunities:**

- Initial cost savings
- Reduced construction time

**Risks:**

- Need to know more about the existing pavement section to make sure that this alternative will work properly

**Technical Discussion:**

A visual inspection of the project site indicated that the pavement appears to be in satisfactory condition. Addition of Section 149, Construction Layout, to the project would result in a “best fit” design if the pavement was left in place. Project cross sections show the new pavement to be above the existing pavement except in three isolated areas, Sta 108+00 – Sta 115+00, Sta 122+00 – Sta 124+50, and Sta 139+50 – Sta 141+50. A minor adjustment of the profile grade would likely be required in these areas.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 5,786,309	\$	\$ 5,786,309
ALTERNATIVE	\$ 5,293,439	\$	\$ 5,293,439
SAVINGS	\$ 492,870	\$	\$ 492,870

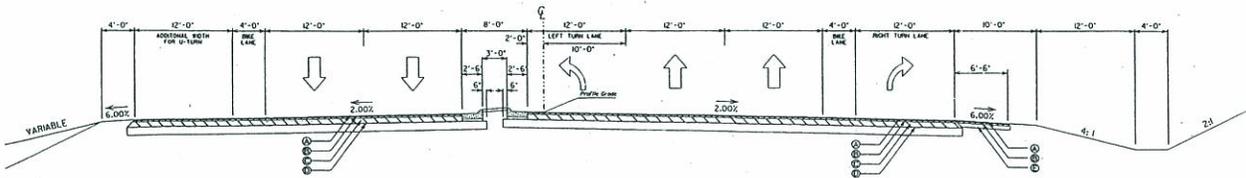
# Illustrations

PROJECT: GEORGIA DEPARTMENT OF TRANSPORTATION  
EDS-72(28) - Madison County - P.I. Number: 122100

ALTERNATIVE NO.: AP-1

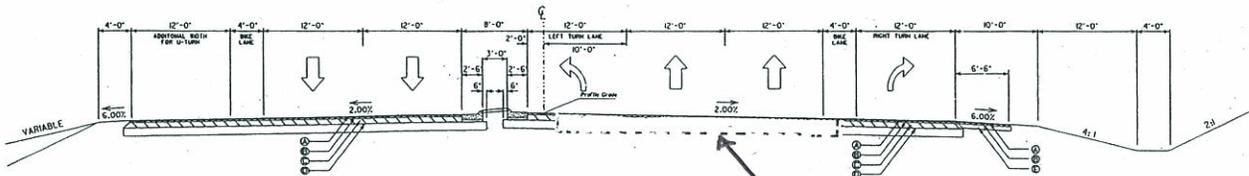
DESCRIPTION: SELECTIVELY USE SECTIONS OF EXISTING ASPHALT

SHEET NO.: 2 of 5



- REQUIRED PAVEMENT
- ① ASPHALTIC CONCRETE 12.5mm SUPERPAVE, GP 2 ONLY, INCL BITUM MATL & H LIME - .165\*/SY
  - ② ASPHALTIC CONCRETE 19mm SUPERPAVE, GP 1 OR 2, INCL BITUM MATL & H LIME - .220\*/SY
  - ③ ASPHALTIC CONCRETE 25mm SUPERPAVE, GP 1 OR 2, INCL BITUM MATL & H LIME - .880\*/SY
  - ④ GRADED AGGREGATE BASE CRS, 12", INCL MATL
  - ⑤ GRADED AGGREGATE BASE CRS, 6", INCL MATL
  - ⑥ CONCRETE CURB & GUTTER 8"x30" TYPE 7

TYPICAL SECTION - ORIGINAL DESIGN



EXISTING ROADWAY

- REQUIRED PAVEMENT
- ① ASPHALTIC CONCRETE 12.5mm SUPERPAVE, GP 2 ONLY, INCL BITUM MATL & H LIME - .165\*/SY
  - ② ASPHALTIC CONCRETE 19mm SUPERPAVE, GP 1 OR 2, INCL BITUM MATL & H LIME - .220\*/SY
  - ③ ASPHALTIC CONCRETE 25mm SUPERPAVE, GP 1 OR 2, INCL BITUM MATL & H LIME - .880\*/SY
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  - ⑥ CONCRETE CURB & GUTTER 8"x30" TYPE 7

TYPICAL SECTION - ALTERNATIVE DESIGN

# Calculations



PROJECT: GEORGIA DEPARTMENT OF TRANSPORTATION  
EDS-72(28) - Madison County - P.I. Number: 122100

ALTERNATIVE NO.: AP-1

DESCRIPTION: SELECTIVELY USE SECTIONS OF  
EXISTING ASPHALT

SHEET NO.: 3 of 5

AREAS OF PAVEMENT TO BE RETAINED

STA 100+00 - STA 108+00 24' WIDTH  
 $800' \times 24' = 19200 \text{ sf} = 2133 \text{ SY}$

STA 108+00 - STA 120+50 20' WIDTH  
 $1250' \times 20' = 25000 \text{ sf} = 2777 \text{ SY}$

STA 120+50 - STA 122+50 24' WIDTH  
 $200' \times 24' = 4800 \text{ sf} = 533 \text{ SY}$

STA 122+50 - STA 128+50 36' WIDTH  
 $600' \times 36' = 21600 \text{ sf} = 2400 \text{ SY}$

STA 128+50 - STA 144+50 20' WIDTH  
 $1600' \times 20' = 32000 \text{ sf} = 3555 \text{ SY}$

STA 144+50 - STA 147+50 12' WIDTH  
 $300' \times 12' = 3600 \text{ sf} = 400 \text{ SY}$

TOTALS 106200 sf 11798 SY

## PROPOSED TYPICAL SECTION

12.5 mm SUPERPAVE	165 <sup>#</sup> /SY
19 mm SUPERPAVE	220 <sup>#</sup> /SY
25 mm SUPERPAVE	880 <sup>#</sup> /SY
GAB	12" DEPTH

## REDUCED QUANTITIES

12.5 mm	165 <sup>#</sup> /SY	$\times 11798 \text{ SY} \div 2000 =$	796 TN
19 mm	220 <sup>#</sup> /SY	$\times 11798 \text{ SY} \div 2000 =$	1297 TN
25 mm	880 <sup>#</sup> /SY	$\times 11798 \text{ SY} \div 2000 =$	5191 TN
GAB	145 <sup>#</sup> /ft <sup>3</sup>	$\times 106200 \text{ SF} \times 1.0 \text{ f} \div 2000 =$	7699 TN

# Calculations



PROJECT: GEORGIA DEPARTMENT OF TRANSPORTATION  
EDS-72(28) - Madison County - P.I. Number: 122100

ALTERNATIVE NO.: AP-1

DESCRIPTION: SELECTIVELY USE SECTIONS OF  
EXISTING ASPHALT

SHEET NO.: 4 of 5

ADDITIONAL LEVELING REQUIRED TO  
BRING EXISTING PAVEMENT TO GRADE  
AND CROSS SLOPE

LEVELING 330 #/54

$$330 \times 11798 \text{ SF} \div 2000 = 1946 \text{ TD}$$

UNCLASSIFIED EXCAVATION

DEPTH OF TYPICAL SECTION  $23 \frac{1}{2}'' = 1.95 \text{ ft}$

$$106200 \text{ SF} \times 1.95 \text{ F} \div 27 = 7670 \text{ CY}$$

# COST WORKSHEET



PROJECT:	GEORGIA DEPARTMENT OF TRANSPORTATION	ALTERNATIVE NO.:	<b>AP-1</b>				
<i>SR 72 Widening &amp; Relocation - Federal Aid Project - EDS-72(28) - PI No 122100</i>							
DESCRIPTION: <i>Selectively use sections existing asphalt</i>			SHEET NO.:	5 of 5			
CONSTRUCTION ITEM		ORIGINAL ESTIMATE			PROPOSED ESTIMATE		
ITEM	UNITS	NO. OF UNITS	COST/UNIT	TOTAL	NO. OF UNITS	COST/UNIT	TOTAL
205-0001 Unclass Excav	CY	401822	\$ 4.51	\$1,812,217	394152	\$ 4.51	\$1,777,626
310-1101 Gr Aggr Base Crs	TN	62614	\$ 21.49	\$1,345,575	54915	\$ 21.49	\$1,180,123
402-1811 Recycled Asph Conc Leveling	TN	0	\$ 68.19	\$0	1946	\$ 68.19	\$132,698
402-3121 Recycled Asph Conc 25 mm	TN	24053	\$ 59.45	\$1,429,951	18862	\$ 59.45	\$1,121,346
402-3190 Recycled Asph Conc 19mm	TN	12096	\$ 55.60	\$672,538	10799	\$ 55.60	\$600,424
Material costs have been escalated to 2007 dollars.							
<b>Sub-total</b>				<b>\$5,260,281</b>			<b>\$4,812,217</b>
Mark-up at 10.00%				\$526,028			\$481,222
<b>TOTAL</b>				<b>\$5,786,309</b>			<b>\$5,293,439</b>

# Value Analysis Design Alternative



PROJECT: GEORGIA DEPARTMENT OF TRANSPORTATION  
Project No. EDS-72(28) – Madison County – P.I. Number: 122100

ALTERNATIVE NO.:  
**AP-9**

DESCRIPTION: **USE REDUCED PAVEMENT SECTION FOR RURAL  
DEPRESSED MEDIAN SECTION**

SHEET NO.: 1 of 5

**Original Design:**

The original design required the same typical section for the curbed raised median section and the depressed grass median rural section. The pavement section was as follows:

12.5 mm Superpave – 165#/SY	19 mm Superpave – 220#/SY
25 mm Superpave – 880#/SY	And, GAB – 12” Thickness

**Alternative:**

The alternative design would provide for a reduced section for the depressed grass median rural section only. The proposed pavement section would be as follows (the curbed raised median section would remain unchanged):

12.5 mm Superpave – 165#/SY	19 mm Superpave – 330#/SY
25 mm Superpave – 440#/SY	And, GAB – 10” Thickness

**Opportunities:**

- Initial cost savings
- Reduced construction time

**Risks:**

- Minimal redesign

**Technical Discussion:**

As discussed in the project presentation, it was stated that a lesser pavement section (reduced thicknesses) is allowed in areas where no curb and gutter exist. Additionally, the latest available concept report provides the thicknesses for asphalt pavement and GAB that were recommended in the alternative design.

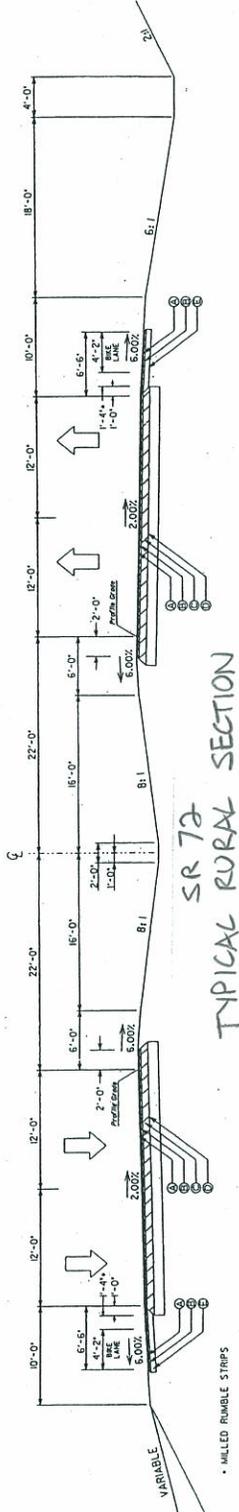
COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 3,792,870	\$	\$ 3,792,870
ALTERNATIVE	\$ 3,475,815	\$	\$ 3,475,815
SAVINGS	\$ 317,055	\$	\$ 317,055

PROJECT: **GEORGIA DEPARTMENT OF TRANSPORTATION**  
**EDS-72(28) – Madison County – P.I. Number: 122100**

ALTERNATIVE NO.: **AP-9**

DESCRIPTION: **TWO PAVEMENT SECTIONS – ONE FOR CURBED MEDIAN –**  
**ONE FOR RURAL SECTION**

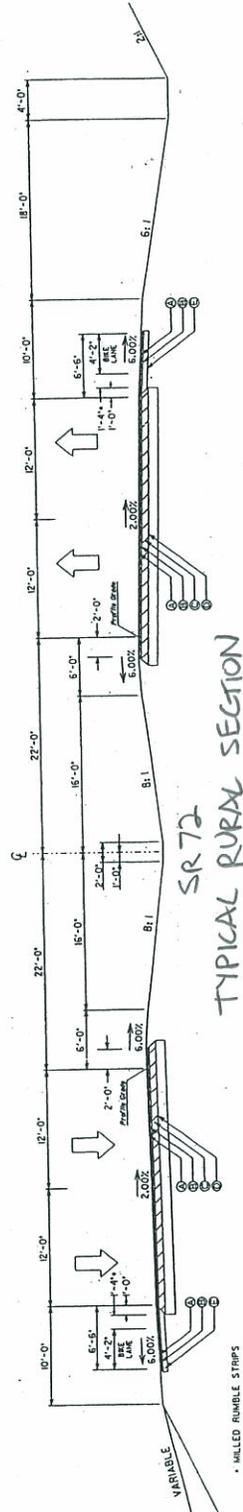
SHEET NO.: **2 of 5**



**SR 72**  
**TYPICAL RURAL SECTION**

**ORIGINAL DESIGN**

- REQUIRED PAVEMENT**
- ① ASPHALTIC CONCRETE 12.5mm SUPERPAVE, GP 2 ONLY, INCL BITUM MATL & H LIME - 165 #/SY
  - ② ASPHALTIC CONCRETE 19mm SUPERPAVE, GP 1 OR 2, INCL BITUM MATL & H LIME - 220 #/SY
  - ③ ASPHALTIC CONCRETE 25mm SUPERPAVE, GP 1 OR 2, INCL BITUM MATL & H LIME - 880 #/SY
  - ④ GRADED AGGREGATE BASE CRS. 12" INCL MATL
  - ⑤ GRADED AGGREGATE BASE CRS. 6" INCL MATL
  - ⑥ CONCRETE CURB & GUTTER 8' X30" TYPE 7



**SR 72**  
**TYPICAL RURAL SECTION**

**ALTERNATIVE**

- REQUIRED PAVEMENT**
- ① ASPHALTIC CONCRETE 12.5mm SUPERPAVE, GP 2 ONLY, INCL BITUM MATL & H LIME - **165 #/SY**
  - ② ASPHALTIC CONCRETE 19mm SUPERPAVE, GP 1 OR 2, INCL BITUM MATL & H LIME - **330 #/SY**
  - ③ ASPHALTIC CONCRETE 25mm SUPERPAVE, GP 1 OR 2, INCL BITUM MATL & H LIME - **440 #/SY**
  - ④ GRADED AGGREGATE BASE CRS. 10" INCL MATL
  - ⑤ GRADED AGGREGATE BASE CRS. 6" INCL MATL
  - ⑥ CONCRETE CURB & GUTTER 8' X30" TYPE 7

# Calculations



PROJECT: GEORGIA DEPARTMENT OF TRANSPORTATION  
EDS-72(28) - Madison County - P.I. Number: 122100

ALTERNATIVE NO.: AP-9

DESCRIPTION: TWO PAVEMENT SECTIONS - ONE FOR  
CURRED MEDIAN - ONE FOR RURAL SECTION

SHEET NO.: 3 of 5

## CALCULATION FOR PAVEMENT QUANTITY IN DEPRESSED MEDIAN (RURAL SECTION)

STA 153+84 - STA 233+00

LENGTH 7996 ft WIDTH 24 ft

$$7996' \times 24' = 191904 \text{ SF} = 21322 \text{ SY}$$

### TURN LANES

SR72EB { STA 190+33 - STA 192+13

LENGTH 180' WIDTH 0-12'

$$180' \times \frac{0+12}{2} = 1080 \text{ SF} = 120 \text{ SY}$$

STA 192+13 - STA 195+29

LENGTH 316' x 12' = 3792 SF = 421 SY

STA 197+49 - STA 199+92

LENGTH 243' WIDTH 12'

$$243' \times 12' = 2916 \text{ SF} = 324 \text{ SY}$$

STA 199+68 - STA 205+87

LENGTH 619' WIDTH 12'

$$619' \times 12' = 7428 \text{ SF} = 825 \text{ SY}$$

STA 205+87 - STA 209+27

LENGTH 340' WIDTH 0-12'

$$340 \times \frac{0+12}{2} = 2040 \text{ SF} = 226 \text{ SY}$$

TOTALS 209160 SF 23238 SY

# Calculations



PROJECT: GEORGIA DEPARTMENT OF TRANSPORTATION  
EDS-72(28) - Madison County - P.I. Number: 122100

ALTERNATIVE NO.: AP-9

DESCRIPTION: TWO PAVEMENT SECTIONS - ONE FOR  
CURBED MEDIAN - ONE FOR RURAL SECTION

SHEET NO.: 4 of 5

## ORIGINAL DESIGN

12.5 mm SUPERPAVE 165#/yd<sup>2</sup>  
19 mm SUPERPAVE 220#/yd<sup>2</sup>  
25 mm SUPERPAVE 880#/yd<sup>2</sup>  
GAB 12"

## ALTERNATE DESIGN (2000 CONCEPT REPORT)

12.5 mm SUPERPAVE 165#/yd<sup>2</sup>  
19 mm SUPERPAVE 330#/yd<sup>2</sup>  
25 mm SUPERPAVE 440#/yd<sup>2</sup>  
GAB 10"

## QUANTITY CHANGE

12.5 mm SUPERPAVE NONE

19 mm SUPERPAVE  $110\#/yd^2 \times 23238 yd^2 \div 2000 =$   
1278 TN INCREASE

25 mm SUPERPAVE  $440\#/yd^2 \times 23238 yd^2 \div 2000 =$   
5112 TN DECREASE

GAB  $145\#/ft^3 \times 209160 sf. \times 0.17 ft \div 2000 =$   
2577 TN DECREASE



# Value Analysis Design Alternative



PROJECT: GEORGIA DEPARTMENT OF TRANSPORTATION  
Project No. EDS-72(28) – Madison County – P.I. Number: 122100

ALTERNATIVE NO.:  
**UE-3**

DESCRIPTION: **REDUCE THE WIDTH OF THE DEPRESSED MEDIAN**

SHEET NO.: 1 of 4

**Original Design:**

The original design calls for the construction of a 44-foot depressed median along SR 72 from CR 325 to the end of the project.

**Alternative:**

The alternative suggests reducing the width of the depressed median from 44' to 36'.

**Opportunities:**

- Initial cost savings
- Reduced right-of-way costs

**Risks:**

- Design exception will be required from GDOT
- Medians less than 40-feet in width are less desirable according the AASHTO design manual

**Technical Discussion:**

The AASHTO Policy on Geometric Design of Highways and Streets (2004) states that median widths of 40 feet are the most desirable to satisfy the user and for freedom of operation. However, AASHTO also states that there is a demonstrated benefit in any separation, raised or flush, therefore, by reducing the median width from 44 feet to 36 feet, the alternative accomplishes the same function as the original design at a reduced cost.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 8,592,301	\$	\$ 8,592,301
ALTERNATIVE	\$ 7,045,687	\$	\$ 7,045,687
SAVINGS	\$ 1,546,614	\$	\$ 1,546,614



# Calculations

**PBSJ**

PROJECT: GEORGIA DEPARTMENT OF TRANSPORTATION  
EDS-72(28) - Madison County - P.I. Number: 122100

ALTERNATIVE NO.: UE 3

DESCRIPTION: REDUCE DEPRESSED MEDIAN WIDTH

SHEET NO.: 3 of 4

## ORIGINAL DESIGN

\* DEPRESSED MEDIAN EXTENDS FROM STA. 153+50.04 TO 233+50  $\rightarrow L = 1.52$  MILES  
LENGTH OF ENTIRE PROJECT  $\rightarrow L = 2.67$  MILES  
DEPRESSED MEDIAN  $\rightarrow 1.52/2.67 = 57\%$  OF PROJECT LENGTH.

## UNCLASSIFIED EXCAVATION

$$\$1,285,830 \times 0.57 = \boxed{\$732,923}$$

## RIGHT-OF-WAY

$$\$12,418,000 \times 0.57 = \boxed{\$7,078,260}$$

$$\text{TOTAL COST} = \boxed{\$7,811,183}$$

## ALTERNATIVE

\* BY REDUCING THE DEPRESSED MEDIAN WIDTH FROM 44-FEET TO 36-FEET, ASSUME THE COST WILL BE REDUCED BY 18%  $\rightarrow 44-36/44 \times 100 = \boxed{18\%}$

$$\text{ORIGINAL COST } \$7,811,183 - 18\% = \boxed{\$6,405,170}$$

# COST WORKSHEET

PROJECT:	GEORGIA DEPARTMENT OF TRANSPORTATION	ALTERNATIVE NO.:	<b>UE-3</b>				
<i>SR 72 Widening &amp; Relocation - Federal Aid Project - EDS-72(28) - PI No 122100</i>							
DESCRIPTION: <i>Reduce depressed median width</i>				SHEET NO.:	4 of 4		
CONSTRUCTION ITEM		ORIGINAL ESTIMATE			PROPOSED ESTIMATE		
ITEM	UNITS	NO. OF UNITS	COST/ UNIT	TOTAL	NO. OF UNITS	COST/ UNIT	TOTAL
* Unclassified Excavation	LS	1	\$ 732,923	\$732,923			
* Right-of-Way	LS	1	\$ 7,078,260	\$7,078,260			
* See calculation sheet for source of these numbers							
The alternative assumes an 18% reduction in the quantities above (See Calcs)							
Unclassified Excavation	LS				1	\$ 600,997	\$600,997
Right-of-Way	LS				1	\$ 5,804,173	\$5,804,173
<b>Sub-total</b>				<b>\$7,811,183</b>			<b>\$6,405,170</b>
Mark-up at 10.00%				\$781,118			\$640,517
<b>TOTAL</b>				<b>\$8,592,301</b>			<b>\$7,045,687</b>

# Value Analysis Design Suggestion



PROJECT: GEORGIA DEPARTMENT OF TRANSPORTATION  
Project No. EDS-72(28) – Madison County – P.I. Number: 122100

ALTERNATIVE NO.:  
UE-4

DESCRIPTION: ADJUST PROFILE GRADE TO MINIMIZE EARTHWORK SHEET NO.: 1 of 1

## Original Design:

At the time of the Value Engineering workshop, the vertical profile was well developed.

## Alternative:

It is customary to ask, one last time before the vertical profile is firmly set and accepted, whether or not the design team has fairly thoroughly optimized the profile to minimize the resulting unclassified excavation.

## Opportunities:

- May reduce initial construction cost
- Could help to reduce the number of loads of earth being moved within the community

## Risks:

- Some redesign required

## Technical Discussion:

Basically, this suggestion would call for the “form fit” of the profile to the existing ground, within the limits of good sight distance and vertical curvature design standards.

# Value Analysis Design Suggestion



PROJECT: GEORGIA DEPARTMENT OF TRANSPORTATION  
Project No. EDS-72(28) – Madison County – P.I. Number: 122100

ALTERNATIVE NO.:  
RB-1

DESCRIPTION: **KEEP PORTIONS OF EXISTING BRIDGE**

SHEET NO.: 1 of 1

## Original Design:

The current design calls for the complete removal of the existing bridge.

## Alternative:

Keep a portion of the existing bridge.

## Opportunities:

- May prove to be a recreation resource

## Risks:

- Will need to have a turnover of ownership to local sponsor (County?, City?)

## Technical Discussion:

A portion of the existing bridge may be kept in place to serve as a future bicycle and walking pathway. No savings is calculated. The local sponsor must accept ownership and the associated liabilities.

# Value Analysis Design Alternative



PROJECT: GEORGIA DEPARTMENT OF TRANSPORTATION  
 Project No. EDS-72(28) – Madison County – P.I. Number: 122100

ALTERNATIVE NO.:  
**CB-1**

DESCRIPTION: **SHORTEN WESTBOUND BRIDGE**

SHEET NO.: 1 of 5

**Original Design:** (See attached Illustration)

The current construction cost estimate indicates that the westbound and eastbound bridges are 268 feet in length. This is a variation from the drawings which show that the westbound bridge is 268' in length and the eastbound bridge is 220' in length. Each of the bridges is 41' – 3" wide.

**Alternative:** (See attached Illustration)

It is intended that the two bridges will be constructed to an identical length of 220 feet. The cross section of the superstructure will remain at 41' – 3".

**Opportunities:**

- Initial cost savings
- Reduced life cycle costs for maintenance
- Beam sizes would be reduced due to shorter spans. This may make it possible for additional cost savings due to a reduction in the number of bridge pilings required.

**Risks:**

- Moderate redesign required

**Technical Discussion:**

The spans for the westbound bridge are to be changed in their lengths to match those of the eastbound bridge in its 220 foot design configuration. All four supports (two piers and two abutments) will require relocation from their present designed positions.

The advantage of these changes will be to simplify the construction on the site by providing a repetition of the work sequences between the two, now identical bridges. There will be a requirement to review the foundation conditions to make sure that these changes are possible.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 2,067,285	\$	\$ 2,067,285
ALTERNATIVE	\$ 1,767,645	\$	\$ 1,767,645
SAVINGS	\$ 299,640	\$	\$ 299,640

# Illustrations



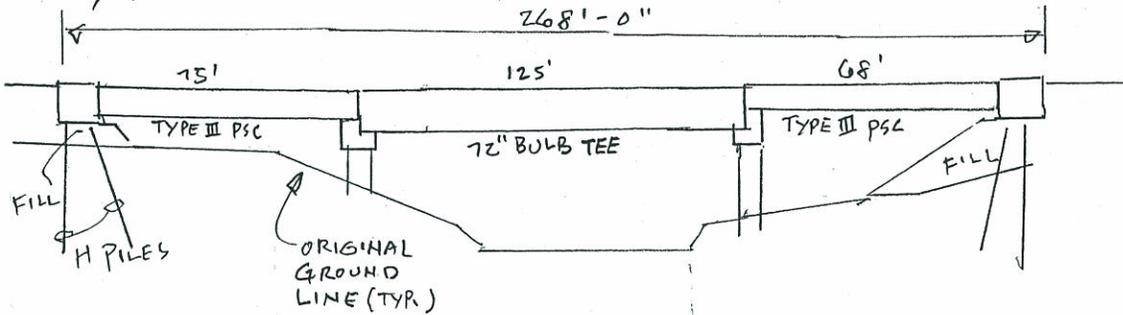
PROJECT: GEORGIA DEPARTMENT OF TRANSPORTATION  
EDS-72(28) - Madison County - P.I. Number: 122100

ALTERNATIVE NO.:  
CB-1

DESCRIPTION: COMMENTS ON STRUCTURE

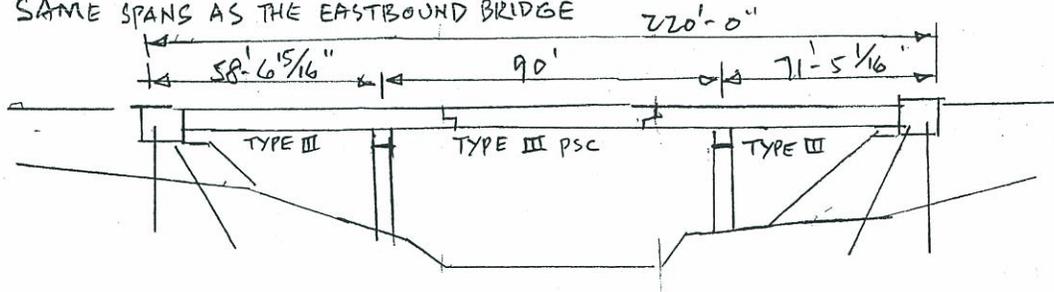
SHEET NO.: 2 of 5

1, THE WIDTHS OF RIVER ARE ABOUT THE SAME FOR TWO BRIDGES ON SHEETS 234 & 236. THE TOP/EXISTING GRADE ARE LOWER FOR WESTBOUND BRIDGE ON P. 236, THUS THE ABUTMENTS ARE SUPPORTED BY PILES DRIVEN THRU SLOPED FILLS.



## SUGGEST

TO MOVE SUB-STRUCTURES SO THE SUPER-STRUCTURE CAN HAVE SAME SPANS AS THE EASTBOUND BRIDGE



SO THE BRIDGE DESIGNS CAN BE THE SAME

# Illustrations

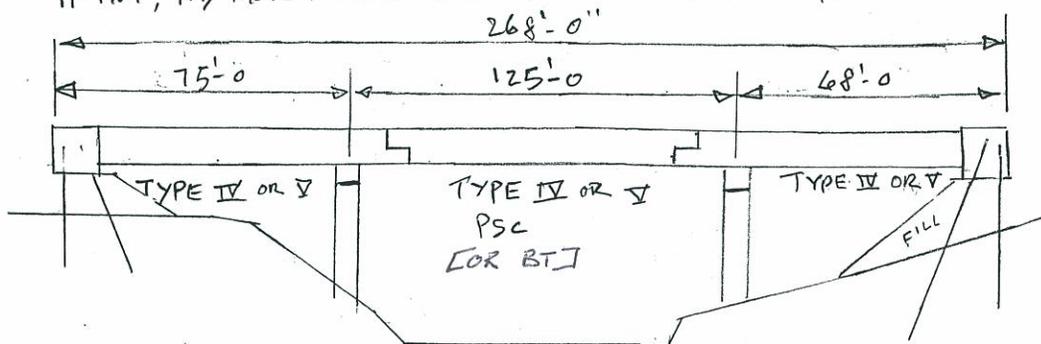
PROJECT: GEORGIA DEPARTMENT OF TRANSPORTATION  
EDS-72(28) - Madison County - P.I. Number: 122100

ALTERNATIVE NO.:  
CB-1

DESCRIPTION: COMMENTS ON STRUCTURE

SHEET NO.: 3 of 5

2. IF, FOR SOME REASON(S), THE LOCATIONS OF SUB-STRUCTURES CANNOT BE MOVED TOO MUCH, TRY TO USE TYPE IV PSC BEAMS TO SEE IF SAME DESIGN APPROACH AS EASTBOUND BRIDGE CAN BE EMPLOYED IF NOT, TRY MOVE SOME ACCEPTABLE AMOUNT OF THE SUPPORTS. OR



USE TYPE V AND COMPARE COSTS.

3. IF  $\frac{1}{2}$ ' SLOPE BECOMES A PROBLEM, TRY VERTICAL PRECAST TIE-BACK WALL AT ABUTMENTS. COMPARE ALSO USING ONLY ONE TYPE OF DEEP FOUNDATION - EITHER DRILLED PIERS OR H-PILES - INSTEAD OF H-PILE AT ABUTMENTS (BENT 1 & 4) AND DRILLED PIERS AT BENT 2 & 3 AS CURRENTLY ASSUMED IN SOILS REPORT.

# Calculations



PROJECT: GEORGIA DEPARTMENT OF TRANSPORTATION  
EDS-72(28) - Madison County - P.I. Number: 122100

ALTERNATIVE NO.:  
CB-1

DESCRIPTION: SAVINGS FROM 48' REDUCTION OF BRIDGE SHEET NO.: 4 of 5

LENGTH

1) BRIDGE SLAB

$$41'-3" \times 48' = 1,980 \text{ sq}' \text{ REDUCTION IN AREA}$$

2) BEAM TYPE

$$\text{WAS } 60' + 75' = 143' \text{ PSC TYPE III}$$

$$+ 125' \text{ 72" BULB TEE}$$

$$\text{NOW } 220' \text{ PSC TYPE III}$$

3) SUB-STRUCTURE

$$\text{WAS CAPABLE OF SUPPORTING EXTRA } 1,980 \text{ sq}'$$

$$\times .67 \times .15 \doteq \underline{200 \text{ K}} \text{ FROM SLAB}$$

AND EXTRA LOAD FROM BEAM CHANGE

DEAD LOAD ONLY

$$\text{LIVE LOAD } 1980 \text{ sq}' \times .25 \text{ K/sq}' \doteq \underline{500 \text{ K}}$$

2'-0 SOIL EQUIVALENCE

NOW NO MORE THESE CAPACITY NEEDED

# COST WORKSHEET



PROJECT:	GEORGIA DEPARTMENT OF TRANSPORTATION	ALTERNATIVE NO.:	<b>CB-1</b>				
<b>SR 72 Widening &amp; Relocation - Federal Aid Project - EDS-72(28) - PI No 122100</b>							
DESCRIPTION:				SHEET NO.:	5 of 5		
CONSTRUCTION ITEM		ORIGINAL ESTIMATE			PROPOSED ESTIMATE		
ITEM	UNITS	NO. OF UNITS	COST/UNIT	TOTAL	NO. OF UNITS	COST/UNIT	TOTAL
Original Design Estimate							
EB Bridge 41.25' x 268'	SF	11055	\$ 85.00	\$939,675			
WB Bridge 41.25' x 268'	SF	11055	\$ 85.00	\$939,675			
Alternative Design Estimate							
EB Bridge 41.25' x 220'	SF				9075	\$ 85.00	\$771,375
WB Bridge 41.25' x 220'	SF				9075	\$ 85.00	\$771,375
Add 100 feet of roadway	LF				100	\$ 642.00	\$64,200
<b>Cost for Roadway in Place:</b>							
\$2,408,000 per mile (yr 2000)							
5% annual inflation							
cost per mile 7 years later =							
\$3,388,056							
cost per LF 7 years later =							
\$642/LF							
Note:							
Cost per square foot for Bridge is \$85.00 (2007 \$)							
<b>Sub-total</b>				<b>\$1,879,350</b>			<b>\$1,606,950</b>
<b>Mark-up at 10.00%</b>				<b>\$187,935</b>			<b>\$160,695</b>
<b>TOTAL</b>				<b>\$2,067,285</b>			<b>\$1,767,645</b>

# Value Analysis Design Alternative



PROJECT: **GEORGIA DEPARTMENT OF TRANSPORTATION**  
EDS-72(28) – Madison County – P.I. Number: 122100

ALTERNATIVE NO.:  
**CB-2**

DESCRIPTION: **COMBINE EB AND WB BRIDGES TO ONE BRIDGE WITH 5 - 12' LANES (INCLUDING TURN LANE)** SHEET NO.: 1 of 6

**Original Design:** (The VE team realizes that there is some design information not yet available for the project. Appropriate assumptions have been made in their place).

The original design calls for twin 3-span EB and WB bridges 268' long with 75' and 68' end spans and a 125' intermediate span. Based on the Plan & Elevation drawings provided, it is anticipated that end spans 1 and 3 will consist of seven Type III PSC beams evenly spaced. Likewise, Span 2 will consist of seven 72" Bulb Tee PSC beams evenly spaced. The out-to-out width of each of the bridges is 41'-3". The EB bridge accommodates 2 – 12' travel lanes and a 12' left turn lane. The WB bridge accommodates 2 – 12' travel lanes. The bents are made up of concrete caps and columns. The end bents and intermediate bents are founded on Steel H Piles and Drilled Shafts respectively.

**Alternative:**

The proposed alternative combines the EB and WB bridges to one bridge, 75'-3" in cross section to accommodate 2 -24' lanes in each direction and a 12' Left Turn in the EB direction for a total cross section of 75'-3". The alternative maintains the current span configuration other current horizontal and vertical geometry.

**Opportunities:**

- Cost savings by combining the bridges (reduced deck area & beam requirements)
- Better drainage control across bridge section and at ends
- Reduced construction time
- Reduced Right-of-Way requirements
- Since the bridge is currently in the preliminary design process no time will be lost in the re-design effort

**Risks:**

- This configuration is typically used in an Urban environment
- Since the bridge is currently in the preliminary design process no time will be lost in the re-design

**Technical Discussion:**

The resulting bridge cross section will comprise of thirteen Type III PSC beams in the end spans and thirteen 72" Bulb Tee PSC beams evenly spaced for the intermediate span 2. Additionally, the substructure will be comprised of reduced cap lengths.

A staged construction approach may have to be adopted for maintenance of traffic.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 2,688,033	\$	\$ 2,688,033
ALTERNATIVE	\$ 2,229,530	\$	\$ 2,229,530
SAVINGS	\$ 458,503	\$	\$ 458,503

# Illustrations



PROJECT: **GEORGIA DEPARTMENT OF TRANSPORTATION**  
**EDS-72(28) – Madison County – P.I. Number: 122100**

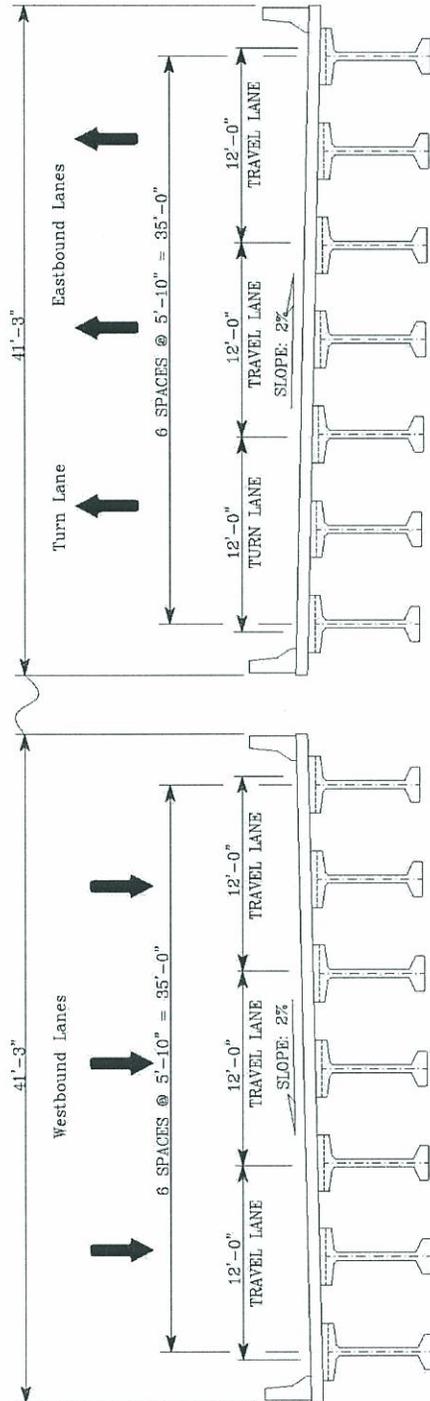
ALTERNATIVE NO.:

**CB-2**

DESCRIPTION: **COMBINE EB AND WB BRIDGES TO ONE BRIDGE WITH**  
**5 - 12' LANES (INCLUDING TURN LANE)**

SHEET NO.:

2 of 6



NOTE:  
DRAWING NOT TO SCALE  
ASSUMED SCHEME

CURRENT DESIGN

72" BULB TEE

**ORIGINAL DESIGN**

# Illustrations

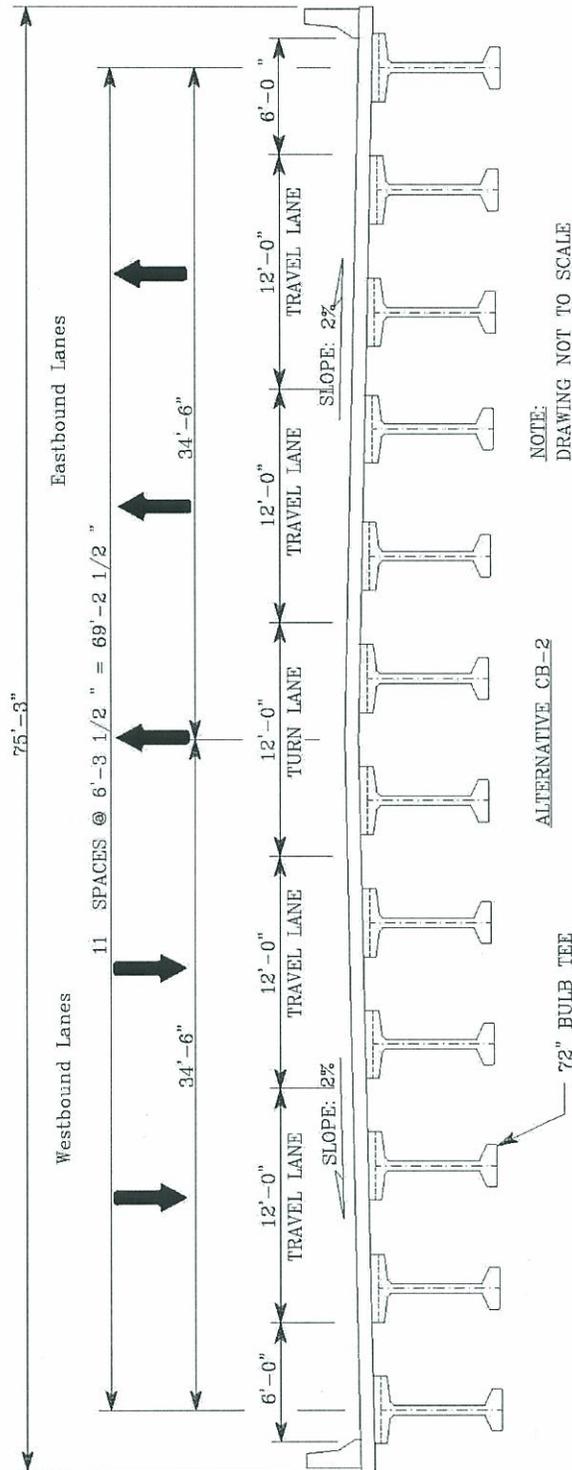


PROJECT: **GEORGIA DEPARTMENT OF TRANSPORTATION**  
**EDS-72(28) – Madison County – P.I. Number: 122100**

ALTERNATIVE NO.:  
**CB-2**

DESCRIPTION: **COMBINE EB AND WB BRIDGES TO ONE BRIDGE WITH**  
**5 - 12' LANES (INCLUDING TURN LANE)**

SHEET NO.: **3 of 6**



NOTE:  
 DRAWING NOT TO SCALE

ALTERNATIVE CB-2

ALTERNATIVE

# Calculations



PROJECT: **GEORGIA DEPARTMENT OF TRANSPORTATION**  
**EDS-72(28) – Madison County – P.I. Number: 122100**

ALTERNATIVE NO.:  
**CB-2**

DESCRIPTION: **COMBINE EB AND WB BRIDGES TO ONE BRIDGE WITH**  
**5 - 12' LANES (INCLUDING TURN LANE)**

SHEET NO.: **4 of 6**

## Current Design (3 Span – 268' Long, 41'-3" Out-to-Out Twin Bridges)

### **Superstructure (Twin Structures):**

Deck Area =  $2 * 268' * 41.25'$  (avg.) = 22,110 SF

Volume of 9" thick Class AA Superstructure Deck concrete =  $[22110 * (9/12)] / 27 = 614.16$  CY

Area of Grooved concrete (approx.) =  $2 * 268' * 36' / 9 = 2,144$  SY

Total length of Type III PPC Girders (approx.- 7 Beams per span) =  $(2 * 75' * 7) + (2 * 68' * 7) = 2,002'$

Total length of 72" Bulb Tee PPC Girders (approx.) =  $2 * 125' * 7 = 1,750'$

Total length of Bridge Parapet =  $2 * 2 * 268' = 1072'$

Area of Rip-Rap (assumed same for current design & alternative, therefore, not considered - conservative)

### **Substructure (Twin Structures – Assume 4'X4' cap, 50'-6" length along skew, (3) 4'X4' columns per bent, 4'X3' End Bents):**

Volume of Class A concrete (average dimensions of Caps, Columns & Pile Caps, 18' columns, 9'X9' footings, 4' thick):

Intermediate Bents:  $2 * 2 * \{ [50.5' * 4' * 4'] + (3 * 4' * 4' * 18') + (3 * 9' * 9' * 4') \} / 27 = 391.71$  CY

End Bents:  $2 * 2 * \{ [50.5' * 4' * 3'] + [2 * 7.5' * 11.5'] \} / 27 = 115.33$  CY

Total Volume of Class A concrete = 507.04 CY

Length of 14" PSC Piling =  $2 * 2 * 9 * 30' = 1,080$  LF

Length of 18" PSC Piling =  $2 * 2 * 3 * 9 * 30' = 3,240$  LF

# Calculations



PROJECT: **GEORGIA DEPARTMENT OF TRANSPORTATION**  
**EDS-72(28) – Madison County – P.I. Number: 122100**

ALTERNATIVE NO.:  
**CB-2**

DESCRIPTION: **COMBINE EB AND WB BRIDGES TO ONE BRIDGE WITH**  
**5 - 12' LANES (INCLUDING TURN LANE)**

SHEET NO.: **5 of 6**

## Alternative (Single Bridge, 3 Span – 268' Long, 75'-3" Out-to-Out)

### **Superstructure:**

Deck Area =  $268' * 75.25'$  (avg.) = 20,167 SF

Volume of 9" thick Class AA Superstructure Deck concrete =  $[20167 * (9/12)] / 27 = 560.20$  CY

Area of Grooved concrete (approx.) =  $268' * 69' / 9 = 2,054$  SY

Total length of Type III PPC Girders (approx.- 12 Beams per span) =  $(75' * 12) + (68' * 12) = 1,716'$

Total length of 72" Bulb Tee PPC Girders (approx.) =  $125' * 12 = 1,500'$

Total length of Bridge Parapet =  $2 * 268' = 536'$

Area of Rip-Rap (assumed same for current design & alternative, therefore, not considered - conservative)

### **Substructure (Assume 4'X4' cap, 91'-9" length along skew, (4) 4'X4' columns per bent, 4'X3' End Bents):**

Volume of Class A concrete (average dimensions of Caps, Columns & Pile Caps, 18' columns, 9'X9' footings, 4' thick):

Intermediate Bents:  $2 * \{ [91.75' * 4' * 4'] + (4 * 4' * 4' * 18') + (4 * 9' * 9' * 4') \} / 27 = 290.07$  CY

End Bents:  $2 * \{ [91.75' * 4' * 3'] + [2 * 7.5' * 11.5'] \} / 27 = 94.33$  CY

Total Volume of Class A concrete = 507.04 CY

Length of 14" PSC Piling =  $2 * 14 * 30' = 840$  LF

Length of 18" PSC Piling =  $2 * 4 * 9 * 30' = 2,160$  LF



# Value Analysis Design Alternative



PROJECT: **GEORGIA DEPARTMENT OF TRANSPORTATION**  
EDS-72(28) – Madison County – P.I. Number: 122100

ALTERNATIVE NO.:  
**CB-3**

DESCRIPTION: **COMBINE EB AND WB BRIDGES TO ONE BRIDGE WITH** SHEET NO.: 1 of 6  
**4 - 12' LANES (NO TURN LANE)**

**Original Design:** (The VE team realizes that there is some design information not yet available for the project Assumptions have been made in their place).

The original design calls for twin 3-span EB and WB bridges 268' long with 75' and 68' end spans and a 125' intermediate span. Based on the Plan & Elevation drawings provided, it is anticipated that end spans 1 and 3 will consist of seven Type III PSC beams evenly spaced. Likewise, Span 2 will consist of seven 72" Bulb Tee PSC beams evenly spaced. The out-to-out width of each of the bridges is 41'-3". The EB bridge accommodates 2 – 12' travel lanes and a 12' left turn lane. The WB bridge accommodates 2 – 12' travel lanes. The bents are made up of concrete caps and columns. The end bents and intermediate bents are founded on Steel H Piles and Drilled Shafts respectively.

**Alternative:**

The proposed alternative combines the EB and WB bridges to one bridge, 63'-3" in cross section to accommodate 2 -12' lanes in each direction and 6' shoulders on each side for a total cross section of 63'-3".

The alternative maintains the current span configuration other current horizontal and vertical geometry.

**Opportunities:**

- Cost savings by combining the bridges (reduced deck area & beam requirements)
- Better drainage control across bridge section and at ends
- Reduced construction time
- Reduced Right-of-Way requirements
- Since the bridge is currently in the preliminary design process no time will be lost in the re-design effort

**Risks:**

- This configuration is typically used in an Urban environment
- No left turn lane to Brickyard Rd.
- Since the bridge is currently in the preliminary design process no time will be lost in the re-design (in reality, an opportunity)

**Technical Discussion:**

The resulting bridge cross section will comprise of ten Type III PSC beams in the end spans and ten 72" Bulb Tee PSC beams evenly spaced for the intermediate span 2. Additionally, the substructure will be comprised of reduced cap lengths as compared to the combined cap lengths of twin bridges.

A staged construction approach may have to be adopted for maintenance of traffic.

See the next sheet for the calculation of the savings noted below. (Cost of Bridge removal is same for both, current design & alternative and hence not considered).

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 2,688,033	\$	\$ 2,688,033
ALTERNATIVE	\$ 1,847,613	\$	\$ 1,847,613
SAVINGS	\$ 840,420	\$	\$ 840,420

# Illustrations



PROJECT: **GEORGIA DEPARTMENT OF TRANSPORTATION**  
**EDS-72(28) – Madison County – P.I. Number: 122100**

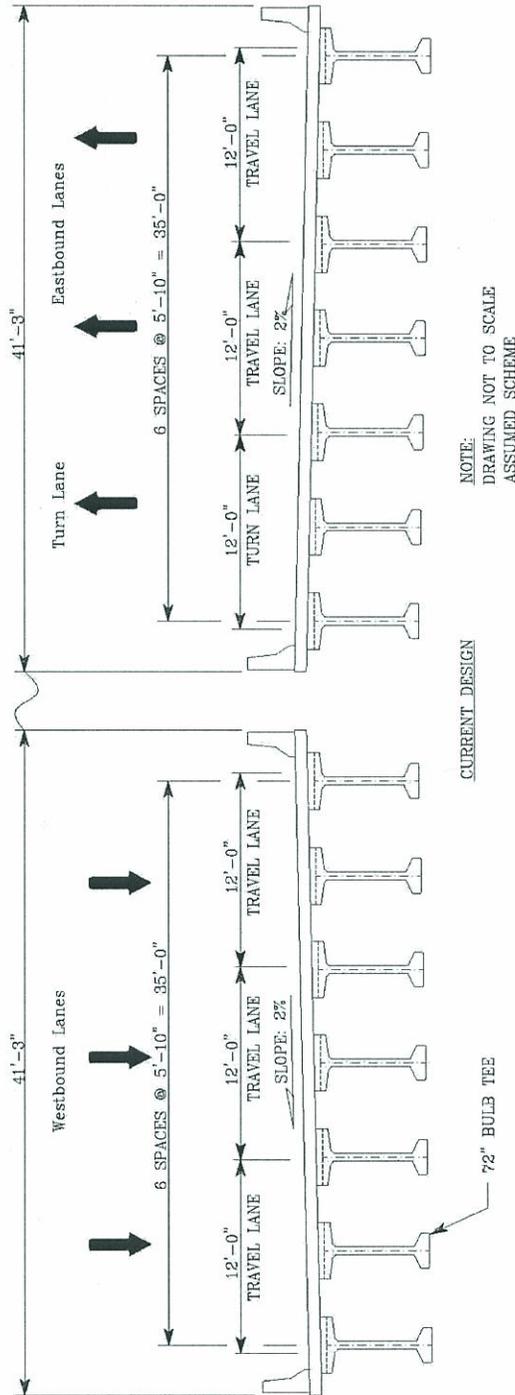
ALTERNATIVE NO.:

**CB-3**

DESCRIPTION: **COMBINE EB AND WB BRIDGES TO ONE BRIDGE WITH**  
**4 - 12' LANES (NO TURN LANE) -- ORIGINAL DESIGN**

SHEET NO.:

2 of 6



NOTE:  
DRAWING NOT TO SCALE  
ASSUMED SCHEME

CURRENT DESIGN

# Illustrations



PROJECT: **GEORGIA DEPARTMENT OF TRANSPORTATION**  
**EDS-72(28) – Madison County – P.I. Number: 122100**

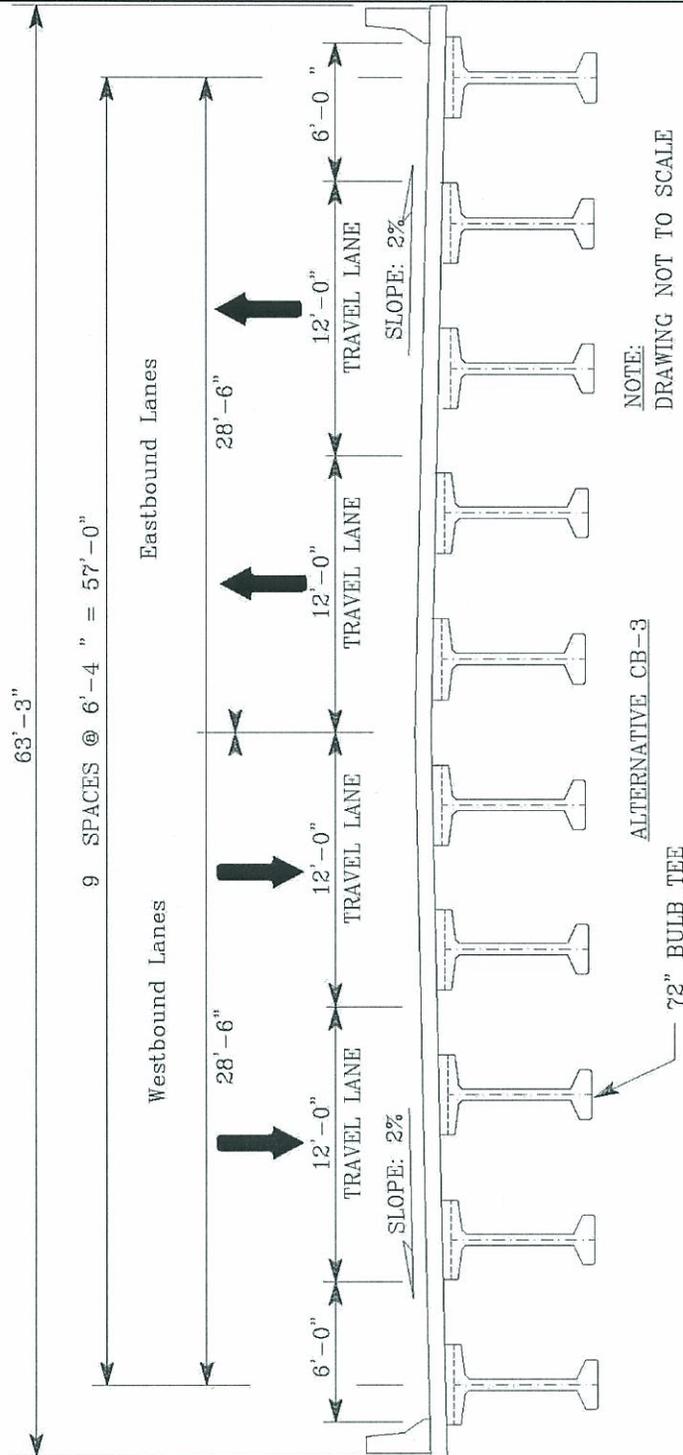
ALTERNATIVE NO.:

**CB-3**

DESCRIPTION: **COMBINE EB AND WB BRIDGES TO ONE BRIDGE WITH**  
**4 - 12' LANES (NO TURN LANE) --- ALTERNATIVE**

SHEET NO.:

3 of 6



# Calculations



PROJECT: **GEORGIA DEPARTMENT OF TRANSPORTATION**  
**EDS-72(28) – Madison County – P.I. Number: 122100**

ALTERNATIVE NO.:  
**CB-3**

DESCRIPTION: **COMBINE EB AND WB BRIDGES TO ONE BRIDGE WITH**  
**4 - 12' LANES (NO TURN LANE)**

SHEET NO.: **4 of 6**

## Current Design (3 Span – 268' Long, 41'-3" Out-to-Out Twin Bridges)

### **Superstructure (Twin Structures):**

Deck Area =  $2 * 268' * 41.25'$  (avg.) = 22,110 SF

Volume of 9" thick Class AA Superstructure Deck concrete =  $[22110 * (9/12)] / 27 = 614.16$  CY

Area of Grooved concrete (approx.) =  $2 * 268' * 36' / 9 = 2,144$  SY

Total length of Type III PPC Girders (approx.- 7 Beams per span) =  $(2 * 75' * 7) + (2 * 68' * 7) = 2,002'$

Total length of 72" Bulb Tee PPC Girders (approx.) =  $2 * 125' * 7 = 1,750'$

Total length of Bridge Parapet =  $2 * 2 * 268' = 1072'$

Area of Rip-Rap (assumed same for current design & alternative, therefore, not considered - conservative)

### **Substructure (Twin Structures – Assume 4'X4' cap, 50'-6" length along skew, (3) 4'X4' columns per bent, 4'X3' End Bents):**

Volume of Class A concrete (average dimensions of Caps, Columns & Pile Caps, 18' columns, 9'X9' footings, 4' thick):

Intermediate Bents:  $2 * 2 * \{ [50.5' * 4' * 4'] + (3 * 4' * 4' * 18') + (3 * 9' * 9' * 4') \} / 27 = 391.71$  CY

End Bents:  $2 * 2 * \{ [50.5' * 4' * 3'] + [2 * 7.5' * 11.5'] \} / 27 = 115.33$  CY

Total Volume of Class A concrete = 507.04 CY

Length of 14" PSC Piling =  $2 * 2 * 9 * 30' = 1,080$  LF

Length of 18" PSC Piling =  $2 * 2 * 3 * 9 * 30' = 3,240$  LF

# Calculations



PROJECT: **GEORGIA DEPARTMENT OF TRANSPORTATION**  
**EDS-72(28) – Madison County – P.I. Number: 122100**

ALTERNATIVE NO.:  
**CB-3**

DESCRIPTION: **COMBINE EB AND WB BRIDGES TO ONE BRIDGE WITH**  
**4 - 12' LANES (NO TURN LANE)**

SHEET NO.: **5 of 6**

## Alternative (Single Bridge, 3 Span – 268' Long, 63'-3" Out-to-Out)

### **Superstructure:**

Deck Area =  $268' * 63.25'$  (avg.) = 16,951 SF

Volume of 9" thick Class AA Superstructure Deck concrete =  $[16951 * (9/12)] / 27 = 470.86$  CY

Area of Grooved concrete (approx.) =  $268' * 57' / 9 = 1,698$  SY

Total length of Type III PPC Girders (approx.- 10 Beams per span) =  $(75' * 10) + (68' * 10) = 1,430'$

Total length of 72" Bulb Tee PPC Girders (approx.) =  $125' * 10 = 1,250'$

Total length of Bridge Parapet =  $2 * 268' = 536'$

Area of Rip-Rap (assumed same for current design & alternative, therefore, not considered - conservative)

### **Substructure (Assume 4'X4' cap, 77'-3" length along skew, (4) 4'X4' columns per bent, 4'X3' End Bents):**

Volume of Class A concrete (average dimensions of Caps, Columns & Pile Caps, 18' columns, 9'X9' footings, 4' thick):

Intermediate Bents:  $2 * \{ [77.25' * 4' * 4'] + (4 * 4' * 4' * 18') + (4 * 9' * 9' * 4') \} / 27 = 272.89$  CY

End Bents:  $2 * \{ [77.25' * 4' * 3'] + [2 * 7.5' * 11.5'] \} / 27 = 81.44$  CY

Total Volume of Class A concrete = 354.33 CY

Length of 14" PSC Piling =  $2 * 10 * 30' = 600$  LF

Length of 18" PSC Piling =  $2 * 4 * 9 * 30' = 2,160$  LF



# Value Analysis Design Alternative



PROJECT: GEORGIA DEPARTMENT OF TRANSPORTATION  
Project No. EDS-72(28) – Madison County – P.I. Number: 122100

ALTERNATIVE NO.:  
**CB-8**

DESCRIPTION: **ELIMINATE LEFT TURN LANES AT BRICKYARD ROAD**

SHEET NO.: 1 of 5

**Original Design:**

The original design specified a median opening at Brickyard Road with a left turn/u-turn decel lane in the eastbound and westbound lanes. The original design also required an additional 12' width be added to the eastbound bridge to accommodate the eastbound left turn lane.

**Alternative:**

The alternative design eliminates the eastbound and westbound decel lanes and also the 12' widening of the eastbound bridge.

**Opportunities:**

- Initial cost savings
- Reduced construction time
- Reduced environmental considerations due to less bridge construction

**Risks:**

- Restricted/eliminated access to Brickyard Road
- Public objection due to elimination of access to Brickyard Road from the eastbound direction.

**Technical Discussion:**

Traffic studies indicate limited use of Brickyard Road with an ADT of 25 current and proposed. Access could be provided through a u-turn median crossing at a location that would not affect the bridge traffic. Other choices could include relocation of the Brickyard Road intersection or, the use of a cul-de-sac to close off access between Brickyard Road and the mainline.

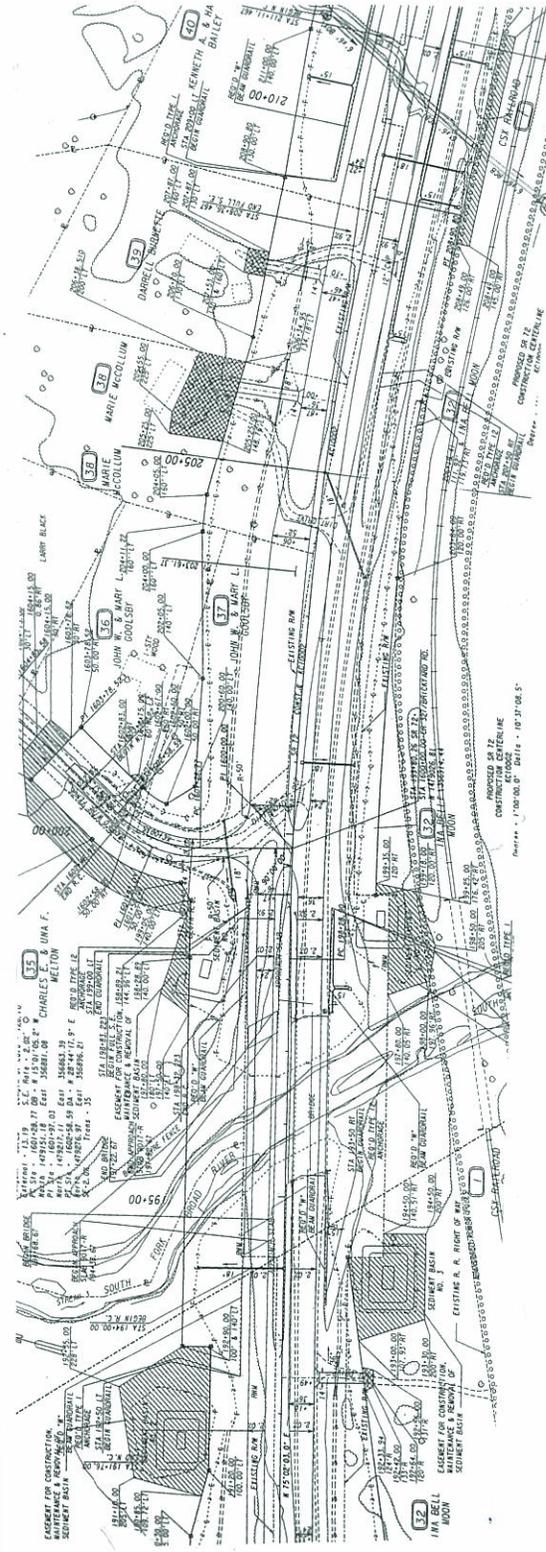
COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 5,707,492	\$	\$ 5,707,492
ALTERNATIVE	\$ 5,299,462	\$	\$ 5,299,462
SAVINGS	\$ 408,030	\$	\$ 408,030

PROJECT: GEORGIA DEPARTMENT OF TRANSPORTATION  
EDS-72(28) – Madison County – P.I. Number: 122100

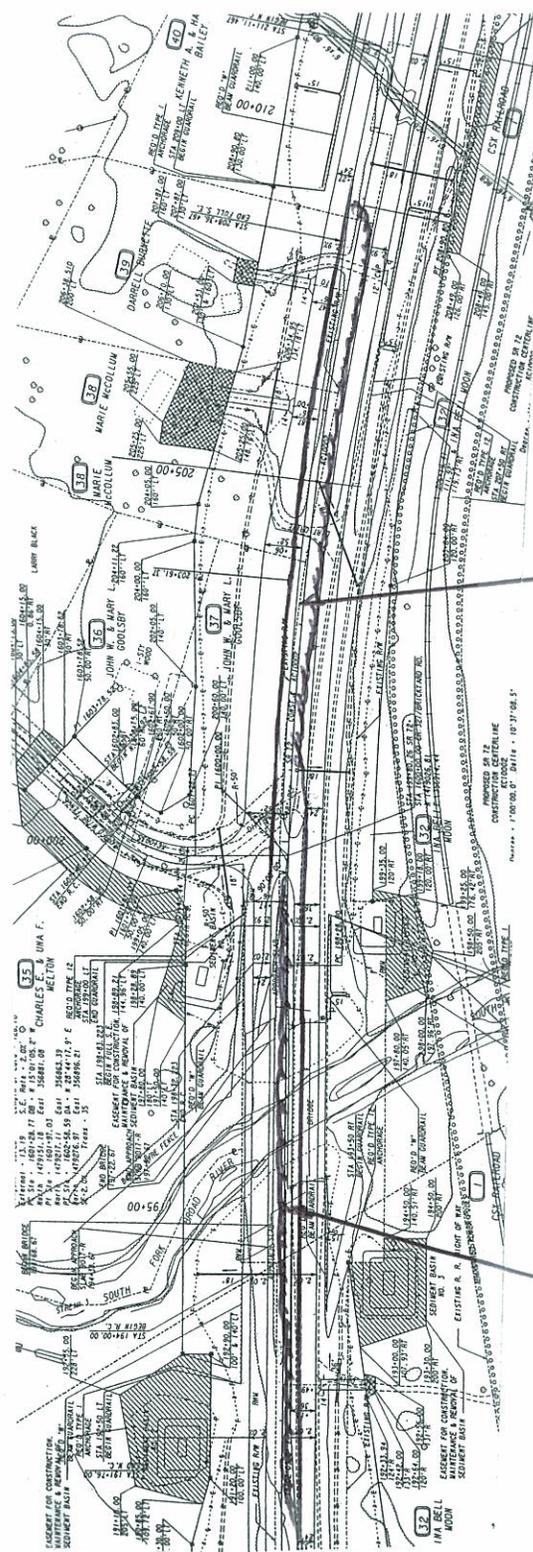
ALTERNATIVE NO.: CB-8

DESCRIPTION: ELIMINATE LEFT TURN LANES  
AT BRICKYARD ROAD

SHEET NO.: 2 of 5



ORIGINAL DESIGN



PROPOSED DESIGN

DELETE

DELETE

# Calculations



PROJECT: GEORGIA DEPARTMENT OF TRANSPORTATION  
EDS-72(28) - Madison County - P.I. Number: 122100

ALTERNATIVE NO.: C0-8

DESCRIPTION: ELIMINATE LEFT TURN LANES  
AT BILLIARD ROAD

SHEET NO.: 3 of 5

## AREA OF PAVEMENT FOR TURN LANE

SR72EB	STA 190+33 - STA 192+13	WIDTH 0'-12'	
			$180' \times \frac{0+12}{2} = 1080 \text{ sf} = 120 \text{ S4}$
	STA 192+13 - STA 195+29	WIDTH 12'	$316 \times 12' = 3792 \text{ sf} = 421 \text{ S4}$
	STA 197+49 - STA 199+92	WIDTH 12'	$243' \times 12' = 2916 \text{ sf} = 324 \text{ S4}$
SR72WB	STA 199+68 - STA 205+87	WIDTH 12'	$619' \times 12' = 7428 \text{ sf} = 825 \text{ S4}$
	STA 205+87 - STA 209+27		$340 \times \frac{0+12}{2} = 2040 \text{ sf} = 226 \text{ S4}$
	TOTAL		<u>17256 sf</u> <u>1916 S4</u>

## AREA OF NEW BRIDGE

ASSUME LENGTH OF NEW EAST BRIDGE  
IS SAME AS PROPOSED WEST BOUND BRIDGE

LENGTH 268'

WIDTH 12' (REDUCED)

AREA  $268' \times 12' = 3216 \text{ sf}$

# Calculations



PROJECT: GEORGIA DEPARTMENT OF TRANSPORTATION  
EDS-72(28) - Madison County - P.I. Number: 122100

ALTERNATIVE NO.: CB-8

DESCRIPTION: ELIMINATE LEFT TURN LANES  
AT BILLIARD ROAD

SHEET NO.: 4 of 5

## QUANTITY OF ROADWAY PAVEMENTS

12.5mm	$165\#/54 \times 1916 \div 2000 =$	<u>158 TN</u>
19 mm	$220\#/54 \times 1916 \div 2000 =$	<u>210 TN</u>
25 mm	$580\#/54 \times 1916 \div 2000 =$	<u>843 TN</u>
GAB	$145\#/ft^3 \times 17256 sf \times 1 ft \div 2000 =$	<u>1251 TN</u>

# COST WORKSHEET



PROJECT:	GEORGIA DEPARTMENT OF TRANSPORTATION	ALTERNATIVE NO.:	<b>CB-8</b>				
<b>SR 72 Widening &amp; Relocation - Federal Aid Project - EDS-72(28) - PI No 122100</b>							
DESCRIPTION: <i>Eliminate left turn lane at Brickyard Road</i>		SHEET NO.:	5 of 5				
CONSTRUCTION ITEM		ORIGINAL ESTIMATE			PROPOSED ESTIMATE		
ITEM	UNITS	NO. OF UNITS	COST/ UNIT	TOTAL	NO. OF UNITS	COST/ UNIT	TOTAL
310-1101 Gr Aggr Base Crs	TN	62614	\$ 21.49	\$1,345,575	61363	\$ 21.49	\$1,318,691
462-3121 Recycled Asph Conc 25 mm	TN	24053	\$ 59.45	\$1,429,951	23210	\$ 59.45	\$1,379,835
402-3130 Recycled Asph Conc 12.5 mm	TN	9365	\$ 56.33	\$527,530	9207	\$ 56.33	\$518,630
402-3190 Recycled Asph Conc 19 mm	TN	12096	\$ 55.60	\$672,538	11886	\$ 55.60	\$660,862
543-9000 Construction of Bridge SR 72 Eastbound	LS	1	\$ 1,213,035	\$1,213,035	1	\$ 939,675	\$939,675
Note:							
The estimate for the eastbound bridge did not include a cost for the left turn lane running across the bridge. The plans, however, indicate the left turn lane adding width and cost to the bridge. The \$1,213,035 above is the VE Team's approximation of the cost of the eastbound bridge with the left turn lane.							
The bridge costs and paving materials have all been escalated to current day unit costs. For the bridge -- this amounts to \$85.00 per square foot vs. \$70.00 per square foot used in the original estimate.							
<b>Sub-total</b>							<b>\$4,817,692</b>
<b>Mark-up at 10.00%</b>							<b>\$481,769</b>
<b>TOTAL</b>							<b>\$5,299,462</b>

# Value Analysis Design Alternative



PROJECT: GEORGIA DEPARTMENT OF TRANSPORTATION  
 Project No. EDS-72(28) – Madison County – P.I. Number: 122100

ALTERNATIVE NO.:  
**RW-1**

DESCRIPTION: **USE 20 FOOT RAISED MEDIAN FOR ENTIRE LENGTH OF PROJECT**

SHEET NO.: 1 of 4

**Original Design:**

The original design calls for the typical section to transition from a 20-foot raised median to a 44-foot depressed median from CR 35 (Sta. 153+04.22) to end of project (Sta. 233+50.00), which ties to project EDS(39) at the west city limits of Comer.

**Alternative:**

This alternative calls for the use of 20-foot raised median for the entire length of the project.

**Opportunities:**

- Initial construction cost savings
- Reduced cost of right-of-way

**Risks:**

- Moderate redesign required
- Project delivery schedule could be affected
- May require design exception to GDOT median design guidelines

**Technical Discussion:**

The concept report approved in 1994, recommended a 20-foot raised median for the entire length of the project. The revised concept report approved in 2000, recommended that the typical section be changed from a 20-foot raised median to a 44-foot depressed median at CR 325 to match the typical sections on the projects it ties into. However, in the year 2000, this revision increased the construction and right-of-way cost by \$1,830,000. It is suggested to revert back to the original concept report results in order to make it possible to reduce the project cost very significantly – since right-of-way cost have risen markedly since the time of the year 2000 report.

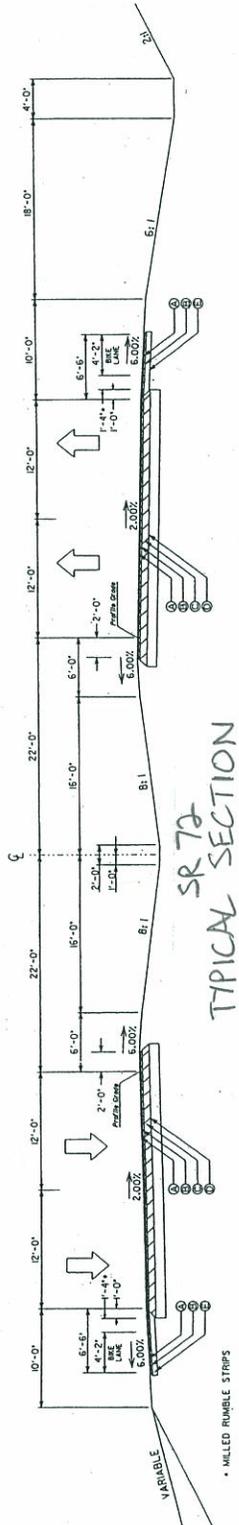
COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 12,228,473	\$	\$ 12,228,473
ALTERNATIVE	\$ 8,253,610	\$	\$ 8,253,610
SAVINGS	\$ 3,974,863	\$	\$ 3,974,863

PROJECT: GEORGIA DEPARTMENT OF TRANSPORTATION  
EDS-72(28) – Madison County – P.I. Number: 122100

ALTERNATIVE NO.: R/W 1

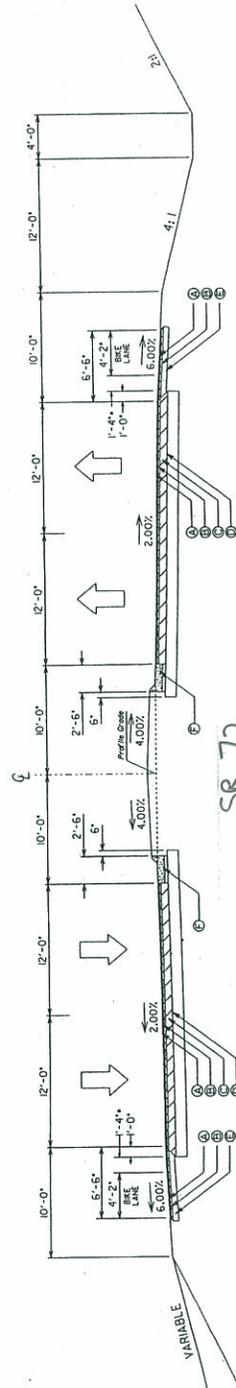
DESCRIPTION: USE 20 FOOT RAISED MEDIAN FOR ENTIRE  
LENGTH OF PROJECT

SHEET NO.: 2 of 4



SR 72  
TYPICAL SECTION

ORIGINAL DESIGN



SR 72  
TYPICAL SECTION

ALTERNATIVE

# Calculations



PROJECT: GEORGIA DEPARTMENT OF TRANSPORTATION  
EDS-72(28) - Madison County - P.I. Number: 122100

ALTERNATIVE NO.: R/w 1

DESCRIPTION: USE 20 FOOT RAISED MEDIAN FOR ENTIRE LENGTH  
OF PROJECT.

SHEET NO.: 3 of 4

## ORIGINAL DESIGN

STA. 153 + 04.22 TO STA. 233 + 50.00  $\rightarrow L = 8045.78'$   
SAY 8046' OR 1.52 MILES

OVERALL PROJECT LENGTH  $\rightarrow L = 14,080.25'$   
SAY 14,080' OR 2.67 MILES

\*USE 44 FOOT DECREASED MEDIAN FROM STA. 153 + 04.22 TO STA. 233 + 50.00  
- FROM REVISED CONCEPT REPORT DATED 8/18/2000

RURAL NEW LOCATION: 4-LANES W/ 44 FT. DIVIDED MEDIAN =  
\$2,408,000 / MILE

+ INFLATION 7 YEARS @ 5% PER YEAR = \$980,298

TOTAL SECTION COST = \$3,388,298 / MILE

## CONSTRUCTION COST

1.52 MILES  $\times$  \$3,388,298 / MILE =  $\boxed{\$5,150,213}$

## RIGHT OF WAY COST

TOTAL = \$12,418,000

1.52 MILES / 2.67 MILES = 0.569  $\xrightarrow{\text{SAY}}$  57%

\$12,418,000  $\times$  0.57 =  $\boxed{\$7,078,260}$

ORIGINAL DESIGN  
TOTAL COST =  $\boxed{\$12,228,473}$

# Calculations



PROJECT: GEORGIA DEPARTMENT OF TRANSPORTATION  
EDS-72(28) - Madison County - P.I. Number: 122100

ALTERNATIVE NO.: R/W 1

DESCRIPTION: USE 20 FOOT RAISED MEDIAN FOR ENTIRE  
LENGTH OF PROJECT

SHEET NO.: 4 of 4

## ALTERNATIVE

\* USE 20 FT. RAISED MEDIAN FROM STA. 153+04.00 TO STA. 233+50.00  
- FROM REVISED CONCEPT REPORT DATED 8/18/2000

RURAL NEW LOCATION: 4-LANES W/ 20-FT RAISED MEDIAN =  
\$1,410,000/MILE

+ INFLATION 7 YEARS @ 5% PER YEAR = \$574,012

TOTAL SECTION COST = \$1,984,012/MILE

## CONSTRUCTION COST

1.52 MILES X \$1,984,012/MILE =  $\boxed{\$3,015,698}$

## RIGHT OF WAY COST

\* RIGHT OF WAY WIDTH CAN BE DECREASED FROM 250 FEET TO 185 FEET

$$\frac{250-185}{250} = 0.26 \rightarrow 26\% \text{ REDUCTION}$$

$$\begin{aligned} \$12,418,000 \times 0.57 &= \$7,078,260 - 26\% \\ &= \boxed{\$5,237,912} \end{aligned}$$

ALTERNATIVE TOTAL COST =  $\boxed{\$8,253,610}$

# Value Analysis Design Alternative



PROJECT: GEORGIA DEPARTMENT OF TRANSPORTATION  
 Project No. EDS-72(28) – Madison County – P.I. Number: 122100

ALTERNATIVE NO.:  
**M-1**

DESCRIPTION: **REVIEW LOCATION OF PRECAST MEDIAN BARRIER IN STAGE CONSTRUCTION** SHEET NO.: 1 of 4

**Original Design:**

The original design specifies temporary concrete barrier in Stage 1 for the entire length of the project, for separation of existing traffic from construction on the north side of the project. Temporary barrier was shown in limited locations during Stage 2 construction.

**Alternative:**

The alternative design would specify utilization of temporary concrete only in areas where construction would worsen existing conditions for Stage 1. The temporary barrier in Stage 2 would be specified in areas of 2:1 slopes which exceed six foot high fills.

**Opportunities:**

- Initial cost savings

**Risks:**

- Reduces positive protection between traffic and work zone

**Technical Discussion:**

All work in Stage 1 would be performed at varying distances away from the traffic. In no cases would the construction impact the existing roadway or shoulder. Barriers would be specified in Stage 1 where cuts for construction would leave differences in elevations greater than six feet, with a 2:1 slope. Similarly, barriers would be specified for Stage 2 where traffic was shifted to Stage 1 construction and the new roadway had fill slopes greater than six feet and the resulting slopes were 2:1 or greater.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 387,156	\$	\$ 387,156
ALTERNATIVE	\$ 129,052	\$	\$ 129,052
SAVINGS	\$ 258,104	\$	\$ 258,104

# Illustrations



PROJECT: GEORGIA DEPARTMENT OF TRANSPORTATION  
EDS-72(28) - Madison County - P.I. Number: 122100

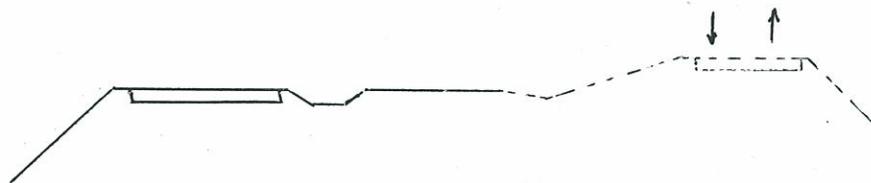
ALTERNATIVE NO.: M-1

DESCRIPTION: REVIEW LOCATION OF PRECAST  
MEDIAN BARRIER IN STAGE CONSTRUCTION

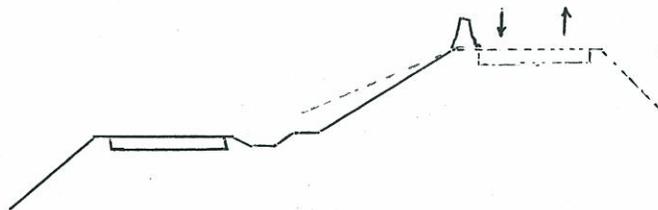
SHEET NO.: 2 of 4



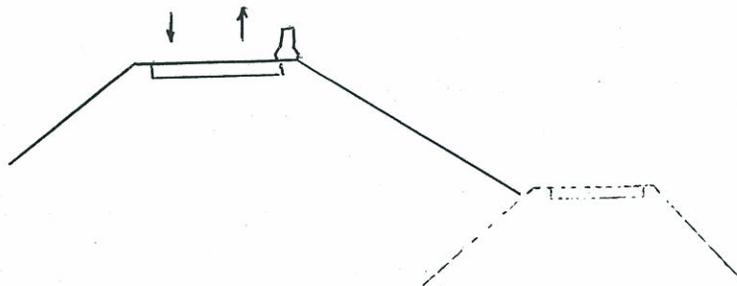
BARRIER NOT REQUIRED



BARRIER NOT REQUIRED



BARRIER REQUIRED



BARRIER REQUIRED

# Calculations



PROJECT: GEORGIA DEPARTMENT OF TRANSPORTATION  
EDS-72(28) - Madison County - P.I. Number: 122100

ALTERNATIVE NO.: M-1

DESCRIPTION: REVIEW LOCATION OF PRECAST  
MEDIAN BARRIER IN STAGE CONSTRUCTION

SHEET NO.: 3 of 4

## PROPOSED TEMPORARILY CONCRETE MEDIAN BARRIER LOCATIONS

STA 153+50 - STA 157+50	STAGE 2	400 LF
STA 162+00 - STA 167+50	STAGE 1	550 LF
STA 170+00 - STA 174+00	STAGE 2	400 LF
STA 178+50 - STA 182+50	STAGE 2	400 LF
STA 184+50 - STA 192+50	STAGE 1	800 LF
STA 201+00 - STA 205+50	STAGE 1	450 LF
STA 209+00 - STA 212+00	STAGE 2	300 LF
	TOTAL	3300 LF

ALLOW 100 LINEAR FEET FOR EACH  
LOCATION FOR TRANSITION

TOTAL BARRIER NEEDED 4000 LF



# Value Analysis Design Suggestion



PROJECT: GEORGIA DEPARTMENT OF TRANSPORTATION  
Project No. EDS-72(28) – Madison County – P.I. Number: 122100

ALTERNATIVE NO.:  
**M-2**

DESCRIPTION: **RELOCATE INTERSECTION OF BRICKYARD ROAD**

SHEET NO.: 1 of 1

## Original Design:

The original design provides access for Brickyard Road at Station 199+80, SR 72. Also, included as part of the design are decel lanes in the eastbound and westbound directions, and a median crossover. The eastbound decel lane extends across the bridge over the South Fork Broad River and requires 12 feet of added deck width.

## Alternative:

Relocate the intersection of Brickyard Road approximately 800 feet to the east. The relocation would eliminate the need for extra width on the bridge. Sight distance for the intersection could prove to be more satisfactory since the crossover would not be partially obscured by the bridge structure.

## Opportunities:

- Will help drivers anticipate an unexpected traffic movement

## Risks:

- Moderate redesign required

## Technical Discussion:

The traffic projection for this turning movement is only 25 cars per day, projected all the way out to 2030. It seems unlikely that the expenditure for the turning lane is cost effective. Also, moving this turning movement to a crossover 800 feet down the road will help to improve the drivers' anticipation of this unexpected traffic turn.

## *Project Description*

# *Project Description*

## **INTRODUCTION**

Georgia DOT Project EDS-72(28), P.I. No. 122100, located in Madison County, is proposed to improve State Route 72 from a two and three lane rural roadway to a rural four lane roadway with a 20 foot raised median. It begins at SR 172 and widens SR 72 by adding two lanes with a 20 foot raised median to the north side of the existing roadway. It ends at the west Comer City limits, 3,600 feet east of South Fork Broad River for a total length of 2.8 miles. The revised concept (see enclosed documents – with hand written comment dated 22 September 2000) provides the recommendation that the western termini be revised from SR 172 to 1,800 feet east of SR 172. This shift removes the overlap with the previous project EDS-72 (35), which includes the improvement of the SR 172 intersection. The total length changes from 2.8 miles to 2.5 miles, which is from milepost 7.1 to milepost 9.6.

It is recommended that the typical section be changed from a 20 foot raised median to a 44 foot depressed median from CR 325 to project EDS-72 (39) at the west city limits of Comer. The change in typical section on the project it ties into. This would increase the right-of-way from 185 feet to 250 feet. The 20-foot median section remaining would be used to tie into the 20-foot median section for project EDS-72(35) at SR 172. This is noted as being a recommended exception to the median design guidelines.

The project has been designed to include the demolition of the existing bridge and its replacement with two bridges (one east and one westbound).

This project is rather fully described in the documentation that follows. The current new estimate for the cost of construction, provided to the VE team, totals \$21,814,126. This is composed of \$9,231,863 total construction cost, \$12,418,000 for right-of-way, and \$164,263 for reimbursable utilities.

Please see the following enclosed documents

- Construction Cost Estimate
- Georgia Department of Transportation
  - Revised Project Concept Approval – 6 October 2000
  - Revised Project Concept Approval – 21 January 1998
  - Final Alternate Selection Approval – 10 November 1997

The VE team utilized the supplied project materials noted above, along with the design products from **PB**, and the current standard drawings, details and specifications during the conduct of their work in the VE Study effort.

## Estimate Report for file "122100"

Section ROADWAY					
Item Number	Quantity	Units	Unit Price	Item Description	Cost
150-1000	1	LS	100000.00	TRAFFIC CONTROL - EDS-72(28)	100000.00
153-1300	1	EA	51853.00	FIELD ENGINEERS OFFICE TP 3	51853.00
201-1500	1	LS	325000.00	CLEARING & GRUBBING - EDS-72(28)	325000.00
205-0001	401822	CY	3.20	UNCLASS EXCAV	1285830.40
310-1101	62614	TN	15.24	GR AGGR BASE CRS, INCL MATL	954237.36
402-3121	24053	TN	42.16	RECYCLED ASPH CONC 25 MM SUPERPAVE, GP 1 OR 2, INCL BITUM MATL & H LIME	1014074.48
402-3130	9365	TN	39.95	RECYCLED ASPH CONC 12.5 MM SUPERPAVE, GP 2 ONLY, INCL BITUM MATL & H LIME	374131.75
402-3190	12096	TN	39.36	RECYCLED ASPH CONC 19 MM SUPERPAVE, GP 1 OR 2, INCL BITUM MATL & H LIME	476098.56
413-1000	6910	GL	0.97	BITUM TACK COAT	6702.70
433-1200	540	SY	138.58	REINF CONC APPROACH SLAB, INCL SLOPED EDGE	74833.20
441-0748	7643	SY	27.38	CONCRETE MEDIAN, 6 IN	209265.34
441-6740	10337	LF	11.23	CONC CURB & GUTTER, 8 IN X 30 IN, TP 7	116084.51
603-2182	180	SY	44.06	STN DUMPED RIP RAP, TP 3, 24 IN	7930.80
622-1033	12000	LF	29.33	PRECAST CONCRETE MEDIAN BARRIER, METHOD 3	351960.00
634-1200	99	EA	84.51	RIGHT OF WAY MARKERS	8366.49
641-1100	116	LF	31.10	GUARDRAIL, TP T	3607.60
641-1200	5313	LF	12.76	GUARDRAIL, TP W	67793.88
641-5001	12	EA	453.29	GUARDRAIL ANCHORAGE, TP 1	5439.48
641-5012	17	EA	1520.26	GUARDRAIL ANCHORAGE, TP 12	25844.42
<b>Section Sub Total:</b>					<b>\$5,459,053.97</b>

Section EROSION CONTROL					
Item Number	Quantity	Units	Unit Price	Item Description	Cost
163-0232	26	AC	479.11	TEMPORARY GRASSING	12456.86
163-0240	966	TN	199.41	MULCH	192630.06
163-0300	10	EA	1132.54	CONSTRUCTION EXIT	11325.40
163-0520	785	LF	12.64	CONSTRUCT AND REMOVE TEMPORARY PIPE SLOPE DRAIN	9922.40
163-0530	4220	LF	2.34	CONSTRUCT AND REMOVE BALED STRAW EROSION CHECK	9874.80
163-0531	7	EA	7386.85	CONSTRUCT AND REMOVE SEDIMENT BASIN, TP 1	51707.95
163-0550	31	EA	177.30	CONSTRUCT AND REMOVE INLET SEDIMENT TRAP	5496.30
165-0010	6200	LF	0.90	MAINTENANCE OF TEMPORARY SILT FENCE, TP A	5580.00
165-0030	4040	LF	1.18	MAINTENANCE OF TEMPORARY SILT FENCE, TP C	4767.20
165-0050	600	LF	2.16	MAINTENANCE OF SILT RETENTION BARRIER	1296.00
165-0060	7	EA	942.37	MAINTENANCE OF TEMPORARY SEDIMENT BASIN	6596.59
165-0070	4220	LF	1.27	MAINTENANCE OF BALED STRAW EROSION CHECK	5359.40
165-0101	10	EA	360.08	MAINTENANCE OF CONSTRUCTION EXIT	3600.80
165-0105	31	EA	81.35	MAINTENANCE OF INLET SEDIMENT TRAP	2521.85
167-1000	2	EA	1964.70	WATER QUALITY MONITORING AND SAMPLING	3929.40
167-1500	24	MO	814.53	WATER QUALITY INSPECTIONS	19548.72
170-2000	600	LF	10.36	STAKED SILT RETENTION BARRIER	6216.00
171-0010	6200	LF	1.82	TEMPORARY SILT FENCE, TYPE A	11284.00
171-0030	4040	LF	3.07	TEMPORARY SILT FENCE, TYPE C	12402.80
603-2180	330	SY	34.61	STN DUMPED RIP RAP, TP 3, 12 IN	11421.30
603-2182	180	SY	44.65	STN DUMPED RIP RAP, TP 3, 24 IN	8037.00
603-7000	510	SY	4.26	PLASTIC FILTER FABRIC	2172.60
700-6910	51	AC	764.04	PERMANENT GRASSING	38966.04
700-7000	76	TN	58.01	AGRICULTURAL LIME	4408.76
700-7010	189	GL	18.80	LIQUID LIME	3553.20
700-8000	21	TN	264.44	FERTILIZER MIXED GRADE	5553.24
700-8100	2520	LB	1.52	FERTILIZER NITROGEN CONTENT	3830.40

716-2000	57253	SY	1.12	EROSION CONTROL MATS, SLOPES	64123.36
<b>Section Sub Total:</b>					<b>\$518,582.43</b>

### Section SIGNING & MARKING

Item Number	Quantity	Units	Unit Price	Item Description	Cost
636-1020	149	SF	13.30	HIGHWAY SIGNS, TP 1 MATL, REFL SHEETING, TP 3	1981.70
636-1029	96	SF	19.84	HIGHWAY SIGNS, TP 2 MATL, REFL SHEETING, TP 3	1904.64
636-1031	178	SF	16.89	HIGHWAY SIGNS, TP 1 MATL, REFL SHEETING TP 6	3006.42
636-1032	64	SF	27.58	HIGHWAY SIGNS, TP 2 MATL, REFL SHEETING TP 6	1765.12
636-2070	710	LF	6.46	GALV STEEL POSTS, TP 7	4586.60
636-2090	184	LF	6.86	GALV STEEL POSTS, TP 9	1262.24
653-0120	25	EA	56.04	THERMOPLASTIC PVMT MARKING, ARROW, TP 2	1401.00
653-0170	4	EA	76.68	THERMOPLASTIC PVMT MARKING, ARROW, TP 7	306.72
653-1501	32020	LF	0.27	THERMOPLASTIC SOLID TRAF STRIPE, 5 IN, WHITE	8645.40
653-1502	26980	LF	0.27	THERMOPLASTIC SOLID TRAF STRIPE, 5 IN, YELLOW	7284.60
653-1704	90	LF	3.37	THERMOPLASTIC SOLID TRAF STRIPE, 24 IN, WHITE	303.30
653-3501	29220	GLF	0.17	THERMOPLASTIC SKIP TRAF STRIPE, 5 IN, WHITE	4967.40
653-6004	1616	SY	2.54	THERMOPLASTIC TRAF STRIPING, WHITE	4104.64
653-6006	64	SY	2.71	THERMOPLASTIC TRAF STRIPING, YELLOW	173.44
654-1001	40	EA	3.51	RAISED PVMT MARKERS TP 1	140.40
654-1003	410	EA	3.23	RAISED PVMT MARKERS TP 3	1324.30
<b>Section Sub Total:</b>					<b>\$43,157.92</b>

### Section DRAINAGE

Item Number	Quantity	Units	Unit Price	Item Description	Cost
207-0203	164	CY	40.23	FOUND BKFILL MATL, TP II	6597.72
500-3101	507	CY	505.57	CLASS A CONCRETE	256323.99
500-3800	15	CY	737.41	CLASS A CONCRETE, INCL REINF STEEL	11061.15
511-1000	66776	LB	0.85	BAR REINF STEEL	56759.60
550-1180	3629	LF	34.88	STORM DRAIN PIPE, 18 IN, H 1-10	126579.52
550-1240	373	LF	43.96	STORM DRAIN PIPE, 24 IN, H 1-10	16397.08
550-1360	108	LF	65.70	STORM DRAIN PIPE, 36 IN, H 1-10	7095.60
550-2180	660	LF	26.67	SIDE DRAIN PIPE, 18 IN, H 1-10	17602.20
550-2240	90	LF	30.80	SIDE DRAIN PIPE, 24 IN, H 1-10	2772.00
550-2360	30	LF	46.35	SIDE DRAIN PIPE, 36 IN, H 1-10	1390.50
550-3518	10	EA	609.61	SAFETY END SECTION 18 IN, STORM DRAIN, 6:1 SLOPE	6096.10
550-3524	4	EA	998.95	SAFETY END SECTION 24 IN, STORM DRAIN, 6:1 SLOPE	3995.80
550-3618	42	EA	586.51	SAFETY END SECTION 18 IN, SIDE DRAIN, 6:1 SLOPE	24633.42
550-3624	6	EA	867.98	SAFETY END SECTION 24 IN, SIDE DRAIN, 6:1 SLOPE	5207.88
550-3636	2	EA	2367.93	SAFETY END SECTION 36 IN, SIDE DRAIN, 6:1 SLOPE	4735.86
550-4218	20	EA	547.28	FLARED END SECTION 18 IN, STORM DRAIN	10945.60
550-4224	1	EA	625.01	FLARED END SECTION 24 IN, STORM DRAIN	625.01
668-1100	5	EA	1889.15	CATCH BASIN, GP 1	9445.75
668-2100	13	EA	2815.15	DROP INLET, GP 1	36596.95
668-4300	2	EA	1956.28	STORM SEWER MANHOLE, TP 1	3912.56
668-5000	1	EA	1788.42	JUNCTION BOX	1788.42
668-8011	74	SF	50.59	SAFETY GRATE, TP 1	3743.66
668-8013	84	SF	34.15	SAFETY GRATE, TP 3	2868.60
<b>Section Sub Total:</b>					<b>\$617,174.97</b>

### Section BRIDGES

Item Number	Quantity	Units	Unit Price	Item Description	Cost
540-1101	1	LS	117463.55	REMOVAL OF EXISTING BR, STA NO -	117463.55
543-9000	1	Lump Sum	773850.00	CONSTRUCTION OF BRIDGE COMPLETE-SR 72 WESTBOUND-268 FT X 41.25 FT @\$70/SF	773850.00
543-9000	1	Lump Sum	773850.00	CONSTRUCTION OF BRIDGE COMPLETE-SR 72 EASTBOUND-268 FT X 41.25 FT @\$70/SF	773850.00
603-2024	1902	SY	43.00	STN DUMPED RIP RAP, TP 1, 24 IN	81786.00
603-7000	1902	SY	4.04	PLASTIC FILTER FABRIC	7684.08
<b>Section Sub Total:</b>					<b>\$1,754,633.63</b>

**Total Estimated Cost: \$8,392,602.92**

**Subtotal Construction Cost    \$8,392,602.92**

E&C Rate 10.0 %            \$839,260.29

Inflation Rate 0 % @ 0 Years            \$0.00

---

**Total Construction Cost    \$9,231,863.21**

Right Of Way            \$12,418,000.00

ReImb. Utilities            \$164,263.00

---

**Grand Total Project Cost    \$21,814,126.21**

D.O.T. 66

DEPARTMENT OF TRANSPORTATION  
STATE OF GEORGIA

INTERDEPARTMENT CORRESPONDENCE

**FILE** EDS-72(28) Madison County **OFFICE** Preconstruction  
P. I. No. 122100 **DATE** October 6, 2000

**FROM** *CWH*  
C. Wayne Hutto, Assistant Director of Preconstruction

**TO** SEE DISTRIBUTION

**SUBJECT** REVISED PROJECT CONCEPT REPORT APPROVAL

Attached for your files is the approval for subject project.

CWH/cj

Attachment

DISTRIBUTION:

Tom Turner  
David Mulling  
Harvey Keepler  
Jerry Hobbs  
Herman Griffin  
Michael Henry  
Marion Waters  
Marta Rosen  
Jimmy Chambers (ATTN: *Wayne Note*  
~~Tod Cassin~~)  
Larry Dent

STATE OF GEORGIA

INTERDEPARTMENT CORRESPONDENCE

RECEIVED

9/22/00

TOM,

THE PROPOSED 20' RAISED MEDIAN AT THE BEGINNING OF THE PROJECT DOES NOT MEET CURRENT MEDIAN DESIGN GUIDELINES. HOWEVER THE PROJECT UNDER CONSTRUCTION WEST OF THIS PROJECT CONTAINS A 20' RAISED MEDIAN (TOTAL LENGTH OF 20' RAISED MEDIAN IN EDS-72(28) = 1.0 MI. ±) RECOMMEND EXCEPTIONS TO GUIDELINES. JDel

FILE

EDS 72(28)  
P.I. No.: 122100  
Madison County

OFFICE  
DATE

FROM

*Harvey D. Keeper* <sup>SRM</sup>  
Harvey D. Keeper, State Environment/

TO

Tom Turner, P.E., Director of Precons

SUBJECT

Revised Project Concept Report - S.R.  
Approved Concept

EDS 72(28) in Madison County is proposed to improve SR 72 from a two and three lane rural roadway to a rural four lane roadway with a 20 foot raised median. It begins at SR 172 and widens SR 72 by adding two lanes with a 20 foot raised median to the north side of the existing roadway. It ends at the west Comer City limits, 3,600 feet east of South Fork Broad River for a total length of 2.8 miles.

Revised Concept

It is recommended that the western termini be revised from SR 172 to 1,800 feet east of SR 172. This shift removes the overlap with the previous project EDS 72(35), which includes the improvement of the SR 172 intersection. The total length changes from 2.8 miles to 2.5 miles, which is from milepost 7.1 to milepost 9.6.

It is recommended that the typical section to be changed from a 20 foot raised median to a 44 foot depressed median from CR 325 to project EDS 72(39) at the west city limits of Comer. The change in typical section matches the typical section on the project it ties into. This would increase the right of way from 185 feet to 250 feet. \*The 20-foot median section remaining would be used to tie into the 20-foot median section for project EDS 72(35) at SR 172.

\* RECOMMEND EXCEPTION TO MEDIAN DESIGN GUIDELINES -JDel

OK  
F20

<u>Estimated Cost:</u>	<u>Proposed(2000)</u>	<u>Approved (1994)</u>	<u>Prog.</u>
	2.5 miles	2.8miles	<u>Date</u>
Construction (incl.E&C + infl.)	\$ 7,364,000	\$6,378,000	2007
Right-of-way	\$ 3,222,000	\$2,378,000	2004
Utilities	LGPA	LGPA	

**Recommendation:** It is recommended that the proposed revision to the concept be approved for implementation.

Concur: Tom L. Turner  
Tom Turner, P.E.  
Director of Preconstruction

Approve: Frank L. Danchetz  
Frank L. Danchetz, P.E.  
Chief Engineer

HDK/FRM

Attachments: Sketch Map  
Cost Estimate  
Typical Sections

# PRELIMINARY COST ESTIMATE

Office of Environment/Location

August 9, 2000

County(s)

Madison

PI Number

122100

Project Number

EDS 72(28)

Project Name

SR 72 Improvements

Project Length

2.5

Miles

Project Description

SR 72 Improvements from just west of CR 221/Zetta Lee Johnson Road to west Comer city limits.

Existing Roadway

SR 72

Comments

TRAFFIC:

Current Design Year

2000

Daily Volume (AADT)

7,250

Future Design Year

2020

Daily Volume (AADT)

11,000

Concept Estimate

Feasibility Estimate

Typical Section(s) Used in Estimate

Typical Section Length

Rural Widening: 2 To 4-Lanes with 20 ft Raised Median Widen On One Side

.6

Miles

Rural New Location: 4-Lanes with 20 ft Raised Median

.3

Miles

Rural New Location: 4-Lanes with 44 ft Divided Median

1.6

Miles

Miles

Miles

Miles

Prepared By

Fred Matheny

**PROJECT COSTS**

**MAJOR STRUCTURES**

**1. Bridges: Stream Crossings & Grade Separations**

NO	LOCATION	QTY	TYPE *		W(FT)	L(FT)	UNIT COST	TOTAL
			S/G/R	W/N				
1	South Fork Broad River	1	S	N	41.0	221.0	54.00	489,000
2	South Fork Broad River	1	S	W	6.0	221.0	120.00	159,000
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								

\* S = Stream Crossing G = Grade Separation R = Railroad W = Widening N = New

**2. Bridge Culverts**

NO	LOCATION	TYPE	SIZE	L(FT)	UNIT COST	TOTAL
		S/D/T/Q	W x H (FT)			
1						
2						
3						
4						
5						
6						
7						

**3. Walls**

NO	LOCATION	TYPE	H(FT)	L(FT)	UNIT COST	TOTAL
1						
2						
3						
4						

MAJOR STRUCTURES SUBTOTAL \$ 648,000

Typical Section

Rural Widening: 2 To 4-Lanes with 20 ft Raised Median Widen On One Side

Typical Section Length  Miles

Right-of-Way Width  Feet

**GRADING AND DRAINAGE**

- 1. EARTHWORK
  - a. Unclassified Excavation Soil
  - b. Unclassified Excavation Rock
  - c. Borrow Excavation
- 2. MINOR DRAINAGE

QUANTITY	UNIT COST	TOTAL
80515 CY	2.50	201,000
14980 CY	10.00	150,000
CY	3.72	
.6 MI	\$105,658.16	63,000
<b>GRADING AND DRAINAGE SUBTOTAL</b>		<b>\$414,000</b>

**BASE AND PAVING**

- 1. GRADED AGGREGATE BASE
- 2. ASPHALT PAVING
  - a. Asph Conc 9.5 mm Superpave
  - b. Asph Conc 19 mm Superpave
  - c. Asph Conc 25 mm Superpave
  - d. Bituminous Tack Coat
- 3. CONCRETE PAVING
  - a. Curb and Gutter
  - b. Miscellaneous
- 4. OTHER PAVING

THICKNESS AND SPREAD RATE	QUANTITY	UNIT COST	TOTAL
10"	5,702 TN	13.05	74,000
1 1/2" (165 LB/SY)	1,800 TN	34.55	62,000
3" (330 LB/SY)	3,601 TN	34.54	124,000
4" (440 LB/SY)	1,859 TN	34.62	64,000
	1,629 GL	0.82	1,000
	6028 LF	9.39	57,000
	0 MI	\$15,615.60	0
<b>BASE AND PAVING SUBTOTAL</b>			<b>\$420,000</b>

**LUMP ITEMS**

- 1. TRAFFIC CONTROL
- 2. CLEARING AND GRUBBING
- 3. LANDSCAPING
- 4. EROSION CONTROL
- 5. SIGNING/STRIPING
- 6. OTHER

QUANTITY	UNIT COST	TOTAL
.6 MI	\$65,043.48	39,000
13 AC	6,000	76,000
.6 MI	\$24,348.00	15,000
.6 MI	\$59,337.84	36,000
.6 MI	\$22,046.82	13,000
.6 MI	\$39,096.13	23,000
<b>LUMP ITEM SUBTOTAL</b>		<b>\$202,000</b>

**MISCELLANEOUS**

- 1. GUARDRAIL
  - a. GUARDRAIL ANCHORS
- 2. DETOURS

QUANTITY	UNIT COST	TOTAL
1,580 LF	10.11	16,000
8 EA	435.59	3,000
MI	300,000.00	0
<b>MISCELLANEOUS SUBTOTAL</b>		<b>\$19,000</b>

**SPECIAL FEATURES**

Relocation of Crossroads

\$ 94,000

**Typical Section**

Rural New Location: 4-Lanes with 20 ft Raised Median

Typical Section Length  Miles

Right-of-Way Width  Feet

**GRADING AND DRAINAGE**

- 1. EARTHWORK
  - a. Unclassified Excavation Soil
  - b. Unclassified Excavation Rock
  - c. Borrow Excavation
- 2. MINOR DRAINAGE

QUANTITY	UNIT COST	TOTAL
	CY	2.50
	CY	10.00
	CY	3.72
.3 MI	\$105,734.37	32,000
<b>GRADING AND DRAINAGE SUBTOTAL</b>		<b>\$32,000</b>

**BASE AND PAVING**

- 1. GRADED AGGREGATE BASE
- 2. ASPHALT PAVING
  - a. Asph Conc 9.5 mm Superpave
  - b. Asph Conc 19 mm Superpave
  - c. Asph Conc 25 mm Superpave
  - d. Bituminous Tack Coat
- 3. CONCRETE PAVING
  - a. Curb and Gutter
  - b. Miscellaneous
- 4. OTHER PAVING

THICKNESS AND SPREAD RATE	QUANTITY	UNIT COST	TOTAL
10"	5,702 TN	13.05	74,000
1 1/2" (165 LB/SY)	813 TN	34.55	28,000
3" (330 LB/SY)	1,626 TN	34.54	56,000
4" (440 LB/SY)	1,859 TN	34.62	64,000
	965 GL	0.82	1,000
	3014 LF	9.39	28,000
	0 MI	\$46,200.00	0
			25,000
<b>BASE AND PAVING SUBTOTAL</b>			<b>\$276,000</b>

**LUMP ITEMS**

- 1. TRAFFIC CONTROL
- 2. CLEARING AND GRUBBING
- 3. LANDSCAPING
- 4. EROSION CONTROL
- 5. SIGNING/STRIPING
- 6. OTHER

QUANTITY	UNIT COST	TOTAL
.3 MI	\$30,304.35	9,000
6 AC	6,000	38,000
.3 MI	\$36,364.74	11,000
.3 MI	\$97,000.00	29,000
.3 MI	\$22,862.70	7,000
.3 MI	\$70,956.52	21,000
<b>LUMP ITEM SUBTOTAL</b>		<b>\$115,000</b>

**Typical Section**

Rural New Location: 4-Lanes with 44 ft Divided Median

Typical Section Length  Miles

Right-of-Way Width  Feet

**GRADING AND DRAINAGE**

- 1. EARTHWORK
  - a. Unclassified Excavation Soil
  - b. Unclassified Excavation Rock
  - c. Borrow Excavation
- 2. MINOR DRAINAGE

QUANTITY	UNIT COST	TOTAL
209093 CY	2.50	523,000
78680 CY	10.00	787,000
CY	3.72	
1.6 MI	\$101,000.00	162,000
<b>GRADING AND DRAINAGE SUBTOTAL</b>		<b>\$1,472,000</b>

**BASE AND PAVING**

- 1. GRADED AGGREGATE BASE
- 2. ASPHALT PAVING
  - a. Asph Conc 9.5 mm Superpave
  - b. Asph Conc 19 mm Superpave
  - c. Asph Conc 25 mm Superpave
  - d. Bituminous Tack Coat
- 3. CONCRETE PAVING
  - a. Curb and Gutter
  - b. Miscellaneous
- 4. OTHER PAVING

THICKNESS AND SPREAD RATE	QUANTITY	UNIT COST	TOTAL
10"	28,722 TN	13.05	375,000
1 1/2" (165 LB/SY)	4,646 TN	34.55	161,000
3" (330 LB/SY)	9,293 TN	34.54	321,000
4" (440 LB/SY)	9,912 TN	34.62	343,000
	5,353 GL	0.82	4,000
	0 LF	9.39	0
	5 MI	\$42,000.00	210,000
			141,000
<b>BASE AND PAVING SUBTOTAL</b>			<b>\$1,555,000</b>

**LUMP ITEMS**

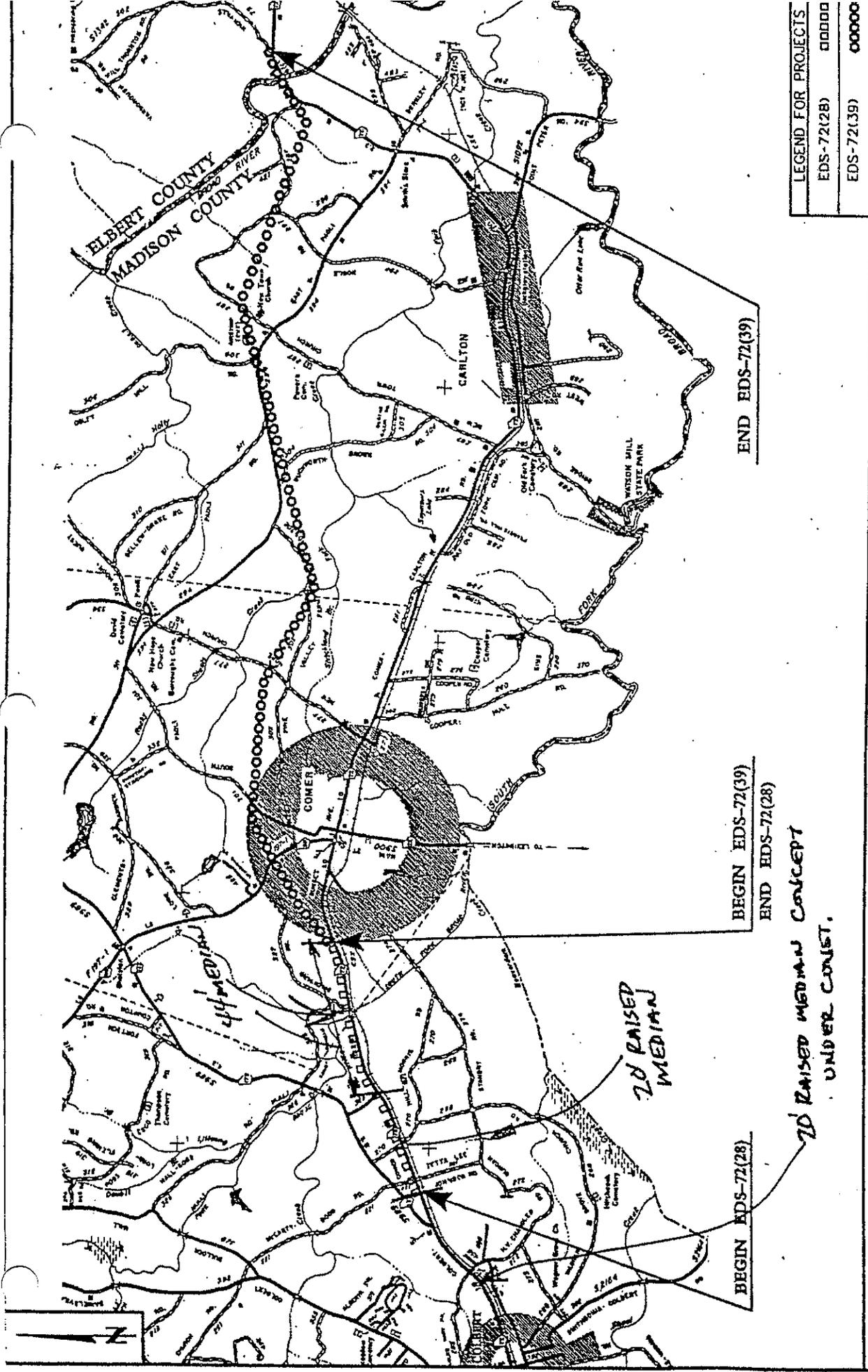
- 1. TRAFFIC CONTROL
- 2. CLEARING AND GRUBBING
- 3. LANDSCAPING
- 4. EROSION CONTROL
- 5. SIGNING/STRIPING
- 6. OTHER

QUANTITY	UNIT COST	TOTAL
1.6 MI	\$41,000.00	66,000
48 AC	6,000	291,000
1.6 MI	\$80,002.42	128,000
1.6 MI	\$97,000.00	155,000
1.6 MI	\$19,320.59	31,000
1.6 MI	\$96,000.00	154,000
<b>LUMP ITEM SUBTOTAL</b>		<b>\$825,000</b>

ESTIMATE SUMMARY

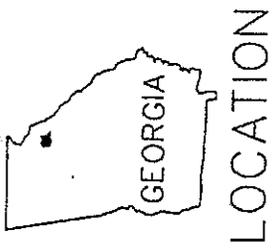
Typical Section	Section Cost (per mile)
1. Rural Widening: 2 To 4-Lanes with 20 ft Raised Median Widen On One Side	\$1,727,000
2. Rural New Location: 4-Lanes with 20 ft Raised Median	\$1,410,000
3. Rural New Location: 4-Lanes with 44 ft Divided Median	\$2,408,000

PROJECT COST	
A. MAJOR STRUCTURES	\$648,000
B. GRADING AND DRAINAGE	\$1,918,000
C. BASE AND PAVING	\$2,251,000
D. LUMP ITEMS	\$1,142,000
E. MISCELLANEOUS	\$19,000
F. SPECIAL FEATURES	\$94,000
<b>SUBTOTAL CONSTRUCTION COST</b>	<b>\$6,072,000</b>
E. & C. (10%)	\$607,000
INFLATION 2 yrs @ 5 % per yr	\$684,598
<b>GRAND TOTAL CONSTRUCTION COST</b>	<b>\$7,364,000</b>

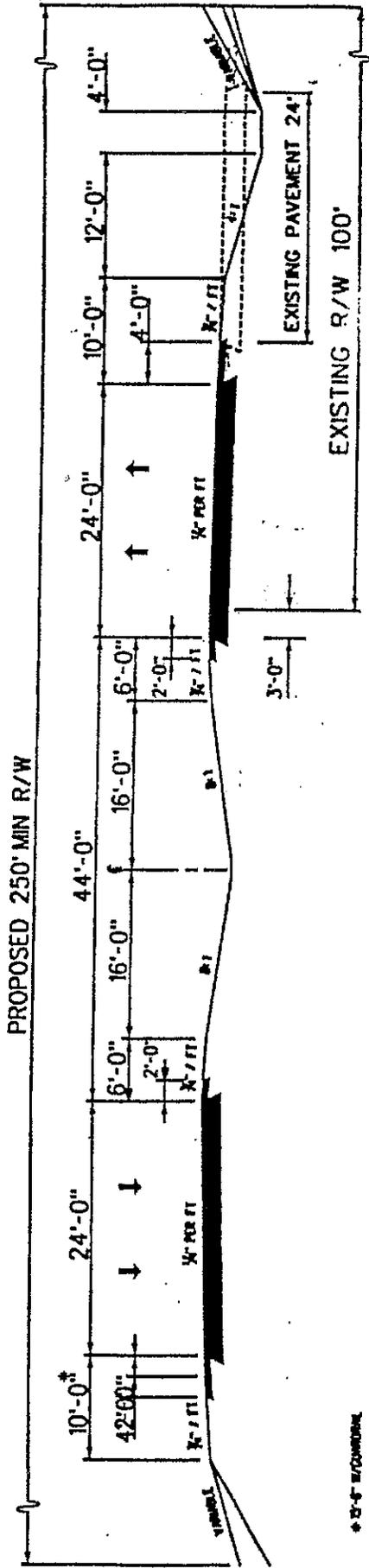


LEGEND FOR PROJECTS	
EDS-72(28)	00000
EDS-72(39)	00000

EDS-72 (28 & 39)  
 SR 72 IMPROVEMENTS  
 MADISON / ELBERT COUNTIES  
 P.I.# 122100 & 122650  
 NOVEMBER 20, 1998

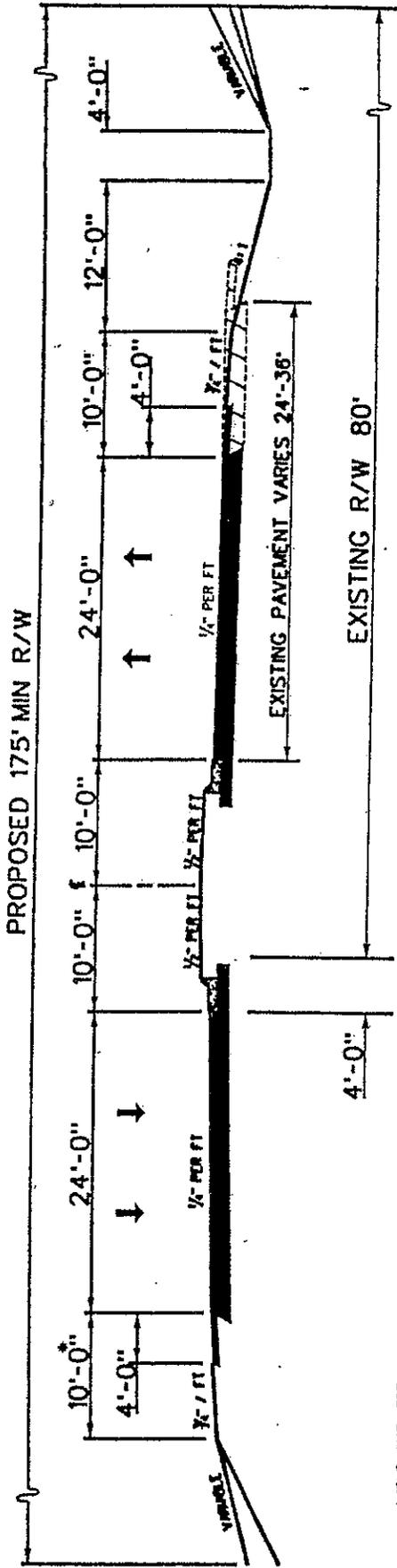


SOURCE: GENERAL HIGHWAY MAP, MADISON CO. GEORGIA  
 PREPARED BY THE GEORGIA DEPARTMENT OF TRANSPORTATION, 1991



TYPICAL CROSS SECTION  
**S.R. 72 IMPROVEMENTS**  
**EDS-72(28), MADISON COUNTY**  
 FROM C.R. 325 TO WEST COMER CITY LIMITS

NOT TO SCALE



**TYPICAL CROSS SECTION**  
**S.R. 72 IMPROVEMENTS**  
**EDS-72(28), MADISON COUNTY**  
**FROM 1800' EAST OF S.R. 172 TO C.R. 325**

NOT TO SCALE

PROJECT NUMBER/COUNTY: EDS-72(28) MADISON

NUMBER: 122/00

This project concept is contained in the Transportation Improvement Program (TIP) and/or in the State Transportation Improvement Program (STIP). The concept as presented herein and submitted for approval is consistent with that which is included in the TIP and/or the STIP.

M. J. [Signature]  
STATE TRANSPORTATION PLANNING ADMINISTRATOR

DATE: 9/20/00

D.O.T. 66

DEPARTMENT OF TRANSPORTATION  
STATE OF GEORGIA

INTERDEPARTMENT CORRESPONDENCE

**FILE** EDS-72(28) Madison County **OFFICE** Preconstruction  
P. I. No. 122100  
*CWH* **DATE** January 21, 1998  
**FROM** C. Wayne Hutto, Assistant Director of Preconstruction  
**TO** SEE DISTRIBUTION

**SUBJECT** REVISED PROJECT CONCEPT REPORT APPROVAL

Attached for your files is the approval for subject project.

CWH/cj

Attachment

**DISTRIBUTION:**

Walker Scott  
Bobby Mustin  
David Studstill (ATTN: Harvey Keepler)  
Jerry Hobbs  
Herman Griffin  
Marta Rosen (ATTN: Michael Henry)  
Marion Waters  
Toni Dunagan  
Paul Liles  
Jim Hitt (Traffic Ops)  
Hugh Tyner

DEPARTMENT OF TRANSPORTATION  
STATE OF GEORGIA

INTERDEPARTMENT CORRESPONDENCE

FILE EDS 72(28) OFFICE Environment/Location  
P.I. No.: 122100 DATE December 12, 1997  
Madison County

FROM *David E. Studstill SAM*  
David E. Studstill, P.E., State Environment/Location Engineer

TO Frank L. Danchetz, P.E., Chief Engineer

SUBJECT Revised Project Concept Report - S.R. 72 Improvements

Approved Concept

EDS 72(28) in Madison County is proposed to improve SR 72 from a two and three lane rural roadway to a rural four lane roadway with a 6.00 m raised median. It begins at SR 172 and continues along SR 72 through the city of Comer to CR 277/Hill Street. A one way pair is proposed through the city of Comer. The proposed design speed is 90 km/h west of Comer and 70 km/h through Comer. The length of the project is 7.72 km.

The project begins at SR 172 and widens existing SR 72 by adding two lanes with a 6.00 m raised median to the north side of the existing roadway. It continues on the north side to 183.00 m west of Ivy Street in Comer where it changes to a one way pair through Comer. It ties back into a four lanes 6.00 m raised median at CR 277/Hill Street, at the east city limits of Comer.

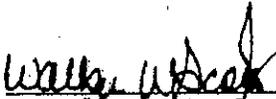
Revised Concept

It is recommended that the eastern termini be revised from CR 277 back to the west city limits of Comer, 1100.00 m east of South Fork Broad River. This project will then tie to the next project that will be on new location bypassing Comer and Carlton to the north. This will eliminate the one way pair through Comer and change the length of the project from 7.72 km to 4.51 km, which is from milepost 6.8 to milepost 9.6. The typical section will remain the same; which consist of improving the two and three lane rural roadway to a rural four-lane roadway with a 6.00 m raised median. The existing R/W varies from 24.38 m to 30.50 m.

The revision is recommended because of an overwhelming support from the local officials and citizens to bypass Comer and Carlton to the north.

Estimated Cost:	<u>Proposed</u>	<u>Approved (1994)</u>	Prog. Date
	2.8 miles	4.7miles	
Construction (incl.E&C + infl.)	\$ 6,378,000	\$8,623,000	LR
Right-of-way	\$ 2,378,000	\$2,692,000	LR
Utilities	LGPA	LGPA	

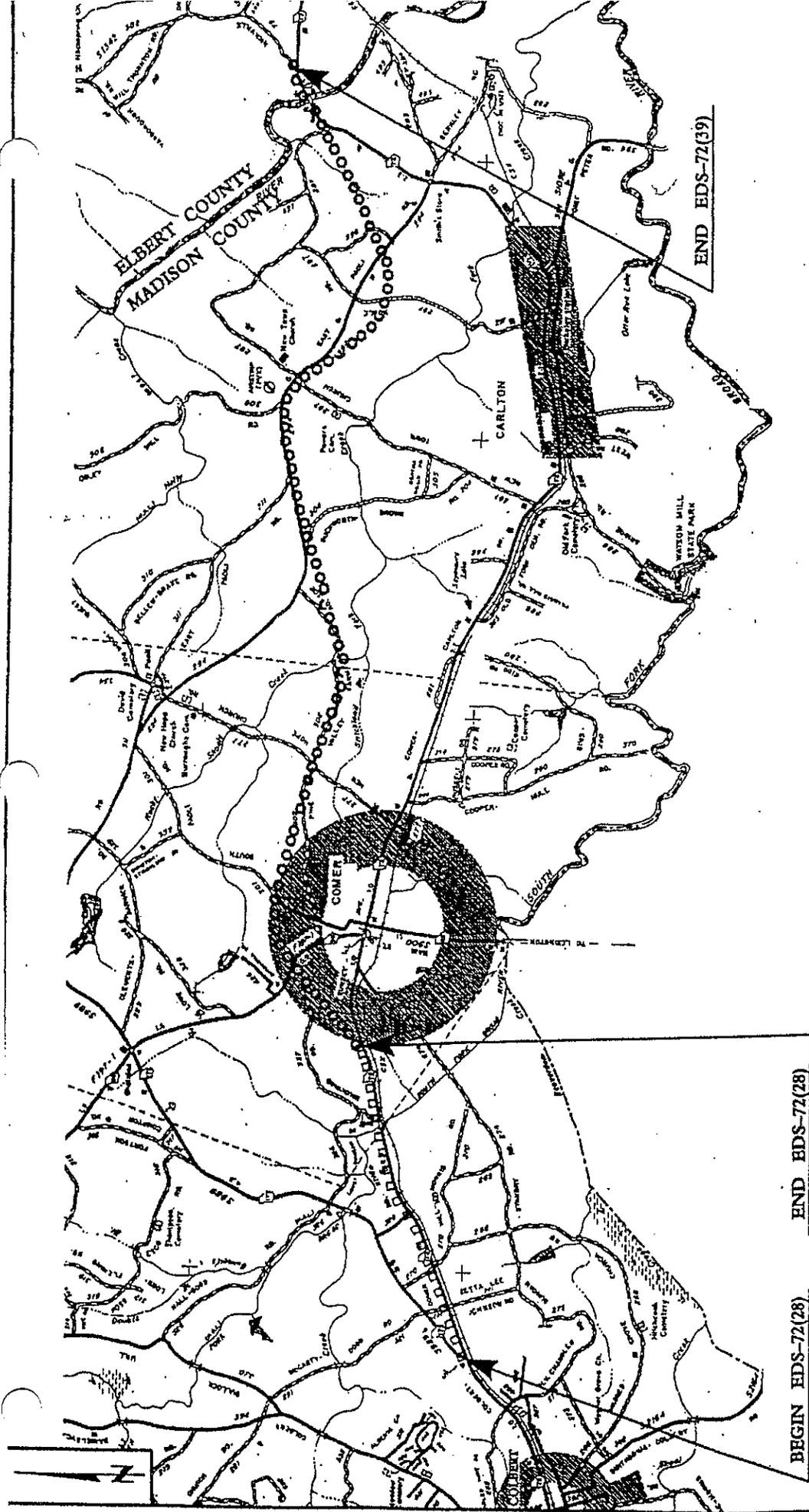
Recommendation: It is recommended that the proposed revision to the concept be approved for implementation.

Concur:   
Walker W. Scott, P.E.  
Director of Preconstruction

Approve:   
Frank L. Danchetz, P.E.  
Chief Engineer

DES/FRM

Attachments: Sketch Map  
Cost Estimate  
Typical Sections



BEGIN EDS-72(28)      END EDS-72(28)  
 BEGIN EDS-72(39)      END EDS-72(39)

END EDS-72(39)

LEGEND FOR PROJECTS	
EDS-72(28)	000000
EDS-72(39)	000000



LOCATION



EDS-72(28),(39)  
 SR 72 IMPROVEMENTS  
 MADISON COUNTY  
 P.I.# 122100 & 122650  
 OCTOBER 21, 1997

SOURCE: GENERAL HIGHWAY MAP, MADISON CO., GEORGIA  
 PREPARED BY THE GEORGIA DEPARTMENT OF TRANSPORTATION, 1991

ESTIMATE SUMMARY

10/21/97

PROJECT LENGTH 2.8 MILES  
EDS 72(28) / SR 72 IMPROVEMENTS / MADISON COUNTY  
SECTION I & 2

A. RIGHT OF WAY	\$ 2,378,000	\$849,000 per mile
B. REIMBURSABLE UTILITIES (includes 5% per year for 2 years inflation)	\$ —	

CONSTRUCTION COSTS SUMMARY

C. MAJOR STRUCTURES	\$ 731,000	
D. GRADING AND DRAINAGE	\$ 1,073,000	
E. BASE AND PAVING	\$ 2,330,000	
F. LUMP ITEMS	\$ 635,000	
G. MISCELLANEOUS	\$ 405,000	
H. SPECIAL FEATURES	\$ 85,000	
SUBTOTAL CONSTRUCTION COST	\$ 5,259,000	
E & C(10%)	\$ 526,000	
INFLATION (5% per year for 2 years)	\$ 593,000	
TOTAL CONSTRUCTION COST	\$ 6,378,000	\$2,278,000 per mile
GRAND TOTAL CONSTRUCTION COST	\$ 8,756,000	\$3,127,000 per mile

PRELIMINARY COST ESTIMATE  
OFFICE OF ENVIRONMENT/LOCATION

P.I. NO: 122100

DATE: 10-21-1997

PROJECT NO: EDS 72(28)

PROJECT NAME: SR 72 IMPROVEMENTS

COUNTY: MADISON

PROJECT DESCRIPTION:

SECTION I OF II ALONG SR 72 FROM SR 172 TO COMER  
CITY LIMITS.

PROJECT LENGTH: 2.800 MILES

SECTION LENGTH: 2.220 MILES

TYPICAL SECTION:

RURAL NEW LOCATION-4-LANES WITH 20' RAISED MEDIAN (48' PAV'T)

\*PROPOSED R / W = 175 ft

EXISTING ROADWAY (If Applicable):

SR 72

TRAFFIC:

INITIAL DESIGN YEAR: 1996

DAILY VOLUME (AADT): 6,700

FINAL DESIGN YEAR: 2016

DAILY VOLUME (AADT): 9,900

COMMENTS:

RIGHT OF WAY IS FOR TOTAL 2.8 MILES

PREPARED BY: FRED MATHENY

## PROJECT COSTS

### A. RIGHT - OF - WAY

1. PROPERTY (Land and Easements)	\$ 114,000
2. DISPLACEMENTS	\$ 1,198,000
3. OTHER COST	\$ 1,066,000
SUBTOTAL	\$ 2,378,000

### B. REIMBURSABLE UTILITIES

1. RAILROAD	\$ 0
2. TRANSMISSION LINES	\$ 0
3. SERVICES	\$ 0
SUBTOTAL	\$ 0

### C. MAJOR STRUCTURES

1. WALLS	\$ 0
<hr/>	
2. BRIDGE STREAM CROSSING WIDENING SOUTH FORK BROAD RIVER BRIDGE	\$ 731,000
<hr/>	
3. BRIDGE OVER/UNDERPASS	\$ 0
<hr/>	
4. BOX CULVERTS	\$ 0
<hr/>	
SUBTOTAL	\$ 731,000

### D. GRADING AND DRAINAGE

#### 1. EARTHWORK

a. UNCLASSIFIED EXCAVATION SOIL 160,000 CY @ \$2.28	\$ 365,000
b. UNCLASSIFIED EXCAVATION ROCK 75,000 CY @ \$5.00	\$ 375,000
c. BORROW EXCAVATION 0 CY @ \$3.00	\$ 0

#### 2. DRAINAGE

a. MINOR DRAINAGE (Including Cross Drain Pipes & Longitudinal System) 2.220 MILES @ \$68,040	\$ 151,000
b. CURB AND GUTTER 12,000 LF @ \$9.21	\$ 111,000
SUBTOTAL	\$ 1,002,000

# PROJECT COSTS

con't.

## E. BASE AND PAVING

1. GRADED AGGREGATE BASE	\$	586,000
12.00" -- 50,637 T @ \$11.57		
2. ASPHALT PAVING		
a. ASPHALTIC CONCRETE "E"	\$	222,000
1.50" -- 6,740 T @ \$33.01		
b. ASPHALTIC CONCRETE "B"	\$	285,000
2.00" -- 8,987 T @ \$31.76		
c. ASPHALTIC CONCRETE BASE	\$	687,000
6.25" -- 22,466 T @ \$30.58		
d. BITUMINOUS TACK COAT	\$	7,000
8,572 G @ \$0.86		
3. CONCRETE PAVING	\$	0
4. OTHER PAVING	\$	179,000
	SUBTOTAL \$	1,966,000

## F. LUMP ITEMS

1. TRAFFIC CONTROL	\$	25,000
2. CLEARING AND GRUBBING	\$	221,000
47 ACRES @ \$4,700		
3. LANDSCAPING	\$	191,000
2.220 MILES @ \$86,040		
4. EROSION CONTROL	\$	102,000
2.220 MILES @ \$46,050		
5. DETOURS (Including Temporary Bridges)	\$	0
	SUBTOTAL \$	539,000

## G. MISCELLANEOUS

1. SIGNING/STRIPING	\$	82,000
2.220 MILES @ \$37,000		
2. GUARDRAIL	\$	7,000
480 LF @ \$10.78 + 2 Anchors @ \$1,230.99		
3. OTHER	\$	266,000
2.220 MILES @ \$120,000		
	SUBTOTAL \$	355,000

## H. SPECIAL FEATURES

CROSS ROAD TIE INS

\$ 60,000

## ESTIMATE SUMMARY

		SECTION COST (per mile)
A. RIGHT-OF-WAY	\$ 2,378,000	\$ 1,071,000
B. REIMBURSABLE UTILITIES	\$ 0	\$ 0

### CONSTRUCTION COST SUMMARY

C. MAJOR STRUCTURES	\$ 731,000	
D. GRADING AND DRAINAGE	\$ 1,002,000	
E. BASE AND PAVING	\$ 1,966,000	
F. LUMP ITEMS	\$ 539,000	
G. MISCELLANEOUS	\$ 355,000	
H. SPECIAL FEATURES	<u>\$ 60,000</u>	
SUBTOTAL CONSTRUCTION COST	\$ 4,653,000	\$ 2,096,000
E. & C. (10%)	\$ 465,000	
INFLATION 2 yr(s) @ 5% per year	<u>\$ 525,000</u>	
TOTAL CONSTRUCTION COST	\$ 5,643,000	\$ 2,542,000
<hr/>		
GRAND TOTAL CONSTRUCTION COST	\$ 8,021,000	\$ 3,613,000

RURAL NEW LOCATION-4-LANES WITH 20' RAISED MEDIAN (48' PAV'T)

PRELIMINARY COST ESTIMATE  
OFFICE OF ENVIRONMENT/LOCATION

P.I. NO: 122100

DATE: 10-21-1997

PROJECT NO: EDS 72(28)

PROJECT NAME: SR 72 IMPROVEMENTS

COUNTY: MADISON

PROJECT DESCRIPTION:

SECTION II OF II ALONG SR 72 FROM SR 172 TO COMER  
CITY LIMITS.

PROJECT LENGTH: 2.800 MILES

SECTION LENGTH: 0.580 MILES

TYPICAL SECTION:

PROPOSED WIDENING-2 LANE 4 LANE WITH 20' RAISED MEDIAN WIDEN ON ONE SIDE (48' PAV'T)

EXISTING ROADWAY (If Applicable):

SR72

TRAFFIC:

INITIAL DESIGN YEAR: 1996

DAILY VOLUME (AADT): 6,700

FINAL DESIGN YEAR: 2016

DAILY VOLUME (AADT): 9,900

COMMENTS:

RIGHT OF WAY IS INCLUDED IN SECTION I

PREPARED BY: FRED MATHENY

PROJECT COSTS

A. RIGHT - OF - WAY

1. PROPERTY (Land and Easements)	\$	0
2. DISPLACEMENTS	\$	0
3. OTHER COST	\$	0
SUBTOTAL		\$ 0

B. REIMBURSABLE UTILITIES

1. RAILROAD	\$	0
2. TRANSMISSION LINES	\$	0
3. SERVICES	\$	0
SUBTOTAL		\$ 0

C. MAJOR STRUCTURES

1. WALLS	\$	0
<hr/>		
2. BRIDGE STREAM CROSSING	\$	0
<hr/>		
3. BRIDGE OVER/UNDERPASS	\$	0
<hr/>		
4. BOX CULVERTS	\$	0
<hr/>		
SUBTOTAL		\$ 0

D. GRADING AND DRAINAGE

1. EARTHWORK

a. UNCLASSIFIED EXCAVATION SOIL	\$	21,000
9,000 CY @ \$2.28		
<hr/>		
b. UNCLASSIFIED EXCAVATION ROCK	\$	4,000
750 CY @ \$5.00		
<hr/>		
c. BORROW EXCAVATION	\$	0
0 CY @ \$3.00		
<hr/>		

2. DRAINAGE

a. MINOR DRAINAGE (Including Cross Drain Pipes & Longitudinal System)	\$	17,000
0.580 MILES @ \$29,970		
<hr/>		
b. CURB AND GUTTER	\$	29,000
3,100 LF @ \$9.21		
<hr/>		

SUBTOTAL \$ 71,000

# PROJECT COSTS

cont.

## E. BASE AND PAVING

1. GRADED AGGREGATE BASE	\$	85,000
12.00" -- 7,350 T @ \$11.57		
<hr/>		
2. ASPHALT PAVING		
a. ASPHALTIC CONCRETE "E"	\$	70,000
1.50" -- 2,113 T @ \$33.01		
<hr/>		
b. ASPHALTIC CONCRETE "B"	\$	89,000
2.00" -- 2,817 T @ \$31.76		
<hr/>		
c. ASPHALTIC CONCRETE BASE	\$	86,000
6.00" -- 2,817 T @ \$30.58		
<hr/>		
d. BITUMINOUS TACK COAT	\$	1,000
1,739 G @ \$0.86		
<hr/>		
3. CONCRETE PAVING	\$	0
4. OTHER PAVING	\$	33,000
	SUBTOTAL \$	364,000

## F. LUMP ITEMS

1. TRAFFIC CONTROL	\$	7,000
2. CLEARING AND GRUBBING	\$	58,000
12 ACRES @ \$4,700		
<hr/>		
3. LANDSCAPING	\$	14,000
0.580 MILES @ \$24,960		
<hr/>		
4. EROSION CONTROL	\$	17,000
0.580 MILES @ \$30,000		
<hr/>		
5. DETOURS (Including Temporary Bridges)	\$	0
	SUBTOTAL \$	96,000

## G. MISCELLANEOUS

1. SIGNING/STRIPING	\$	21,000
0.580 MILES @ \$37,000		
<hr/>		
2. GUARDRAIL	\$	0
0 LF @ \$10.78 + 0 Anchors @ \$1,230.99		
<hr/>		
3. OTHER	\$	29,000
0.580 MILES @ \$50,100		
<hr/>		
	SUBTOTAL \$	50,000

## H. SPECIAL FEATURES

CR 221 TIE IN	\$	25,000
<hr/>		

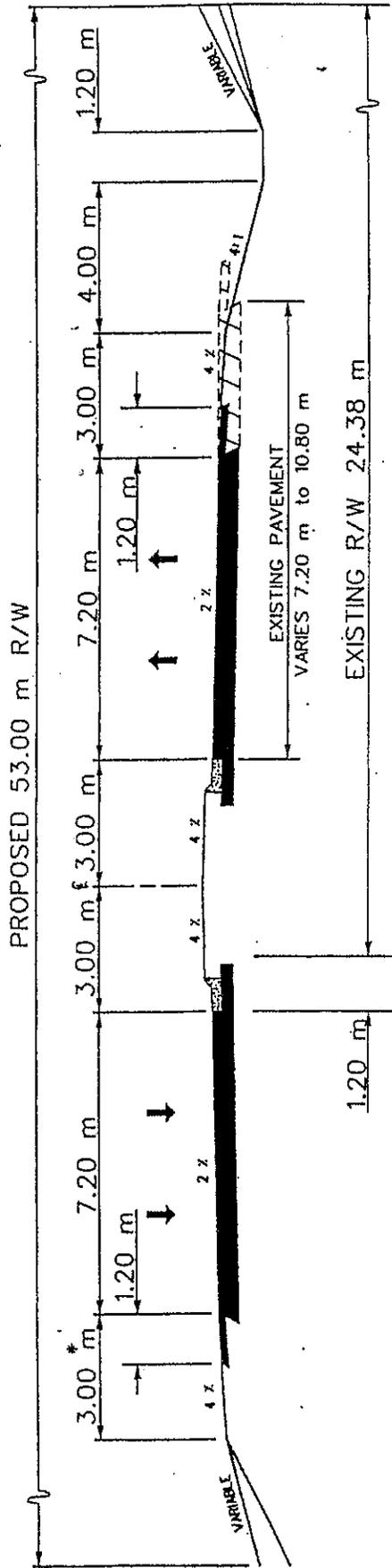
## ESTIMATE SUMMARY

		SECTION COST (per mile)
A. RIGHT-OF-WAY	\$ 0	\$ 0
B. REIMBURSABLE UTILITIES	\$ 0	\$ 0

### CONSTRUCTION COST SUMMARY

C. MAJOR STRUCTURES	\$ 0	
D. GRADING AND DRAINAGE	\$ 71,000	
E. BASE AND PAVING	\$ 364,000	
F. LUMP ITEMS	\$ 96,000	
G. MISCELLANEOUS	\$ 50,000	
H. SPECIAL FEATURES	<u>\$ 25,000</u>	
SUBTOTAL CONSTRUCTION COST	\$ 606,000	\$ 1,045,000
E. & C. (10%)	\$ 61,000	
INFLATION - 2 yr(s) @ 5% per year	<u>\$ 68,000</u>	
TOTAL CONSTRUCTION COST	\$ 735,000	\$ 1,267,000
<hr/>		
GRAND TOTAL CONSTRUCTION COST	\$ 735,000	\$ 1,267,000

RURAL WIDENING-2 TO 4 LANES WITH 20' RAISED MEDIAN WIDEN ON ONE SIDE (48' PAV'T)



TYPICAL CROSS SECTION  
 S.R. 72 IMPROVEMENTS  
 EDS-72(28), MADISON COUNTY

FROM S.R. 172 TO C.R. 325

NOT TO SCALE



D.O.T. 66

DEPARTMENT OF TRANSPORTATION  
STATE OF GEORGIA

INTERDEPARTMENT CORRESPONDENCE

**FILE** EDS-72(28), (39), (38) Madison County **OFFICE** Preconstruction  
P.I. Nos. 122100, 122650, 122640 **DATE** November 10, 1997

**FROM** *CW Hutto*  
C. Wayne Hutto, Assistant Director of Preconstruction

**TO** SEE DISTRIBUTION

**SUBJECT** FINAL ALTERNATE SELECTION APPROVAL

Attached for your further handling is the approved Final Alternate Selection Report on the above subject project.

Also attached is the Notice of Final Alternate Selection Approval. This is your authorization to proceed with advertisement.

CWH/cj

Attachment

DISTRIBUTION:

Walker Scott  
Bobby Mustin  
David Studstill  
Herman Griffin  
Paul Liles  
Joe Palladi  
Marion Waters  
Jerry Hobbs  
Hugh Tyner



# Department of Transportation

ROUTING SLIP

10-7-97

Date

TO:	ROOM No.	OUT
(1) <del>W. Allen Scott</del>		
(2) <del>Frank Danahetz</del>		
(3) <del>Steve Parks</del>		(S)
(4) <del>Wayne Stackelford</del>		11-8
(5) Wayne Hutto * See below		
(6)		
(7)		
(8)		

TO FORWARD, STRIKE YOUR NAME, INITIAL AND DATE

- 1, 2, 4 (x) FOR SIGNATURE ( ) AS REQUESTED
- ( ) FOR APPROVAL ( ) PREPARE REPLY
- 3 (x) FOR INFORMATION ( ) FILE
- ( ) FOR COMMENTS AND RECOMMENDATIONS ( ) MAIL
- 5 (x) FOR ACTION ( ) PLEASE ANSWER
- ( ) FOR DISCUSSION ON \_\_\_\_\_ BY \_\_\_\_\_ (Date) (Date)

OTHER: \* Wayne, with Alternate 5 selected, we  
 need to do NEPA, not GEPa so that we may  
 be able to use Federal funds on these projects.  
 Discuss with Studstill. *ms*

FROM: CJ/6-5312

*I am not  
F20*

DEPARTMENT OF TRANSPORTATION RECEIVED  
STATE OF GEORGIA  
SEP 17 1997  
PRECONSTRUCTION

INTERDEPARTMENT CORRESPONDENCE

FILE EDS 72(28,39,38), Madison County OFFICE Environment/Location  
P.I. No.: 122100,122650,122640 DATE September 12, 1997

FROM *D. E. Studstill*  
David E. Studstill, P.E., State Environment/Location Engineer

TO Wayne Hutto, Assistant Director of Preconstruction

SUBJECT **Alternate Selection Report**

The recommended alternative for project EDS 72(28,39,38), Madison County, is **Alternative #5**. This alternative consists of widening a section of existing SR 72 from SR 172 to west of Comer city limits and a section of new location from the west Comer city limits to existing SR 72 at the Broad River/Madison-Elbert county line. This new location section is known as the "Comer/Carlton Long Bypass." The proposal would be a four lane rural roadway with a median for a total length of 12.0 miles.

The following describes **Alternative #5**:

SR 72 would be widened from SR 172 to 850 feet west of the Comer city limits by adding two lanes with a 20 foot raised median to the north side of the existing two lanes with rural ditches. The widening would hold the required distant from the existing railroad on the south side. The proposed alignment would then continue on new location in northeast direction with a four lane rural roadway and a 44 foot median on 250 foot of right-of-way. It would parallel a power line crossing SR 98 500 feet south of the intersection of CR 327. It would continue in a northeast direction crossing C.R. 301 just south of the Comer city limits where it would turn to an easterly direction. The alignment would then intersect CR 302/Pine Valley Farm Road just west of CR 277. It would follow along CR 302 crossing back and forth until it intersects CR 294/East Paoli Road. The alignment would then parallel along the south side of CR 294 to CR 306 where it would turn to a southeast direction. It would then leave CR 294 just south of CR 287/New Town Church Road crossing CR 297/Noble Road 800 feet south of CR 294. The alignment would then turn to a northeast direction crossing CR 294 west of CR 298, then CR 298, and CR 287 200 feet north of SR 72. The alignment would then tie back into SR 72 just before crossing the Madison/Elbert County Line at the Broad River. It would cross the Broad River adding a parallel bridge on the north side and continue to CR 79/Nickville Road where it would tie into the existing four lanes with a 14 foot flush median.

Other Alternatives considered were as follows:

**Alternative #1** would follow existing SR 72. It would begin at SR 172 and widen the existing roadway to a point 600 feet west of Ivy Street/CS 513 in Comer. It would then continue through Comer with a one way pair system. The westbound lanes would follow existing SR 72 and the proposed eastbound lanes would parallel the Seaboard System R.R. on new location to a point just east of Railroad Avenue/ CS 524. It would then tie back into SR 72 400 feet west of Hill Street/CR 277 and continue through Carlton to CR 79/Nickville Road in Elbert County just east of the Broad River. The total length of this alternative would be 13.4 miles.

**Alternative #2** would begin at SR 172 and widen the existing SR 72 to a point 850 feet west of the Comer city limits where it would bypass Comer on new location to the north, tying back to SR 72 at CR 281. This is called the "Comer Short Bypass". It would then follow Alternative #1 from CR 281 east of Comer through Carlton to CR 79/Nickville Road in Elbert County just east of the Broad River. The total length of this alternative would be 13.7 miles.

**Alternative #3** would begin at SR 172 and widen existing SR 72 to a point 600 feet west of Ivy Street/CS 513 in Comer. It would then continue through Comer with a one way pair system, as described in Alternative #1. It would then follow existing SR 72 to a point 1250 feet east of CR 287/ New Town Church Road where it would bypass Carlton on new location to the north and tie back into SR 72 600 feet east of CR 294. This is called the "Carlton Short Bypass". It would then continue along SR 72 to CR 79/Nickville Road in Elbert County just east of the Broad River. The total length of this alternative would be 12.5 miles.

**Alternative #4** would begin at SR 172 and widen existing SR 72 to a point 850 feet west of the Comer city limits. It would then follow the "Comer Short Bypass" alignment to the north of Comer tying back into SR 72 at CR 281 east of Comer. It would then follow Alternative #1 alignment from CR 281 east of Comer to 1250 feet east of CR 287/New Town Church Road. Then it would follow the "Carlton Short Bypass" to CR 294. It then would follow the Alternative #1 alignment from 600 feet east of CR 294 to the end of the project. The total length of this alternative would be 13.4 miles.

The estimated cost for each Alternative is as follows:

	Alternative #1	Alternative #2	Alternative #3	Alternative #4	Alternative #5
Construction	\$23,833,000	\$26,686,000	\$23,931,000	\$26,784,000	\$31,230,000
Right of Way	\$12,307,000	\$11,489,000	\$ 8,557,000	\$ 7,739,000	\$ 6,886,000
<b>TOTAL</b>	<b>\$36,140,000</b>	<b>\$38,175,000</b>	<b>\$32,488,000</b>	<b>\$34,523,000</b>	<b>\$38,116,000</b>

The results of the Public Information Meeting were as follows:

At a Public Information Meeting held December 10, 1996 in Comer 186 people attended and 176 comments were received. Five different alternatives were presented for public input. There were 94 people in support of Alternative #5, 2 were opposed; 43 in support of Alternative #3, 1 was opposed; 37 in support of Alternative #1, 57 were opposed; 9 in support of Alternative #2, 1 was opposed; 7 in support of Alternative #4, 1 was opposed.

The recommendations are as follows:

Alternative #1 is rejected because of the historical impacts and the number of residential displacements (60).

Alternative #2 is rejected because of the historical impacts and the number of residential displacements (62).

Alternative #3 is rejected because of the historical impacts and the number of residential displacements (42).

Alternative #4 is rejected because of the lack of support of those attending the PIM and the number of residential displacements (44).

Alternative #5 is recommended because of the local support of the citizens and government and has fewer impacts.

Recommended: Walker W. Scott  
Walker W. Scott, P.E., Director of Preconstruction

Concurred: Frank L. Danchetz  
Frank L. Danchetz, P.E., Chief Engineer

Approved: Wayne Shackelford  
Wayne Shackelford, Commissioner

Attachments: Sketch Map, Cost Estimates and Typical Sections

**ESTIMATE SUMMARY**

9/12/97

PROJECT LENGTH 13.7 MILES  
EDS 72(28,39,38) / SR 72 IMPROVEMENTS / MADISON COUNTY  
ALTERNATIVE #2

A. RIGHT OF WAY	\$11,489,000	\$839,000 per mile.
B. REIMBURSABLE UTILITIES (includes 5% per year for 2 years inflation)	\$ _____	

**CONSTRUCTION COSTS SUMMARY**

C. MAJOR STRUCTURES	\$ 1,970,000	
D. GRADING AND DRAINAGE	\$ 4,580,000	
E. BASE AND PAVING	\$ 9,968,000	
F. LUMP ITEMS	\$ 3,062,000	
G. MISCELLANEOUS	\$ 2,425,000	
H. SPECIAL FEATURES	\$ _____ 0	
SUBTOTAL CONSTRUCTION COST	\$22,005,000	
E & C(10%)	\$ 2,201,000	
INFLATION (5% per year for 2 years)	\$ 2,480,000	
TOTAL CONSTRUCTION COST	<u>\$26,686,000</u>	\$1,948,000 per mile
 GRAND TOTAL CONSTRUCTION COST	 \$38,175,000	 \$2,787,000 per mile

**ESTIMATE SUMMARY**

9/12/97

PROJECT LENGTH 12.5 MILES  
EDS 72(28,39,38) / SR 72 IMPROVEMENTS / MADISON COUNTY  
ALTERNATIVE #3

A. RIGHT OF WAY	\$ 8,557,000	\$685,000 per mile
B. REIMBURSABLE UTILITIES (includes 5% per year for 2 years inflation)	\$ _____	

**CONSTRUCTION COSTS SUMMARY**

C. MAJOR STRUCTURES	\$ 2,133,000	
D. GRADING AND DRAINAGE	\$ 4,243,000	
E. BASE AND PAVING	\$ 8,985,000	
F. LUMP ITEMS	\$ 2,495,000	
G. MISCELLANEOUS	\$ 1,877,000	
H. SPECIAL FEATURES	\$ _____ 0	
SUBTOTAL CONSTRUCTION COST	\$19,733,000	
E & C(10%)	\$ 1,974,000	
INFLATION (5% per year for 2 years)	\$ 2,224,000	
TOTAL CONSTRUCTION COST	<u>\$23,931,000</u>	\$1,915,000 per mile
GRAND TOTAL CONSTRUCTION COST	\$32,488,000	\$2,599,000 per mile

ESTIMATE SUMMARY

9/12/97

PROJECT LENGTH 13.4 MILES  
EDS 72(28,39,38) / SR 72 IMPROVEMENTS / MADISON COUNTY  
ALTERNATIVE #4

A. RIGHT OF WAY	\$ 7,739,000	\$578,000 per mile
B. REIMBURSABLE UTILITIES (includes 5% per year for 2 years inflation)	\$ _____	

CONSTRUCTION COSTS SUMMARY

C. MAJOR STRUCTURES	\$ 2,283,000	
D. GRADING AND DRAINAGE	\$ 3,991,000	
E. BASE AND PAVING	\$10,274,000	
F. LUMP ITEMS	\$ 3,095,000	
G. MISCELLANEOUS	\$ 2,443,000	
H. SPECIAL FEATURES	\$ _____ 0	
SUBTOTAL CONSTRUCTION COST	\$22,086,000	
E & C(10%)	\$ 2,209,000	
INFLATION (5% per year for 2 years)	\$ 2,489,000	
TOTAL CONSTRUCTION COST	<u>\$26,784,000</u>	\$1,999,000 per mile
GRAND TOTAL CONSTRUCTION COST	\$34,523,000	\$2,577,000 per mile

**ESTIMATE SUMMARY**

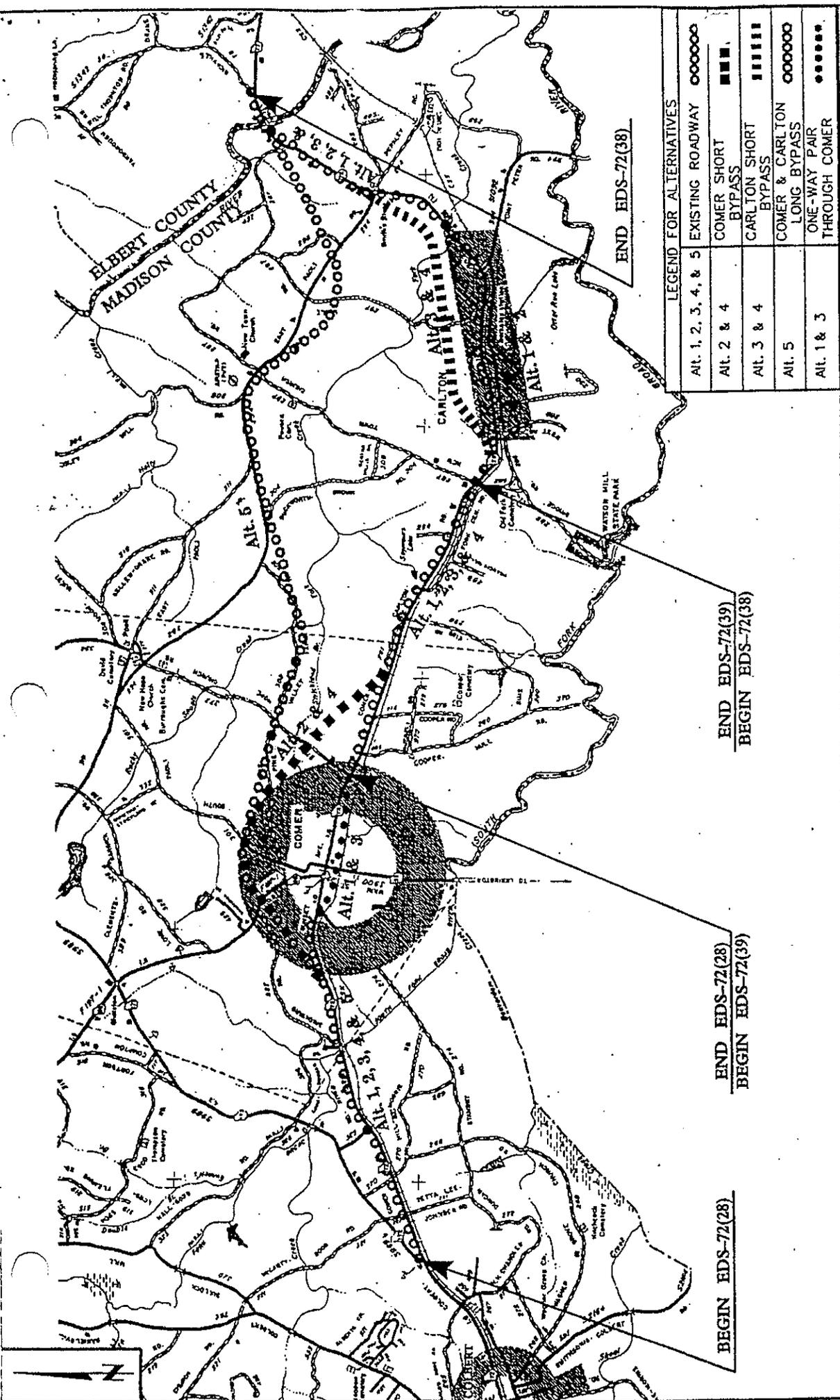
9/12/97

PROJECT LENGTH 12.0 MILES  
EDS 72(28,39,38) / SR 72 IMPROVEMENTS / MADISON COUNTY  
ALTERNATIVE #5

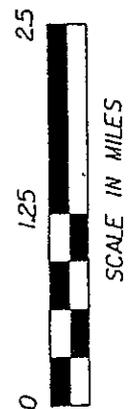
A. RIGHT OF WAY	\$ 6,886,000	\$ 574,000 per mile
B. REIMBURSABLE UTILITIES (includes 5% per year for 2 years inflation)	\$ _____	

**CONSTRUCTION COSTS SUMMARY**

C. MAJOR STRUCTURES	\$ 1,670,000	
D. GRADING AND DRAINAGE	\$ 9,280,000	
E. BASE AND PAVING	\$ 9,479,000	
F. LUMP ITEMS	\$ 2,884,000	
G. MISCELLANEOUS	\$ 2,439,000	
H. SPECIAL FEATURES	\$ _____ 0	
SUBTOTAL CONSTRUCTION COST	\$25,752,000	
E & C(10%)	\$ 2,575,000	
INFLATION (5% per year for 2 years)	\$ 2,903,000	
TOTAL CONSTRUCTION COST	<u>\$31,230,000</u>	\$2,603,000 per mile
GRAND TOTAL CONSTRUCTION COST	\$38,116,000	\$3,117,000 per mile



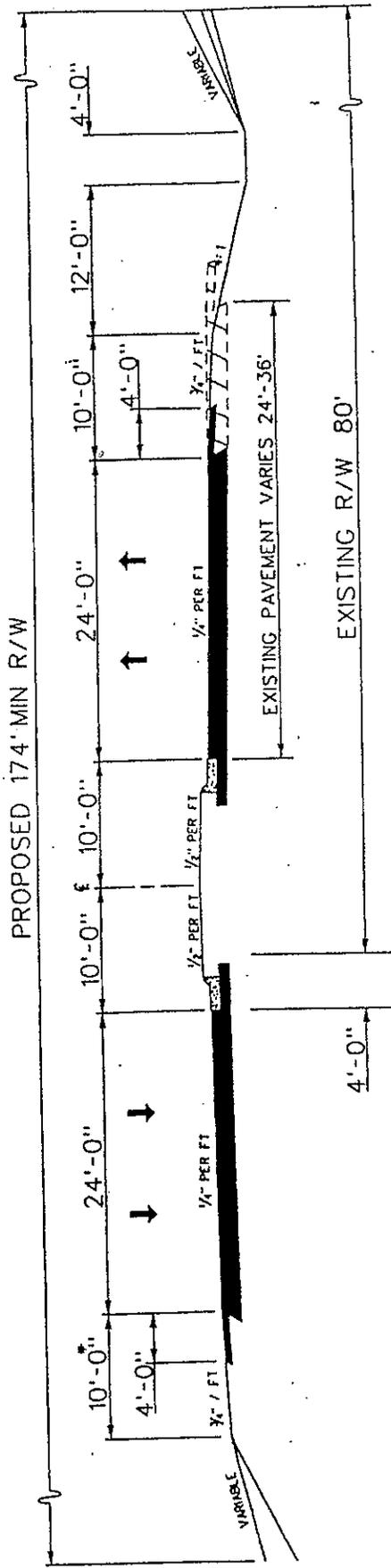
LOCATION



EDS-72(28),(39),(38)  
 SR 72 IMPROVEMENTS  
 MADISON COUNTY  
 P.I.# 122100, 122650, 122640

SEPTEMBER 11, 1997

SOURCE: GENERAL HIGHWAY MAP, MADISON CO. GEORGIA  
 PREPARED BY THE GEORGIA DEPARTMENT OF TRANSPORTATION, 1991

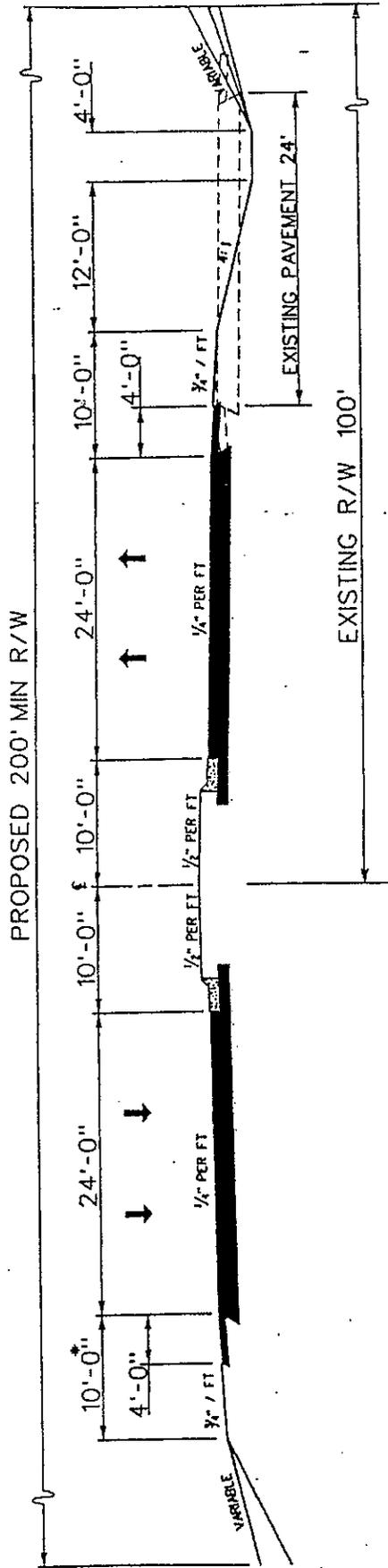


TYPICAL CROSS SECTION  
 S.R. 72 IMPROVEMENTS  
 EDS-72(28), MADISON COUNTY

FROM S.R. 172 TO C.R. 325

NOT TO SCALE

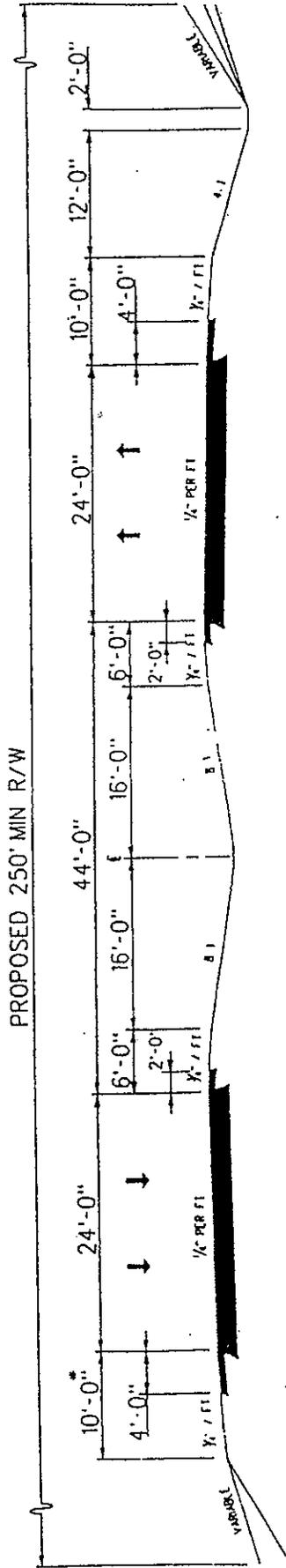
4 15'-6" W/GUARDRAIL



\* 15'-6" W/CURBGRAL

TYPICAL CROSS SECTION  
 S.R. 72 IMPROVEMENTS  
 EDS-72(28), MADISON COUNTY  
 FROM C.R. 325 TO WEST COMER CITY LIMITS

NOT TO SCALE



TYPICAL CROSS SECTION  
 S.R. 72 IMPROVEMENTS  
 EDS-72(28,39,38), MADISON COUNTY  
 COMER-CARLTON LONG BYPASS

NOT TO SCALE

• 15'-6" W/GUARDBANK

# *Value Engineering Process*

# *Value Engineering Process*

## **Introduction**

This report summarizes the analysis and conclusions by the PBS&J Value Engineering workshop team as they performed a VE study during the period of March 26 – 29, 2007 in Atlanta, Georgia for the Georgia Department of Transportation. The subject of the Value Engineering study was the project for the Widening and Relocation of State Route 72 (Federal Aid Project EDS-72(28) – P.I. No. 122100). in Madison County, Georgia. The design is being performed by Parsons Brinckerhoff Quade and Douglas, Inc. (PB).

The Value Engineering workshop team and its leadership were provided by PBS&J. This team consisted of the following:

Charles McDuff	PBS&J	CVS/Civil Engineer/VE Team Leader
Chris Carbuto	PBS&J	Highway Design Engineer
Ramesh Kalvakaalva	CSI	Structures Engineer
Gary King	PBS&J	Highway Construction Specialist

The Value Engineering team followed the seven step Value Engineering job plan as promulgated by the Georgia Department of Transportation. This seven step job plan includes the following:

- **Investigative** – during this phase of the team’s work, the team received a briefing from the project delivery team representatives of the Georgia Department of Transportation (GDOT). This briefing included discussions of the design intent behind the project, the cost concerns, design constraints and right-of-way issues. In the working session that followed, the VE team developed cost models from the cost data provided by the designers and familiarized themselves with the construction drawings and other data that was available to the team. Some of the representative project information may be found in the tabbed section of this report entitled *Project Description*. Following this current narrative the reader will also find a cost model done in the Pareto fashion, i.e., identifying the highest costs down to the lowest costs for the larger construction cost elements. This cost model, developed by the VE team, was used by the VE team to help focus their week of work. The headings on the Pareto Chart also were used as headings for creative phase activities.
- **Analysis** – during this phase the team reviewed the project from the simplest format in asking the questions of “What is the project supposed to do?”, and “How is it supposed to accomplish this purpose?” In the Value Engineering vernacular, the answers to these questions are cast in the form of active verbs and measurable nouns. These verb/noun pairs form the basis of the function analysis which distinguishes a Value Engineering effort from a potentially damaging cost cutting exercise. The important functions of the new project were identified as follows:

- **Project Objective/Goals (Higher Order Goals)**
  - **Enhance Access**
  - **Reduce Required Maintenance**
  - **Expedite Commerce**
  - **Improve Connectivity**
- **Project Basic Functions**
  - **Connect Alignments (Use Bridge and Roadways)**
  - **Separate Traffic (Use two bridges and divided roadway)**
  - **Distribute Traffic Loads (Wheel Loads)**
  - **Support Alignment (Earthwork and Bridge Work)**
  - **Clear Construction Obstacle (Remove Bridge)**
  - **Comply With Regulations**
  - **Increase Load Capacity**
- **Other Key Functions**
  - **Build Bridge**
  - **Protect Wetlands**
  - **Improve Operations**
  - **Control Access**

This function analysis is documented further through the inclusion of the Function Analysis and Cost-Worth worksheets. The Cost-Worth Ratios that are included helped the VE team to identify areas of interest for the brainstorming session. When a function has a current cost-worth ratio of greater than 1.00 it is often found that there are opportunities for reducing the cost, thereby better matching its actual worth for the project.

- **Speculation** – The VE team performed a brainstorming session to identify ideas that might offer opportunities to help meet the VE team objectives for this workshop:
  - Reduce construction and life cycle costs
  - Improve roadway operations
  - Reduce the time of construction
  - Clarify risks and opportunities associated with the project and acts to mitigate risks and to act on opportunities.

This brainstorming session initially identified numerous ideas that were then evaluated in the next phase. The reader will find the creative worksheets enclosed. These same work sheets were also used to record the results of the Evaluation of these creative ideas.

- **Evaluation** – Once the team identified the creative ideas, it was necessary to decide which alternatives should be carried forward. This is the work of the Judgment or Evaluation Phase. The team reflected back on the project constraints and objectives shared with the team by the owner's representatives, in the kick-off meeting on the first day of the workshop. From that guidance, the team settled on

the following values as measures of whether or not an alternative had enough merit to be carried forward in the VE process:

- Construction Cost Savings
- Maintainability
- Ability to Implement the Idea
- General Acceptability of the Alternatives
- Constructability

Based on these measurement sticks, the VE team evaluated the alternatives and graded them from 5 (Excellent) down to 1 (Poor). Other notes about the alternatives are annotated at the bottom of the enclosed creative and evaluation sheets.

- **Development** – This is the section of the report (see tabbed section number three – Study Results) in which the alternatives are explained, sketched, documented and put to cost and technical tests to determine their suitability for implementation and for their impact on the project.
- **Recommendation** – As noted earlier, the team made a final, informal out-briefing on the last day of the workshop, designed to inform the stakeholders of the initial findings of the VE workshop. The purpose of that recommendation section of the workshop is to make sure that the stakeholders have a clear understanding of the work products of the VE team and to make sure that each of the alternatives brought forward have been developed in good context with the project facts.
- **Presentation** – This final report of the findings of the workshop represents the primary presentation to the client of the expected results from the workshop.

The VE team is enclosing a copy of the attendance sheets so that the reader can be informed about who participated in the workshop proceedings. The cost model developed in the information phase is also enclosed. These cost models are done in Pareto Fashion. This means that they are intended to highlight the high cost items in the current working estimate for the construction of the project. The high cost items were then evaluated by the VE team as to whether the team might be able to have an effect on these line items. Where it was felt that the team might affect the line items, they were typically used as the topics for the creative phase.



# FUNCTION ANALYSIS AND COST-WORTH

SHEET NO.: 1 of 3

PROJECT: GEORGIA DEPARTMENT OF TRANSPORTATION  
 Proj. No. EDS-72(28) – Madison County – P.I. Number: 122100

NO.	ELEMENT	FUNCTION			COST (000)	WORTH (000)	COMMENTS
		VERB	NOUN	KIND			
	(UE) Unclassified Excavation	Prepare	Vertical Alignment	B	\$1,290	\$1,150	C/W Ratio = 1.12
		Support	Alignment	B			
		Level	Ground	S			
		Avoid	Flooding	RS			
		Connect	Points	B			
		Disturb	Land	U			
		Enhance	Development and Commerce	HO			
	(GA) Graded Aggregate Base	Distribute	Pavement Loads	B	\$1,030	\$900	C/W Ratio = 1.14
		Develop	Foundation	S			
		Facilitate	Construction				
				S			

Function defined as: Action Verb  
 Measurable Noun

Kind: B = Basic  
 S = Secondary  
 RS = Required Secondary

HO = Higher Order  
 LO = Lower Order  
 U = Unwanted



# FUNCTION ANALYSIS AND COST-WORTH

SHEET NO.: 2 of 3

PROJECT: GEORGIA DEPARTMENT OF TRANSPORTATION  
 Proj. No. EDS-72(28) – Madison County – P.I. Number: 122100

NO.	ELEMENT	FUNCTION			COST (000)	WORTH (000)	COMMENTS
		VERB	NOUN	KIND			
	(RB) Remove Bridge	Clear	Construction Obstacle	B	\$890	\$300	C/W Ratio = 2.97
		Reduce	Required Maintenance	HO			
	(AP) ASPHALT PAVEMENT	Distribute	Traffic Loads	B	\$1,870	\$1,500	C/W Ratio = 1.25
		Support	Traffic	B			
		Shed	Water	RS			
		Expedite	Commerce	HO			
		Enhance	Access	HO			
		Improve	Connectivity	HO			
		Enhance	Safety	RS			
		Distribute	Traffic	S			
		Increase	Capacity	S			

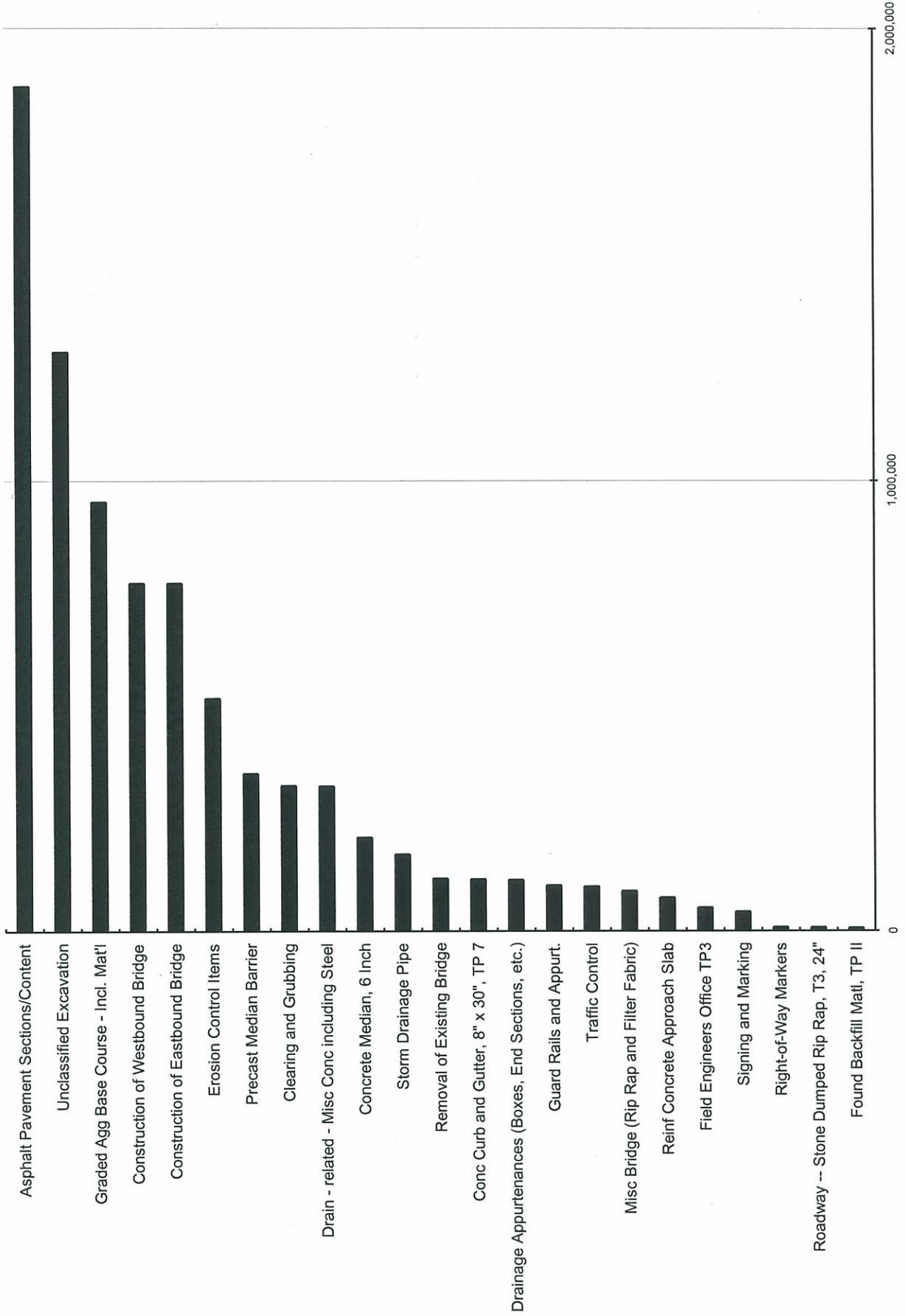
Function defined as: Action Verb Measurable Noun  
 Kind: B = Basic HO = Higher Order  
 S = Secondary LO = Lower Order  
 RS = Required Secondary  
 Cost/Worth Ratio = (Total Cost + Basic Worth)



# PARETO CHART - COST HISTOGRAM

PROJECT: SR 72 Widening & Relocation – Federal Aid Project – EDS-72(28) – PI No 122100			
Madison County, Georgia			
PROJECT ELEMENT	COST	PERCENT	CUM. PERCENT
Asphalt Pavement Sections/Content	1,871,008	22.29%	22.29%
Unclassified Excavation	1,285,830	15.32%	37.61%
Graded Agg Base Course - Incl. Mat'l	954,237	11.37%	48.98%
Construction of Westbound Bridge	773,850	9.22%	58.21%
Construction of Eastbound Bridge	773,850	9.22%	67.43%
Erosion Control Items	518,582	6.18%	73.60%
Precast Median Barrier	351,960	4.19%	77.80%
Clearing and Grubbing	325,000	3.87%	81.67%
Drain - related - Misc Conc including Steel	324,144	3.86%	85.53%
Concrete Median, 6 Inch	209,265	2.49%	88.03%
Storm Drainage Pipe	171,836	2.05%	90.07%
Removal of Existing Bridge	117,464	1.40%	91.47%
Conc Curb and Gutter, 8" x 30", TP 7	116,085	1.38%	92.86%
Drainage Appurtenances (Boxes, End Sections, etc.)	114,595	1.37%	94.22%
Guard Rails and Appurt.	102,685	1.22%	95.45%
Traffic Control	100,000	1.19%	96.64%
Misc Bridge (Rip Rap and Filter Fabric)	89,470	1.07%	97.70%
Reinf Concrete Approach Slab	74,833	0.89%	98.60%
Field Engineers Office TP3	51,853	0.62%	99.21%
Signing and Marking	43,158	0.51%	99.73%
Right-of-Way Markers	8,366	0.10%	99.83%
Roadway -- Stone Dumped Rip Rap, T3, 24"	7,931	0.09%	99.92%
Found Backfill Matl, TP II	6,598	0.08%	100.00%
<b>Subtotal</b>	<b>\$ 8,392,600</b>	<b>100.00%</b>	
E & C Rate @ 10%	<b>INCL \$ 839,260</b>		
Subtotal =	<b>\$ 9,231,860</b>		
Inflation Rate 0.0% @ 1.0 Years	<b>\$ -</b>		
Total Construction Cost =	<b>\$ 9,231,860</b>		
Right-of-Way =	<b>\$ 12,418,000</b>		
Reimb. Utilities =	<b>\$ 164,263</b>		
<b>TOTAL</b>	<b>\$ 21,814,123</b>	<b>Comp Mark-up:</b>	<b>160%</b>

Pareto Chart 2



# CREATIVE IDEA LISTING

PROJECT: GEORGIA DEPARTMENT OF TRANSPORTATION  
EDS-72(28) – Madison County – P.I. Number: 122100

SHEET NO.: 1 of 2

NO.	IDEA DESCRIPTION	RATING
<b>ASPHALT PAVEMENT (AP)</b>		
AP-1	Utilize existing sections of existing asphalt	5
AP-2	Optimize pavement design	DS
AP-3	Use soil treatment to reduce pavement section	1
AP-4	Reduce offset left turn lanes	3
AP-5	Reduce turn lane widths only	3
AP-6	Reduce all lane widths	2
AP-7	Eliminate paving on existing gravel side roads	1
AP-8	Use PCC in lieu of asphalt	DS
AP-9	Use two pavement sections – one for curbed median and one for rural portion of roadway	4
<b>REMOVE BRIDGE (RB)</b>		
RB-1	Keep existing bridge	5
RB-2	Keep existing bridge for future use	1
RB-3	Widen existing bridge	See RB-1
RB-4	Re-use existing piers	1
RB-5	Evaluate maintenance costs for bridge	See RB-1
<b>UNCLASSIFIED EXCAVATION (UE)</b>		
UE-1	Selectively use demo material on site -- (It is likely that contractors will do this)	ABD
UE-2	Selectively use demo material in situ -- (It is likely that contractors will do this)	ABD
UE-3	Reduce median width	4
UE-4	Adjust profile grade	DS
UE-5	Use independent profiles for eastbound/westbound lanes	2

Rating: 1→2 = Not to be Developed; 3 = Varying Degrees of Development Potential;  
4→5 = Most likely to be Developed; DS = Design Suggestion; ABD = Already Being Done

# CREATIVE IDEA LISTING

PROJECT: GEORGIA DEPARTMENT OF TRANSPORTATION  
EDS-72(28) – Madison County – P.I. Number: 122100

SHEET NO.: 2 of 2

NO.	IDEA DESCRIPTION	RATING
<b>GRADED AGGREGATE BASE (GA)</b>		
GA-1	Utilize existing sections of roadway	See AP-1
GA-2	Optimize pavement design	See AP-2
GA-3	Use demo material to construct temporary pavement/detours	DS
<b>RIGHT-OF-WAY (RW)</b>		
RW-1	Use TS-2 for entire length of project	5
RW-2	Use walls in lieu of slopes	4
RW-3	Selectively use guardrail to reduce the right-of-way acquisition	4
RW-4	Use curb and gutter on outside to reduce right-of-way acquisition	3
RW-5	Utilize existing alignment	2
RW-6	Combine bike lanes on new paved bike path	1
<b>CONSTRUCTION OF BRIDGES (CB)</b>		
CB-1	Shorten bridges	5
CB-2	Combine bridges – use one bridge in lieu of two	4
CB-3	Use continuous deck over intermediate supports	3
CB-4	Reduce the width of the superstructure	2
CB-5	Use one intermediate pier	1
CB-6	Use ConSpan-Type units	1
CB-7	Use bailey bridge	1
CB-8	Eliminate left turn lane at Brickyard Road	5
<b>MISCELLANEOUS (M)</b>		
M-1	Review location of precast median barrier in stage construction	4
M-2	Relocate intersection of Brickyard Road to the East	DS

Rating: 1→2 = Not to be Developed; 3 = Varying Degrees of Development Potential;  
4→5 = Most likely to be Developed; DS = Design Suggestion; ABD = Already Being Done



# DESIGNER'S REPRESENTATION MEETING PARTICIPANTS

**Project:** Georgia Department of Transportation

Date: 26 March 2007

**EDS-72-(28) Madison County PI No. : 122100**

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